63rd Street at Indian Creek Drive Intersection
MIAMI-DADE COUNTY, FLORIDA

FINAL PRELIMINARY ANALYSIS, EVALUATION, AND RECOMMENDATION REPORT

WPI NUMBER: 6119832
STATE PROJECT NUMBER: 99006-1635
FM NUMBER: 25062212201

Prepared For:
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT SIX

Prepared By:
Reynolds, Smith and Hills, Inc.
300 S. Pine Island Road, Suite 300
Plantation, FL 33324-2619

JANUARY 29, 1999

63rd Street at Indian Creek Drive Intersection
MIAMI-DADE COUNTY, FLORIDA

FINAL PRELIMINARY ANALYSIS, EVALUATION, AND RECOMMENDATION REPORT

WPI NUMBER: 6119832
STATE PROJECT NUMBER: 99006-1635
FM NUMBER: 2506221201

Prepared For:
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT SIX

Prepared By:
Reynolds, Smith and Hills, Inc.
300 S. Pine Island Road, Suite 300
Plantation, FL 33324-2619

JANUARY 29, 1999

TABLE OF CONTENTS

Section			Page
1.0	EXECUTIVE SUMMARY		1
	1.1	Introduction and Purpose	1
	1.2	Existing Conditions and Needs	1
	1.3	Viable Alternatives	3
	1.4	Recommendations	4
2.0	INTRODUCTION		5
3.0	EXISTING CONDITIONS		5
	3.1	Roadway Typical Sections	5
	3.2	Existing Bridges	8
	3.3	Drainage	9
	3.4	Pedestrian and Bicycle Facilities	9
	3.5	Recreational Facilities	12
	3.6	Landscaping	12
	3.7	Accident Analysis	13
4.0	NEED FOR IMPROVEMENT		13
	4.1	Deficiencies of the Existing Facility	13
		4.1.1 Capacity	13
		4.1.2 Flyover Structure	14
		4.1.3 Safety	14
	4.2	Planned and Programmed Improvements	14
	4.3	Multimodal Transportation Systems Considerations	15
5.0	DESIGN CRITERIA		16
	5.1	Design Standards	16
	5.2	Design Constraints	17
6.0	ALTERNATIVES ALIGNMENT ANALYSIS		17
	6.1	No-build Option	17
	6.2	Transportation System Management (TSM) Alternative	19
	6.3	Milling and Resurfacing Existing Roadway	19
	6.4	Requested Modifications	19

TABLE OF CONTENTS (CONTINUED)

Section			Page
6.5	Build Alternatives		20
	6.5.1	Alternative 1: At-Grade Improvements	20
	6.5.2	Alternative 2: New Flyover	25
	6.5.3	Landscape Opportunities	29
	6.5.4	Maintenance Costs	31
	6.5.5	Evaluation of Alternatives	32
		6.5.5.1 Design Parameters	32
		6.5.5.2 Level of Service	32
		6.5.5.3 Evaluation Matrix	34
7.0	RECOMMENDATION		37

LIST OF TABLES

Table		Page
Table 1	Pedestrian Volumes at the 63rd Street and Indian Creek Drive Intersection	12
Table 2	Programmed Improvements	15
Table 3	Design Criteria	18
Table 4	Design Standards and Design Parameters Used	33
Table 5	PM Peak Level of Service	35
Table 6	Evaluation Matrix	36

LIST OF FIGURES

Figure		Page
Figure 1	Existing Intersection	6
Figure 2	Existing Roadway Typical Sections	7
Figure 3	63rd Street Flyover - Looking East from Bascule Bridge Crossing	10
Figure 4	63rd Street Flyover - at Touchdown, Looking South on Indian Creek Drive	10
Figure 5	63rd Street Flyover - Southbound on Indian Creek Drive Denoting Vehicle Impacts on the Flyover	11
Figure 6	63rd Street - Looking Westbound at Indian Creek Drive Intersection	11
Figure 7	Proposed Typical Sections for Alternative 1	21
Figure 8	Alternative 1 - At-Grade Improvement	22
Figure 9	Alternative 1 - Landscape Opportunities	24
Figure 10	Proposed Typical Sections for Alternative 2	26
Figure 11	Alternative 2 - New Flyover	27
Figure 12	Alternative 2 - Flyover Profile Sheet	28
Figure 13	Alternative 2 - Landscape Opportunities	30

1.0 EXECUTIVE SUMMARY

1.1 Introduction and Purpose

This report was prepared to review potential safety and Level of Service (LOS) improvements to the intersection of 63rd Street and Indian Creek Drive in the City of Miami Beach, Florida. Currently, a grade-separated flyover structure carries eastbound traffic from 63rd Street to northbound Indian Creek Drive. The purpose of this report is to examine current and future travel conditions for this facility and propose solutions which would reduce safety concerns and restore more acceptable LOS conditions. Several options were considered for this intersection, including a No-build Option and two build alternatives. The build alternatives included: Alternative 1, an at-grade intersection; and Alternative 2, replacement of the existing flyover structure with a new flyover to provide 4.27 meters (m) [14 feet (14')] of vertical clearance. The only significant constraint adhered to throughout the alternatives analysis was that no appreciable right-of-way acquisition would be allowed.

1.2 Existing Conditions and Needs

The flyover structure consists of a 171 m (560') seven span, continuous solid slab, reinforced concrete bridge. It is functionally obsolete in its physical design and poses a safety hazard due to its limited vertical clearance. The structure is posted with an 3.56 m (11'-8") under-clearance for vehicles traveling southbound on Indian Creek Drive beneath the structure. The flyover carries one traffic lane on a deck that provides a pavement width (roadway plus shoulders) ranging from 3.51 m (11'-6") to 4.11 m (13'-6"). The flyover structure has been subjected to repeated impacts due to large vehicles attempting to pass under the structure while traveling southbound on Indian Creek Drive. The flyover structure has an estimated remaining life of 15 years, based on inspection reports provided by the Department.

As part of this project effort, a traffic study was completed which included obtaining existing volume counts, turning movements, pedestrian counts and estimates of truck traffic. This data was analyzed through recognized traffic modeling programs for the purpose of verifying current travel conditions as well as LOS conditions for 5, 10, 15 and 20 years in the future. Based on that information, it was confirmed that the AM peak hour conditions for southbound traffic using the two continuous right

turn lanes was LOS F regardless of the alternative considered. Because of the right-of-way constraint, it was not possible to remedy that condition for any option studied. Consequently, the focus of the study was to identify alternatives that improved the PM peak hour conditions while improving safety.

A review of accidents at this intersection was made for the years 1995, 1996 and 1997. The State of Florida compiles accident information and reviews the number of accidents against state-wide averages. Locations with safety ratios equal to or higher than 1.0 are considered high crash locations. The computed safety ratios at this intersection were 0.910, 0.753, and 2.341 for those years, respectively. Twelve of the 28 crashes that occurred in 1997 involved right angle collisions between vehicles traveling southbound and eastbound at the signalized intersection. A contributing factor to these crashes, most likely, was reduced visibility for oncoming traffic resulting from the flyover structure. Two other crashes in 1997 were a result of vehicles hitting the flyover structure.

A number of issues have been identified by the public in the past. Some temporary and some more permanent remedies were reviewed and rejected from additional consideration. These included Transportation Systems Management alternatives primarily dealing with transit options as well as milling and resurfacing the existing roadway in the vicinity of the flyover structure to increase the vertical clearance [by as much as 0.15 m (6")] under the structure. The milling alternative, however, would have reduced the expected life of the roadway under the flyover and would be limited to a maximum increase in vertical clearance from the existing 3.6 m (11'-8") to 3.8 m (12'-2") due to the proximity of support foundations for the flyover and utilities. This would not provide adequate design life for the pavement or meet minimum American Association of State Highway and Transportation Officials (AASHTO) or Florida Department of Transportation (FDOT) design standards.

Two other suggestions by the City of Miami Beach were examined as possible interim solutions: Painting the existing flyover to enhance visibility of the structure and placing additional warning signs for southbound traffic. Painting the flyover structure violates current FDOT policy and, more

importantly, adds to a growing list of on-going maintenance issues for this bridge. However, if the City were to apply for a permit to paint a strip along the bottom of the flyover for motorists to identify, the Department would re-consider its policy. Placing additional advance warning signs for the southbound traffic on Indian Creek Drive was also examined. However, an inventory of existing signs suggests that there are more than sufficient advance warning signs consisting of both a graphic format and a written format as well as an overhead sign carried on mast arms. Additional signage is not warranted and, in fact, could be very confusing.

1.3 Viable Alternatives

Three alternatives were considered in detail. These included the No-build Option and two build alternatives. The No-build Option would retain the intersection configuration as it currently exists.

Alternative 1 would remove the existing flyover structure and construct an at-grade intersection. The improvements would allow for three left-turn lanes for traffic traveling eastbound on 63rd Street to turn to northbound Indian Creek Drive. Southbound, two right-turn lanes on Indian Creek Drive will remain free flow similar to existing operation. Alternative 1 will provide a better LOS operation at the intersection. The southbound free-flow right-turn movement also should be posted with a 30 kilometers per hour (km/h) [20 miles per hour (mph)] speed limit to meet minimum AASHTO design standards. This applies to the No-build Option as well as to both build alternatives. Minimal additional right-of-way may be necessary for this alternative on the east side of Indian Creek Drive near the 63rd Street intersection. This alternative would remove the existing flyover structure from the intersection, thereby improving visibility for oncoming traffic and eliminating this fixed object. This will reduce the potential for crashes. Pedestrian access would be improved by adding a mid-block pedestrian activated signal on Indian Creek Drive north of 63rd Street. Landscaping opportunities would also be enhanced by larger raised islands for this alternative. This alternative would cost $1,440,000 to construct and would meet FDOT standards for a 60 km/h (35 mph) design speed.

Alternative 2 would replace the existing flyover structure with a new flyover bridge that would increase the vertical clearance to 4.25 m (14'-0"). No additional right-of-way would be required for this alternative. Pedestrian access would be improved by providing pedestrian crosswalks for the south, east, and north legs of the signalized intersection and by providing a pedestrian activated signal to cross the free-flow southbound right-turn lanes. Landscaping opportunities would be enhanced by the provision of additional raised barrier islands. The construction cost for Alternative 2 is $3,330,000. This alternative was designed to fit within existing right-of-way and to retain the 63rd Street draw bridge without reconstruction. The alternative would meet minimum AASHTO design standards, but would not meet minimum FDOT standards in terms of vertical clearance and flyover clear width.

The existing flyover structure is functionally obsolete due to its inadequate pavement width [a minimum of 3.51 m (11'-6")] and the vertical under-clearance of 3.56 m (11' - 8"). The No-build Option does not meet current FDOT or AASHTO design standards in terms of either the vertical clearance or the clear width provided on the flyover structure to carry motor vehicles. Additionally, the maximum grade on the flyover is 7.5 percent which exceeds the maximum desired grade of 6.0 percent for this roadway. Prior traffic analyses indicate that the existing intersection would operate at LOS F in the AM and PM peak hours of the design year (2021), assuming the existing geometry remains unchanged. Neither the existing flyover structure or the one proposed for Alternative 2 would operate at an acceptable LOS in the 2021 design year. In order to achieve an acceptable LOS, two travel lanes would need to be provided on either flyover structure. This is not possible due to the need for significant right-of-way.

