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**SUNSHINE STATE  
PARKWAY**  
MIAMI TO FT. PIERCE SECTION

**ENGINEERING REPORT**

- INVESTIGATIONS
- ROUTE LOCATION
- PROJECT COST



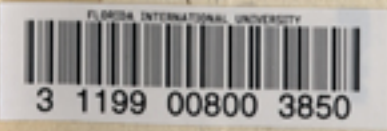
06097

HOWARD,  
NEEDLES,  
TAMMEN &  
BERGENDOFF

*Consulting Engineers*

KANSAS CITY CLEVELAND NEW YORK

FEBRUARY



**955**



STATE OF FLORIDA

The Hon. LeRoy Collins, Governor

FLORIDA STATE TURNPIKE AUTHORITY

Thomas B. Manuel, Chairman

W. Howard Frankland

William T. Alsop

Sam P. Turnbull

Chief Engineer

Richard H. Simpson

Charles E. Commander, Jr.

Alan S. Boyd

Attorney

# SUNSHINE STATE PARKWAY

*Miami to Fort Pierce Section*

## ENGINEERING REPORT

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KANSAS CITY, MO.

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ENOCH R. NEEDLES  
RUBEN N. BERGENDOFF  
THEODORE J. CAMBERN  
ELLIS E. PAUL  
JOSEF SORKIN  
JAMES P. EXUM  
ELMER K. TIMBY

ERNEST E. HOWARD  
1903 - 1953  
HENRY C. TAMMEN  
INACTIVE 1951

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS

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KANSAS CITY 8, MO.

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KANSAS CITY 8, MO.

February 14, 1955

Florida State Turnpike Authority  
Dania, Florida

Attention: Mr. T. B. Manuel  
Chairman

Gentlemen:

Presented herein is our report covering the engineering studies and project costs made in connection with the determination of economic feasibility as a toll road of the Sunshine State Parkway, Project No. 1, Miami to Fort Pierce.

The report reviews the engineering studies made on the project, describes the adopted route and limits of the Parkway, the location and type of interchanges, the principal design features, provisions for toll collection, types of service and maintenance areas, outlines a proposed construction program, summarized detailed estimates of construction costs, and lists operation and maintenance costs after the project is opened to traffic.

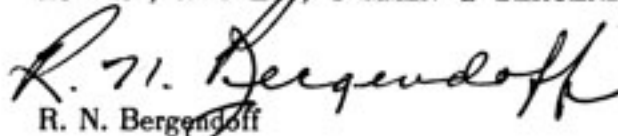
Our estimates show the total project cost of the proposed dual lane Parkway to be \$65,700,000, including cost of construction, right of way, engineering and legal with allowance for contingencies but exclusive of interest during construction and bond discount. Operation and

maintenance costs are estimated to be \$1,000,000 for the first year, increasing to \$1,200,000 in the fifth year of operation.

Grateful acknowledgment is made of the information and assistance received from the Florida State Road Department in assembling data for this report.

Very truly yours,

HOWARD, NEEDLES, TAMMEN & BERGENDOFF

A handwritten signature in cursive script, appearing to read "R. N. Bergendoff". The signature is written in dark ink and is positioned above the printed name.

R. N. Bergendoff

## TABLE OF CONTENTS

	<i>Page</i>
Introduction	1
Advantages of Turnpikes	6
Route Location	9
Route Surveys	13
Soils and Geology	15
Design Criteria	18
Appurtenances	31
Utility Adjustments	38
Right of Way	39
Construction Costs	40
Construction Schedule	44
Maintenance and Operation Costs	45
Plates	
1 Interstate Highway System and Turnpikes	4-5
2 Progress Schedule and Fund Requirements	42-43
3 Location Map	
Figures	
1 Southern Terminal Interchange	8
2 Route 84 Interchange	10
3 Typical Parkway Cross Section	22
4 Typical View of Parkway at Crossing over Intersecting Road	24
5 Structure Carrying Parkway over Intersecting Road	25
6 Typical Structure Carrying a Cross Road over the Parkway	26
7 Typical Farm Road Crossing	28
8 Typical Intermediate Traffic Interchange	30
9 Typical Toll Collection Station	32
10 Aerial View of Principal Service Area	34
Tables	
I Geometric Design Standards	20
II Estimate of Cost	41
III Maintenance and Operation Costs	49
Appendix	

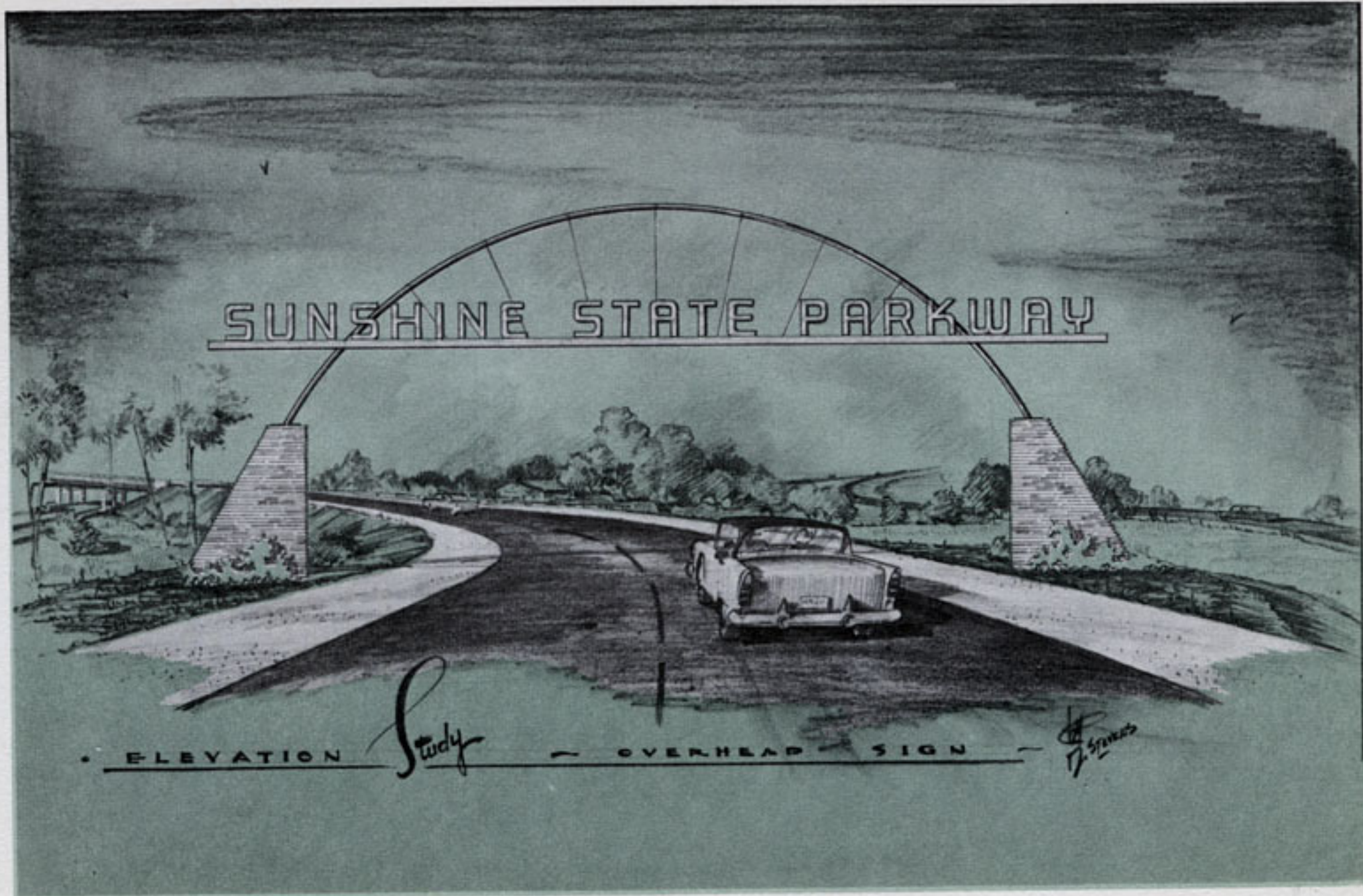
SUNSHINE STATE PARKWAY

ELEVATION

*Study*

OVERHEAD SIGN

*D. Stevens*



**SUNSHINE STATE PARKWAY  
MIAMI TO FORT PIERCE SECTION**

**ENGINEERING REPORT**

**INTRODUCTION**

The Florida State Road System has grown in a manner common to much of the present road system in the United States. Most sections were constructed twenty to thirty years ago for relatively light and slow traffic with no anticipation of requirement of future traffic needs. Often initial costs overshadowed the need for supplying the functional requirements, resulting in inadequate facilities. As Florida developed into a mecca for tourists, not only did the traffic increase beyond the safe capacity of the roads, but the development of valuable frontages along the existing routes precluded their modernization except at great cost. Some of the most necessary improvements have been made and thus the present system consists of improved links alternated with stretches of substandard remains of the original construction. While the improved portions permit safe travel at relatively high speeds, motorists often do not correspondingly reduce their speed on the unimproved sections, with occasional disastrous results.

Due to a general lack of public funds available for new road construction under the existing tax structure, there is little hope of providing a solution to the traffic problem without an additional source of revenue. Florida officials realizing this fact have sought an answer through construction of projects financed by revenue bonds. The universal record of success experienced on the turnpikes in operation offer the

best indication of the willingness of the motorist to pay direct toll for direct benefits by way of a facility tailored to modern motoring needs.

By the Florida Turnpike Act, Chapter 28128, Laws of Florida, Acts of 1953, the legislature of Florida established the general route of a future turnpike to be known as the "Sunshine State Parkway", extending the length of the State in a general northerly direction from a point in Dade County to a point in Duval County. It created the Florida State Turnpike Authority empowered to construct, maintain, repair and operate a turnpike project on such route from the point of beginning in Dade County northward a distance of not more than 110 miles, or such part or parts thereof as the Authority might determine to be suitable. Further authorization was granted to determine the exact route and termini of the project, construction of which was to be financed by revenue bonds of the Authority payable solely from revenues received therefrom, thus incurring no debt to the State.

The Turnpike was defined by the Act as being a limited-access, express highway constructed, or to be constructed, under the provisions of the Act, at the location established therein, or at such other locations as thereafter might be established by law, with lanes in each direction, having center divisions, ample shoulder widths, long sight distances and grade separations at intersections with public roads and at intersections with all railroads, and including, but not limited to, all bridges, tunnels, overpasses, underpasses, traffic circles, interchanges, feeder roads, landscaping, entrance plazas, approaches, toll houses, service areas, communication facilities, such facilities for motor fuel and food as the Authority might deem necessary or desirable, and administration, storage and other buildings which the Authority might deem necessary for the operation of the project, together with all property, rights, easements and interests which might be acquired by the Authority for the construction or the operation of the project. The Authority was expressly prohibited from granting



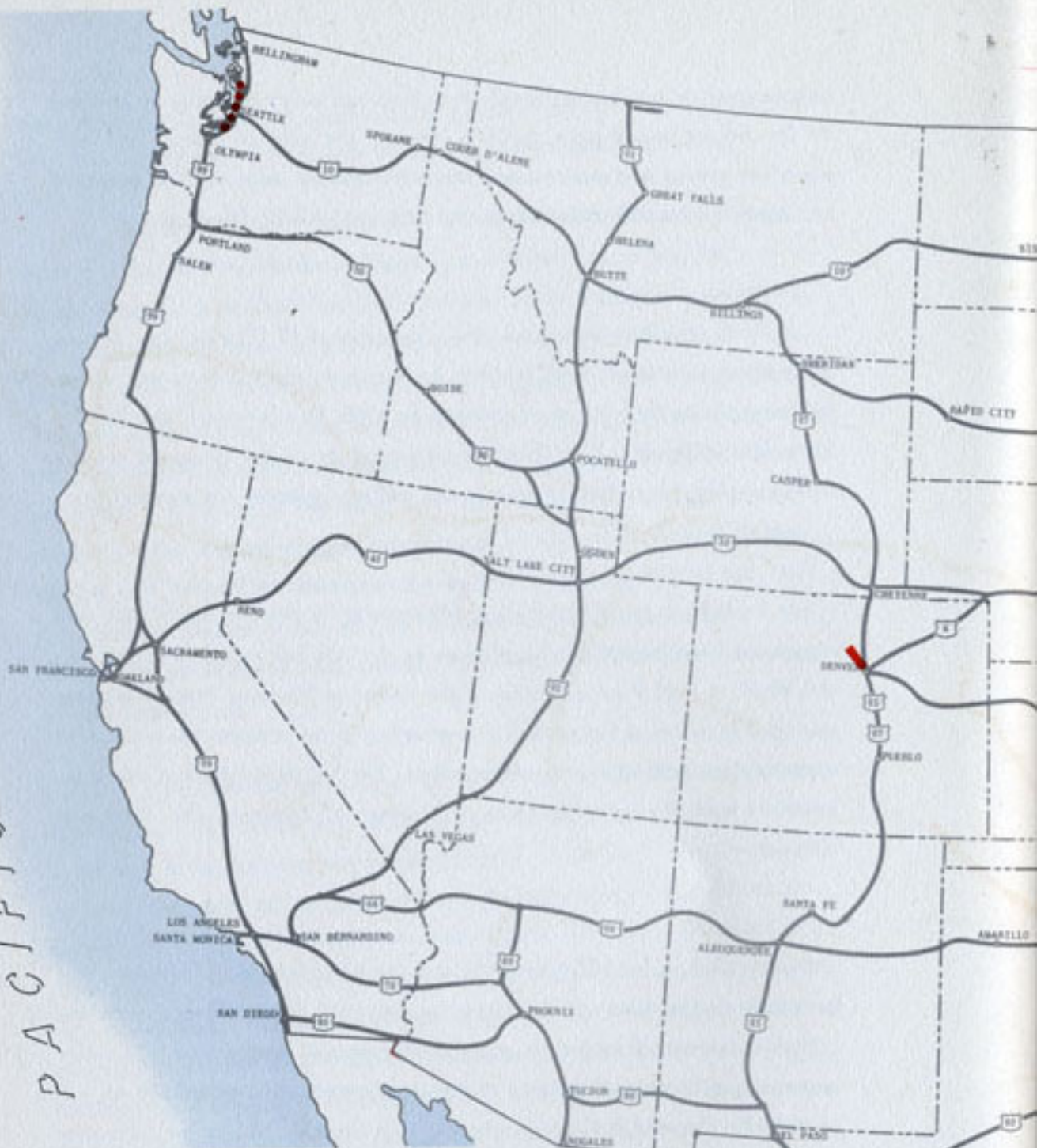
concessions or selling any services or products along the project covered by the Act or subsequent projects except the sale of motor fuel with attendant towing and maintenance facilities and the sale of food prepared and ready for consumption with attendant non-alcoholic beverages.

