Manatee

expansion project

Volume I of III

FPL

SITE CERTIFICATION APPLICATION
MANATEE EXPANSION PROJECT

VOLUME I OF III

Submitted by:

Florida Power & Light Company
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February 2002
0137609/GAS

FPL

APPLICANT INFORMATION

Please supply the following information:

Applicant's Official Name *Florida Power and Light Company*

Address *700 Universe Boulevard, Juno Beach, FL 33408*

Address of Official Headquarters *700 Universe Boulevard, Juno Beach, FL 33408*

Business Entity (corporation, partnership, co-operative) *Corporation*

Names, owners, etc. *Florida Power and Light Company (an investor-owned electric utility)*

Name and Title of Chief Executive Officer *Paul J. Evanson, President*

Name, Address, and Phone Number of Official Representative responsible

for obtaining certification *K. H. Simmons, Manager of New Capacity Projects, Environmental Services*

700 Universe Boulevard, Juno Beach, FL 33408 Phone: (561) 691-2216 Fax: (561) 691-7049

Site Location (county) *5 miles East of Parrish, 19050 SR 62, Manatee County, FL 34219*

Nearest Incorporated City *Palmetto, FL (about 14 miles)*

Latitude and Longitude *27°36' 20" N 82°20' 52" E*

UTM's Northerly *3,054.06 km N*

Easterly *367.0 km E (Zone 17)*

Section, Township, Range *Portions of Section 18 of Township 33S, Range 20E*

Location of any directly associated transmission

facilities (counties) *Not Applicable*

Name Plate Generating Capacity *Nominal 1,150 MW*

Capacity of Proposed Additions and Ultimate Site

Capacity (where applicable) *Capacity Addition is 1,150 MW nominal*

Remarks (additional information that will help identify the applicant)

Project Name: Manatee Expansion Project (a.k.a. Manatee Unit 3)

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LIST OF ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
AAQS	Ambient Air Quality Standards
ANSI	American National Standard Institute
AR	argon
BACT	best available control technology
Btu/lb	British thermal units per pound
°C	degrees Celsius
CAA	Clean Air Act
CEM	continuous emission monitoring
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
C_2H_6	ethane
C_3H_8	propane
C_4H_{10}	butane
C_5H_{12}	pentane
C_6H_{14}	hexane
C_7H_{16}	heptane
C_8H_{18}	octane
Cl	chloride
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
CR	County Road
CT	combustion turbine
dB	decibel
dBA	A-weighted decibel
DEM	Digital Elevation Model
DLN	dry-low NO_x
DSM	demand side management
ELAPP	Environmental Lands Acquisition and Protection Program
EPA	U.S. Environmental Protection Agency

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LIST OF ACRONYMS AND ABBREVIATIONS - continued

ET	evapotranspiration
°F	degrees Fahrenheit
F.A.C.	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FFWCC	Florida Fish and Wildlife Conservation Commission
FGD	flue gas desulphurization
FLM	Federal Land Manager
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Area Inventory
FPL	Florida Power & Light Company
FPSC	Florida Public Service Commission
F.S.	Florida Statutes
FSUTMS	Florida Standard Urban Transportation Modeling Structure
ft	foot
ft^2	square foot
ft^2/day	square feet per day
ft-bls	feet below land surface
ft/day	feet per day
ft/ft	feet per foot
ft/mile	feet per mile
ft-msl	feet above mean sea level
ft-NGVD	feet national geodetic vertical datum
gpd	gallons per day
gpm	gallons per minute
gr/100 scf	grains per 100 standard cubic feet
H_2O	water vapor
HCM	Highway Capacity Manual
H-D	Hester Dendy
He	Helium

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LIST OF ACRONYMS AND ABBREVIATIONS - continued

HHV	high heating value
HHW	higher high water
HLW	higher low water
HPM	higher power mode
HRSG	heat recovery steam generator
HSH	highest, second-highest
Hz	hertz
I	Interstate Highway
IRP	integrated resource planning
IWAQM	Interagency Workgroup on Air Quality Models
kg	kilogram
km	kilometer
kWh	kilowatt hour
lb/hr	pounds per hour
lb/yr	pounds per year
LHV	lower heating value
LHW	lower high water
LLW	lower low water
LOLP	loss-of-load probability
LOS	Level of Service
m	meter
Manatee Expansion Project	Manatee Unit 3 Combined Cycle Project or the Project
MB	mixed bed
mgd	million gallons per day
mg/L	milligrams per liter
mi^2	square mile
MM4	Mesoscale Model - Generation 4
MMBtu/hr	million British thermal units per hour
MMcf/hr	million cubic feet per hour
mph	miles per hour
MW	megawatt
N_2	nitrogen

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LIST OF ACRONYMS AND ABBREVIATIONS - continued

Na	sodium
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NSPS	New Source Performance Standards
NWS	National Weather Service
O_2	oxygen
O_3	ozone
OFW	Outstanding Florida Waters
‰	parts per thousand
Pb	lead
PDPI	Planned Development Public Interest
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter of 10 micrometers or less
ppm	parts per million
ppmvd	parts per million-dry conditions
PPSA	Power Plant Siting Act
PSD	prevention of significant deterioration
QA/QC	quality assurance/quality control
RFP	Request for Proposal
RO	reverse osmosis
ROW	right-of-way
S	sulfur
SCA	Site Certification Application
SCR	selective catalytic reduction
SCRAM	Support Center for Regulatory Air Models
SHPO	State Historic Preservation Officer
SIP	site implementation plan
SO_2	sulfur dioxide
SOR	Save Our Rivers

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LIST OF ACRONYMS AND ABBREVIATIONS - continued

SPCC	Spill Prevention Control and Countermeasure
SPL	sound pressure level
SR	State Road
SWFWMD	Southwest Florida Water Management District
TDS	Total dissolved solids
TPY	tons per year
TRB	Transportation Research Board
TTN	Technical Transfer Network
$\mu g/m^3$	micrograms per cubic meter
µm	micrometer
µS	microSiemens
USACE	U.S. Army Corps of Engineers
USF	University of South Florida
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
ft^3/year	cubic feet per year
ZOD	zone of discharge

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

This chapter of the Site Certification Application (SCA) introduces Florida Power & Light Company (FPL) and explains the need for a new generating unit at FPL's Manatee Power Plant site.

1.1 INTRODUCTION

FPL proposes to construct a new natural gas fired combined cycle generating unit at its existing power plant site near Parrish in Manatee County, Florida. The new unit will utilize four new combustion turbines (CTs), four new heat recovery steam generators (HRSGs) and a new steam turbine/electric generator. The resulting combined cycle unit (Manatee Unit 3) will be capable of generating approximately 1,100 megawatts (MW).

The Manatee Expansion Project (also referred to as the Manatee Unit 3 Combined Cycle Project or the Project) is part of FPL's plan to meet its customers' increased need for electricity in 2005 and 2006. FPL's plan would add a total of 1,900 MW of new, cleaner-burning natural gas-fueled combined cycle generation at two existing power plant sites (the Manatee Plant site and FPL's Martin Plant site). These two projects would increase FPL's system-wide capability to provide electricity by 10 percent.

The plan, based on the two projects, would allow FPL to serve the electrical needs of more than 400,000 customers throughout its service territory by 2005 and maintain a 20-percent reserve margin. The decision to meet customer need with the Manatee and Martin Projects is the result of a comprehensive evaluation of power purchase alternatives and FPL-formulated alternatives. The evaluation showed that these two projects are the most cost-effective option for FPL's customers, representing the best balance of economic and environmental considerations.

FPL is seeking approval of the Manatee Expansion Project under the Florida Electrical Power Plant Siting Act (PPSA), Chapter 403, Part II, Florida Statutes (F.S.). The PPSA provides a centralized review process for new electrical generating facilities in Florida, involving a balancing of "the increasing demand for electrical power plants with the broad interests of the public". The Florida Public Service Commission (FPSC) is the sole forum for the determination of need for a proposed facility. The Florida Department of Environmental Protection (FDEP) acts as the coordinator for the remainder of the site certification process, with input from various state, regional and local agencies, along with interested citizens. Ultimate disposition of the SCA is by the Governor and Cabinet sitting as the Siting Board.

FPL plans to submit a Petition to Determine Need for the Manatee Expansion Project (and for the Martin Expansion Project) to the FPSC in March 2002. That Petition, along with supporting documentation, will address the manner in which FPL's Manatee and Martin projects will meet the need for electric system reliability, integrity and adequacy at reasonable cost and be the most cost-effective alternatives available. Section 1.5 contains a summary of FPL's capacity needs, its Request for Proposal process, analyses of the proposals, and the timing of FPL's unit additions.

This SCA is being filed with FDEP pursuant to Chapter 62-17, Florida Administrative Code (F.A.C.). The SCA describes the Manatee Expansion Project and addresses its environmental and socioeconomic aspects by presenting information on the existing natural and human environment, on the new facilities to be constructed and generated, and on the impacts of those facilities on those environments.

1.2 THE APPLICANT

FPL, the principal subsidiary of FPL Group, is the largest electric utility in Florida. FPL serves more than 7 million people (approximately 3.9 million customer accounts) along the eastern seaboard and the southern and southwestern portions of Florida. FPL serves customers in all or parts of 35 Florida counties (see Figure 1.2-1). FPL owns and operates 34 major generating units and more than 68,000 miles of transmission and distribution lines to serve its customers.

FPL uses a combination of gas-, oil-, coal-, and nuclear-fueled plants to generate electricity. This diverse mix provides FPL with reliability, operating flexibility, and the ability to minimize fuel costs.

FPL has seen significant growth in the number of customers and the demand for electricity over the past ten years. In the coming decade, FPL expects continued growth in the demand for electricity to meet its customers' needs.

1.3 OVERVIEW OF THE PROJECT

FPL has determined that in order to continue to provide reliable and cost-effective service to its customers, and to meet future load growth, it must add generating resources in the near future. FPL's plan to best meet the need projected in the years 2005 and 2006 includes construction of a new combined cycle generating unit at the Manatee Plant site.

The Manatee Plant has reliably supplied electric power to FPL's residential, commercial and industrial customers since 1976, when Unit 1 began operation. The Manatee Plant site occupies 9,500 acres near Parrish, Florida (see Figure 1.3-1). Generating units at the Manatee Plant site presently include Units 1 and 2 (each nominal 800-MW residual oil-fired steam units). The Manatee Plant site currently has a total summer net generating capability of approximately 1,600 MW. The site includes a 4,000-acre cooling pond that serves Units 1 and 2. The Manatee Plant site was designed and developed to accommodate additional generating capacity.

The Project will consist of four new CTs, four new HRSGs, and a new steam turbine/electric generator to create a "four-on-one" combined cycle unit. The CTs are similar to, but larger and more efficient than, traditional jet engines. They produce electrical energy by direct connection to an electric generator. Natural gas will be the fuel for the CTs. The exhaust heat from the CTs, which would otherwise be wasted energy released to the atmosphere, will be routed through the HRSGs to produce steam for the new turbine generator, which produces additional electricity. The HRSGs will have duct burners to optimize the Unit's generating capacity. Cooling water for Manatee Unit 3 will come from the existing cooling pond at the Manatee Plant site.

Manatee Unit 3, with generating capacity of approximately 1,100 MW, will be among the most efficient electric generators in Florida.

The portion of the Manatee Plant site that will be occupied by Project facilities comprises approximately 73 acres within the defined Project area. Existing Units 1 and 2 will remain in operation and will not be affected by the Project.

Natural gas will be supplied to the Project by a lateral, which will connect to an interstate gas pipeline. FPL has not selected a gas supplier for Manatee Unit 3 at this time.

The electricity generated by Manatee Unit 3 will interconnect with FPL's existing transmission network at the existing system substation at the Manatee site. In conjunction with the Manatee Project, FPL plans to upgrade its existing transmission system to ensure system reliability. For this purpose, a new transmission line will be added between the existing Manatee substation and the existing Johnson substation within an existing FPL right-of-way. These new lines will carry electricity generated at the Manatee Plant, as well as electricity generated elsewhere as is characteristic of the electric grid. System upgrades such as this, which occur beyond the initial connection to the transmission network at the onsite system substation, are "integration" facilities as distinct from "interconnection" facilities.

Protecting the environment while providing safe, reliable and adequate power to its customers is of great importance to FPL. FPL's Manatee Plant will continue to comply with all applicable regulatory standards through construction and operation of Manatee Unit 3.

1.4 FPL'S RESOURCE PLANNING PROCESS

FPL uses an integrated resource planning (IRP) process in order to determine when new resources are needed, the magnitude of the resources needed, and the type of resources that should be added. The timing and type of potential new power plants are determined as part of this process. A description of FPL's IRP process is contained in FPL's Ten Year Power Plant Site Plan 2001-2010.

There are four basic steps which are fundamental to FPL's resource planning:

Step 1: Determine the magnitude and timing of FPL's resource needs.

Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of these resource needs (i.e., identify competing options and resource plans).

Step 3: Determine the economics for the total utility system with each of the competing options and resource plans.

Step 4: Select a resource plan and commit, as needed, to near-term options.

1.5 NEED FOR THE PROJECT

1.5.1 FPL'S CAPACITY NEEDS

FPL's IRP work in 2001 confirmed what its work in previous years had shown: that FPL will have a need for additional resources in 2005 and 2006. This part of the IRP process is generally called a "reliability assessment", and it is designed to determine both the magnitude and timing of FPL's resource needs. In other words, it is a determination of how many megawatts of load reduction, new capacity, or a combination of both load reduction (including consumption) and new capacity options are needed and when these megawatts are needed to meet FPL's planning criteria.

In the reliability assessment portion of its 2001 IRP work, FPL started with an updated load forecast and the updating of several databases. Examples of the database information that was updated include: delivered fuel price projections, current financial and economic assumptions, and power plant capability and reliability assumptions. In addition, three assumptions were made by FPL during its 2001 IRP work that had a direct impact on the reliability assessment. These three assumptions concerned near-term construction capacity additions, near-term firm capacity purchase additions, and long-term demand side management (DSM) implementation.

The first of these assumptions included FPL's announced plans to add near-term capacity through various construction projects. These construction projects include the repowering of several existing units and the addition of several new combustion turbines at existing FPL Plant sites. FPL committed in 1998 to repower both existing steam units at its Fort Myers Plant site and two of the three existing steam units at its Sanford Plant site. These two repowering efforts will add significant capacity to FPL's system and will greatly increase the efficiency of the capacity at those two sites. The repowered Fort Myers capacity is scheduled to come in-service by the summer of 2002. Six new CTs, which are components of the repowering effort, began coming in-service at Fort Myers in late 2000 and through their initial operation in a stand-alone mode have already increased FPL's system capacity. A somewhat different schedule is planned for the two Sanford units that will be repowered. Both of these units will be repowered without the combustion turbine components coming in-service during the process. Sanford Unit No. 5 came out-of-service in the fall of 2001 and will return fully repowered by the summer of 2002. Sanford Unit No. 4 will come out-of-service in the spring of 2002 and return fully repowered at the end of 2002. As a result of this commitment, FPL assumed that these capacity additions resulting from the Fort Myers and Sanford repowerings were a "given" in its 2001 IRP work.

Another part of FPL's construction capacity addition assumption was its previously announced (in earlier site plans) decision to add four new CTs in the 2001 through 2003 time frame. The first two CTs came in-service at FPL's existing Martin Plant site in mid-2001. The second pair of CTs is scheduled to be in-service in 2003 and will be placed at FPL's existing Fort Myers Plant site. FPL's 2001 resource planning work included these new CT capacity additions.

The second of these three assumptions involved a decision, which was made during FPL's 2000 resource planning work, to secure an amount of capacity for the next few years through firm capacity, short-term purchases. These firm capacity purchases are from a combination of utility and non-utility generators. These capacity purchases were not finalized at the time FPL filed its 2001 Site Plan, but were finalized later in 2001. The capacity and duration of these purchase totals are both greater than projected in the 2001 Site Plan. These purchases were also assumed as a "given" in FPL's 2001 IRP work.

The third of these assumptions involved DSM. Since 1994, FPL's resource planning work has used the DSM MW called for in FPL's approved DSM Goals as a "given" in its analyses. This was again the case in FPL's 2001 planning work as its recently approved new DSM goals through the year 2009 were taken as a "given".

These assumptions and much of the updated database information were then used to determine the magnitude and the timing of FPL's resource needs. This determination is accomplished by system reliability analyses, which are typically based on a dual planning criteria of a minimum peak period reserve margin of 15 percent (FPL applies this to both summer and winter peaks) and a maximum loss-of-load probability (LOLP) of 0.1 days/year criteria. Both of these criteria are commonly used throughout the utility industry. FPL also used a "third" reliability criterion in its 2001 planning work: a minimum 20-percent summer and winter reserve margin, which was applied in the analysis to the mid-2004–on time period due to a joint settlement reached among FPL, Florida Power Corporation, Tampa Electric Company, and the FPSC in Docket No. 981890-EU.

These three reliability criteria (15-percent reserve margin, 20-percent reserve margin, and 0.1 day per year) are utilized in two types of reliability assessment approaches: deterministic and probabilistic. Reserve margin analysis is a deterministic approach while LOLP analysis is a probabilistic approach. The reserve margin approach is essentially a calculation of excess firm capacity at the annual system peaks. This relatively simple calculation can be performed on a spreadsheet. It provides an indication of how well a generating system can meet its native load during peak periods.

However, a deterministic approach such as a reserve margin calculation does not take into account probabilistic-related elements such as: the reliability of individual generating units; the total number of generating units, or the sizes of these generating units. Nor does a deterministic approach fully take into account the value of being part of an interconnected system. Therefore, FPL also utilizes a probabilistic approach (LOLP) to provide additional information on the reliability of its generating system. Simply stated, LOLP is an index of how well a generating system may be able to meet its demand (i.e., a measure of how often load may exceed available resources). In contrast to reserve margin, the calculation of LOLP looks at the daily peak demands for each year, while taking into consideration such probabilistic events as the unavailability of individual generators due to scheduled maintenance or forced outages. LOLP is expressed in units of "number of times per year" that the system demand could not be served. The standard for LOLP accepted throughout the industry is a maximum of 0.1 day per year. This analysis requires a more complicated calculation methodology than does reserve margin analysis.

In a reliability assessment, either a reserve margin criterion or the LOLP criterion will be violated first. This means that, for a given future year, FPL's system will not have a 15 percent or a 20 percent (whatever the criterion is for the year in question) reserve margin or it will have a projected LOLP value greater than 0.1. Whichever criterion is violated first is said to "drive" FPL's future resource needs. For the last few years, summer reserve margin has driven FPL's future needs. This again was the case in FPL's most current reliability assessment work performed as part of its 2001 IRP work.

FPL's work showed that with no additional resources beyond its existing generating units and purchases, plus the repowerings, new CTs, new purchases, and DSM implementation mentioned above, FPL would begin to fall below its summer reserve margin criterion of 20 percent starting with the summer of 2005. A minimum of 1,122 MW of additional resources would be needed by mid-2005 and an additional 600 MW by mid-2006 in order for FPL to continue to meet its summer reserve margin criterion for those years. Without these combined additions of 1,722 MW, FPL's summer reserve margin would fall significantly below the 20-percent criterion in both years. FPL's summer reserve margins would fall to 14.1 percent in 2005 and to 11.1 percent in 2006 with no additional capacity additions.

Consequently, FPL determined that it needed to add new resources for 2005 and 2006. In order to meet those needs by building new generating units, FPL would need to begin that process in 2001.

1.5.2 FPL'S REQUEST FOR PROPOSALS AND RESULTS OF RFP ANALYSES

FPL's resource planning work conducted in previous years showed that the most economic type of new generation to add to its system would be new combined cycle units. This type of generating unit falls under the FPSC's "Bidding Rule" (Rule 25-22.082, F.A.C.). This rule requires electric utilities seeking to build such a unit to first solicit bids from interested parties in order to determine whether the utility's construction of this unit is the most economical alternative available. Consequently, FPL issued a Request for Proposal (RFP) in mid-August of 2001. This RFP solicited proposals for 1,150 MW beginning on or before mid-2005, and for an additional 600 MW on or before mid-2006, for a total of 1,750 MW for the 2005 and 2006 time frame. The RFP was announced in an advertisement in the Wall Street Journal and in a press release that was carried in numerous Florida newspapers and trade publications.

On the proposal due date of September 28, 2001, FPL received proposals from 15 organizations (Bidders) consisting of 3 electric utilities and 12 non-utilities. A number of these Bidders submitted more than one proposal. Furthermore, in the course of e-mail and telephone conversations with these Bidders designed to clarify the information contained in their proposals, the number of proposals to be evaluated increased. (This occurred as some Bidders decided they wanted their proposals evaluated for both 2005 and 2006, while other Bidders wanted a variation(s) of their proposal evaluated as well.) Ultimately, 81 proposals were evaluated by FPL in response to the RFP. The vast majority of these were power purchase offerings from yet-to-be built new generating units. Most of these new generating units were natural gas-fired CC units. The amount of capacity offered in these proposals was approximately 14,500 MW.

After a lengthy period of clarifying information in the proposals, FPL evaluated these "outside proposals" as well as 13 self-build FPL construction options. Most of FPL's construction options were also natural gas-fired CC units. FPL's analysis first determined the best combination of only outside proposals that could meet FPL's resource needs. Next, FPL determined the best combination of only FPL construction options. Then FPL determined the best "combined" combination of outside proposals and FPL construction options. Finally, these "best combinations" were all compared to one another to determine the most economical combination of options for meeting FPL's needs.

FPL's RFP analysis determined that a combination of two FPL self-build construction options was the most economic way to meet its 2005 and 2006 capacity needs. These two construction options are:

1. A conversion of the two existing CTs at FPL's Martin Plant site into a four CT-based CC unit. Two additional CTs, plus heat recovery steam generators, electric generators, and steam turbine would be added to the existing CTs as part of this conversion.
2. A new, four CT-based CC unit at FPL's Manatee Plant site. Its design would be essentially identical to the new CC unit to be added at Martin as a result of the CT-to-CC conversion previously described.

FPL plans to petition the FPSC in March of this year for approval of a Determination of Need filing for both of these construction projects.

1.5.3 THE TIMING OF THE UNIT ADDITIONS

The two FPL construction options selected as the most economical options in the RFP analysis work allow FPL to meet its 2005 and 2006 resource needs. Together the Martin Expansion Project and the Manatee Expansion Project will result in new combined cycle units that are able to provide 1,107 MW of summer capability. Since the Martin Project utilizes two existing CT units that would otherwise be capable of providing a combined total of 318 MW of summer capacity in 2005 without the conversion, it will add 789 incremental MW (1,107 MW from the completed unit minus 318 MW of existing CT capacity = 789 MW). The resulting total capacity addition of these two FPL construction options is almost 1,900 MW and that amount meets the combined total MW need for 2005 and 2006 of 1,722 MW.

In order to meet its FPSC-approved 20-percent summer reserve margin in 2005, both the Martin and Manatee Projects need to be in service by then. Consequently, FPL plans to complete construction and have both projects in-service by mid-2005.

1.6 <u>BENEFITS OF THE PROJECT</u>

The most significant benefit of the Manatee Expansion Project is the continued supply of reliable, cost-effective electrical service to FPL's customers. Project benefits also include increased tax revenues to local government and increased employment during construction of the Project, as well as additional opportunities for incorporating community involvement into Plant development activities.

The Manatee Project is another step in FPL's continuing efforts to attain and maintain a diversified fuel mix. Over the past two decades, FPL has significantly reduced its reliance on oil-fired generation by diversifying its range of fuels.

1.7 SUMMARY OF PUBLIC OUTREACH PROGRAM

Employees of the Manatee Plant have been involved with the local community for several years, including providing ongoing communication about the Plant's activities and plans. FPL will continue this dialogue with citizens in Parrish and the surrounding areas. One goal will be to build shared understanding between FPL and citizens about this new Project, as well as to explore other shared, individual and community interests. This process includes various outreach activities focused on a wide variety of individuals and groups that have, or may have, an interest in the project. These activities involve FPL employees, Parrish, Palmetto, Bradenton and surrounding community residents, customers, and interested individuals or groups.

In addition to generating well-informed decisions about the Project, FPL also hopes to achieve a high degree of alignment between project features and the interests and priorities of people living in the surrounding communities. FPL plans to maximize the potential for the people of Manatee County to participate in the Project through outreach efforts already underway that will continue throughout the project and into the future.

Primary activities for accomplishing these outreach goals include continuing dialogue with citizens through one-on-one discussions, group meetings, plant tours, and other opportunities as may be of interest to residents. Activities will be focused on listening to people's needs, issues, and concerns. FPL is committed to responding to people's comments and questions in a timely manner. FPL's goal is to be the first and best source of information about the project.

Immediately following the announcement of the proposed project, FPL began its outreach to residents. Dialogue-based research continues to determine what people in Parrish and the surrounding communities know about the project, what they are interested in learning about it, and how to best communicate with them. So far, most of the interviewees have been positive about the Project. They recognize the need for power and comment that they believe the Project will have economic, social and environmental benefits. Findings from this research, the ongoing dialogue and outreach FPL has initiated, plus continuing feedback from the community, will be used as a basis for future communication initiatives.

FPL has committed to keeping the community updated on the Project through presentations, dialogue forums, information on the FPL website and in various print materials.

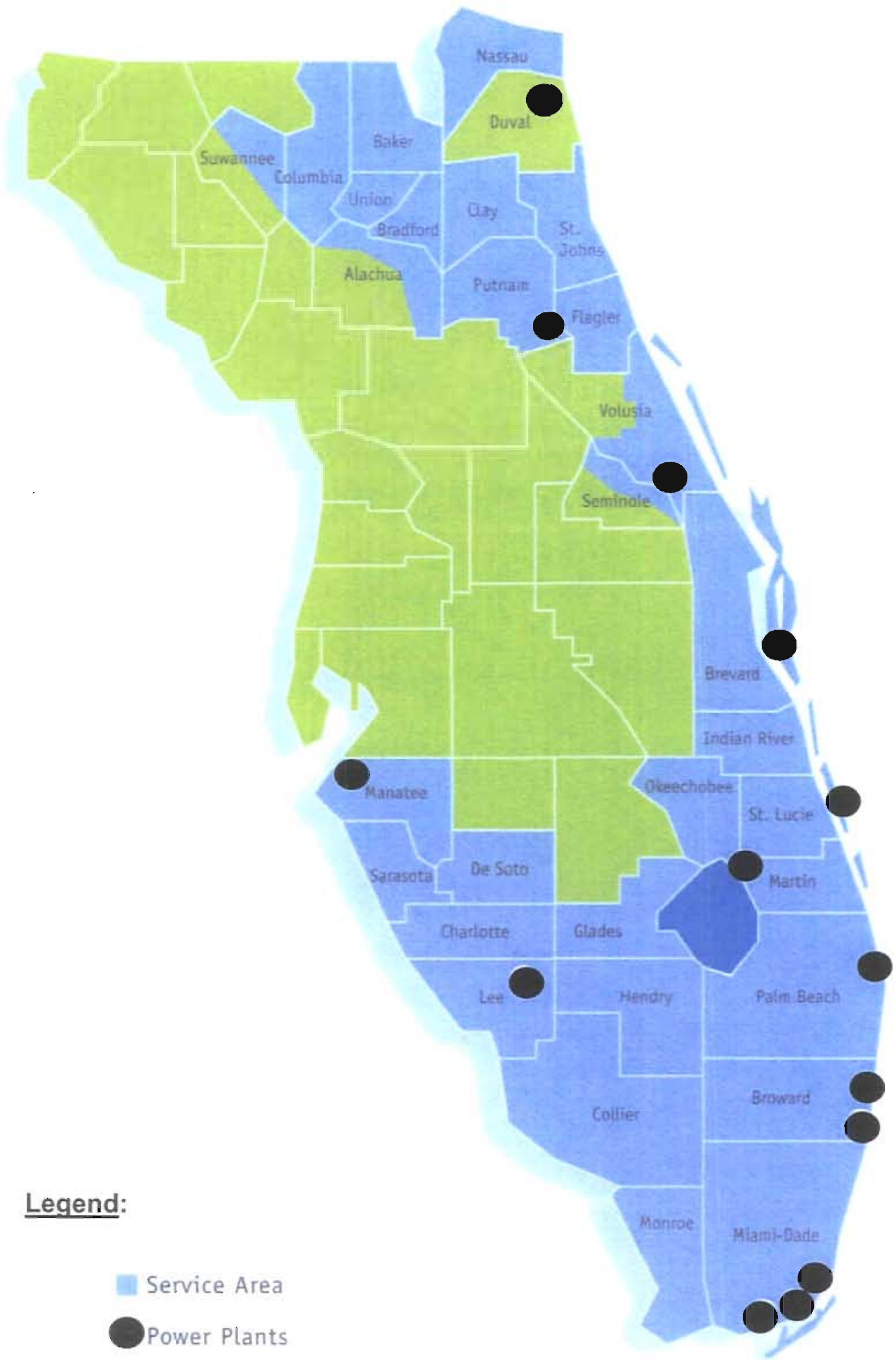


Figure 1.2-1. FPL Service Territory

Source: FPL, 2001; Golder, 2002.

FPL

Manatee Unit 3

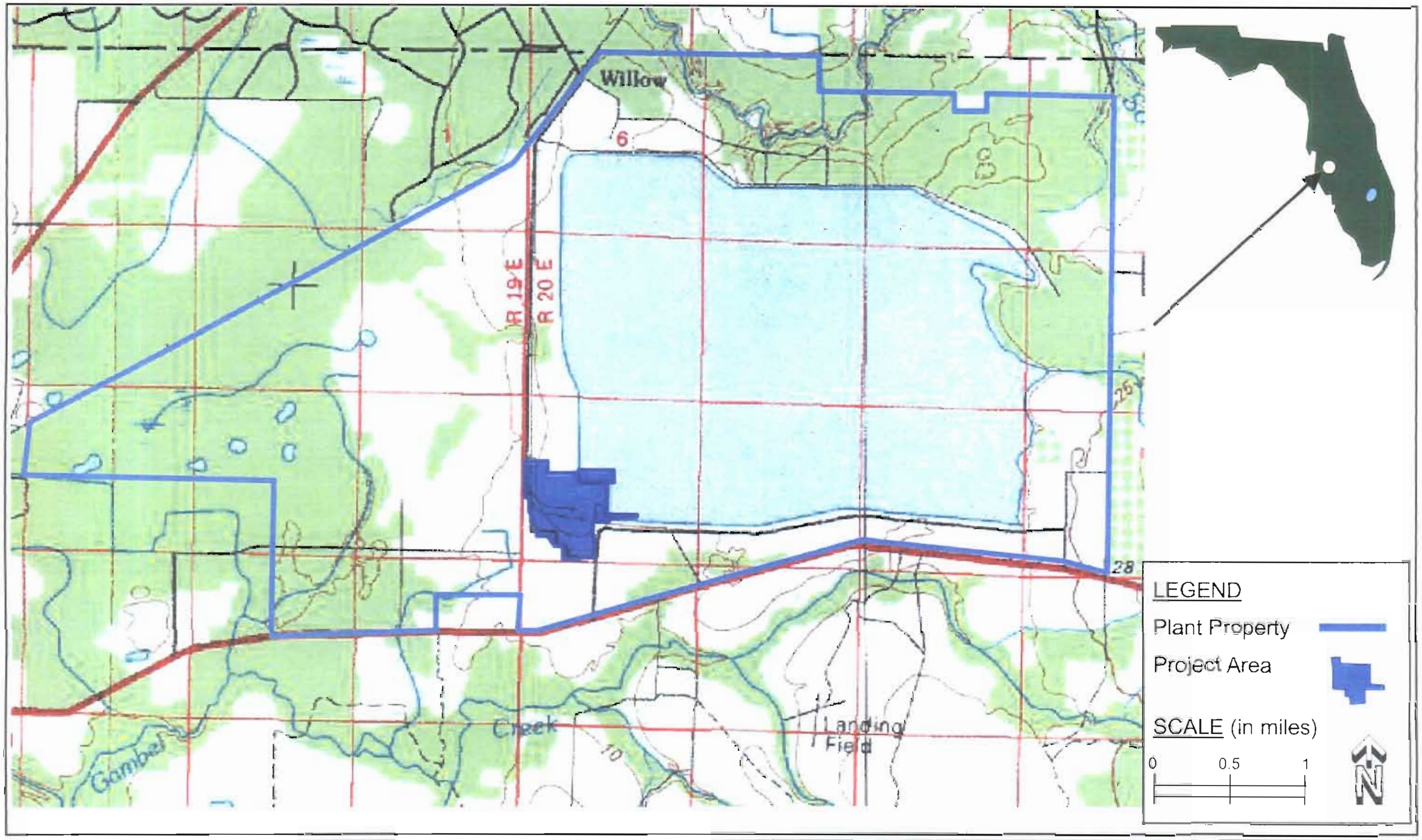


Figure 1.3-1. FPL Manatee Plant Site Location

Source: TerraServer.com, 2002; Golder, 2002.

FPL
Manatee Unit 3

2.0 SITE AND VICINITY CHARACTERISTICS

2.1 SITE AND ASSOCIATED FACILITIES DELINEATION

2.1.1 SITE LOCATION

2.1.1.1 Manatee Plant

The site for the Project is the existing FPL Manatee Plant 9,500-acre site, located in unincorporated north-central Manatee County (see Figure 2.1-1). The existing power generating facilities are located in all or portions of Sections 18 and 19 of Township 33S, Range 20-E. The plant site lies approximately 5 miles east of Parrish, Florida. It is approximately 5 miles east of U.S. 301 and 9.5 miles east of Interstate Highway 75 (I-75). The existing plant is approximately 2.5 miles south of the Hillsborough-Manatee County line; a portion of the north property boundary of the plant site abuts the county line. State Road 62 (SR 62) is about 0.7 mile south of the plant, with the plant entrance road going north from that highway. Saffold Road marks the eastern boundary of the site.

Within the Manatee Plant site is the 72.8-acre Project area, which is the site proposed for certification. The Project area is west of the existing generating units. A map with 1-, 2-, 3-, 4- and 5- mile radii from the Project area is presented in Figure 2.1-2.

FPL owns in fee approximately 15 miles of active railroad right-of-way from Ellenton to the plant spur at Willow Run, which borders a portion of the northwest part of the property.

2.1.2 EXISTING SITE USES

A color aerial photograph of the Project area is provided in Figure 2.1-3. The existing power generation and fuel handling facilities occupy a relatively small area at the Manatee Plant site. Those facilities include the two existing generating units, fuel oil tanks, water plant, cooling water intake and outfall structures, service buildings, wastewater treatment basins, and system substation and are shown in the aerial photograph. A small portion of the 4,000 acre cooling pond is also shown in the aerial photograph.

The two existing 800-MW (nominal) electric generation units at the site have been in service since 1976 (Unit 1) and 1977 (Unit 2). These units currently burn residual fuel oil with a maximum sulfur content of 1 percent.

2.1.3 ADJACENT PROPERTIES

Surrounding land uses are almost exclusively agricultural with the exception of the Willow Shores residential area north of the railroad at the northwest corner of the Manatee Plant site. Individual homes are located in the larger of two outparcels within the Manatee Plant site, along SR 62 at the southern perimeter of the site and along Saffold Road at the northeast corner of the site.

2.1.4 USES WITHIN PROJECT AREA

The Project will consist of four nominal 170-MW GE "F" Class advanced CTs, four HRSGs, which will utilize the waste heat from the CTs to produce steam and a new steam electric turbine-generator. This configuration is a referred to as a 4-on-1 combined cycle unit. The Project facilities and their approximate areas are:

Base Plant and Buildings	9.4 acres
Collector Yard	3.8 acres
System Substation Addition	1.2 acres
Site Runoff Detention Ponds	2.5 acres
Demineralizer and Condensate Tanks	1.6 acres
Warehouse Area	6.4 acres
Intake and Outfall Structures and Circulating Water	7.0 acres
Construction Laydown, parking, trailers	30.8 acres
Miscellaneous (Includes Plant Maintenance Area)	9.6 acres
Project Area	72.8 acres

2.1.5 100-YEAR FLOOD ZONE

The elevation of the Manatee Plant site ranges from 55 feet above mean sea level (ft-msl) on the east side of the site to 30 ft-msl in the farming areas to the west. No part of the Project area is within the 100-year flood zone [Federal Emergency Management Agency (FEMA), 1992].

2.1.6 PROPERTY DELINEATION

A boundary survey map of the Project area is presented in Figure 2.1-4, which is the site proposed for certification.

2.2 SOCIOPOLITICAL ENVIRONMENT

2.2.1 GOVERNMENTAL JURISDICTIONS

The site is located in an unincorporated area of north-central Manatee County approximately 2.5 miles south of the Hillsborough County line, 15 miles northeast of Bradenton, and 25 miles south-southeast of Tampa. There are no governmental jurisdictions within a 5-mile radius of the plant.

The following areas are not found within 5 miles of the plant:

- National Parks,
- National Forests,
- National Seashores,
- National Wildlife Refuges,
- National Wilderness Areas,
- National Memorials or Monuments,
- National Marine and Estuarine Sanctuaries,
- Roadless Area Review and Evaluation Areas
- National Wild and Scenic Rivers,
- State Forests,
- State Archaeological Landmarks,
- Areas of Critical State Concern,
- Conservation and Recreation Lands,
- Scenic and Wild Rivers,
- Manatee County or Hillsborough County Parks,
- Indian Reservations,
- Military Lands,
- Major Private Land-Holdings for Environmental Protection, and
- Licensed Public or Private Airports.

Figure 2.2-1 shows parks, recreation areas, and environmentally sensitive lands within 5 miles of the Manatee Plant site. Several such areas are associated with the Little Manatee River to the north of the site. The Little Manatee River State Canoe Trail, part of the Florida Recreational Trails System, follows the Little Manatee River from U.S. 301 to just east of I-75 in Hillsborough County. The portion of the Little Manatee River, from its mouth to the western crossing of SR 674 (but excluding any tributaries), has been designated Outstanding Florida Waters (OFW) by the FDEP. FDEP has also designated the portion of the Little Manatee River from Cockroach Bay to the crossing of U.S. 301 as part of the Cockroach Bay Aquatic Preserve. The same area of the Little Manatee River has been designated Critical Manatee Habitat by the U.S. Fish and Wildlife Service (USFWS).

Associated with these areas, lands in Hillsborough and Manatee counties adjacent to the Little Manatee River and South Fork Little Manatee River have been designated as a land acquisition priority by the Southwest Florida Water Management District (SWFWMD) as part of the District's Save Our Rivers (SOR) program. Also associated with this area are lands purchased or approved for purchase by Hillsborough County as part of its Environmental Lands Acquisition and Protection Program (ELAPP). In addition, the South Hillsborough Wildlife Corridor, which follows the Little Manatee River and some of its tributaries in Hillsborough County from I-75 eastward, connects the ELAPP and SOR lands. Finally, a portion of the Little Manatee State Recreation Area lies within 5 miles of the plant, joining the SOR and ELAPP sites to form a continuous corridor of lands north of the FPL Manatee Plant site that have been identified as having special environmental or recreational value. None of the county, state, or federally designated areas are located within 1 mile of the Project area.

2.2.2 ZONING AND LAND USE PLANS

Manatee County has adopted a comprehensive plan in accordance with the Local Government Comprehensive Plan and Land Development Regulation Act, Chapter 163, Part II, F.S. As shown in Figure 2.2-2, the vast majority of the Manatee Plant site is located in the Agriculture/Rural future land use category. The major portion of the Project Area is designated Major Public/Semi Public (1) (P/SP-1) and the balance is designated Agriculture/Rural. Electric generating plants are specifically allowed in the Agriculture/Rural land use category as well as in the P/SP-1 category.

Zoning of the site closely matches the future land use map (see Figure 2.2-3). The part of the Project Area corresponding to the P/SP-1 designation is currently zoned Planned Development-Public Interest (PDPI) and a small portion of the Project Area is zoned A (General Agriculture). The PDPI category was established to provide a planned review process for the establishment of public and semi-public facilities. This zoning district is designed for application in the P/SP-1 classification of the Comprehensive Plan's Future Land Use Element. Under a recent amendment to the Manatee

County Land Development Code, new power plant facilities are not permitted in the Agriculture/Rural zoning district. FPL expects to seek Manatee County's approval for a site plan for the Project under the County's Land Development Code.

In 1972, development of the Manatee Plant site was approved by Manatee County as a special exception in the Agriculture Zoning that applied to the Plant site, permitting "public utilities and public service buildings: to construct, operate and maintain electric power generating facilities including cooling water lake area, and all related and accessory uses." A modification to the special exception was approved in 1991, permitting a new maintenance facility addition and incorporating additional property acquired by FPL as part of the Manatee Plant site since 1972. The Project area lies wholly within the original special exception's boundaries.

2.2.3 DEMOGRAPHY AND ONGOING LAND USE

There are no incorporated areas within 5 miles of the project boundaries. Unincorporated communities in the Manatee County portion of the study area include Willow, located about 2 miles north of the Manatee Plant, and Parrish, located about 5 miles southwest of the plant. In Hillsborough County, the nearest unincorporated communities are Sundance, located approximately 3 miles northwest of the plant; Sun City Center, located 7 miles north of the plant; and Wimauma, located 8 miles northeast of the plant.

Florida's population increased 37.2 percent between 1960 and 1970, 43.5 percent between 1970 and 1980, and 32.7 percent between 1980 and 1990. Between 1990 and 2000 the population increased another 23.5 percent. Manatee County's population increased 40.4 percent in the 1960s, 52.9 percent in the 1970s, and 42.6 percent in the 1980s. Between 1990 and 2000 the population increased another 24.7 percent. Unincorporated Manatee County grew 61.1 percent from 1970 to 1980, and 48 percent from 1980 to 1990.

In 2000, Manatee County had a population of 264,002, which was a 24.7 percent increase over the 1990 population of 211,707. The growth rate from 1990 to 2000 in the unincorporated areas was 29.2 or about 20 percent higher than the county average. With the exception of Palmetto, the other municipalities in Manatee had lower growth rates. Palmetto had a growth rate of 35.6 percent from 9,268 to 12,571. The largest municipality in Manatee County is Bradenton, which had a population of 43,769 in 1990, which increased 13.1 percent to 49,504. The population in Manatee County is projected to continue its growth but at a slightly less rate (FSA, 2001). Manatee County's population is projected to grow to 312,000 by 2010 or about 18 percent based on the medium projection. The projected range of population in 2010 is from a low of 268,700 to a high of 363,600.

Existing land uses within a 5-mile radius of the Manatee Plant consist mainly of agricultural and pasture lands, interspersed with low-density residential areas and undeveloped vegetated areas. Figures 2.2-4a and 2.2-4b shows the existing Level II land uses within 5 miles of the Manatee Plant on SWFWMD land use/land cover maps at a 1:24,000 scale.

2.2.4 EASEMENTS, TITLE, AGENCY WORKS

No easements, title, or agency works crossing approvals are known to be required for the Project.

2.2.5 REGIONAL SCENIC, CULTURAL AND NATURAL LANDMARKS

Areas identified in Section 2.2.1 located within 5 miles of the Manatee Plant include one state canoe trail, one state recreation area, one privately owned state railroad museum, one proposed wildlife corridor, one aquatic preserve, critical manatee habitat, the SWFWMD Little Manatee River SOR lands, and the Hillsborough ELAPP parcels. The state canoe trail is part of a network of recreational, scenic, and historic trails and by definition would contain areas of scenic value. The state recreation area contains facilities for hiking, fishing, boating, and other intensive recreational uses which may be considered to have scenic value. The railroad museum has cultural significance because it preserves railroad history and was designed to extend educational and recreational opportunities to the people of Manatee and surrounding counties. The proposed wildlife corridor is a part of a category of lands designated by Hillsborough County as "corridor open space," which are areas through which people travel but which are also designed for aesthetic enjoyment and leisure; by definition, this area would have scenic value. The aquatic preserve, manatee habitat, and other designated areas associated with the Little Manatee River contain significant scenic and/or natural values. Those areas within a 5-mile radius that are considered to contain scenic, cultural, and natural landmarks are described briefly below.

1. Little Manatee River State Recreation Area (established in 1974): 1,600 acres adjacent to the Little Manatee River with hiking, fishing, and boating facilities.
2. Little Manatee River State Canoe Trail: a 5-mile stretch of the Little Manatee River, designated as a scenic canoe trail in 1981, from U.S. 301 west to a point just east of

I-75. It is part of a network of recreational, scenic, and historic trails, including bicycling, canoeing, hiking, horseback riding, and jogging trails.

3. Cockroach Bay Aquatic Preserve (established in 1975): follows the mean high water line of the Little Manatee River from its mouth to U.S. 301. The area is managed by the state to preserve natural conditions and processes and to influence the type and direction of area growth and development.

4. Critical Manatee Habitat (designated in 1970): follows the waters of the Little Manatee River from U.S. 301 downstream to its mouth. USFWS has designated this portion of the river as natural habitat crucial to the survival of the endangered manatee.

5. South Hillsborough Wildlife Corridor: follows the Little Manatee River in Hillsborough County from I-75 eastward. This scenic riverine corridor was designated by Hillsborough County in 1989 for its aesthetic qualities. Within the 5-mile radius of the Manatee Plant, the corridor follows all of the Hillsborough County portion of the Little Manatee River and some of its tributaries. The actual width of the corridor is undetermined.

6. Hillsborough County ELAPP Parcels: four areas within the 5-mile radius of the Manatee Plant. The Saffold Road site, acquired in February, 1993, consists of 355 acres located on the Little Manatee River. Access is on the west side of SR 579 just north of the Manatee County line. The Little Manatee River site, acquired between 1989 and 1995, contains 1,200 acres with 3 miles of river shoreline between Highways 41 and 301. The Upper Little Manatee site, acquired in 1996 as part of the Little Manatee River wildlife corridor, consists of over 568 acres located upstream of Highway 301 to SR 579. The Little Manatee River Corridor includes land in southern Hillsborough County along the Little Manatee River Corridor from CR 579 upstream as far as Leonard Lee Road. All lands are adjacent to the Little Manatee River and have been acquired for the purpose of conservation, preservation, and provision of open space corridors and park and recreations needs, in conjunction with other programs such as SOR.

7. SOR-Little Manatee River: lands adjacent to the Little Manatee River and South Fork Little Manatee River in Hillsborough and Manatee counties. The SWFWMD has acquired 8,413 acres of land dominated by dense forest along the river's floodplain, with pine flatwoods, mixed hardwoods, and brushland in the upland

areas. An additional 29,038 acres are considered "land acquisition priority" in the SWFWMD Land Acquisition Five Year Plan (2001). These areas include the Little Manatee River and South Fork, to the north and west of the Manatee plant.

8. OFW: designated by FDEP in 1982 for identification and preservation of outstanding surface water quality. The designation covers the length of the Little Manatee River from its mouth to SR 674, including Hayes, Mill, and Bolster Bayous, but excluding South Fork, Ruskin, and all other tributaries.
9. Florida Gulf Coast Railroad Museum: a private, non-profit museum recognized by the Florida Legislature as an official Florida State railroad museum, currently operating from temporary facilities in Parrish. The all-volunteer organization was founded in 1983 to preserve railroad history throughout Florida, to preserve rolling stock, concentrating on that utilized by the railroads of Florida, and to provide educational and recreational opportunities to the people of Manatee County and other visitors. The museum operates on a portion of the former Seaboard Airline Railway, Parrish Subdivision track, under an agreement with FPL, who is the current owner of the track.

2.2.6 ARCHAEOLOGICAL AND HISTORIC SITES

A cultural resource assessment survey was conducted in June 1994 in and around the Project area to determine whether any significant archaeological or historical sites will be impacted by future development. No archaeological or historical sites recorded by the State of Florida were found within or around the Project area. Several such sites are recorded in the vicinity, including three burial mounds, four artifact scatters, and a lithic scatter. All but two, one lithic scatter and one artifact scatter, are located off the Manatee Plant site. The condition of two of the burial mounds is unknown, and the remaining portion of the partially destroyed third mound is in moderately good condition. The archaeological significance of these mounds has not been evaluated, but the potential for encountering human remains requires that they be treated as sensitive resources. The scatters have either been destroyed or evaluated as not significant. Since no prehistoric or historic archaeological sites were discovered during the survey, it was concluded that no cultural resources eligible for nomination to the National Register of Historic Places will be impacted by any future development in the Project area. The complete survey report and the opinion letter from the Division of Historical Resources, Florida Department of State Archaeology is included in Appendix 10.5.1 of this document.

2.2.7 SOCIOECONOMICS AND PUBLIC SERVICES

2.2.7.1 Socioeconomics

Employment and Income

Manatee County's labor force was 123,345 in 2000. The unemployment rate in 2000 was reported at 2.3 percent, a significant decrease from the 1995 unemployment rate of 4.0 percent due to a steady rise in the work force.

According to the Manatee County Chamber of Commerce Economic Development Council, 1999 data show the services industry to be the largest of local industries, with 41.7 percent of the labor force employed. The average annual wage for this sector was reported to be $22,109. Finance, insurance and real estate was estimated to have the highest average annual wage at $31,423, but only employed approximately 2.8 percent of the population. The largest employment sectors in Manatee County include business services with 63.3 percent of the population employed, followed by health service with 17.8 percent employment. Other various services and social services are also included with a combined total of 18.9 percent employment.

Manatee County was reported to have a 1998 per capita income of $30,440 which was significantly greater than Florida's 1998 per capita income of $26,845, and greater than the national average of $27,203. Per capita income has risen steadily in the County since 1996, increasing at a more substantial rate than that of Florida.

Housing

The breakdown of housing units by type in Manatee County is listed in the county's comprehensive plan. No distinction is made between incorporated and unincorporated areas of the county. According to 2000 Census data, Manatee County was estimated to have 112,460 total households, with family households accounting for 73,726, or 65.6 percent. Of the 112,460 total households, 82,947 or 73.8 percent were owner-occupied and 29,513 or 26.2 percent were renter-occupied. The average household size of owner occupied units in 2000 was 2.26, while the average household size of renter-occupied units was 2.39.

Local Government Revenues and Expenditures

Manatee County's revenue sources include taxes, licenses and permits, intergovernmental revenues, charges for services, fines and forfeitures, and miscellaneous revenues. Revenues are allocated to a general fund, transportation trust fund, special revenue funds, debt service funds, general capital projects funds, internal service funds, and trust and agency funds.

For the fiscal year 1998-1999, the total revenue for Manatee County was $355,956,000 or about 1.4 percent over the previous fiscal year. The major source of this revenue are services ($139.3 million), taxes and impact fees ($104.0 million), state revenue sharing ($42.9 million) and other miscellaneous sources and transfers ($69.6 million). The corresponding expenditures in 1998-1999 were $361,368,000 or about a 7 percent increase over the previous year. The expenditures were for general government ($68.4 million), public safety ($74.8 million), physical and economic environment ($74.4 million), transportation ($40.1 million), human services, cultural and recreation ($40.0 million) and debt service including interfund transfers ($69.7 million).

The property ad *valorem* tax mileage rates in Manatee County (January 2001) were 17.1456 with following components: 7.4312 operating, 0.2492 debt, 8.682 school board and 0.7832 other (FSA, 2001). The current millage rate is 1.783346.

2.2.7.2 Public Services

Parks and Recreation

Manatee County's Parks and Recreation Department maintains 80 activity-based and resource-based recreational facilities throughout the county, providing residents with public parks, golf courses, and access to sports and outdoor activities. There are no Manatee County parks located within a 5-mile radius of the Manatee Plant. The closest facility is Parrish Park, a 2.25-acre neighborhood park located in the unincorporated Parrish community, approximately 5.5 miles southwest of the Manatee Plant.

Educational Services

Several colleges and technical schools are located in Manatee County, including Manatee Community College in Bradenton. The University of South Florida's (USF) main campus is located in Tampa, approximately 30 miles north-northwest of the Manatee Plant. USF also has branch campuses in St. Petersburg, approximately 30 miles northwest of the plant, and in Sarasota (USF-New College), approximately 22 miles southwest of the plant. There are a number of primary and secondary schools in the county, including 28 elementary schools, 7 middle schools, 5 high schools, a vocational and technical school, 8 exceptional student schools, and 13 other types of schools.

School enrollment for Manatee County totaled 37,553 in 1990 with 3,189 enrolled in preprimary school, and 26,221 enrolled in elementary and secondary school. In the fall of 2000, Manatee school enrollment totaled 39,745 with 36,557 in elementary and secondary schools.

According to the Department of Education, Manatee County elementary schools with an "A" rating were given a 2000-2001 budget for total operating costs of $45,204,940, a slight increase from the 1999-2000 actual operating cost total of $44,318,438. The 2000-2001 cost per student for the "A" designated schools was $5,635.01. Elementary schools with a "D" rating were given a 2000-2001 budget for total operating costs of $2,879,820, a rather significant decrease from the 1999-2000 actual operating cost total of $3,277,016. For these "D" rated schools, cost per student was reported to be $6,566.54. According to 2000 data provided by the Manatee County School Board, grades K-3 had a student/teacher ratio of 22.0/1, grades 4-5, a student/teacher ratio of 24.9/1, while data for grades 6-12 was unavailable.

Schools nearest the Manatee Plant are Wimauma Elementary in Wimauma and Eisenhower Junior High and East Bay High School in Gibsonton.

Manatee County provides countywide library services to their respective jurisdictions. Manatee County operates six libraries, including the main library in downtown Bradenton and five branches throughout western Manatee County. The closest branch to the Manatee Plant is the Rocky Bluff Branch in Ellenton. In addition, there is a small, community library in Parrish that is staffed by volunteers but is not associated with the county library system.

Public Safety

Fire protection in Manatee County is provided by 14 separate and independent fire protection districts. In addition, Bradenton and Myakka City each have their own fire departments. The Manatee Plant is located in the North River Fire Protection District and is served by the Parrish Fire Department (volunteer). The County has a hazardous materials handling team, comprised of personnel from each of the fire protection districts. Some of the individual districts, including the North River district, have their own hazardous materials teams in addition to the county team.

Manatee County provides public safety services throughout the county. The County's Public Safety offices are located at 1112 Manatee Avenue West in Bradenton. These offices have responsibility for EMS, emergency management, emergency communications, animal control, and marine rescue. The City of Bradenton has separate public safety operations which are coordinated with the county.

There are 14 EMS stations throughout Manatee County which provide ambulance and rescue services. Station 6 is the nearest EMS station, located approximately 14 miles from the Manatee Plant on U.S. 301 in Ellenton at North River Fire District Station 4. There are two hospitals in Manatee County, Blake Medical Center and Manatee Memorial, both located in Bradenton. Blake Medical Center has a capacity of 385 patients. Manatee Memorial Hospital has a capacity of 520 patients.

Law enforcement is provided by the Manatee County Sheriff's Office, headquartered in Bradenton. The Sheriff's Office serves a population of over 264,000 people, covering an area of 772 square miles (mi^2). There are more than 1,100 employees currently working to serve Manatee County. The Sheriff's Office Services are divided into four categories – Law Enforcement, Investigative, Corrections, and Administrative.

Utility Services

Manatee County provides central water and wastewater facilities in designated service areas located in the western part of the county. Manatee County operates three regional wastewater treatment plants (Southeast, Southwest, and North County). The plant nearest the FPL Manatee Plant site is the North County wastewater treatment plant, which has a design capacity of 7.1 million gallons per day (mgd). One-hundred percent of its capacity is allocated to serve unincorporated areas of Manatee County. The demand in its service area is projected to exceed capacity by the year 2010. Its proposed service area does not include areas of the county east of U.S. 301 and north of SR 675, thus excluding the Manatee Plant. The Manatee Plant is served by a package treatment plant operated by FPL.

The Manatee County Public Works Department is responsible for potable water facilities that provide water to the unincorporated area, a part of Sarasota County, and each of the municipalities in Manatee County except Bradenton. Potable water facilities near Lake Manatee serve urban land uses located in the western portion of Manatee County. The Manatee Plant is not served by this system, but it is served by its own potable water facilities (see Section 3.5.3).

Solid Waste Services

Manatee County handles solid waste disposal for the county. The county operates the Lena Road landfill, which is the solid waste disposal site for each local government in the county. The Lena Road landfill, located southeast of the intersection of I-75 and SR 64, is designed to accommodate Manatee County's waste through the year 2010. Approximately 1,200 acres have been purchased for landfilling activities in the vicinity of the Lena Road site. The Level of Service (LOS) for this landfill, established at 7.1 pounds per day per capita for the period 1985-1995 in the Manatee County Comprehensive Plan, is not projected to increase through 2010. Each local government is responsible for solid waste collection within its jurisdiction. In the unincorporated county, solid waste collection is handled by private companies that contract with Manatee County and take solid waste directly to the landfill. Private waste collection companies serving Manatee County are Waste Management, Inc. and Industrial Waste Services.

Transportation

Study Area

The area evaluated for the Traffic Impact Analysis (see Section 4.6.1 and Section 5.9.1) was a portion of the study previously conducted in 1994 by Kimley-Horn and Associates, Inc. Roadways on which the most significant project traffic is expected were evaluated. Additionally, intersections at the termini for the roadway segments were also evaluated.

The concept of LOS is defined by the Florida Department of Transportation (FDOT) as a qualitative measure describing operational conditions within a traffic stream and the perception of those conditions by motorists and passengers [Transportation Research Board, (TRB) 2000]. A LOS definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

The FDOT defines six LOS classes. They are given letter designations from "A" through "F", with LOS A representing the most favorable operating conditions and LOS F representing the least favorable. The operational conditions for these six designations can be conceptually described as follows (TRB, 2000).

1. LOS A – Motorists are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream

is extremely high. The general level of comfort and convenience provided to the motorist and passenger is excellent.

2. LOS B – Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual motorist behavior.
3. LOS C – The operation of individual motorists becomes significantly affected by interactions with others in the traffic stream. The selection of speed is affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.
4. LOS D – Speed and freedom to maneuver are severely restricted, and the motorist experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.
5. LOS E – All speeds are reduced to a low, but relatively uniform, value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor.
6. LOS F – Operational conditions are forced or have broken down. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion.

A single study area was determined for temporary impacts of the project using traffic volumes from peak construction, present operation, peak operation and expected delivery traffic combined. An overlap between peak construction and present operation employment is assumed to occur. Therefore, the combination of the two employment numbers represents an extremely conservative analysis.

The roadways identified as study links for the analysis of temporary peak construction and operation traffic are as follows:

SR 62: U.S. 301 to FPL Main Entrance

SR 62: FPL Main Entrance to County Road (CR) 39

The following intersections were also included in the temporary peak construction and operation traffic study:

SR 62 & CR 39

SR 62 & FPL Main Entrance

SR 62 & U.S. 301

Existing Traffic Conditions

The existing traffic volumes in the study area were identified so that a determination of existing operating conditions could be made. Kimley-Horn and Associates, Inc conducted traffic counts at the intersections of concern, SR 62 & CR 39 and SR 62 & FPL Main Entrance, in June of 1994. These 1994 traffic counts were used to determine the pm peak hour LOS for the current study evaluation years 2004 baseline traffic, 2004 background and peak construction traffic and 2006 background and peak operation traffic for the intersections and links previously mentioned. The generalized Manatee County growth rate of 3 percent was compounded annually and applied to the 1994 non-project baseline pm peak hour distributed traffic volumes to obtain the future baseline volumes for 2004 peak construction and 2006 peak operation years.

To validate the assumption the original traffic count data (Kimley-Horn and Associates, Inc, June of 1994) is comparable to present day and future values, the 2000 Average Annual Daily Traffic (AADT) counts for the roadway links of concern, as previously mentioned, were obtained from the FDOT. A growth rate of 3 percent compounded annually was applied to these AADT values to obtain the future 2004 baseline and 2006 baseline traffic volumes. A conservative K-Factor of 10.5 percent was used to determine the proportion of the total daily traffic that occurred during the pm peak hour on each of the impacted links. According to the Highway Capacity Manual (HCM2000), typical K-Factors are generally in the range of 9.1 percent in urbanized areas to 10 percent in rural undeveloped areas. These projected pm peak hour traffic volumes obtained from the use of the K-Factor were compared to the values obtained through the use of the original 1994 traffic count data. The original traffic count data compounded annually by 3 percent gave a more conservative value than using the AADT traffic compounded annually with a K-Factor. Therefore, the original traffic count data and turning distributions were used as the baseline for this study.

Also, in the original traffic study (Kimley-Horn and Associates, Inc, June of 1994), trips were distributed and assigned to the roadway network using the computerized transportation planning model for Sarasota and Manatee counties. The model, Florida Standard Urban Transportation Modeling Structure (FSUTMS), was used to provide an objective distribution and assignment. As required by Manatee County, the zone's trip generation was created using ZDATA3 (special generator) input.

Therefore, following the assumption that the original traffic count data is valid for use in this traffic study, trips were distributed and assigned to the roadway networks of concern as previously conducted.

Employment at the FPL site is based on three shifts with the largest shift operating from 7:30 a.m. to 3:30 p.m. . FPL construction employment associated with the Manatee Expansion Project is to operate on the same shifts with most of the construction activity occurring during the day shift.

Roadway volume information was collected in 1994 to find the peak hours of activity at the site and the adjacent roadway SR 62. Machine counters, which counted volumes 24 hours per day in 15-minute increments for 7 days, were set on the site driveways and SR 62 west of the site. Peak hours of site traffic occurred from 6:30 to 7:30 a.m. and 3:15 to 4:15 p.m. The peak hour of the adjacent street (SR 62) was found to occur from 3:30 to 4:30 p.m. Therefore, the existing conditions information was collected from 3:30 to 4:30 p.m. to correspond to peak hour of project traffic.

Turning movement volumes were counted at study area intersections from 2:30 to 4:30 p.m. Existing traffic volumes were increased to peak season levels using the FDOT weekly adjustment factors for Manatee County. For this analysis, the highest hour of volumes during the p.m. periods was used.

The traffic study intersections were analyzed to determine the 2002 existing LOS. The FPL main entrance & SR 62 and SR 62 & CR 39 and U.S. 301 and SR 62 are intersections without signal lights.

All of the study intersections were analyzed using the 2000 *Highway Capacity Manual (HCM2000)* signalized or unsignalized intersection methodology. Use of this methodology is intended to derive an overall LOS for each signalized intersection and an approach LOS for the unsignalized intersections.

The results of the existing link analysis are as follows:

SR 62: U.S. 301 to FPL Main Entrance	LOS B
SR 62: FPL Main Entrance to CR 39	LOS B

The results of the existing intersection analysis are as follows:

SR 62 & CR 39	LOS B
SR 62 & FPL Main Entrance	LOS B
SR 62 & U.S. 301	LOS B

2.3 BIO-PHYSICAL ENVIRONMENT

2.3.1 GEOHYDROLOGY

2.3.1.1 Geologic Description of the Site Vicinity

Manatee County is located within the mid-peninsular physiographic zone to the west of the dominant ridges and valleys of the central portion of the state, in an area that is described by broad uplands and marine terrace features. The northern portion of Manatee County in the vicinity of the Little Manatee River is generally characterized by its relatively well developed marine terraces (White, 1970). The site is located within the DeSoto Plain physiographic province that is characterized by the surficial occurrence of medium to fine grained sand and silt sediments (Knapp, 1980).

The subsurface stratigraphy of Manatee County is characterized by unconsolidated or poorly indurated sediments underlain by carbonate rocks, primarily of Tertiary age (Peek, 1958). A generalized hydrostratigraphic section for Manatee County is presented in Figure 2.3-1. Regional stratigraphy in the vicinity of the site is characterized by several distinct deposits. A general description of the sediments and rock type encountered with increasing depth adapted from SWFWMD (1988) and Peek (1958) follows:

- Unconsolidated Sediments – Comprised of sand, clay, silt, marl, shell, limestone, and phosphorite that range in age from Pleistocene to Recent. These sediments are also referred to as terrace deposits. In the vicinity of the site these sediments are estimated to range in thickness between 25 and 50 feet (ft).

- Undifferentiated Deposits – Comprised of sand and clay with phosphatic deposits of Pliocene age, and includes the Bone Valley Formation that is commercially mined in the central Florida phosphate district. The Bone Valley Formation is generally described to be less than 25 ft thick in the vicinity of the site.
- Hawthorn Group – Comprised of sand, clay, gravel, phosphorite, limestone, and dolomite of Miocene age. These sediments are estimated to range in thickness between 200 and 250 ft in the vicinity of the site.
- Tampa Member – Comprised of hard, dense limestone with varying amounts of quartz sand and clay in the carbonate matrix, with thin beds of chert. The Tampa Member is of Miocene age, and is estimated to be 100 ft thick in the vicinity of the site.
- Suwannee Limestone – Comprised of soft to hard, fossiliferous limestone with interbeds that contain quartz sand or chert, with dolomitized beds more prevalent near the base of the unit. The Suwannee Limestone is of Oligocene age, and is estimated to be 175 ft thick in the vicinity of the site.
- Ocala Limestone – This unit is comprised of three subunits (Crystal River, Williston, and Inglis) that are collectively described as soft, chalky, coquinic, foraminiferal limestone that is dolomitized near its base. The Ocala Limestone is of Eocene age, and is known to be at least 150 ft thick in the vicinity of the site, however this unit averages about 275 ft thick across Manatee County.
- Avon Park Formation – Comprised of hard, fossiliferous, limestone and dolomite, with lenses of evaporite near the base of the unit. The Avon Park Formation is of Eocene age, and is estimated to be 700 ft thick in Manatee County.
- Oldsmar Formation – Comprised of dolomite and limestone with intergranular evaporites throughout the unit. The Oldsmar Formation is of Eocene age, and is estimated to be 950 ft thick in Manatee County.
- Cedar Key Formation – Comprised of fairly hard, dolomite and limestone with interbeds of anhydrite, and is fossiliferous in part. The Cedar Key Formation is of Paleocene age, and is estimated to be 2,000 ft thick in Manatee County.

Generalized geologic cross-sections for Manatee County are presented in Figure 2.3-2.

2.3.1.2 Detailed Site Lithologic Description

Several investigations have been conducted at the FPL Manatee Plant site to characterize the near-surface geology at specific locations within the property boundary. These investigations were conducted by Mid-Valley, Inc., Atlanta Testing & Engineering, Geraghty & Miller, Inc., and CH2M Hill. The scopes of work associated with these investigations are summarized below.

- Mid-Valley, Inc. (1973) – Completed soil borings and developed soil profiles for power block area and associated facilities during the original development of the Manatee Plant site. Soil samples were generally collected at 5-ft intervals to depths of 50 ft below grade at 39 individual locations, and at 5-ft intervals to a depth of 100 ft below grade at 1 location.
- Atlanta Testing & Engineering (1987) – Installed two monitor wells completed to depths of 12 and 15 ft below grade in the vicinity of the neutralization basins. Provided lithologic description of near-surface soils encountered at the two monitor well locations.
- Atlanta Testing & Engineering (1992) – Characterized the direction of groundwater flow in the surficial aquifer in the vicinity of the neutralization basins. One standard penetration test soil boring was installed to a depth of 40 ft below grade with soil samples collected at 5-ft intervals.
- Geraghty & Miller, Inc. (1993a) – Installed three monitor wells completed to depths of 20 ft below grade at areas immediately downgradient of the neutralization basins. Presented a description of soils encountered during monitor well installation.
- CH2M Hill (1994) – Conducted a hydrogeological and geotechnical investigation in an area west of the Project area. A total of 24 soil borings with split spoon samples were collected at varying intervals at depths ranging from 15 to 63.6 ft below grade.

The results of the field investigation conducted by CH2M Hill (1994) to describe subsurface conditions immediately west of the Project area are typical of the Project area. Soils encountered during drilling activities were generalized into five strata, presented in order of increasing depth:

Stratum I – Encountered at 4 of the 24 borings in depressional or low-lying areas. Materials were fine to coarse grained, very loose to medium dense, silty sand, and sand with silt. Thickness of these materials, where encountered, ranged from 0.3 to 4.3 ft.

Stratum II – This stratum underlies Stratum I materials, or occurs at the land surface where Stratum I materials were absent. Materials were fine to coarse grained, very loose to very dense, sand, interbedded with layers of poorly graded sand with silt, silty sand, sand with clay, and/or clayey sand. Thickness of these materials ranged from 2.5 to 36.2 ft.

Stratum III – Materials were very loose to dense, clayey sand, with shell fragments and phosphate granules. Thickness of these materials ranged from 11.3 to 21.3 ft.

Stratum IV – Materials were clay, clay and sand, and clayey sand. Thickness of these materials ranged from 6.8 to 15.2 ft.

Stratum V – Materials were weathered limestone. Thickness of this stratum was not determined during field activities.

Near-surface soils in the vicinity of the Project area are characterized as poorly drained, and are typical of flatwoods throughout Manatee County. Soil types are generally described to be nearly level, sandy, with moderate to low recharge rates (SWFWMD, 1988). Site-specific borings are consistent with this general description and indicate that the uppermost soils encountered include sand, silty sand, and clayey sand.

2.3.1.3 Geologic Maps

The lithology present at land surface throughout Manatee County is characterized by Knapp (1980) as a medium to fine grained sand and silt unit that generally occurs at a thickness in excess of 10 ft in central Manatee County. This surficial unit is consistent with the description of the unconsolidated sediments presented above in Section 2.3.1.1, and is described to contain minor amounts of heavy minerals, shell, phosphorite, and organics.