1.4 Recommendations

The No-build Option and the two build alternatives were evaluated using criteria identified by the Department. Based on those criteria, it is recommended that Alternative 1 be approved for construction. Alternative 1 will be able to meet current design standards, will improve PM peak hour travel conditions, will replace the existing substandard flyover structure, and will cost less than one half the total cost of Alternative 2.

2.0 INTRODUCTION

This Preliminary Analysis, Evaluation, and Recommendations Report (Report) has been prepared to consider improvements to the State Road 907 (63rd Street) and State Road A1A (Indian Creek Drive) intersection. The project is located in the City of Miami Beach, Miami-Dade County, Florida. The predominant feature at this intersection is a grade-separated flyover which serves to carry eastbound traffic from 63rd Street to northbound Indian Creek Drive. Several options are under consideration for this intersection, including the No-build Option and two build alternatives. The build alternatives include: an alternative for an entirely at-grade intersection and an alternative to replace the existing flyover structure to provide 4.27 m (14') of vertical clearance.

3.0 EXISTING CONDITIONS

3.1 Roadway Typical Sections

Sixty-third Street runs in an east-west direction at its intersection with Indian Creek Drive. The existing intersection is shown in Figure 1. Brittany Bay Park, owned by the City of Miami Beach, is located in the northwest quadrant of the intersection and separates Indian Creek Drive from Indian Creek. Sixty-third Street west of the Indian Creek Drive intersection has a four-lane roadway and a posted speed limit of 30 mph (48 km/h). Approximately 61 m (200') west of the intersection a draw bridge is provided to allow boats to navigate Indian Creek. A flyover structure begins just east of the opening portion of the bascule bridge that carries eastbound left-turning vehicles from 63rd Street to northbound Indian Creek Drive. The typical cross section for 63rd Street on the east end of the bascule bridge at the start of the flyover structure is shown in Figure 2. At this location, two westbound lanes are provided, the flyover structure starts for the eastbound left turn, and two lanes continue eastbound to the signalized intersection with Indian Creek Drive.

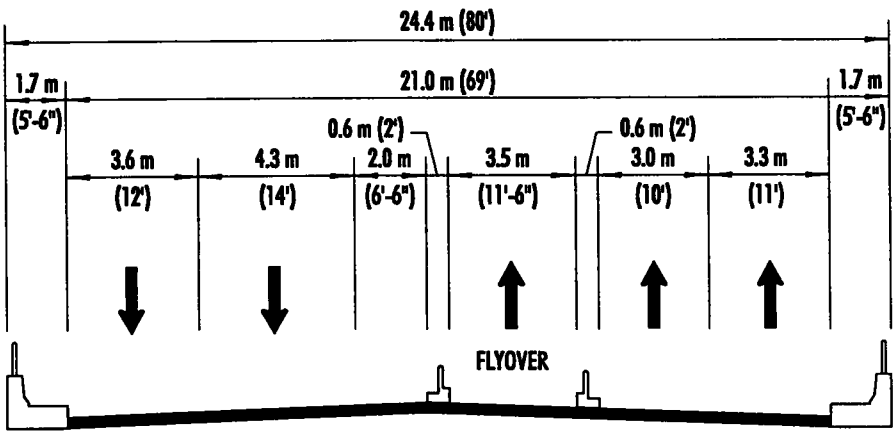
The east leg of the intersection provides a four-lane divided roadway with a left-turn lane and a right-turn lane approaching the intersection and two lanes head eastbound away from the intersection. Indian Creek Drive north of the intersection is a six-lane divided roadway, which has a posted 30

STATE PROJ. NO.	SHEET NO.

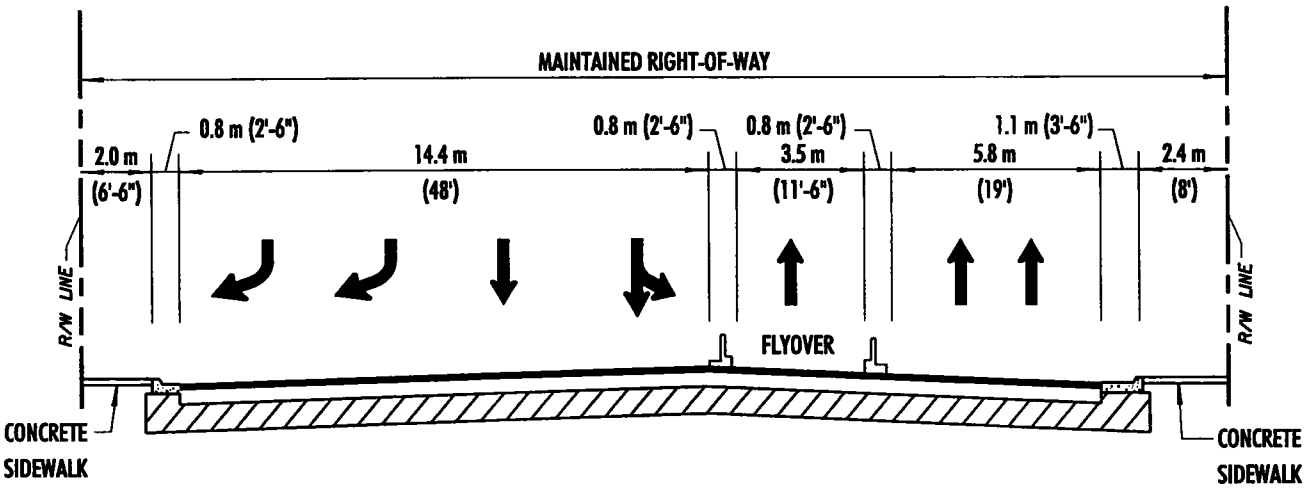
REVISIONS														
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

FLORIDA DEPARTMENT OF TRANSPORTATION

FIGURE 1: EXISTING INTERSECTION



63rd STREET DRAW BRIDGE



INDIAN CREEK DRIVE
NORTH OF 63rd STREET

FIGURE 2	EXISTING ROADWAY TYPICAL SECTIONS	RS&H Reynolds, Smith and Hills, Inc.

I:\1067150.015\DESIGN\TYP01A.DGN

mph (48 km/h) speed limit. At the point where the flyover structure touches down, southbound traffic is provided a combined left-through lane, a through lane, and two right-turn lanes which travel in a free-flow movement to westbound 63rd Street. Northbound traffic has the single lane coming from the flyover structure and two through lanes coming from the signalized intersection (Figure 2).

On the south leg of the intersection, Indian Creek Drive continues as a one-way, southbound roadway providing three through lanes with parking on both sides of the road.

3.2 Existing Bridges

There are two bridges on 63rd Street approaching Indian Creek Drive. A bascule bridge is provided to allow boats to navigate Indian Creek. The opening portion of this bridge ends just west of the flyover structure which carries eastbound left turns to northbound Indian Creek Drive.

The flyover structure consists of a 171 m (560') seven span, continuous solid slab, reinforced concrete bridge. The superstructure consists of a 0.61 m (2') thick reinforced concrete section. The structure is posted with a 3.56 m (11'-8") clearance for vehicles traveling southbound on Indian Creek Drive under the structure. The structure carries one traffic lane on a deck that provides a pavement width (roadway plus shoulders) ranging from 3.51 m (11'-6") to 4.11 m (13'-6"). Barrier railings of 0.30 m (1') are provided on the outside of the travel way. The additional width for the travel way is provided to ease turns through the existing 36.6 m (120') radius horizontal curve on the flyover.

The flyover bridge has been rated from generally good to good condition with an estimated remaining life of 15 years. A recent bridge inspection report provided by the FDOT contains the following ratings for the flyover:

- Deck N/A
- Superstructure 7
- Substructure 8
- Channel & Channel Protection N/A
- Approach Roadway Alignment 7

The deck received a "not applicable" rating because there is no separate bridge deck. In general, the structural components of the flyover bridge are in good condition. The flyover bridge is rated as functionally obsolete. This results from inadequate roadway and shoulder widths on the structure and a substandard vertical clearance.

Various views of the existing intersection and flyover structure are shown in Figures 3 through 6. Due to the limited under clearance, the flyover structure has been struck numerously by vehicles traveling southbound on Indian Creek Drive. The results of these impacts are shown in Figure 5.

3.3 Drainage

Along Indian Creek Drive, the drainage system is composed of a series of "mini-drains", where each such mini-system consists of two or more inlets located directly across the street from each other. These inlets are connected by a pipe which slopes from the east side of Indian Creek Drive to the west. The west inlet then outfalls directly into Indian Creek through an opening in the seawall. This type of drainage, prevalent along the promenade areas of Indian Creek Drive, appears to be the original system constructed with the roadway. At the present time, there appears to be no known treatment or pollution abatement for the roadway in this area. In general, the existing drainage system appears to work well.

3.4 Pedestrian and Bicycle Facilities

Sidewalks are provided for pedestrian access to the area on both sides of all legs of the 63rd Street and Indian Creek Drive intersection. At the signalized intersection, pedestrian crosswalks are provided for the south and east legs. No accommodations are provided for pedestrians to cross the west or north legs of the intersection.

Manual pedestrian volume counts were conducted as part of this project at the intersection of 63rd Street and Indian Creek Drive. The pedestrian volume counts were conducted on November 17, 1998 during the AM peak period (7:30 a.m. to 9:30 a.m.), midday peak period (11:30 a.m. to 1:30 p.m.) and PM peak period (4:30 p.m. to 6:30 p.m.). The results of these pedestrian counts are

Figure 3. 63rd Street Flyover - Looking east from bascule bridge crossing.

Figure 4. 63rd Street Flyover - At touchdown, looking south on Indian Creek Drive.

Figure 5. 63rd Street Flyover - Southbound on Indian Creek Drive denoting vehicle impacts on the flyover.

