LEE COUNTY, FLORIDA
SOLID WASTE ENERGY RECOVERY FACILITY
APPLICATION FOR
POWER PLANT CERTIFICATION

VOLUME I - APPLICATION

Lee COUNTY

SUBMITTED BY
THE LEE COUNTY
BOARD OF COUNTY COMMISSIONERS

JUNE 1990

PREPARED BY
CAMP DRESSER & McKEE INC.

THIS DOCUMENT IS PRINTED ON RECYCLED PAPER.

environmental engineers, scientists, planners, & management consultants **CDM**

Lee COUNTY
BOARD OF COUNTY COMMISSIONERS

P.O. Box 398
Fort Myers, Florida 33902-0398
(813) 334-2166

335-2276
Writer's Direct Dial Number

L-219-90

June 28, 1990

HAND DELIVER

Florida Department of Environmental Regulation
Division of Air Resources Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

ATTN: Hamilton Oven, Jr., P.E.
Power Plant Siting Section

RE: Application for Power Plant Site Certification
Lee County Energy Recovery Facility

Dear Mr. Oven:

Enclosed is Lee County's application for an Electrical Power Plant Siting Certification submitted pursuant to Chapter 17-17, FAC and FDER Form 17-1.211(1).

Lee County and its engineering consultant, Camp Dresser & McKee Inc., look forward to working with you and other reviewing agencies regarding this application.

We anticipate that the information contained herein provides the data necessary to allow a thorough evaluation of our application. However, if you find that additional data or clarification is required, do not hesitate to contact us.

Also enclosed is our check for $25,000.00 to cover the application fee.

Sincerely,

George Reilly

George Reilly, P.E.
Director
DEPARTMMENT OF LEE COUNTY UTILITIES

LCL1/9

Enclosures (12 copies)

XC: M. J. Ihnat
D. E. Strobridge
R. J. Tietz

6/28/90

Hamilton Oven, Jr., P.E.
June 30, 1990
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ENGINEER SUBMITTING APPLICATION: Michael J. Ihnat, P.E.
Principal

FLORIDA REGISTRATION NUMBER: 39126

APPLICANT INFORMATION

Applicant's Official Name:	Lee County
Address:	Lee County Utilities Department 2178 McGregor Boulevard Fort Myers, Florida 33901
Business Entity:	County Government
Name and Title of Business head:	John Manning, Chairman Lee County Board of County Commissioners
Name, Title and Address of Representative Responsible for Obtaining Certification:	George Reilly, P.E. Administrative Director, Lee County Utilities Department
Site Location:	County - Lee Nearest Incorporated City - Fort Myers Latitude: $26^{o}37'54"$ Longitude: $81^{o}45'41"$ Township and Range: Section 24, Township 44S, Range 25E
Nameplate Generating Capacity of Proposed Facility:	50 megawatts initially 65 megawatts ultimate

REMARKS: The purpose of the proposed energy recovery facility is to dispose of solid waste while recovering energy and providing an opportunity for materials recycling. This facility will afford Lee County a method of solid waste disposal which will minimize the need for landfilling operations. Lee County does not operate, maintain or construct facilities for the purpose of electric generation, and does not distribute electrical energy generated at facilities operated by others.

CDM CAMP DRESSER & McKEE INC.

environmental engineers, scientists planners, & management consultants

CHECK NO. 0022513

51-44
119

PAY CAMP DRESSER & MCKEE $25000and00cts

CHECK DATE	NET AMOUNT
06-21-90	$ **25,000.00**

TO THE ORDER OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

CAMP DRESSER & McKEE INC.

Connecticut National Bank
Hartford, Conn. 06115

AUTHORIZED SIGNATURE

⑈0000022513⑈ ⑆011900445⑆ 19466⑈

CAMP DRESSER & McKEE INC.

DETACH BEFORE DEPOSITING

CHECK NO. 22513

VOUCHER NUMBER	INVOICE NUMBER	P.O. NO. / MISC.	INVOICE DATE	AMOUNT	DISCOUNT	NET AMOUNT
654071	PPSA PERMIT FEE					25,000.00

NET AMOUNT OF CHECK 25,000.00

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ABBREVIATIONS

Technical Terms and Units of Measurement

5-5-3-1	5 mg/L BOD, 5 mg/L TSS, 3 mg/L Nitrogen, 1 mg/L Phosphorus
AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
AWT	Advanced Wastewater Treatment
BOD	Biological Oxygen Demand
Btu	British Thermal Unit
cfs	Cubic Feet per Second
CLU	Critical Level Volume
CMP	Corrugated Metal Pipe
COD	Chemical Oxygen Demand
csm	Cubic Feet per Second per Square Mile
cy	Cubic Yards
dBA	Decibels (A-Weighted Scale)
dscf	Dry Standard Cubic Foot (Feet)
du/a	Dwelling Units per Acre
ERF	Energy Recovery Facility
ESP	Electrostatic Precipitator
ET	Evapotranspiration
FGD	Flue Gas Desulfurization
GEP	Good Engineering Practice
gpd	Gallons Per Day
gpm	Gallons Per Minute
gr	Grain(s)
HHV	Higher Heat Value
KWH	Kilowatt Hour
lb	Pound
L_{eq}	Equivalent Continuous Sound Levels
LOS	Level of Service
mgd	Million Gallons Per Day
mg/L	Milligrams per Liter

ABBREVIATIONS

(Continued)

ml	Milliliters
MPN	Most Probable Number
MSL	Mean Sea Level
MSW	Municipal Solid Waste
NGVD	National Geodetic Vertical Datum
NTU	Nephelometric Turbidity Unit
pCi/L	Pico-Curies per Liter
PFU	Plaque Forming Units
PM_{10}	Particulate Matter with equivalent diameter of less than 10 microns
ppm	Parts Per Million
ppmdv	Parts Per Million, Dry Volume Basis
PVC	Polyvinyl Chloride
SPT	Standard Penetration Test Boring
2,3,78 TCDD	Tetrachlorodibenzo-p-dioxon
tpd	Tons Per Day
tpy	Tons Per Year
TKN	Total Kjeldahl Nitrogen
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
ug/L	Micrograms per Liter
ug/m^3	Micrograms per Cubic Meter
umhos/cm	Micro-mhos per Centimeter
VOC	Volatile Organic Compound
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Agencies and Regulatory Terms

AAQS	Ambient Air Quality Standards
ASTM	American Society of Testing and Materials
BACT	Best Available Control Technology
CDM	Camp Dresser & McKee Inc.
CFR	Code of Federal Regulations
COE	United States Army Corps of Engineers
CUP	Consumptive Use Permit
DER	Department of Environmental Regulation, State of Florida
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FAC	Florida Administrative Code
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FGFWFC	Florida Game and Freshwater Fish Commission
FHWA	Federal Highway Administration
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FMSF	State of Florida Master Site File (archaeological/historic sites)
FP&L	Florida Power and Light Corporation
FTE	Florida Transportation Engineering
ISCST	Industrial Source Complex Short Term
KLECE	Kevin L. Erwin Consulting Engineers, Inc.
NAAQS	National Ambient Air Quality Standards
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollution Discharge Elimination System
OBERS/BEA	Office of Business and Economic Research Service; Bureau of Economic Analysis
PSD	Prevention of Significant Deterioration

ABBREVIATIONS
(Continued)

SCS	Soil Conservation Service, USDA
SR	State Road
SFWMD	South Florida Water Management District
STAMINA	United States Department of Transportation, Federal Highway Administration, Noise Model, (March 1982)
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WUP	Water Use Permit

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EXECUTIVE SUMMARY

INTRODUCTION AND BACKGROUND

Lee County has been investigating alternative methods of long-term solid waste disposal since 1979 when the State of Florida enacted legislation (Chapter 403.706, Florida Statutes) that required the County to submit solid waste resource recovery and management plans. Subsequent to the development of a comprehensive 40-year solid waste master plan in 1989, the County has decided to pursue the implementation of an integrated solid waste management system. Lee County has signed an interlocal agreement with adjacent Hendry County, and intends to develop the system to serve the solid waste disposal needs of both counties. The system will incorporate an aggressive recycling/materials recovery program, an 1,800-ton per day (tpd) energy recovery facility to process and dispose of the waste which remains after recycling (which was sized taking into account the reduction in the waste stream due to recycling, and is expandable to 2,400 tpd), a new sanitary landfill/ashfill for the disposal of bypass wastes and ash residue, and a Class III landfill for construction and demolition debris.

Pursuant to Section 403.505, Florida Statutes, Lee County is applying for site certification of the solid waste energy recovery facility. This application has been prepared in accordance with Chapter 17-17, Florida Administrative Code (FAC), and follows the format prescribed in the Florida Department of Environmental Regulation (DER) Form 17-1.211(1), FAC (Instruction Guide for Certification Application: Electrical Power Plant Site, Associated Facilities, and Associated Transmission Lines).

The proposed energy recovery facility meets the State Legislature's intent "to encourage energy conservation in order to protect the health, prosperity, and general welfare of the state and its citizens." By developing this Facility, the County also recognizes the Legislature's declaration that: (1) "the disposal of solid refuse is an important governmental obligation and that, if the disposal is not accomplished in a proper manner, such refuse poses a definite threat to the public health and welfare," and (2) "the combustion of refuse by solid waste facilities to supplement the electricity supply not only represents an effective conservation effort but also represents an environmentally preferred alternative to conventional solid waste disposal in the state" [Section 377.709(1), Florida Statutes].

This application comprises three volumes:

- Volume I (Application) contains the applicant information sheet, and Sections 1.0 through 10.0 of the application which describe existing conditions, the proposed Facility, and construction and operational impacts.

- Volume II (Appendices) contains the appendices to the application. In addition to the appendices required by the DER Instruction Guide, several other appendices are included to supplement Volume I.

- Volume III (Air Quality) contains information concerning the Prevention of Significant Deterioration (PSD) determination and the Best Available Control Technology (BACT) determination.

The following summarizes the material contained in this application.

NEED FOR POWER AND THE PROPOSED FACILITIES

The purpose of the proposed energy recovery facility is to process and dispose of that solid waste generated in Lee and Hendry counties that remains after recycling. The County sought an alternative to conventional solid waste disposal methods due to the shortage of suitable land for landfilling. The combustion of solid waste will reduce the volume of waste to be landfilled by up to 90 percent, thus significantly extending the useful life of the landfill while generating electricity which will conserve traditional fossil fuels. The energy recovery facility also meets the state's objectives concerning energy conservation and reduced landfilling [Section 377.709(1), Florida Statutes].

Lee County has filed an application with the Federal Energy Regulatory Commission (FERC) for certification of the Facility as a small power production facility. The County is currently negotiating an agreement with Florida Power & Light (FP&L) for the sale of electrical power from the Facility. The terms, conditions, and pricing embodied in the power purchase agreement will be in accordance with applicable Florida Public Service Commission (FPSC) Rules and Requirements, and Florida Administrative Code Rules 25-17.082 and 25-17.083. A petition for the determination of need will be submitted to FPSC under separate cover.

SITE AND VICINITY CHARACTERIZATION

The site for the proposed energy recovery facility was selected in March 1990 following detailed site analyses and public hearing reviews. The site is located in east-central Lee County near the waste generation centroid of both counties. Lee County is in the process of purchasing a 155-acre tract constituting portions of the southeast quarter of Section 24 (145.2 acres), the northeast quarter of Section 25 (2.8 acres), and 7.0 acres along the eastern and northern boundaries of the northeast quarter of Section 24, Township 44S, Range 25E for development of the Facility. This site is approximately two and one-half miles east of the intersection of Interstate 75 and State Road 82.

The site is predominantly rural with no residences, and comprises approximately 124 acres of upland habitat and 32 acres of wetland vegetation. The wetland habitats on the site have been severely impacted by cattle grazing, logging activities, and drainage practices over the past 20 years. The site is not located within the 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA).

Local, regional, state, and federal agencies were contacted to determine any areas of concern on or in proximity to the site. Zoning districts and adjacent land uses were evaluated for compliance with regional, County, and municipal comprehensive plans. Lee County is in the process of rezoning the site from AG-2 (agricultural) to IPD (industrial planned development) for consistency with its intended use. (See Section 2.2 of Volume I for a detailed discussion on land use and zoning.)

Numerous studies were conducted on the Facility site, including ecological, archaeological, geotechnical, traffic, noise, and air quality impact analyses. Copies of all of these studies are included in Volume II, with the exception of air quality impacts which are presented in Volume III. The conclusions of these studies indicate that the site is suitable for its proposed use and will have minimal impact on the surrounding environment. These studies are summarized below. In general, the Facility will be designed and operated to meet all applicable federal, state, and local requirements.

- Air Quality - An air pollution control technology evaluation and an air quality impact assessment were conducted for the proposed Facility. The control technology evaluation considered energy, environmental, and economic criteria. Dry scrubbers and baghouses are proposed as Best Available Control Technology for the Facility. If stoker waterwall technology is selected, a deNO_x system is also recommended. If a rotary waterwall technology is selected, staged combustion/low excess air will be used to control NO_x. The air quality impact assessment compared the predicted air quality impacts from the proposed Facility to Florida and National Ambient Air Quality Standards (FAAQS/NAAQS) and PSD Class I and Class II increments. These analyses demonstrated that the predicted impacts of the proposed Facility will be extremely small—they will be less than significant levels and will not cause air quality standards or increments to be exceeded.

- Surface Water and Groundwater - Because the Facility is totally enclosed, no contamination of stormwater runoff will occur. Stormwater runoff will be managed on-site, and discharges will be in accordance with South Florida Water Management District (SFWMD) Rule 40E-4. With the exception of dewatering activities during Facility construction, no impacts to surface water or groundwater are expected. Refuse storage and ash residue handling operations will be totally enclosed inside the Facility so that no runoff from these operations will occur. All cooling water needed by the Facility will be drawn from the Central Fort Myers Advanced Wastewater Treatment Plant (Central WWTP), and all wastewater discharged from the Facility will be routed to the Central WWTP. Nearly all Facility process water will be recycled, with no discharge to surface or ground waters. An on-site well will provide a back-up supply of process cooling water for the Facility. Potable water needs will be met from existing municipal supplies.

- <u>Impacts to Wetlands</u> - Wetland impacts will be minimal and will be primarily associated with construction of the electrical interconnect power line. Construction of the Facility itself will not disturb any wetlands; construction of an associated transmission line may affect a maximum of 2.7 acres. An assessment of ecological impacts indicated that limited low quality wetlands exist on the Facility site. These wetland areas have been severely disturbed by 20 years of cattle grazing, logging, and drainage activities. Nevertheless, measures will be taken to avoid or minimize any impacts to any wetland areas on the site, both during construction and Facility operations.

- <u>Plant and Animal Communities</u> - During more than 100 observer hours of site surveying by four professional ecologists, there were no direct observations or other evidence of species listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or the Florida Game and Fresh Water Fish Commission (FGFWFC) within the Facility site boundaries. The ecological impact assessment also concluded that species diversity and composition on the site would not be impacted by the Facility.

- <u>Archaeological and Historic Sites</u> - An archaeological and historic survey was conducted of the eastern half of Section 24. The survey revealed two sites of interest: (1) a prehistoric campsite marked by a single chert waste flake, and (2) an early 20th century board-and-batten structure which has been highly modified and is in poor condition. While these sites were discovered within the study area, neither are actually located on the Facility site, nor are either of these finds considered to be a regionally significant cultural resource.

- Geological Conditions - Subsurface conditions at the Facility site are considered typical of those normally encountered in Lee County and southwest Florida. Certain subsurface conditions will require specific site preparation and subsurface design which has been included in the Facility design plan.

- Noise - A technical noise analysis revealed that noise levels at the closest residence, approximately 1,500 feet away from the Facility, will only increase by 2 to 3 dBA above existing and anticipated ambient noise levels as a result of Facility operations. This small increase will not be perceptible to the human ear.

- Traffic - A traffic impact study revealed that the Facility will have no adverse impacts or effects on the existing level of service on the surrounding roadway network. A left-turn lane for eastbound traffic on Buckingham Road is recommended to facilitate vehicle access to the site. No other road improvements associated with the Facility are required to minimize traffice impacts.

- Aesthetics - A visual impact study revealed that a major portion of the Facility will be obscured from view from most off-site vantage points due to the natural buffer surrounding the site. The Facility stack will be visible for up to approximately two miles in some directions, but it will be fully or partially obscured at most other locations (even as close as one-half mile). Visual impacts will be minimized by the use of existing natural buffers and planned landscaping. The design of the Facility will be aesthetically pleasing and architecturally compatible with the surrounding area.

THE FACILITY AND DIRECTLY ASSOCIATED FACILITIES

The proposed Facility will be a mass-burn energy recovery facility with an initial design-rated capacity of 1,800 tons of municipal solid waste per day. In anticipation of future waste disposal needs, Lee County is seeking certification for an ultimate design-rated capacity of 2,400 tpd with a total electrical generating capacity of approximately 65 megawatts (net). The Facility will use either three stoker waterwall combustion/steam generation units each rated at 600 tpd, or four rotary waterwall units each rated at 450 tpd. Each boiler unit will be operated and serviced independently. An additional boiler unit of the selected technology type will be added to expand the Facility to its ultimate capacity when needed. The County will contract with a full-service vendor to design, construct, and operate the Facility for 20 years.

Since the proposed Facility will use mass-burn technology, no pre-processing of wastes will be conducted at the Facility prior to combustion. However, separation of recyclables will occur at the waste generation sites. Municipal solid wastes will be reduced to about 10 percent of original volume and about 30 percent of original weight. The Facility will be equipped with a fabric filter (baghouse) for particulate removal and an acid gas dry scrubber for each combustion train. If stoker waterwall technology is selected, a deNO_x system is also recommended. If a rotary waterwall technology is selected, staged combustion/low excess air will be used to control NO_x. Bypass wastes and ash residue will be disposed of at a new double-lined landfill/ashfill located in Hendry County. Other facilities associated with the County's integrated solid waste management system, which will be remotely located and permitted separately, include: a Class III landfill for construction/demolition debris, a sludge composting facility, and a materials recovery facility for the initial processing of recyclables to be delivered to an end-use market.

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ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED FACILITIES CONSTRUCTION

A 28-month construction schedule is anticipated for the Facility. Both positive and negative impacts are associated with any construction project of this size. Positive impacts include: the creation of new jobs, additional income to the area generated by the construction work force, and revenues from the purchase of goods and services related to construction operations. In addition to these positive construction impacts, long-term benefits associated with the Facility include: a safe method of solid waste processing and disposal; a reduction in landfill requirements; increased protection of groundwater supplies; the generation of electrical power for resale; the conservation of oil, gas, and coal; and increased employment associated with a permanent work force. Negative impacts include: increased waste generation from general construction activities and on-site workers; the disturbance of existing terrain; the alteration of site topography; minimal temporary aquifer drawdown due to dewatering during construction of the refuse pit; minimal impacts to existing low quality wetlands due to fill areas; localized short-term air quality impacts from fugitive dust emissions and fuel combustion; short-term noise increases due to construction; and increased traffic.

EFFECTS OF FACILITY OPERATION

There will be no discharges to surface waters or groundwater from the Facility and, therefore, no temperature effect on receiving water bodies, no effects on aquatic life, and no biological effects of modified circulation. The cooling towers and other in-plant process uses of the proposed Facility will use approximately 1.5 million gallons of reclaimed water per day from the Central WWTP. Chlorine or an equivalent will be used for high-level disinfection of the reclaimed water in compliance with Chapter 17-610.460, FAC. To assure high quality makeup water, a monitoring program will be established in compliance with Chapter 17-610.463, FAC.

A maximum of 150,000 gallons per day (gpd) of combined sanitary and process wastewater will be routed to the Central WWTP following pretreatment in accordance with the Fort Myers Sewer Use Ordinance. Cooling tower blowdown will be treated and reused at the energy recovery facility to the greatest extent possible; any cooling tower blowdown not reused at the Facility will be blended with sanitary wastewater and discharged to the Central WWTP. Wastewater discharges will be monitored in accordance with the City of Fort Myers Sewer Use Ordinance.

There will be no long-term impacts to surface water as a result of Facility operations. A stormwater retention pond will be designed to contain Facility runoff during a 25-year storm event. Groundwater wells are proposed to provide an emergency back-up supply of cooling water for the Facility. Since the wells will only be used infrequently, if at all, no impact on surface water or wetlands is anticipated. All solid waste and ash residue will be stored in enclosed buildings to prevent contact with stormwater runoff. A groundwater monitoring program will be established.

No hazardous wastes will be accepted or created at the Facility. A chemical and toxicity analysis of the combined ash residue will be conducted during acceptance testing and quarterly thereafter to verify that the ash is not toxic or hazardous. Based upon tests at similar facilities, the ash residue is not expected to be hazardous according to U.S. Environmental Protection Agency (EPA) and DER standards. This waste material is suitable for disposal in a Class I permitted sanitary landfill/ ashfill.

TRANSMISSION LINES AND OTHER LINEAR FACILITIES

Electrical power generated at the Facility will be routed to an FP&L substation via transmission lines to be constructed along the eastern and northern site boundary. Three transmission pipelines will be constructed to convey potable water and reclaimed water to the site and to transport wastewater from the site. These lines will all be constructed in existing rights-of-way and will avoid major intersections and congested areas to the maximum extent practicable. Potable water will be supplied by Lee County's Corkscrew Water Treatment Plant. Reclaimed water will be supplied by the City of Fort Myers Central Advanced Wastewater Treatment Plant, and wastewater generated at the Facility will be treated at the Central WWTP.

ECONOMIC AND SOCIAL EFFECTS OF FACILITY CONSTRUCTION AND OPERATION

Socioeconomic benefits associated with the proposed energy recovery facility include: a reduction in landfill needs and the associated public opposition and environmental risks; a significant decrease in waste quantities due to the reduction in processed waste volumes and a corresponding reduction in landfill space requirements (thus increasing the life span of the landfill); improved protection of ground and surface water resources; the generation of electricity and corresponding decrease in the use of crude oil and other fossil fuels; the full-time permanent employment of approximately 54 personnel which will contribute to the local economy; and construction related benefits to the local economy and labor market, and regional economic benefits to industries involved in the construction process.

Construction costs will be financed with system revenue bonds. The total bonded indebtedness for Facility development is estimated to range between $220 and $240 million. The County will finance debt service and operating costs through user fees.

SITE AND FACILITY DESIGN ALTERNATIVES

Many factors were evaluated during the planning of the Lee County energy recovery facility including: alternative sites, solid waste management methods, ownership and financing options, Facility sizes, and boiler redundancy. The energy recovery facility is an integral component of the County's overall solid waste management system. The system also incorporates an aggressive recycling program that is being implemented in phases and will comply with the state's 30 percent waste reduction goal by 1994 in accordance with the 1988 Solid Waste Management Act (88-130). The alternatives chosen for implementation of the Facility were those deemed to be the most environmentally and economically sound for Lee County.

SECTION 1.0

NEED FOR POWER

AND

THE PROPOSED FACILITIES

1.0 NEED FOR POWER AND THE PROPOSED FACILITIES

1.1 GENERAL DESCRIPTION OF THE PROJECT AND THE AFFECTED UTILITY

This project consists of a solid waste-to-energy resource recovery facility employing mass-burn technology (energy recovery facility). The initial facility size will allow processing of 1,800 tons per day (tpd) of municipal solid waste, and will have an installed generating capacity of approximately 50 Mw of which 43 Mw will be available for sale to Florida Power & Light (FP&L). The Facility will be designed with expansion capability to allow processing of an additional 600 tpd (2,400 tpd ultimate capacity) and an ultimate generating capacity of approximately 65 Mw.

As alluded to above, FP&L is the utility affected by this project which will be owned by Lee County. The point of interconnection to FP&L's system will be the Buckingham substation which borders the north boundary of Section 24, Township 44 S, Range 25 E. The interconnection will be made in accordance with FP&L's technical specifications. The costs for such interconnection will be paid by Lee County. This interconnection will allow transmission via FP&L's 138 kV transmission line. This transmission line and the Buckingham Substation are adjacent to the proposed energy recovery facility.

FP&L's load in the Lee County service area stems primarily from residential, commercial, industrial, and street and lighting sales. Precise load data and forecasts specific to the Lee County service area are not available. However, population data and projections (provided by Lee County) are indicative of the existing and future loads in Lee County. The 1990 population estimate in Lee County is 400,800 which represents a seasonally adjusted average annual population. By 1994, the in-service date of the proposed Facility, the adjusted popluation is projected to be 470,700. By the year 2000, population is projected to be 576,324, and by 2013, the end of the 20-year Facility financing period, population is expected to be about 788,500. Population growth between now and the in-service date represents a 17.4 percent increase. By the end of the Facility financing period, population is expected to grow by 97.6 percent.

The proposed Facility, located in this high growth area, will assist in meeting future load requirements. Additional load information is provided in Section 1.3.

1.2 DESCRIPTION OF THE ENERGY RECOVERY FACILITY

A complete description of the Facility is contained in Section 3.0 of this Application. The proposed electrical generating facility is a mass-burn municipal solid waste disposal facility designed to initially process 1,800 tpd with expansion capability to ultimately process 2,400 tpd. The Facility will be owned by Lee County but will be designed, constructed, and operated for a 20-year period by a private vendor experienced in the design, construction, and operation of solid waste to energy recovery facilities. The projected in-service date of the Facility is January 1994.

The Facility will initially have three solid waste processing units if stoker waterwall technology is selected, and four processing units if rotary waterwall technology is used.

One steam powered turbine-generator will be provided capable of using all steam generated by the combustion of 1,800 tpd of solid waste.

Expansion of the Facility will be accomplished by the construction of one additional processing unit and a turbine-generator sized to use the steam from the additional unit.

The estimated capital cost of the initial construction is $165 million.

Solid waste collected in Lee and Hendry counties by private and municipal waste haulers will be delivered to the Facility on a 6-day per week basis. The Facility will have a refuse storage bunker sized to hold a minimum of 3 days operating fuel at the expanded Facility size of 2,400 tpd. All solid waste receiving, storage, processing, and residue handling facilities will be completely enclosed.

The Facility will be designed to process a minimum of 85 percent of the maximum daily rated capacity on an annual average basis.

FP&L can integrate the power from the Facility into its system. The following interconection specifications were developed in coordination with FP&L. The interconnection to FP&L's system will be through their Buckingham substation. The interconnection equipment will meet National Electric Manufacturers Association (NEMA) standards and FP&L's technical characteristics and requirements (138 Kv transmission line, 60 cycles nominal at a power factor of 0.85 leading to 0.85 lagging, grounged wye on the high side, delta on the low side, and fault values shall be consistent with those for the Buckingham substation). Additional interconnection requirements that will be met are those contained in Florida Public Service Commission's Interconnection Guideline Rule 25-17.087. The Facility will be equipped with two half-capacity step-up transformers (13.8 kV to 138 kV with separate but identical protective relaying). The step-up transformers themselves will be designed such that a failure of one transformer will not result in damage to the other transformer. In addition, a station-service (step-down) transformer, switch gear, emergency power supply for safe facility shut-down, an uninterruptable power supply for the distributed control system, and all auxiliary equipment will be provided.

Reliability

The mass-burn technology for solid waste incineration has been commercially demonstrated in over 25 facilities within the United States, and is employed in six energy recovery facilities in Florida which are either under construction or in commercial operation. Those in operation in the state include those in Pinellas, Hillsborough, and Bay counties and the city of Tampa. Each of these facilities have on-line operating reliability factors in excess of 85 percent and have achieved continuous 12-month rolling average capacity factors of 70 percent or greater.

1.3 CONDITIONS INDICATING A NEED FOR THE FACILITY

The need for the Facility is primarily premised on the need for solid waste reduction in order to minimize the landfilling of solid waste. The production of electricity from the Facility is a secondary benefit, the sale of which to FP&L will provide reliable capacity for the utility's Lee

County base load demand and will reduce the overall cost of solid waste disposal to Lee and Hendry counties. As shown in Table 1-1, solid waste generation in Lee and Hendry counties is projected to be 560,976 tons per year in 1993. By the year 2013, the annual quantity of solid requiring disposal is projected to grow to 1,107,820 tons per year. Achieving the statutory goal of 30 percent recycling will reduce the quantity of solid waste requiring disposal by about 168,300 tons in 1993 and 332,350 tons in 2013, thereby leaving significant quantities of solid waste requiring other methods of disposal.

Energy loads forecasted by FP&L are shown in Figures 1-1 though 1-3. Historical loads are also shown in these figures. Load forecasts were developed by FP&L using the models described in Section IV, Florida Power & Light Company 10 Year Power Plant Site Plan 1990-1999, dated April 1, 1990. This same FP&L document identifies FP&L's Cogeneration and Small Power Production Program as an important part of the company's Energy Management Plan and states that, "Current information supports incorporating approximately 1,110 Mw (summer) and 5,971,646 Mwh of purchased power from Qualifying Facilities into FPL's power supply plans during the next ten years." Table 1-2 lists FP&L's expected annual contribution of capacity and energy from qualifying facilities through 1997.

Presently, FP&L has contracted for 315 Mw of generating capacity which nearly satisfies FP&L's projected capacity and energy contributions from qualifying facilities through 1992, leaving a requirement of 795 Mw of capacity to be satisfied by qualifying facilities. These data affirmatively support FP&L's need for the Facility.

<u>Least Cost</u>

The capacity and energy to be sold to FP&L by the proposed Facility will be in accordance with applicable Florida Public Service Commission rules and requirements for standard offer contracts and Florida Administrative Code Rules 25-17.082.083.

TABLE 1-1
POPULATION AND WASTE QUANTITY PROJECTIONS

YEAR	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
POPULATION										
Lee Co.	453,183	470,658	488,133	505,771	523,409	541,048	558,686	576,324	595,896	615,468
Hendry Co.	28,369	28,926	29,482	29,924	30,367	30,809	31,252	31,694	32,136	32,579
Total	481,552	499,584	517,615	535,696	553,776	571,857	589,937	608,018	628,033	648,047
WASTE QUANTITY										
Lee Co.	531,042	560,895	591,610	623,408	656,116	689,756	724,350	759,921	799,086	833,897
Hendry Co	29,934	30,521	31,109	31,575	32,042	32,509	32,976	33,443	33,909	34,376
Total	560,976	591,417	622,718	654,983	688,158	722,265	757,326	793,364	832,996	868,273

YEAR	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
POPULATION											
Lee Co.	635,041	654,613	674,185	688,588	702,991	717,394	731,797	746,200	760,293	774,386	788,479
Hendry Co.	33,021	33,464	33,906	34,348	34,791	35,233	35,676	36,118	36,560	37,003	37,445
Total	668,062	688,076	708,091	722,936	737,782	752,627	767,473	782,318	796,853	811,389	825,924
WASTE QUANTITY											
Lee Co.	860,415	886,934	913,452	932,967	952,481	971,996	991,510	1,011,025	1,030,120	1,049,214	1,068,309
Hendry Co	34,843	35,310	35,777	36,243	36,710	37,177	37,644	38,111	38,578	39,044	39,511
Total	895,258	922,244	949,229	969,210	989,192	1,009,173	1,029,154	1,049,136	1,068,697	1,088,259	1,107,820

FIGURE 1-1

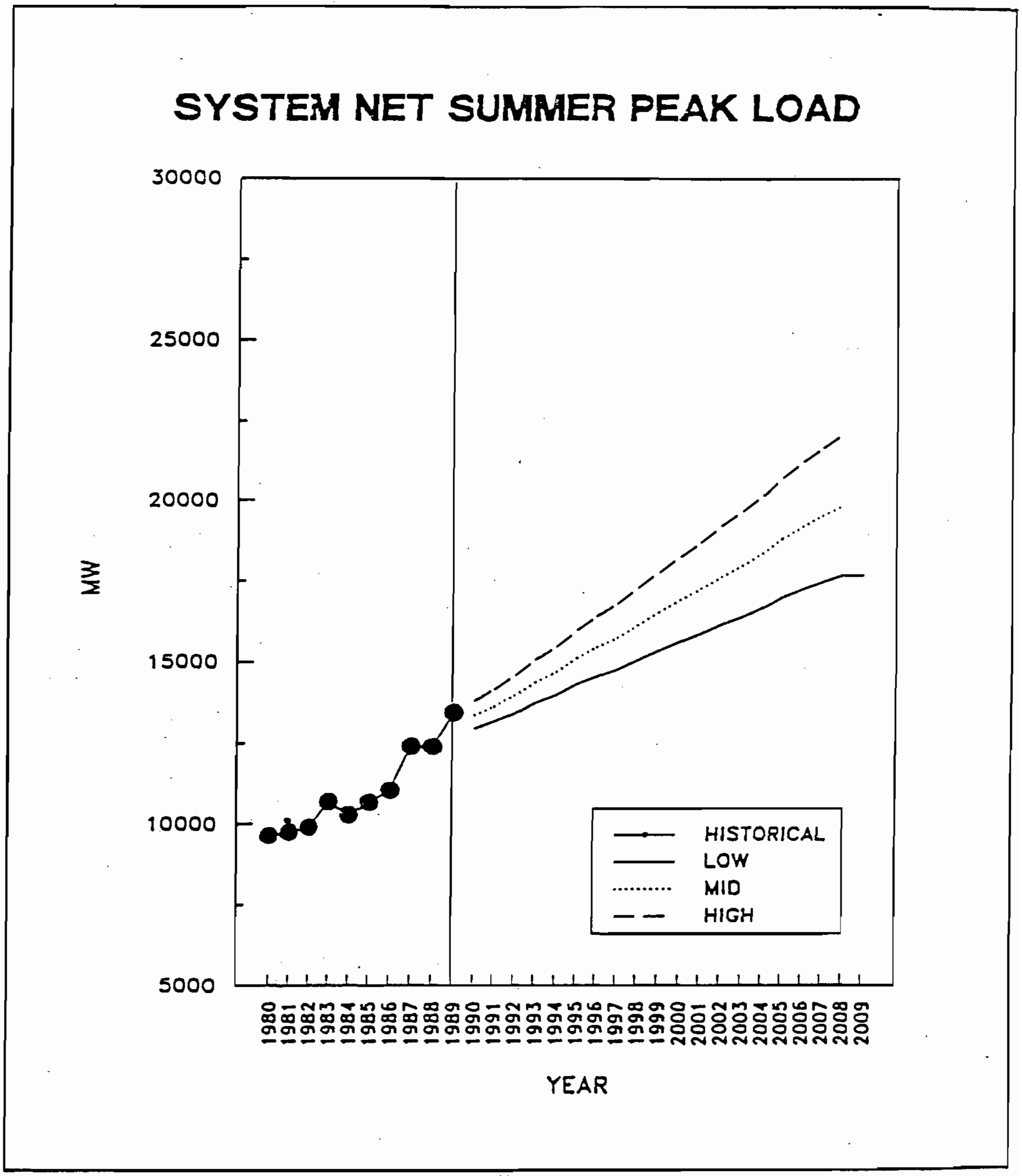

Exhibit 4

Source:

FP&L Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

FIGURE 1-2

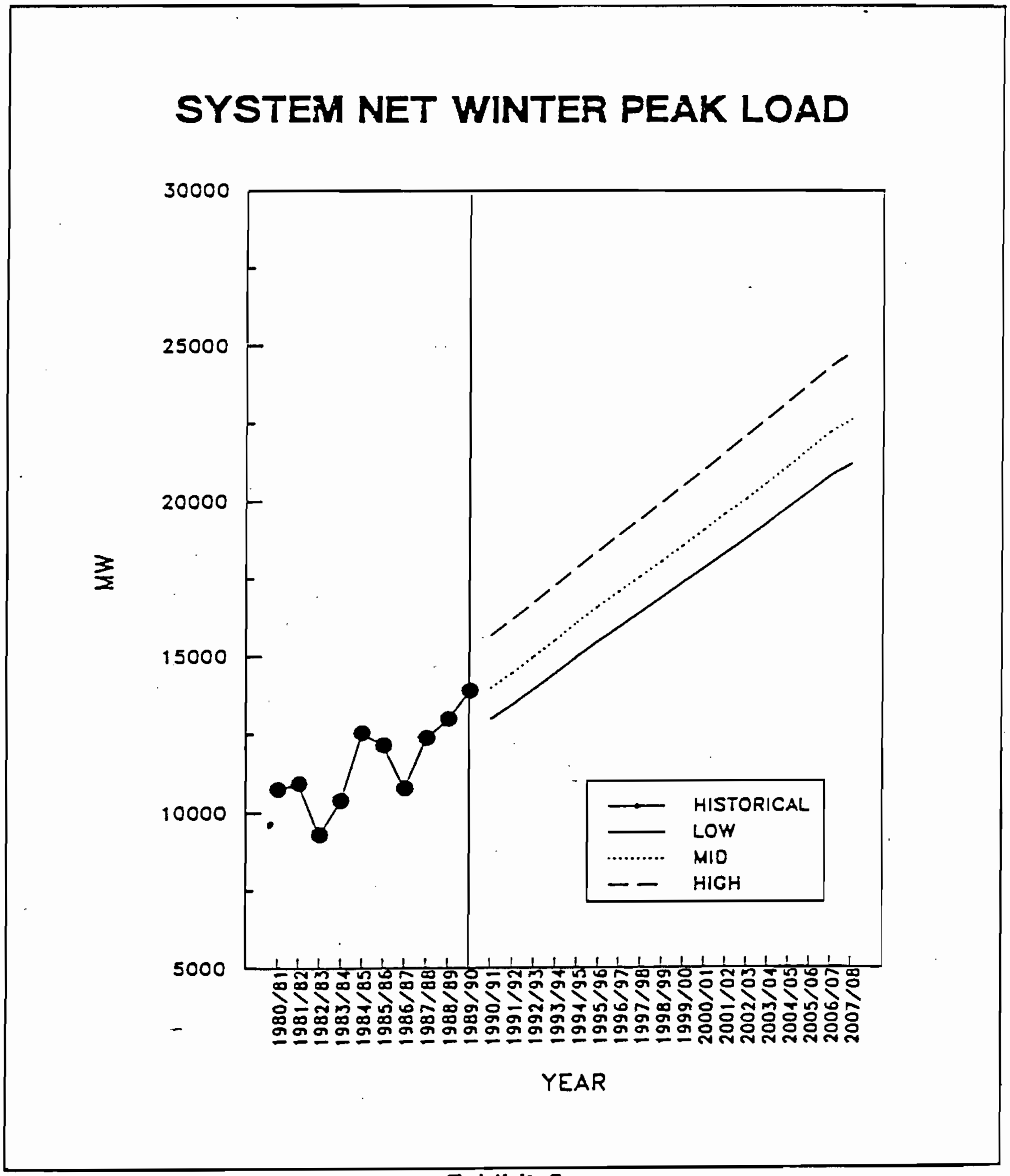

Exhibit 5

Source:

FP&L Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

FIGURE 1-3

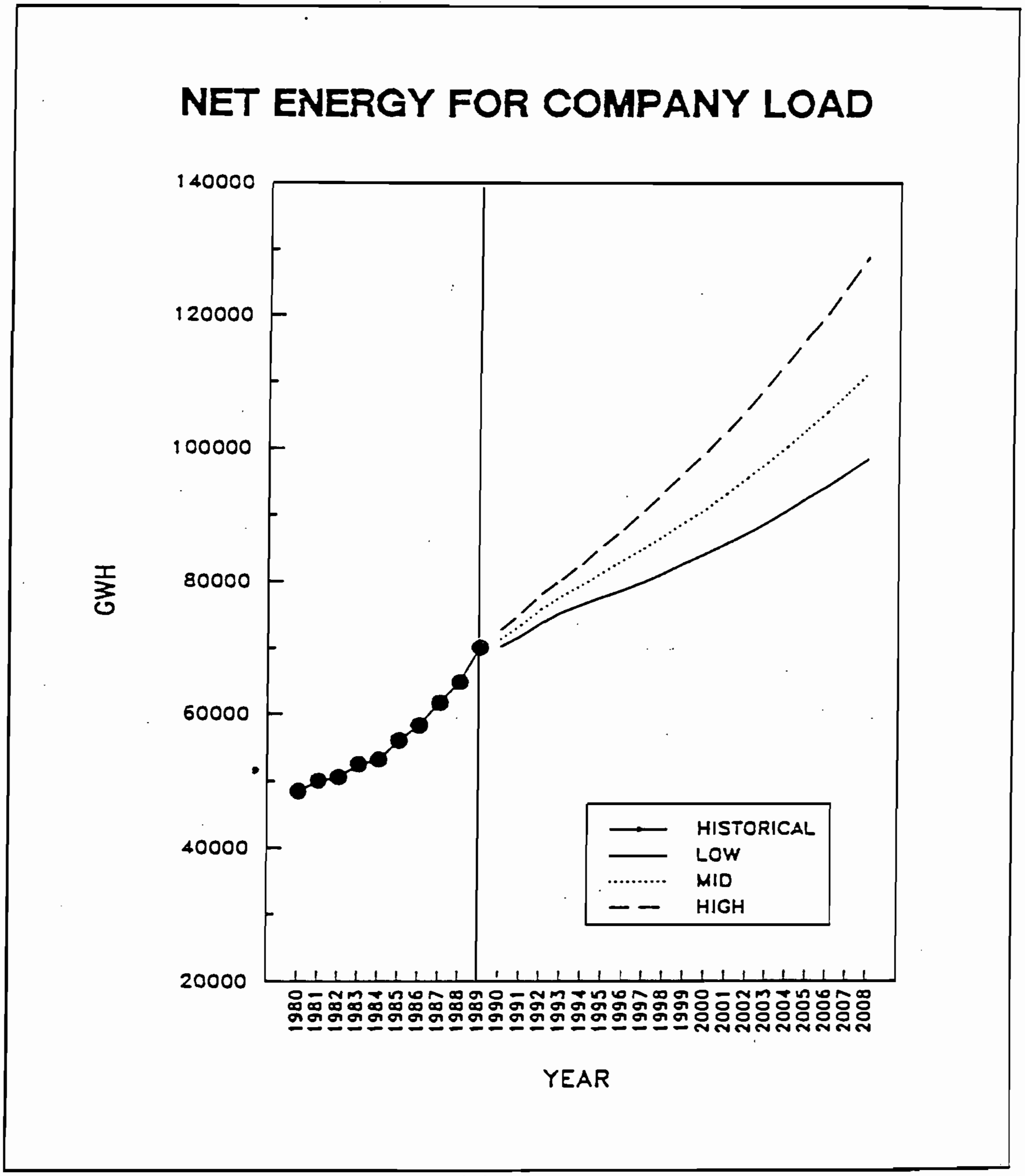

Exhibit 6

Source:

FP&L Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

TABLE 1-2

CAPACITY AND ENERGY CONTRIBUTION
FROM QUALIFYING FACILITIES

Year	Firm Cumulative Summer	Firm[a] Cumulative Winter	Cumulative[b] Annual Energy
1990	0	0	1,513,200
1991	0	0	1,841,200
1992	391	391	2,160,600
1993	616	616	3,908,000
1994	616	616	3,936,600
1995	991	991	5,213,256
1996	1,058	1,058	5,627,156
1997	1,095	1,095	5,854,056
1998	1,110	1,110	5,971,656
1999	1,110	1,110	5,971,656

SOURCE: Florida Power and Light Ten Year Power Plant Site Plan 1990-1999, April 1, 1990.

[a] 1990 Winter = Winter 1990-91.

[b] Includes as-available (non-firm) energy purchases from Qualifying Facilities.

Note: Assumptions are based on the May 1989 "Forecast of Qualifying Facilities for the Years 1989 through 2008."

1.4 ELECTRICAL GENERATING ALTERNATIVES

Since this project is designed to be an integral component of a solid waste management system to satisfy Lee and Hendry countie's long-term solid waste disposal needs; electrical generating alternatives were not considered per se. What were considered were alternate processing facility capacities. The facility capacities considered included:

- A 1,200-tpd facility which would reach capacity in the first 12 to 18 months of operation;
- A 1,500-tpd facility which would reach capacity within the first three years of operation;
- A 1,650-tpd facility which would reach capacity within five to six years of initial operation;
- A 1,800-tpd facility which reaches capacity after about ten years of operation; and
- A 2,050-tpd facility which would reach capacity in about the fifteenth year of operation.

Sensitivity analyses were conducted for a range of solid waste quantity projections to determine the economic impact and the landfilling requirements associated with each. The 1,800-tpd facility size was selected by Lee County as the facility which offered the county the greatest degree of flexibility in terms of meeting near and intermediate-term solid waste disposal needs while minimizing exposure to unreasonably high solid waste disposal costs.

FP&L's Ten Year Plan evaluated various alternatives for meeting future capacity and energy needs including nuclear, oil, gas, and coal fired generating facilities, purchases from other utilities, and purchases from cogeneration and small power production facilities. The results of this analysis indicated that approximately 1,110 Mw of capacity should be purchased from qualifying facilities through 1999.

1.5 NON-GENERATING ALTERNATIVES

FP&L's non-generating alternatives include residential load control, commercial and industrial load control, and the purchase of capacity and energy from others as discussed in FP&L's Ten Year Plan. That plan presently incorporates the use of each of these alternatives to meet projected future needs.

With respect to the proposed energy recovery facility, several alternatives were investigated including recycling, composting, landfilling, and incineration without energy production.

Recycling was determined to be a viable alternative, but as a disposal method alone will not meet the volume reduction goals of Lee County. Composting the mixed municipal waste stream was determined to be a technology still in the developmental stage and not commercially demonstrated at a scale size sufficient to meet the County's solid waste disposal needs. The composting of yard wastes was only determined to be viable but, like recycling, it alone would not achieve the volume reduction goals of the County. Landfilling was determined to be technologically viable but would provide no benefit in terms of volume reduction, and does not meet the County's goal of minimizing dependency on a landfill for solid waste disposal. Incineration without energy recovery was determined to be technologically, viable but the economics in comparison to incineration with energy recovery were unfavorable resulting in a higher cost for solid waste disposal.

The selected plan includes incineration with energy recovery, the recycling of source separated materials, composting yard waste with sewage sludge, and landfilling the incinerator residue and other non-processible and non-recyclable materials.

1.6 CONSEQUENCES WITHOUT THE PROPOSED FACILITY

Without the proposed Facility, Lee County will consume landfill capacity at over twice the rate at which such landfill capacity will be consumed if the Facility is an integral part of the system. This will result in the continued and accelerated irretrievable commitment of land resources. Also as a result of increased landfilling of unprocessed solid waste, the potential for groundwater pollution will be increased.

Other adverse consequences include:

- Loss of electricity needed from alternative fuels electric generating facilities;
- Loss of electricity available on a least cost basis;
- Increases in the air emission of particulates and volatile organic compounds as a result of landfilling unprocessed solid waste;
- Loss of over 300 short-term construction jobs associated with building the Facility;
- Loss of at more than 50 long-term jobs associated with the operation of the Facility; and
- Increased consumption of land resources for the disposal of solid waste via landfilling.

1.7 SUMMARY AND BENEFITS OF THE FACILITY

The proposed Lee County energy recovery facility will provide capacity and energy in an area experiencing significant load growth. The energy produced will be available to FP&L at a cost consistent with Statutory requirements governing the sale of capacity and energy from small power producers under the Standard Offer Agreement for such small power producers. The power can be integrated into FP&L's system through the

Buckingham substation, and FP&L needs the power from the Facility to assist in satisfying a projected need of 1,110 Mw from qualifying facilities. Currently FP&L has contracted for power from qualifying facilities which satisfies the utility's identified need for such power only until 1992.

The Facility will eliminate the need for approximately 560,000 barrels of oil per year for electric energy generation by using an alternate fuel (e.g., municipal solid waste).

The Facility will also provide other benefits to the state and to Lee and Hendry counties. In Chapter 84-198, Laws of Florida (1984), the Florida Legislature has declared that "It is critical to encourage energy conservation in order to protect the health, prosperity, and general welfare of this state and its citizens." The Legislature has further declared that the "combustion of solid waste by small power production facilities for the production of electricity not only represents conservation efforts well-directed towards that goal, but also represents an environmentally preferred alternative to conventional solid waste disposal in this state." In Section 377.709(1), Florida Statutes, the Legislature also declares that "it is critical to encourage energy conservation in order to protect the health, prosperity, and general welfare of this state and its citizens," "that the disposal of solid refuse is an important governmental obligation and that, if the disposal is not accomplished in a proper manner, such refuse poses a definite threat to the public health and welfare," and "that the combustion of refuse by solid waste facilities to supplement the electricity supply not only represents an effective conservation effort, but also represents an environmentally preferred alternative to conventional solid waste disposal in this state." The Legislature, therefore, "directs the Florida Public Service Commission to establish a funding program to encourage the development by local governments of solid waste facilities that use solid waste as a primary source of fuel for the production of electricity." In Section 403.702 of the Florida Statutes, the Florida Resource Recovery and Management Act declares that "the purpose of this act is to promote the application of resouce recovery systems which preserve and enhance the quality of air, water and land resources."

Lee and Hendry counties' proposed solid waste processing and disposal program pursues the state's policy of resource recovery as a long-term solid waste disposal solution. The proven mass-burn technology will provide a reliable and economical solution for the counties' long-term solid waste processing and disposal needs.

The proposed system is also consistent with the Florida State Comprehensive Plan (FS, 1985). The plan states the following goals and policies regarding energy and waste.

Energy Goal:

#12 Florida shall reduce its energy requirements through enhanced conservation and efficiency measures in all end-use sectors, while at the same time promoting an increased use of renewal energy resources.

Policies (Objectives):

#5 Reduce the need for new power plants by encouraging end-use efficiency, reducing peak demand, and using cost-effective alternatives.

#9 Promote the use and development of renwable energy resources.

Waste Management Goal:

All solid waste, including hazardous waste, wastewater and all hazardous materials, shall be properly managed, and the use of landfills shall be eventually eliminated.

Policies (Objectives):

#1 By 1995, reduce the volume of nonhazardous solid waste disposed of in landfills to 55 percent of the 1985 volume.

#7 Encourage the research, development, and implementation of recycling, resource recovery, energy recovery, and other methods of using garbage, trash, sewage, slime, sludge, hazardous waste, and other waste.

SECTION 2.0

SITE AND VICINITY CHARACTERIZATION

2.0 SITE AND VICINITY CHARACTERIZATION

2.1 SITE AND ASSOCIATED FACILITIES DELINEATION

2.1.1 SITE LOCATION

Lee County is in the process of (1) rezoning the site selected for the energy recovery facility and (2) obtaining ownership of the property. The proposed County purchase will be a portion of Section 24 and Section 25, Township 44 South, Range 25 East, totaling 155 acres. The energy recovery facility site acreage delineation is as follows.

Portion of Southeast Quarter of Section 24	145.2 acres
Portion of Northeast Quarter of Section 25 to Buckingham Road	2.8 acres
Facility Power Line Corridor	7.0 acres
	155.0 acres

Only the portion of the southeast quarter of Section 24 (145.2 acres) and the north portion of the northeast quarter of Section 25 (2.8 acres) will be rezoned for the proposed Facility.

The site is located near the center of Lee County, as shown in Figure 2-1. Figure 2-2 details the site location. The property is north of Buckingham Road, approximately 2.5 miles east of the intersection of I-75 and State Road 82. The boundary survey for the site is presented in Figure 2-3. The property deed will be submitted supplemental to this power plant siting act permit application. The legal description of the property can be found in Appendix 1.1.

2.1.2 EXISTING USES

Properties abutting the Facility Site boundary are shown on Figure 2-4a. A complete list of abutting property owners is contained in Appendix 1.2.