By the Act, the State Road Department of Florida was authorized, upon request of the Turnpike Authority, to expend from any of its funds available therefor, such amounts as might be necessary and desirable in the judgment of the Department for study of the proposed project and to employ consulting engineers and traffic engineers for that purpose.

It is in compliance with such request by the Authority that this report has been prepared. Its purpose is to establish location for the initial Miami to Fort Pierce Section of the proposed Sunshine State Parkway, principal features of the project, standards for its design, the estimated expenses for operation and maintenance, the estimated cost of the construction and the project cost, exclusive of interest and financing charges.

The initial 104 mile section of the Sunshine State Parkway will be a modern, four-lane, superhighway constructed in accordance with the highest standards feasible as regards alignments, grades and sight distance. It will have all the safety features known and recognized as essential for present-day motor travel. This initial section and the proposed extensions will constitute an important addition to the network of turnpikes developing in the country. Plate 1 indicates the present status of turnpikes, including facilities in operation, projects in various stages of planning and construction and the key position which will be occupied by the proposed Sunshine State Parkway.

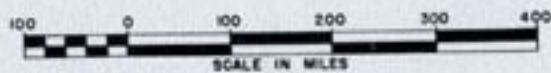
PACIFIC OCEAN

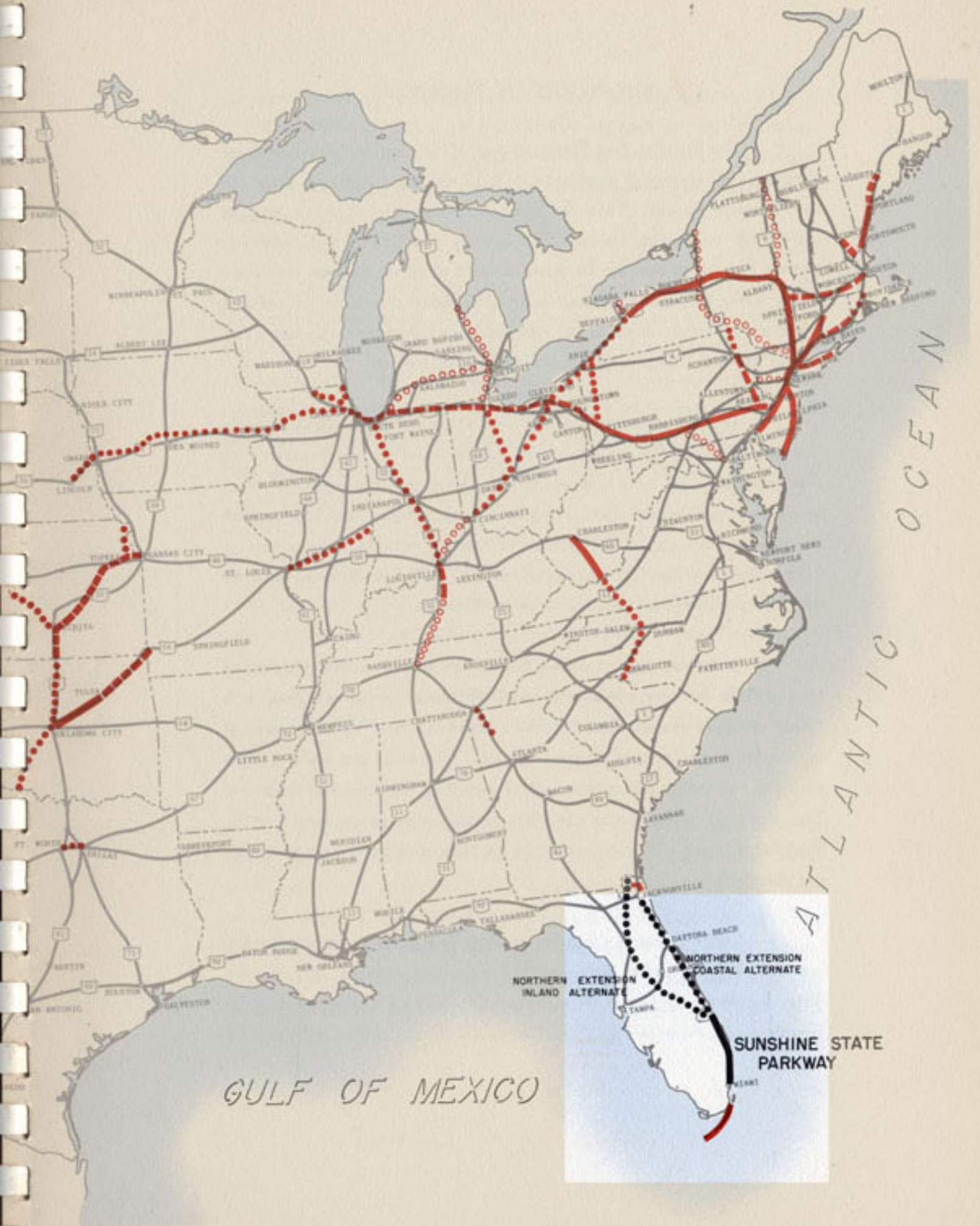


### INTERSTATE HIGHWAY SYSTEM AND TURNPIKES

#### LEGEND

- PROPOSED SUNSHINE STATE PARKWAY
- TOLL ROADS IN OPERATION
- TOLL ROADS UNDER CONSTRUCTION
- FEASIBILITY STUDY AUTHORIZED
- PROJECTED TOLL ROADS
- INTERSTATE HIGHWAY





## ADVANTAGES OF TURNPIKES

The Miami to Fort Pierce section of the proposed Sunshine State Parkway lies somewhat parallel to U. S. 1, the major highway along the east coast of Florida. Thus the distance savings offered to the turnpike patron will tend to be modest. The heavily travelled U. S. 1, however, passes through or near the business centers of all the various cities and towns along the route. Necessarily this location results in reduced speed zones, traffic controls and congestion attendant upon the large volume of short trip, local traffic encountered in city travel.

The proposed Parkway will offer to the public numerous tangible and intangible benefits. Often the intangible benefits, which provide no monetary gain, are more compelling than those tangible benefits which may result in a direct dollar saving to the user. Public reaction to both the tangible and intangible benefits offered by turnpike construction is best indicated by the fact that the anticipated traffic loads have been far exceeded on almost all existing major toll facilities.

The most direct tangible benefit is that of vehicle operation cost. While there is a relatively small distance saving resulting in a direct saving in cost of operation, the savings realized by elimination of city traffic conditions will be considerable. The stops and starts experienced in city traffic take a heavy toll of gasoline, oil, tires and batteries. The ability to maintain near constant speeds for the entire length of the Parkway provides a definite benefit in the form of reduced costs of vehicle operation.

Limited access facilities with median dividers show a marked reduction in accidents as compared to average highways and city streets. While accident reduction is often deemed the major intangible benefit of a superhighway, there is a very tangible saving to the public by reason of

the superior facility. Data gathered on urban projects indicate a saving of three-quarters of a cent per vehicle mile between city street and expressway traffic. Since a comparable accident reduction is experienced on express facilities in rural areas, a comparable saving in accident costs would be expected.

Savings in time are also considered as a tangible benefit. In the case of motor transport traffic this can be definitely substantiated for time is readily converted into wages. It is somewhat difficult to attach a similar value to time savings in the case of the passenger vehicle, but it has often been demonstrated that the automotive public does place a high value on savings in time. Considerable time would be saved by use of the Parkway since much of the travel experienced on the existing route is over city streets.

In addition to the tangible benefits there are other inducements for the motorist in the form of travel comfort and reduced fatigue. The patron is relieved of concern for both pedestrian and crossroad traffic. A higher standard of maintenance and repair is supplied to meet the needs and demands of the paying public. The service areas will provide convenient, attractive and desirable facilities immediately adjacent to the route.

Certain benefits also accrue to the general public as a result of turnpike construction. Large volumes of through traffic as well as heavy truck traffic will be diverted from existing routes offering them some measure of relief, thus permitting better service for local needs. This will be particularly true for the urban portions of the existing routes. The reduction of traffic will to some extent reduce maintenance costs on existing routes and decrease the urgency for providing major improvements or replacement for these facilities.

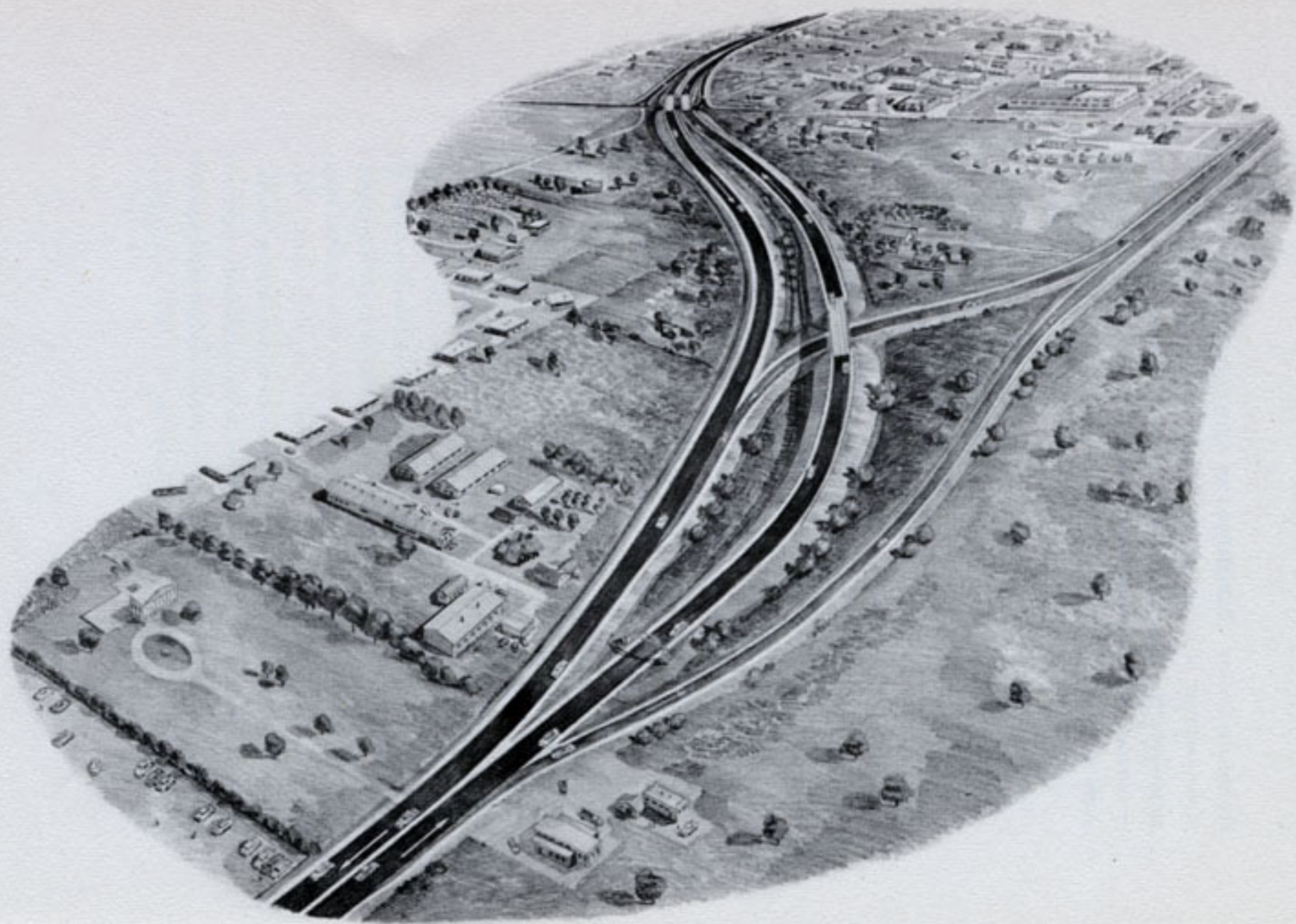


Figure 1. Southern Terminal Interchange

## ROUTE LOCATION

The recommended location of this initial section of the Sunshine State Parkway, its principal features and the related principal highways and population centers are shown on Plate 3.

At the south end, location of the Parkway is dictated by considerations of available and future avenues of access to Miami and other principal population centers and by right of way and construction limitations imposed by the highly developed nature of the area. Numerous locations for the southern portion of the proposed route were studied and investigated by use of maps and aerial photographs supplemented by thorough field reconnaissance. Following these studies and investigations the route shown on Plate 3 was selected as providing the most direct service for traffic feasible under the controlling conditions.

The Southern Terminal will be near the southwest corner of Hollywood at a connection with State Route 7 about  $4\frac{1}{2}$  miles northeast of the intersection of U. S. 441—State Route 7 with State Route 9. At the intersection of these routes, an existing interchange provides direct access to major routes leading to Miami and other developed areas. Included as a part of the Parkway construction will be the widening of the present two lane portions of U. S. 441 to four lanes between the Parkway terminal and State Route 9. The Southern Terminal, as may be viewed by a motorist approaching from the south, is shown in the Frontispiece and an aerial perspective of the terminal interchange is shown in Figure 1.

From the Southern Terminal the route will swing northwest to avoid a large subdivision located just west of Hollywood and will then turn north to be located approximately one-half mile west of and generally parallel to U. S. 441. Continuing north the route will pass through the extreme western edge of the Seminole Indian Reservation and continue



Figure 2. Route 84 Interchange



generally along a section line to the northwest corner of the Fort Lauderdale Country Club. This area is well developed and the location adjacent to a section line will result in the least property severance damages and in the minimum relocation of utilities in this area. Just south of existing Route 84 a new spur connecting existing Route 84 from the east side of U.S. 441 to the proposed Route 84 interchange will be constructed. This interchange is shown by insert on Plate 3 and in perspective in Figure 2.