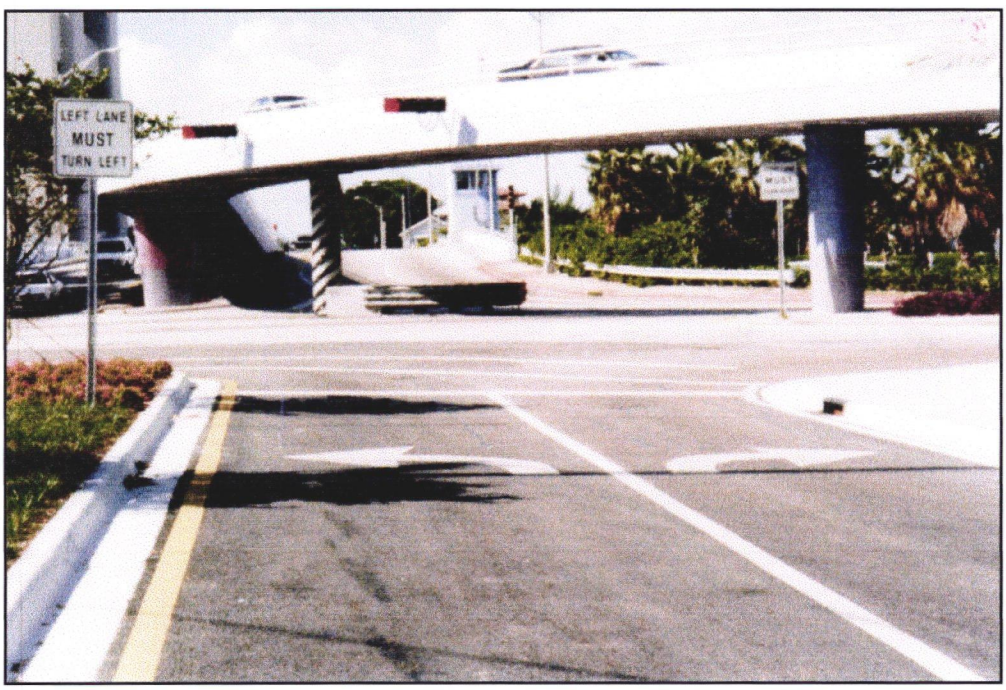


Figure 6. 63rd Street - Looking westbound at Indian Creek Drive intersection.

provided below in Table 1. Pedestrian group sizes were also recorded for the study. All group sizes recorded contained five or less pedestrians. This is the minimum pedestrian group size specified in the Manual of Uniform Traffic Studies. A goal of this project assignment is to improve pedestrian access.

Table 1. Pedestrian Volumes at the 63rd Street and Indian Creek Drive Intersection

PEDESTRIAN MOVEMENT				
Time Period	**North Side**	**South Side**	**East Side**	**West Side**
8:00 - 9:00 a.m	6	6	16	13
12:00 - 1:00 p.m.	2	12	4	0
5:00 - 6:00 p.m.	2	21	7	3

3.5 Recreational Facilities

Brittany Bay Park is located in the northwest quadrant of the 63rd Street and Indian Creek Drive intersection. This is a public park operated by the City of Miami Beach. Any right-of-way acquisition from this facility would require preparation of a Section 4(f) evaluation according to the United States Department of Transportation Act of 1966.

Bicyclists have the ability to travel in the outside travel lanes for all roadways approaching and leaving the intersection.

3.6 Landscaping

Landscaping within the road right-of-way is provided on the east leg of 63rd Street between Indian Creek Drive and Collins Avenue. This includes landscaping in the median and on the north side of the road. Due to limited right-of-way, opportunities for additional landscaping are limited. A goal of this project is to provide enhanced landscaping opportunities.

3.7 Accident Analysis

An accident analysis was conducted for the intersection of 63rd Street and Indian Creek Drive. Accident data for the period, from January 1, 1995 through December, 1998, were obtained from the FDOT. The data shows a total of 46 accidents recorded during the three-year period. Ten accidents were recorded in 1995, eight in 1996, and 28 in 1997. A total of 16 accidents involving injuries were recorded and no fatalities resulted from any of the accidents.

During the year 1995, seven of the 10 recorded accidents (70%) involved collisions with the flyover structure. Additional warning devices were installed which reduced the number of crashes with the flyover structure to zero in 1996 and two in 1997. Twelve of the 28 crashes that occurred in 1997 involved right angle collisions between vehicles traveling southbound and eastbound at the signalized intersection. A contributing factor to these crashes, most likely, was reduced visibility for oncoming traffic resulting from the flyover structure. The limited pavement width on the flyover structure also has led to numerous impacts of the barrier walls on the structure by vehicles traveling on the flyover.

The safety ratio compares the crash rate at a study location with the critical crash rate for similar spot locations throughout the State. Locations with safety ratios greater than or equal to 1.0 are considered high crash locations. The computed safety ratios for the years 1995, 1996, and 1997 were 0.910, 0.753, and 2.341 respectively. Based on these results the intersection experienced an abnormally high accident rate during 1997.

4.0 NEED FOR IMPROVEMENT

The following section discusses and identifies the need for the proposed improvement. The deficiencies and improvements are discussed with respect to local and regional planning efforts.

4.1 Deficiencies of the Existing Facility

4.1.1 Capacity

A traffic study was completed as part of this project. The study included collection of existing traffic counts and projection of future traffic volumes to the 2021 design year at the following intersections

and connecting links: 63rd Street at Allison Road, 63rd Street at Indian Creek Drive, 63rd Street at Collins Avenue, and 65th Street at Indian Creek Drive. The Project Traffic Report dated January 1999 provides detailed information regarding the methodology used to develop the traffic projections and contains the printouts from the computer analysis of the Level of Service (LOS) provided. The results of this analysis indicate that the flyover structure would operate at LOS F and the signalized intersection would operate at LOS D in the PM peak hour of the design year, assuming the existing intersection geometry remains unchanged.

4.1.2 Flyover Structure

As noted above, the existing flyover structure carrying eastbound left-turning traffic on 63rd Street to northbound Indian Creek Drive is functionally obsolete. This is due to both the inadequate travel way width provided, a minimum of 3.51 m (11' - 6"), and the vertical under clearance of 3.56 m (11' - 8"). Additionally, the grade for traffic traveling down the flyover is 7.5 percent.

4.1.3 Safety

A review of accidents at the intersection has been conducted for the years 1995, 1996, and 1997. The safety ratios for 1995, 1996, and 1997 were 0.910, 0.753, and 2.341 respectively. Safety ratios that are greater than 1.0 are considered high crash locations. A very high accident ratio occurred in 1997.

4.2 Planned and Programmed Improvements

The 2015 Long Range Transportation Plan adopted by the Metropolitan Planning Organization for the Miami Urbanized Area has been reviewed. This plan identifies only those projects that are systems level or capacity improvement projects. Projects listed in FDOT's approved 1996 Transportation Improvement Program (TIP) are referred to as Priority 1 projects and are listed in the Plan's Appendix. Table 2 provides a summary of the TIP programmed improvements in the immediate vicinity of 63rd Street and Indian Creek Drive. According to the Appendix table entitled "Approved 1996 Transportation Improvement Program Projects (over $500,000)", the 63rd Street Flyover is listed on page 65 of the 1996 TIP under WPI number 6114117. Because this project is

listed in the 1996 TIP, it is incorporated by reference in the Priority 1 category of projects in the 2015 Long Range Transportation Plan.

Table 2. Programmed Improvements

Approved 1996 Transportation Improvement Program Projects (over $500,000)				
1996 TIP Pg. No.	**WPI**	**FACILITY**	**LIMITS**	**IMPROVEMENTS**
58	6113864	SR-A1A / Collins Ave	From 5 St/US-41 to 26 St	Preliminary Engineering (6 lanes)
65	6114117	SR-A1A / Indian Creek	From 59 St to 62 Abbott Ave	Replace Grade Separation-Conc.

4.3 Multimodal Transportation Systems Considerations

The Miami-Dade Transit Authority provides public transportation on a countywide basis. This multi-modal transit agency includes Metrobus, Metrorail, and Metromover. For the 63rd Street Flyover vicinity, riders must use Metrobus to connect with Metrorail or Metromover. During most operating hours, riders can reach one of the multi-modal transit terminals within 20 minutes of departing either of two southbound Metrobus stops near the intersection.

Metrobus has 70 routes serving all of Miami-Dade County and operates seven days a week, up to 22 hours a day. Bus service in the vicinity of the 63rd Street Flyover is available seven days a week, approximately 20 hours a day. Metrobus has three routes that serve the 63rd Street Flyover area: Routes H, S, and T. There are two northbound and two southbound stops in the vicinity of the 63rd Street Flyover. For all three routes, the northbound stops are at 41st Street and Collins Avenue and at 69th Street and Collins Avenue; the southbound stops are at 41st Street and Indian Creek Drive and at 69th Street and Abbott.

Metrobus Route H provides local service to Skylake Mall, 163rd Street Mall, Bal Harbour Shops, Lincoln Road Mall, and Rebecca Towers. Bus headways are every 20 to 25 minutes during weekday operating times.

Metrobus Route S provides local service to Aventura Mall, Haulover, Bal Harbour, Surfside, Lincoln Road Mall, and Bayside. This route also has connections to the Metromover, Metrorail, and the downtown bus terminal. Buses arrive every 10 to 15 minutes during most operating times, including weekends.

Metrobus Route T is a limited-stop route providing local service to Bal Harbour and Surfside. This route has connections to the Metromover, Metrorail, and the downtown bus terminal. Buses arrive every 20 to 30 minutes during most operating times, including weekends; however, the hours of operation are only approximately 16 hours a day and service ends around 10 p.m.

5.0 DESIGN CRITERIA

5.1 Design Standards

Engineering design criteria include such items as lane and median widths, bridge and roadway shoulders widths, horizontal curvature, superelevation, horizontal clearances, grades, and vertical clearances. Operational criteria consist of design speeds and levels of service.

Design criteria for this study are based upon current design standards established by FDOT, American Association of State Highway and Transportation Officials (AASHTO), and the Federal Highway Administration (FHWA). The following documents were among the principal references used in establishing the design criteria for this study:

- *Plans Preparation Manual*, Volume 1 Metric, Roadway Design Office, FDOT, 1998;
- *A Policy on Geometric Design of Highways and Streets*, AASHTO 1994; and
- *Manual of Uniform Traffic Control Devices for Streets and Highways*, FHWA, 1988.

Table 3 presents the roadway design criteria which were used to develop alternatives for the proposed improvements.

5.2 Design Constraints

Several design constraints limit the ability to meet the design criteria. A number of site specific constraints limit the ability to meet FDOT criteria for the desired 60 km/h (35 mph) design speed. Brittany Bay Park is located in the northeast quadrant of the intersection. Acquisition of right-of-way from this park is not considered acceptable. The existing bascule bridge on 63rd Street cannot be replaced at this time. This limits the width available coming off the bridge structure and limits the vertical clearance that can be provided under a new flyover. A 4.3 m (14'-0") vertical clearance was established as the minimum acceptable for a new flyover structure. AASHTO establishes minimum design criteria that must be followed in the development of alternatives and the FDOT has established design criteria for highway improvements. The AASHTO minimum criteria for the desired 60 km/h (35 mph) design speed and the AASHTO minimum design speed of 30 km/h (20 mph) are indicated in Table 3. FDOT criteria for the 60 km/h (35 mph) design speed and the minimum reported design speed of 40 km/h (25 mph) are also indicated in Table 3.

6.0 ALTERNATIVES ALIGNMENT ANALYSIS

The following sections discuss the alternatives developed and analyzed for the 63rd Street at Indian Creek Drive intersection.

6.1 No-build Option

The No-build Option would allow the existing facility to remain without substantial improvements. This alternative would save the cost of construction improvements. No short-term disruption of the community would result from this option since construction would not take place. The No-build Option does not provide for the anticipated growth in traffic volumes in the future. This option also would not improve pedestrian access or provide additional landscaping opportunities. Greater congestion and delays would be expected in the future with the No-build Option.