To the east of the FPL Manatee Plant site in eastern Manatee County, sediments of the Bone Valley Formation including phosphatic clayey sand with varying amounts of sand, calcareous clay, and clay occur at or near land surface. To the west of the FPL Manatee Plant site near coastal portions of Manatee County, sediments described as sand, shell, and clay occur at land surface. Along the Manatee River near Bradenton, a very sandy, phosphatic limestone-dolomite lithologic unit is exposed or occurs very near land surface. This carbonate unit is described as part of the Hawthorn Group and is comprised of interbedded sandy clay, limestone, and dolomite that individually contain varying amounts of phosphorite.

2.3.1.4 Bearing Strength

Geotechnical investigations have been conducted at the locations selected for development of facilities within the FPL Manatee Plant site. Initial work at the FPL Manatee Plant site was conducted by Mid-Valley, Inc., in the 1970s prior to initial site development to characterize subsurface conditions. Additional geotechnical investigations were conducted in the mid-1990s in the area of the existing facilities and in the Project area. Supplemental geotechnical investigation of subsurface conditions will be conducted at areas adjacent to existing facilities at the FPL Manatee Plant where Unit 3 construction is planned. The planned development from a geotechnical standpoint is appropriate provided the recommendations of the geotechnical investigations are followed.

2.3.2 SUBSURFACE HYDROLOGY

2.3.2.1 Subsurface Hydrologic Data for the Site Aquifers

The occurrence of groundwater in the vicinity of the site is affected by the geologic formations described in Section 2.3.1.1. The three aquifers that supply potable-quality groundwater are separated by clayey sediments of relatively low permeability that act to restrict the vertical movement of water between the aquifers, as described below in order of increasing depth.

Surficial Aquifer

The surficial aquifer occurs throughout the majority of Manatee County where the unconsolidated sediments are encountered. This aquifer extends from the water table surface to the clayey sediments of the upper confining unit of the underlying intermediate aquifer. Within central Manatee County, a hardpan layer may be present within the unconsolidated sediments. Where it occurs, the hardpan limits vertical groundwater movement within the surficial aquifer.

Recharge to the surficial aquifer occurs on a local basis, mainly by infiltration of rainfall. Discharge from the surficial aquifer occurs by seepage into surface water bodies, evaporation, and downward seepage to the underlying intermediate aquifer. The direction of groundwater flow in the surficial aquifer is affected by topography, with local flow patterns affected by surface water bodies.

Water levels in the surficial aquifer were observed at selected locations within the Manatee Plant site by CH2M Hill (1994). Elevations of the water table surface ranged from approximately 25 to 40 ft NGVD, corresponding to water table depths from 2.5 to 4.8 ft-msl, as measured on May 25, 1994.

The direction of groundwater flow in the surficial aquifer was interpreted from these water level measurements to be generally westward. The May 1994 water levels are considered to be representative of average to seasonally dry conditions, with an estimated hydraulic gradient of 0.007 foot per foot (ft/ft) and groundwater flow rate of 0.035 foot per day (ft/day).

The *Soil Survey of Manatee County, Florida* (Soil Conservation Service, 1983) indicates seasonal high water level for soil types located within the site is approximately 1 feet below land surface (ft-bls). It is estimated that seasonal water level fluctuation is in the range from 3 to 4 ft for the surficial aquifer.

Characteristics of the surficial aquifer in Manatee County or of the southern west-central groundwater basin described by SWFWMD (1988) are presented below:

- Transmissivity – ranges between about 250 and 5,300 square feet per day (ft^2/day);
- Specific yield – 0.05 to 0.12;
- Vertical hydraulic conductivity – 0.12E-05 to 13 ft/day; and
- Horizontal hydraulic conductivity – 0.0028 to greater than 1,000 ft/day.

Results of the hydrogeologic investigation conducted by CH2M Hill (1994) provide site-specific information for the surficial aquifer. Slug tests conducted at selected locations at the proposed backup byproduct disposal area indicate the horizontal hydraulic conductivity ranges from 0.4 to 5.0 ft/day. Relatively undisturbed samples collected from the semi-confining unit of the lower surficial aquifer indicate vertical permeability ranged from 4.0E-04 to 2.2E-01 ft/day.

Groundwater samples were collected from two monitor wells in the surficial aquifer and analyzed for 19 metals, 6 conventional and organic (semi-volatiles, volatiles, herbicides, and pesticides) (CH2M Hill, 1994). The results of parameters above the detection limits are summarized in Table 2.3-1. This sampling event was conducted to characterize background groundwater quality and establish ambient groundwater conditions.

Intermediate Aquifer

The intermediate aquifer occurs throughout Manatee County and is comprised of the sediments of the Hawthorn Group, including sandy clay, clay, and marl, with interbedded permeable sand, shell, gravel, and carbonate sediments. The sand and shell beds are generally less than 10 ft thick and are of limited horizontal extent. Permeable limestone beds of the intermediate aquifer are hard, sandy, fossiliferous, and dolomitic, and are about 200 ft thick in the northern portion of Manatee County. The water bearing units within the intermediate aquifer are under confined conditions, and groundwater flow is generally toward the west-southwest.

The potentiometric surface of the intermediate aquifer is relatively stable, and is approximately at elevation 30 ft NGVD in the vicinity of the site. Regional estimates for the intermediate aquifer estimate a hydraulic gradient of 3.3 ft per mile, and a groundwater flow rate of 0.0007 ft/day. Transmissivity of the intermediate aquifer in Manatee County is reported to range between 300 and 2,000 ft^2/day, while leakance rates are reported to range between 1.0E-04 to 2.4E-05 ft^3/day/ft^3 (SWFWMD, 1988). Recharge to the intermediate aquifer is considered to be low in northern Manatee County, averaging less than 2 inches per year.

Floridan Aquifer

The upper Floridan aquifer is comprised of the Tampa Member, Suwannee Limestone, Ocala Limestone, and upper portion of the Avon Park Formation, and it occurs throughout west-central Florida. The Tampa Member is considered to be the top of the upper Floridan aquifer, while the base of the upper Floridan aquifer consists of the first vertically persistent intergranular evaporite deposits of the Avon Park Formation. The thickness of the upper Floridan aquifer is estimated to be 1,200 ft in northern Manatee County. The water bearing units within the upper Floridan aquifer are under confined conditions.

The potentiometric surface of the upper Floridan aquifer in Manatee County varies on a seasonal basis due to agricultural withdrawals. At the end of the wet season (September) the potentiometric surface indicates groundwater flow is westward at the Manatee Plant site, with a hydraulic gradient estimated at 0.7 foot per mile (ft/mile). At the end of the dry season (May) the potentiometric surface indicates groundwater flow is eastward at the Manatee Plant site, with a hydraulic gradient estimated at 1.7 ft/mile.

Transmissivity of the upper Floridan aquifer in Manatee County is reported by SWFWMD (1988) to range from 4,900 to 160,000 ft^2/day, with porosity ranging from 0.25 to 0.35 percent. Aquifer tests conducted within 4 miles of the site reported the transmissivity of the upper Floridan aquifer averaged about 116,000 ft2/day. Leakance rates for the upper Floridan aquifer range from 0.00001 to 0.0023 $ft^3/day/ft^3$.

Vertical recharge to the upper Floridan aquifer from the overlying intermediate aquifer is reported to be less than 2 inches per year (SWFWMD, 1988). Given the extensive nature of confining units at the base of the intermediate aquifer, the majority of recharge to the upper Floridan aquifer in Manatee County occurs primarily as lateral inflow from Polk County.

2.3.2.2 Karst Hydrogeology

The Manatee Plant is situated in an area designated as low potential for sinkhole development (SWFWMD, 1988). In the vicinity of the Project area, the potential for active solutioning is limited by the presence of extensive clayey sediments in the upper confining unit, which acts to retard the vertical movement of groundwater. Several circular topographic depressions observed in Manatee County and the southern half of Hillsborough County represent remnant solution features resulting from historic changes in sea level during the Pleistocene Epoch (SWFWMD, 1988).

There are nine remnant depressional features associated with localized historic karst activity in an area on the Manatee Plant site and west of the Project area. These depressions, which are commonly aligned along subsurface fracture traces, were recently evaluated during geologic investigations performed by CH2M Hill (1994). In order to determine whether active karst solutioning of the underlying carbonate rock was occurring, soil borings in the vicinity of the depressional areas were used to evaluate the stratigraphic conformity of these depressional features. These soil borings encountered the same stratigraphic sequence of sediments at nearly the same depths as borings outside the depressions, indicating that no portions of the stratigraphic sequence are missing as a result of solutioning and sinkhole collapse. It is likely that these depressional features, which are typically less than 5 ft in depth, are localized along near-surface, carbonate lenses or shell layers. These carbonate features were apparently more susceptible to solutioning during periods of sea level rise than the other carbonate rock types encountered at depths below the clayey sediments which make up the stratigraphic sequence of this area. The results of these investigations indicate that there is no subsidence associated with sinkhole activity in the vicinity of the site.

Additional site-specific investigations of potential karst features were conducted by National Soil Services, Inc. (NSS), prior to construction of the cooling pond in the 1970s. Topographic features described as closed, surface depressions were studied to characterize their nature and indicate if there were active changes during the prior 20-year period. The report prepared by NSS (1973) indicated that the findings of the investigation regarding the cause and mechanism for the formation of the depressions were inconclusive. The collected data indicated the soils within the depression areas were incompressible and did not appear to be subject to further subsidence. It was concluded that the depressions had not changed in configuration during the prior 20 years, and that additional solution activity and depression formation was not likely to occur.

2.3.3 SITE WATER BUDGET AND AREA USERS

2.3.3.1 Site Water Budget

Components of the existing site water budget include precipitation, evaporation and evapotranspiration (ET), runoff, and groundwater recharge. The nearest long-term precipitation data collection station is located in Parrish, Florida, approximately 5 miles from the site. The nearest pan evaporation data station (evaporation data are not collected at Parrish) is at the Lake Alfred Agricultural Research and Education Center, approximately 51 miles from the site. The evaporation data were obtained from NOAA data files through a proprietary data service (EarthInfo, 1993). Basin average precipitation values for the Little Manatee River were obtained from the United States Geological Survey (USGS) (2000) internet site.

Long-term monthly precipitation and pan evaporation averages, maximums, and minimums are summarized in Table 2.3-2. The basin average precipitation is 53.04 inches per year with the highest precipitation in the summer months (June, July, August, and September). The average pan evaporation rate is 71.33 inches per year, while monthly averages range from 3.23 to 8.49 inches in December and May, respectively.

The estimated annual runoff in the site vicinity of the Manatee Plant is 15.41 inches per year. This estimate is based on a 61-year period of flow data for the Little Manatee River at USGS Gauge No. 02300500, which is located 3.3 miles downstream of the Manatee Plant. This gauging station has a drainage area of 149 mi^2. The peak recorded instantaneous runoff rate at this station is 14,000 cubic feet per second (cfs), which occurred on September 11, 1960 (USGS, 2000).

The estimated groundwater recharge rate along the northern border of Manatee County is from 0.0 to 2.0 inches per year (Fernald and Patton, 1984). This is consistent with estimates of recharge at the existing plant site (SWFWMD, 1988), which also gave a range from 0.0 to 2.0 inches per year.

A water budget was developed for the Little Manatee River watershed as representative of conditions in the Project area (see Table 2.3-3). The difference between precipitation and discharge, less groundwater recharge, is an estimate of ET. The resulting annual average ET value is 36.41 inches per year. This compares well with other published estimates of ET in southwest Florida (Fernald and Patton, 1984). Lake evaporation, which is usually higher than ET, is estimated to be approximately 51 inches per year in this area (Fernald and Patton, 1984).

2.3.3.2 Area Users

There are no municipal water supplies within 5 miles of the Manatee Plant. A review of current well construction and water use permits provided by SWFWMD (SWFWMD web site, 2001) for the area within 5 miles of the Project area identified mostly agricultural water users, especially for citrus and vegetable production. Table 2.3-4 lists the permitted water users, sorted by distance from the Project area. There are two existing permitted public supply wells between 4 and 5 miles from the Project area. One serves a youth camp and the other serves a unspecified private facility. In addition, there are three fish farms within 5 miles of the Manatee Plant, along Dug Creek and north of the main stem of the Little Manatee River. Both of these facilities are about 5 miles from the plant. The only industrial user in the vicinity is FPL. Figure 2.3-3 maps the permitted users in relation to the location of the Manatee Project area.

The primary water uses at the existing Manatee Plant include plant service water, process water, and makeup to the cooling pond. Initially, plant service and process water requirements were supplied from three onsite wells in the Floridan aquifer. In April 1989, the source was switched to the cooling pond with the wells reserved for standby purposes. Water use is recorded, and monthly totals are sent to SWFWMD. The average usage is 400,000 gallons per day (gpd). All service and process wastewater is returned to the cooling pond after treatment.

Condenser cooling is a separate system utilizing the cooling pond for heat dissipation. It is an internal recirculation of water, and the maximum circulation rate is approximately 850,000 gallons per minute (gpm) and includes both condenser and auxiliary cooling. Withdrawals from the Little

Manatee River to replenish the cooling pond are provided for in an existing Permit Agreement with SWFWMD which is based upon pond water levels and a diversion schedule tied to river flow. Withdrawals over the life of the plant (1974 to 2001, including initial filling of the cooling pond) have averaged approximately 7.4 million gallons per day (Table 2.3-5), or about 6.4 percent of the river flow at the point of withdrawal. Figure 2.3-4 shows the daily withdrawals and the withdrawals as a percentage of the river flow, for the period subsequent to the initial filling of the cooling pond, from October 1977 through September 2001. Over this time period, withdrawals have averaged 5.7 million gallons per day, or about 5.0 percent of the river flow. Maximum cooling pond withdrawal rates have exceeded 75 mgd and 40 percent of river flow many times over this 24-year period. As stated by SWFWMD staff in 1995, "extensive studies indicate that previous levels of water use have not impacted the river" (SWFWMD, 1995).

High-water-control discharges from the cooling pond can occur during periods of extreme rainfall. Since the initial filling of the pond, four such discharge events have occurred.

2.3.4 SURFICIAL HYDROLOGY

The Manatee Plant is located within the Manatee and Little Manatee drainage basins, two of four major rivers discharging to Tampa Bay (see Figure 2.3-5). The plant is approximately 5 miles east of Parrish in a rural and undeveloped area. Water is withdrawn from the Little Manatee River to augment the existing cooling pond. Also, immediately east of Saffold Road, there is a remnant wooded wetland and interconnected agricultural ditches draining an area of approximately 1,220 acres with surficial flow to a small ditch draining west. This drainage flows into the eastern end of the cooling pond. Land surface elevations at the Manatee Plant range from approximately 30 to 55 ft-msl. Runoff from the plant site drains to the cooling pond, north to the Little Manatee River, and to the south to Gamble Creek and then to the Manatee River.

The existing surface water runoff from the farm area drains toward Sand Prairie, which borders the western limits of the Project area. Runoff at the site currently collects in numerous shallow agricultural swales. These swales outfall to depressional wetlands, which have been interconnected by drainage ditches. The western berm of the cooling pond serves as a regional drainage divide.

The seasonal high water level of soils at the site is approximately 1 ft below the ground surface as indicated by the Soil Survey of Manatee County, Florida (Soil Conservation Service, 1983). This water level fluctuates about 3 or 4 ft during wet and dry conditions.

2.3.4.1 Hydrologic Characterization

Physical Characteristics

The Manatee Plant withdraws water from the Little Manatee River under a Permit Agreement with SWFWMD to maintain the required water levels for its 4,000-acre (6.25 mi^2) cooling pond. The total Little Manatee River drainage basin encompasses approximately 229 mi^2.

The cooling pond intake and discharge points are located approximately 2.5 miles downstream from the confluence of the main stem and its largest tributary, the South Fork. The main stem's headwaters are located 16.1 miles from its confluence with the South Fork (FDEP, 1979). Other tributaries to the main stem include Carlton Branch, Howard Branch, Prairie Branch, and Alderman Creek. The South Fork's headwaters are located 12.4 miles from its confluence with the main stem (FDEP, 1979). Major tributaries to the South Fork include Moody Branch and Long Branch.

The Little Manatee River's main stem runs approximately 18 miles from the Manatee Plant site to Tampa Bay. Downstream from the Manatee Plant's point of withdrawal, the major tributaries of the Little Manatee River main stem include Dug Creek and Cypress Creek.

The Little Manatee River area is part of the coastal lowlands physiographic region that borders the coast of Florida. The main riverine system is approximately 40 miles long. Headwater elevations of the South Fork and main stem are in excess of 100 feet national geodetic vertical datum (ft-NGVD). A significant change in the river bottom profile occurs at U.S. 301 near River Mile 15 (see Figure 2.3-6). This point marks the extent of tidal influence on water levels. Because the hydraulic gradients above this point are relatively large, the channels in this reach of the river are generally narrow and well defined.

High runoff rates have been reported within the Little Manatee drainage basin, averaging 163 mgd for the entire basin (SWFWMD, 1992). These high runoff rates can be attributed to the lack of depressional storage (lakes, extensive wetlands) and low recharge rates within the drainage basin.

In 1989, FDEP designated portions of the Little Manatee River as an OFW. As stated in Rule 62-302.700, F.A.C., these portions are delineated as "...from its mouth to the western crossing of the river by SR 674, including Hayes, Mill and Bolster Bayous, but excluding South Fork, Ruskin Inlet and all other tributaries." The Manatee Plant cooling pond and its withdrawal and discharge points were constructed prior to the OFW designation and are located within the OFW section of the Little Manatee River. Downstream of the Manatee Plant, a segment of the Little Manatee River, approximately from its mouth to U.S. Highway 301, is included as part of the Cockroach Bay Aquatic Preserve.

The Manatee River basin encompasses approximately 330 mi^2. The Gamble Creek basin is approximately 17 percent of this area and flows directly into the estuarine portion of the Manatee River. Portions of the Manatee Plant site are in the headwaters of the Gamble Creek basin. No stream gauging stations exist on Gamble Creek.

Hydrologic Characteristics

The USGS has maintained a long-term stream gauging station on the Little Manatee River near Wimauma for 61 years (1939-2000). The station (No. 02300500) is located 15 miles upstream from the river's mouth and approximately 3.3 miles downstream from the point of withdrawal for the Manatee Plant. This station measures flow for 149 mi^2 of the Little Manatee's drainage basin, with an average flow of 172 cfs.

Flow data for the Wimauma station were obtained for the period of record from April 1, 1939 through December 19, 2001. The seven consecutive day low flow (7Q) for each year was determined, and the results are shown in Figure 2.3-7. The 7Q flows from 1940 through 1977, except for 1959, ranged between 17.9 and 1.2 cfs. The 7Q flows from 1978 through 1999 ranged considerably higher, from 9.7 through 36.7 cfs. The 7Q flows from 2000 and 2001 are back in the same range as were those from 1940-1977. The 7Q flow with a recurrence interval of 10 years (7Q10) for the entire period is calculated to be 4.23 CFS.

The elevation of the river bottom near USGS Station No. 02300500 is less than 2 ft-NGVD, resulting in gentle downstream channel bottom slopes. Stage-discharge at the station is at times tidally influenced due to periodic low-flow conditions and the gentle slopes.

The estuarine portion of the Little Manatee River extends approximately 9.9 miles upstream from the mouth at Shell Point (Fernandez, 1985). The daily tide cycle in the Little Manatee River is predominantly semidiurnal (Brown & Root, Inc., 1973). Two lows and two highs are usually observed daily: lower low water (LLW), higher low water (HLW), lower high water (LHW), and higher high water (HHW). The mean tidal range at St. Petersburg tide gauge and at Shell Point where the Little Manatee River enters Tampa Bay is 2.3 ft. Mean high water is at Elevation 1.1 ft-msl and mean low water is at -1.2 ft-msl.

The Little Manatee River estuary may be classified as a partly mixed estuary (Brown & Root, Inc., 1973) during mean and high flows. Results of a vertical conductivity study by Fernandez (1985) suggest that the estuary is well mixed during low flows. A partly mixed estuary is developed primarily by two characteristics, both of which are present in the Little Manatee River. The first is that mixing is likely to occur even without the presence of strong currents because the river is wide and relatively shallow at its lower end. The second characteristic is that the low ratio of freshwater discharges to the tidal prism volume in the estuary of the river is of the magnitude which defines partly mixed estuaries (Brown & Root, Inc., 1973).

Tidal currents produce significant vertical mixing of and freshwater in the partly mixed estuaries. The interface between the freshwater in the surface strata and the saltier water underneath is not well defined, and the presence of the interface is indicated by a more or less pronounced transition in the vertical salinity profile or the vertical velocity profile.

Chemical Characteristics

In general, the Little Manatee River has good and stable overall water quality. In 1992, the 305(b) water quality assessment performed by FDEP concluded that there are no major water quality problems in the river and that quality was stable over the selected period of record (10 years).

While the river water quality has historically been good, elevated bacteria and nutrient levels have been observed (see 303(d) list, FDEP, 2000). The likely cause of these problems is runoff from rangeland and other agricultural areas (FDEP, 1992). Most of the watershed land use is associated with agricultural activities (SWFWMD, 1992). Citrus production (12,500 acres) and row crops (26,300 acres) are the two most prevalent agricultural activities. Increasing trends in specific conductivity and nitrite-nitrate concentrations were noted by SWFWMD at the U.S. 301 station. The increase in specific conductivity may be the result of the increased use of mineralized groundwater in the area for irrigation. The increase in nitrite and nitrate seems to be associated with increased agricultural activities within the basin. FDEP (1992) also cites SWFWMD data that indicate excess crop irrigation water enters the river along sections of the North Fork.

Assessments of Little Manatee River water quality have been furthered by the high density of water quality sampling stations on the river. More than 20 water quality sampling stations have been maintained on the river or its tributaries by different agencies at various times, as listed in STORET. All but three of the stations are on the mainstream of the river or one of its two major tributaries, the North Fork and the South Fork. Stations exist both upstream and downstream of the Manatee Plant location on the river. Table 2.3-6 shows the maximum, average and minimum values for various parameters measured in the Little Manatee River at the USGS Station 02300500 near Wimauma, Florida between 1994 and 1999. State water quality standards for dissolved oxygen (O^2), pH, copper, and iron have been exceeded in the past. Generally, however, the river water quality is good.

In the estuarine portion of the Little Manatee River, existing water quality data do not indicate any serious problems (FDEP, 1992).

In the estuarine reach of the river, the most important factors determining physio-chemical conditions and their fluctuations are the tide, volume and content of the river water discharged, and the geomorphology of the estuarine area. Although there are a number of different types of estuaries, the following basic physio-chemical characteristics apply to the majority of them, including the Little Manatee River estuary. Typically, water will be fresher at the surface and more saline on the bottom, and saline water will penetrate further up the estuary near the bottom than near the surface. Tidal changes, which vary temporally and spatially, also affect salinity by increasing salinities on flood tide and decreasing it on ebb tide. These fluctuations will be greater in the middle than at either the head or the mouth of the estuary. Salinity may vary seasonally, ranging from near fresh water during the summer rainy season, to near full strength seawater during the spring dry season. Site-specific salinity fluctuations may also be significantly influenced by estuarine circulation patterns which would be created by tidal changes, geomorphology of the estuary, and amount of fresh water inflow. Figure 2.3-8 depicts freshwater discharge to the estuary, as measured at the USGS gauge at U.S. 301, and salinity measurements available from the STORET database, taken near the U.S. 41 bridge over the Little Manatee River. As shown, salinity at this location has ranged from almost 0 to between 25 and 30 parts per thousand.

As of the date of the 305(b) assessment (1992), water quality in Gamble Creek had not recently been sampled. Historically, nutrient and dissolved O_2 values have been problematic due to runoff from agriculture and construction.

2.3.4.2 Measurement Programs

All hydrologic and water quality data used to characterize the site area surface water conditions were compiled from existing sources.

2.3.5 VEGETATION/LAND USE

The Florida Land Use, Cover, and Forms Classification System (FLUCFCS) Level III codes were utilized to describe the existing vegetative communities at the Project area and the surrounding Manatee plant site. Figure 2.3-9 illustrates vegetative communities and land use at the Project area. Each community is discussed in detail in Section 2.3.6.1.

Existing vegetation/land use within the project boundary includes electrical power facilities (FLUCFCS Code 831), open, grassed areas (FLUCFCS Code 741), a portion of the cooling pond (FLUCFCS Code 531), and a small parcel of mixed pine and oak forest (FLUCFCS Code 434). The power block area for the Manatee Unit 3 Combined Cycle Project area will be located within the maintained grass lawn located to the west of the existing facility. Surfaced construction laydown areas will occupy open, grassed areas. Additional switchyard construction laydown, warehouses, trailers, and parking areas will be located on previously cleared areas. Two stormwater basins are proposed, one in the northwest corner of the Project area and another basin located on the southern portion of the Project area adjacent to the construction parking area.

The vegetative communities surrounding the Project area are dominated by row crops (FLUCFCS code 214) and improved pasture (FLUCFCS code 211). Intermixed with the cropland and pastures are upland forests (FLUCFCS code 400) and wetlands (FLUCFCS code 600), many of which have been drastically altered by agricultural activities.

2.3.6 ECOLOGY

2.3.6.1 Species-Environmental Relationships

The following subsections include descriptions of flora and fauna at the Project area and areas in vicinity of the Project. The Project area reconnaissance was conducted on January 8, 2002. The areas surrounding the Project area were surveyed in 1994 and 1995.

Terrestrial Ecology Systems – Flora

741 Rural Land

There are large areas of open filled land adjacent to the existing power plant which are covered by grasses. Grasses that dominate this habitat include big carpet grass (*Axonopus furcatus*) and smut grass (*Sporobolus indicus*). The disturbed land within the existing plant site has all been previously cleared, the surface leveled and filled, and is now mowed regularly. It is very poor quality as a native habitat.

531 Reservoir

The man-made cooling pond serves as source water for plant service and process water as well as the condenser and cooling water system. The banks of the cooling pond are lined with concrete, offering little area for emergent vegetation to become established.

831 Electrical Power Facilities

Within the Project area, electrical power facilities include warehouses, offices, and portions of the existing cooling pond intake and outfall structures.

434 Hardwood-Coniferous Mixed

A small amount of pine and oak forest is located near the southeastern Project area. This area was originally longleaf pine flatwoods. Ditching, lack of periodic burning, and cattle paths have altered this area. Dominant canopy species include longleaf pine (*Pinus palustris*), laurel oak (*Quercus hemisphaerica*), live oak (*Quercus virginiana*), sand live oak (*Quercus geminata*), and occasional sweet bay (*Magnolia virginiana*) and swamp bay (*Persea palustris*). The understory is dominated by wax myrtle (*Myrica cerifera*) and saw palmetto (*Serenoa repens*). The ground cover is dominated by wiregrass (*Aristida beyrichiana*).

Vegetative Communities Adjacent to the Project area

The vegetative communities surrounding the Project area were classified during field reconnaissance conducted in 1994 and 1995. These communities have remained essentially unchanged since the 1994 field reconnaissance. The following paragraphs describe the major vegetation systems found in the area surrounding the project and their dominant or indicator species.

211 Improved Pasture

The Manatee Plant site includes areas of improved pasture, primarily used for cattle grazing. The majority of the original vegetation in these areas has been removed and the habitat is drained by ditches. Common species in unimproved pastures include big carpet grass, common carpet grass (*Axonopus fissifolius*), and torpedo grass (*Panicum repens*). This habitat is extensively disturbed and is extremely poor quality as a native area.

213/434 Woodland Pasture/Hardwood-Conifer Mixed

Forested land to the southeast of the Project area is being used as native pasture. Many cattle trails wander through this pine flatwoods and oak habitat. This forested area was originally longleaf pine flatwoods. Ditching, lack of periodic burning, and cattle paths have altered this area. It is now of moderate quality.

214 Row Crops

The majority of the western side of the Manatee Plant site is a tomato farm. Various parts of the land are cultivated as the crop and market dictate. As sections of the fields are harvested and finished for the year, they may remain or be disked or plowed. This farm has no current value as a native area. Row crop farming has replaced virtually all of the native species. Only weedy species, many of them exotic such as goose grass (*Eleusine indica*) and torpedo grass, remain.

411 Pine Flatwoods

Pine flatwoods in the vicinity of the Project area are dominated by longleaf pine and sand live oak in the canopy, saw palmetto and wax myrtle in the understory, and wiregrass in the ground cover. These pine flatwoods exist to the southeast of the Project area and are in good condition. Understory vegetation, usually open, is dense and overgrown, and laurel and live oaks are common, likely as a result of fire suppression. Periodic fires traditionally control oaks and dense undergrowth.

610 Wetland Hardwood Forests

Willow swamps occur to the northeast of the Project area and are dominated by coastal plain willow (*Salix caroliniana*) with frequent Brazilian pepper trees (*Schinus terebinthfolius*). The water table keeps the understory and ground cover sparse to absent. The willow swamps are all thoroughly ditched, drained, and bermed with some mowing, but enough water is retained to support the swamp. The quality of this habitat is good in spite of the alterations.

611 Bay Swamps

A number of heavily ditched bay swamps to the west of the Project area are the remnants of a more extensive system. The swamps are now connected by an extensive ditch system which serves to drain the row crops as well as the swamps. These swamps are dominated by swamp laurel oak (*Quercus laurifolia*), slash pine (*Pinus elliotii*), Brazilian pepper tree, sweet bay, and swamp bay with an understory of coastal plain willow and wax myrtle. Dense cover from the canopy and understory prevents most ground cover species from growing; however, wild grape (*Vitis* sp.) is extensive. The bay swamps have all been ditched and bermed which has allowed swamp laurel oak and Brazilian pepper tree to invade. The quality of this system is still moderate due to the existence of hydric soils and hydrology.

616 Inland Ponds and Sloughs

Areas classified as inland ponds and sloughs are small, shallow ponds used to water cattle. The ponds are dominated by primrose-willow (*Ludwigia* sp.), spatterdock (*Nuphar luteum*), soft rush (*Juncus effusus*), pickerelweed (*Pontederia cordata*), torpedo grass and various other grasses, sedges, and rushes. The ponds act as storage areas for drainage from many of the pastures on which they occur. Cattle heavily graze within the associated marshes and adjacent pastures. The ponds typically are of good vegetative quality, but the water is of lesser quality due to the presence of cattle.

620 Wetland Coniferous Forests

Pine-mesic oak (wet pine flatwoods) occur to the southeast of the Project area mixed with dry pine flatwoods. This vegetation type is dominated by swamp laurel oak, upland laurel oak, coastal plain willow, dahoon holly (*Ilex cassine*), Brazilian pepper tree, sweet bay and swamp bay in the canopy with saw palmetto, gallberry (*Ilex glabra*) and wax myrtle in the understory. The ground cover is composed of many sedges and grasses. Most of these areas have been ditched and bermed. Many areas are overgrown and in need of prescribed fire. Weedy species such as blackberries and plants more characteristic of upland habitats are frequent. Exotic species such as Brazilian pepper tree and torpedo grass are invading and replacing or crowding out native species. The change of water flow and lack of fire are permanently changing these pine-mesic oak wetlands.

640 Vegetated Non-Forested Wetlands – Ditches

A large dendritic pattern of agricultural drainage ditches occurs throughout the area surrounding the Project area. These ditches connect the bay swamps as well as drain the farmland and wetland coniferous forests. The ditches are dominated by primrose-willow, groundsel bush (*Baccharis halimifolia*), coastal plain willow, elderberry (*Sambucus canadensis*), wild grape, and various grasses, sedges, and rushes.

641 Freshwater Marshes

Freshwater marshes are common in the area surrounding the Project area and are dominated by blue maidencane (*Amphicarpum muhlenbergianum*), torpedo grass, coinwort (*Centella asiatica*), few-flower beakrush (*Rhynchospora oligantha*), soft rush, wax myrtle, spikerushes (*Eleocharis* sp.), and other grasses, sedges, and rushes. These freshwater marshes are heavily grazed; some have been cleared of woody vegetation, and some are mowed. Some of the freshwater marshes are in good condition, but those being periodically mowed are being invaded by upland species.

Terrestrial Ecology Systems - Fauna

Wildlife habitat in the Project area has been significantly altered by the construction and operation of the existing power facility. Only a very small amount of native habitat is present within the Project area. The majority of the site is cleared, grassed, and periodically mowed. As a result of these extensive alterations, most of the Project area provides poor wildlife habitat.

Wildlife utilization of the Project area is expected to be minimal. Only those species tolerant of urbanization and human interaction were observed during site reconnaissance conducted on January 8, 2002, including mockingbirds (*Mimus polyglottis*), mourning doves (*Zenaida macroura*), blue jays (*Cyanocitta cristata*), and common grackles (*Quiscalus quiscula*). Wading birds occasionally use ditches located on the plant site outside of the Project area, as well as the cooling pond. Common wading birds utilizing these habitats include great blue heron (*Ardea herodias*), little blue heron (*Ardea caerulescens*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), and white ibis (*Eudocimis albus*).

The area surrounding the Project area is comprised of agricultural and natural areas, including row crops, pasturelands, pine flatwoods, and freshwater wetlands. Typical mammals found in the habitats surrounding the Project area include species common in Florida, such as deer (*Odocoileus virginiana*), feral hog (*Sus scrofa*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginianus*), armadillo (*Dasypus novemcinctus*), cotton-tailed rabbit (*Sylvilagus palustris*), gray squirrel (*Sciurus carolinianus*), skunk (*Mephitis mephitis*), and a variety of reptiles and amphibians. Avian species observed in the vicinity of the project include a variety of songbirds and wading birds, as well as red-shouldered hawk (*Buteo lineatus*), Southeastern American kestrel (*Falco sparverius paulus*), barred owl (*Strix varia*), osprey (*Pandion haliaetus*), and marsh hawk (*Circus cyaneus*).

Threatened and Endangered Species – Flora and Fauna

Species in this category consist of plants and animals designated by the USFWS as endangered, threatened, or under review for listing; animal species designated by the Florida Fish and Wildlife Conservation Commission (FFWCC) as endangered, threatened, or species of special concern; and plant species designated by Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, or commercially exploited.

Prior to the field surveys, a literature search was conducted to identify listed animal and plant species of Manatee County. Sources used to identify species that could potentially occupy the area included the Florida Natural Areas Inventory (FNAI) database, Notes on Florida's Endangered and Threatened Plants (Coile, 1998), and Ashton and Ashton's (1988) *Handbook of Reptiles and Amphibians of Florida*. Previous studies performed in the mid-1990s were also consulted.

Flora

Table 2.3-7 details the state and federally listed plant and animal species of Manatee County and their probability of occurrence on the Project area. No suitable habitat for listed plant species is located within the Project area. Native vegetation has been cleared during the construction of the existing plant facilities. The probability of listed plant species occurring on the Project area is extremely low.

Fauna

The Project area offers very poor habitat for wildlife. However, several state-listed wading birds and the American alligator (Table 2.3-7) utilize the cooling water reservoir, a portion of which is included within the Project area. Those species with a moderate or high probability of occurrence in or near the Project area are discussed below.

Snowy Egret (*Egretta thula*) - The snowy egret is listed as a species of special concern by FFWCC. This species is associated with wetlands, and was observed within the cooling pond. A small portion of the cooling water reservoir is included in the Project area for intake and outfall; therefore, the probability of occurrence in or near the Project area is high.

Tricolored Heron (*Egretta tricolor*) - The tricolored heron is listed as a species of special concern by FFWCC. This species was not observed on the Project area, however, it is likely to be found in the cooling pond and may occasionally forage in ditches and wetlands near the Project area. The probability of occurrence is high in or near the Project area.

Little Blue Heron (*Egretta caerulea*) - The little blue heron is listed as a species of special concern by FFWCC. This species was observed in the cooling pond, and likely forages in the herbaceous wetlands near the Project area. The probability of occurrence in or near of the Project area is high.

White Ibis (*Eudocimis albus*) - The white ibis, listed as a species of special concern by FFWCC, was observed within the cooling pond. The white ibis prefers wetlands and agricultural environments, and may occasionally forage in the herbaceous wetlands near the Project area. The probability of occurrence in or near the Project area is high.

Florida Sandhill Crane (*Grus canadensis pratensis*) - The nonmigratory Florida sandhill crane is listed as threatened by FFWCC. This subspecies, as well as migrant cranes from the Midwest which winter in Florida, forages in wetlands and dry prairies. These birds may occasionally forage in the herbaceous wetlands near the plant site; therefore, the probability of occurrence in or near the Project area is moderate.

Bald Eagle (*Haliaeetus leucocephalus*) - The bald eagle is listed as threatened by FFWCC and USFWS. There are no known bald eagle nests or roosting sites in the vicinity of the proposed

Project area. The nearest known eagle nest is approximately 8 miles west of the Project area. Eagles do occasionally forage in the open water of the cooling pond east of the existing plant, therefore the likelihood of occurrence in or near the Project area is moderate.

Wood Stork (*Mycteria americana*) - The wood stork is listed as endangered by both FFWCC and USFWS. Wood stork habitats include swamps and other wetlands, where they require concentrations of fish in shallow waters for foraging. There is no suitable habitat on the Project area for wood storks, but they may forage in wetland areas nearby. Therefore, the probability of occurrence or near the Project area is moderate.

American Alligator (*Alligator mississippiensis*) - The alligator is listed as a species of special concern by FFWCC and as threatened by the USFWS due to similarity of appearance with the endangered American crocodile. It is associated with wetlands and other freshwater habitats. Alligators exist in the cooling pond and in some wetlands nearby the plant site, therefore the probability of occurrence is high.

Aquatic Systems

The aquatic systems in the vicinity of the Manatee Plant consist of the Little Manatee River, the cooling pond, and Gamble Creek. The manmade cooling pond serves as source water for plant service and process water and for the existing plant's condenser and auxiliary cooling water system.

The Little Manatee River

The Little Manatee River is approximately 40 miles in length, and most has been designated as an Outstanding Florida Water by FDEP. The lower 10-mile portion of the river east of Tampa Bay is considered to be estuarine.

Fishes

The Little Manatee River is a relatively healthy stream ecosystem with a diverse assemblage of fish species, including mosquitofish (*Gambusia holbrooki*), ironcolor shiners (*Notripos chalybaeus*), brook silverside (*Labidesthes sicculus*), dollar sunfishes (*Lepomis marginatus*), shads, golden topminnow (*Fundulus chrysotus*), killifishes (families *Cyprinodontidae* and *Poeciliidae*), brown bullheads (*Ameiurus nebulosis*), warmouth (*Lepomis gulosus*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), and swamp darter (*Etheostoma fusiforme*) (SWFWMD, 1992).

Macroinvertebrates

Macroinvertebrate sampling in the Little Manatee River was conducted during August-September 1993. Sampling was conducted at three stations: immediately upstream from the cooling pond (Station 12), between the two drainageways which formerly discharged cooling pond seepage water to the Little Manatee River (Station 13), and immediately downstream from the cooling pond (Station 24). Hester Dendy (H-D) artificial substrate samplers were retrieved 35 days after immersion (7 days longer than originally scheduled due to high water and high flow conditions).

A total of 454 individuals representing 11 species was collected in three H-D samplers at Station No. 12. A total of 177 individuals representing 4 species were collected from four H-D samplers at Station No. 13. A total of 1,092 individuals representing 13 species were collected from six H-D samplers at Station No. 24.

Dipteran (fly) larvae were the most abundant group of species occurring on the H-D samplers. Within this group, the chironomid (midges) genera common to all stations included *Ablabesmyia*, *Polypedilum*, and *Stenochironomus*. The chironomid genera *Thienemaniella* was common between Station Nos. 12 and 24. Other dipteran taxon common between Station Nos. 12 and 24 included a Tenedipedinae (chironomid) pupae, Simulidae (blackfly) larvae; other taxon common between these two stations included a megalopteran (dobsonfly) *Corydalus* sp., a coleopteran (beetle) *Cylloepus* sp., and an ephemeropteran (mayfly). The pelycepod (bivalve) *Corbicula manilensis* was common between Station Nos. 13 and 24.

2.3.6.2 PRE-EXISTING STRESSES

Aquatic Systems

The Little Manatee River is a relatively healthy stream ecosystem. However, increases in nutrients, sediment transport, and riverine encroachment have affected streamflow and water quality (SFWMD, 1992). See Section 2.3.4 for a detailed description of water quality characteristics in the river.

Terrestrial Systems

The native vegetative communities within the Project area have been altered and/or disturbed during the construction and operation of the existing plant facilities. The area of the existing plant is regularly mowed. The surrounding area has been logged, and most habitats have been developed, grazed, or farmed. Some communities have not been disturbed in recent years, but they have become overgrown due to lack of the natural system fires. Wetland habitats have been altered by the introduction of ditches and berms which have changed the availability of water with some communities drying out and others becoming wetter. The area to the west of the Project area is farmed and is regularly plowed and disked.

Because of these extensive alterations, wildlife habitat in the Project area and surrounding area has been severely disrupted. There are, however, important areas of wildlife habitat outside of the Project area, especially north of the cooling pond. These areas will not be affected by the proposed Project.

2.3.6.3 <u>MEASUREMENT PROGRAMS</u>

Terrestrial Ecology

Site reconnaissance of the Project area was conducted in January 2002. Terrestrial ecological resources, including vegetative communities, wildlife utilization, and threatened and endangered species occurrence were evaluated through direct observation, as well as previous studies and literature searches. Wildlife species were identified by direct observation, as well as by identification of calls, tracks, and scat. In 1994, vegetative habitats surrounding the Project area were classified and surveys for wildlife and threatened and endangered species were conducted. These investigations encompassed an area larger than that proposed for Manatee Unit 3. Since 1994, the land use of the area surrounding the Project area has remained essentially unchanged. Vascular plant identifications were made using: Wunderlin (1982), Hall (1978), Hall (1993), and Dressler *et al.* (1987). When necessary, the collections of the University of Florida's Vascular Plant Herbarium, Gainesville, were used to document identifications and insure consistency.

Aquatic Ecology

The macroinvertebrate sampling program discussed in Section 2.3.6.1 was conducted to verify that the cooling pond seepage discharges were not adversely impacting the biota of the Little Manatee River.

2.3.7 METEOROLOGICAL AND AMBIENT AIR QUALITY

2.3.7.1 Meteorology

Meteorological data collected at existing monitoring stations were used to describe the local and regional climatology in the vicinity of the Manatee Plant. The closest existing meteorological station to the Manatee Plant with complete data is the National Weather Service (NWS) station located at the Tampa International Airport, situated approximately 45 kilometers (km) (28 miles) northwest of the Manatee Plant. The NWS has recorded weather observations for more than 50 years at this site. These data are the most complete for, and representative of, the region surrounding the Project. FDEP has approved the use of these meteorological data in previous air permit applications for this area and recommended that these data be used for this Project.

The climate in the Manatee Plant area is subtropical with a marine influence from the Gulf of Mexico. The monthly and annual average temperatures for this area are presented in Table 2.3-8. The annual average temperature is approximately 72°F with monthly average temperatures varying from a maximum of 90°F to a minimum of 50°F. Record extreme temperatures range from a low of 18°F to a record high of 99°F. During the summertime, temperatures rarely exceed 99°F due to the high relative humidities with subsequent cloud cover formation and the abundant convective-type (e.g., thunderstorms) precipitation.

The monthly and annual average precipitation data are presented in Table 2.3-9. Approximately 70 percent of the annual precipitation falls during the 6 warmest months, May through October. The average annual precipitation is approximately 44 in, but this has varied from as little as 30 inches to 68 inches in the past 30 years. The majority of rain is in the form of short-lived convection showers (e.g., thunderstorms). Large amounts of rain are also produced during the late summer or fall when tropical storms or hurricanes may pass near the Tampa region. These events may result in heavy downpours that reach torrential proportions; 24-hour amounts of about 12 inches have been associated with hurricanes.

Monthly and annual average relative humidities, which indicate the amount of moisture in the air at a given temperature, are presented in Table 2.3-9 for the morning hours of 1:00 A.M. and 7:00 A.M. and early afternoon and evening hours of 1:00 P.M. and 7:00 P.M. The highest humidities are coincident with the coolest ambient temperatures, which generally occur at 7:00 A.M., or near dawn. The lowest humidities coincide with the highest ambient temperatures.

The Project area lies entirely within the trade wind belt (i.e., below 30°N latitude), resulting in predominant winds from the east. Because of the location of the Gulf of Mexico, moderate to strong late afternoon sea breezes occur on days with strong land heating and produce localized onshore winds to reinforce the westerly winds. Annual and seasonal windroses for the 5-year period from 1991 through 1995 are given in Figures 2.3-10 and 2.3-11a through 2.3-11d. A summary of the seasonal and annual average wind direction and wind speed, including calm conditions, is presented in Table 2.3-10. The data for this period were also used in the air quality impact analyses for the Project.

Except during the passage of tropical storms or hurricanes, wind speeds greater than 25 mph are not common.

Atmospheric stability is a measure of the atmosphere's capability to disperse pollutants and potentially reduce ground-level concentrations. During the daytime with strong solar heating, the atmosphere can disperse pollutants very quickly for a relatively short period of time. This condition is considered as very unstable and generally occurs more frequently during the summer. During the nighttime under clear skies and light wind speeds, the atmosphere is considered stable with minimal potential to disperse pollutants. During the day or night when wind speeds are moderate to high, pollutants are dispersed at moderate rates (i.e., dispersion rates that are lesser than those during unstable conditions but greater than those during stable conditions). This condition is considered neutral and occurs frequently throughout the year. The seasonal and annual average occurrences of atmospheric stability classes for this area for 1991 to 1995 are shown in Table 2.3-11.

During the summer months, unstable conditions occur about 35 percent of the time due to strong solar heating, whereas unstable stability occurs only 16 percent of the time in the winter months. Neutral stability occurs most frequently during the winter months due to the higher wind speeds that occur in this season. The occurrence of stable stability is nearly uniform throughout the year.

The mixing height is a parameter used to define the vertical height to which pollutants can disperse and, therefore, is used in estimating the volume of air in which pollutants are emitted and can be dispersed. In general, the higher the mixing height, the greater the potential for pollutants to be dispersed and for ground-level concentrations to be reduced.

The seasonal and annual average morning and afternoon mixing heights for the Manatee Plant area for 1991 to 1995 determined using the Holzworth method are listed in Table 2.3-12. The highest afternoon mixing heights occur in the spring and the lowest morning mixing heights occur in winter.

Thunderstorms are the most frequent of severe storms, occurring an average of 83 days per year as reported by the NWS at Tampa International Airport. These storms occur throughout the year, but about 73 percent occur from May through October.

Hurricanes and tornadoes are other types of severe weather that can occur at the Project area, but the probability of a hurricane or tornado passing over the Manatee Plant is low.

In the 80-km (50-mile) coastal strip from Pinellas County to Tampa Bay, there is about a 10 percent chance that a tropical storm will pass over the Bay area during any given year (Gale Research Co., 1980). For storms of hurricane strength [i.e., wind speeds exceeding 73 miles per hour (mph)], the chance decreases to about 6 percent with a 1-percent chance that the winds will be greater than 124 mph (i.e., wind speeds of a great hurricane).

Statistics compiled by the severe local storms branch of the national severe storms forecast center (Pautz, 1969) show that 42 tornadoes were spotted within the 1 degree latitude by 1 degree longitude square centered just south of the Tampa area from 1955 to 1967. This averages about two tornadoes per year. The tornado recurrence interval for any specific point location within the 1 degree square was estimated by the Methodology of Thom (1963). The recurrence interval, r, is equal to 1/p where p is the probability of a tornado striking within the 1 square area and is estimated as follows:

$$p = (2.8209 \times t)/A$$

where: t = mean annual frequency of tornadoes occurring

A = area of the 1 square (mi^2)

In this analysis, t was assumed to be 1.4 based on data collected from 1953 to 1962 and A was estimated to be 4,200 mi^2. Therefore, the mean recurrence interval for a tornado striking a point within this square is about 1,000 years.

2.3.7.2 Ambient Air Quality

Ambient Standards

The National and Florida Ambient Air Quality Standards (AAQS) are presented in Table 2.3-13. Primary National AAQS were promulgated to protect the public health, and secondary National AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements. Pollutants for which AAQS have been established are referred to as criteria pollutants. These pollutants include particulate matter (PM) with an aerodynamic particle size of 10 micrometers (µm) or less (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb).

On July 18, 1997 the U.S. Environmental Protection Agency (EPA) promulgated revisions to the National AAQS for O_3 and PM (62 Federal Register No. 138). The O_3 standard was modified to be 0.08 parts per million (ppm) for a 3-hour average concentration; this standard is achieved when the 3-year average concentration of the 99th percentile values is 0.08 ppm or less. The revised PM AAQS included two new $PM_{2.5}$ standards ($PM_{2.5}$ represents PM with an aerodynamic diameter of 2.5 µm or less), a short-term 24-hour average standard and an annual average standard as well as a revised PM_{10} standard. The $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 µg/m^3 3-year average concentration of the 98th percentile values) and an annual standard of 15 µg/m^3 (3-year average concentration at community monitors). The revised PM_{10} standard changes the form of compliance from an expected exceedance not to be exceeded more than once per year averaged over 3 years to a 3-year average concentration of the 99th percentile values. The courts have stayed these revised AAQS. As a result, the FDEP has not yet adopted them.

Manatee County is classified as an attainment area for all criteria pollutants (Rule 62-204.340, F.A.C.).

In promulgating the 1977 Clean Air Act (CAA) Amendments, congress specified that certain increases above an air quality *baseline concentration* level of SO_2 and PM concentrations would constitute *significant deterioration* for sources located in attainment areas. The magnitudes of the allowable increases, or prevention of significant deterioration (PSD) increments, depend on the classification of the area in which a new source (or modification) will be located or have an impact.

Three PSD increment classifications were designated based on criteria established in the 1977 CAA amendments. Initially, Congress promulgated areas as either Class I (national parks, national wilderness areas, and memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. EPA then promulgated as regulations the requirements for classifications and area designations.

On October 17, 1988, EPA promulgated regulations to prevent significant deterioration due to nitrogen oxide (NO_x) emissions and established PSD increments for NO_2 concentrations. The EPA class designations and allowable PSD increments are presented in Table 2.3-13. Florida has adopted the EPA allowable increments for PM_{10}, SO_2, and NO_2.

Manatee County is classified as a Class II area (Rule 62-204.340, F.A.C.) since it is an attainment area for all pollutants. The nearest Class I area to the Manatee Plant is the Chassahowitzka National Wilderness Area located about 120 km (72 miles) to the north-northwest.

Ambient Air Quality Data

The Manatee Plant is located in a rural area of Manatee County which has a minimal number of air pollution sources. Air monitoring data are collected in the county for SO_2, PM_{10}, O_3, and NO_2. These data are representative of air quality in Manatee County.

A summary of the maximum pollutant concentrations measured in Manatee County from 1998 through 2001 is presented in Table 2.3-14. These data indicate that the maximum air quality concentrations measured in the region are well below applicable standards.

Given the lack of industrial development in the vicinity of the plant, existing concentrations of other criteria pollutants, i.e., CO and Pb, which are usually associated with an urban environment, are expected to be well below the AAQS.

Existing Air Pollutant Sources

The Manatee Plant is located in a rural area with a minimal number of air pollution sources. The existing Manatee Plant consists of two nominal 800-MW oil-fired units, each permitted at a maximum heat input rate of 8,650 million British thermal units per hour (MMBtu/hr). The commercial in-service dates for Units 1 and 2 were October 1976 and December 1977, respectively. The fuel oil being fired has a maximum sulfur content of 1 percent and is currently authorized to operate under air operating permits issued by FDEP. The applicable emission limits for the existing units are specified in the state's emission limiting standards for SO_2 and NO_x, as specified in FDEP Chapter 62-296, F.A.C. These regulations stipulate that fossil fuel-fired steam generators located at the Manatee Plant site must meet:

PM – 0.1 lb/MMBtu [Rule 62-296.405(1)(b), F.A.C.]

SO_2 – 1.1 lb/MMBtu [Rule 62-296.405(1)(c)1.g, F.A.C.]

NO_x – 0.3 lb/MMBtu [Rule 62-296.405(1)(d)2, F.A.C.]

For PM emissions, an allowance of no greater than 0.3 lb/MMBtu in a 24-hour period is allowed for sootblowing and loadchanging [Rule 62-210.700(3), F.A.C.]. EPA determined in 1972 that there are no New Source Performance Standards (NSPS) applicable to the existing Manatee Plant units.

Existing major sources within 25 km (16 miles) include Tampa Electric Company's Big Bend Plant and Tropicana Products, Inc. In general, most of the other major air pollution sources are located more than 30 km (19 miles) from the site in Polk County. These sources are mainly phosphate rock mining and beneficiation plants. Air pollutant emissions from these sources, in the form of fugitive dust, are not significant.

2.3.7.3 Measurement Programs

All information (i.e., meteorology and air quality data) was compiled from offsite monitoring stations maintained and operated by FDEP, Manatee County, or cooperating governmental agencies (i.e., NWS). No significant changes in these programs are anticipated after the construction and operation of the Project.

Meteorological data were obtained from the NWS surface and upper-air station at the Tampa International Airport. These data were obtained for a 5-year period from 1991 through 1995 from which the joint frequency of wind direction, wind speed, and atmospheric stability and a 5-year average of mixing heights were developed. The wind sensors at the Tampa International Airport have been located 22 ft above grade. Regular surface observations are taken just before each hour, 7 days per week. Upper-air soundings are conducted twice per day at 0700 and 1900 eastern standard time.

A PSD preconstruction ambient air monitoring analysis was developed as part of the licensing planning to satisfy PSD requirements. Since the estimated increase in potential emissions due to the Project exceeds the *de minimis* emission rate of 100 tons per year (TPY) for volatile organic compound (VOC), an ambient air monitoring analysis is required for this pollutant (O_3 in the case of VOC emissions). Preconstruction monitoring analysis is required for PM_{10} and SO_2 since the Project's impacts of applicable pollutants are predicted to be above the *de minimis* impact levels for those pollutants. For NO_2 and CO, an exemption from monitoring is provided by FDEP rules since the impacts of these pollutants are less than *de minimis* impact levels [Rule 62-212.400(3)(e), F.A.C.].

Monitoring data, as presented in Table 2.3-14, was used to support the impact evaluation as included in the SCA and Air Permit/PSD Application.

2.3.8 NOISE

2.3.8.1 Background

Sound propagation involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components, the noise source and the transmission path, are easily quantified (i.e., direct measurements or though predictive calculations), the effects of noise on humans is the most difficult to determine due to the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by humans is very subjective, and just as for odors and taste, it is very difficult to predict a response from any particular individual to another.

The magnitude of noise levels or loudness is referred to as sound pressure level (SPL) with units in decibels (dB). Decibels are calculated as a logarithmic function of SPL in air to a reference effective pressure, which is considered the hearing threshold, or:

$$SPL = 20 \log_{10} (P_e/P_o)$$

where:

P_e = measured effective pressure of sound wave in micropascals (μPa), and

P_o = reference effective pressure of 20 Pa.

To account for the effect of how the human ear perceives sound pressure, at moderate to low levels, SPLs are adjusted for frequency (or pitch). One of the most commonly used frequency filters is the A-weighting (dBA), which adjusts measurements for the approximated response of the human ear to low-frequency SPLs [i.e., below 1,000 hertz (Hz)] and high-frequency SPLs (i.e., above 1,000 Hz).

In 1999, Manatee County amended the existing countywide noise control ordinance. The amended noise ordinance (Chapter 2-21 Miscellaneous Provisions and Offenses, Article II Noise) includes both qualitative and quantitative requirements depending upon the specific activity. The ordinance is applicable to the unincorporated areas of the county and includes sections on terminology/definitions, exceptions, prohibited acts, enforcement and penalties, and civil remedies. Exceptions from the Noise Ordinance include emergency work, ceremonial or traditional activities, operation of certain equipment, appropriately zoned manufacturing areas, and construction. Some of the exceptions specify the applicable hours, as well as certain restrictions.

2.3.8.2 Noise Measurement Procedures

A comprehensive ambient noise-monitoring program was performed to assess the existing ambient noise levels in the Unit 3 Project area at the FPL Manatee Plant site. The field effort to collect the baseline noise level data was conducted on December 18, 2001 and January 16, 2002. The equipment used to monitor the baseline noise levels operated in the slow response mode to obtain accurate, integrated, A-weighted SPLs. A windscreen was used because all measurements were taken outdoors. The microphone was positioned so that a random incidence response, as specified by the American National Standard Institute (ANSI), was achieved. The sound level meter and octave band analyzer were calibrated immediately prior to and just after the sampling period to provide a quality control check of the sound level meter's operation during monitoring.

Integrated SPL (SPL) data consisting of the following noise parameters were collected at each location:

L_{eq} The SPL averaged over the measurement period; this parameter is the continuous steady SPL that would have the same total acoustic energy as the real fluctuating noise over the same time period;

Max The maximum SPL for the sampling period,

Min The minimum SPL for the sampling period, and:

L_n The SPLs, which were exceeded n% of the time during sampling period. For example, L_{90} is the sound level exceeded 90 percent of the time during the monitoring period.

The SPL data were analyzed and reported in both dB and dBA. The higher the dB value, the louder the sound.

The SPLs and octave band data were collected at the monitoring locations, for a minimum of 15 continuous minutes, using measurement techniques set forth by ANSI S12.9-1993/Part 3 (ANSI, 1993).

The noise monitoring equipment used during the study included:

1. Continuous Noise Monitoring Equipment
   a. Larson Davis Model 824 Precision Integrating Sound Level Meter with Real Time Frequency Analyzer
   b. Larson Davis Model PRM902 Microphone Preamplifier
   c. Larson Davis Model 2560 Prepolarized 1/2" Condenser Microphone
   d. Windscreen, tripod, and various cables
2. Sound Level Meter Calibration Unit
   a. Larson Davis Model CAL200 Sound Level Calibrator, 94/114 dB at 1,000 Hz.

Monitoring was conducted using the sound level meter mounted on a tripod at a height of 1.2 m (4 ft) above grade. Local meteorological conditions (wind speed, wind direction, temperature, and relative humidity) were measured during the monitoring periods. The operator recorded detailed field notes during monitoring and included major noise sources in the area. The equipment and procedures used are consistent with the measurement procedures in the Manatee County Ordinance.

The SPLs and octave band data were collected at five different locations (Figure 1). These five sample locations (Sites 1, 2, 4, 5, 6) were taken at the same sample locations that were used in an ambient noise study that was conducted in May 1994 and are numbered accordingly. Three of the five monitoring locations, (Sites 4, 5, and 6) were selected to delineate the noise levels at or near the property lines of a receiving land use category (i.e., residential or agricultural). Additionally, Sites 1 and 2 were selected to delineate the existing noise levels produced by the Manatee Plant during normal operations. Noise monitoring was performed at the five sites during the daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).

The Larson Davis sound level meter complies with Type I – Precision requirements set forth for sound level meters and for one-third octave filters. The L_{eq} (equivalent SPL averaged for the sampling period) as well as the maximum, minimum and L_{90} SPLs during each monitoring episode were recorded and are presented in Table 1. The SPL averages were calculated using the following formula:

$$\text{Average SPL} = 10\ \text{Log}\ \frac{\sum_{i-1}^{N} 10^{(SPLi/10)}}{N}$$

where: N = number of observations.

SPL_i = individual SPL in data set.

2.3.8.3 Existing Ambient SPL Conditions

The daytime and nighttime ambient noise levels, measured as an equivalent SPL (L_{eq}), for each of the monitoring sites are illustrated in Table1. Figure 2 presents the observed SPLs for each site relative to the minimum SPL, Ln(%) and maximum SPL.

Within the Manatee Plant site (Sites 1 and 2) the maximum L_{eq} noise levels for daytime and nighttime were 57.6 and 65.4 dBA, respectively. At the northern, western and southeastern boundaries of Manatee Plant site (Sites 4, 5, and 6), the maximum L_{eq} noise levels occurred at Site 6 and were 44.7 and 59.3 dBA for daytime and nighttime periods, respectively.

Minimum SPLs primarily represent sound contributions from continuous noise sources such as the generating equipment at the Manatee Plant. For example, this can be seen by the minimum SPLs observed at Sites 1 and 2, which are in very close proximity to the existing power generating equipment. As shown in Table 1, the minimum SPL for the daytime and nighttime at these sites are generally less than 5 dBA different than the L_{eq}.

The sites (1, 2, 4, 5, and 6) show both similarities and differences in noise patterns in 2001 and 2002 when compared to the sound levels observed in May 1994 (compare Table 1 and Table 2). The nighttime maximum L_{eq} noise level was observed in 2001 at Site 6 as 59.3 dBA. The minimum SPL observed in 2001 at Site 6 was 53.7 dBA, which represents contributions from the continuously running equipment at Manatee Units 1 and 2. The nighttime L_{eq} of 59.3 dBA observed at Site 6 in December 2001 was higher than the maximum nighttime L_{eq} of 46.8 dBA observed in May 1994. An evaluation of the octave band data indicates that the 2001 L_{eq} observation was a result of higher frequency plant-related noise in the 1,250 to 2,500 Hz octave bands. The observed sound levels in these octave bands were more than 10 dB higher than has been typically observed from steam electric generating equipment such as Manatee Units 1 and 2. This can be attributed to the fact that the plant was operating under cold start up conditions and that the wind direction put Site 6 in a downwind location. A cold start-up typically occurs for only 4 to 6 hours at a time and about 5 to 6 times per year. A cold start-up requires operations necessary to insure the safety of the equipment and personnel that produce a high frequency for short durations. These factors indicate that the observed nighttime sound levels at Site 6 were a transient and unusual event.

To evaluate the influence of the startup conditions on observed sound levels, monitoring was conducted on January 16, 2002 at monitoring sites 1, 5 and 6 (see Table 1). The L_{eq} for Site 6 was about 10 dBA lower (i.e., 49.5 dBA), while the Manatee Plant was operating under normal conditions in January 2002 compared to the measurements observed on December 18, 2001 (59.3 dBA). Moreover, the sound levels observed during January 2002 were similar to those observed in 1994 (see Tables 1 and 2). This suggests that the startup condition that occurred in December 2001 is a transient noise source.

Noise from traffic, aircraft and other noise sources (e.g., barking dogs, farm equipment operation, etc.) are intermittent sources. While these noise sources add to the overall noise level (e.g., L_{eq}), they are typically of short duration. The L_{90}, the A-weighted SPL which is exceeded ninety percent of the time, is therefore the most appropriate sound level to use as background for excluding intermittent sounds. The L_{90} includes the noise from the existing Manatee Plant since the power units operate continuously.

As shown in Table 1, the daytime L_{90} sound levels at the property boundary monitoring locations (Sites 4, 5, and 6) range from 34.8 dBA (Site 4) to 42.2 dBA (Site 6). The nighttime L_{90} sound levels at the property boundary monitoring locations range from 34.3 dBA (Site 4) to 47.1 dBA (Site 6).

Table 2.3-1. Summary of Groundwater Analytical Parameters Exceeding Detection Levels

	Sampling Locations			
Analytical Parameters	MW-1 [a]	MW-2 [b]	Detection Level	Units
Barium	14.6	21.0	2.0	µg/L
Iron	22,200	265	20.0	µg/L
Sodium (Na)	6,860	23,700	500	µg/L
Tin	65.2	<50.0	50.0	µg/L
Zinc	8.9	10.3	5.0	µg/L
Total Dissolved Solids	620	436	1.0	mg/L
Chloride (Cl)	13	28	1.0	mg/L
Ammonia-N	0.31	0.22	0.04	mg/L
Nitrate-N	0.05	0.04	0.03	mg/L
Total Organic Carbon	31.6	8.9	1.0	mg/L

[a] Approximately 1,600 ft west of Unit 3 Power Block.

[b] Approximately 3,400 ft west-northwest of Unit 3 Power Block.

Note: mg/L = milligrams per liter.
MW = monitoring well.

Table 2.3-2. Little Manatee River Basin Average Precipitation and Lake Alfred Pan Evaporation

Month	Precipitation (inches) [a]			Pan Evaporation (inches) [b]		
	Average	Maximum	Minimum	Average	Maximum	Minimum
January	2.53	8.02	0.05	3.48	5.25	2.75
February	2.95	10.87	0.08	4.23	6.26	2.63
March	3.16	11.10	0.21	6.30	8.49	4.74
April	2.40	9.85	0.00	7.59	9.35	6.80
May	3.45	8.79	0.06	8.49	10.54	6.97
June	7.30	16.22	2.06	7.68	9.92	6.18
July	8.55	18.17	3.05	7.60	8.94	6.37
August	8.42	16.80	2.98	7.13	8.23	5.64
September	7.26	16.10	1.41	6.36	8.31	5.23
October	3.10	13.53	0.01	5.58	7.12	4.00
November	1.85	6.66	0.00	4.00	4.73	3.12
December	2.05	10.17	0.15	3.23	4.10	2.50
Annual	53.04	81.45	36.70	71.33	85.13	64.91

[a] Source USGS: Little Manatee River Basin Average, 86-year period of record, 1915 to 2000.

[b] Lake Alfred Agricultural Research and Education Center, 27-year period of record, 1966 to 1992.

Source: EarthInfo, 1994 and USGS, 2001.

Table 2.3-3. Climatological and Hydrologic Observations, Little Manatee River Basin

Month	Precipitation [a] (Inches)	Discharge [b] (Inches)	Evapotranspiration [c] (Inches)
January	2.59	0.85	1.78
February	2.99	1.00	2.16
March	3.38	1.14	3.22
April	2.21	0.59	3.87
May	3.18	0.39	4.33
June	7.58	1.15	3.92
July	8.38	2.24	3.88
August	8.36	2.77	3.64
September	7.15	2.99	3.25
October	2.93	1.14	2.85
November	1.90	0.58	2.04
December	2.17	0.57	1.65
Annual	52.82	15.41	36.41

[a] USGS Little Manatee River Basin Average Precipitation; 61 years, period of record 1940 to 2000.

[b] USGS Station 02300500 near Wimauma, FL; 61 years, period of record 10/1939 to 9/2000.

[c] Annual value calculated as the difference between annual precipitation and annual discharge, less 1 inch of recharge (see Section 2.3.2.1). Monthly values distributed based on the annual value and the monthly to annual pan evaporation ratios determined from Table 2.3-2.