Skirting the southwest corner of the Fort Lauderdale Country Club, the route swings northeast to cross U. S. 441 just south of Plantation Road and continues to the Fort Lauderdale interchange which is located near the northwest corner of the City. An existing new road leading to State Route 816 will be utilized for this interchange which is shown by insert on Plate 3. Continuing northeast the route passes the southeast corner of West Prospect Air Field, then turns north to be located along a section line to near Pompano Beach. After crossing the Pompano Canal the route swings to the east and north to be located just west of and parallel to Telegraph Road from State Route 814 to the Palm Beach-Broward County line. At State Route 814 a toll interchange and maintenance area as shown by insert on Plate 3 will be provided.

At the Palm Beach-Broward County line the route will swing west and will be located along the west side of and parallel to the large existing canal which extends from the County line north for approximately 22 miles. At the Parkway crossing of State Route 806 immediately west of Delray Beach a toll interchange as shown on Plate 3 will be provided. At the northern terminal of the large canal just south of West Palm Beach the route will again swing to the east, crossing State Route 700 and then turn north just south of the city of West Palm Beach. At the Parkway crossing with State Route 704 a toll interchange and maintenance area will be provided as shown on Plate 3.

From the State Route 704 interchange the Parkway extends due north adjacent to a section line for approximately 12 miles, then bends to the northwest to pass just west of the Loxahatchee River, the city of Jupiter and Jupiter State Park. As shown on Plate 3 a possible future interchange is proposed at the Parkway crossing of State Route 706 approximately two miles west of Jupiter. Continuing in a northwesterly direction the route is located through more or less open and undeveloped land with such angularity as is required to minimize developed property takings and severances. Near State Route 708 the route swings north for approximately  $2\frac{1}{2}$  miles, then returns to a northwesterly direction to pass through the Hanson Grant and skirt the headwaters of the Saint Lucie River and principal tributaries. Approximately  $1\frac{1}{2}$  miles northwest of the Parkway crossing of State Route 76, the route crosses the Saint Lucie Canal where a high level bridge is proposed to permit uninterrupted navigation in the canal.

Continuing northwesterly the Parkway interchanges with State Route 714 just southwest of Stuart. At this location a toll interchange and maintenance area have been provided as shown on Plate 3. From this interchange the route continues in a northwesterly course with only such minor deviations in alignment as are necessitated by right of way and construction considerations. After crossing State Route 712 and the Florida East Coast Railway line to the southwest of Fort Pierce, the route turns to the north to terminate at the intersection of State Routes 607 and 70. Direct connections between this temporary Northern Terminal and U. S. Highway 1 to the north would be provided by the use of State Route 607 and approximately  $2\frac{1}{2}$  miles of new highway connecting to U. S. Highway 1 to the north of Fort Pierce.

The length of the recommended Parkway as described above is approximately 104 miles. Feeder improvements have been made at U. S. 441 at the Southern Terminal and provision made for connection

to U. S. Highway 1 at the Northern Terminal. The recommended location is based on right of way and construction considerations, terminal locations and on intermediate interchange sites which will provide the best traffic service consistent with reasonable construction costs. These considerations, as well as the location of maintenance and concession areas, as shown on Plate 3, are discussed in more detail in subsequent parts of this report.

### ROUTE SURVEYS

Following passage of the Turnpike Legislation in June, 1953, an Engineering Report on a proposed location for this initial section of the Sunshine State Parkway was prepared. In the preparation of this report all available U. S. G. S. County and other maps were assembled and large scale aerial photographs of critical sections of the proposed route were made. In addition all other available pertinent data which would affect the location and cost of the proposed project was reviewed. The location thus determined was thoroughly reviewed in the field and soils and foundation conditions, road and stream crossing and right of way requirements were investigated.

Subsequent to this Engineering Report, the Florida State Road Department advanced funds for preparation of detailed surveys and plans. These field surveys and plans were practically completed during 1954 for a location which, except for minor modifications, coincided closely with that proposed in the aforementioned Engineering Report. Recent policy determinations which were dictated largely by right of way and construction considerations have necessitated major relocations of portions of the southerly fifty miles of the originally proposed project. Except for these relocation areas, the information and data available in connection with the 1954 surveying and plan preparation have been extremely valuable in the

preparation of location studies and estimates of cost for the project as presented in this report. Complete subsurface explorations by means of soundings and borings, detailed cross sections of existing ground and location of principal developments and topographical features have permitted a precise determination of location and an accurate estimate of quantities and costs.

For that portion of the project where major relocations are proposed information similar to that assembled for the initial Engineering Report has been gathered and used as a basis for location and estimates. In addition to this available data, large scale aerial photographs were made of the south ten miles of the project which is located through an area of expensive properties and well developed subdivisions and commercial areas. Thus, the results of the detailed field surveys and plans, coupled with available U. S. G. S. County and State maps and aerial photographs, have made it possible to accurately locate the line in the areas of major relocation and have provided an excellent basis for the determination of quantities and estimates of cost.

As a final check on the selected location both in the area where detailed surveys have been made and in the sections of new location, a thorough field reconnaissance and inspection was made. Particular attention was given to the problems of drainage, to bridge sites, road and railroad crossings, utility crossings and required relocations and to obstacles and problems of construction not readily and easily discernible from the maps and photographs. Separate field reviews and surveys of the proposed route were made to evaluate soils conditions and to determine right of way requirements and assess probable property costs.

The location and estimates thus developed and presented in this report give assurance and certainty of the accuracy of the estimated construction cost and the feasibility of the proposed locations of the Parkway and its principal features.

## SOILS AND GEOLOGY

### *Topography*

The east coastal area of southern Florida is an extensive, almost flat, marl and limestone shelf, covered with a variable thickness of sand and some muck. The vast, low-lying glades area of south central Florida reaches to within a few miles of the coast and is separated from the coast by a low ridge varying from two to twenty miles wide. The location of this initial section of the Parkway generally follows the western edge of this ridge.

South of the Broward-Palm Beach County line, the ridge is underlain by oolitic and sandy limestone, and to the north of it by cemented shell beds (coquina) and marl. The sand ridge has been breached in some areas by ancient tidal flats formed at a sea level about 20 feet higher than at present. These breaches serve as outlets for inland drainage, and in some instances, contain extensive deposits of muck.

### *Engineering Considerations*

Generally, the underlying rock formations are relatively soft and unconsolidated. They are composed of sand, shell and calcium carbonate cementing material. While geologically classified as bedrock, they are considered to be soils where the cementing material is not present in a significant quantity. Engineering problems associated with this condition and others are discussed in the following paragraphs.

*Borrow.* The project will require considerable borrow since it will be constructed predominantly on embankment with few, if any, cut

sections. The borrow will be obtained from side ditches and areas adjacent to the Parkway and as such will consist primarily of sand and poorly cemented materials from underlying formations. These materials are considered to be excellent for use in embankment construction. No restriction will be placed on the use of these suitable materials in embankment except in the stabilized subgrade and in areas where muck excavation will require an underwater backfill composed of sand or other granular material. Obtaining suitable borrow in adequate quantities will not be a problem except in highly developed areas. In these areas embankment material must of necessity be secured some distance from the project.

*Shrinkage.* Earthwork quantities used in the estimate have been increased approximately 35 per cent to allow for shrinkage and consolidation in the materials used in embankment construction. This extensive shrinkage is based on several considerations. Some stripping of topsoil will be necessary and there is a certain loss of material from natural ground during clearing and grubbing. There will be considerable compaction of natural ground by the passage of construction equipment and additional consolidation under the weight of the embankment. The borrow material will also exhibit a certain amount of shrinkage or consolidation during compaction in the embankment. This shrinkage allowance corresponds to that currently used by the Florida State Road Department for similar construction.

*Unsuitable Material.* Muck deposits will be encountered in some areas of natural outlets for inland drainage. The major deposits are encountered in the south half of the Parkway location and have probable maximum depths in the order of 10 to 15 feet. Provision has been made in the estimate for all such unsuitable materials to be removed to eliminate the problems of embankment stability and settlement. The estimate also includes an allowance for the replacement of the muck with suitable embankment material. Because of the nature of the muck material and the

generally shallow depths anticipated, complete excavation is preferred to other methods such as partial excavation or sand drains.

*Embankment.* No major problems will be encountered in connection with embankment stability. The embankment side slopes will be in accordance with the present practice of the Florida State Road Department.

*Structure Foundations.* No strongly cemented bedrocks will be encountered within reasonable depth north of the Palm Beach-Broward County line except for occasional thin shell beds. The amount of cementing agent varies from place to place and the underlying materials will offer variable resistance to pile penetration. The pile lengths should be reasonably uniform at any given structure, however. A friction-type pile foundation having an average length of pile in the order of 40 feet should be adequate to meet the anticipated conditions.

South of the Palm Beach-Broward County line, soft bedrock will be encountered occasionally near the surface. This rock will support spread footings, in some instances, or short (20 ft  $\pm$ ) friction-type piles. This material should be reasonably uniform at any given structure, but caution should be exercised in the design of the structure foundation since the material commonly becomes weaker with depth. Adequate exploration of foundation conditions by borings will be an absolute necessity where such design is contemplated. Hard bedrock is normally encountered at depths of 30 to 80 feet and may vary by as much as 20 feet at any given structure or even under an individual footing. An average length of pile of 40 feet should also be adequate for most conditions.

Estimates of cost for structures are based on the estimated pile lengths and foundation conditions outlined above.

### *Summary*

The soil conditions to be encountered along the proposed location of this initial section of the Sunshine State Parkway present no extraordinary problems for turnpike construction. The quantities and estimates of cost are based on the conditions outlined above and have been adjusted to provide for removal and replacement of unsuitable materials encountered and to allow for high shrinkage conditions anticipated in placing embankment.

### DESIGN CRITERIA

The design features of the Sunshine State Parkway will incorporate safety features derived from experience gained in the design and operation of existing turnpikes and expressway projects. The two pavements will each consist of two 12 ft lanes, providing adequate width for fast moving vehicles to maintain their speed without being retarded by slower vehicles. The 20 ft median provided between the two pavement edges will serve as a physical division of opposing traffic. Such separations have proven highly desirable in reducing the frequency of accidents.

A 10 ft stabilized shoulder provided on the right or parking side of each pavement will accommodate a disabled vehicle without interference to the through traffic in the adjacent Parkway lanes. On the left or passing edge of the pavements a 4 ft width of the median will be stabilized to serve as additional running surface for any vehicle which might be forced to leave the Parkway lanes in passing. The minimum standards established as a criteria for design permit standard operating speed of 70 miles per hour. These standards are intended to be minimum and every



effort will be made to exceed these standards where such can be accomplished without materially increasing the cost of construction. Generous distances will be provided for deceleration to reduce the effort required on the part of the driver and thus promote safety. Where topography does not require curvature, consideration will be given to the introduction of slight curves to provide relief from the monotony of long straight stretches. Service areas, ramps and interchanges will be approached by long acceleration and deceleration lanes to assure a smooth change of speed with a minimum of interference with through traffic. Spur roads from the interchanges to existing highways will be constructed to standards adequate to serve the anticipated traffic volumes. Structures will be used to separate all cross roads and railroads, eliminating all grade crossings of the Parkway.

Roadway marking, warning and directional signs will be employed on the Parkway to a greater extent than is general practice on the typical public highway. Slopes will be covered with vegetation to reduce maintenance. Occasional natural landscaping features will be permitted to remain within the right of way where they do not provide a hazard to traffic. Guard rails will be placed on all fills of 10 ft or more in height to provide for traffic safety. The entire right of way will be fenced to prevent accidental or purposeful intrusion by persons or animals. A stock fence topped by barbed strands will be used except in populous areas where a chain link fence will be used for greater security.

The inherent safety features of the project will be augmented by the services of an adequate highway patrol. The design includes the complete coverage of the Parkway by a communications network which will serve to aid the highway patrol and permit fire, ambulance and towing equipment to be quickly summoned when required.