Table 3. Design Criteria

Metric Units

	Design Standard			
	AASHTO		FDOT	
Design Speed[1]	60 km/h	30 km/h	60 km/h	40 km/h
Lane Width	3.0 to 3.6	3.0 to 3.6	3.3 to 3.6	3.3 to 3.6
Superelevation Ratio (Maximum)	0.05	0.05	0.05	0.05
Horizontal Radius (SB Right Turn)	145	33	145	60
Flyover Structure				
Horizontal Radius (Flyover Structure)	145	33	145	60
Flyover Entrance Pavement Width	4.3[2]	4.3[2]	6.6	3.6
Bridge Pavement Width	4.3[2]	4.3[2]	8.1	6.6
Flyover Exit Pavement Width	4.3[2]	4.3[2]	6.6	5
K - Sag	15	4	18	10
K - Crest	14	3	18	5
Maximum Vertical Grade	6.0%	6.0%	6.0%	6.0%
Vertical Clearance	4.3	4.3	5.05	5.05

English Units

	Design Standard			
	AASHTO		FDOT	
Design Speed[1]	35 mph	20 mph	35 mph	25 mph
Lane Width	10' to 12'	10' to 12'	11' to 12'	11' to 12'
Superelevation Ratio (Maximum)	0.05	0.05	0.05	0.05
Horizontal Radius (SB Right Turn)	475'	110'	475'	200'
Flyover Structure				
Horizontal Radius (Flyover Structure)	475'	110'	475'	200'
Flyover Entrance Pavement Width	14'-0"[2]	14'-0"[2]	21'-8"	21'-8"
Bridge Pavement Width	14'-0"[2]	14'-0"[2]	26'-7"	26'-7"
Flyover Exit Pavement Width	14'-0"[2]	14'-0"[2]	21'-8"	21'-8"
K - Sag	15	4	18	10
K - Crest	14	3	18	5
Maximum Vertical Grade	6.0%	6.0%	6.0%	6.0%
Vertical Clearance	14'-0"	14'-0"	16'-6"	16'-6"

[1]km/h=kilometers per hour; mph=miles per hour

[2]If bypass is available.

Source: RS&H, 1999

I:\1067150.015\report\dspd.xls Table 3

6.2 Transportation System Management (TSM) Alternative

Transportation System Management alternatives have been reviewed for the project area. Alternatives such as mass transit, fringe parking, and ride-sharing would have little or no impact on reducing the traffic volumes at this intersection. No other means of transit are available to replace the existing highway proposed for improvement.

6.3 Milling and Resurfacing Existing Roadway

An alternative was reviewed to lower the pavement elevation in the vicinity of the existing flyover structure in order to increase the vertical clearance by 0.3 m (1'). This would be accomplished by milling the existing pavement. Upon investigation it was determined that the foundations for the existing flyover structure are located approximately 0.15 m (6") below the surface and are located under the existing roadway. Therefore, the maximum reduction would be limited to under 0.15 m (6").

Reducing the pavement by this amount would weaken the pavement, limiting its useful life. The vertical clearance could only be increased to 3.8 m (12'-2") which is below AASHTO and FDOT minimum design standards. The existing drainage system would need to be modified or replaced. A number of utility lines are located under the pavement that are close to the surface. These would weaken the pavement if the roadway were milled and resurfaced. Due to the limited increase in vertical clearance, this alternative would not result in a significant reduction in accidents. This alternative was dropped from further consideration because it would not provide an effective improvement in the existing conditions.

6.4 Requested Modifications

Several requests to modify the existing conditions were reviewed. Painting the existing flyover was considered to enhance the structure's appearance and to provide a visual warning of the vertical clearance problem. The existing flyover is a concrete structure. FDOT has a statewide policy that restricts the painting of concrete structures. The existing advance warning signs are adequate,

therefore, very little benefit could be obtained by painting the flyover. Due to the limited benefit that could be achieved, painting the structure is not considered viable.

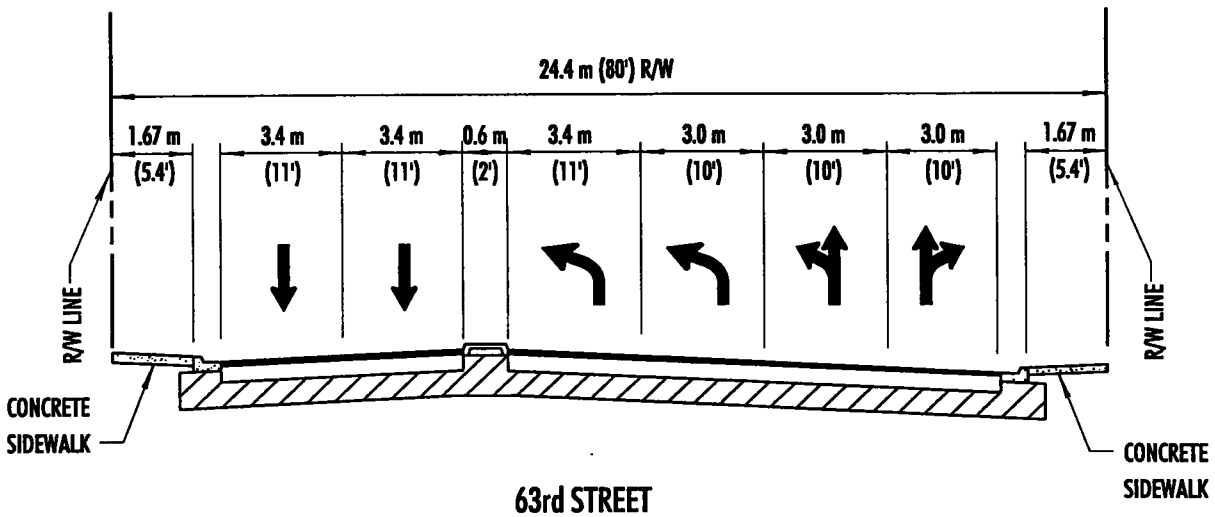
Additional advance warning signs were also considered to warn motorists of the 3.6 m (11'-8") vertical clearance for the existing flyover structure. Existing signs warning motorists of the vertical clearance are provided in graphical format, in written format, and by an overhead sign carried on mast arms. The existing signage has been maximized to warn approaching motorists. It is believed that additional signs would serve no useful purpose.

6.5 Build Alternatives

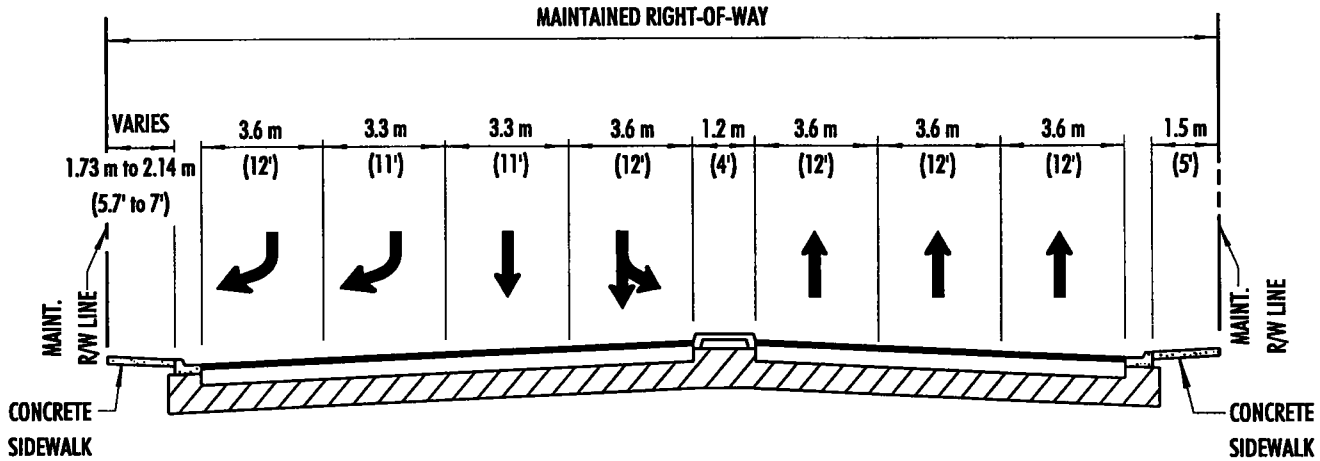
6.5.1 Alternative 1: At-Grade Improvements

Alternative 1 considers the improvement of the 63rd Street and Indian Creek Drive intersection by removing the existing flyover structure and handling all traffic via at-grade movements. Eastbound traffic on 63rd Street would be provided two left-turn lanes, a combined left-through lane, and a combined through-right turn lane. Westbound traffic on 63rd Street would be re-channeled into a right-turn only movement. Southbound traffic on Indian Creek Drive would be provided a combined left-through lane, a through lane, and two right-turn lanes. All movements at the intersection would run through a traffic signal with the exception of the southbound right-turn lanes, which would operate under free-flow condition. The southbound free-flow right-turns travel through a curve with an existing horizontal radius of 35.0 m (115'). This curve does not meet the 60 km/h (35 mph) design speed, therefore, the turn should be posted for a 30 km/h (20 mph) speed limit. Figure 7 provides the typical sections and Figure 8 provides a plan view of the proposed improvements for Alternative 1.

The Traffic Report, dated January 1999, has provided a detailed analysis of expected operating conditions for this alternative. The traffic analysis has found that the proposed geometry would allow the intersection to operate at LOS B conditions in the 2021 design year.



