COASTAL ZONE

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ST. LUCIE COUNTY BARRIER ISLAND STUDY
ANALYSIS OF
EXISTING PLUS APPROVED DEVELOPMENT

Prepared for:
Board of County Commissioners
St. Lucie County, Florida

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PROBLEM STATEMENT SUMMARY

Analysis of existing and approved development on St. Lucie County's barrier islands has been conducted to determine the adequacy of water and sewer services, the transportation system and public safety services to identify any deficiencies or surpluses in capacities which can be anticipated once approved development is fully constructed and occupied.

TRANSPORTATION

Approved development traffic will nearly double existing traffic volumes in the study area. The significant reduction of Florida Power and Light labor force on the island will greatly alleviate potential severe congestion which would otherwise occur. Analyses of existing plus approved development with the Florida Power and Light reduction taken into consideration indicate that some minor congestion will be experienced in the study area. The potential also exists for isolated severe congestion unless intersection improvements are accomplished. The following is a summary of the conditions and possible improvements to reduce congestion:

North Island

Level of Service "C" or better will be provided on the transportation network associated with the north island, with the exception of the intersection of Royal Palm and State Road A-1-A. If signalization is provided at this intersection, the level of service will be just into the "D" range. Level of Service "A" could be provided by adding a right turn lane on the north approach.

South Island (Fort Pierce Area)

The Fort Pierce bridge and adjacent roadway network will provide surplus capacity over and above that required to accommodate existing plus approved development. Level of Service "A" will be provided. Certain improvements will be required at the intersections of Ocean Drive and Seaway Drive, and Ocean Drive and Binney Drive. These intersections will experience severe congestion unless traffic signalization is provided. Due to the close proximity of these intersections, it will be necessary for this signalization to be interconnected. Furthermore, geometric improvements will be required. As a minimum, a left turn lane will be required on the south approach of Ocean Drive at Binney Drive. With these improvements, Level of Service "A" can be provided.

In order to maintain desirable flow characteristics on State Road A-1-A south of Binney Drive, it would be desirable to provide a three-lane cross-section similar to that developed in the south part of St. Lucie County. This cross-section would be developed between Binney Drive and Coconut Drive. Further, any new access points developed along State Road A-1-A will require appropriate turn lanes.

South Island (Jensen Beach Causeway Area)

The theoretical link capacity for State Road A-1-A north of Jensen Causeway will be exceeded. In order to avoid serious congestion, it will be necessary to provide a four-lane cross-section from Jensen Causeway to approximately one mile north of the Martin County line.

The Jensen Causeway bridges will operate at Level of Service "D", however, significant congestion will not occur if appropriate improvements are implemented at the causeway termination points. At Jensen Causeway and State Road A-1-A, traffic signalization will be required. At the intersection of Jensen Causeway and Indian River Drive, signalization will be required as well as provision of a separate right turn lane on the south approach. With these improvements, Level of Service "A" would be provided at the Indian River Drive intersection and Level of Service "C" at the State Road A-1-A intersection. Again, the link between these intersections will experience minor congestion and reduced travel speeds typical of Level of Service "D" operation.

WATER SUPPLY

North Hutchinson Island

The existing distribution system on North Hutchinson Island was evaluated by introducing into the system peak daily flows for all existing and approved projects, plus an additional 1,500 gallons per minute for fire flow. The results of the analysis indicate that the system is adequate for serving the projects within the geographic limits of its present network.

However, because geographic distribution of additional units is unknown, any new units proposed for connection to the existing primary distribution system must be evaluated on a project-by-project basis to determine if the evaluation criteria could still be met.

South Hutchinson Island

The existing primary distribution system on the south island was evaluated by introducing into the system the peak daily flow (PDF) for all existing and approved projects that are connected or have definite commitments with the FPUA for connection, plus an additional 1,500 gpm for fire flow. The contractual demand of 1,200 gpm for FPL was not included under the fire emergency conditions because the separate valve controlling the water supply to FPL would be closed during a period of fire demand.

It was found that the system functioned satisfactorily only to a point approximately 1,000 feet south of the Herman Bay Beach access point. From that point to the south St. Lucie County Line, a distance of approximately 4 miles, residual pressures in the main dropped below 20 psi, demonstrating that the system cannot deliver the volume of water required for PDF and fire flow.

Therefore, no new projects in St. Lucie County may connect to the FPUA system until additional system improvements are made.

SEWERAGE SERVICE

The entire study area with the exception of that portion lying within the city limits of Fort Pierce treats their waste water in on-site waste water treatment plans.

Investigation of the Fort Pierce Utilities Authority collection and treatment system indicates that it is currently capable of treating waste water from those existing, under construction and committed units which lie within the service area of the utility authority. The utility authority has no immediate plans to extend service beyond the city limits of Fort Pierce. Therefore, no adverse impact on the Fort Pierce Utilities Authority Waste Water Treatment and Disposal Systems are anticipated by either or approved units on either North Island or South Island.

The current method of waste water treatment in the unincorporated areas of the barrier islands permits development to occur without adversely impacting the FPUA system. Although the continued construction of on-site package waste water treatment plants is advantageous to the existing FPUA system, it is not the appropriate long-term solution to the problem of waste water collection, treatment and disposal. Package waste water treatment plants often provide treatment that falls below acceptable standards because they are not operated and maintained properly, thereby becoming a nuisance to surrounding areas. Properly designed and operated treatment plants are not prohibited for those projects not served by existing facililities. However, the cost of building those facilities may impose a financial constraint on the developer.

PUBLIC SAFETY

Police, Fire and Emergency Medical Services

City police and sheriff manpower will need to be increased by one and nine men, respectively. An additional patrol car will be required in Fort Pierce and three cars in the county (one on the north island, two on the south). These demands will be much lower in the off season.

Planned fire service will be adequate for the south island, however, the existing plus approved population with its high percentage of elderly suggest the need for a paramedic team. Therefore, the new south station should be equipped with an advance life support system. North island population growth will require the addition of six firemen at an existing mainland station.

Emergency Evacuation

Consideration has been given to island evacuation time in the event of a sudden disaster. Hurricane evacuation considerations are being addressed separately by the Treasure Coast Regional Planning Council. The most obvious possible emergency condition would be a radiological emergency. Analyses have, therefore, been conducted considering such an emergency.

The evacuation times are generally in accord with data provided in Attachment 2, St. Lucie County "Radiological Emergency Plan for Nuclear Power Plants".

North island evacuation times are reasonable. The north part of the south island could be evacuated in nearly half the indicated time with the provision of a third lane on Ocean Drive in Fort Pierce between Coconut Drive and Binney Drive and on Seaway Drive between Binney Drive and the bridge. Special operational plans would also be required at Indian River Drive and U.S. 1 to accommodate the flow.

South island evacuation times are far greater than in the other areas and point to the need for additional capacity. This could be accommodated by bridge widening or by allowing two-lane westbound flow on the existing bridges. The latter would require a unique plan for police traffic control to accommodate emergency vehicles.

CHAPTER I
INTRODUCTION

The St. Lucie County Board of County Commissioners has been concerned over the ability of the St. Lucie County barrier islands to support both already approved development and ultimate development allowed under the Growth Management Policy Plan. Therefore, they retained a team of professionals to evaluate the impact of approved development and identify any related problems in providing necessary services for this development. The project team will also identify the infrastructure required to support development under the Growth Management Policy Plan, identify funding required for infrastructure improvements, and evaluate the environmental suitability of the island for different types and intensities of development. Infrastructure is defined in this study as water and sewer services, transportation facilities, and public safety services including police, fire, emergency medical services, and evacuation.

This report summarizes the inventories and analyses related to the first task, evaluating existing plus approved developments on both north and south barrier islands in St. Lucie County. Analyses have been performed to determine the transportation needs as well as water, sewer and public service requirements to accommodate this level of development. For each of these infrastructure elements, summaries of inventories and analyses are presented. Problem statements are also provided describing projected deficiencies or surpluses in the islands' infrastructure.

The second report, which will be provided at the end of this study, will include analyses and recommendations relative to full development of the St. Lucie County barrier islands in conformance with the Growth Management Policy Plan.

CHAPTER II
LAND USE INVENTORY

It was necessary to quantify existing and approved development on the barrier islands. Existing land use data was used to calibrate transportation and public safety models. Approved development was quantified to permit analysis of transportation, water and sewer, and public safety needs in the study area. The study areas are defined as the north and south barrier islands in St. Lucie County. Additional data were obtained in adjacent counties to facilitate transportation analyses.