Table 2.3-4. List of Water Use Permits Within 5 Miles of the Project Area (Page 1 of 4)

FPL PERMITS

Permit Number	Withdrawal Location: Latitude D	M	S	Longitude D	M	S	Permitted Average (gpd)	Use Type	Source	Status
20.5423.01	27	36	14.96	82	17	37.48	107000	Agriculture	Groundwater	Existing
20.5423.02	27	36	22.4	82	17	53.18	129000	Agriculture	Groundwater	Existing
20.5423.04	27	38	15.21	82	19	38.31	10000	Industrial-Commercial	Groundwater	Existing
20.5423.05	27	36	0.93	82	19	55.04	1000	Industrial - Commercial	Groundwater	Existing
20.5423.06	27	36	9.02	82	17	49.85	1500	Industrial-Commercial	Groundwater	Existing
20.5423.07	27	37	26.14	82	20	57.38	286000	Industrial - Commercial	Groundwater	Stand by
20.5423.08	27	37	41.5	82	20	57.53	286000	Industrial - Commercial	Groundwater	Stand by
20.5423.09	27	37	56.56	82	20	57.88	288000	Industrial - Commercial	Groundwater	Stand by
20.5423.12	27	36	9.54	82	19	24.95	109000	Agriculture	Groundwater	Existing
20.5423.14	27	35	59.46	82	20	0.77	500	Industrial - Commercial	Groundwater	Existing
20.5423.15	27	37	48.95	82	21	7.16	313000	Agriculture	Groundwater	Existing
20.5423.16	27	37	2.88	82	21	6.86	313000	Agriculture	Groundwater	Existing
20.5423.17	27	36	37.85	82	21	7.74	313000	Agriculture	Groundwater	Existing
20.5423.18	27	36	3.83	82	21	43.22	313000	Agriculture	Groundwater	Existing
20.5423.19	27	37	55.96	82	17	34.38	387000	Agriculture	Groundwater	Existing
20.5423.20	27	36	29.29	82	20	44.51	1	Industrial - Commercial	Surface water	Existing
20.5423.22	27	36	25.1	82	20	50.12	10000	Industrial - Commercial	Groundwater	Existing
20.5302.01	27	38	19.77	82	19	38.39	8519000	Hydro Power	Surface water	Other

0-1 MILES

Permit Number	Withdrawal Location: Latitude D	M	S	Longitude D	M	S	Permitted Average (gpd)	Use Type	Source	Status
20.11106.02	27	35	35.25	82	20	42.62	28800	Agriculture	Groundwater	Stand by
20.11106.03	27	35	35.4	82	20	54.57	28800	Agriculture	Groundwater	Stand by
20.11106.04	27	35	44	82	20	30.06	13000	Agriculture	Groundwater	Existing
20.11941.01	27	35	47.44	82	21	17.57	18000	Agriculture	Groundwater	Existing

1-2 MILES

Permit Number	Withdrawal Location: Latitude D	M	S	Longitude D	M	S	Permitted Average (gpd)	Use Type	Source	Status
20.3847.20	27	35	58.57	82	19	34.88	353100	Agriculture	Groundwater	Existing
20.8829.01	27	35	18.76	82	20	2.75	231800	Agriculture	Groundwater	Existing
20.9968.01	27	35	43.51	82	20	8.43	44100	Agriculture	Surface water	Existing
20.9968.02	27	35	42.7	82	20	11.23	44100	Agriculture	Surface water	Stand by
20.9968.03	27	35	50.04	82	19	53.2	142100	Agriculture	Groundwater	Existing
20.9968.04	27	35	41.95	82	20	6.85	400	Agriculture	Groundwater	Existing
20.11106.01	27	35	29.95	82	20	46.78	68000	Agriculture	Groundwater	Existing
20.11708.01	27	35	24.16	82	21	59.42	239900	Agriculture	Groundwater	Existing

2-3 MILES

Permit Number	Withdrawal Location: Latitude D	M	S	Longitude D	M	S	Permitted Average (gpd)	Use Type	Source	Status
20.3847.02	27	34	50.85	82	18	57.66	214700	Agriculture	Groundwater	Existing
20.3847.03	27	34	47.12	82	18	45.58	167000	Agriculture	Groundwater	Existing
20.3847.13	27	35	8.91	82	18	49.14	550900	Agriculture	Groundwater	Existing
20.3847.14	27	35	26.54	82	19	0.8	477300	Agriculture	Groundwater	Existing
20.3847.19	27	35	30.39	82	18	36.53	333700	Agriculture	Groundwater	Existing
20.3847.21	27	34	16.84	82	19	55.35	107400	Agriculture	Groundwater	Existing
20.3847.22	27	34	53.13	82	19	40.73	323400	Agriculture	Groundwater	Existing
20.4518.26	27	37	59.43	82	23	3.33	206900	Agriculture	Groundwater	Existing
20.4662.04	27	36	4.39	82	23	4.31	170000	Agriculture	Groundwater	Existing
20.4780.04	27	36	27.91	82	22	49.58	1800	Agriculture	Groundwater	Existing
20.7260.08	27	37	34.86	82	23	25.2	54800	Agriculture	Groundwater	Existing
20.8829.02	27	34	31.76	82	20	46.64	507000	Agriculture	Groundwater	Existing
20.8829.03	27	34	14.5	82	20	54.91	420000	Agriculture	Groundwater	Existing
20.9827.01	27	35	54.68	82	23	35.19	41700	Agriculture	Groundwater	Existing
20.11708.02	27	34	40.27	82	22	6.17	258100	Agriculture	Groundwater	Existing
20.11848.02	27	33	59.71	82	21	13.5	493200	Agriculture	Groundwater	Existing
20.11973.01	27	34	4.54	82	19	35.66	77000	Agriculture	Groundwater	Existing

Table 2.3-4. List of Water Use Permits Within 5 Miles of the Project Area (Page 2 of 4)

3-4 MILES

Permit Number	Withdrawal Location						Permitted Average (gpd)	Use Type	Source	Status
	Latitude			Longitude						
	D	M	S	D	M	S				
20.2866.01	27	39	9.49	82	19	42.47	435000	Agriculture	Groundwater	Existing
20.2866.02	27	39	20.64	82	19	44.8	160700	Agriculture	Groundwater	Existing
20.2866.03	27	39	17.97	82	19	52.96	160700	Agriculture	Groundwater	Existing
20.3847.04	27	33	58.49	82	18	45.15	1055100	Agriculture	Groundwater	Existing
20.3847.06	27	34	37.96	82	18	3.03	271800	Agriculture	Groundwater	Existing
20.3847.18	27	35	51.64	82	17	32.23	416600	Agriculture	Groundwater	Existing
20.3847.23	27	34	15.71	82	18	55.76	502800	Agriculture	Groundwater	Existing
20.3847.50	27	35	1.19	82	17	47.19	0	Observation Well	Groundwater	Other
20.4518.25	27	36	58.76	82	23	57.42	0	Agriculture	Groundwater	Other
20.4518.27	27	38	23.58	82	22	49.54	136800	Agriculture	Groundwater	Existing
20.4518.34	27	36	58.07	82	24	14.88	498000	Agriculture	Groundwater	Existing
20.4616.01	27	36	44.38	82	23	53.84	30800	Agriculture	Groundwater	Existing
20.4780.01	27	36	22.39	82	23	52.53	126000	Agriculture	Groundwater	Existing
20.4780.03	27	36	48.01	82	23	45.36	45000	Agriculture	Groundwater	Existing
20.4780.05	27	36	2.67	82	24	0.84	275100	Agriculture	Groundwater	Existing
20.4780.07	27	35	52.5	82	24	33.64	1800	Agriculture	Groundwater	Existing
20.4780.08	27	35	52.75	82	23	53.87	1800	Agriculture	Groundwater	Existing
20.4780.09	27	35	52.36	82	24	26.09	1800	Agriculture	Groundwater	Existing
20.5620.01	27	38	31	82	18	3.99	339200	Agriculture	Groundwater	Existing
20.5620.02	27	38	31.22	82	18	15.04	339200	Agriculture	Groundwater	Existing
20.6060.01	27	39	41.6	82	20	2.62	40000	Agriculture	Groundwater	Existing
20.6060.02	27	39	36.23	82	20	6.63	43000	Agriculture	Groundwater	Existing
20.7085.04	27	36	42.49	82	17	8.66	70200	Agriculture	Groundwater	Existing
20.7085.14	27	37	35.33	82	17	16.85	100200	Agriculture	Groundwater	Existing
20.7085.17	27	37	22.82	82	17	14.29	79100	Agriculture	Groundwater	Existing
20.7131.01	27	39	25.38	82	21	14.39	566000	Agriculture	Groundwater	Existing
20.7451.01	27	39	33.3	82	19	32.23	191500	Agriculture	Groundwater	Existing
20.7795.01	27	38	39.8	82	23	29.09	45300	Agriculture	Groundwater	Existing
20.7795.02	27	38	30.02	82	23	22.39	52050	Agriculture	Groundwater	Existing
20.7795.03	27	38	12	82	23	35	52050	Agriculture	Groundwater	Existing
20.7928.01	27	36	33.58	82	23	54.1	47000	Agriculture	Groundwater	Existing
20.7997.01	27	38	43.25	82	18	9.93	121300	Agriculture	Groundwater	Existing
20.8829.04	27	33	46.24	82	20	4.58	289800	Agriculture	Groundwater	Existing
20.9358.01	27	34	12.58	82	23	24.77	19200	Agriculture	Groundwater	Existing
20.9817.25	27	33	45.75	82	19	48.28	48300	Agriculture	Groundwater	Existing
20.9817.74	27	33	49.65	82	19	33.36	101500	Agriculture	Groundwater	Existing
20.9860.01	27	36	38.74	82	24	10.58	30200	Agriculture	Groundwater	Existing
20.10455.01	27	36	29.18	82	17	18.37	137000	Agriculture	Groundwater	Existing
20.10487.01	27	32	56.38	82	20	50.47	1031800	Agriculture	Groundwater	Existing
20.10487.02	27	33	2.16	82	20	10.09	562900	Agriculture	Groundwater	Existing
20.10749.01	27	33	51.29	82	22	58.63	125900	Agriculture	Groundwater	Existing
20.10749.02	27	33	35.44	82	22	27.43	62900	Agriculture	Groundwater	Existing
20.11848.01	27	33	30.49	82	21	52.23	493200	Agriculture	Groundwater	Existing
20.11922.05	27	36	58.07	82	24	14.88	43838	Agriculture	Groundwater	Existing
20.11961.03	27	33	23.01	82	19	21.37	396000	Agriculture	Groundwater	Existing

Table 2.3-4. List of Water Use Permits Within 5 Miles of the Project Area (Page 3 of 4)

4-5 MILES

Permit Number	Withdrawal Location						Permitted Average (gpd)	Use Type	Source	Status
	Latitude			Longitude						
	D	M	S	D	M	S				
20.1840.01	27	40	22.59	82	20	6.48	513000	Agriculture	Groundwater	Existing
20.1840.02	27	40	22.11	82	20	21.19	58000	Agriculture	Groundwater	Existing
20.1840.08	27	40	22.73	82	20	25.5	0	Observation Well	Surface water	Other
20.1840.07	27	40	22.67	82	20	17.96	0	Agriculture	Surface water	Other
20.2192.01	27	40	39.96	82	20	3.65	56000	Agriculture	Groundwater	Existing
20.2192.02	27	40	39.51	82	20	0.06	27600	Agriculture	Groundwater	Existing
20.2192.03	27	40	40.84	82	20	4.39	2000	Agriculture	Groundwater	Existing
20.2192.04	27	40	40.92	82	20	2.58	2000	Agriculture	Groundwater	Existing
20.3328.01	27	40	0.98	82	21	45.06	40700	Public Supply	Groundwater	Existing
20.3328.02	27	40	9.01	82	21	45.23	59000	Agriculture	Surface water	Existing
20.3798.01	27	33	58.37	82	24	23.33	20500	Agriculture	Groundwater	Existing
20.3799.01	27	34	25.23	82	24	39.08	22200	Agriculture	Groundwater	Existing
20.3800.01	27	34	48.03	82	24	40.93	35800	Agriculture	Groundwater	Existing
20.3838.01	27	35	37.03	82	25	35.57	65224	Agriculture	Groundwater	Existing
20.3838.02	27	35	40	82	25	20	115623	Agriculture	Groundwater	Existing
20.3838.03	27	35	30.49	82	25	16.42	70700	Agriculture	Groundwater	Existing
20.3838.04	27	35	22.41	82	25	26.96	500	Agriculture	Groundwater	Existing
20.3847.05	27	33	45.81	82	17	39.89	726900	Agriculture	Groundwater	Existing
20.3847.07	27	34	39.23	82	17	4.58	704600	Agriculture	Groundwater	Existing
20.3847.08	27	34	46.45	82	17	7.77	704600	Agriculture	Groundwater	Stand by
20.3847.15	27	33	45.92	82	18	1.28	581200	Agriculture	Groundwater	Existing
20.3847.16	27	33	56.92	82	17	9.58	239800	Agriculture	Groundwater	Existing
20.3847.25	27	34	42.6	82	16	22.27	458600	Agriculture	Groundwater	Existing
20.3847.26	27	35	34	82	16	55.13	341300	Agriculture	Groundwater	Existing
20.3850.01	27	33	17.8	82	23	26.85	31000	Agriculture	Groundwater	Existing
20.4035.01	27	34	37.51	82	25	3.85	0	Agriculture	Groundwater	Other
20.4035.02	27	34	39.44	82	25	3.58	88400	Agriculture	Groundwater	Existing
20.4319.01	27	33	17.06	82	23	4.82	37000	Agriculture	Groundwater	Existing
20.4382.01	27	40	13.62	82	19	15.03	150000	Agriculture	Groundwater	Stand by
20.4382.02	27	40	7.68	82	19	0.67	150000	Agriculture	Groundwater	Existing
20.4382.03	27	40	18.75	82	19	14.14	0	Domestic	Groundwater	Other
20.4518.03	27	38	13.11	82	25	5.32	515500	Agriculture	Groundwater	Stand by
20.4518.04	27	38	4	82	25	5	0	Agriculture	Groundwater	Other
20.4518.05	27	38	9	82	24	37	467700	Agriculture	Groundwater	Existing
20.4518.06	27	37	28.27	82	25	21.85	673500	Agriculture	Groundwater	Existing
20.4518.08	27	37	18.91	82	25	32.63	668100	Agriculture	Groundwater	Existing
20.4518.20	27	36	29	82	25	14	432900	Agriculture	Groundwater	Existing
20.4689.02	27	40	28.04	82	19	14.14	114000	Agriculture	Groundwater	Existing
20.4780.02	27	36	0.34	82	24	49.58	242500	Agriculture	Groundwater	Existing
20.4780.06	27	35	57.81	82	24	51.45	121200	Agriculture	Groundwater	Existing
20.5649.01	27	35	21.22	82	25	10.22	7900	Agriculture	Groundwater	Existing
20.5649.02	27	35	18.29	82	25	9.81	3200	Agriculture	Groundwater	Existing
20.6007.01	27	40	13.22	82	19	43.9	1290000	Agriculture	Groundwater	Existing
20.6784.01	27	34	35.12	82	24	52.51	41000	Agriculture	Groundwater	Existing
20.6857.01	27	34	39.91	82	24	44.16	24200	Agriculture	Groundwater	Existing
20.6892.01	27	39	42.04	82	18	49.82	779000	Agriculture	Groundwater	Existing

Table 2.3-4. List of Water Use Permits Within 5 Miles of the Project Area (Page 4 of 4)

4-5 MILES

Permit Number	Withdrawal Location						Permitted Average (gpd)	Use Type	Source	Status
	Latitude D	Latitude M	Latitude S	Longitude D	Longitude M	Longitude S				
20.7085.01	27	38	10.09	82	16	32.15	59200	Agriculture	Groundwater	Existing
20.7085.02	27	38	23.12	82	17	22.2	68300	Agriculture	Groundwater	Existing
20.7085.05	27	36	58.21	82	16	35.81	138700	Agriculture	Groundwater	Existing
20.7085.12	27	37	16.31	82	16	59.5	145400	Agriculture	Groundwater	Existing
20.7085.13	27	37	25.59	82	16	55.84	20600	Agriculture	Groundwater	Existing
20.7239.01	27	40	27.68	82	19	41.76	183000	Recreational	Groundwater	Existing
20.7239.02	27	40	25.68	82	19	39.09	203000	Agriculture	Surface water	Existing
20.7350.01	27	36	38.91	82	16	39.59	440000	Agriculture	Groundwater	Existing
20.7350.03	27	36	23.94	82	16	41.44	440000	Agriculture	Groundwater	Existing
20.7350.04	27	36	35.86	82	16	38.14	485000	Agriculture	Groundwater	Existing
20.7235.02	27	32	46.28	82	23	25.47	480300	Agriculture	Groundwater	Existing
20.7410.01	27	39	57.11	82	21	16.04	16300	Public Supply	Groundwater	Existing
20.7451.02	27	40	3.14	82	19	10.84	127000	Agriculture	Groundwater	Existing
20.7451.03	27	39	39.25	82	19	16.64	127000	Agriculture	Groundwater	Existing
20.7451.04	27	40	3.75	82	19	27.21	191000	Agriculture	Groundwater	Existing
20.7920.02	27	39	47.65	82	22	26.74	25	Recreational	Groundwater	Existing
20.7920.01	27	39	42.07	82	23	53.65	5150	Recreational	Groundwater	Existing
20.8982.01	27	33	52.19	82	24	23.09	16200	Agriculture	Groundwater	Existing
20.9265.01	27	34	55.41	82	24	52.14	112900	Agriculture	Groundwater	Existing
20.9265.02	27	35	11.78	82	24	58.19	1400	Agriculture	Groundwater	Existing
20.9265.03	27	35	4.18	82	25	26.22	79700	Agriculture	Groundwater	Existing
20.9375.01	27	38	38.44	82	25	1.92	104000	Agriculture	Groundwater	Existing
20.9375.02	27	38	30.11	82	25	0.32	0	Irrigation	Groundwater	Other
20.9694.01	27	38	37.44	82	23	55.72	32800	Agriculture	Groundwater	Existing
20.9817.64	27	32	35.85	82	21	27.44	579500	Agriculture	Groundwater	Existing
20.9996.01	27	33	33.56	82	23	31.01	24000	Agriculture	Groundwater	Existing
20.10033.02	27	33	22.72	82	24	16.11	10000	Recreational	Groundwater	Existing
20.10033.03	27	33	18.12	82	23	31.41	10000	Recreational	Groundwater	Existing
20.10033.04	27	33	16	82	23	46.07	5000	Recreational	Groundwater	Existing
20.10033.06	27	33	18.4	82	23	59.3	10000	Recreational	Groundwater	Existing
20.10448.01	27	33	6.82	82	23	32.59	79300	Agriculture	Groundwater	Existing
20.10541.01	27	35	7.98	82	16	35.45	650700	Agriculture	Groundwater	Existing
20.10541.02	27	34	43.59	82	16	24.76	269800	Agriculture	Groundwater	Existing
20.11362.01	27	34	17.67	82	24	27.2	39000	Agriculture	Groundwater	Existing
20.11918.01	27	35	53.51	82	25	19.81	0	Agriculture	Groundwater	Other
20.11918.02	27	36	3.23	82	25	22.01	369800	Agriculture	Groundwater	Existing
20.11919.01	27	36	29	82	25	14	616400	Agriculture	Groundwater	Existing
20.11921.01	27	38	9	82	24	37	616400	Agriculture	Groundwater	Existing
20.11922.01	27	38	13.11	82	25	5.32	483700	Agriculture	Groundwater	Stand by
20.11922.02	27	38	4	82	25	5	0	Agriculture	Groundwater	Other
20.11961.01	27	32	45.36	82	19	13.41	308600	Agriculture	Groundwater	Existing
20.11961.02	27	32	59.06	82	18	18.51	697600	Agriculture	Groundwater	Existing
20.11961.04	27	33	0.15	82	19	37.4	806400	Agriculture	Groundwater	Existing
20.11961.50	27	32	15.82	82	20	37.18	0	Agriculture	Groundwater	Other
20.11961.51	27	32	39.7	82	19	25.91	0	Agriculture	Groundwater	Other
20.11961.53	27	33	10.63	82	17	34.82	0	Agriculture	Groundwater	Other

Table 2.3-5. Historical Cooling Pond Diversions from the Little Manatee River (1974-2001)

Actual Historical Diversions from the Little Manatee River for FPL Manatee plant in MGD

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Overall
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.5	20.6	0.1	
1975	0.0	0.0	3.6	0.0	0.0	0.0	0.0	1.5	28.9	77.9	57.9	69.9	
1976	48.4	0.0	0.0	0.0	0.2	0.4	0.4	20.2	72.5	29.8	43.4	25.2	
1977	4.5	1.6	32.0	19.1	22.3	23.9	2.3	0.4	5.3	28.3	29.6	16.1	
1978	0.0	1.2	0.0	0.1	0.1	0.0	0.0	0.0	0.1	24.7	0.8	0.2	
1979	1.6	0.0	3.4	20.6	0.0	2.9	0.7	13.6	5.0	16.6	37.5	5.3	
1980	0.0	1.5	8.4	7.9	2.0	2.5	3.8	15.3	8.7	2.6	0.0	0.0	
1981	0.0	0.0	0.0	0.0	5.1	0.5	0.0	7.5	9.2	16.5	41.1	46.6	
1982	0.8	0.0	0.0	0.2	5.0	23.9	7.9	12.3	27.8	4.6	0.0	2.4	
1983	0.0	0.0	0.0	4.4	9.6	0.0	0.0	0.7	15.3	0.3	2.0	0.0	
1984	1.8	2.5	11.8	3.1	0.0	0.3	0.0	0.0	0.0	3.3	10.0	1.3	
1985	0.0	0.0	0.0	0.2	0.0	2.3	0.0	0.0	4.2	0.2	3.4	15.8	
1986	1.2	3.1	0.0	4.0	5.5	14.6	0.6	0.3	12.7	23.4	37.0	12.1	
1987	5.5	6.3	4.4	16.1	2.7	26.8	20.5	42.4	1.0	0.0	0.0	0.6	
1988	21.7	9.9	3.9	0.0	0.0	4.8	3.8	2.1	0.0	23.0	11.3	7.9	
1989	0.0	13.3	12.1	16.0	12.2	11.2	2.4	0.3	4.1	46.3	8.1	0.0	
1990	7.1	2.1	20.5	3.7	5.5	1.4	1.1	0.0	0.0	8.9	0.1	1.3	
1991	17.3	0.0	0.0	0.6	0.0	16.4	8.1	10.9	0.0	19.3	1.9	2.1	
1992	0.6	0.0	0.0	0.0	9.1	7.1	15.8	0.7	21.2	0.7	0.0	0.0	
1993	0.0	0.0	0.0	27.1	19.8	27.1	2.8	0.0	0.0	0.0	0.1	0.0	
1994	21.9	22.9	2.3	25.8	8.9	9.3	5.7	0.8	0.1	0.0	0.0	0.0	
1995	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1996	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1997	0.1	1.5	2.9	0.7	0.0	0.0	2.3	3.8	2.8	13.8	29.6	8.9	
1998	24.5	28.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1999	0.0	0.0	1.4	2.3	0.0	0.0	0.0	0.0	15.7	10.2	7.4	12.7	
2000	13.4	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	2.7	27.9	
2001	0.4	0.4	0.0	0.0	0.0	3.5	6.6	0.0	5.8	45.7	38.4	49.3	
Maximum	48.4	28.9	32.0	27.1	22.3	27.1	20.5	42.4	72.5	85.5	57.9	69.9	85.5
Average	6.3	3.5	4.1	5.6	4.0	6.6	3.1	4.9	8.9	17.2	13.7	10.9	7.4

Table 2.3-6. Water Quality at USGS Station 02300500 Little Manatee River Near Wimauma, FL (1994-1999)

STORET Code	Parameter	Maximum	Average	Minimum	Class III Numerical Criteria	Notes
00010	Water Temp (C)	27	23	13		
00020	Air Temp (C)	32	30	27		
00061	Stream Flow (Inst-cfs)	4980	329	28		
00065	Stream Stage (Feet)	16.93	4.83	2.35		
00080	Color (Pt-Co) (Units)	240	123	30		
00095	Conductivity at 25C (umho)	540	295	160	1275	
00300	Dissolved Oxygen (mg/L)	9.4	6.9	2.9	5.0	
00400	pH (SU)	8.3	7.2	5.2	6.0 to 8.5	
00530	Residue, Total Nonfilterable (mg/L)	10	6.5	3		
00610	NH3+NH4- (as N total) (mg/L)	0.110	0.054	0.020		
00615	NO2 (as N Total) (mg/L)	0.060	0.009	0.005		
00625	TKN (as N) (mg/L)	1.60	0.79	0.23		
00630	NO2&NO3 (Total) (mg/L)	0.96	0.59	0.34		
00665	Phosphorus-Total (mg/L P)	0.85	0.496	0.26		
00915	Calcium (Dissolved) (mg/L)	39	23	11		
00925	Magnesium (Dissolved) (mg/L)	16.0	10.3	5.1		
00930	Sodium (Dissolved) (mg/L)	58.0	15.4	5.3		
00935	Potassium (Dissolved) (mg/L)	9.4	5.1	2.8		
00940	Chloride (Total) (mg/L)	20	16	11		
00945	Sulfate (Total) (mg/L)	130	70	31		
00950	Fluoride (Dissolved) (mg/L)	1.0	0.4	0.2	10.0	
00955	Silica (Dissolved) (mg/L)	9.8	7.3	4.9		
01002	Arsenic (Total) (ug/L)	5.8	1.2	0.5	50.0	
01027	Cadmium (Total) (ug/L)	0.5	0.5	0.5	1.05*	Notes 1 & 2
01034	Chromium (Total) (ug/L)	2.5	1.0	0.5	11	Notes 1, 2 & 3
01042	Copper (Total) (ug/L)	11.0	4.4	0.5	10.9*	
01045	Iron (Total) (ug/L)	1200	344	75	1000	
01051	Lead (Total) (ug/L)	1.8	0.7	0.5	2.82*	
01067	Nickel (Total) (ug/L)	1.6	0.7	0.5	14.2*	
01080	Strontium (Dissolved) (ug/L)	1900	624	180		
01092	Zinc (Total) (ug/L)	8.4	4.5	2.0	98*	
01105	Aluminum (Total) (ug/L)	410	210	79		
70300	Solids, Residue (Dissolved at 180C) (mg/L)	336	217	138		
70507	Phosphorus, Orthophosphate, Total (mg/L P)	0.71	0.46	0.24		
71900	Mercury, total (ug/L)	0.10	0.05	0.05	0.012	1 Detect
90095	Specific Conductance, Lab (us/cm)	541	285	126	1275	
90410	Acid Neutralizing Capacity, Unfiltered, Lab, Titration to pH 4.5 (mg/L as CaCO3)	106	39.55	16		

Note 1: Non-detects are set to 50% of detection limit

Note 2: Never Detected

Note 3: Class III criteria based on hexavalent chromium (worst case)

* Hardness of water estimated to be 91 mg/L based on 10 values from 1990 to 1993

Table 2.3-7 Probability of Occurrence of Listed Species of Manatee County at or near the Project Area (Page 1 of 3)

Scientific Name	Common Name	Status (T, E, SSC) Federal	State	Observed (Yes/No)	Probability of Occurrence High	Moderate	Low
FISH							
Rivulus marmoratus	mangrove rivulus	N	SSC	No			X
AMPHIBIANS				No			X
Rana capito	gopher frog	N	SSC				
REPTILES							
Alligator mississippiensis	American alligator	T(S/A)	SSC	No		X	
Caretta caretta	loggerhead	T	T	No			X
Chelonia mydas	green turtle	E	E	No			X
Dermochelys coriacea	leatherback	E	E	No			X
Drymarchon corais couperi	eastern indigo snake	T	T				
				No			X
Gopherus polyphemus	gopher tortoise	N	SSC	No		X	
Lepidochelys kempii	Kemp's ridley	E	E	No			X
Pseudemys concinna	Suwannee cooter	N	SSC				
suwanniensis				No			X
BIRDS							
Ajaia ajaja	roseate spoonbill	N	SSC	No			X
Aphelocoma coerulescens	Florida scrub-jay	T	T	No			X
Aramus guarauna	limpkin	N	SSC	No			X
Caracara plancus	crested caracara	T	T	No			X
Charadrius alexandrinus	snowy plover	N	T	No			X
Charadrius melodus	piping plover	T	T	No			X
Egretta caerulea	little blue heron	N	SSC	Yes	X		
Egretta rufescens	reddish egret	N	SSC	No			X
Egretta thula	snowy egret	N	SSC	Yes	X		
Egretta tricolor	tricolored heron	N	SSC	No	X		

Table 2.3-7 Probability of Occurrence of Listed Species of Manatee County at or near the Project Area (Page 2 of 3)

Scientific Name	Common Name	Status (T, E, SSC)		Observed	Probability of Occurrence		
		Federal	State	(Yes/No)	High	Moderate	Low
Eudocimus albus	white ibis	N	SSC	Yes	X		
Falco peregrinus	peregrine falcon	E	E	No			X
Falco sparverius paulus	southeastern American kestrel	N	T	No			X
Grus canadensis pratensis	Florida sandhill crane	N	T	No		X	
Haematopus palliatus	American oystercatcher	N	SSC	No			X
Haliaeetus leucocephalus	bald eagle	T	T	No		X	
Mycteria americana	wood stork	E	E	No		X	
Pelecanus occidentalis	brown pelican	N	SSC	No			X
Rynchops niger	black skimmer	N	SSC	No			X
Speotyto cunicularia floridana	Florida burrowing owl	N	SSC	No			X
Sterna antillarum	least tern	N	T	No			X
MAMMALS							
Podomys floridanus	Florida mouse	N	SSC	No			X
Sciurus niger shermani	Sherman's fox squirrel	N	SSC	No			X
Trichechus manatus	manatee	E	E	No			X
Ursus americanus floridanus	Florida black bear	N	T	No			X
VASCULAR PLANTS							
Acrostichum aureum	golden leather fern	N	E	No			X
Asclepias curtissii	Curtiss' milkweed	N	E	No			X
Bonamia grandiflora	Florida bonamia	T	E	No			X
Cheiroglossa palmata	hand fern	N	E	No			X
Chrysopsis floridana	Florida golden aster	E	E	No			X
Eragrostis tracyi	Sanibel lovegrass	N	E	No			X
Glandularia tampensis	Tampa vervain	N	E	No			X

Table 2.3-7 Probability of Occurrence of Listed Species of Manatee County at or near the Project Area (Page 3 of 3)

		Status (T, E, SSC)		Observed	Probability of Occurrence		
Scientific Name	Common Name	Federal	State	(Yes/No)	High	Moderate	Low
Gossypium hirsutum	wild cotton	N	E	No			X
Lechea cernua	nodding pinweed	N	T	No			X
Lechea divaricata	pine pinweed	N	E	No			X
Rudbeckia nitida	St. John's Susan	N	E	No			X
Tillandsia flexuosa	banded wild-pine	N	E	No			X
Zephyranthes simpsonii	rain lily	N	T	No			X

Note: T = Threatened
E = Endangered
SSC = Species of Special Concern

FPL

Table 2.3-8. Monthly and Annual Average Temperatures Measured at Tampa International Airport

	Daily Temperatures (°F)[a]			Extremes (°F)[b]	
Month	Average	Maximum	Minimum	Maximum	Minimum
January	59.9	69.8	50.0	86	21
February	61.5	71.4	51.6	88	24
March	66.4	76.6	56.5	91	29
April	71.2	81.7	60.8	93	40
May	77.2	87.2	67.5	98	49
June	81.0	89.5	72.9	99	53
July	82.1	90.2	74.5	97	63
August	82.1	90.2	74.5	98	67
September	81.0	89.0	72.8	96	57
October	74.9	84.3	65.2	94	40
November	67.6	77.7	57.2	90	23
December	62.2	72.1	52.3	86	18
Annual	72.3	81.6	63.0	99	18

[a] 30-year period of record, climatological normal, 1961 to 1990.
[b] 54-year period of record, 1947 to 2000.

Source: National Oceanic and Atmospheric Administration (NOAA), 2000.

Table 2.3-9. Monthly and Annual Average Precipitation and Relative Humidity Measured at Tampa International Airport

Month	Precipitation (inches)			Humidity (%) hour (LT) [a]			
	Average[a]	Maximum[b]	Minimum[b]	1 a.m.	7 a.m.	1 p.m.	7 p.m.
January	1.99	8.02	< 0.01	84	86	58	73
February	3.08	10.82	0.21	83	86	56	69
March	3.01	12.64	0.06	82	87	54	67
April	1.15	10.71	< 0.01	82	86	50	62
May	3.10	17.64	0.02	82	86	52	62
June	5.48	13.75	1.46	84	87	60	69
July	6.58	20.59	1.65	85	88	63	73
August	7.61	18.59	2.35	87	90	64	75
September	5.98	13.98	1.28	86	91	62	75
October	2.02	7.36	0.06	85	89	56	71
November	1.77	6.12	< 0.01	86	88	57	74
December	2.15	15.57	0.07	84	87	58	74
Annual	43.92	20.59	< 0.01	84	88	58	70

[a] 30-year period of record, climatological normal, 1961 to 1990.
[b] 54-year period of record, 1947 to 2000.

Note: LT = local time.

Source: NOAA, 2000.

Table 2.3-10. Seasonal and Annual Average Wind Direction and Wind Speed Measured at Tampa International Airport[a]

			Prevailing Wind	
Season	Average Wind Speed (mph)	Calm (Percent)	Direction	Average Wind Speed (mph)
Winter	7.8	6.4	Northeast	7.8
Spring	8.3	6.1	East-northeast	7.5
Summer	6.1	14.2	Southeast	6.8
Fall	6.8	10.6	Northeast	7.6
Annual	7.2	9.3	East-northeast	6.9

[a] 5-year period of record, 1991 to 1995. The data for this period were also used in the air quality impact analyses for the project.

Source: NOAA, 1995.

Table 2.3-11. Seasonal and Annual Average Atmospheric Stability Classes Determined at Tampa International Airport [a]

Season	Occurrence (Percent) of Stability Class: Very Unstable	Moderately Unstable	Slightly Unstable	Neutral	Slightly Stable	Moderately Stable
Winter	0.0	3.5	12.2	41.7	18.4	24.2
Spring	0.5	8.6	17.1	33.1	18.0	22.8
Summer	2.6	13.4	19.0	20.8	14.7	29.6
Fall	0.6	7.5	15.4	30.3	17.5	28.8
Annual	0.9	8.3	15.9	31.4	17.1	26.3

[a] 5-year period of record, 1991 to 1995. The data for this period were also used in the air quality impact analyses for the project.

Source: NOAA, 1995.

Table 2.3-12. Seasonal and Annual Average Morning and Afternoon Mixing Heights Determined at Tampa International Airport [a]

Season	Mixing Height (m)	
	Morning	Afternoon
Winter	475	1,032
Spring	691	1,531
Summer	657	1,398
Fall	481	1,132
Annual	577	1,275

[a] 5-year period of record, 1991 to 1995. The data for this period were also used in the air quality impact analyses for the project. Mixing heights based on surface temperatures and upper-air data from the NWS stations at Tampa International Airport and Ruskin, respectively.

Source: NOAA, 1995.

Table 2.3-13. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels

Pollutant	Averaging Time	National AAQS (μg/m³) Primary Standard	National AAQS (μg/m³) Secondary Standard	Florida AAQS [a] (μg/m³)	PSD Increments (μg/m³) [a] Class I	PSD Increments (μg/m³) [a] Class II	Significant Impact Levels[b] (μg/m³)
Particulate Matter [c] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	1
	24-Hour Maximum	365	NA	260	5	91	5
	3-Hour Maximum	NA	1,300	1,300	25	512	25
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	1
Ozone [c]	1-Hour Maximum [d]	235	235	235	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	15	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
NA = Not applicable, i.e., no standard exists.

[a] Short-term maximum concentrations are not to be exceeded more than once per year, except for PM_{10} and O_3 AAQS which are based on expected exceedances.

[b] Maximum concentrations are not to be exceeded.

[c] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour average standard of 65 μg/m³ (based on the 3-year averages of the 98th percentile values) and an annual standard of 15 μg/m³ (3-year averages at community monitors). The form of the 24-hour PM_{10} standard was changed; compliance is based on 3-year average of 99th percentile concentrations that is 150μg/m³ or less. The O_3 standard was modified to be 0.08 ppm for the 8-hour average; achieved when the 3-year average of 99th percentile values is 0.08 ppm or less. The courts have stayed these standards. Florida DEP has not yet adopted the revised standards.

[d] 0.12 ppm; achieved when the expected number of days per year with concentrations above the standard is fewer than 1.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978.
40 Code of Federal Regulations (CFR) 50; 40 CFR 52.21.
Florida Chapter 62.204, F.A.C.

Table 2.3-14. Summary of Maximum Measured SO_2, PM_{10}, O_3, and NO_2 Concentrations Representative of the Manatee Plant Site, 1998 to 2001

AIRS/ Saroad Site No.	Operator	Location	Measurement Period Year	Measurement Period Months	Concentration 1-Hour Highest	1-Hour 2nd Highest	3-Hour Highest	3-Hour 2nd Highest	8-Hour 3-year Average 4th Highest
Sulfur dioxide		**Florida AAQS**			**NA**	**NA**	**NA**	**0.5 ppm**	**NA**
12-081-3002	Manatee County	Palmetto/ Port Manatee	1998	Jan-Dec	NA	NA	0.068	0.012	NA
4760-004-G01			1999	Jan-Dec	NA	NA	0.017	0.014	NA
			2000	Jan-Dec	NA	NA	0.049	0.043	NA
			2001	Jan-Jul	NA	NA	0.055	0.044	NA
PM_{10} [a]		**Florida AAQS**			**NA**	**NA**	**NA**	**NA**	**NA**
12-081-0008	Manatee County	Holland/ House 100 yards east	1998	Jan-Dec	NA	NA	NA	NA	NA
2540-008-G02		of US 41 on Buckeye	1999	Jan-Dec	NA	NA	NA	NA	NA
			2000	Jan-Dec	NA	NA	NA	NA	NA
			2001	Jan-Jul	NA	NA	NA	NA	NA
Ozone [a]		**Florida AAQS**			**NA**	**0.12 ppm**	**NA**	**NA**	**0.08 ppm**
12-081-3002	Manatee County	Palmetto/ Port Manatee	1998	Jan-Dec	0.133	0.112	NA	NA	0.082
4760-004-G01			1999	Jan-Dec	0.112	0.111	NA	NA	0.084
			2000	Jan-Dec	0.107	0.105	NA	NA	0.084
			2001	Jan-Jul	0.117	0.103	NA	NA	0.079
12-081-4012	Manatee County	Bradenton/ 5502 33rd Ave. Drive W.	1999	Jan-Dec	0.115	0.112	NA	NA	NA
0320-012-G01			2000	Jan-Dec	0.122	0.101	NA	NA	NA
			2001	Jan-Jul	0.116	0.105	NA	NA	0.079
12-081-4013	Manatee County	Bradenton/ 5511 39th Street E.	1999	Jan-Dec	0.112	0.100	NA	NA	NA
0320-013-G01			2000	Jan-Dec	0.093	0.089	NA	NA	NA
			2001	Jan-Jul	0.091	0.081	NA	NA	0.075
Nitrogen dioxide		**Florida AAQS**			**NA**	**NA**	**NA**	**NA**	**NA**
12-081-4012	Manatee County	Bradenton/ 5502 33rd Ave. Drive W.	1999	Jan-Dec	NA	NA	NA	NA	NA
0320-012-G01			2000	Jan-Dec	NA	NA	NA	NA	NA
			2001	Jan-Jul	NA	NA	NA	NA	NA

Note: NA = not applicable.
AAQS = ambient air quality standard.

[a] On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour average standard of 65 $\mu g/m^3$ (based on the 3-year averages of the 98th percentile values) and an annual standard of 15 $\mu g/m^3$ (3-year averages at community monitors). The form of the 24-hour PM_{10} standard was changed; compliance is based on 3-year average of 99th percentile concentrations that is 150 $\mu g/m^3$ or less. The O_3 standard was modified to be 0.08 ppm for the 8-hour average; achieved when the 3-year average of 99th percentile values is 0.08 ppm or less. The courts have stayed these standards. Florida DEP has not yet adopted the revised standards.

FPL

Table 2.3-15. Baseline Ambient Sound Pressure Level Data for FPL Manatee Power Plant (2001-2002)

Site	Location	Date	Time	Wind Speed	Wind Direction	Sound Levels (dBA) Min	Max	L_{90}	Leq	Comments/Notes
1	South side of Pavillion Road by the first curve to the west	18-Dec-01	Day	3-5	North	52.8	70.2	54.7	57.6	Plant operations and insect noise.
		18-Dec-01	Night	1-2	NE	62.2	75.3	63.0	65.4	Plant cold start-up[a]
		16-Jan-02	Night	0	NA	54.9	62.6	56.5	58.0	Plant operational
2	West of the of power block to the east of Pavillion Road	18-Dec-01	Day	3-5	North	42.9	51.7	44.8	46.5	Plant operations, insects, and farm equipment
		18-Dec-01	Night	1-2	NE	52.0	64.6	54.3	57.1	Plant operational
4	Northwest corner of fenced area by the railroad entrance	18-Dec-01	Day	3-5	North	34.0	48.6	34.8	37.2	Insect noise
		18-Dec-01	Night	1-2	NE	33.7	48.4	34.3	36.8	Dogs barking intermittently
5	Eastern boundary of outparcel by tomato field	18-Dec-01	Day	1-3	North	37.6	67.5	39.0	43.9	Insect noise, farm equipment, and plant operations
		18-Dec-01	Night	0	NA	40.5	57.4	41.7	45.1	Plant cold start-up[a]
		16-Jan-02	Night	0	NA	36.2	46.0	36.5	37.9	Plant operational
6	Northeast corner of outparcel bordering SR62	18-Dec-01	Day	1-3	North	41.1	55.5	42.2	44.7	Plant operations, insects, and survey crew
		18-Dec-01	Night	0	NA	53.7	64.7	55.9	59.3	Plant cold start-up[a]
		16-Jan-02	Night	0	NA	45.4	55.4	47.1	49.5	Plant operational

Source: Golder, 2002.

[a] plant cold startup is a transient condition occurring 4 to 6 hours at a time and 5 to 6 times per year.

FPL

Table 2.3-16. Baseline Ambient Sound Pressure Level Data for FPL Manatee Plant (1994)

Site	Date	Time	Wind Speed	Wind Direction	Microphone Orientation	Sound Pressure Levels (dBA) Min	Max	Leq	Location
1	5/18/94	1430	3-5	300	000	48.4	68.9	54.9	S. side pavillion road 1st curve W.
	5/18/94	2248	0-3	135-330	000	51.4	63.2	55.8	
	5/19/94	0941	3-5	160	000	49.2	63.2	54.8	
	5/19/94	1610	5-7	260-330	000	49.8	66.7	55.5	
	5/19/94	2323	5-8	90	000	54.4	65.4	58.2	
					Average	50.6	65.5	55.8	
2	5/18/94	1539	3-5	300	090	46.1	61.2	50.8	W. of power blk. W. of pavillon road.
	5/18/94	0053	0-3	135	090	51.4	62.5	54.6	
	5/19/94	1047	3-5	135	090	44.8	60.3	50.9	
	5/20/94	0103	5-7	020	090	48.5	59.7	52.7	
					Average	47.7	60.9	52.3	
4	5/18/94	1649	3-5	300	180	32.4	66.0	45.8	NW corner of fenced enclosure.
	5/19/94	0200	3-5	135	180	32.4	52.8	35.3	
	5/19/94	1128	3-5	160-330	180	28.9	57.4	37.9	
	5/20/94	0213	5-10	020	180	32.4	54.0	36.5	
					Average	31.5	57.6	38.9	
5	5/18/94	1841	3-5	330	090	31.5	66.7	45.5	E. line outparcel, tomato field
	5/18/94	2141	0-3	135	090	40.9	49.7	43.0	
	5/19/94	0717	0-3	150	090	44.4	65.1	48.7	
	5/20/94	0029	5-8	020	090	37.1	53.2	41.2	
					Average	38.5	58.7	44.6	
6	5/18/94	1504	3-5	330	045	35.4	61.8	46.9	NE corner of outparcel.
	5/18/94	2215	0-3	135	045	35.8	57.2	42.8	
	5/19/94	1012	3-5	160-270	045	35.5	68.5	49.3	
	5/19/94	2354	5-8	090	045	42.6	55.0	46.8	
					Average	37.3	60.6	46.5	

Source: KBN, 1994.

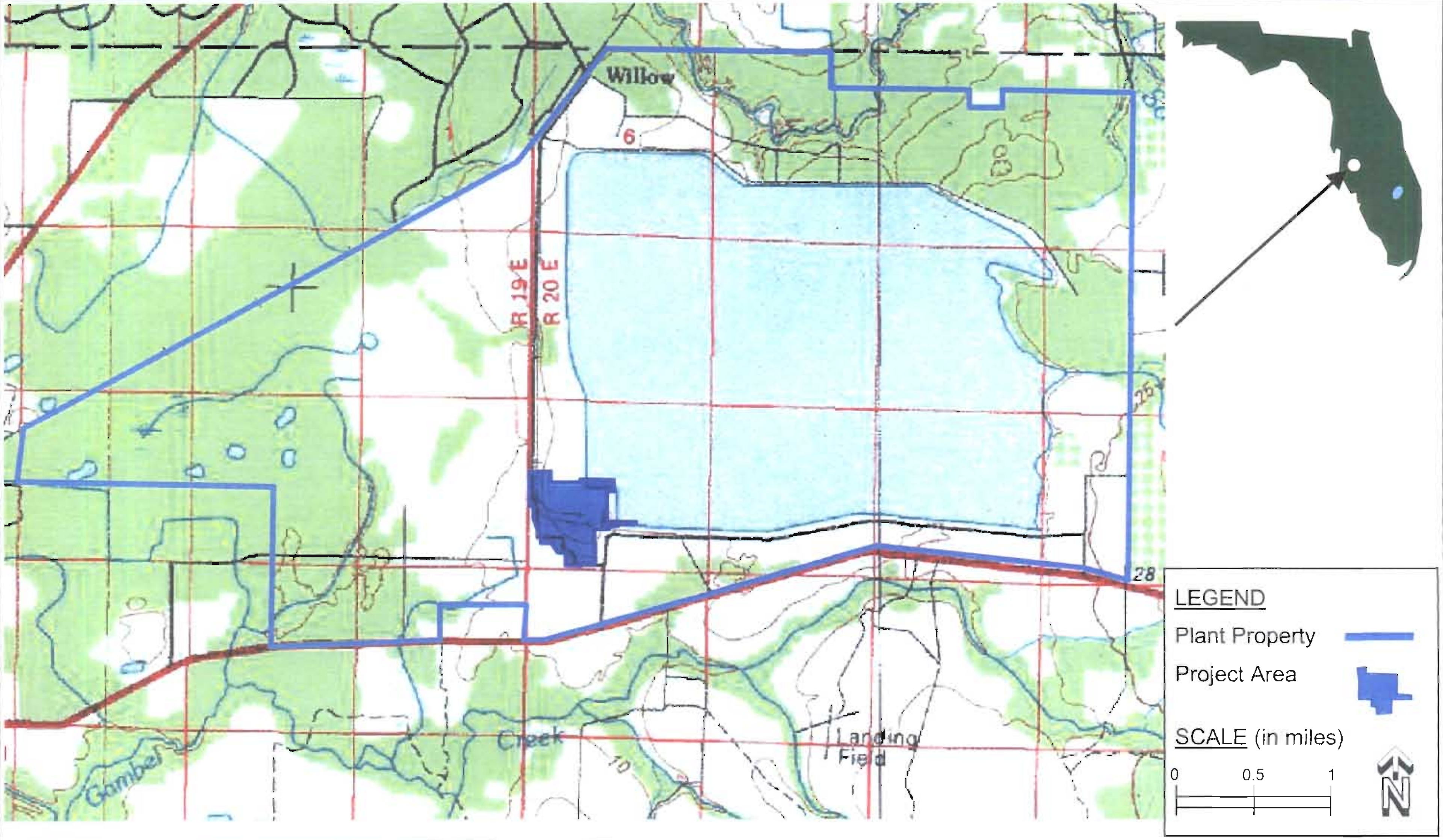


Figure 2.1-1. FPL Manatee Plant Site Location

Source: TerraServer.com, 2002; Golder, 2002.

FPL
Manatee Unit 3

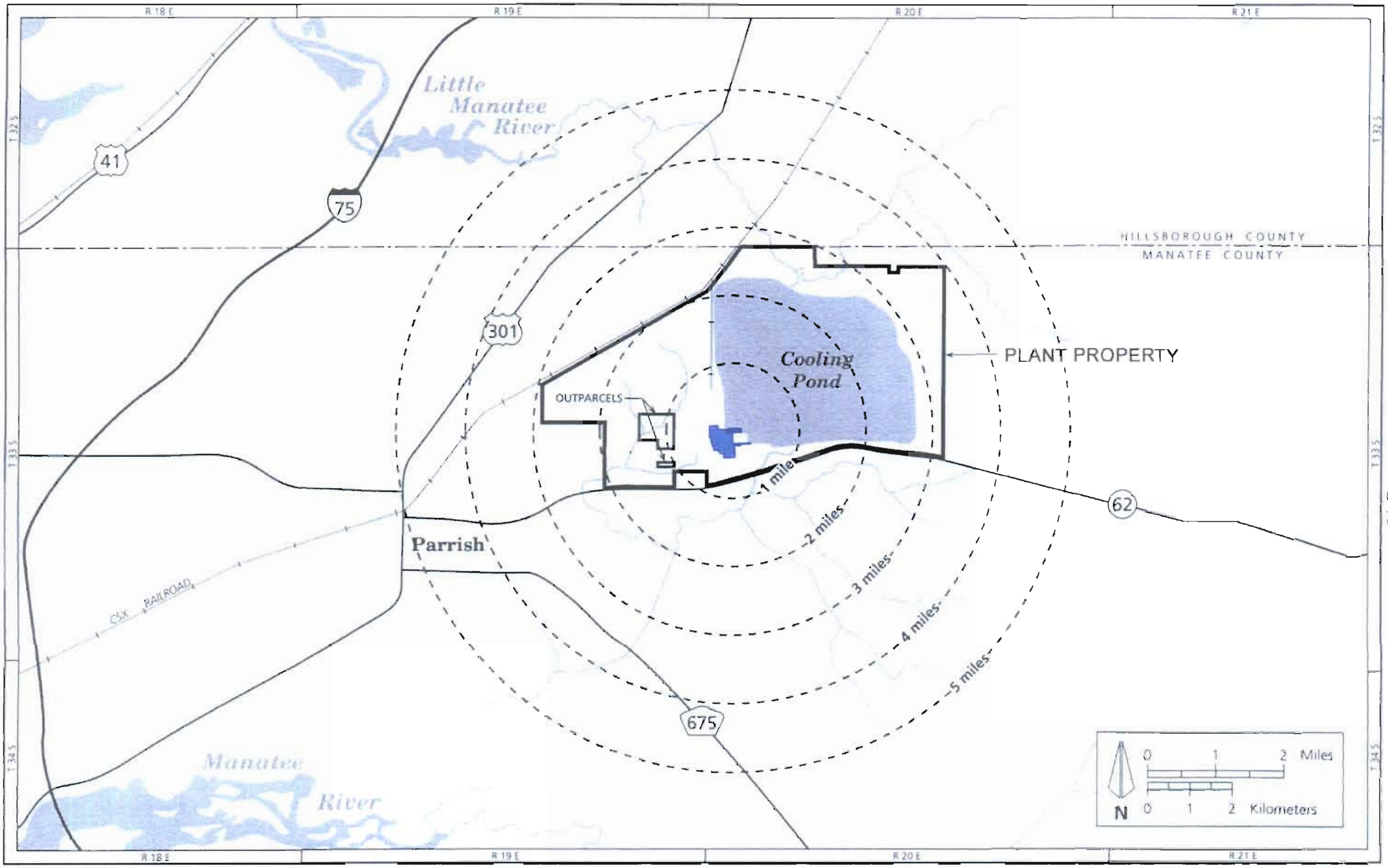


Figure 2.1-2. Project Location with 5-, 4-, 3-, 2-, 1-Mile Radius

Source: Moore/Bowers, 1994; KBN, 1994; Golder, 2002.

FPL
Manatee Unit 3

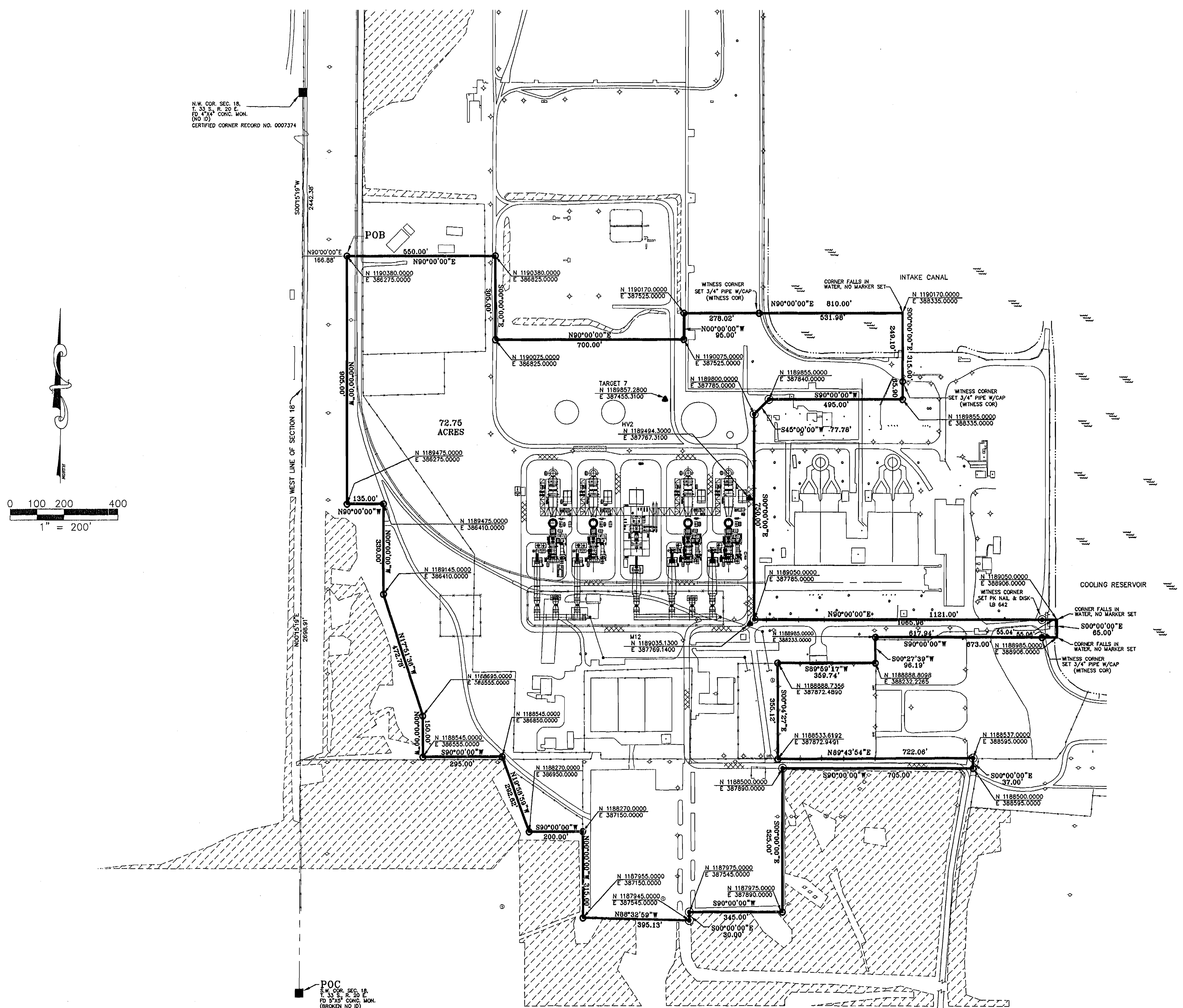
Figure 2.1-3. Recent Aerial View of Manatee Plant With Project Boundary

Source: SRM of Miami, Inc., 2001; Golder, 2002.

FPL

Manatee Unit 3

081010-006 (1)



NOTES:

LOCATION OF IMPROVEMENTS SHOWN ON THIS DRAWING ARE FROM FPL&L DRAWING FILE #130770-3STA-S001. ANY IMPROVEMENTS SHOWN ON THIS DRAWING WERE NOT LOCATED BY JOHNSON ENGINEERING.

DESCRIPTION:

A TRACT OR PARCEL OF LAND LYING IN SECTION 18, TOWNSHIP 33 SOUTH, RANGE 20 EAST, MANATEE COUNTY, FLORIDA, SAID TRACT OR PARCEL BEING DESCRIBED AS FOLLOWS:
COMMENCING AT THE SOUTHWEST CORNER OF SECTION 18, TOWNSHIP 33 SOUTH, RANGE 20 EAST, RUN N00°15'19"E ALONG THE WEST LINE OF THE SAID SECTION 18, A DISTANCE OF 2698.91 FEET; THENCE RUN N90°00'00"E FOR 166.88 FEET TO THE POINT OF BEGINNING.
FROM SAID POINT OF BEGINNING CONTINUE N90 °00'00"E FOR 550.00 FEET; THENCE RUN S00 °00'00"E FOR 305.00 FEET; THENCE RUN N90°00'00"E FOR 700.00 FEET; THENCE RUN N00°00'00"W FOR 95.00 FEET; THENCE RUN N90°00'00"E FOR 810.00 FEET; THENCE RUN S00°00'00"E FOR 315.00 FEET; THENCE RUN S90 °00'00"W FOR 495.00 FEET; THENCE RUN S45 °00'00"W FOR 77.78 FEET; THENCE RUN S00 °00'00"E FOR 750.00 FEET; THENCE RUN N90°00'00"E FOR 1,121.00 FEET; THENCE RUN S00°00'00"E FOR 65.00 FEET; THENCE RUN S90 °00'00"W FOR 673.00 FEET; THENCE RUN S00°27'39"W FOR 96.19 FEET; THENCE RUN S89 °59'17"W FOR 359.74 FEET; THENCE RUN S00°04'27"E FOR 355.12 FEET; THENCE RUN N89 °43'54"E FOR 722.06 FEET; THENCE RUN S00 °00'00"E FOR 37.00 FEET; THENCE RUN S90 °00'00"W FOR 705.00 FEET; THENCE RUN S00°00'00"E FOR 525.00 FEET; THENCE RUN S90°00'00"W FOR 345.00 FEET; THENCE RUN S00 °00'00"E FOR 30.00 FEET; THENCE RUN N88°32'59"W FOR 395.13 FEET; THENCE RUN N00 °00'00"W FOR 315.00 FEET; THENCE RUN S90° 00'00"W FOR 200.00 FEET; THENCE RUN N19°58'59"W FOR 292.62 FEET; THENCE RUN S90 °00'00"W FOR 295.00 FEET; THENCE RUN N00°00'00"W FOR 150.00 FEET; THENCE RUN N17°51'36"W FOR 472.78 FEET; THENCE RUN N°00'00"W FOR 330.00 FEET; THENCE RUN N90 °00'00"W FOR 135.00 FEET; THENCE RUN N00°00'00'W FOR 905.00 FEET TO THE POINT OF BEGINNING.
CONTAINING 72.75 ACRES.

NOTES:

1. Date of last fieldwork: January 8, 2002.
2. Survey for boundary and description only.
3. Improvements and/or utilities, above ground or underground, are not located on this survey.
4. Survey performed as requested by Florida Power and Light Company.
5. Bearing Reference: State Plane Coordinate, Florida West Zone NAD27.
6. State Plane Coordinates are based on drawing file provided by Florida Power and Light Company.
7. Control points for State Plane Coordinates are Target 7, HV2 and M12. Coordinate values were shown on drawing file provided by Florida Power and Light Company.
8. This survey is subject to any facts that may be disclosed by a full and accurate title search.
9. No environmental assessment or audit was performed on the surveyed parcel by this firm.
10. This survey was performed for the purpose shown hereon and does not make any representation as to the delineation of any jurisdictional lines except as shown or noted hereon.
11. Flood zones not determined by this survey.
12. This survey is subject to easements, restrictions, reservations and rights-of-way of record.
13. Zoning not determined by this survey.

THIS SURVEY IS ONLY FOR THE BENEFIT OF:

FLORIDA POWER AND LIGHT
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

NO OTHER PERSON OR ENTITY MAY RELY ON THIS SURVEY. IN MY PROFESSIONAL OPINION, AS A LICENSED FLORIDA PROFESSIONAL SURVEYOR AND MAPPER, THIS PLAT IS A TRUE AND CORRECT REPRESENTATION OF A RECENT SURVEY MADE AND PLATTED UNDER MY DIRECTION.

[signature]

MATTHEW M. HOWARD (FOR THE FIRM LB-642)
REGISTERED LAND SURVEYOR
FLORIDA CERTIFICATE NO. 4912

DATE SIGNED: 2-4-02
NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

J:\023039\NAD27-130770-3STA-S001dwg

LEGEND:

FP&L = FLORIDA POWER & LIGHT
R/W = RIGHT-OF-WAY
PK = PARKER KALON
PB = PLAT BOOK
OR = OFFICIAL RECORD BOOK
PG = PAGE
COR = CORNER
POC = POINT OF COMMENCEMENT
POB = POINT OF BEGINNING

CONC = CONCRETE
MON = MONUMENT
FD = FOUND
SEC = SECTION
T. = TOWNSHIP
S. = SECTION
W/ = WITH
ID = IDENTIFICATION

■ = CONCRETE MONUMENT
○ = SET 3/4 " PIPE W/ CAP LB 642
◉ = SET PK NAIL & DISK LB 642

FIELD BOOK 2383/ PAGES 14-17

FLORIDA POWER AND LIGHT
MANATEE PLANT
SECTION 18, TOWNSHIP 33 SOUTH, RANGE 20 EAST
MANATEE COUNTY, FLORIDA

JOHNSON ENGINEERING

2158 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE (941) 334-0046
FAX (941) 334-3661
E.B. #642 & L.B. #642

BOUNDARY SURVEY

DATE	PROJECT NO.	FILE NO.	SCALE	SHEET
01/10/02	20023039	18-33-20	1" = 200'	1 OF 1

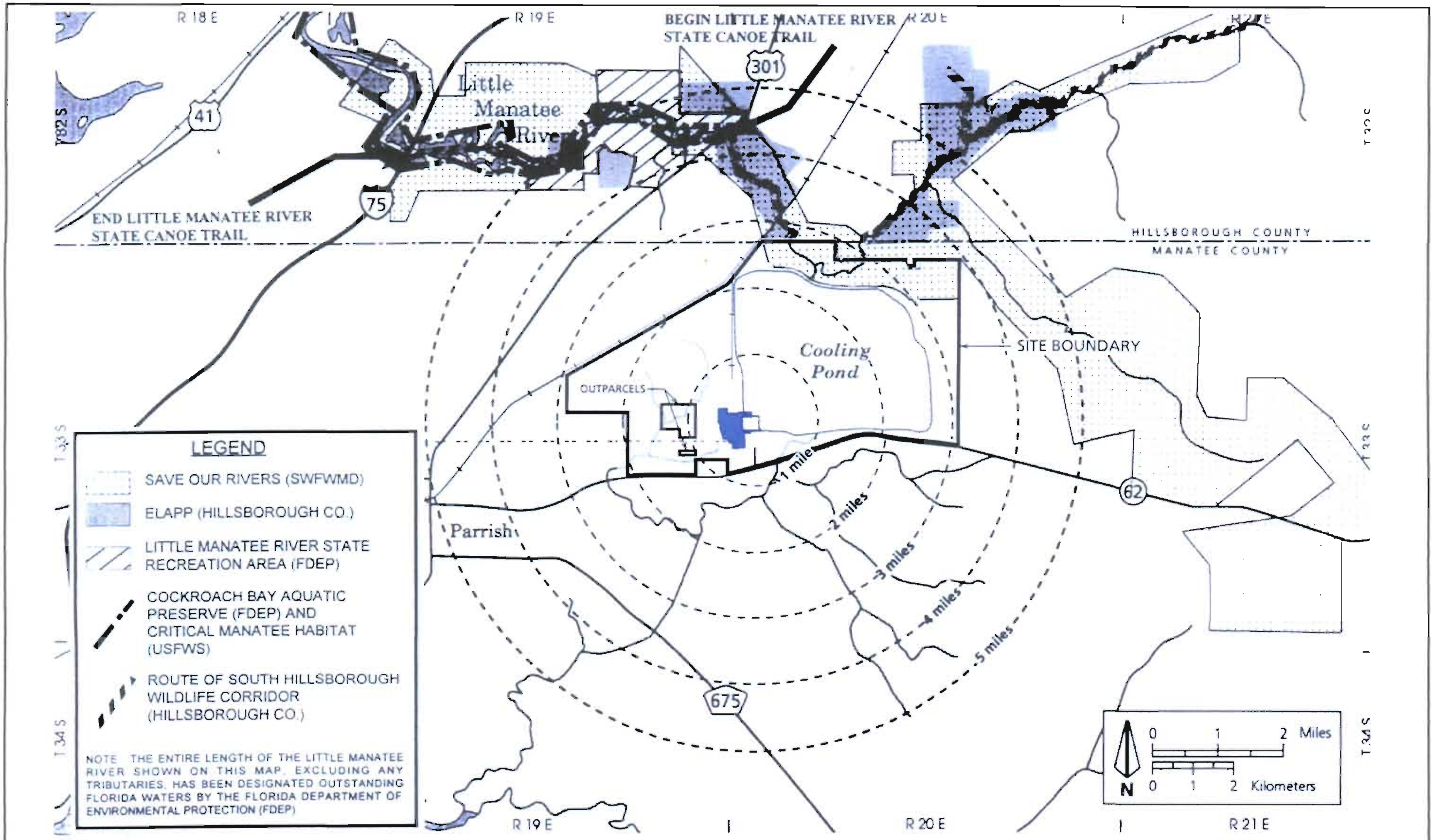
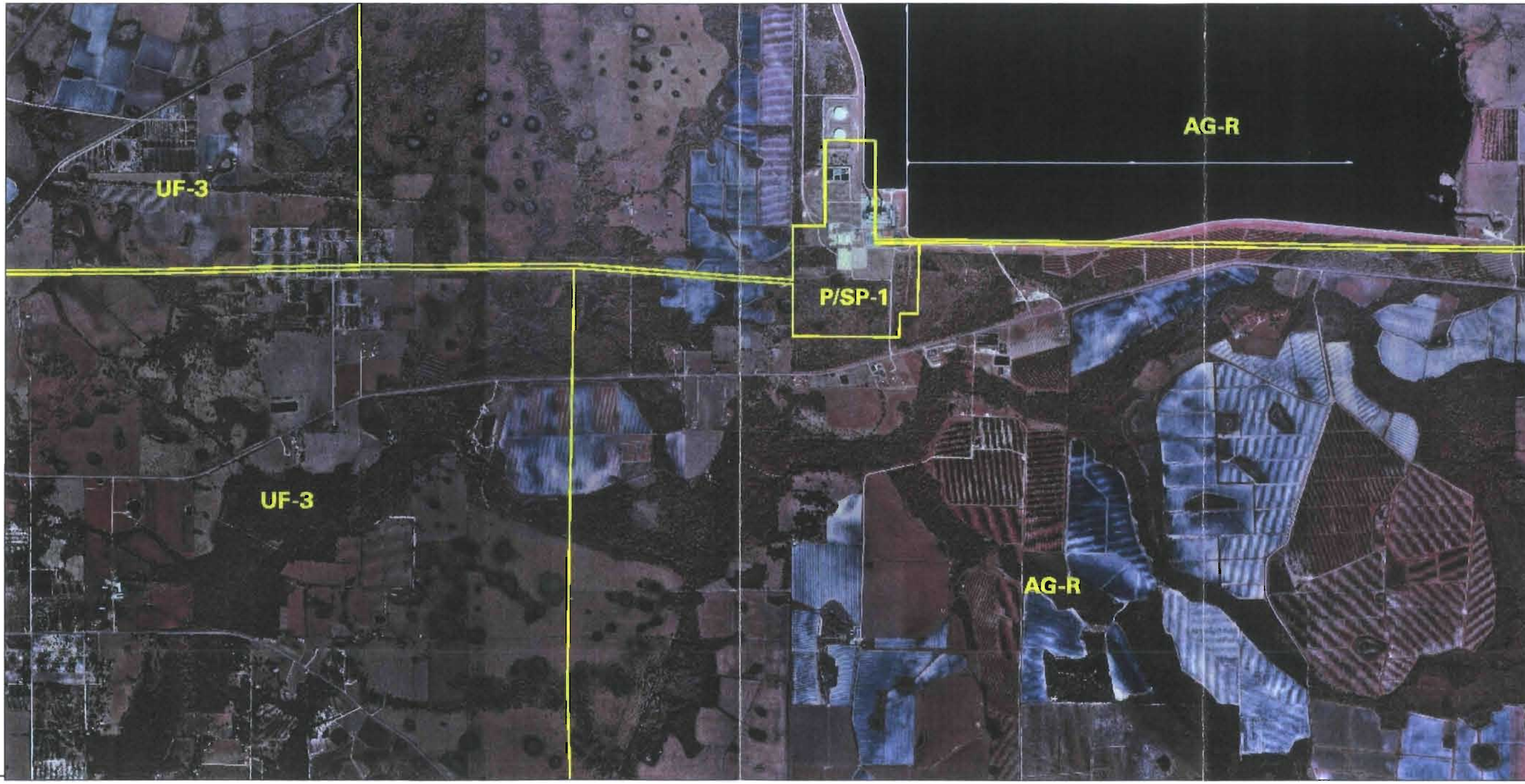


Figure 2.2-1. Parks, Recreation Areas, and Conservation Lands within Five Miles of the Manatee Plant

Source: Hillsborough County, 1992; FDER, 1992; SWFWMD, 1994; FDEP, 1994(b); Moore/Bowers, 1994; Golder, 2002.