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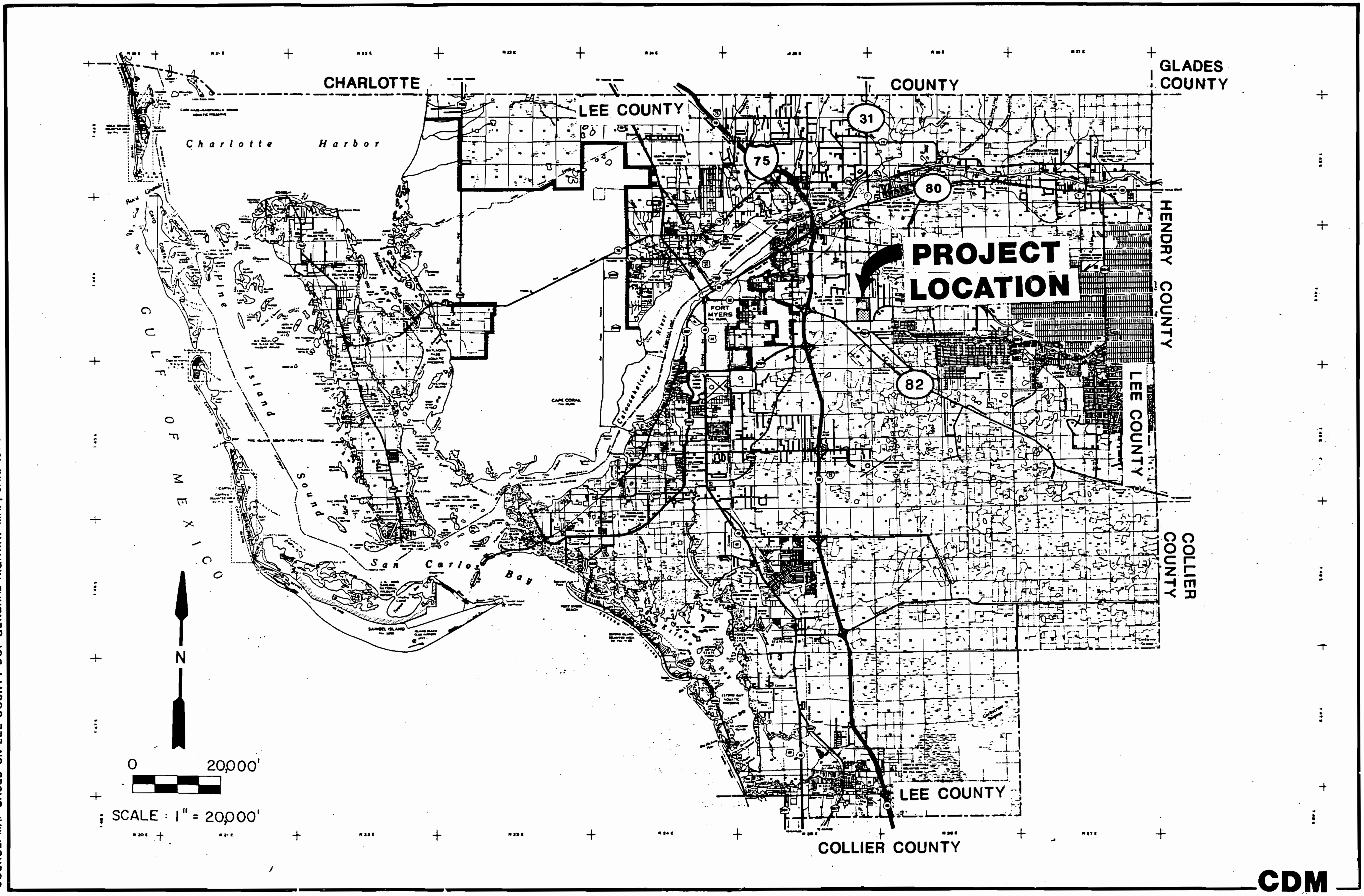


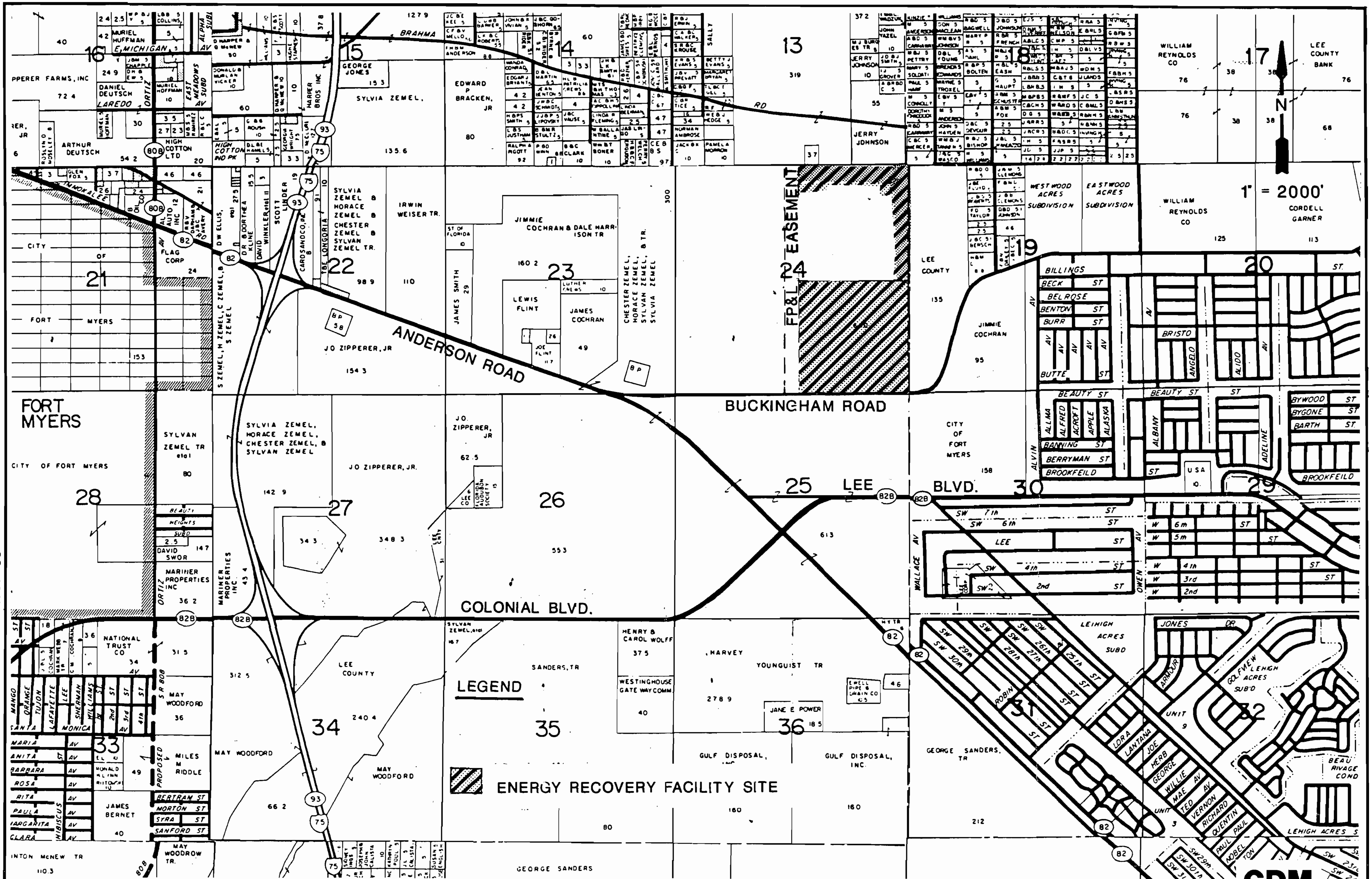
SOURCE: MAP BASED ON LEE COUNTY DOT GENERAL HIGHWAY MAP, JAN. 1976

CDM

FIGURE 2-1

General Location Map - Lee County Energy Recovery Facility

Best Available Copy

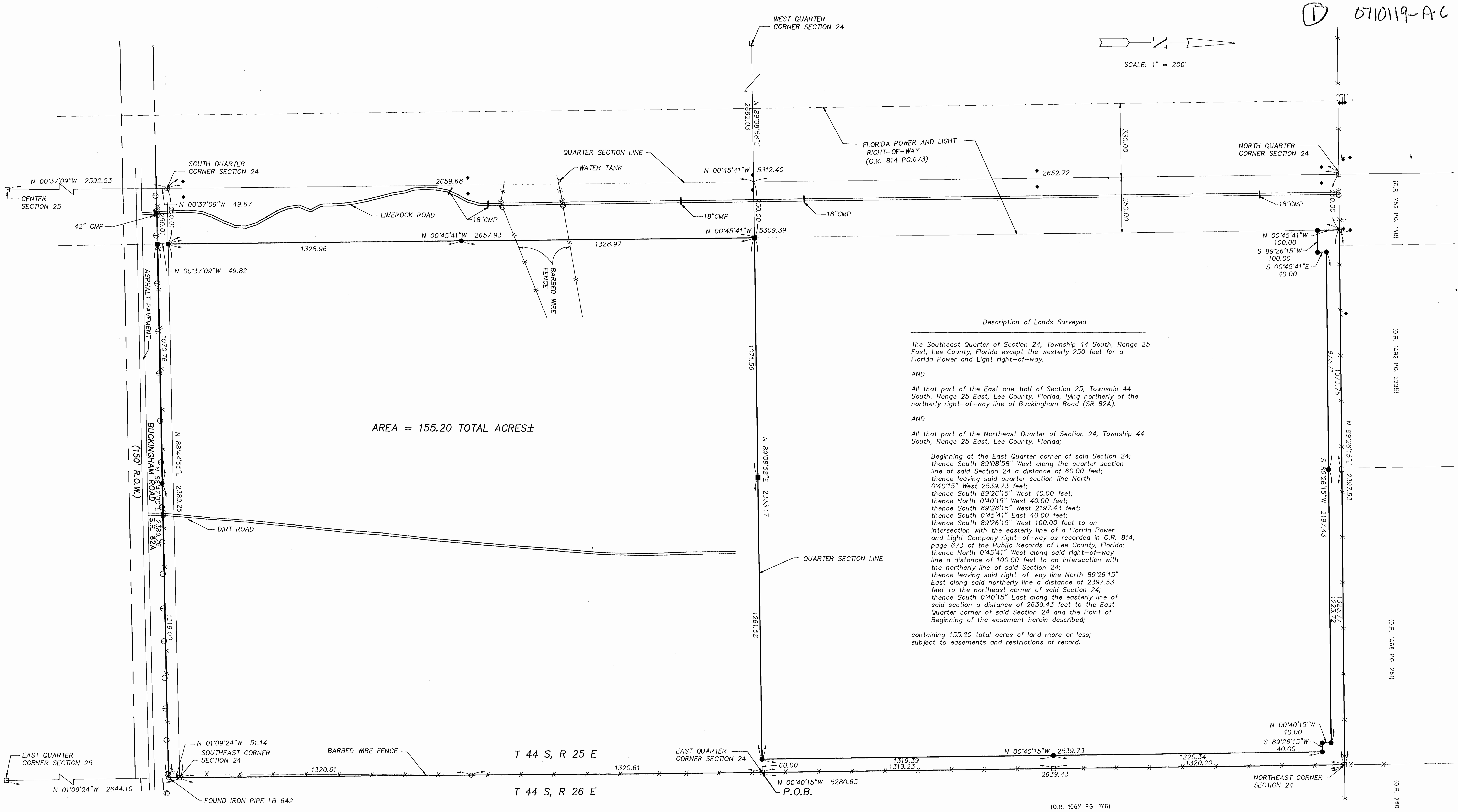


SOURCE: "LEE COUNTY PLAT DIRECTORY 1987-88"

Site Location Map - Lee County Energy Recovery Facility

FIGURE 2-2

(1) 0710119-AC



Description of Lands Surveyed

The Southeast Quarter of Section 24, Township 44 South, Range 25 East, Lee County, Florida except the westerly 250 feet for a Florida Power and Light right-of-way.

AND

All that part of the East one-half of Section 25, Township 44 South, Range 25 East, Lee County, Florida, lying northerly of the northerly right-of-way line of Buckingham Road (SR 82A).

AND

All that part of the Northeast Quarter of Section 24, Township 44 South, Range 25 East, Lee County, Florida;

Beginning at the East Quarter corner of said Section 24; thence South 89°08'58" West along the quarter section line of said Section 24 a distance of 60.00 feet; thence leaving said quarter section line North 0°40'15" West 2539.73 feet; thence South 89°26'15" West 40.00 feet; thence North 0°40'15" West 40.00 feet; thence South 89°26'15" West 2197.43 feet; thence South 0°45'41" East 40.00 feet; thence South 89°26'15" West 100.00 feet to an intersection with the easterly line of a Florida Power and Light Company right-of-way as recorded in O.R. 814, page 673 of the Public Records of Lee County, Florida; thence North 0°45'41" West along said right-of-way line a distance of 100.00 feet to an intersection with the northerly line of said Section 24; thence leaving said right-of-way line North 89°26'15" East along said northerly line a distance of 2397.53 feet to the northeast corner of said Section 24; thence South 0°40'15" East along the easterly line of said section a distance of 2639.43 feet to the East Quarter corner of said Section 24 and the Point of Beginning of the easement herein described;

containing 155.20 total acres of land more or less; subject to easements and restrictions of record.

CERTIFICATE:

WE HEREBY CERTIFY to LEE COUNTY BOARD OF COUNTY COMMISSIONERS, that a BOUNDARY SURVEY of a part of Section 24 and 25, Township 44 South, Range 25 East, Lee County, Florida, was completed under our direction on June 26, 1990.

This BOUNDARY SURVEY meets the minimum technical standards set forth by the Florida Board of Land Surveyors in Chapter 21HH-6 Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

AGNOLI, BARBER & BRUNDAGE, INC.
Professional Engineers, Planners & Land Surveyors

By
Guy P. Adams, P.L.S. No. 4390

NOTE:

This certification is only for the lands as described. It is not a certification of title, zoning, easements or freedom of encumbrances. This Certification is not valid unless signed by the surveyor and sealed with the surveyor's embossed seal.

ABSTRACT NOT REVIEWED.

GENERAL NOTES:

1. Dimensions are in feet and decimals thereof.
2. R.O.W. = Right-of-Way.
3. Bearings are based on the plat of Buckingham Park Entrance Roads as recorded in Plat Book 9, page 98, Lee County Public Records, Lee County, Florida.

SURVEYOR'S NOTE

Interior improvements not located under the scope of this survey.

LEGEND

- ● = SET IRON ROD W/CAP #LB 3664
- ○ = RECOVERED IRON ROD #LB 3664
- ■ = SET CONCRETE MONUMENT #3664
- □ = FOUND CONCRETE MONUMENT
- Ⓣ = TELEPHONE POLE
- Ⓤ = U.T.S. RISER
- Ⓖ = GATE POST
- ◆ = POWER POLE
- ⟵ = ANCHOR
- CMP = CORRUGATED METAL PIPE

approved:	design:	date: JUNE 22, 1990	for: LEE COUNTY, FLORIDA
	drawn: RLC, JAN	scale: 1" = 200'	title: MAP OF BOUNDARY SURVEY OF PART OF SECTIONS 24 & 25, T44S, R25E LEE COUNTY, FLORIDA
	checked:	book: 272,273 page: 32 6	
	revision:		agnoli, barber & brundage, inc. professional engineers, planners, & land surveyors 7400 tamiami trail, n. naples, florida 33963 (813)597-3111 2077 bayside parkway, fort myers, florida 33901 (813)337-3111
			project no.: 4657 / acad: 2838-BS tech: 3308 / sheet of / file no.: 2838

FIGURE 2-3

Best Available Copy

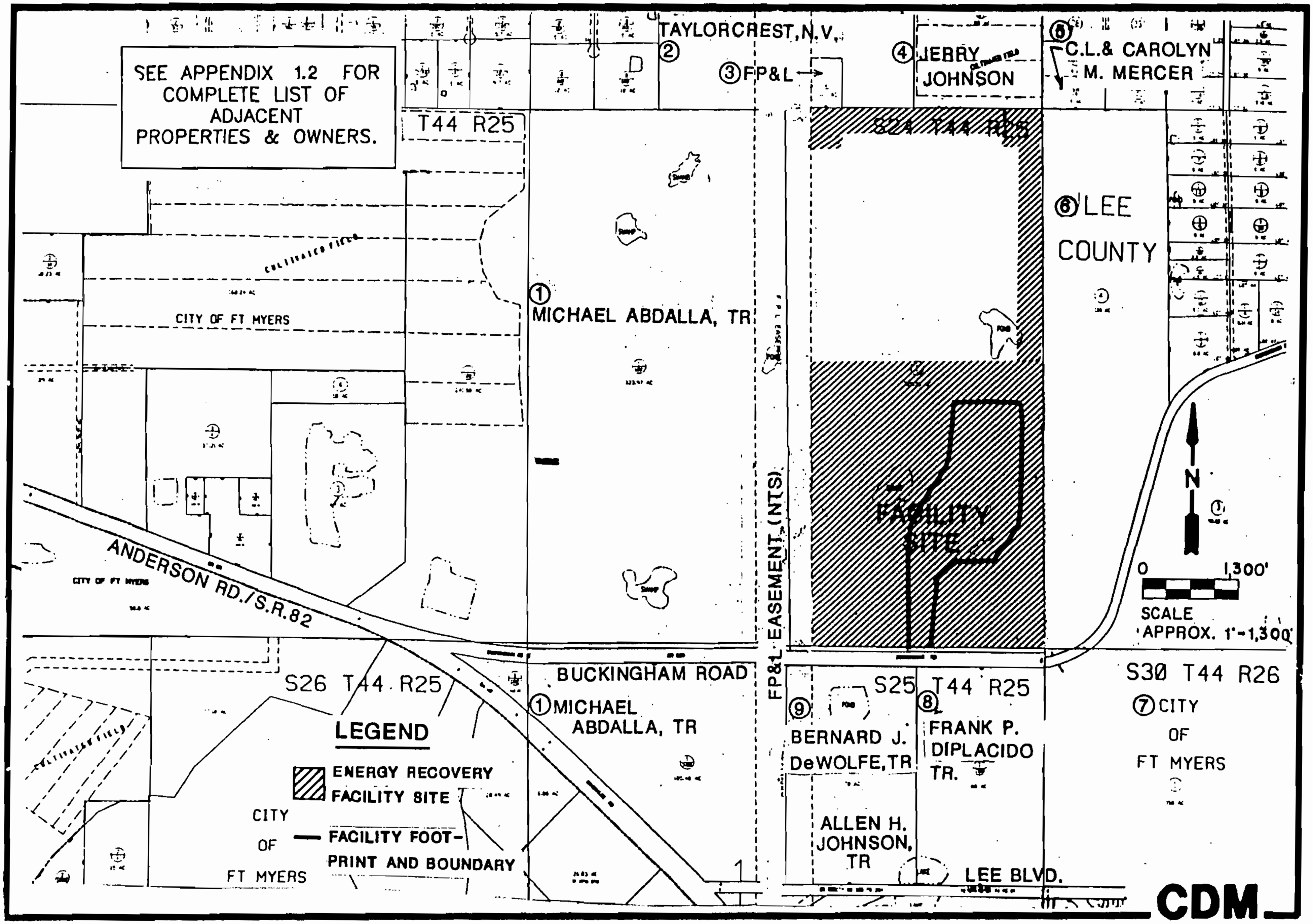


FIGURE 2-4a

ABUTTING PROPERTIES – LEE COUNTY ENERGY RECOVERY FACILITY

The site is bounded on its western side by a Florida Power and Light (FP&L) easement containing power transmission lines. Approximately 3/4-mile to the west is a mining operation where limerock, fill, and topsoil materials are obtained. To the east, the site is bordered by property owned by Lee County slated for a future park. An adjacent parcel southeast of the site was previously used as a sanitary landfill, and is now owned by the City of Fort Myers and by private individuals who use it for livestock grazing. The abandoned landfill is shown in Figure 2-4b. The Gulf Coast Sanitary Landfill (Figure 2-4b) is located three miles directly south of the site and is currently contracted by Lee County for solid waste disposal. Estimates for remaining capacity for this facility are in the range of one and a half to three years. Further expansion of this facility is not practical nor proposed.

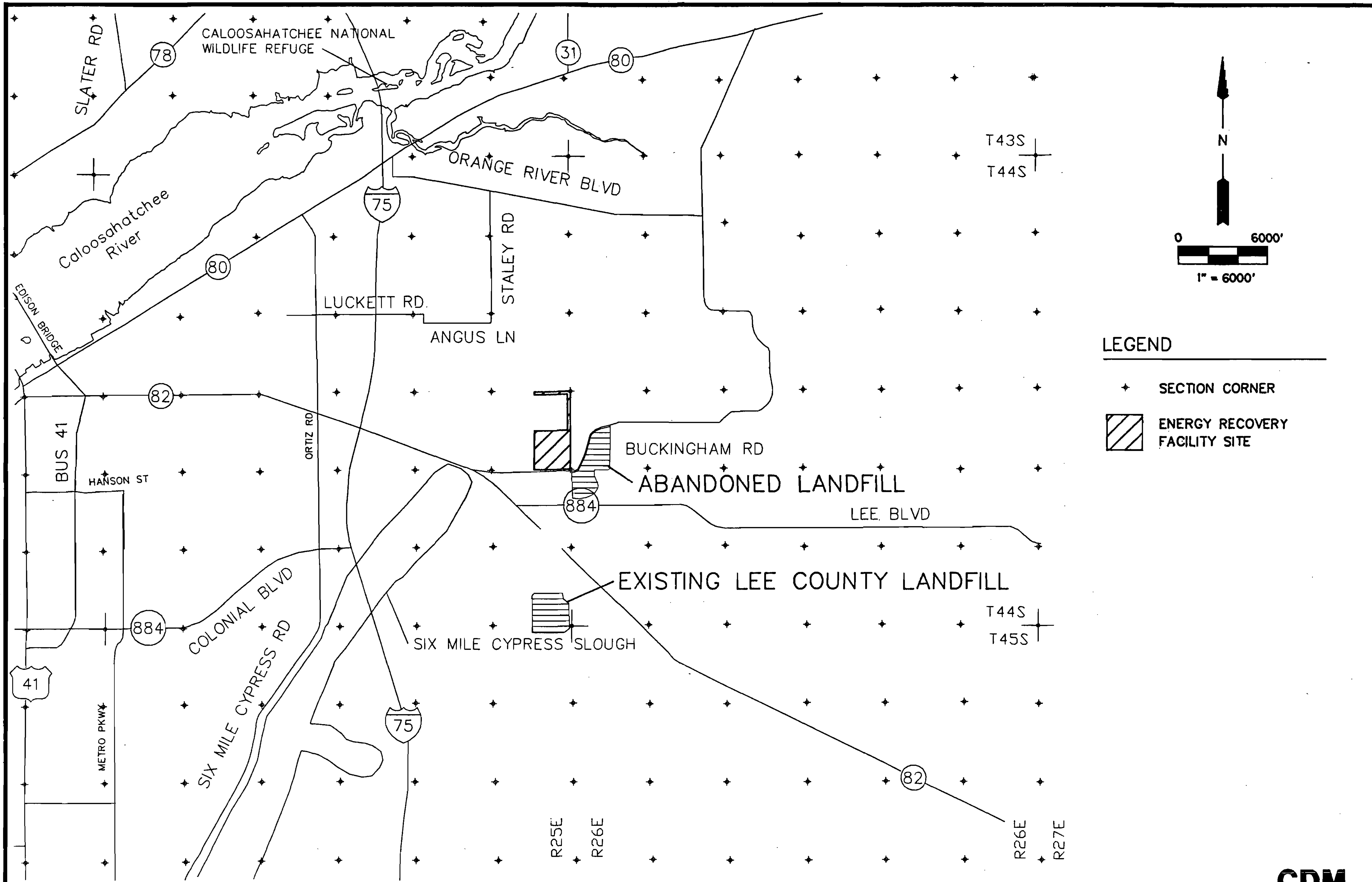
The 155-acre site includes approximately 123 acres of upland and 32 acres of wetland vegetation. Upland areas are predominated by farm pasture, wax myrtle, palmetto prairie, and pine flatwoods. Wetland habitats include cypress, cypress/pine, wet pine flatwoods, and wet prairie.

A survey of the Facility site revealed that land is being used primarily for raising livestock and rural residences. The site itself has been used for grazing cattle. There are no residences on the site. A detailed discussion of vegetation and land use is presented in Section 2.3.5.

Two aerial photographs are included in this application to depict the project area. Figure 2-5a is a 1:1000 scale composite of aerials obtained from the Florida Department of Transportation (FDOT) dated February 24, 1990. A 1:200 scale aerial, flown in May 1990, is provided as Figure 2-5b.

2.1.3 SITE MODIFICATION

The general site development plan is shown in Figure 2-6. The energy recovery facility will be located in the approximate center of the eastern half of the 155-acre site. The selected location produces the minimum impact to on-site wetlands and uses existing vegetation as a buffer to the greatest extent possible.

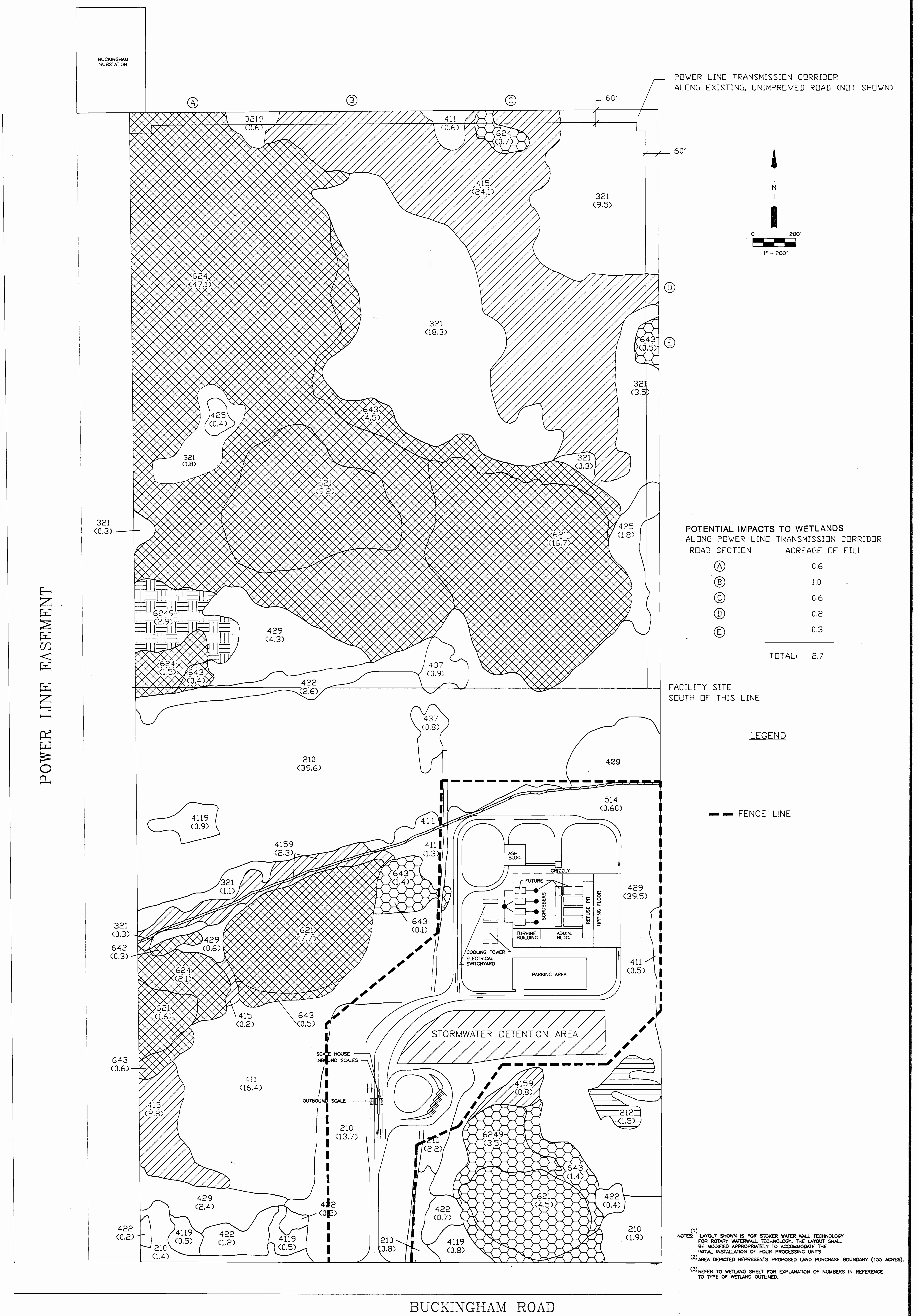


CDM

Existing and Abandoned Landfills - Lee County Energy Recovery Facility

FIGURE 2-4b

② 0710119 - AC



POTENTIAL IMPACTS TO WETLANDS
ALONG POWER LINE TRANSMISSION CORRIDOR

ROAD SECTION	ACREAGE OF FILL
Ⓐ	0.6
Ⓑ	1.0
Ⓒ	0.6
Ⓓ	0.2
Ⓔ	0.3
TOTAL:	2.7

FACILITY SITE SOUTH OF THIS LINE

LEGEND

FENCE LINE

NOTES:
(1) LAYOUT SHOWN IS FOR STOKER WATER WALL TECHNOLOGY FOR ROTARY WATERWALL TECHNOLOGY, THE LAYOUT SHALL BE MODIFIED APPROPRIATELY TO ACCOMMODATE THE INITIAL INSTALLATION OF FOUR PROCESSING UNITS.
(2) AREA DEPICTED REPRESENTS PROPOSED LAND PURCHASE BOUNDARY (155 ACRES).
(3) REFER TO WETLAND SHEET FOR EXPLANATION OF NUMBERS IN REFERENCE TO TYPE OF WETLAND OUTLINED.

FIGURE 2-6

SHEET NO.	PROJECT NO.	LEE COUNTY ENERGY RECOVERY FACILITY SITE LAYOUT	CAMP DRESSER & McKEE INC. environmental engineers, scientists, planners, & management consultants CDM	DESIGNED BY: DRAWN BY: CHECKED BY: APPROVED BY: DATE: JUNE 1990

REV. NO.	DATE	DRWN	CHKD.	REMARKS

③

0710119

N

SCALE: 1"=200'

ONE INCH

0 200' 1200'

NO.	DATE	REMARKS	BY
		REVISIONS	

	APPROVED BY NAME	DATE	SCALE	FIELD WORK
DRAWN BY				
TRACED BY				
CHECKED BY				
NOTEBOOK NO.			SHEET OF SHEETS	

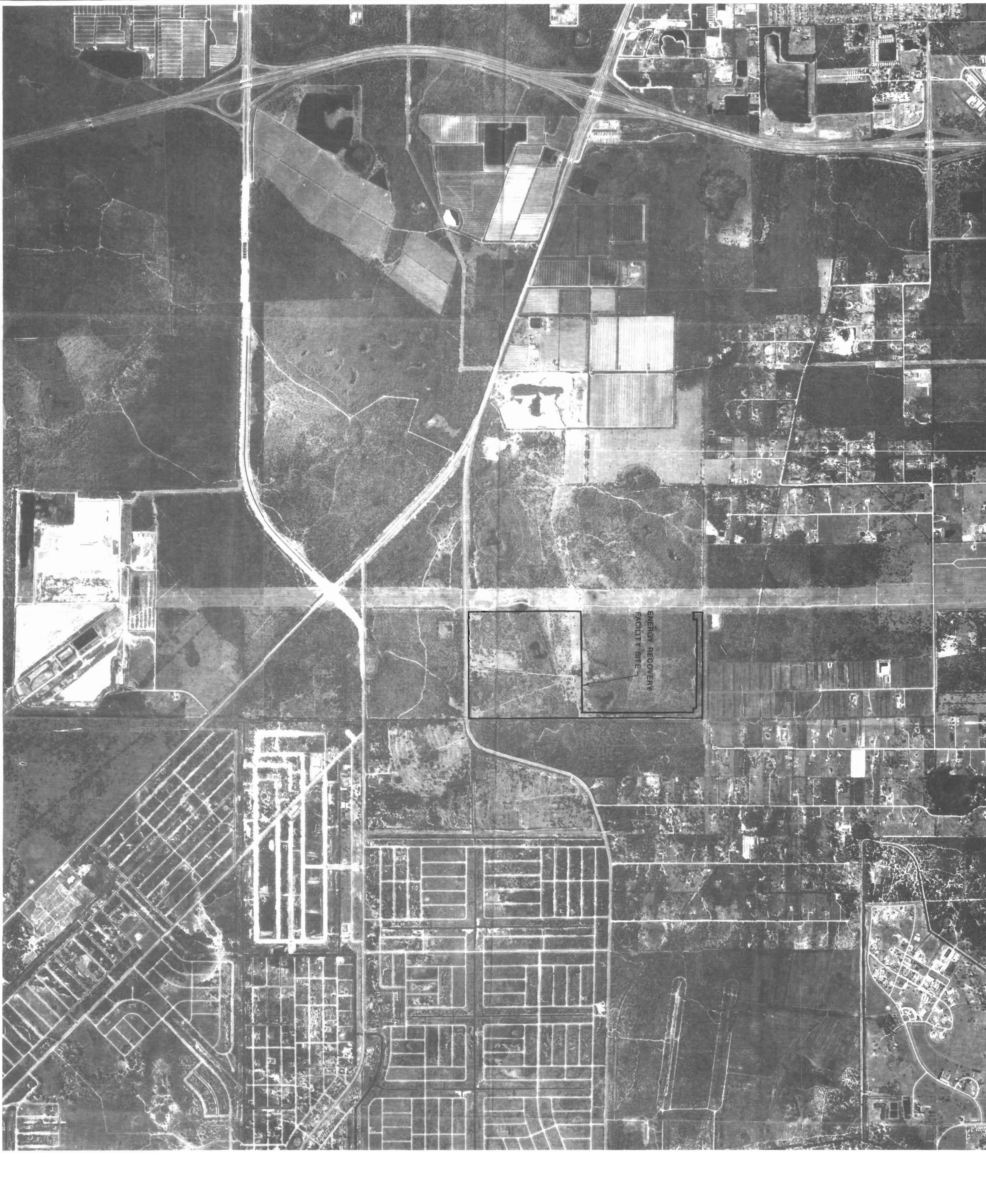
CAMP DRESSER & McKEE INC.

environmental engineers, scientists, planners, & management consultants CDM

FIGURE 2-5b

SITE LOCATION:
AERIAL SURVEY

REPRO PRODUCTS



N

0 1000'

APPROX. SCALE
1"=1000'
PHOTO: 2/24/90

070119

4

PROJECT NO.	SHEET NO.
6685-38	

SITE LOCATION: AERIAL SURVEY

CAMP DRESSER & McKEE INC.

environmental engineers, scientists, planners, & management consultants CDM

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATE:

REV. NO.	DATE	DRWN	CHKD	REMARKS

FIGURE 2-5a

The Facility structures will occupy approximately 3.1 percent of the site; roads and parking about 4.7 percent, and stormwater retention approximately 3.2 percent. approximately 89 percent of the site will remain unused and will serve as buffer and conservation areas. Table 2-1 summarizes the proposed land use divisions of the Facility.

2.1.4 100-YEAR FLOOD ZONE

The proposed Facility site is not located within the 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA). The site is located in an area designated as Zone B which is defined as:

> "Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood."

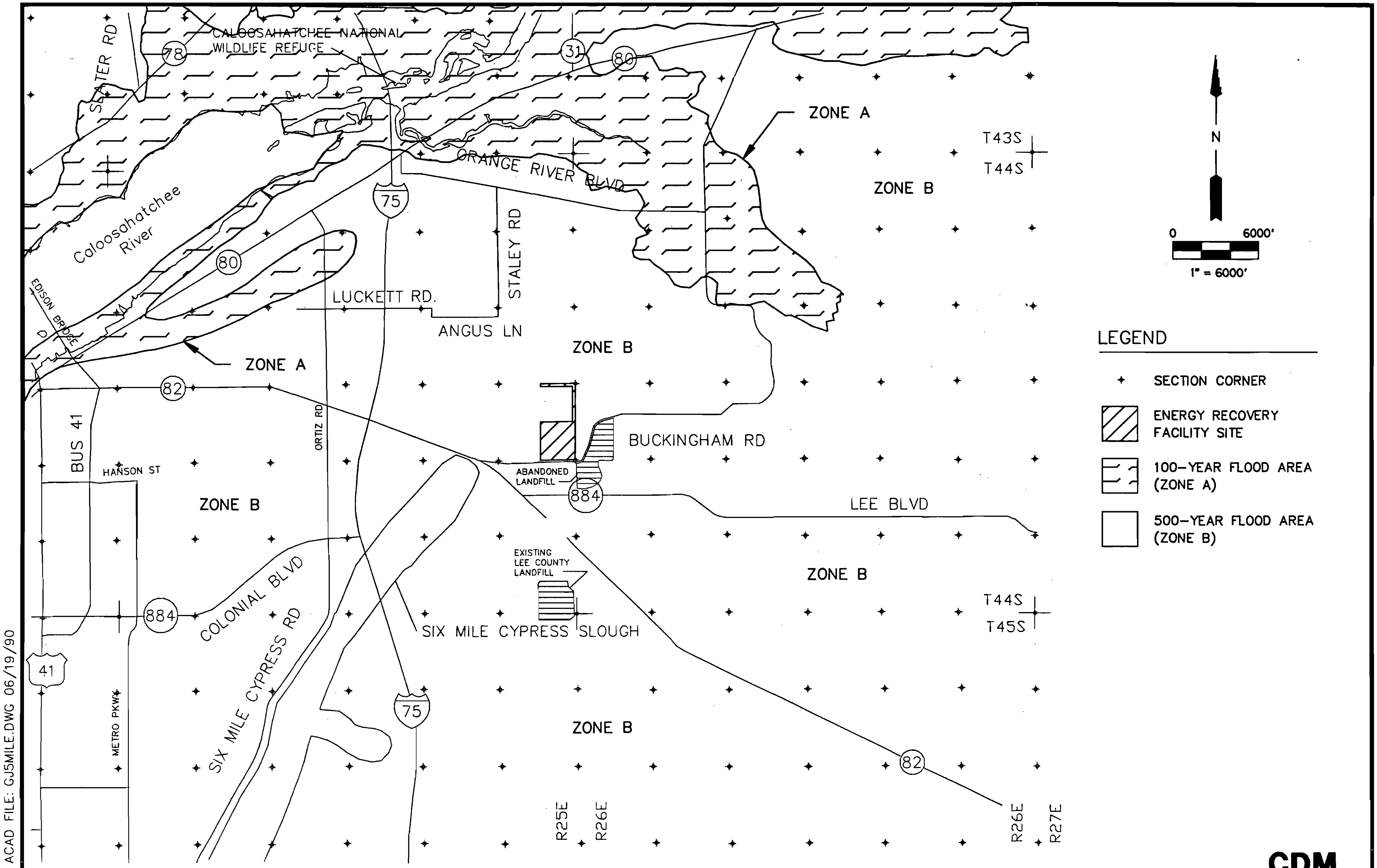
The 100-year flood zone and its relation to the project site is shown in Figure 2-7.

2.2 SOCIO-POLITICAL ENVIRONMENT

2.2.1 GOVERNMENTAL JURISDICTIONS

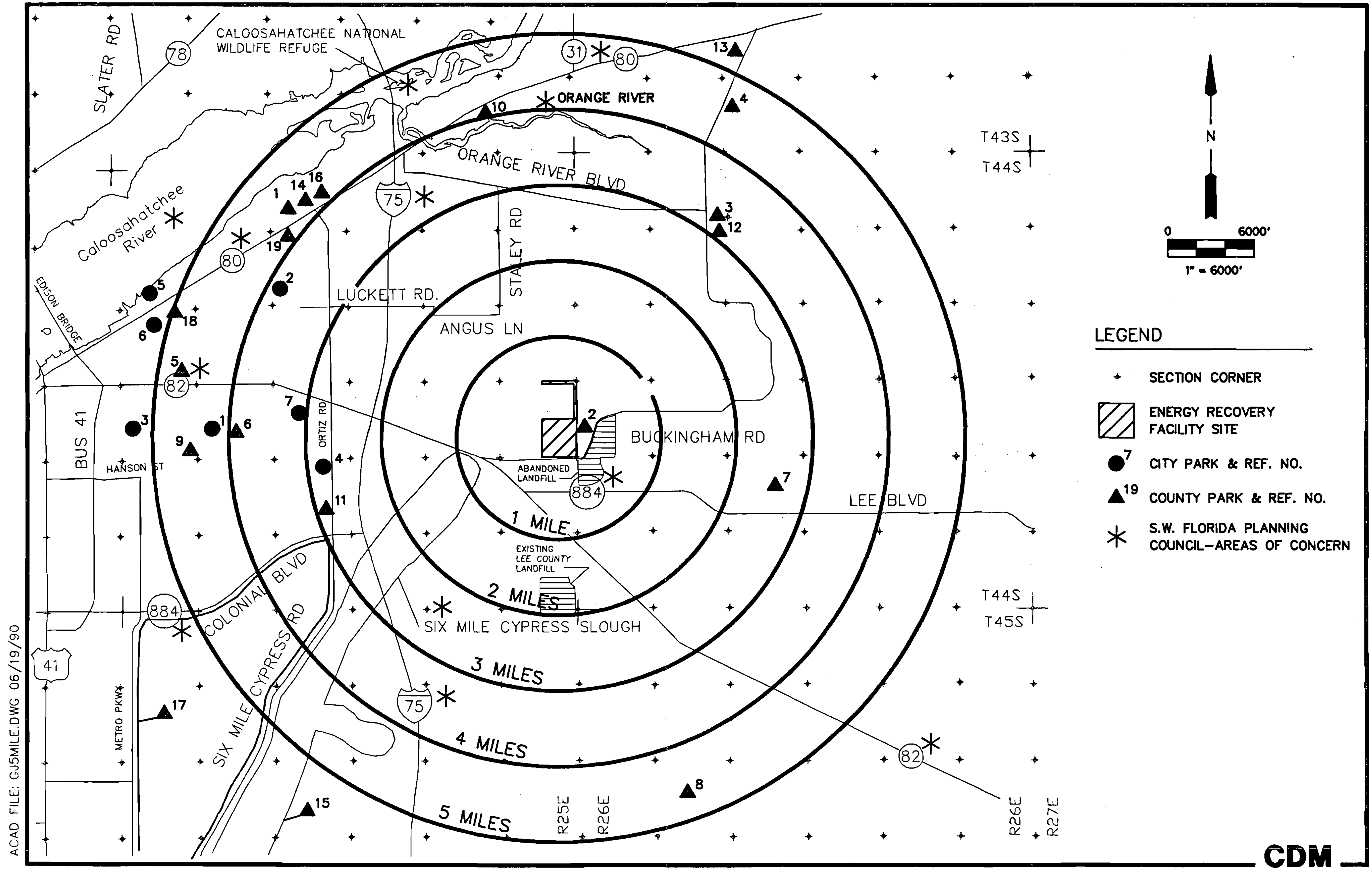
The majority of the area within a five-mile radius of the proposed Facility is unincorporated Lee County, except for portions of the City of Fort Myers which extend to within about one mile west of the site. Figures 2-8a indicates the locations of County and city parks and other local/regional governmental jurisdictional areas. Figures 2-8b and 2-8c indicate state and federal governmental jurisdictional areas, respectively. Table 2-2 summarizes the data shown on these three figures. Figure 2-9 details areas of concern within a one-mile radius of the site.

In order to identify local, regional, state, and federal areas of concern, the agencies listed in Table 2-3 were contacted. Information provided by each agency is summarized in the table.



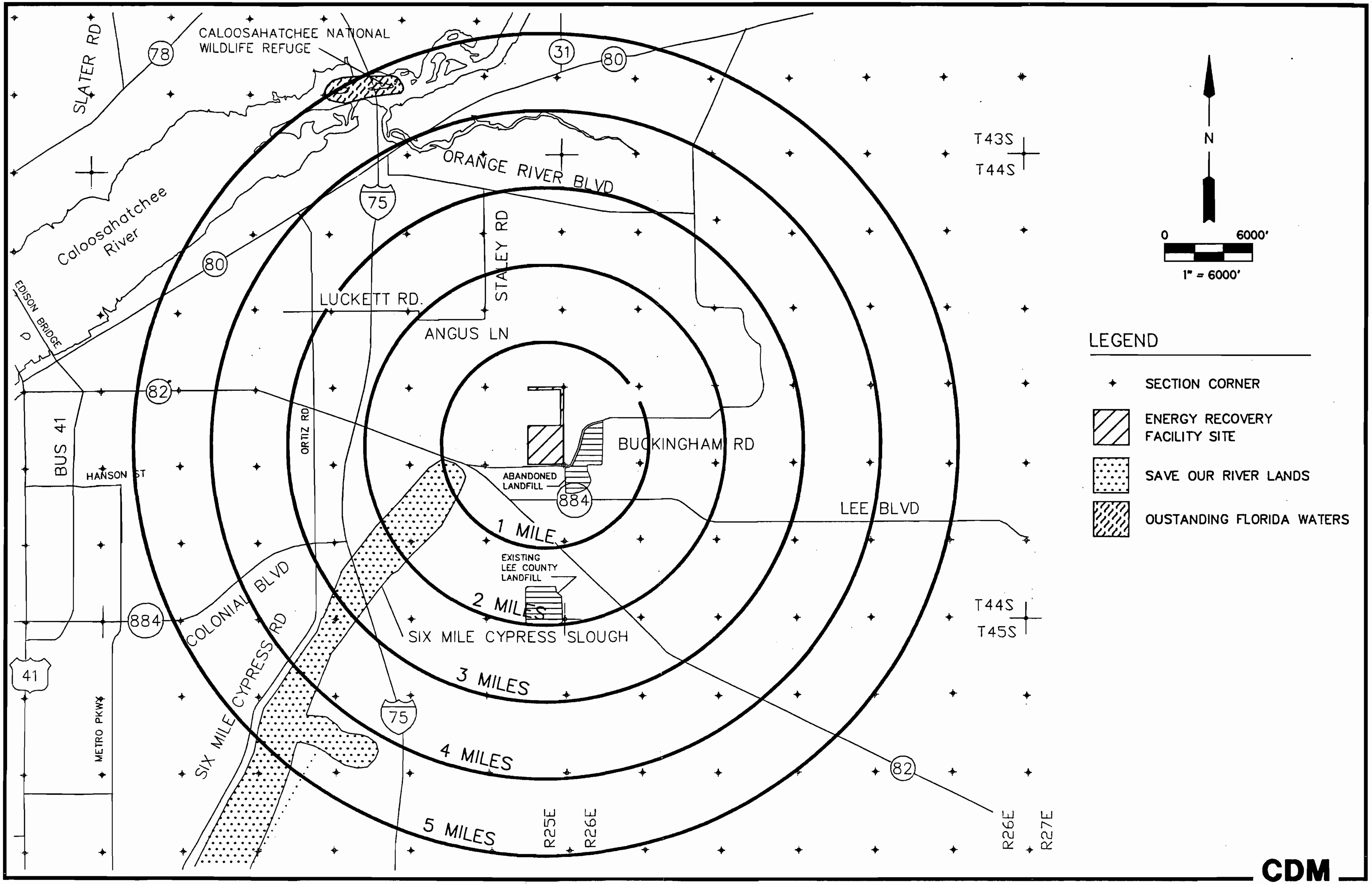
100 Year Flood Prone Areas – Lee County Energy Recovery Facility

FIGURE 2–7



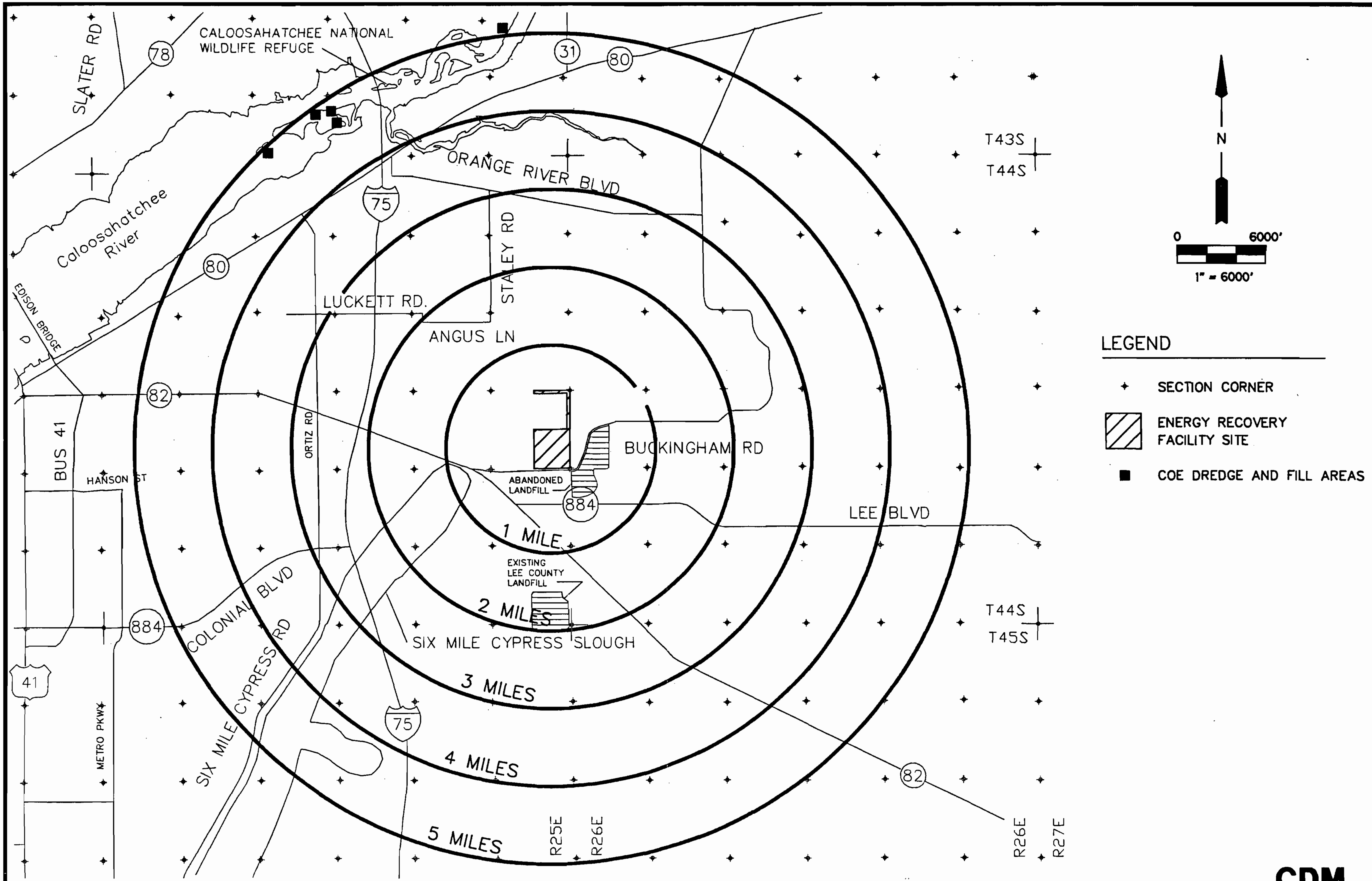
Local Governmental Jurisdictions Within a Five-Mile Radius - Lee County Energy Recovery Facility

FIGURE 2-8a



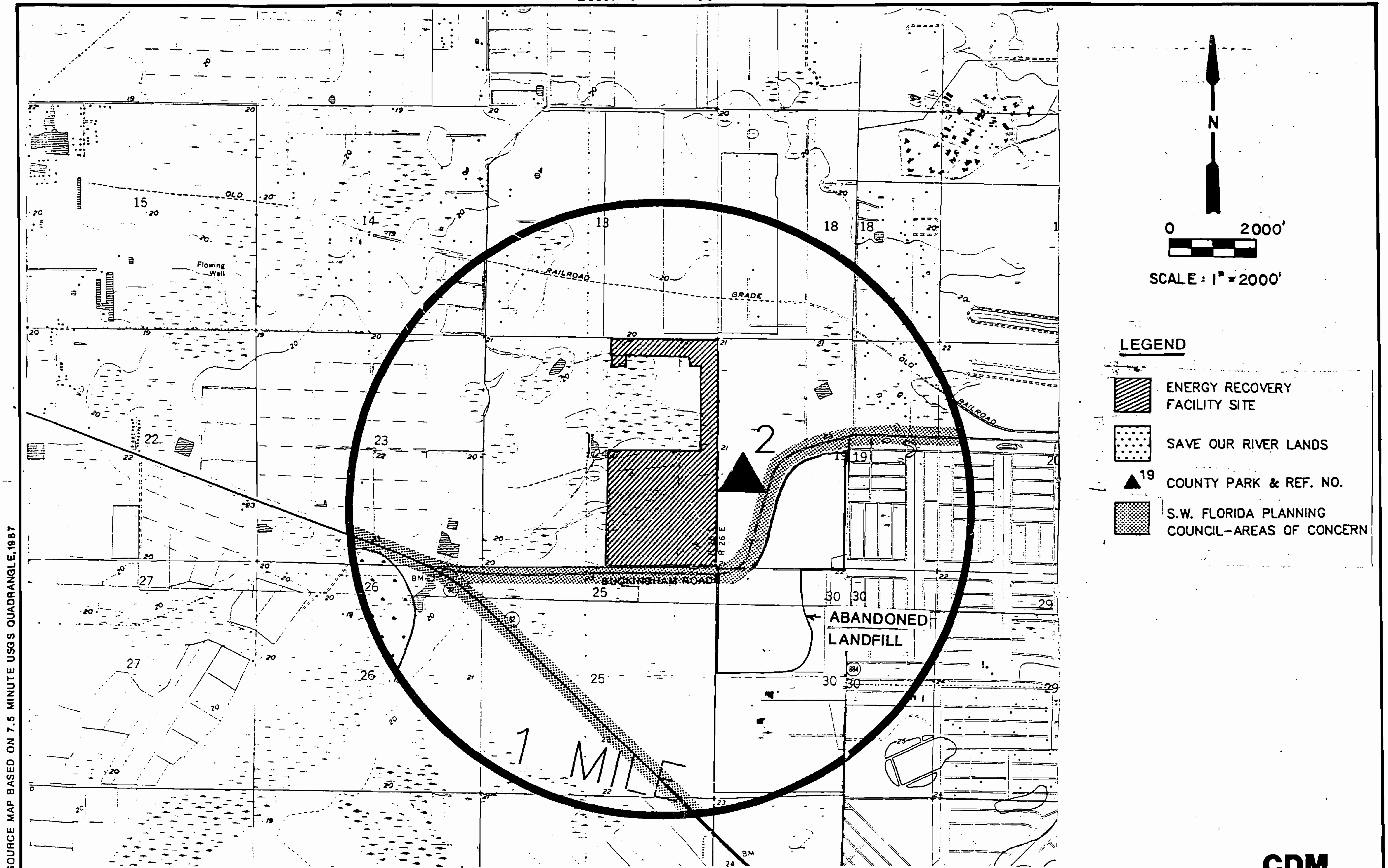
State Governmental Jurisdictions Within a Five-Mile Radius – Lee County Energy Recovery Facility

FIGURE 2–8b



Federal Governmental Jurisdictions Within a Five-Mile Radius - Lee County Energy Recovery Facility

FIGURE 2-8c



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Governmental Jurisdictions Within a One-Mile Radius - Lee County Energy Recovery Facility

FIGURE 2-9

TABLE 2-1

PROPOSED LAND USE DIVISIONS OF THE FACILITY

	Proposed Land Use Areas	
Proposed Use	Acres	Percentage of Site
Structures	4.9	3.16
Roadways and Parking	7.4	4.77
Retention Basins	5.0	3.23
Open Areas/Buffer Zones	137.7	88.84
TOTALS	155.0	100.0

TABLE 2-2

GOVERNMENTAL JURISDICTIONS WITHIN A 5-MILE RADIUS

CITY OF FORT MYERS

1. Aztec Park
   Location: Dupree Street
   Size: 1.03 Acres
   Description: Mini Park

2. C. Billy Bowlegs Park
   Location: 3775 Evans Avenue
   Size: 5 Acres
   Description: Neighborhood Park

3. Dunbar Park
   Location: 2990 Edison Avenue
   Size: 20 Acres
   Description: Neighborhood Park

4. Eastwood Golf Course
   Location: Ortiz Avenue
   Size: 170 Acres
   Description: 18-hole Golf Course

5. Freemont Minipark
   Location: 1000 Freemont Street, approximately one-quarter mile outside of the 5-mile radius
   Size: 0.5 Acre
   Description: Play/Picnic Area

6. Shady Oaks Community Park
   Location: 3300 Marion Street
   Size: 31 Acres
   Description: Community Park

7. Stars Park (Proposed)
   Location: City Wellfield
   Size: Unknown
   Description: Proposed Community Park

UNINCORPORATED LEE COUNTY

1. Avocado Neighborhood Park
   Location: 200 Avocado Court
   Size: 2 Acres
   Description: Wayside Park/Landscaping

2. Buckingham Community Park (Proposed)
   Location: West side of Buckingham Road, southwest of Neal Road and adjacent to the project site
   Size: 135 Acres
   Description: Community Park to be developed in the Fall of 1991

3. Buckingham School Community Center
   Location: 4940 Buckingham Road
   Size: 1 Acre
   Description: Community Center

4. Buckingham Exceptional Student Center
   Location: 3200 Buckingham Road
   Size: 3 Acres
   Description: Exceptional Student Programs (104 students, 44 staff members)

5. Clemente Park
   Location: 1936 Henderson Avenue
   Size: 5 Acres
   Description: Neighborhood Park

6. Dunbar Middle School Park
   Location: Indian Street, near Dunbar Middle School
   Size: 4 Acres
   Description: School Park

7. East Regional Library (proposed)
   Location: Gunnary Road, one-quarter mile north of Lee Boulevard, west of Able Canal
   Size: 12 acres
   Description: Regional Library

8. Gateway Park (proposed)
   Location: (Information Pending)
   Size: 28 Acres
   Description: Currently under development

9. Highlands East Recreational Center
   Location: 3925 Canal Street
   Size: 30 Acres
   Description: Recreation Building with Auditorium, Meeting Room, Weight Room, Nature Trails, Recreation Facilities; Leased from County School Board

10. Manatee Park
   Location: Straddles both banks of Florida Power & Light outfall (Yankee Ditch) from State Road 80 to Orange River
   Size: 12 Acres
   Description: Community Park

11. Nature Center and Planetarium
    Location: 3450 Ortiz Avenue
    Size: 105 Acres
    Description: Museum, Planetarium, Gift Shop

12. Orange River Canoe Launch and Trail (Proposed)
    Location: East site of Buckingham Road on the south bank of Orange River
    Size: 3 Acres
    Description: Canoe Slip, and Trail which will connect the launch with Manatee Park near the confluence of the Caloosahatchee and Orange Rivers

13. Riverdale High School Park
    Location: Buckingham Road off State Road 80, at one-quarter mile outside the 5-mile radius
    Size: 15 Acres
    Description: Community Park

14. Royal Palm Neighborhood Park
    Location: 299 Royal Palm Park Road
    Size: 1 Acre
    Description: Wayside Park/Landscaping

15. Six Mile Cypress Slough Preserve
    Location: South of State Road 82, along Six Mile Cypress Parkway
    Size: Approximately 2000 Acres
    Description: "Save Our Rivers" Project in conjunction with SFWMD

16. Shandler Hall Community Park
    Location: 419 Florence Avenue
    Size: 4 Acres
    Description: Community Park

17. Ten Mile Canal Bike Path
    Location: Adjacent to Ten Mile Canal
    Size: N/A
    Description: Bike Path

18. Terry Park
    Location: 3410 Palm Beach Boulevard
    Size: 40 Acres
    Description: Baseball Field, Grandstands

19. Tice Elementary School Park
    Location: 4524 Tice Street
    Size: 1 Acre
    Description: Community Park

TABLE 2-2
(Continued)

FEDERAL FACILITIES

1. Caloosahatchee Natural Wildlife Refuge

Location:	North of the Caloosahatchee River, east of I-75, near the five-mile radius boundary
Size:	40 Acres
Description:	Wildlife Refuge

OTHER FACILITIES

1. Golf Course

Location:	South of the Gulf Coast Landfill

TABLE 2-3

GOVERNMENTAL JURISDICTIONS INFORMATION SOURCES

Agency/Department Contacted	Information Provided	Areas of Concern Within 5 Miles of Project Site?
LOCAL/REGIONAL		
Lee County Historic Preservation Committee	- List of Historic and Prehistoric Places	No
Lee County Department of Community Services; Division of Planning and Construction	- County Parks - Libraries	Yes
Southwest Florida Regional Planning Council	- Areas of Concern - Indian Reservations	Yes No
City of Fort Myers Recreation Department	- City Parks	Yes
Lee County Division of Environmental Sciences	- Endangered and Threatened Species - Wildlife Management - Specific Plant Communities and and Habitats	(Response Pending)
Lee County Division of Water Resources	- Water Well Inventory	Yes
STATE OF FLORIDA		
Florida Game and Fresh Water Fish Commission	- Game Management Areas	Yes
Department of Natural Resources; Division of Recreation and Parks	- State Parks	No
Department of Agriculture and Consumer Services; Division of Forestry	- State Forests	No
Department of Community Affairs; Bureau of Land and Water Management	- Areas of Critical State Concern	No
Department of Environmental Regulation; Bureau of Surface Water Management	- Outstanding Florida Waters	Yes

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TABLE 2-3
(Continued)

Agency/Department Contacted	Information Provided	Areas of Concern Within 5 Miles of Project Site?
Department of Environmental Regulation; Fort Myers Branch Office	- Endangered and Threatened Species - Wildlife Management - Specific Plant Communities and Habitats	Yes
South Florida Water Management District; Fort Myers Branch Office	- Endangered and Threatened Species - Wildlife Management - Specific Plant Communities and Habitats	Yes
South Florida Water Management District, West Palm Beach Office	- Consumptive Use Permits -"Save Our Rivers" Lands	Yes
Department of Natural Resources; Division of Land Resources; Land Acquisition Planning Section	- Conservation and Recreation Lands	No
Department of Natural Resources; Division of State Lands; Fort Myers Office	- Submerged Lands	Yes
Department of Natural Resources; Division of State Lands; Southwest Florida Aquatic Preserves	- Aquatic Preserves	No
Department of State; Division of Historical Resources	- State Archaeological Lands or Landmark Zones	No
Department of Natural Resources; Florida Natural Areas Inventory	- Special Plants and Animals	Yes
FEDERAL		
National Oceanic and Atmospheric Administration (NOAA); National Marine Fisheries Services (NMFS); Environmental Assessment Branch, and Protected Species Management Branch	- Marine Sanctuaries - Estuarine Sanctuaries - National Seashores	(Response Pending)

TABLE 2-3
(Continued)

Agency/Department Contacted	Information Provided	Areas of Concern Within 5 Miles of Project Site?
U.S. Fish and Wildlife Service	- Critical Habitats of Endangered Species - Wildlife Refuges - Wildlife Areas - Memorials NPS - Monuments NPS - Marine Sanctuaries - Estuarine Sanctuaries - Rare Areas - Wild and Scenic Rivers - Military Lands - Endangered and Threatened Species	Yes
U.S. Army Corps of Engineers	- Dredge and Fill Sites	Yes

According to the Lee County Department of Community Service, there are 14 existing recreation areas and one library located within a five-mile radius of the project area. Lee County's Historic Preservation Committee reported no prehistoric sites (Indian mounds or campsites) within the five-mile radius. The City of Fort Myers Recreation Department provided information confirming five city parks, one golf course, and one proposed park in the study area.