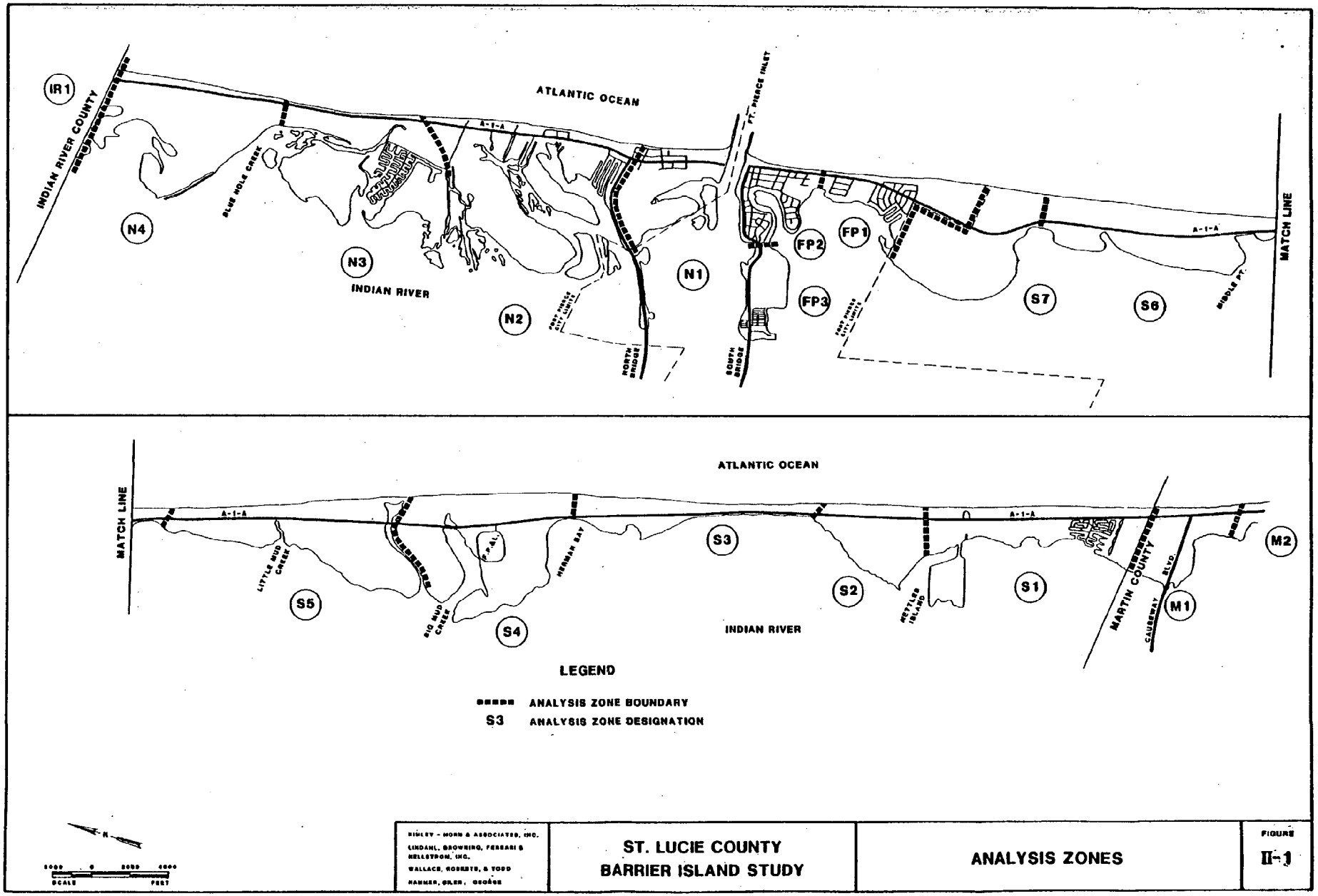
Existing and approved land use data were obtained for the barrier islands in Martin, St. Lucie and Indian River Counties. Data for the south island (Martin County and St. Lucie County) were provided by the Treasure Coast Regional Planning Council, St. Lucie County and the City of Fort Pierce. Inventory data for the north island (St. Lucie County and Indian River County) were provided by St. Lucie and Indian River Counties.

Consideration was given to the distribution and type of existing land uses as well as future land use under the Growth Management Policy Plan and analysis zones were developed. The study area and adjacent barrier islands have been stratified into seventeen separate zones. Study area zones are depicted on Figure II-1.

The portion of the south island located in Martin County was divided into two zones to assist in transportation analyses. Zone M1 includes the island from the county line to one mile south of the line. Zone M2 contains the remainder of the island in Martin County. Two zones have also been identified for Indian River County. These correspond to zones identified in the 1981 Indian River County Barrier Island Study. Zone IR1 includes an area from the St. Lucie County line to just south of 17th Street. Zone IR2 extends from south of 17th Street to State Road 60. Areas north of Zone IR2 were not considered to significantly effect the study area.

The location of each existing or approved residential development was identified along with the number and type of dwelling units included. These data were then aggregated by analysis zone. Table II-1 provides a summary of existing and approved residential development by analysis zone.

Non-residential development in the study area is very minimal. There are currently several convenience food stores and several restaurants. In addition, small commercial areas exist on Seaway Drive in the City of Fort Pierce and on A-1-A in south Martin County near Indian River Plantation. One other small site has been approved for commercial development in St. Lucie County. A summary of commercial land use by analysis zone is provided in Table II-2.



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ST. LUCIE COUNTY BARRIER ISLAND STUDY

ANALYSIS ZONES

FIGURE II-1

TABLE II-1

EXISTING AND APPROVED DEVELOPMENT

Analysis Zone	Single Family Units		Multi-Family Units		Recreation Vehicle Spaces		Hotel Rooms	
	E	A	E	A	E	A	E	A
M1	72	--	255	422	--	--	184	--
M2	13	420	1,170	1,705	--	--	--	--
Subtotal - Martin County	85	420	1,425	2,127	0	0	184	0
S1	129	48	1,177	797	2,608	--	119	--
S2	--	--	190	1,318	--	--	--	--
S3	--	--	203	337	--	--	--	--
S4	--	--	--	--	--	--	--	--
S5	--	--	---	--	--	--	--	--
S6	--	--	--	534	--	--	--	--
S7	--	--	--	488	--	--	--	--
Subtotal - St. Lucie County	129	48	1,570	3,474	2,608	0	119	0
FP1	150	--	1,142	668	--	--	--	--
FP2	213	--	635	388	--	--	103	--
FP3	--	--	266*	--	--	--	--	--
Subtotal - St. Pierce	363	0	2,043	1,056	0	0	103	0
TOTAL - SOUTH ISLAND	577	468	5,038	6,657	2,608	0	406	0
N1	177	--	109	--	--	--	--	--
N2	64	196	335	1,355	--	--	147	--
N3	--	--	--	513	400	--	--	--
N4	--	--	--	250	--	--	--	--
Subtotal - St. Lucie County	241	196	444	2,118	400	0	147	0
IR1	491	648	597	227	--	--	--	--
IR2	637	338	787	128	--	--	--	--
Subtotal - Indian River Co.	1,128	982	1,384	355	0	0	0	0
TOTAL - NORTH ISLAND	1,369	1,178	1,828	2,473	400	0	147	0

E = Existing
A = Approved
* = Mobile Homes

TABLE II-2
COMMERCIAL LAND USE

ANALYSIS ZONE	EXISTING	APPROVED
M1 - M2	6.3 acres	12.4 acres
S1 - S6	5.5 acres*	1.5 acres ±
FP1 - FP2	9.7 acres	1.4 acres
N1 - N4	4.0 acres ±	-0-
IR1 - IR2	63 acres ±	-0-

* = Private commercial in Nettles Island not included.

CHAPTER III
TRANSPORTATION

INVENTORY

An extensive inventory of traffic and roadway characteristics was conducted to identify existing peak season conditions. Twenty-four hour machine counts were made throughout the study area. Many of these counts were obtained by direction in order to determine existing peak hour characteristics. Directional hourly counts were made immediately north and south of the Florida Power and Light Power Plant in order to identify peak work trips associated with this facility. Further, quarterly counts were obtained from the Florida Department of Transportation for 1981.

Peak hour intersection turning movements were obtained for the afternoon peak hour at major intersections within the study area. Existing intersection geometrics and bridge cross sections were inventoried for use in capacity calculations.

TRIP GENERATION AND DISTRIBUTION

An extensive trip generation and distribution study was conducted to determine the trip generation and distribution characteristics of potential development on the St. Lucie County barrier islands. Data were collected in cooperation with St. Lucie County and City of Fort Pierce staff during the Winter of 1982 to obtain maximum occupancy conditions. A field review was conducted to determine the various types of development on the island and to identify those locations where accurate traffic counts could be obtained. A total of 12 sites were identified for inclusion in the study. These include 3 developments in Martin County, 8 developments in St. Lucie County and 1 development in Indian River County. Care was taken to obtain data for both the north and south islands in St. Lucie County as well as for a mixture of dwelling unit types, including high-rise and low-rise multi-family units, single family developments, a recreational vehicle development, and a motel.

Counts were obtained using recording counters to help insure the accuracy of the count and also identify peaking characteristics. Each development site was counted for a 24-hour period. Excellent data were obtained for all sites with the exception of Fairwinds Cove, where field observation indicated that sales activities and a special landscaping program distorted the count data. Data for this development was, therefore, eliminated from the generation study.

In addition to the trip generation data obtained at each location, a manual count was made during the day to identify the general directional distribution of traffic entering and leaving the project. Table III-1 summarizes the sites studied and the resulting data.

The developments of Ocean Village in Fort Pierce and Indian River Plantation in Martin County are both mixed-density developments. Both have internal attractions which are open to the public; however, there was no

TABLE III-1
RESULTS OF SITE TRIP GENERATION STUDY

DEVELOPMENT	ANALYSIS ZONE	24-HOUR VOLUME	OCCUPIED UNITS	TRIPS PER OCCUPIED UNIT
Mixed High & Low Rise				
Indian River Plantation	M2	2,646	525	5.04*
Ocean Village	FP1	2,688	930	2.89
Low Rise				
Ocean View (West)	M2	474	50	9.48*
High Rise				
Atlantis	S1	445	111	4.01
Ocean Towers	S2	654	170	3.85
Sand Dollar Villas	S3	547	183	2.99
Ocean Harbor	N4	296	88	3.36
Single Family				
Queens Cove	N2	470	66	7.12
Single Family/Townhouse				
Windward	IR1	1,507	161	9.36*
Recreation Vehicle Park				
Nettles Island	S1	5,458	1,550	3.52
Motel				
Holiday Inn	N2	1,137	112	10.20

* Includes "internal trips" crossing A-1-A.

way to isolate this traffic. Because these additional trips are included in the trip rates per unit, trip rates indicated for the residential units are somewhat overstated. The trip rate for Indian River Plantation is significantly higher than that for Ocean Village, due in large part to the availability of convenient commercial attractions at the site. Based upon field observations, 20 to 25 percent of the Indian River Plantation trips appear to be oriented to the commercial development at the site. Thus, the actual number of trips leaving the Indian River Plantation site is estimated at 3.8 trips per unit. This is slightly greater than the trip rate identified for Ocean Village.