TABLE I  
GEOMETRIC DESIGN STANDARDS

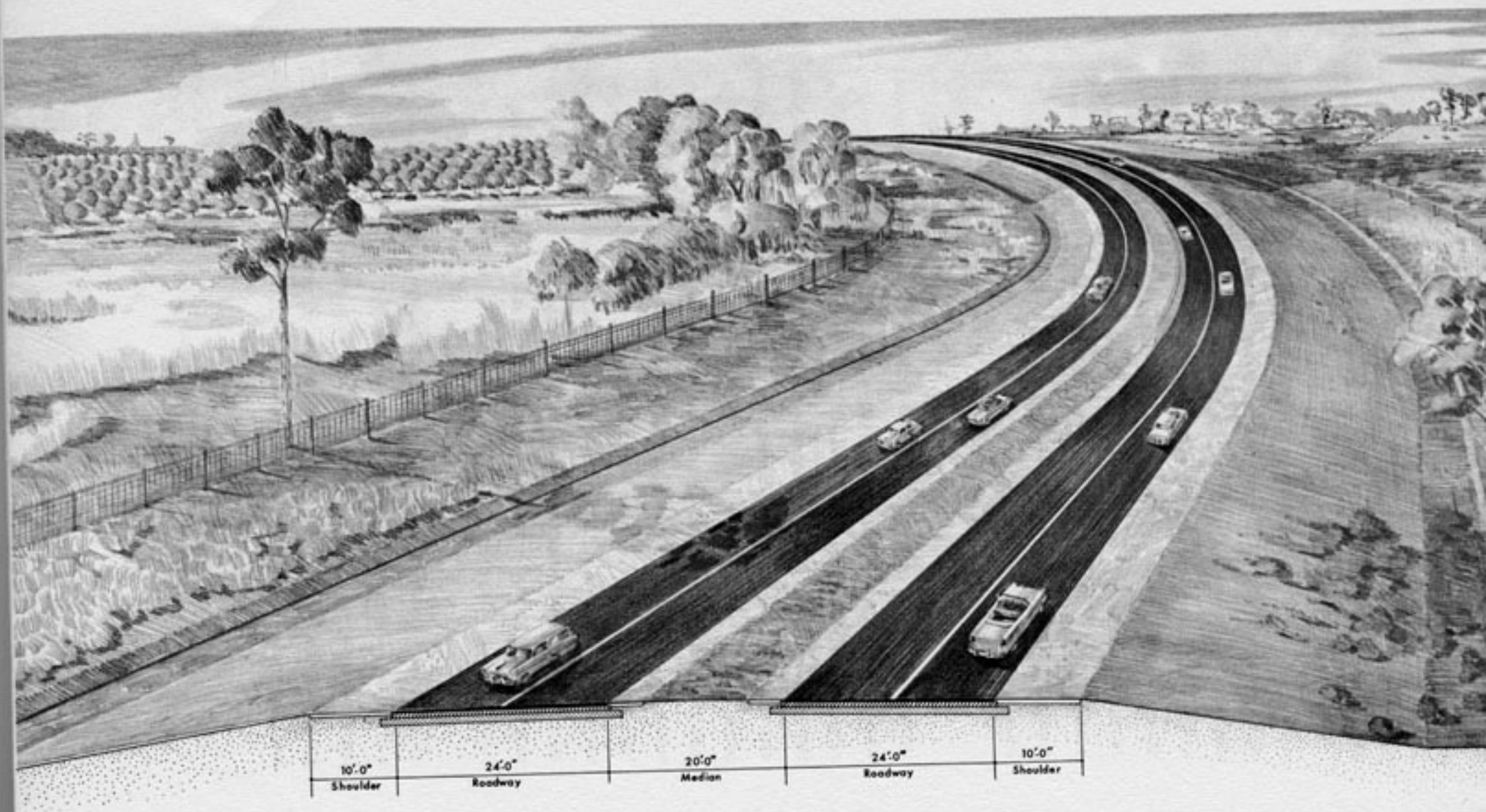
	<i>Parkway</i>	<i>Ramps</i>
<b>DESIGN SPEED</b>		
Saint Lucie Canal Bridge	60 mph	--
Southern Terminal	50 mph	35 mph
Other Sections	70 mph	35 mph
<b>ALIGNMENT</b>		
Maximum Degree of Curve	3°-00'	--
Minimum Length of Curve (including transitions)	1000 ft	--
Minimum Tangent - "Broken Back" Curves	1000 ft	--
- "Reverse" Curves	400 ft	--
Desirable Minimum Radius	--	230 ft
Absolute Minimum Radius	--	180 ft
<b>GRADES</b>		
Maximum Grades - Saint Lucie Canal Bridge	4.5%	--
- Other Sections	3.0%	6.0%
Minimum Grades - Unsuperelevated Sections	0.0%	0.0%
- Superelevated Parkway Sections	0.3%	--
- Superelevated Single Lane Ramps	--	0.0%
- Superelevated Dual Lane Ramps	--	0.3%
<b>SIGHT DISTANCE AND VERTICAL CURVES</b>		
Minimum Non-passing Sight Distance - 35 mph	--	200 ft
- 50 mph	350 ft	--
- 60 mph	475 ft	--
- 70 mph	725 ft	--
Minimum Length of Vertical Curve	400 ft	--
<b>TYPICAL SECTIONS</b>		
Width of Pavement Lane	12 ft	15 ft
Width of Median including inner shoulders		
Saint Lucie Canal Bridge and Approaches	4 ft	--
Other Sections	20 ft	2 ft
Width of Outside Stabilized Shoulders	10 ft	10 ft
Width of Inside Stabilized Shoulders	4 ft	2 ft
<b>CLEARANCES</b>		
Minimum Vertical Clearance over Pavement	15 ft	15 ft
Minimum Horizontal Clearance - Right Edge Pavement	10 ft	10 ft
- Left Edge Pavement	8 ft	6 ft
<b>RIGHT OF WAY</b>		
Normal Width - Urban and developed areas	200 ft	--
- Other Areas	300 ft	--

*Roadway.*

Designs contemplate a thoroughly modern express highway of the highest type conforming to the most recent standards, established by the American Association of State Highway Officials to govern the design of the National System of Interstate Highways. Certain modifications of these standards have been adopted in the light of experience gained on recently constructed express highway projects. The geometric design standards are shown in Table I. The Parkway will be a limited access highway with access permitted only at those designated points along the route where ramps are provided.

The Parkway will be designed for speeds of 70 mph except at the terminal points where the designated speed will be reduced to provide smooth speed transitions into the connecting highways. The design speed will also be reduced to 60 miles per hour at the crossing of the Saint Lucie Canal where economic considerations dictate the use of slightly steeper grades and slightly shorter sight distances at this proposed high level structure. Ramps will be designed for a speed of 50 mph at the entrance to the Parkway and for 30 mph on the remaining portions. To facilitate the safe merging of ramp traffic with the through Parkway traffic, acceleration lanes 950 ft in length will be provided at entrance ramps and deceleration lanes 475 ft in length will be provided at all exit ramps, thus permitting a safe transition and offering a minimum of interference with high speed through traffic continuing on the Parkway.

Changes in Parkway alignment will be accomplished by long sweeping curves with a maximum curvature of 3 degrees corresponding to a radius of approximately 1900 ft. All curves will be superelevated as required for safe vehicular operation at the design speed. The maximum grade used for the Parkway will be 3 per cent, except at the high level bridge over the Saint Lucie Canal where  $4\frac{1}{2}$  per cent grades will be used.



*Figure 3. Typical Parkway Cross Section*

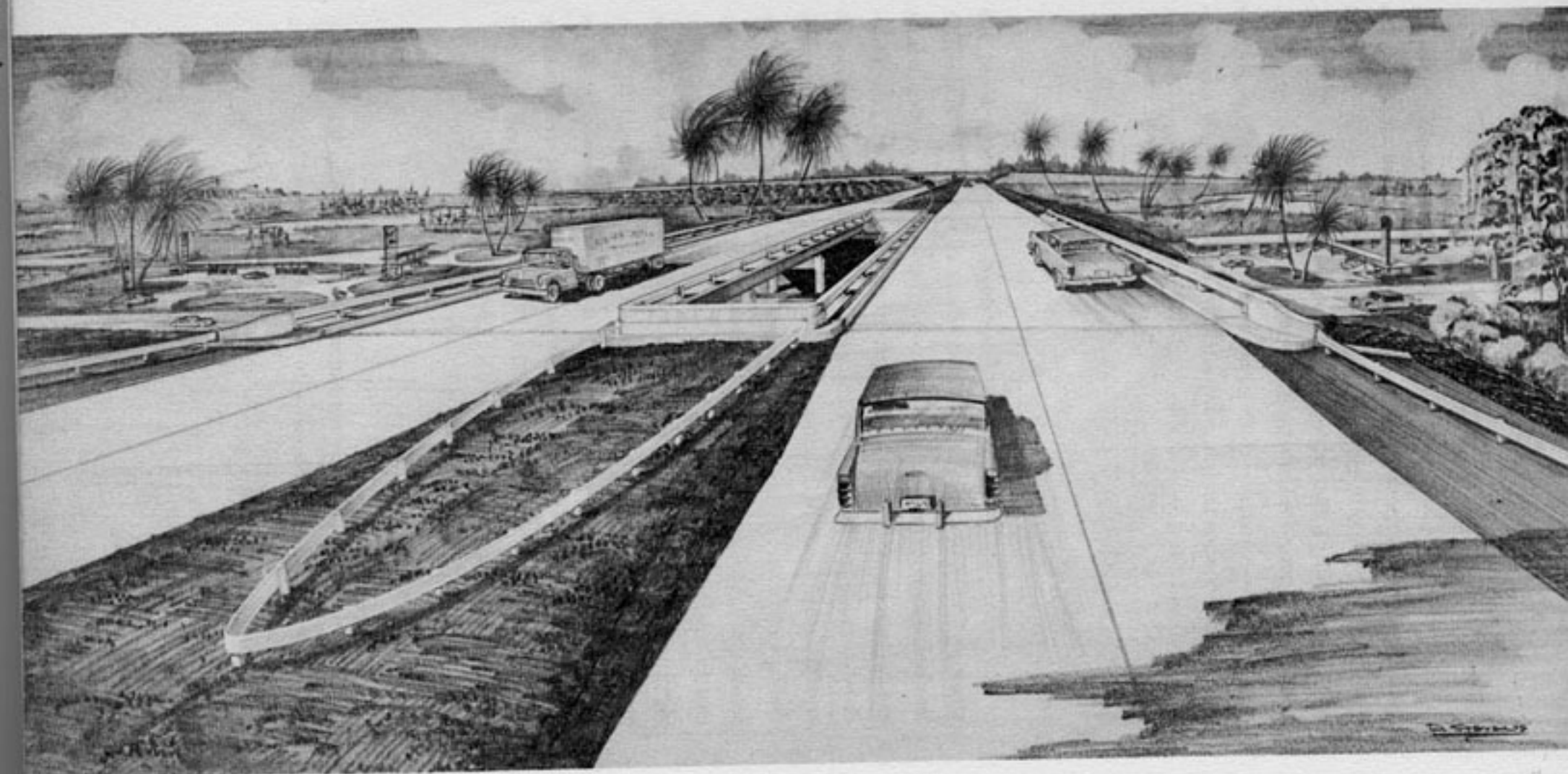
At changes in grade long vertical curves will be used to provide adequate sight distances for the design speeds. A typical roadway section of the Parkway is shown in Figure 3. The two pavements will each be 24 ft wide separated by a 20 ft median. An overhead clearance of 15 ft will be provided above the Parkway for the entire width of pavement and a minimum horizontal clearance of 10 ft provided on the right of the pavement with 8 ft provided on the left. The minimum vertical clearance over railroads will be 22 ft 6 inches or as modified by railroad company requirements.

#### *Drainage*

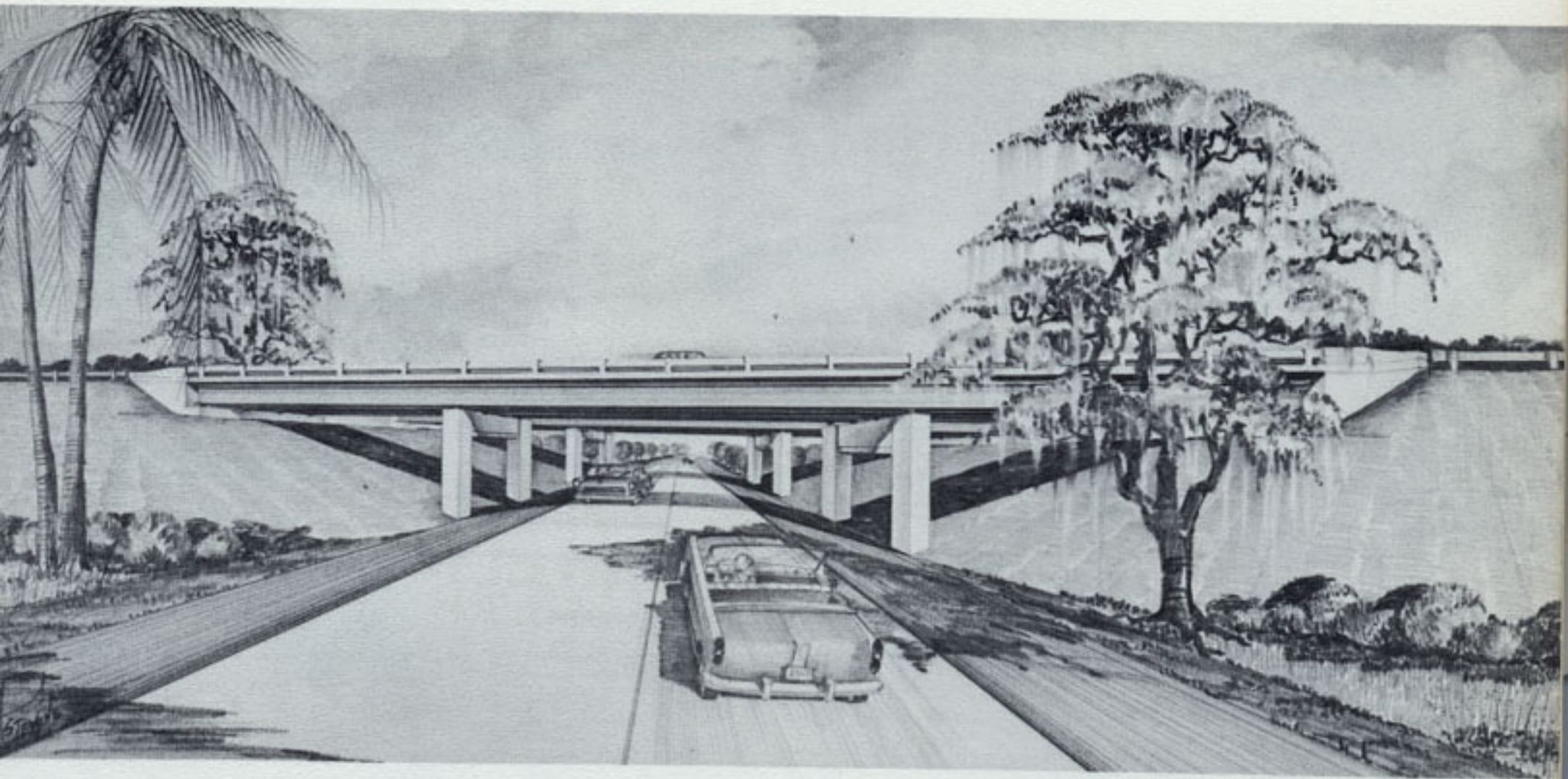
The function of highway drainage is to protect roadway and structure foundations from the damaging effects of water. To accomplish this it is necessary to collect, remove, and dispose of all surface waters and to intercept, collect, and remove all ground waters which tend to induce unstable conditions under the pavement. It is also necessary to provide for the continued functioning of the adjacent natural and man-made drainage facilities. Inherent in the design criteria is the requirement to insure that existing systems are not overloaded by run-off from the newly created facilities. The design of the Sunshine State Parkway contemplates embankment sections over the majority of the route to keep the pavement base course above any water level. Thus the majority of drainage structures will be equalizing structures to adjust water levels on opposite sides of the embankment. The sandy soil permits rapid leaching of ground water so, in general, there is little horizontal movement of surface drainage except at canals.