Information provided by the Southwest Regional Planning Council indicated concerns related to potential impacts on the following areas.

- o Interstate 75
- o State Roads
- o The Caloosahatchee River
- o The Orange River
- o The Six-Mile Cypress Slough and Preserve Area
- o The Caloosahatchee River National Wildlife Refuge

The Southwest Florida Regional Planning Council confirmed there are no Indian reservations in Lee County. The State of Florida Department of Natural Resources confirmed there are no Conservation and Recreation Lands within the five-mile radius.

According to the Department of Natural Resources, Division of State Lands, there are state owned submerged lands within the five-mile radius of the Facility. These submerged lands are submerged lands associated with the Caloosahatchee and Orange Rivers and any naturally occurring navigable water bodies within the five-mile radius.

The Florida Natural Areas Inventory provided a list of special plants and animals. A special element is any component of the natural environment, such as an animal or plant species, that is limited in abundance, range, or habitat. Known occurences of special elements have been recorded in the area.

The South Florida Water Management District (SFWMD) has a "Save Our Rivers" project in the study area, in conjunction with Lee County. The Six Mile Cypress Slough Preserve, comprised of approximately 2,000 acres, is located south of SR 82, adjacent to the Six Mile Cypress Parkway. The northernmost reach of the slough extends to about one mile west-southwest of the energy recovery facility site.

The Department of Environmental Regulation (DER) indicated that there is only one Outstanding Florida Water in the study area. The Caloosahatchee National Wildlife Refuge is located northwest of the site, on the boundary of the five-mile radius. The Florida Department of Natural Resources has confirmed that there are no state parks or aquatic preserves within the five-mile radius. Additionally, the Division of Forestry reports no state forests in the area. The Florida Department of Community Affairs has indicated that there are no areas of critical state concern in Lee County or any adjacent counties.

The U.S. Army Corps of Engineers noted the presence of dredge-and-fill disposal sites on the boundary of the five-mile radius. These spoil sites are located about five miles north and northwest of the project site and are associated with the Caloosahatchee River. The most notable of these is on Beautiful Island, located in the middle of the river.

The Florida Game and Fresh Water Fish Commission and U.S. Fish and Wildlife Service were contacted regarding threatened and endangered species in the study area. A detailed discussion of existing fauna can be found in Section 2.3.6.

2.2.2 ZONING AND LAND USE PLANS

The following section highlights applicable issues regarding the energy recovery facility from regional, county and municipal comprehensive plans with jurisdiction within the study area.

Regional Comprehensive Plans

The Regional Comprehensive Policy Plan For Southwest Florida, adopted by the Southwest Florida Regional Planning Council on May 21, 1987, is the region's policy statement for Charlotte, Collier, Glades, Hendry, Lee, and Sarasota counties. The Regional Comprehensive Policy Plan for Southwest Florida includes a goals and policies section on hazardous and nonhazardous materials and waste. The section goal states:

GOAL: All solid waste, including hazardous waste, wastewater, and all hazardous materials, shall be properly managed, and the use of landfills shall be eventually eliminated.

In addition, there is a section which includes a regional goal and policies (Cluster 51) that apply to the proposed energy recovery facility. For a complete review of the goals and policies section regarding hazardous and nonhazardous materials and waste, refer to Appendix 3.0 in Volume II.

REGIONAL GOAL: By 1991, the per capita amount of solid waste being disposed of in landfills will begin to decline and will continue to decline over previous years.

POLICY 3: The volume of materials disposed of in landfills should be reduced through feasible recycling.

POLICY 4: Programs for research, development, and implementation of waste reduction and resource recovery methods should be established.

The Lee Plan is Lee County's Comprehensive Plan which was adopted on January 31, 1989 and became effective March 1, 1989. Lee County Ordinance 89-02 amended the Lee Plan and adopted the revised format of the Lee Plan. Refer to Appendix 3.0 for a copy of the ordinance. The Lee Plan consists of 12 elements, a glossary, appendices, and two support documents. The 12 elements are:

1) Future land use;
2) Traffic circulation;
3) Community facilities and services;
4) Mass transit;
5) Parks, recreation and open space;
6) Capital improvements;
7) Conservation and coastal management;
8) Ports, aviation, and related facilities;
9) Housing;
10) Historic preservation;
11) Intergovernmental coordination; and
12) Procedures and administration.

Applicable sections of the Lee Plan pertaining to the energy recovery facility include the Future Land Use Element and the Community Facilities and Services Element.

The Future Land Use Element of the County's comprehensive plan outlines goals, objectives, and policies which will provide the proper future land uses for public and private development within Lee County. The element establishes a future land use map and future land use classifications with various allowable utilizations and densities.

Future land uses within the study area include Suburban, Urban Community, Outlying Suburban, Central Urban, Intensive Development, New Community, Rural, Open Lands, Industrial Development, Industrial (Interchange), General Commercial (Interchange), Airport Commerce, Public Facilities, and Resource Protection Areas and Transition Zones. The project site is classified as Rural.

Suburban uses include Fort Myers Shores, located to the north of the project site. Urban Community uses include a portion of Lehigh Acres and an area east of Interstate 75. Outlying Suburban uses are limited within the study area, including a quarter-section adjacent to Orange River Boulevard three miles from the project site and an area next to Six Mile Cypress Slough approximately four miles southwest of the project site. Central Urban uses include a portion of Lehigh Acres to the southeast of the project site and an area to the west of Six Mile Cypress Slough. Intensive Development areas within the study area are adjacent to SR 884 west of Interstate 75. New Community uses are located over two miles to the south of the project site adjacent to SR 82. This area is currently being developed as a mixed use community with commercial, single-family and multi-family housing, school, park, and golf course uses.

Rural uses include the majority of the low density residential uses north of SR 82 and east of Interstate 75. Open Lands are located primarily south of SR 82 and east of Six Mile Cypress Slough. Industrial Development within the area includes the landfill located to the south of the project site and an industrial area located south of Lee Boulevard one mile southeast of the project site. Industrial Interchange areas are located at and north of the

Interstate 75/SR 82 interchange. General Commercial Interchange areas are located at the Interstate 75/SR 80 interchange. Airport Commerce areas are located almost five miles south of the project site adjacent to the Southwest Florida Regional Airport.

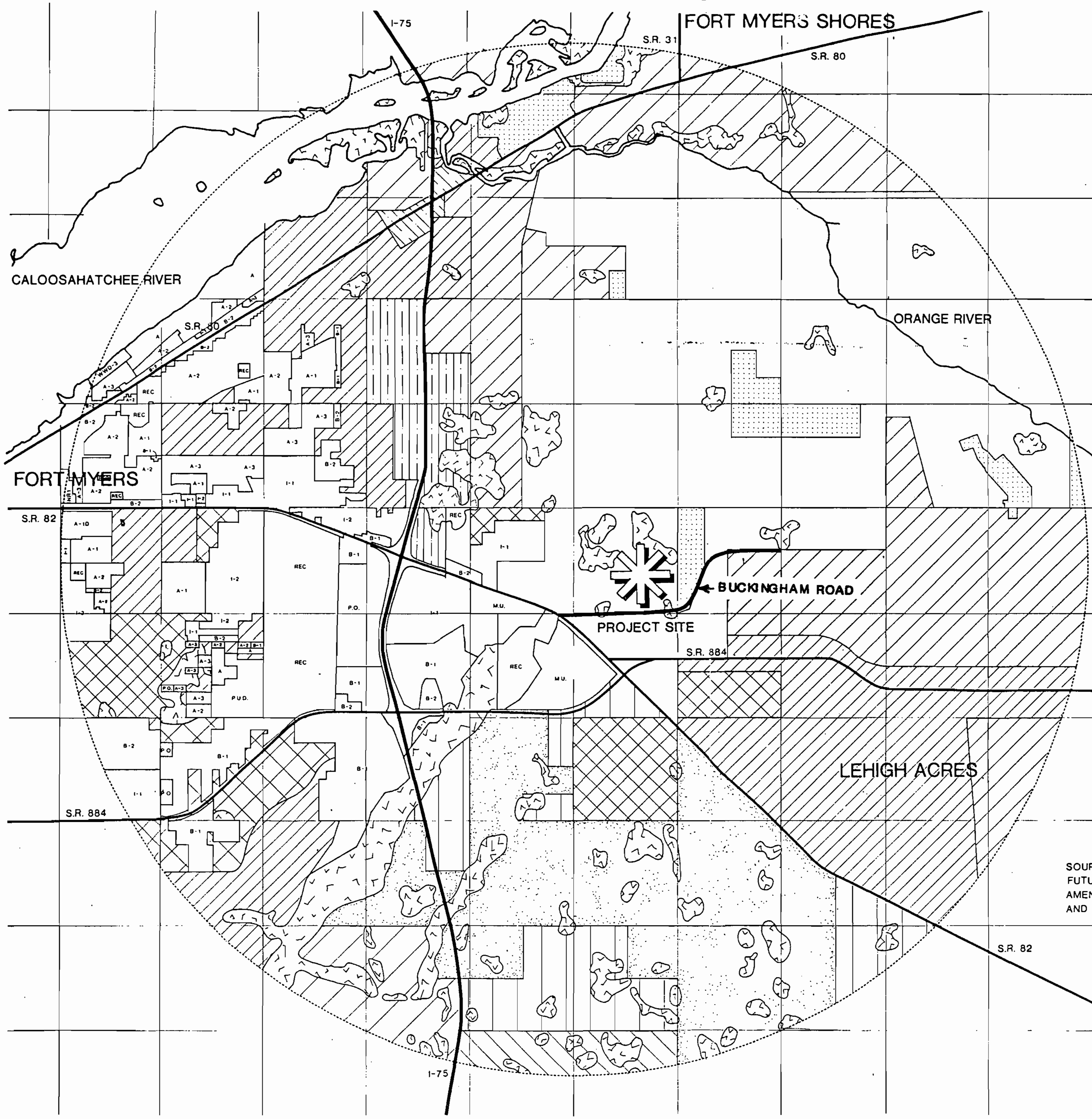
Public Facility uses include Buckingham Community Park located adjacent to the eastern portion of the project site. This park is 135 acres in size and is anticipated to open in the fall of 1991. The Sunland Training Center is located approximately two miles northeast of the project site. Other public facilities in the study area include an airstrip located four miles to the east of the project site and the Florida Power and Light plant over four miles to the north of the site. Resource Protection Areas and Transition Zones are scattered throughout the study area. The future land uses within the study area are illustrated on Figure 2-10. See Appendix 3.0 for the future land use category descriptions.

Pursuant to Objective 1.7 of the Lee Plan, there are overlays on the future land use map that are special treatment areas with allowances or restrictions in addition to the requirements of their underlying categories. The five overlays include Airport Noise Zones, Committed Development, Urban Reserve, Privately Funded Infrastructure, and a Water-Dependent overlay. Refer to Appendix 3.0 for overlay descriptions and locations.

Within the Future Land Use Element, there is a goal, objective and policy relating to the siting of resource/energy recovery facilities which eliminates the need for a comprehensive plan amendment for the future land use classification of the project site. The goal, objective and policy include:

GOAL 2: GROWTH MANAGEMENT. To provide for an economically feasible plan which coordinates the location and timing of new development with the provision of infrastructure by government agencies, private utilities, and other sources.

OBJECTIVE 2.1: DEVELOPMENT LOCATION. Contiguous and compact growth patterns shall be promoted through the rezoning process to contain sprawl, minimize energy costs, conserve land, water and natural resources, minimize the cost of services, and reverse



FUTURE LAND USE

LEGEND

THE CITY OF FORT MYERS FUTURE LAND USE DISTRICTS:

A	Low Density Single Family Residential
A-1	Medium Density Single Family Residential
A-1D	Medium Density Single Family/duplex Residential
A-2	Medium Density/multi-family Residential
A-3	High Density/multi-family Residential
PO	Professional Office
B-1	Intensive Commercial
I-1	Light Industrial
I-2	Heavy Industrial
REC	Recreation & Open Space
MU	Mixed Use
PUD	Planned Unit Development District
NR1	Neighborhood Redevelopment District

LEE COUNTY FUTURE LAND USE DISTRICTS:

INTENSIVE DEVELOPMENT
CENTRAL URBAN
URBAN COMMUNITY
SUBURBAN
OUTLYING SUBURBAN
INDUSTRIAL DEVELOPMENT
PUBLIC FACILITIES
AIRPORT COMMERCE
INDUSTRIAL
GENERAL COMMERCIAL
NEW COMMUNITY
RURAL
OPEN LANDS
RESOURCE PROTECTION AREAS AND TRANSITION ZONES

LEE COUNTY ENERGY RECOVERY FACILITY

SOURCE: THE CITY OF FORT MYERS FUTURE LAND USE MAP AMENDED DECEMBER 18, 1989 AND THE LEE PLAN FUTURE LAND USE MAP, 1989

NOTE: MAP SCALE IS APPROXIMATE

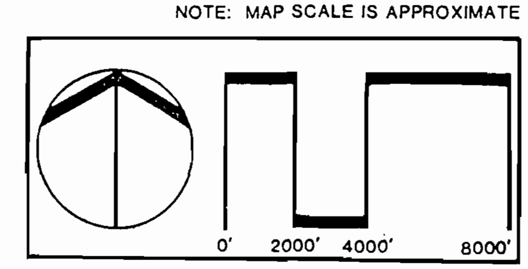


FIGURE 2-10

typical development patterns where large tracts of land are by-passed in favor of development more distant from services and existing communities.

POLICY 2.1.3: All land use categories permit the consideration of churches and schools (except in Resource Protection Areas, Transition Zones, and Airport Noise Zones), public uses and buildings, public utilities and resource recovery facilities, public recreational uses (including franchised quasi-commercial uses in conjunction with a public use), and sites for compatible public facilities when consistent with the goals, objectives, policies, and standards and applicable zoning and development regulations.

Solid Waste is a sub-element of the Community Facilities and Services Element of the Lee Plan, and lists goals, objectives, and policies regarding the County's solid waste issues. The complete goals, objectives and policies section from the solid waste sub-element is included in Appendix 3.0 while the goals, objectives, and pertinent policies regarding the proposed energy recovery facility are listed below, including:

GOAL 40: SOLID WASTE. To ensure the health, safety, and general welfare of the citizens of Lee County by protecting the quality of the environment through the proper management and disposal of solid waste.

OBJECTIVE 40.1: SOLID WASTE COLLECTION. Establish during 1989 a program to segregate construction and demolition debris and to separate newspaper, aluminum cans, and glass bottles for recycling.

POLICY 40.1.2: Design and implement resource recovery and recycling programs for glass, paper, plastic, and nonferrous metal containers.

POLICY 40.1.3: Develop programs which will result in a decrease in the volume of materials in the solid waste stream requiring landfilling (i.e., source separation of material which can be reused or disposed of in another manner).

OBJECTIVE 40.2: SOLID WASTE DISPOSAL. By 1994, reduce by 30 percent the anticipated per capita volume of solid waste material which must be disposed of; and by 1990, complete the design plans for a new landfill.

POLICY 40.2.1: The County shall continue to study and implement as appropriate available disposal technologies and volume reduction by recycling to meet Objectives 40.1 and 40.2. Particular attention shall be paid to volume reduction of bulky and potentially recyclable items such as horticultural waste, rubber tires, appliances, etc.

POLICY 40.2.6: The County shall immediately proceed to design and construct a new landfill to serve the entire County including all municipalities.

In addition to the unincorporated portion of Lee County, a portion of the study area is within the City of Fort Myers. The City of Fort Myers Ordinance 2545 was amended and adopted The City of Fort Myers Comprehensive Plan on December 18, 1989. The City of Fort Myers has established concurrent future land use and zoning classifications for lands within city limits. Based on the City of Fort Myers Future Land Use Map, as amended December 18, 1989, the following categories are within the study area.

District	Classification
Residential:	
Low Density Single-Family	A
Medium Density Single-Family	A-1
Medium Density Single-Family/Duplex	A-1D
Medium Density Multi-Family	A-2
High-Density Multi-Family	A-3

District	Classification
Professional Office	PO
General Commercial	B-1
Intensive Commercial	B-2
Light Industrial	I-1
Heavy Industrial	I-2
Recreation and Open Space	REC
Mixed Use	MU
Planned Unit Development	PUD
Neighborhood Redevelopment	NR1
Waterfront Development	WWD-3

The various residential districts are differentiated by the type of housing (single-family/multi-family), densities of use, dimension and area regulations, and permitted uses and conditional uses. Refer to Appendix 3.0 for the future land use classifications and intents.

Zoning

The Lee County Official Zoning Ordinance, established by Ordinance 86-17, adopted by the Lee County Board of County Commissioners on June 25, 1986; effective on August 1, 1986; and amended through August 1, 1987 and January 4, 1989, is the official zoning statement for lands in the unincorporated areas of Lee County.

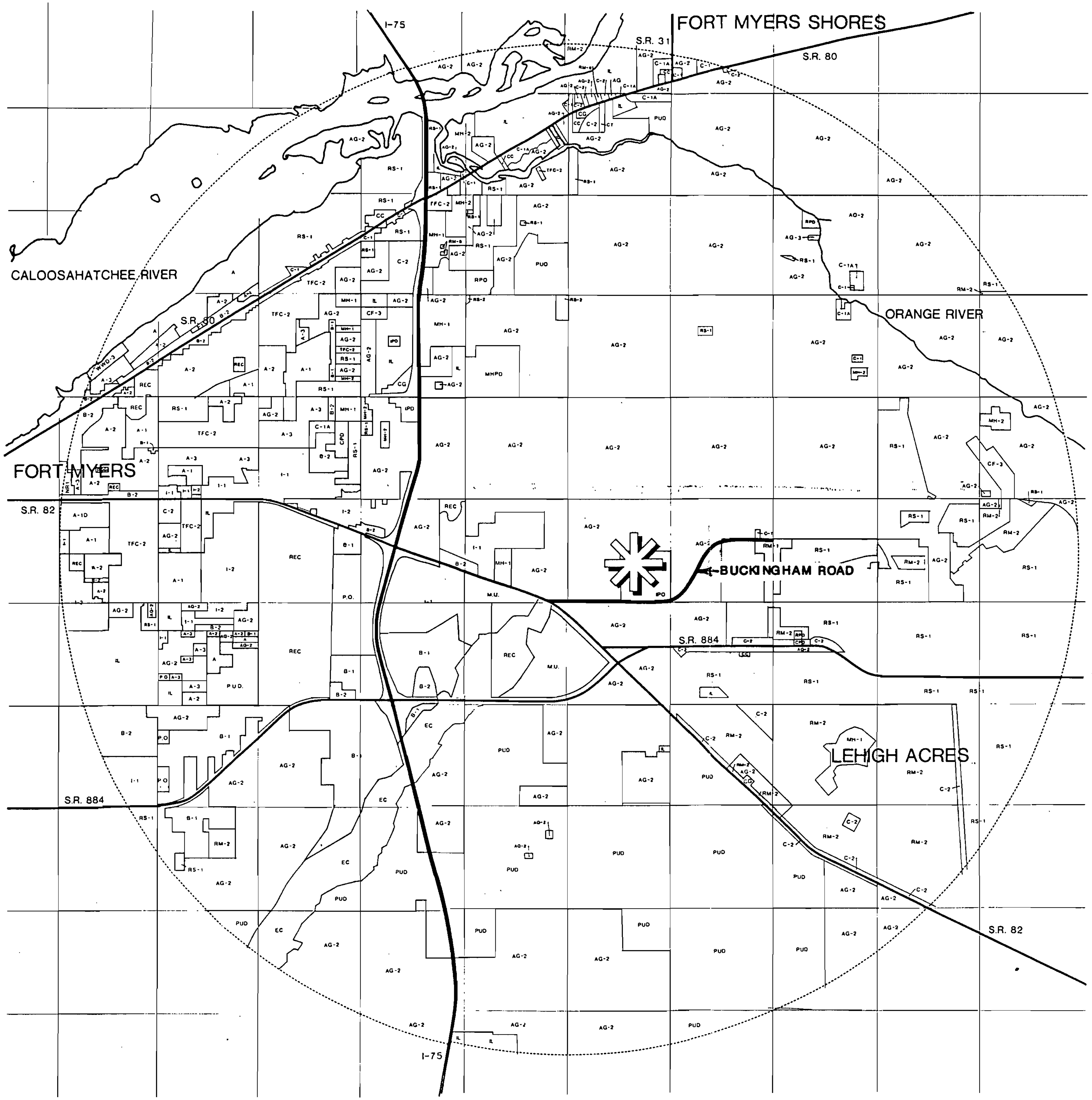
The zoning ordinance includes sections on title, authority, short title, purpose and intent; general information; the Lee Plan; district establishment, designation, and regulations; supplemental regulations; non-conforming uses, lots, buildings, and structures; the official zoning map and interpretation; application procedures and requirements; the local planning agency, hearing examiner, and Board of County Commissioners; definitions and use activity groups; and fees related to zoning matters. A listing of the zoning districts located within the study area, with purpose and intent descriptions, is included in Appendix 3.0.

The project site is in the process of being rezoned from Agricultural (AG-2) to Industrial Planned Development (IPD). The principal use of any Industrial

Planned Development is the manufacture of goods and materials, and the storage and wholesale distribution of such goods and materials. However, for the welfare of the public and for the efficiency of the local economic structure, the IPD District permits many services and activities not allowed elsewhere and a limited number of commercial uses intended to serve principally the employees or patrons of businesses within the IPD (SOURCE: Lee County Zoning Ordinance). The IPD district designation of acceptable uses allows for the development and operation of the energy recovery facility.

Zoning surrounding the project site includes agricultural districts in the rural, low density residential areas north of SR 82. Residential zoning districts characterize Lehigh Acres with commercial districts primarily located adjacent to SR 82 and SR 884. Refer to the zoning map on Figure 2-11 for complete district locations within the study area. The following is a listing of the Lee County zoning districts located within the study area.

Residential Single Family (RS-1, RS-2, RS-3)
Residential Multiple Family (RM-2, RM-6, RM-8)
Mobile Home Residential (MH-1, MH-2)
Conventional RV (RV-3)
Residential Two Family-Conservation (TFC-2)
Two Family (TF-1)
Agricultural (AG-2, AG-3)
Community Facilities (CF-2, CF-3)
Community Facilities Planned (CFPD)
Planned Unit Development (PUD)
Mobile Home Planned Development (MHPD)
Residential Planned Development (RPD)
Industrial Planned Development (IPD)
Light Industrial (IL)
Rural Industrial (RI)
General Industrial (IG)
Commercial Planned Development (CPD)
Commercial (C-1A)
Commercial (C-1)
Commercial (C-2)
Community Commercial (CC)



ZONING

LEGEND

THE CITY OF FORT MYERS FUTURE LAND USE DISTRICTS:

A	Low Density Single Family Residential
A-1	Medium Density Single Family Residential
A-1D	Medium Density Single Family/duplex Residential
A-2	Medium Density/multi-family Residential
A-3	High Density/multi-family Residential
PO	Professional Office
B-1	Intensive Commercial
I-1	Light Industrial
I-2	Heavy Industrial
REC	Recreation & Open Space
MU	Mixed Use
PUD	Planned Unit Development District
NR1	Neighborhood Redevelopment District

LEE COUNTY ZONING DISTRICTS:

RS-1	Residential Single Family Districts
RS-2	Residential Single Family Districts
RS-3	Residential Single Family Districts
RM-1	Residential Multiple Family Districts
RM-2	Residential Multiple Family Districts
MH-1	Mobile Home Residential Districts
MH-2	Mobile Home Residential Districts
TFC-2	Residential Two Family Conservation Districts
RV-3	Conventional RV Districts
AG-2	Agricultural Districts
AG-3	Agricultural Districts
CF-2	Community Facilities Districts
CF-3	Community Facilities Districts
PUD	Planned Unit Development District
MHPD	Mobile Home Planned Development
RPD	Residential Planned Development
IL	Light Industrial District
IPD	Industrial Planned Development
CPD	Commercial Planned Development
C-1A	Commercial District
C-1	Commercial District
C-2	Commercial District
CC	Community Commercial District
CG	General Commercial District
CT	Tourist Commercial District
CS	Special Commercial Office District
CR	Rural Commercial District

PROJECT SITE

SOURCES:

- LEE COUNTY LAND INFORMATION SYSTEMS, MAY 1, 1990
- CITY OF FORT MYERS FUTURE LAND USE MAP - DEC. 18, 1989

LEE COUNTY ENERGY RECOVERY FACILITY

NOTE: MAP SCALE IS APPROXIMATE

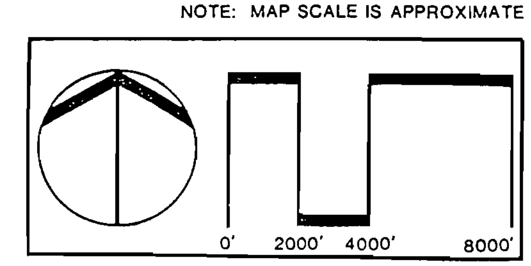


FIGURE 2-11

General Commercial (CG)
Tourist Commercial (CT)
Special Commercial Office (CS)
Rural Commercial (CR)
Environmentally Critical (EC)

The following City of Fort Myers zoning districts are located within the study area.

Single Family Residential (A)
Single Family Residential (A-1)
Single Family/Duplex Residential (A-1D)
Medium Density Multi-Family Residential (A-2)
High Density Multi-Family Residential (A-3)
General Commercial (B-1)
Intensive Commercial (B-2)
Professional Office (PO)
Light Industrial (I-1)
Heavy Industrial (I-2)
Recreation and Open Space (REC)
Mixed Use (MU)
Planned Unit Development (PUD)
Neighborhood Redevelopment (NR1)
Waterfront Development (WWD-3)

2.2.3 DEMOGRAPHY AND ONGOING LAND USE

Existing Population

Table 2-4 illustrates 1970, 1980, and approximate 1988 populations for major cities and the unincorporated sections of Lee County. Lee County's population grew 95 percent between 1970 and 1980 as compared with the state population growth rate of 44 percent during the same time period. Lee County's population grew 50 percent from 1980 to 1988 compared with the state growth rate of 27 percent. The City of Cape Coral had the largest population increase in the

TABLE 2-4

POPULATION: LEE COUNTY 1970 - 1988

Area	1970	1980	1988
Cape Coral	10,193	32,103	57,773
Fort Myers	27,351	36,638	43,766
Sanibel	1,106	3,363	5,475
Unincorporated Areas	66,566	133,162	200,512
TOTAL	105,216	205,266	307,526

SOURCE: 1989 Florida Statistical Abstract and U.S. Census Bureau

County from 1970 to 1988 with 47,580 new residents. Lee County's unincorporated population has also grown from over 66,000 in 1970 to over 200,000 as of 1988.

The majority of the study area is within the unincorporated section of Lee County. A portion of the City of Fort Myers, primarily west of Interstate 75, is within the western part of study area.

Existing Land Use Within a Five-Mile Radius of the Project Site

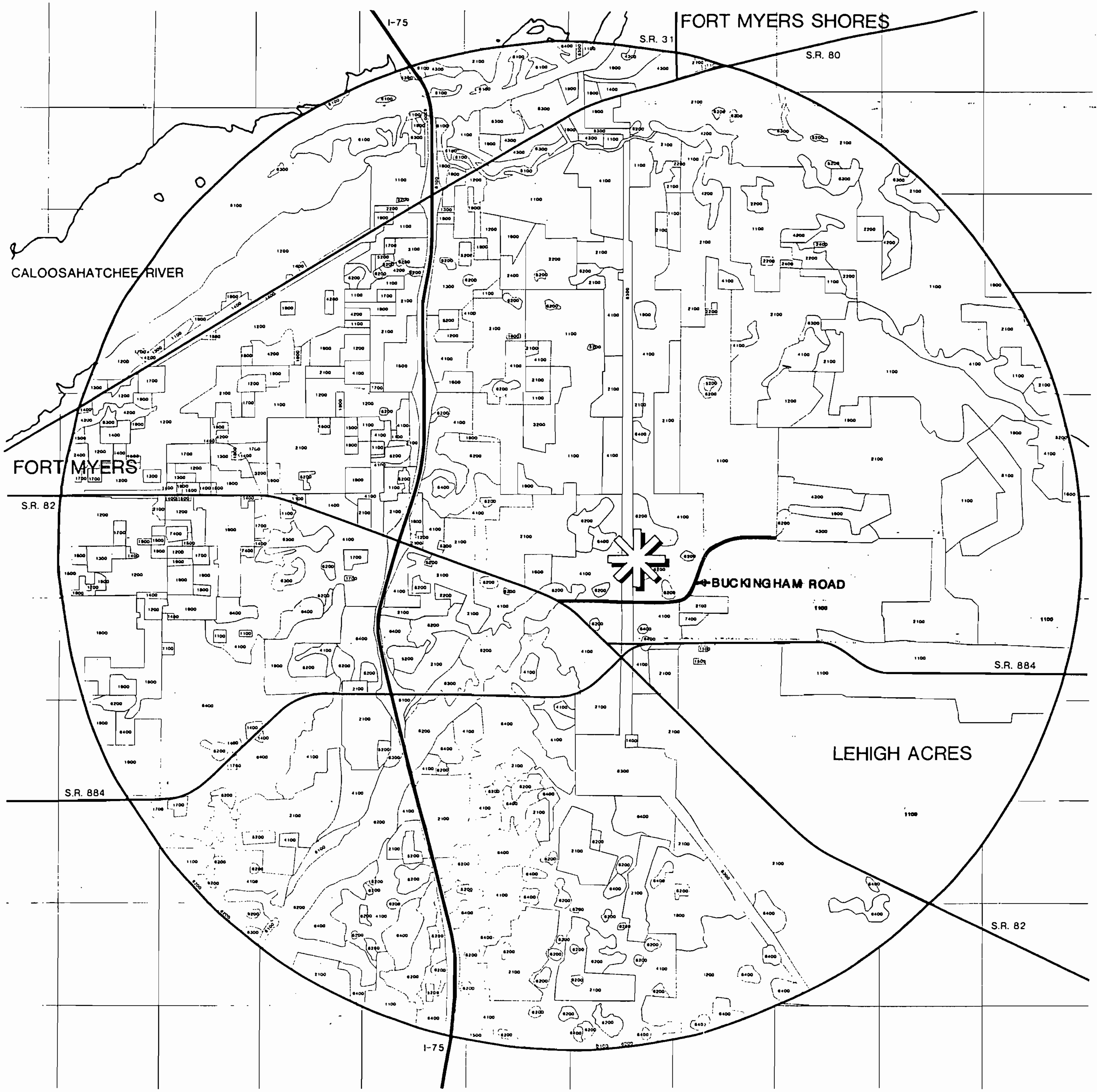
The study area is comprised of many urban and non-urban land uses. Urban uses include residential, commercial, industrial, extractive, institutional, recreation, and open lands. Non-urban land uses include croplands, pastureland, forested uplands, shrub and brushland, two rivers, several small lakes, and numerous wetlands. There also are transportation and utility uses in addition to a few small disturbed lands.

The Facility site is comprised of uplands and surrounding wetlands. Existing land uses within the study area are illustrated on Figure 2-12. Refer to the Appendix 3.0 for existing land use definitions.

There are three urban areas in the study area including the City of Fort Myers, Lehigh Acres, and the unincorporated area east of Interstate 75. Fort Myers, the most developed urban region in the study area, contains low [less than two dwelling units per acre (du/a)] and medium (2-5 du/a) density residential uses. The city boundary is one mile to the west of the site, with residential uses approximately three and a half miles to the northwest of the project site.

The Lehigh Acres boundary is located approximately one mile to the southeast of the site. The area contains low density residential areas in addition to many predominantly vacant areas. The third residential area is located primarily north of SR 884, south of SR 80, and east of Interstate 75. This low density rural area is scattered between croplands, pastureland, uplands, wetlands, and other non-urban uses.

EXISTING LAND USE



LEGEND

FLORIDA LAND USE COVER AND FORMS CLASSIFICATION SYSTEM (LEVEL II):

1100	LOW DENSITY RESIDENTIAL
1200	MEDIUM DENSITY RESIDENTIAL
1300	HIGH DENSITY RESIDENTIAL
1400	COMMERCIAL AND SERVICES
1500	INDUSTRIAL
1600	EXTRACTIVE
1700	INSTITUTIONAL
1800	RECREATION
1900	OPEN LANDS
2100	CROPLAND AND PASTURELAND
2200	TREE CROPS
2400	NURSERIES AND VINEYARDS
3200	SHRUB AND BRUSHLAND
4100	UPLAND CONIFEROUS FORESTS
4200	UPLAND HARDWOOD FORESTS
4300	UPLAND HARDWOOD FORESTS (CONT.)
5100	STREAMS AND WATERWAYS
5200	LAKES
6100	WETLAND HARDWOOD FORESTS
6200	WETLAND CONIFEROUS FORESTS
6300	WETLAND FORESTED MIXED
6400	VEGETATED NON-FORESTED WETLANDS
7400	DISTURBED LAND
8100	TRANSPORTATION
8300	UTILITIES

PROJECT SITE ✳

SOURCE: SOUTH FLORIDA WATER MANAGEMENT DISTRICT/ THE LEE PLAN, FLUCCS LAND CLASSIFICATION CONVERSION CHART-LEE COUNTY DIVISION OF PLANNING, FLORIDA DEPARTMENT OF TRANSPORTATION AERIAL PHOTOGRAPHS- FEBRUARY 24, 1990.

LEE COUNTY ENERGY RECOVERY FACILITY

DATE: FEBRUARY 24, 1990
NOTE: MAP SCALE IS APPROXIMATE

0' 2000' 4000' 8000'

FIGURE 2-12

Commercial uses within the study area are primarily located adjacent to roads, including SR 82 and SR 884 west of Interstate 75, and SR 80. Industrial uses are located primarily to the west of Interstate 75 or adjacent to SR 82 west of Interstate 75. Extractive uses are located east of Interstate 75 between SR 80 and SR 82. A mining site is located one mile to the west of the project site.

Institutional uses are located in the urbanized area west of Interstate 75. Recreation areas are located primarily in Fort Myers. Two golf courses are within the study area. One, Eastwood Golf Course, is located northwest of the SR 884/Interstate 75 interchange three miles from the project site. The other golf course is a private facility located south of the Gulf Coast landfill three miles south of the project site.

Open lands are those inactive or undeveloped areas within or adjacent to urban areas. The majority of the open lands in the study area are undeveloped lots within Fort Myers.

Cropland, pastureland, tree crops, nurseries, and vineyards are scattered throughout the study area, with the majority of these areas east of Interstate 75. Shrub and brushland and forested uplands are located throughout the study area.

The Caloosahatchee River and Orange River are located over three miles to the north of the project site. Billy Creek, canals, and other small waterways are not graphically represented on the existing Land Use Map. Numerous small lakes and wetlands are found in the study area, primarily south of SR 82 adjacent to Six Mile Cypress Slough.

Transportation uses include roadways and airstrips in the areas. Interstate 75 is located over two miles to the west of the project site. The interstate is the only roadway that is graphically represented on the existing land use map (Figure 2-12). An airstrip is located almost four miles to the east of the project site.

Utility uses in the study area include a landfill, a power plant, and a power transmission line. The Gulf Coast landfill is located three miles south of the project site. A Florida Power and Light (FP&L) plant is located over five miles north of the project site to the northeast of the Interstate 75/SR 80 interchange. A transmission power line and associated easement traverse the entire study area. The power line is adjacent to the project site.

2.2.4 EASEMENTS, TITLE, AGENCY WORKS

Construction of the Facility will not require additional easements or titles from government agencies. Power generated by the Facility will be transmitted to FP&L's Buckingham Substation within a corridor on the property to be purchased by Lee County. Water and wastewater lines will be constructed within existing City and County rights-of-way. See Section 6.0 for a complete discussion of power and utility transmission routes.

2.2.5 REGIONAL SCENIC, CULTURAL AND NATURAL LANDMARKS

Recreational facilities within a five-mile radius of the project site are listed in Table 2-2.

2.2.6 ARCHAEOLOGICAL AND HISTORIC SITES

Piper Archaeological Research, Inc. of St. Petersburg was retained to conduct an investigation of archaeological and historic remains within the vicinity of the site boundary. A cultural resource assessment survey was performed, beginning with a literature review. The document search consisted of a review of the State of Florida Master Site File (FMSF), and examination of historical and archaeological literature and historic records. The document search revealed no recorded sites on the FMSF within the Facility site.

Following the literature search, a field survey was conducted. The field survey focused on areas of high archaeological site potential, as identified by Piper Research using environmental variables known to be associated with prehistoric and early historic period sites. Such variables include soil drainage, proximity to water or wetlands, vegetation, and relative elevation. Subsurface shovel tests, with each dig measuring approximately 40 centimeters in diameter, were conducted to a depth of at least one meter in areas of high site potential. All excavated soil was screened through 1/4-inch wire mesh. In areas of minimal vegetation and/or upturned soil, a careful surface inspection was performed.

One prehistoric site and one historic structure were identified during the field survey of study area (Figure 2-13); however, neither of these is located on the Facility site. The prehistoric site (8L1 1441) consists of a single chert waste flake from the manufacture or resharpening of a stone tool. The historic structure (8L1 1442) is of board and batten construction, typical of the early 20th century. The structure is in poor condition and has been highly modified. Neither of these sites is considered to be a regionally significant cultural resource.
Since no significant prehistoric or historic archaeological sites were discovered during the survey, it is concluded that no cultural resources eligible for nomination in the National Register of Historic Places will be impacted by the proposed development.

2.2.7 SOCIOECONOMICS AND PUBLIC SERVICES

Social and Economic Characteristics

Current Population. The following census tracts and planning districts are located, at least in part, within the study area. Census tract delineations are based on the 1980 census count. Planning districts were established in the Lee Plan and utilize census tract boundaries. The map on Figure 2-14 illustrates the census tract and planning district boundaries in relation to the study area.

Census Tracts		Planning Districts
2	204	1
3	301	2
4	302	4
5	401	5
6	402	6
12	403	7

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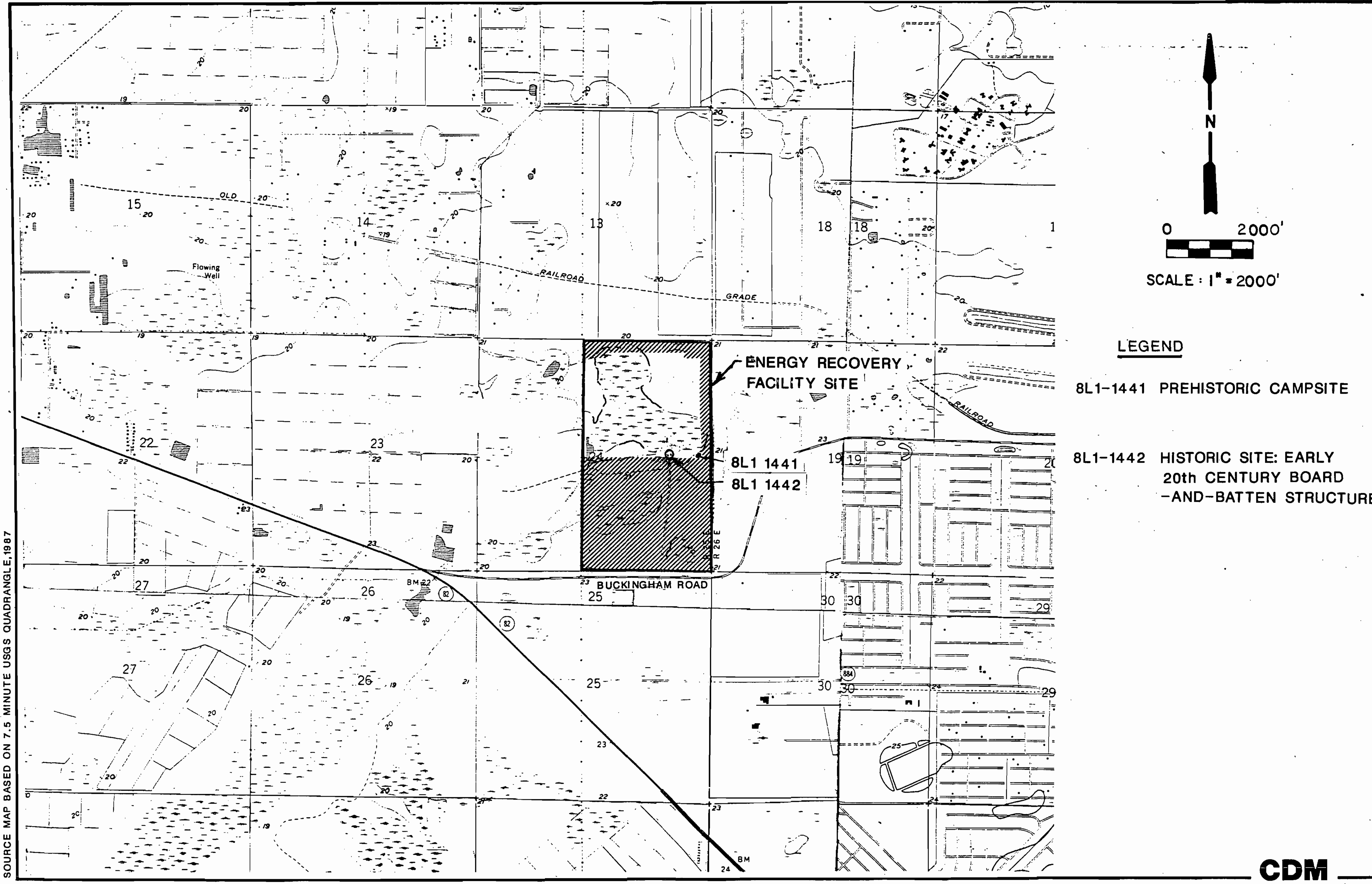
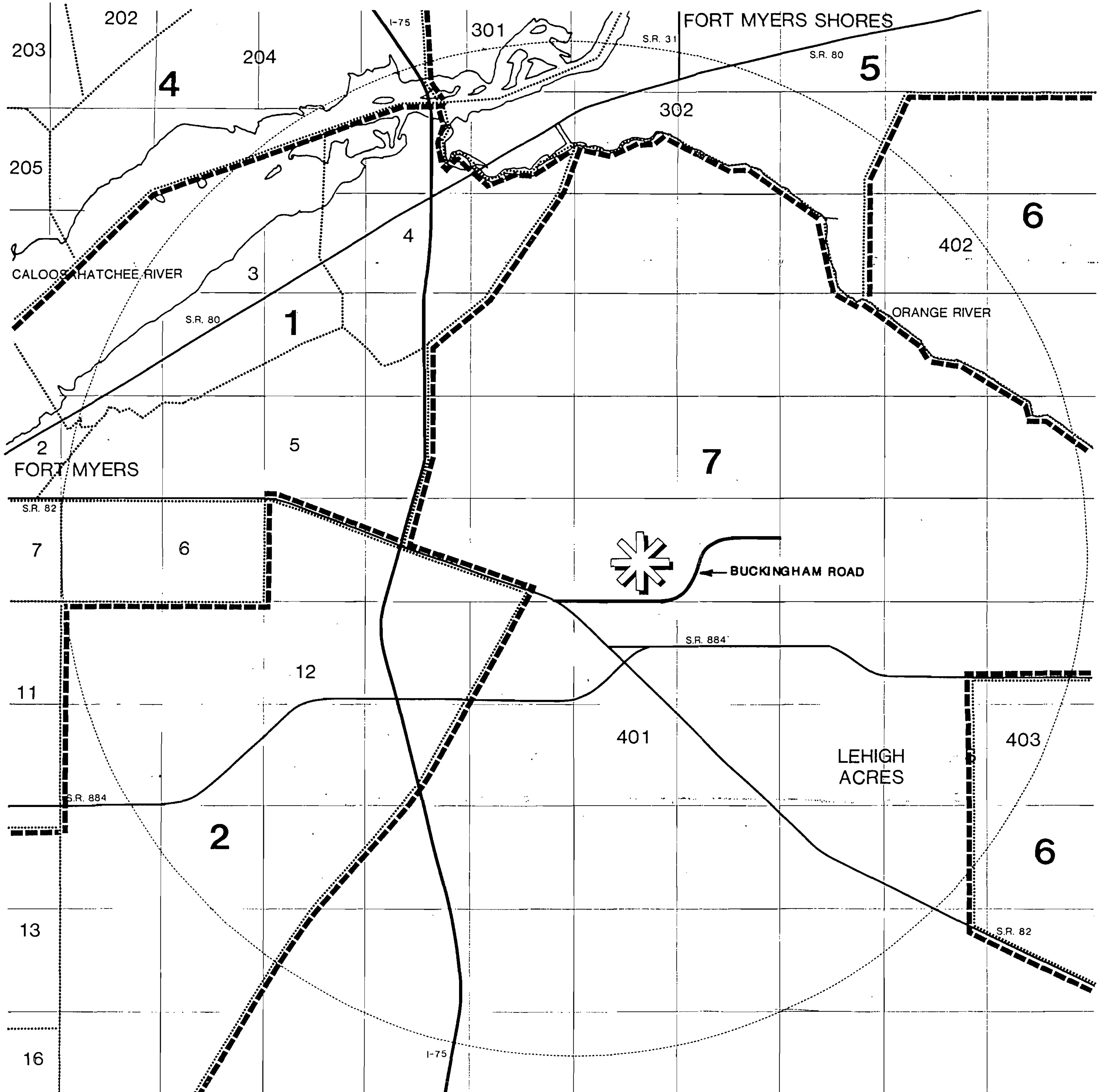


CDM

Archaeological And Historic Sites - Lee County Energy Recovery Facility

FIGURE 2-13

PLANNING DISTRICTS AND CENSUS TRACTS



PLANNING DISTRICT	5
CENSUS TRACT	404
PLANNING DISTRICT BOUNDARY LINE	
CENSUS TRACT BOUNDARY LINE	
PROJECT SITE	

SOURCE: REVISED 1980 CENSUS TRACT/ED MAP AND THE LEE PLAN, 1989; LEE COUNTY, FLORIDA

LEE COUNTY ENERGY RECOVERY FACILITY

NOTE: MAP SCALE IS APPROXIMATE

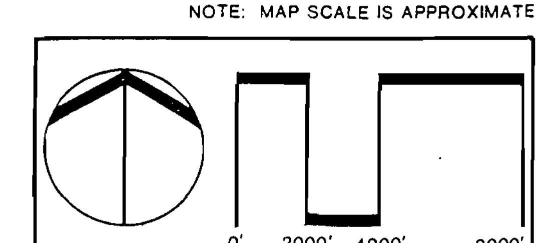


FIGURE 2-14

Table 2-5 illustrates the 1980 census counts for the census tracts listed above that are partially or wholly within the study area. The project site is located within census tract 401. The majority of the urbanized part of census tract 401 is within the study area. The 1980 census population count for tract 401 is 3,726.

Projected Population. Table 2-6 lists the low, medium and high population projections for Lee County from 1990 to 2020. The table indicates a significant difference in population projections utilizing the low, medium or high figures. The Lee Plan projects a 2010 permanent population at over 637,000 residents, approximately comparable to the "medium" population projections. The medium set of population projections indicates an increase of over 214,000 persons or 64 percent for Lee County between 1990 and 2010.

Table 2-7 illustrates the 1990 through 2010 permanent population projections for the six planning districts that are partially or wholly within the study area. The project site is located within Planning District 7. Table 2-7 indicates a population increase during 1990 through 2010 of almost 150,000 persons or over 73 percent for the six planning districts within the study area. Planning District 7 is predicted to increase from under 14,000 residents in 1990 to over 60,000 by 2010.

Labor Force. Table 2-8 lists the labor force, employed and unemployed persons in Lee County between 1980 and 1988. The table illustrates a 71.5 percent increase in the labor force during this period from over 82,000 persons in 1980 to over 140,000 by 1988. A similar 73.5 percent increase in employment also occurred, from over 78,000 employed in 1980 to over 135,000 by 1988. The number of unemployed grew to over 5,000 by 1988, an increase of over 1,000 persons in 1980, while the unemployment rate for the County dropped 23.4 percent from 4.7 percent in 1980 to 3.6 percent in 1988.

TABLE 2-5

CENSUS TRACT POPULATION: 1980

Census Tract	1980 Population
002	1,712
003	7,609
004	4,282
005	12,775
006	5,849
012	461
204	1,419
301	1,510
302	5,571
401	3,726
402	3,806
403	8,040
TOTAL	56,760

SOURCE: U.S. Census Bureau, 1980.

TABLE 2-6

POPULATION PROJECTIONS: LEE COUNTY 1990 - 2020

Lee County	1990	1995	2000	2010	2020
Low	321.9	369.6	383.9	385.0	335.2
Medium	335.3	399.6	451.7	550.0	609.5
High	348.7	429.5	519.4	715.1	883.7

SOURCE: Florida Statistical Abstract, 1989.

NOTE: Population figures are expressed in thousands and have been rounded to hundreds. County projections are based on an average of projections derived from nine different techniques. The sum of the medium County projections equals the state projection for that year, while the low and high projections have more pessimistic and more optimistic criteria.

TABLE 2-7

PLANNING DISTRICT PERMANENT POPULATION: 1990 - 2010

Planning District	1990 Pop.	1995 Pop.	2000 Pop.	2010 Pop.
1	71,410	78,344	82,195	83,193
2	39,812	48,482	57,174	73,366
4	38,809	43,245	46,248	47,093
5	11,241	12,214	12,658	11,741
6	27,824	37,434	48,347	72,877
7	13,682	22,831	34,224	62,743
TOTALS	202,778	242,550	280,846	351,013

SOURCE: The Lee Plan, 1989.

TABLE 2-8

LABOR FORCE FIGURES: LEE COUNTY 1980 - 1988

Annual Averages	Labor Force	Employment	Unemployment	Unemployment Rate
1980	82,040	78,187	3,853	4.7%
1981	90,652	85,837	4,815	5.3%
1982	97,464	89,789	7,675	7.9%
1983	102,567	94,291	8,276	8.1%
1984	110,009	104,170	5,839	5.3%
1985	116,166	110,641	5,525	4.8%
1986	121,999	116,834	5,166	4.2%
1987	130,764	125,781	4,983	3.8%
1988	140,725	135,669	5,056	3.6%

SOURCE: Florida Department of Labor and Employment Security, Bureau of Labor Market Information, Tallahassee, Florida; Labor Force Summary, Annual Averages, Lee County.

Table 2-9 illustrates the major private sector employers in Lee County. Three of the ten largest (and two of the top three) employers in the County are in the health care profession.

Employment By Occupation. Employment figures by occupation are not available for Lee County.

Employment By Industrial Sector. Table 2-10 lists the average monthly employment by industrial sector for Lee County from 1980 through 1988. The County's employment by industry increased 67.1 percent during the 1980 to 1988 time period with the service sector increasing 119.9 perccent. Table 2-11 provides the most current monthly employment information based on first and second quarter 1989 reports.

Employment Projections. Table 2-12 illustrates the projected employment in Fort Myers and Cape Coral from 1995 through 2035. The table indicates an anticipated 43.7 percent increase in total Fort Myers and Cape Coral employment between 1995 and 2035. The largest employment increases during this period are anticipated to be in the retail trade and service sectors, which are projected to increase by 27,100 (65.8 percent) and 20,500 (47.8 percent) jobs respectively. Farming is the only employment sector anticipated to decline in County jobs, with a 14.3 percent reduction from 1995 to 2035 (400 jobs). Mining and federal military jobs are anticipated to remain constant throughout the time period.

General Income Characteristics. Table 2-13 illustrates payroll by industrial sector for Lee County from 1980 through 1988. The table indicates a 157 percent increase in annual payroll during this time to over $2 billion, with private industry increasing 158 percent and government industry increasing 152 percent. The largest payroll sector in 1988 was the service industry with a County payroll of over $534,000,000. Service sector payroll increased over 275 percent during the eight-year study period.

TABLE 2-9

MAJOR PRIVATE SECTOR EMPLOYERS: LEE COUNTY

EMPLOYER	PRODUCT/ SERVICE	TOTAL EMPLOYEES
1. Lee Memorial Hospital	Health Care	1,951
2. The Mariner Group	Holding Company	1,380
3. SW FL Reg. Medical Center	Health Care	1,310
4. United Telephone Co.	Telephone Service	973
5. Yoder Brothers	Foliage Product	700
6. Lehigh Corp.	Developer	685
7. Cape Coral Hospital	Health Care	673
8. Ft. Myers News-Press	Newspaper	500
9. Prathers Inc.	Laundry/Dry Cleaners	500
10. Florida Power & Light	Electric Power	375

SOURCE: Florida Department of Commerce, Division of Economic Development, Florida County Profile 1988.