63rd STREET

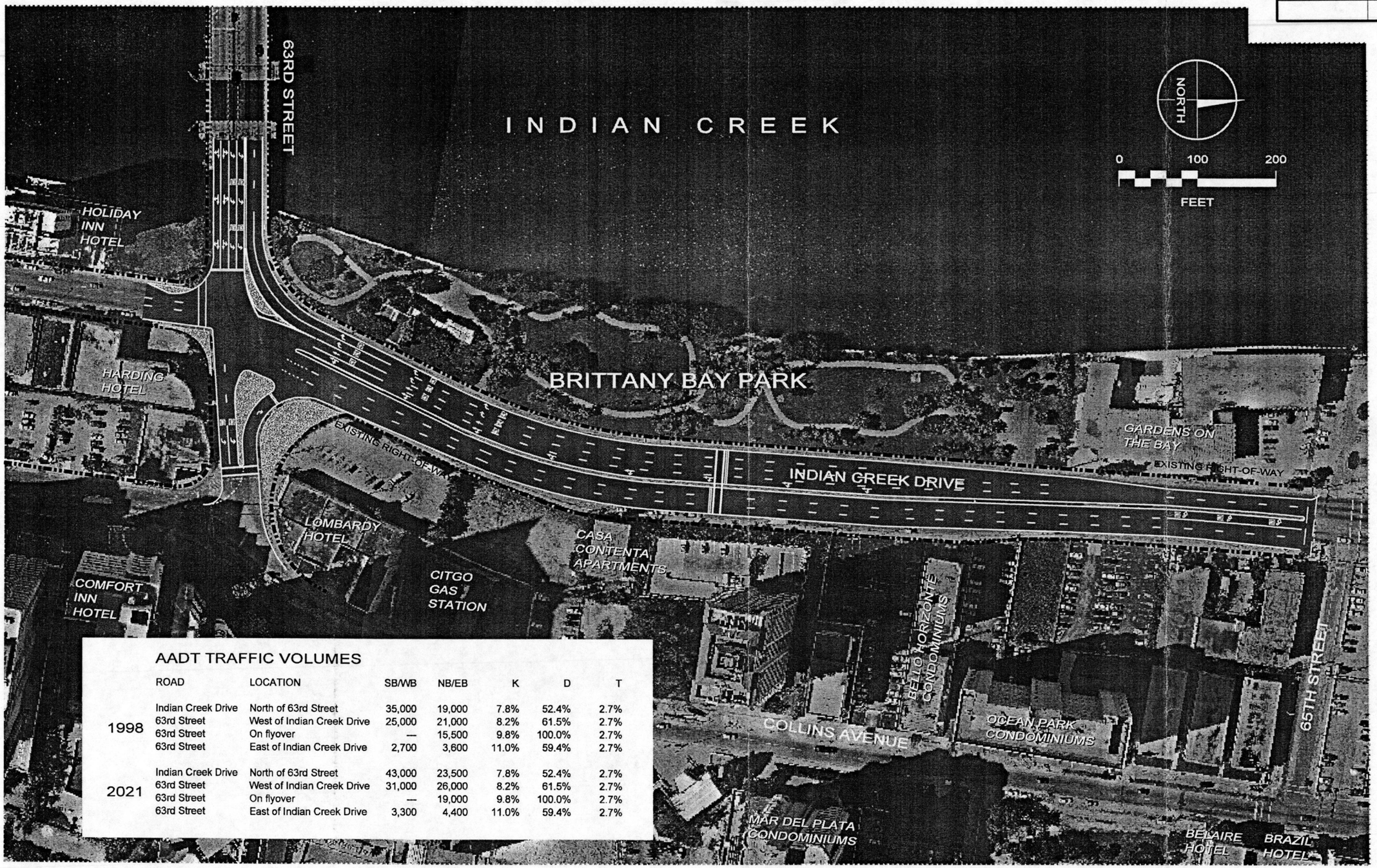


INDIAN CREEK DRIVE

FIGURE 7	PROPOSED TYPICAL SECTIONS FOR ALTERNATIVE 1	RS&H Reynolds, Smith and Hills, Inc.

I:\ 106715D.015\DESIGN\TYP03A.DGN

STATE PROJ. NO.	SHEET NO.



AADT TRAFFIC VOLUMES

	ROAD	LOCATION	SB/WB	NB/EB	K	D	T
1998	Indian Creek Drive	North of 63rd Street	35,000	19,000	7.8%	52.4%	2.7%
	63rd Street	West of Indian Creek Drive	25,000	21,000	8.2%	61.5%	2.7%
	63rd Street	On flyover	---	15,500	9.8%	100.0%	2.7%
	63rd Street	East of Indian Creek Drive	2,700	3,600	11.0%	59.4%	2.7%
2021	Indian Creek Drive	North of 63rd Street	43,000	23,500	7.8%	52.4%	2.7%
	63rd Street	West of Indian Creek Drive	31,000	26,000	8.2%	61.5%	2.7%
	63rd Street	On flyover	---	19,000	9.8%	100.0%	2.7%
	63rd Street	East of Indian Creek Drive	3,300	4,400	11.0%	59.4%	2.7%

REVISIONS														
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

FLORIDA DEPARTMENT OF TRANSPORTATION

FIGURE 8: ALTERNATIVE 1 - AT-GRADE IMPROVEMENT

Safety of the intersection would be improved for Alternative 1. The existing flyover structure would be removed, eliminating the vertical clearance problem for southbound through traffic. The visual obstruction which may have contributed to the substantial number of right angle crashes at the signalized intersection will be removed. This will enhance the safety for motorists at the intersection.

A limited amount of right-of-way may be required for this alternative. No business or residential relocations would result from this alternative. This alternative will have minimal impact on area drainage. Due to the removal of the existing flyover structure and laneage reconfiguration at the intersection, the existing drainage facilities would need to be modified. There would be a negligible increase in impervious surface due to this alternative, therefore it is believed that no additional treatment will be required and impact on area drainage would be minimal.

Pedestrian and bicycle access for this alternative would be improved over the existing conditions. Sidewalks would be provided along the outside of all roadways, as is currently provided. Pedestrian crosswalks would also be provided across the east and south legs of the intersection. Pedestrian access would be improved by the installation of a pedestrian activated traffic signal that would be located on Indian Creek Drive north of 63rd Street. The limited pedestrian activity in the area would result in little disruption to the motoring public. Bicycle access would continue to be provided along the outside travel lane for 63rd Street and Indian Creek Drive.

Within the road right-of-way, landscaping opportunities would be enhanced over the existing conditions. A raised median would be provided on the east leg of the intersection, separating opposing traffic flows. This island provides the largest landscape opportunity at the intersection. Additional landscape opportunities would be provided on the south leg of the intersection. Areas for landscape improvements are identified in Figure 9.

A preliminary cost estimate has not been developed for this alternative. If additional right-of-way is required, the cost would be minimal. The cost to demolish the existing flyover structure and construct the improvements is estimated at $1,440,000.

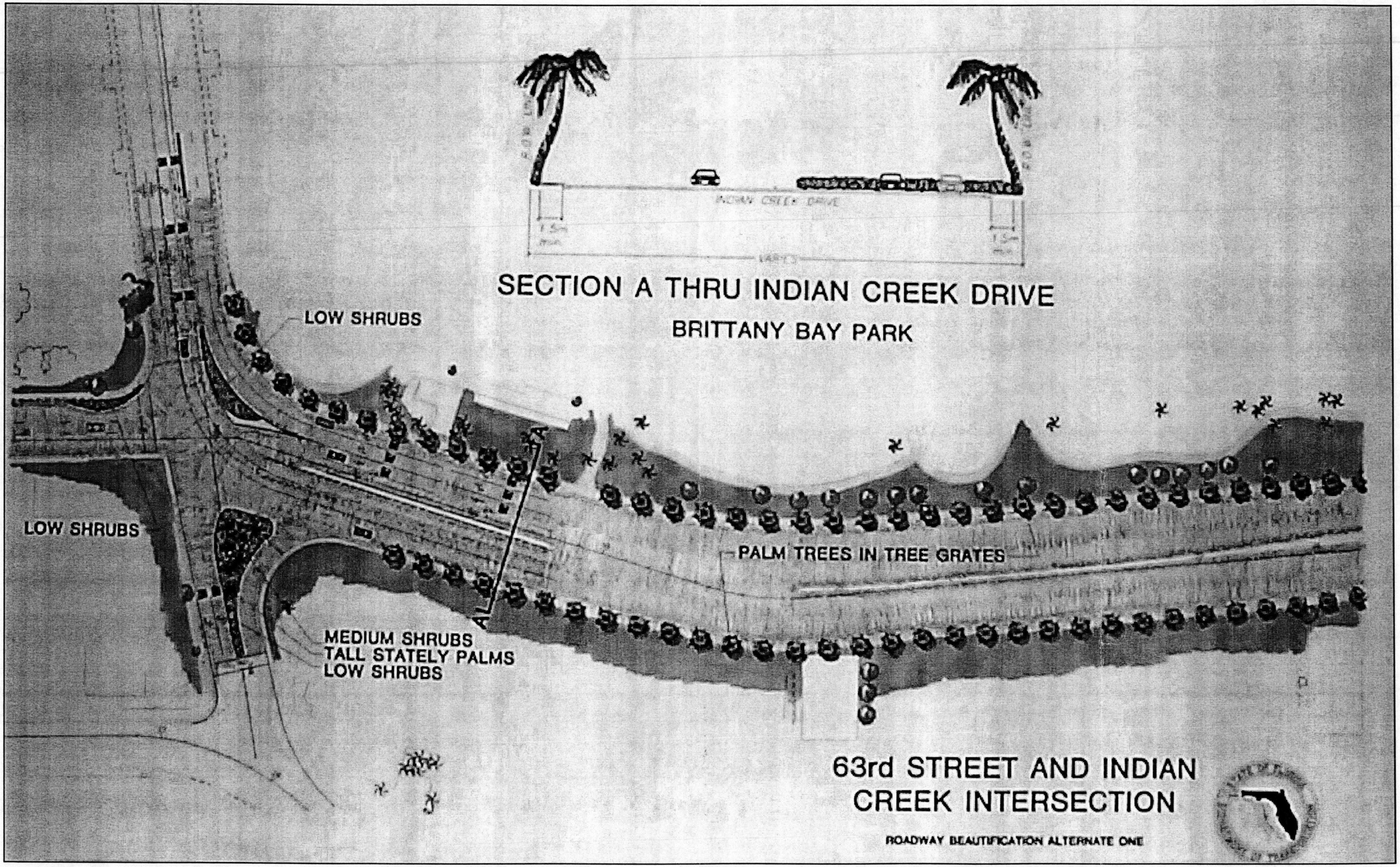


FIGURE 9: ALTERNATIVE 1 - LANDSCAPE OPPORTUNITIES

6.5.2 Alternative 2: New Flyover

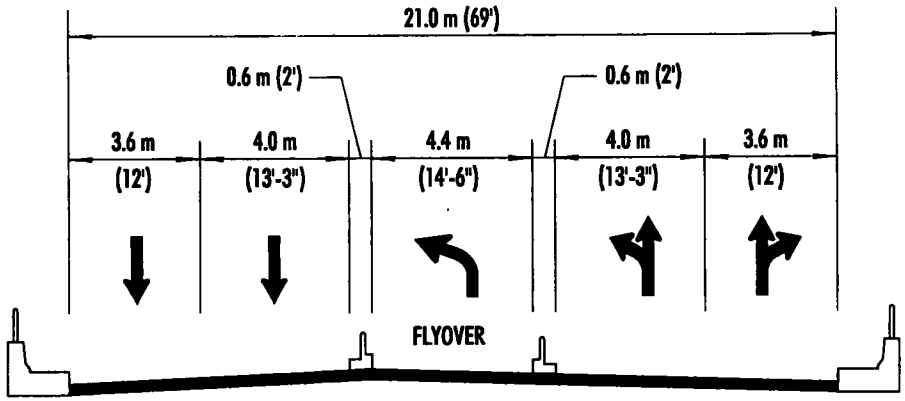
Alternative 2 considers the improvement of the 63rd Street and Indian Creek Drive intersection by replacing the existing flyover with a new one-lane structure to carry eastbound left turns on 63rd Street over the Indian Creek Drive intersection. This alternative was developed with several design constraints. The desirable clearance for vehicles traveling under the flyover structure is 4.25 m (16.5'). Due to the limited distance from the opening portion of the bascule bridge on 63rd Street, a design constraint of 4.25 m (14.0') was established for the vertical clearance. The flyover structure must begin on the bridge spanning Indian Creek just east of the draw spans. The bascule bridge has an existing pavement width of 21.04 m (69'-0") and cannot be widened. Right-of-way acquisition was not considered feasible from Brittany Bay Park.