#### *Structures*

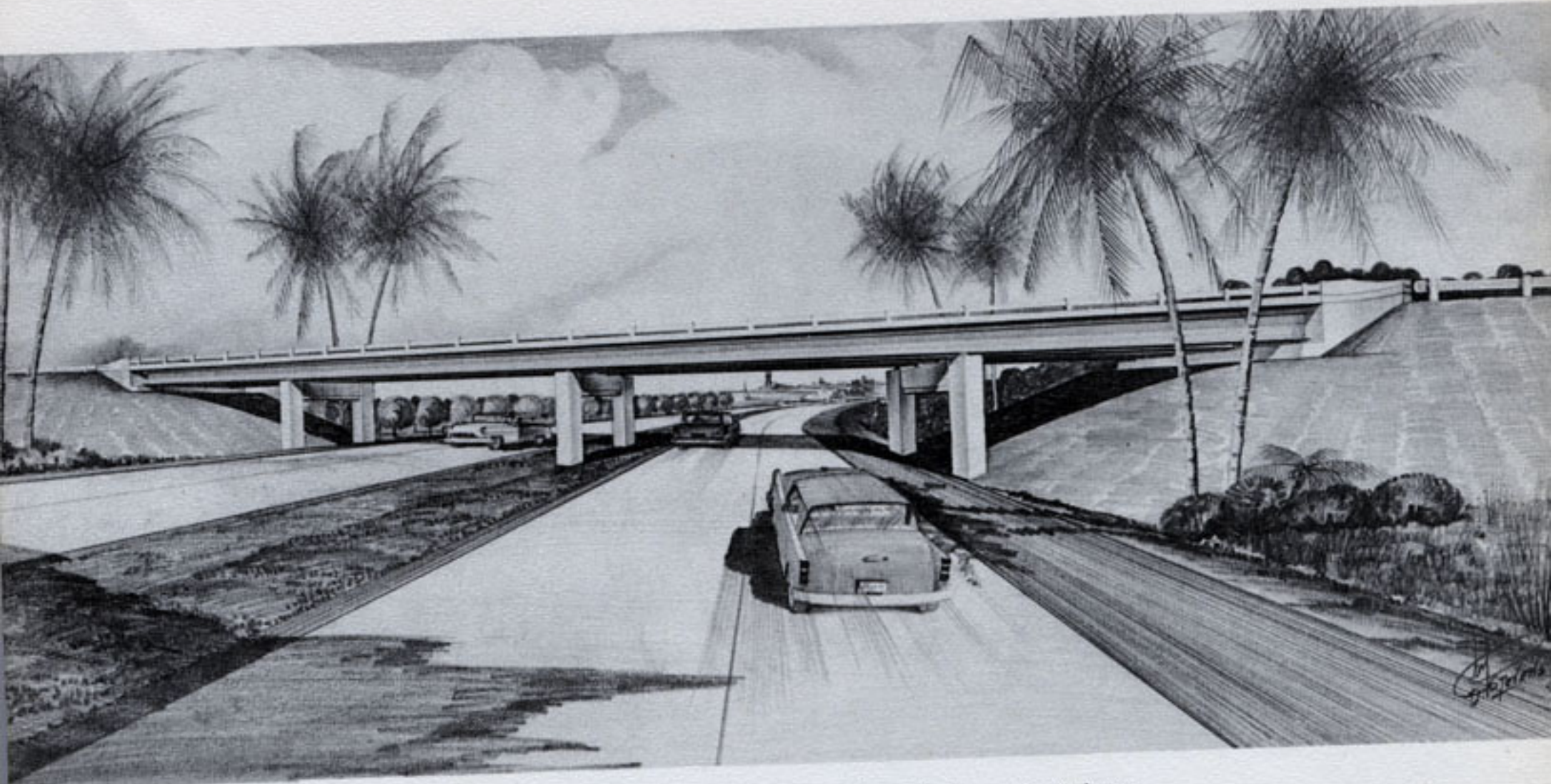
All bridge and grade separation structures carrying the Parkway will be designed in accordance with the current specifications of the



*Figure 4. Typical View of Parkway at Crossing over Intersecting Road*



*Figure 5. Typical Structure Carrying Parkway over Intersecting Road*



*Figure 6. Typical Structure Carrying a Cross Road over the Parkway*



American Association of State Highway Officials to carry H20-S16 loading. This design loading provides for any probable number of 20 ton trucks with trailers and a resultant 16 ton axle load. Structures carrying cross roads and streets over the Parkway will be designed in accordance with the current practice of the Florida State Road Department. Structures carrying primary highways and heavily traveled streets will be designed for H20-S16 loading and those carrying secondary highways or streets for the same or smaller loading commensurate with the type of traffic anticipated. All structures will be deck structures with the top of handrailing below the level of driver's eye. A typical structure carrying Parkway traffic over an intersecting road as seen from the Parkway is shown in Figure 4. Figure 5 shows the same structure as seen from the intersecting road. In general the Parkway structures will have 28 ft wide roadways with 1 ft 6 inches safety walks. Twin structures will be employed so that the full median width can be maintained and no constriction introduced for the entire length of the structure. The one exception to this would be the high level bridge over the Saint Lucie Canal where, due to economic considerations, the median width will be reduced to 4 ft. Where the length of bridge end to end of terminal posts is less than 100 ft, the roadway will be increased to 38 ft curb to curb thus providing full effective shoulder widths across the otherwise short constricted length of roadway. A typical structure carrying a crossroad over the Parkway is shown in Figure 6. The roadway widths used on these structures will be in accordance with the anticipated traffic load on the crossroad and the design will be in accordance with the practice of the Florida State Road Department. Figure 7 shows a farm access crossing passing under the Parkway, which is one type being considered. The farm access crossing shown would be designed as a reinforced concrete box culvert.

#### *Pavement*

The item of pavement in the estimate includes not only the main



*Figure 7. Typical Farm Road Crossing*

Parkway lanes, but also the stabilized shoulders, acceleration and deceleration lanes, ramps, and surfacing for toll plazas, service and maintenance areas and relocated and reconstructed crossroads. Acceleration and deceleration lanes, ramps, toll plazas, service and maintenance areas will be surfaced with a high-type pavement similar to that used on the Parkway lanes. The Parkway pavement will be comprised of an asphaltic concrete on a compacted lime rock base. This type of pavement has been selected because of its suitability in this area, and its economy of construction and maintenance. It is constructed mainly of local materials ideally suited and readily available at numerous locations in the area of the Parkway. Reconstructed and relocated crossroads will in most

instances be surfaced with a material consistent with the present surface existing on these roads.

The pavement on the Parkway will be 2½ inches of plant-mixed, asphaltic concrete made up of 1½ inches of binder course and 1 inch surface course. The base material will be 8 inches compacted lime rock placed on 12 inches of **stabilized** subbase compacted to a Florida bearing of at least 75 psi. The subbase would be extended a minimum of 12 inches beyond the pavement edge.

Shoulders along both sides of the Parkway lanes and on both sides of the interchange ramps will be stabilized by the addition of crushed lime rock material to the native material as necessary to reach a Florida bearing of at least 75 psi. The shoulders will be grassed.

The pavement design will be of a standard capable of supporting truck loads in excess of those presently permitted on public highways. The facility will be designed for the operation of heavy trucks at high speeds with utmost safety. It is intended that the ultimate design shall provide a pavement which will compare favorably in all respects with the pavements of turnpikes now in operation.

#### *Interchanges*

An interchange includes the acceleration and deceleration lanes, ramps, grade separations, toll plazas and feeder connections necessary to provide safe and orderly movement between the Parkway lane and the public highways. The location of interchanges has been determined by the traffic needs of the various communities near which the Parkway passes. A trumpet-type interchange similar to the one shown in Figure 8 will be employed at all interchanges except the two terminals where barrier-type stations will be employed.



*Figure 8. Typical Intermediate Traffic Interchange*

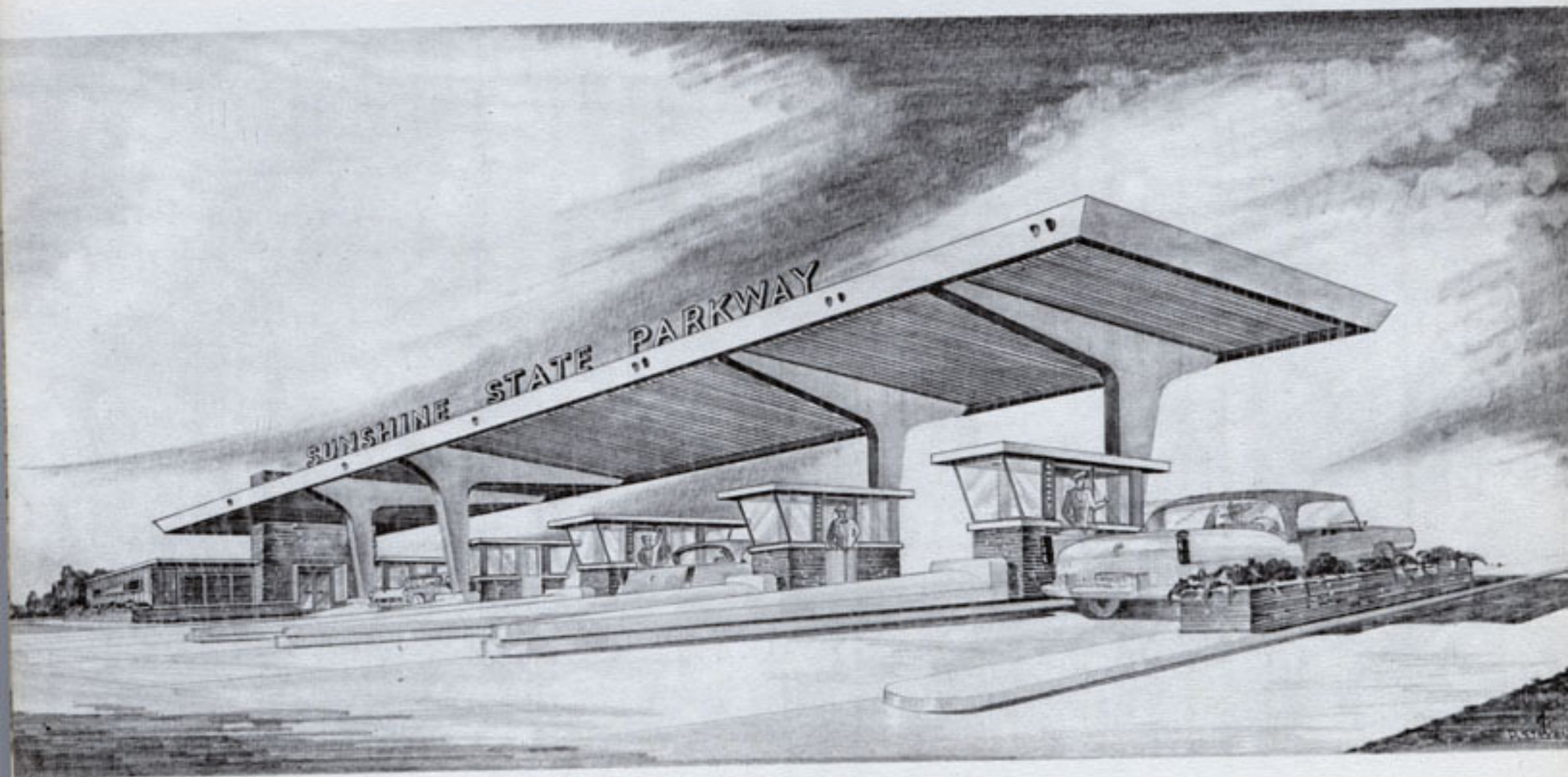
The design of the component parts of the interchange is based on the traffic needs to be served. The ingress and egress lanes at the Parkway will be of a consistent design regardless of traffic volumes. The number of lanes to be provided for ramps and feeder connections will be a direct function of the volume of traffic. Sufficient lanes will be provided at the toll plaza to assure a prompt clearance of traffic through the toll area. Lighting at the interchange will not only serve to promote safety at the critical points of access and aid in the collection of tolls, but will also serve as a guide to vehicles seeking an entrance to the facility.

## APPURTENANCES

The traveling needs of the turnpike patron must of necessity be supplied within the limits of right of way by reason of the limited access nature of the project. Service areas with gasoline and restaurant facilities have been located along the route to adequately serve the needs of the motorist. Maintenance areas, with necessary equipment and personnel, will be located at suitable intervals along Parkway. Complete toll collection equipment will be installed at each of the 8 controlled interchanges. The careful planning of these appurtenances is mandatory for a facility where the successful amortization of the project cost is wholly dependent upon the free choice of the motorist. Thus prompt services, courteously and efficiently extended, augment the inherent advantages of the road itself in offering an appealing facility to the potential patron.

### *Toll Collection Facilities*

Toll collection facilities are especially important because the initial and final contact the public has with the Parkway is at the toll



*Figure 9. Typical Toll Collection Station*

stations. It is mandatory that the tolls be collected in a courteous, efficient and accurate manner. In order that these tolls may be properly received, accounted for and deposited, the latest types of machines will be employed to assist the toll collector and the accountant. Several manufacturers of business machines now provide equipment specifically adapted to toll collection and accounting processes. It is contemplated that equipment of this type will be employed on the Sunshine State Parkway.

A typical toll collection station is shown in Figure 9. As each vehicle stops at the toll collection station upon entering, the toll collector will hand the driver a ticket. This ticket will be validated by the entry register in the toll booth and will indicate place of entry, time of entry, date, classification of vehicle, identification of toll collector and the basic fare to all points of exit. In each toll collection lane there is installed a treadle which is activated by the weight of an axle passing across it. A count of these axles is remotely recorded on tape as a future check on vehicles entering and leaving the Parkway and their classification. With the ticket in his possession, the driver proceeds to the desired destination and is stopped at the toll station there. The validated entry ticket is handed to the toll collector along with cash fare. The toll collector determines the type of vehicle, validates the ticket in the exit register and makes the necessary change. The exit register records place of exit, time of exit, identification of toll collector, verification of the original vehicle classification at time of entry and the amount of fare. As for entry lanes, treadles are installed which record the number of axles crossing them. Using a system such as this it is anticipated that a minimum of delay will be encountered by the motorist and that the payment of tolls will be made without incident.