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TABLE 2-10

AVERAGE MONTHLY EMPLOYMENT: LEE COUNTY 1980-1988

Industry	1980 Average Monthly Employment	1981 Average Monthly Employment	1982 Average Monthly Employment
PRIVATE			
Agriculture, Forestry, Fishing	2,865	2,544	2,477
Mining	268	226	148
Construction	8,371	9,268	8,024
Manufacturing	3,517	4,053	4,025
Transportation, Communications, and Public Utilities	3,805	3,938	3,977
Wholesale Trade	3,244	3,283	3,097
Retail Trade	16,473	17,693	18,403
Finance, Insurance, Real Estate	5,882	6,662	6,606
Services	12,762	14,487	15,593
Non-classifiable and Other	57	40	9
SUBTOTALS	57,244	62,194	62,359
GOVERNMENT			
Federal	798	761	821
State	1,919	1,965	2,083
Local	8,006	8,456	8,755
SUBTOTALS	10,723	11,182	11,659
TOTALS	67,967	73,376	74,018

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-10
(continued)

AVERAGE MONTHLY EMPLOYMENT: LEE COUNTY 1980-1988

Industry	1983 Average Monthly Employment	1984 Average Monthly Employment	1985 Average Monthly Employment
PRIVATE			
Agriculture, Forestry, Fishing	2,645	2,972	3,013
Mining	129	55	167
Construction	8,701	10,297	10,908
Manufacturing	4,126	4,393	4,574
Transportation, Communications, and Public Utilities	4,103	4,118	4,197
Wholesale Trade	3,109	3,337	3,599
Retail Trade	19,965	22,026	24,629
Finance, Insurance, Real Estate	6,800	6,645	6,828
Services	17,020	19,667	21,721
Non-classifiable and Other	11	132	51
SUBTOTALS	66,609	73,642	79,687
GOVERNMENT			
Federal	861	912	973
State	2,084	2,166	2,242
Local	9,155	9,760	10,332
SUBTOTALS	12,100	12,838	13,547
TOTALS	78,709	86,480	93,234

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-10
(continued)

AVERAGE MONTHLY EMPLOYMENT: LEE COUNTY 1980-1988

Industry	1986 Average Monthly Employment	1987 Average Monthly Employment	1988 Average Monthly Employment
PRIVATE			
Agriculture, Forestry, Fishing	2,995	3,062	3,498
Mining	144	129	NR
Construction	11,294	11,936	12,560
Manufacturing	5,090	5,295	5,824
Transportation, Communications, and Public Utilities	4,609	4,683	4,985
Wholesale Trade	3,722	3,898	4,078
Retail Trade	35,499	27,820	29,986
Finance, Insurance, Real Estate	7,430	7,861	8,131
Services	23,620	26,190	28,065
Non-classifiable and Other	18	8	NR
SUBTOTALS	84,421	90,882	97,127
GOVERNMENT			
Federal	1,045	1,110	1,263
State	2,335	2,481	2,697
Local	10,657	11,465	12,481
SUBTOTALS	14,037	15,056	16,441
TOTALS	98,458	105,938	113,568

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-11

MONTHLY EMPLOYMENT: LEE COUNTY JANUARY - JUNE 1989

INDUSTRY	1/89	2/89	3/89	4/89	5/89	6/89
PRIVATE						
Agriculture	4,176	4,140	4,060	3,803	3,476	2,934
Mining	121	127	125	124	126	125
Construction	13,004	12,993	13,420	12,882	12,951	13,247
Manufacturing	6,069	6,108	6,130	6,049	6,106	6,153
Transportation	4,982	5,027	5,110	5,006	5,067	5,126
Wholesale	4,302	4,338	4,395	4,437	4,436	4,513
Retail	32,501	33,034	33,289	31,825	31,488	30,965
Finance	8,610	8,677	8,827	8,677	8,723	8,953
Services	30,034	30,692	31,100	30,629	30,202	30,482
SUBTOTAL	103,799	105,136	106,456	103,432	102,575	102,498
GOVERNMENT						
Federal	1,283	1,340	1,350	1,355	1,352	1,338
State	2,770	2,757	2,748	2,772	2,828	2,883
Local	13,631	13,739	13,774	13,830	13,817	13,837
SUBTOTAL	17,684	17,836	17,872	17,957	17,997	18,058
TOTAL	121,483	122,972	124,328	121,389	120,572	120,556

NOTE: The agriculture totals include agriculture, forestry and fishing; the transportation totals include transportation, communications and public utilities; the finance totals include finance, insurance and real estate.

SOURCE: Florida Department of Labor and Employment Security, Bureau of Labor Market Information, ES202 Program, Edited ES-202, Quarterly County Report on Employment and Wages Covered Under The Florida Unemployment Compensation Law and Unemployment Compensation For Federal Employees, First Quarter and Second Quarter, 1989.

TABLE 2-12

PROJECTED EMPLOYMENT: FORT MYERS AND CAPE CORAL 1995 - 2035

Employment	1995	2000	2015	2035
TOTAL EMPLOYMENT	162.7	184.2	218.7	233.8
Farm	2.8	2.7	2.6	2.4
Nonfarm	159.9	181.5	216.1	231.4
PRIVATE	140.4	160.1	191.7	206.0
Agriculture	3.2	3.5	3.8	3.7
Mining	.2	.2	.2	.2
Construction	15.8	16.9	18.4	18.5
Manufacturing	6.8	7.3	8.2	8.4
Transportation	7.9	9.0	10.7	11.4
Wholesale Trade	7.6	8.7	10.7	11.7
Retail Trade	41.2	48.3	61.1	68.3
Finance	14.9	16.8	19.5	20.5
Services	42.9	49.4	59.2	63.4
GOVERNMENT	19.5	21.4	24.4	25.4
Federal, Civilian	1.4	1.6	1.8	1.9
Federal, Military	.6	.6	.6	.6
State and Local	17.5	19.3	22.0	23.0

NOTE: Jobs are expressed in thousands. Agricultural employment totals include agricultural services, forestry, fisheries, and other. Manufacturing totals include nondurable and durable goods. Transportation totals include transportation and public utilities. Finance totals include finance, insurance, and real estate.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, 1985 OBERS BEA Regional Projections, Volume 2 - Metropolitan Statistical Area Projections to 2035.

TABLE 2-13

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

Industry	1980 Average Payroll	1981 Average Payroll	1982 Average Payroll
PRIVATE			
Agriculture, Forestry, Fishing	24,232.5	23,943.7	25,036.9
Mining	4,824.1	4,854.7	3,031.8
Construction	115,631.0	136,082.3	122,473.0
Manufacturing	41,420.0	53,280.7	56,389.6
Transportation, Communications and Public Utilities	59,388.4	67,707.0	73,510.5
Wholesale Trade	50,491.7	50,159.7	49,461.1
Retail Trade	141,100.8	161,313.6	169,880.3
Finance, Insurance, Real Estate	71,935.0	89,328.2	94,702.0
Services	142,407.5	176,902.7	208,819.3
Non-classifiable and Other	484.1	460.6	80.7
SUBTOTALS	651,915.1	764,033.2	803,385.2
GOVERNMENT			
Federal	15,531.8	18,070.3	19,391.6
State	20,000.3	22,206.7	25,880.5
Local	95,878.2	108,406.1	126,906.8
SUBTOTALS	131,410.3	148,683.1	172,178.9
TOTALS	783,325.4	912,716.3	975,564.1

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-13
(continued)

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

Industry	1983 Average Payroll	1984 Average Payroll	1985 Average Payroll
PRIVATE			
Agriculture, Forestry, Fishing	26,279.2	36,032.2	31,622.8
Mining	2,431.0	1,308.1	4,459.6
Construction	134,041.1	163,800.5	179,484.1
Manufacturing	60,410.5	71,280.4	77,505.7
Transportation, Communications and Public Utilities	81,398.3	85,818.4	93,000.5
Wholesale Trade	51,622.9	58,665.9	65,614.3
Retail Trade	193,486.2	221,616.1	257,853.7
Finance, Insurance, Real Estate	103,453.0	108,176.3	121,365.2
Services	237,654.1	280,859.3	321,334.0
Non-classifiable and Other	346.7	2,666.0	695.5
SUBTOTALS	891,123.0	1,024,895.2	1,152,935.4
GOVERNMENT			
Federal	21,812.9	23,867.7	26,958.9
State	27,536.9	28,810.9	30,534.4
Local	142,564.7	158,928.6	173,627.8
SUBTOTALS	191,914.5	211,607.2	231,121.1
TOTALS	1,083,037.5	1,236,502.4	1,384,056.5

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

TABLE 2-13
(continued)

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

Industry	1986 Average Payroll	1987 Average Payroll	1988 Average Payroll
PRIVATE			
Agriculture, Forestry, Fishing	33,424.4	34,121.8	40,466.5
Mining	3,494.5	3,461.7	NR
Construction	193,677.9	218,491.3	243,755.7
Manufacturing	90,881.0	97,816.1	113,981.2
Transportation, Communications and Public Utilities	100,905.0	108,242.5	118,138.5
Wholesale Trade	70,383.2	78,262.1	88,398.7
Retail Trade	287,039.3	327,858.9	370,139.6
Finance, Insurance, Real Estate	143,543.8	161,673.0	173,854.1
Services	371,615.9	459,096.0	534,285.5
Non-classifiable and Other	313.7	156.7	NR
SUBTOTALS	1,295,278.7	1,489,180.1	1,683,019.8
GOVERNMENT			
Federal	28,364.9	31,256.8	35,803.7
State	34,498.9	42,212.5	46,615.3
Local	196,567.1	224,618.8	248,964.2
SUBTOTALS	259,431.9	298,088.1	331,383.2
TOTALS	1,554,710.6	1,787,268.2	2,014,403.0

SOURCE: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County.

NOTE: Due to rounding and non-disclosure editing, subtotals may not equal totals. NR denotes "no report."

Average Wages and Salaries. Table 2-14 illustrates the average annual salary by industrial sector for Lee County from 1980 to 1988. The table indicates a county-wide average increase of 54 percent during this time, from $11,525 in 1980 to $17,737 in 1988. By 1988, the largest average annual salary by sector was the federal government at $28,348 while the lowest annual salary was the agricultural, forestry, and fishing sector.

Table 2-15 illustrates the mean household income and income distribution for the census tracts wholly or partially within the study area. The range of incomes within the study area is from $10,797 in census tract 5 to $22,222 in census tract 12. The mean household income for census tract 401, which contains the project site, is $18,695.

Income Projections. Income projections are not available for Lee County.

Existing Housing Stock. Table 2-16 illustrates the total number of year-round housing units and number of units per structure in the census tracts that are, at least in part, located within the study area. The table indicates that 69.7 percent of housing within the study area census tracts are one-unit dwellings, 10.3 percent of housing are mobile homes and trailers and 9.3 percent are two- to four-unit structures. The remainder of housing are structures with ten or more units (7.3 percent) and five- to nine-unit structures (3.4 percent).

Table 2-17 illustrates the age of the housing stock within the census tracts that are located, at least in part, within the study area. The table indicates that 45.2 percent of the units were built between 1970 and 1980, 31.1 percent were built between 1960 and 1969, 12.6 percent were built between 1950 and 1959, 6.7 percent were built before 1940, and 4.5% percent were built between 1940 and 1949.

TABLE 2-14

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

INDUSTRY	1980			1981			1982		
	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY
PRIVATE									
Agriculture, Forestry, Fishing	2865	24233000	8458	2544	23944000	9412	2477	25037000	10108
Mining	268	4824000	18000	226	4855000	21482	148	3032000	20486
Construction	8371	115631000	13813	9268	136082000	14683	8024	122473000	15263
Manufacturing	3517	41420000	11777	4053	53281000	13146	4025	56390000	14010
Transportation, Communications and Public Utilities	3805	59388000	15608	3938	67707000	17193	3977	73511000	18484
Wholesale Trade	3244	50492000	15565	3283	50160000	15279	3097	49461000	15971
Retail Trade	16473	141101000	8566	17693	161314000	9117	18403	169880000	9231
Finance, Insurance and Real Estate	5882	71935000	12230	6662	89328000	13409	6606	94702000	14336
Services	12762	142408000	11159	14487	176903000	12211	15593	208819000	13392
Nonclassifiable and Other	57	484000	8491	40	461000	11525	9	81000	9000
SUBTOTAL	57244	651916000	11388	62194	764035000	12285	62359	803386000	140281
GOVERNMENT									
Federal	798	15532000	19464	761	18070000	23745	821	19392000	23620
State	1919	20000000	10422	1965	22207000	11301	2083	25881000	12425
Local	8006	95878000	11976	8456	108406000	12820	8755	126907000	14495
SUBTOTAL	10723	131410000	12255	11182	148683000	13297	11659	172180000	14768
TOTAL	67967	783326000	11525	73376	912718000	12439	74018	975566000	13180

Note: Due to rounding and nondisclosure editing, subtotals may not equal totals. NR denotes 'no report'.

Source: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County

TABLE 2-14 Continued

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

INDUSTRY	1983			1984			1985		
	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY	AVERAGE MONTHLY EMPLOYMENT	TOTAL ANNUAL PAYROLL	AVERAGE ANNUAL SALARY
PRIVATE									
Agriculture, Forestry, Fishing	2645	26279000	9935	2972	30632000	10307	3013	31623000	10496
Mining	129	2431000	18845	55	1380000	25091	167	4460000	26707
Construction	8701	134041000	15405	10297	163801000	15908	10908	179484000	16454
Manufacturing	4126	60411000	14642	4393	71280000	16226	4574	77506000	16945
Transportation, Communications and Public Utilities	4103	81398000	19839	4118	85818000	20840	4197	93001000	22159
Wholesale Trade	3109	51623000	16604	3337	58666000	17580	3599	65614000	18231
Retail Trade	19965	193486000	9691	22026	221616000	10062	24629	257854000	10470
Finance, Insurance and Real Estate	6800	103453000	15214	6645	108176000	16279	6828	121365000	17775
Services	17020	237654000	13963	19667	280859000	14281	21721	321334000	14794
Nonclassifiable and Other	11	347000	31545	132	2666000	20197	51	696000	13647
SUBTOTAL	66609	891123000	13378	73642	1024894000	13917	79687	1152937000	167676
GOVERNMENT									
Federal	861	21813000	25334	912	23868000	26171	973	26959000	27707
State	2084	27537000	13214	2166	28811000	13301	2242	30534000	13619
Local	9155	142565000	15572	9760	158929000	16284	10332	173628000	16805
SUBTOTAL	12100	191915000	15861	12838	211608000	16483	13547	231121000	17061
TOTAL	78709	1083038000	13760	86480	1236502000	14298	93234	1384058000	14845

Note: Due to rounding and nondisclosure editing, subtotals may not equal totals. NR denotes 'no report'.

Source: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County

TABLE 2-14 Continued

ANNUAL PAYROLL BY INDUSTRIAL SECTOR
LEE COUNTY 1980-1988

INDUSTRY	1986 AVERAGE MONTHLY EMPLOYMENT	1986 TOTAL ANNUAL PAYROLL	1986 AVERAGE ANNUAL SALARY	1987 AVERAGE MONTHLY EMPLOYMENT	1987 TOTAL ANNUAL PAYROLL	1987 AVERAGE ANNUAL SALARY
PRIVATE						
Agriculture, Forestry, Fishing	2995	33424000	11160	3062	34122000	11144
Mining	144	3495000	24271	129	3462000	26837
Construction	11294	193678000	17149	11936	218491000	18305
Manufacturing	7430	90881000	12232	5295	97816000	18473
Transportation, Communications and Public Utilities	4609	100905000	21893	4683	108243000	23114
Wholesale Trade	3722	70383000	18910	3898	78262000	20077
Retail Trade	25499	287039000	11257	27820	327859000	11785
Finance, Insurance and Real Estate	7430	143544000	19320	7861	161673000	20566
Services	23620	371616000	15733	26190	459096000	17529
Nonclassifiable and Other	18	314000	17444	8	157000	19625
SUBTOTAL	86761	1295279000	14929	90882	1489181000	16386
GOVERNMENT						
Federal	1045	28365000	27144	1110	31257000	28159
State	2335	34499000	14775	2481	42213000	17015
Local	10657	196568000	18445	11465	224619000	19592
SUBTOTAL	14037	259432000	18482	15056	298089000	19799
TOTAL	100798	1554711000	15424	105938	1787270000	16871

INDUSTRY	1988 AVERAGE MONTHLY EMPLOYMENT	1988 TOTAL ANNUAL PAYROLL	1988 AVERAGE ANNUAL SALARY
PRIVATE			
Agriculture, Forestry, Fishing	3498	40467000	11569
Mining	NR	0	0
Construction	12560	243756000	19407
Manufacturing	5824	113981000	19571
Transportation, Communications and Public Utilities	4985	118139000	23699
Wholesale Trade	4078	88399000	21677
Retail Trade	29986	370140000	12344
Finance, Insurance and Real Estate	8131	173854000	21382
Services	28065	534286000	19037
Nonclassifiable and Other	NR	0	0
SUBTOTAL	97127	1683022000	17328
GOVERNMENT			
Federal	1263	35804000	28348
State	2697	46615000	17284
Local	12481	248964000	19947
SUBTOTAL	16441	331383000	20156
TOTAL	113568	2014405000	17737

Note: Due to rounding and nondisclosure editing, subtotals may not equal totals. NR denotes 'no report'.

Source: Florida Department of Labor & Employment Security, Bureau of Labor Market Information, ES202 Program, 1980-1988 Annual Edited ES-202 for Lee County

TABLE 2-15

INCOME BY HOUSEHOLD: LEE COUNTY 1980

Census Tracts	Mean Household Income($)	Percentage of Households % Under $10,000	$10,000-$19,999	$20,000-$34,999	$35,000 and over
2	11,508	59.0	25.5	8.7	6.8
3	15,492	38.4	38.6	16.6	6.4
4	14,846	36.8	37.2	22.1	3.9
5	10,797	55.2	29.5	13.0	2.2
6	13,660	50.3	34.8	12.3	2.7
12	22,222	27.0	27.8	28.7	16.5
204	21,913	25.6	23.8	39.9	10.7
301	20,967	30.5	31.9	26.0	11.6
302	18,695	23.9	41.1	28.6	6.4
401	21,801	27.5	25.5	33.3	13.6
402	18,596	21.7	41.6	27.2	9.4
403	14,838	38.9	38.0	17.9	5.2

NOTE: Due to rounding, figures may not total 100 percent.

SOURCE: U.S. Census Bureau, 1980.

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TABLE 2-16

HOUSING UNITS: 1980

Census Tract	Year-Round Housing Units	Units In The Structure				
		one	2-4	5-9	10+	MH
2	867	374	215	45	233	0
3	3,417	2,190	502	270	277	178
4	1,951	1,250	116	4	27	554
5	4,276	2,500	448	183	715	430
6	1,665	1,105	288	123	129	20
12	121	115	0	0	0	6
204	584	481	19	0	23	61
301	602	308	30	0	0	264
302	2,539	1,708	201	25	21	584
401	913	622	7	6	13	265
402	2,036	1,687	144	82	75	48
403	4,442	3,976	201	54	200	11
TOTALS	23,413	16,316	2,171	792	1,713	2,421

SOURCE: U.S. Census Bureau, 1980.

NOTE: MH represents mobile homes or trailers.

TABLE 2-17

AGE OF HOUSING STOCK: 1980

Census Tract	Total Number of Units in Tract	Age				
		1970–1980	1960–1969	1950–1959	1940–1949	1939 or earlier
2	867	115	130	127	139	356
3	3,417	1,164	778	738	279	458
4	1,951	638	678	404	164	67
5	4,276	1,457	1,590	628	238	363
6	1,665	260	662	432	157	154
12	121	78	37	0	0	6
204	584	323	188	50	0	23
301	602	331	176	45	26	24
302	2,539	1,869	488	132	12	38
401	913	623	167	41	31	51
402	2,036	1,560	415	36	7	18
403	4,442	2,160	1,961	308	7	6
TOTALS	23,413	10,578	7,270	2,941	1,060	1,564

SOURCE: U.S. Census Bureau, 1980.

Housing Costs. Table 2-18 illustrates the housing values for units in census tracts partially or wholly within the study area. The table indicates that the majority of housing units within the study area are in the $20,000 to $79,999 range (1980 figures).

Table 2-19 illustrates the median value of specified owner-occupied housing units for the census tracts wholly or partially within the study area.

Table 2-20 illustrates the 1989 building permit activity for Lee County. The table indicates that almost 40 percent of the building permit value was for single-family home construction. The 2,405 building permits for single-family homes had an average building permit value of just over $80,000.

Public Service and Utilities

Transportation. The energy recovery facility site is located adjacent to Buckingham Road approximately one mile east of the SR 82/Buckingham Road intersection and two and one-half miles east of the Interstate 75/SR 82 interchange. Major roads in the area include Interstate 75, SR 82/Anderson Avenue/Immokalee Road, SR 80/Palm Beach Boulevard, SR 884/Colonial Boulevard, SR 884/Lee Boulevard, and Buckingham Road. Interstate 75, a four-lane freeway, is a north-south route which traverses the eastern United States from Sault Ste. Marie, Michigan to near Miami. SR 82/ Anderson Avenue/Immokalee Road, a two-lane minor arterial, is an east-west road running from Fort Myers to SR 29, located approximately five miles north of Immokalee. SR 80/Palm Beach Boulevard, a two-lane principal arterial with some four lane segments located approximately four miles to the north of the project site, is an east-west route from Fort Myers to its intersection with U.S. Highway 27 near Clewiston. Colonial Boulevard/SR 884, a four-lane minor arterial located to the southwest of the project site, is an east-west road running from Fort Myers to Interstate 75. A roadway linking Colonial Boulevard with Lee Boulevard is under construction. Lee Boulevard/SR 884, a two-lane minor arterial located to the southeast of the project site, is an east-west road running from Leeland Heights Boulevard to SR 82 one mile southeast of the site. Buckingham Road runs from

TABLE 2-18

HOUSING VALUES: 1980

Census Tract	Percent of Units Within Specified Value Range %				
	<$20000	$20000 -39999	$40000 -79999	$80000 -149,999	>$150,000
2	22.9	49.2	20.3	6.8	0.8
3	14.4	49.0	32.6	3.6	0.4
4	13.5	43.0	39.6	3.8	0.1
5	22.4	57.3	19.7	0.6	0.1
6	42.6	44.8	12.2	0.3	0.1
12	9.6	39.4	29.8	18.1	3.2
204	4.0	16.8	55.9	21.5	1.9
301	3.7	22.5	56.4	12.8	4.6
302	1.7	30.3	57.5	9.4	1.1
401	8.4	23.0	41.9	21.4	5.3
402	0.8	18.1	67.5	13.1	0.4
403	2.4	37.2	56.6	3.8	0.1

NOTE: Figures are the percent of housing within the value category based on specified owner-occupied housing units. Figure totals may not equal 100% due to rounding.

SOURCE: U.S. Census Bureau, 1980.

TABLE 2-19

MEDIAN HOUSING VALUES: 1980

CENSUS TRACT	MEDIAN VALUE
2	$32,400
3	$34,900
4	$37,200
5	$30,600
6	$21,600
12	$41,700
204	$61,300
301	$53,100
302	$47,600
401	$54,200
402	$56,400
403	$44,100

SOURCE: U.S. Census Bureau, 1980.

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TABLE 2-20

BUILDING PERMITS: LEE COUNTY 1989

Type	Number of Building Permits Issued		Total Value
Single-Family	2,405		$192,447,722
Duplexes	106		11,330,419
Motels	2		1,700,000
Apartments (3-4 units/permit)	66	(248 units total)	13,766,840
Apartments (5+ units/permit)	138	(1730 units total)	86,622,965
Churches	5		1,101,000
Industrial	17		4,089,422
Commercial	92		19,599,923
Service Stations	3		1,513,360
Office and Professional	10		31,198,000
Schools	3		702,000
Moved Building	7		71,000
Temporary Trailers	306		2,843,141
Permanent Trailers	1,382		29,472,000
Seawalls, Docks, Pools, Spas	2,006		19,292,308
Recreation Buildings	32		3,148,279
Miscellaneous	2,072		8,112,771
Land Excavating	2		19,000
Completion of Buildings	429		10,200,279
Residential Additions/ Remodeling	3,837		25,394,461
Commercial Addition/Remodeling	733		23,895,703
Demolition	104		428,000
TOTAL	13,757		$485,960,961

SOURCE: Lee County Division of Codes and Building Services.

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SR 82 northeast to SR 80. Table 2-21 lists the existing roadway classifications and the number of lanes for each roadway segment. Table 2-22 lists traffic volumes for various segments of these roadways.

Table 2-23 lists the performance standards for roadways. Performance standards include capacity volumes and levels of service (LOS) for roadway segments. No roadway segment has a lower existing volume level of service than its performance capacity.

Medical Facilities. Hospitals in the area include:

- East Point Hospital, which has 88 beds and is located at 1500 Lee Boulevard, Lehigh Acres.

- Lee Memorial Hospital, which has 608 beds and is located at 2776 Cleveland Avenue, Fort Myers.

- Southwest Florida Regional Medical Center, which has 400 beds and is located at 3785 Evans Avenue, Fort Myers.

- Cape Coral Hospital, which has 194 beds and is located at 636 Del Prado Boulevard, Cape Coral.

Police Protection. The project site is within the East District of the Lee County Sheriff's Department. The East District Substation is located at 14002 Palm Beach Boulevard. The Sheriff's Department Headquarters is located at 1700 Monroe Street, Fort Myers.

Fire Protection. The project site is within the Tice Fire Protection Fire District. The fire district, chartered in 1976, covers 44 square miles, has an average response time of three minutes, and received 2,288 calls in 1987. The fire district includes three fire stations located at 5170 Tice Street, 3705 Edison Avenue, and 5850 Buckingham Road. Fire district personnel include 25 paid staff, 15 volunteers, three certified fire

TABLE 2-21

EXISTING ROADWAYS

Roadway	Segment	Roadway Classification	Number of Lanes
Anderson Avenue	Ortiz Ave. to I-75	Minor Arterial	4LD
Anderson Avenue	I-75 to Buckingham Rd.	Minor Arterial	2LU
Anderson Avenue	Buckingham Rd. to Lee Blvd.	Minor Arterial	2LU
Anderson Avenue	Lee Blvd. to County Line	Minor Arterial	2LU
Buckingham Road	SR 80 to SR 82	Major/Minor Collector	2LU
Colonial Boulevard	Six Mile Parkway to Metro Parkway	Minor Arterial	4LD
Lee Boulevard	SR 82 to Leeland Heights Blvd.	Minor Arterial	2LU
Palm Beach Boulevard	Ortiz Ave. to I-75	Principal Arterial	2LD
Palm Beach Boulevard	I-75 to SR 31	Principal Arterial	2LU
Palm Beach Boulevard	SR 31 to Buckingham Rd.	Principal Arterial	4LD
Palm Beach Boulevard	Buckingham Rd. to County Line	Principal Arterial	2LU
Interstate 75	SR 80 to Bayshore Rd.	Freeway	4LD
Interstate 75	SR 82 to SR 80	Freeway	4LD
Interstate 75	Colonial Blvd. to SR 82	Freeway	4LD
Interstate 75	Daniels Rd. to Colonial Blvd.	Freeway	4LD

SOURCE: Transportation Element, Lee Plan, 1989.

NOTE: 2L represents a two-lane road, 4L represents a four-lane road, U represents an undivided road, and D represents a divided road.

TABLE 2-22

EXISTING TRAFFIC VOLUMES

ROADWAY	SEGMENT	VOLUME	LOS
Anderson Avenue	Ortiz Ave. to I-75	1,093	A
Anderson Avenue	I-75 to Buckingham Rd.	1,223	D
Anderson Avenue	Buckingham Rd. to Lee Blvd.	1,313	D
Anderson Avenue	Lee Blvd. to County Line	1,315	D
Buckingham Road	SR 80 to SR 82	466	A
Colonial Boulevard	Six Mile Parkway to Metro Parkway	2,545	C
Lee Boulevard	SR 82 to Leeland Heights Blvd.	1,061	B
Palm Beach Boulevard	Ortiz Ave. to I-75	2,026	E
Palm Beach Boulevard	I-75 to SR 31	1,540	E
Palm Beach Boulevard	SR 31 to Buckingham Rd.	1,821	A
Palm Beach Boulevard	Buckingham Rd. to County Line	903	B
Interstate 75	SR 80 to Bayshore Rd.	2,833	A
Interstate 75	SR 82 to SR 80	3,106	A
Interstate 75	Colonial Blvd. to SR 82	3,433	A
Interstate 75	Daniels Rd. to Colonial Blvd.	2,181	A

SOURCE: Master Roadway Link Listing, December 12, 1989, Concurrency Management Division, Lee County.

NOTE: Existing roadway volumes are as of December 12, 1989, LOS represents level of service.

TABLE 2-23

PERFORMANCE STANDARDS

ROADWAY	SEGMENT	CAPACITY	LOS
Anderson Avenue	Ortiz Ave. to I-75	3,600	E
Anderson Avenue	I-75 to Buckingham Rd.	1,570	E
Anderson Avenue	Buckingham Rd. to Lee Blvd.	1,570	E
Anderson Avenue	Lee Blvd. to County Line	1,570	E
Buckingham Road	SR 80 to SR 82	1,120	E
Colonial Boulevard	Six Mile Parkway to Metro Parkway	3,600	E
Lee Boulevard	SR 82 to Leeland Heights Blvd.	1,570	E
Palm Beach Boulevard	Ortiz Ave. to I-75	2,220	E
Palm Beach Boulevard	I-75 to SR 31	1,570	E
Palm Beach Boulevard	SR 31 to Buckingham Rd.	3,600	E
Palm Beach Boulevard	Buckingham Rd. to County Line	1,570	E
Interstate 75	SR 80 to Bayshore Rd.	7,590	E
Interstate 75	SR 82 to SR 80	7,590	E
Interstate 75	Colonial Blvd. to SR 82	7,590	E
Interstate 75	Daniels Rd. to Colonial Blvd.	7,590	E

SOURCE: Master Roadway Link Listing, December 12, 1989, Concurrency Management Division, Lee County.

NOTE: LOS represents "level of service".

inspectors, five certified EMTs (emergency medical technicians), two certified divers, and a cumulative 100 years of fire-fighting experience. Fire district hardware includes a 6,550-gallon capacity of mobile water and 8,800 feet of four-inch hose, three quick attack trucks, nine class "A" pumpers, one ladder truck, two brush trucks, one special unit, four generators, and two dive sets (SOURCE: Lee Plan, 1989).

Education. There are five public elementary schools located within the study area: Orange River Elementary School, Tice Elementary School, Edgewood Elementary School, Franklin Park Elementary School, and Michigan Elementary School. There are two public middle schools located within the study area: Dunbar Middle School and Lee Middle School.

Orange River Elementary, located at 4501 Underwood Drive, has an enrollment of 677 students and a staff of 66. Tice Elementary School, located at 4524 Tice Street, has an enrollment of 719 students and a staff of 73. Edgewood Elementary School, located at 3464 Edgewood Avenue, has an enrollment of 334 students and a staff of 29. Franklin Park Elementary School, located at 2323 Ford Street, has an enrollment of 373 students and a staff of 43. Michigan Elementary School, located at 4312 East Michigan Avenue, has an enrollment of 512 students and a staff of 54. Emergency shelters are located at Orange River, Tice, Edgewood, and Franklin Park elementary schools.

Dunbar Middle School, located at 3800 E. Edison Avenue, has an enrollment of 403 students and a staff of 45. Lee Middle School, located at 4203 Ballard Road, has an enrollment of 643 and a staff of 63.

There are three exceptional student programs within the study area: Buckingham Exceptional Student Center, Riverside School, and Royal Palm Exceptional Center. Buckingham Exceptional Center, located at 3200 Buckingham Road, has an enrollment of 104 students and a staff of 44. Riverside School, located at 1634 Manchester Boulevard, has an enrollment of 92 students and a staff of 38. Royal Palm Exceptional Student Center, located in Dunbar Community School at 1857 High Street, has an enrollment of 33 students and a staff of 15.

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Dunbar Middle School, located at 3800 E. Edison Avenue, has an enrollment of 403 students and a staff of 45. Lee Middle School, located at 4203 Ballard Road, has an enrollment of 643 and a staff of 63.

There are three exceptional student programs within the study area: Buckingham Exceptional Student Center, Riverside School, and Royal Palm Exceptional Center. Buckingham Exceptional Center, located at 3200 Buckingham Road, has an enrollment of 104 students and a staff of 44. Riverside School, located at 1634 Manchester Boulevard, has an enrollment of 92 students and a staff of 38. Royal Palm Exceptional Student Center, located in Dunbar Community School at 1857 High Street, has an enrollment of 33 students and a staff of 15.

All enrollment and staffing figures are based on second quarter, 1987-1988 academic year numbers (SOURCE: Lee Plan, 1989; Fort Myers, Florida 7.5 Minute Series Map, Photorevised 1987, United States Geologic Survey).

Recreation Facilities. There are over 20 recreation facilities located within the study area. Refer to Section 2.2.1 for additional information regarding recreation facilities.

Water Supply Facilities. Potable water service to the site will be provided by tapping into the distribution system for the County's Corkscrew Water Treatment Plant. The location of the Corkscrew Plant is shown in Figure 2-15. A pipeline with a minimum diameter of eight inches will tie into the existing system near the intersection of Ortiz Avenue and Highcotton Lane. Typical water pressure in the line will be 40 to 60 psi. Water quality is in compliance with FDER potable water system permit requirements. Typical characteristics of the potable water are a pH range of 7.5 to 9.0, a total hardness between 100 and 200 mg/l as $CaCO_3$, color between 2 and 15 color units, turbidity less than 1.0 Nephelometric Turbidity Units, and chloride concentrations up to 250 mg/l.

Cooling Water Supply. Reclaimed water from the City of Fort Myers Central Advanced Wastewater Treatment Plant (Central WWTP) will be used as cooling water for the Facility. The Central WWTP location is shown on Figure 2-15. A 1.5-mgd firm capacity pump station will be constructed at the Central WWTP (firm capacity refers to the capacity of the station with the largest pump out of service). A pipeline will be constructed to convey the reclaimed water to the site, as well as to serve other future reuse needs, as discussed in Section 6.0. The pipeline will have a minimum diameter of 12 inches. It is also planned that on-site groundwater wells will be installed to provide a source of back-up cooling water supply in the unlikely event that the primary source is interrupted. This is discussed further in Section 3.5.1 and Appendix 7.2.

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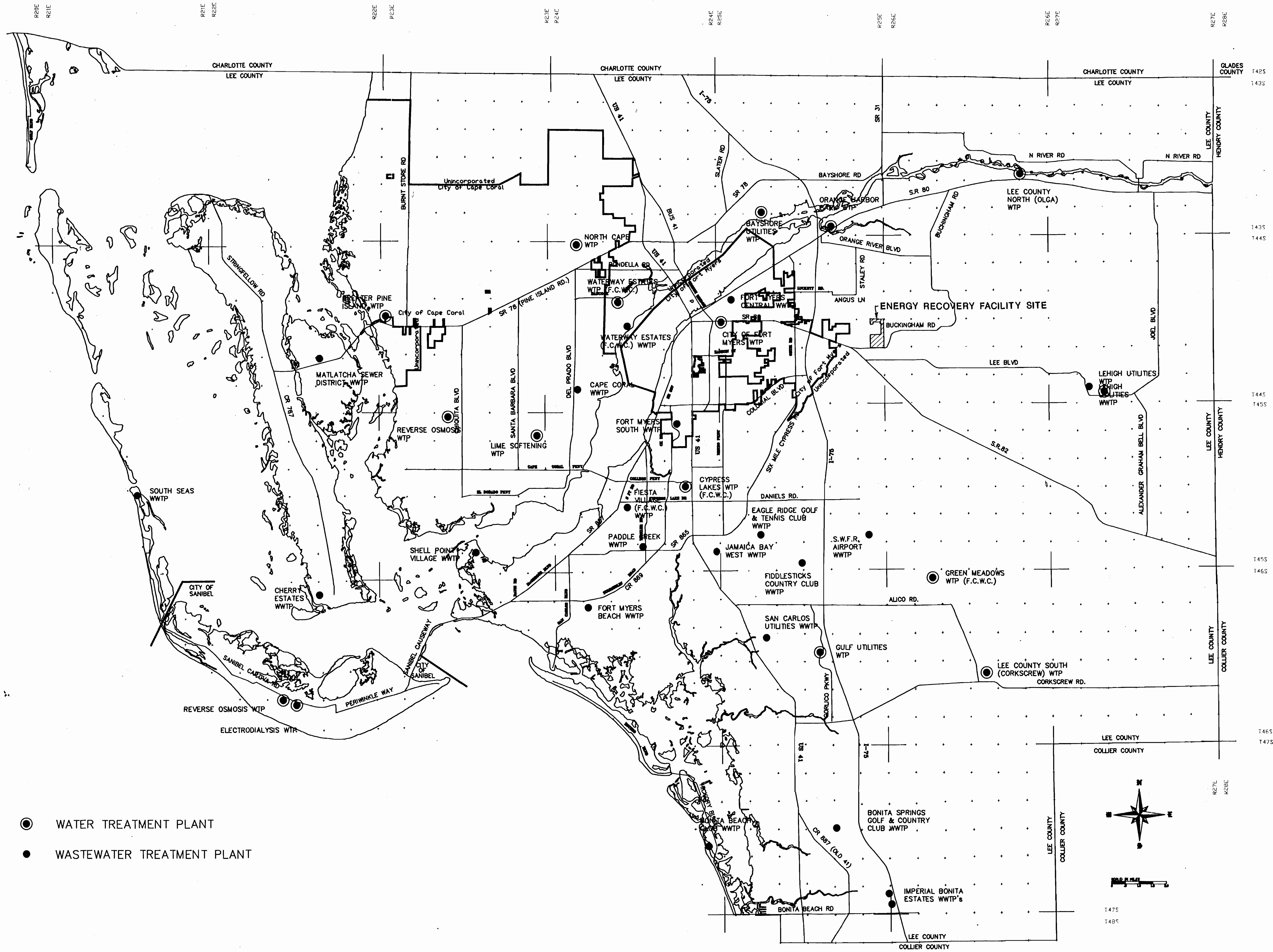

◉ WATER TREATMENT PLANT

● WASTEWATER TREATMENT PLANT

ACAD FILE : DKT-WWTP.DWG

REV. NO.	DATE	DRWN	CHKD.	REMARKS

DESIGNED BY: S.D.A.
DRAWN BY: S.D.A.
CHECKED BY:
APPROVED BY:
DATE:

CAMP DRESSER & McKEE INC.

CDM environmental engineers, scientists, planners, & management consultants

WATER AND WASTEWATER TREATMENT PLANT LOCATIONS

PROJECT NO.

SHEET NO.

FIGURE 2-15

Sewage Treatment Facilities. The City of Fort Myers Central WWTP will receive the wastewater generated by the energy recovery facility. The wastewater discharge will consist of a maximum of approximately 150,000 gpd of sanitary, process wastewater, and cooling tower blowdown wastewater. Process wastewater will be reused at the Facility to the greatest extent practicable.

Wastewater will be pumped into a pipeline with a minimum diameter of six inches, which will tie into an existing pump station near the corner of Flagler Street and SR 82. This pump station is part of the influent transmission facilities of the City of Fort Myers Central WWTP. Prior to discharge to the sewer, the wastewater shall meet city pretreatment requirements.

The current pretreatment requirements prohibit slugs of pollutants, excessive grease and oils, taste or odor-causing substances, radioactive wastes, corrosive wastes, or other wastes which would interfere with treatment operations. They also limit average concentrations of heavy metals and other contaminants in the sewage as it arrives at the wastewater treatment plant to the concentrations shown in Table 2-24. At no time shall the hourly concentration at the wastewater treatment plant exceed three times the average concentration.

The city is in the process of revising its pretreatment ordinance. A draft ordinance is currently being reviewed by both the city and Lee County. Upon receipt of comments from the County, the new ordinance will be forwarded to the U.S. Environmental Protection Agency (EPA) for approval. This ordinance strengthens the intent of the existing ordinance by providing more specific regulations. Permitting, sampling, monitoring, and enforcement procedures are presented in detail. The maximum pollutant concentrations allowed under the new ordinance are summarized in Table 2-25.

It is anticipated that a new pretreatment ordinance will be in effect for the city's Central WWTP when the energy recovery facility becomes operational. The Contractor who designs, builds, and operates the Facility will be required to meet all city pretreatment requirements. The County will continue to coordinate with the city on this matter until a new pretreatment ordinance is adopted.

TABLE 2-24

EXISTING WASTEWATER CONSTITUENT CONCENTRATION LIMITS
Fort Myers Pretreatment Ordinance
(City Ordinance 2201)

	Maximum 24-Hour Flow Proportional Average Concentration, ppm
Arsenic	0.05
Barium	2.0
Cadmium	1.0
Chromium (total)	1.0
Chromium (hexavalent)	0.05
Copper	1.0
Cyanide	1.0
Iron	2.0
Lead	1.5
Mercury	0.05
Nickel	2.0
Selenium	1.0
Silver	1.0
Raw Sewage Chlorine Demand	12.0
Zinc	2.0
Oil & Grease (petroleum and/or mineral)	100.0
Total Sulfides	0.5

TABLE 2-25

PROPOSED MAXIMUM WASTEWATER DISCHARGE LIMITATIONS
City of Fort Myers Draft Pretreatment Ordinance
May 1990

Parameter	Maximum Concentration (mg/l) (24-hour Flow Proportional Composite Sample)	Maximum Instantaneous Concentration (mg/l) (Grab Sample)
Aluminum, dissolved (Al)	15.00	30.00
Antimony (Sb)	0.50	1.00
Arsenic (As)	0.50	0.10
Barium (Ba)	2.50	5.00
Boron (B)	1.00	2.00
Cadmium (Cd)	0.01	0.02
Chromium, total (Cr)	1.50	3.00
Cobalt (Co)	5.00	10.00
Copper (Cu)	0.40	0.80
Cyanide (CN)	0.05	0.10
Fluoride (F)	10.00	20.00
Iron (Fe)	5.00	10.00
Lead (Pb)	0.10	0.20
Manganese (Mn)	0.50	1.00
Mercury (Hg)	0.015	0.03
Nickel (Ni)	0.50	1.00
Phenols	0.40	1.00
Selenium (Se)	0.75	1.50
Silver (Ag)	0.05	0.10
Titanium, dissolved (Ti)	1.00	2.00
Zinc (Zn)	2.00	4.00
Total Dissolved Solids	1875.00	3,750.00
BOD	300.00*	—
COD	600.00*	—
TSS	300.00*	—
Total Nitrogen (TKN)	30.00*	—
Total Phosphorus	10.00*	—
Oil and Grease	100.00*	100.00*
MBAS	5.00	10.00

* Concentrations above this amount are subject to a surcharge in accordance with the City of Ft. Myers high strength wastewater control charge schedule and other rate resolutions and ordinances that may apply.

MLC19/2
6/27/90

Solid Waste Collection and Disposal. Lee County enacted its Mandatory Garbage and Solid Waste Collection Ordinance (No. 86-38) in April 1987. This ordinance provides for County control over solid waste collection and disposal within its jurisdiction. The County is currently divided into eight major service areas for collection purposes, as summarized in Table 2-26.

The incorporated cities of Fort Myers, Cape Coral, and Sanibel are not regulated under the County's mandatory collection ordinance; they either have or are formulating their own ordinances. The City of Fort Myers provides its own collection services. Long-term franchise agreements are in effect for all other service areas.

All solid waste collected in Lee County, by both private haulers and the City of Fort Myers, is transported to the Gulf Coast landfill for disposal under contract with Lee County. The landfill is owned and operated by Waste Management, Inc. The landfill location is depicted in Figure 2-16. The figure also shows the location of a future landfill/ashfill to be constructed in Hendry County in conjunction with the proposed energy recovery facility. The new landfill/ashfill will be permitted separately from the Facility described in this application.

The Lee County Solid Waste Disposal System Policy Issues Memorandum (December, 1989) projected solid waste quantities to be generated within Lee and Hendry Counties through the year 2030. The results of this analysis indicate an increase in waste generation from 920 tons per day (Lee County only) in 1987 to approximately 4,000 tons per day in 2030. This anticipated increase has sparked interest in the concepts of recycling and energy recovery. In addition to providing power from the combustion of refuse, an energy recovery system in conjunction with recycling reduces the volume of material to be landfilled, enhances protection of groundwater and surface water resources, and provides a long-term means of solid waste processing and disposal.

TABLE 2-26
SUMMARY OF COLLECTION PRACTICES

Franchise/Service Area	Customer Base[a] Residential	Customer Base[a] Commercial	VEHICLE TYPES: Rear Load Number	Rear Load Capacity[b]	Front Load Number	Front Load Capacity[b]	Roll Off Number	Number In Crew Residential	Number In Crew Commercial	Transfer Stations
Gulf Disposal[c]	25,217	1,800	10	25	5	40	4	2	1	None
			(2)	(27)						
Cape Coral/Pine Island	15,647/3,848	1,026/118	11	25	2	40	15	2	1	None
					1	25				
Turner Disposal	9,266	550	10	10	3	25	None	1	1	1
Lehigh Utilities	8,479	260	7	25	2	25	None	1 or 2	1	None
Beach Disposal[d]	8,305	801								
Sanibel Disposal[d]	2,505	319	10	13 to 25	5	40	2	1 or 2	1	1
Captiva Disposal[d]	359	53								
City of Ft. Myers[e]	8,072	1,906	8	25	5	32	None	3	1 or 2	None
			(3)	(32)				(1)		

SOURCE: Conversations with franchise/service area haulers and Lee County Solid Waste Department personnel.

[a] The numbers shown here are for the period ending July 1987 for areas under mandatory collection ordinance, or the period ending January 1987 for remaining areas.

[b] Capacity is indicated in cubic yards.

[c] The values shown in parentheses are for side load vehicles which are used for the rural routes.

[d] Browning Ferris Industries (BFI) handles these areas. The numbers shown are for the combined areas since an individual breakdown is not available.

[e] The City of Fort Myers is gradually converting to a totally automated system. The numbers shown in parentheses represent the number of automated trucks in use at this time.

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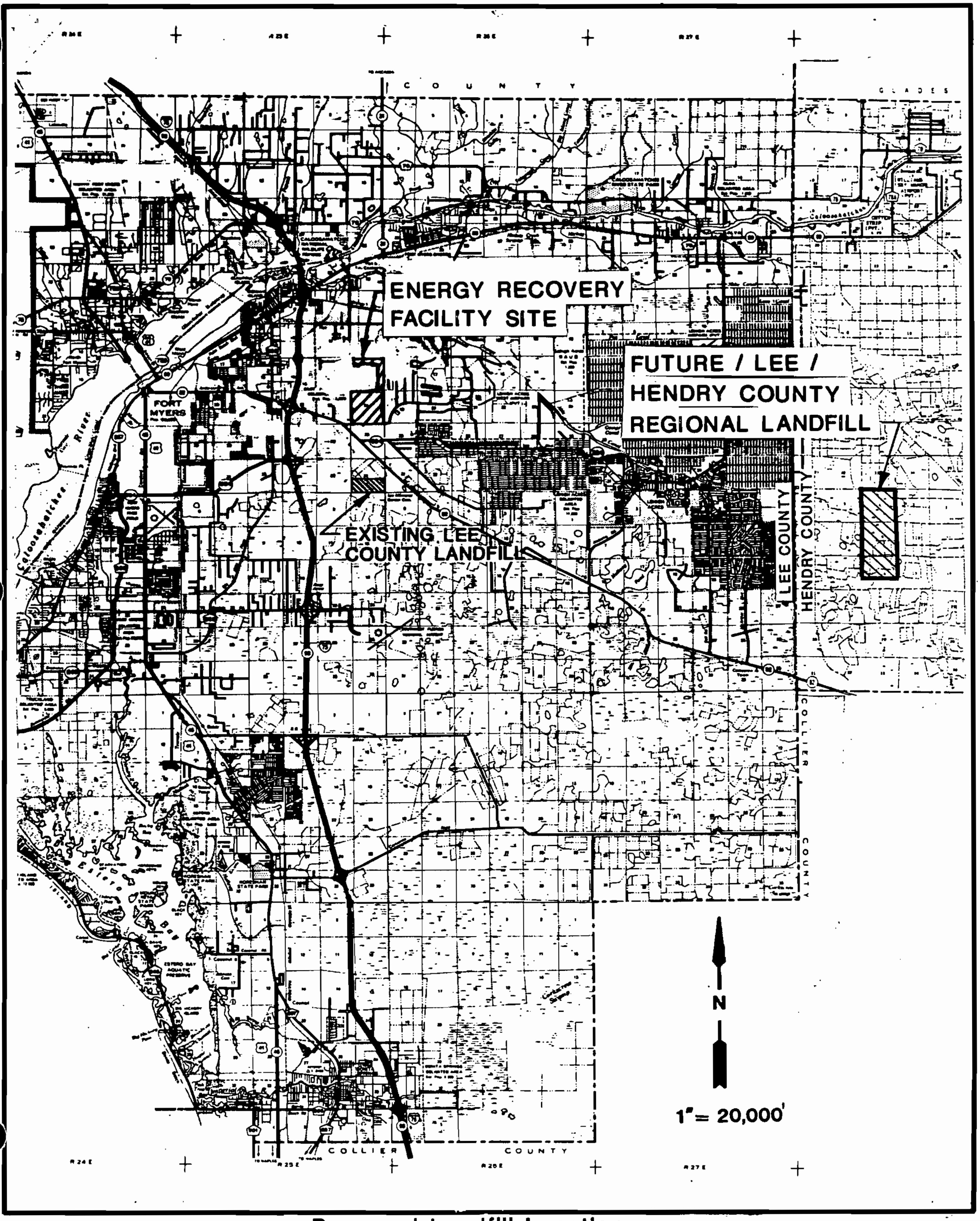

Proposed Landfill Location
Lee County Energy Recovery Facility

FIGURE 2-16

2.3 BIOPHYSICAL ENVIRONMENT

2.3.1 GEOLOGY AND SOILS

The subsections under this topic describe the soils and geology of the site. Information from existing documents, the results of a site-specific geotechnical investigation, and further details of the site-specific geotechnical investigation, together with regional geological information, are presented below.

Site Soils Information

The U.S. Soil Conservation Service (SCS) has published a soil survey for Lee County (USDA, 1984) that was used to identify the characteristic soils on site. The predominant soil series association in the area of the site is the Oldsmar-Malabar-Immokalee series. This association is composed of nearly level, poorly drained, deep sandy soils with a loamy subsoil in some locations. Figure 2-17 depicts the major individual soil units on and near the site. The major soil units on-site include the following.

Unit No.	Soil Unit
13	Boca fine sand
14	Valkaria fine sand
26	Pineda fine sand
27	Pompano fine sand, depressional
34	Malabar fine sand
44	Malabar fine Sand, depressional
74	Boca fine sand, slough
75	Hallandale fine sand, slough
77	Pineda fine sand, limestone substratum

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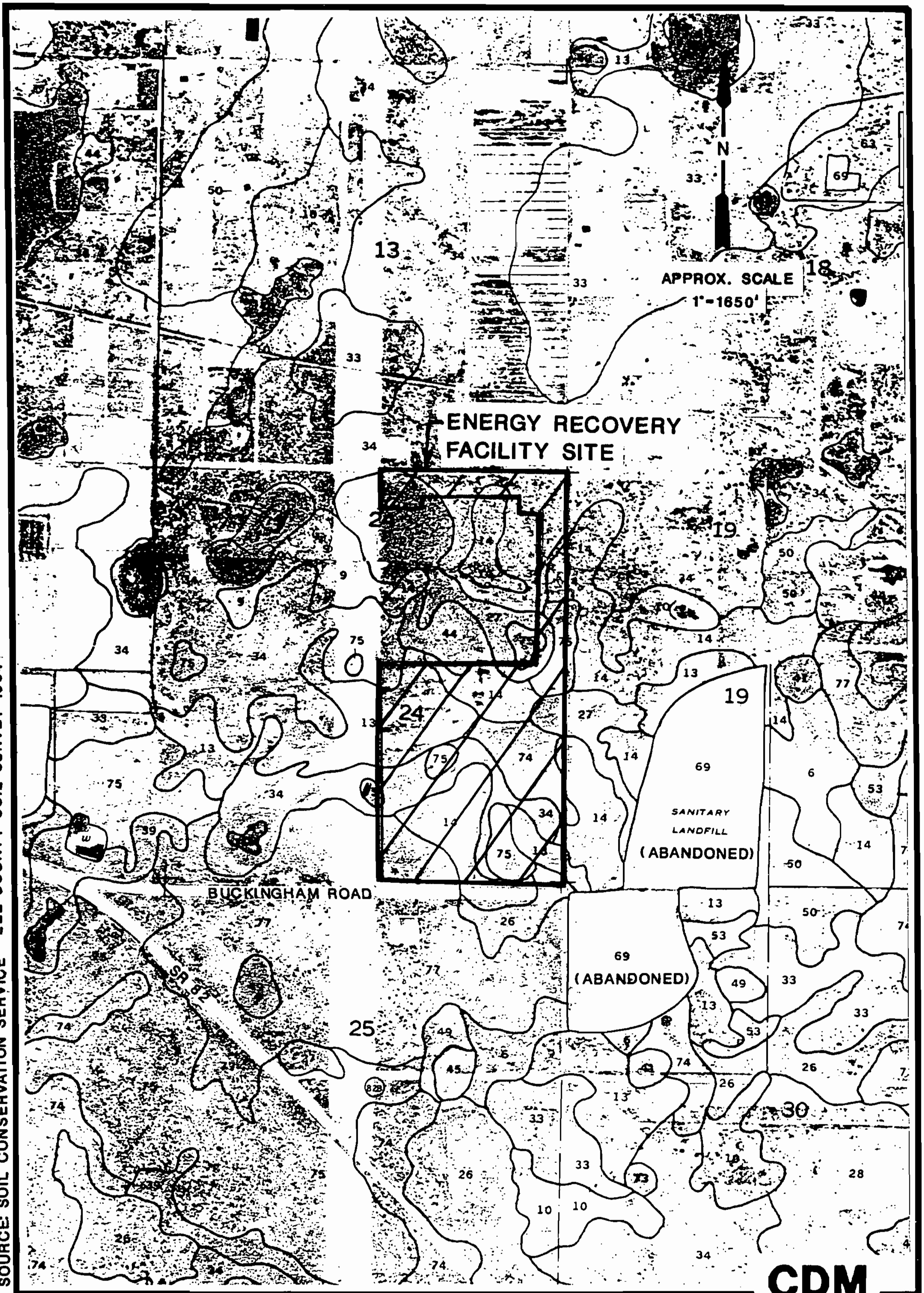


CDM

Facility Soils Map
Lee County Energy Recovery Facility

FIGURE 2-17

Most of the site is composed of soils from the Boca and Malabar series (soil units 13, 74, 34 and 44 on the map) with isolated areas of Valkaria fine sand (soil unit 14), and Hallandale fine sand (soil unit 75) in slough throughout. There are small areas of Pineda fine sand (soil units 26 and 77) along the southern border of the site including an area with a limestone substratum at depths beyond 50 inches in the southwestern corner. The principal soil series on-site are Malabar, Valkaria, Pompano, and Boca. Each series is summarized below.

The Malabar series consists of deep, sandy soils that are poorly drained. The soils have a moderately low permeability ranging from about 6 to 20 inches per hour but have a zone of much lower permeability (less than 0.2 inches per hour) at depths from about 40 to 60 inches below land surface. The soils have less than 25 percent clay, one to two percent organic matter, and have a low shrink/swell potential. They were formed as thick beds of sandy and loamy marine sediments.

Soils of the Valkaria and Pompano series are deep, poorly drained siliceous sands and fine sands that were formed in thick beds of sandy marine sediments. They have a high permeability of 6 to 20 inches per hour. The soils are found in sloughs and depressional areas and are usually level or sloping up to one percent. The soils have less than five percent clay, one to five percent organic matter, and a low shrink/swell potential.

In areas where the Malabar, Valkaria, or Pompano soils are present, the water table in the uppermost aquifer rises to within 10 inches of the ground surface for one to four months of the year, is 10 to 40 inches below ground surface for about six months a year, and falls beyond 40 inches deep for about three months during dry periods. Where these soils are present in depressions, water ponds on the soil for three to six months per year. In sloughs, these soils are covered by slowly moving, shallow water for seven days to one month or more during and following periods of heavy rain.