FPL
Manatee Unit 3



Future Land Use for FPL Parrish Facility

Manatee County, FL Legend

1995 DOQQ's provided by the Southwest Florida Water Management District

Scale: .70" = 1652 Feet

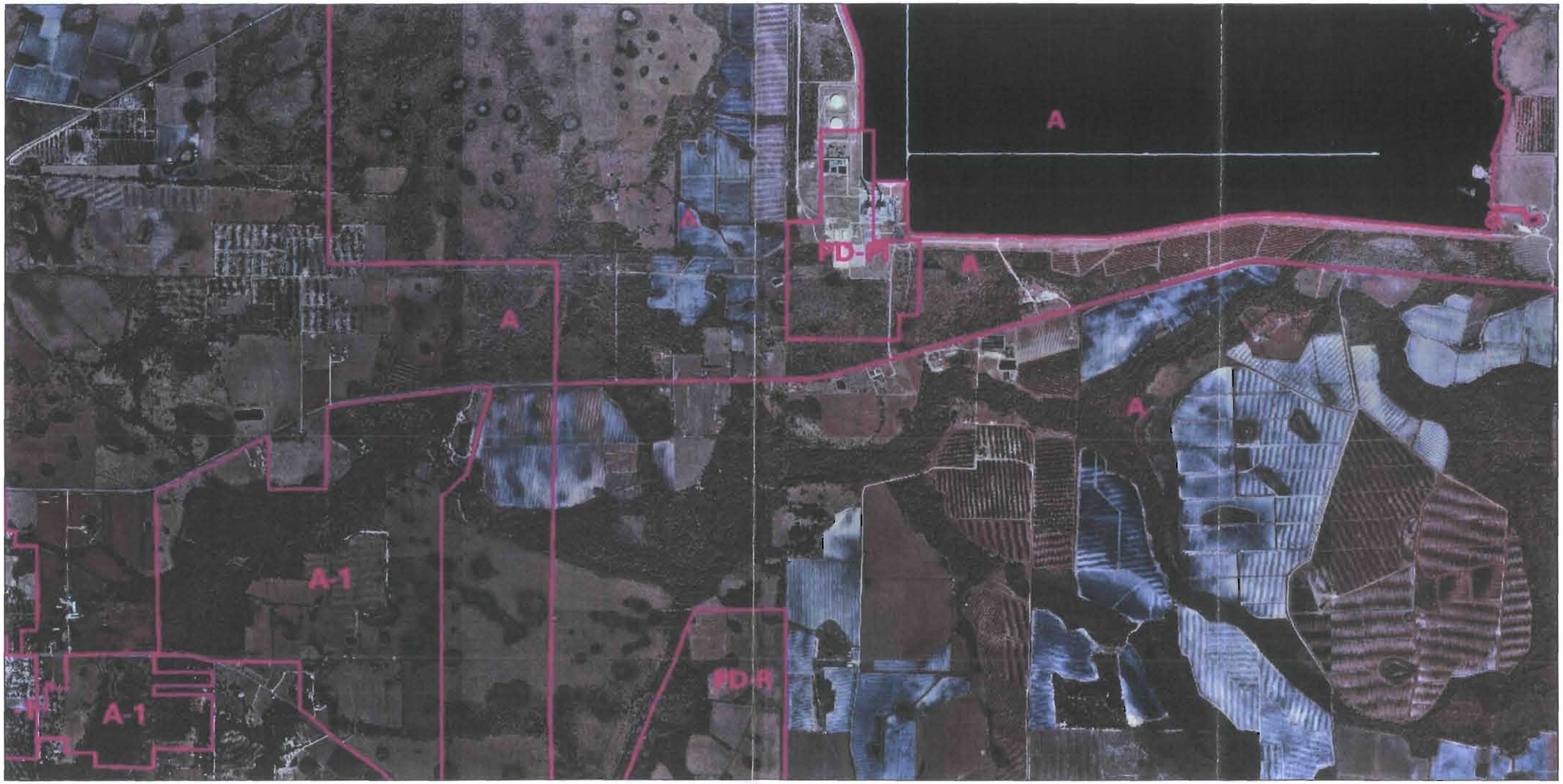
1652 0 1652

This map was developed using the Manatee County Land Information System. It is provided for general reference, is subject to change, and is not warranted for any particular use or purpose. The information contained within is derived from several sources of varying quality and accuracy. Errors from non-coincidence of features from different sources may be present. The Manatee County Land Information System and the Manatee County County Commissioners do not warrant and are not liable for inappropriate or unintended uses of the information.

Figure 2.2-2. Future Land Use

Source: Manatee County, 2002.

FPL
Manatee Unit 3



Zoning for FPL Parrish Facility

Manatee County, FL
Legend

1995 DOQQ's provided
by the Southwest Florida
Water Management District

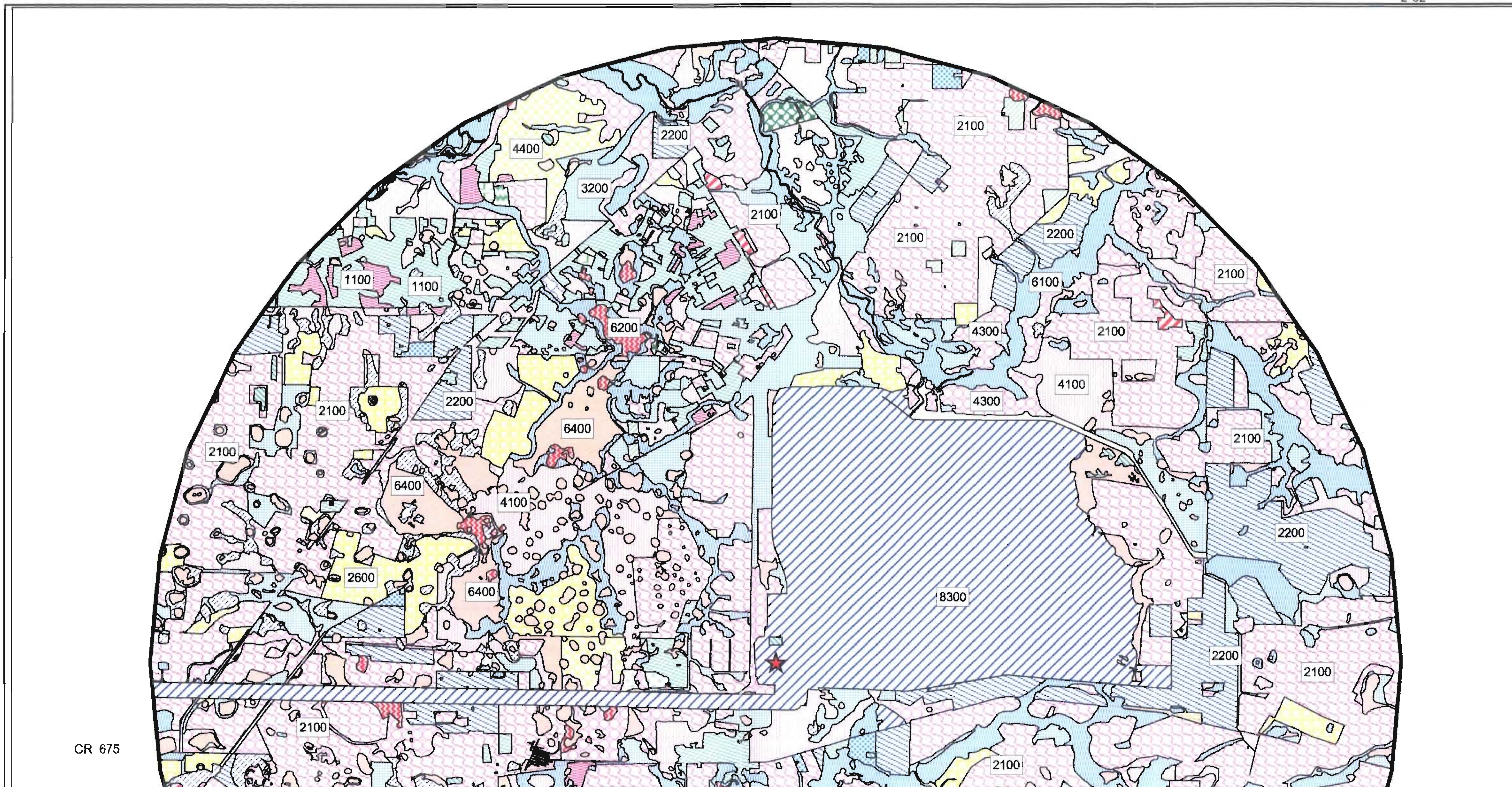
Scale: .70" = 1561 Feet
1561 0 1561

This map was developed using the Manatee County Land Information System. It is provided for general reference, is subject to change, and is not warranted for any particular use or purpose. The information contained within is derived from several sources of varying quality and accuracy. Errors from non-coincidence of features from different sources may be present. The Manatee County Land Information System and the Manatee County County Commissioners do not warrant and are not liable for inappropriate or unintended uses of the information.

Figure 2.2-3. Zoning

Source: Manatee County, 2002.

FPL
Manatee Unit 3



LEGEND

- ★ Project Area
- Major Roads
- 5 Mile Radius

5 Mile Land Use/Cover Name & Number

- Residential Low Density (1100)
- Residential Med. Density (1200)
- Commercial and Services (1400
- Industrial (1500)
- Extractive (1600)
- Institutional (1700)
- Recreational (1800)
- Open Land (1900)
- Cropland and Pastureland (2100)
- Tree Crops (2200)
- Feeding Operations (2300)
- Nurseries and Vineyards (2400)
- Specialty Farms (2500)
- Other Open Lands (2600)
- Herbaceous (3100)
- Shrub and Brushland (3200)
- Mixed Rangeland (3300)
- Upland Coniferous Forest (4100)
- Upland Hardwood Forest (4200)
- Upland Hardwood Forests - Continued (4300)
- Tree Plantations (4400)
- Streams and Waterways (5100)
- Lakes (5200)
- Reservoirs (5300)
- Bays and Estuaries (5400)
- Wetland Hardwood Forests (6100)
- Wetland Coniferous Forests (6200)
- Wetland Forested Mixed (6300)
- Vegetated Non-Forested Wetlands (6400)
- Disturbed Lands (7400)
- Transportation (8100)
- Communications (8200)
- Utilities (8300)

REFERENCES

Southwest Florida Water Management District Land Use/Cover, 1999.
Datum: NAD 83 Projection: UTM Zone 17
Updated by Golder Associates Inc. January 2002.

3000 0 3000 6000 Feet

Scale 1" = 3/4 mile

N

PROJECT

Manatee Unit 3

TITLE

Land Use and Cover Within 5 Mile Radius of Project Area

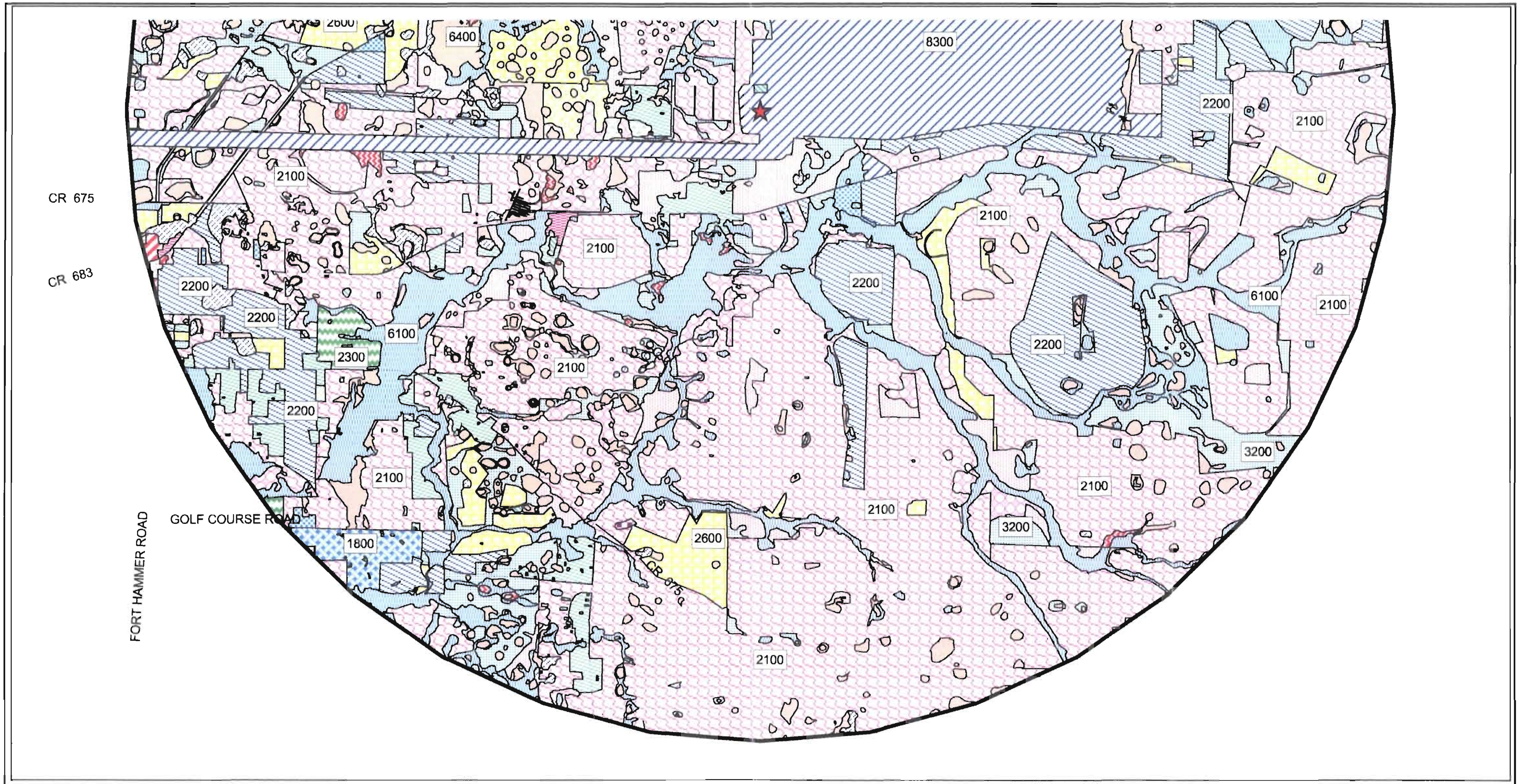
Sheet 1 of 2

Golder Associates

PROJECT No. 001-1001.1000			SCALE AS SHOWN	REV. 0
DESIGN	JW	2 Feb 2002		
GIS	JW	2 Feb 2002		
CHECK	RAZ	2 Feb 2002		
REVIEW	KFK	2 Feb 2002		

FIGURE 2.2-4a

H:\Golder\Vol1\PROJECTS\2001proj\013-7609-3000 FPL Manatee\Land Use\GIS\5 mile land cover.apr



LEGEND

- ★ Project Area
- Major Roads
- 5 Mile Radius

5 Mile Land Use/Cover Name & Number

- Residential Low Density (1100)
- Residential Med. Density (1200)
- Commercial and Services (1400
- Industrial (1500)
- Extractive (1600)
- Institutional (1700)
- Recreational (1800)
- Open Land (1900)
- Cropland and Pastureland (2100)
- Tree Crops (2200)
- Feeding Operations (2300)
- Nurseries and Vineyards (2400)
- Specialty Farms (2500)
- Other Open Lands (2600)
- Herbaceous (3100)
- Shrub and Brushland (3200)
- Mixed Rangeland (3300)
- Upland Coniferous Forest (4100)
- Upland Hardwood Forest (4200)
- Upland Hardwood Forests - Continued (4300)
- Tree Plantations (4400)
- Streams and Waterways (5100)
- Lakes (5200)
- Reservoirs (5300)
- Bays and Estuaries (5400)
- Wetland Hardwood Forests (6100)
- Wetland Coniferous Forests (6200)
- Wetland Forested Mixed (6300)
- Vegetated Non-Forested Wetlands (6400)
- Disturbed Lands (7400)
- Transportation (8100)
- Communications (8200)
- Utilities (8300)

REFERENCES

Southwest Florida Water Management District Land Use/Cover, 1999.
Datum: NAD 83 Projection: UTM Zone 17
Updated by Golder Associates Inc. January 2002.

3000 0 3000 6000 Feet

Scale 1" = 3/4 mile

N

PROJECT

Manatee Unit 3

TITLE

Land Use and Cover Within 5 Mile Radius of Project Area

Sheet 2 of 2

Golder Associates

PROJECT No. 001-1001.1000			SCALE AS SHOWN	REV. 0
DESIGN	JW	2 Feb. 2002	**FIGURE 2.2-4b**	
GIS	JW	2 Feb. 2002		
CHECK	RAZ	2 Feb. 2002		
REVIEW	KFK	2 Feb. 2002		

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System	Series	Stratigraphic Unit	General Lithology	Major Lithologic Unit	Hydrogeological Unit
Quaternary	Holocene and Pleistocene	Surficial sand, terrace sand, phosphorite	Predominantly fine sand; interbedded clay, marl, shell, limestone, phosphorite	Sand	Surficial aquifer
		Undifferentiated deposits	Clayey and pebbly sand; clay, marl, shell, phosphatic.	Clastic	Confining bed
Tertiary	Pliocene				
	Miocene	Hawthorn Group	Dolomite, sand, clay, and limestone; silty, phosphatic.	Carbonate and clastic	INTERMEDIATE AQUIFER AND CONFINING BEDS: Aquifer
		Tampa Member	Limestone, sandy, phos-phatic, fossiliferous; sand and clay in lower part of some areas.		Confining bed
	Oligocene	Suwannee Limestone	Limestone, sandy limestone, fossiliferous	Carbonate	FLORIDAN AQUIFER SYSTEM
	Eocene	Ocala Limestone	Limestone, chalky, foraminiferal, dolomitic near bottom.		Upper Floridan aquifer
		Avon Park Formation	Limestone and hard brown dolomite; intergranular evaporite in lower part in some areas.		Middle confining unit
		Oldsmar Formation	Dolomite and Limestone, with intergranular gypsum in most areas.	Carbonate with evaporites	Lower Floridan aquifer
	Paleocene	Cedar Key Formation	Dolomite and limestone with beds of anhydrite.		Lower confining unit

Figure 2.3-1 Generalized Regional Hydrogeological Framework of Manatee County

Source: Modified from Ryder, 1985.

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Manatee Unit 3

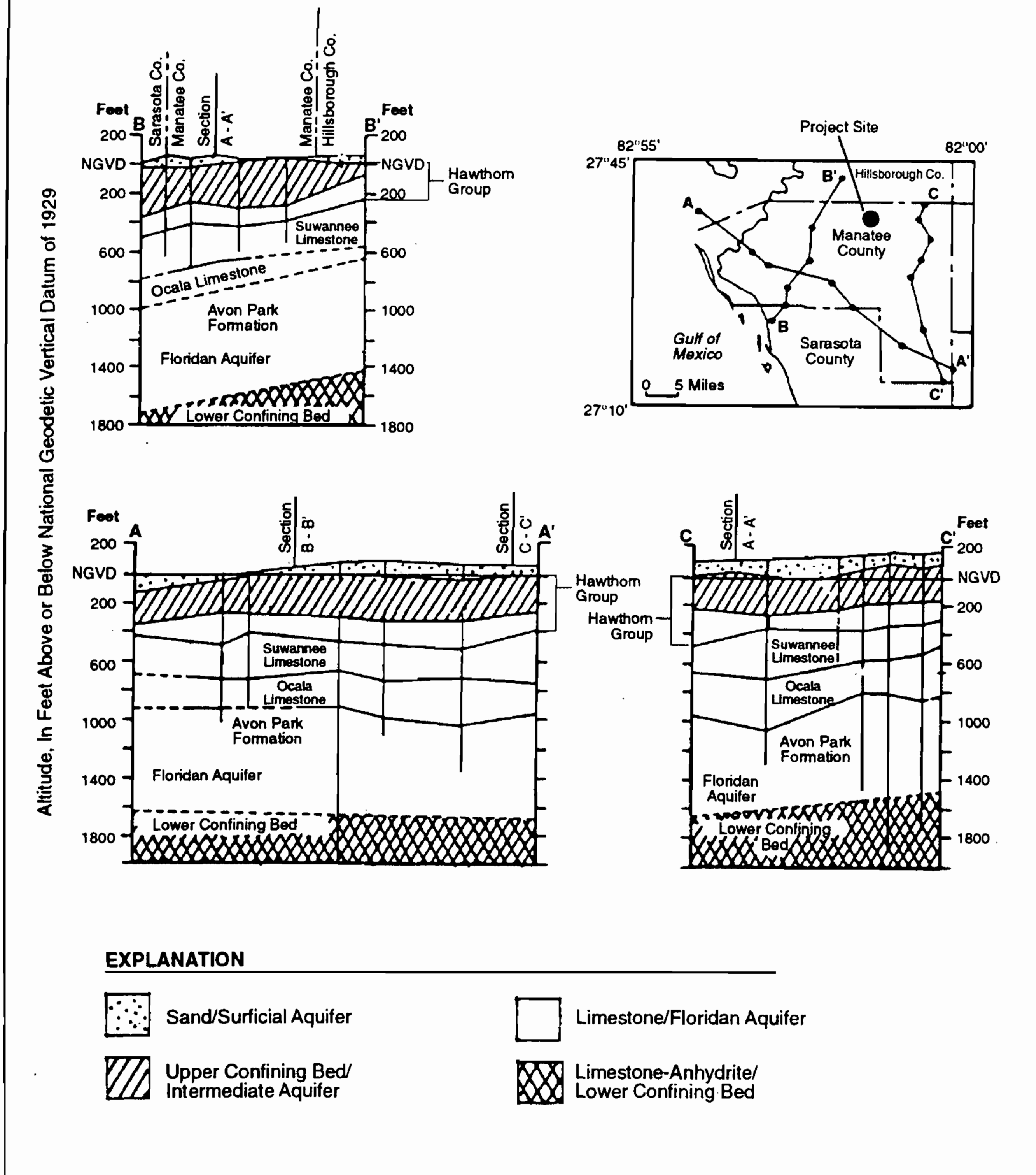

Figure 2.3-2. Generalized Geologic Cross Section of Manatee County, Florida

Sources: SWFWMD, 1988; CH2MHill/KBN, 1994.

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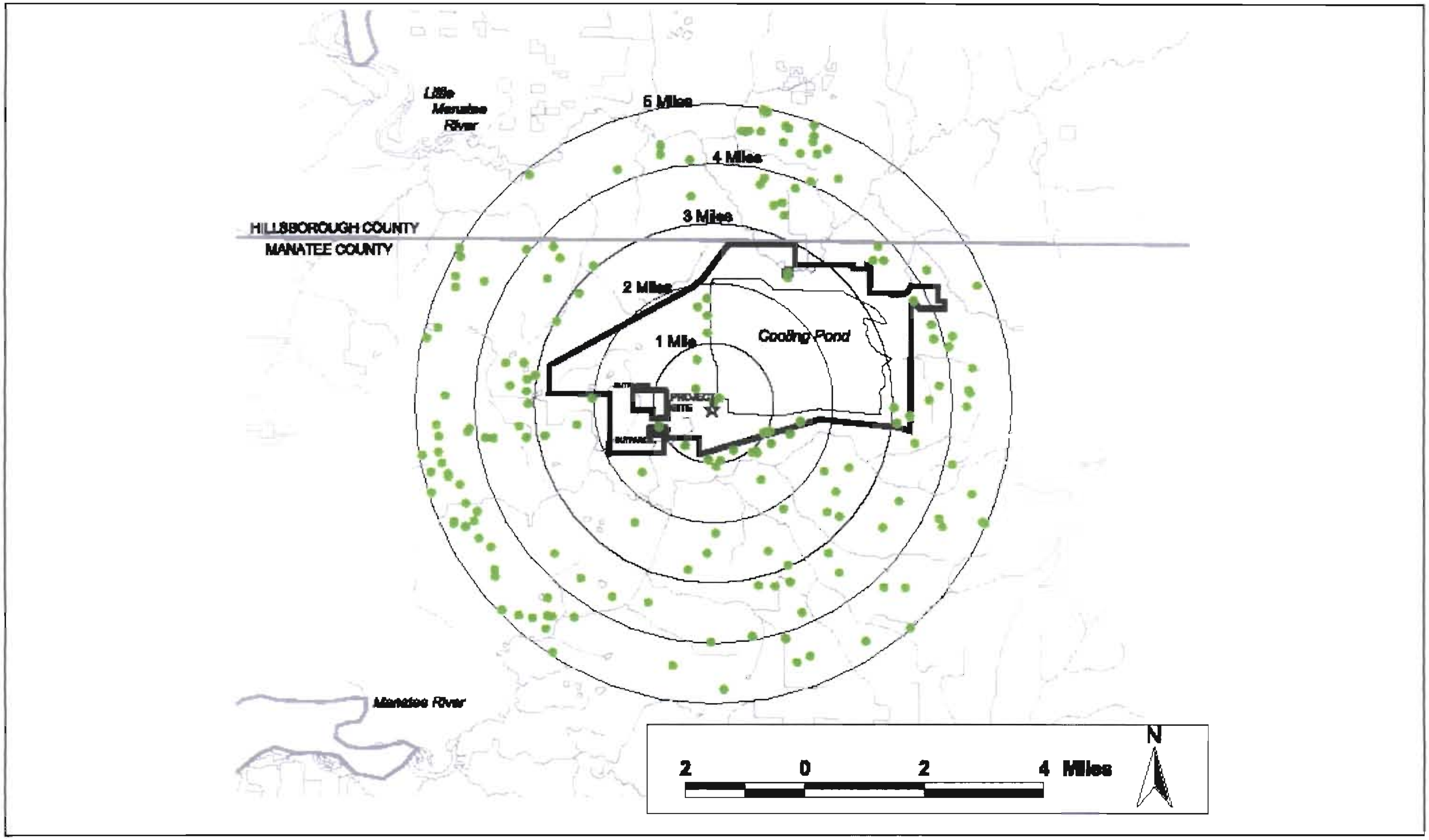

Figure 2.3-3. Existing Water Use Permits Within Five Miles of the Manatee Project Area

Source: Golder, 2002.

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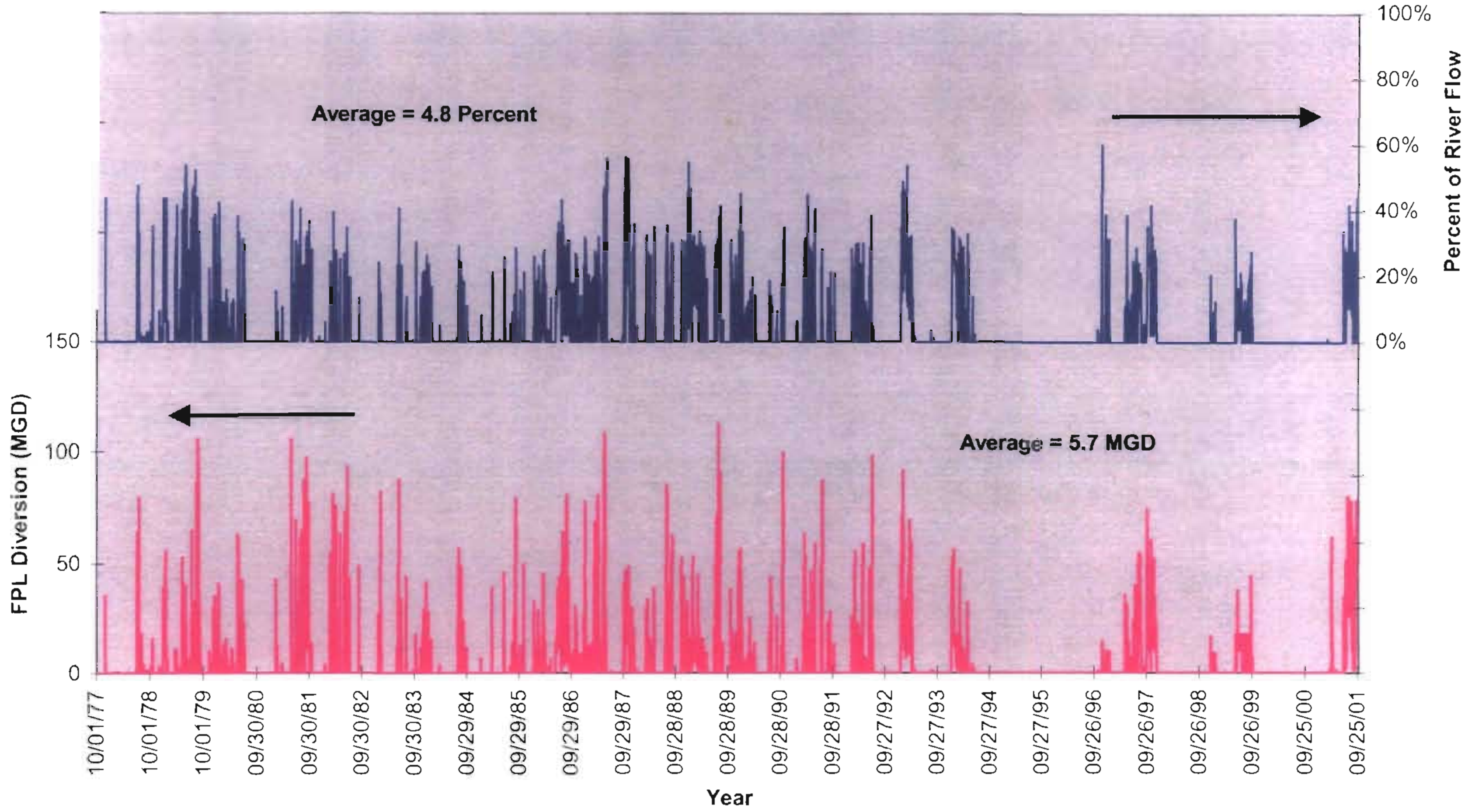

Figure 2.3-4. Historical Cooling Pond Diversions from Little Manatee River (10/1977 - 9/2001)

Source: Golder, 2002.

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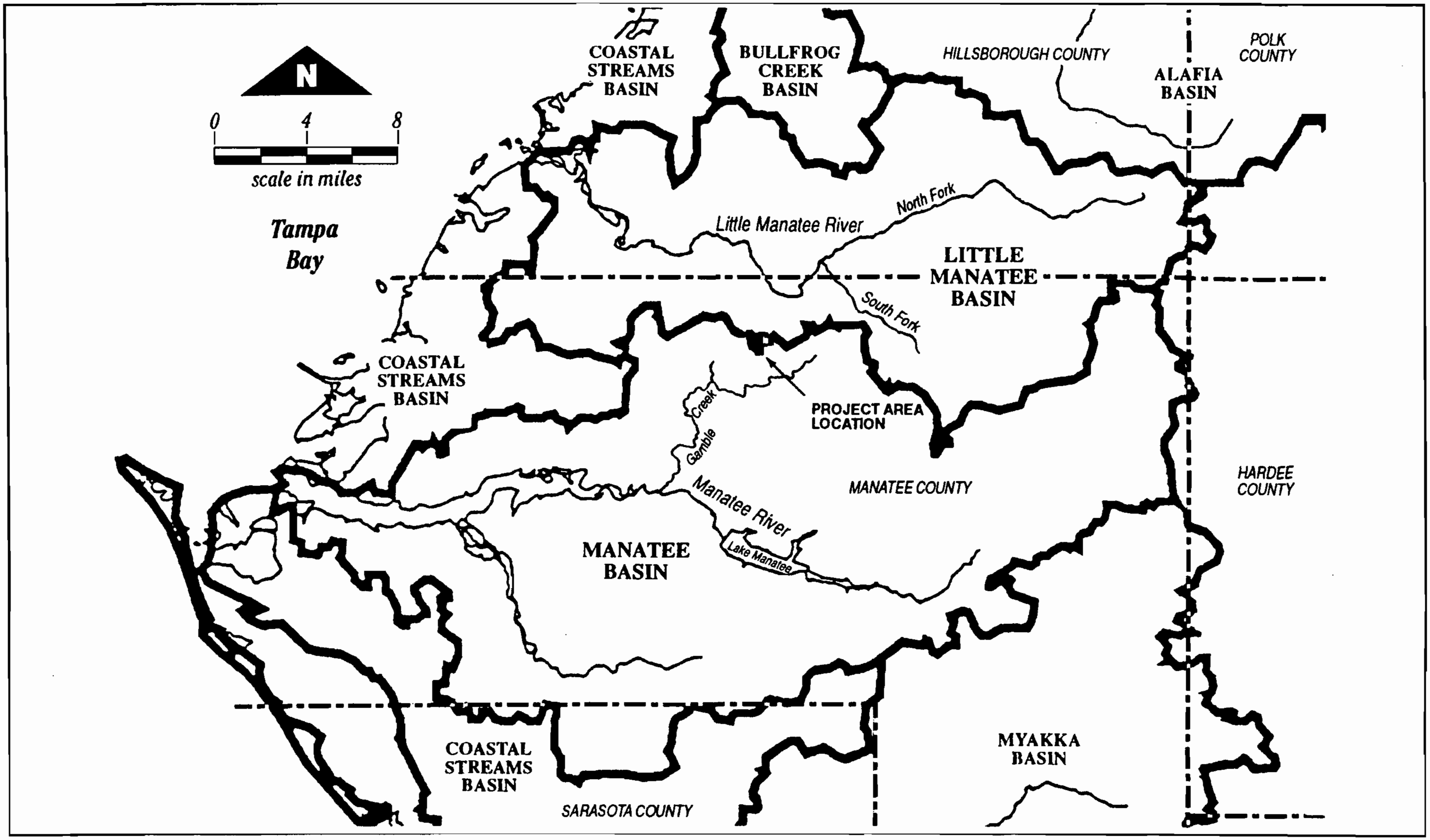

Figure 2.3-5. Manatee River and Little Manatee River Drainage Basins

Source: SWFWMD, 1993; Golder, 2002.

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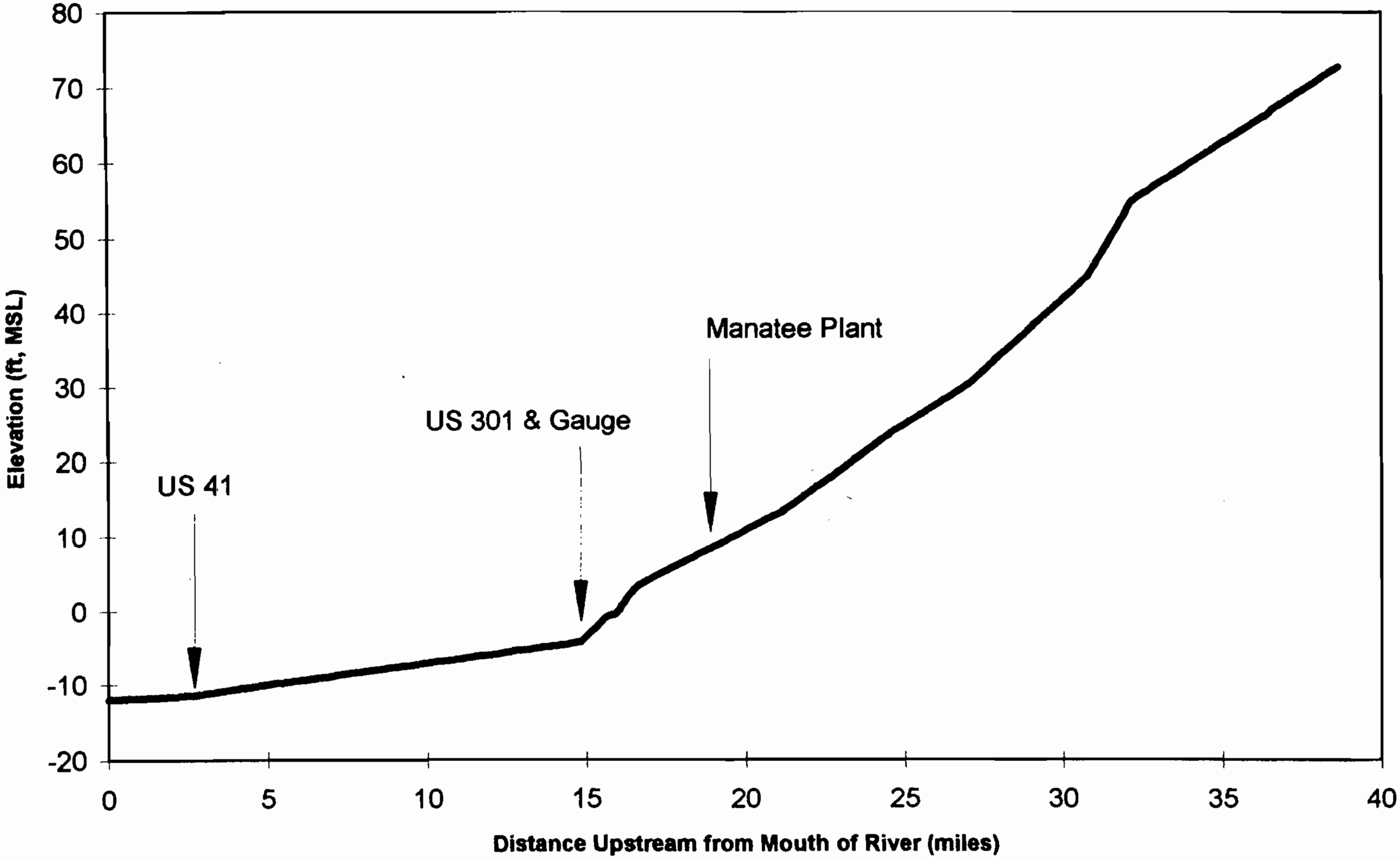

Figure 2.3-6. Profile of Bottom Elevation of the Little Manatee River

Source: Dames & Moore, 1975; Golder, 2002.

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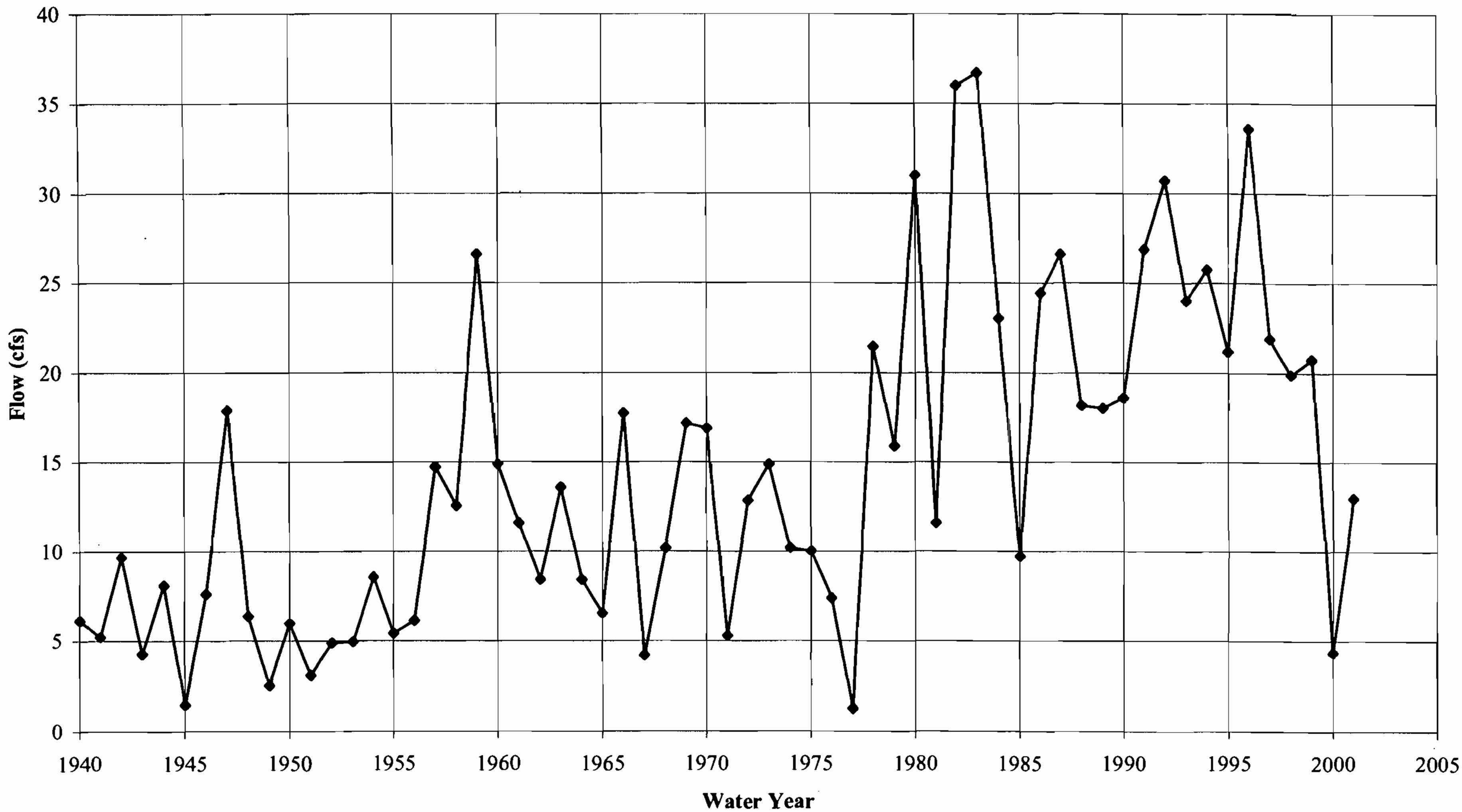

Figure 2.3-7. Little Manatee River Flow at USGS Station 02300500 Near Wimauma, Florida
(Lowest 7 Consecutive Day Average Flow for Each Water Year)

Source: Golder, 2002.

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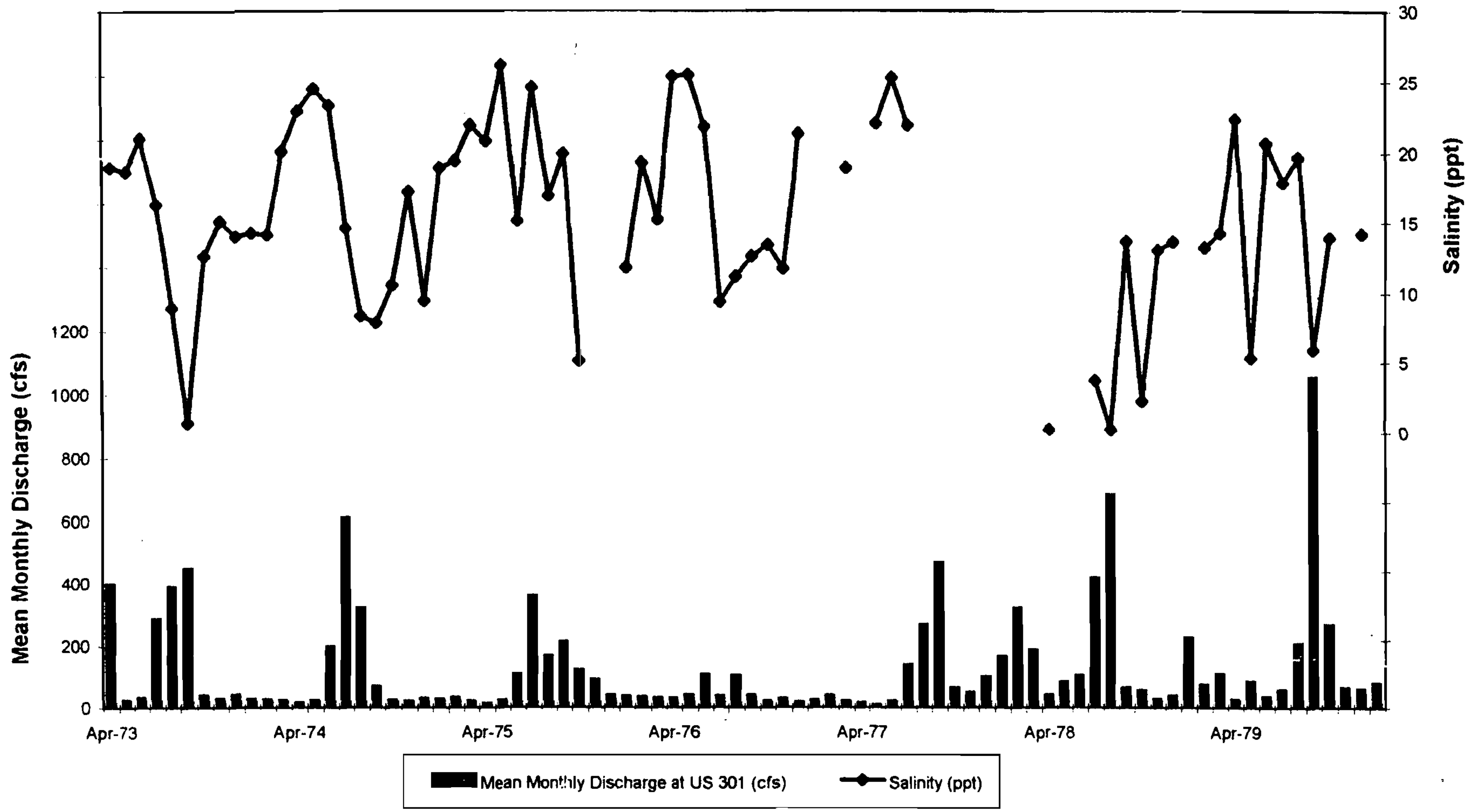
Manatee Unit 3



NOTE: Discharge measured at U.S. 301; salinity measured at U.S. 41.

Figure 2.3-8. Mean Monthly Discharge and Salinity for the Little Manatee Estuary

Source: EarthInfo, 1993; Golder, 2002.

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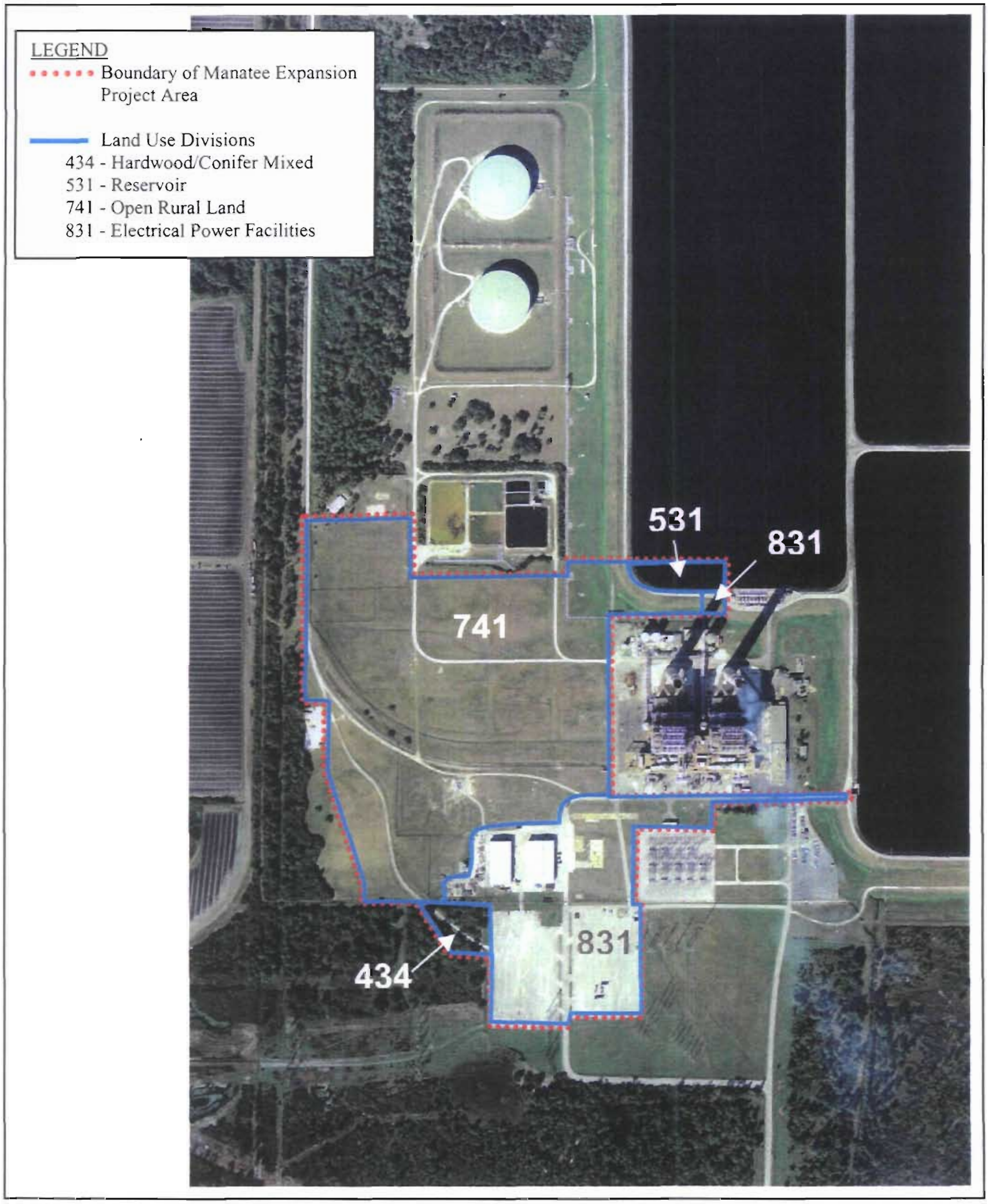

Figure 2.3-9. Vegetative Communities/Land Use Within the Project Area Using the Florida Department of Transportation's Florida Land Use, Cover, and Forms Classification System (1999)

Source: SRM of Miami, Inc., 2001; Golder, 2002.

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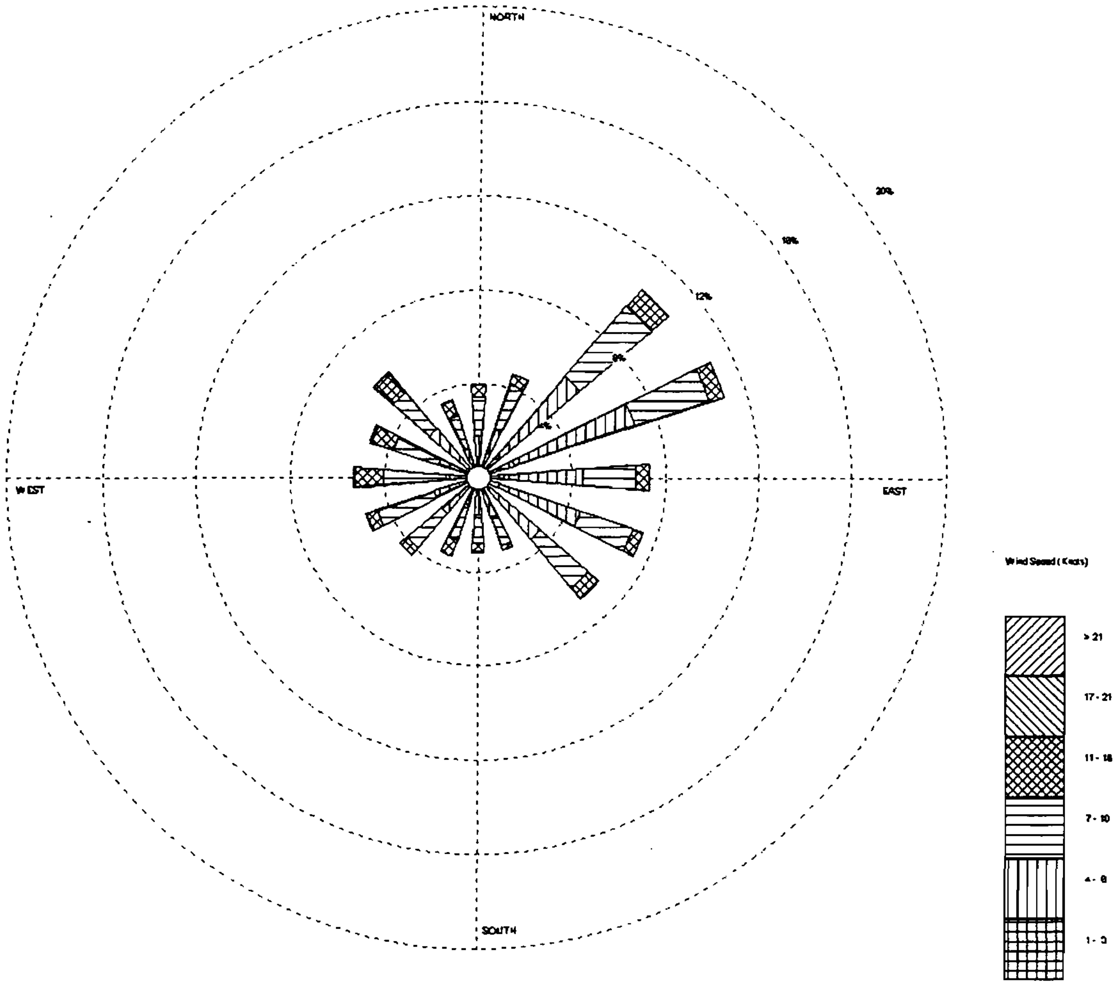

Average Wind Speed 6.97 Knots
Calm winds 9.34%

Source: National Climatic Data Center, 2001
Lakes Environmental Software WRPLOT View 3.05

Figure 2.3-10. Annual Wind Rose for Tampa International Airport, Florida (Station No. 12842) 1991 - 1995

Source: Golder, 2002.

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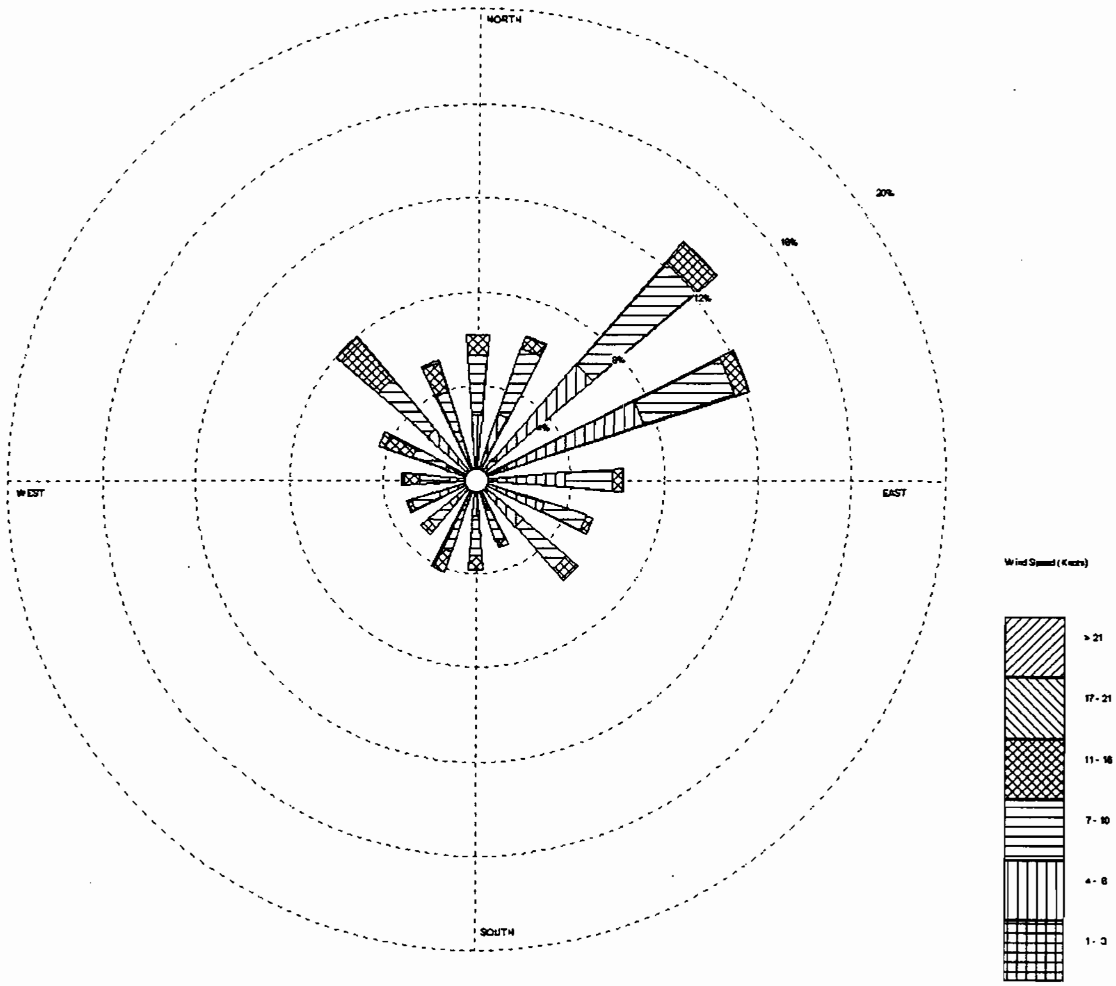
Manatee Unit 3



Average Wind Speed	7.25 Knots
Calm winds	6.42%

Source: National Climatic Data Center, 2001
Lakes Environmental Software WRPLOT View 3.05

Figure 2.3-11a. Winter Wind Rose for Tampa International Airport, Florida (Station No. 12842) December-February 1991 - 1995

Source: Golder, 2002.

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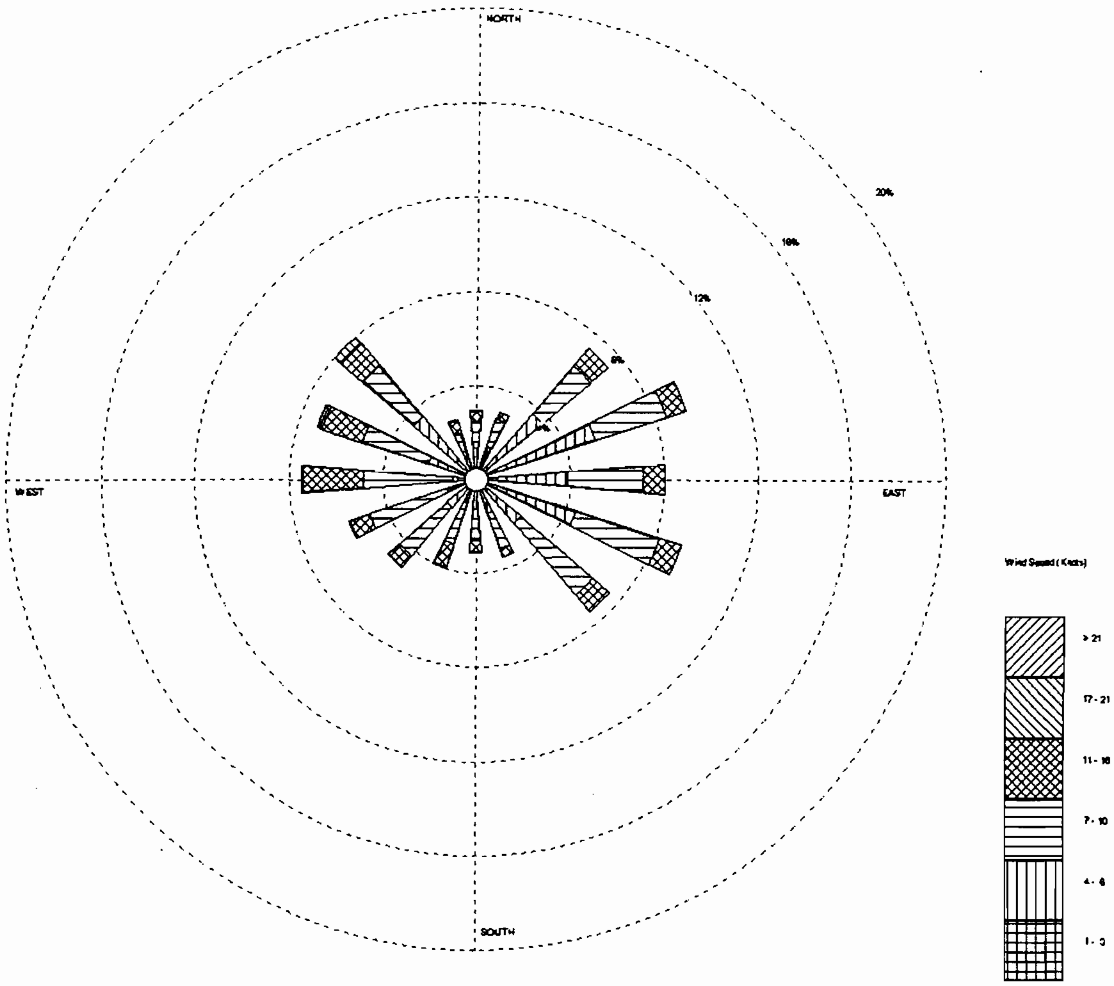

Average Wind Speed 7.68 Knots
Calm winds 6.09%

Source: National Climatic Data Center, 2001
Lakes Environmental Software WRPLOT View 3.05

Figure 2.3-11b. Spring Wind Rose for Tampa International Airport, Florida (Station No. 12842) March-May 1991 - 1995

Source: Golder, 2002.

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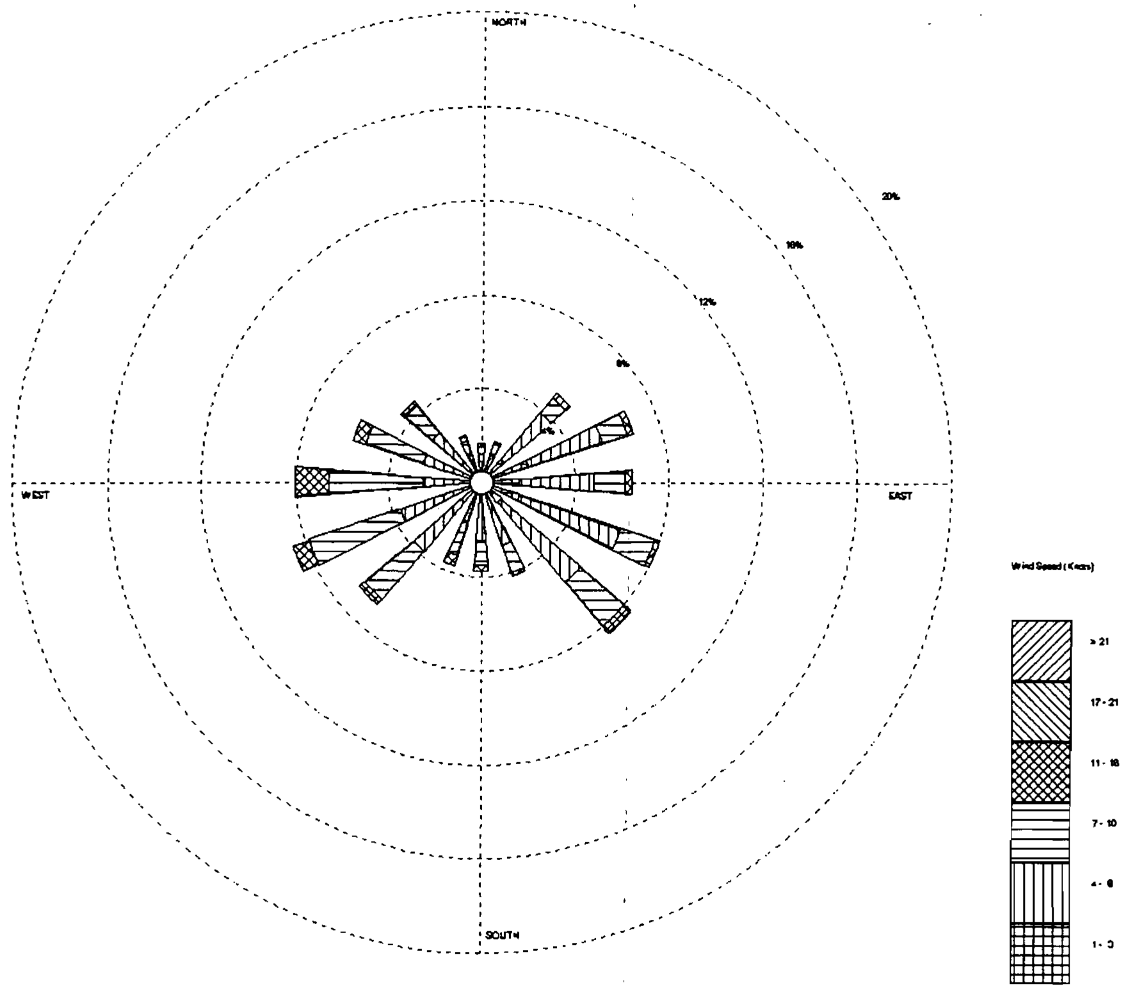

Average Wind Speed 6.21 Knots
Calm winds 14.23%

Source: National Climatic Data Center, 2001
Lakes Environmental Software WRPLOT View 3.05

Figure 2.3-11c. Summer Wind Rose for Tampa International Airport, Florida (Station No. 12842) June-August 1991 - 1995

Source: Golder, 2002.

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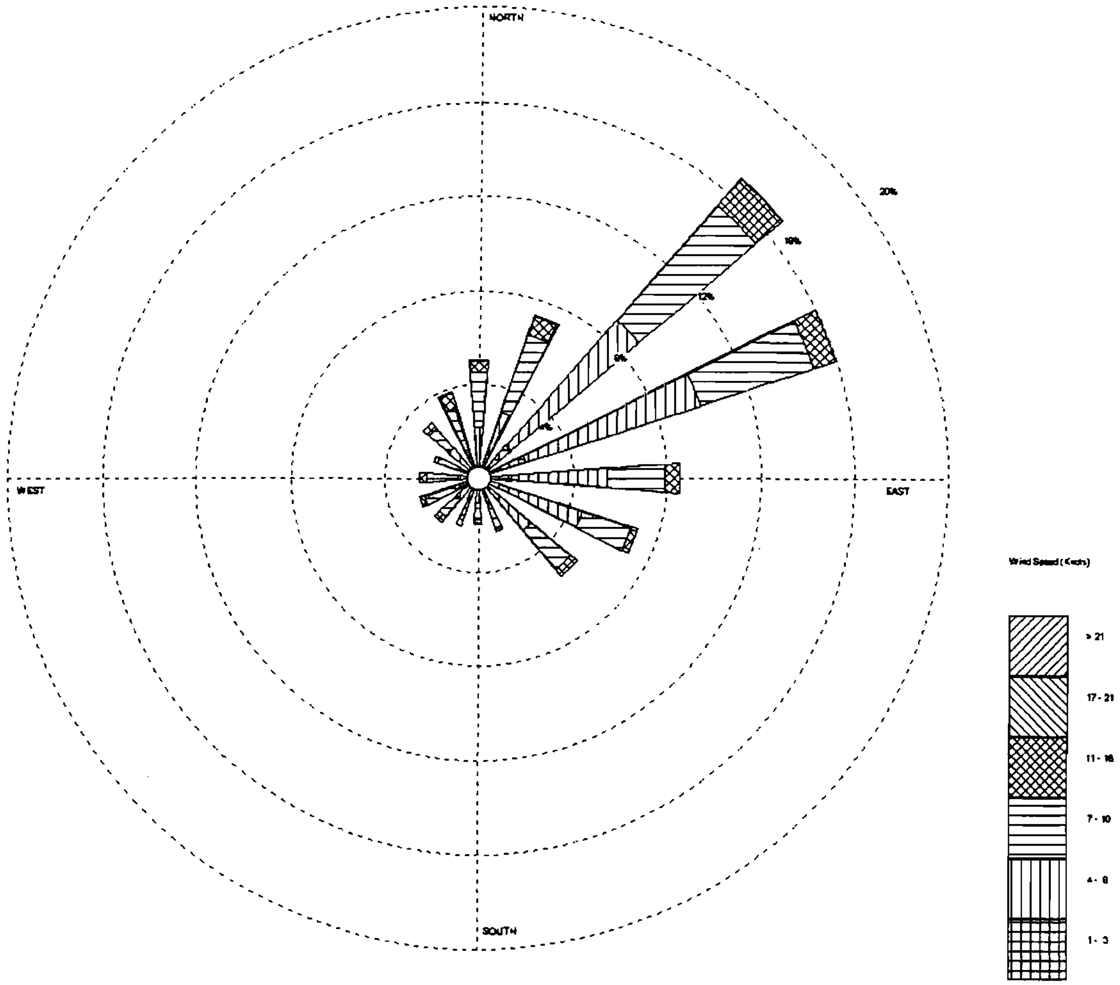
Manatee Unit 3



Average Wind Speed 6.65 Knots
Calm winds 10.6%

Source: National Climatic Data Center, 2001
Lakes Environmental Software WRPLOT View 3.05

Figure 2.3-11d. Fall Wind Rose for Tampa International Airport, Florida (Station No. 12842) September-November 1991 - 1995

Source: Golder, 2002.