The accounting of tolls will follow the same orderly, systematic procedure. Upon completing a working shift, the toll collector at an exit will assemble all cancelled tickets together with his receipts for that day.

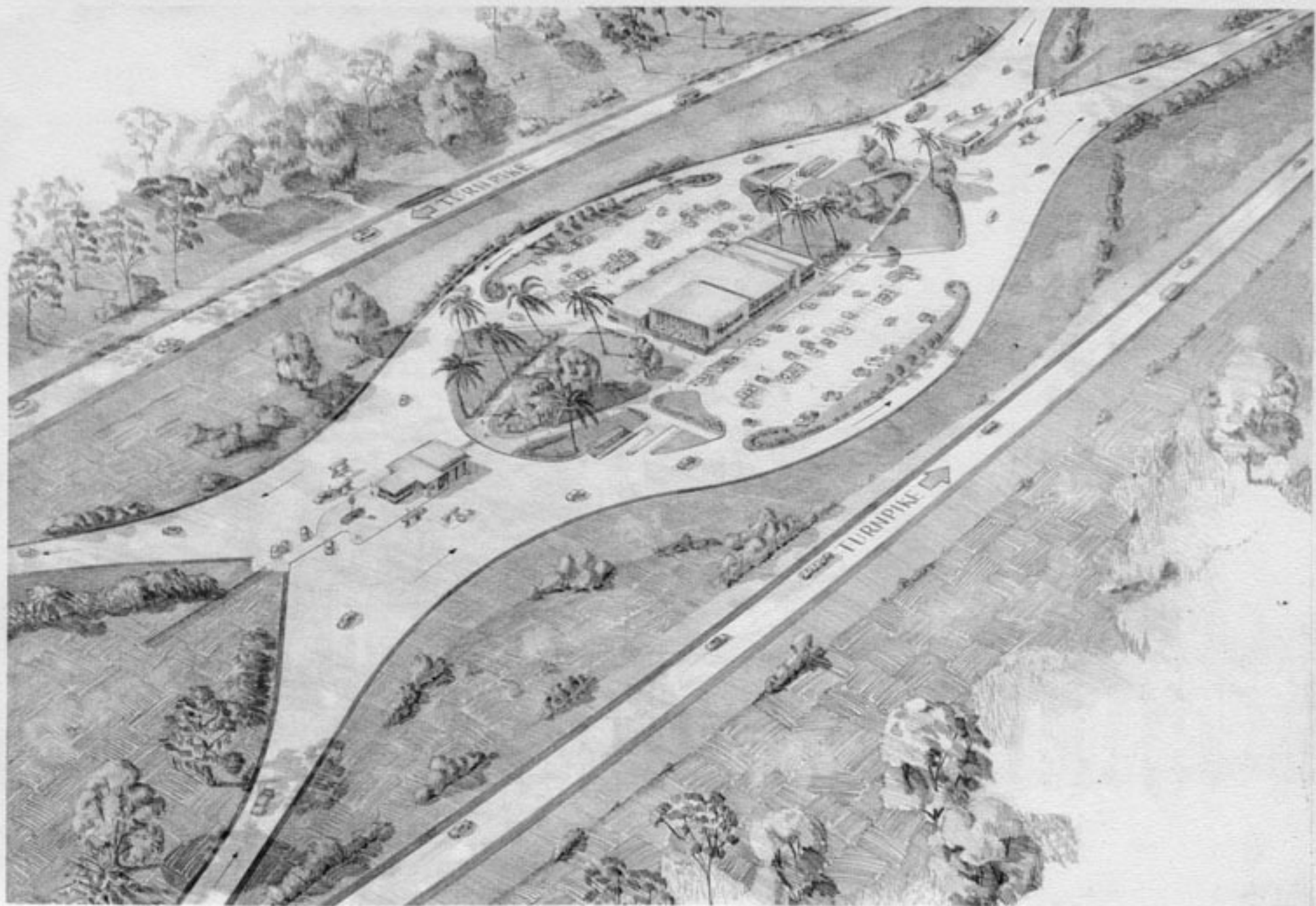


Figure 10. Aerial View of Principal Service Area



These will be placed in a locked bag and stored in a vault for safekeeping until transferred to a bank. A statement from the bank will account for the individual receipts from each collector daily. The cancelled tickets together with the tape, recording the axle counts, will be taken to the central office where machines will sort and tabulate them as necessary to verify the accuracy of the deposit. Additional data can also be extracted from these tickets relating to vehicle characteristics, distances traveled, fares paid, etc.

The system will provide for a method of charge account and monthly billing to commercial users who desire this service. For purposes of estimate only it was assumed that toll collection and accounting equipment will be acquired on a purchase basis.

#### *Service Areas*

Service areas will be located at approximately thirty-five mile intervals. A principal service area will be located near West Palm Beach and minor service areas near Pompano Beach and northwest of Stuart. The principal service area will contain an attractively appointed restaurant and facilities for gasoline, oil, diesel fuel and minor repairs. Figure 10 shows an aerial view of a principal service area. There will be provisions for both table and counter service in the restaurant as well as rest rooms, novelty and confectionery counters. Parking areas will be conveniently located. The motor fuel and minor repair area will be separate from the restaurant, but adjacent thereto. The two minor service areas will offer essentially the same services as the principal service area except that a snack bar will replace the restaurant.

At the location of these service areas it is planned to diverge the Parkway lanes so as to place the service facilities in the widened

median. This arrangement will enable one service area to serve traffic in both directions. A substantial saving in cost of construction and operation of the facilities should be affected, as compared with the alternate arrangement of providing duplicate facilities for each roadway. Approaches to these areas will consist of long acceleration and deceleration lanes provided with ample warning and directional signs. The center service area arrangement has received enthusiastic endorsement by concessionaires and has been adopted for use by Kentucky and Kansas on turnpikes being constructed in those states.

The estimates of cost of these facilities are based on the premise that Authority will furnish the concessionaire a building, underground facilities, items of fixed equipment, necessary utilities, grading, paving and landscaping. All other items of interior and exterior equipment such as tables, chairs, dishes, kitchen utensils, gasoline pumps, grease racks and other items necessary to make the facility operable are to be furnished by the lessee.

#### *Maintenance and Administrative Areas*

The Sunshine State Parkway will be maintained from two section maintenance areas located near Pompano Beach and Stuart and one division maintenance area to be located near West Palm Beach. Each area will have the responsibility for maintenance of approximately thirty-five miles of Parkway. The section areas will be staffed and equipped to serve the day-to-day needs of their respective sections. The division maintenance area, in addition to being responsible for a thirty-five mile section, will be equipped to supply the entire route with special items of maintenance equipment and correspondingly staffed to accomplish such work as painting, welding, electrical work and work requiring specialized items of heavy equipment.

An administration building will be constructed at a site yet to be chosen. It will contain space for the Authority, the Manager's office, the headquarters of the Maintenance Department and the Police Patrol, the Toll Collection Department, the Accounting Department and allied personnel.

#### *Highway Patrol*

It is common practice for turnpikes to obtain the services of regular state highway patrolmen for the turnpike. The Act provides for a contingent of the Florida Highway Patrol to be furnished for service on the Parkway. It is planned that the highway patrol would operate on a twenty-four hour basis. The estimate makes provision for salaries of the personnel, cost of all equipment and officers' uniforms.

#### *Communications*

A communication system is required to provide the administrative, maintenance, police and toll collection personnel with a reliable and rapid means of contact regardless of location, time of day or weather, for issuing weather bulletins, advice, instructions, police calls and for summoning assistance.

The communication system will consist of a micro-wave transmission network containing two telephone channels and two VHF radio channels. Provisions will be made so additional channels of telephone and radio can be added as they become necessary. Telephone installations will be provided at administrative and maintenance areas. Toll facilities, administrative and safety patrol vehicles and major items of maintenance equipment will be equipped with VHF transmitter-receiver

units, either mobile or fixed as required. It is contemplated that teletype facilities will not be installed initially, but can be readily added should they eventually be required.

#### UTILITY ADJUSTMENTS

The Act has granted the Authority the power to relocate, renew or remove any public utility facility on or near the project as necessary to provide for the construction or operation of the Parkway. It further provides that such changes will be accomplished by the forces of the utility concerned with the cost of such work to be borne by the Authority. Allowances have been made in the estimated project cost to provide for the adjustment of the utilities encountered.

In order to obtain an accurate appraisal of the utility relocation costs, a field survey was made of the entire line. Contact was made with owners of utilities to verify information received in the field. All electric power and telephone lines will cross the Parkway overhead except where it may be advantageous to carry the line in conduit on a grade separation structure. In addition to the utilities to be relocated the estimate makes provision for the cost of signaling at railroads during construction over their right of way. The route location has avoided residential areas thus accounting for the lack of sewer, water and gas lines.

The following tabulation lists the utilities to be adjusted:

Power transmission lines	4
Power distribution lines	30
Telephone lines	15
Railroad crossings	3
TOTAL	52

## RIGHT OF WAY

The Florida Turnpike Act empowers to the Authority "...to acquire in the name of the Authority by purchase or otherwise, on such terms and conditions and in such manner as it may deem proper, or by the exercise of the power of eminent domain, any land and other property, which it may determine is reasonably necessary for any project or for the relocation or reconstruction of any public road by the Authority under the provisions of this act or for the construction of any feeder road as defined herein, and any and all rights, title and interest in such land and other property, including public lands, parks, playgrounds, reservations, roads or parkways...."

For carrying out the provisions of the Act, appraisals and acquisition of right of way will be under the direction of an experienced right of way agent directly responsible to the Authority. The services of local, qualified appraisers will be retained as advisors in each county traversed by the Turnpike.

The basic right of way width will be 300 ft with provision for additional acreage at service areas, interchanges and maintenance areas. The estimate of right of way cost as shown is based on the premise that crossroad structures contemplated by estimates of this report will be provided to maintain the existing road pattern to permit a reasonably convenient means of access to portions of land severed by the Parkway. In arriving at the estimate of cost for right of way preliminary appraisals were available for use on the northern portion of the route. For the southern portion of the route where a shift in line was made, recent sales and settlements were evaluated to determine the present values of the property. The estimates thus obtained were increased to provide for the increased judgments which are sometimes awarded on turnpike projects and for the various acquisition costs. The costs of

acquisition takes into consideration fees for title search and insurance, condemnation costs, abstracting, negotiation expenses and special surveys.

## CONSTRUCTION COSTS

The cost of construction presented herein represents a detailed determination of the quantities involved, an extensive evaluation of the right of way and utility adjustments, and the application of unit prices considered typical of Florida construction, but reflecting the accelerated construction program involved. Table II contains the estimated cost of the Project exclusive of interest and financing charges.

All grading, drainage, paving and other roadway quantities were carefully computed from preliminary studies. The estimates of quantities and costs for the toll, administration, service and maintenance facilities were determined from preliminary architectural layouts and are based on arrangements of comparable facilities. Quantities of steel, concrete, piling and other materials for bridge construction were determined from preliminary layouts of the individual structures included in the facility.

The unit prices assumed for the cost estimates are based on the best and most recent information available and considered to be representative of prices likely to be experienced in competitive bidding for the Parkway construction. In arriving at these unit prices the current trends of construction costs and average bid prices received in recent years by the Florida State Road Commission were tabulated and reviewed. In general, the prices used are higher than bid prices currently received by the Florida State Road Commission. The difference reflects conditions engendered by the accelerated construction schedule, completion penalties, effects of greater construction volume and correspondingly greater demands on the capacity of contractors, and other similar aspects.

TABLE II  
**SUNSHINE STATE PARKWAY**  
*Miami to Fort Pierce Section*  
**ESTIMATE OF COST**  
 104 Miles