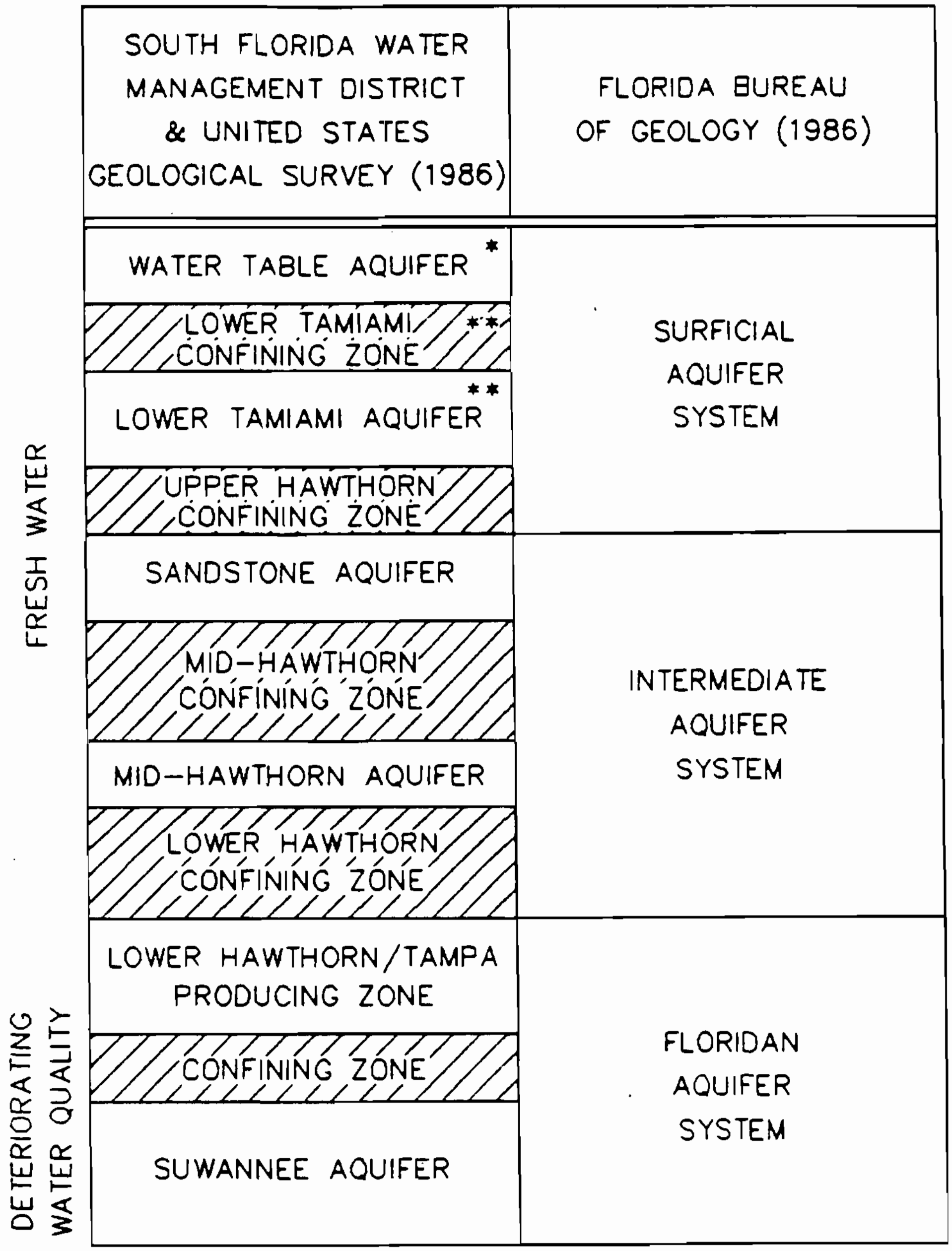
The Boca series consists of deep, poorly drained fine sand and fine sandy loam soils. The soils have a moderate permeability of 6 to 20 inches per hour in the upper two to three feet of soil where the clay content is less than two percent and 0.6 to 2 inches/hour below that depth because the clay content increases to about 10 to 30 percent. The soils were formed in moderately thick beds of marine sediment over limestone. The soils have one to three percent organic matter and a low shrink/swell capacity. Fractured limestone was encountered at a depth of 30 inches in a typical sample representative of the series (a pedon). The fractured limestone was reported to have solution cavities filled with sandy clay loam soil. These soils are usually found in nearly level areas with zero to two percent slope in flatwoods, depressional areas, and sloughs. In the flatwoods, the water table level of the uppermost aquifer is usually within 10 inches below the ground surface for two to four months per year, and recedes below the limestone (beyond 25 to 40 inches) for about six months. In depressional areas, water ponds on the soil for three to six months, and slowly moving water covers the soil in sloughs for seven days to one month or more during and following periods of high rainfall.

For all of these soils, site development is hampered by severe wetness or ponding, seasonal drought, potential for site flooding, and the lack of stability and cohesiveness of soils during excavation; and the Boca series is further limited by the shallow depth to rock (USDA, 1984; Tables 10 and 11). The soils are generally poor materials for roadfill (due to wetness) and are too sandy for gravel or topsoil, but are generally good sources of sand materials (USDA, 1984; Table 12).

Regional Geology

The sequence of geologic sediments that underlie Lee County, Florida, from land surface to a depth of approximately 1,000 feet NGVD, contains three major aquifer systems separated by low permeability confining zones. Figure 2-18 indicates the generalized geologic stratigraphy, which includes the surficial, intermediate, and Floridan aquifer systems.

Surficial Aquifer System. The surficial aquifer system is composed of the water table aquifer and, in the southern part of the County, the lower Tamiami aquifer. The leaky Tamiami confining bed pinches out northwest of Bonita Springs and along a southwest-northeast trending zero isopach line



* INCLUDES LOWER TAMIAMI AQUIFER NORTH OF BONITA SPRINGS AREA

** ONLY PRESENT IN BONITA SPRINGS AREA

NOT TO SCALE

SOURCE: CDM, 1987

CDM

Generalized Geologic Stratigraphy – Lee County, Florida

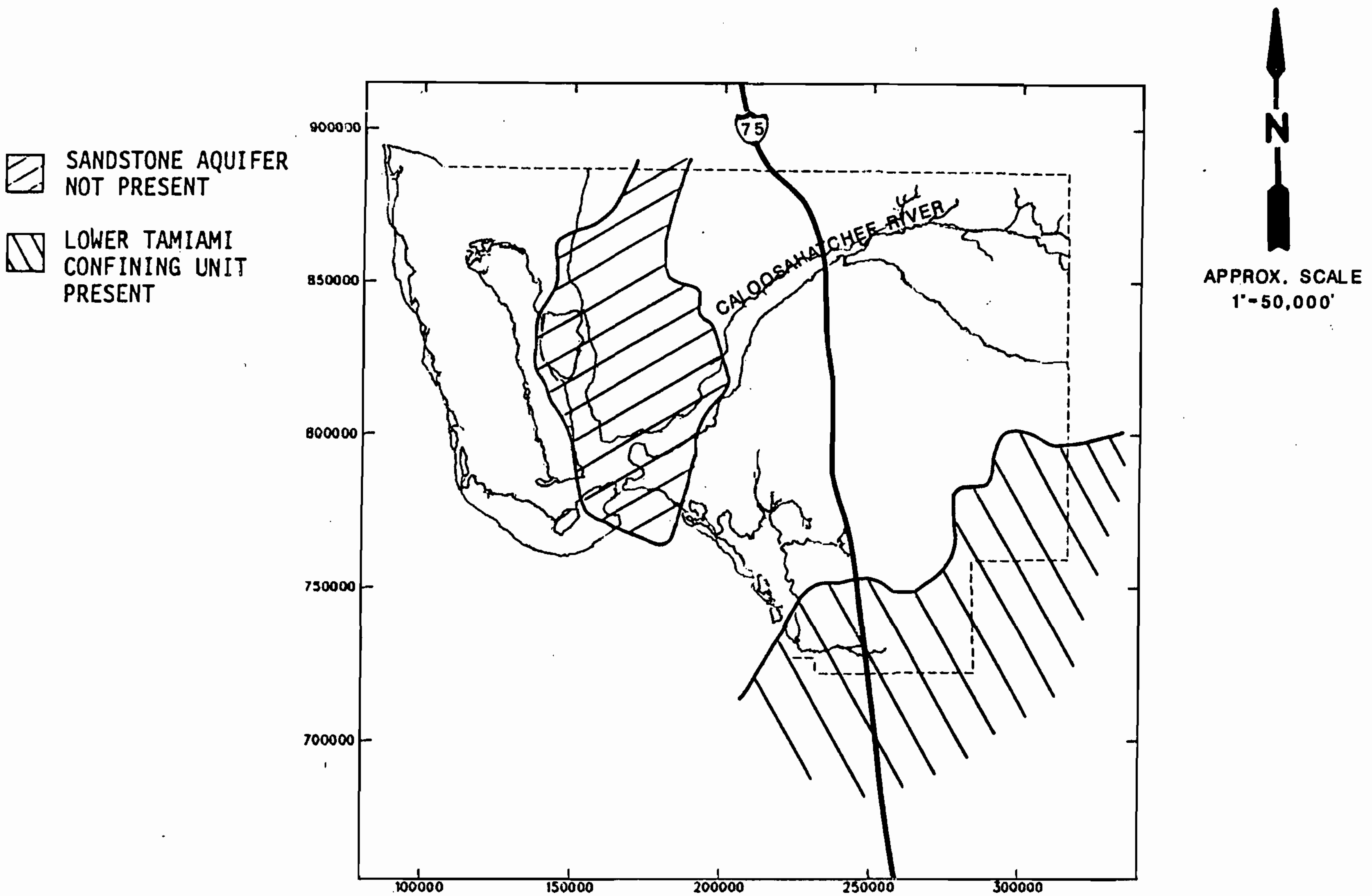
FIGURE 2-18

from the Gulf Coast at the Lee-Collier County line to the intersection of Townships 44 and 45 at the Lee-Hendry County line (see Figure 2-19). To the north and west of this zero isopach line, where the proposed energy recovery facility site lies, the lower Tamiami aquifer becomes unconfined and is therefore considered part of the water table aquifer. In general, the water table and lower Tamiami aquifers, and the intervening lower Tamiami confining zone, consist of unconsolidated sands, sandstones, shell beds, and limestones, of the undifferentiated Quaternary Age surficial deposits and the Tertiary Age Tamiami formation.

Recharge to the surficial aquifer system in Lee County comes from five principal sources: 1) direct infiltration of precipitation, 2) inflow from surface water bodies, 3) subsurface flow from adjacent areas, 4) upward leakage from semi-confined aquifers, and 5) infiltration from free-flowing artesian wells at the ground surface. Direct infiltration from precipitation is the major source of recharge to the aquifer. Surface water bodies (Caloosahatchee River, canals, lakes, and rock quarries) may act as recharge sources when their water levels exceed the groundwater levels. The generally high groundwater levels compared to the elevations of surface water bodies suggest that the groundwater may frequently recharge surface water bodies (Wedderburn et al., 1982).

Discharge from the water table aquifer occurs as flow into streams and wetlands, evapotranspiration, downward leakage into underlying semi-confined aquifers, surface outflow to adjacent areas, and pumping from wells. Evapotranspiration is the major source of natural water loss from the water table aquifer (Wedderburn et al., 1982).

Intermediate Aquifer System. The intermediate aquifer system underlies the surficial aquifer system across the entire County and acts as a regional confining sequence for the deeper Floridan aquifer system (Knapp et al., 1986). This aquifer system is composed predominantly of low permeability clays, dolosilts, limestones, and mixtures of these lithologies. The intermediate aquifer system is capped by an areally extensive zone of very low permeability greenish gray phosphatic, clayey dolosilts and is termed the Upper Hawthorn confining unit. The first appearance of the greenish-gray phosphatic clayey dolosilts is recognized as the top of the Hawthorn formation in Lee County.



CDM
FIGURE 2-19

Geologic Unit Pinchout Boundaries - Lee County Energy Recovery Facility

The intermediate aquifer system can be subdivided into two aquifers (the sandstone and mid-Hawthorn) separated by the semi-confining mid-Hawthorn zone. The sandstone aquifer underlies the Upper Hawthorn confining zone in nearly all of Lee County but pinches out in the northwestern part of the County (see Figure 2-19). Although the term "sandstone" has been applied to the aquifer, in reality this aquifer is composed of two distinct lithofacies: a classic (sandstone) and a subordinate carbonate (limestone), both confined above and below by clayey dolosilts.

Major recharge to the sandstone aquifer comes from downward leakage from the surficial aquifer system. A hydraulic connection appears to exist between the surficial aquifer system and the sandstone aquifer based on the similar hydrograph shapes in adjacent wells in both aquifers (Boggess and Watkins, 1986). The underlying mid-Hawthorn aquifer has higher potentiometric levels than the sandstone aquifer, but upward leakance is considered minimal due to the better confining properties of the mid-Hawthorn confining zone overlying the mid-Hawthorn aquifer (Wedderburn et al., 1982).

The mid-Hawthorn confining zone underlies the sandstone aquifer in Lee County and is composed of a relatively thick sequence of clayey dolosilts locally interbedded with thin seams of porous limestone, dolostone, and sand. The unit effectively separates the mid-Hawthorn aquifer from overlying hydrostratigraphic units. The mid-Hawthorn aquifer lies below this confining zone and is present throughout the County. Lithologically the unit consists of sandy and phosphatic limestones and dolostones which exhibit intergranular, moldic, and possible fracture and solution porosity. Over most of the County, the potentiometric surface of the mid-Hawthorn aquifer is above land surface, creating flowing artesian conditions in wells which penetrate it.

The lower Hawthorn confining zone lies below the mid-Hawthorn aquifer, and consists of sandy, phosphatic, poorly indurated limestones interbedded with phosphatic dolosilts. The low permeability of this unit results from the fine-grained nature of the rocks, although localized zones of high permeability limestones, dolostones, and sandstones do occur.

Floridan Aquifer System. The Floridan aquifer system lies hydrostratigraphically below the intermediate aquifer system. In the upper portions of the system in Lee County, the Floridan aquifer system can be subdivided into the lower Hawthorn/Tampa producing zone and the Suwannee aquifer.

Water quality in the lower Hawthorn/Tampa producing zones is brackish to saline. Most of the recharge to the lower Hawthorn/Tampa producing zone originates from outside the County, probably in the Polk County highlands and adjacent areas where the aquifer crops out at higher elevations. Beds of low permeability micrites are present at the base of the lower Hawthorn/Tampa producing zone which separate this zone from the underlying Suwannee aquifer.

The Suwannee aquifer occurs within the interbedded poorly indurated micrites, phosphatic dolosilts, sands, and sandstones of the Suwannee Limestone (Oligocene). The Suwannee aquifer contains nonpotable water throughout all of Lee County. From the top of the lower Hawthorn/Tampa producing zone, water quality usually deteriorates with depth into the Suwannee and deeper aquifers.

Site-Specific Lithographic Description

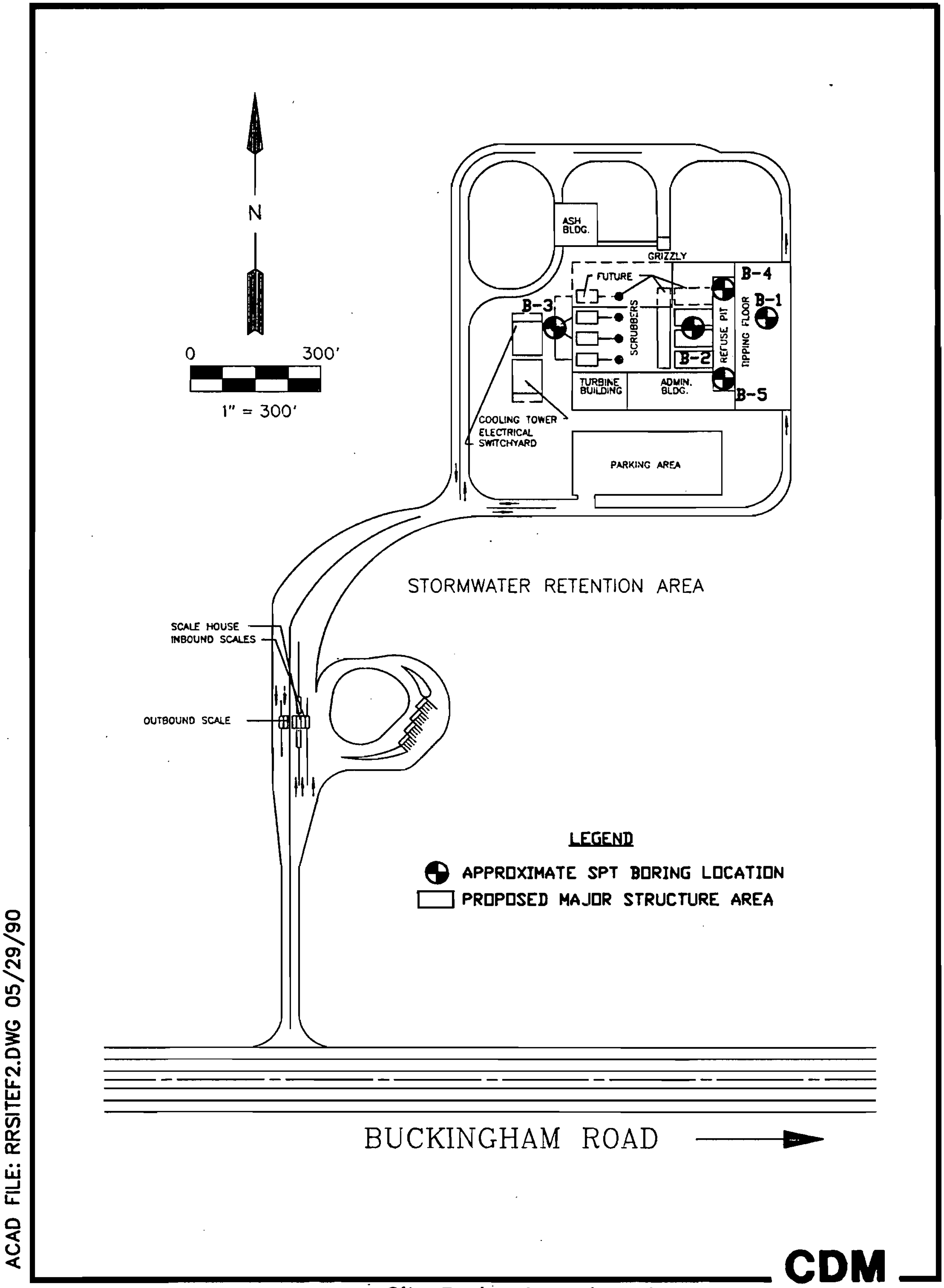
A geotechnical firm, Mortensen Engineering, Inc. of Tampa, Florida, was contracted to perform a site-specific investigation during April 1990. Their scope of work included installation of five standard penetration test (SPT) borings to a depth of 80 feet (done between April 4 to 6, 1990), classification of soils, and laboratory measurement of amounts of fine particles in selected samples. The geotechnical firm also made recommendations regarding potential subsurface capabilities and limitations to support facility structures. The geotechnical report that presents the field work results and findings is included in Appendix 10.1. The following paragraphs summarize some of the findings.

On-site Borings. The borings were sited in locations to provide geotechnical information about Facility structures. Figure 2-20 shows the locations of the borings on the proposed Facility layout plan. Boring B-1 was sited in the vicinity of the proposed tipping floor area, borings B-4 and B-5 were drilled at either end of the proposed refuse pit area, boring B-2 was placed west of the refuse pit, and boring B-3 was drilled at the proposed site of an exhaust or venting stack.

All five borings were installed to a depth of 80 feet below land surface following an SPT boring procedure consistent with the ASTMD-1586 method. A 2-15/16-inch diameter tri-cone roller bit and rotary wash drilling technique was used. Soil samples were collected using a split-barrel (split-spoon) sampler. Two or three soil samples were collected from the upper 10 feet of each boring, then samples were collected every 5 or 10 feet depending upon the lithology. The blow counts to advance the sampler one foot, called "N"-values, were recorded.

The boring logs are included as Plates 2, 3, and 4 in Appendix 10.1. The logs depict the geologic stratigraphy with depth, the N-values or blow counts (which also indicates collection of a soil sample), the percent of fines passing a 200 sieve (using ASTMD-1140), and the depth to groundwater during the drilling activities. The ground surface elevations of the borings are similar. The elevations of borings B-1, B-2, and B-3 are at 21.2 feet above National Geodetic Vertical Datum (NGVD), boring B-4 is at 21.4 feet, and boring B-5 is at 21.3 feet.

The boring logs demonstrate consistency in the site geology, but it should be noted that all five borings were constructed in a small area of about 250 feet north to south, and about 500 feet east to west. All of the borings encountered the same soil or rock formations at similar depths. The geotechnical subconsultant summarized the site stratigraphy which is presented in Table 2-27. The sands, sandy silt, and clayey silt of the upper three strata make up the soils of the uppermost water table (or



Site Boring Locations
Lee County Energy Recovery Facility

FIGURE 2-20

TABLE 2-27
SUMMARY OF SOIL BORINGS

Approximate Depth	Stratum No.	Material Description	Material Relative Density or Consistency
0 to 3 feet	1	Fine SAND to slightly silty fine SAND	Loose
3 to 6-1/2 feet	2	Clayey/calcareous SAND and limestone fragments (CAPROCK)	Medium-Dense
6-1/2 to 20 feet	3	Sandy/clayey SILT, with limestone fragments (MARL)	Soft
20 to 25 feet	4	Silty CLAY	Soft/Firm
25 to 67 feet	5/6	Silty to slightly clayey fine SAND with trace phosphates	Very loose to loose (limited medium-dense)
67 to 80 feet	7	Weathered SANDSTONE	Medium-dense (limited dense)

surficial) aquifer. The so-called caprock in stratum 2 may encourage infiltrating water to perch above that strata but it is part of the uppermost aquifer. The silty clayey soil of stratum 4 comprises the confining unit (aquitard) between the water table aquifer and the underlying sandstone aquifer (stratum 7). Stratum 4 is not illustrated on the boring log for boring B-3 but is possibly present between the 15- and 25-foot sampling depths. The confining unit is part of the upper Hawthorn formation. Strata 5 and 6 are transitional soils between the confining unit and the sandstone aquifer. The upper portion of the strata may behave hydraulically as part of the confining unit. Although they are comprised of silts and silty clays, the lower portion of the strata may behave hydraulically as part of the underlying sandstone aquifer (personal communication, R. Mortensen, Mortensen Engineering, Inc., May 2, 1990).

The water table was approximately 2-1/2 to 4 feet below ground surface during the geotechnical field investigation. Circulation of drilling mud was lost at about the 76-foot depth in borings B-2 and B-3. The 100 percent circulation loss occurred in the weathered sandstone formation and may be attributable to the poorly cemented sandstone which is highly porous. Loss of drilling mud circulation in the sandstone formation occurs about 70 percent of the time when drilling in that formation in southwestern Florida; it is not indicative of sinkhole activity and does not pose a reason for concern (personal communication, R. Mortensen, Mortensen Engineering, Inc., May 2, 1990). After completion of the borings, each was grouted to ground surface with Portland cement.

Soil Sample Data. Ten of the soil samples were sent to the laboratory for limited physical testing to determine the percentage of materials in the soil samples that have a diameter less than 75 microns, referred to as fines. The results of the tests, and information about the location of each sample, are summarized in Table 2-28. The percentage of fines in the samples ranges from 8 to 27 percent. No analyses for vertical and horizontal hydraulic conductivity were performed because the information was not needed for a structural evaluation.

TABLE 2-28

SUMMARY OF SIEVE DATA FOR SOIL SAMPLES

BORING	DEPTH OF SAMPLE (feet)	FORMATION (Stratum)	% MATERIAL PASSING Sieve 200
B-1	29	5	26
B-1	49	5	13
B-2	39	5	10
B-3	29	5	11
B-3	49	5	11
B-4	29	5	14
B-4	39	6	8
B-4	59	5	30
B-5	24	5	27
B-5	44	5	12

Formation Strata:

5 = Gray-green to gray silty to slightly clayey fine sand, trace phosphates.

6 = Gray-green to gray slightly silty to silty fine sand, trace phosphates.

Geologic Mapping

The significant geologic formations for the proposed Facility structures, and for the evaluation of hydrogeology and contaminant transport, are the water table aquifer, the Hawthorn confining unit, and the sandstone aquifer. Isopach maps of the tops of the confining unit and the sandstone aquifer were presented in a publication by the South Florida Water Management District (SFWMD)(1982). They show that the elevation of the top of the upper Hawthorn confining unit is nearly 0 feet NGVD, which is generally consistent with the site-specific boring logs which place the top of the upper Hawthorn confining unit (stratum 4 or 5) between +4 to -4 feet NGVD (17 to 25 feet below ground surface). The thickness of the confining unit may be 75 feet thick in the vicinity of the site (SFWMD) but the site-specific borings indicate confining unit (including strata 4, 5 and 6) to be about 40 to 50 feet thick.

A recent regional summary of Lee County water resources data was prepared by J. M. Montgomery & Associates (JMM, 1988). That report included an isopach map of the top of the sandstone aquifer which indicated that its elevation ranged between -4 to -60 feet NGVD in the vicinity of the site. That isopach map is included here as Figure 2-21. It shows that the proposed site is located in an area of the County where the sandstone aquifer formation is located closest to the ground surface. The site-specific borings indicate that the top of the sandstone aquifer (stratum 7) lies between -45 to -48 feet NGVD (66 to 69 feet below ground surface).

The Facility does not present sources of concern for groundwater degradation. However, for completeness of the permit document, a later section of this document, Section 4.3, addresses the potential impact the Facility may have on groundwater flow and quality. The clayey and silty clay soils of the upper Hawthorn confining unit (stratum 4 and to some extent stratum 5) will provide an effective barrier to downward movement of contaminants. Therefore, the potential for contaminant transport from the site will focus on the uppermost water table aquifer as the principal formation of concern in the unlikely event of releases to groundwater.

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

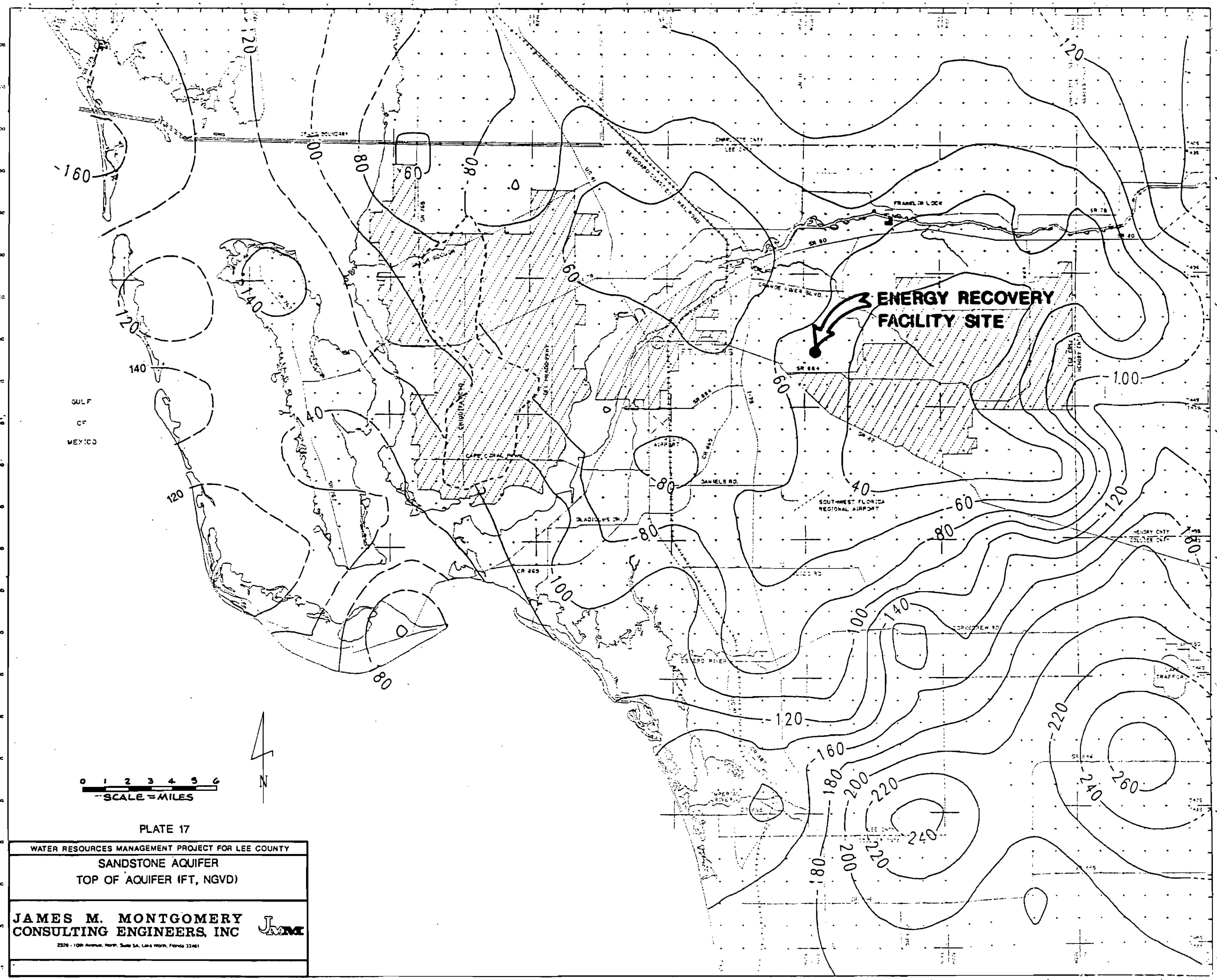


FIGURE 2-21

Soil Bearing Strength

The geotechnical subconsultant expressed a concern about the soft and/or loose unconsolidated soils to depths of nearly 70 feet. They also identified a potential for total and differential settlement in the soft to very soft clayey silt soils of stratum 3, the soft highly plastic silty clay soils of stratum 4, and the loose silty to clayey fine sand soils of strata 5 and 6. The geotechnical subconsultant offers two reasonable options for site improvement to support the Facility structures:

1. Improve the subsurface conditions using an in situ vibroreplacement technique, install stone columns in areas of major structures, and use a shallow foundation system for structure support; OR

2. Install deep end-bearing and/or friction piling foundation systems.

Each option is discussed below.

Vibroreplacement Option. Vibroreplacement has proven effective in improving silty sands, silts and soft clays. It uses gravel or stone as backfill along the vibrating probe to form stone columns about two feet in diameter. A cylindrical vibratory probe is used to form holes to a selected depth by displacing and compacting the soft silts, clays, or loose sands present. The gravel or stone backfill is compacted into the hole to create stone columns. The backfill is pushed laterally by the probe into the formation which reduces compressibility potential, and improves shear strength and bearing capacity. Stone columns at the proposed site may be 35 to 70 feet deep and spaced about 8 to 12 feet apart on centers. A field load test using 2 to 3 stone columns would have to be performed to establish the proper foundation design criteria and settlement analyses. Conventional strip and pad shallow foundations could be used to support the structures over a properly designed and installed improved soil/stone column system. The vibroreplacement and stone column technique should only be installed by qualified specialty foundation contractors.

Piling Option. The geotechnical subconsultant believes that pilings would need to be driven at least 80 to 100 feet below ground surface and into the sandstone layer (stratum 7). Deeper test borings, NX-diamond coring and strength testing of the sandstone formation would be needed to evaluate the deep piling foundation option. Piling foundations that could be considered include square prestressed, precast concrete piles, closed or open-ended concrete filled steel pipe piles; steel H-piles; and cast-in-place (such as auger cast) piles. The County has decided to direct the selected vendor to incorporate a friction piling foundation system for facility design and construction.

2.3.2 GROUNDWATER HYDROLOGY

The subsections under this topic summarize regional and site-specific data on the water table aquifer, the upper Hawthorn confining unit, the sandstone aquifer, and water quality.

Water Table Aquifer

The near surface hydrogeology is characterized by a close interrelationship between surface water and groundwater in the water table aquifer. The wetlands on-site are formed by overland flow of surface water in sloughs during rainy periods, and by groundwater discharge when the water table elevation is higher than the ground surface elevation in the wetlands. The seasonal groundwater elevations may vary on the order of three feet (USDA, 1984). The Lee County Water Resources Management Project (JMM, 1988) included maps of the dry and wet season water elevations for major aquifers. Figures 2-22a and 2-22b show the water level elevations for the water table aquifer in the wet and dry seasons, respectively. A comparison of the two figures indicates that the difference between the wet and dry season water level elevations near the proposed site is about two feet (from about 16 feet NGVD during the wet season to 14 feet NGVD during the dry season). The diagrams also clearly show the regional groundwater flow gradient at the site is northward toward the Caloosahatchee River. The hydraulic gradient in the vicinity of the site is about 0.001 feet/foot.

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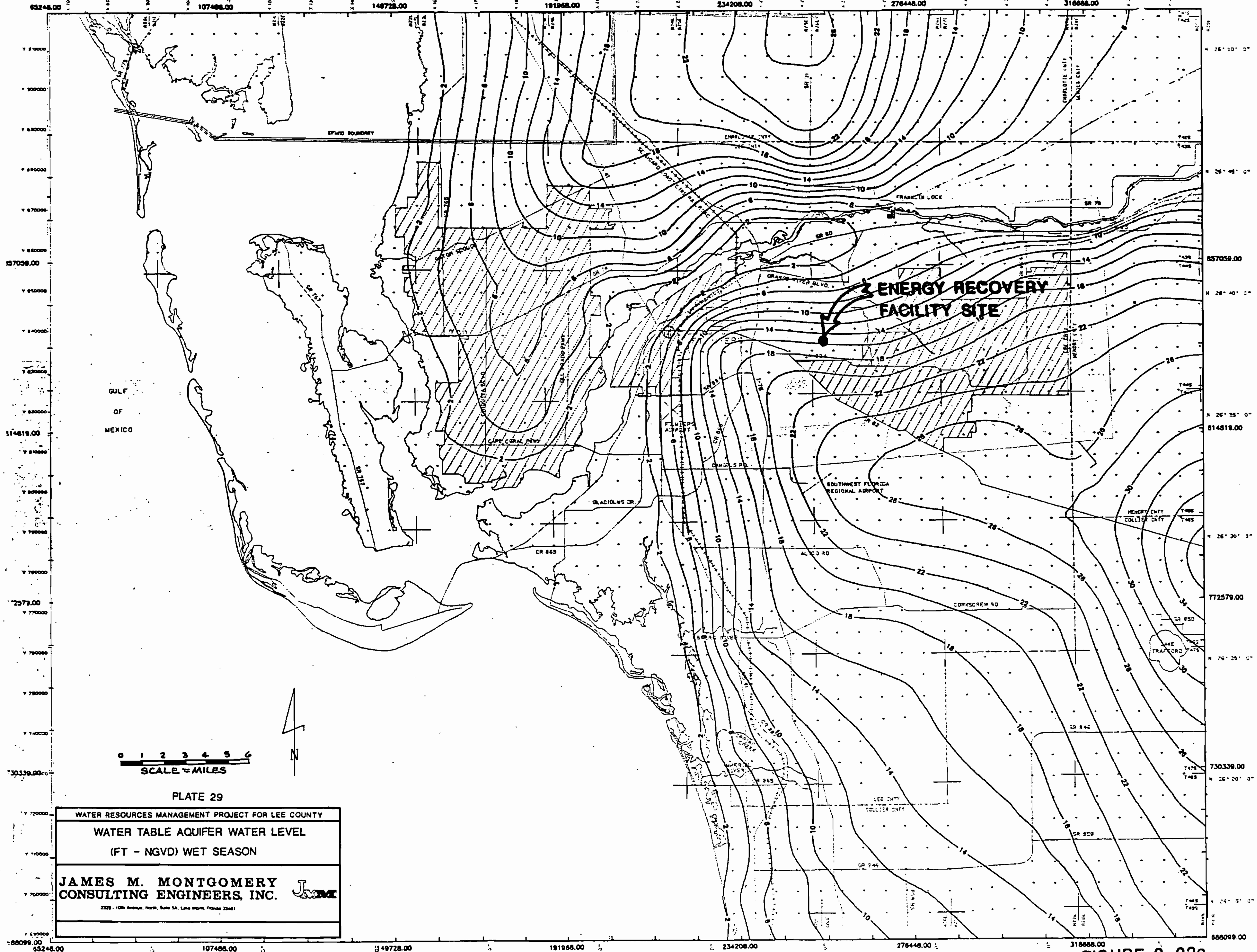

SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

FIGURE 2-22a

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SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

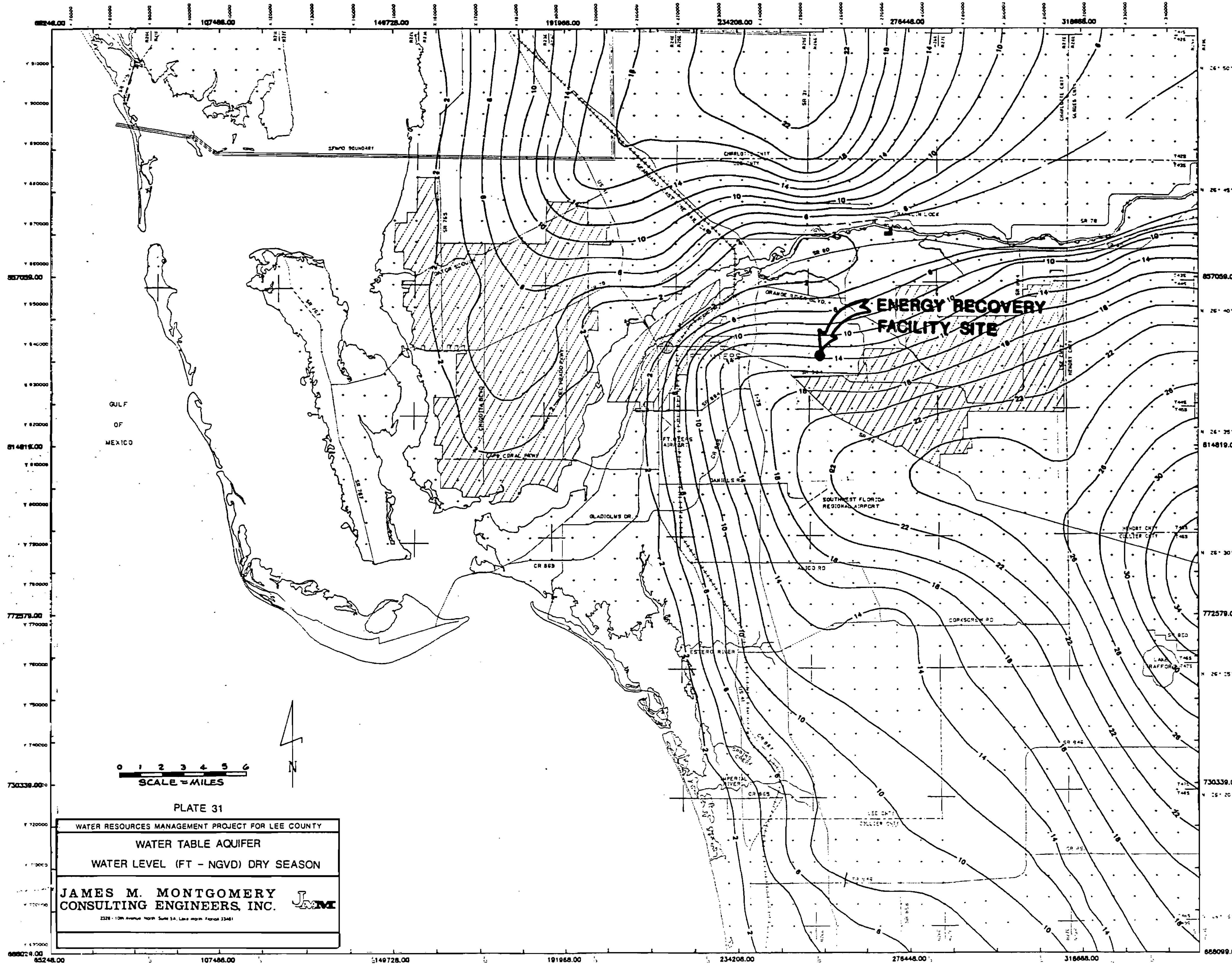

FIGURE 2-22b

The site-specific groundwater elevation data collected during the geotechnical investigation are higher than the regional data, and indicate that there is an overall southeasterly flow direction on-site. The on-site groundwater elevations measured during the field geotechnical investigation ranged from 17.2 to 19.2 feet NGVD. These data are summarized in Table 2-29. The wells are relatively closely spaced, and the water level data probably reflect local effects that are not evident in regional flow. The regional gradient should govern in cases of evaluating groundwater impacts.

It should also be noted that the groundwater data may not have been measured all in one day during the geotechnical investigation so that the information may not reflect similar hydrologic conditions at each boring location. However, there were no rainfall events during the field work.

The water table aquifer based on the site borings, is about 17- to 25-feet thick (if the transitional stratum 3 is included with the aquifer material). Reviews of regional data report that the water table aquifer thickness near the site ranges from less than 25 feet (SFWMD, 1982) to between 20 and 30 feet (JMM, 1988). An overall aquifer thickness for the proposed site, that can be used for estimation, is 20 feet.

The hydraulic transmissivity of the water table aquifer may be about 80,000 gallons per day/foot (gpd/ft) (JMM, 1988) which, for a 20- to 30-foot thick aquifer, equates to a value of hydraulic conductivity of about 400 to 550 feet/day. The proposed site lies within an area where the hydraulic conductivity of the water table aquifer was estimated to be about 900 feet/day in a County-wide modeling study (CDM, 1987). The specific yield of the water table aquifer is probably between 0.12 to 0.14 (unitless) (JMM, 1988). Other values for aquifer transmissivity and specific yield within four miles south of in the site area have been given as 150,000 gpd/ft and 0.15 (unitless) (Westinghouse Gateway Communities, 1984).

TABLE 2-29

ON-SITE GROUNDWATER ELEVATION DATA

BORING	GROUND SURFACE ELEVATION (feet NGVD)	DEPTH TO GROUNDWATER (feet)	ELEVATION OF GROUNDWATER (feet NGVD)
B-1	21.2	3.5	17.7
B-2	21.2	4	17.2
B-3	21.2	2	19.2
B-4	21.4	3	18.4
B-5	21.3	3.5	17.8

SOURCE: CDM, 1990 and Agnoli, Barber and Brundage, Inc. (Registered Land Surveyor).

NOTE: Depth to groundwater measured during field work on April 4 to 6, 1990.

The water table aquifer is used as a public water supply and agricultural irrigation aquifer. The public water supplies closest to the proposed site that are permitted to withdraw from the water table aquifer are the Gulf Utilites Green Meadows well field located about eight to ten miles southeast of this site, and the proposed Westinghouse Gateway well field about four miles southeast of the site.

Upper Hawthorn Confining Unit

The thickness of the confining unit in the vicinity of the site is about 50 feet (SFWMD, 1982). The on-site borings indicate that the confining unit composed of stratum 4 ranges in thickness from about three to eight feet. However, it is likely that at least portions of strata 5 and 6 are part of the confining unit and when they are included, the thickness ranges from about 42 feet in boring B-3 to about 52 to 58 feet in boring B-5.

The upper Hawthorn confining unit does, as all confining units do, allow some groundwater to be transmitted through the formation, but the water travels at a much slower rate. Groundwater moves through the confining unit when there is a hydraulic gradient across the layer, and it is typically assumed that the water flow is vertical. The assumption of vertical flow through the confining unit is a reasonable one, plus it simplifies the mathematics describing the interrelationship of adjacent aquifers. The vertical flow, or potential for flow, through an aquitard (confining unit) is often expressed in terms of a leakance value. In the vicinity of the site, this value is about 0.003 gpd/ft^3 (JMM, 1988). This value is not significant by itself, but can be used in equations of flow for the aquifer system. Another value for leakance within four miles south of the site area has been given as 0.001 gpd/ft^3 (Westinghouse Gateway Communities, 1984). The vertical hydraulic conductivity of the confining unit is on the order of 0.0005 feet/day (CDM, 1987).

Sandstone Aquifer

The sandstone aquifer is a confined aquifer. It is recharged from the overlying water table aquifer and from upgradient areas within the formation. Figures 2-23a and 2-23b depict the groundwater potentiometric surface of the sandstone aquifer during the wet and dry seasons. The

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SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

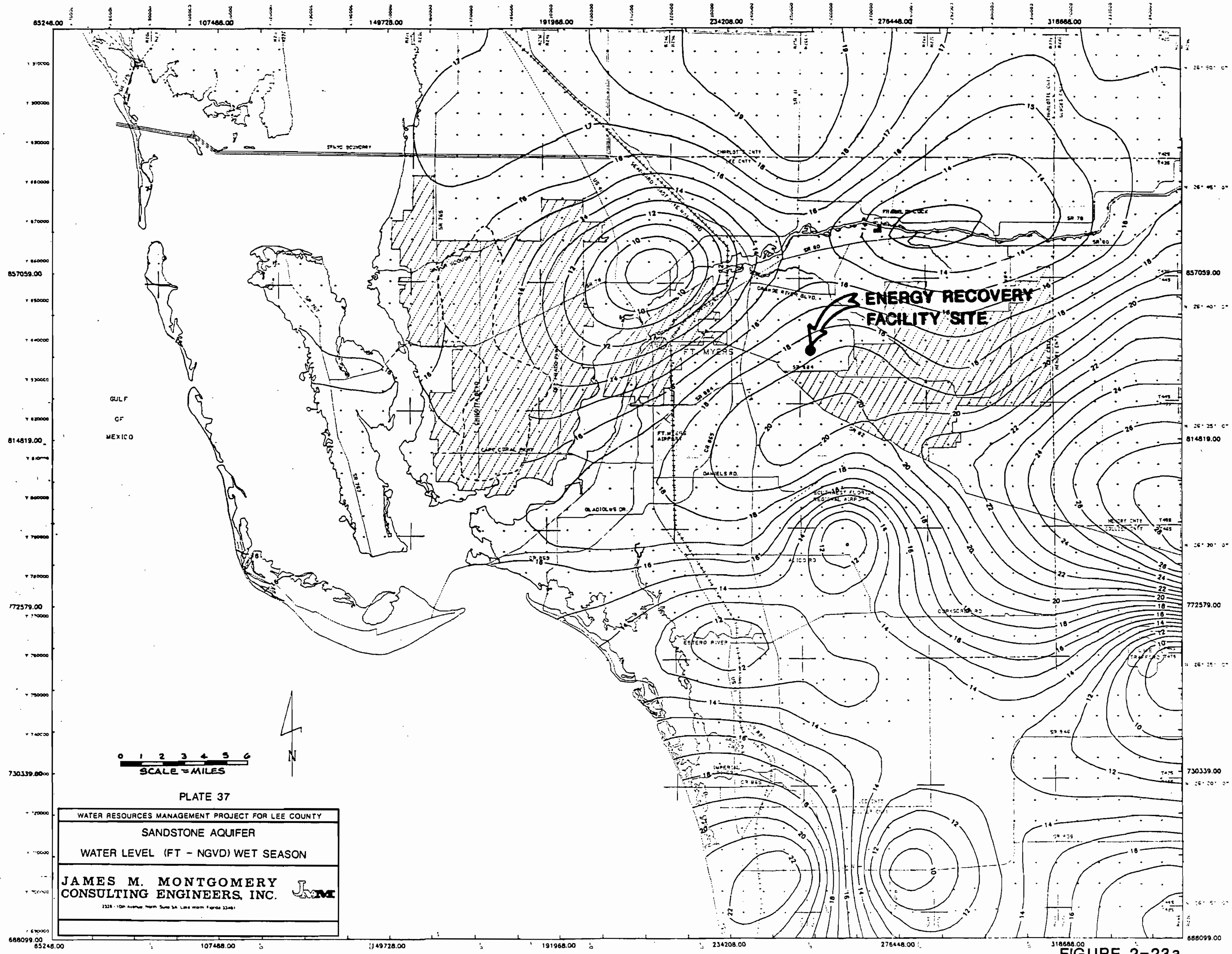

FIGURE 2-23a

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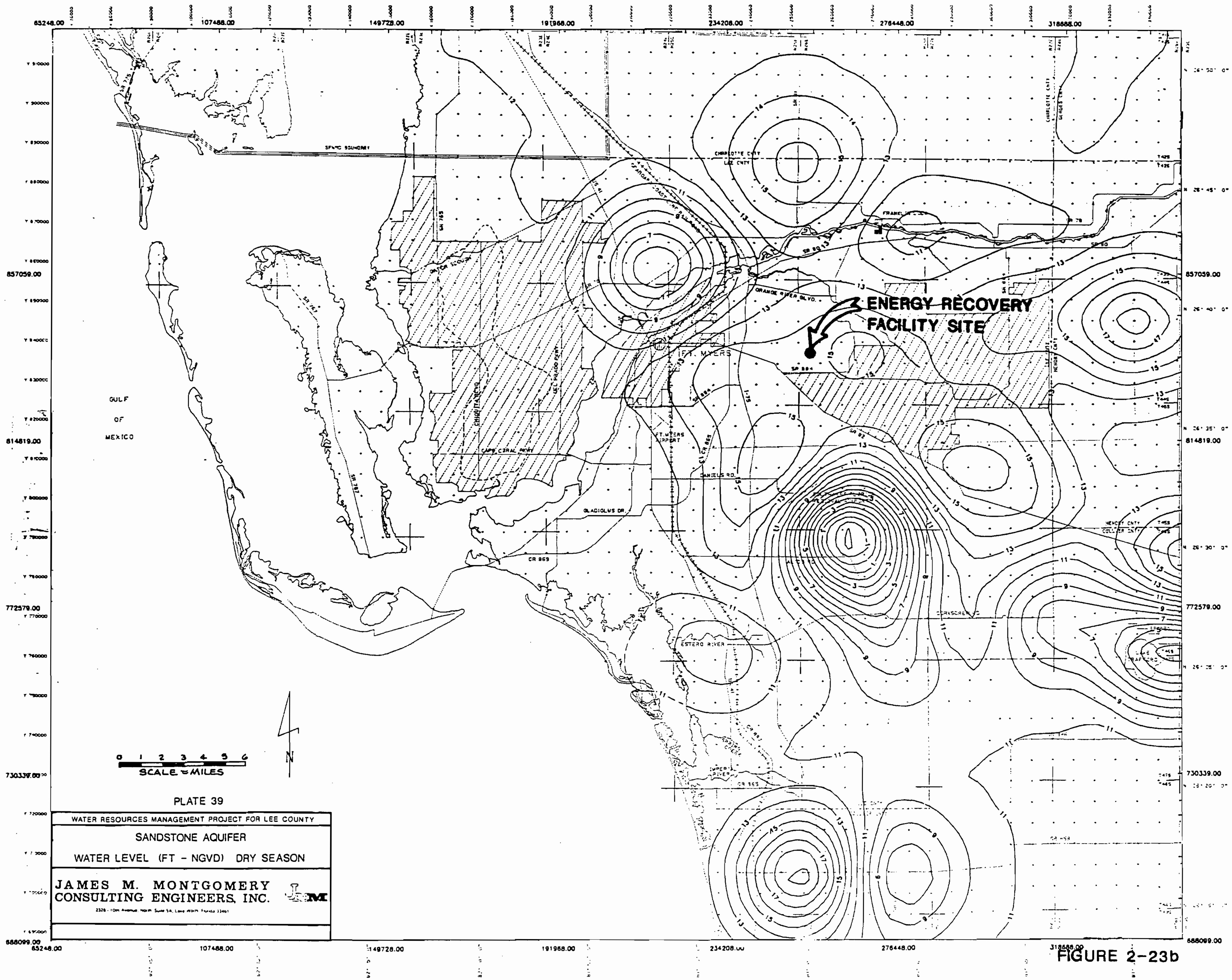


SOURCE: LEE COUNTY WATER RESOURCES MANAGEMENT PROJECT OCTOBER 5, 1988

FIGURE 2-23b

groundwater potentiometric head in the sandstone aquifer below the site ranges from about 18.5 feet NGVD during the wet season to 14.5 feet NGVD during the dry season (JMM, 1988). These elevations are slightly higher than the water table elevations (2.5 feet and 0.5 feet) which indicates there is an upward hydraulic flow gradient through the upper Hawthorn confining unit during the wet season and maybe during the dry season also.

The groundwater flow direction in the sandstone aquifer below the site is generally to the north-northwest (JMM, 1988). The hydraulic gradient in the vicinity ranges from about 0.0002 to 0.0003 feet/foot during the dry season to 0.0002 feet/foot during the wet season.

The thickness of the sandstone aquifer in the vicinity of the proposed site is between 25 and 50 feet (SFWMD, 1982), or between 40 and 60 feet (JMM, 1988). For estimation purposes, it would be reasonable to assume that the thickness of the sandstone aquifer is 50 feet at the site. None of the on-site borings were designed to penetrate the entire thickness of the sandstone aquifer so they can not be used to confirm the sandstone aquifer thickness.

The hydraulic transmissivity of the sandstone aquifer is about 10,000 gpd/ft (JMM, 1988), which for a 50-foot thick aquifer, equates to a value of hydraulic conductivity of about 30 feet/day. The proposed site lies in an area where the hydraulic conductivity of the sandstone aquifer was estimated to be about 50 feet/day in a county-wide modeling study (CDM, 1987). The coefficient of storativity ranges between 0.00024 to 0.00036 (unitless) (JMM, 1988). Another value for aquifer transmissivity within four miles south of the site area has been given as 20,000 gpd/ft (Westinghouse Gateway Communities, 1984).

The sandstone aquifer is used as a public water supply and agricultural irrigation aquifer. The public water supplies closest to the proposed site that are permitted to withdraw from the sandstone aquifer are the Lehigh Acres well field, located about eight to ten miles east and southeast of the site, Gulf Utilities Green Meadows well field, about eight to ten miles southeast of the site, and the proposed Westinghouse Gateway well field, about four miles southeast of the site.

A map that shows locations of permitted groundwater withdrawals (greater than 500,000 gallons/month) within a five-mile radius of the Facility site is provided as Figure 2-24. A groundwater well inventory lists the wells that have consumptive use permits (included as Appendix 9.2) and the smaller wells not permitted by SFWMD (Appendix 9.3).

Water Quality

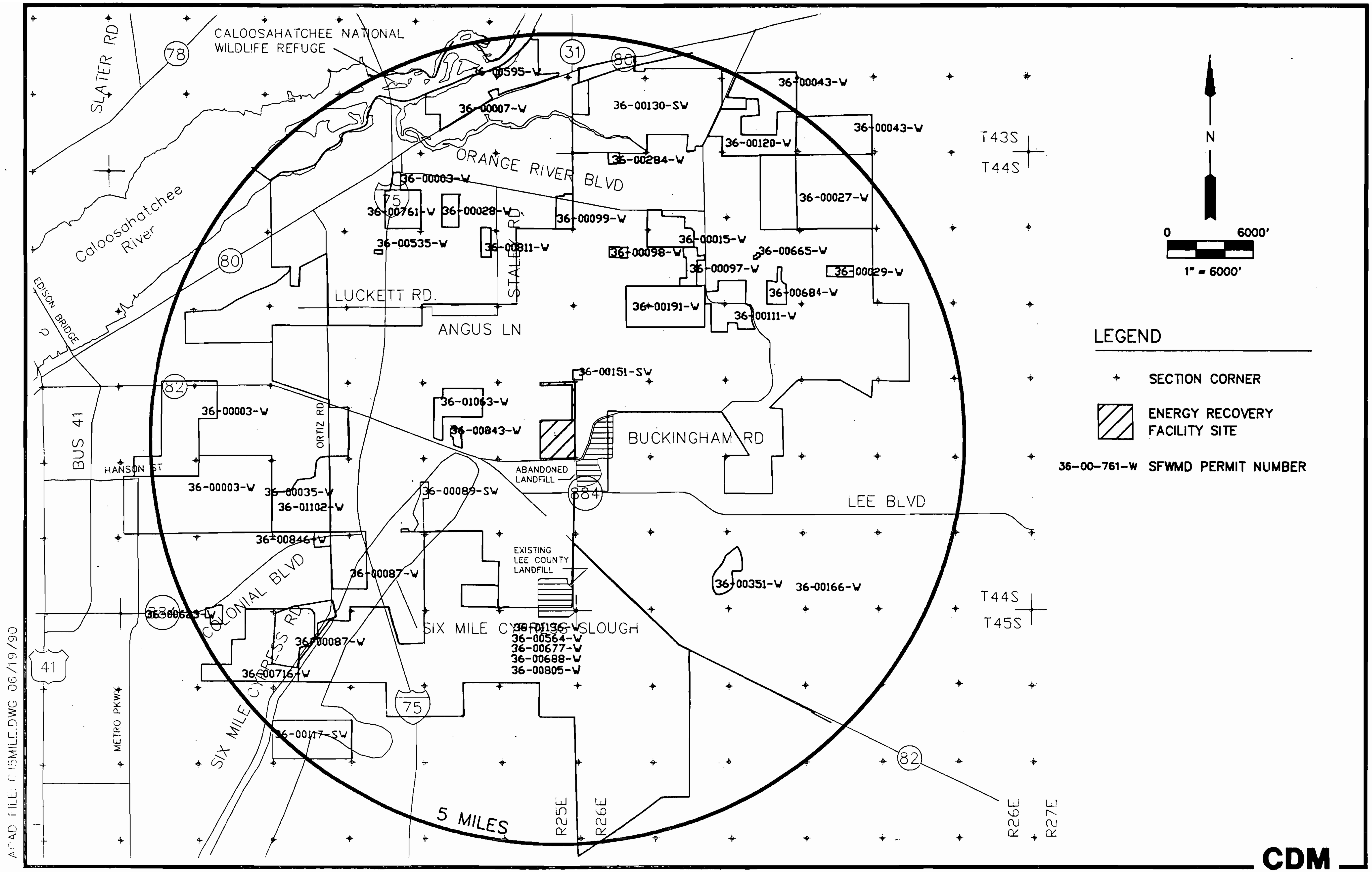
There are several USGS-monitored groundwater quality monitor wells located near the proposed site (Boggess and Watkins, 1986). Some of the closest monitor wells include:

Well No.	Open Depth	Unit Monitored	Approximate Distance from Site
L-234	70 to 100 feet	Sandstone Aquifer	1 mile west
L-1981	75 to 106 feet	Sandstone Aquifer	1/2 mile east
L-728	30 to 32 feet	Water Table Aquifer	1/2 mile south

Water levels and water samples from these wells are collected periodically. A water sample for chemical analysis was collected from monitor well L-1981 in 1976. The results of the laboratory analyses are included in Table 2-30 along with general water quality ranges for the water table and sandstone aquifers.