With these constraints in mind, geometry for Alternative 2 was developed. The southbound traffic on Indian Creek Drive desiring to turn right would be provided two right-turn lanes that would operate as a free-flow movement. Traffic to be handled at the signalized intersection would be provided a left-through lane and a through-right turn lane for eastbound 63rd Street. Westbound traffic on 63rd Street would be channeled into a single right-turn lane. Southbound traffic on Indian Creek Drive would be provided a left-through lane and a through lane.

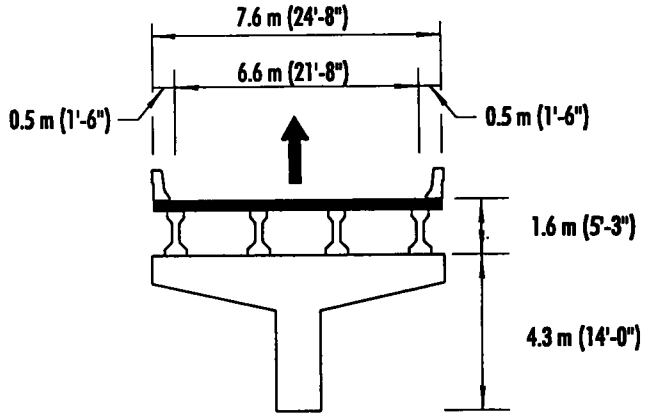
Typical sections for this alternative are provided in Figure 10. Figure 11 provides a plan view of the improvements and Figure 12 provides a profile view of the flyover structure.

Future traffic conditions for this alternative have been investigated in the Traffic Report, dated January 1999. This report indicates that the flyover structure will operate at LOS F and the intersection will operate at LOS C in the 2021 design year.

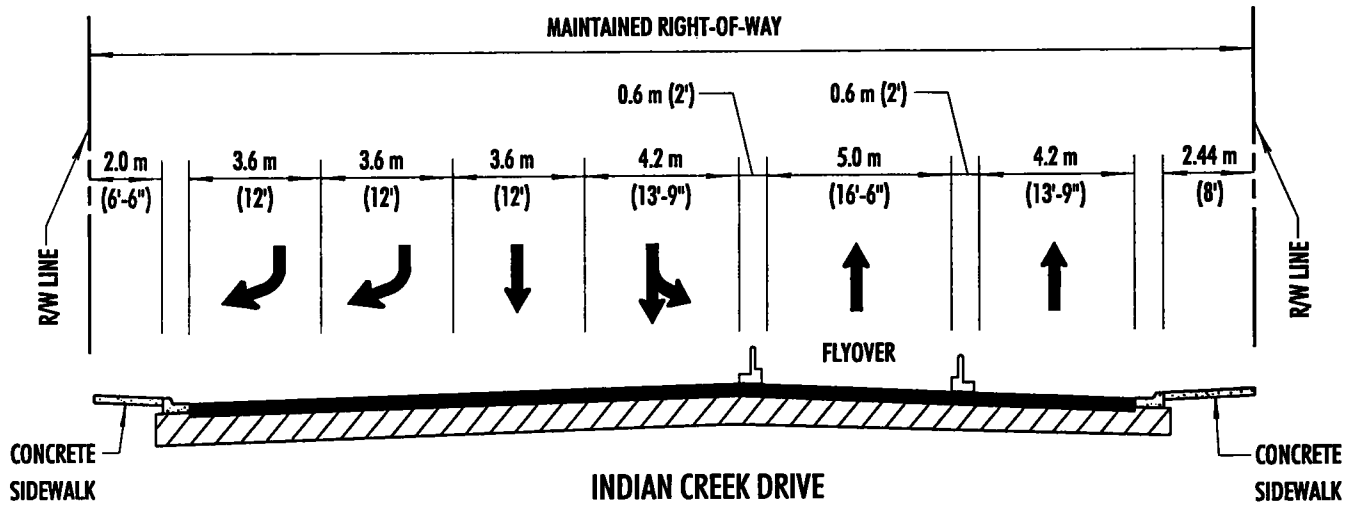
Safety will be improved over the No-build Option with this alternative. The vertical clearance will be raised to 4.3 m (14'-0") which will allow more vehicles to pass under the structure without impact. The pavement width on the flyover structure will also be wider than is currently provided. This should reduce impacts with the barrier walls on the structure.



63rd STREET DRAW BRIDGE



PROPOSED 63rd STREET FLYOVER

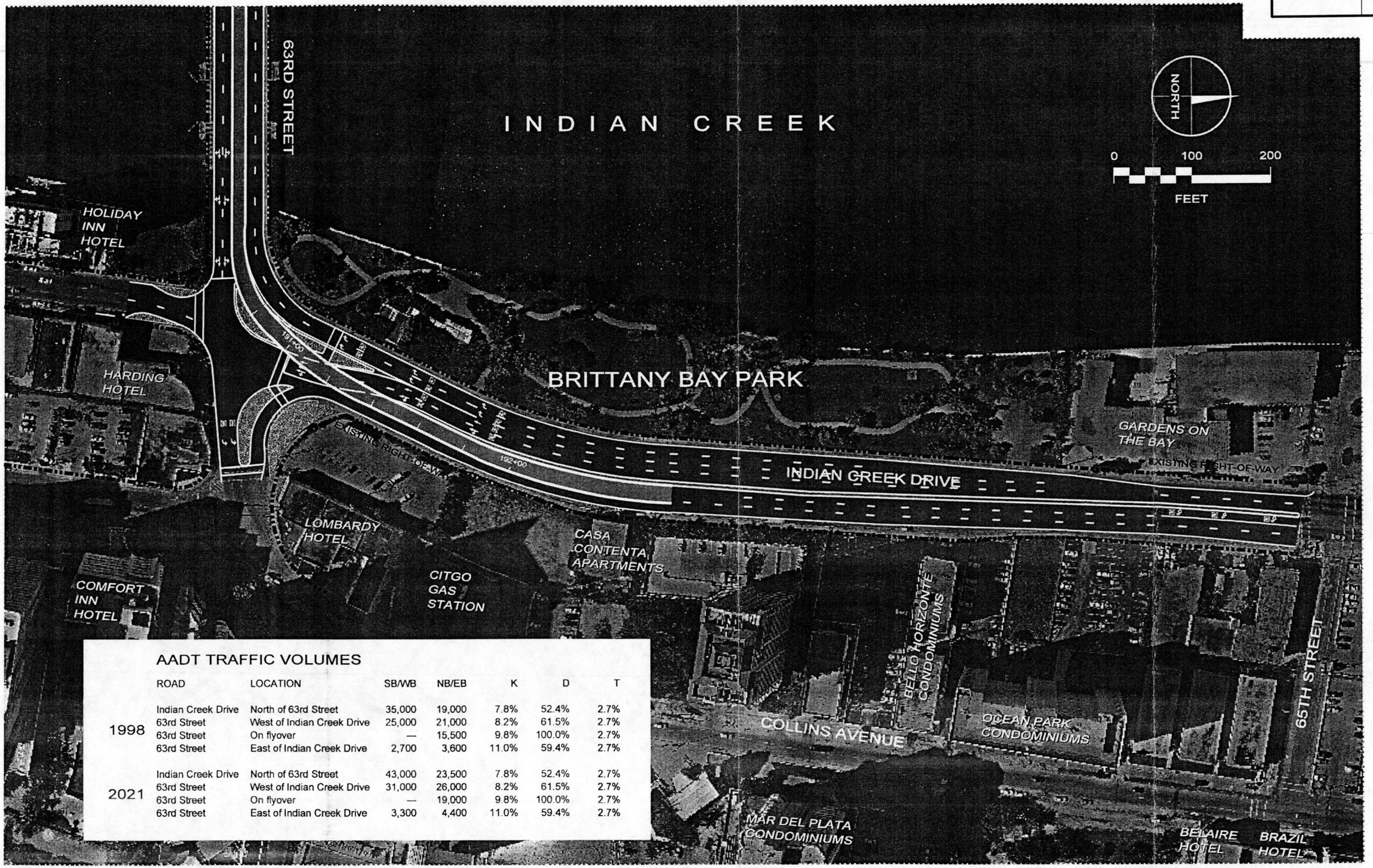


INDIAN CREEK DRIVE
NORTH OF 63rd STREET

FIGURE 10	PROPOSED TYPICAL SECTIONS FOR ALTERNATIVE 2	RS+H Reynolds, Smith and Hills, Inc.

I:\1067150.015\DESIGN\TYP02A.DGN

STATE PROJ. NO.	SHEET NO.



AADT TRAFFIC VOLUMES

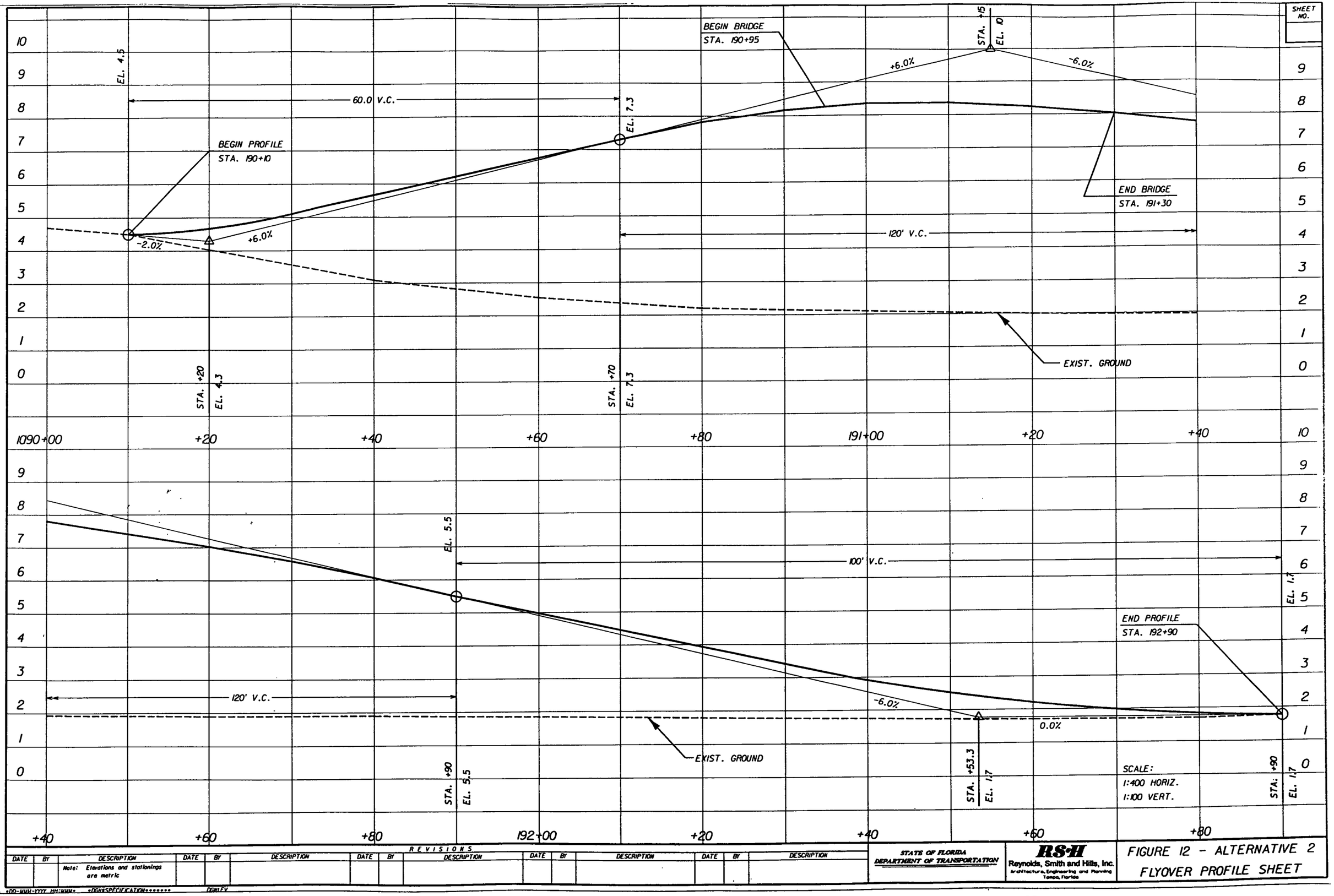
	ROAD	LOCATION	SB/WB	NB/EB	K	D	T
1998	Indian Creek Drive	North of 63rd Street	35,000	19,000	7.8%	52.4%	2.7%
	63rd Street	West of Indian Creek Drive	25,000	21,000	8.2%	61.5%	2.7%
	63rd Street	On flyover	—	15,500	9.8%	100.0%	2.7%
	63rd Street	East of Indian Creek Drive	2,700	3,600	11.0%	59.4%	2.7%
2021	Indian Creek Drive	North of 63rd Street	43,000	23,500	7.8%	52.4%	2.7%
	63rd Street	West of Indian Creek Drive	31,000	26,000	8.2%	61.5%	2.7%
	63rd Street	On flyover	—	19,000	9.8%	100.0%	2.7%
	63rd Street	East of Indian Creek Drive	3,300	4,400	11.0%	59.4%	2.7%