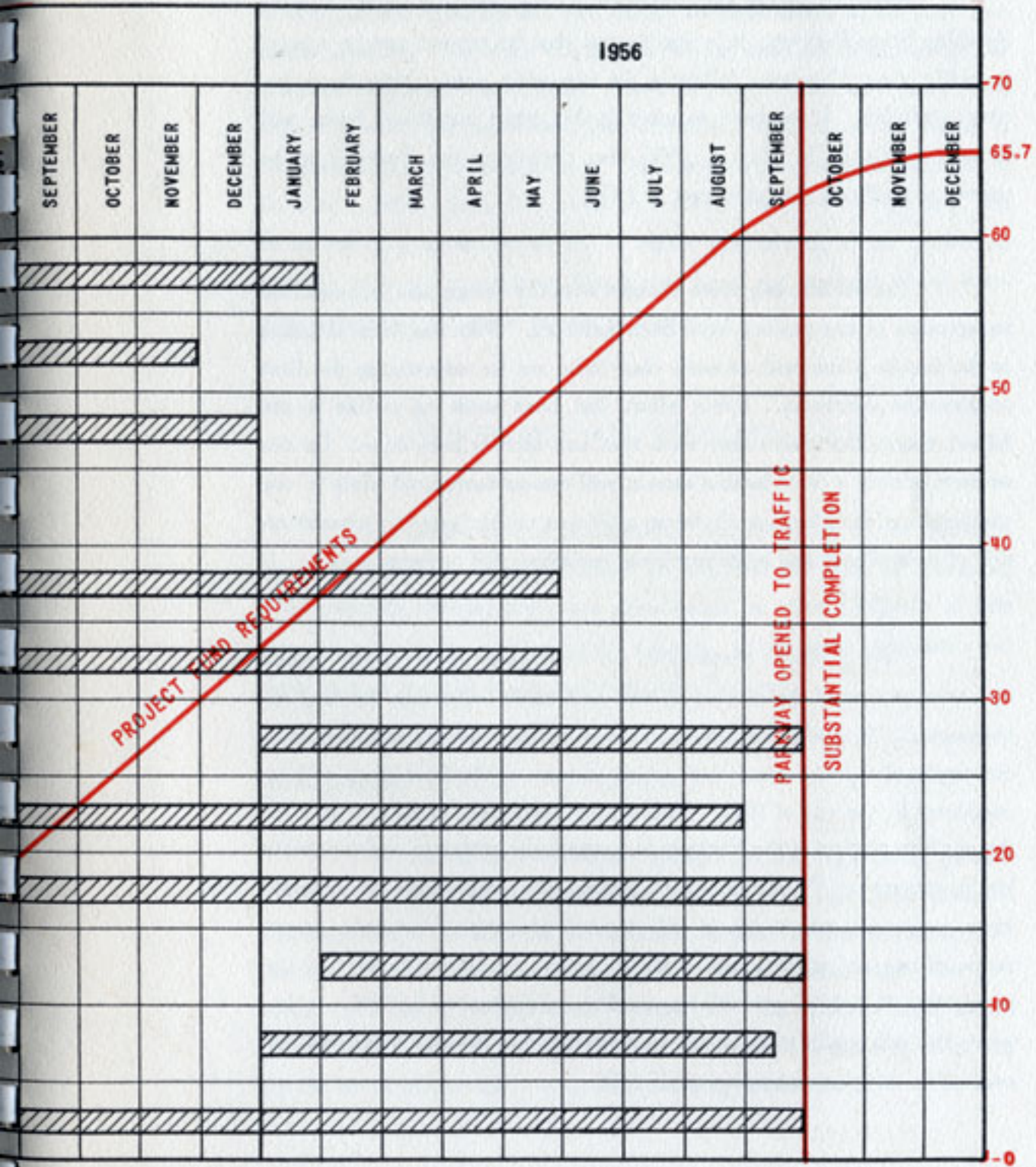
<b>GRADING AND EARTHWORK</b>		
Clearing and Grubbing	\$ 398,700	
Embankment	8,572,600	
Muck Excavation	245,700	\$ 9,217,000
<b>DRAINAGE AND SLOPE PROTECTION</b>		
Inlets and Ditch Paving	\$ 143,500	
Pipe Drains and Culverts	316,600	
Box Culverts and Pipe Headwalls	1,919,100	
Grassing and Sodding	1,162,000	
Slope Maintenance	207,800	\$ 3,749,000
<b>PAVEMENT, SUB-BASE AND SHOULDERS</b>		
Sub-base Stabilization	\$1,693,600	
Turnpike Pavement	7,830,800	
Turnpike Shoulders	567,300	
Crossroad Surfacing	333,700	
Curb, Gutter and Median	70,700	
Approach Slabs	165,900	\$10,662,000
<b>STRUCTURES</b>		
Saint Lucie Canal Bridge	\$4,880,000	
Twin Overpasses over Roads and Canals	6,895,000	
Twin Overpasses over Railroads	536,000	
Underpasses	1,950,000	
Ramp Structures	952,000	\$15,213,000
<b>ROADWAY PROTECTIVE DEVICES</b>		
Guard Rail	\$ 390,800	
Lighting	660,000	
Communications	150,000	
Signs and Markings	311,700	
Right of Way Fence	927,500	\$ 2,440,000
<b>TOLL COLLECTION FACILITIES</b>		
Toll Booths and Canopies	\$ 490,000	
Toll Collection Equipment	185,000	\$ 675,000
<b>BUILDINGS AND EQUIPMENT</b>		
Maintenance Areas	\$ 618,000	
Administration Building	118,000	
Service Areas	1,545,000	\$ 2,281,000
<b>MISCELLANEOUS ITEMS</b>		
Borings and Testing	\$ 460,000	
Detours	150,000	
Approach Roads	600,000	
Utility Adjustments	320,000	
Landscaping	83,000	\$ 1,613,000
<b>CONSTRUCTION COST</b>		<b>\$45,850,000</b>
<b>RIGHT OF WAY (Including Acquisition)</b>		<b>5,500,000</b>
<b>MAINTENANCE AND OFFICE EQUIPMENT</b>		<b>740,000</b>
<b>ADMINISTRATIVE AND LEGAL</b>		<b>500,000</b>
<b>ENGINEERING</b>		<b>3,550,000</b>
<b>CONTINGENCIES</b>		<b>6,500,000</b>
<b>PRELIMINARY EXPENSE</b>		<b>3,060,000</b>
<b>PROJECT COST (Exclusive of Interest and Financing Charges)</b>		<b>\$65,700,000</b>

# PROGRESS SCHEDULE AND FUND REQUIREMENTS

ITEM	1955					
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
PLANS AND SPECIFICATIONS	[Hatched bar from Jan to Jun]					
RIGHT OF WAY ACQUISITION				[Hatched bar from Apr to Jun]		
UTILITY RELOCATION				[Hatched bar from Apr to Jun]		
CONSTRUCTION				[Hatched bar from Apr to Jun]		
GRADING AND EARTHWORK				[Hatched bar from Apr to Jun]		
DRAINAGE AND SLOPE PROTECTION				[Hatched bar from Apr to Jun]		
PAVEMENT, SUB-BASE AND SHOULDERS				[Hatched bar from Apr to Jun]		
STRUCTURES				[Hatched bar from Apr to Jun]		
ROADWAY PROTECTIVE DEVICES					[Hatched bar from May to Jun]	
TOLL COLLECTION FACILITIES					[Hatched bar from May to Jun]	
BUILDINGS AND EQUIPMENT					[Hatched bar from May to Jun]	
MISCELLANEOUS ITEMS	[Hatched bar from Jan to Jun]					

CONSTRUCTION FUNDS AVAILABLE





MILLIONS OF DOLLARS

## CONSTRUCTION SCHEDULE

Based on design and construction considerations involved in the Sunshine State Parkway, it is anticipated that the project can be opened to traffic about 17 months following the date when construction funds become available. It has been assumed in this report that these funds will become available by May 1, 1955 thus permitting the Parkway to be opened to traffic in the latter part of 1956.

The section engineers charged with the design and construction supervision of the project have been selected. Work has been initiated on the design plans with an early date to be set for advertising the first construction contracts. Every effort has been made to utilize to the fullest extent the preliminary work that has already been done. On the northern portion a considerable amount will remain unchanged while in the southern portion, where an alignment shift was necessitated by consideration of right of way and other problems, revisions will be necessary.

Plate 2 shows graphically the anticipated progress for design and construction of the project as well as a curve indicating the fund requirements. With work on plans and specifications already initiated, it is contemplated that the plans and specifications on the final items will be completed by the end of 1955. Preliminary appraisals of right of way for the northern portion of the Parkway is essentially complete and abstracts are in progress. On the southern portion the preparation of property maps, appraisals and abstracts will proceed concurrently with the preparation of revised grading and drainage plans. It is estimated that the acquisition of right of way will be complete by December 1, 1955. Likewise, the utility adjustments will be started during the plan stage and expedited for completion by January 1, 1956.

Construction contracts will be let in March, thus permitting construction operations to begin by April 1, 1955. Grading contracts on approximately twenty-five miles of the northern end and the substructure contract for the Saint Lucie Canal Bridge are programmed as the first contracts to be let. The work will be divided into sections to encourage the maximum competition in bidding. The climate of Florida will permit year around construction operations; thus affording a distinct overall saving in the time allotted to construction. Substantial completion is planned for October 1, 1956. Some few items may not be complete by this date, but these are of a nature so as not to affect the opening of the project to traffic. It is not considered feasible to open any segment of the route prior to opening the whole project to traffic.

#### MAINTENANCE AND OPERATION COSTS

The annual cost of maintenance and operation of the Sunshine State Parkway has been estimated for the first full year of operation. This estimate reflects the costs experienced on other facilities of this type analyzed in the light of traffic volumes, maintenance conditions and other factors peculiar to the Sunshine State Parkway.

##### *Administration*

The item of Administration includes the top supervisory personnel in the divisions of Engineering and Maintenance, Toll Collection and Highway Patrol in addition to expenses incurred by the Authority, the Manager's Office, the Comptroller's Office, Legal Counsel and other personnel in a strictly administrative capacity. The estimate also makes provision for consulting engineers' fees, an annual independent audit and for the usual trustee fees involved in handling the bonds.

Salaries and Compensation	\$155,000	
Engineers and Audit	25,000	
Office Expense	20,000	
Public Relations	50,000	
Trustee Fees	30,000	
TOTAL		\$280,000

*Toll Collection*

Toll Collection expense includes the salaries and expenses of regular toll collectors, relief collectors, toll supervisors, tellers, interchange and toll plaza lighting, utilities, uniforms and other miscellaneous expense necessary to provide efficient and accurate collection of tolls.

Salaries and Expenses	\$231,000	
Lighting and Utilities	32,000	
Uniforms and Supplies	22,000	
TOTAL		\$285,000

*Maintenance*

Provision has been made for an ample allowance to cover all recurring costs of maintenance of pavement, slopes, structures, service areas, buildings and other appurtenances as necessary to keep the facility in the best operating condition at all times. The maintenance practices contemplated and the qualifications of maintenance personnel used in arriving at the estimate reflect the current practice of the Florida State Road Commission.

Salaries and Expenses	\$157,000	
Equipment Operation & Depreciation	89,000	
Material & Misc.	60,000	
TOTAL		\$306,000

*Highway Patrol*

This estimate provides for reimbursement to the State for the services of patrol forces adequate to enforce regulations and assist Parkway patrons, as well as cost of vehicle operation, uniforms and other expenses.

Reimbursement	\$61,000	
Uniforms and Expenses	4,000	
Vehicle Operation & Replacement	18,000	
TOTAL		\$83,000

*Insurance*

The item of insurance provides for the requirements of the trust indenture as well as other desirable insurance coverage.

Bridge Property Damage	\$ 8,000	
Use and Occupancy	16,000	
Public Liability & Property Damage	12,000	
Fire	3,000	
Messenger and Interior Robbery	800	
Workmen's Compensation	5,000	
Fidelity Bonds	1,200	
TOTAL		\$46,000

*Summary*

Summarized below is the cost of maintenance and operation for the first full year after completion of the project.

Administration	\$280,000
Toll Collection	285,000
Maintenance	306,000
Highway Patrol	83,000
Insurance	46,000
TOTAL	\$1,000,000

It is anticipated that expenses incurred for maintenance and operation will increase as traffic increases. The increases during the early years should be considerably greater than after the budget has reached a sizable amount. Table II shows the anticipated cost of maintenance and operation for the forty-year life of the bonds. The amounts set aside for these items are ample to provide a high standard of maintenance and operation adequate in all respects for the anticipated traffic needs.

TABLE III

## MAINTENANCE AND OPERATION COSTS

<i>Year</i>	<i>Amount</i>	<i>Year</i>	<i>Amount</i>
1957	\$1,000,000	1972	\$1,600,000
1958	1,050,000	1978	1,600,000
1959	1,100,000	1979	1,600,000
1960	1,150,000	1980	1,600,000
1961	1,200,000	1981	1,600,000
1962	1,240,000	1982	1,600,000
1963	1,280,000	1983	1,600,000
1964	1,320,000	1984	1,600,000
1965	1,360,000	1985	1,600,000
1966	1,400,000	1986	1,600,000
1967	1,420,000	1987	1,600,000
1968	1,440,000	1988	1,600,000
1969	1,460,000	1989	1,600,000
1970	1,480,000	1990	1,600,000
1971	1,500,000	1991	1,600,000
1972	1,520,000	1992	1,600,000
1973	1,540,000	1993	1,600,000
1974	1,560,000	1994	1,600,000
1975	1,580,000	1995	1,600,000
1976	1,600,000	1996	1,600,000

## APPENDIX

1. Estimate of Construction Cost
2. Estimate of Maintenance and Operation Costs



**SUNSHINE STATE PARKWAY**  
**DETAILED ESTIMATE OF COST**  
**ROADWAY AND APPURTENANCES**

Item	Unit	Unit Price	SECTION 1		SECTION 2	
			Quantity	Cost	Quantity	Cost
<b>EARTHWORK</b>						
Clearing and Grubbing	Acre	\$130.00	357	\$ 46,400	320	\$ 41,600
Embankment	Cubic Yards	0.81	2,335,000	1,891,400	1,761,000	1,426,400
Sub-soil Excavation	Cubic Yards	0.50	321,000	160,500	82,000	41,000
<b>Sub-Total</b>				<b>2,098,300</b>		<b>1,509,000</b>
<b>DRAINAGE AND SLOPE PROTECTION</b>						
Box Culverts and Pipe Headwalls						
Class "A" Concrete	Cubic Yards	65.00	3,000	195,000	4,000	260,000
Reinforcing Steel	Pounds	0.14	300,000	42,000	350,000	49,000
Inlets	Each	245.00	82	20,100	42	10,300
Ditch Paving	Square Yds.	4.00	1,280	5,100	4,450	17,800
Grassing	Square Yds.	0.10	1,250,000	125,000	1,750,000	175,000
Sodding	Square Yds.	0.75	44,000	33,000	20,000	15,000
Pipe Culverts: 15 Inch round CMP	Lineal Feet	4.50	2,890	13,000	1,640	7,400
18 Inch round RCP	Lineal Feet	5.60				
24 Inch round RCP	Lineal Feet	7.00	390	2,700	658	4,600
30 Inch round RCP	Lineal Feet	9.00	---	---	248	2,200
36 Inch round RCP	Lineal Feet	12.00	1,078	12,900	4,412	52,900
42 Inch round RCP	Lineal Feet	15.00	---	---	---	---
48 Inch round RCP	Lineal Feet	20.00	448	9,000	713	14,300
54 Inch round RCP	Lineal Feet	26.00	---	---	---	---
60 Inch round RCP	Lineal Feet	28.00	60	1,700	232	6,500
Slope Protection	Mile	2000.00	12.2	24,400	16.7	33,400
<b>Sub-Total</b>				<b>483,900</b>		<b>648,400</b>
<b>PAVEMENT AND SHOULDERS</b>						
Stabilized Roadbed (12 Inch)	Square Yds.	0.50	438,400	219,200	545,100	272,600
Miami Rock Base (8 Inch)	Square Yds.	1.30	405,000	526,500	504,600	656,000
Asphaltic Concrete Pavement (2½ Inch)	Square Yds.	1.25	386,900	483,600	484,000	605,000
Stabilized Shoulders (6 Inch)	Square Yds.	0.32	233,900	74,800	284,900	91,100
4 Inch Concrete Curb	Lineal Feet	0.90	5,600	5,000	1,600	1,400
6 Inch Concrete Curb	Lineal Feet	1.00	10,000	10,000	5,000	5,000
6 Inch Asphalt Curb	Lineal Feet	0.80	8,000	6,400	2,500	2,000
1 Inch Asphaltic Concrete (Gutters and Medians)	Square Yds.	0.50	5,890	2,900	1,940	1,000
Approach Slabs	Square Yds.	12.00	2,780	33,400	2,390	28,700
Cross-roads and Service Roads						
6 Inch Stabilized Shoulders	Square Yds.	0.15	34,100	5,000	19,900	3,000
Pavement, Class 2*	Square Yds.	1.30	20,800	27,000	25,600	33,300
Pavement, Class 1*	Square Yds.	2.50	30,400	76,000	4,270	10,700
Stabilized Roadbed	Square Yds.	0.45	57,600	25,900	33,600	15,100
<b>Sub-Total</b>				<b>1,495,700</b>		<b>1,724,900</b>
<b>ROADWAY PROTECTIVE DEVICES</b>						
Guard Rail	Lineal Feet	3.50	36,800	128,900	22,400	78,400
Lighting	Lump Sum	---		275,000		100,000
Communications	Lump Sum	---		---		---
Signs and Markings	Mile	3000.00	12.2	36,600	16.7	50,100
Right of way Fence: Rural	Lineal Feet	0.75	75,150	56,400	176,130	132,100
Urban	Lineal Feet	2.65	54,000	143,200	1,100	2,900
<b>Sub-Total</b>				<b>640,100</b>		<b>363,500</b>
<b>TOLL COLLECTION FACILITIES</b>						
<b>BUILDINGS AND EQUIPMENT</b>						
<b>MISCELLANEOUS ITEMS</b>						