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Manatee Unit 3

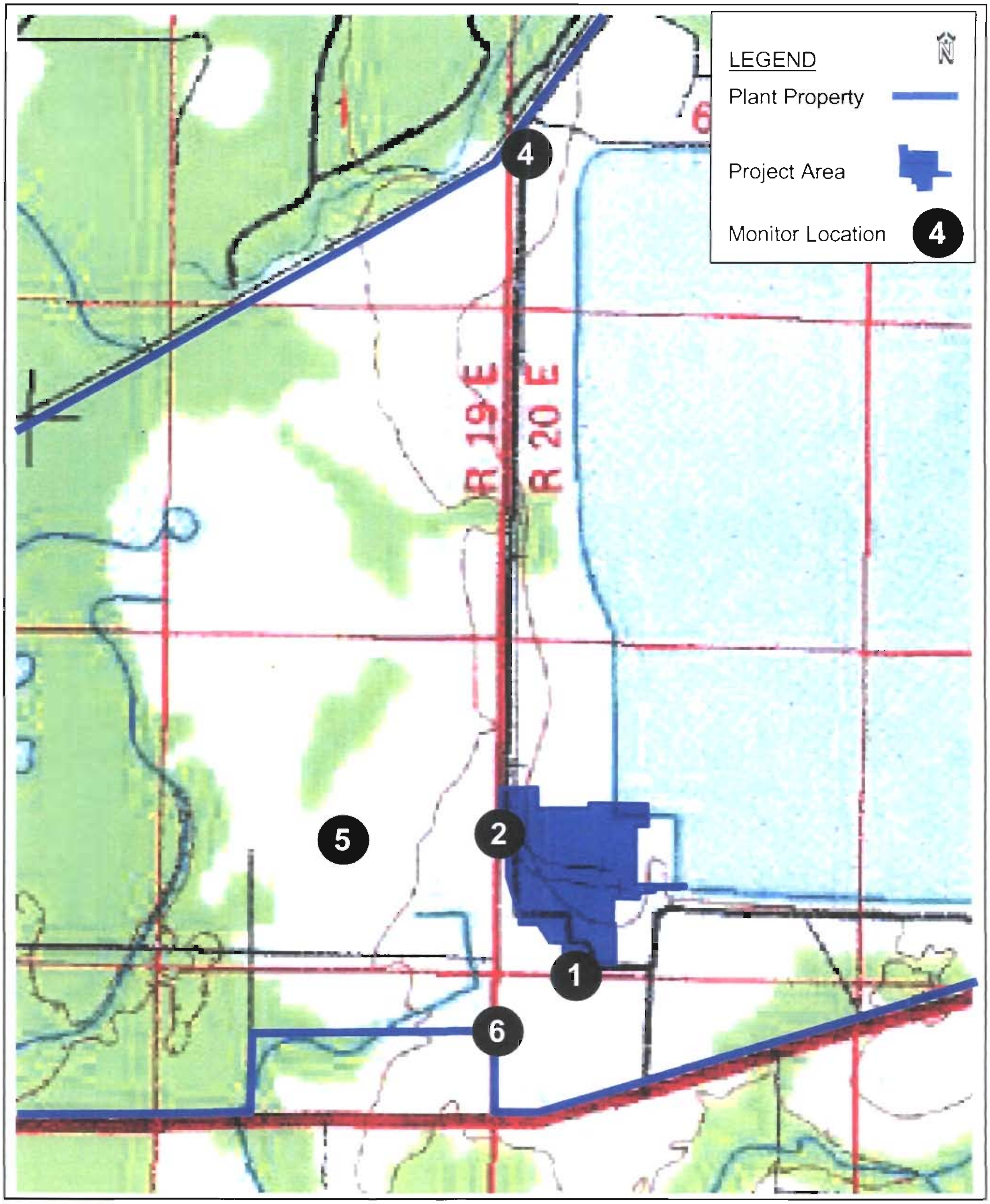

Figure 2.3-12. Baseline Noise Survey Monitoring Locations

Source: Golder, 2002.

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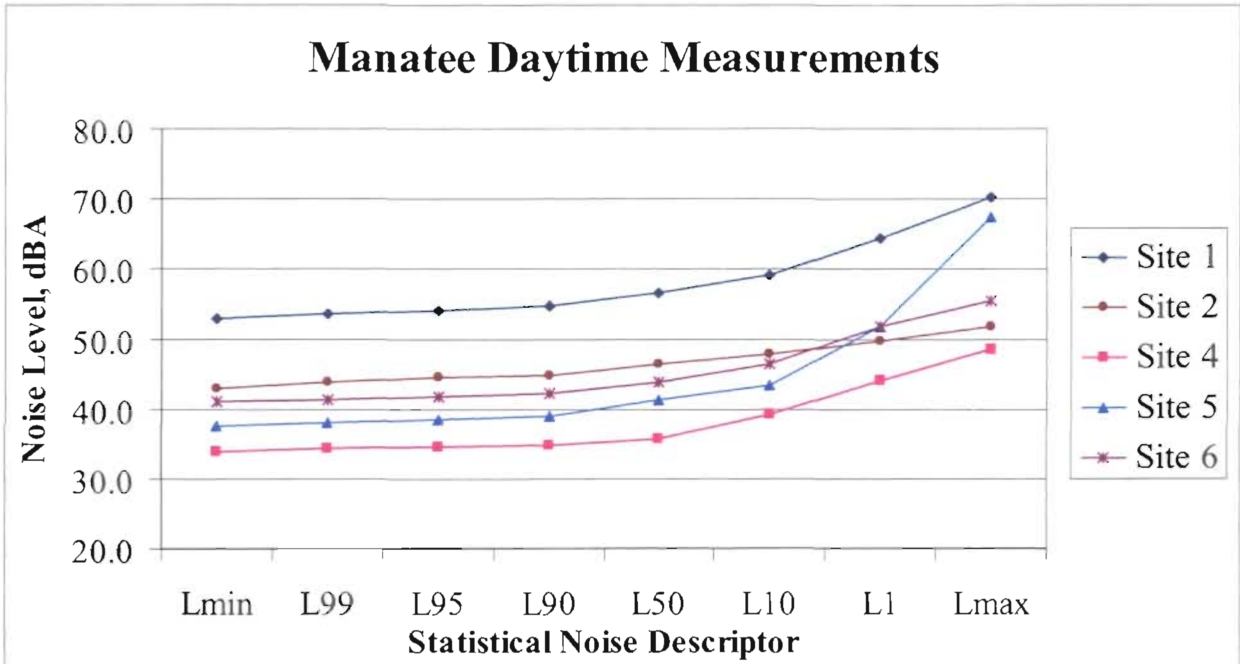
Manatee Unit 3



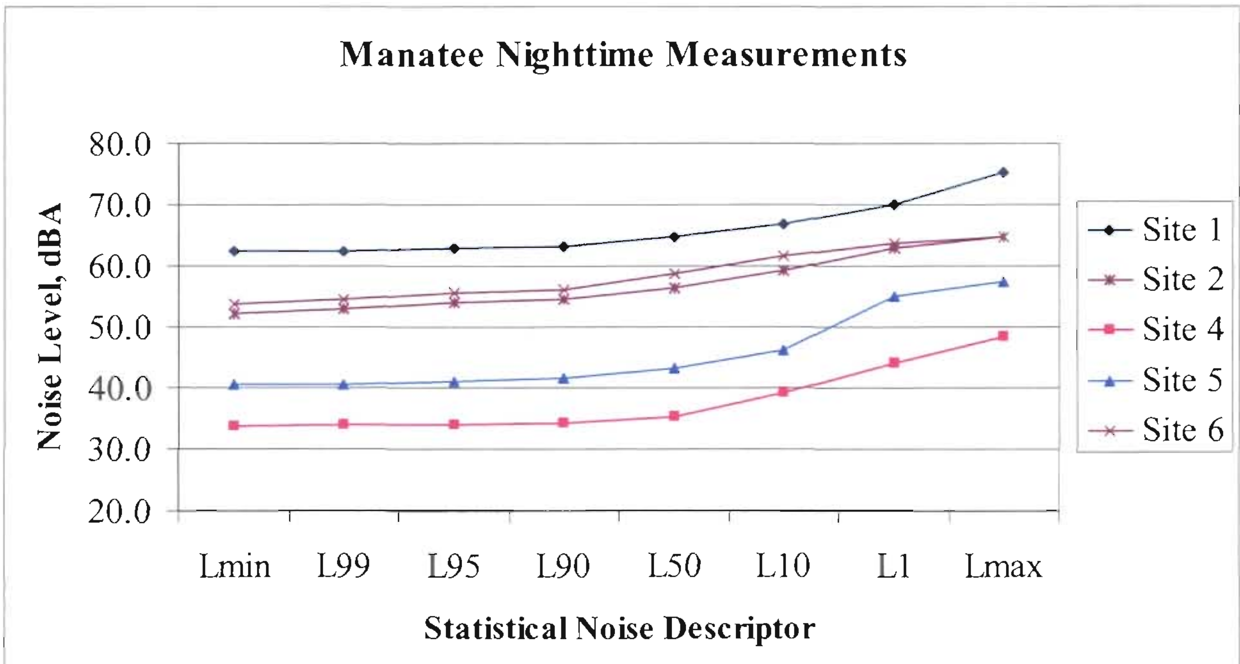


Figure 2.3-13. Observed Daytime and Nighttime Sound Pressure Levels (December 2001)

Source: Golder, 2002.

FPL

Manatee Unit 3

3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

This chapter provides a description of the Manatee Expansion Project, including the overall site layout, key components of the facility and their operation, and proposed controls for air emissions and water discharges. Fuel specifications are provided for pipeline natural gas. Estimates of the expected character, quality, and quantity of discharges and emissions from the Project are provided.

The Manatee Plant is an existing generating facility originally constructed in the early to mid 1970s, with the commercial in-service dates for Units 1 and 2 in October 1976 and December 1977, respectively. The plant consists of the following units:

- Unit 1 – 800 MW (nominal capacity)
  – Steam electric generating unit firing residual oil
- Unit 2 – 800 MW (nominal capacity)
  – Steam electric generating unit firing residual oil

Location of the new combined cycle Unit 3 at the existing Manatee Plant site, and selection of the combined cycle technology, will maximize the beneficial use of the site while minimizing environmental, land use, and cost impacts otherwise associated with development of a nominal 1,150-MW power plant. The Project will utilize a number of existing facilities, while increasing the generating capacity of the site without increasing the overall size of the site.

Unit 3 will consist of four nominal 170-MW GE "F" Class advanced CTs, with DLN combustors and four HRSGs, which will utilize waste heat from the CT to produce steam to be utilized in a new steam turbine generator. The configuration is referred to as a 4-on-1 combined cycle unit (see Figures 3.1-1 and 3.1-2). By utilizing the otherwise wasted heat from the CTs in four new HRSGs, the resulting combined cycle unit will be more efficient than the simple cycle CTs. Unit 3 will have a total nominal generating capacity of 1,150 MW (net) firing gas at an annual average ambient condition of 75 °F and 60-percent relative humidity. Duct burners are also proposed for each HRSG and are fired during peak demand periods to achieve the total nominal generating capacity. Duct firing will be limited to an equivalent of 2,880 hours per CT per year at the maximum firing rate.

Each CT unit will utilize inlet air evaporative cooling. Direct inlet fogging systems achieve adiabatic cooling using water to form fine droplets (fog). The fog droplets are produced by injection grids placed in the turbine inlet duct that use nozzles producing a fine spray. Because the continuous production of fine spray is essential to the process, demineralized water is utilized to avoid plugging due to scaling of the specially designed nozzles. The fog droplets (about 10 to 20 microns) extract the latent heat of vaporization from the gas stream when the water droplet is converted to gas. Heat is removed at a rate of 1,075 British thermal units per pound (Btu/lb) of water. The result of the fogging is a cooler more moisture-laden air stream. This allows additional power to be produced more efficiently. For the GE Frame 7FA CT, an 8°F average decrease in temperature would result in a 3.0 percent increase in power and an associated 1.2 percent decrease in heat rate. Thus, while power increases, the production of power is more efficient with concomitant lower emissions per MW-hr generated.

Each CT will be capable of power augmentation. With power augmentation, steam from the HRSG can be injected into the compressor discharge casing of each CT during periods of peak demand to increase net output. Each CT will also be capable of operation in "peak" mode. In peak mode, the firing temperature of the turbine is increased resulting in increased power. Power augmentation and peak mode together are referred to as higher power mode (HPM). Each CT will be limited to 400 hours per year.

The CTs will use natural gas as fuel. The HRSG duct burners will fire natural gas. Gas will be transported to the Project through a pipeline. NO_x emissions will be controlled using DLN combustion technology in simple cycle operation and DLN and selective catalytic reduction (SCR) in combined cycle operation.

Primary water uses for the Project will be for condenser cooling, combustion turbine inlet foggers, steam cycle makeup and service water.

Condenser cooling for the steam cycle portion of Unit 3 will be accomplished by the existing cooling pond. Service and process water for the Project will come from the cooling pond. Make up to the pond will continue to come from the Little Manatee River.

Other onsite facilities to be constructed as part of the Project will include interconnections with existing onsite infrastructure and storage facilities for ammonia, hydrogen, demineralized water, and condensate water.

Air emissions control will consist of state-of-the-art dry low-NO_x combustors and SCR. The dry low-NO_x combustor designed for the GE 7FA CTs pre-mixes natural gas with air to achieve low NO_x emission levels. These design alternatives maximize control of air emissions while balancing economic, environmental, and energy impacts [see Section 3.4 for a description of the Control Technology and a summary of best available control technology (BACT)].

The Project has been designed to minimize direct discharge to surface waters. Stormwater runoff from affected portions of the project area, excluding the power block, will be collected and routed to stormwater detention ponds, designed to meet SWFWMD and Manatee County requirements (see Section 3.8 and Appendix 10.6). Stormwater from the power block including the system substation will be treated as appropriate and recycled to the cooling pond. All wastewaters, including process water pretreatment backwash, plant and equipment drains, and neutralization unit effluent, will be treated as appropriate and recycled to the existing cooling pond.

The Project will connect to the existing onsite system substation via a new tie line. The existing onsite system substation will be expanded to accommodate the new interconnection to FPL's electric transmission system.

In addition to the onsite tie line, load flow analysis suggests an upgrade to the existing transmission network will be required to maintain system reliability when the new generation is dispatched to serve FPL's customers. FPL will upgrade its existing electrical transmission system by adding a new 230-kV transmission line between the existing Manatee system substation and FPL's existing Johnson substation in Manatee County. The transmission line will be located entirely within an existing FPL transmission line right-of-way (ROW) containing other 230-kV lines. Transmission system upgrades such as this, which occur beyond the internal connection of an electrical power plant to the established transmission network at the onsite system substation, are "integration" facilities, as distinct from "interconnection" facilities. The route of the transmission line is shown in Appendix 10.6, along with profiles of the existing and planned transmission line structures. Required permits and regulatory approvals will be obtained separately. The new 230-kV transmission line will comply with the FDEP's regulations for electric and magnetic fields set forth in Rule 62-814.460, F.A.C. as shown in Appendix 10.6.

3.2 SITE LAYOUT

The Project will be located west of the existing Units 1 and 2 on the existing 9,500-acre Manatee Plant site. Figure 3.2-1 presents the boundary of the Project area, which comprises approximately 73 acres. Figure 3.2-2 presents an overall site arrangement. A profile of the facilities is shown in Figure 3.2-3. The new CTs and associated HRSGs will be located in an area that has already been affected by existing uses at the plant. Within the Project area, 72.8 acres will be utilized for temporary and permanent facilities with about 26 acres for Unit 3 and about 30 acres for construction (laydown, parking, and construction trailers). The Project area also includes 6.4 acres occupied by the existing warehouse area and 2.5 acres for stormwater facilties.

In combined cycle mode exhaust gases will be emitted from a stack associated with each HRSG unit. In simple cycle mode exhaust gases will be emitted from either a bypass stack associated with each CT (if constructed) or the HRSG stack (see Figure 3.2-3).

3.3 FUEL

The fuel used by the CTs and the HRSG duct firing will be natural gas, delivered to the plant by pipeline. FPL has an agreement with Gulfstream Natural Gas System to supply natural gas for the existing Manatee Plant Units 1 and 2, and a new lateral from the Gulfstream main line into the Plant is planned for that purpose. Natural gas for Manatee Unit 3 may be supplied by this new lateral or from another gas supplier who would independently undertake the necessary permitting and construction activities. Typical properties of pipeline-grade natural gas are shown in Table 3.3-1. The heat content is typically 20,835 Btu/lb [lower heating value (LHV)] with a sulfur content of 2 grains per 100 standard cubic feet (gr/100 scf) of gas.

No onsite storage will be provided for natural gas.

The generating capacity of a combined cycle plant is affected by ambient temperature, with increased temperature resulting in slightly less efficient electric production. Greater overall fuel consumption will occur at lower ambient temperatures. For the purpose of calculating maximum hourly fuel use quantities, the following operating conditions for the CTs were used:

1. 35°F dry-bulb turbine inlet temperature,
2. 60 percent relative humidity, and
3. 20,835 Btu/lb heating value (LHV) of natural gas.

At these conditions, the maximum heat input is 1,674 MMBtu/hr (LHV) for each CT (100-percent capacity, 35°F). The corresponding maximum fuel usage is about 80,300 pounds per hour (lb/hr) or about 1,857 million cubic feet per hour (MMcf/hr) of natural gas for each CT. Annual fuel usage at 59°F turbine inlet temperature would be 2,691 billion pounds per year (lb/yr) or 5.9 x 10^{10} cubic feet per year (yr^3) of natural gas for the Project. The duct burners associated with each HRSG will have a maximum firing rate of 550 MMBtu/hr high heating value (HHV) or 495.5 MMBtu/hr (LHV). The maximum annual fuel usage for the duct burners is based on 2,880 hours/year per HRSG at this heat input. The maximum potential annual fuel usage for the duct burners is calculated to be 274 million lb/year or 6 billion scf/year.

3.4 AIR EMISSIONS CONTROLS

3.4.1 AIR EMISSIONS TYPES AND SOURCES

Air emissions result from either the combustion process itself or impurities in the fuel. Table 3.4-1 presents the maximum estimated emission rates of regulated pollutants for each CT/HRSG stack. The maximum estimated emission rates were determined using the manufacturer's information for the equipment proposed for the Project. The design parameters were provided for operating loads of 100 percent (baseload), 75 percent, and 50 percent capacity and for ambient temperatures of 35°F, 59°F, 75°F, and 95°F. Annual emissions were based on emissions expected for baseload and ambient temperatures of 59°F. For the four new CTs, simple cycle operation was assumed for the first year of operation to be at baseload with 3,390 hours firing only natural gas. After the first year, simple cycle operation for the four CTs would not exceed an aggregate heat input equivalent of 4,000 hours. To produce the maximum annual emissions when combined cycle operation begins, it is assumed Unit 3 would operate 1,000 hours/year in simple cycle mode and 7,760 hours/year in combined cycle mode. In combined cycle mode, the 7,760 hours firing natural gas included 2,880 hours with maximum duct firing of 550 MMBtu/hr and 400 hours power augmentation or peak firing with duct firing. The potential emissions are based on the 59°F turbine inlet temperature at 100-percent load condition since it represents a conservative average when the annual average temperatures are slightly higher than 70°F. The air permit and PSD application (see Appendix 10.1.5) presents the basis for the emission rates and maximum annual emissions of regulated and nonregulated pollutants.

During combustion, two primary types of NO_x are formed: fuel NO_x and thermal NO_x. Fuel NO_x emissions are formed through the oxidation of a portion of the nitrogen contained in the fuel. Thermal NO_x emissions are generated through the oxidation of a portion of the nitrogen contained in the combustion air. NO_x formation can be limited by lowering combustion and/or staging combustion (a reducing atmosphere followed by an oxidizing atmosphere, known as dry NO_x control).

Carbon monoxide is formed by incomplete combustion of fuel. High combustion temperatures, adequate excess air, and good fuel/air mixing during combustion will minimize CO formation. Carbon monoxide formation is limited by ensuring complete efficient combustion of the fuel in the turbines. Recent improvements in CT combustor technology allow for both reduced NO_x emissions and low CO emissions.

Emissions of NO_x for Manatee Unit 3 in combined cycle mode are proposed at concentrations of 2.5 parts per million-dry conditions (ppmvd), corrected to 15-percent O_2. In simple cycle mode, NO_x emissions will be limited to 9 and corrected to 15-percent O_2.

Emission rates for CO were established by the level of NO_x control, since dry low NO_x combustors will be used. Maximum CO emission rates for Unit 3 when firing natural gas would be 9 ppmvd at baseload operation, 24.5 ppmvd when duct firing, and 29.5 ppmvd when in power augmentation or peak mode.

Maximum SO_2 and PM_{10} emission rates are dictated by the amount of sulfur in the fuel.

3.4.2 AIR EMISSION CONTROLS

The use of clean fuel, i.e. natural gas, and combustion controls will minimize air emissions and ensure compliance with applicable emission-limiting standards. Using clean fuels will minimize emissions of SO_2, PM/PM_{10}, and other fuel-bound contaminants. Combustion controls will minimize the formation of NO_x and the formation of CO and VOCs by combustor design. Further NO_x reduction will be achieved in Unit 3 through the use of SCR when in combined cycle mode. The combination of these methods are proposed for this Project and have been determined to be BACT on previous projects based on an evaluation of economic, energy, and environmental impacts. The following subsection presents a summary of the Air Pollution Control Technology and BACT analysis, which is presented in full in the Air/PSD permit application in Appendix 10.1.5.

3.4.3 CONTROL TECHNOLOGY DESCRIPTION AND BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

BACT review is required under FDEP rules and EPA regulations pertaining to PSD. Federal regulations are codified in 40 Code of Federal Regulations (CFR) Part 52.21, and FDEP has adopted PSD regulations in FAC 62-212.400. The BACT review is part of the evaluation of control technology under the Florida PSD rules. BACT is applicable to all pollutants for which PSD review is required and is pollutant-specific. It is an emission limitation that is based on the maximum degree of reduction for each regulated pollutant which is determined to be appropriate after taking into account energy, environmental, and economic impacts and other costs. BACT cannot be any less stringent than the federal NSPS applicable to the source under evaluation.

The FDEP and EPA have established a policy for BACT review in which the most stringent control alternatives are evaluated first. The alternatives are either rejected based on technological, environmental, energy, or economic reasons or are proposed as BACT. This procedure is referred as the "top-down" approach. For the Project, BACT is applicable for emissions of particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, volatile organic compounds and sulfuric acid mist.

The applicable NSPS for the Project are those promulgated by EPA for stationary gas turbines. These NSPS (40 CFR Part 60, Subpart GG) establish emission-limiting standards for NO_x and SO_2. The applicable NSPS are:

NO_x 75 ppmvd corrected to 15 percent oxygen and heat rate plus adjustment to fuel-bound nitrogen

SO_2 no more than 0.8 percent sulfur in the fuel

Appendix 10.1.5 of the Site Certification Application contains a complete PSD application. Section 3.0 presents the regulatory applicability for the Project. Section 4.0 of that application contains the BACT evaluation for this Project and addresses those pollutants for which BACT is applicable. It includes a discussion of the environmental, economic, and energy aspects of alternative control techniques and methods. The remainder of this section briefly describes those control technologies that are proposed for the Project. For further details, refer to Section 4.0 in Appendix 10.1.5.

3.4.3.1 Nitrogen Oxides

DLN combustor technology has recently been offered and installed by CT manufacturers to reduce NO_x emissions by inhibiting thermal NO_x formation through premixing fuel and air prior to combustion and providing pre-mix combustion to reduce flame temperatures. NO_x emissions of 9 ppmvd (corrected to 15-percent O_2) have been guaranteed by GE for new CTs firing natural gas.

The NO_x emissions will be controlled using state-of-the-art DLN burners in the CTs when firing natural gas. In combined cycle operation, NO_x emissions will be further controlled by SCR systems when firing natural gas. The dry low-NO_x combustors for the advanced machines typically have premixed fuel zones plus a standard diffusion flame pilot burner for startup. Low NO_x levels are achieved by introducing fuel primarily to the pre-mix zones and reducing the amount of fuel being combusted from the pilot nozzle. The SCR systems will be installed within the HRSGs with ammonia injected into the CT exhaust to reduce NO_x emissions. Ammonia will be stored in one 20,000-gallon tank. The SCR system is designed for approximately 73 percent reduction of flue gas NO_x emissions to 2.5 ppmvd, corrected to 15-percent O_2.

SCR is a post-combustion process where NO_x in the gas stream is reacted with ammonia in the presence of a catalyst to form nitrogen and water. The reaction occurs typically between 316 and 399 degrees Celsius (°C) (600 and 750°F), which limits SCR application to combined cycle units where such temperatures occur in the HRSG. Exhausts from simple cycle operation are in the range of 538°C (1,000°F), thus limiting SCR application for this mode of operation. SCR has been installed and operated on combined cycle facilities generally achieving 9 ppmvd (corrected to 15-percent O_2) or less while burning natural gas.

The recent permitting trend for combined cycle unit's is the use of dry low-NO_x combustors and SCR. Based on the ability to control NO_x to low emission levels, an emission level of 2.5 ppmvd corrected to 15-percent oxygen is proposed for Unit 3 when firing natural gas and is equal to or lower than BACT determinations for combined cycle units made in EPA Region IV.

3.4.3.2 Carbon Monoxide

The proposed BACT emission rates for CO are 9 ppmvd at base load to 50 percent load. The maximum emission rate proposed as BACT is 24.5 ppmvd when duct firing and 29.5 ppmvd for power augmentation or peak mode. The CTs would utilize advanced combustion technology, and the proposed CO emission rates are consistent with those established as BACT.

3.4.3.3 Sulfur Oxides (SO_2 and H_2SO_4 Mist)

Post-combustion controls comprise various wet and dry flue gas desulfurization (FGD) processes. However, FGD alternatives are not feasible for use on CT facilities due to high-pressure drops across the control device. The only feasible control for combined cycle facilities are clean fuels, i.e., natural gas. Additionally, sulfuric acid mist production will be limited by fuel selection as previously described.

3.4.3.4 Particulate Matter and Other Regulated Pollutants

Post-combustion alternatives such as baghouses, scrubbers, and electrostatic precipitators are not feasible due to the high pressure drops associated with the units and the small amount of PM reduction which would occur since the Project PM emissions are minimal (i.e., these emissions are already lower than most baghouses emit). Clean-burning natural gas fuel that has low PM and trace contaminant contents are being proposed as BACT.

Emissions of other pollutants are expected to be minimal and require no additional control technology. Therefore, analysis of alternative emission controls for these other pollutants is not necessary.

3.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

Design data for the air pollution control equipment is presented in Section 4.0 of Appendix 10.1.5 (PSD Application).

3.4.5 DESIGN PHILOSOPHY

The Project minimizes air pollutant emissions by using the most efficient and pollutant-preventing generating technology. This concept has been incorporated with the selection of a combined cycle process utilizing advanced CTs. Combined cycle plants can be expected to achieve fuel conversion rates on the order of 7,000 Btu/kilowatt hours (kWh), as opposed to values in the 9,000 to 10,000 Btu/kWh range for more conventional generating plants. This is an improvement of about 25 percent. Thus, by maximizing the megawatt output per unit of fuel consumed, the air pollutant emissions per megawatt output are minimized. The selection of the most efficient CTs (the advanced type) also minimizes emissions with respect to power output. Pollution prevention is incorporated in the design by the use of clean fuels and combustion technology. Natural gas will be used. Moreover, advanced dry low-NO_x combustion technology will be used to minimize NO_x emissions while ensuring that CO and VOC emissions are within accepted limits. SCR will be installed to further reduce NO_x emissions in combined cycle mode. Taken together, the design of Project will incorporate features that will make the Project one of the most efficient and low-polluting power plants in the State of Florida.

3.5 PLANT WATER USE

The existing 4,000-acre cooling pond, with makeup provided from the Little Manatee River, will continue to be the source of cooling, service and process water for the Manatee Plant after the addition of Unit 3. The existing standby wells will remain as a backup water source. Any small increase in potable water use resulting from the addition of Unit 3 is well within the quantity permitted for the existing onsite well. The overall water management plan for the Manatee Plant, including Unit 3, is shown in Figure 3.5-1.

Makeup to the existing cooling pond is, and will continue to be, from the existing makeup water pumping station that withdraws water from the Little Manatee River in accordance with the Permit Agreement with SWFWMD. This water will continue to be pumped into the existing cooling pond, from which it will be withdrawn for Unit 3 uses, including condenser cooling, general plant service water, fire protection water, and demineralized water. The largest consumptive use will continue to be replacement of net evaporation from the cooling pond.

Process water uses for the Project will include: demineralized water use in the CT inlet fogger system, CT power augmentation, and HRSG steam-cycle makeup; and general services water use for wash downs.

The water quality of the Little Manatee River is described in Section 2.3.4. The following sections (3.5.1 through 3.5.4) provide more detailed descriptions of plant water uses.

3.5.1 CIRCULATING WATER HEAT REJECTION SYSTEM

The Unit 3 circulating water system will entail the construction of new inlet and outfall structures in the cooling pond and installation of circulating water pumps and underground supply and outfall piping. In addition to a surface condenser, an auxiliary cooling water system for equipment cooling will be installed. This system will consist of water-to-water heat exchangers and will receive cooling water from the circulating water system.

The existing cooling pond is man-made and has earth embankments. The cooling pond surface area is approximately 4,000 acres, and has a gross storage volume of 52,000 acre-ft. The normal pond water level range is between elevation 57.0 ft mean sea level (ft-msl) and elevation 67.67 ft-msl. Included within the pond are two divider dikes to prevent short circuiting between the circulating water inlet and outfall, thus enhancing the cooling pond's heat dissipation efficiency.

A spillway is provided on the north embankment. The spillway consists of three sluice gates and has a crest elevation of 68.75 ft-msl. The spillway is designed to safeguard against overtopping of the embankment in keeping with sound engineering practice. The only planned releases from the cooling pond are associated with annual testing of the spillway gates. FPL intends to continue analyzing the pond water, as required by the Units 1 and 2 Industrial Wastewater Facility Permit, prior to any such releases. If the analysis indicates that any pond constituent is present in concentrations that would exceed Class III surface water criteria, water in the stilling basin, which receives the release will be analyzed for the same constituent(s). Provided that calculations indicate that the combined discharge would meet Class III surface water criteria, the gate test will be conducted.

Seepage from the cooling pond takes place through the earth embankments, as well as through the bottom of the cooling pond. A system of toe drains is constructed around the perimeter of the cooling pond to capture the seepage through the embankments. The toe drains direct the seepage to collection sumps from which the water is returned to the cooling pond. This toe seepage collection system will return an average of approximately 3 mgd to the cooling pond.

The inlet/outfall structures for the Unit 3 circulating/cooling water systems will located in the southwest corner of the pond. The inlet structure will be approximately 100 ft long by 80 ft wide with a top elevation of 76.25 ft-msl. The structure will consists of two individual pump bays with floor elevations of approximately 37 ft-msl. Each bay will contain a coarse bar screen and a traveling water screen. Additionally, each bay contains a single circulating water pump, as well as either a cooling water pump or a wash pump, which keeps traveling screens clear of trash and vegetation.

The Manatee Plant will continue to use the existing closed loop cooling system in its current configuration, subsequent to the construction of Unit 3. There are no modifications needed to the cooling pond, the cooling water systems for Units 1 and 2, or the cooling pond makeup system to support the new Unit 3. The maximum estimated heat rejected to the cooling pond, at 100-percent load on all 3 units, is estimated to be:

Units 1 and 2	8.2 Billion Btu per hour
Units 3	2.3 Billion Btu per hour

Mathematical modeling of the thermal performance of the cooling pond has been performed to predict water usage and operating temperatures, and associated water quality. The model, and its applicability to the Manatee cooling pond, are described in detail in Appendix 10.7. The modeling is based on the period of record including water years (October 1 through September 30) 1977 through 2001. This period of record spans the operating history of Units 1 and 2, and includes the severe drought of 2000-2001. This model was employed in the mid-1990s, and was adapted at that time to estimate daily withdrawals (diversions) from the Little Manatee River based on water level in the cooling pond, flow in the river, and a revised allowable diversion schedule.

Operation of the model proceeds in a step-wise fashion month to month over the 24-year period simulating 2005 to 2028. The combination of expected plant operating loads, pond area, and meteorological conditions was used to estimate the evaporation rate from the pond and its monthly inlet and outlet temperatures. The model also predicts the number of cycles of concentration at which the pond would operate, relative to the makeup water (Little Manatee River). This information can be used to estimate the dissolved solids level in the cooling pond so that performance of the condenser cooling system can be evaluated with respect to water chemistry, and so that water quality within the pond can be predicted.

After Manatee Unit 3 begins operation, makeup water for the cooling pond will continue to be withdrawn from the Little Manatee River. The existing Permit Agreement between FPL and SWFWMD allows sufficient makeup water for operation of the Manatee Plant cooling pond with the addition of Unit 3. To minimize withdrawals from the Little Manatee River, FPL proposes to use a more restrictive schedule for diversions after Unit 3 becomes operational in mid-2005. Under this proposal, withdrawals from the Little Manatee River will generally reduce the rate of daily river flow by no more than 10 percent (see Figure 3.5-2). If the cooling pond level falls to 62 ft-msl, FPL could make withdrawals in accordance with the current Permit Agreement diversion schedule for October through July until the pond level reaches 63 ft-msl. As under the Permit Agreement, withdrawals will not be allowed to reduce stream flow below a minimum flow rate of 40 cfs, and the maximum withdrawal rate from the river is 190 cfs. FPL's proposed revised diversion schedule, in summary, includes the following conditions:

- No diversion will reduce flow in the river below 40 cfs, as measured at the USGS gauging station at Wimauma;
- Under normal conditions, diversions will not exceed 10 percent of river flow, as measured at the Manatee Plant;
- Under defined emergency conditions (cooling pond level falls to 62 ft-msl), revert to the October through July diversion schedule under the current SWFWMD Permit Agreement until the cooling pond level reaches 63 ft-msl;
- Diversions will not exceed a rate of 190 cfs.

Estimated diversions using the revised schedule and based on the modeling performed, are shown in Table 3.5-1. The overall average monthly diversion (withdrawal) is estimated to be about 8.9 MGD. Estimated pond water levels associated with operation at these diversions rates are shown on Figure 3.5-3. The modeling indicates that there would be only 3 events in a 24-year period that would qualify as "emergencies" in which the current diversion schedule would have to be used. The predicted cumulative frequency of withdrawals above 10 percent of the total river flow as shown in the annual frequency plot on Figure 3.5-4) is only 3 percent of the time.

Estimated monthly condenser inlet temperatures (the "cold" side of the cooling pond) are presented in Figure 3.5-5. Condenser outlet temperatures (the "warm" side of the pond) will be about 18°F higher. Temperatures within the pond will decay logarithmically from condenser outlet to inlet.

Estimated cycles of chemical concentration within the pond are presented in Figure 3.5-6. The cycles of concentration peaked at about 10.6, but then reduced to about 5.4. Predicted water quality in the pond at these cycles of concentrations are shown in Table 3.5-2.

Finally, simultaneous estimated water levels, condenser inlet temperatures, and cycles of concentration are shown on Figure 3.5-7, which demonstrates that peak cycles of concentration coincide with minimum cooling pond water level.

3.5.2 DOMESTIC/SANITARY WASTEWATER

Additional domestic/sanitary wastewater generated by Unit 3 will be handled by the existing system. No new facilities are planned for Unit 3.

3.5.3 POTABLE WATER SYSTEMS

Potable water uses at Unit 3 will not cause the facility to exceed existing permitted values. Potable water use will be limited by using bottled water for drinking purposes and by use of portable safety shower/eyewash stations.

3.5.4 PROCESS WATER SYSTEMS

The Manatee Plant's reverse osmosis (RO)/mixed bed (MB) demineralizer system will be used for Unit 3.

3.5.4.1 Demineralized Water

The second largest water use for the Project will be the preparation of demineralized water [i.e., conductivity < 0.1 microSiemens per centimeter (μS/cm)]. Demineralized water is required for:

- Makeup to replace blowdown from the HRSG (necessary to maintain a low dissolved solids content in the HRSG);
- Makeup to replace miscellaneous steam losses in the steam cycle;
- CT air inlet fogger cooling system feed; and
- CT power augmentation.

Raw water from the existing Manatee cooling pond will be used as service water. The service water system, among other uses, will feed the RO/MB train (Process Water Treatment System). The MBs are rental units and will be periodically regenerated offsite. The RO reject will be treated by existing plant systems for recycling to the cooling pond.

3.5.4.2 General Service Water

General service water uses, including seal water, cleaning and flushing water, and fire protection water, will be provided by the service water system.

3.5.5 WATER SUPPLY ALTERNATIVE

An evaluation of possible alternative water supply strategies for the Manatee Plant is provided in Appendix 10.10.

3.6 CHEMICAL AND BIOCIDE WASTE

Unit 3 will utilize the Manatee Plant's process water treatment system and existing associated wastewater treatment systems. The only new wastewaters generated by Unit 3 will be HRSG blowdown and equipment area storm and wash waters. HRSG blowdown will be quenched with service water and recycled to the cooling pond. Equipment area storm and wash waters will be passed through an oil/water separator and then recycled to the cooling pond.

The principal uses of chemicals and biocides will be for steam cycle water quality control, chemical cleaning of the boiler and preboiler piping systems, and miscellaneous chemical drains.

3.6.1 COOLING SYSTEM WATER CHEMICAL TREATMENT

Intermittent shock chlorination or other oxidizing or nonoxidizing biocides will be used to prevent biofouling of the heat rejection system. A chlorine solution will be fed into the intake structure for the heat rejection system, as appropriate for the project's configuration.

3.6.2 STEAM CYCLE WATER TREATMENT

The steam-condensate-feedwater cycle will be chemically treated to prevent corrosion or scaling of the condensate piping and the HRSG preboiler piping and boiler drums. The steam cycle water will be treated with an oxygen scavenger, such as hydrazine, for dissolved oxygen control and with ammonia or an amine for pH control. Sodium phosphate will be fed to the boiler for control of pH and hardness. Residual phosphate in the boiler will react with hardness to form a nonadherent precipitate that can be removed through boiler blowdown.

3.6.3 SANITARY WASTEWATER TREATMENT

No additional sanitary treatment system will be required.

3.6.4 MAKEUP WATER DEMINERALIZATION

As discussed in Section 3.5.4, the makeup water to the steam cycle will be demineralized using the existing plant RO/MB type demineralizer train. The existing treatment equipment will be upgraded as necessary to reliably deliver the design flow rate. The resulting RO reject will be treated by existing plant systems for recycle to the cooling pond.

3.6.5 CHEMICAL CLEANING

The HRSG boiler and preboiler piping will be chemically cleaned initially during commissioning and also periodically during the life of the plant. The chemicals used will not be permanently stored onsite but will be delivered to the site by a licensed contractor at the time of the scheduled periodic cleanings. The chemical cleaning solutions to be used for acid and alkaline cleaning of the HRSG will be dependent on the HRSG manufacturer selected. The actual cleaning solutions used must be consistent with the HRSG manufacturer's recommendations. Chemicals typically used in HRSG and feedwater pipe cleaning include the following:

1. Inhibited citric acid,
2. Aqueous Ammonia,
3. Organic Chelates, such as EDTA,
4. Disodium phosphate,
5. Trisodium phosphate,
6. Nonfoaming wetting agents, and
7. Foam inhibitors.

Wastewaters will consist of the cleaning solutions and material removed during the cleaning process. The chemical cleaning contractor will dispose of the chemical cleaning wastes offsite.

Since chemical cleaning is an infrequent maintenance operation, it does not contribute to the liquid wastes produced by the normal operation of the plant.

3.6.6 MISCELLANEOUS CHEMICAL DRAINS

Chemical wastewater can result from draining a chemical storage tank or from cleaning and maintenance operations such as washdown of chemical storage areas. Chemical wastes will be contained and either scavenged locally or routed to the existing neutralization system for treatment.

Flows from the miscellaneous chemical drains will be intermittent and will not normally contribute to the wastewater flows. Periodic off-line washes of the combustion turbines using water or a detergent-water solution will also produce chemical wastes. These wastes are collected in a tank and pumped out by a licensed contractor for offsite disposal or routed to the wastewater system.

3.7 SOLID AND HAZARDOUS WASTE

3.7.1 SOLID WASTE

Only small quantities of solid wastes will be generated by the Project since there will be no ash or FGD waste generated. Solid wastes will be limited to municipal solid waste and infrequent replacement of inlet air filters. Periodic replacement of SCR catalyst will be recycled or disposed of according to applicable requirements. All municipal solid wastes will be disposed of by an approved trash disposal contractor.

3.7.2 HAZARDOUS WASTE

Generation of hazardous waste at the facility will be limited to periodic chemical cleaning of the boilers [less than 100 kilograms (kg)/month] of spent solvents and other chemicals. These wastes will be collected onsite and disposed of by a licensed hazardous waste contractor. Hazardous waste will be stored onsite only for limited periods of time as allowed under 40 CFR 262.34.

3.8 ONSITE DRAINAGE SYSTEM

Site drainage facilities for the Project will be constructed and designed in accordance with applicable federal, state, regional, and local regulations for water quality and water quantity control. A plant site drainage system of catch basins, pipes, channels, culverts and pumps will convey runoff to the site drainage system of channels and ponds. A conceptual stormwater management plan (see Figures 3.8-1 through 3.8-5) and calculations for the Project are presented in the Appendix 10.8.

3.8.1 STORMWATER DETENTION PONDS

Non-contact surface runoff from the area disturbed for new facility construction and operation will be collected and routed to two new drainage ponds, located in the north and south portion of the site and to the existing cooling pond. Existing drainage patterns will be separated from the new Unit 3 areas. Stormwater flow from basins in the Project area is routed to the new two stormwater ponds and the cooling pond is shown as Figure 3.8-1. The stormwater system will be designed in order to be adequate in handling the entire 25-year, 24-hour storm. The perimeter roads surrounding the Unit 3 CT/HRSG area will contain the runoff from the 100-year, 24-hour storm.

3.8.2 STORMWATER RUNOFF CONTROL DURING CONSTRUCTION

Stormwater runoff ponds constructed in the south end and northwest ends of the Project area will be utilized during construction of the Project to prevent sediment transmission offsite. These ponds will be used to collect construction runoff and sediment while final construction of the Project stormwater drainage system is complete.

Prior to beginning any earth disturbing activities, a silt fence will be installed along the perimeter of the project where runoff to offsite areas is expected. This silt fence will filter sediments from construction runoff. During construction, the extent of earth disturbances will be minimized as much as is practical. Areas outside of cut and fill operations will be protected against unnecessary equipment traffic. Aggregate-surfaced areas will be provided for roads, while limerock surfacing will be provided for new laydown areas. Existing asphalt surfacing will remain in the construction parking and warehouse areas.

Temporary erosion and sedimentation control measures will be designed to prevent sediment from being displaced and carried offsite by construction runoff. Erosion control during construction will include periodic spraying of water to minimize fugitive dust from the project area. Silt fences, and inlet and outlet protection will be used at catch basins and culverts to assist in sediment control. As necessary, sediment collected during construction will be removed and disposed of onsite. All temporary sediment and erosion control measures will be removed at the end of construction.

3.8.3 SITE DRAINAGE

Generally, the drainage in the area of the CT/HRSG, water tanks and system substation areas will be directed away from the structures and routed to catch basins. The water from these catch basins will be pumped to the new outfall structure and recycled to the existing cooling pond. The CT/HRSG, tanks and system substation areas will be graded with moderate slopes for effective drainage. The perimeter roads surrounding the Unit 3 CT/HRSG area will contain the runoff from the 100-year, 24-hour storm.

Remaining runoff from disturbed portions of the Project area will be conveyed to the stormwater detention ponds through a drainage system of pipes, channels, and culverts (see Appendix 10.8).

3.8.4 PLANT MAINTENANCE AREA

A small berm will be constructed around the plant maintenance area which will be used for laydown during CT/ST overhauls. The berm height will be set to contain the 100-year, 24-hour storm. Stormwater drainage will be conveyed by a controlled discharge to the oil/water separator and then routed to the stormwater system that discharges to the cooling pond.

3.9 MATERIALS HANDLING

3.9.1 CONSTRUCTION MATERIALS AND EQUIPMENT

Construction materials and equipment will be delivered to the site by existing roads and railroads. The existing access road will be used during construction and operation of the Project.

Materials will be unloaded and moved around the site using portable cranes and trucks. Some of the heaviest items such as the new CTs, new steam turbines, electric generators, HRSGs, and transformers may require rail delivery as discussed in Section 3.9.3. Pollution control measures for the laydown areas will include runoff collection as described in Section 3.8. Main roads in the laydown areas will be surfaced with aggregate/limerock and treated with water or a dust palliative to reduce dust. Water sprays will also be used, as required, to control dust due to traffic.

3.9.2 ROADS

Construction trucks will travel to the Manatee Plant site via SR 62 and the existing site access road. This route was used during construction of the existing units, and continues in use for operational purposes.

3.9.3 RAILROAD

A railroad branch-line currently runs to the Project area on the site. Rail deliveries of construction materials and equipment for the facility will be off-loaded at a rail siding in the Project. This line can accommodate the shipments required for the Project. FPL will repair and maintain the track as needed to continue the line's compliance with the Federal Railroad Administration's track standards, including any repair or rehabilitation of rail, cross ties, ballast, alignment, and trestles as needed.

Table 3.3-1. Typical Natural Gas Composition

Composition	Mole %
Nitrogen (N_2)	0.27 - 0.45
Helium (He)	0.01
Carbon Dioxide (CO_2)	0.44 - 0.88
Methane (CH_4)	96 - 97.0
Ethane (C_2H_6)	1.8 - 2.6
Propane (C_3H_8)	0.16 - 0.29
Butane (C_4H_{10})	0.011 - 0.017
Pentanes (C_5H_{12})	0.007 - 0.03
Hexanes (C_6H_{14})	0.03
Heptanes (C_7H_{16})	0.01
Octanes (C_8H_{18})	0.0
Argon, Oxygen (Ar, O_2)	0.0
Sulfur (S)	2 grains per 100 scf
Water Vapor (H_2O)	0.6 lb/MMscf

Low Heating Value (LHV) - 20,835 Btu/lb; 950 Btu/cf

High Heating Value (HHV) - 23,127 Btu/lb; 1,055 Btu/cf

Note: scf = standard cubic feet

MM = million

Table 3.4-1. Summary of Maximum Potential Annual Emissions for the FPL Manatee Expansion Project

Pollutant	Annual Emissions (tons/year)						PSD Significant Emission Rate (tons/year)	PSD Review Required?
	Year 1[a]			Year 2[b]				
	4 CTs Simple Cycle	4 Natural Gas Fuel Heaters	TOTAL	4 CTs/HRSGs with Duct Burners	4 Natural Gas Fuel Heaters	TOTAL		
SO2	66	0.17	67	191	0.13	191	40	Yes
PM	61.0	0.38	61	228	0.29	229	25	Yes
PM10	61.0	0.38	61	228	0.29	229	15	Yes
NOx	403	6.2	409	417	4.7	422	40	Yes
CO	189	4.7	194	784	3.6	788	100	Yes
VOC (as methane)	18.6	0.27	19	106	0.20	106	40	Yes
Sulfuric Acid Mist	6.6	NA	6.6	21.1	NA	21.1	7	Yes
Lead	0.000	NA	0.000	0.000	NA	0.000	0.6	No

[a] Year 1 operated only in simple cycle mode for 4 CTs with 3,390 hours firing gas (at 100 percent load).

[b] Year 2 and Future is based on: (1) combined cycle for 7,760 hours firing gas (with 2,880 hours duct firing and 400 hours power augmentation or peak firing with duct firing); (2) simple cycle operation for 1,000 hours on gas.

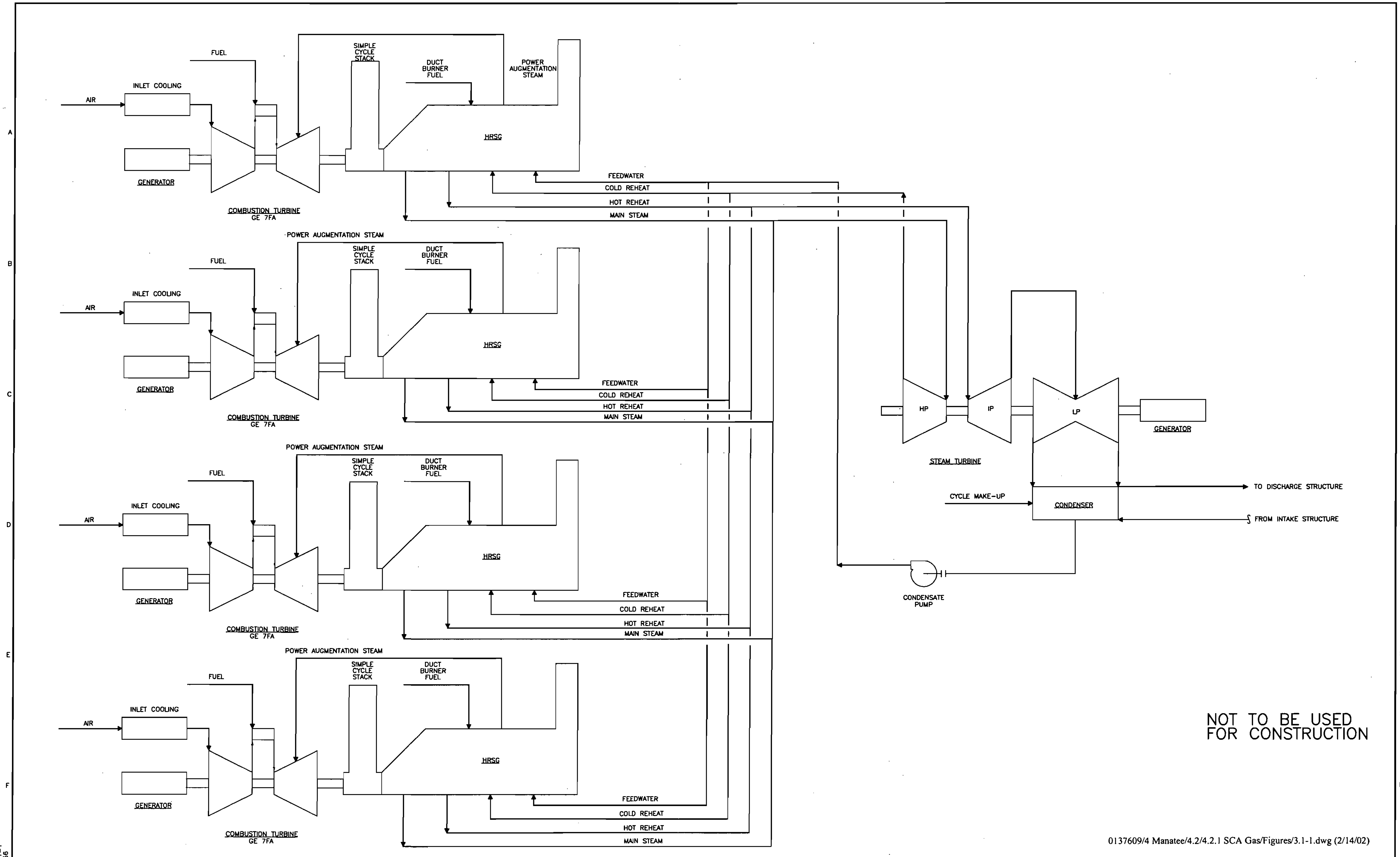
Note: Refer to Appendix 10.1.5 for more detail.

Table 3.5-1. Estimated Monthly River Diversions (MGD) with Unit 3 Added

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
1	0.00	0.00	0.00	0.00	0.00	0.00	1.23	4.06	5.73	28.12	15.52	2.85	4.79
2	2.57	0.00	1.27	15.94	4.08	6.61	0.00	5.82	1.39	4.35	15.83	14.40	6.02
3	16.43	3.89	4.34	5.64	6.69	5.11	7.40	8.38	6.29	5.81	7.19	15.24	7.70
4	1.42	0.92	0.69	1.52	8.11	2.15	0.00	2.34	4.13	6.83	50.09	32.74	9.24
5	3.14	0.50	1.53	3.37	6.29	14.22	6.76	8.71	35.03	24.05	19.93	32.26	12.98
6	10.99	5.63	2.51	3.82	1.23	0.00	11.18	1.94	10.04	22.67	9.29	0.00	6.61
7	6.76	4.79	0.00	7.98	9.41	9.02	5.67	1.90	0.15	6.07	10.50	4.56	5.57
8	0.81	0.55	0.05	2.24	4.08	4.18	1.27	0.57	3.24	2.80	10.79	16.55	3.93
9	4.17	3.67	1.70	5.50	6.05	12.38	3.49	1.88	28.76	43.71	84.87	10.40	17.22
10	5.27	5.20	3.46	7.75	4.55	21.45	16.00	21.57	2.86	14.53	16.75	8.85	10.69
11	5.72	10.91	5.01	6.88	9.00	13.45	4.17	2.05	1.17	10.14	24.18	36.58	10.77
12	7.07	9.64	4.73	7.68	4.62	6.85	2.21	0.22	2.29	19.89	11.50	25.45	8.51
13	8.36	5.51	10.77	5.44	8.57	3.63	1.47	0.24	3.78	15.87	5.57	3.55	6.06
14	11.23	1.65	0.14	5.87	0.09	33.05	13.76	46.31	14.76	33.84	24.56	7.22	16.04
15	1.96	0.00	0.09	0.15	9.83	5.16	9.90	2.97	28.98	24.21	28.71	15.98	10.66
16	8.18	3.90	3.56	12.20	7.21	12.60	12.30	2.70	4.50	3.45	3.80	17.97	7.70
17	8.35	8.31	2.12	9.63	4.36	6.08	5.54	1.29	22.77	22.51	34.08	5.38	10.87
18	11.92	5.22	6.49	8.36	8.10	4.26	3.44	0.57	5.59	22.84	18.97	10.82	8.88
19	9.36	0.00	4.31	0.00	7.42	9.61	6.73	7.77	10.88	11.22	4.37	2.57	6.19
20	2.28	0.04	2.18	0.41	0.71	1.60	4.76	4.84	4.05	15.20	22.08	19.36	6.46
21	10.20	28.39	0.44	0.00	0.00	0.00	0.00	2.90	0.35	4.79	10.89	20.01	6.50
22	14.31	9.92	5.60	6.06	5.24	3.58	0.00	0.96	14.00	11.51	13.03	9.57	7.82
23	7.89	4.15	4.78	2.76	1.32	0.23	0.12	0.00	1.50	7.41	8.10	18.78	4.75
24	0.51	0.32	0.09	0.00	0.00	1.91	1.32	0.00	10.43	79.35	78.97	46.07	18.25
Maximum	16.43	28.39	10.77	15.94	9.83	33.05	16.00	46.31	35.03	79.35	84.87	46.07	35.17
Average	6.62	4.71	2.74	4.97	4.87	7.38	4.95	5.42	9.28	18.38	22.06	15.71	8.93
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	2.80	3.80	0.00	0.56

Table 3.5-2. Estimated Cooling Pond Chemical Concentrations

Constituent (mg/l)	Long Term Average River Concentration	Peak Cooling Pond Concentration	Final Cooling Pond Concentration
Alkalinity (Bicarbonate)	35.100	372.159	189.639
Alkalinity (Carbonate)	0.000	0.000	0.000
Alkalinity, Total	35.100	372.159	189.639
Aluminum	0.294	3.116	1.588
Ammonia Nitrogen	0.050	0.530	0.270
Antimony	0.000	0.000	0.000
Arsenic	0.000	0.000	0.000
Asbestos	0.000	0.000	0.000
Barium dissolved	0.050	0.562	0.302
Barium total	0.050	0.562	0.302
Berylium	0.000	0.000	0.000
Cadmium	0.000	0.000	0.000
Calcium	21.400	263.665	152.385
Chloride	17.500	236.690	145.690
Chromium	0.000	0.000	0.000
Copper (dissolved)	0.004	0.040	0.020
Copper (total)	0.005	0.050	0.026
Cyanide	0.000	0.000	0.000
Fluoride	0.450	5.457	3.117
Hardness	98.000	1127.133	617.533
Iron (dissolved)	0.213	2.259	1.151
Iron (total)	0.360	3.817	1.945
Lead (dissolved)	0.000	0.000	0.000
Lead (total)	0.000	0.000	0.000
Magnesium	0.011	165.988	109.828
Manganese (dissolved)	0.010	0.106	0.054
Manganese (total)	0.015	0.159	0.081
Mercury	0.000	0.000	0.000
Nickel (dissolved)	0.006	0.064	0.032
Nickel (total)	0.006	0.064	0.032
Nitrate	0.620	7.227	4.003
Nitrite	0.000	0.000	0.000
Nitrate + Nitrite	0.620	7.227	4.003
Oil & Grease	0.500	5.300	2.700
Ortho-Phosphate	0.000	0.000	0.000
Potassium	0.005	67.637	39.557
Selenium	0.000	0.000	0.000
Silver	0.000	0.000	0.000
Sodium	17.400	265.353	174.873
Specific Conductance	262.500	3151.548	1786.548
Sulfate	72.500	908.698	531.698
Sulfides	0.280	2.968	1.512
TDS	223.000	2863.800	1704.200
Thallium	0.000	0.000	0.000
Total Phosphate	0.470	5.002	2.558
Turbidity (NTU)	6.500	68.900	35.100
Vanadium (dissolved)	0.003	0.035	0.018
Zinc (dissolved)	0.004	0.037	0.019
Zinc (total)	0.004	0.043	0.022



0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.1-1.dwg (2/14/02)

ACAD 15.05 D1 1=1 14:10:56
RUM02825 A1ASL015 01/07/02

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FLORIDA POWER & LIGHT
MANATEE UNIT 3 COMBINED CYCLE PROJECT

MANATEE EXPANSION
PROJECT FLOW DIAGRAM

PROJECT DRAWING NUMBER: 130770-3STA-S0005
REV: A
CODE
AREA

Figure 3.1-1

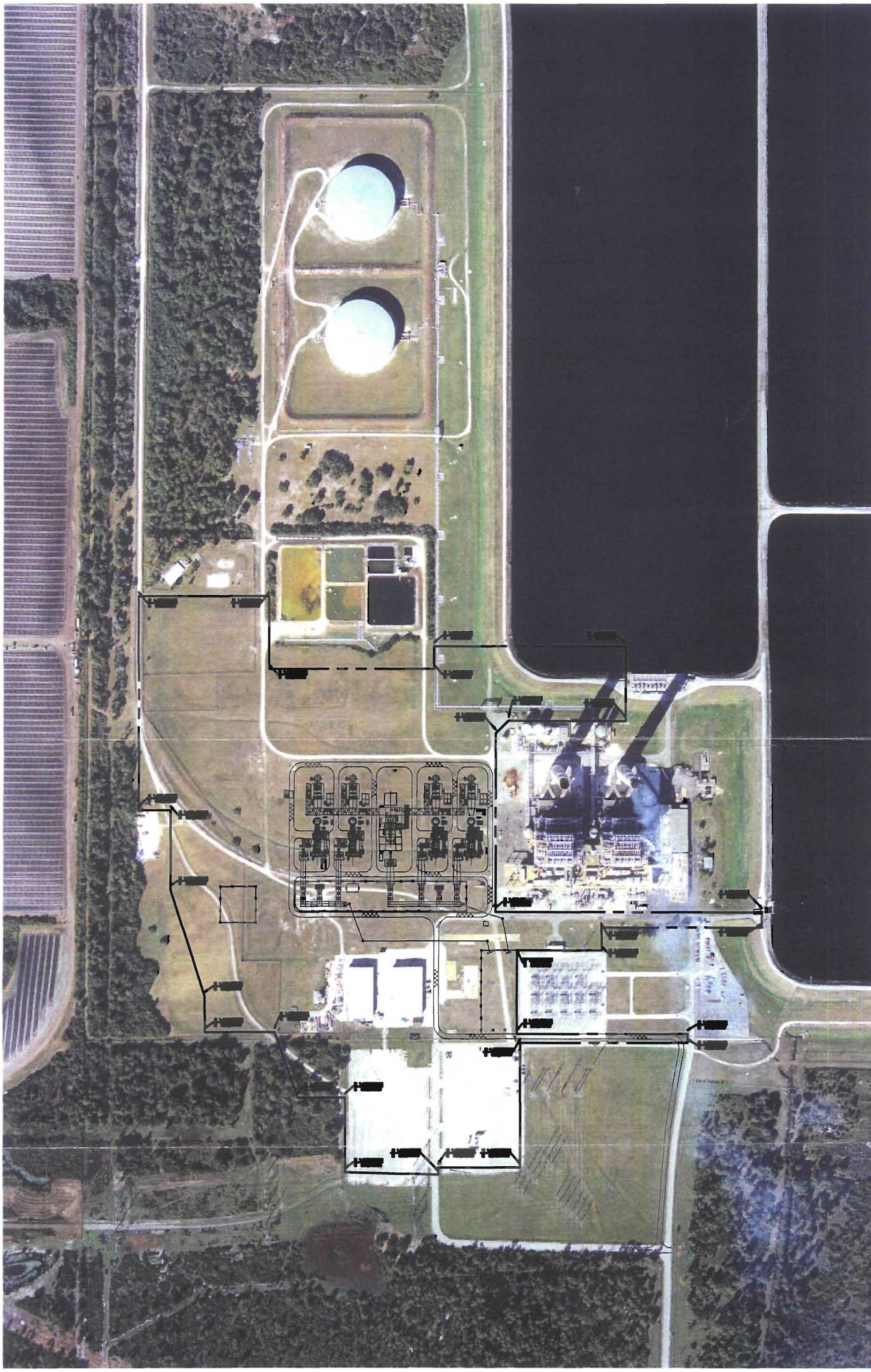
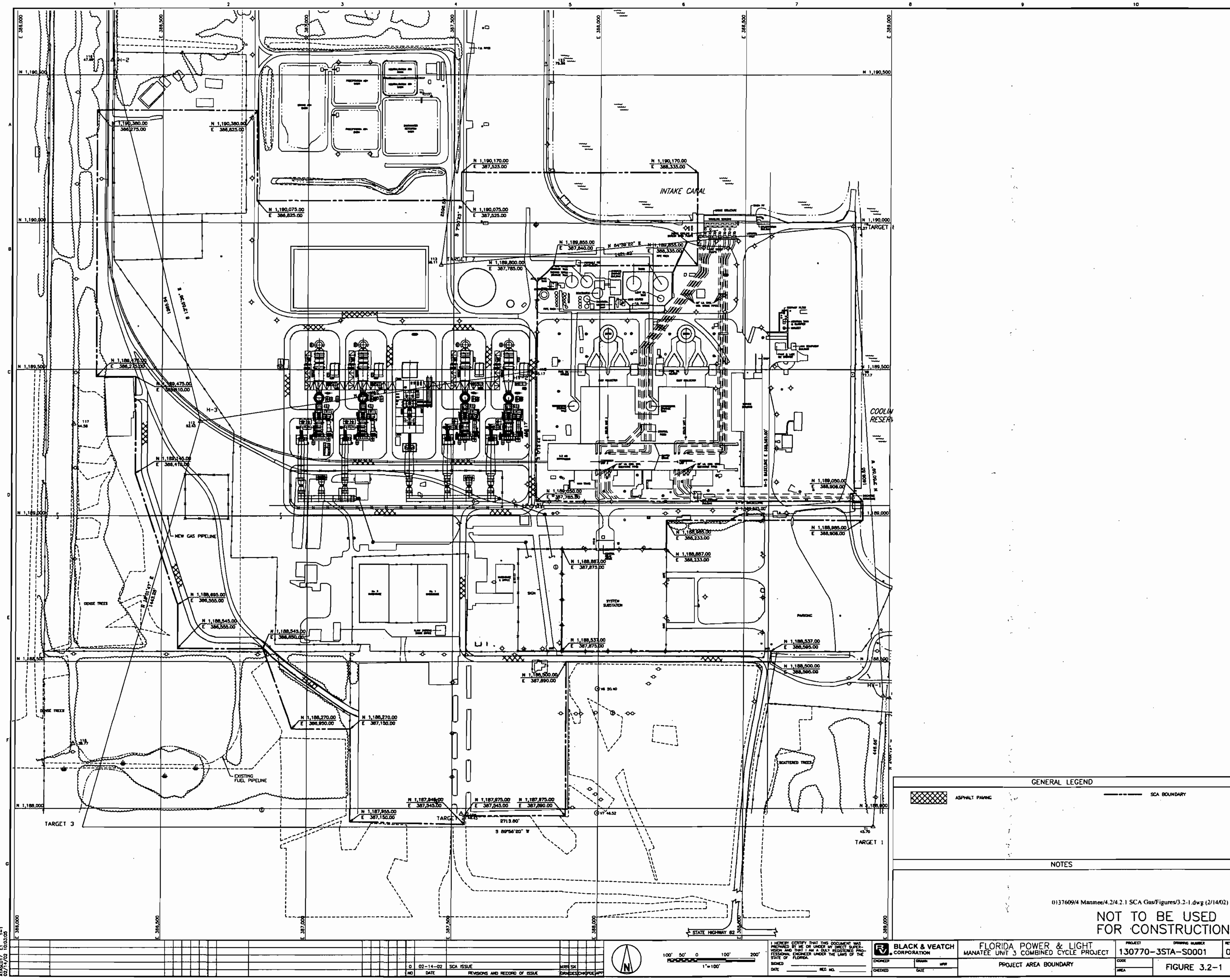


Figure 3.1-2 Unit 3 on Aerial Photograph

Source: FPL, 2001 : B&V, 2002

FPL
Manatee Unit 3


INTAKE CANAL
NEW GAS PIPELINE
EXISTING FUEL PIPELINE
DENSE TREES
SCATTERED TREES
PARKING
SWITCH SUBSTATION
STATE HIGHWAY 62
TARGET 1
TARGET 3
N 1,190,500
N 1,190,000
N 1,189,500
N 1,189,000
N 1,188,500
N 1,188,000
E 386,000
E 386,500
E 387,000
E 387,500
E 388,000
E 388,500
E 389,000
S 89°56'20" W
2713.60'
GENERAL LEGEND
ASPHALT PAVING
SCA BOUNDARY
NOTES
0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.2-1.dwg (2/14/02)
NOT TO BE USED
FOR CONSTRUCTION
0 02-14-02 SCA ISSUE
NO DATE REVISIONS AND RECORD OF ISSUE
1"=100'
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BLACK & VEATCH CORPORATION
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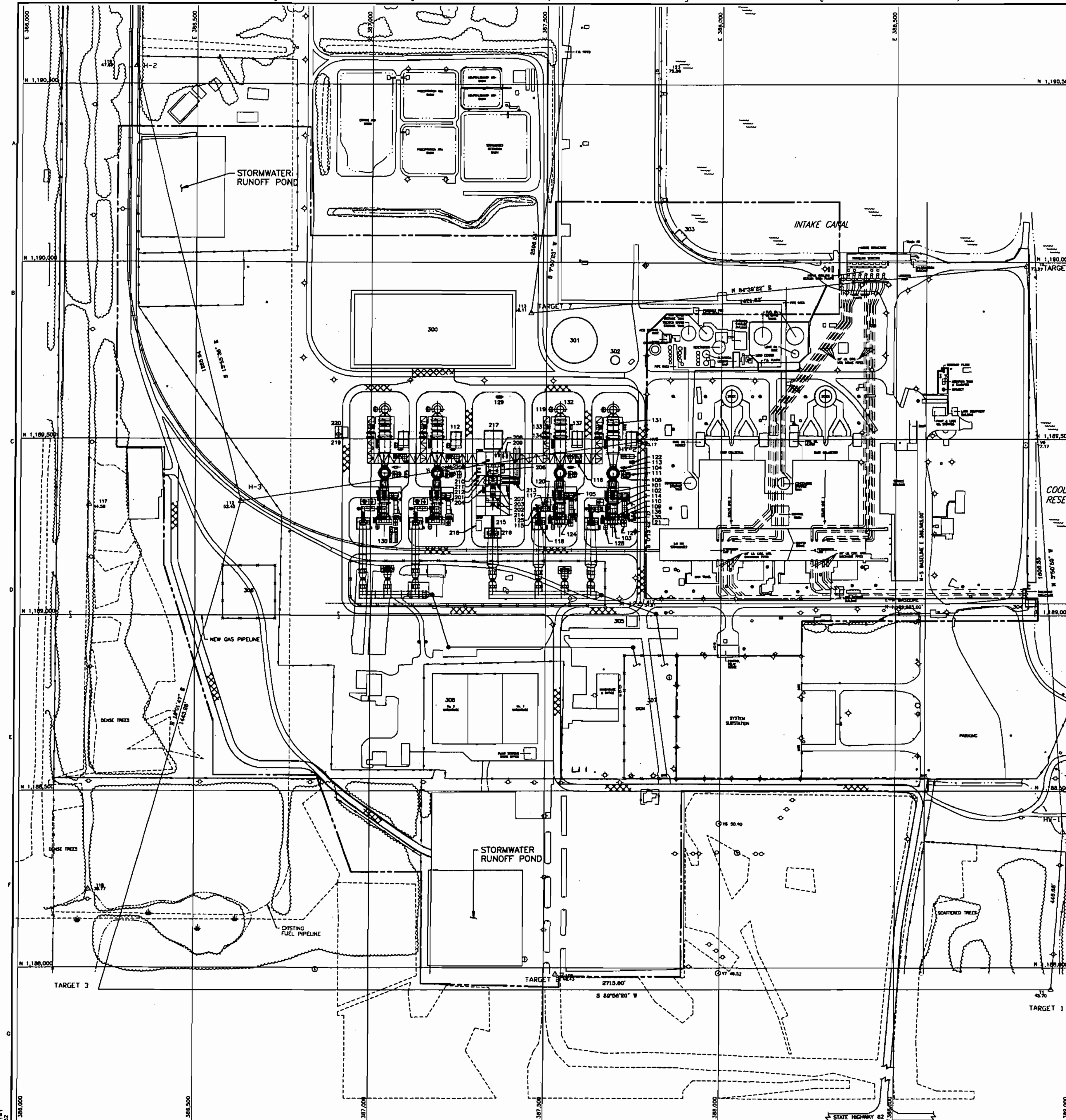
DATE
FLORIDA POWER & LIGHT
MANATEE UNIT 3 COMBINED CYCLE PROJECT
PROJECT AREA BOUNDARY
PROJECT
DRAWING NUMBER
130770-3STA-S0001
REV
0
CODE
AREA
FIGURE 3.2-1