Additional monitor wells have been installed to monitor the abandoned landfill located southeast of the site. A USGS-sponsored study was performed to evaluate the impact the landfill had had on groundwater quality (Boggess, 1975). The County continues to monitor groundwater quality in monitor wells installed around the abandoned landfill.

The geologic deposits that make up the aquifer system in southwest Florida, principally limestone, dolomite and carbonate materials, contribute dissolved solids to the groundwater. The dissolved solids in the sandstone aquifer range from about 236 to 2,360 mg/L in the eastern part of the



Permitted Wells Within a Five Mile Radius – Lee County Energy Recovery Facility

FIGURE 2-24

TABLE 2-30

SUMMARY OF GROUNDWATER QUALITY DATA
(Adapted from Boggess and Watkins, 1986)
(Concentrations in mg/L except as noted)

Parameters	Water Table and Lower Tamiami Aquifer[a]	Sandstone Aquifer	Well L-1981[b]
Primary Drinking Water[c]			
Arsenic	0 to 0.001	0 to 0.001	NM[d]
Cadmium	0 to 0.002	0 to 0.002	NM
Chromium	0	0 to 0.001	NM
Lead	0.003 to 0.016	0 to 0.0022	NM
Mercury	0	0 to 0.005	NM
Sodium	20 to 100	26 to 520	100
Secondary Drinking Water			
Chloride	26 to 120	45 to 1,000	180
Copper	0 to 0.001	0 to 0.002	NM
Iron	0.01 to 0.21	0.01 to 0.74	0.08
Manganese	0	0 to 0.017	NM
Sulfate	5 to 71	2.0 to 410	82
Zinc	0.006 to 0.010	0 to 0.020	NM
Color (Pt-Co units)	10 to 100	0 to 8.6	10
pH	7.0 to 8.4	6.9 to 8.6	7.2
Total Dissolved Solids	137 to 570	328 to 2,350	785
Others			
Silica			33
Calcium			100
Magnesium			32
Strontium			1.0
Potassium			8
Fluoride			0.5
Bicarbonate			344
Alkalinity (as $CaCO_3$)			282
Hardness as $CaCO_3$: Calcium/Magnesium			380
Hardness as $CaCO_3$: Noncarbonate			98

[a] The lower Tamiami aquifer is not present near proposed site but the source document did not distinguish the lower Tamiami aquifer as being separate from th e water table aquifer.
[b] Samples collected for well L-1981 on April 6, 1976.
[c] Concentrations of Barium, Nitrate, Selenium and Silver were not analyzed or not reported so these parameters are deleted from the table.
[d] NM means not analyzed (measured).

County (Boggess and Watkins, 1986). Concentrations of total dissolved solids greater than 800 mg/L are considered to be an indication of saltwater contamination, possibly from underlying aquifers of brackish water. Concentrations of chloride usually range between 26 and 100 mg/L (Boggess and Watkins, 1986). Saltwater from the Caloosahatchee River and underlying brackish aquifers can influence local chloride concentrations.

2.3.3 SITE WATER BUDGET AND AREA USES

The general hydrologic conditions of the Facility site are outlined in Table 2-31. This table includes information on rainfall, temperature, estimated evapotranspiration, groundwater recharge, and surface runoff. The climatic data presented is for the Fort Myers weather station, as reported in the South Florida Water Management District's "Management of Water Use Permit Information Manual" (SFWMD, 1985). The Fort Myers station is reported as having 98 years of records for the rainfall and temperature data. The soils data used for this water balance are from the Soil Conservation Service's Soil Survey of Lee County, Florida (SCS, 1984).

The monthly evapotranspiration was estimated using the modified Blaney-Criddle formula which describes a linear relationship between evapotranspiration and mean air temperature. The general equation used for calculation of evapotranspiration (ET) is given as follows.

$$ET = (Kt * Kc)p\ t/100$$

where:
- ET = Evapotranspiration potential
- Kt = $0.0173t - 0.314$
- Kc = Growth factor for crop or vegetation
- p = Percentage of daylight hours
- t = Mean temperature in degrees farenheit

The monthly groundwater recharge was estimated based on the available water capacity for the soil types found on the Facility site. In Table 2-31, the evaporation potential and the groundwater recharge potential are subtracted from the average monthly precipitation, resulting in estimates of runoff in the last two columns. Runoff quantities are presented for groundwater recharge rates of 0.25 and 0.56 inches per month.

Table 2-31 indicates that, under average conditions, the maximum runoff will occur during the rainy season (June through September). However, runoff may occur throughout the year based on current climatic conditions. The average annual runoff from the site is estimated to be in the range of 7.97 to 10.21 inches. The results shown in Table 2-31 are similar to those found in the Lee County Water Resources Management Project (JMM, 1988). In that report, the estimated surface water runoff was 9.17 inches per year for their nine-square-mile study area which includes the location of the proposed energy recovery facility site.

Major water users in the area may be categorized as domestic, industrial, irrigation, and public water supply. A search of the SFWMD records has been conducted to locate all permitted wells within a five-mile radius of the Facility site. The wells may be permitted with a construction permit and/or a water use permit. A complete list of these permitted wells is provided in Appendix 9.1. Appendix 9.2 provides data for smaller wells not permitted by SFWMD which fall within the five-mile radius. Data for the smaller wells were provided by Lee County.

2.3.4 SURFICIAL HYDROLOGY

Hydrologic Characterization

The proposed Facility site has no surface water bodies within its boundary. DER jurisdictional wetlands are present along the western edge of the site. An isolated wetland encompasses approximately nine acres in the southern portion of the site (see Section 2.3.5). Existing surface water runoff sheet-flows into these wetlands, which provides some degree of storage. For large rainfall events, runoff flows westerly in a series of connected wetlands, or along the Buckingham Road swale which eventually flows under SR 82 into the Six Mile Cypress Slough.

TABLE 2-31

HYDROLOGICAL DATA REPRESENTATIVE OF THE PROJECT SITE
LEE COUNTY ENERGY RECOVERY FACILITY

MONTH	MONTHLY MEAN PRECIPITATION FORT MYERS (INCHES)[a]	MONTHLY MEAN TEMPERATURE (Degrees F)	MONTHLY MEAN PERCENTAGE OF DAYLIGHT HOURS	MONTHLY EVAPORATION POTENTIAL (INCHES)[b]	RUNOFF POTENTIAL IN/MONTH, AT STATED GROUNDWATER RECHARGE 0.25 IN MONTH[c]	0.56 IN/ MONTH[c]
JANUARY	1.90	64.32	7.46	1.03	0.62	0.31
FEBRUARY	2.16	65.36	7.11	1.59	0.32	0.01
MARCH	2.21	68.62	8.38	2.91	0.00	0.00
APRIL	2.37	73.07	8.65	4.20	0.00	0.00
MAY	3.90	77.34	9.40	5.81	0.00	0.00
JUNE	9.09	80.60	9.32	6.57	2.27	1.96
JULY	8.47	81.99	9.52	6.64	1.58	1.27
AUGUST	8.00	82.41	9.13	5.94	1.81	1.50
SEPTEMBER	8.13	81.15	8.32	4.64	3.24	2.93
OCTOBER	3.88	76.26	8.05	3.33	0.30	0.00
NOVEMBER	1.37	69.44	7.33	1.94	0.00	0.00
DECEMBER	1.51	65.50	7.34	1.18	0.08	0.00
	52.99 (INCH/ YEAR)	73.84 (ANNUAL MEAN)			10.21 (INCH/ YEAR)	7.97 (INCH/ YEAR)

(a) Climatological data is based on the data provided for the Fort Myers Weather Station included in the South Florida Water Management District's Management of Water Use Permit Information Manual. The weather station is reported as having 98 years of record (SFWMD, 1985).

(b) The evapotranspiration potential was estimated using the Modified Blaney-Criddle Equation.

(c) The soils data is based on the SCS Soil Survey of Lee County, Florida. Two groundwater recharge rates, 0.25 and 0.56 inch/month, are assumed based on available soils data to present minimum and maximum runoff scenarios.

The Six Mile Cypress Slough is classified in the Lee County Comprehensive Plan as an "Environmentally Critical Area" and a "Resource Protection Area." Historic drainage patterns on-site have been altered, in part, by an entrance road which acts as a drainage basin divide for small rain events. An existing 18-inch diameter culvert, located under the entrance road, connects a small depressional flow-way in the eastern portion of the site to the wetlands in the west (see Figure 2-25).

2.3.5 VEGETATION/LAND USE

Seventeen land use and vegetation types have been identified on the Lee County energy recovery facility site, as illustrated on Figure 2-26. These types have been classified to Levels III and IV of the Florida Land, Use and Cover Forms Classification System (FLUCFCS). The vegetation types for the site include farm pasture (210), low pasture (212), palmetto prairie (321), palmetto prairie invaded by exotics (3219), pine flatwoods (411), pine flatwoods invaded by exotics (4119), wet pine flatwoods (415), wet pine flatwoods invaded by exotics (4159), Brazilian pepper (422), mesic oak (425), wax-myrtle (429), Australian pine (437), drainage canal (514), cypress (621), cypress/pine (624), cypress/pine invaded by exotics (6249), and wet prairie (643).

The acreage quantities for the various vegetation types are based upon a Facility site acreage of 154.1 acres as determined by unrectified aerial photographs. The percentage of wetlands is based on the unrectified areal acreage. The boundary survey (see Figure 2-3) indicates a total Facility site size of 155 acres.

This site has been severely impacted from drainage practices, as well as overgrazing by cattle. As a result of these agricultural practices, most of the habitats on the site are in poor condition. Some of the habitats such as wax-myrtle (429), pine flatwoods (411), and wet pine flatwoods (415) have been logged in the past.

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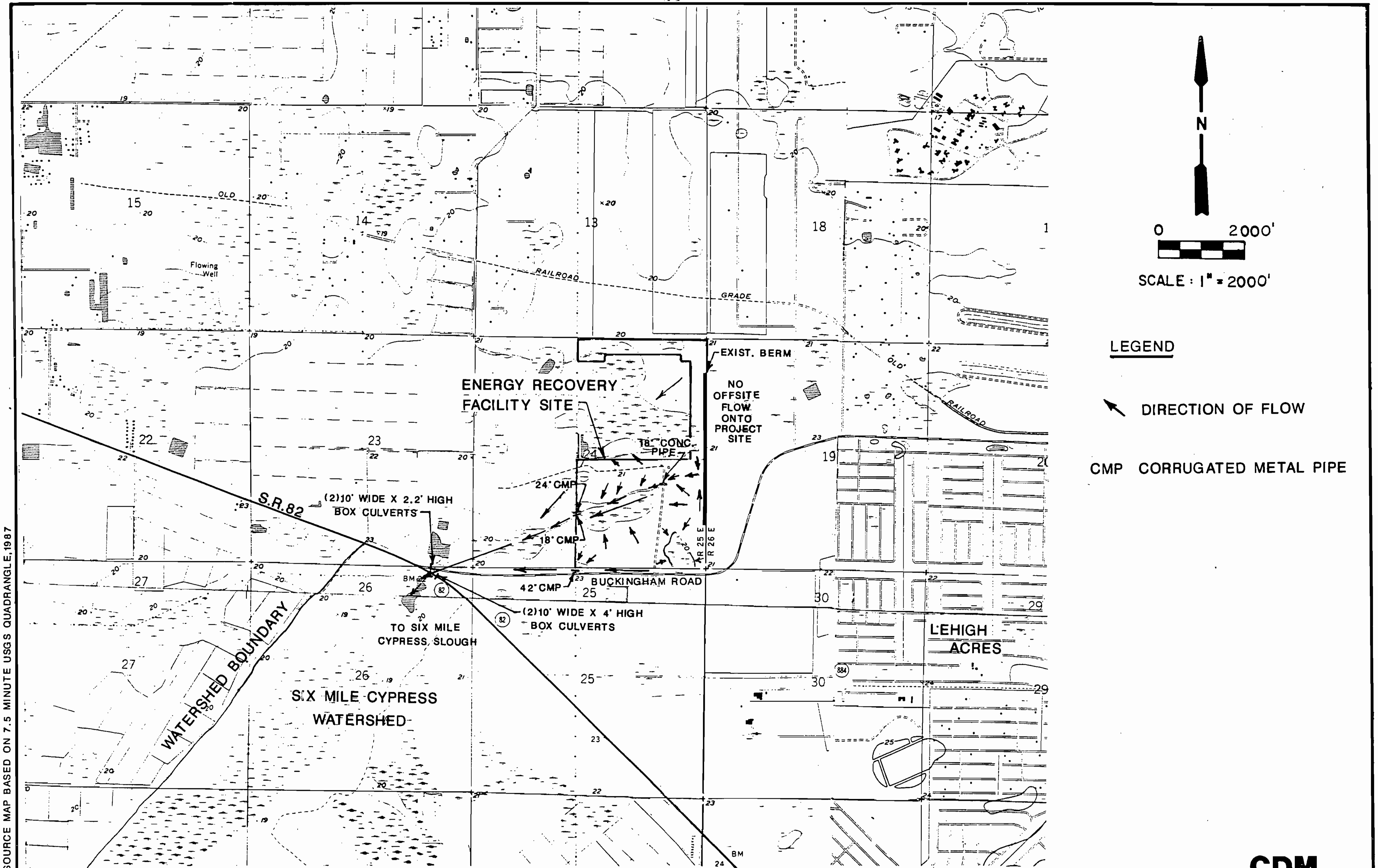

Predevelopment Surface Water Flow Patterns – Lee County Energy Recovery Facility

CDM

FIGURE 2-25

FIGURE 2-26
VEGETATIONAL COMMUNITIES AND LAND USE

COVER TYPE SUMMARY

COVER TYPE	HABITAT	ACRES	% OF TOTAL
210	FARM PASTURE	51.0	33.1%
212	LOW PASTURE	1.3	0.8%
321	PALMETTO PRAIRIE	3.8	2.5%
3219	PALMETTO PRAIRIE INVADED BY EXOTICS	0.3	0.2%
411	PINE FLATWOODS	17.9	11.6%
4119	PINE FLATWOODS INVADED BY EXOTICS	2.6	1.7%
415	WET PINE FLATWOODS	4.7	3.0%
4159	WET PINE FLATWOODS INVADED BY EXOTICS	3.1	2.0%
422	BRAZILLIAN PEPPER	2.9	1.9%
425	MESIC OAK	0.7	0.5%
429	WAX-MYRTLE	40.1	26.0%
437	AUSTRALIAN PINE	0.8	0.5%
514	DRAINAGE CANAL	0.6	0.4%
621	CYPRESS	13.7	8.9%
624	CYPRESS/PINE	2.8	1.8%
6249	CYPRESS/PINE INVADED BY EXOTICS	3.2	2.1%
643	WET PRAIRIE	4.6	3.0%
TOTAL PROJECT ACREAGE		154.1	100%

WETLAND JURISDICTIONAL SUMMARY

	COE		SFWMD		LEE CO.		DER	
COVER TYPE	ACREAGE	%	ACREAGE	%	ACREAGE	%	ACREAGE	%
212	0.0	0.0%	0.0	0.0%	1.3	0.8%	0.0	0.0%
415	4.7	3.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
4159	2.6	2.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
514	0.6	0.4%	0.0	0.0%	0.0	0.0%	0.0	0.0%
621	13.7	8.9%	13.7	8.9%	13.7	8.9%	9.2	6.0%
624	2.8	1.8%	2.8	1.8%	2.8	1.8%	2.7	1.8%
6249	3.2	2.1%	3.2	2.1%	3.2	2.1%	0.0	0.0%
643	4.6	3.0%	4.6	3.0%	4.6	3.0%	1.4	0.9%
TOTAL	32.2	21.2%	24.3	15.8%	25.6	16.6%	13.3	8.7%

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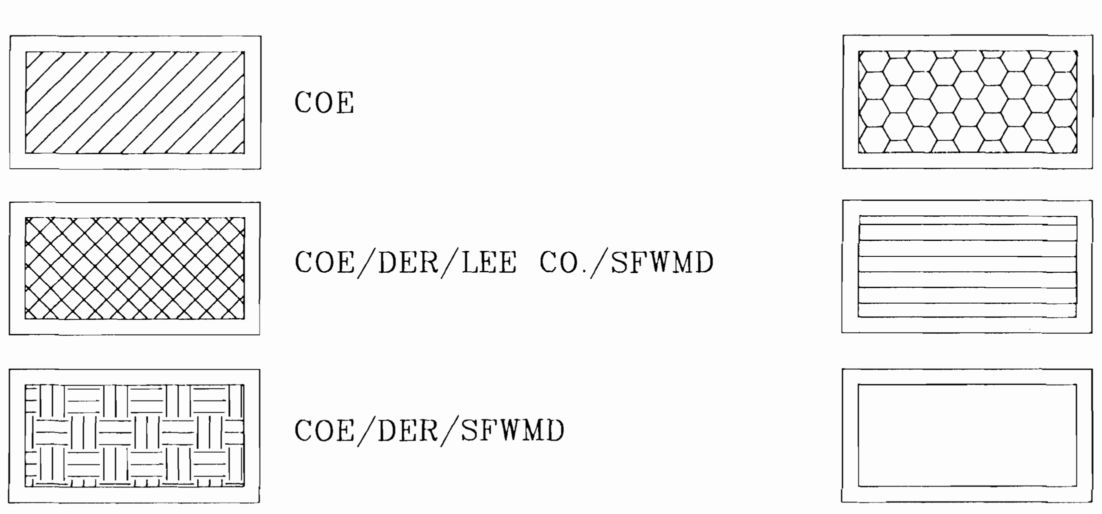
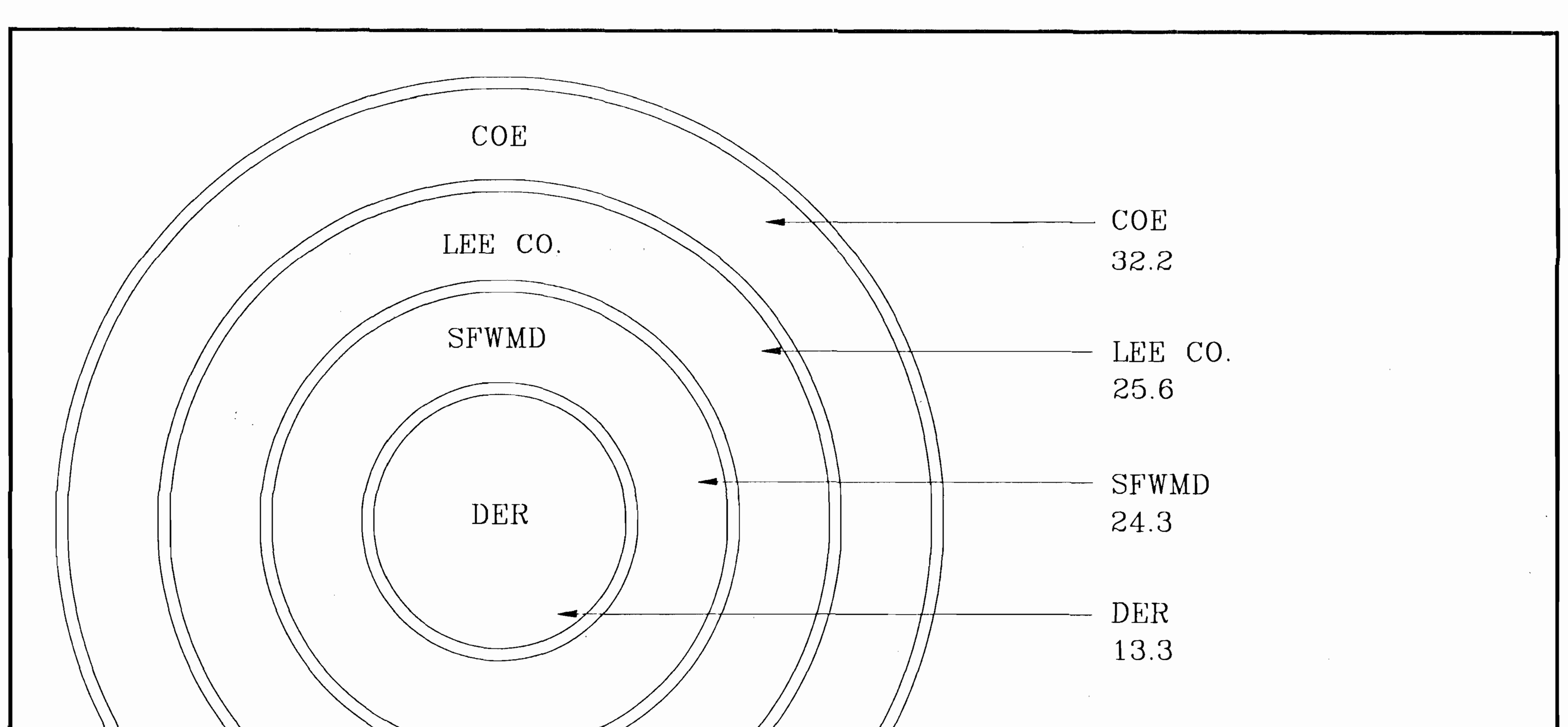




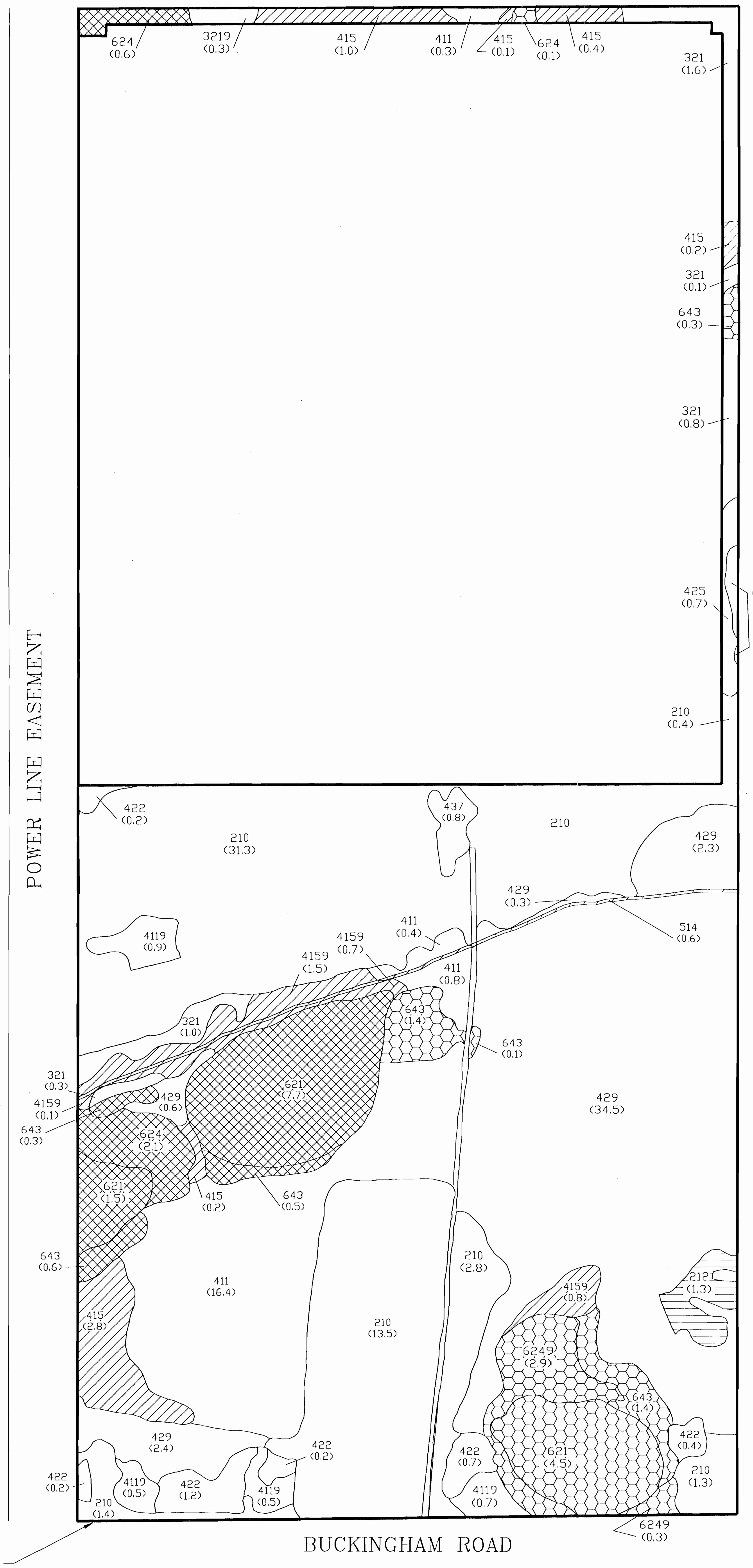
AGENCY WETLAND JURISDICTION CHART

Kevin L. Erwin
Consulting Ecologist, Inc.
2077 Bayside Parkway Fort Myers Florida 33901 (813) 337-1505

Project No: CDMRR105	CAD Date: 6-15-90	Source Media Type: LEE COUNTY AERIAL	Approved: William R. Cop	Client: Camp, Dresser & McKee
Drawn: BC	Scale: 1"=200'	Date: FEB. 1986	Date: 6/19/90	Title: Lee County Energy Recovery Facility Site
Verified: BC	Sheet: 1 OF 1	Scale: 1"=200'	SUBJECT TO CHANGE WITH FIELD VERIFICATION	
CAD Tech: BCB	CAD File: CDMRREV4			

SECTION 24 TWP 44S RANGE 25E

NOTE: NOT BASED ON GROUND SURVEY OR RECTIFIED AERIAL PHOTOGRAPH.



Farm Pasture (210) occupies 51.0 acres or 33.1 percent of the property. Vegetation of this upland habitat is dominated by pasture grasses that have been severely grazed by cattle. Common species include thin paspalum (Paspalum setaceum), marsh-pinks (Sabatia grandiflora), stinkweeds (Pluchea spp.), and frog-fruit (Lippia nodiflora). Species scattered throughout this habitat include cabbage palm (Sabal palmetto), wax-myrtle (Myrica cerifera), saw palmetto (Serenoa repens), live oak (Quercus virginiana), laurel oak (Quercus laurifolia), slash pine (Pinus elliottii), wiregrass (Aristida spp.), pawpaw (Asimina reticulata), and bluestem (Andropogon spp.). This habitat has been severely impacted from overgrazing and drainage practices.

Low Pasture (212) occupies 1.3 acres or 0.8 percent of the property. Vegetation of this habitat is dominated by pasture grasses and wood sorrel (Oxalis spp.). Other common species include coinwort (Centella asiatica), frog-fruit, wax-myrtle, Brazilian pepper (Schinus terebinthifolius), dog fennel (Eupatorium spp.), and scattered small slash pine. This area has been severely impacted by overgrazing as evidenced by the pasture grasses being only at ground level.

Palmetto Prairie (321) occupies 3.8 acres or 2.5 percent of the property. Vegetation of this upland habitat is dominated by saw palmetto from dense thickets more than five feet tall to scattered clumps with an open intermittent ground cover of wiregrass. Common ground cover vegetation consists of wiregrass, dwarf wax-myrtle, and stinkweed. Scattered species include the problematic Brazilian pepper and melaleuca (Melaleuca quinquenervia). Other scattered species include black-root (Pterocaulon pycnostachyum), thistle (Cirsium spp.), umbrella-grass (Fuirena spp.), grape (Vitis spp.), greenbriar (Smilax spp.), slash pine, cabbage palm, laurel oak, live oak, and buckthorn (Bumelia reclinata). Golden polypody (Phelebodium aureum), listed as a threatened plant by the Florida Department of Agriculture (Wood, 1989), is found on scattered cabbage palm throughout this habitat.

Palmetto Prairie Invaded by Exotics (3219) occupies 0.3 acres or 0.2 percent of the property. The overstory vegetation of this upland habitat is dominated by saw palmetto and the problematic melaleuca. Common ground cover vegetation species include wiregrass, stinkweed, and dwarf wax-myrtle. Also present are scattered slash pine and tickseed (Coreopsis leavenworthii).

Pine Flatwoods (411) occupies 17.9 acres or 11.6 percent of the property. Vegetation of this upland habitat is dominated by an overstory of slash pine with scattered melaleuca. Midstory species include saw palmetto, melaleuca, wax-myrtle, and scattered cabbage palm, buckthorn, Brazilian pepper, and slash pine. Ground cover species include wiregrass and dwarf wax-myrtle. Scattered ground cover species include heliotrope (Heliotropium polyphyllum), bluestem, stinkweed, black-root, tickseed, dog fennel, grape, Virginia creeper, Black-eyed Susan (Rudbeckia hirta), and thistle. This habitat has been disturbed by logging, grazing, and drainage activities. Several age classes of pine were observed with most of the pine being immature. Very few mature pine were observed in this habitat.

Pine Flatwoods Invaded by Exotics (4119) occupy 2.6 acres or 1.7 percent of the property. The dominant vegetation of the overstory of this upland habitat is slash pine. The midstory is dominated by Brazilian pepper with scattered cabbage palm and melaleuca. The ground cover is non-existent under the dominant midstory Brazilian pepper, however, where Brazilian pepper is not present, the ground cover is dominated by wiregrass.

Wet Pine Flatwoods (415) occupies 4.7 acres or 3.0 percent of the property. The overstory of this wetland habitat is dominated by slash pine with a midstory of wax-myrtle, $\pm$ 6-foot cypress (Taxodium distichum), scattered Brazilian pepper, and cabbage palm. Ground cover vegetation includes wiregrass, coinwort, stinkweed, and scattered yellow-eyed grass (Xyris spp.), rush (Juncus spp.), and Tracyi's beakrush (Rhynchospora tracyi). This wetland habitat has been disturbed by heavy grazing, drainage, and logging activities. Several age classes of pine were observed with most of the pine being immature.

Wet Pine Flatwoods Invaded by Exotics (4159) occupies 3.1 acres or 2.0 percent of the property. Dominant vegetation of the overstory includes slash pine and melaleuca. Midstory species includes ± 6-foot cypress, melaleuca, Brazilian pepper, cabbage palm, wax-myrtle, and slash pine. Ground cover species include wiregrass, dwarf wax-myrtle, scattered small pine, heliotrope, stinkweed, grape, Tracyi's beakrush, rushes, and yellow-eyed grass. This wetland habitat has been heavily disturbed by grazing, drainage, and logging activities. Some areas of this habitat are heavily infested by the problematic melaleuca and Brazilian pepper as a result of excessive agricultural practices. Several age classes of pine were observed with most of the pine being immature. A very small percentage of the pine observed in this area was mature.

Brazilian Pepper (422) occupies 2.9 acres or 1.9 percent of the property. Vegetation of the overstory of this upland habitat is dominated by Brazilian pepper. The ground cover ranges from very little vegetation to scattered vegetation that consists of stinkweed, different grasses, Boston fern (Nephrolepsis exaltata), coinwort, grape, greenbriar, Virginia creeper, common rag weed (Ambrosia artemisiifolia), thistle, and very small slash pine. This highly disturbed habitat has been impacted by overgrazing and drainage practices.

Mesic Oak (425) occupies 0.7 acres or 0.5 percent of the property. Vegetation of the overstory of this upland habitat is dominated by laurel oak with some scattered live oak. The oaks range in height from 15 feet to 30 feet tall. The midstory consists of widely scattered wax-myrtle and cabbage palm. The ground cover vegetation consists of wiregrass, stinkweed, coinwort, yellow-eyed grass, and Boston fern. This upland habitat has been impacted by overgrazing and drainage practices.

Wax-myrtle (429) occupies 40.10 acres or 26.0 percent of the property. Dominant overstory vegetation of this upland habitat includes wax-myrtle, Brazilian pepper, scattered cabbage palm, and slash pine. A few scattered laurel and live oak also make up the overstory of this habitat. Midstory vegetation includes wax-myrtle, saw palmetto, scattered cabbage palm, and melaleuca. A wide variety of ground cover vegetation exists in this habitat. Species include wiregrass, stinkweed, greenbriar, grape, Virginia creeper, coinwort, pepper-vine (Ampelopsis arborea), black-root, yellow-eyed grass, aster (Aster spp.), tickseed, frog-fruit, purple thistle (Cirsium horridulum), dog fennel, hat pin (Eriocaulon spp.), bluestem, Boston fern, common rag weed, beauty-berry (Callicarpa americana), lantana (Lantana spp.), and poison ivy (Toxicodendron radicans). This highly disturbed habitat has been severely impacted by overgrazing, drainage practices, and logging.

Australian Pine (437) occupies 0.8 acres or 0.5 percent of the property. Vegetation of the overstory of this upland habitat is dominated by Australian pine (Casuarina litorea). No midstory or ground cover species exist. The Australian pine are approximately 40 to 50 feet tall.

Drainage Canal (514) occupies 0.6 acres or 0.4 percent of the property. This wetland habitat contains no standing water and is vegetated by coinwort and various grasses. The drainage canal habitat has been impacted by overgrazing and lack of water.

Cypress (621) occupies approximately 13.7 acres or 8.9 percent of the property. Dominant overstory vegetation includes cypress. Midstory species include wax-myrtle, cypress, cabbage palm, myrsine (Myrsine guianensis), and the problematic melaleuca and Brazilian pepper. Ground cover vegetation includes smartweed, southern blue flag (Iris virginica), swamp fern (Blechnum serrulatum), dwarf arrowhead (Sagittaria subulata), panicum (Panicum spp.), thistle, groundsel (Senecio glabellus), and mock bishop's weed (Ptilimnium capillaceum). This wetland habitat has been severely impacted from overgrazing and drainage practices.

Cypress/Pine (624) occupies 2.8 acres or 1.8 percent of the property. Dominant overstory vegetation includes cypress and slash pine. Midstory vegetation consists of wax-myrtle, cabbage palm, myrsine, and scattered problematic Brazilian pepper and melaleuca. Ground cover vegetation includes swamp fern, wiregrass, yellow-eyed grass, rush, ludwigia (Ludwigia spp.), thistle, stinkweed, coinwort, Virginia creeper, and scattered sawgrass (Cladium jamaicense). This wetland habitat has been severely impacted by cattle grazing, logging, and drainage activities.

Cypress/Pine Invaded by Exotics (6249) occupies 3.2 acres or 2.1 percent of the property. Dominant overstory vegetation includes cypress, slash pine, and melaleuca. Midstory vegetation includes cypress, slash pine, the problematic melaleuca and Brazilian pepper, wax-myrtle, scattered cabbage palm and myrsine. Ground cover vegetation includes small slash pine, frog-fruit, panicum, tickseed, bluestem, wood sorrel, dog fennel, wiregrass, stinkweed, scattered swamp fern, yellow-eyed grass, rush, and ludwigia. This wetland habitat has been impacted by drainage practices.

Wet Prairie (643) occupies 4.6 acres or 3.0 percent of the property. Dominant overstory vegetation includes wax-myrtle and sand cordgrass (Spartina bakeri). Common ground cover vegetation includes wiregrass, stinkweed, yellow-eyed grass, milkwort (Polygala spp.), rush, different sedges, and tickseed. Vegetation scattered throughout this wetland habitat is saw palmetto, cabbage palm, slash pine, heliotrope, frog-fruit, coinwort, umbrella-grass, marsh-pinks, small cypress, and bitter mint (Hyptis alata). The problematic melaleuca and Brazilian pepper are also present throughout this wetland habitat. This habitat has been impacted by cattle grazing and drainage activities.

In summary, eight of the 17 vegetation types are wetland habitats. Wetland vegetation types include low pasture (212), wet pine flatwoods (415), wet pine flatwoods invaded by exotics (4159), drainage canal (514), cypress (621), cypress/pine (624), cypress/pine invaded by exotics (6249), and wet prairie (643). The total of these wetland vegetation types equaled 34.0 acres or 22.0 percent of the property. The remainder of the property was upland habitat which included 120.1 acres or 78.0 percent of the property. The ecological value of all the wetlands and uplands on site have been greatly reduced by farm practices such as cattle grazing logging, and drainage practices. These impacts have been compounded by the infestation of the problematic exotics melaleuca and Brazilian pepper. The vegetation types that have particularly been impacted by these exotics are palmetto prairie, pine flatwoods, wet pine flatwoods, and cypress/pine.

TABLE 2-32
WILDLIFE OBSERVED OR EXPECTED[a] TO OCCUR
ON LEE THE COUNTY ENERGY RECOVERY SITE

SCIENTIFIC NAME	COMMON NAME
FISH	
Lepisosteus platyrhincus	Florida Gar[b]
Jordanella floridae	Flagfish
Gambusia affinis	Mosquitofish[b]
AMPHIBIANS	
Bufo quercicus	Oak toad
Bufo terrestris	Southern toad
Acris gryllus dorsalis.	Southern cricket frog
Pseudacris nigrita verrucosa	Southern chorus frog
Hyla cinerea cinerea	Green tree frog
Rana areolata aesopus	Gopher frog[d]
Rana sphenocephala	Southern leopard frog
REPTILES	
Terrapene carolina	Eastern box turtle[b]
Gopherus polyphemus	Gopher tortoise[d]
Eumeces egregius onocrepis	Mole skink
Anolis carolinensis	Green anole
Thamnophis sauritis sackeni	Eastern ribbon snake
Thamnophis sirtalis sirtalis	Eastern garter snake
Diadophis punctatus punctatus	Eastern ringneck snake[b]
Heterodon platyrhinos	Eastern hognose snake
Elaphe guttata guttata	Corn snake
Elaphe obsoleta quadrivittata	Rat snake
Opheodrys aestivus	Rough green snake
Drymarchon corais couperi	Eastern indigo snake[e,f]
Coluber constrictor priapus	Southern black racer[b]
Masticophis flagellum flagellum	Eastern coachship snake
Sistrurus miliarius	Pigmy rattlesnake
Crotalus adamanteus rattlesnake	Eastern diamondback
BIRDS	
Podilymbus podiceps	Pied-billed grebe
Anhinga anhinga	Anhinga
Nycticorax nycticorax	Black-crowned night heron
Nycticorax violaceus	Yellow-crowned night heron
Butorides striatus	Green-backed heron[b]
Egretta tricolor	Tricolored heron[b,d]
Egretta caerulea	Little blue heron[b,d]
Bubulcus ibis	Cattle egret[b]
Egretta thula	Snowy egret[b,d]

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TABLE 2-32
(Continued)

SCIENTIFIC NAME	COMMON NAME
BIRDS	
Casmerodius albus	Great egret[b]
Ardea herodias	Great blue heron[b]
Mycteria americana	Wood stork[g,h]
Grus canadensis pratensis	Florida sandhill crane[f]
Anas platyrhynchos	Mallard[c]
Anas strepera	Gadwall[c]
Anas crecca	Green-winged teal[c]
Anas discors	Blue-winged teal[c]
Aix sponsa	Wood duck
Lophodytes cucullatus	Hooded merganser[c]
Aramus guarauna	Limpkin[d]
Gallinula chloropus	Common moorhen
Charadrius vociferus	Killdeer
Gallinago gallinago	Common snipe[c]
Cathartes aura	Turkey vulture[b]
Coragyps atratus	Black vulture
Haliaeetus leucocephalus	Bald eagle[f,g]
Elanoides forficatus	American swallow-tailed kite[b,c]
Rostrhamus isoclabilis	Snail kite[g,h]
Circus cyaneus	Northern harrier[c]
Accipiter striatus	Sharp-shinned hawk[c]
Accipiter cooperii	Cooper's hawk
Buteo lineatus	Red-shouldered hawk
Buteo jamaicensis	Red-tailed hawk
Pandion haliaetus	Osprey
Polyborus plancus audubonii	Audubon's crested caracara[e,f]
Falco sparverius	American kestrel
Colinus virginianus	Northern bobwhite[b]
Meleagris gallopavo	Wild turkey[b]
Zenaida macroura	Mourning dove[b]
Columbina passerina	Common ground-dove[b]
Bubo virginianus	Great horned owl
Strix varia	Barred owl
Otus asio	Eatern screach-owl
Caprimulgus carolinensis	Chuck-will's-widow[b]
Chordeiles minor	Common nighthawk[b,c]
Ceryle alcyon	Belted kingfisher
Melanerpes carolinus	Red-bellied woodpecker[b]
Colaptes auratus	Northern flicker[b]
Sphyrapicus varius	Yellow-bellied sapsucker[c]
Picoides pubescens	Downy woodpecker
Dryocopus pileatus	Pileated woodpecker[b]
Tyrannus dominicensis	Grey kingbird[c]
Myiarchus crinitus	Great crested flycatcher[b,c]
Tachycineta bicolor	Tree swallow[c]
Cyanocitta cristata	Blue jay
Corvus brachyrhynchos	American crow
Corvus ossifragus	Fish crow[b]

TABLE 2-32
(Continued)

SCIENTIFIC NAME	COMMON NAME
BIRDS	
Parus bicolor	Tufted titmouse
Thryothorus ludovicianus	Carolina wren
Polioptila caerulea	Blue-gray gnatcatcher
Sialia sialis	Eastern bluebird
Turdus migratorius	American robin[c]
Lanius ludovicianus	Loggerhead shrike
Dumetella carolinensis	Gray catbird[b,c]
Mimus polyglottos	Northern mockingbird[b]
Toxostoma rufum	Brown thrasher
Bombycilla cedrorum	Cedar waxwing[c]
Sturnus vulgaris	European starling[b]
Vireo griseus	White-eyed vireo[b]
Vireo solitarius	Solitary vireo
Dendroica coronata	Yellow-rumped warbler[b,c]
Dendroica pinus	Pine warbler
Dendroica discolor	Prairie warbler
Dendroica palmarum	Palm warbler[c]
Geothlypis trichas	Common yellowthroat
Setophaga ruticilla	American redstart[b,c]
Cardinalis cardinalis	Northern cardinal[b]
Pipilo erythrophthalmus	Rufous-sided towhee[b]
Zonotrichia albicollis	White-throated sparrow[c]
Sturnella magna	Eastern meadowlark[b]
Agelaius phoeniceus	Red-winged blackbird[b]
Quiscalus quiscula	Common grackle
Quiscalus major	Boat-tailed grackle
Carduelis tristis	American goldfinch[c]
MAMMALS	
Didelphis marsupialis	Opossum
Dasypus novemcinctus	Nine-banded armadillo[b]
Sylvilagus palustris	Marsh rabbit
Sylvilagus floridanus	Eastern cottontail[b]
Sciurus niger avicennia	Big cypress fox squirrel[b,f]
Sciurus niger shermani	Sherman's fox squirrel[d]
Oryzomys palustris	Rice rat
Reithrodontomys humulis	Eastern harvest mouse
Peromyscus gossypinus	Cotton mouse
Sigmodon hispidus	Hispid cotton rat
Procyon lotor	Raccoon[b]
Mephitis mephitis	Striped skunk
Felis concolor coryi	Florida panther[g,h]
Lynx rufus	Bobcat
Sus scrofa	Pig
Odocoileus virginianus	White-tailed deer

TABLE 2-32
(Continued)

[a] Based on distribution maps and range charts, as well as habitat types found on the property.
[b] Direct sighting of the animal or their sign (tracts, feces, vocalizations, burrow spoils, snake skins, etc.).
[c] Migratory species that possibly could use the site seasonally or on a stop-over basis.
[d] Species of Special concern - Florida Game and Fresh Water Fish Commission (FGFWFC)
[e] Threatened - U.S. Fish and Wildlife Service (USFWS)
[f] Threatened - FGFWFC
[g] Endangered - USFWS
[h] Endangered - FGFWFC

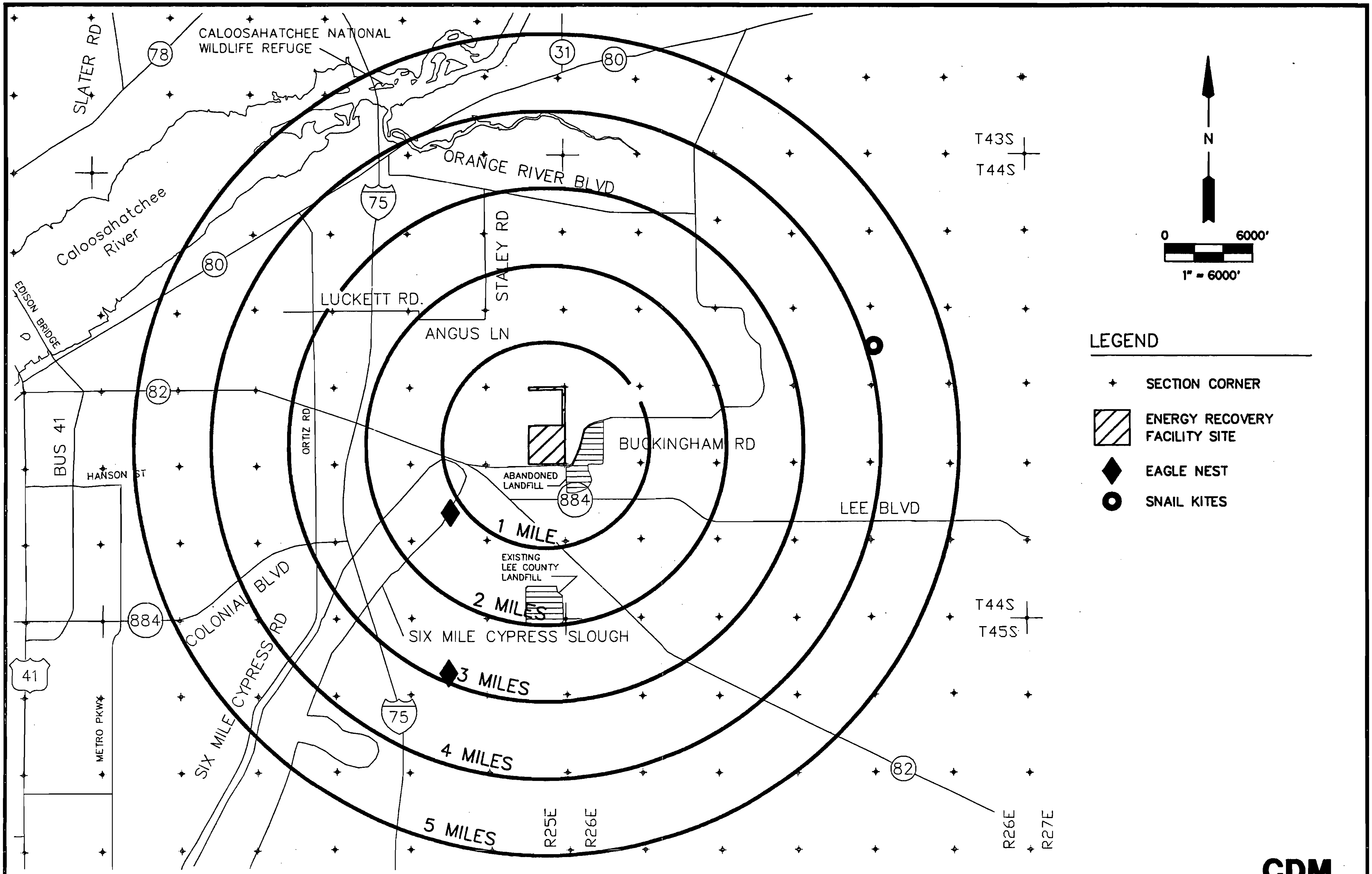
2.3.6 ECOLOGY

Table 2-32 lists the wildlife species observed or expected to occur within the land purchase boundary. The wildlife list sequence is in phylogenetic order from the animals that evolved first to the more complex and advanced animals. This list includes fish, amphibians, reptiles, birds, and mammals. Wildlife species listed as observed were observed by direct sighting of the animal or their sign, such as tracks, feces, vocalizations, burrow spoils, snake skins, etc. Wildlife species listed as expected were based on distribution maps or range charts and habitat types found on the property. Wildlife species were also listed as species of special concern, threatened, or endangered as listed by the U.S. Fish and Wildlife Service (USFWS) or Florida Game and Fresh Water Fish Commission (FGFWFC) (Wood 1989). Other important species such as those listed as game, fur bearers, or freshwater game fish in Florida Administrative Code Rule 39-1 are discussed in the text below.

A total of 126 wildlife species were listed for the site. Only 39 species or 31.0 percent of the total list were observed on the site. Of the total species listed for the site there were 3, 7, 16, 82, and 16 species of fish, amphibians, reptiles, birds, and mammals, respectively. Only 2 fish, 0 amphibians, 3 reptiles, 30 birds, and 4 mammals were observed on the site. This is extremely low when one considers the variety of habitats (see Section 2.3.5, Vegetation/Land Use) and number of hours of wildlife observation on the site. For example, there were 17 different vegetation types mapped for the site that included forested, shrub, and herbaceous vegetation, as well as uplands and wetlands. Also, more than 100 hours of observations were made between four ecologists on the site for wildlife species during March and April 1990. These observations were made either during actual wildlife surveys or vegetation mapping. The low number of observed species (low species richness) is most likely due to the poor condition of the habitats on the site caused by previous overgrazing by cattle, logging, and drainage practices. Furthermore, the wetlands on the site, such as the cypress habitats, were dry due to the existing drought conditions and the dry season during the time of wildlife surveys. Also, no nocturnal wildlife surveys were made. However, despite the low species richness, there were moderate numbers of game birds such as wild turkey (Melagris gallopavo), mourning dove (Zenaida macroura), and northern bobwhite (Colinus virginianus). These game birds were observed on or adjacent to the site along the north-south power line easement.

Important wildlife species observed on the site were limited. Several wildlife surveys were conducted for the purpose of locating listed and other important wildlife species. Only one sighting was made of the tricolored heron (Egretta tricolor), little blue heron (Egretta caerulea), and snowy egret (Egretta thula). All three of these species are listed as species of special concern by the FGFWFC (Wood, 1989). The species of special concern status indicates a species that is not in immediate danger of extinction, but which could eventually become threatened or endangered. The Florida sandhill crane (Grus canadensis pratensis) and wood stork (Mycteria americana) are listed as threatened and endangered, respectively, by the FGFWFC. The wood stork is also listed as endangered by the USFWS (Wood, 1989). These species have been observed feeding in suitable habitats within a five-mile radius of the site. It is possible that these species may occasionally be observed on the site.

The bald eagle (Haliaeetus leucocephalus) is listed as endangered by both the FGFWFC and the USFWS (Wood 1989). It has not been observed on the site, but occasionally has been observed flying over the site (Higginbotham 1990). All suitable habitats for eagle nesting and roosting were extensively groundtruthed for eagle nests and eagles, and none were found. There are two eagle nests located within five miles of the site (Erwin 1990, Dryden 1990, and Mraz 1990) (see Figure 2-27). These eagle nests are located in Section 26, Township 44S, Range 25E (eagle nest LE37) and Section 2, Township 45S, Range 25E (eagle nest LE31), Lee County, Florida. Eagle nest LE37 was active in 1989 and not active in 1990, while eagle nest LE31 was active in 1990 and not active in 1989 (Mraz, 1990). Rick Mraz of Lee County thinks that the eagle pair from LE37 has relocated to LE31. The energy recovery facility site is well out of potential primary zones (750 feet) and secondary zones (1,500 feet) for these eagle nests. According to Kim Dryden (FGFWFC), eagle management plans have not been developed for



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Endangered Species Habitat Within a Five-Mile Radius - Lee County Energy Recovery Facility

CDM

FIGURE 2-27

these eagle nests. Furthermore, the feeding flight paths for the eagle nests are toward the existing sanitary landfill, away from the Lee County Facility site; the landfill is several miles to the south of the site.

Audubon's crested caracara (Polyborus plancus audubonii) is listed as threatened by both the FGFWFC and USFWS (Wood, 1989). Four Audubon's crested caracara's were observed within a five-mile radius of the site on February 13, 1990 (Monfort, 1990). Old (15 years ago) sitings of these birds were made in the vicinity of Colonial Boulevard when favorable habitat existed (Dryman, 1990). However, this habitat has slowly degraded due to the invasion of melaleuca. The Audubon's crested caracara prefers large cabbage palm and open space habitats. These type of habitats do not exist on the site. There is a large open area to the west associated with the north-south power line easement, and this species could occasionally use this area as a stop-over. However, the Audubon's crested caracara is not expected to use the site.

Burrowing owls (Athene cunicularia) are listed as species of special concern by the FGFWFC (Wood, 1990). The Florida scrub jay (Aphelocoma coerulescens coerulescens) is listed as threatened by the FGFWFC and the USFWS (Wood, 1990). The results of the wildlife survey indicate that burrowing owls and scrub jays do not exist on the site due to the lack of suitable habitat. According to Kim Dryden of the FGFWFC (1990), scrub jay habitat (oak scrub) does exist along Buckingham Road; however, oak scrub habitat does not exist on the site. She also has had reports of burrowing owls and scrub jays in Lehigh Acres, but she has not confirmed these reports. These species and their favored habitats were not observed on the site.

Red-cockaded woodpeckers (Picoides borealis) are listed as threatened and endangered by the FGFWFC and USFWS, respectively (Wood, 1990). Suitable red-cockaded woodpecker habitat does not exist on the site. The pine flatwood (411) and transitional pine (415) have been heavily logged over the last ± 20 years removing most of the mature pine favored by these birds for nesting, cavities, and foraging. Also, these habitats have been invaded by the problematic melaleuca with many of these trees being greater than 15 feet tall. This also makes these habitats unsuitable for the red-cockaded woodpecker. Several clans of red-cockaded woodpeckers exist within a five-mile radius of the site, however, due to the lack of suitable habitat on the site for foraging and nesting, the birds will most likely remain to the south of the project site.

The gopher tortoise (Gopherus polyphemus) is listed as a species of special concern by the FGFWFC (Wood, 1989). Habitat for the gopher tortoise does exist on the site; however, surveys for the gopher tortoise revealed no burrows or other signs of the gopher tortoise. Commensal species of the gopher tortoise are the gopher frog (Rana aerolata aesopus) and eastern indigo snake (Drymarchon corais couperi). The gopher frog is listed as a species of special concern by the FGFWFC (Wood, 1990). The eastern indigio snake is listed as threatened by both the FGFWFC and USFWS (Wood, 1990). These two listed species most likely do not occupy the site due to the lack of habitat (i.e., gopher tortoise burrows). Kim Dryden has reports of gopher tortoises along the Orange and Caloosahatchee River corridors, but they have not been mapped. She also has reports of gopher tortoises in Lehigh Acres area.

The snail kite (Roskhamus sociabilis) is listed as endangered by both FGFWFC and USFWS. Although no snail kites have been observed on site, this species has been observed within a five-mile radius. A resident population of snail kite has been reported by Catherine Hultgren of Lee County, approximately four miles east of the project site. Available habitat for this species on-site, however, is small (less than 40 acres and of poor quality) (Figure 2-27).

The big cypress fox squirrel (Sciurus niger avicennia) is listed as threatened by the FGFWFC (Wood, 1990). Two big cypress fox squirrels may have been observed on the site: one in March 1990 and one in April 1990. It is very difficult to differentiate between the phenotypes of the big cypress fox squirrel and Sherman's fox squirrel (Sciurus niger shermani). According to Kim Dryden of the FGFWFC (1990), the big cypress fox squirrel is found on the south side of the Caloosahatchee River, while the Sherman's fox squirrel is found on the north side of the Caloosahatchee River. Since the land purchase is on the south side of the Caloosahatchee River, the fox squirrels observed are most likely the big cypress fox squirrel. A positive identification, however, could not be made on either observation.

The Florida panther (Felis concolor coryi) is listed as endangered by both the FGFWFC and USFWS (Wood 1990). Kim Dryden, of the Florida Game and Freshwater Fish Commission, has stated that the proposed land to be purchased is presently in the travel corridor of a young Florida panther (see map provided with Kim Dryden's letter, Appendix 8.0). Available habitat of pine flatwoods (411) on the site for the Florida panther is small, about 17.9 acres or 11.6 percent of the property, and these areas will not be disturbed by the energy recovery facility location.

Observed mammals on this site which can be considered game animals or fur bearers (Julie Hovis, 1990) are the eastern cottontail (Sylvilagus floridanus), and raccoon (Procyon lotor). Other species that may also be found on the site are white-tailed deer (Odocoileus virginianus), pig (Sus serofa), bobcat (Lynx rufus), striped skunk (Mephitis mephitis), opossum (Didelphis marsupialis), and marsh rabbit (Sylvilagus palustris).