The higher rate for Indian River Plantation is easily understood by comparing the trip end opportunities for each development. Indian River Plantation is a short trip from Sewell's Point and Stuart attractions. Conversely, a significant drive is required of Ocean Village residents to reach any major trip destinations. As trip lengths increase, there is a greater tendency for people to satisfy more of their needs on one individual trip rather than by making multiple trips. The average trip rate for the mixed-use developments was calculated to be 3.7 trips per unit.

High-rise development is the predominant type of approved development in St. Lucie County. Thus, for the purposes of analyzing approved development impact, this is the most important land use category. A total of four high-rise sites were studied. The resulting trip rates ranged from 3.0 trips per unit to 3.9. The average rate is 3.5 trips per unit. The trip rates observed for this category are lower than rates which have been used in some studies for Hutchinson Island in the past, but the consistency of results for these projects clearly indicate that such a rate is correct for high-rise development in the study area. The rate is nearly the same as the average rate identified by the Institute of Transportation Engineers (3.7 trips per unit).

One low-rise development was studied. The total rate was 9.5 trips per unit, however, this included internal development trips (crossing A-1-A). Based on field observation during manual counts and data from previous studies of similar development, it is estimated that the external rate is 7.5 trips per unit.

One single-family development was studied in St. Lucie County. Queens Cove is generating 7.1 trips per unit. This rate is below typical single-family rates. Once again, the lower rate is most likely related to the long trip required to reach major destinations.

By contrast, the Windward project in Indian River County, which includes a mix of single-family and townhouses, is generating 9.4 trips per unit. Significant travel was observed crossing A-1-A to attractions in the Moorings Development. Based on manual counts, approximately 67 percent of the total trips or 6.3 trips per unit leave the development area.

Other trip rates for motel and recreation vehicle park are shown in Table III-1. The motel rate closely approximates the Institute of Transportation Engineers rate for motels (10.1 trips per occupied room).

The trip generation rates applicable to the study area are summarized in Table III-2. These apply to existing and approved development, as no major increases in trip attractions have been approved in the study area. In the future, if and when significant trip end opportunities are provided in the study area, the residential trip rates may increase somewhat due to the increased convenience afforded area residents. This increase will be evaluated during Phase II of the study when the impact of the Growth Management Policy Plan is studied.

TABLE III-2
SUMMARY OF TRIP GENERATION RATES

LAND USE	DAILY TRIP RATE
Mixed-density residential	3.6 per occupied dwelling unit
High-rise residential	3.5 per occupied dwelling unit
Low-rise residential	7.5 per occupied dwelling unit
Single-family residential	7.1 per occupied dwelling unit
Motel	10.2 per occupied room
Recreation vehicle park	3.5 per occupied space

The directional distribution data gathered in the generation study was used to develop estimates of directional distribution and assignment for each analysis zone. Distribution percentages for zones that are currently void of development were based on interpolation between zones for which data were available. Table III-3 summarizes the distribution by zone.

MODEL CALIBRATION ANALYSIS

The results of the trip generation study and distribution data appeared reasonable when compared with Institute of Transportation Engineers (ITE) trip generation standards and existing attractions. However, prior to using these models for analysis of approved development, they were applied to existing development to provide an additional validity check. The accuracy of the modeling is checked by comparing synthesized traffic volumes to actual existing ground counts. Trips from existing development were generated and distributed based on the data presented in the previous section and observed occupancy rates which average 88 percent. The analysis assumed that 90 percent of the trips generated by the residential development leave the islands and 10 percent remain on the islands. The low percent of retention on the islands is based on the existing limitation of commercial and service facilities on the islands. Trips for the FPL employees were based upon data obtained in the inventory phase of the study. The detailed evaluation of 2 components of existing traffic flow was beyond the scope of

TABLE III-3
TRAVEL DISTRIBUTION SUMMARY

ANALYSIS ZONE	PERCENT NORTH	PERCENT SOUTH
M2	15	85
M1	40	60
S1	20	80
S2	20	80
S3	30	70
S4	50	50
S5	60	40
S6	70	30
S7	80	20
FP1	85	15
FP2	90	10
FP3	90	10
N1	10	90*
N2	20	80
N3	35	65
N4	45	55
IR1	80	20
IR2	90	10

* = Percent West

this study to quantify. The components were construction traffic and mainland traffic attracted by the island beaches and parks. It was anticipated that the major difference in traffic would be on the Stuart and Fort Pierce bridges due to the beach attractions and construction activity currently underway in the area. Some differential was also anticipated on the Jenson Beach Causeway Bridge due to construction traffic and beach attraction for residents of Port St. Lucie; however, a much lower differential was expected than for the other bridges. The north island bridge was expected to have a differential due to trips traveling to the state park, as well as some construction travel. Synthesized traffic was compared to ground counts at four bridge crossings and along six points on roads in the study area. In general, the synthesized volumes for the bridge crossings were lower than the actual ground counts as expected. Synthesized volumes on island roads agree very closely with actual ground counts. The actual differentials

between synthesized traffic and ground counts on the various bridges appear to correspond well with reasonable levels of beach and construction traffic. The comparison of the synthesized volumes and ground counts is shown in Table III-4. The close comparison of assigned and existing volumes clearly validate the generation and distribution models.

TABLE III-4
COMPARISON ASSIGNED AND EXISTING DAILY TRAVEL

LOCATION	A SYNTHESIZED VOLUME	B EXISTING VOLUME	C DIFFERENCE (B - A)
Stuart Bridge	8,500	10,300	1,800*
Jensen Beach Causeway	10,900	10,600	- 300**
South Bridge	13,000	15,400	2,400*
North Bridge	6,200	7,600	1,400*
A-1-A north of Jackson	3,700	4,500	800
Seaway Drive	5,600	5,300	- 300
Binney Drive	5,600	5,300	- 300
Ocean Drive south of Binney	9,900	9,300	- 600
A-1-A at FPL Power Plant	6,500	5,700	- 800
A-1-A south of Martin County Line	14,000	13,600	- 400

* Difference represents beach, park and construction traffic.

** Negative difference indicates slight over-estimate of impact on Jensen Beach Causeway.

EXISTING PLUS COMMITTED ANALYSIS

Based on projections by Florida Power and Light and a reasonable time frame for completion of the approved development, it appears that most of the FPL construction traffic on the island will be eliminated by the time the approved projects are built out. Therefore, the first step in this analysis was to adjust 1982 daily and peak hour traffic to reflect this traffic reduction. Table III-5 shows the effects of the FPL work force reductions. Committed development traffic was then generated, distributed and assigned to the network based upon the models developed in the calibration stage of the study. A summary of trips by zone is contained in Table III-6. Daily traffic volumes were converted to peak hour volumes at the critical intersections. The basis for converting daily traffic to peak hour traffic is listed below:

- Nine percent of the daily traffic occurs in the PM peak hour.
- Directional split is the same as base year traffic directional split.

TABLE III-5
EFFECTS OF FLORIDA POWER AND LIGHT
WORK FORCE REDUCTION

LOCATION	VOLUME REDUCTION	
	Daily	PM Peak Hour
Fort Pierce Bridge	1,400	479
A-1-A south of Binney Drive	1,400	479
A-1-A at Martin County Line	1,700	429
Jensen Beach Causeway	1,400	350

TABLE III-6
APPROVED DEVELOPMENT
TRIP GENERATION SUMMARY

ANALYSIS ZONE	DAILY TRIPS
M1	575*
M2	1,253*
S1	4,427
S2	4,673
S3	1,245
S4	0
S5	0
S6	1,869
S7	1,708
FP1	2,790
FP2	2,183
FP3	32
N1	0
N2	6,480
N3	1,914
N4	875
IR1	1,229*
IR2	325*

* Reflects only those trips impacting the study area and/or Jensen Causeway.

Existing and approved development traffic volumes, daily and peak hour, are shown on Figure III-1.

CAPACITY ANALYSIS

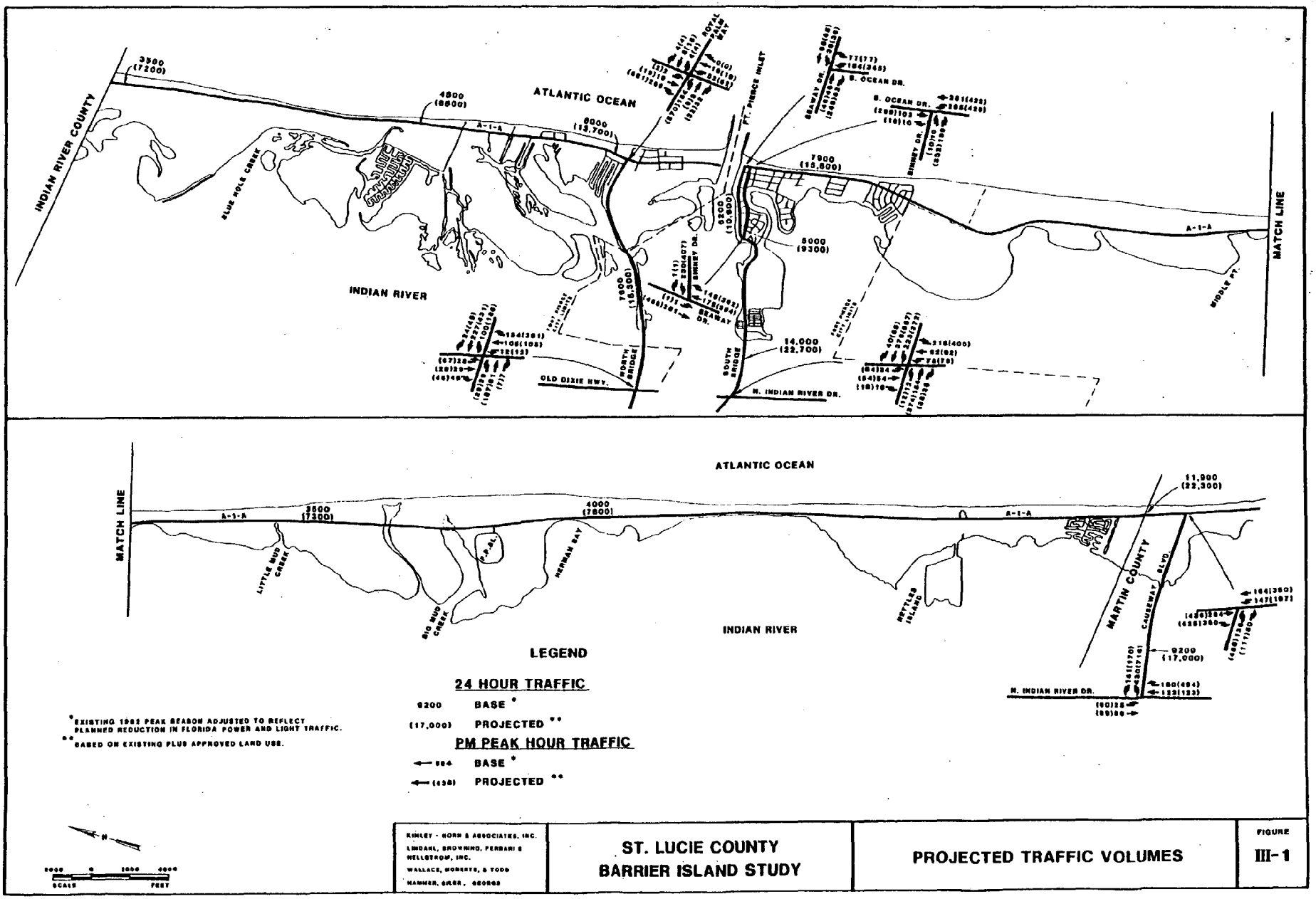
In order to assess the ability of the existing system to accommodate existing plus approved development, capacity analyses were performed for major roadway links, as well as critical intersections in the study area. Daily capacity volumes were developed based upon the 1965 Highway Capacity Manual and capacity estimates provided by the Florida Department of Transportation in their report, Analysis of Hutchinson Island Traffic, dated April 19, 1982.