Best Available Copy



FACILITIES LEGEND

ID	FACILITY	TIEDOWN LOCATION NORTH	TIEDOWN LOCATION EAST	REMARKS
101	CT3A COMBUSTION TURBINE	–	–	–
102	CT3A GENERATOR	–	–	–
103	CT3A INLET AIR FILTER	–	–	–
104	CT3A EXHAUST STACK	–	–	–
105	CT3B ACCESSORY MODULE	–	–	–
106	NOT USED	–	–	–
107	NOT USED	–	–	–
108	CT3A DRAINS TANK	–	–	–
109	CT3A STARTUP AIR COMPRESSOR	–	–	–
110	CT3A AIR DRYER	–	–	–
111	CT3A WATER WASH DRAINS TANK (BURIED)	–	–	–
112	CT3C COOLING WATER MODULE	–	–	–
113	CT3A FIRE PROTECTION / CO2 SKID	–	–	–
114	CT3A PEECC	–	–	–
115	CT3B ISOLATED PHASE BUS DUCT	–	–	–
116	CT3B FUEL GAS SCRUBBER DRAINS TANK	–	–	–
117	CT3B LCI / EX2000	–	–	–
118	CT3B MAIN STEP-UP TRANSFORMER	–	–	–
119	CT3B CONTINUOUS EMISSION MONITORING EQUIP.	–	–	–
120	CT3B EXCITATION TRANSFORMER	–	–	–
121	CT3A MCC	–	–	–
122	CT3A FUEL GAS SCRUBBER	–	–	–
123	CT3B LCI ISOLATION TRANSFORMER (NOT SHOWN)	–	–	–
124	CT3B 480V SECONDARY UNIT SUBSTATION	–	–	–
125	CT3B DC LINK REACTOR	–	–	–
126	FUEL GAS HEATER-DIRECT FIRED (NOT SHOWN)	–	–	–
127	CT3A 480V SUS TRANSFORMER	–	–	–
128	CT3A FOGGER SKID	–	–	–
129	OIL/WATER SEPARATOR	–	–	–
130	CT3D 4160V SWITCHGEAR (NOT SHOWN)	–	–	–
131	CT3A HEAT RECOVERY STEAM GENERATOR	–	–	–
132	CT3B HRSG EXHAUST STACK	–	–	–
133	CT3B HRSG BLOW DOWN TANK	–	–	–
134	CT3B BOILER FEED PUMPS	–	–	–
135	CONSTRUCTION SWITCHBOARD	–	–	–
136	CONSTRUCTION TRANSFORMER	–	–	–
137	CT3B AMMONIA SKID ASSEMBLY	–	–	–
201	STEAM TURBINE	–	–	–
202	STEAM TURBINE GENERATOR	–	–	–
203	STEAM TURBINE CONDENSER	–	–	–
204	CONDENSATE PUMP	–	–	–
205	EHC UNIT	–	–	–
206	STEAM TURBINE LUBE OIL STORAGE TANK	–	–	–
207	STEAM TURBINE GENERATOR SEAL OIL UNIT (NOT SHOWN)	–	–	–
208	CLOSED CYCLE COOLING WATER PUMP	–	–	–
209	CLOSED CYCLE COOLING WATER HEAT EXCHANGER	–	–	–
210	AIR COMPRESSORS	–	–	–
211	AIR RECEIVER	–	–	–
212	AIR DRYER	–	–	–
213	CIRCULATING WATER PIPING	–	–	–
214	STEAM TURBINE EXCITATION COMPARTMENT	–	–	–
215	ISOLATED PHASE BUS DUCT	–	–	–
216	STEAM TURBINE MAIN STEP-UP TRANSFORMER	–	–	–
217	AUXILIARY CONDENSER	–	–	–
218	4160V SWITCHGEAR	–	–	–
219	AMMONIA STORAGE TANK	–	–	–
220	AMMONIA FORWARDING PUMPS	–	–	–
221	CIRCULATING WATER PUMPS	–	–	–
300	PLANT MAINTENANCE AREA	–	–	–
301	DEMINERALIZED WATER TANK	–	–	–
302	CONDENSATE TANK	–	–	–
303	NEW INTAKE STRUCTURE	–	–	–
304	NEW DISCHARGE STRUCTURE	–	–	–
305	STORM WATER DRAINAGE PUMP STATION	–	–	–
306	GAS YARD	–	–	–
307	NEW SYSTEM SUBSTATION EXPANSION	–	–	–
308	WAREHOUSE	–	–	–
309	NOT USED	–	–	–

GENERAL LEGEND

ASPHALT PAVING

SCA BOUNDARY

SECURITY FENCE

NOTES

0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.2-2.dwg (2/14/02)

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100' 50' 0 100' 200'
1" = 100'

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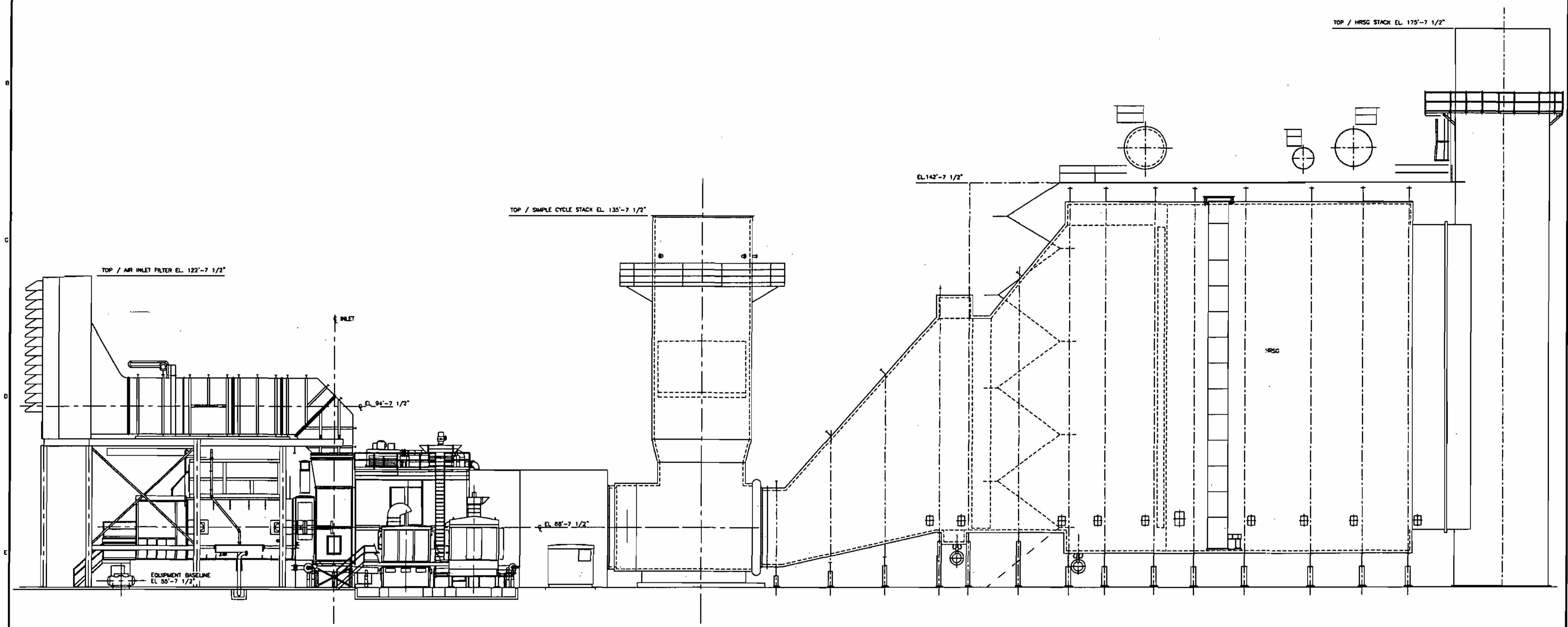
FLORIDA POWER & LIGHT
MANATEE UNIT 3 COMBINED CYCLE PROJECT
SITE ARRANGEMENT

PROJECT: 130770 | DRAWING NUMBER: 3STA-S0002 | REV: 0

FIGURE 3.2-2



PROFILE
(LOOKING WEST)

NOTES:

1. THE EQUIPMENT ARRANGEMENT SHOWN IS TYPICAL OF A COMBINED CYCLE FACILITY.

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0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.2-3.dwg (2/8/02)

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SCALE: 1/8"=1'-0"

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FLORIDA POWER & LIGHT
MANATEE UNIT 3 COMBINED CYCLE PROJECT

PLANT ARRANGEMENT
PROFILE

PROJECT / DRAWING NUMBER: 130770-3STA-S0004 | REV: A
CODE | AREA

Figure 3.2-3

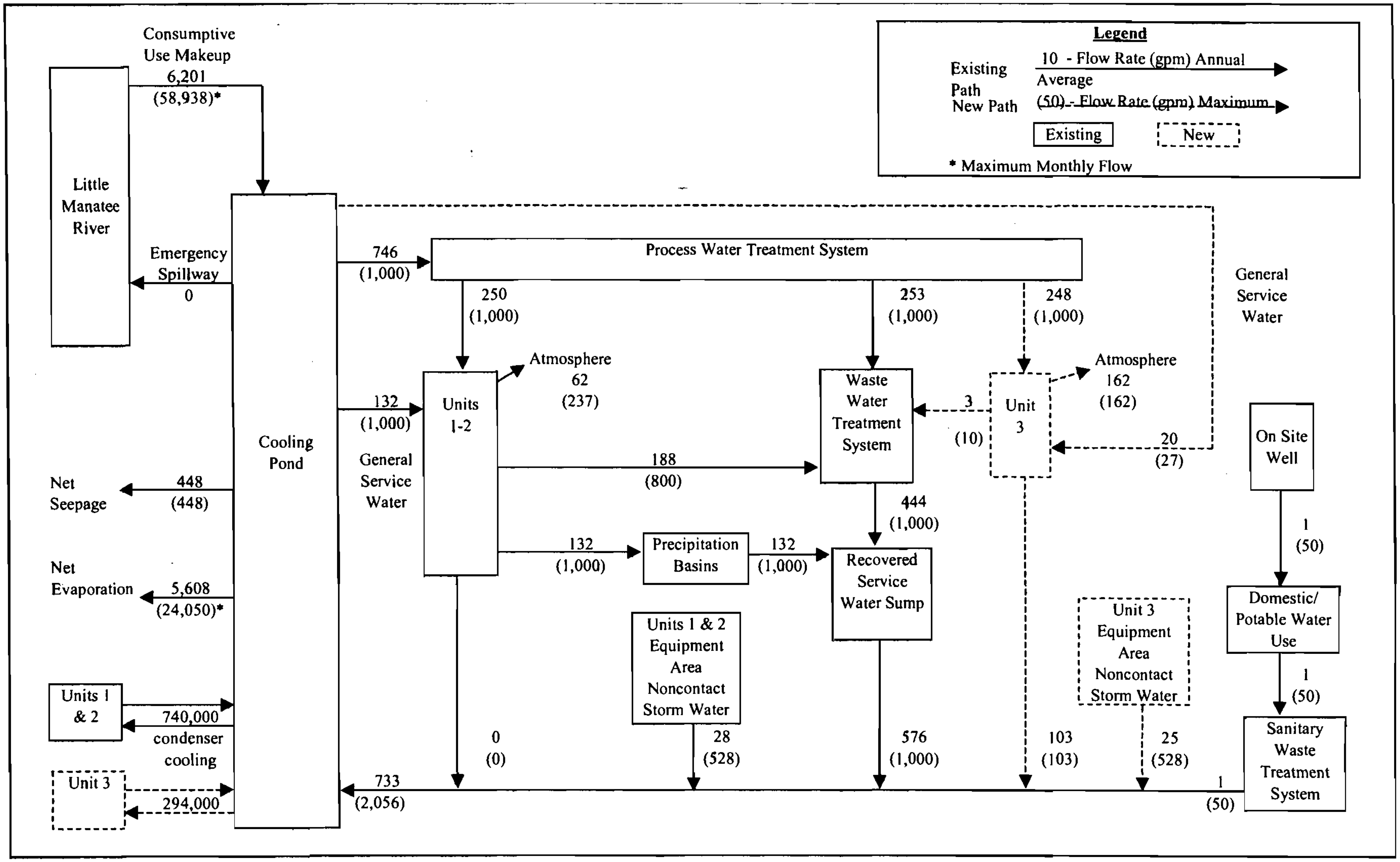

Figure 3.5-1. FPL Manatee Plant Water Management Plan

Source: Foster Wheeler, 2002.

FPL Manatee Unit 3

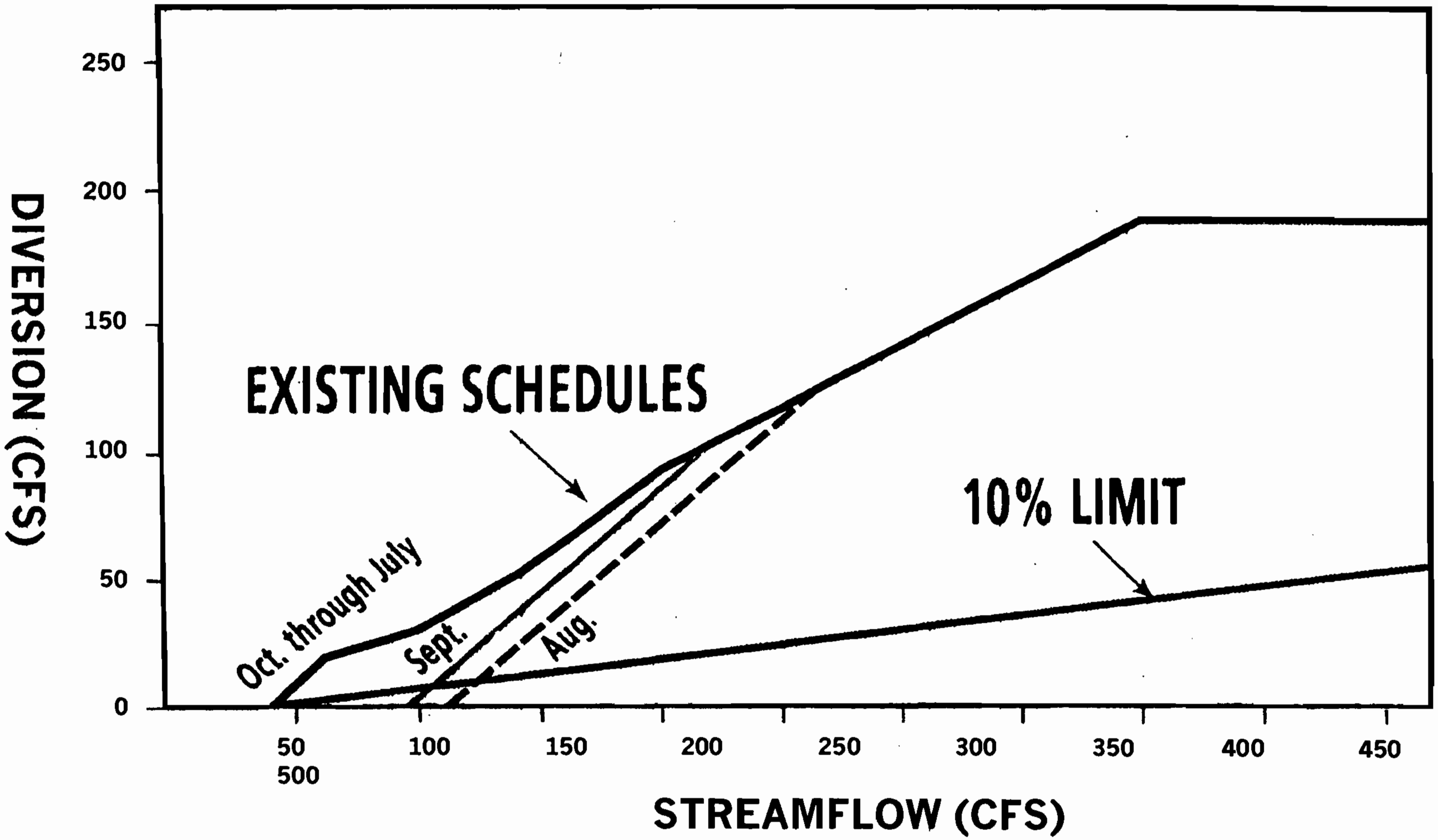

Figure 3.5-2. Comparison of Existing Diversion Schedules and Ten Percent Limit

Source: SWFWMD, 1995; Golder, 2002.

FPL
Manatee Unit 3

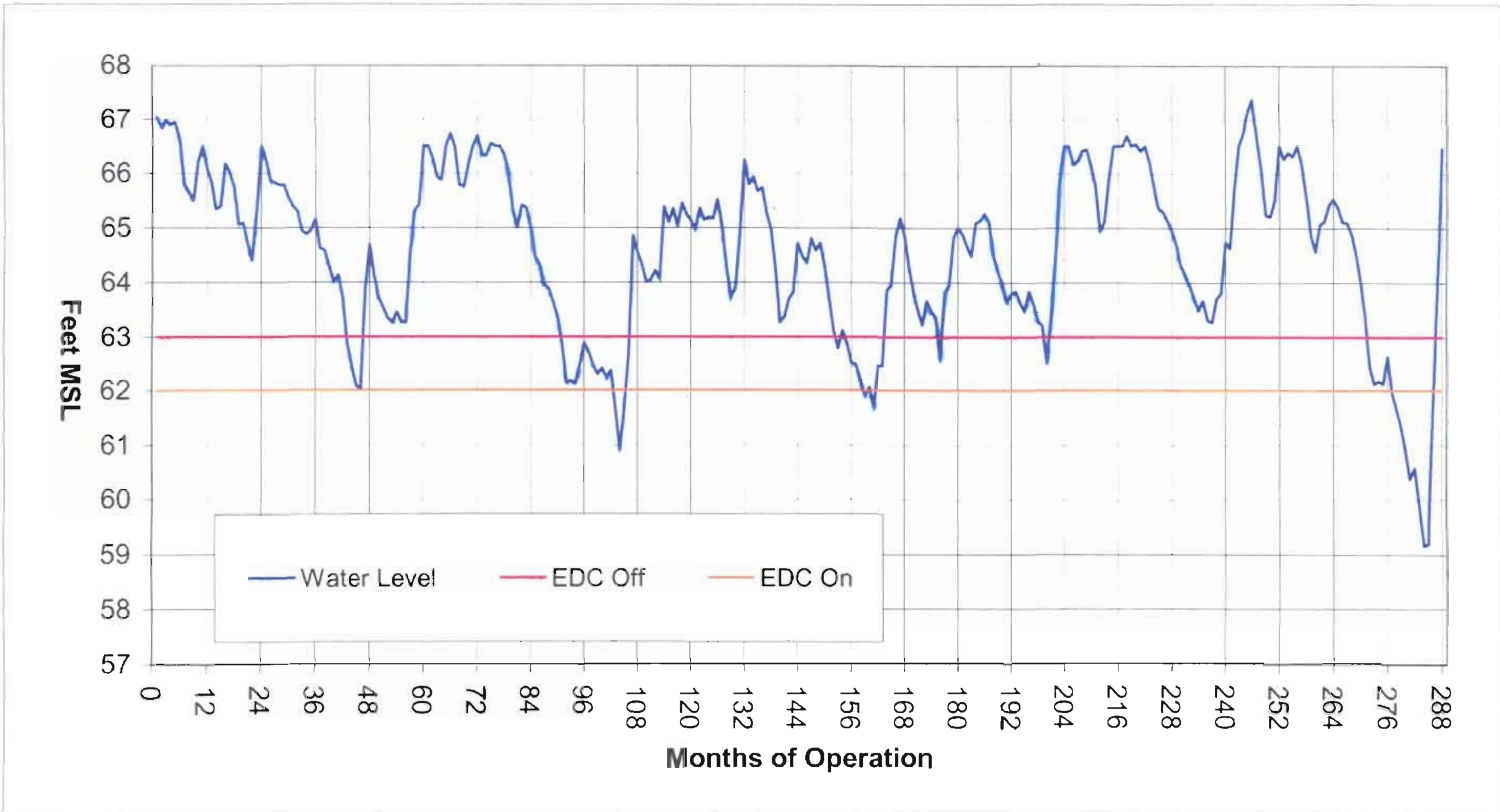

Figure 3.5-3. Estimated Operating Monthly Cooling Pond Water Levels

Source: Foster Wheeler, 2002.

FPL Manatee Unit 3

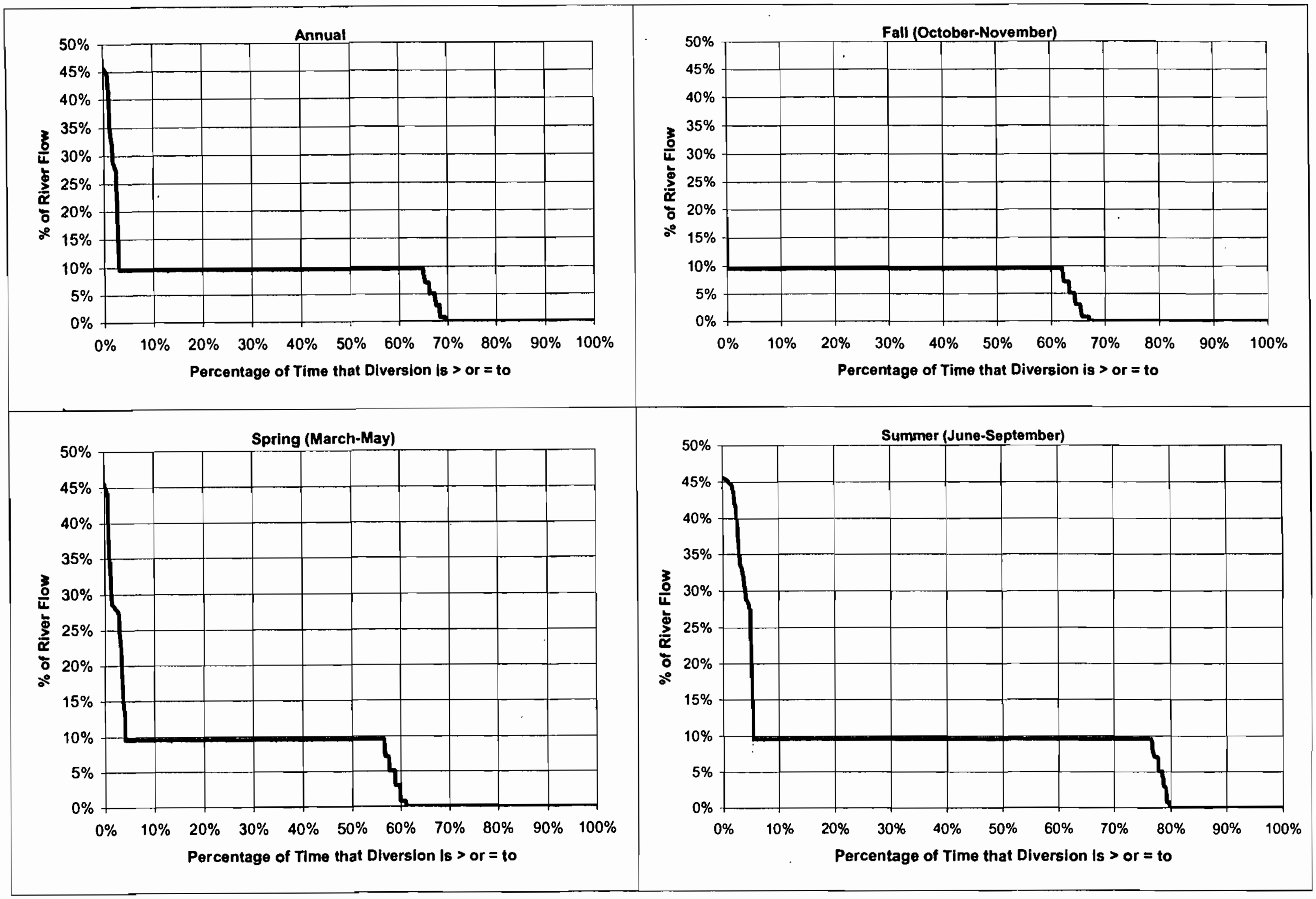

Figure 3.5-4. Frequency of River Withdrawals

Source: Foster Wheeler, 2002.

FPL Manatee Unit 3

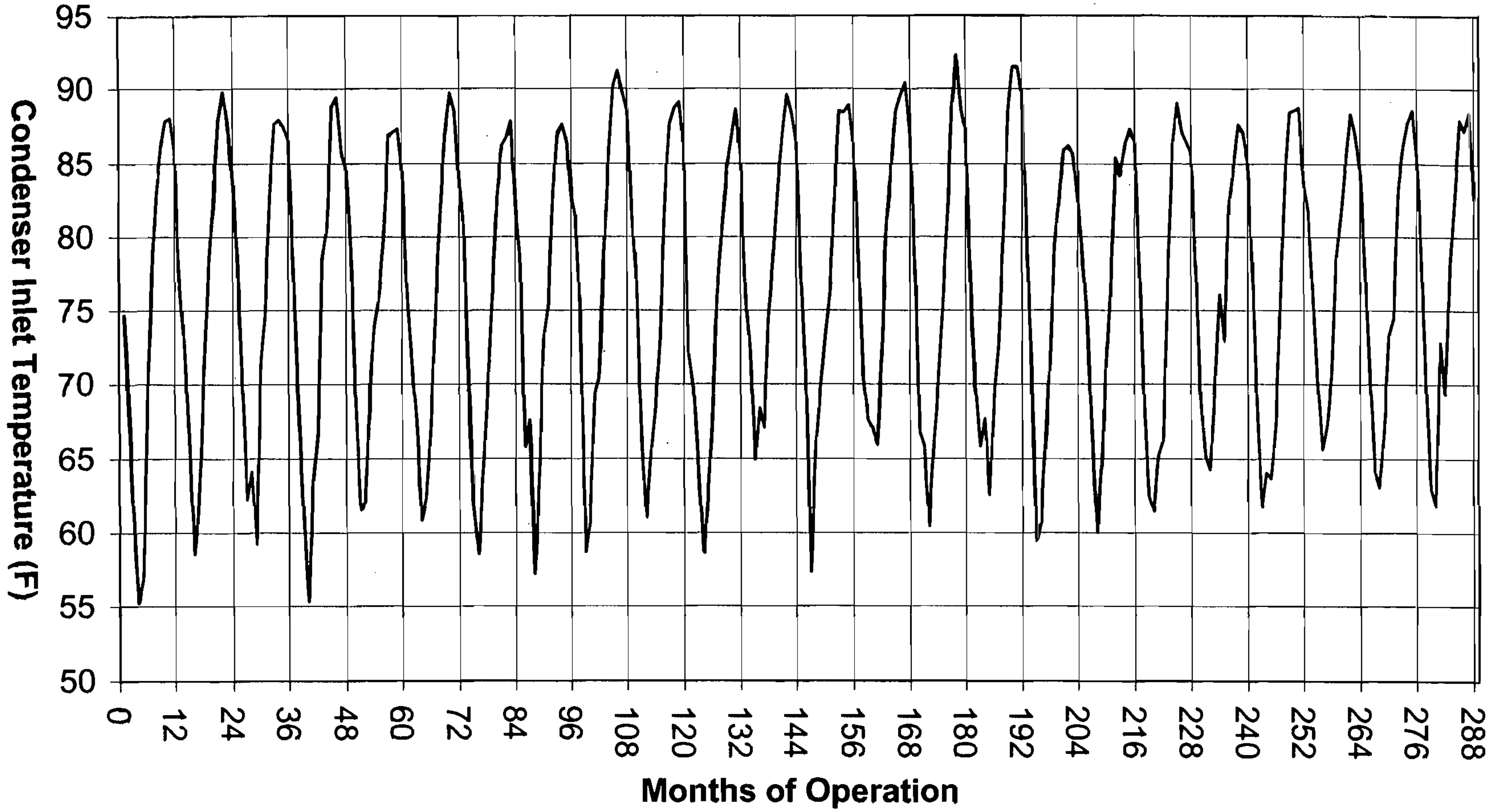

Figure 3.5-5. Estimated Monthly Condenser Inlet Temperature

Source: Foster Wheeler, 2002.

FPL Manatee Unit 3

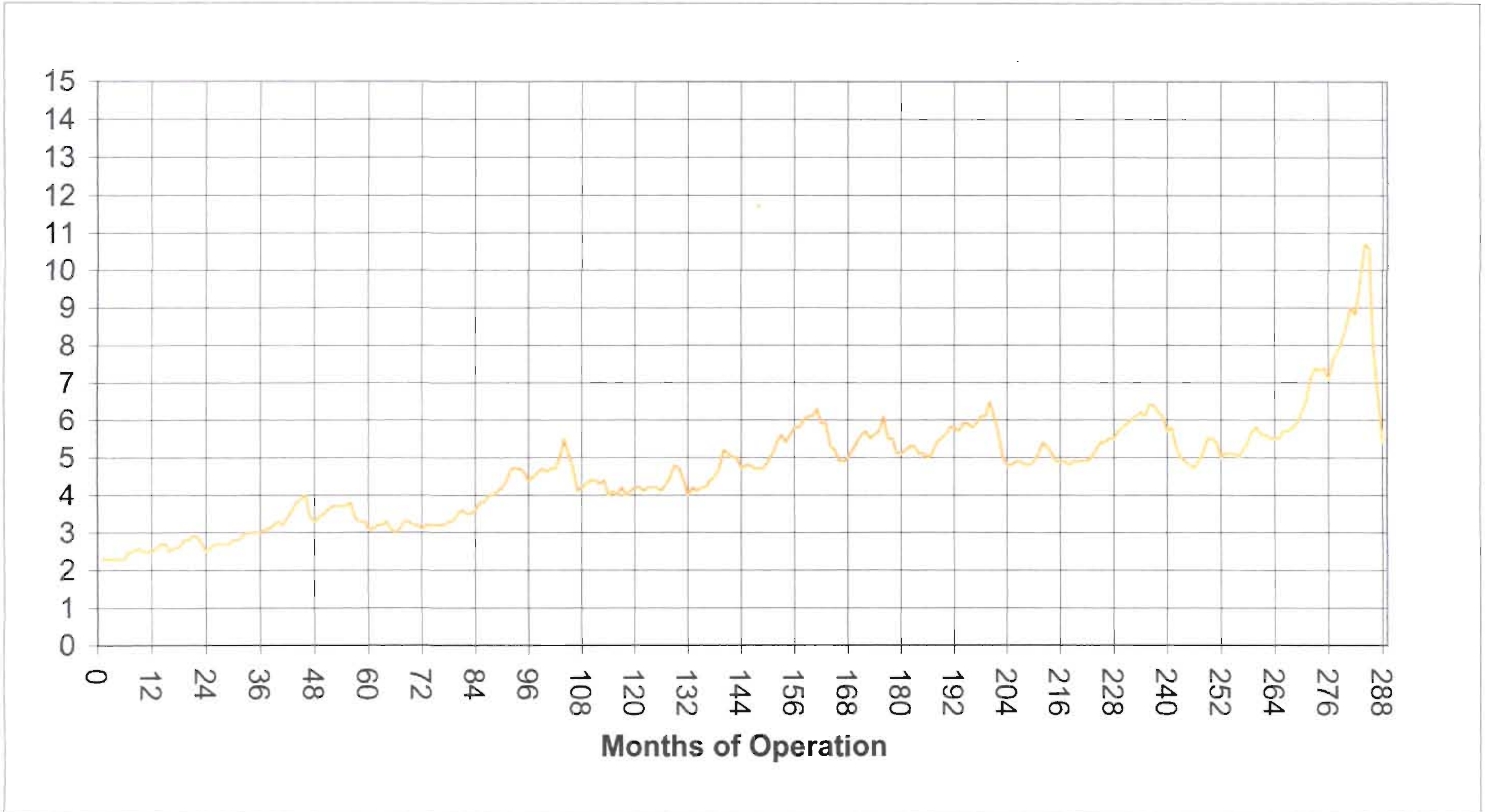

Figure 3.5-6. Estimated Cycles of Concentration

Source: Foster Wheeler, 2002.

FPL
Manatee Unit 3

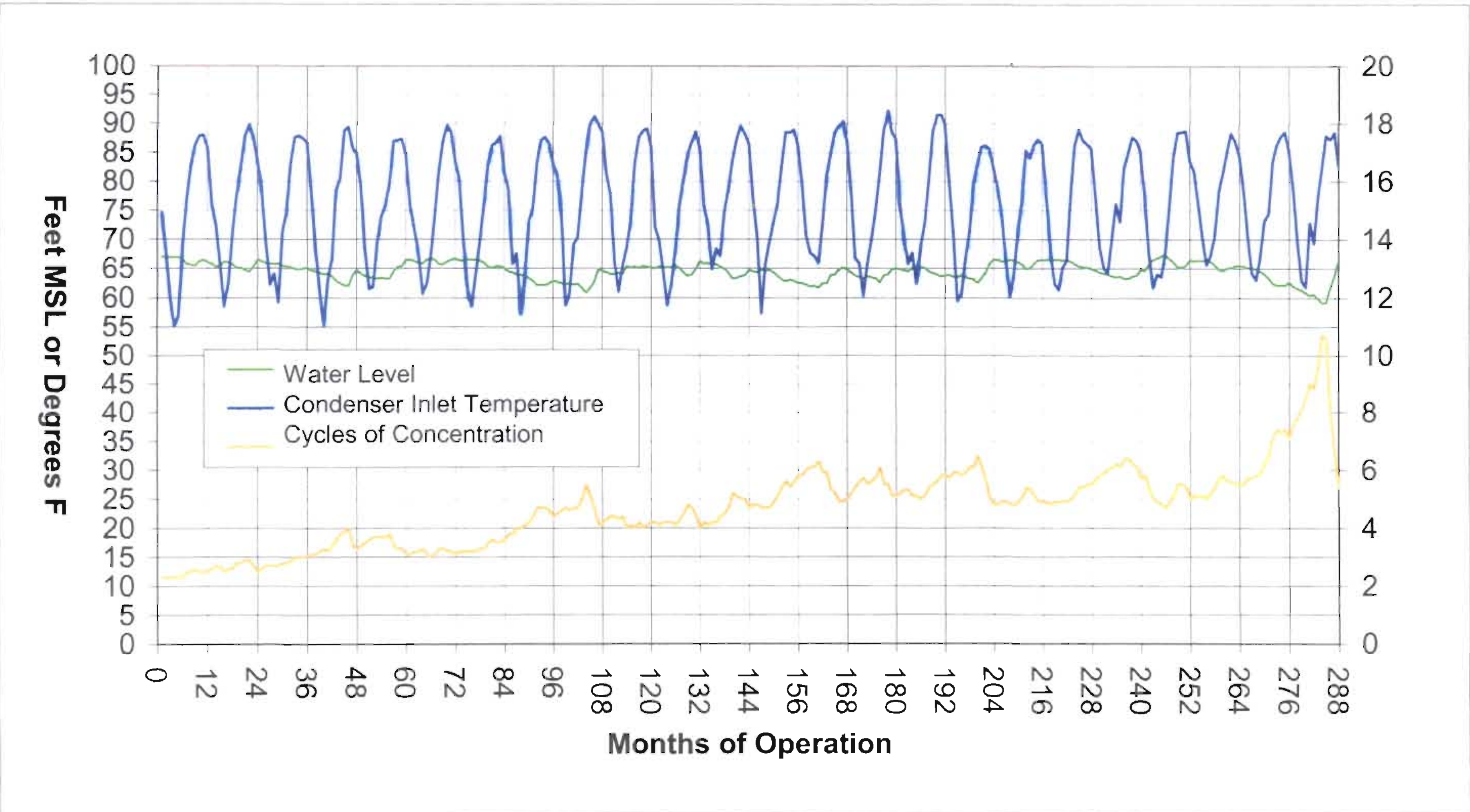

Figure 3.5-7. Simultaneous Expected Water Levels, Condenser Inlet Temperatures, and Cycles of Concentration

Source: Foster Wheeler, 2002.

FPL
Manatee Unit 3

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DRAINAGE TABLE		
	EXISTING	PROPOSED
IMPERVIOUS AREAS	15.0 ACRES	61.0 ACRES
PERVIOUS AREAS	57.8 ACRES	11.8 ACRES
TOTAL	72.8 ACRES	72.8 ACRES

GENERAL LEGEND

- NEW IMPERVIOUS SURFACING
- EXISTING ASPHALT
- DIRECTION OF FLOW
- DROP INLET
- DRAINAGE AREAS
- SUB-BASIN AREAS
- DRAINAGE PIPING

NOTES

1. PLANT MAINTENANCE AREA WILL CONTAIN 100 YEAR-24 HOUR STORM WITH CONTROLLED DISCHARGE TO OIL/WATER SEPARATOR.

0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.8-1.dwg (2/14/02)

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FLORIDA POWER & LIGHT
MANATEE UNIT 3 COMBINED CYCLE PROJECT
SITE DRAINAGE

PROJECT / DRAWING NUMBER: 130770-3STA-S0006 REV 0
CODE / AREA
FIGURE 3.8-1

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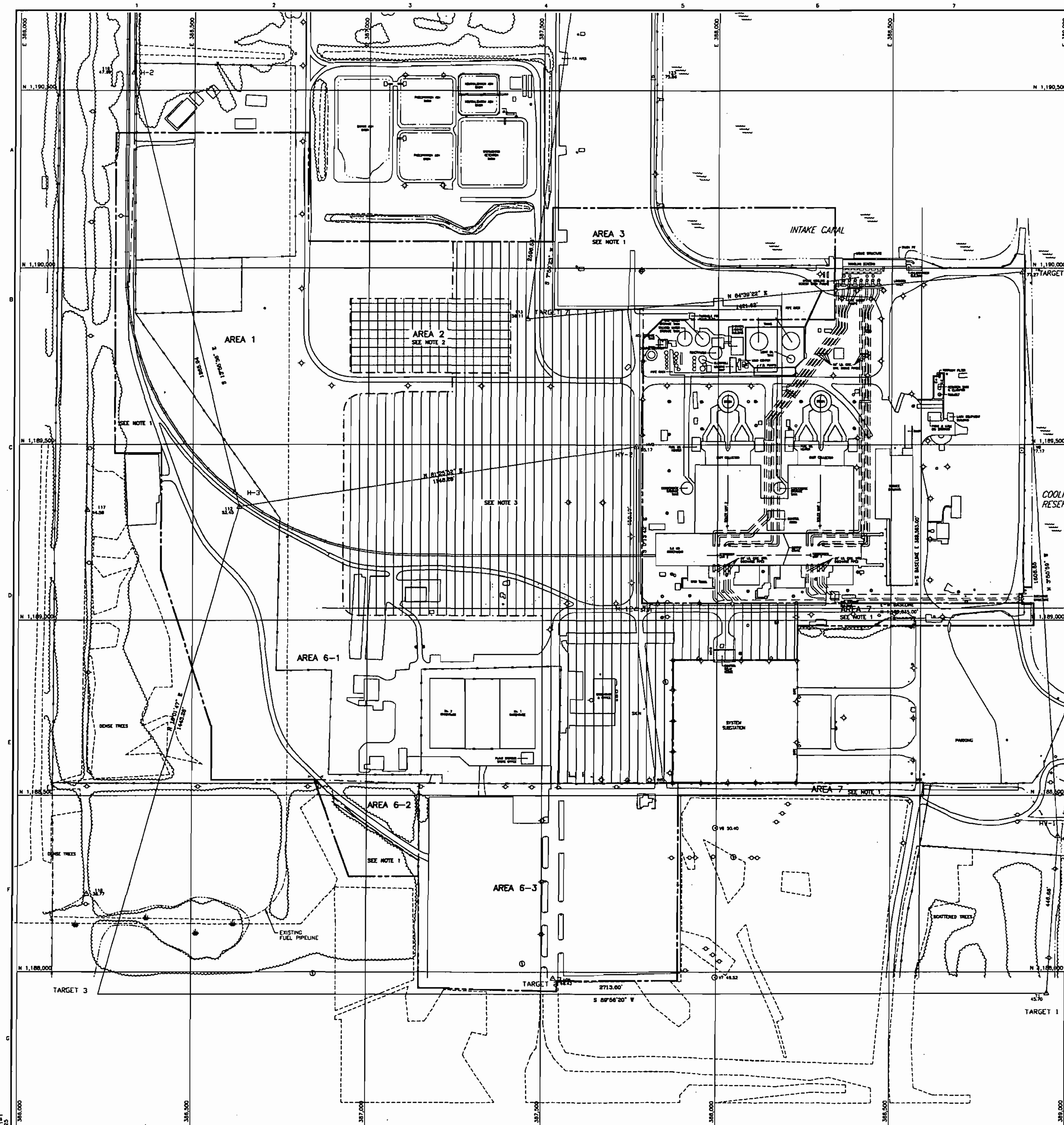

GENERAL LEGEND

SCA BOUNDARY

DRAINAGE AREAS

0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.8-2.dwg (2/14/02)

NOTES

1. AREAS 3, 7, AND AREAS WEST OF 1 & 6-2 HAVE NO SITE GRADING CHANGES OR CHANGES IN DRAINAGE PATTERNS.
2. PLANT MAINTENANCE AREA IS NOT INCLUDED IN DRAINAGE CALCULATIONS. AREA 2 WILL CONTAIN 100 YEAR-24 HOUR STORM WITH CONTROLLED DISCHARGE TO OIL/WATER SEPARATOR.
3. RUNOFF FROM THIS AREA WILL BE CONTAINED AND WILL NOT BE DISCHARGED OFFSITE. DISCHARGE WILL BE TO THE COOLING POND.

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MANATEE UNIT 3 COMBINED CYCLE PROJECT

PROJECT / DRAWING NUMBER: 130770-3STA-S0007 | REV: 0

PRE-DEVELOPMENT DRAINAGE BOUNDARIES

FIGURE 3.8-2

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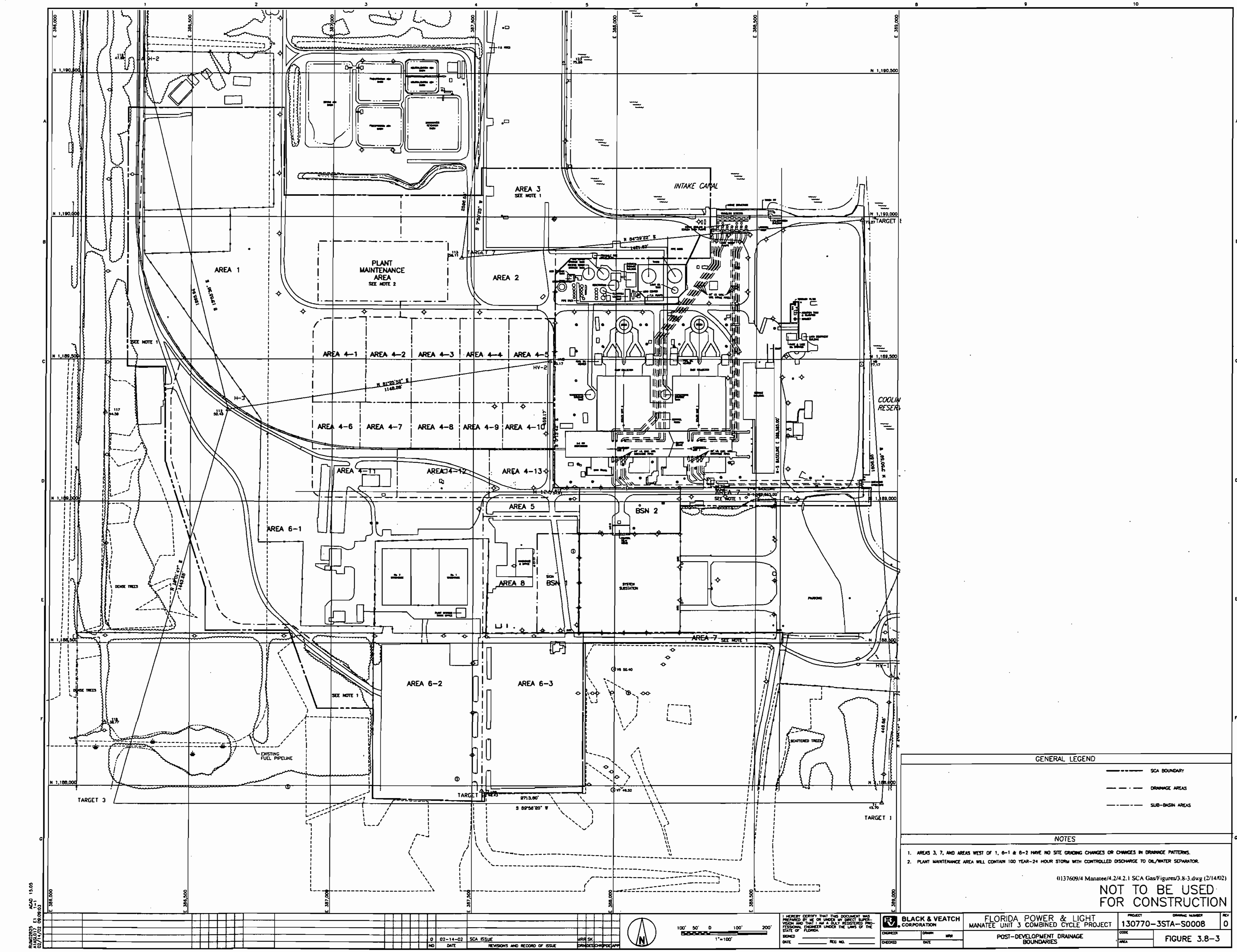

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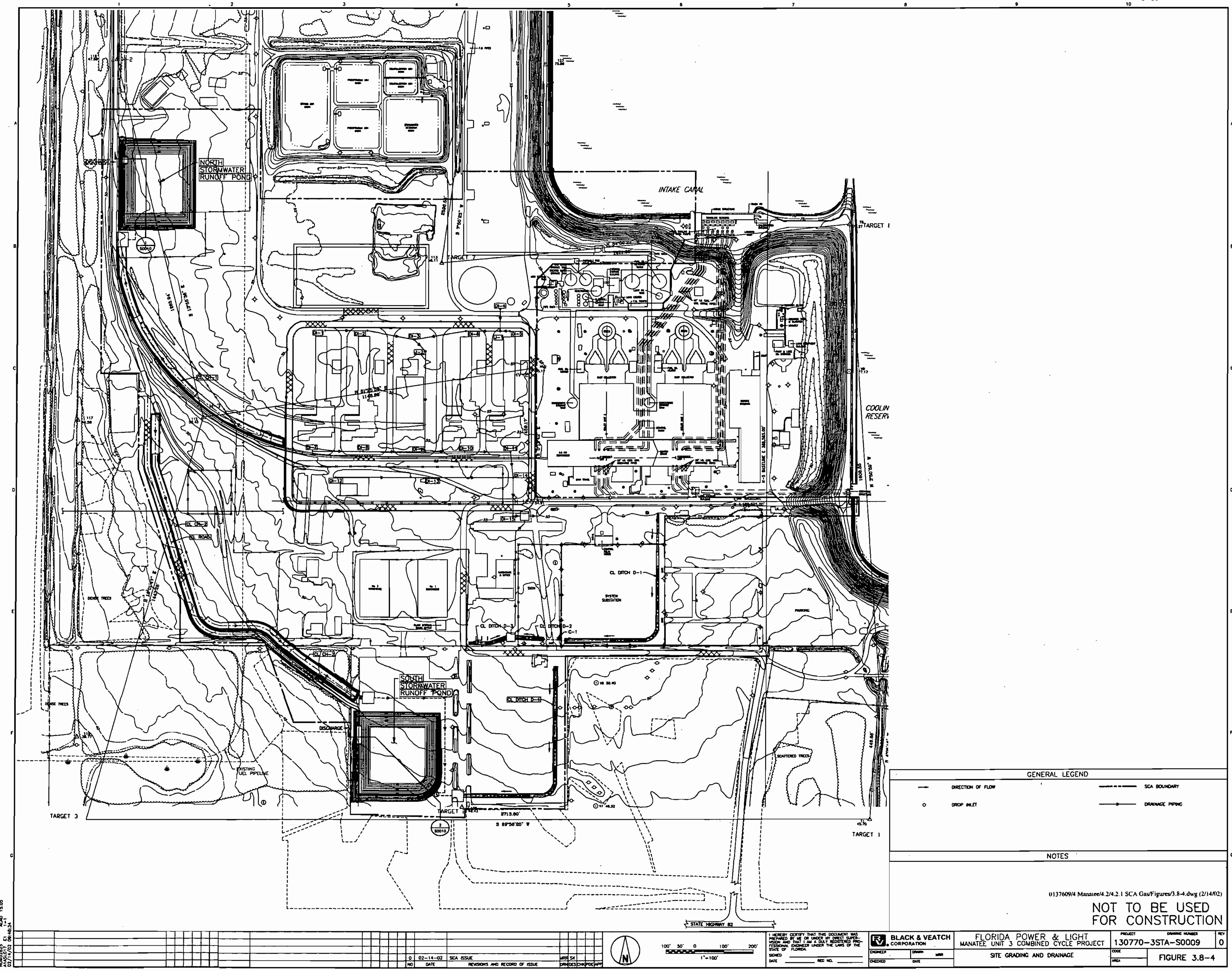

0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.8-4.dwg (2/14/02)

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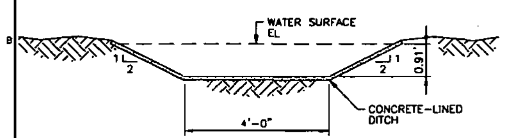
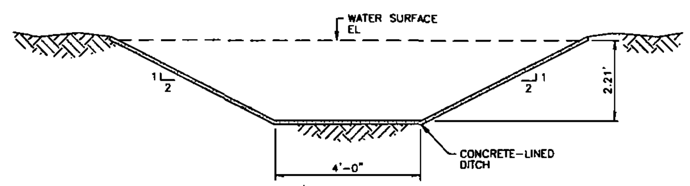
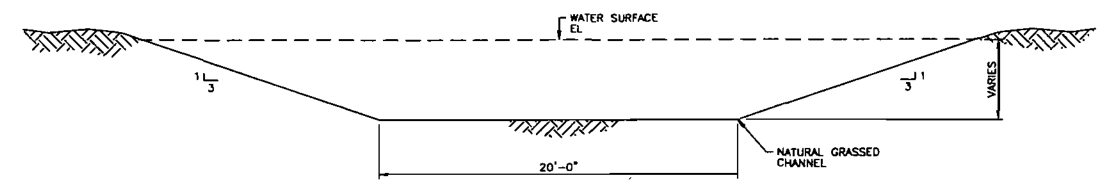
FIGURE 3.8-4



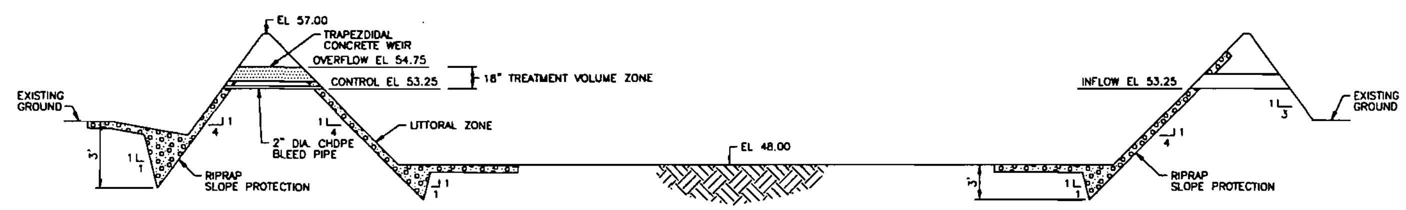
D-1, D-2, & D-3
TYPICAL DITCH SECTION
NO SCALE
SEE DWG S0009



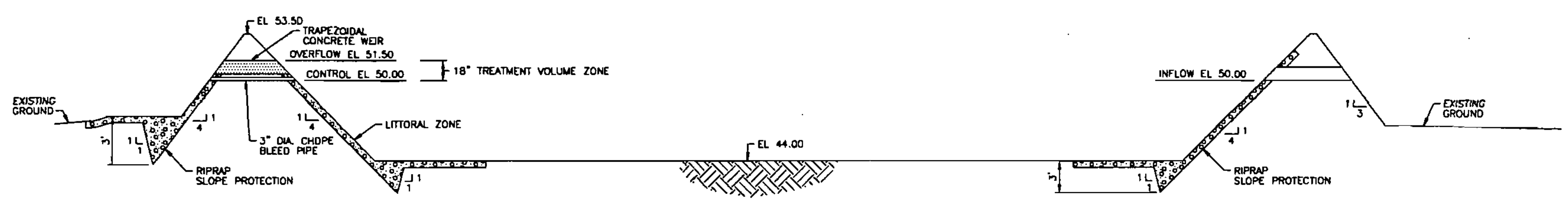
D-4
TYPICAL DITCH SECTION
NO SCALE
SEE DWG S0009



CH-1 & CH-2
TYPICAL CHANNEL SECTION
NO SCALE
SEE DWG S0009



SECTION 1
NORTH RUNOFF POND
NO SCALE
SEE DWG S0009



SECTION 2
SOUTH RUNOFF POND
NO SCALE
SEE DWG S0009

NOT TO BE USED
FOR CONSTRUCTION

0137609/4 Manatee/4.2/4.2.1 SCA Gas/Figures/3.8-5.dwg (2/8/02)

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FLORIDA POWER & LIGHT
MANATEE UNIT 3 COMBINED CYCLE PROJECT
TYPICAL SECTIONS AND DETAILS

PROJECT / DRAWING NUMBER: 130770-3STA-S0010 REV A

Figure 3.8-5

4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION AND PLANT AND ASSOCIATED FACILITIES CONSTRUCTION

4.1 LAND IMPACTS

4.1.1 GENERAL CONSTRUCTION IMPACTS

The portions of the Manatee Plant site that will be affected by the construction of the Project are shown in Figure 4.1-1. As described in Section 3.2, the Project area comprised of 73 acres will be utilized. The Unit 3 power block area will be located west of the existing Units 1 and 2 and with other permanent facilities will occupy about 25.7 acres. Activities associated with construction will occupy 30.8 acres. This will include 29.1 acres for laydown and parking and 1.7 acres for management and contractor trailers. The existing warehouse area, which consists of 6.4 acres, will also be used during construction. These areas have been previously disturbed by development/operation activities and will be cleared of any vegetation. Construction laydown and parking areas, which may be heavily traveled, will be stabilized with shell or rock. Other, more lightly traveled areas will be seeded with grass to prevent erosion. Stormwater facilities occupy about 2.5 acres.

The areas occupied by the Project include the Unit 3 power block, which provides space for the four CTs and associated HRSGs, steam turbine generator, and collector yard (see Figure 4.1-1). Other facilities include the gas yard and cooling system structures. These areas have been previously cleared for existing power plant facilities. The other areas affected by facilities construction require minimal clearing.

No explosives for blasting will be used during construction of the Project.

The impacts of creating material laydown areas will be minimal, temporary, and associated mainly with grubbing and grading for proper drainage.

There will be no construction of new temporary or permanent roads that connect offsite, or new onsite railroads. The existing plant entrance, located on SR 62, will be used for Project construction. Fugitive dust generation from traffic and/or excavations will be minimized through paving and/or the use of water sprinkling.

The existing grade ranges from about 40 ft-msl in the southern and western portions of the Project area to about 55 ft-msl in the area for the power block. The power block area will be filled to approximately 55 ft-msl and graded.

Excavation of soils in the power block area will be required to provide support for the plant foundations, piping, electrical duct banks, trenches, and manholes. Pockets of material unsuitable for buildings or heavy equipment foundation may be found in this area. Removal of this material and the unavoidable removal of some adjacent material may be required. The removed material will be replaced, as necessary, by structural fill.

Foundations required to support heavy loads, such as building columns, CTs, and generators, will be either supported by spread foundations or pilings. In some instances, excavation could reach 15 ft-bls. In general, it is anticipated that this excavation would be about 5 ft-bls.

Temporary dewatering will be required during construction of some foundations and facilities. The effluent from the dewatering operation will be routed to the cooling pond.

Dewatering will be accomplished by localized pumping of the shallow aquifer to reduce the water table. The dewatering system will be of the well-point type or other appropriate methods designed to control turbidity. Lowering the water table by pumping adjacent to the excavation allows the use of heavy equipment in formerly saturated excavations.

Location and structures that may require construction dewatering include:

1. Lift stations, underground pipes, trenches, duct banks, and manholes;
2. CT foundation;
3. HRSG foundation;
4. Steam turbine foundation; and
5. Cooling Water System (circulating water pipes, pumps, structures, etc.).

The duration of each dewatering task for these structures and facilities will generally be limited to 6 months. Based on the location of dewatering areas within the Project area, no offsite impacts to groundwater are anticipated (see Section 4.3). There will be no impacts to the underlying deeper aquifers because excavation and dewatering activities will be limited to the surficial aquifer system.

Once the detailed design is completed, a dewatering plan will be submitted to SWFWMD prior to commencing dewatering activities.

Solid waste materials will be disposed of in accordance with applicable rules and regulations. Construction and demolition wastes, such as scrap wood and metal, will be transferred to a specified storage area on the site where they will be separated and stockpiled for salvage. General waste materials (i.e., typical of municipal solid wastes) will be collected in appropriate waste collection containers for disposal at an approved offsite location.

During construction, the construction labor force will use portable chemical toilets. All sanitary sewage will be pumped from the portable toilets as needed and transported to an approved disposal facility by a licensed contractor.

Potable water for consumption during construction will be obtained from the existing potable system or from bottled water.

Waste oil from construction vehicles and equipment will be collected in appropriate containers and transported offsite for recycling or disposal at an approved facility. The approved disposal facility will be permitted for commercial recycling or disposal of waste oils.

Individual contractors will be responsible for handling any hazardous materials required to perform their tasks and any resulting hazardous wastes. This responsibility includes the proper transportation, storage, handling, and offsite disposal of such wastes.

Onsite construction activities will begin by May 2003 and be complete in June 2005. Demobilization, site restoration, and clean-up will extend through November 2005. The simple cycle portions of Unit 3 will be completed beginning in August 2004. This will allow operation in simple cycle mode while construction is ongoing for the combined cycle portion of the Project. Each CT will then be connected to its associated HRSG. Once all CT/HRSG connections are made, the steam turbine will undergo final commissioning for combined cycle operation. Figure 4.1-2 presents the estimated manpower curve for the construction of the Project. The peak employment will be about 748 construction workers and management staff that will occur in May 2004. Construction employment will average about 500 workers from about January 2004 through December 2004.

4.1.2 ROADS

Construction traffic will use SR 62 and the main plant entrance, which is an asphalt-paved road. A separate onsite construction driveway connected to the main plant entrance road will direct construction traffic to either the existing construction parking or to the laydown areas.

4.1.3 FLOOD ZONES

Based on the flood zones delineated by the FEMA, the entire proposed construction area within the Project area is outside the 100-year flood zone. All proposed permanent facilities have been designed and located so that no adverse impacts on the 100-year flood elevations or flood flows are expected. The Project will not adversely impact adjacent surface water flood elevations or flows and will not cause any adverse flooding or related impacts to offsite property.

4.1.4 TOPOGRAPHY AND SOILS

Current topographic features at the project area of the Manatee Plant site reflect past and present power-plant-related activities. The existing grade of the Project area is approximately 40 to 55 ft-msl. Several areas will be excavated to remove material unsuitable for foundations. Approximately 2,000 yd^3 will be removed from the Unit 3 power block area, and the area will be filled with crushed limestone and rock to raise the elevation to approximately 55 ft-msl at the highest point.

Most of the areas designated for construction facilities will generally not require filling. Those areas requiring fill will average about 2 ft of fill. This area is about 20,000 yd^3, and the fill will consist of clean rock or shell. Construction-related changes in site topography will not have any adverse effect on aesthetics or viewshed. Since the elevations after construction will be no more than about 55 ft-msl, no significant topographical changes will be observable from offsite locations.

No adverse impact is anticipated to soil stability or bearing strength because the power block foundation will be supported by concrete piles or spread footings; therefore, overall settling of the land area will be negligible. Slight settling may take place in areas of construction, but this will be moderate and localized in extent. It is not anticipated that sinkhole formation will be enhanced.

The areas affected by construction do not include any areas designated as Prime and Unique Farmland.

Construction activities will alter runoff in several parts of the site; however, no adverse effects are anticipated from this alteration. In the vicinity of the Unit 3 power block, surface water runoff will be conveyed to existing ponds. Surface water runoff from the parking areas and laydown areas will also be directed to an existing pond. These existing ponds can provide wet retention for all runoff from these areas (see Section 3.8 and Figure 3.8-1).

Groundwater levels will not be significantly affected by modifications to soil percolation from construction activities at the site due to the proximity of surface water and the interconnection between these surface water bodies and the surficial aquifer. Slight changes in percolation rates will have negligible impacts on water levels, because the surface infiltration affects only localized areas of the site.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 IMPACT ASSESSMENT

The surface waters surrounding the Project area, which potentially could be affected by site preparation and construction activities, include the Little Manatee River to the north and Sand Prairie to the west, and an unnamed tributary, which drains to Gamble Creek. Gamble Creek flows into the Manatee River about 4 miles downstream from Sand Prairie. The primary surface water bodies on the Manatee Plant site are the cooling pond and the Little Manatee River. With the exception of the construction of the cooling water system structures in the cooling pond, no other construction activities will take place in the above-referenced water bodies. Figure 4.1-1 presents the land areas that will be impacted by construction.

4.2.1.1 Surficial Hydrology—Physical and Chemical Impacts

The primary potential impacts from site preparation and construction are erosion and sedimentation due to earthmoving and material placement associated with site preparation and plant construction. These impacts will be controlled and minimized through proper design and placement of runoff control features in accordance with SWFWMD Manatee County requirements described in Section 3.8. Specific regulatory criteria, design parameters, and construction-phase stormwater runoff management calculations are presented in Appendix 10.6. Runoff from the Project area not disturbed by construction activities will continue to be directed to the existing drainage systems.

Erosion will be controlled by compaction of soils, construction of ditches and embankments, maintenance of relatively flat grades, and other appropriate erosion control techniques. Sedimentation will be controlled during construction by use of sediment control basins and traps, filter berms, straw bales, and other applicable devices as appropriate.

Runoff from the construction laydown areas and parking will drain to retention swales. The evaporation/percolation pond and retention swales have sufficient detention storage to hold the entire storm volumes from the runoff created on these areas.

Based on the limited discharge quantity and treated nature of runoff to surface water bodies associated with construction activities, adverse impacts to surface waters are anticipated to be negligible.

Dewatering required for the construction of the cooling water structures in the cooling pond will be isolated with coffer dams. The dewatering releases will be routed back to the cooling pond. The water quality of the dewatering release will essentially be identical to the groundwater and water in the cooling pond.

Impacts from the use of chemicals for cleanup of spillage of chemicals or oil and grease will be mitigated thorough proper handling and disposal practices. Construction contractors will be required to implement practices (e.g., designating specific areas for fueling and maintenance) to minimize any spills. These areas will be located so that any spills, if they do occur, will not be adjacent to any surface waters. If any spills occur, immediate cleanup will be performed with ultimate disposal in an approved facility. When appropriate, such materials will be handled as described in FPL's existing Spill Prevention Control and Countermeasure (SPCC) plan and the Manatee Plant hazardous waste management plan.

Following completion of construction, the non-paved areas will be replanted with appropriate ground cover.

4.2.1.2 Aquatic Systems

As described in Section 4.2.1.1, the potential for impacts to aquatic systems will be minimized through the use of appropriate construction techniques to control erosion, sedimentation, and surface runoff.

No construction is proposed in surface waters of the state, including wetlands. Construction of the Project will comply with wetland buffer requirements.

Construction activities potentially could cause runoff containing high-suspended solids, to reach surface waters. To minimize possible impacts to surface waters and aquatic systems, sedimentation traps and other control measures will be used during the construction phase.

4.2.2 MEASURING AND MONITORING PROGRAMS

Release of treated stormwater associated with construction activities will be monitored as required under the applicable regulations.

4.3 GROUNDWATER IMPACTS

4.3.1 PHYSICAL AND CHEMICAL IMPACTS

Activities associated with site preparation and construction are not expected to produce any significant changes to groundwater quality, quantity or levels in the site vicinity. Dewatering associated with construction will be confined to localized area within and surrounding the dewatering site. The maximum period of dewatering is expected to be 12 months or less. The water table in the project area is about 3 ft-bls and the maximum expected dewatering depth is 15 ft-bls (maximum drawdown of 12 feet). Based on site-specific information from a previous dewatering study for the adjacent facilities (ATE, 1995) the surficial aquifer is approximately 30 feet thick, the horizontal hydraulic conductivity is estimated to be 2.5 ft^2/day and the specific yield is less than 0.25. Using these values, the maximum pumping rate for dewatering is estimated to be less than 500 gpm. Figure 4.3-1 shows the areas to be dewatered and the intake and discharge pipeline routes to the cooling pond. Also shown on this figure are the zero-, one- and three-foot drawdown contours during dewatering. The zone of influence for the dewatering activities will be confined to the Manatee Plant site and no impacts to offsite wells or environmental resources will occur from dewatering activities. Furthermore, no natural wetland areas or significant habitats will be impacted. A small, man-made drainage ditch vegetated with cattails is within the estimated 1-foot drawdown zone. This artificial wetland is not considered ecologically significant, and temporary drawdown will not impact wildlife resources. Water levels in the surficial aquifer within the zone of influence should recover to original levels in less than one year after dewatering stops. Water derived from the dewatering process will be recycled to the cooling pond.

No adverse impacts to groundwater resources from dewatering activities are anticipated.

Construction workers will require an average of approximately 5,000 gpd of potable water, which will come from either the existing potable supply system or bottled water.

As discussed in Section 4.2.1.1, construction contractors will be required to implement practices to minimize spills. Maintenance and refueling will be performed only in designated areas. Any spills will be disposed of properly.

4.3.2 MEASURING AND MONITORING PROGRAM

During construction dewatering applicable measuring and monitoring programs will be conducted.

4.4 ECOLOGICAL IMPACTS

4.4.1 IMPACT ASSESSMENT

4.4.1.1 Terrestrial Systems

The Project area comprises approximately 73 acres, which has been affected by previous activities at the Manatee Plant site. The power block for Unit 3 will occupy open, grassy areas that are periodically mowed. The construction laydown and parking areas will be located in maintained grassy areas or areas already surfaced with limerock. Open land located to the south of the power block will be used for construction trailers and warehousing. These areas have been cleared and maintained as a result of previous activities. The construction activities in these areas will not cause significant adverse ecological impacts. These terrestrial systems are highly altered systems either maintained as grassy or cultivated areas.

These altered terrestrial systems (see Section 2.3.6, Pre-Existing Stress, Terrestrial Systems) do not contain unique wildlife species and are not considered important wildlife habitats because of their disturbed nature. No significant adverse impacts to wildlife resources in the areas will occur as a result of construction in these areas.

The area designated for construction activities (see Figures 4.4-1 and 4.4-2) include big carpet grass and smut grass that have become established within the lawn. The grassed area is mowed periodically. When developed, some of these altered areas will be lost. Areas used for permanent facilities will be seeded after construction.

Construction activities will not alter hydrologic surface water flows to any wetlands.

No significant impacts to federally or state listed terrestrial plants and animals are expected.

Fugitive dust generated by construction activities will be minimized through reasonable precautions. Any localized fugitive dust will not adversely affect the terrestrial systems surrounding the site.

Noise (including other human disturbance from construction activities) will not affect wildlife in the vicinity of the site. Presently, the site has noise associated with operation of the existing facility, and wildlife that occurs in the vicinity of the site is acclimated to such activities.

4.4.1.2 Aquatic Systems

Based on the limited areas affected by construction and the measures to mitigate impacts of runoff, impacts to aquatic ecological systems resulting from construction-phase activities are not anticipated. Erosion, sedimentation, and runoff control measures will mitigate the potential for water quality degradation; therefore, associated impacts to aquatic biological communities are not expected to be significant.

4.4.2 MEASURING AND MONITORING PROGRAMS

4.4.2.1 Terrestrial Systems

No monitoring programs will be undertaken because no important terrestrial systems will be affected by construction activities proposed for the site. No wetland impacts are expected as a result of construction activities.

4.4.2.2 Aquatic Systems

No fish or benthic invertebrates are expected to be affected by construction activities.

4.5 AIR IMPACTS

4.5.1 AIR EMISSIONS

Construction activities will result in the generation of fugitive PM emissions and vehicle exhaust emissions. Fugitive PM emissions will result primarily from land clearing and grubbing, ground excavation, grading, cut and fill operations, and vehicular travel over paved and unpaved roads. Vehicular traffic will include heavy-equipment traffic and traffic due to construction workers entering and leaving the Manatee Plant site. Construction personnel and equipment will enter the site primarily over surfaced roadways. Exposed land areas may also generate fugitive dust due to wind erosion.

Emissions of fugitive PM from these activities are extremely difficult to quantify because of their variable nature. They can only be estimated since emissions are dependent upon a number of factors, including specific activities conducted, level of activity, meteorological conditions, and control measures utilized.

During the construction period, the PM_{10} emissions are estimated to average about 8.3 TPY, 63.8 lb/day (5 days/week), or 6.4 lb/hr (10 hr/day). An emission rate of 8.3 TPY of PM_{10} is less than the PSD significant emission rate of 15 TPY. As a result, the estimated fugitive emissions are not expected to significantly affect air quality outside the Manatee Plant site boundary.