\* Class 2:6 Inch Rock Base, Type 2 Bit, Surface Treatment  
Class 1:8 Inch Rock Base, 2½ Inch Asphaltic Concrete

**SUNSHINE STATE PARKWAY  
 DETAILED ESTIMATE OF COST  
 ROADWAY AND APPURTENANCES**

SECTION 3		SECTION 4		SECTION 5		SECTION 6		TOTALS	
Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
500	\$ 65,000	850	\$ 110,300	306	\$ 39,800	734	\$ 95,400	3,067	\$ 398,700
1,814,000	1,469,300	2,166,000	1,754,500	942,500	763,400	1,565,000	1,267,600	10,584,300	8,572,600
7,600	3,800	56,600	28,300	---	---	24,280	12,100	491,480	245,700
	<b>1,538,100</b>		<b>1,893,300</b>		<b>803,200</b>		<b>1,375,100</b>		<b>9,217,000</b>
6,000	390,000	4,950	322,000	2,115	137,500	4,036	262,400	24,101	1,566,900
600,000	84,000	480,200	67,200	238,690	33,400	546,870	76,600	2,515,760	352,200
52	12,700	24	5,900	34	8,300	31	7,600	265	64,900
4,630	18,500	4,500	18,000	1,960	7,800	2,850	11,400	19,670	78,600
2,250,000	225,000	2,000,000	200,000	1,100,000	110,000	2,250,000	225,000	10,600,000	1,060,000
16,000	12,000	28,000	21,000	12,000	9,000	16,000	12,000	136,000	102,000
1,840	8,300	1,140	5,100	440	2,000	1,380	6,200	9,330	42,000
		294	1,600	---	---	64	400	358	2,000
2,595	18,200	1,382	9,700	102	700	192	1,300	5,319	37,200
---	---	987	8,900	283	2,500	---	---	1,518	13,600
6,065	72,800	1,293	15,400	64	800	138	1,700	13,040	156,500
---	---	990	14,800	---	---	---	---	990	14,800
---	---	125	2,500	102	2,000	446	8,900	1,834	36,700
---	---	---	---	---	---	120	3,100	120	3,100
---	---	90	2,500	---	---	---	---	382	10,700
21.2	42,400	20.5	41,000	11.5	23,000	21.8	43,600	103.9	207,800
	<b>883,900</b>		<b>735,600</b>		<b>337,000</b>		<b>660,200</b>		<b>3,749,000</b>
681,300	340,600	671,700	335,800	339,600	169,800	711,300	355,600	3,387,400	1,693,600
630,500	819,600	621,600	808,100	314,400	408,700	658,600	856,200	3,134,700	4,075,100
604,500	755,600	596,000	745,000	302,000	377,500	631,200	789,000	3,004,600	3,755,700
355,900	114,000	350,900	112,300	176,000	56,300	371,420	118,800	1,773,020	567,300
1,600	1,400	1,600	1,400	---	---	1,600	1,400	12,000	10,600
5,000	5,000	5,000	5,000	1,300	1,300	6,300	6,300	32,600	32,600
5,000	4,000	---	---	6,000	4,800	2,000	1,600	23,500	18,800
3,610	1,800	280	100	4,000	2,000	1,720	900	17,440	8,700
4,130	49,500	1,770	21,200	1,120	13,400	1,640	19,700	13,830	165,900
5,690	800	14,220	2,200	5,420	900	14,040	2,100	93,370	14,000
---	---	8,530	11,100	8,130	10,600	21,070	27,400	84,130	109,400
8,530	21,300	12,600	31,500	---	---	---	---	55,800	139,500
9,600	4,300	24,000	10,800	9,150	4,100	23,700	10,600	157,650	70,800
	<b>2,117,900</b>		<b>2,084,500</b>		<b>1,049,400</b>		<b>2,189,600</b>		<b>10,662,000</b>
21,800	76,300	13,600	47,600	7,300	25,600	9,700	34,000	111,600	390,800
	85,000		75,000		20,000		105,000		660,000
	---		---		---		---		150,000
21.2	63,600	20.5	61,500	11.5	34,500	21.8	65,400	103.9	311,700
223,720	167,700	216,000	162,000	121,010	90,800	230,150	172,400	1,042,160	781,400
---	---	---	---	---	---	---	---	55,100	146,100
	<b>392,600</b>		<b>346,100</b>		<b>170,900</b>		<b>376,800</b>		<b>2,440,000</b>
									<b>675,000</b>
									<b>2,281,000</b>
									<b>1,613,000</b>

**SUNSHINE STATE PARKWAY  
DETAILED ESTIMATE OF COST  
STRUCTURES**

**UNIT PRICES USED IN ESTIMATING STRUCTURES**

Concrete in Substructure	\$60.00 per Cubic Yard
Concrete in Superstructure	80.00 per Cubic Yard
Reinforcing Steel	0.14 per Pound
Structural Steel (rolled beams)	0.17 per Pound
Structural Steel (girders)	0.21 per Pound
Handrailing	8.50 per Foot
Structural Excavation (and backfill)	5.00 per Cubic Yard
Piling	7.00 per Lineal Foot
Slope Paving under Structures	6.00 per Square Yard

<i>Bridge No.</i>	<i>Name</i>	<i>Parkway Over/Under</i>	<i>Roadway Width</i>	<i>Estimated Cost</i>
<b>SECTION 1</b>				
1	State Road No. 7 (Southern Terminal)	Over	Single 28'	\$155,000.00
2	State Road 820 (Hollywood Boulevard)	Over	Twin 28'	243,000.00
3	Johnson Street	Over	Twin 28'	149,000.00
4	Taft Street	Over	Twin 28'	153,000.00
5	Dania Davie Boulevard	Under	Single 28'	109,000.00
6	State Road 818 - South New River Canal Canal and Road	Over	Twin 28'	320,000.00
7	State Road 84 - Spur over State Road 8	--	Single 28'	87,000.00
8	State Road 84 - Interchange	Under	Single 20'	70,000.00
9	State Road 84 and North New River Canal	Over	Twin 28'	254,000.00
10	Davie Boulevard	Under	Single 28'	99,000.00
11	West Broward Boulevard	Under	Single 48'	171,000.00
12	Plantation Canal	Over	Twin 28'	172,000.00
13	State Road No. 7	Over	Twin 28'	246,000.00
14	Wingate Road	Under	Single 28'	109,000.00
15	Fort Lauderdale Interchange	Under	Dbl. 17'-2' M.	128,000.00
<b>SECTION 2</b>				
16	Oakland Park Road and Canal	Over	Twin 28'	219,000.00
17	Mid River Canal	Over	Twin 28'	169,000.00
18	Prospect Field Road	Under	Single 28'	104,000.00
19	Access Road and Railroad	Over	Twin 28'	155,000.00
20	Pompano Canal	Over	Twin 28'	206,000.00
21	Pompano - Interchange	Under	Dbl. 17'-2' M.	128,000.00
22	State Road 814	Over	Twin 28'	177,000.00
23	Sample Road	Over	Twin 28'	149,000.00
24	State Road 810	Under	Single 28'	99,000.00
25	Hillsboro Canal	Over	Twin 28'	243,000.00
26	State Road 808	Over	Twin 28'	149,000.00

**SUNSHINE STATE PARKWAY**  
**DETAILED ESTIMATE OF COST**  
**STRUCTURES (Continued)**

<i>Bridge No.</i>	<i>Name</i>	<i>Parkway Over/Under</i>	<i>Roadway Width</i>	<i>Estimated Cost</i>
<b>SECTION 3</b>				
27	Clint Moore Road	Over	Twin 28'	\$149,000.00
28	Lateral 38	Over	Twin 28'	89,000.00
29	Lateral 36	Over	Twin 28'	80,000.00
30	State Road 806 and Lateral 34	Over	Twin 28'	226,000.00
31	Delray Beach Interchange	Under	Db1. 17'-2' M.	128,000.00
32	Lateral 33	Over	Twin 28'	67,000.00
33	Lateral 30	Over	Twin 28'	90,000.00
34	Lateral 27	Over	Twin 28'	90,000.00
35	Lateral 25	Over	Twin 28'	78,000.00
36	State Road 804	Over	Twin 28'	149,000.00
37	Boynton Canal	Over	Twin 28'	89,000.00
38	State Road 812	Over	Twin 28'	149,000.00
39	Lateral 14	Over	Twin 28'	89,000.00
40	State Road 802	Over	Twin 28'	149,000.00
41	Lateral 11	Over	Twin 28'	82,000.00
42	West Palm Beach Canal	Over	Twin 28'	282,000.00
43	State Road 80	Under	Db1. 24'-4' M.	270,000.00
44	Belvedere Road	Under	Single 28'	121,000.00
<b>SECTION 4</b>				
45	Cheechobee Road (State Road 704)	Under	Single 28'	120,000.00
46	West Palm Beach Interchange	Under	Db1. 17'-2' M.	128,000.00
47	West Palm Beach Water Company Canal	Over	Twin 28'	164,000.00
48	Seaboard Airline Railroad	Over	Twin 28'	199,000.00
49	Lake Park Road (State Road 809)	Under	Single 28'	102,000.00
50	Monet Road	Under	Single 28'	99,000.00
51	Hood Road	Under	Single 28'	98,000.00
52	Canal C-18	Over	Twin 28'	229,000.00
53	Jupiter Road (State Road 706)	Under	Single 28'	119,000.00
54	Loxahatchie Creek	Over	Twin 28'	174,000.00
55	Cypress Creek	Over	Twin 28'	175,000.00
<b>SECTION 5</b>				
56	Drainage Trestle	Over	Twin 28'	73,000.00
57	State Road 708	Over	Twin 28'	153,000.00
58	Drainage Trestle	Over	Twin 28'	75,000.00
59	State Road 76	Over	Twin 28'	155,000.00
<b>SECTION 5A</b>				
60	Saint Lucie Canal	Over	Twin 28'	4,880,000.00
<b>SECTION 6</b>				
61	State Road 714	Under	Single 28'	116,000.00
62	Stuart Interchange	Under	Db1. 17'-2' M.	128,000.00
63	Trestle	Over	Twin 28'	154,000.00
64	Canal C-23	Over	Twin 28'	286,000.00
65	Becker Road	Under	Single 28'	107,000.00
66	Canal C-24	Over	Twin 28'	282,000.00
67	Canal C-107	Over	Twin 28'	91,000.00
68	State Road 712	Under	Single 28'	107,000.00
69	Florida East Coast Railroad	Over	Twin 28'	182,000.00
70	Ten Mile Creek	Over	Twin 28'	177,000.00

## SUNSHINE STATE PARKWAY

### ESTIMATE OF MAINTENANCE AND OPERATION COSTS

#### ADMINISTRATION

##### Personnel

Chief Executive Office (Chairman of Turnpike Authority)	\$12,000
Executive Assistant	8,000
Chief Engineer	11,600
Assistant Chief Engineer (Maintenance)	8,000
General Counsel	9,000
Comptroller	8,000
Accountant	5,000
Supervisor of Tolls	7,000
Assistant Supervisor of Tolls	6,000
Police Patrol Supervisor	6,000
4 - Radio Operators	14,000
15 - Secretarial and Clerical	42,400
Janitor	3,000

TOTAL

\$140,000

Retirement and Social Security	\$ 10,000
Authority Expense	5,000
Travel, Office Supplies, Utilities	20,000
Advertising and Public Relations	50,000
Public Audit	10,000
Consulting Engineers	15,000
Trustee, Depository, Bond Attorney, etc.	30,000
TOTAL	\$280,000

#### TOLL COLLECTION

##### Personnel

60 - Collectors	\$198,000
3 - Supervisors	11,000
2 - Pick-up Men	7,000

TOTAL

\$216,000

Retirement and Social Security	15,000
Lighting	28,000
Vehicle Operation	5,000
Supplies	
Transit Tickets	9,000
Uniforms	4,000
Other	4,000
Utilities and Misc.	17,000
	4,000
TOTAL	\$285,000

# ESTIMATE OF MAINTENANCE AND OPERATION COSTS

(Continued)

## MAINTENANCE OF ROADWAY AND STRUCTURES

### Personnel

2 - Engineer	\$ 9,000
3 - Maintenance Supervisors	12,000
3 - Mechanics	11,000
6 - Equipment Operators	20,000
15 - Truck Drivers	45,000
4 - Painters, Welders, Electricians	13,000
10 - Laborers	27,000
Part Time Labor	5,000

TOTAL \$147,000

Retirement and Social Security	\$ 10,000
Equipment Operation and Repair	39,000
Equipment Depreciation	50,000
Materials	50,000
Utilities and Misc.	10,000

TOTAL \$306,000

## HIGHWAY PATROL

### Personnel

2 - Sergeants	\$ 8,000
14 - Officers	49,000

TOTAL \$ 57,000

Retirement and Social Security	4,000
Vehicle Operation	18,000
Misc. Supplies, Uniforms	4,000

TOTAL \$ 83,000