These were developed to reflect the actual peak hour conditions projected for existing and committed development. (The capacities identified by the Florida Department of Transportation are based upon a 10 percent peak hour condition.) It is estimated that the existing plus committed condition will reflect an average peak hour of 8.5 percent areawide. This is the average of existing conditions (8 percent after the FPL reduction) and new development (9 percent) which represents about half of the total projected traffic. With an 8.5 peak hour percentage, the daily capacity will be greater than that estimated by the Department. These capacities are tabulated in Table III-7.

Capacities are shown in the table for Levels of Service "C" and "D". Level of Service "C" is the design level of service. However, in many areas it has been recognized as too costly or infeasible altogether to provide this level and Level of Service "D" has been adopted as a compromise between convenience and economics. To better understand the meaning of level of service, the following brief comparison, based on the 1965 Highway Capacity Manual, is offered.

LEVEL "C"	LEVEL "D"
- Stable flow (acceptable delay)	- Approaching unstable flow (tolerable delay)
- Serves 80 percent of capacity	- Serves 90 percent of capacity
- 30 percent of time a few drivers will wait through a green signal and go on second green signal	- 70 percent of time a few drivers will wait through a green signal and go on second green signal
- No drivers wait through two greens and go on third	- Occasionally drivers wait through two greens or more
- Average overall travel speed (including stopped time) = 20 mph	- Average overall travel speed (including stopped time) = 15 mph

Peak hour capacities were determined at major intersections in the study area, based upon Transportation Research Circular 212, Interim Materials on Highway Capacity. The results of the analyses are shown in Tables III-8 and III-9. These tables reflect the level of service provided at major intersections and on critical links in the study area.



LEGEND

24 HOUR TRAFFIC

9200 BASE *

(17,000) PROJECTED **

PM PEAK HOUR TRAFFIC

← 884 BASE *

← (638) PROJECTED **

* EXISTING 1983 PEAK SEASON ADJUSTED TO REFLECT PLANNED REDUCTION IN FLORIDA POWER AND LIGHT TRAFFIC.

** BASED ON EXISTING PLUS APPROVED LAND USE.

N

SCALE 0 1000 4000 FEET

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ST. LUCIE COUNTY BARRIER ISLAND STUDY

PROJECTED TRAFFIC VOLUMES

FIGURE III-1

TABLE III-7
CAPACITY OF CRITICAL ROADWAY LINKS
(Vehicles/Day)

LOCATION	FDOT CAPACITY[1] ESTIMATE		REVISED CAPACITY[2]	
	C*	D*	C*	D*
Jensen Beach Causeway	13,280	--	15,600	17,600
A-1-A	16,000	--	18,800	21,200
Binney Drive	--	--	18,800	21,200
Fort Pierce (South) Bridge	--	--	58,900*	66,200*
North Bridge	--	--	15,600	17,600

(1) Based on 10 percent peak hour.
(2) Based on 8.5 percent peak hour.
* Level of Service
** Capacity cannot be reached due to intersection constraints east and west of bridge.

TABLE III-8
INTERSECTION CAPACITY ANALYSIS
(Total Projected Traffic)

INTERSECTION	CRITICAL LANE VOLUMES	SIGNAL PHASES	LEVEL OF SERVICE
A-1-A at Old Dixie Highway	1,098	2	C
A-1-A at Royal Palm Way	1,218	2	D
Seaway Drive at North Indian River Dr.	715	3	A
Seaway Drive at Binney Dr.	865	2	A
Seaway Drive at Ocean Dr.*	716	2	A
Ocean at Binney Dr.*	1,328	2	A
Jensen Beach Causeway at A-1-A	1,089	3	C
Jensen Beach Causeway at North Indian River Dr.	1,482	2	E

* Not currently signalized.

TABLE III-9
CAPACITY ANALYSIS SUMMARY

LINK	EXISTING PLUS APPROVED VOLUME	CAPACITY C**	CAPACITY D**	LEVEL OF SERVICE
North Bridge				
LINK	15,300	15,600	17,600	C
@ Old Dixie Hwy. Intersection		16,600	18,900	C
@ Royal Palm Way Intersection		15,000*	17,000*	D
Fort Pierce (South) Bridge				
LINK	22,700	58,900	66,200	A
@ Indian River Drive Intersection		36,000	40,500	A
@ Binney Drive Intersection		27,600	31,100	A
Binney Drive west of Seaway Drive				
LINK	9,300	18,800	21,200	A
@ Seaway Drive Intersection		12,900	14,500	A
Seaway Drive west of Binney Drive				
LINK	10,600	18,800	21,200	A
@ Binney Drive Intersection		13,800	15,500	A
A-1-A south of Binney Drive				
LINK	15,800	18,800	21,200	B
@ Binney Drive Intersection		13,600*	15,200*	E
Jensen Beach Causeway				
LINK	17,000	15,600	17,600	D
@ A-1-A Intersection		17,900*	20,000*	C
@ Indian River Drive Intersection		13,100	14,700*	E
A-1-A north of Jensen Causeway				
LINK	22,300	18,800	21,200	E
@ Jensen Causeway Intersection		23,200*	26,200*	C

* Assumes signalization.

** Level-of-Service

PROBLEM STATEMENT

Approved development traffic will nearly double existing traffic volumes in the study area. The significant reduction of Florida Power and Light labor force on the island will greatly alleviate potential severe congestion which would otherwise occur. Analyses of existing plus approved development with the Florida Power and Light reduction taken into consideration indicate that some minor congestion will be experienced in the study area. The potential also exists for isolated severe congestion unless intersection improvements are accomplished. The following is a summary of the conditions and possible improvements to reduce congestion:

- NORTH ISLAND

  Level of Service "C" or better will be provided on the transportation network associated with the north island, with the exception of the intersection of Royal Palm and State Road A-1-A. If signalization is provided at this intersection, the level of service will be just into the "D" range. Level of Service "A" could be provided by adding a right turn lane on the north approach.

- SOUTH ISLAND (Fort Pierce area)

  The Fort Pierce bridge and adjacent roadway network will provide surplus capacity over and above that required to accommodate existing plus approved development. Level of Service "A" will be provided. Certain improvements will be required at the intersections of Ocean Drive and Seaway Drive, and Ocean Drive and Binney Drive. These intersections will experience severe congestion unless traffic signalization is provided. Due to the close proximity of these intersections, it will be necessary for this signalization to be interconnected. Furthermore, geometric improvements will be required. As a minimum, a left turn lane will be required on the south approach of Ocean Drive at Binney Drive. With these improvements, Level of Service "A" can be provided.

  In order to maintain desirable flow characteristics on State Road A-1-A south of Binney Drive, it would be desirable to provide a three-lane cross-section similar to that developed in the south part of St. Lucie County. This cross-section would be developed between Binney Drive and Coconut Drive. Further, any new access points developed along State Road A-1-A will require appropriate turn lanes.