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

FLORIDA DEPARTMENT OF TRANSPORTATION

FIGURE 11: ALTERNATIVE 2 - NEW FLYOVER



REVISIONS															
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	
		Note: Elevations and stationings are metric													

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

RS+H
Reynolds, Smith and Hills, Inc.
Architecture, Engineering and Planning
Tampa, Florida

FIGURE 12 - ALTERNATIVE 2
FLYOVER PROFILE SHEET

•DD-MMM-YYYY HH:MMA• •DGNSPECIFICATION••••••• DGNLEV

This alternative has been designed to fit within the existing right-of-way. Therefore, no business or residential relocations will result and there will be no right-of-way cost.

This alternative will have minimal impact on area drainage concerns. Water will need to be conveyed from a larger flyover structure. The at-grade improvements will also require modification of the existing drainage system. This alternative should result in a negligible increase in impervious surface area. It is, therefore, believed that no additional treatment will be required.

Pedestrian and bicycle access will be improved over the existing conditions. Sidewalks will be provided along the outside of the roadway. Pedestrian crosswalks will be provided for the south, east, and north legs of the signalized intersection. A pedestrian activated signal would be installed to stop the southbound Indian Creek Drive free-flow right-turn movement to 63rd Street. This would allow pedestrians to fully cross all traffic at the intersections. Bicycle access would continue to be provided along the outside travel lane for both roads.

Landscaping opportunities will be enhanced within the road rights-of-way. A raised median will be provided in the median of 63rd Street on the east side of the intersection. Additional landscape opportunities would be provided on the south leg of the intersection and along the flyover structures as shown in Figure 13.

A preliminary cost estimate has been prepared. The construction cost to demolish the existing flyover, and construct the new flyover and roadway is estimated at $3,330,000.

6.5.3 Landscape Opportunities

Alternatives 1 and 2 provide increased opportunities to enhance the landscape over the No-build Option. The Rosenberg Design Group has prepared the two landscape plans identified in Figures 9 and 13. In preparing the landscape plans for the corridor, they focused on beautifying the existing roadway while being sensitive to safety concerns.

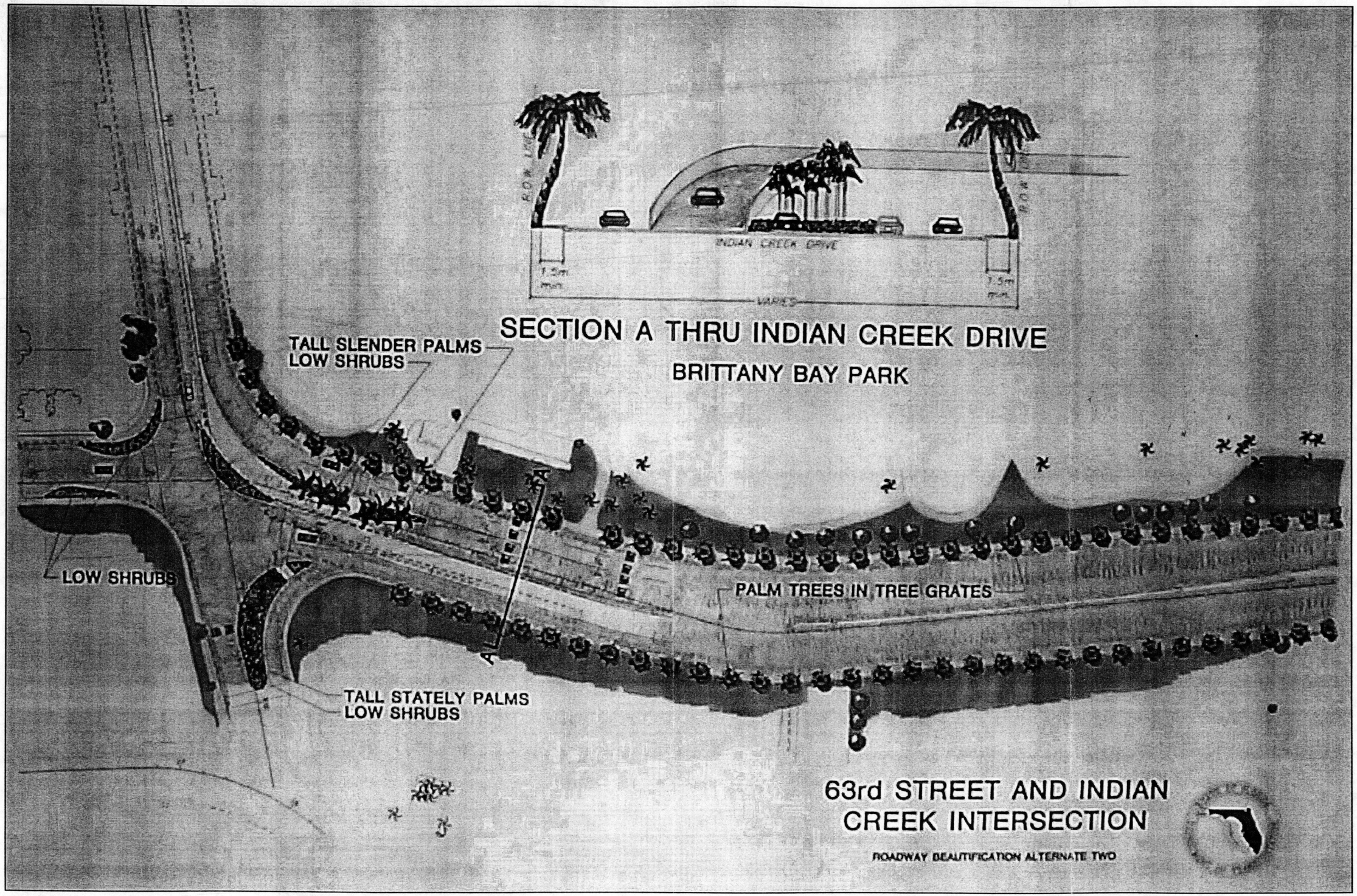


FIGURE 13: ALTERNATIVE 2 - LANDSCAPE OPPORTUNITIES

The existing right-of-way is a harsh expanse of pavement. The proposed improvements will add landscaping to "soften" the paved areas. Along Indian Creek Drive, the roadway will be flanked by rows of tall palms.

In Alternative 1, a mass of low shrubs will be placed between the eastbound triple left-turn movement and the southbound free-flow right-turn lanes. A wide landscape area with tall stately palms and shrubs of varying heights will be placed in the median of westbound 63rd Street. There will be some low shrubs in a planting island at the southwest corner of the intersection on Indian Creek Drive.

Alternative 2 will have tall slender palms in an area of low shrubs that will "soften" the vertical flyover for the motorist traveling south on Indian Creek Drive. The east leg of the intersection has a long curving median, which will be landscaped with stately palms and low shrubs. There will be some low shrubs in planting islands on either side of Indian Creek Drive at the south corners of the intersection.

The conceptual landscape development plans have been designed to follow all of the safety criteria set by the FDOT with regard to clear sight distances and setbacks from travel lanes. Landscaping will not impede views of oncoming traffic for vehicular traffic or pedestrians.

6.5.4 Maintenance Costs

Annual maintenance costs for the alternatives under consideration have been reviewed. For purpose of the analysis, equal segments of the 63rd Street and Indian Creek Drive roadway approaches to the intersection were used for all alternatives. Annual maintenance costs of $26,717 for the No-build Option, $26,550 for Alternative 1, and $26,744 for Alternative 2 were calculated using information obtained from FDOT's 1996-97 Transportation Costs Report. A copy of the calculation is provided in the Appendix. Since maintenance costs were similar for all alternatives they were not considered further.

6.5.5 Evaluation of Alternatives

An evaluation has been prepared to review the differences between the No-build Option, Alternative 1, and Alternative 2.

6.5.5.1 Design Parameters

The parameters used to develop the designs for the existing intersection, the No-build Option, Alternative 1, and Alternative 2 are indicated in Table 4. Identified in the table are the metric and English equivalents of the applicable design criteria. Also identified in this table are the AASHTO and FDOT design standards that were presented in Table 3.

All of the alternatives under consideration do not meet FDOT standards for the southbound free-flow right-turn movement on Indian Creek Drive. They do, however, meet the AASHTO minimum for a 30 km/h (20 mph) design speed.

The No-build Option does not meet acceptable AASHTO or FDOT standards for the flyover entrance clear width, maximum allowable vertical grade, or vertical clearance.

Alternative 1 meets FDOT design criteria for a 60 km/h (35 mph) design speed with the exception of the southbound free-flow right-turn discussed above.

Alternative 2 meets AASHTO minimum design criteria for a 30 km/h (20 mph) speed limit on the flyover structure. The flyover structure would not meet FDOT minimum criteria for a 40 km/h (25 mph) design speed in terms of horizontal radius, flyover entrance, exit, and bridge clear width and k value for sag vertical curve.