Emissions will also result from onsite construction equipment including cranes, trucks, compressors, etc., operating with diesel and gasoline engines. This equipment will produce emissions of CO, NO_x, VOC, PM and SO_2. Exhaust emissions were based on the following EPA emission factors (AP-42) for diesel engines. Based on these emission factors and number of vehicles, the CO, NO_x, VOC, PM, and SO_2 emissions are estimated to be 4.3, 19.8, 1.6, 1.4, and 1.3 TPY, respectively, over the 2-year construction period. These levels of emissions will not cause significant impacts to air quality in the vicinity of the Manatee Plant site.

4.5.2 CONTROL MEASURES

A number of control measures will be implemented during the construction period in order to minimize air emissions and potential impacts. Clearing within the project area of the site will be kept to a minimum, thereby reducing air emissions due to wind erosion of exposed surfaces. After grading, the unraveled or lightly traveled areas will be either paved or vegetated to minimize fugitive

PM and wind erosion. Heavily traveled unpaved construction laydown areas and unpaved roads will be stabilized with shell or rock. Fugitive dust from highly traveled areas will be controlled by watering on an as-needed basis. The plant entrance road is currently paved, which minimizes dust emissions from vehicles entering the Manatee Plant site.

4.5.3 POTENTIAL IMPACTS

During the construction period, the four new CTs associated with the proposed Project will be available to operate in simple cycle mode while the combined cycle portion of the project is still under construction. Upon completion of construction, Unit 3 will operate in simple cycle or combined cycle modes.

For the first phase of construction, the maximum pollutant concentrations for the Unit 3 CTs operating in simple-cycle mode with bypass stacks are summarized in Tables 4.5-1 and 4.5-2 for the Class II and Class I areas, respectively. More detailed information is presented in Appendix 10.1.5. These results show that, the maximum SO_2, NO_2, PM_{10}, and CO impacts predicted during the construction phase from the Project will ensure compliance with, and maintenance of, the AAQS.

4.6 IMPACT ON HUMAN POPULATIONS

4.6.1 TRANSPORTATION

The highway network will be temporarily impacted during the construction phase by construction-related traffic. The Project is expected to take about 2 years to complete and have an average construction employment of about 274 construction workers and management staff. During the peak month of construction, 748 construction employees are expected to be onsite during weekdays. No weekend construction activities are currently planned. All construction employees will use the main plant entrance, which currently has a full access opening to SR 62.

4.6.1.1 Year 2004 Non-Project Traffic

A projection of 2004 traffic volumes not associated with the construction traffic was made. This background projection was based on existing AADT, obtained by FDOT. No vested traffic was assigned to SR 62 in 1994 and vested traffic was not included in the 2002 baseline volume. The roadway volumes without the construction traffic are summarized below:

SR 62:	US 301 to FPL Main Entrance	397 Non Project EB/WB
	FPL Main Entrance to CR 39	383 Non Project EB/WB

4.6.1.2 Construction Traffic

Trips associated with the peak construction activity at the plant were estimated through a trip generation analysis and then a distribution and assignment process. The projected peak impact of 748 employees was evaluated. The expected shift times were incorporated into the analysis. The construction employment is to consist of FPL and contract employees. The pm peak hour is expected to occur in the afternoon between 2:30 p.m. and 3:30 p.m. The anticipated shift times correspond to current peaks of traffic at the Manatee Expansion Project and the adjacent SR 62.

Access

Access to the FPL Manatee Plant is currently provided through a driveway on SR 62. No change in access is proposed.

Trip Generation

The greatest number of construction-related trips will be generated at the beginning and ending of work shifts. The number of trips will be directly related to the number of employees.

The existing trip generation characteristics of the FPL Manatee Plant site were quantified for use in this study. Seven-day machine counts were conducted on the site driveway in 1994. Information was collected in 15-minute increments so that the peak hour could be determined. Using the existing trip generation characteristics, projections of future traffic volumes were made. Table 4.6-1 summarizes the expected traffic from construction employment.

Distribution and Assignment

Trips were distributed and assigned to the roadway network using the computerized transportation-planning model for Sarasota and Manatee counties. This methodology was used in the 1994 traffic study. The model, FSUTMS, was used to provide an objective distribution and assignment. A new zone was created for the project with a single centroid connector tying into the network on SR 62 east of US 301. As required by Manatee County, the zone's trip generation was created using ZDATA3 (special generator) input.

The FSUTMS-based assignment indicated 12 percent of traffic oriented east of the site and 88 percent oriented west on SR 62. For comparison, turning movement volume counts at the driveway indicated an existing split of 13 percent east and 87 percent west.

Using the percentage assignment derived from FSUTMS, the expected project trips were assigned to the roadway network. From this assignment, the study area was defined, as identified in Section 2.2.7. At study intersections, peak hour project traffic turning movements were determined.

4.6.1.3 Roadway Capacity Analysis

The 2004 non-project volumes and construction traffic volumes were combined to provide a projection of 2004 total traffic during peak construction. The total traffic volumes on study roadways and intersections were analyzed to determine the anticipated operating conditions.

The roadways were evaluated using the 2000 Highway Capacity Manual arterial analysis methodology. A summary of the predicted roadway levels of service with total traffic at the time of peak construction employment is depicted below:

SR 62, US 301 to FPL Manatee Plant Entrance	LOS C
FPL Manatee Plant Entrance to US 301	LOS B

4.6.1.4 Intersection Capacity Analyses

Intersections in the study area were analyzed with the 2004 total traffic volumes. Predictions of the total traffic peak hour conditions of the intersections are shown below:

SR 62 & CR 39	LOS-B
SR 62 & FPL Main Entrance	LOS-B
SR 62 & US 301	LOS-C/F *

*Note: Intersection has LOS F on SR 62 for less than 8 months during peak construction employment.

4.6.1.5 Conclusions

No permanent capacity-enhancing improvements are necessary to accommodate the total traffic conditions associated with the average peak construction employment. For an 8-month period, a traffic management specialist will likely be required to assist traffic movement from SR 62 onto US 301.

4.6.1.6 Rail Delivery

The FPL Manatee Site is served by a rail siding that may be used during construction. Several facility components of the expansion project are pre-assembled off-site and shipped to the construction site for assembly. If shipped by rail, these components will be a maximum of approximately 30 and require a single flat or boxcar with a locomotive. The likely route of shipment would be through Tampa from other originations throughout the U.S. The Port of Tampa or Port Manatee may also be used of some components. From any of these locations, the tracks paralleling US 301 would be utilized through Hillsborough County. The train shipment would enter the site along the north boundary at a location northeast of Parrish. Shipments are anticipated to occur over a four to six month period. Impacts from these shipments are anticipated to be negligible because of the low number of shipments, the short length of the train, the extended time during which the shipments are made, and the fact that the train approaches the site in a rural area. Although multiple cars or deliveries may occur on a given day, on average, a two-car train may deliver facility components to the site once every four to five days.

4.6.2 CONSTRUCTION NOISE IMPACTS

The impacts of construction-period noise on human populations are dependent upon the proximity of residences to construction activities and the type and extent of noise sources. The nearest residence (i.e., critical receptor) to the proposed facility construction area is located approximately 3,500 ft southwest of the power block for the Project.

Construction of the Project will require installation of foundations and erection of major components of the combined cycle unit such as the CTs, HRSG, steam turbines, and cooling system. The use of construction equipment, such as pile drivers, cranes, bulldozers, graders, front-end loaders, and air compressors will be required. These sources have maximum noise levels ranging from about 70 to 90 dBA (measured at a distance of 50 ft). Additionally, during final commissioning of the HRSGs and steam turbine, steam is used for cleaning and is returned to as “steam blows”. These steam blows are of short duration with elevated noise levels.

The evaluation of noise impacts from construction activities was performed using noise propagation computer programs to estimate noise levels (CadnaA). Noise source levels are entered as octave band sound power levels. Coordinates, either rectangular or polar, can be specified by the user. All noise sources are assumed to be point sources; line sources can be simulated by several point sources. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the American National Standard Institute Method for the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path specific attenuation can be specified to account for the effects of vegetation, foliage and wind shadow. Direction source characteristics and reflection can be simulated using path-specific attenuation. Attenuation due to barriers can be specified by giving the coordinates and height of the barrier. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs (filtered to approximate human hearing) are calculated. Background noise levels can be incorporated into the results and are used to calculate overall SPLs.

The model was performed to predict the maximum noise levels produced by a combination of likely noise sources with and without background noise levels. A conservative estimate of the number and types of construction equipment was assumed to calculate construction noise levels.

Table 4.6-2 lists the major types of equipment expected to be used during the construction of the Project and their associated noise characteristics. For the purpose of the construction noise impact analyses, all of the equipment was conservatively assumed to be operating simultaneously at peak power. These heavy construction activities are expected to occur during the daytime hours. Most of the heavy construction activities will occur during the first 6 to 8 months of construction. Mechanical and electrical installation activities, which may occur at night (i.e., between 9 p.m. and 7 a.m.) will not involve the use of heavy equipment and will comply with the Manatee County standard for construction noise. These nighttime construction activities will have minimal noise levels and are much less than the existing plant.

The noise levels resulting from these combinations of equipment were input as multiple sources to the model. Octave bands were estimated from *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliance* (EPA, 1971). It is unlikely that all the equipment would be operating simultaneously and continuously, and, therefore, this impact assessment is conservative. Background SPL values were incorporated into the model to calculate impacts at the locations identified in Section 2.3.8. Only the atmospheric attenuation option was enabled during the noise modeling runs.

The construction noise impacts at the two onsite monitoring locations near the power block and the three property boundary monitoring locations are presented in Table 4.6-3. The L_{90} sound level is used as background, construction equipment impact and the background with construction impacts are presented in the table. The Manatee County noise ordinance provides the methods for measuring sound levels. The ordinance specifies that "traffic, aircraft, and other background noise shall not be considered in taking measurements except where such background sound interferes with the primary noise being measured." At the Manatee Plant site, noise from traffic, aircraft, and other noise sources (e.g., barking dogs, farm equipment operation, etc.) are intermittent sources. While these noise sources add to the overall noise level (e.g., L_{eq}), they are typically of short duration. The L_{90} sound level, which is the A-weighted sound pressure level exceeded 90 percent of the time, would eliminate these intermittent noise levels. This ambient noise level would be the background sound level from which a comparison to the Manatee County noise ordinance could be made.

Section 2-21-33(5) of the Manatee County Code exempts "usual noises of construction and operation of construction between the hours of 7 a.m. and 9 p.m." from the requirements of the county noise ordinance. As shown in Table 4.6-3, the estimated noise levels at the monitoring locations during the construction of the Project, although exempt, are predicted to be below the daytime noise requirements of 55 dBA. When the construction impacts are combined with the background levels, the predicted impacts are all less than the levels allowed under the Manatee County noise control ordinance. The daytime construction-phase noise level predicted at the nearest property boundary is 51.8 dBA (Site 6 as identified in Section 2.3.8). Figure 4.6-1 presents isopleths of the sound levels predicted by the model during construction activities in the vicinity of the Project site. The model predictions are conservative and include only atmospheric attenuation.

4.6.3 CONSTRUCTION EMPLOYMENT

It is estimated that the workforce during the 24-month construction phase of the Project will average 274 persons, with a peak workforce of 748 persons (see Figure 4.1-2). A majority of these construction workers will be skilled tradesmen (cement masons, laborers, millwrights, iron workers, pipe fitters, carpenters, electricians, plumbers, etc.), although there will also be 30 management personnel. The average duration of any particular trade onsite during construction will be approximately 9 months. It is estimated that these workers will travel to the job site from outside the immediate area and from surrounding communities.

Traditional practice is that the construction workers will not bring their families with them if they seek temporary housing. Therefore, the local permanent population is not expected to increase significantly during the construction period, as a result of the Project. Since construction workers typically do not bring their families for short-term construction assignments, minimal impacts on local schools and other local infrastructure is expected.

Over 50,000 construction workers reside within the Tampa Bay Region, with the majority of these in Hillsborough and Pinellas counties (FSA, 2001). Since a more-than-adequate labor supply exists within commuting distance, it is anticipated that most workers will be hired from within the region with minimal relocation required. Consequently, construction should have a small effect on permanent housing within the region or locally. As is typical with mid-term (1 to 2 years) construction projects, some workers commuting from longer distances may choose to reside in transient accommodations (hotels and motels), returning to their permanent homes and families on weekends or special occasions.

With the exception of the minor use of transient accommodations and related potable water and sanitary sewer services, no new impacts are expected on community services and facilities within the region as a result of the construction effort. Those workers hired from the area will have already established usage patterns and will probably continue to frequent the same facilities and establishments that they used prior to employment on this Project. Consequently, any new demands will be dispersed throughout the region and should not create any noticeable change in the availability of area community services and facilities due to the small number of potential employees that may relocate into the area.

4.7 IMPACTS ON LANDMARKS AND SENSITIVE AREAS

Construction-related impacts to landmarks and sensitive areas will be minor and will not result in any changes to accessibility. The closest landmarks and sensitive areas within the 5-mile of the Project (refer to Section 2.2.5) will not experience any changes in air quality, noise level, water quality, or visual characteristics perceptible to the users. The construction activities will not be visible from the natural and scenic landmarks associated with the Little Manatee River.

Occasional construction noise may be heard near the site during the construction term. The noise is anticipated to be infrequent and of short duration. Visual impacts will be minor since most of the construction activity and new structures are visually shielded from the closest public viewpoint (SR 62), which is more than a half-mile away.

No use-related impacts are anticipated at public recreational facilities since these areas are a considerable distance from the Project area.

4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

Based on an earlier evaluation of a portion of the Manatee Plant site that included the Project area, the Florida Department of State, Division of Historical Resources determined that no significant archaeological or historical sites are recorded, or likely to be present within the area evaluated (see Section 2.2.6). As a result, no construction impacts on historic properties listed, or eligible for listing in the *National Register of Historic Places,* or otherwise of historical or archaeological value, are anticipated.

4.9 SPECIAL FEATURES

There will be no unusual products, raw materials, solid water disposal, incinerator effluents, or residues produced during construction of the Project that will have influence on the environment or ecological systems of the Project area, Manatee Plant site or adjacent areas.

Facilities at the Manatee Plant site, including Units 1 and 2, transmission systems and fuel delivery and storage facilities, will be unaffected by construction activities.

4.10 BENEFITS OF CONSTRUCTION

The construction phase of the Project will contribute both short- and long-term economic benefits to the surrounding region. Construction benefits will include construction employment that will average several hundred over the 2-year construction period (see Figure 4.1-2). Construction wages will increase the demand for goods and services in the region. Direct purchases of construction materials will have both direct and indirect economic benefits. This includes materials and services required as a direct result of construction activities. This includes construction materials (e.g., concrete and steel for foundations), rental equipment (e.g., construction cranes, pumps), food services and transportation services. These economic benefits are discussed in Section 7.0, Economic and Social Effects of Plant Construction and Operation.

4.11 VARIANCES

No variances from applicable standards due to the construction of the Project are being sought as part of this SCA.

Table 4.5-1. Summary of Maximum Pollutant Concentrations Predicted for the Project in PSD Class II Areas
Simple Cycle Combustion Turbines Operating

Pollutant	Averaging Time	Maximum Predicted Concentration (ug/m3)	PSD Class II Increments (ug/m3)	Ambient Air Quality Standards (ug/m3)
SO_2	Annual	0.01	20	60
	24-Hour	1.68	91	260
	3-Hour	7.87	512	1,300
PM_{10}	Annual	0.02	17	50
	24-Hour	2.22	30	150
NO_2	Annual	0.08	25	100
CO	8-Hour	16.08	NA	10,000
	1-Hour	48.34	NA	40,000

Refer to Appendix 10.1.5 for more detail.

Table 4.5-2. Summary of Maximum Pollutant Concentrations Predicted for the Project at the PSD Class I Area of the Chassahowitzka NWA Compared to the Proposed EPA Class I Significant Impact Levels, Simple Cycle Combustion Turbine Operating

Pollutant	Averaging Time	Maximum Concentration ($\mu g/m^3$) [a]	PSD Class I Increments ($\mu g/m^3$)
Simple-Cycle [b]			
SO_2	Annual	0.0010	2.0
	24-Hour	0.017	5.0
	3-Hour	0.062	25.0
PM_{10}	Annual	0.0040	2.5
	Annual	0.0010	4.0
NO_2	24-Hour	0.016	8.0

Note: NM = not modeled

[a] Concentrations are highest predicted using CALPUFF model and 1990 CALMET wind field for central Florida.

[b] Concentrations predicted are based on the operating scenario with the maximum hourly emissions.

Refer to Appendix 10.1.5 for more detail.

Table 4.6-1. Trip Generation During Peak Construction Employment (2004)

Parameter	Daily	P.M. Peak Hour
Number of Employees	748	748
Trip Generation Rate	2.38	0.48
Number of Two-Way Trips	1,780	362
Entering		293
Exiting		69
Number of Trucks		12
Entering Trips		6
Exiting Trips		6

Table 4.6-2. Summary of Construction Noise Sources Associated with Heavy Construction Activities

Source	Equipment Location(s)[a] X (m)	Equipment Location(s)[a] Y (m)	Modeled Source Height[b] (m)	31.5	63	125	250	500	1K	2K	4K	8K	Overall Sound Power Level (dB)	Overall Sound Power Level (dBA)
				Sound Power Level (dB) for Octave Band Center Frequency (Hz)										
Front End Loader 1	8,036.69	456.39	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Truck 1	8,037.48	435.76	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Truck 2	8,179.96	446.87	1.8	0.0	0.0	118.6	116.1	113.1	109.6	106.1	102.1	0.0	121.7	115.3
Front end Loader 2	8,169.25	463.54	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Bulldozer 1	8,139.88	506.00	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9
Bulldozer 2	8,035.50	514.73	1.8	0.0	106.6	103.6	101.6	102.6	99.6	96.6	94.6	96.6	105.3	110.9
Crane 1	8,097.01	540.93	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Crane 2	7,980.73	469.49	1.8	0.0	111.6	118.6	116.6	114.6	109.6	104.6	98.6	92.6	122.4	115.5
Welder 1	7,953.74	519.11	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 2	7,989.86	556.01	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 3	8,079.95	501.24	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Welder 4	8,170.83	522.27	1.8	0.0	102.6	110.6	105.6	98.6	98.6	93.6	88.6	84.6	103.6	112.7
Pile Drivers (2)	[c]	[c]	4	130.6	131.6	126.6	115.6	118.6	121.6	123.6	116.6	109.6	135.5	127.5

[a] Construction noise source locations relative to the site coordinates.
[b] Source height used for modeling analysis only and does not necessarily represent the physical height of the source.
[c] Location X(m), Y(m) = 8,526.11, 398.47; 8,214.20, 718.09

Note: m = meter.

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Table 4.6-3. Observed Background and Predicted Construction Noise Levels for the Manatee Power Plant (in dBA)

Site No.	L_{90} Daytime Observed Values	Construction Only [a]	Construction plus Observed Values [b]
1	54.7	59.8	61.0
2	44.8	64.4	64.4
4	34.8	35.9	38.4
5	39.0	48.5	49.0
6	42.2	50.9	51.4

[a] Major construction activities using heavy equipment will occur during 7 a.m. to 9 p.m.
[b] Includes observed and predicted construction noise levels.

Note: Refer to Section 2.3.8 for information on the description and location of the noise monitoring site.

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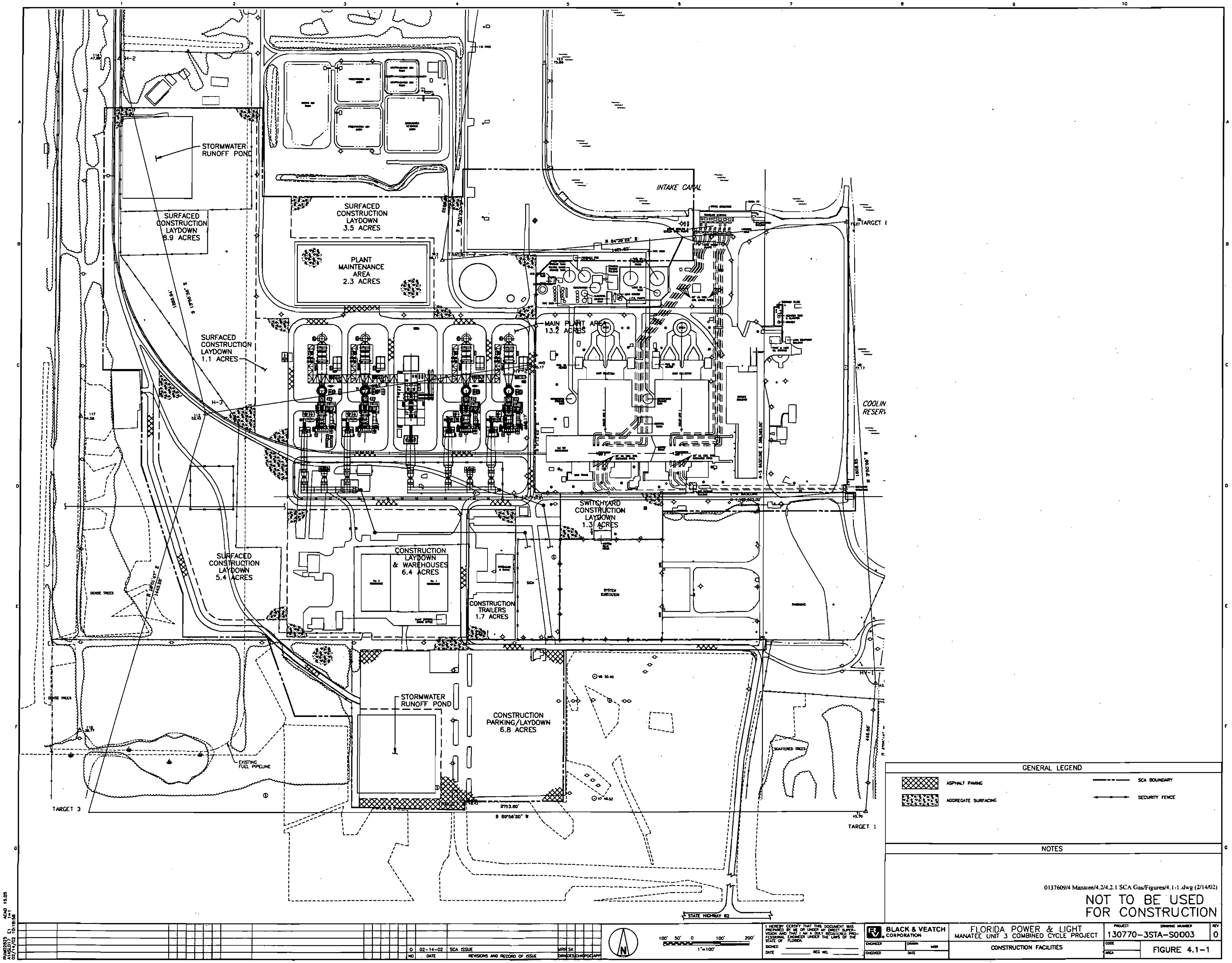

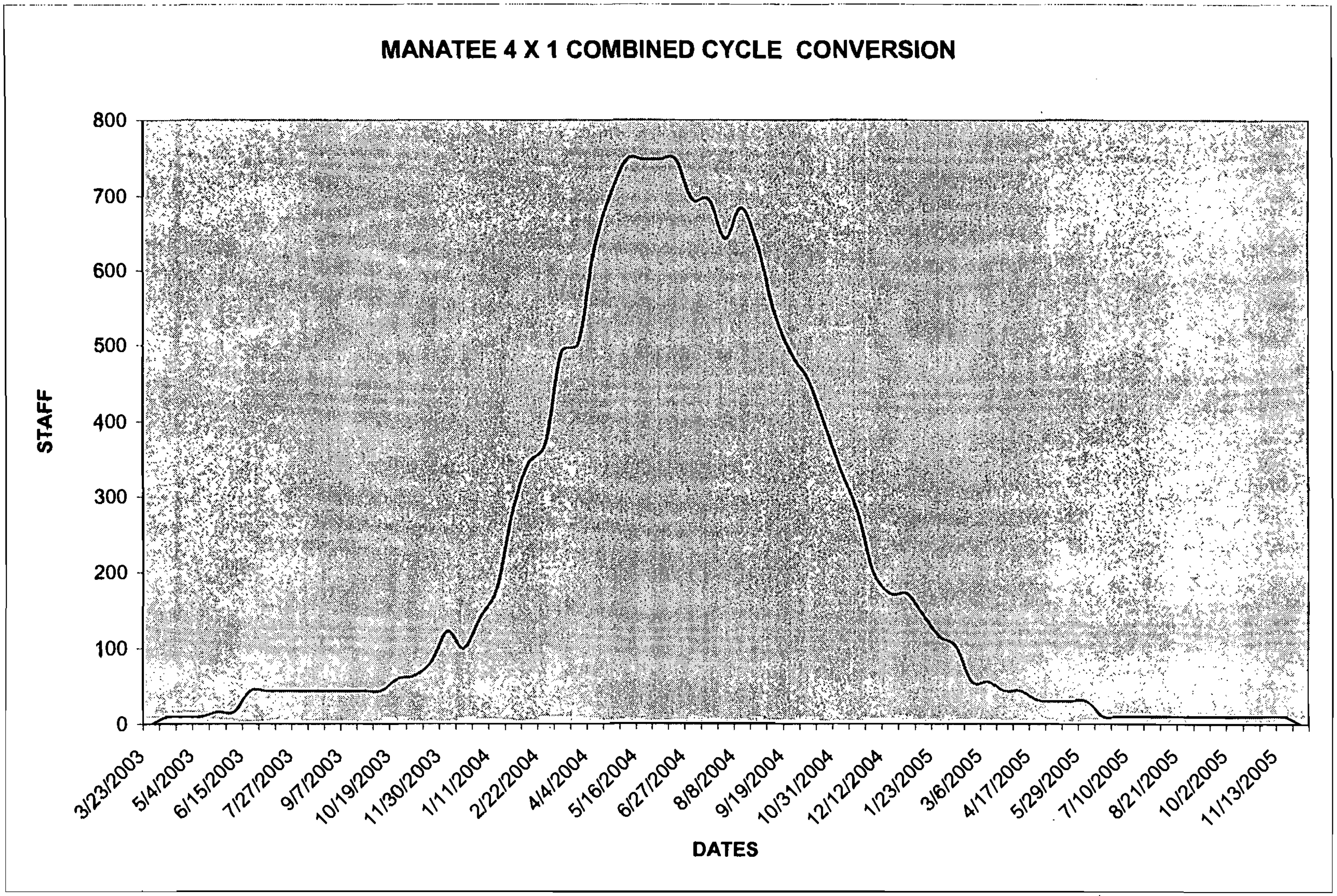

Figure 4.1-2. Construction Employment

Source: Golder, 2002.

FPL
Manatee Unit 3

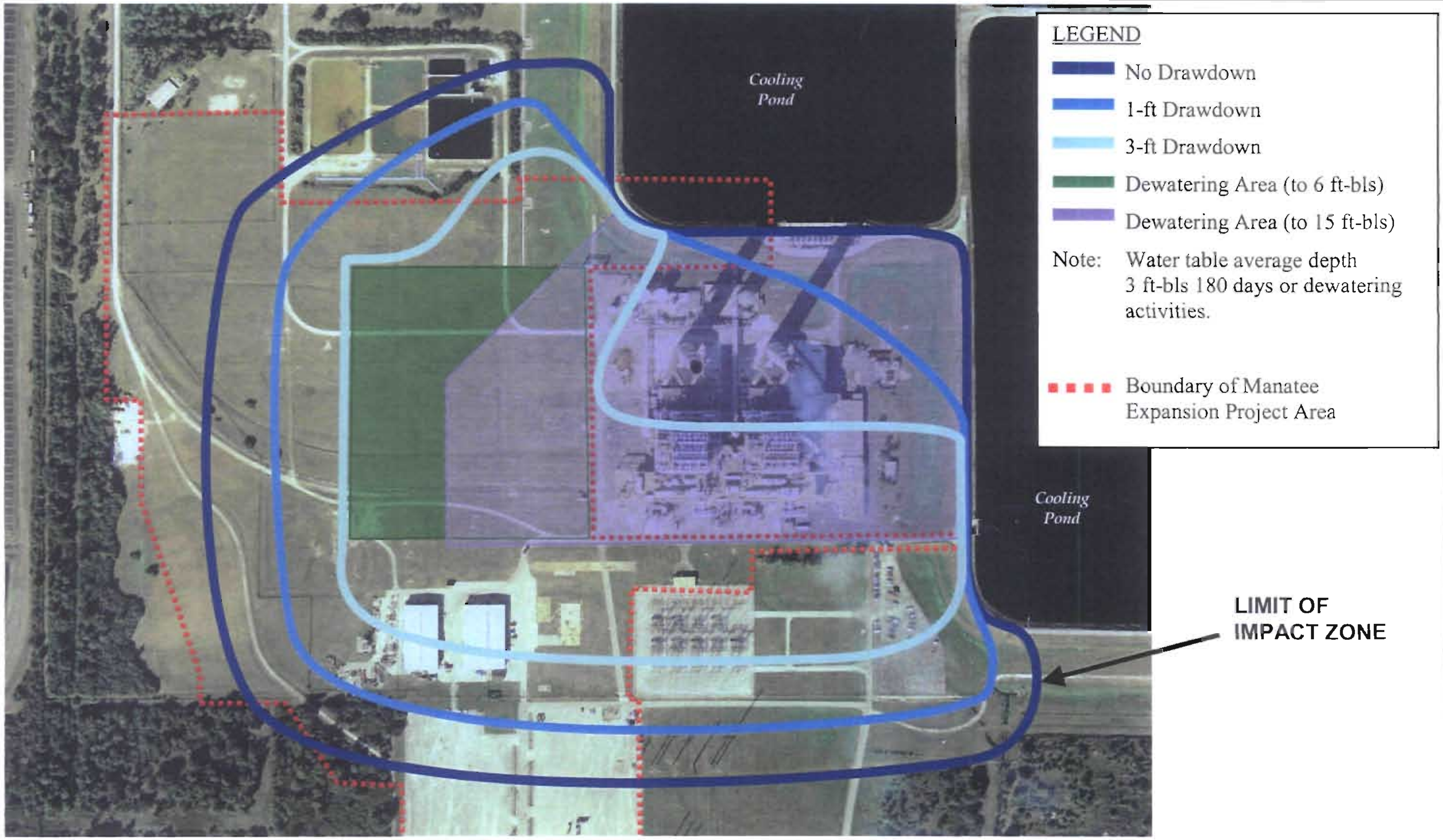

Figure 4.3-1. Maximum Predicted Surficial Aquifer Drawdown from Dewatering Activities

Source: Golder, 2002.

FPL
Manatee Unit 3

Looking North-Northwest with Warehouses and Units 1 and 2 in Background

Looking Southeast with Warehouses in Background

Figure 4.4-1. Views of Project Area from South and West

Source: Golder, 2002.

FPL

Manatee Unit 3

Looking East-Southeast with Units 1 and 2, and Warehouses Shown in Background

Looking East with Units 1 and 2 Shown in Background

Figure 4.4-2. Views of Project Area from the West Boundary

Source: Golder, 2002.

FPL

Manatee Unit 3

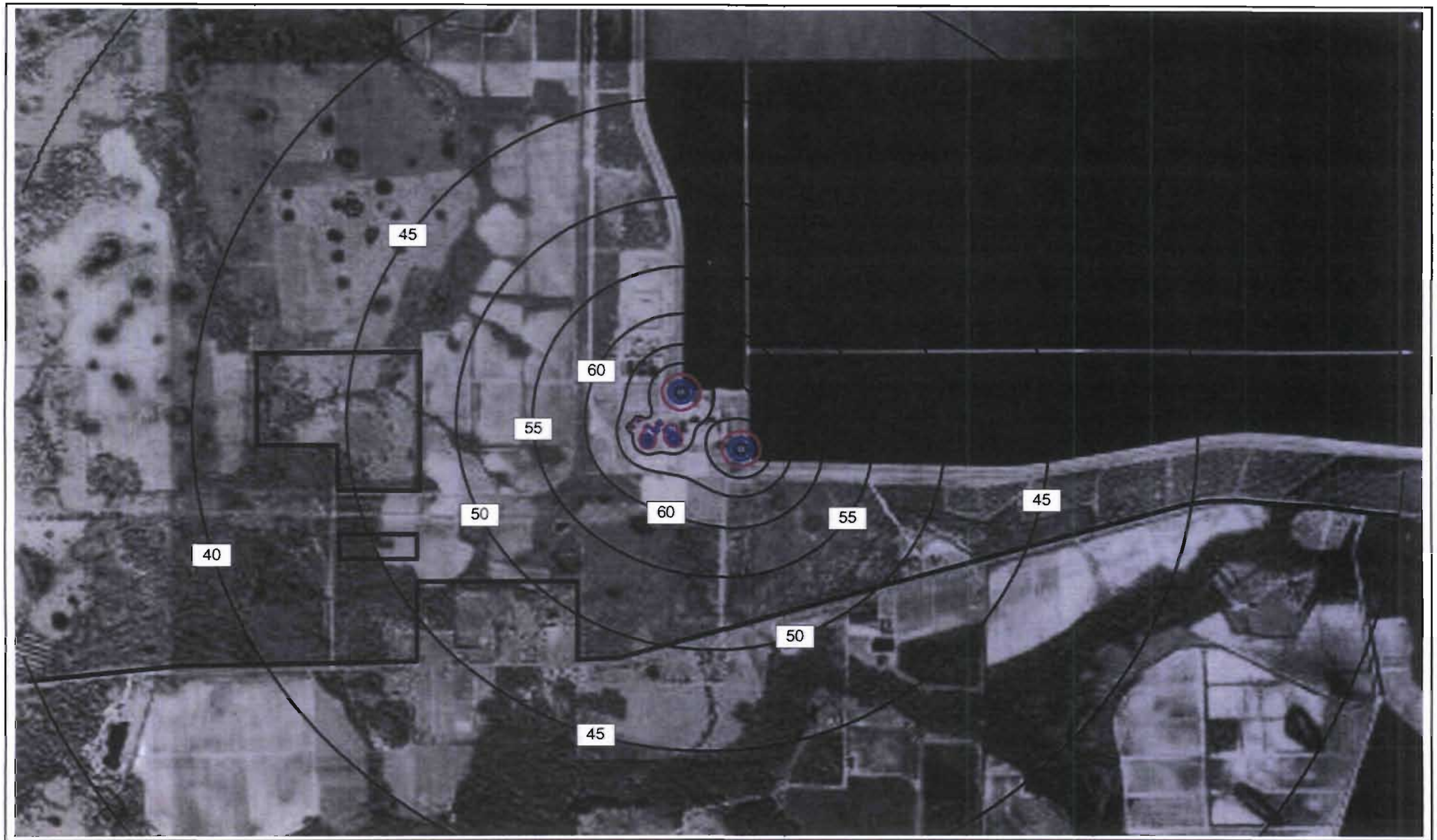

Figure 4.6-1. Maximum Predicted Sound Levels (dBA) for Construction of Manatee Unit 3

Source: Golder, 2002.

FPL
Manatee Unit 3

5.0 EFFECTS OF PLANT OPERATION - INTRODUCTION

As discussed in this chapter, operation of the Manatee Unit 3, along with the existing power generating facilities at the Manatee Plant, will comply with applicable regulatory standards. The Project will not require an increase in the currently authorized withdrawal rates of water from the Little Manatee River or from groundwater sources. Discharges from the existing cooling pond will continue to be in compliance with water quality standards. Utilization of the existing FPL Manatee Plant site for this Project will result in lower overall environmental impacts than if the Project were undertaken on a greenfield site.

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

The Manatee Plant will continue to use the existing cooling pond for heat dissipation subsequent to the addition of the Unit 3 Project.

The additional cooling requirements will be satisfied by circulating cooling pond water through the new Unit 3 condenser and heat exchangers. Consequently, the Project will increase the total heat load to the cooling pond. To assess the effect of these changes, a cooling pond performance model was used. The modeling was performed using historic load factors for Units 1 and 2 and corresponding meteorologic/hydrologic conditions, for the period from 1977 to 2001, with and without Unit 3 at full load. The cooling pond performance modeling report is included in Appendix 10.7. The additional heat load from Unit 3 will increase the pond temperature, the evaporation rate, the makeup water demand and the cooling pond cycles-of-concentration.

Along with the addition of Unit 3, FPL proposes that water withdrawals from the Little Manatee River for cooling pond makeup, after Unit 3 becomes operational, will be governed by a ten percent withdrawal limit, with the current diversion curve for October-July used only under defined conditions (see Section 3.5.1). The cooling pond performance model shows that pond water levels can generally be maintained within acceptable limits, using the 10 percent diversion limitation. The modeling predicts that there are only 3 events in a 24-year period that would require diversions in excess of the ten percent of the stream flow of the Little Manatee River. The predicted cumulative frequency of such withdrawals is only 3 percent of the time.

High-water-control discharges from the cooling pond may be required during periods of extreme rainfall (rainfall amounts exceeding the 100-year 24-hour event). To accommodate the possibility of such discharges, which are required to maintain public safety, the cooling pond has an existing spillway located on the north side. The spillway consists of three sluice gates and has a crest elevation of 68.75 ft-msl. The spillway is designed to safeguard against overtopping of the embankment in keeping with sound engineering practice.

When Unit 3 is operational, excess rainfall releases will be become less frequent. There are at least two reasons for this improvement. First, the normal maximum water level for the pond will be set at 67.67 ft-msl. This level provides adequate reserve storage to retain all direct rainfall and surface runoff to the pond from a 100-year 24-hour storm event. Second, the additional heat load from Unit 3 improves operational control of the cooling pond. This is evident from the results of the calibrated cooling pond performance model, which was run using the last 24-years of historical data. The model results show that with Unit 3 operational, no high-water-control discharges would occur over the 24-year period modeled.

To ensure reliability, spillway gate tests are conducted annually. During these tests, approximately 10,000 gallons of water is released. The water released from the spillway flows into a stilling basin at the base of the spillway, which can hold approximately 500,000 gallons. Water overflowing the stilling basin outlet structure (Weir 10) must flow another 1,700 ft down the spillway canal before entering the Little Manatee River.

The only planned releases from the cooling pond are associated with annual testing of the spillway gates. FPL intends to continue analyzing the pond water, as required by the Units 1 and 2 Industrial Waste Water Facility Permit, prior to any such releases. If the analysis indicates that any pond constituent is present in concentrations that would exceed Class III surface water criteria, water in the stilling basin, which receives the release will be analyzed for the same constituent(s). Provided that calculations indicate that the combined discharge would meet Class III surface water criteria, the gate test will be conducted.

5.1.1 TEMPERATURE EFFECT ON RECEIVING BODY OF WATER

Given the procedures discussed above, adverse thermal impacts on the receiving body of water are not expected.

5.1.2 EFFECTS ON AQUATIC LIFE

5.1.2.1 Thermal Impacts

Given the procedures discussed above, and the current temperature fluctuations in the Little Manatee River, adverse thermal impacts on the aquatic life in the receiving body of water are not expected.

5.1.2.2 Impingement and Entrainment

Historically, operation of the pumphouse at the Little Manatee River has caused no notable incidents of entrainment or impingement of biota at the intake structure. The additional water for Unit 3 will not require diversion rates that exceed those allowed under the current Permit Agreement. Therefore, no adverse impacts to the aquatic communities from impingement and entrainment are anticipated.

5.1.2.3 Freshwater Flow Reduction

Salt marshes within the Little Manatee River exist where constant or periodic levels of saline water saturate the soils, and often the extent of salt marshes along the coast is determined by the height of previous storm surges. If the storm surges are frequent enough, salt can be deposited and incorporated into the soil to sustain populations of salt tolerant plants. The duration and extent of storm surges, and their resultant effects on riverine vegetation, will not be affected by the proposed Project.

The occurrence of salt-water intrusion upstream in the Little Manatee River is not frequent, limited primarily to periods of extended reduced river flow (such as drought). Any salt-tolerant species of plants which manage to establish during an episode of saltwater excursion upstream would have to be tolerant of fresh water due to subsequent river flushing from upland storm events. Saltwater or estuarine plant species would establish only on the river bottom and not on the bank, since the freshwater water flow during high-water events is extensive enough that very few salt-tolerant plants would be able to permanently survive.

The Manatee Plant and associated cooling pond have been in existence approximately 28 years. In the early 1970s, FPL and SWFWMD entered into an agreement for the withdrawal of pond makeup water from the Little Manatee River. Studies conducted at that time in support of the agreement concluded that impacts due to the withdrawals were acceptable. The purpose of this section is to review the original withdrawal impact study and a subsequent study performed by USGS (1985) to explain why the conclusions reached by the original study are still valid.

The original study was conducted for FPL by Brown and Root, Inc. (1973). The study objective was to determine the probability of increasing saltwater intrusion due to upstream diversions from the Little Manatee River to the cooling pond. Total dissolved solids (TDS) concentration was used as a surrogate for salinity. River TDS levels during low, mean, and high streamflows were calculated and compared for before- and after-flow diversion conditions. Figures 5.1-1 through 5.1-3 show computed TDS levels before and after the withdrawals for these three streamflow/diversion scenarios. The low-flow scenario (Figure 5.1-1) simulates a 28 percent diversion rate. The mid-flow scenario (Figure 5.1-2) simulates a 37 percent diversion rate. The high-flow scenario (Figure 5.1-3) simulates a 39 percent diversion rate. As the figures suggest, the saltwater-freshwater interface [defined as approximately 0.5 parts per thousand (‰)] was located approximately between river-mile 10.0 and 11.0, both before and after the withdrawal. The study concluded that at estuary locations near Tampa Bay, the increase in TDS is less than 6 percent during times of withdrawal. This suggests that historical flow diversions of 30 to 40 percent at the pumping station have no significant effect on the water quality in the estuarine portion of the river.

One change in the assumptions upon which the Brown and Root study was based occurred in 1975. An amendment to the withdrawal agreement modified the upper withdrawal rate from approximately 165 cfs at a river flow of 350 cfs to a withdrawal rate of 190 cfs at a river flow of approximately 400 cfs. Figure 5.1-4 shows the two withdrawal rate curves. While this change would have altered the computed results on Figure 5.1-3 (the river flow after withdrawal would be 230 cfs instead of 255 cfs, a 5 percent change relative to the starting streamflow of 420 cfs), this does not significantly alter the conclusions of the original study.

In a subsequent study, USGS (Fernandez, 1985) investigated the potential impacts of reducing inflow from the Little Manatee River to the river estuary and adjacent areas of Tampa Bay. Intensive monitoring of tides, streamflows, and conductivity was undertaken from February 1982 through May 1983. These data were used to develop a regression relationship for the maximum upstream location of the saltwater-freshwater interface (in river miles above the mouth at Shell Point) as a function of higher high tide and mean daily discharge at Wimauma. The interface was defined as the location of the 800- mho conductivity line. An interface location-duration analysis for the period of study indicated that the maximum upstream location of the 800- mho interface will be above Mile 9.7 about 12 percent of the time. The results indicated that if river flows were reduced, the saltwater-freshwater interface would move upstream, as expected. The report concluded that reducing flow in the Little Manatee River would result in increased salinity near the river mouth.

Fernandez developed a linear regression equation, normalized for Tampa Bay conductivity conditions. The R^2 was 0.92, and the root mean square error for the maximum upstream location of the interface was ±0.4 mile. This equation, developed for the 800- mho conductivity line (0.5‰ salinity), is valid for discharges ranging from 42 to 118 cfs, higher high tides from 0.81 to 2.48 ft-msl, and an interface location between 5.8 and 10.4 miles above Shell Point. Fernandez concluded that the equation could also be used for flows lower than 42 cfs assuming linearity of the relationship. Based on daily streamflow duration curves for the Little Manatee River near Wimauma for the period of record up to the construction of the Manatee Plant (Figure 5.1-5), the developed equation would be applicable approximately 70 percent of the time, since the flow equals or exceed 118 cfs only 30 percent of the time. Together, the regression equation and the streamflow duration curve also show that this salinity point, which defines the landward extent of the estuary, routinely ranges from 6 miles to approximately 12 miles above Shell Point.

In order to assess the effects of the cooling pond diversions on saltwater intrusion under the current permit agreement diversion schedule, the Fernandez's (1985) regression equation was used to plot streamflow versus location of the interface with and without diversion using a higher high tide of 2.48 ft (Figure 5.1-6). For example, the plot suggests that at a streamflow (at Wimauma) of 100 cfs, the interface without diversion would be located at 7.7 miles above Shell Point; with the maximum allowable diversion (current permit agreement), the interface would be located at 9.2 miles above Shell Point. Thus, the maximum allowable diversion for this example results in approximately 1.5 miles of net upstream movement of the 800- mho conductivity interface. This is well within the natural excursion range for the estuary.

Applying the 10 percent diversion limit now proposed by FPL, the interface would move only 0.5 miles upstream (see Figure 5.1-6). Since the results of the cooling pond performance modeling confirm that even with Unit 3 at a 100 percent capacity factor, the pond can generally be maintained within acceptable limits using the 10 percent diversion limit, the saltwater interface within the Little Manatee River will remain well within its normal excursion range.

As discussed above and in Section 2.3.6, the Little Manatee River is considered to be estuarine as far as 10 to 12 miles upstream from the mouth at Shell Point. Thus, fish and other aquatic species occurring in this portion of the river are already pre-adapted to estuarine conditions. The predicted location of the saltwater/freshwater interface, under the currently permitted diversion curves and under the proposed 10 percent diversion curves is within that portion of the Little Manatee River considered to be estuarine. Therefore, no significant adverse impacts to aquatic biota are expected.

5.1.3 BIOLOGICAL EFFECTS OF MODIFIED CIRCULATION

The existing intake and discharge structures at the Little Manatee River will be utilized, and no changes in their operation are anticipated. The diversion rate from the Little Manatee River will continue to be within the currently authorized maximum withdrawals, therefore, no adverse impacts are anticipated.

5.1.4 EFFECTS OF OFFSTREAM COOLING

Since the Plant started operation in 1976, there have been no reported fogging problems associated with the cooling pond. Because the cooling pond operating temperatures with Manatee Unit 3 are expected to be similar to existing conditions, the Project is not expected to result in a significant increase in the amount of fog in the area.

5.1.5 MEASUREMENT PROGRAM

FPL has maintained a water quality sampling program in the vicinity of the Manatee Plant site, in accordance with the Plant's Industrial Wastewater Facility Permit. The required monitoring will continue.

Since no significant impacts to surface water quality are expected from the Project, no additional monitoring is proposed.

Because there are no significant adverse ecological impacts due to the Project's heat dissipation system, no biological monitoring is proposed.

5.2 EFFECTS OF CHEMICAL AND BIOCIDE DISCHARGES

5.2.1 INDUSTRIAL WASTEWATER DISCHARGES

5.2.1.1 Surface Water Discharge

Compliance with applicable state and federal regulations after Unit 3 becomes operational will be assured through the procedures described in Section 5.1. Current and planned water conservation measures (see Section 3.5.2) reduce the volume of industrial wastewater and maximize stormwater reuse and cooling pond seepage recapture. With the addition of unit 3, treated plant process wastewater will continue to be routed to the cooling pond, and existing water reuse measures will continue. No new industrial wastewater discharges to surface waters of the state are proposed for Unit 3 operations.

Spillway discharges to the Little Manatee River from gate tests are carefully controlled (see Section 5.1 for a discussion of the spillway gate test procedures). Seepage along the outside of the cooling pond enters a seepage return system that has been designed to return all seepage back to the cooling pond. Uncontaminated stormwater from the existing Plant parking lot is currently permitted to discharge to Gamble Creek.

The existing Manatee Plant has three types of wastewater releases to the cooling pond: plant low-volume and metal-cleaning wastewaters, plant-related sanitary wastewater, and plant site stormwater. Consistent with FDEP and SWFWMD policy, the existing plant treats, retains, and/or recycles all industrial wastewater flows, thus minimizing offsite surface water discharges.

Existing plant low-volume and metal-cleaning wastewaters include equipment drain wastes, boiler blowdown, and water treatment wastestreams. Anticipated generation rates for these wastewater streams with Unit 3 in operation are presented in Chapter 3. These wastewaters will continue to be treated to satisfy EPA steam electric guidelines for effluent quality prior to recycling to the cooling pond. Use of the cooling pond to receive treated plant wastewaters maximizes the retention and recycling of treated wastewater flows and thus minimizes offsite surface water discharges, while maximizing water reuse.

Based on the cooling pond performance modeling and pond inflow water quality (including the treated plant wastewaters and sanitary wastewaters), the long-term pond water quality has been estimated (see Table 3.5-2). Given the increased evaporative losses and the minimal seepage from the pond, some evapo-concentration of water quality constituents will occur over the life of the pond.

For several reasons, these estimates of pond water quality are conservative (i.e., more likely to overestimate than underestimate the actual concentration). As discussed in Section 5.1, the cooling pond will not discharge under normal conditions, and releases made during gate testing will be carefully controlled to ensure compliance with water quality criteria. Consequently, when Unit 3 is operational, no surface water discharge from the cooling pond is expected, except for gate testing and during extreme meteorologic conditions (events exceeding the 100-year 24-hour storm). Therefore, no mixing zones are necessary and no mixing zones are requested as part of this application.

5.2.1.2 Groundwater Discharges

Industrial wastewaters associated with Unit 3 operations will continue to be collected and/or treated in lined basins (e.g., neutralization basins, solids-settling basins) prior to recycling to the cooling pond. A detailed description, along with flow diagrams, is provided in Chapter 3. Therefore, no impacts to groundwater are expected from the Project.

Horizontal groundwater seepage from the cooling pond is intercepted and collected by a system of toe drains, drainage ditches, and weirs that are located along the south, west, and north sides of the cooling pond. All seepage is normally returned to the cooling pond, minimizing ground impacts surficial aquifer.

Table 5.2-1 shows a comparison of river water quality, peak predicted cooling pond concentrations, final predicted cooling pond concentrations, and the primary drinking water standards (i.e., the applicable standard for groundwater discharges from the cooling pond).

The cooling pond water quality is projected to remain below the groundwater standards for all parameters except sodium and fluoride. Fluoride concentrations of 6 mg/L are predicted to occur for only 5 months out of 24-years, and will not cause contravention of the groundwater standard outside the zone of discharge.

The Manatee Plant cooling pond was in existence in July 1982 and is therefore an existing installation for purposes of groundwater discharges under Rule 62-522.200, F.A.C. Groundwater discharges from the cooling pond and other existing installations must meet primary drinking water standards at the boundary of the zone of discharge (ZOD) and are exempt from meeting secondary drinking water standards. The cooling pond currently has a ZOD that extends to FPL's property boundaries and to the base of the surficial aquifer. Based upon the predicted sodium concentration in the cooling pond and upon past evaluations of groundwater discharges from the cooling pond (Garlanger, 1995; see Appendix 10.9), FPL requests that the existing ZOD be extended vertically from the base of the surficial aquifer into and to the base of the confining unit below the surficial aquifer. The expanded ZOD will not extend beyond its current horizontal limits at FPL's property boundaries. The groundwater discharge will not significantly impair any designated use of receiving groundwater, and will comply with Class G-II groundwater standards at the edge of the proposed ZOD.

In summary, the Project will minimize the potential for groundwater discharges by the reuse of collected and treated wastestreams and stormwater will be handled in a manner that is consistent with applicable regulations. No significant impacts to groundwater quality are expected.

5.2.1.3 Biological Impacts

All plant-related wastewaters associated with the Project, as discussed in Chapter 3, will be collected, treated, and recycled to the cooling pond. No direct discharge of chemical and biocide wastes will enter any natural surface water or groundwater.

Intermittent shock chlorination or other oxidizing or nonoxidizing biocides will be used to prevent biofouling within the Unit 3 circulating water system. Based on the anticipated residence time of the water in the cooling pond, the dilution and the natural decay of the biocides, the level of total residual oxidants in the pond will be insignificant.

5.2.2 COOLING TOWER BLOWDOWN

There are no cooling towers at the Manatee Plant, and none are proposed for the Manatee Unit 3 Combined Cycle Project. Therefore, there is no cooling tower blowdown to be addressed.

5.2.3 MEASUREMENT PROGRAMS

5.2.3.1 Surface Water

The existing monitoring program required by current permits is structured to provide the necessary data on operational water quality at the site for determination of Project compliance and impacts and will be continued after Unit 3 is operational.

5.2.3.2 Groundwater

Because of the utilization of lined basins and monitoring requirements for the cooling pond, the facility has historically been exempted from groundwater monitoring in accordance with Rule 17-522.600(9)(b), F.A.C. The Industrial Wastewater Facility Permit requires monitoring of the cooling pond water quality in lieu of groundwater monitoring. The Unit 3 Project is not anticipated to result in groundwater quality impacts from cooling pond discharges; therefore, groundwater monitoring is not warranted.

5.2.3.3 Biological Monitoring

Because of the absence of anticipated ecological impacts, no biological monitoring during Project operations is proposed.

5.3 IMPACTS ON WATER SUPPLIES

5.3.1 SURFACE WATER

A search of SWFWMD records (see Table 2.3-4) identified no downstream permitted water users on the Little Manatee River. Water use by the plant will have no impact on upstream users. Furthermore, use of surface water from the Little Manatee River by FPL over the last 28 years at the historical rates has had no reported impact on any other consumers along the river. Because proposed withdrawal rates are a smaller percent of the river's flow, impacts to existing users are unlikely.

A review of the current SWFWMD Regional Water Supply Plan (August 2001), identified no future water supply projects downstream of the Manatee Plant. One potential future project, upstream of the Manatee Power Plant, is the IMC/MARS Augmentation Option. This project proposes to use restored phosphate mines for reservoir storage of streamflow diverted from the south fork of the Little Manatee River and from Long Branch. The water would be used to help supply agricultural users. The Unit 3 Project will have no impact on this upstream water supply project.

5.3.2 GROUNDWATER

5.3.2.1 Consumptive Use Impacts

The Manatee Plant, with Unit 3, will operate within the existing water use permit allocation for groundwater. The majority of water consumption at the plant related to power generation is from surface water, with groundwater sources identified for potable and standby uses. The FPL existing water use permit issued by SWFWMD also authorizes groundwater withdrawals for agricultural use (irrigation).

The average volume of groundwater withdrawn for potable use is estimated at about 7,000 gpd for the existing Manatee Plant and will be about 8,000 gpd with the addition of Unit 3. These existing and proposed average groundwater demands for potable use at the plant are within the permitted withdrawal rates authorized in the above-referenced consumptive use permit. It is, therefore, anticipated that there will be no adverse impacts on groundwater supplies as a result of the Unit 3 Project.

5.3.2.2 Groundwater Quality Impacts

The cooling pond is the principal source of potential impacts to groundwater quality from the cooling pond Unit 3 Project at the Manatee Plant. Water quality projections for parameters in cooling pond water after 24 years of operation exceed primary drinking water standards only for sodium and fluoride. A previous study (Garlanger, 1995, see Appendix 10.9) indicates that sodium and fluoride concentrations at the projected levels in the cooling pond will not cause a groundwater quality contravention at the property line or at the base of the confining layer below the surficial aquifer. The toe drain system and sumps that are designed to recover horizontal seepage from the cooling pond will further minimize potential groundwater quality impacts to the surficial aquifer

Site-specific lithology developed from subsurface investigations conducted at the site indicates the clayey sediments were encountered consistently. Less than 2 inches per year of recharge to the intermediate aquifer is estimated for northern Manatee County. Potential impacts to groundwater quality in the intermediate aquifer is unlikely given the extensive confining units that separate the surficial and intermediate aquifers. Based on the well inventory information, most private domestic supply wells are completed in the intermediate aquifer in the vicinity of the Project area.

5.3.3 DRINKING WATER

As previously indicated, groundwater withdrawals will remain within authorized limits, and there are no existing or projected discharges to sources of drinking water supplies.

The inventory of area users of groundwater conducted in the vicinity of the project area was prepared with data obtained from SWFWMD water use permit files, as indicated in Section 2.3.3.2. Review of water use permits for an area within 5 miles of the Manatee Plant did not indicate current municipal water users. The nearest residences on the south side of SR 62 are located about 4,000 ft south-southeast of the existing plant.

Domestic use wells were not identified in the SWFWMD well construction permit file for the section that includes the larger outparcel located near the western boundary of the project area (Section 13, T32S, R19E). It is considered likely that the residences within this outparcel are provided with potable water from private wells that may have been installed prior to development of the SWFWMD well construction permit database. Buildings within the larger outparcel are located about 6,000 ft west of the existing plant.

The average groundwater withdrawal for potable use at the existing plant is about 7,000 gpd. Average groundwater withdrawal for potable use with the addition of Unit 3 will be about 8,000 gpd to support the additional drinking water volume for 12 additional plant personnel. The small increase in groundwater use for potable supply at the Project will not have an adverse impact on drinking water supplies or adjacent domestic wells.

The source of service water and process water for the Manatee Plant will continue to be the cooling pond, with the three production wells reserved for standby purposes. There will be no resulting impacts to drinking water supplies or adjacent domestic wells.

5.3.4 RUNOFF AND LEACHATE

Proposed changes to the Manatee Plant site related to the Project include new stormwater management facilities. These facilities will be designed to applicable standards as discussed in Appendix 10.8. There are no components of the Project that would be expected to generate leachate. Therefore, no impacts from stormwater runoff or leachate are expected.

5.3.5 MEASURING PROGRAMS

No water supply monitoring is proposed.

5.4 IMPACTS FROM DISPOSAL OF BYPRODUCTS AND SOLID AND HAZARDOUS WASTES

5.4.1 SOLID WASTE

As explained in Section 3.7.2, all solid wastes generated during plant operations will be disposed of in offsite licensed landfills or by other approved methods. The operation of Unit 3 will generate minor amounts of solid wastes (e.g., used turbine inlet filters). The number of plant employees will increase only slightly. Therefore, there will be no adverse impacts resulting from solid waste generated by the project.

5.4.2 HAZARDOUS WASTE

The types of hazardous wastes currently generated at the Manatee Plant are not anticipated to change as a result of operation of Unit 3. FPL instituted an aggressive pollution prevention and waste minimization program at the Manatee Plant in the early 1990s. This program has resulted in a reduction of hazardous waste quantities so that the Manatee Plant could qualify as a small quantity generator. Historical volumes of hazardous waste generated at the site on an annual basis include:

- Paint Solids – approximately 2 drums,
- Solvent Liquids – approximately 2 drums,
- Laboratory Waste Liquids – approximately 3 drums, and
- Solvent Rags – approximately 1 drum.

FPL has a contract with Chemical Waste Management to transport and dispose of hazardous waste at licensed facilities in a manner that complies with environmental regulations. Therefore, no adverse impacts are anticipated from hazardous wastes generated at the Manatee Plant.

5.5 SANITARY AND OTHER WASTE DISCHARGES

Sanitary wastewaters are, and will continue to be, treated and released to either the cooling pond for dilution and reuse in the cooling system or into an existing drainfield. Sanitary wastewaters are treated in a permitted package sewage treatment plant designed to provide secondary treatment. All effluent is chlorinated prior to release to the cooling pond. No adverse impacts to receiving bodies of water from sanitary wastewater discharges are anticipated.

5.6 AIR QUALITY IMPACTS

5.6.1 IMPACT ASSESSMENT

5.6.1.1 Regulatory Applicability

Analyses were performed to estimate the potential air quality impacts of pollutant emissions from the Project. These analyses are discussed in detail in the PSD Permit Application contained in Appendix 10.1.5. The technical information and analysis required by the federal and state PSD regulations are contained in the PSD application document. Although the PSD application document is an appendix to the SCA, it has been prepared as a stand-alone PSD application to allow FDEP, EPA, and other involved agencies to readily review the Project's air emissions and impacts.

The following sections present a summary of the air modeling approach used and air quality impacts obtained. These results demonstrate that the Project will comply with all AAQS and PSD Class II and I increments.

Under federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the CAA must be reviewed and a pre-construction permit issued. The EPA has promulgated PSD regulations under 40 CFR Part 52.21 and implemented through delegation to the FDEP. Florida's PSD regulations are codified in Florida Rule 62-212.400, F.A.C. EPA has approved Florida's State Implementation Plan (SIP), which contains FDEP's PSD regulations.

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 TPY or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under the CAA. A "major modification" is defined under PSD regulations as a change at an existing major facility that increases emissions by greater than significant amounts. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new source is determined to be a "major modification" for a particular pollutant, any pollutant emitted in amounts greater than the PSD significant emission rates is subject to PSD review.

The existing Manatee Plant is classified as a major source because it is one of the named source categories and has the potential to emit more than 100 TPY of at least one regulated pollutant. The Project is a proposed major modification to an existing major source since Unit 3's emissions are greater than the PSD significant emission increase rates for several regulated pollutants.

Annual emissions for the Project are presented in Table 5.6-1 and are compared to the PSD significant net emission increase thresholds. Based on the proposed emissions for the Project, PSD review is required for each of the following regulated pollutants:

- PM as total suspended particulate matter (TSP),
- Particulate matter with aerodynamic diameter of 10 microns or less (PM_{10}),
- SO_2,
- NO_2,
- CO,
- VOCs, and
- Sulfuric acid mist.

Manatee County has been designated as an attainment area for all criteria pollutants (i.e., O_3, PM_{10}, SO_2, CO, and NO_2) and is classified as a PSD Class II area for PM_{10}, SO_2, and NO_2.

PSD review is used to determine whether significant air quality deterioration will result from new or modified facilities. The following analyses related to PSD are required for each pollutant emitted in significant amounts:

- Control technology review,
- Source impact analysis,
- Air quality analysis (monitoring),
- Source information, and
- Additional impact analyses.

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met, and that BACT be applied to control emissions from the source. The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, as a minimum, demonstrate compliance with NSPS for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on balancing environmental benefits with energy, economic, and other impacts.

A source impact analysis must be performed for criteria pollutants to address compliance with AAQS and PSD Class II and I increments. These analyses may be limited to the new source if the net increases in impacts as a result of the new source are below significant impact levels. The significant impact levels are threshold levels that are used to determine the level of air impact analyses needed for the project. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance.

An air quality monitoring analysis must be performed that contains an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. The regulations also include an exemption that excludes or limits the pollutants for which an air quality analysis must be conducted if the air quality impacts for the proposed source are predicted to be less than the *de minimis* levels.

Source information must be provided to adequately describe the proposed project. The information required for this Project is presented in Appendix 10.1.5.

Additional analyses of the proposed source's impacts on soils, vegetation, and visibility, especially as they affect PSD Class I areas, must be performed. Air quality impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed.

The following sections describe the methods and assumptions used to determine the air quality impacts due to the Project and provide a summary of the maximum air quality impacts associated with operation of Unit 3.

5.6.1.2 Analysis Approach and Assumptions

General Modeling Approach

The air quality modeling approach for the Project followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments. In general, when model predictions are used to determine compliance with AAQS and PSD increments, current policies stipulate that the highest annual average and highest, second-highest (HSH) short-term (i.e., 24 hours or less) concentrations are to be compared to the applicable standard when a 5-year period of meteorological data is used. The HSH concentration is calculated for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor,
2. Identifying the second-highest concentration at each receptor, and
3. Selecting the highest concentration among these second-highest concentrations.

This approach is consistent with the ambient air quality standards, which permit a short-term average concentration to be exceeded once per year at each receptor.

To predict the maximum annual and short-term concentrations for the proposed Project, the modeling approach was divided into screening and refined phases. Concentrations are predicted for the screening phase using a coarse receptor grid and a 5-year meteorological data record. If the highest concentration is predicted at a receptor that lies in an area where the receptor spacing is more than 100 m, then a refined analysis is performed in that area using a receptor grid of greater resolution. Modeling refinements are performed using a receptor spacing of 100 m or less with a receptor grid centered on the screening receptor at which the maximum concentration was predicted. The air dispersion model is then executed with the refined grid for the entire year of meteorology during which the screening concentration occurred.

This approach was used to ensure that valid highest concentrations were obtained. Descriptions of the emission inventory and receptor grids used in the screening and refined phases of the analysis are presented in the following sections with detailed discussions given in the PSD Permit Application, Appendix 10.1.5.

Air Quality Models

The selection of an air quality model to calculate air quality impacts for this Project was based on the models' ability to simulate impacts in areas surrounding the Manatee Plant site as well as at the nearest PSD Class I area of the Chassahowitzka NWA, located about 115 km (71.5 miles) from the site. Two air quality dispersion models were selected and used in these analyses to address air quality impacts for the project. These models were the:

- Industrial Source Complex Short Term (ISCST3) dispersion model, and
- California Puff model (CALPUFF).

The ISCST3, Version 00101, dispersion model (EPA, 2000) was used to evaluate the maximum pollutant impacts due to the Project in nearby areas surrounding the Project Site. The ISCST3 model is applicable for estimating the air quality impacts in areas that are within 50 km from a source. This model is maintained by the EPA on its Internet website, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN).

The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

The Manatee Plant site is about 55 ft-msl. Around the immediate vicinity of the site, the terrain is flat to gently rolling with elevations that range within about 10 to 20 ft of the site elevation. Due to the minimal amount of terrain elevation differences in the Project's vicinity, receptor elevations were not included in the analysis. As a result, the simple terrain option was used for the air modeling analysis, which assumes that all receptors are at the same elevation as the stack base elevations for the Unit 3's stacks.

At distances beyond 50 km from a source, the CALPUFF model, Version 5.4 (EPA, 2000), is recommended for use by the EPA and the Federal Land Manager (FLM). The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The CALPUFF model is maintained by the EPA on the SCRAM internet website. The methods and assumptions used in the CALPUFF model are based on the latest recommendations for modeling analysis as presented in the following reports:

- Interagency Workgroup on Air Quality Models (IWAQM), *Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts* (EPA, 1998); and
- *Federal Land Manager's Air Quality Relative Values Workgroup (FLAG) Phase I Report* (December 2000).

In addition, updates to the modeling methods and assumptions were followed based on previous discussions with the FLM.

The CALPUFF model was used to perform a significant impact analysis for the Project at the PSD Class I area of Chassahowitzka NWA and to assess the Project's impact on regional haze and total nitrogen and sulfur deposition levels.

For modeling analyses that will undergo regulatory review, such as PSD permit applications, the following model features are recommended by EPA for rural mode and are referred to as the regulatory default options in the ISCST3 model and, where applicable, the CALPUFF model:

1. Final plume rise at all receptor locations,
2. Stack-tip downwash,
3. Buoyancy-induced dispersion,
4. Default wind speed profile coefficients for rural mode,
5. Default vertical potential temperature gradients, and
6. Calm wind processing.

In this analysis, the EPA regulatory default options were used to address maximum impacts.

Meteorological Data

Meteorological data used in the ISCST3 model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the NWS office located at the Tampa International Airport. The 5-year period of meteorological data was from 1991 through 1995. The NWS office at the airport is located approximately 44 km north-northwest of the site and is the closest primary weather station to the study area considered to have meteorological data representative of the project site. These meteorological data have been approved by the FDEP and used for numerous air modeling studies submitted as part of air construction permits approved for sources located in Manatee County and Tampa Bay Region.

CALMET, the meteorological preprocessor to CALPUFF, was used to develop a 3-dimensional wind field necessary to perform the air modeling analysis to evaluate pollutant impacts at the PSD Class I area. The modeling domain covered an area over west-central Florida that consisted of a rectangular 3-dimensional grid that extended from approximately 79.0 to 84.5 degrees longitude and from 26.25 to 30.5 degrees latitude. The modeling domain includes the following meteorological and land use parameters:

- Surface weather data,
- Upper air data,
- A 1-degree land use data,
- A 1-degree Digital Elevation Model (DEM) terrain data,
- Mesoscale Model - Generation 4 (MM4) data (for initializing the wind field), and
- Hourly precipitation data.

These data were obtained and processed for the calendar year 1990, the year for which MM4 data are available on CD. The CALMET wind field and the CALPUFF model options used were consistent with the suggestions of the FLMs. Meteorological data used with the CALPUFF model consist of a CALMET-developed wind field covering south Florida.

Emission Inventory

Emission rates for regulated pollutants and stack and operating parameters for the Unit 3 CTs and duct burners were developed for combined- and simple-cycle configurations from design data supplied by equipment vendors for the Project. The emission and stack operating parameters were developed for use in the air modeling analysis for three operating loads and 35°F, 59°F, and 95°F ambient temperatures for the four CTs firing natural gas. Additional operating cases were also considered that included power augmentation and high-power mode for the CTs firing natural gas. In an effort to obtain the maximum air quality impacts for a range of possible operating conditions, the air modeling used a range of emission rates and stack parameter data to predict air quality impacts.

A total of 24 modeling scenarios were considered for simple-cycle and combined cycle configuration with the CTs operating over a range of operating loads (100, 75 and 50 percent), turbine inlet air temperature (35, 59 and 95°F), and operating conditioning (high power mode and duct firing).

These modeling scenarios encompass the operating conditions that will produce the maximum emissions on a short-term basis (i.e., 100-percent load at 35°F) and the minimum plume rise (i.e., 50-percent load at 95°F).