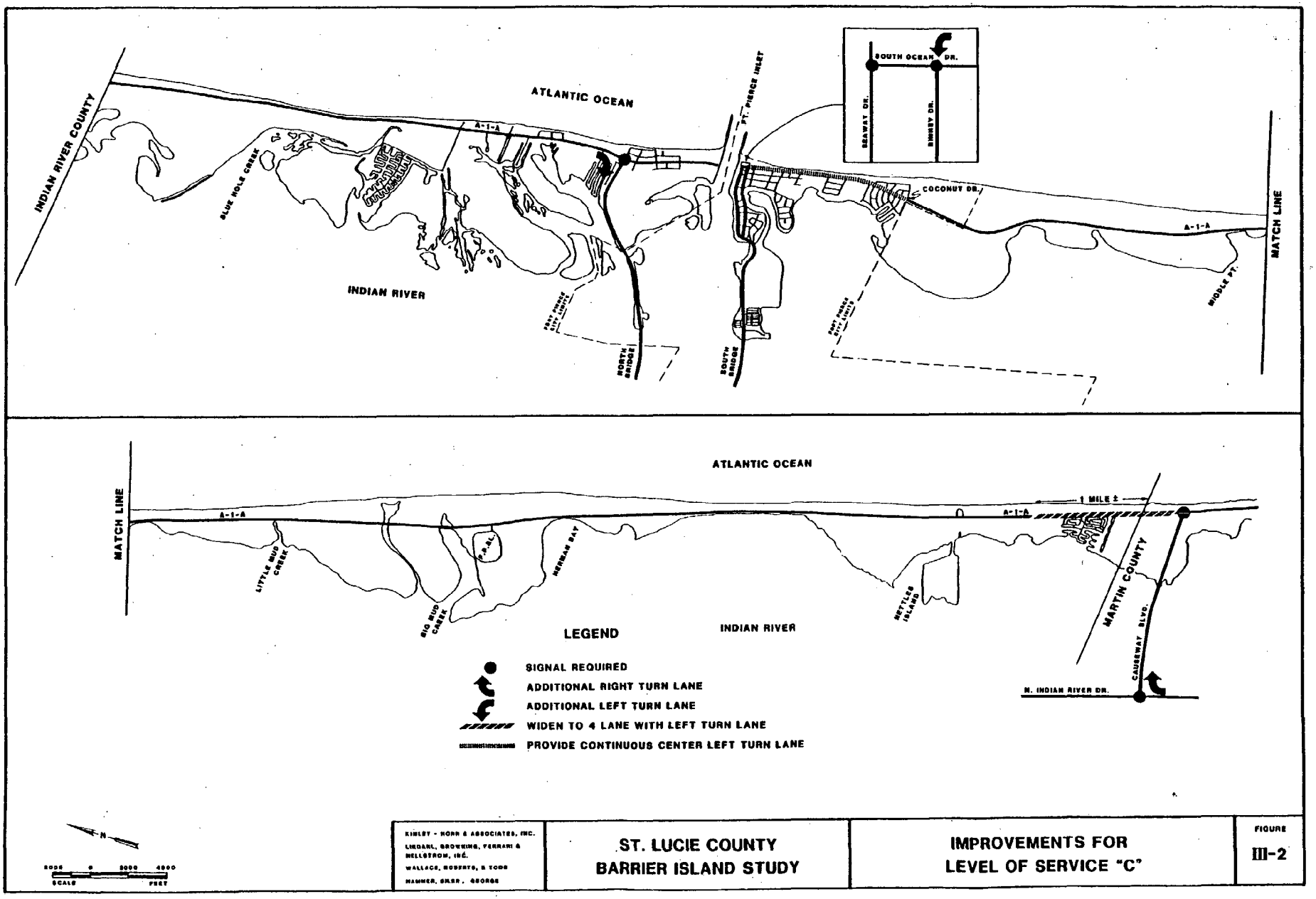
- SOUTH ISLAND (Jensen Beach Causeway area)

  The theoretical link capacity for State Road A-1-A north of Jensen Causeway will be exceeded. In order to avoid serious congestion, it will be necessary to provide a four-lane cross-section from Jensen Causeway to approximately one mile north of the Martin County line.

  The Jensen Causeway bridges will operate at Level of Service "D", however, significant congestion will not occur if appropriate improvements are implemented at the causeway termination points. At Jensen Causeway and State Road A-1-A, traffic signalization will be required. At the intersection of Jensen Causeway and Indian River Drive, signalization will be required as well as provision of a separate right turn lane on the south approach. With these improvements, Level of Service "A" would be provided at the Indian River Drive intersection and Level of Service "C" at the State Road A-1-A intersection. Again the link between these intersections will experience minor congestion and reduce travel speeds typical of Level of Service "D" operation.

Figure III-2 identifies the improvements which will be required to provide Level of Service "C" or better operation during the peak season at full build-out of existing plus approved development.

A number of improvements have been identified to accommodate a worst case condition. The analysis undertaken has identified the maximum traffic volumes which could be expected if 100 percent of the development on the island were occupied simultaneously. Based upon our inventory of winter occupancy, it is likely that as much as 10 to 15 percent of the total units may be vacant at any one time. This, of course, would significantly reduce the demands on the system. Furthermore, it should be considered in evaluating improvements that the conditions identified in this chapter will be experienced during approximately three or four months per year. Off peak season traffic is approximately 60 percent of peak season flow. Thus, for a Level of Service "D" or "E" identified during the winter season, Level of Service "A" will be provided during the remainder of the year.



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ST. LUCIE COUNTY BARRIER ISLAND STUDY

IMPROVEMENTS FOR LEVEL OF SERVICE "C"

FIGURE III-2

CHAPTER IV
WATER AND SEWERAGE SERVICE

INVENTORY

As described in Chapter II, a land use inventory was prepared for that portion of Hutchinson Island lying within St. Lucie County including the City of Fort Pierce. The inventory enumerated existing dwelling units, and dwelling units approved for development. The inventory further delineated dwelling units by unit type, single family, multi-family, recreational vehicle space or transitory hotel or motel accommodations. Information on which the inventory was based was furnished by St. Lucie County and the City of Fort Pierce.

The study area has been broken into three major locations for purposes of unit identification. Table IV-1 lists the projects by name for the area lying north of the Fort Pierce Inlet. Table IV-2 lists the inventory information for the area of Hutchinson Island lying within the City limits of the City of Fort Pierce. Table IV-3 lists the inventory information for the area of St. Lucie County lying southerly of the City limits of the City of Fort Pierce to the Martin County Line.

TABLE IV-2

Fort Pierce Units and Water Demand

UNITS	ADF (GPD)	ADF (GPM)	PEAK DAY (PDF) (GPM)
363 Single-Family	88,935	61.7	92.6
3099 Multi-Family	542,325	376.6	564.9
103 Transients	17,510	12.2	18.2
TOTALS	648,770	450.5	675.7

TABLE IV-1
NORTH ISLAND UNITS AND WATER DEMAND

NORTH ISLAND		WATER DEMAND		
PROJECT NAME	UNITS EXISTING, UNDER CONSTRUCTION AND APPROVED	ADF (GPD)	ADF (GPM)	PEAK DAY (GPM)
Barclay	80 MF	14,000	9.7	14.6
Barclay Beach Club	113 MF	19,775	13.7	20.6
Bryn Mawr Campground (WTP)	400 RV	68,000	47.2	70.8
Bryn Mawr Condo (WTP)	207 MF	36,225	25.2	37.7
Costa Shopping Center (WTP)				
Costa Townhouses (WTP)	47 MF	8,225	5.7	8.6
Costa Triplexes (WTP)	57 MF	9,975	6.9	10.4
Gates & Hoffman Triplexes	6 MF	1,050	0.7	1.1
Hackley Apartments	22 MF	3,850	2.7	4.0
Holiday Inn	147 Trans	24,990	17.4	26.0
Keil Condo	78 MF	13,650	9.5	14.2
Monte Carlo Beach Club (WTP)	306 MF	53,550	37.2	55.8
Ocean Harbor	250 MF	43,750	30.4	45.6
Ocean Harbor South (WTP)	216 MF	37,800	26.3	39.5
Pegasus Bay	82 MF	14,350	10.0	15.0
Queen's Cove Subdiv. (WTP)	260 SF	63,700	44.2	66.4

TABLE IV-1 (CONTINUED)

NORTH ISLAND (Cont.)		WATER DEMAND		
PROJECT NAME	UNITS EXISTING, UNDER CONSTRUCTION AND APPROVED	ADF (GPD)	ADF (GPM)	PEAK DAY (GPM)
The Sands	498 MF	87,150	60.5	90.8
Sands on the Ocean	246 MF	43,050	29.9	44.8
Sea Gate Tower	92 MF	16,100	11.2	16.8
Sea Palms	116 MF	20,300	14.1	21.1
Treasure Cove Dunes	37 MF	6,475	4.5	6.7
Miscellaneous Units	177 SF 109 MF	62,440	43.4	65.0

Key:

Unit Code	Type	Unit Water Demand
MF	Multi-family	175 gal. per day
SF	Single family	245 gal. per day
RV	Rec. vehicle	170 gal. per day
Trans	Transient	170 gal. per day
MH	Mobile home	175 gal. per day

(WTP) = Project has water treatment plant on-site or access to one; not on the FPUA System.

ADF = Units X unit water demand

Peak Day = ADF X 150%

TABLE IV-3
SOUTH ISLAND UNITS AND WATER DEMAND

SOUTH ISLAND		WATER DEMAND		
PROJECT NAME	UNITS EXISTING, UNDER CONSTRUCTION AND APPROVED	ADF (GPD)	ADF (GPM)	PEAK DAY (GPM)
Altamira (WTP)	150 MF	26,250	18.2	27.3
Atlantis	202 MF	35,350	24.5	36.8
Beach Club Colony	96 MF	16,800	11.7	17.5
California by the Sea (WTP)	12 SF	2,940	2.0	3.1
Highland Development	488 MF	85,400	59.3	89.0
Holiday Out	861 RV	146,370	101.6	152.5
Hutchinson Island Club	92 MF	16,100	11.2	16.8
Hutchinson Island Inn	19 Trans	3,230	2.2	3.4
Island Beach Club	84 MF	14,700	10.2	15.3
Islandia	572 MF	100,100	69.5	104.3
Island Dunes	648 MF	113,400	78.7	118.1
Island Village (WTP)	288 MF	50,400	35.0	52.5
The Miramar (WTP)	63 MF	11,025	7.7	11.5
Miramar North (WTP)	184 MF	32,200	22.4	33.5
Nettles Island	1,579 RV	268,430	186.4	279.6
Oceana	286 MF	50,050	34.8	52.1

TABLE IV-3 (CONTINUED)

SOUTH ISLAND (Cont.)