6.5.5.2 Level of Service

One area where differences occur is in the expected LOS to be provided in the 2021 design year. The intersection operation consists of three elements: a free-flow movement for southbound right turns, a free-flow flyover structure for eastbound left turns, and a signalized intersection. Two lanes are

Table 4. Design Standards and Design Parameters Used

Metric Units

	Design Standard				As Designed		
	AASHTO		FDOT		Existing	Alt. 1	Alt. 2
Design Speed[1]	60 km/h	30 km/h	60 km/h	40 km/h	60 km/h[2]	60 km/h[2]	60 km/h[2]
Lane Width	3.0 to 3.6	3.0 to 3.6	3.3 to 3.6	3.3 to 3.6	3.0	3.3 min	3.3 min
Superelevation Ratio (Maximum)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Horizontal Radius (SB Right Turn)	145	33	145	60	35	35	35
Flyover Structure							
Horizontal Radius (Flyover Structure)	145	33	145	60	36.6	NA	36.6
Flyover Entrance Pavement Width	4.3[3]	4.3[3]	6.6	3.6	3.5	NA	4.4
Bridge Pavement Width	4.3[3]	4.3[3]	8.1	6.6	4.1	NA	6.6
Flyover Exit Pavement Width	4.3[3]	4.3[3]	6.6	3.6	3.5	NA	5.0
K - Sag	15	4	18	10		NA	7.5
K - Crest	14	3	18	5		NA	10
Maximum Vertical Grade	6.0%	6.0%	6.0%	6.0%	7.50%	NA	6.0%
Vertical Clearance	4.3	4.3	5.05	5.05	3.6	NA	4.3

English Units

	Design Standard				As Designed		
	AASHTO		FDOT		Existing	Alt. 1	Alt. 2
Design Speed[1]	35 mph	20 mph	35 mph	25 mph	35 mph[2]	35 mph[2]	35 mph[2]
Lane Width	10' to 12'	10' to 12'	11' to 12'	11' to 12'	10'	11' min	11' min
Superelevation Ratio (Maximum)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Horizontal Radius (SB Right Turn)	475'	110'	475'	200'	115'	115'	115'
Flyover Structure							
Horizontal Radius (Flyover Structure)	475'	110'	475'	200'	120'	NA	120'
Flyover Entrance Pavement Width	14'-0"[3]	14'-0"[3]	21'-8"	21'-8"	11'-6"	NA	14'-6"
Bridge Pavement Width	14'-0"[3]	14'-0"[3]	26'-7"	26'-7"	13'-6"	NA	21'-8"
Flyover Exit Pavement Width	14'-0"[3]	14'-0"[3]	21'-8"	21'-8"	11'-6"	NA	16'-6"
K - Sag	15	4	18	10		NA	7.5
K - Crest	14	3	18	5		NA	10
Maximum Vertical Grade	6.0%	6.0%	6.0%	6.0%	7.50%	NA	6.0%
Vertical Clearance	14'-0"	14'-0"	16'-6"	16'-6"	11'-8"	NA	14'-0"

[1]km/h=kilometers per hour; mph=miles per hour

[2]Need to post SB right turn and flyover for 30 km/h (20 mph).

[3]If bypass is available.

Source: RS&H, 1999

I:\1067150.015\report\dspd.xls Table 4

provided for the free-flow right-turn movement from southbound Indian Creek Drive to westbound 63rd Street for all alternatives considered. The AM peak hour traffic for this movement is projected to reach 3,711 vehicles by the 2021 design year. This volume would result in LOS F conditions for the two-lane right turn. Since the additional right-of-way could not be obtained from the Brittany Bay Park and widening of the 63rd Street bascule bridge is not an option for this project, no more than two lanes can be provided for this traffic movement. This operating condition is the same for all alternatives. Since it is not feasible to provide additional capacity for this traffic movement, analysis was conducted to determine how to best improve operation of the remaining elements of the intersection operation.

The PM peak hour represents the worst case operation for the intersection as a whole. The project operating conditions for this intersection are summarized in Table 5. The existing flyover structure and the flyover structure for Alternative 2 are projected to operate at LOS F conditions. The signalized intersection would operate at LOS D for the No-build Option, at LOS B for Alternative 1 and at LOS C for Alternative 2 in the 2021 design year. Alternative 1 would operate better than the No-build Option or Alternative 2 because it would provide three lanes for the eastbound left turn movement. Based on the expected capacity improvements for the critical eastbound to northbound movement at the intersection, Alternative 1 is superior to Alternative 2 and the No-build Option.

6.5.5.3 Evaluation Matrix

An evaluation matrix has been prepared to compare the alternatives and is provided in Table 6. Alternative 1 would cost approximately $1,440,000 while Alternative 2 would cost $3,330,000 to construct. No alternative under consideration would require the relocation of businesses or residences. Social economic impacts on the community are considered to be minimal for all alternatives.

Safety will be improved for both of the build alternatives over the No-build Option. The greatest improvement will be provided by Alternative 1 since the flyover structure will be removed. This will

Table 5. PM Peak Level of Service

Year	No-build Option	Alternative 1 At-Grade Improvements	Alternative 2 New Flyover
1998 Existing			
Flyover Structure	F	NA	NA
Signalized Intersection	B	NA	NA
2001 First Year Open			
Flyover Stucture	F	NA	F
Signalized Intersection	B	B	B
2021 Design Year			
Flyover Structure	F	NA	F
Signalized Intersection	D	B	C

Sources: F.R. Alleman, 1999
RS&H, 1999

I:\1067150.015\Report\Table5.xls

Table 6. Evaluation Matrix

Item	No-build Option	Alternative 1 At-Grade Improvements	Alternative 2 New Flyover
Right-of-Way Cost	$0	$0*	$0
Construction Cost Roadway, Bridge, and Demolition	$0	$1,440,000	$3,330,000
Total Right-of-Way and Construction Cost	$0	$1,440,000	$3,330,000
Socioeconomic Impact	Minimal	Minimal	Minimal
Relocations Business Residential	 0 0	 0 0	 0 0
Safety	No Change	Eliminate Fixed Object Improved Visibility	Improved Clearance
Pedestrian Access	Restricted	Improved	Improved
Landscaping Opportunities	No Additional	Enhanced	Enhanced
Roadway Deficiencies			
Flyover Pavement Width	3.51 m (11' - 6")	No Flyover	4.40 m (14' - 5")
Vertical Clearance	3.56 m (11' -8")	No Flyover	4.25 m (14' - 0")
Flyover Ramp Speed	30 km/h (20 mph)	No Flyover	30 km/h (20 mph)
Vertical Curves on Flyover	Below 60 km/h (35 mph) design speed	No Flyover	Below 60 km/h (35 mph) design speed
Southbound Free Flow Right Turn	30 km/h (20 mph)	30 km/h (20 mph)	30 km/h (20 mph)

*Some minor right-of-way may be required.
Source: RS&H, 1999
I:\1067150.015\report\table6.xls

eliminate the visual obstruction, vertical clearance problem under the structure, and pavement width concerns on the flyover itself.

Pedestrian access would be improved for both build alternatives over the existing or No-build Option condition. For Alternative 1, a mid-block pedestrian activated signal would be installed on Indian Creek Drive north of 63rd Street. For Alternative 2, full pedestrian access would be provided at the 63rd Street and Indian Creek Drive intersection including a pedestrian activated signal to stop the southbound free-flow right-turn movement.

Landscaping opportunities would be enhanced for both of the build alternatives by providing additional raised islands that could be improved.

The No-build Option and Alternative 2 have several design elements relating to the flyover that do not meet current design standards. These are summarized in Table 4 and some of the constrained design elements are listed in Table 6.

7.0 RECOMMENDATION

After careful evaluation of the No-build Option and the two build alternatives, it is concluded that Alternative 1 should be recommended for construction. This alternative will meet current design criteria, whereas the No-build Option does not meet AASHTO or FDOT design standards and Alternative 2 does not meet FDOT design standards, while it meets AASHTO minimum standards. The No-build Option has a severe vertical height restriction and provides substandard clear width. A better level of service can be provided by Alternative 1. The total cost to construct Alternative 1 is $1,440,000 which is less than half the cost for Alternative 2. For these reasons, Alternative 1 is recommended for construction.

APPENDIX

Construction Cost Estimate

Alternative 1 - At-Grade Improvement

	Unit Cost	Quantity	Cost
1. Clearing & Grubbing	$15,000/HA	1 HA	$15,000
2. Demolition of Exist Flyover	$400,000 LS	LS	$400,000
3. Milling	$1.00/m2	5,000 m2	$5,000
4. Stabilization	$3.00/m2	1,600 m2	$5,000
5. Base	$12.00/m2	1,500 m2	$18,000
6. Asphaltic Pavt.	$9.00/m2	6,500 m2	$59,000
		subtotal	$502,000
7. Curb & Gutter, Traffic Islands, etc (25%)			$125,000
		subtotal	$627,000
8. Drainage (10%)			$63,000
		subtotal	$690,000
Signing and Pavement Marking (~5%)			$35,000
Lighting (~5%)			$35,000
Intersection Signalization			$100,000
Pedestrian Activated Signal			$60,000
		subtotal	$920,000
Mobilization (~10%)			$90,000
MOT (~15%)			$140,000
		Total	$1,150,000
Contingency (25%)			$290,000
		Grand Total	$1,440,000

Construction Cost Estimate

Alternative 2 - New Flyover

	Unit Cost	Quantity	Cost
1. Clearing & Grubbing	$15,000/HA	1 HA	$15,000
2. Demolition of Exist Flyover	$400,000 LS	LS	$400,000
3. Embankment	$8.00 / m3	6,000 m3	$50,000
4. Stabilization	$3.00/m2	9,000 m2	$27,000
5. Base	$12.00/m2	8,600 m2	$103,000
6. Asphaltic Pavt.	$9.00/m2	8,600 m2	$77,000
7. Structures			$1,000,000
		subtotal	$1,672,000
8. Curb and Gutters, Traffic Islands, etc.			$250,000
		subtotal	$1,922,000
9. Drainage (5%)			$100,000
		subtotal	$2,022,000
Signing & Pavt Marking (4%)			$80,000
Lighting (4%)			$80,000
Intersection Signalization			$100,000
Pedestrian Activated Signal			$40,000
		subtotal	$2,322,000
Mobilization (5%)			$115,000
MOT (10%)			$230,000
		Total	$2,667,000
Contingency (25%)			$663,000
		Grand Total	$3,330,000

Annual Maintenance Cost Estimate

No-build Option

Roadway			
Indian Creek Drive	0.2 mile x $105,800/mile	=	$21,160
63rd Street	0.1 mile x $53,900/mile	=	5,390
Existing Flyover Structure	8,350 sq.ft. x $0.02/sq.ft.	=	167
	TOTAL		$26,717

Alternative 1

Roadway			
Indian Creek Drive	0.2 mile x $105,800/mile	=	$21,160
63rd Street	0.1 mile x $53,900/mile	=	5,390
	TOTAL		$26,550

Alternative 2

Roadway			
Indian Creek Drive	0.2 mile x $105,800/mile	=	$21,160
63rd Street	0.1 mile x $53,900/mile	=	5,390
New Flyover Structure	19,480 sq.ft. x $0.01/sq.ft.	=	194
	TOTAL		$26,744

Sources: 1996-97 Transportation Costs, FDOT 1998
RS&H, 1999

Notes: Indian Creek Drive based on 6 lane and 63rd Street based on 4 lane urban road, bridge costs for bridge preservation.

I:\1067150.015\report\annualcost.xls