The stack, operating, and emission data used in the air dispersion modeling are presented in Appendix 10.1.5

Receptor Locations

To determine the maximum impact for all pollutants and averaging times in the Project's vicinity, concentrations were predicted at receptors located in a detailed polar receptor grid centered on the modeling origin. This grid was comprised of 180 radials, spaced at 4-degree intervals along each radial. Receptors were located at the following distances from the origin:

- Every 100 m out to 1.5 km;
- Every 250 m from 1.5 to 3 km; and
- at 7 km, 10 km, 15 km, 20 km, and 30 km.

Cartesian receptors were placed every 50 m along the plant boundary.

To determine the 24-hour average SO_2 significant impact area for the Project, a second receptor grid was developed using a polar receptor grid centered on the modeling origin. This grid was comprised of 180 radials, with receptors spaced at 2-degree intervals along each radial. Receptors were located every 1,000 m out to a distance of 15 km from the modeling origin. Additionally, 657 Cartesian receptors, spaced at 50 m, were used to predict impacts along the plant boundary.

For each pollutant and averaging time, modeling refinements were performed, as needed, by employing a Cartesian receptor grid with a maximum spacing of 100 m centered on the receptor and for the year during which the maximum impact from the Project was predicted.

For the PSD Class I analysis, the maximum concentrations were predicted at 13 receptors surrounding the PSD Class I area of the Chassahowitzka NWA. These receptors have been provided by the FDEP for use on previous applications.

5.6.1.3 Model Results

The maximum pollutant concentrations predicted for Unit 3 operating in simple cycle and combined cycle configurations are given in Table 5.6-2. The maximum impacts predicted for the Project, by itself and together with other emission sources, demonstrate compliance with all AAQS and PSD Class II and I increments.

The modeling results indicated that maximum concentrations due to the Project are predicted to be less than the significant impact levels for all pollutants except PM_{10} for the 24-hour averaging time. The Project's significant impact area for PM_{10} extends out approximately 4 km. As a result, additional modeling analyses were performed to address compliance with the PM_{10} AAQS and allowable PSD Class II increments.

The modeling analysis results for the Project at the Chassahowitzka NWA are summarized in Table 5.6-3. The maximum SO_2, PM_{10}, and NO_2 pollutant concentrations are predicted to be well below the EPA proposed PSD Class I significant impact levels. Therefore, a more detailed analysis for determining compliance with PSD Class I increments is not required.

The maximum impacts due to the Project operating in simple cycle and combined cycle configurations are also predicted to be below the *de minimis* monitoring levels for PM_{10}, SO_2, NO_2 and CO. For predicted impacts less than *de minimis* levels, preconstruction monitoring data are not required to be submitted as part of the PSD review. However, PM_{10} monitoring data was used in the cumulative impact analysis.

The nearest monitor to the Project that measures PM_{10} concentrations is located at Holland/House, 100 yards east of US 41 on Buckeye Road (AIRS No. 12-081-0008). This station is operated by Manatee County and measure concentrations according to EPA procedures. The data from this station indicate that the AAQS for PM_{10} are being met.

In the case of O_3, the Project's VOC emissions are greater than the monitoring exemption level of 100 TPY. Therefore, pre-construction ambient monitoring analyses for O_3 (based on VOC emissions) are required to be submitted as part of the application. It should be noted that Manatee County and adjacent counties are classified as attainment for O_3. O_3 concentrations are measured at Palmetto/Port Manatee (AIRS No. 12-081-3002), located approximately 20 km to the northwest of the Project. Since O_3 is a regional pollutant, O_3 monitoring data collected in Palmetto/Port Manatee are considered to be representative of O_3 concentrations for the region and can be used to satisfy this requirement for the project. This station is operated by the FDEP and measures concentrations according to EPA procedures. As indicated by monitoring data collected over the last 4 years, the highest O_3 concentrations measured at this monitoring station have complied with the O_3 AAQS. These O_3 monitoring data are presented as part of this application to satisfy the preconstruction monitoring requirement for the Project.

Summaries of the maximum 24-hour average PM_{10} concentrations predicted for the Project and other emissions sources for comparison to the AAQS, and PSD Class II increment are provided in Table 5.6-4.

The HSH 24-hour average PM_{10} concentrations for all sources is predicted to be 75 $\mu g/m^3$ compared to the AAQS of 150 $\mu g/m^3$. The maximum HSH 24-hour average PM_{10} concentration for estimating PSD Class II increment consumption is predicted to be 14 $\mu g/m^3$, which is below the allowable PSD Class I increments of 30 $\mu g/m^3$.

5.6.1.4 Additional Impact Analysis

Impacts Due To Direct Growth

FPL is obligated to provide reliable and adequate electric service to meet its customers demand. The Project is being constructed to meet FPL's customers need for electricity in future years. Additional growth as a direct result of the additional electric power provided by the Project is not expected.

Construction of the Project will occur over a 24-month period requiring an average of approximately 275 workers during that time. It is anticipated that many of these construction personnel will be drawn from outside the Project area and will commute to the job site.

The Manatee Plant will employ a total of 12 additional operational workers as a result of the at Project. The operational workforce will also include annual contracted maintenance workers to be hired for periodic routine services. It is expected that most of these workers will be contracted from outside the region. The workforce needed to operate the Project represents a small fraction of the population already present in the immediate area. Therefore, while there would be a very slight increase in vehicular traffic in the area, the effect on air quality levels would be minimal.

There are also expected to be no air quality impacts due to associated industrial/commercial growth given the Project's location on the existing Manatee Plant site. The existing commercial infrastructure should be more than adequate to provide any support services that the Project might require.

Impacts on Soils, Vegetation, Wildlife, and Visibility

The potential effects of the Project on soils, vegetation, wildlife, and visibility in the local vicinity of the Manatee Plant Site and at the PSD Class I area of the Chassahowitzka NWA are not expected to be significant. Certain air pollutants in acute concentrations or chronic exposures can impact soils, vegetation, and wildlife. Based on available literature, soils impacts can result from SO_2 and NO_2 deposition creating an acidic reaction or lowering of soil pH. Vegetation is sometimes affected by acute exposures to high concentrations of pollutants often resulting in foliar damage. Lower dose exposure over longer periods of time or chronic exposure can often affect physiological processes within plants causing internal and external damage.

Based on an evaluation of the literature for effects from SO_2, acid rain (sulfuric acid mist), NO_2, CO, and combinations of these pollutants, emissions from the Project will not result in impacts that cause harm to soils and vegetation. Maximum concentrations of SO_2, PM_{10}, NO_2, and CO in the vicinity of the Manatee Plant site are predicted to be lower than the EPA Class II significant impact levels for all pollutants PM_{10}. When modeled with other sources, the maximum PM_{10} concentrations are predicted to be less than the AAQS and PSD Class II increments. Since the Project's impacts are predicted to be less than the significant impact levels and AAQS that are designed to protect the public welfare, including effects on soils and vegetation, no detrimental effects on soils or vegetation should occur in this area.

Maximum concentrations of SO_2, PM_{10}, and NO_2 at the PSD Class I area of the Chassahowitzka NWA are predicted to be lower than the EPA Class I significant impact levels. Since the Project's impacts are predicted to be less than the significant impact levels, no detrimental effects on soils or vegetation should occur in this area.

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National AAQS. This occurs in non-attainment areas, none of which are located in Florida. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations. Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed. For impacts on wildlife, the lowest threshold values of SO_2, NO_2, and particulates that are reported to cause physiological changes are up to orders of magnitude larger than maximum concentrations predicted to result from operation of Unit 3. As a result, no adverse effects on wildlife due to SO_2, NO_2, and particulate impacts from the Project are expected.

No visibility impairment is expected from the Project in the immediate vicinity of the plant site or at the PSD Class I area at the Chassahowitzka NWA due to the type and quantities of emissions proposed for the Project sources. Opacity levels from the combustion exhausts from the Project will be low and are typically at or approaching zero. Emissions of PM_{10} and SO_2 will also be low due to the use of pipeline natural gas, the cleanest fuel commercially available. While the Project will emit NO_x and VOC, the potential to impair visibility at the local level, or to cause regional haze at the PSD Class I area, should be relatively low, given the very low expected emissions. As a result, the Project will not adversely affect visual qualities in the area.

5.6.2 MONITORING PROGRAMS

5.6.2.1 Ambient Air Quality Monitoring

Pre- and post-construction ambient air quality monitoring is not anticipated to be required for this Project since the air quality analyses demonstrate that the Project's impacts are less than the *de minimis* monitoring thresholds or that ambient monitoring data representative of the Project site are measured in the region. Air quality concentrations at and in the region of the Manatee Plant comply and are anticipated to continue to comply with all applicable AAQS.

5.6.2.2 Air Emissions Monitoring

The Project will be subject to the applicable NSPS for the CTs (40 CFR Part 60, Subpart GG) and the duct burners (40 CFR Part 60, Subpart Db) and acid rain program (40 CFR 75). Continuous monitoring will be conducted for the Project CTs as required by Subpart GG. Monitoring of fuel sulfur and nitrogen content will also be performed pursuant to Subpart GG, 60.334(b). Initial performance testing of the CTs for SO_2 and NO_x emissions will be conducted as required by Subpart GG, 60.335.

Continuous emission monitoring (CEM) for SO_2 and NO_x is required for gas- and oil-fired affected units in accordance with the provisions of 40 CFR 75. SO_2 emissions may be determined using procedures established in Appendix D, 40 CFR Part 75. CO_2 emissions must also be determined either through CEM (e.g., as a diluent for NO_x monitoring) or calculation. Alternate procedures, test methods, and quality assurance/quality control (QA/QC) procedures for CEM are specified (Part 75 Appendices A through I). The CEM requirements, including QA/QC procedures are, in general, more stringent than those specified in the NSPS for Subpart GG. New units are required to meet the requirements not later than 90 days after the unit commences commercial operation. The Project will be required to either install CEMs for NO_x or to meet the Part 75 requirements.

Initial and periodic compliance testing of pollutants emitted by the Project will be conducted pursuant to the FDEP requirements as specified in the FDEP Air Constructional PSD Permit in accordance with Section 62-297.401, F.A.C.

5.7 NOISE

5.7.1 IMPACTS TO ADJACENT PROPERTIES

5.7.1.1 Existing and Proposed Noise Sources

The proposed noise sources and their octave band and overall sound power level are listed in Table 5.7-1.

The existing power plant (Units 1 and 2) will continue to operate and emit noise after the Project is complete. Noise measurements taken in proximity of Units 1 and 2, while these units were operating, were used to determine the sound power levels (see Table 5.7-1). Additionally, new equipment will be added in association with the Project, which will also emit noise. These new noise sources include the inlet air filters of the gas turbines, the gas turbines, the HRSGs stacks, steam turbine-generator, and the power transformers. The inlet air system will include silencers. Unlike the existing steam generators, the HRSGs do not have ID fans that generate noise; the CT and steam noise will be reduced through the HRSG's thermal insulation.

5.7.1.2 Noise Impact Methodology

Sound propagation involves three principal components: a noise source, a person or a group of people, and the transmission path. While two of these components, the noise source and the transmission path, are easily quantified (i.e., direct measurements or through predictive calculations), the effects of noise on humans is the most difficult to determine due to the varying responses of humans to the same or similar noise patterns. The perception of sound (noise) by humans is very subjective, and just like odor and taste, it is very difficult to predict a response from one individual to another.

The impact evaluation of the Project was performed using CADNA A, an environmental noise propagation computer program that was developed to assist with noise propagation calculations for major noise sources and projects. Noise sources are entered as octave band sound power levels, L_w. Locations of the noise sources, buildings, and receptors are input directly on the base map and can be edited throughout the modeling process. All noise sources are assumed to be a point, line, area or vertical area source, and can be specified by the user. Sound propagation is calculated by accounting for hemispherical spreading and three other user-identified attenuation options: atmospheric attenuation, path-specific attenuation, and barrier attenuation. Atmospheric attenuation is calculated using the data specified by the Calculation of the Absorption of Sound by the Atmosphere (ANSI, 1999). Path-specific attenuation can be specified to account for the effects of vegetation, foliage, and wind shadow. Directional source characteristics and reflection can be simulated using path-specific attenuation. Barrier attenuation is calculated by assuming an infinitely long barrier perpendicular to the source-receptor path. Total and A-weighted SPLs are calculated. The sound power levels for the various major noise sources of the Project are provided in Appendix A.

The noise impact modeling was performed to predict the maximum noise levels produced by the proposed and existing noise sources with background noise levels. Atmospheric and ground attenuation were assumed for all sites. The source data used in the analysis are contained in Table 5.7-1. The daytime and nighttime L_{90} levels measured at Site 4 during the baseline noise study were included in the predicted maximum SPLs calculated for each monitoring location. Noise data from Site 4 was selected as being representative of background noise levels, since it was farthest from Units 1 and 2.

The receptors selected for the analysis consisted of three locations across the Manatee Plant property boundary, plus two onsite monitoring locations where ambient noise measurements were taken (refer to Section 2.3.8). The property boundary location closest to the facility is Site 6.

5.7.1.3 Results

Table 5.7-2 presents the observed and predicted noise levels at the 5 monitoring locations. The observed noise levels include the operation of existing Units 1 and 2, and are the L_{90} noise levels. The L_{90}, which is the a-weighted sound pressure level exceeded ninety percent of the time, excludes such transient noise sources.

Figure 5.7-1 illustrates the sound level isopleths for Units 1, 2, and 3, developed from the results of the noise impact analysis. Based on the results of the analysis, the Project will comply with applicable provisions of the Manatee County Noise Ordinance.

Intermittent noise sources during routine startup, testing and maintenance, and emergency conditions will include steam venting. Such activities would not normally occur simultaneously and would last for a short duration. The noise impacts of these conditions would not be expected to create a noise disturbance.

5.8 CHANGES TO NON-AQUATIC SPECIES POPULATION

5.8.1 IMPACTS

5.8.1.1 Flora

Potential impacts to onsite and regional vegetation due to plant operation are limited since the existing cooling pond will be used for condenser cooling, and operation activities will occur on previously impacted and cleared land. Any potential impacts to non-aquatic species will be due to plant construction rather than plant operation and, therefore, are discussed in Section 4.2. Those impacts are primarily associated with clearing of grassed areas, which can be used as foraging by bird species.

5.8.1.2 Fauna

The existing cooling pond is used for foraging by birds, mammals, reptiles, and amphibians. No adverse impacts will occur to fauna utilizing the cooling pond as a result of the proposed project.

As mentioned in Sections 2.3.6 and 4.4, the construction area has been severely altered by development and maintenance of the existing power plant. Thus, the wildlife species present in the area are generally those that tolerate human proximity. No populations of recreational or commercially important species will be significantly affected by operation of the proposed project.

5.8.2 MONITORING

Because no significant impacts to non-aquatic species populations are anticipated, no monitoring program is proposed.

5.9 OTHER PLANT OPERATION EFFECTS

5.9.1 OPERATIONS TRAFFIC

Traffic associated with the operation of the power plant represents a long-term impact to Manatee County roadways since employees required to operate the plant will commute during facility operation. Traffic impacts will be directly related to the number of employees and to new truck traffic to be generated. About 12 new jobs are expected as a result of the project. These impacts were evaluated for the year 2006 that represents the first full year of commercial operation.

The year 2006 non-project background volumes were determined to be the background volumes in 2000 increased by means of a growth rate. The generalized Manatee County growth rate of 3 percent per year was applied to the 2000 non-project volumes to derive future volumes. The roadway volumes are summarized below:

SR 62:	U.S. 301 to FPL Main Entrance	421 Non Project EB/WB
	FPL Main Entrance to CR 39	406 Non Project EB/WB

Trips associated with the operating conditions at the plant were estimated through a trip generation analysis and then a distribution and assignment process. The new plant employees will work in shifts. For the purposes of estimating maximum peak hour trip generation, 10 additional employees working a 7:00 a.m. to 3:30 p.m. shift and 10 additional employees working a 6:00 a.m. to 6:00 p.m. shift were assumed in the analysis, to be conservative.

5.9.1.1 Trip Generation

Trip generation expected from the proposed project has been related to the number of employees. The results of the trip generation study for the existing plant were used for the generation of operation employment trips. A worst-case assumption for truck traffic was also made. Table 5.9-1 summarizes the trip generation.

5.9.1.2 Distribution and Assignment

Trips were distributed and assigned to the roadway network using the FSUTMS model assignment previously discussed in Chapter 4.0. Using the percentage assignment derived from FSUTMS, the expected project trips were assigned to the roadway network. At study intersections, peak hour project traffic turning movements were determined.

5.9.1.3 Roadway Capacity Analysis

The year 2006 non-project background volumes and operations traffic volumes were combined to provide a projection of year 2006 total traffic. The total traffic volumes on study roadways and intersections were analyzed to determine the anticipated operating conditions.

The roadways were evaluated using the FDOT 2000 Highway Capacity Manual arterial analysis methodology. The predicted volumes and generalized levels of service are summarized below:

SR 62:	U.S. 301 to FPL Main Entrance	480 EB/WB
	FPL Main Entrance to CR 39	408 EB/WB

All of the roadways are anticipated to operate acceptably at project buildout (LOS C or better).

5.9.1.4 Intersection Capacity Analysis

The study intersections were analyzed for 2006 traffic conditions. The study intersections were analyzed using HCM signalized and unsignalized intersection methodology. The predicted operating conditions of the intersections with Project traffic are shown below:

SR 62 & CR 39	LOS B
SR 62 & FPL Main Entrance	LOS B
SR 62 & U.S. 301	LOS B

All of the intersections are expected to operate acceptably during Project operation without the need for improvements.

5.9.1.5 Conclusions

The traffic conditions of the roadway network were evaluated with the ultimate project-related volumes at the FPL Manatee Plant. All of the roadways and intersections were found to be operating acceptably. No improvements are required to accommodate the impacts from operation traffic of the Manatee Expansion Project.

5.10 ARCHAEOLOGICAL SITES

Plant operation will have no effect on archaeological resources. No significant or potentially significant archaeological properties are located within the areas that would be affected by normal plant operation.

In the event that post-construction activities result in the discovery of archaeological materials, activities that have the potential to disturb those materials will be halted until an evaluation of their potential significance is made by a professional archaeologist. If the materials are believed to be significant, the State Historic Preservation Officer (SHPO) will be consulted to identify appropriate measures.

5.11 RESOURCES COMMITTED

The major irreversible and irretrievable commitments of national, state, and local resources due to the Manatee Unit 3 are the use of land and the consumptive use of water, natural gas, ammonia, and PSD increment.

Of the total Manatee Plant site (9,500 acres), the Project will affect less than 73 acres. In contrast to a new generating facility constructed on a greenfield site, the Project will be significantly more effective in the use of land per megawatt generated. The land areas to be used for the Project have been used previously for power plant construction and operation.

The consumption of water by the proposed project will be for the operation of the cooling pond, process water requirements, and potable water. No additional surface water allocation or groundwater allocation above that currently approved for the Manatee Plant will be required for the Project.

The new units will consume PSD increment for several pollutants (NO_x, PM_{10}, and SO_2). However, the increment consumption is very low compared to the PSD Class I and Class II increments.

Natural gas will be consumed during the operation of the Project. The amounts are described in Section 3.4. This is an irreversible and irretrievable commitment of a national energy resource for the production of electricity for FPL customers in the State of Florida.

Less than one-half million gallons of ammonia annually will be required for the operation of the Project's SCR systems. While ammonia will be consumed, emissions of nitrogen oxides will be substantially reduced (by about 70 percent) as a result.

Given the low environmental impacts of the Project and the use of an existing plant site for the Project, Manatee Unit 3 will effectively utilize state and local resources. Benefits of the project are presented in Section 7.1.

5.12 VARIANCES

No variances are being requested as part of this application.

Table 5.2-1. Comparison of Predicted Cooling Pond Water Quality and Primary Drinking Water Standards

Constituent (mg/l)	Long Term Average River Concentration	Peak Cooling Pond Concentration	Final Cooling Pond Concentration	Primary Drinking Water Standard
Antimony	0.000	0.000	0.000	0.006
Arsenic	0.000	0.000	0.000	0.05
Asbestos	0.000	0.000	0.000	7 MFL
Barium (mg/L) total	0.050	0.562	0.302	2
Berylium	0.000	0.000	0.000	0.004
Cadmium	0.000	0.000	0.000	0.005
Chromium	0.000	0.000	0.000	0.1
Cyanide	0.000	0.000	0.000	0.2
Fluoride	0.450	5.457	3.117	4
Lead (total)	0.000	0.000	0.000	0.015
Mercury	0.000	0.000	0.000	0.002
Nickel (total)	0.006	0.064	0.032	0.1
Nitrate	0.620	7.227	4.003	10
Nitrite	0.000	0.000	0.000	1
Nitrate + Nitrite	0.620	7.227	4.003	10
Selenium	0.000	0.000	0.000	0.05
Sodium (mg/L)	17.400	265.353	174.873	160
Thallium	0.000	0.000	0.000	0.002

MFL = maximum fiber level

Table 5.6-1. Summary of Maximum Potential Annual Emissions for the FPL Manatee Expansion Project

Pollutant	Annual Emissions (tons/year)						PSD Significant Emission Rate (tons/year)	PSD Review Required?
	Year 1[a]			Year 2[b]				
	4 CTs Simple Cycle	4 Natural Gas Fuel Heaters	TOTAL	4 CTs/HRSGs with Duct Burners	4 Natural Gas Fuel Heaters	TOTAL		
SO2	66	0.17	67	191	0.13	191	40	Yes
PM	61.0	0.38	61	228	0.29	229	25	Yes
PM10	61.0	0.38	61	228	0.29	229	15	Yes
NOx	403	6.2	409	417	4.7	422	40	Yes
CO	189	4.7	194	784	3.6	788	100	Yes
VOC (as methane)	18.6	0.27	19	106	0.20	106	40	Yes
Sulfuric Acid Mist	6.6	NA	6.6	21.1	NA	21.1	7	Yes
Lead	0.000	NA	0.000	0.000	NA	0.000	0.6	No

[a] Year 1 operated only in simple cycle mode for 4 CTs with 3,390 hours firing gas (at 100 percent load).

[b] Year 2 and Future is based on: (1) combined cycle for 7,760 hours firing gas (with 2,880 hours duct firing and 400 hours power augmentation or peak firing with duct firing); (2) simple cycle operation for 1,000 hours on gas.

Note: Refer to Appendix 10.1.5 for more detail.

Table 5.6-2. Summary of Maximum Pollutant Concentrations Predicted for the Project Compared to the EPA Class II Significant Impact Levels

Pollutant	Averaging Time	Maximum Predicted Concentration (ug/m^3) Simple Cycle Natural Gas	Maximum Predicted Concentration (ug/m^3) Combined Cycle Natural Gas	EPA Class II Significant Impact Levels (ug/m^3)
SO_2	Annual	0.01	0.33	1
	24-Hour	1.68	4.23	5
	3-Hour	7.87	17.57	25
PM_{10}	Annual	0.02	0.54	1
	24-Hour	2.22	6.78	5
NO_2	Annual	0.08	0.57	1
CO	8-Hour	16.08	57.3	500
	1-Hour	48.34	143.0	2,000

Table 5.6-3. Summary of Maximum Pollutant Concentrations Predicted for the Project at the PSD Class I Area of the Chassahowitzka NWA Compared to the Proposed EPA Class I Significant Impact Levels

Pollutant	Averaging Time	Maximum Concentration (µg/m³)	Proposed EPA Class I Significant Impact Levels (µg/m³)
Combined-Cycle [b]			
SO_2	Annual[c]	0.001	0.1
	24-Hour	0.024	0.2
	3-Hour	0.098	1.0
NO_2	Annual[c]	0.002	0.1
PM_{10}	Annual [c]	0.002	0.2
	24-Hour	0.035	0.3
Simple-Cycle [b]			
SO_2	Annual[c]	0.001	0.1
	24-Hour	0.017	0.2
	3-Hour	0.062	1.0
NO_2	Annual[c]	0.004	0.1
PM_{10}	Annual[c]	0.001	0.2
	24-Hour	0.016	0.3

Note: NM = not modeled

[a] Concentrations are highest predicted using CALPUFF model and 1990 CALMET wind field for central Florida.

[b] Concentrations predicted for combined- and simple cycle operation are based on the operating scenario with the maximum hourly emissions. Maximum emissions are based on the combustion turbines operating for baseload conditions at an ambient temperature of 35 °F.

For combined cycle operation and natural gas-firing, duct burner emission are included. For simple cycle operation, combustion turbines are assumed to operate at higher power mode.

[c] Annual average concentrations are based on a full year operation of each mode.

Table 5.6-4. Summary of Maximum Pollutant Concentrations Predicted for the Project, Other Sources, and Background

Pollutant	Averaging Time	Maximum Predicted Concentrations (ug/m^3) Project, Other Sources and Background	Ambient Air Quality Standards (ug/m^3)	Maximum Predicted Concentrations (ug/m^3) PSD ClassII Increment-All Sources	PSD Class II Increments (ug/m^3)
PM_{10}	24-Hour	75	150	14	30

Note: 24-hour PM_{10} background used in the analysis was ug/m^3

Refer to Appendix 10.1.5 for more detail.

Table 5.7-1. Summary of Noise Source Data Used to Determine Noise Levels Associated with Manatee Unit 3[a]

Power Block Sources	Source Location[b]		Source Height[c] (m)	Sound Power Level (dB) for Octave Band Center Frequency (Hz)									Overall Sound Power Level	
	X (m)	Y (m)		31.5	63	125	250	500	1K	2K	4K	8K	(dB)	(dBA)
3A Air Inlet[d]	7963.62	469.42	2.0	102.0	106.0	99.0	94.0	86.0	78.0	74.0	82.0	77.0	108.2	90.7
3B Air Inlet[d]	8009.12	469.42	2.0	102.0	106.0	99.0	94.0	86.0	78.0	74.0	82.0	77.0	108.2	90.7
3C Air Inlet[d]	8116.80	469.42	2.0	102.0	106.0	99.0	94.0	86.0	78.0	74.0	82.0	77.0	108.2	90.7
3D Air Inlet[d]	8162.13	469.42	2.0	102.0	106.0	99.0	94.0	86.0	78.0	74.0	82.0	77.0	108.2	90.7
3A Exhaust Duct West[d]	7959.62	598.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3A Exhaust Duct East[d]	7967.45	598.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3B Exhaust Duct West[d]	8006.12	598.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3B Exhaust Duct East[d]	8013.29	598.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3C Exhaust Duct West[d]	8112.63	598.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3C Exhaust Duct East[d]	8120.46	598.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3D Exhaust Duct West[d]	8158.63	589.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3D Exhaust Duct East[d]	8166.47	589.42	2.0	110.0	109.0	103.0	97.0	92.0	85.0	83.0	79.0	74.0	113.2	94.5
3A CT Transformer	7944.61	469.60	2.0	80.3	86.3	88.3	83.3	83.3	77.3	72.3	67.3	60.3	92.3	83.7
3B CT Transformer	7989.95	470.27	2.0	80.3	86.3	88.3	83.3	83.3	77.3	72.3	67.3	60.3	92.3	83.7
3C CT Transformer	8098.11	469.60	2.0	80.3	86.3	88.3	83.3	83.3	77.3	72.3	67.3	60.3	92.3	83.7
3D CT Transformer	8144.12	469.26	2.0	80.3	86.3	88.3	83.3	83.3	77.3	72.3	67.3	60.3	92.3	83.7
3A HRSG Stack	7963.42	567.68	38.0	111.7	117.7	115.7	107.7	97.7	90.7	81.7	60.7	45.7	120.7	103.6
3B HRSG Stack	8008.76	568.01	38.0	111.7	117.7	115.7	107.7	97.7	90.7	81.7	60.7	45.7	120.7	103.6

Table 5.7-1. Summary of Noise Source Data Used to Determine Noise Levels Associated with Manatee Unit 3[a]

Power Block Sources	Source Location[b]		Source Height[c] (m)	Sound Power Level (dB) for Octave Band Center Frequency (Hz)									Overall Sound Power Level	
	X (m)	Y (m)		31.5	63	125	250	500	1K	2K	4K	8K	(dB)	(dBA)
3C HRSG Stack	8115.57	567.34	38.0	111.7	117.7	115.7	107.7	97.7	90.7	81.7	60.7	45.7	120.7	103.6
3D HRSG Stack	8161.93	567.34	38.0	111.7	117.7	115.7	107.7	97.7	90.7	81.7	60.7	45.7	120.7	103.6
Unit 3 STG Transformer	8057.30	469.60	2.0	101.0	107.0	109.0	104.0	104.0	98.0	93.0	86.0	79.0	113.0	104.3
Unit 3 ST Generator	8057.80	460.19	2.0	136	124	118	111	110	109	107	105	98	129.1	121.4
Unit 3 Steam Turbine	8058.06	506.68	10.0	126	122	119	114	118	116	116	109	102	136.4	114.5
Boiler Feed Pumps	[e]	[e]	1.0	109.0	106.0	103.0	102.0	103.0	102.0	103.0	95.0	83.0	113.3	107.7
Units 1 and 2	8312.97	468.68	10.0	113.6	127.6	120.6	114.6	115.0	117.5	114.6	118.8	119.9	130.1	124.6

[a] Includes Units 1 and 2.
[b] Power block source locations relative to the stack location.
[c] Source height used for modeling analysis only and does not necessarily represent the physical height of the source.
[d] Line source (remainder are point sources).
[e] Located at HRSG.

Table 5.7-2. Observed and Predicted Sound Levels (dBA) for the Manatee Unit 3 Combined Cycle Project

Monitoring Site Number	Observed L_{90}	Predicted for Units 1, 2, and 3	Units 1, 2, and 3 plus Background[a]
Daytime:			
1	54.7	57.3	57.3
2	44.8	62.3	62.3
4	34.8	31.4	36.4
5	39.0	45.4	45.9
6	42.2	48.7	48.9
Nighttime:			
1	56.5	57.3	57.3
2	54.3	62.3	62.3
4	34.3	31.4	36.1
5	36.5	45.5	45.8
6	47.1	48.7	48.9

Notes: dBA = A-Weighted Decibels
Refer to Section 2.3.8 for information on the description and location of monitoring sites.

[a] Daytime and nighttime L_{90} at Site 4 of 34.8 and 34.3 dBA, respectively, used as background.

Table 5.9-1. Trip Generation During Project Operation

Parameter	Daily	P.M. Peak Hour
Number of Employees	20	10
Trip Generation Rate	2.38	0.48
Number of Two-Way Trips	48	5
Entering		1
Exiting		5
Number of Trucks		12
Entering Trips		6
Exiting Trips		6

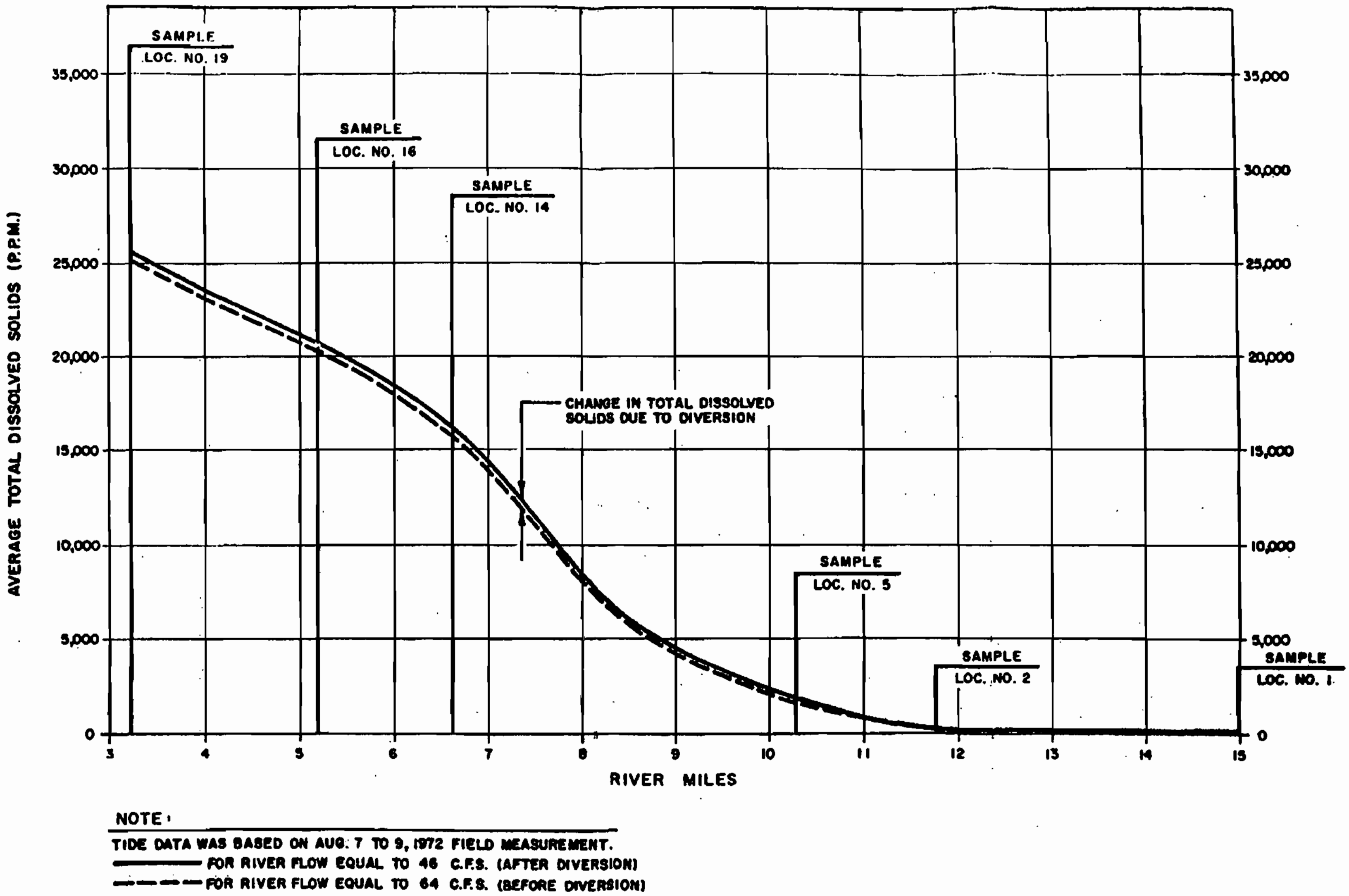

Figure 5.1-1. Computed Average Total Dissolved Solids Profiles for River Flows Equal to 46 cfs and 64 cfs

Source: Brown and Root, Inc., 1973; Golder, 2002.

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Manatee Unit 3

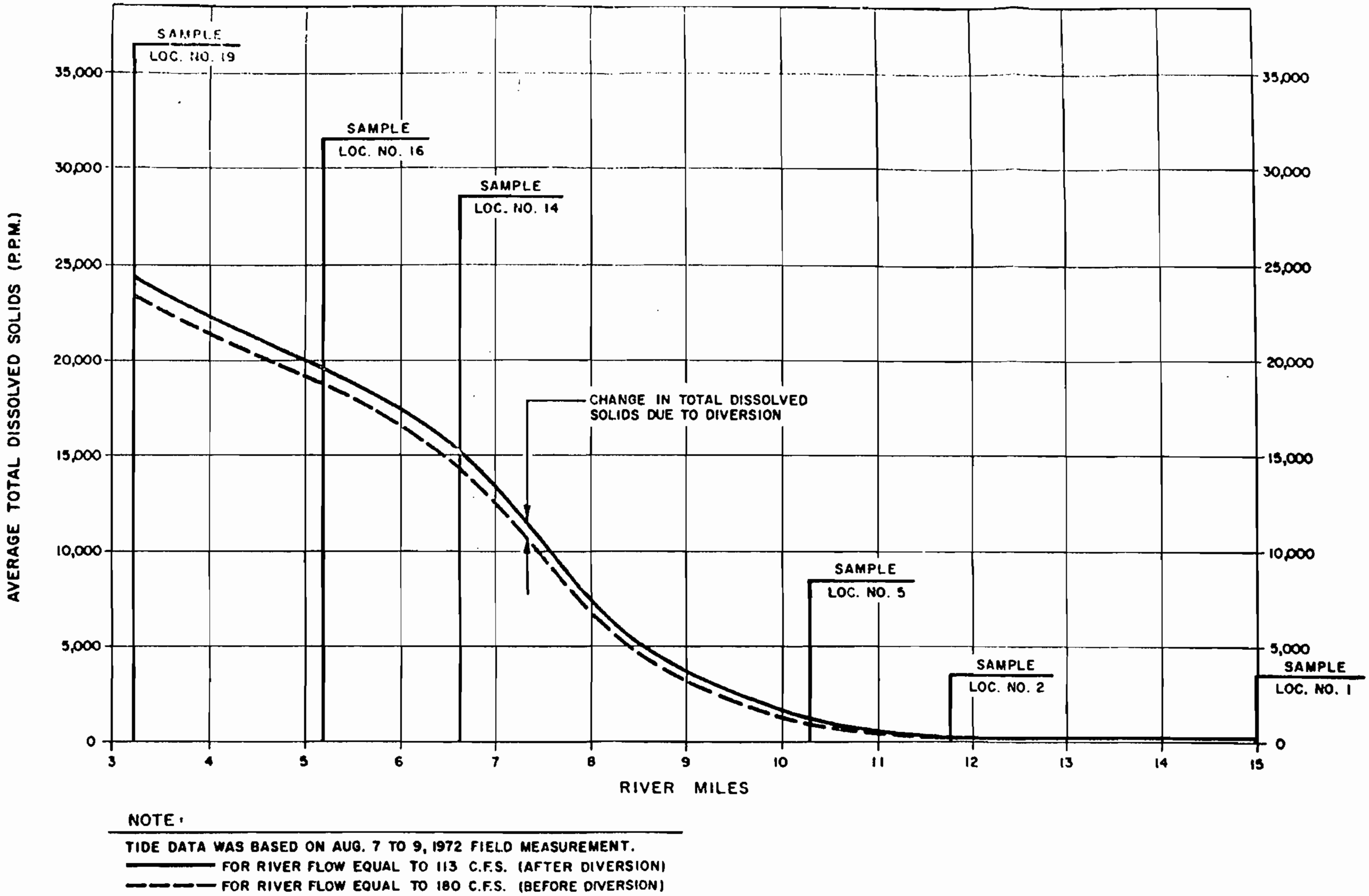

Figure 5.1-2. Computed Average Total Dissolved Solids Profiles for River Flows Equal to 113 cfs and 180 cfs

Source: Brown and Root, Inc., 1973; Golder, 2002.

FPL
Manatee Unit 3

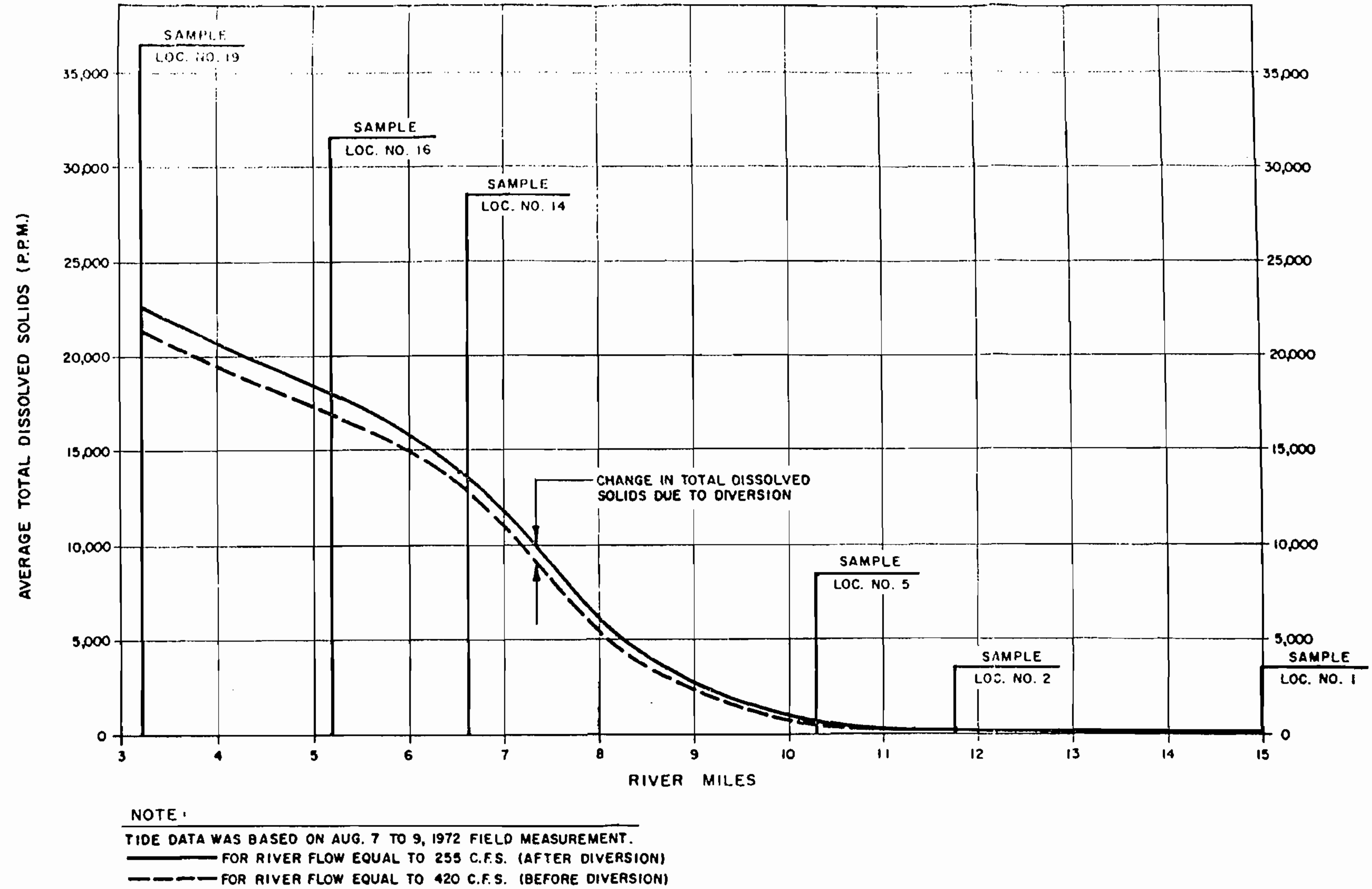

Figure 5.1-3. Computed Average Total Dissolved Solids Profiles for River Flows Equal to 255 cfs and 420 cfs

Source: Brown and Root, Inc., 1973; Golder, 2002.

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Manatee Unit 3

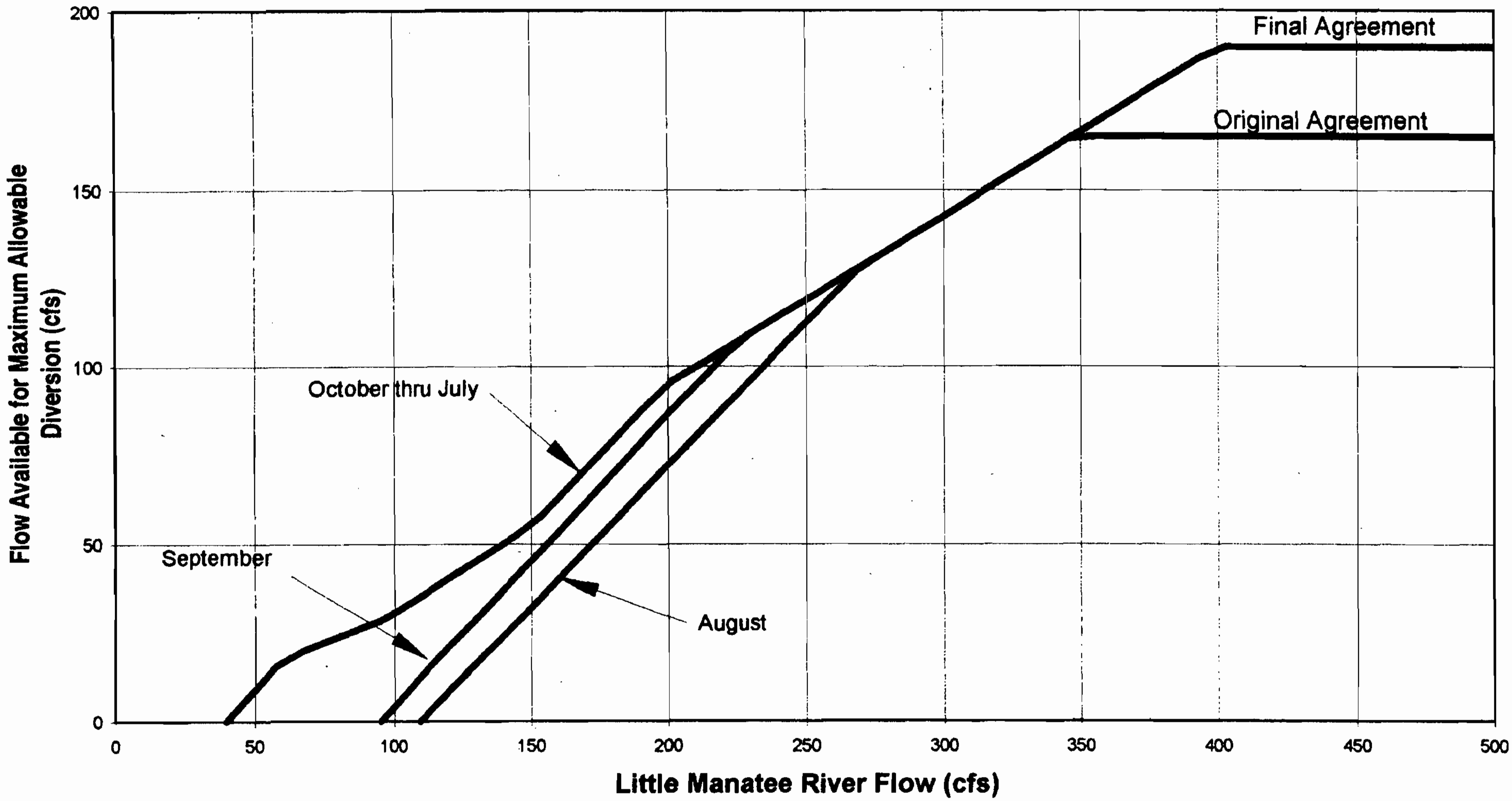

Figure 5.1-4. Plan of Maximum Allowable Diversion

Source: SWFWMD, 1975; KBN, 1994; Golder, 2002.

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Manatee Unit 3

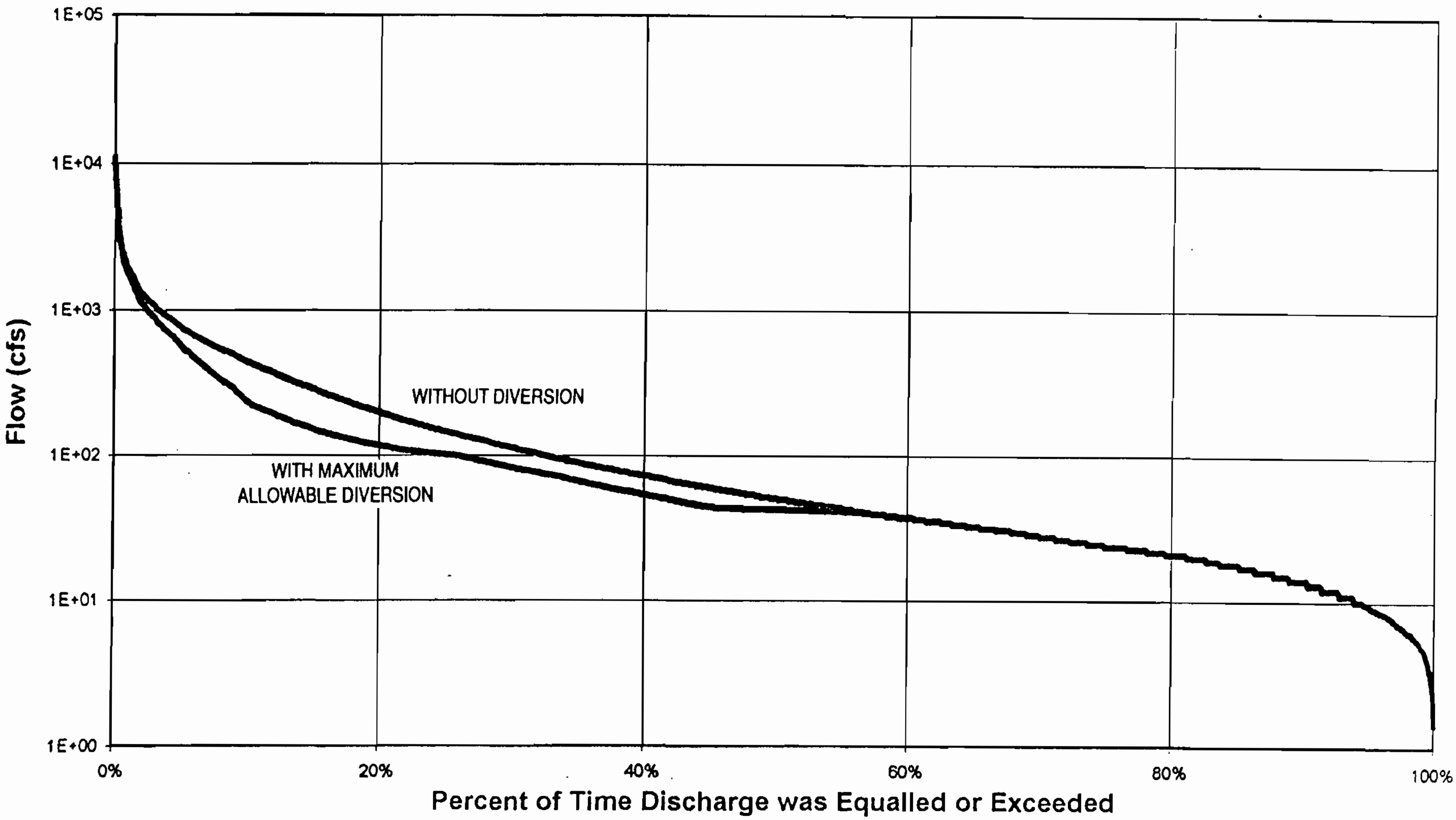

Figure 5.1-5. Flow Duration Curves for the Little Manatee River, 1940-1973

Source: SWFWMD, 1975; KBN, 1994; Golder, 2002.

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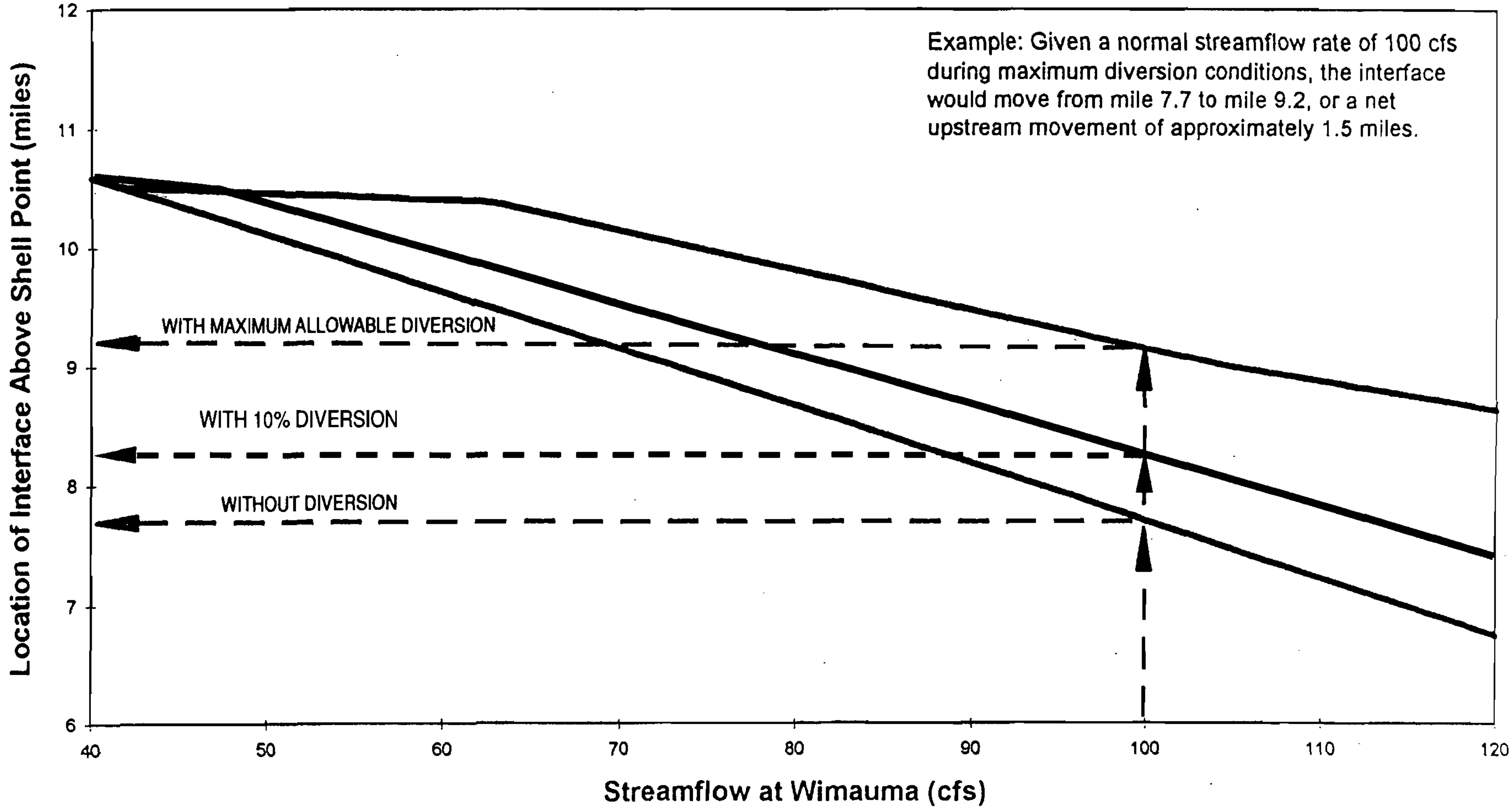
Manatee Unit 3



Note: Calculated using a higher high tide of 2.48 ft-MSL.

Figure 5.1-6. Maximum Upstream Location of the Saltwater/Freshwater Interface with and without Diversion at the Maximum Rate

Source: SWFWMD, 1975; KBN, 1994; Golder, 2002.

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Manatee Unit 3

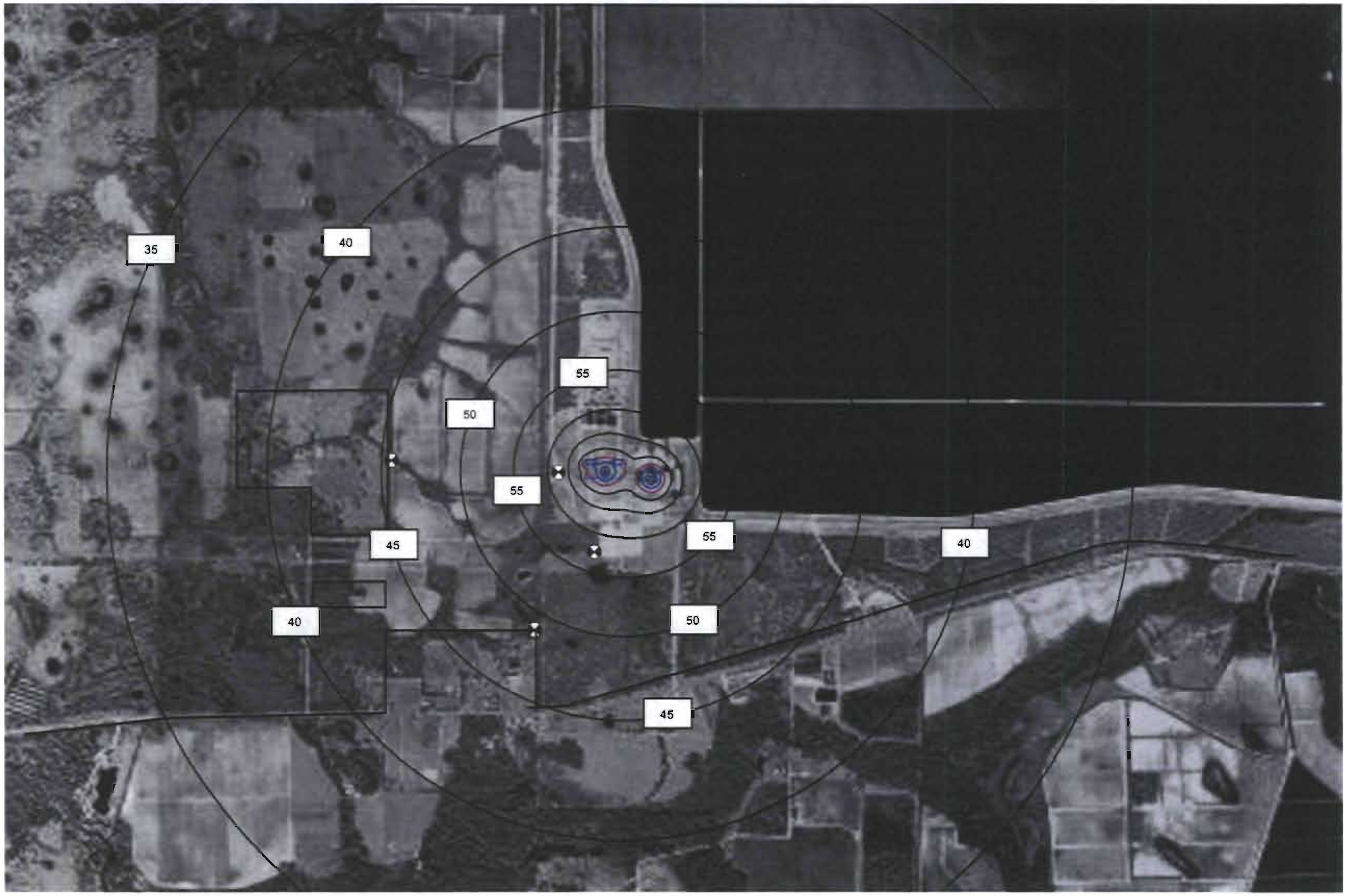

Figure 5.7-1. Sound Level Isopleths

Source: Golder, 2002.

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6.0 TRANSMISSION LINES

The Manatee Expansion Project will not require certification of any associated linear facilities, such as electrical transmission lines or rail lines. Therefore, there is no necessity to prepare a Chapter 6.0 for this application.

FPL

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATION

7.1 SOCIO-ECONOMIC BENEFITS

The purpose of this chapter is to:

- Identify the economic and social effects of construction and operation of the Project.
- Quantify the Project benefits and costs to the groups affected in the area surrounding the site as well as other people and businesses in Manatee County and the State of Florida.

Socio-economic effects can be classified as either direct or indirect effects. Direct effects are those that are the direct result of the construction or operation of the Project. Indirect costs and benefits affect people and business interests in the vicinity of the Project who, because of their proximity to the site, may experience changes in their local environment, such as increased spending by the Project construction and operation personnel. Many of these effects are difficult to measure, and qualitative assumptions must be made to assess the relative values of expected costs and benefits.

This chapter is divided into two parts. Section 7.1 deals with socio-economic benefits and consists of an analysis of the plant construction and operational expenditures. Section 7.2 addresses temporary and long-term indirect costs involving the construction and operational personnel's use of private and public services in the vicinity of the site. All cost and benefit values are based on present (2001) dollar values.

7.1.1 DIRECT SOCIO-ECONOMIC BENEFITS

The Project is expected to benefit the economies of Manatee County and surrounding communities. Direct benefits from the Project include employment opportunities created by the construction and operation of the Project. Construction of the Project is anticipated to begin in 2003 and conclude in 2005. The peak construction workforce is estimated to be about 750 people with an average construction workforce estimated at 275 employees over a 2-year period. Construction employment during 2004 will average about 500 workers and management staff. Employment opportunities will result from construction job opportunities as well as jobs indirectly generated through the purchase of goods and services in the area. Additionally, with the addition of approximately 12 full-time equivalent jobs for the operation of the Project, the labor demands associated with the operation of the Project will not create labor shortages. Due to the proximity of the Manatee Plant site to large labor markets in the Tampa Bay metropolitan areas, the labor demand for both construction and operation is expected to be met by workers in these areas. Population and housing impacts from construction and operation will be minimal because little migration into the area is anticipated.

Sales and income tax benefits will accrue to the State of Florida as a result of the construction and operation of the Project. Local revenues will also be derived from property taxes paid on the property and the onsite facilities.

The construction cost for the Project will be about $580 million. The major cost associated with construction will be the major equipment (about $270 million), labor (about $95 million), and materials (about $140 million). The remaining cost is associated with engineering, licensing, contingencies, and other miscellaneous costs.

Estimated annual property tax revenues from the Project for Manatee County government are $8.2 million in 2006. Based on the first 5 years of operation, the estimated tax payments to the State of Florida and Manatee County will be:

- $1,000,000 in sales taxes will be paid to the State of Florida. These taxes will be placed in the State's general fund and will be available for any use deemed appropriate by the State, and
- $37.9 million will be collected for property taxes by Manatee County for general government and public schools.

These figures are based on current tax rates for each taxing authority, as determined for the State of Florida and Manatee County, based on an estimated property and facility value.

Direct economic benefits of construction of the Project will also result from the purchase of materials and equipment. About $20 to 25 million will be expended for materials and equipment purchased or leased within the state.

Among the primary direct benefits of the Project will be the increase in skilled job opportunities within the region associated with both plant construction and operation. Construction employment is expected to peak at approximately 750 workers. The total construction payroll for this facility is estimated at $95 million, which will be paid over the 2-year construction period. The approximate type of workers over the two-year construction period is presented below:

Estimated Construction Workforce

Cost Component	Percent
Laborers	11.9
Carpenters	6.3
Operators	5.3
Ironworkers	3.7
Millwrights	10.0
Boilermakers	6.5
Pipefitters	19.5
Insulators	1.4
Electricians	21.7
Painters	0.9
Supervision	12.9
Total	100.0

Ongoing operation of the Project will employ approximately 12 additional people. Assuming average wages of $50,000 annually per person, the additional annual operational payroll will be approximately $600,000. Other fixed operational costs, excluding fuel costs, would be about $3,000,000, which would generally be expended in the area.

7.1.2 INDIRECT ECONOMIC BENEFITS

The purchase of goods and services to support the construction of the Project is anticipated to occur over a 2-year period beginning in 2003 and ending in 2005. It is expected that the majority of the $95 million in construction wages paid by for the Project will be spent within Manatee County and the surrounding region. These wages will create additional demands for goods and services. As this money is spent, it will create a multiplier effect within the area, thereby generating additional jobs and earnings. These earnings are indirect or secondary benefits of the Project, which will be enjoyed by other companies whose payroll will increase from the construction of the Project. Materials such as concrete, stone, drainage piping, and other building materials are normally manufactured or produced in the region. Rental of construction equipment would also be obtained locally.

The direct wages from ongoing plant operations will also generate indirect economic benefits. The direct wages will be spent mostly within the region and will increase the demand for goods and services. Using a typical economic multiplier for this effect, wages paid direct to plant personnel will indirectly generate at least $500,000 annually in additional earnings (wages and benefits) in the region.

7.1.3 OTHER ECONOMIC BENEFITS

The major new maintenance cost of operating the Project is associated with fuel, water treatment chemicals, and ammonia for pollution control. These costs not only include the cost of the commodity but the cost of transportation to the site. For example, natural gas will be transported to the site by a regional pipeline. Some of the payments for both the commodity and transportation will benefit the region through additional employment, taxes and materials.

7.1.4 RECREATIONAL AND ENVIRONMENTAL VALUES

Construction and operation of the Project will not impact the recreational value and visual qualities of the facilities in the vicinity of the Manatee Plant site. Several recreational facilities are located within 5 miles of the Project area. Disturbance to these facilities during construction of the planned facilities will be insignificant to non-existent since the recreational facilities are located outside of the area affected by facility construction and operation. Aesthetic and visual impact to nearby recreational facilities is expected to be minimal.

7.1.5 ONSITE ENHANCEMENTS

FPL desires to minimize the Project's impacts on the environment and the community. Accordingly, the Project design incorporates features that reduce the visual and other impacts to the local community. These major features include the low profile, noise attenuation, and air pollution control equipment. In addition, there are minimal transportation impacts to the local roadways during operation.

The use of these features and methods, combined with the location for the Project and associated facilities on the Manatee Plant site, will assure minimal impacts to the community. For example, the Project area is well buffered from the borders of the site. The approximate distances to the Manatee Plant site boundary from the Project power block area are: 0.7 mile from the closest point on SR 62, 2.5 miles from the closest point on the Little Manatee River, 5 miles from Parrish, and 0.75 mile from the closest Manatee Plant site property boundary (toward the southwest). Both the location on the Manatee Plant site and the design features for the Project will minimize the impacts to aesthetics, ambient noise levels and transportation.

7.1.6 OTHER ENVIRONMENTAL BENEFITS

The Project maximizes beneficial use of an existing power plant site. This minimizes the potential environmental impacts associated with the generation of electrical power through the use of existing facilities (i.e., developed site, access roads, substation and transmission lines, and rail facilities). This directly avoids impacts to wetlands or wildlife habitat.

7.1.7 SUMMARY OF BENEFITS

Impacts to the economy associated with construction and operation of the Project are expected to be positive. Labor demands associated with the construction and operation of the Project are not expected to create any labor shortages. Expenditures for field materials and consumption by newly hired workers will boost incomes in Manatee and surrounding counties. Population and housing impacts associated with the Project will be slight due to minimal in-migration into the area.

Construction activities will increase tax revenues to the county and state governments due to sales and income taxes from the purchase of equipment and material to support construction activities. Once operational, county and state governments are expected to receive considerably more dollars in tax revenues than expenditures on public services due to the minimum requirements for public service facilities needed to support the additional units.

Although the local community may experience some temporary impacts during the peak construction periods, overall, socioeconomic impacts associated with the construction and operation of the Project and the Manatee Plant will be favorable.

7.2 SOCIO-ECONOMIC COSTS

7.2.1 TEMPORARY EXTERNAL COSTS

Over 50,000 construction workers reside within the Tampa Bay region, with the majority of these in Hillsborough and Pinellas Counties. Since ample labor supply exists within commuting distance, and since a labor surplus exists within the region, it is anticipated that many workers will be hired from within the region, with minimal relocation required. Consequently, construction should have no adverse effect on permanent housing.

As is typical with longer construction projects, some workers commuting from longer distances may choose to live in transient accommodations (motels, hotels) on a weekly basis, returning to their permanent homes and families on weekends. Transient accommodations are plentiful in the area.

Since workers will mostly be commuting and not relocating permanently into the region, it is not anticipated that construction will create any new or unusual impacts or demands on public facilities or services.

Temporary external costs include the generation of construction traffic and noise from delivery trucks each day. Construction will last approximately 2 years with a peak period of about 12 months from January 2004 through December 2004. The projected construction traffic is not predicted to have a significant impact to the level-of-service on SR 62.

7.2.2 LONG-TERM EXTERNAL COSTS

The Project's external cost impacts will be minimal and localized. The Project is located in the central portion of the Manatee Plant site and over a mile from any public or private facilities used for recreational purposes. With the incorporation of environmental mitigation measures, the operation of the Project will not cause any impairment to recreational values, result in any deterioration of aesthetic and scenic values, or restrict access to areas of scenic values. The Project also will not displace persons from the land, cause loss of income, or result in any significant costs to local government.

Since the operational workforce is expected to be approximately 12 employees, and most are assumed to be residing within commuting distance to the plant, the Project's impacts to local services (e.g., schools, police) are expected to be minimal.

9.0 COORDINATION

State, regional, and local governmental agencies were contacted by FPL representatives to inform these agencies about the Manatee Expansion Project and to solicit input regarding the Project. The Agency staff contacted are listed below:

- Florida Department of Environmental Protection (Tallahassee)
  - Jonathan Alden, Esq.
  - Alan Bedwell
  - Scott Goorland, Esq.
  - Jeff Koerner
  - Al Linero
  - David Lane
  - Hamilton S. Oven
  - Steve Palmer
  - Howard Rhodes
  - Karen Skinner
- Florida Department of Environmental Protection (Tampa)
  - Deborah Getzoff
  - Nancy Knight
- Florida Department of Community Affairs
  - Paul Darst
- Florida Department of Transportation
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- Florida Fish and Wildlife Conservation Commission
  - Doug Bailey
- Southwest Florida Water Management District
  - Jim Guida
  - John Heuer
  - Scott Laidlaw
  - Steve Minnis
  - David Rathke
  - Mary Beth Russell, Esq.
- Tampa Bay Regional Planning Council
  - Suzanne Cooper
- Manatee County
  - Rob Brown
  - Carol Clarke
  - Karen Collins-Fleming
  - Leon Kotecki
  - Jeff Steinsnyder, Esq.
  - Laurie Suess
- Hillsborough County Environmental Protection Commission
  - Dr. Richard Garrity
- Pinellas County
  - Pete Hessling

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