PROJECT NAME	UNITS EXISTING, UNDER CONSTRUCTION AND APPROVED	WATER DEMAND ADF (GPD)	WATER DEMAND ADF (GPM)	WATER DEMAND PEAK DAY (GPM)
Oceana South	253 MF	44,275	30.7	46.1
Ocean Dunes	28 MF 100 Trans	21,900	15.2	22.8
Ocean Rise	68 MF	11,900	8.3	12.4
The Princess (WTP)	190 MF	33,250	23.1	34.6
The Regency (WTP)	31 MF	5,425	3.8	5.7
Riverside Towers (WTP)	106 MF	18,550	12.9	19.3
Sand Dollar Towers (WTP)	96 MF	16,800	11.7	17.5
Sand Dollar Villas	509 MF	89,075	61.9	92.8
Sea Lord	46 MF	8,050	5.6	8.4
Sugar Sands	384 MF	67,200	46.7	70.0
Turtle Reef Club	150 MF	26,250	18.2	27.3
Venture Harbor	36 MH	6,300	4.4	6.6
Villa Del Sol	72 MF	12,600	8.7	13.1

TABLE IV-3 (CONTINUED)

SOUTH ISLAND (Cont.)

PROJECT NAME	UNITS EXISTING, UNDER CONSTRUCTION AND APPROVED	WATER DEMAND ADF (GPD)	WATER DEMAND ADF (GPM)	WATER DEMAND PEAK DAY (GPM)
Windmill Village - I	45 SF 42 MF 168 RV	46,935	32.6	48.9

Key:

Unit Code	Type	Unit Water Demand
MF	Multi-family	175 gal. per day
SF	Single family	245 gal. per day
RV	Rec. vehicle	170 gal. per day
Trans	Transient	170 gal. per day
MH	Mobile home	175 gal. per day

(WTP) = Project has water treatment plant on-site or access to one; not on the FPUA System.

ADF = Units X unit water demand

Peak Day = ADF X 150%

In an effort to separate those developments which receive utility service from the Fort Pierce Utilities Authority (FPUA) or North Hutchinson Services, Inc., (NHS), from those which own, operate and maintain their own systems, both the County-furnished information and the records of the Florida Department of Environmental Regulation were searched to determine the sources of utilities for all of the approved projects. Table IV-4 and IV-5 list the source of utilities for the projects approved for the area north of the Fort Pierce Inlet to the Indian River County Line and the area lying south of the City limits of the City of Fort Pierce to the Martin County Line, respectively. All developments lying within the City of Fort Pierce are served by the FPUA, with the exception of the wastewater needs of a portion of Ocean Village, which is served by its own on-site facility.

It was found during searches of the records that the files of the agencies were incomplete concerning the source of water or sewerage service for particular develoments. In the analysis of the existing water and sewer services, which are discussed later in this report, all water services which were unknown were assumed to be supplied by the FPUA on the south island, and NHS on the north island. This assumption is a conservative assumption, and thereby biases any error towards the worst case situation.

WATER SUPPLY

Water for the barrier islands is secured from four primary sources:

- The Fort Pierce Utilities Authority, serving almost all of the south island.
- North Hutchinson Services, Inc. (NHS), which buys water from, and under contract with, the Fort Pierce Utilities Authority to serve the southern 1.5 miles of the north island.
- Martin County water system, which serves a limited portion of the extreme southern area of St. Lucie County on the south island.
- Private, on-site water supply and treatment systems serving individual projects on both the north and south islands.

The analysis of existing capacity and distribution system capabilities focuses only upon the primary distribution system. The distribution system analyzed on the south island considers not only the existing improvements, but improvements now under construction by the FPUA. (See Figure IV-1)

TABLE IV-4
NORTH ISLAND UTILITY SERVICES

PROJECT NAME	WATER SERVICE	SEWERAGE SERVICE
Barclay	NHS	*
Barclay Beach Club	NHS	STP
Bryn Mawr Campground	WTP	STP
Bryn Mawr Condo	WTP	STP
Costa Shopping Center	NHS	*
Costa Townhouses	NHS	*
Costa Triplexes	NHS	*
Gates & Hoffman Triplexes	*	*
Hackley Apartments	*	*
Holiday Inn	NHS	STP
Keil Condo	*	*
Monte Carlo Beach Club	WTP	STP
Ocean Harbor	*	STP
Ocean Harbor South	WTP	STP
Pegasus Bay	*	*
Queen's Cove Subdiv.	WTP	Septic Tank
The Sands	NHS	NHS
Sands on the Ocean	NHS	*
Sea Gate Towers	NHS	STP
Sea Palms	NHS	*
Treasure Cove Dunes	WTP	STP

NHS = North Hutchinson Services, Inc.
WTP = Water Treatment Plant
STP = Sewage Treatment Plant
* = Data Not Available

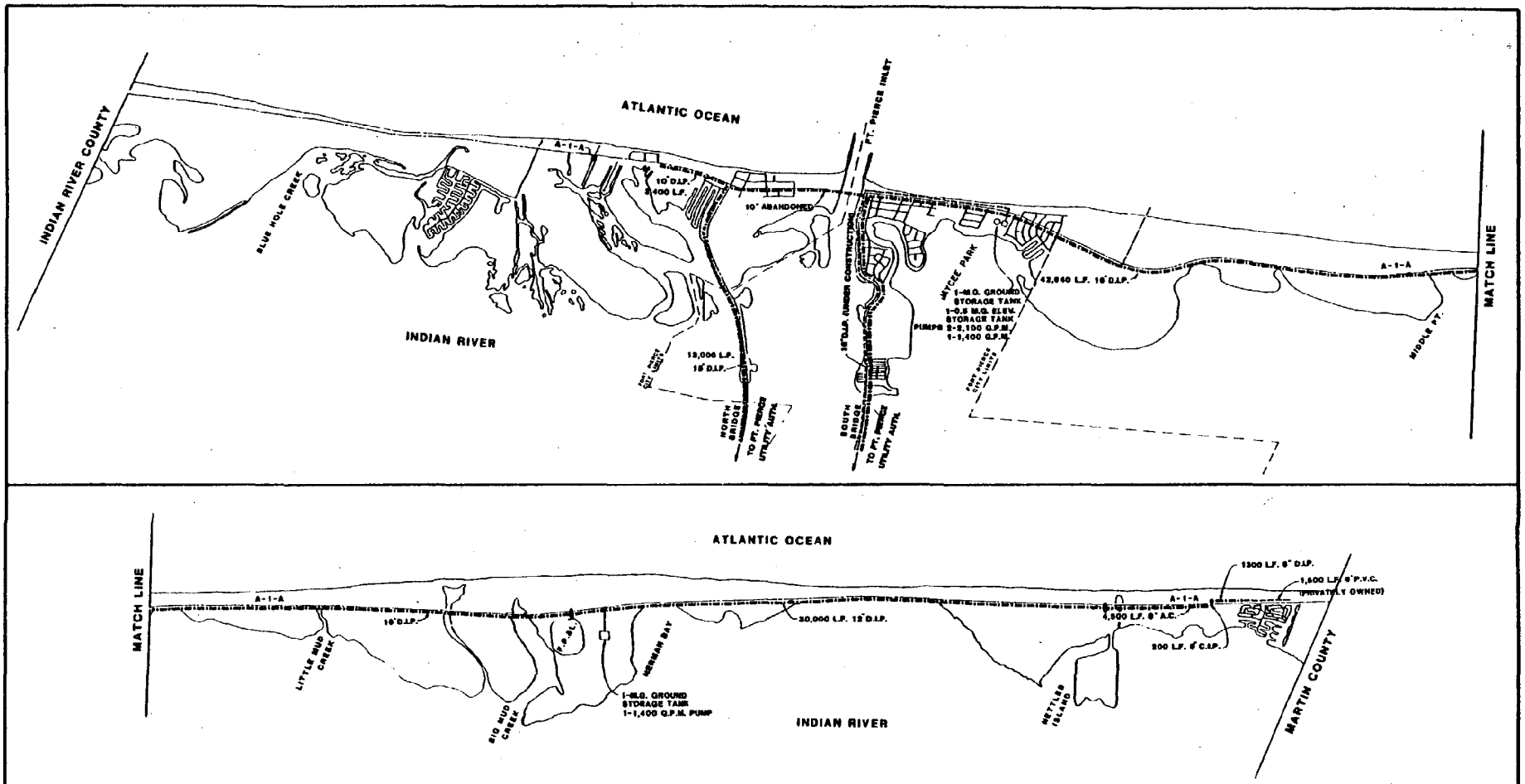
TABLE IV-5
SOUTH ISLAND UTILITY SERVICES

PROJECT NAME	WATER SERVICE	SEWERAGE SERVICE
Altamira	WTP	STP
Atlantis	FPUA	STP
Beach Club Colony	MC	STP
California by the Sea	WTP	Septic Tank
Highland Development	*	STP
Holiday Out	MC	STP
Hutchinson Island Club	FPUA	STP
Hutchinson Island Inn	FPUA	*
Island Beach Club	FPUA	STP
Islandia	FPUA	STP
Island Dunes	FPUA	STP
Island Village	WTP	STP
The Miramar	WTP	STP
Miramar North	WTP	*
Nettles Island	FPUA	STP
Oceana	FPUA	STP
Oceana South	FPUA	STP
Ocean Dunes	*	STP
Ocean Rise	FPUA	STP
Ocean Village	FPUA	STP
The Princess	WTP	STP
The Regency	WTP	*
Riverside Towers	WTP	*
Sand Dollar Towers	WTP	STP
Sand Dollar Villas	FPUA & WTP	STP

TABLE IV-5 (CONTINUED)

PROJECT NAME	WATER SERVICE	SEWERAGE SERVICE
Sea Lord	WTP	STP
Sea Point Towers	FPUA	FPUA
Sugar Sands	WTP	*
Turtle Reef Club	FPUA	STP
Venture Harbor	MC	*
Villa Del Sol	MC	*
Windmill Village - I	MC	STP
All Fort Pierce Developments	FPUA	FPUA (Except portion of Ocean Village)

FPUA = Fort Pierce Utility Authority
STP = Sewage Treatment Plant
WTP = Water Treatment Plant
* = Data Not Available
MC = On Martin County Water System



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PRIMARY WATER DISTRIBUTION SYSTEM

FIGURE IV-1

The north island is serviced primarily by a private distribution system owned by NHS, receiving water from the FPUA. The system consists of 6,000 feet of 18-inch ductile iron pipe (D.I.P.), 3,400 feet of 10-inch pipe and approximately 5,330 feet of 6-inch pipe all as shown in Figure IV-1. The analysis addresses only this primary distribution system.