Species-Environmental Relationships

There are no species present within the boundary of the Facility site that are endemic or unique to this site. The species and habitats on the site are common to the Lee County and southwest Florida areas.

Based upon an extensive evaluation during various field surveys, the site appears to have been heavily impacted by drainage, logging, and cattle grazing, and offers few areas of prime habitat for wildlife. The site has also been extensively invaded by exotic tree species, reducing vegetation diversity and offering few habitat niches for feeding and reproduction.

Of the species observed on the site, four species of wildlife are listed as species of special concern with FGFWFC including the tricolored heron (Egrett tricolor), the snowy egret (Egretta thula), the little blue heron (Egretta caerulea) and perhaps the big cypress fox squirrel (Sciurus niger avicennia). The snowy egret, tricolored heron, and the little blue heron primarily utilize wetland areas on the site. These areas are of low quality due to hydrologic changes caused by on-site drainage and the recent drought. The proposed Facility would have a minimal affect on these wetland areas; in fact, protection of the buffer areas surrounding the site would probably improve these wetland areas for the feeding and reproduction of these birds.

The big cypress fox squirrel prefers areas of open pinelands, dry cypress strands, and coastal broad leaf tropical evergreen hammocks (Brown, 1973). This squirrel is rarely found in areas of thick understory and is most abundant in areas of mature pines. This species feeds on seeds, nuts, fruits and buds of many natural south Florida plants (Brown, 1973). Development of the Facility site by Lee County may provide an improved habitat for the big cypress fox squirrel by protecting upland and wetland habitats from overgrazing by cattle and logging practices.

Pre-Existing Stresses

Pre-existing environmental stresses within the Lee County Facility site boundary are evident. During the past 20 years the site has been extensively grazed by cattle. This grazing activity has stressed vegetation and plant communities in the area.

Prior to grazing, the site was logged and drained. These logging activities removed the majority of mature pine trees and associated pine habitat, making this area unsuitable for some species of wildlife such as the red-cockaded woodpecker (Picoides borealis) which is listed as threatened and endangered by the FGFWFC and USFWS, respectively.

Environmental stresses due to drainage are also evident. Changes in the area's hydrology have stressed and reduced areas of wetlands. In addition, exotic plant species, such as Brazilian pepper (Schinus terebinthifolius) and melaleuca, are abundant on the site as a result of these drainage practices.

Measurement Programs

All major upland and wetland vegetation associations on-site were delineated on recent 1" = 200' aerial photographs and groundtruthed. Groundtruthing was conducted by a trained ecologist to ensure the accuracy and completeness of the mapping effort. Habitats were categorized using the Florida Land Use, Cover and Forms Classification System (FLUCFCS), Levels III and IV. The acreage of each individual FLUCFCS mapping unit is calculated and depicted on the vegetation map (Figure 2-26).

Wildlife surveys were conducted by three trained ecologists walking parallel, overlapping belt transects which were approximately 50 feet apart, through all the suitable habitat to ensure 100 percent visual coverage. Observer hours for this survey totaled more than 100 hours, with species identified by direct observation, song or call, scats, tracks, burrows or nest sites, and skeletal remains. Individual habitat types were extensively surveyed in this manner for all species listed as species of special concern, and threatened or endangered species. The manuals used as ecological or taxonomic guides are listed in the reference section of this document. All methods used in this study are in agreement with Lee County Ordinance No. 89-34 as amended by KLECE, 1990. Study methodologies are detailed in Appendix 12.0.

2.3.7 METEOROLOGY AND AMBIENT AIR QUALITY

Meteorology

The Lee County energy recovery facility will be located in Lee County which is on the west coast of southern Florida. The climate of this region is influenced by the surrounding waters, since no part of Florida is more than 70 miles from salt water. Interior topography ranges from 100 to 200 feet above mean sea level. Summers are long, warm, and relatively humid. Summer temperatures are similar throughout the state. Winters are mild, punctuated by periods of cool to cold air. Temperatures in the northern part of the state average 13°F cooler than in the south. The prevailing winds are from the east, particularly in the southern portion of the state.

Elsewhere land/sea breeze effects and convectional forces inland make prevailing winds erratic. Rainfall is distributed throughout the year with the four-month period from June to September receiving slightly more rain. Precipitation is usually in the form of local showers and thundershowers. Occasionally, tropical storms produce substantial amounts of rain over large areas. Climatological data from Page Field Airport in Fort Myers is presented in Table 2-33.

Atmospheric Dispersion

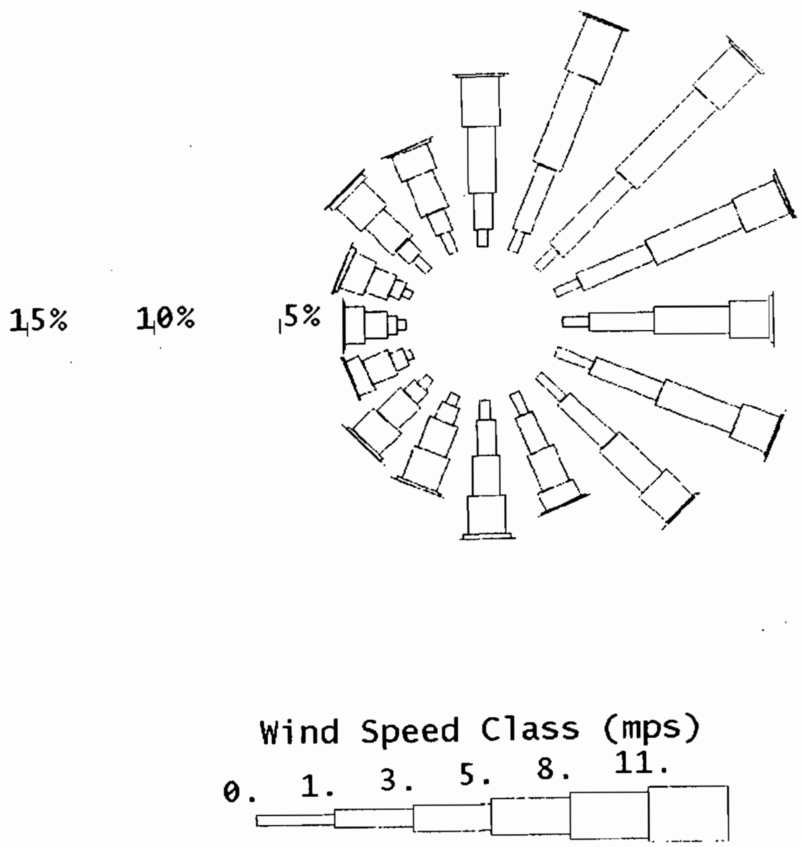
Atmospheric factors that aggravate pollution rarely occur at any specific location in Florida. Air is usually sufficiently unstable to disperse pollutants, as demonstrated by the frequent convective development. The easterly winds sweep across the peninsula, particularly in the south. Five years of sequential meteorological data were used (1982 to 1986) for the air quality dispersion modeling analysis contained in the Prevention of Significant Deterioration (PSD) permi application (see Volume III - Air Quality). The principal parameters which affect stack plume dispersion are wind speed, wind direction, atmospheric stability, temperature, and mixing heights.

Wind speed data for the five-year period have been organized into six wind speed categories, distributed over the 16 wind direction sectors, and displayed in a wind rose plot showing annual average, seasonal, and diurnal variations. The frequency of occurrence of a particular wind speed class in a particular wind direction as plotted on the wind rose is proportional to the size of the telescope segment. As shown in Figure 2-28, the prevailing wind direction is from the northeast. Wind speeds of one to five meters per second (2 to 11 miles per hour) occur most frequently from this direction. Other wind direction maxima are the north/northeast and the east/northeast. Wind speeds in the one to five meters per second (2 to 11 miles per hour) class most frequently prevail from these directions. Figure 2-29 shows the location of the site and prevailing wind direction relative to surrounding communities.

Seasonal wind patterns are displayed on Figure 2-30. Winter winds are predominantly from the north/northeast through north/northwest directions,

WIND SPEED AND DIRECTION ROSE
FIVE-YEAR AVERAGE
LEE COUNTY ENERGY RECOVERY FACILITY

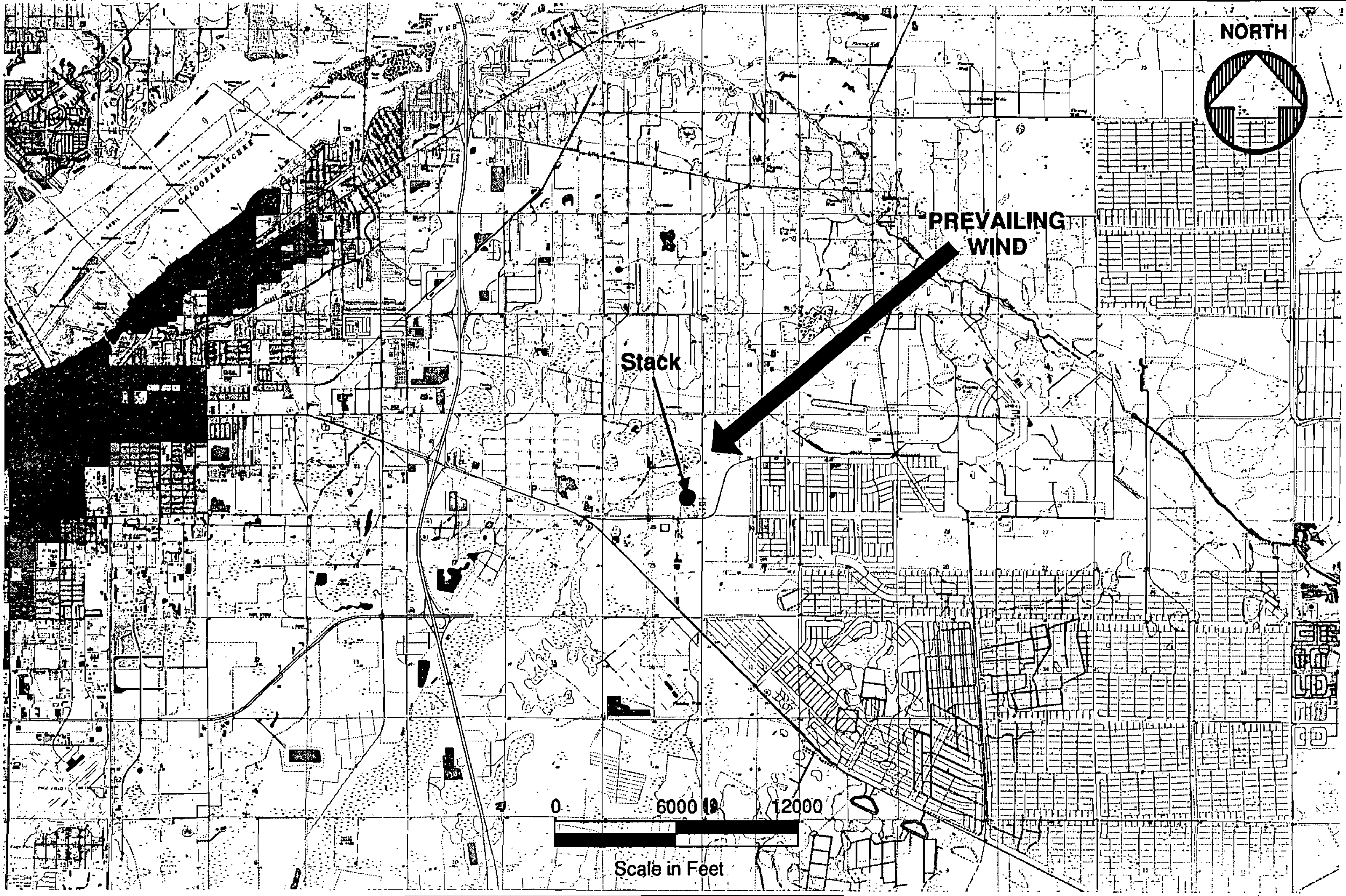
SITE 01 FROM 01/01/82 TO 12/31/86



Readings taken at Page Field Airport, Fort Myers, Florida.

FIGURE 2-28

Best Available Copy



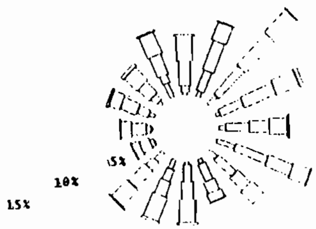
LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc.

FIGURE 2-29
AREA MAP WITH PREVAILING WIND DIRECTION (1982-1986)

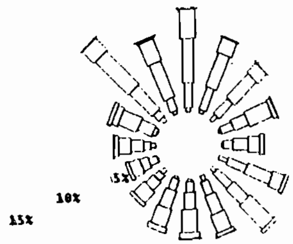
SEASONAL WIND SPEED AND DIRECTION ROSES[a] (1982-1986)
LEE COUNTY ENERGY RECOVERY FACILITY

WINTER SEASON:

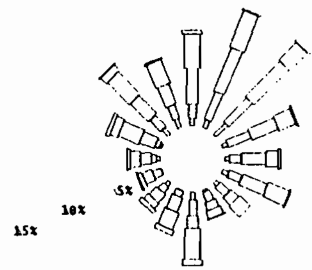
SITE 01 FROM 01/02/82 TO 03/31/82
WIND SPEED AND DIRECTION ROSE



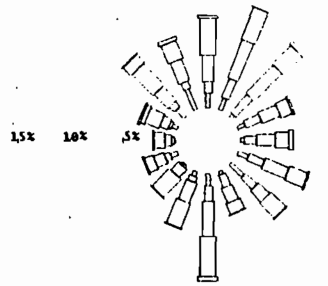
SITE 01 FROM 01/01/83 TO 03/31/83
WIND SPEED AND DIRECTION ROSE



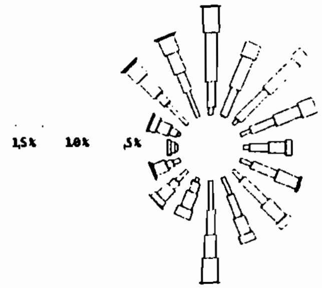
SITE 01 FROM 01/01/84 TO 03/31/84
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 01/01/85 TO 03/31/85
WIND SPEED AND DIRECTION ROSE

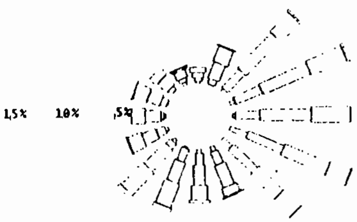


SITE 01 FROM 01/01/86 TO 03/31/86
WIND SPEED AND DIRECTION ROSE

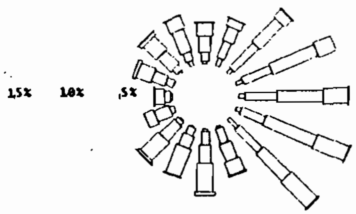


SPRING SEASON:

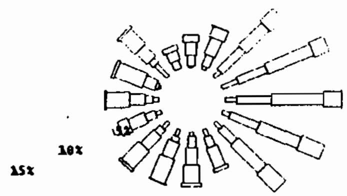
SITE 01 FROM 04/01/82 TO 06/30/82
WIND SPEED AND DIRECTION ROSE



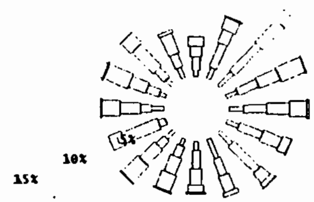
SITE 01 FROM 04/01/83 TO 06/30/83
WIND SPEED AND DIRECTION ROSE



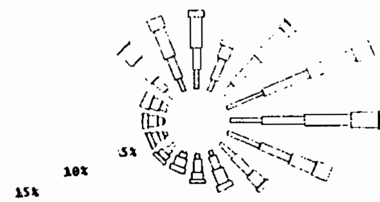
SITE 01 FROM 04/01/84 TO 06/30/84
WIND SPEED AND DIRECTION ROSE

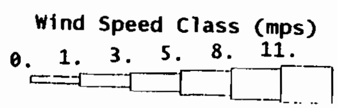


SITE 01 FROM 04/01/85 TO 06/30/85
WIND SPEED AND DIRECTION ROSE



SITE 01 FROM 04/01/86 TO 06/30/86
WIND SPEED AND DIRECTION ROSE





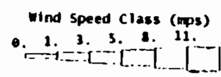


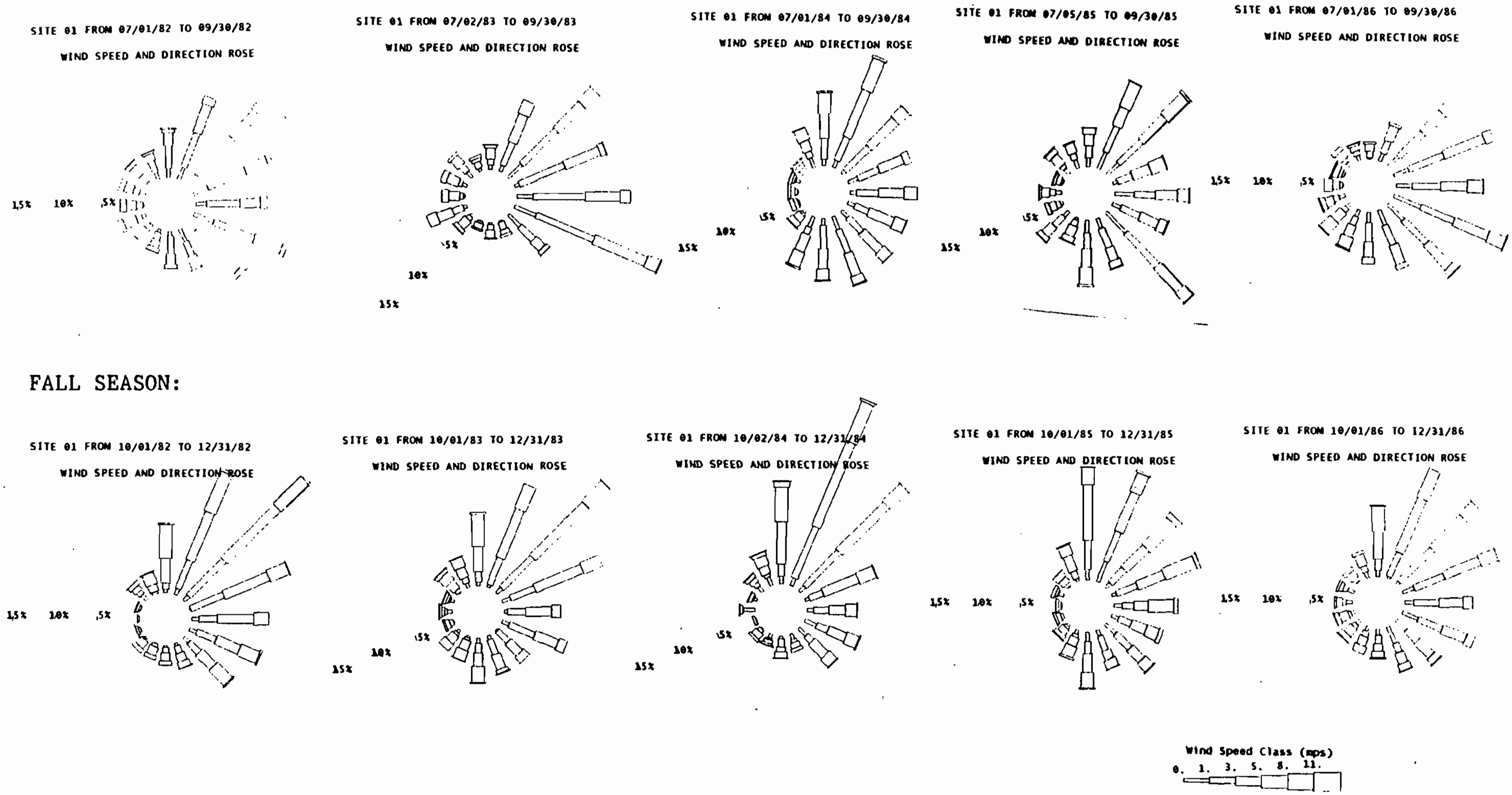
FIGURE 2-30

Best Available Copy

SEASONAL WIND SPEED AND DIRECTION ROSES[a] (1982-1986)
LEE COUNTY ENERGY RECOVERY FACILITY
(continued)

SUMMER SEASON:

FALL SEASON:



a Readings taken at Page Field Airport, Fort Myers, Florida.

FIGURE 2-30

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TABLE 2 -33

NORMALS, MEANS, AND EXTREMES
PAGE FIELD AIRPORT, FORT MYERS

FORT MYERS, FL   PAGE FIELD   EASTERN   26° 35' N   81° 52' W   15 FT

Month	Temperatures °F: Normal: Daily maximum	Normal: Daily minimum	Normal: Monthly	Extremes: Record highest	Year	Extremes: Record lowest	Year	Normal Degree days Base 65 °F: Heating	Cooling
(a)				44		44			
J	74.3	52.5	63.4	88	1982	28	1981	150	100
F	75.3	53.1	64.1	92	1962	30	1958	120	94
M	79.8	57.6	68.8	93	1983	33	1980	39	156
A	84.5	61.7	73.1	95	1946	39	1950	0	243
M	88.7	67.0	77.9	99	1953	50	1945	0	400
J	90.1	72.0	81.1	103	1981	61	1955	0	483
J	91.0	74.1	82.6	101	1942	66	1950	0	546
A	91.2	74.4	82.8	103	1942	65	1957	0	552
S	89.6	73.8	81.7	96	1980	63	1956	0	501
O	85.2	67.7	76.5	94	1941	45	1957	0	357
N	80.0	59.5	69.8	91	1979	34	1970	25	169
D	75.6	53.7	64.7	90	1978	26	1962	107	98
YR	83.8	63.9	73.9	103	JUN 1981	26	DEC 1962	441	3699

Month	Precipitation in inches: Water equivalent: Normal	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, Ice pellets: Maximum monthly	Year	Maximum in 24 hrs.	Year
(a)		44		44		44		44		44	
J	1.89	7.45	1979	0.00	1950	2.63	1983	0.0		0.0	
F	2.06	10.82	1983	T	1944	2.60	1969	0.0		0.0	
M	2.85	18.58	1970	0.03	1974	7.92	1970	0.0		0.0	
A	1.52	7.66	1941	T	1970	3.82	1943	0.0		0.0	
M	4.11	10.32	1968	0.34	1962	5.33	1980	0.0		0.0	
J	8.72	20.10	1974	1.99	1980	6.67	1959	0.0		0.0	
J	8.57	15.28	1941	2.28	1964	4.06	1965	0.0		0.0	
A	8.58	16.73	1941	3.98	1963	6.73	1967	0.0		0.0	
S	8.56	16.60	1969	2.33	1972	9.34	1962	0.0		0.0	
O	3.86	12.04	1959	0.05	1963	10.85	1951	0.0		0.0	
N	1.35	3.85	1972	T	1944	3.34	1960	0.0		0.0	
D	1.57	5.42	1940	0.30	1956	3.00	1969	0.0		0.0	
YR	53.64	20.10	JUN 1974	0.00	JAN 1950	10.85	OCT 1951	0.0		0.0	

Month	Relative humidity pct.: Hour 01 (Local time)	Hour 07	Hour 13	Hour 19	Wind: Mean speed m.p.h.	Prevailing direction (thru 1963)	Fastest mile: Speed m.p.h.	Direction	Year
(a)	22	22	22	22	37	10	34	34	
J	85	88	57	73	8.5	E	40	25	1958
F	84	88	55	70	9.1	E	39	25	1958
M	84	84	52	67	9.4	SW	46	35	1970
A	84	89	48	64	9.0	E	39	20	1958
M	85	89	50	66	8.2	E	40	22	1965
J	88	88	59	74	7.4	E	46	12	1966
J	88	88	60	75	6.8	ESE	45	18	1952
A	88	89	61	78	6.8	E	39	25	1957
S	88	90	62	77	7.7	E	92	05	1960
O	86	89	57	74	8.5	NE	45	23	1953
N	87	89	56	74	8.3	NE	31	27	1963
D	87	89	57	75	8.2	NE	35	33	1967
YR	86	89	56	72	8.2	E	92	05	SEP 1960

Month	Pct. of possible sunshine	Mean sky cover, tenths, sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, Ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility ¼ mile or less	Temperatures °F: Max. 90° and above (b)	Max. 32° and below	Min. 32° and below	Min. 0° and below	Average station pressure mb. Elev. 12 feet m.s.l.
(a)		35	42	42	42	43	43	39	40	23	23	23	23	10
J		5.0	11	12	8	5	0	3	5	0	0	1	0	1019.4
F		4.9	10	11	7	6	0	1	3	*	0	*	0	1018.8
M		4.9	11	12	8	5	0	2	3	1	0	0	0	1017.1
A		4.6	11	13	6	5	0	3	2	3	0	0	0	1017.1
M		5.0	9	15	7	8	0	7	1	13	0	0	0	1014.9
J		6.1	5	15	10	15	0	16	*	19	0	0	0	1016.0
J		6.4	2	18	11	18	0	23	*	24	0	0	0	1017.2
A		6.4	2	19	10	18	0	21	*	24	0	0	0	1016.6
S		6.3	4	15	11	16	0	14	*	18	0	0	0	1014.9
O		5.1	11	12	8	8	0	4	1	5	0	0	0	1015.7
N		4.7	12	11	7	4	0	1	2	*	0	0	0	1017.6
D		4.9	11	12	8	5	0	1	4	*	0	*	0	1019.1
YR		5.4	99	165	101	112	0	93	21	106	0	1	0	1017.0

NOTE: NORMAL COOLING DEGREE DATA PUBLISHED IN THE 1982 ANNUAL WERE FOR THE 1951-1980 PERIOD.

NORMALS, MEANS, AND EXTREMES TABLE NOTE(S):

(a) Length of record, years, through the current year unless otherwise noted, based on January data.
(b) 70° and above at Alaskan stations.
* Less than one half.
T Trace.
BLANK entries denote missing or unreported data.

NORMALS - Based on record for the 1951-1980 period.
MEANS - Length of record in (a) is for complete data years.
EXTREMES- Length of record in (a) may be for other than complete or consecutive data years. Date is the most recent in cases of multiple occurrence.
WIND DIRECTION - Numerals indicate tens of degrees clockwise from true north. 00 indicates calm.
FASTEST MILE WIND - Speed is fastest observed 1-minute value when direction is in tens of degrees.

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows.

Temperature
Lowest : 24 in Dec. 1894.

Precipitation
Maximum monthly : 26.91 in Jun. 1912.
Maximum in 24 hours: 11.70 in Jun. 1901.

Snowfall
Maximum monthly : T in Feb. 1899.
Maximum in 24 hours: T in Feb. 1899.

with a smaller component from the southeast. Westerly winds are slight. The average winter wind speed is at its strongest at three to eight meters per second (7 to 18 miles per hour). The westerly wind peaks in the spring, but its frequency is still small compared to winds from other directions. The largest wind component is from the east. Average easterly wind speed tends to be lighter than the westerly winds. Summer winds are predominantly at one to five meters per second (2 to 11 miles per hour) in the eastern quadrant. Westerly winds diminish. In the fall, winds are likely from the northeast and, to a lesser degree, from the east through the southeast. Westerly winds are at a minimum.

Diurnal wind direction roses are presented in Attachment B of Volume III - Air Quality. In the five-year average diurnal wind direction distribution, the south/southwest through west/southwest directions and the northwest show a diurnal pattern. This pattern shows a maximum frequency of occurrence of these directions during the mid-afternoon and a minimum frequency during the early morning hours. The southwest sector is influenced by the Gulf of Mexico although the airport is several kilometers inland. The northwest pattern may indicate the influence of the Caloosahatchee River to some degree. Since the magnitude of the southwestern sector is much larger than the northwest sector, the Gulf of Mexico influence has the greater effect on the regional wind pattern.

The spring and summer diurnal wind roses show the daily land/sea breeze effects. Virtually no land/sea breeze pattern is evident during the fall, and only a slight pattern is seen during the winter. The fall is strongly influenced by winds coming from the northeast as cool air begins to move southward.

The wind speeds and directions for the five years of meteorological data are stratified by the stability Classes A through F in Attachment B of Volume III - Air Quality, where Class A stability is unstable, and Class F is stable. Classes A and B represent the most unstable categories. Class A occurs less than one percent of the time, and Class B occurs approximately five percent of the time. Class A stability occurs during the day when skies are clear and the incoming solar radiation is strong--

conditions which are more likely during the summer. Fort Myers meteorological data show that Class A stability is strongly associated with light east/northeasterly winds. Class B stability occurs during the day when the incoming solar radiation is moderate, conditions typical of partly cloudy days, or during the fall when sunlight is less direct. Class B conditions are frequently associated with light easterly winds. During the day when the cloud cover is more complete or the incoming solar radiation is slight, Class C—slightly unstable—conditions occur. Winds associated with this case are most likely light to moderate east/southeasterly winds. Neutral stability Class D occurs during overcast conditions during the day or night, or when speeds are strong and the stability category is most likely to occur. These conditions are most frequently associated with northeasterly winds. Classes E and F represent the slightly stable and stable conditions. These conditions occur at night when the sky is partly cloudy or clear. The slightly stable case is associated with light northeasterly winds. The stable case is associated with somewhat lighter northeasterly winds.

Mixing height is the height above the surface through which vigorous vertical mixing occurs. Although the mixing height varies throughout the day, typical morning and afternoon values presented in Table 2-34 represent the average daily minimum and maximum heights, respectively. These climatological mixing heights were derived using data from the nearest upper air monitoring station, Tampa International Airport. Atmospheric conditions such as periods of marked cold air advection, significant precipitation, and missing wind speed or temperature data were not included in the calculation of the average mixing heights presented.

Ambient Air Quality

In the absence of representative background air quality data, pollutants subject to Prevention of Significant Deterioration (PSD) review and emitted at "significant levels" may be subject to ambient air quality monitoring [FAC 17-2.500(5)(f)] to define background concentrations. These ambient levels are then used as a basis for establishing whether the proposed Facility emissions could contribute to a violation of ambient air quality

TABLE 2-34

HOLTZWORTH MIXING HEIGHTS FOR THE FORT MYERS AREA

Period	Morning (meters)	Afternoon (meters)
Annual	493	1,359
Spring	503	1,523
Summer	656	1,460
Fall	419	1,401
Winter	394	1,052

SOURCE: Holtzworth, G.C. January 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States. U.S Environmental Protection Agency AP-101.

MLC16/4
5/30/90

standards. The pollutants subject to this monitoring provision are the criteria pollutants for which ambient standards have been set by the Florida Department of Environmental Regulation (FDER), and other noncriteria pollutants subject to PSD. The significant emission levels and proposed emission levels for these pollutants are listed in Table 2-35.

Sources may be exempt from air quality monitoring if the impact of a given pollutant falls below the de minimis monitoring concentration [FAC 17-2.500(3)(e)]. The air quality impact analysis was performed using sequential meteorological data. From this analysis, the highest concentrations were compared to the appropriate de minimis concentration in Table 2-36. Less than de minimis levels were predicted for each of the PSD regulated pollutants emitted from the Facility. Therefore, the Facility should be exempted from pre-construction monitoring requirements. In light of the modeling results shown in Table 2-36, the Applicant requests FDER to concur in this determination that pre-construction monitoring is not required.

Available Florida ambient air monitoring reports for 1986 through 1988 were used to develop background concentrations of PSD criteria pollutants in the vicinity of the proposed Facility. This period represents the most recent three-year period for which complete ambient monitoring data is available. Limited data are available for 1989. Because there are few monitoring stations within Lee County, monitors outside of the County, shown in Table 2-37, are also considered for determining background concentrations for some pollutants, and may be shown for comparison even when a local Ft. Myers monitor exists, as in the case of SO_2. However, if local monitoring data does exist, it has been chosen in lieu of more distant monitoring data.

Most available monitoring sites in southern Florida are located in areas of heavy urban or industrial growth, such as Broward, Dade, and Hillsborough counties. Therefore, many sites in the Florida monitoring network will be very conservative when used to estimate background levels at the Facility site which is more rural. The proposed background concentrations for criteria pollutants emitted by the Facility are presented in Table 2-38.

TABLE 2-35

COMPARISON OF SIGNIFICANT EMISSION RATES AND
LEE COUNTY ENERGY RECOVERY FACILITY
MAXIMUM EXPECTED CONTROLLED EMISSIONS

Pollutants	Significant[a] Emission Rates (tons/year)	Potential[b] to Emit (tons/year)
Particulate matter		
(total suspended particulate)	25	85
(inhalable particulate, PM_{10})	15	85
Carbon monoxide	100	648*
Nitrogen oxides	40	1,419*
Sulfur dioxide	40	653
Ozone (VOCs)	40	178*
Lead	0.6	2.6
Beryllium	0.0004	0.00059
Mercury	0.1	3.5
Fluorides	3	15.3
Sulfuric acid mist	7	157
Vinyl chloride	1	---[c]
Asbestos	0.007	---[c]
Total reduced sulfur (including H_2S)	10	---[c]
Reduced sulfur (including H_2S)	10	---[c]
Hydrogen sulfide	10	---[c]
Hydrogen chloride	---	282
Dioxins and Furans		
(as 2,3,7,8 TCDD toxic equivalent)	---	6.9×10^{-6}
Inorganic arsenic	AER[d]	0.04
Radionuclides	AER[d]	---[c]
Radon 222	AER[d]	---[c]
Benzene	AER[d]	---[c]

SOURCE: Camp Dresser McKee, Inc., 1990.

*Higher emission rate of either the rotary waterwall or stoker waterwall mass-burn combustor designs under consideration.

[a] FAC 17.2 Part V Table 500.2 or 40 CFR 52.21 (b)(23)(i).

[b] Based on continuous operation at design capacity (2,400 tons per day) with 100 percent Facility availability. See Volume III, Section 4.0 for BACT emission rates.

[c] Emission rates for these pollutants are negligible because these emissions are not expected from an MSW combustion environment or are not considered to be part of an MSW stream (e.g., asbestos).

[d] Any emission rate (AER). Pollutant is regulated by the Clean Air Act under NESHAPS, and any emission is considered a significant emission rate.

TABLE 2-36

LEE COUNTY ENERGY RECOVERY FACILITY
COMPARISON OF MAXIMUM PREDICTED CONCENTRATIONS OF
REGULATED POLLUTANTS TO SIGNIFICANT IMPACT AND
DE MINIMIS MONITORING LEVELS
(concentrations in ug/m^3)

Pollutant	Averaging Period	Rank[a]	Maximum Predicted Concentration[b]	Significant Impact Level	PSD De Minimis Monitoring Level
Sulfur Dioxide (SO_2)	Annual	H	0.25	1	—
	24-hour	H	4.19	—	13
		HSH	3.46	5	—
	3-hour	H	21.0	—	—
		HSH	14.7	25	—
Nitrogen Dioxide (NO_2)	Annual	H	0.54	1	14
Particulate Matter (as TSP or PM_{10})	Annual	H	0.032	1	—
	24-hour	H	0.54	—	10
		HSH	0.45	5	—
Carbon Monoxide (CO)	8-hour	H	10.2	—	575
		HSH	8.2	500	—
	1-hour	H	96.0	—	—
		HSH	63.0	2,000	—
Lead (Pb)	3-month	H	0.017[c]	—	0.1
Mercury (Hg)	24-hour	H	0.023	—	0.25
Beryllium (Be)	24-hour	H	3.8×10^{-6}	—	1×10^{-3}
Fluorides (as HF)	24-hour	H	0.098	—	0.25

SOURCE: Camp Dresser & McKee Inc., 1990.

[a]Abbreviations: H = Highest concentration
HSH = Highest, second-highest concentration

[b]Location and time-of-occurrence for maximum impacts (by rank) are provided in Table 6-7.

[c]The de minimis monitoring level for lead is a quarterly-averaged value. The 24-hour highest average concentration was substituted as a conservative estimate of the quarterly value.

NOTE: No significance guideline level is exceeded.

TABLE 2-37

AMBIENT MONITORING DATA USED TO DERIVE BACKGROUND CONCENTRATIONS FOR THE LEE COUNTY ENERGY RECOVERY FACILITY

Pollutant	Monitoring Site	Averaging Time	Maximum Measured Concentration 1986	1987	1988
CO	Hillsborough County/ Davis Island	1-hr High (ppm)	5	4	4
		2nd High (ppm)	4	3	4
		8-hr High (ppm)	2	3	2
		2nd High (ppm)	2	2	2
	Pinellas County/ Largo	1-hr High (ppm)	16	7	6
		2nd High (ppm)	6	6	5
		8-hr High (ppm)	3	3	4
		2nd High (ppm)	3	3	3
	Broward County/ Pompano Beach	1-hr High (ppm)	7	6	6
		2nd High (ppm)	7*	6	5
		8-hr High (ppm)	5	5	3
		2nd High (ppm)	5*	5*	2
Pb	Hillsborough County/ Plant City	Max Qtr (ug/m^3)	0.0	—	—
	Dade County/ Thompson Park	Max Qtr (ug/m^3)	0.0	0.1[a]*	—
NO_2	Hillsborough County/ Ybor City	Annual Arithmetic Mean (ug/m^3)	39	—[b]	40*
TSP	Lee County/Fort Myers Water Storage Tank, Princeton Street	24-hr High (ug/m^3)	81	63	55
		2nd High (ug/m^3)	67	59	49
		Annual Arithmetic Mean	33*	31	30
		Annual Geometric Mean	30*	28	29
	Lee County/Fort Myers Backup Monitor, Water Storage Tank, Princeton Street	24-hr High (ug/m^3)	79	70	63
		2nd High (ug/m^3)	70*	54	60
		Annual Arithmetic Mean	32	30	31
		Annual Geometric Mean	30*	28	29

TABLE 2-37
(continued)

Pollutant	Monitoring Site	Averaging Time	Maximum Measured Concentration 1986	1987	1988
SO_2	Lee County/Fort Myers Water Storage Tank, Princeton Street	3-hr High (ug/m^3)	113	210	86[a]
		2nd High (ug/m^3)	111	136*	75[a]
		24-hr High (ug/m^3)	65	53	24[a]
		2nd High (ug/m^3)	65*	27	24[a]
		Annual Mean (ug/m^3)	5	6*	5[a]
	Manatee County/ County Dam	3-hr High (ug/m^3)	—	—	—
		2nd High (ug/m^3)	—	—	—
		24-hr High (ug/m^3)	22	44	54
		2nd High (ug/m^3)	9	34	42
		Annual Mean (ug/m^3)	3	8	9
	Sarasota County/ Verna Well Field	3-hr High (ug/m^3)	273	148	396
		2nd High (ug/m^3)	151	126	199
		24-hr High (ug/m^3)	64	54	68
		2nd High (ug/m^3)	35	50	54
		Annual Mean (ug/m^3)	5	6	8
O_3	Lee County/Fort Myers Water Storage Tank, Princeton Street	1-hr High (ppm)	.101	.101	.102[c]
		2nd High (ppm)	.095	.090	.101*
PM_{10}	Hillsborough County/ Davis Island	24-hr High (ug/m^3)	—	—	64
		2nd High (ug/m^3)	—	—	58
		Annual Arithmetic Mean	—	—	30*
		Annual Geometric Mean	—	—	28
	Broward County/ 500 SW 14th Court #12 Ft. Lauderdale	24-hr High (ug/m^3)	72	85[d]	—
		2nd High (ug/m^3)	67	73[d]*	—
		Annual Arithmetic Mean	26	27[d]	—
		Annual Geometric Mean	24	24[d]	—

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards," Florida Department of Environmental Regulation, 1986-1988.

[a] Discontinued during the year.

[b] Data not applicable; fewer than 75 percent of expected observations taken.

[c] Ozone monitoring site relocated from the water storage tank to Cape Coral about October/November 1988.

[d] Not run for a continuous year.

* Represents maximum long-term or maximum second-highest short-term concentration to be used as background in modeling analyses.

TABLE 2-38

PROPOSED BACKGROUND CONCENTRATIONS FOR CRITERIA POLLUTANTS

Pollutant	Averaging Period	Monitor Site	Background Concentration ($\mu g/m^3$)	AAQS[a] ($\mu g/m^3$)	Background Concentration as Percent of NAAQS
TSP[c]	24-Hour	Water Storage Tank, Lee Co.	70	—[b]	—[b]
	Annual	Water Treatment Plant, Lee Co.	33	—[b]	—[b]
PM_{10}	24-Hour	500 SW 14th Couit #12 Ft. Lauderdale, Broward	73	150	48.7
	Annual	Davis Island, Hillsborough	30	50	60.0
SO_2	3-Hour	Water Treatment Plant, Lee Co.	136	1,300	10.5
	24-Hour	Water Treatment Plant, Lee Co.	65	260	25.0
	Annual	Water Treatment Plant, Lee Co.	6	60	10.0
NO_2	Annual	Ybor City, Hillsborough Co.	45	100	45.0
CO (ppm)	1-Hour	Davis Island, Hillsborough Co.	7	35	20.0
	8-Hour	Davis Island, Hillsborough Co.	5	9	55.6
Pb	3-Month	Thompson Park, Dade Co.	0.10	1.5	6.7

SOURCE: "Comparison of Air Quality Data with National Ambient Air Quality Standards," Florida Department of Environmental Regulation, 1986-1988.

[a] More stringent of federal or state standard (see Volume III, Table 5-1).

[b] TSP standard has been replaced with PM_{10} standard (52 FR 24634, July 1987). The State of Florida adopted these PM_{10} standards in May 1988 (FAC 17-2.300).

[c] TSP has been retained in this analysis to supplement PM_{10} data, if necessary.

Additional information about the development of the background concentrations is presented in Section 5.0 of the PSD permit application (see Volume III - Air Quality).

Measurement Programs

Florida has been monitoring air quality since 1962 when the Department of Health began monitoring total suspended particulates (TSP) at Miami International Airport. In January 1972, Florida submitted a plan to the U.S. Environmental Protection Agency (EPA) for establishing an air quality surveillance system in accordance with EPA regulations published in Section 420.17 of 42 CFR Part 420. The surveillance system established as a result of that plan consists of 204 stations.

Most particulate monitoring up to this time has been measured as TSP. Effective July 1987, the TSP standard has been replaced with the standard for particulate matter having an equivalent aerodynamic diameter of less than 10 microns (PM_{10}). The State of Florida adopted these PM_{10} standards in May 1988. Florida started PM_{10} monitoring at three stations in 1986, increased the network to 15 stations in 1988, and currently has a network of 31 stations.

Sampler location is determined by the monitoring objectives and siting criteria contained in 40 CFR 58 Appendix D, Network Design for State and Local Air Monitoring Stations. Continuous samplers run 24 hours per day. Manual samplers run for 24 hours every sixth day. Missing values are carefully documented, and make-up days may be required in manual networks to ensure that reporting requirements are met. The measurement method for each pollutant is listed in Table 2-39. Each sampler is calibrated on a regular basis. Calibration standards are referenced to the National Bureau of Standards - Standard Reference Materials (NBS-SRM). Calibrations are performed at least once each quarter to test the instrument over its full operating range. Final unadjusted calibrations are performed prior to maintenance, before instrument shut-down, when biweekly span checks exceed ± 15 percent error, and after an air quality exceedance. Confidence limits

TABLE 2-39

AIR POLLUTION MEASUREMENT METHODS

Parameter	Method or Reference
Carbon Monoxide	Title 40 Code of Federal Regulations (40 CFR), Part 50, Appendix C Beckman Model 866; EPA No. RFCA-0876-12
Dust (Microscopy) Microscope	Exposed Place Collection - Nikon Polarization
Dustfall	Journal of Air Pollution Control Association July 66, Vol. 16, No. 7
Nitrogen Dioxide:	
Bubbler	EPA No. EON-1277-026 page 62971 Federal Registry Vol. 42
Continuous	40 CFR, Part 50, Appendix F 1. Monitor Labs Model 8440; EPA No. RFNA-0677-021 2. Bendix Model 8101-B Analyzer
Ozone	40 CFR, Part 50 Appendix D 1. Bendix Model 30002; EPA No. RFOA-0176-007 2. Dasibi Model 1003 AH; EPA No. EQOA-0577-019
Sulfur Dioxide:	
Bubbler	40 CFR, Part 50, Appendix A
Continuous	1. Thermo Electron Model 43; EPA No. QSA-0276-009 2. Philips Model, PW9755; EPA No. EQSA-0676-010
Suspended Particulate:	
Total	40 CFR, Part 50, Appendix B
Sulfates	Exposed Plate Collection - Turbidimetric Method
Lead	40 CFR, Part 50, Appendix G
As PM_{10}	40 CFR, Part 50, Appendix J

SOURCE: Florida Department of Environmental Regulation, 1984. Florida national air monitoring stations, and state and local air monitoring station network description.

MLC16/31

of precision and accuracy are assigned to all measurements with federally approved references or equivalent methods/monitors. EPA's audit covers facilities, equipment, procedures, documentation, and personnel.

2.3.8 NOISE

A noise analysis was performed for the proposed Facility. The noise study is contained in Appendix 11. The study explains the methodologies used in estimating the operational impacts of the Facility and the results of the analysis. Ambient noise levels were measured at three locations in the site vicinity to establish baseline conditions during day and night periods. The selection of the monitoring locations was based on the following criteria.

- <u>Land use or zoning</u>--specifically, an area with a significant residential population or commercial use;
- <u>Local noise ordinances</u>--governmental agencies have established local noise levels which may not be exceeded; and
- <u>Sensitive receptors</u>--concentrations of individuals who may be sensitive to an increase in noise level (e.g., hospitals, schools, nursing homes, etc.).

Based on the criteria detailed above, monitoring stations were placed around the site as shown in Figure 2-31. In some cases, a monitoring station was used to assess ambient sound levels at more than one sensitive receptor. Table 2-40 lists the sensitive receptors selected.

Monitoring occurred over a 24-hour period. Each of the monitoring stations was sampled six times: twice in the morning (9:00 a.m. to 12:00 p.m.); twice in the afternoon (1:00 p.m. to 5:00 p.m.); and twice between 1:00 a.m. and 5:00 a.m., the quietest time of the night. Each sampling period consisted of about 20 minutes of actual monitoring. The following data were gathered.

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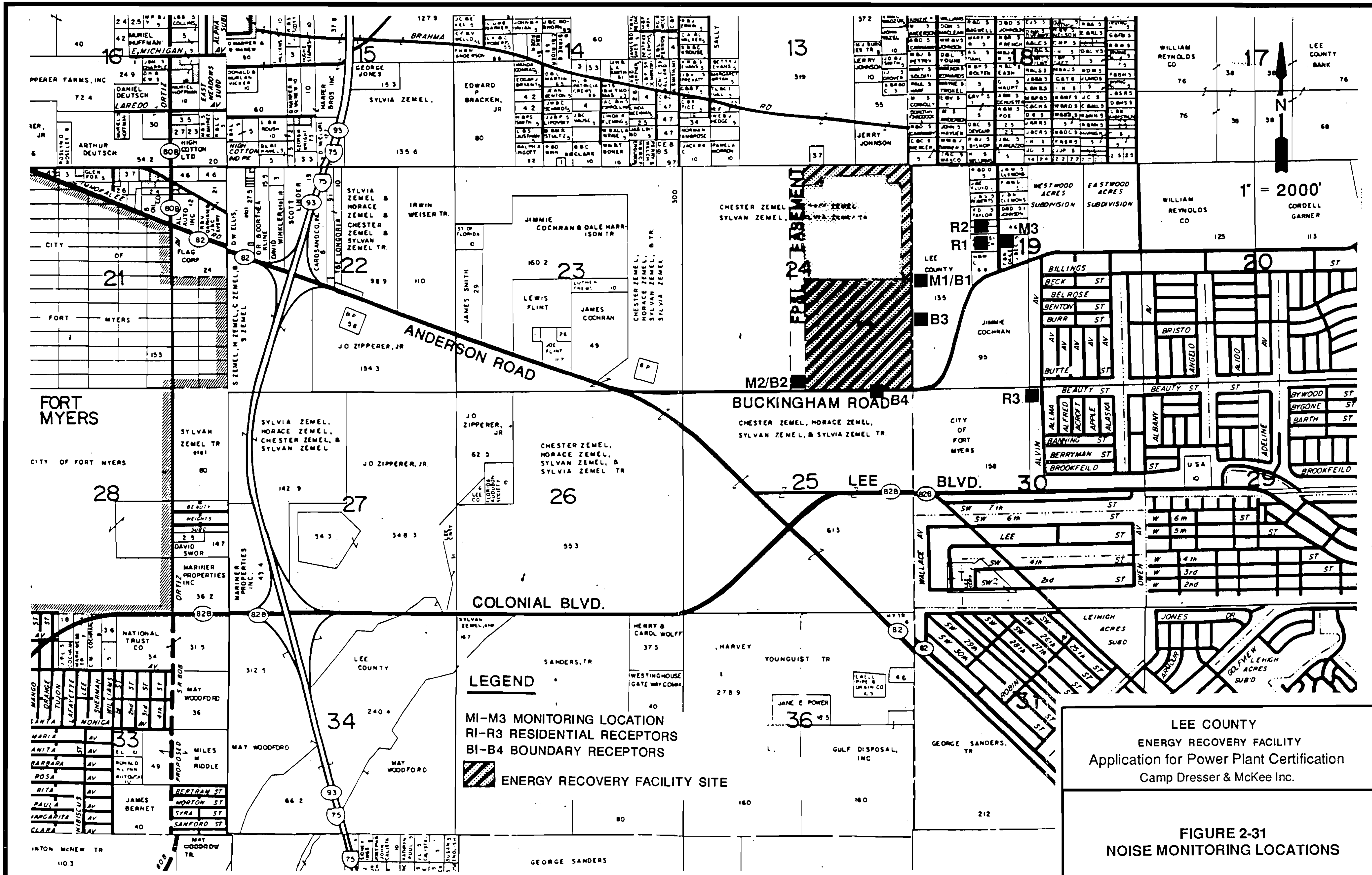


FIGURE 2-31
NOISE MONITORING LOCATIONS

- o Five two-minute A-weighted equivalent continuous sound levels (L_{eq}).

- o Fifty discrete samples taken once every 10 seconds (approximately eight minutes and 20 seconds) to compute statistical noise levels (L_{90}).

Although the statistical noise level (L_{90}) is not required to be compared with any of the applicable standards for this project, it was taken to provide a more complete picture of noise level distribution at each monitoring location.

Noise impacts for the proposed Facility were estimated using typical sound levels from other energy recovery facility operations and truck traffic. These predicted impacts were combined with existing noise levels to estimate total cumulative impact.

Lee County has a noise ordinance (Lee County Ordinance No. 88-47). The ordinance requires that noise levels not exceed 66 decibels (dBA) during day-time hours, and 55 decibels (dBA) during night-time hours (10:00 p.m. to 7:00 a.m.) at the property boundary of a residential, public space, agricultural, or institutional land use (this is the land use category immediately adjacent to the site).

Section 5.7 compares predicted energy recovery facility noise impacts and existing background noise to County standards.

TABLE 2-40

LEE COUNTY RESOURCE RECOVERY FACILITY
AMBIENT NOISE MONITORING LOCATIONS

Monitoring Site Identifier	Location	Rationale For Selection
M1	Eastern Property Boundary Nearest Facility	Eastern site boundary conditions; closest point of adjacent park to Facility noise sources.
M2	Southwestern Property Boundary	Southern and western site boundaries; existing traffic noise levels along route likely to be used by Facility traffic; measurements should be about 100 feet back from the road.
M3	Residential Area East of Site on Neal Road	Residential areas (sensitive receptors) about 3,000 feet to the east on Neal Road and southeast across Buckingham Road.

TABLE 2-41

LEE COUNTY ENERGY RECOVERY FACILITY
EXISTING NOISE CONDITIONS (dBA)

Monitoring Location	Day-time		Night-time		24-Hour	Dominant Noise Source
	L_{eq}	L_{90}	L_{eq}	L_{90}	L_{eq}	
M1 Eastern Boundary of Site	48	39	35	31	46	Undifferentiated background noise No dominant source
M2 Southwestern Boundary of Site	52	42	50	32	52	Traffic on Buckingham Road
M3 Residences on Neal Street	55	39	42	35	54	Traffic on Neal Road and Buckingham Road

NOTE: Noise sampling was performed with a Genrad sound level meter (Model No. 1988). The meter was calibrated with a Genrad sound level calibrator (Model No. 1986) before and after each sampling round. Four day-time and two night-time samples were taken at each location. Each sampling round consisted of L_{eq} measurements which are composites of five two-minute readings, and L_{90} measurements were 50 discrete readings every 10 seconds for a duration of 8 minutes 20 seconds.

SECTION 3.0

THE FACILITY

AND

DIRECTLY ASSOCIATED FACILITIES

3.0 THE FACILITY AND DIRECTLY ASSOCIATED FACILITIES

3.1 BACKGROUND

Commercial-scale energy recovery began in the United States in the late 1960s, but European countries have been recovering energy from solid waste for more than 30 years. Denmark converts 70 percent of its solid waste to energy, Switzerland converts 40 percent, and Sweden converts 30 percent. Currently, the United States converts less than 2 percent of its solid waste to energy, but this quantity is expected to increase to 10 percent during the early 1990s. More and more communities in the United States are building energy recovery facilities as the technology is tested and proven effective.

Lee County wishes to construct its own energy recovery facility to serve its solid waste processing and disposal needs for the waste which remains after recycling. Interest in the concept of energy recovery has been stimulated by an increased awareness of the environmental and siting problems associated with landfill disposal methods.

A Solid Waste Master Plan completed for Lee County by Camp Dresser & McKee Inc. (CDM) in August 1989 recommended the development of a mass-burn energy recovery facility. On November 29, 1989, the Lee County Board of County Commissioners executed an agreement with CDM for implementing an energy recovery-based solid waste management system. Shortly after the contract was approved, a management team was organized to guide this project to completion. The management team includes the consultant team (engineers, legal and financial advisors) and Lee County staff and decision-makers.

On October 17, 1989, Hendry County entered into an agreement with Lee County which states that:

> Lee County shall acquire, own, permit, develop, operate, and maintain land within Hendry County as the combined solid waste disposal site for both Lee and Hendry counties.

Lee County shall obtain all necessary permits for, construct and operate the following solid waste facilities to serve the needs of both Counties:

1. A Class I solid waste disposal facility;

2. An ash landfill for bottom ash, fly ash and siftings from the energy recovery facility;

3. A Class III solid waste disposal facility for waste generated in both Counties;

4. An energy recovery facility;

5. Materials recycling facilities;

6. Sludge disposal and composting facilities;

7. Used tire and white goods disposal facilities;

8. Not more than two transfer stations within Hendry County for the transfer of waste; and

9. Ancillary property and facilities necessary for the efficient and proper operation of a complete solid waste disposal system for both counties.

The ash landfill and Class I and Class III solid waste disposal facilities shall be located at a common disposal site in Hendry County. The energy recovery facility shall be located in Lee County. Transfer stations shall be located at sites designated by Hendry County. Other facilities may be located at the Hendry County common disposal site or at sites designated by agreement of both counties.

A copy of the interlocal agreement between Lee County and Hendry County is provided in Appendix 5.1. It should be noted that the volume of solid waste currently generated in Hendry County is less than one-tenth that generated in Lee County.

3.1.1 SOLID WASTE COLLECTION

Lee County has strong control over collection and disposal activities within the County through its Mandatory Garbage and Solid Waste Collection Ordinance No. 86-38 (effective April 1987). The incorporated cities of Fort Myers, Cape Coral, and Sanibel Island are not regulated under the County's ordinance, but they each have or are formulating their own ordinances. The City of Fort Myers provides its own collection services and the remaining areas are under private contract for waste collection.

In general, the private contract franchises of Lee County operate under similar terms with respect to the various aspects of collection. For example, a weight limitation for typical residential pick-up is 40 pounds per container. All non-containerized or unbagged garbage or waste must be bundled, with a maximum length not to exceed four feet. Other collection rules and regulations, together with well-defined franchise boundaries, are clearly delineated in formal agreements with the County; therefore, the flow of waste within Lee County is tightly controlled through legislation. All franchise and the City of Fort Myers collection operations are closely monitored by the County's solid waste department. User fees are paid directly to the County, by franchise and non-franchise haulers (hauling more than one ton), for disposing of collected wastes at the existing privately-owned landfill. Lee County, in turn, pays the landfill owner/contract operator.

Hendry County has two franchise haulers servicing the county. The southern end of the county is exclusively serviced by Immokalee Disposal. The northern unincorporated area of the county is exclusively serviced by Holland Disposal, which also serves the incorporated areas of LaBelle and Clewiston. All solid waste is currently being hauled to the Hendry County landfill.