The south island is supplied water by the FPUA from an elevated storage tank on the mainland via two (2) 16-inch D.I.P. mains to Jaycee Park. The facilities at Jaycee Park include a 0.5 million gallon elevated storage tank, a 1.0 million gallon ground storage tank and two (2) pumps. One pump is rated at 1,400 gallons per minute (gpm), and the other is rated at 2,100 gpm, with the capability of adding a second 2,100 gpm pump in the future. A single 16-inch D.I.P. main continues from the repump station at Jaycee Park to the nuclear power plant owned by Florida Power & Light Company (FPL). At FPL, the main continues 1.5 miles as a 12-inch D.I.P. to a 1.0 million gallon ground storage tank and repump station having one (1) 1,400 gpm pump. The distribution main continues southerly from this repump station with a 12-inch D.I.P., then an 8-inch D.I.P. to a developer-owned 6-inch PVC main. Figure IV-2 is a schematic layout of the primary water distribution system analyzed for the south island.

WATER SYSTEM DEMANDS

To determine the demand placed upon the water distribution systems on both islands by existing and approved projects, water demand was calculated for each project in the inventory. Demand rates and peaking factors used for the analysis were those determined by the consulting engineers for the FPUA,CH2M-Hill, in its report dated November, 1980, and entitled, "Engineering Report, Water System Master Plan for the Fort Pierce Utilities Authority, Fort Pierce, Florida." This report states that the values used were derived from actual accounting and billing records of the FPUA. The reported values, as used in this study, include 70 gallons per capita per day (gpcd) for residential water demands under conditions of average daily flow (ADF), and a peaking factor for peak daily flow (PDF) of 1.5. PDF is determined by multiplying the ADF by the peak factor of 1.5. Since the CH2M-Hill report addressed population and not dwelling units, conversions were made to estimate demand for the units considered in this study, as shown below.

Unit Type	Demand, Gallons per Day (ADF)
Single Family Residential (3.5 persons/unit)	245
Multi-Family Residential (2.5 persons/unit)	175
Recreational Vehicles, and Transitory Hotel/Motel	170

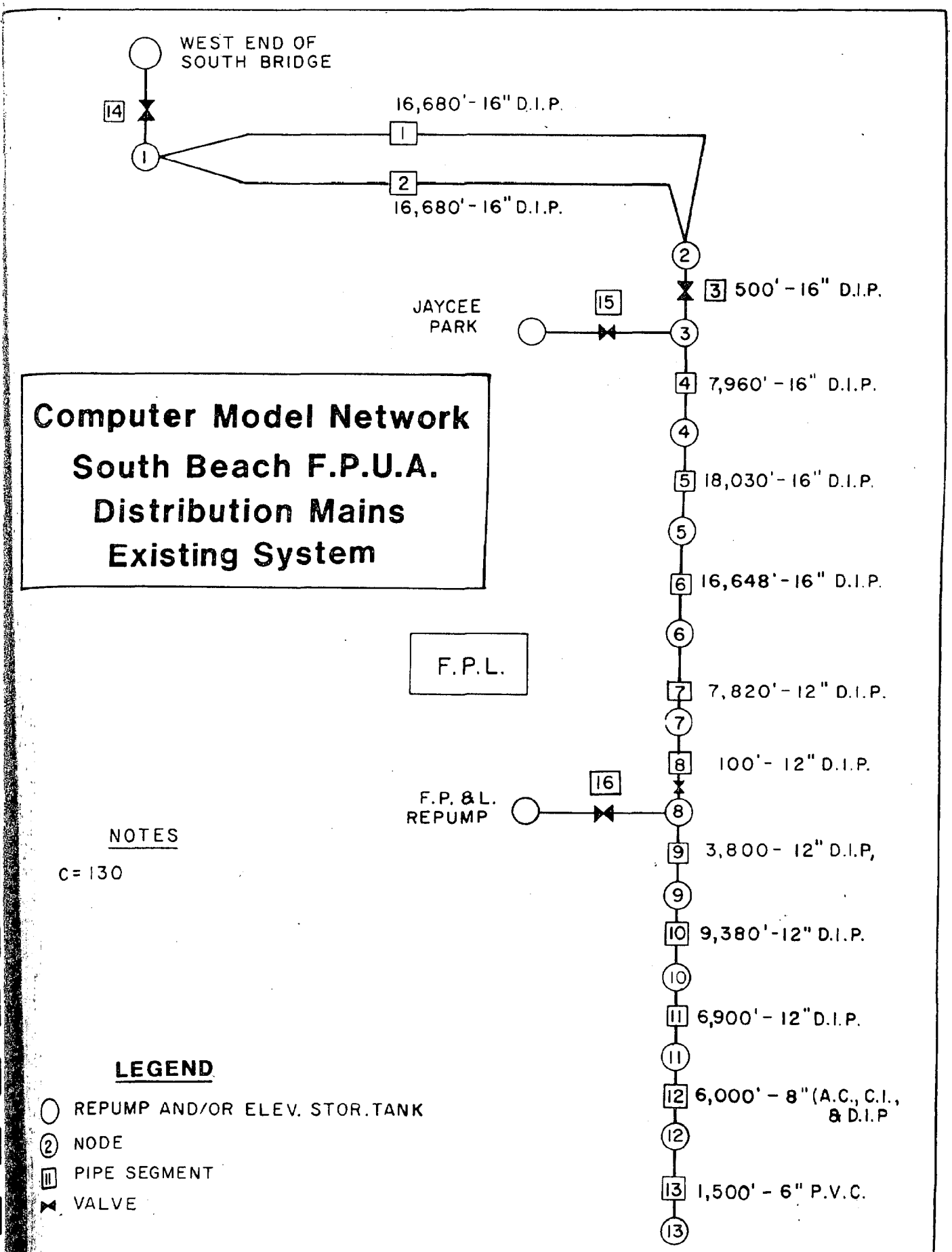
WEST END OF SOUTH BRIDGE
14
1
16,680'-16" D.I.P.
1
2
16,680'-16" D.I.P.
2
3 500'-16" D.I.P.
JAYCEE PARK
15
3
4 7,960'-16" D.I.P.
4
5 18,030'-16" D.I.P.
5
6 16,648'-16" D.I.P.
6
F.P.L.
7 7,820'-12" D.I.P.
7
8 100'-12" D.I.P.
16
F.P. & L. REPUMP
8
9 3,800-12" D.I.P,
9
10 9,380'-12" D.I.P.
10
11 6,900'-12" D.I.P.
11
12 6,000'-8" (A.C., C.I., & D.I.P
12
13 1,500'-6" P.V.C.
13
Computer Model Network
South Beach F.P.U.A.
Distribution Mains
Existing System
NOTES
C=130
LEGEND
REPUMP AND/OR ELEV. STOR. TANK
NODE
PIPE SEGMENT
VALVE

Figure IV-2

To begin the analysis of the existing distribution systems, the demand rates for peak daily flow (PDF) were assigned to the unit types for each project and total water demand schedules were developed. These schedules are found in Tables IV-1, IV-2 and IV-3.

NORTH ISLAND

The existing primary distribution system serving the north island was analyzed on the following basis:

- The underwater connection across the inlet, which according to the FPUA still exists but is inoperative, is considered to be abandoned.
- The nearest terminal energy point for the system is at the connection point of the 18-inch line with a 16-inch line at North 25th Street and Valencia Avenue, with a maintained pressure of 60 psi.
- The design demand used is 2190 gpm, consisting of 690 gpm for PDF and 1,500 gpm for fire flow.
- The minimum acceptable residual pressure at any point in the main distribution system studied during the design demand of 2190 gpm was considered to be 20 psi, a recognized and accepted standard.

The computer analysis of the north island system, terminating at the end of the existing 10-inch main, demonstrated that the system is capable of serving all existing and approved projects within the present area served by the system, under the evaluation criteria enumerated above.

SOUTH ISLAND

The existing primary distribution system serving the south island was analyzed on the following basis:

- The two (2) 16-inch mains from the mainland to the repump station at Jaycee Park are pressurized from the mainland by the water treatment plant and elevated storage tanks. The average pressure in the system on the mainland is between 60-70 psi.

- The repump stations (one at Jaycee Park and the other south of FPL) control the system pressure in their respective reaches of the water main at 65 psi.

- The total design demand used at the point of study initiation is 3,037 gpm, consisting 1,537 gpm for PDF and 1,500 gpm for fire flow. The FPL contractural demand of 1,200 gpm was not included during the time that PDF plus fire flow were experienced, since this demand can be controlled by the FPUA through a remote system.

- The minimum acceptable residual pressure at any point in the main distribution system studied during the design demand is 20 psi, a recognized and accepted standard.

Under the evaluation criteria enumerated above, it was found by computer analysis that the system functioned satisfactorily only to a point approximately 1000 feet south of the Herman Bay beach access point, in Section 27, Township 36 South, Range 41 East. From that point southerly, residual pressures in the main dropped below 20 psi, demonstrating that the system cannot deliver the volume of water required for PDF and fire flow from Herman Bay south to the south St. Lucie County line, a distance of approximately 4 miles.

It is emphasized that this analysis presumes that the FPL contractural demand of 1,200 gpm is not present at the same time the PDF and a fire flow were experienced. It was confirmed by officials of FPL and FPUA that, in the event of a fire demand on the line, the valve controlling the FPL withdrawal would be closed for the duration of the emergency.

SEWERAGE SERVICE

A review of the inventory information for Hutchinson Island, both north and south, reveals that a simple delineation of service is possible. Essentially, all areas that lie outside the city limits of the City of Fort Pierce receive their sewage treatment and disposal service from on-site wastewater treatment plants.

The Fort Pierce Utilities Authority sewage treatment plant and disposal system is located on Hutchinson Island at South Bridge and Seaway Drive. Effluent disposal from this facility is into the Indian River. Those portions of Hutchinson Island which are within the city limits of the City of Fort Pierce have their wastewater collected and transmitted to this facility for treatment and disposal, with the exception of a portion of Ocean Village.

PROBLEM STATEMENT - WATER SUPPLY

North Hutchinson Island

The existing primary distribution system on the north island was evaluated by introducing into the system the peak daily flow (PDF) for all existing and approved projects that are connected or have definite commitments with NHS for connection, plus an additional 1,500 gpm for fire flow.

The results of the analysis indicate that the system is adequate for serving the projects within the geographic limits of its present network.

Although there may be additional water available for more units, identification of the number of units cannot be made. Geographic distribution of the units and unit type must be known before the excess capacity could be allocated. Therefore, any new units proposed for connection to the existing primary distribution system must be evaluated on a project-by-project basis to determine if the criteria established for evaluation could still be met.

South Hutchinson Island

The existing primary distribution system on the south island was evaluated by introducing into the system the peak daily flow (PDF) for all existing and approved projects that are connected or have definite commitments with the FPUA for connection, plus an additional 1,500 gpm for fire flow. The contractural demand of 1,200 gpm for FPL was not included under the fire emergency conditions for the reason stated previously.

It was found that the system functioned satisfactorily only to a point approximately 1,000 feet south of the Herman Bay beach access point. From that point southerly to the south St. Lucie County line, a distance of approximately 4 miles, residual pressures in the main dropped below 20 psi, demonstrating that the system cannot deliver the volume of water required for PDF and fire flow.

The Director of the Fort Pierce Utilities Authority advises that it is the policy of the FPUA not to permit connections to this existing line in the unincorporated area of St. Lucie County other than those which already are connected or those for which the FPUA has made formal commitments.

Therefore, no new projects in St. Lucie County may connect to the FPUA system until additional system improvements are made.

PROBLEM STATEMENT - SEWERAGE SERVICE

The entire study area, with the exception of that portion lying within the limits of the City of Fort Pierce, treats its wastewater in on-site plants.

The FPUA is capable of treating wastewater from all existing and approved units which lie within its service area, the City of Fort Pierce, but it has no plans to extend service beyond the present city limits. Therefore, no adverse impact on the FPUA system is anticipated by any existing or approved units within the study area.

The current method of wastewater treatment in the unincorporated areas of the barrier islands permits development to occur without adversely impacting the FPUA system. Although the continued construction of on-site package wastewater treatment plants is advantageous to the existing FPUA system, it is not the appropriate long-term solution to the problem of wastewater collection, treatment and disposal. Package wastewater treatment plants often provide treatment that falls below acceptable standards because they are not operated and maintained properly, thereby becoming a nuisance to surrounding areas.

SPECIAL NOTE

It is emphasized that local, regional, state and Federal laws and regulations do not prohibit the construction of on-site water and wastewater facilities to serve projects on the barrier islands that have no access to existing facilities. Rather, regulations exist which permit the construction and use of on-site utility systems, provided that the various elements of the utility systems meet certain minimum criteria.

Therefore, the unavailability of existing water or wastewater utilities are not an absolute deterrent to the construction of a new project. However, the expense of on-site utilities must be considered by each developer at the time the project is conceived. Thus, the only constraint as to whether a project can be built without existing water or wastewater service is a financial one.

CHAPTER V
PUBLIC SAFETY

INVENTORY

Meetings were held with police, sheriff and fire officials to identify existing services in the study area and the current fire and police protection standards in St. Lucie County.

Fire and Emergency Medical Services

Fire and ambulance services are currently provided from the fire station on Seaway Drive in Fort Pierce. The site is staffed with 15 men, 5 per shift. The station equipment includes a pumper, a tanker, and an ambulance. Response times to the south end of St. Lucie County are 16 to 18 minutes. This excessive response time has prompted the construction of a new station across from the Sand Dollar development in the south part of St. Lucie County.

The new station will be equipped with a snorkel, a pumper and an ambulance. The station will open with 12 men, 4 per shift. With the new station, maximum response time will be 5 to 6 minutes.

It is estimated that the current fire fighter/population ratio on the south island is about 1:600. This ratio is slightly better than the general criteria of 1:900 used by the Fire District on a countywide basis.

The current population on the north island does not justify a station and thus, service is provided from the mainland. Response times are variable as they are subject to interference from the Intracoastal waterway bridge. A new station is planned for the north island. It will be basically the same as the new south island station and will be constructed when required by island growth.

Police and Sheriff Services

The City of Fort Pierce has one unit assigned to Fort Pierce Beach, operating out of police headquarters on the mainland. The Chief of Police indicates this provides sufficient coverage except when officers are required by other zones for back-up. Recently, demands on the mainland have reduced the department's ability to provide full time coverage of this zone. Citywide the police department has 2.1 officers per 1,000 population. However, on the island, one full time unit translates into about 1 officer per 1,800 population.

The St. Lucie County Sheriff's Department also has one full-time unit on the island. However, there is no backup available when officers are required to appear in court or when prisoners are transported to the mainland. The Sheriff's Department uses a criteria of 1 deputy per 1,000 population. Currently, the one full-time unit corresponds to about one deputy per 1,000 unincorporated population.

REQUIREMENTS FOR APPROVED DEVELOPMENT

Fire

The opening of the south island fire station will provide a firefighter/ population ratio of approximately 1:600. This is well within the criteria set forth by the Fire District.

The total north island approved population will require an additional six firefighters. These would have to be assigned to the mainland station serving the island until a new station on the island is justified. (The minimum station complement is 12 men, 4 per shift.)

Police and Sheriff

Based on the existing ratio of Fort Pierce officers to population on the island, no additional units would be required on a full time basis in Fort Pierce. However, one additional officer should be considered for the highest activity shift. This would improve coverage and help assure coverage of the zone at all times.

The St. Lucie County Sheriff's Department will require six additional deputies on the south island and will need full time coverage on the north island (3 deputies). A sheriff substation should be provided on the south island to accommodate office functions for the three full-time units. This can be accommodated at the new fire station site. The building and site have been designed to accommodate addition of a room to fulfill the substation function.

EMERGENCY EVACUATION

Consideration has been given to island evacuation time in the event of a sudden disaster. Hurricane evacuation considerations are being addressed separately by the Treasure Coast Regional Planning Council. The most obvious possible emergency condition would be a radiological emergency. Analyses have, therefore, been conducted considering such an emergency. In a planned evacuation, school buses would be used to assist in the evacuation and reduce the demands on the island bridges. However, it is unlikely that any significant pooling could be accomplished in an immediate evacuation condition. Therefore, it was assumed as a worst case analysis that each dwelling unit would generate one vehicle. The following is a summary of our analyses and findings.

North Island

Two scenarios were considered here:

(1) A radiological emergency with A-1-A north and the north bridge serving as evacuation routes.

(2) Other emergency requiring all evacuation via the north bridge.

A total of approximately 3,800 vehicles would be evacuated. Since current disaster plans require the use of only one lane on two-lane facilities, a maximum capacity of 2,000 vehicles per hour can be accommodated. In Case 1, it would take approximately 55 minutes to evacuate the island. In Case 2, the time would be doubled or 100 minutes. In either case, if the north and south islands were being evacuated simultaneously, traffic crossing the north bridge would be routed northbound on Old Dixie. If the south island were not being evacuated, U.S. 1 would also be used.

South Island (north of FPL)

Although the Fort Pierce bridge has significant capacity, SR A-1-A to the east is only two lanes. This restricts the evacuation capability. It would take 140 minutes to evacuate the area north of the power plant. It should be pointed out, however, that the residents of the 1,022 units between the power plant and the City of Fort Pierce could be more than seven miles from the plan in five minutes driving time. Once in Fort Pierce, they would experience the 140 minute maximum evacuation time.

South Island (south of FPL)

It was assumed that nearly all evacuations of this area would be via the Jensen Beach Causeway and that Martin County would primarily use the south island bridges. On this basis, it would take about 200 minutes to clear the island.

PROBLEM STATEMENT

Police, Fire and Emergency Medical Services

City police and sheriff manpower will need to be increased by one and nine men, respectively. An additional patrol car will be required in Fort Pierce and three cars in the county (one on the north island, two on the south). These demands will be much lower in the off season.

Planned fire service will be adequate for the south island, however, the existing plus approved population with its high percentage of elderly suggest the need for a paramedic team. Therefore, the new south station should be equipped with an advance life support system. North island population growth will require the addition of six firemen at an existing mainland station.

Emergency Evacuation

The evacuation times are generally in accord with data provided in Attachment 2, St. Lucie County "Radiological Emergency Plan for Nuclear Power Plants".

North island evacuation times are reasonable. The north part of the south island could be evacuated in nearly half the indicated time with the provision of a third lane on Ocean Drive in Fort Pierce between Coconut Drive and Binney Drive and on Seaway Drive between Binney Drive and the bridge. Special operational plans would also be required at Indian River Drive and U.S. 1 to accommodate the flow.

South island evacuation times are far greater than in the other areas and point to the need for additional capacity. This could be accommodated by bridge widening or by allowing two-lane westbound flow on the existing bridges. The latter would require a unique plan for police traffic control to accommodate emergency vehicles.

APPENDIX A
TRIP GENERATION CALCULATIONS

DEVELOPMENT	TRIPS	UNITS
(1) Mixed Density Average Rate		
Indian River Plantation	2,646	525
Ocean Village	2,688	930
TOTAL	5,334	1,455
AVERAGE RATE = 3.7		
(2) High Rise Average Rate		
Atlantis	445	111
Ocean Towers	654	170
Sand Dollar Villas	547	183
Ocean Harbour	296	88
TOTAL	1,942	552
AVERAGE RATE = 3.5		