Hendry County has a mandatory collection ordinance in place. Residences are billed by the county quarterly through the tax collector. There is a flat rate which is set through an annual rate resolution process every year. The county pays the hauler, less the tipping fee. Commercial collection and disposal is handled separately.

Collection strategies will not require a great amount of modification in Lee County to accommodate the energy recovery facility. Agreements will have to be amended to reflect delivery to the energy recovery facility site, and the disposal cost will change. Collection and hauling of refuse from Hendry County will be significantly altered in that transfer stations may be constructed for the cities of Clewiston and LaBelle and the waste thence hauled to the energy recovery facility in Lee County. Ash will be transported from the energy recovery facility in Lee County to the ash landfill in the western portion of Hendry County in covered water-tight transfer trucks. The location of the energy recovery facility in Lee County minimizes overall haul costs because most of the solid wastes are generated in Lee County.

3.1.2 FACILITY SITING

The site selection process for the energy recovery facility began with a detailed study prepared by the County's consulting engineers (CDM, August 1989). A specific siting methodology was used to evaluate the suitability of all potential sites. The initial steps of this methodology eliminated areas that were either unacceptable or marginal by applying negative siting criteria such as flood potential, well field impacts, airport proximity, urban development, and the presence of water bodies. Environmentally-sensitive areas such as cypress forests, wildlife management areas, and high water table areas were avoided. Remaining sites were then characterized by comparing land availability and ownership, and a shortlist of sites was developed.

Subsequent to the August 1989 study, six candidate sites meeting positive siting criteria were identified and shortlisted in a workshop with Lee County staff.

A site analysis completed by CDM in February 1990 provided a more detailed comparison of these six candidate sites. This analysis compared the sites in terms of availability of water and wastewater services, proximity to electrical interconnection with Florida Power and Light (FP&L) or the Lee County Electrical Co-op, transportation impacts and access, zoning and land use, haul cost, air quality, flood plains, wetlands, wildlife, soils and geology with respect to earthwork and foundation requirements, hydrologic conditions, and relative cost. The preferred energy recovery facility site was selected based on these criteria and additional information received at a public hearing before the Board of Lee County Commissioners. A copy of the February 1990 siting report is included in Appendix 4.0.

The ash landfill site had previously been selected and is located in the western portion of Hendry County. It is not intended that this document serve as the application for a permit for the landfill/ashfill. Discussions about the landfill/ashfill contained herein are for reference only as needed to permit the energy recovery facility. The landfill/ashfill will be the subject of separate permit applications.

3.1.3 PROPOSED FACILITIES

After evaluating several technologies, the County has found that its current and foreseeable needs would be best served by a facility which uses the mass-burn technology for combustion of solid waste. This process recovers heat energy in the form of steam, and converts that steam energy into electricity which can be sold. The primary facility proposed for the Lee County site is a mass-burn energy recovery facility (the Facility). Ancillary facilities will include truck scales and a scale house for weighing refuse, an ash handling building, cooling tower, and switch yard.

The Facility will be owned by Lee County, and operated by a full-service vendor/contractor under contract to the County. This full-service vendor/contractor will provide design, construction, start-up, and acceptance testing services, and 20 years of continuous operation and maintenance. Lee County will select an appropriate vendor/contractor through the Request for Qualifications/Request for Proposals (simultaneous negotiation competitive) procurement process.

Energy Recovery Facility

The proposed energy recovery facility will have an ultimate design-rated capacity of 2,400 tons per day (tpd). However, its initial continuous design-rated capacity will be 1,800 tpd, using three stoker waterwall combustion/steam generation units with a continuous design-rated capacity of 600 tpd each, or four rotary waterwall generation units at 450 tpd each. Each boiler unit will operate independently; therefore, it will be possible to shut down one unit at a time for maintenance and inspection. An additional boiler unit of the selected technology type will be added to expand the Facility to its ultimate capacity as needed.

Initial project construction will include a tipping area and refuse storage pit sized to handle 2,400 tpd (continuous design-rated capacity). The emissions stack will be equipped with four or five flues, depending on the type of combustion/steam generation unit employed. The project will have one steam turbine generator which will generate approximately 65 megawatts at 2,400 tpd. Power lines from the project's electrical switch yard will connect with the FP&L Buckingham substation near the Facility. Revenues from energy sales will be shared (90/10) by the County and vendor/contractor during the life of the operating contract.

Since the proposed Facility will use mass-burn technology, there will be no significant pre-processing of wastes at the Facility prior to combustion; however, separation of recyclables will occur at the waste generation sites. A schematic diagram of a typical stoker mass-burn facility is presented in Figure 3-1. Municipal solid waste will be truck-delivered to the Facility, and ash residue will be removed by the same mode of transport. The solid waste will be placed in the refuse bunker directly from transfer trailers and packer trucks inside the bunker housing. All waste will be stored inside the bunker housing so that no waste is visible from the outside. Two overhead cranes will mix the waste in the bunker and load the charging hoppers.

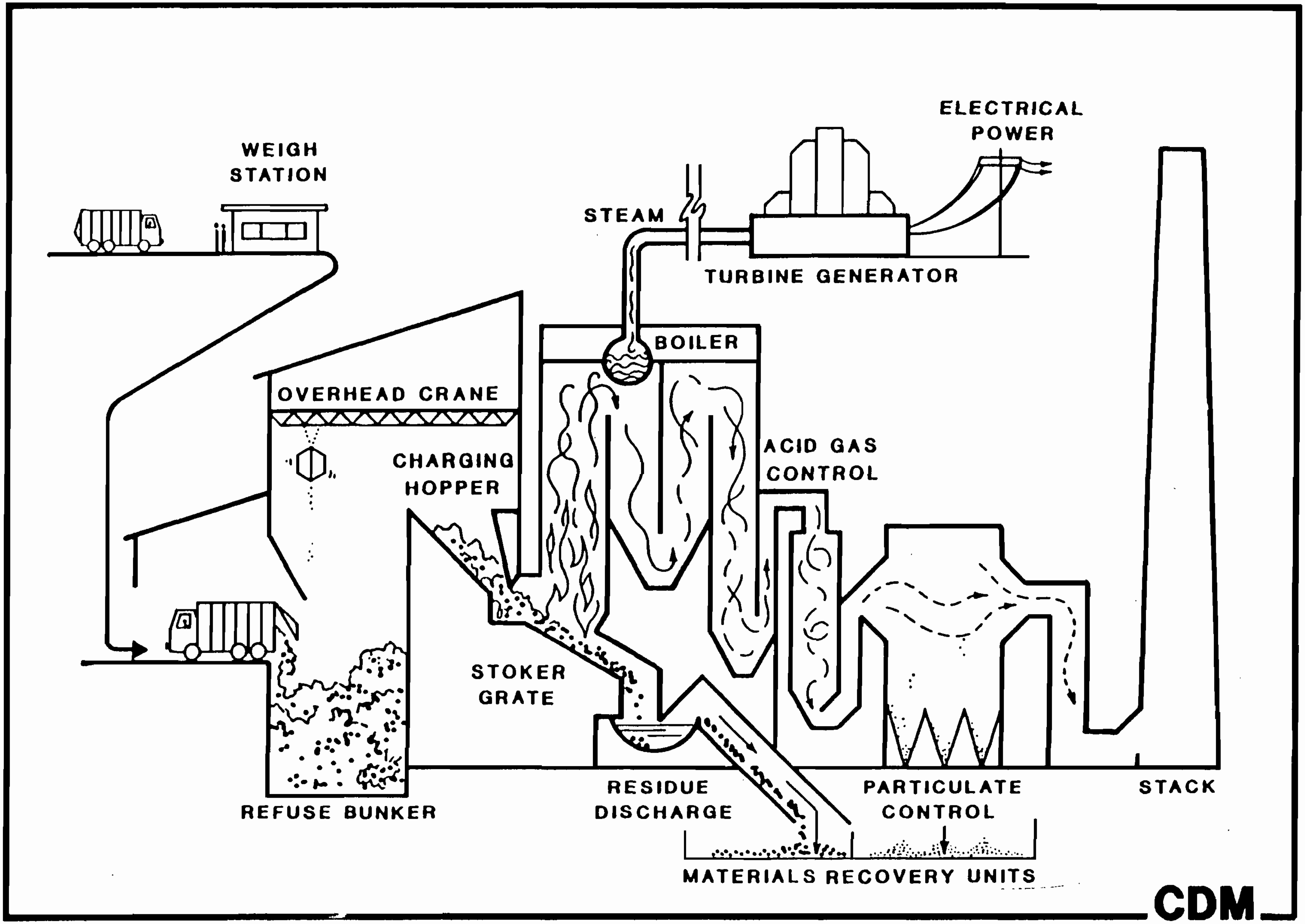


FIGURE 3-1

Energy Recovery Schematic - Lee County Energy Recovery Facility

Municipal solid wastes will be reduced to 10 percent of their original volume and about 30 percent of their original weight by the combustion process. The resulting ash will be quenched to approximately 30 percent moisture. Bottom ash from the furnace and fly ash from the emission control system will be mixed before removal from the Facility.

The Facility will be equipped with fabric filters (baghouses) for particulate removal. Acid gas dry scrubbers will also be used. A dry scrubber and baghouse will be furnished for each combustion train.

3.2 SITE LAYOUT

The general site development plan (Figure 2-6) shows the conceptual building layout on the site. The Facility structures will be set back about 200 feet from the eastern property boundary and about 1,500 feet from Buckingham Road, which will meet the requirements of local set-back ordinances. An access road will loop around the Facility; roads and scale houses are arranged to separate most of the truck traffic from employee and visitor parking and administration areas. The energy recovery facility will include landscaping as necessary to comply with local development standards.

Roadway grades on Facility access roads will not exceed three to five percent for inbound traffic, and five percent on egress to minimize gear shifting by trucks and the associated noise. All roads shall be concrete all-weather construction for heavy traffic and shall comply with FDOT design standards and requirements. Traffic patterns will be regulated by signs and control lights as needed to allow efficient and safe traffic flow.

Parking spaces have been provided to accommodate the work force, potential visitors, and shift overlaps. Automobile parking will be separated from truck circulation to minimize potential conflicts.

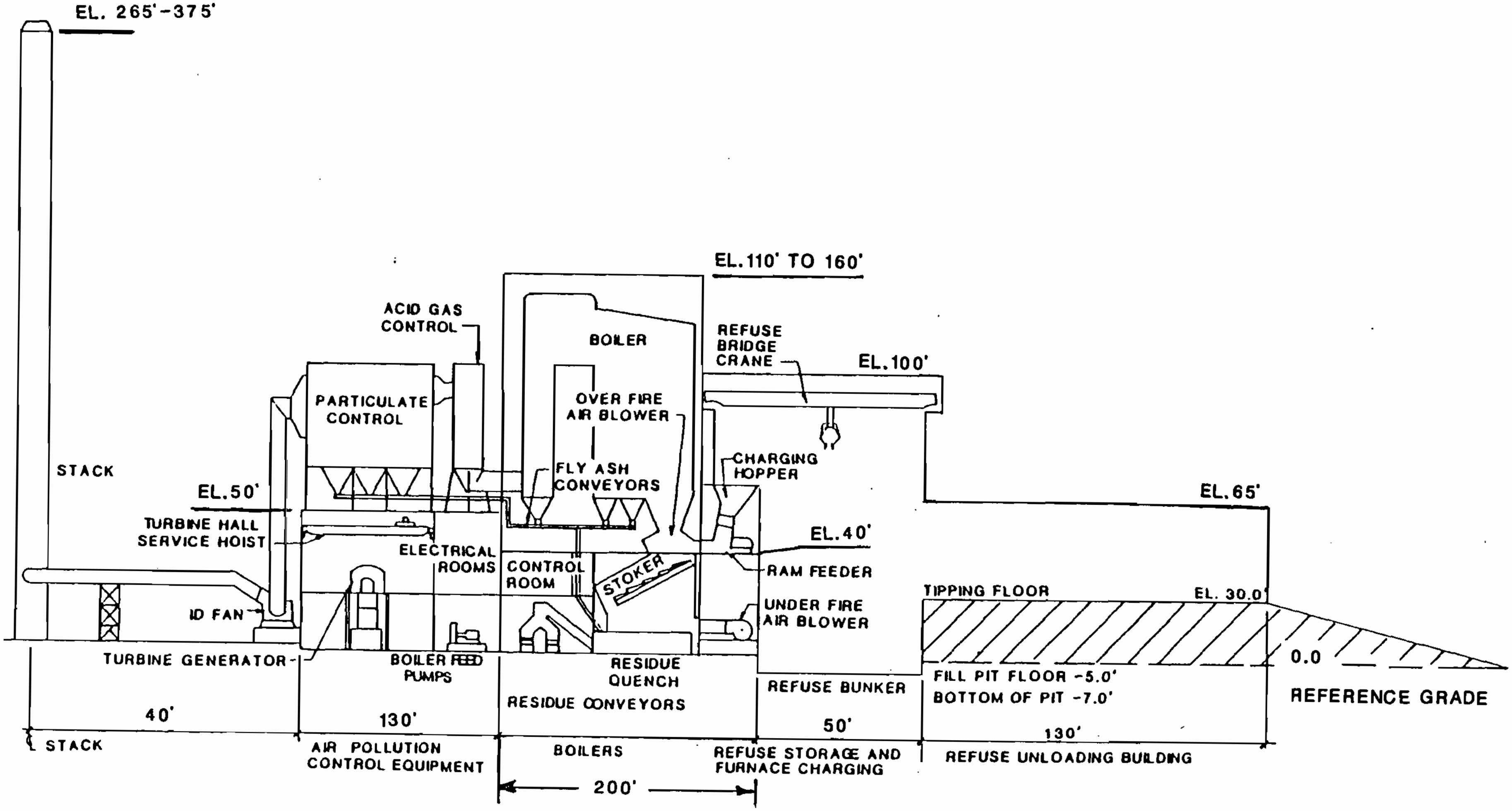
3.2.1 BUILDING DIMENSIONS

The proposed Facility will consist of several contiguous buildings as shown in Figure 2-6. A profile with approximate dimensions is given in Figures 3-2a and 3-2b. The exact Facility dimensions will be determined by the vendor/contractor selected to design, construct, and operate the Facility.

The administration building will be approximately 40 feet high, 250 feet long, and 90 feet wide. It will be bordered on three sides by the centrally-located processing facilities, with the fourth side facing the parking area. Offices will be located along the inner side of the administration building.

The processing facility will vary in height and area depending on the processing function housed in that portion of the building. On the tipping floor side, the building will be about 65 feet high, and 130 feet by 350 feet in surface area to accommodate refuse unloading activities. The maximum height of fill at the tipping floor will be about 30 feet above existing grade. This portion of the Facility must be elevated to allow waste collection trucks to drop refuse into the storage pit. The pit itself will be 80 feet by 300 feet in surface area with its bottom about 20 feet below existing grade.

The three stoker waterwall or four rotary waterwall combustion/steam generation units, with appurtenances, will occupy a surface area of about 200 feet by 260 feet at the Facility's ultimate capacity. Appurtenances include charging hoppers and chutes, feeders, stokers or combustors, siftings hoppers and conveyors, waterwall furnace and non-radiant superheater and convection sections, steam drums, soot cleaning system, boiler support steel, water quenching residue discharge/conveyor, combustion air blowers, auxiliary fuel burners, controls, and economizer. The height of the building over the boiler units will be about 110 to 160 feet. The turbine building, about 130 feet long by 90 feet wide, will adjoin the air pollution equipment area and the administration building.



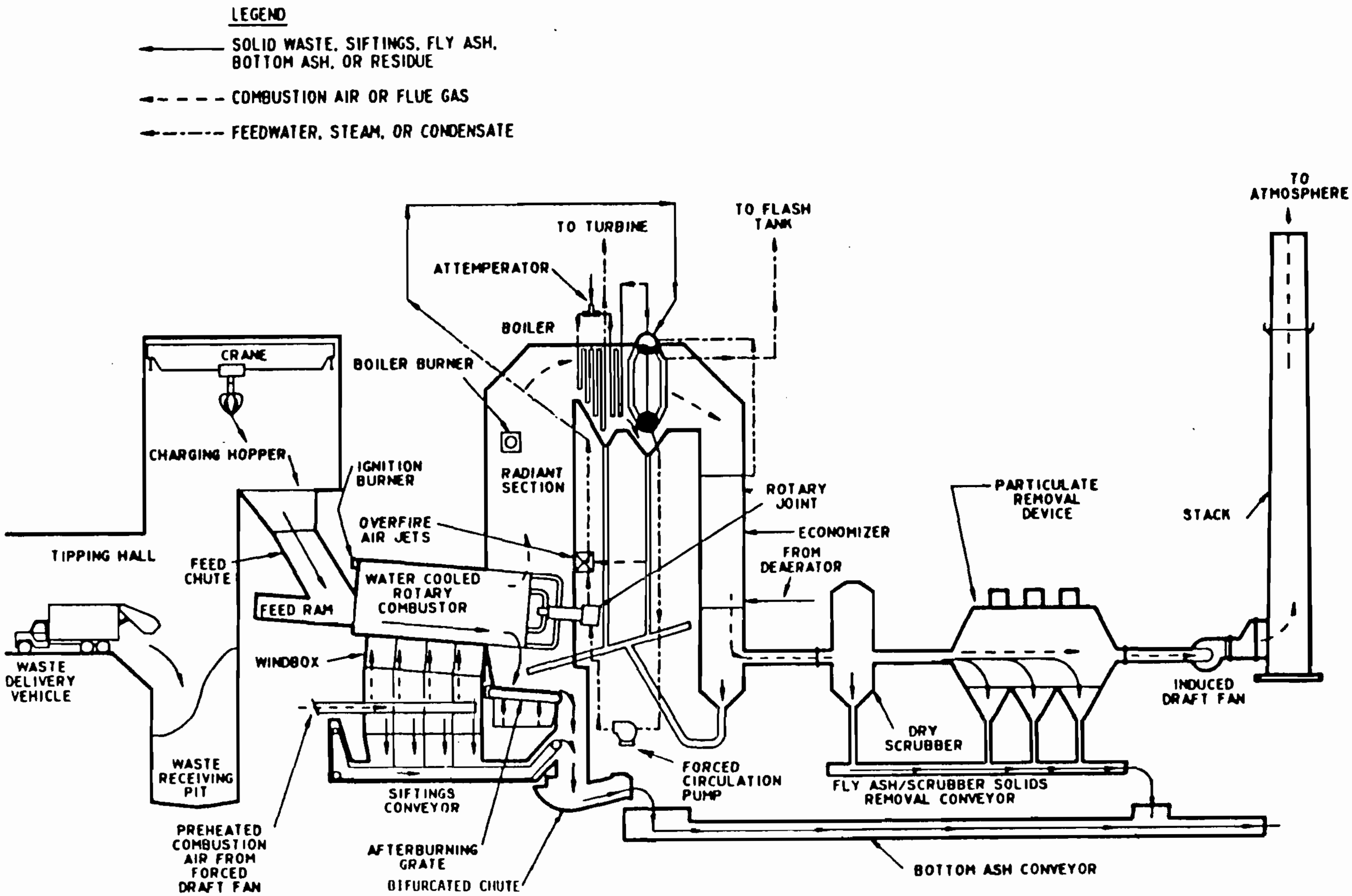
NOTE

0.0 REFERENCE GRADE IS 20 TO 25 FEET ABOVE MSL. ALL DIMENSIONS ARE APPROXIMATE.
NOT TO SCALE.

CDM

FIGURE 3-2a

Typical Facility Cross-Section (Stoker Water Wall Design) - Lee County Energy Recovery Facility



LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc.

FIGURE 3-2b
TYPICAL FACILITY CROSS-SECTION
(Rotary Waterwall Design)

The air pollution control equipment housing will have an approximate 130-foot by 260-foot surface area at the expanded capacity of 2,400 tpd. The Facility stack, located about 40 feet west of the air pollution equipment, will have a maximum height of about 375 feet above existing grade or about 400 feet above mean sea level. A Federal Aviation Administration (FAA) stack height application has been submitted to FAA, and is included in Appendix 6.4. The FAA permit will be forwarded to DER upon receipt by the County. Direct communication with the FAA staff in reviewing of the proposed maximum height indicates that the stack will not pose a hazard to air navigation but must be obstruction marked and lighted. Note that the height of the stack may only be about 265 feet, depending on the vendor/contractor selected. In any case, the stack height will be established in accordance with good engineering practice (GEP).

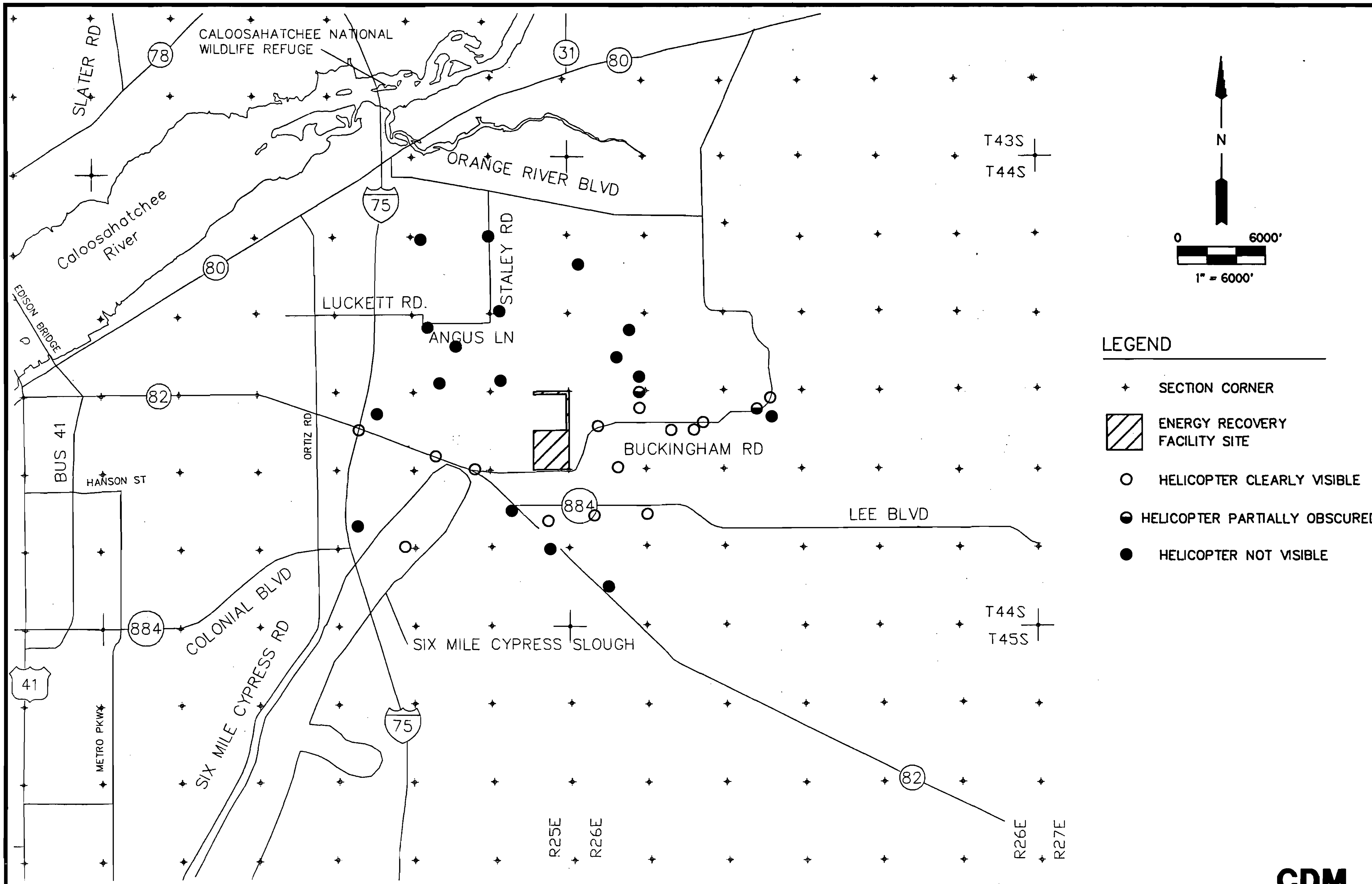
The cooling tower and electrical switch yard will be located west of the Facility proper. The ash building, to the north, will be about 100 feet wide by 100 feet long.

3.2.2 VISUAL IMPACT

A preliminary study was performed to determine the visual impact of the Facility on residences in the area. Since the emissions stack is the tallest structure of the Facility, its maximum height of 400 feet above MSL was chosen for study purposes.

To simulate the emissions stack, a helicopter was flown over the site at a height of about 400 feet MSL. The helicopter was unable to hover over the exact stack location; instead, it circled the location in as narrow a radius as possible. Observations were made from four different directions from the Facility site. Visibility of the helicopter was dependent upon distance from the site, and the proximity of obstructions which consisted primarily of trees.

The results of the visual impact study are shown in Figure 3-3. At each observation point, the figure indicates whether the helicopter was clearly visible, visible only part of the time (it was circling the site and came



Visual Impact Study – Lee County Energy Recovery Facility

FIGURE 3–3

into and out of view at some locations), or not visible. Because the location of the helicopter was not constant, the results of this study err on the conservative side. Where the helicopter was visible only part of the time, it is assumed that the stack will be partially or fully obscured and will not cause a major impact to area aesthetics.

Based on the results of the study, the visibility of the proposed stack is as follows.

- To the northwest, a residential/rural area, the helicopter was not visible, even as close as one-half mile from the site.
- To the northeast, the helicopter was not visible from most locations. The furthest visibility point was about one and one-half miles.
- To the southwest, the helicopter was visible up to about two miles from the site.
- To the southeast, the visibility extended to about one mile from the site.

Again, it must be emphasized that the methodology employed here represents a worse-case scenario and may tend to over-exaggerate the visual impact of the emissions stack. Its full height may be less than 400 feet MSL.

Visual impacts cannot be completely avoided given the stack height needed to meet GEP requirements. The stack may be visible up to about two miles away from the site, depending on the direction, and vegetation and other obstructions. However, it is felt that the Facility will not produce major aesthetic impacts in the area. Furthermore, buffers will be provided to minimize the Facility's visibility. Existing on-site vegetation will be left intact as much as possible. Removal of trees in excess of ten feet in height or with diameters of three inches or greater at breast height shall be minimized to the greatest extent possible, except in areas where structures are to be placed or landscape plantings are to be provided.

The Facility landscaping plan is intended to provide a natural appearance and limit the visibility of the Facility buildings. In addition to the buffer requirements of local zoning and development ordinances, the plan shall incorporate primary, secondary, and minor trees and shrubbery. Primary trees shall be at least 10 to 12 feet in height, secondary trees at least 6 to 10 feet, and minor shrubs less than 6 feet. Landscaping shall be provided along the entrance road and adjacent to the administration building and parking area. Plants species shall be native wherever possible.

3.3 FUEL

3.3.1 FUEL SUPPLY

The energy recovery facility will obtain its fuel supply from municipal solid waste collected in Lee and Hendry counties. The term "municipal solid waste" applies to all of the non-recycled solid waste generated within the two counties, excluding hazardous and pathogenic wastes and sewage sludges. Since this waste is heterogeneous, characteristics such as heating value, moisture content, and ash content of the waste will vary. However, the solid waste may be classified according to the following general characteristics and sources of generation.

- Residential Wastes - Mixed domestic household wastes (including non-composted yard wastes) generated by individuals or families in single-family or multiple-family dwellings (comprises approximately 46 percent of the waste stream).

- Commercial/Institutional Wastes - Wastes generated by the commercial and retail sector of the counties, including wastes from hospitals, schools, and churches. The physical characteristics of these wastes are similar to residential wastes, consisting primarily of combustible materials in the form of paper and food wastes from offices, restaurants, and retail establishments (comprises approximately 40 percent of the waste stream).

- Special Wastes - Wastes generated by the construction industry, including construction and demolition debris and white goods. Any wastes classified as infectious by federal and state regulations will be excluded (comprises approximately 11 percent of the waste stream).

- Industrial Wastes - Wastes generated by industrial process and manufacturing operations, excluding any wastes classified as hazardous or infectious by federal and state regulations. These wastes also include general housekeeping and support activity wastes associated with industry (comprises approximately 3 percent of the waste stream).

All calculations, analyses, and performance data for the energy recovery facility have been based on the as-fired solid waste higher heat value of 5,000 Btu per pound, with a 21 percent moisture content by weight. Table 3-1 presents the as-received reference solid waste composition, and Table 3-2 lists the reference waste ultimate analysis.

3.3.2 FUEL STORAGE

The energy recovery facility will be equipped with an automatic weighing station to weigh and record the quantity of solid waste delivered. The waste will be delivered in standard municipal-type packer vehicles, open-bodied dump trucks, and transfer trailers with capacities up to 110 cubic yards. The Facility will receive solid waste deliveries 6 days per week, 52 weeks per year. The fuel storage design capacity is based on the ultimate expanded Facility capacity of 2,400 tpd.

The energy recovery facility will include a totally enclosed tipping floor with 18 tipping bays, each 15 feet wide. Back-up barriers will be provided at each tipping bay to prevent vehicles from backing into the solid waste storage pit. Solid waste will be stored in a completely enclosed pit with a floor elevation below that of the tipping floor. The pit will be sized for a minimum storage capacity of 7,200 tons of solid waste at a density of 450 pounds per cubic yard, which will provide at least three days storage at the Facility's ultimate capacity of 2,400 tpd.

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TABLE 3-1

REFERENCE SOLID WASTE COMPOSITION

Waste Category	Nominal Percentage By Weight
Combustibles	58.4
Moisture	20.7
Non-Combustibles	20.9
TOTAL	100.0

TABLE 3-2

REFERENCE SOLID WASTE ULTIMATE ANALYSIS

Component	Nominal Percentage By Weight
Moisture	20.7
Total Inert	20.9
Carbon	28.5
Hydrogen	3.8
Oxygen	25.1
Nitrogen	0.5
Chlorine	0.4
Sulfur	0.1
TOTAL	100.0
Higher Heat Value (HHV)	5,000 Btu/lb

The primary purpose of three-day pit capacity is to ensure adequate on-site storage for refuse over a three-day weekend. However, the pit capacity could also be used to store incoming refuse when the Facility is down for scheduled or unscheduled maintenance. In this manner, the need to bypass waste directly to the landfill is minimized.

Three examples have been prepared to illustrate the waste processing capabilities of the Facility with one or more units out of operation. The examples are based on the following assumptions, with the Facility operating at its ultimate capacity.

- o The Facility combusts wastes continuously: 24 hours per day, seven days per week.

- o The Facility receives an average of 2,400 tpd or 16,800 tons per week. However, the Facility will actually be open to receive wastes only six days a week (Monday through Saturday). Based on current trends within the County, approximately half as much waste is received on Saturday as during the week. Therefore, under this example the Facility will receive 3,055 tpd on Monday through Friday and 1,530 tpd on Saturday.

- o The Facility will have four processing trains, each with a design capacity of 600 tpd.

- o The refuse pit will have a storage capacity of approximately 32,000 cubic yards to the elevation of the tipping floor. An additional 16,000 cubic yards of storage above the tipping floor elevation is available when waste is stored against the pit sidewalls. The ultimate capacity of the pit is 48,000 cubic yards. (Based on a density of 450 pounds per cubic yard, the pit will store 7,200 to 10,800 tons of waste.)

Example One - Three Unit Operation

One unit shuts down due to mechanical failure at 6:00 a.m. on Monday. The remaining three units are capable of operating at 100 percent of their total combined capacity of 1,800 tpd. At the time of breakdown, the pit contains 1,200 tons (normal minimum half-day storage reserve).

Time/Day	Received (tons)	Processed (tons)	Waste in Pit (tons)
6:00 a.m., Mon. (Week 1)	3,055	1,800	1,200
			+1,255
6:00 a.m., Tues.	3,055	1,800	2,455
			+1,255
6:00 a.m., Wed.	3,055	1,800	3,710
			+1,255
6:00 a.m., Thurs.	3,055	1,800	4,965
			+1,255
6:00 a.m., Fri.	3,055	1,800	6,220
			+1,255
6:00 a.m., Sat.	1,530	1,800	7,475
			- 270
6:00 a.m., Sun.	0	1,800	7,205
			-1,800
6:00 a.m., Mon. (Week 2)	3,055	1,800	5,405
			+1,255
6:00 a.m., Tues.	3,055	1,800	6,660
			+1,255
6:00 a.m., Wed.	3,055	1,800	7,915
			+1,255
6:00 a.m., Thurs.	3,055	1,800	9,170
			+1,255
6:00 a.m., Fri.	3,055	1,800	10,425
			+1,255
6:00 a.m., Sat.			11,680

The pit will be filled to capacity in the mid-afternoon of the second Friday. The total reserve time for this situation is 12 days.

Example Two - Two Unit Operation

At 6:00 a.m. on Monday, two units shut down due to mechanical failure. The remaining units continue to process waste at 100 percent of their capacity, for a total capacity of 1,200 tpd.

Time/Day	Received (tons)	Processed (tons)	Waste in Pit (tons)
6:00 a.m., Mon.	3,055	1,200	1,200
			+1,855
6:00 a.m., Tues.	3,055	1,200	3,055
			+1,855
6:00 a.m., Wed.	3,055	1,200	4,910
			+1,855
6:00 a.m., Thurs.	3,055	1,200	6,765
			+1,855
6:00 a.m., Fri.	3,055	1,200	8,620
			+1,855
6:00 a.m., Sat.	1,530	1,200	10,475
			+ 330
6:00 a.m., Sun.	0	1,200	10,805

The pit will be filled to capacity at some time during the late afternoon on Saturday. Since no waste is delivered on Sunday, the total reserve time in this example is seven days.

Example Three - Alternative to Example One

At 6:00 a.m. on Saturday of week 1 in example one, a second unit shuts down due to mechanical failure. The remaining units continue to process waste at 100 percent of their nameplate capacity.

Time/Day	Received (tons)	Processed (tons)	Waste in Pit (tons)
6:00 a.m., Sat. (Week 1)	1,530	1,200	7,475
			+ 330
6:00 a.m., Sun.	0	1,200	7,805
			-1,200
6:00 a.m., Mon. (Week 2)	3,055	1,200	6,605
			+1,855
6:00 a.m., Tues.	3,055	1,200	8,460
			+1,855
6:00 a.m., Wed.	3,055	1,200	10,315
			+1,855
6:00 a.m., Thurs.	3,055	1,200	12,170

The pit will be filled to capacity at some time during Wednesday of week 2. The total reserve time in this situation is 10 days.

These three scenarios show that the Facility will continue to receive the entire waste stream without any bypass to the landfill or another Facility for 12 days in Example One; for seven days when two units fail simultaneously (Example Two); or for 10 days when two units fail in a staggered manner (Example Three). Incoming refuse need not be diverted to the landfill/ashfill during these periods.

3.4 AIR EMISSIONS AND CONTROLS

3.4.1 AIR EMISSION TYPES AND SOURCES

The proposed energy recovery facility is a new facility that will be located in Lee County. At ultimate size, the Facility will contain either: four mass-burn stoker waterwall combustor boilers each with a rated capacity of 600 tpd of municipal solid waste, or four mass-burn rotary waterwall combustor boilers at 450 tpd each plus one at 600 tpd, for a total of 2,400 tpd. The flues from all of the combustor trains will be encased in a single stack shell.

The refuse bunker will be enclosed and under negative pressure, which is achieved by drawing combustion air during normal operations from this area. There will be no on-site storage of either refuse or residue except within controlled, enclosed areas. Loading and unloading of trucks will take place inside the residue storage building and enclosed tipping floor building, respectively. Provisions for loading containers or trucks outside using a redundant conveyor during main ash conveyor outages will be designed featuring impervious surface areas and controlled stormwater runoff. Trucks entering and leaving the site will be covered and will travel on paved roads.

The ash handling area may be a minor source of particulate emissions, but a fabric filter device will be used to ensure that virtually no emissions will be released from this area. Thus, the common boiler stack will be the only major source of emissions from the Facility.

A complete description of stack emissions is contained in Section 3.0 of the Prevention of Significant Deterioration (PSD) permit application (see Volume III - Air Quality). Maximum expected emission rates for the proposed Facility are contained in Table 3-2, Section 3.0 of the PSD permit application in Volume III (see Section 7.6 in Volume III). A complete FDER Form 17-1.202 (1), "Application to Operate/Construct Air Pollution Sources," may also be found in the front of Volume III.

3.4.2 AIR EMISSION CONTROLS

A number of air pollution control technologies are available to control different classes of pollutants which include particulate matter, trace metals and organic compound emissions, SO_2 and acid gases, NO_x and products of incomplete combustion such as CO and VOCs. Commercially available pollution control systems and their operating characteristics are fully described in the Best Available Control Technology (BACT) analysis in Section 4.0 of the PSD permit application (see Volume III - Air Quality).

3.4.3 BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

The BACT analysis is presented in Section 4.0 of the Prevention of Significant Deterioration permit application (Volume III - Air Quality). The analysis evaluates the environmental, economic, and energy aspects of alternative control techniques and methods. For all of the criteria pollutants, Lee County is designated as being in attainment of the National Ambient Air Quality Standards (or unclassified), and hence subject to BACT. Based on a review of various air pollution control alternatives, a dry scrubber and baghouse are proposed as BACT for the Lee County energy recovery facility for all pollutants subject to PSD review. The dry scrubber will be designed to achieve an emission limit of 30 parts per million on a dry volume basis (ppmdv) at 7 percent 0_2, or 80 percent reduction, 24-hour block average for SO_2; and 25 ppmdv at 7 percent 0_2, or 95 percent reduction, for HCl. The baghouse will be designed to achieve an outlet grain loading of 0.010 grains per dry standard cubic foot corrected to 7 percent O_2 (gr/dscf @ 7% O_2). Combustion control techniques will be employed to minimize emissions of VOC and CO using rotary waterwalls. If the Facility employs mass-burn stoker waterwall combusters, selective non-catalytic reduction (SNCR) will be used to control NO_x emissions. If the Facility employs massburn rotary waterwall combustors, staged combustion will be used to control NO_x emissions.

3.4.4 DESIGN DATA FOR CONTROL EQUIPMENT

Design data for control equipment are not available because a furnace/boiler supplier has not been selected yet. Design parameters for the mass-burn energy recovery facilities under consideration, used in the BACT analysis, are presented in Section 4.0 of Volume III - Air Quality.

3.4.5 DESIGN PHILOSOPHY

The proposed control technologies, including dry scrubber and baghouse, are designed to neutralize acid gas emissions and capture particulate matter entrained in the flue gas from the furnace/boiler. The particulate matter is collected in a dry form to avoid wastewater disposal, corrosion, and stack gas reheat problems.

3.5 PLANT WATER USE

During normal operation of the energy recovery facility, all process cooling water will be treated wastewater effluent (reclaimed water) drawn from the City of Fort Myers Central Advanced Wastewater Treatment Plant (Central WWTP). The Central WWTP is located approximately four miles west of the site. The cooling tower blowdown water will be internally used in the Facility, to the greatest practicable extent, for ash quenching, lime slaking, and the like. Potable water provided by the Lee County Utilities will be used for process and potable purposes. An on-site well will be used for back-up cooling water needs. No process or sanitary wastewater will be discharged to surface water or groundwater bodies. Alternative sources of water are discussed in Section 8.0. A quantitative water use diagram is provided in Figure 3-4. The quantities of water presented in this figure are approximate and will be more accurately determined when a vendor/contractor is selected to design and build the Facility.

3.5.1 HEAT DISSIPATION SYSTEM

System Design

Cooling water will be used in a closed-loop system which employs water-cooled condensers to condense the low pressure steam discharged from the turbine. Cooling water will circulate through the condensers, and waste heat will be dissipated from the condenser cooling water by passage through a wet mechanical draft cooling tower.

The cooling tower system has adequate capacity to dissipate the heat from steam generated by firing 1,800 tpd of solid waste. If the steam turbine generator is out of service at any time when the boilers are producing high pressure steam, a separate bypass condenser will be used to accept the full rated design capacity of high pressure steam from the plant boilers. Through the use of the bypass condenser system, Facility processing capacity will not be diminished during periods of full or partial turbine generator outage.

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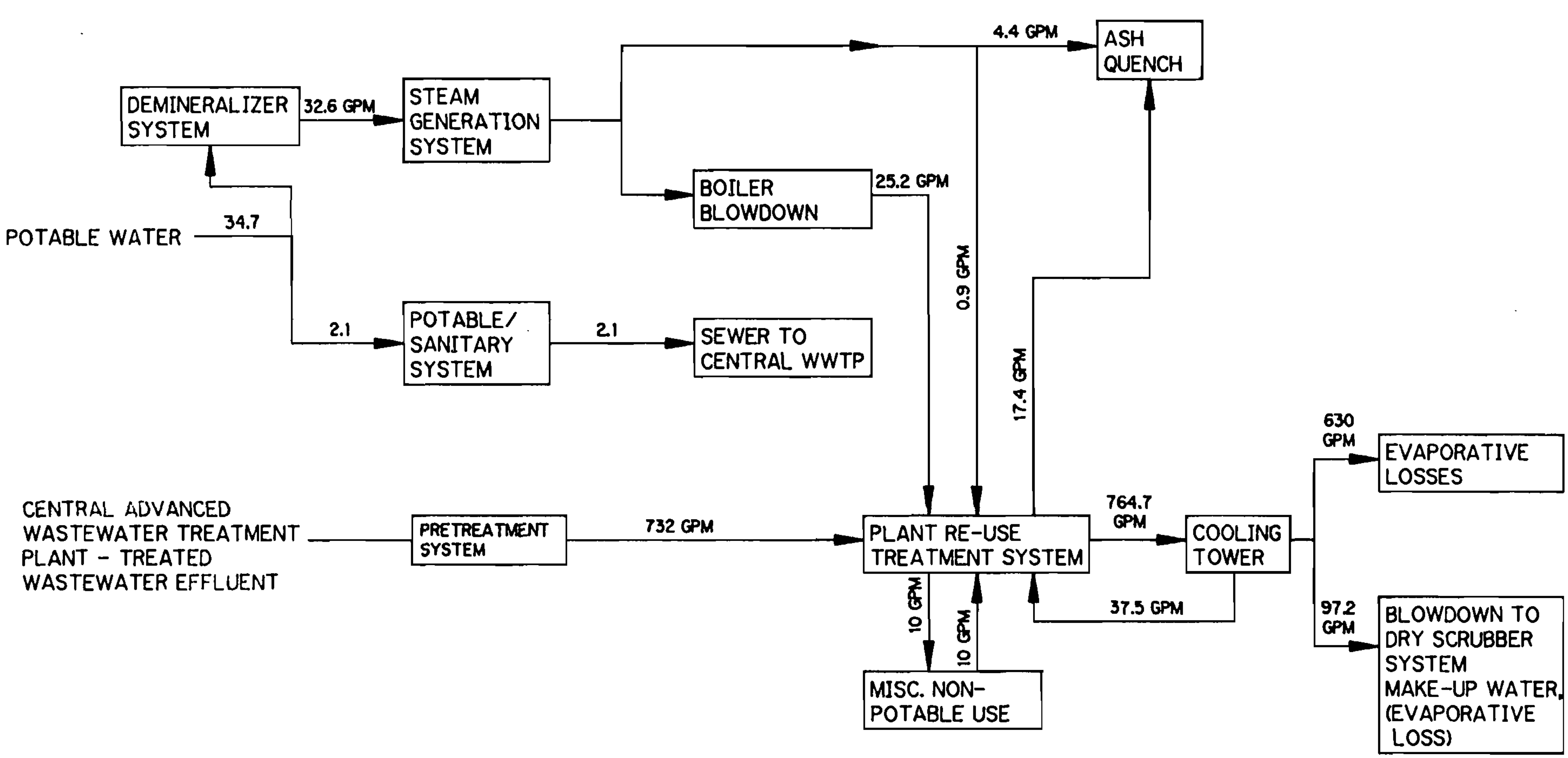

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Quantitative Water Use Diagram - Lee County Energy Recovery Facility

FIGURE 3-4

Consumptive (non-potable) water use will primarily be losses from the cooling tower system in the form of evaporation and drift. The average water loss due to evaporation will be 1.2 mgd at 1,800 tpd. Other water uses (losses) include water consumed in ash quenching operations and the operation of the dry scrubber system.

No conventional water intake structure will be needed in the energy recovery facility system, since all cooling water will be taken by pipeline from the Central WWTP. Similarly, no water will be discharged from the energy recovery facility system, except for approximately 0.15 mgd of combined sanitary and process wastewater which will be routed to the Central WWTP for treatment and reuse. Cooling ponds will not be used in the system.

Source of Cooling Water

All cooling tower makeup water will be obtained through a direct pipeline link with the Central WWTP. Approximately 1.1 mgd of reclaimed water will be needed for cooling tower makeup when the Facility is operating at 1,800 tpd. This will increase to 1.5 mgd at the Facility's ultimate capacity of 2,400 tpd. The WWTP has a capacity of 11 mgd, which is ample to supply the reclaimed water needed by the energy recovery facility even during low wastewater flow periods. Table 3-3 lists the current effluent permit limits for the Central WWTP. Table 3-4 contains the results of a recent comprehensive analysis of the reclaimed water. A letter of commitment from the City to furnish the reclaimed water can be found in Appendix 5.2.

The back-up cooling water supply for the Facility will be an on-site well. Information on the proposed well can be found in the water use permit application in Appendix 7.2.

TABLE 3-3

CURRENT EFFLUENT LIMITS FOR THE
FORT MYERS CENTRAL ADVANCED WASTEWATER TREATMENT PLANT

Parameter	Concentration (mg/L)*
Annual Average BOD & TSS	20
Monthly Average BOD & TSS	30
Daily Sample BOD & TSS	60
Total Nitrogen	3.0 at 11 mgd (300 lb/day)
Total Phosphorus	0.5 at 11 mgd (50 lb/day)
Residual Chlorine	0.01 Daily Maximum
pH	Between 6.0 & 8.5 pH units
Annual Fecal Coliforms	200 per 100 ml
Individual Sample Fecal Coliforms	800 per 100 ml

*Unless Otherwise Noted.

TABLE 3-4

APRIL 19, 1990 EFFLUENT SAMPLE ANALYSIS RESULTS
FOR THE
FORT MYERS CENTRAL ADVANCED WASTEWATER TREATMENT PLANT

Parameter	Concentration, mg/L (unless otherwise noted)
Calcium	53
Magnesium	20
Manganese	0.010
Sodium	200
Potassium	14
Iron	0.11
Iron, dissolved	0.11
Silica	10
Hydroxide	<0.50
Carbonate Alkalinity (as $CaCO_3$)	<1.0
Bicarbonate Alkalinity (as $CaCO_3$)	98
Sulfate (as SO_4)	120
Sulfite	<0.10
Chloride	250
Fluoride	0.85
Nitrite-N	<0.050
Nitrate-N	<0.050
Ortho-Phosphate-P	0.12
Total Kjeldahl Nitrogen-N	1.4
Ammonia-N	0.041
Carbon Dioxide	100
Total Organic Carbon	22
Chemical Oxygen Demand	17
Biochemical Oxygen Demand (5 day)	1.2
Suspended Solids	8.0
Total Dissolved Solids	850
Alkalinity (to pH 8.3)	<1.0
Hydroxide Alkalinity (as $CaCO_3$)	<1.0
Specific Conductance, umhos/cm	1100
pH, units	7.2
Turbidity, NTU	1.7
Color, PCU	20
Sulfide, EPA 600-376.1	<0.10
Arsenic	<0.0010
Aluminum	0.32
Barium	<0.010
Cadmium	<0.0050
Chromium	<0.010

TABLE 3-4
(continued)

Parameter	Concentration, mg/L (unless otherwise noted)
Copper	<0.010
Lead	<0.0050
Mercury	<0.00020
Selenium	<0.0020
Silver	<0.010
Zinc	0.022
Endrin ketone, ug/L	<0.10
Gamma-BHC, ug/L	0.027
Methoxychlor, ug/L	<0.50
Toxaphene, ug/L	<1.0
2,4-D, ug/L	<0.10
2,4,5-TP Silvex, ug/L	<0.010
Surfactants (MBAS-EPA 425.1)	<0.10
Total Coliform MF, colonies/100 ml	130
Gross Alpha, pCi/L	6.6+/-4.2
Gross Beta, pCi/L	56.8+/-6.7
Benzene, ug/L	<1.0
Carbon Tetrachloride, ug/L	<1.0
1,2-Dichloroethane,ug/L	<1.0
1,1-Dichloroethylene, ug/L	<1.0
Trichloroethylene	6.4
1,1,1-Trichloroethane, ug/L	<1.0
Vinyl Chloride, ug/L	<1.0
1,2-Dichlorobenzene, ug/L	<1.0
Tetrachloroethylene,ug/L	<1.0

Dilution System

Process water will be treated and reused internally within the Facility to the greatest extent practical. A maximum wastewater discharge of 150,000 gpd will consist of a combination of sanitary wastewater and process water. No Facility outfall will be required.

Blowdown

Liquid flows from blowdown systems will come from the boiler drums, the cooling towers, and the boiler feedwater demineralizers (BFDS). Blowdown flows from BFDS and boilers will be collected in the blowdown tank and either discharged to the residue quench tank or treated and reused in for the Facility. Cooling tower blowdown will be used in the lime slaking dry scrubber system and other Facility uses to the extent necessary and will achieve a maximum sewer discharge of 0.15 mgd. Since no intake structures are required, no intake structure trash disposal will be required.

Injection Wells

No injection wells will be used at this Facility.

3.5.2 DOMESTIC/SANITARY WASTEWATER

Sanitary wastewater flows will be generated within the Facility only in the personnel service areas (e.g., showers and washrooms). The Facility will employ approximately 50 people for normal operation, with fluctuating staff increases from time to time as contractors and other specialty staff are retained for task-specific work. Provisions will be made to accommodate up to 30 visitors at the Facility at any one time.

Wastewater discharged from the Facility will be limited to 0.15 mgd and will consist of sanitary sewage, and other waste process water. Wastewater discharges will be treated as necessary to comply with the City of Fort Myers pretreatment requirements, detailed in Section 2.2.7, prior to discharge. Wastewater will be discharged via sewer to the Central WWTP for treatment.

3.5.3 POTABLE WATER SYSTEMS

Potable water requirements (up to 0.075 mgd) will be supplied by tapping into the Lee County Corkscrew Water Treatment Plant's distribution system. The proposed potable water transmission route is described in Section 6.2.

3.5.4 PROCESS WATER SYSTEMS

To meet its process water needs at the initial design capacity of 1,800 tpd, the Facility will use approximately 1.1 mgd of advanced-treated effluent from the Fort Myers Central WWTP. The energy recovery facility will use this reclaimed water for cooling purposes, and will treat and reuse the spent process water to achieve a limited discharge from the process train. All residue liquid wastes will become part of the returned sanitary and process flows for treatment at the Fort Myers wastewater treatment plant.

3.6 CHEMICAL AND BIOCIDE WASTE

Both anti-corrosion and anti-fouling agents will be used at the Facility in the boilers and cooling tower. Blowdown will be treated and reused at the Facility. The exact flow diagram of the chemical waste system will be developed by the selected contractor. There will be no discharges from chemical processing, spent process water treatment, or waste piles as a result of plant operation that may enter the local environment.

3.7 SOLID AND HAZARDOUS WASTES

3.7.1 SOLID WASTES (INCLUDING ASH)

The residues of combustion will consist of noncombustible by-products, fly ash, spent lime, and bottom ash siftings. The residue handling system will be designed to remove these materials from the combustion system for disposal. The bottom ash siftings from the combustion units will be quenched and subsequently dewatered. Conveyers will also be supplied to transport fly ash and spent lime from the boilers, dry scrubbers, and bag house to the residue system.

The residue handling system will consist of totally enclosed conveyors and an enclosed building with a truck loading area and residue storage bunkers. Residue will be hauled from the Facility in covered trucks to the landfill/ashfill in Hendry County. The residue to be disposed of at the landfill/ashfill will meet all local, state, and federal regulations which govern such disposal. The residue will contain no more than four percent noncombustible material by dry weight content. Ferrous materials will be recovered from the residue prior to final disposal.

The only other solid wastes to be produced under normal operating conditions will be minute amounts of solid waste, primarily office and lunchroom trash. Since the Facility is specifically designed for the processing of solid waste, the Facility will dispose of its own trash.

Ash Management Plan

The residue of combustion will consist of non-combustible by-products fly ash, bottom ash, and siftings. The residue removal systems will be designed to remove these materials from the combustion and air pollution control systems for disposal. Ash will fall from the bottom of each combustion unit directly into a water-filled quench tank. The quench tank will be fully enclosed to prevent ash siftings from becoming airborne. The quenched ash will then be allowed to drain free water, and will then be mechanically loaded into an enclosed conveyor system which will transport the ash and residue to the enclosed ash storage building. A back-up system for ash transport to the ash storage building will be provided.

Fly ash will be handled in the same manner. Ash removal conveyors (fully enclosed) to transport fly ash from the boilers, dry scrubbers, and bag house to the residue water system will be used for the bottom ash. The combined ash is quenched and taken to the ash storage building. The floor of the ash building will be watertight. It will have a sealed concrete floor. Any free liquid which is generated by the storage piles will be collected and treated as required. The ash storage building will be covered to keep out precipitation and enclosed to prevent wind blown emissions. The ash will be stored in piles inside the building.

The transfer of the ash from the storage piles to the covered watertight vehicles for transport to the landfill will be accomplished by using rubber tire front-end loaders. All loading and preparation for ash transport will occur within the fully enclosed ash storage building. The ash residue will be transported from the energy recovery facility in covered watertight trucks, to the proposed landfill/ashfill located approximately 15 miles from the Facility.

Because of the moist nature of the ash materials, dust will not be generated by the ash handling, conveying, and transport activities. The consistency and appearance of the wetted ash material will be that of wet aggregate. This condition will continue to be maintained during transport to the landfill, unloading via hydraulic lift truck beds and spreading in relatively thin layers (lifts) of approximately 12- to 24-inch thickness.

Table 3-5 presents the estimated quantities of ash residue requiring disposal when the energy recovery facility capacity is operating at its initial capacity of 1,800 tons per day. Ash quantities will peak and level off at approximately 168,000 tons per year at year 2003 at 459 tons per day. In the future when the Facility is expanded to 2,400 tons per day, the maximum annual quantity of residue requiring disposal will reach approximately 263,000 tons per year. It is not possible to accurately estimate the quantities of fly ash separate from total ash to be produced. Most facilities currently in operation in the United States combine fly and bottom ash in the total ash quench system. Thus, there is little information for calculating the precise amounts of fly vs. bottom ash.

TABLE 3-5

ESTIMATED ANNUAL AND DAILY QUANTITIES OF
ASH RESIDUE FOR LEE AND HENDRY COUNTIES

Year	Tons/Day	Tons/Year[a]
1993	292	107
1994	308	112
1995	324	118
1996	341	124
1997	358	131
1998	376	137
1999	394	144
2000	413	151
2001	434	158
2002	452	165
2003	459	168
2004	459	168
2005	459	168
2006	459	168
2007	459	168
2008	459	168
2009	459	168
2010	459	168
2011	459	168
2012	459	168
2013	459	168
2014	459	168
2015	459	168
2016	459	168
TOTAL		3,699

[a] In thousands (rounded).

As part of the ash handling system, a ferrous metal removal system will be installed to recover ferrous material. Experience at other energy recovery facilities has indicated that from six to eight percent of the total ash residue (wet condition) is comprised of recoverable ferrous metal. For the Lee County energy recovery facility, it can be estimated that between 6,500 and 8,500 tons of ferrous materials can be recovered during the first full year of Facility operation. It is not clear whether these quantities will decrease during the life of the Facility because the County's aggressive recycling program will become fully implemented. The development and implementation of the comprehensive recycling program will benefit the operations of the Facility by reducing the noncombustible recyclable materials entering the Facility for processing. A complete description of the Lee County recycling program, including a general implementation plan, can be found in Section 5.4.1.

The ash materials will be managed in compliance with Chapter 17-702, FAC, and in a manner (i.e., wet) such that an extremely low potential for inhalation ingestion or direct dermal contact will exist. The selected vendor will be required to develop a detailed and specific employee safety training program. This program will provide effective personal respiratory protection equipment if necessary to promote a high degree of protection to all persons who may have contact with the ash material, including landfill personnel. This program will be continuously updated as new information and equipment is developed to assure compliance with all OSHA standards and FDER requirements. After quenching and draining of free water from the residual materials, the ash will still contain about 30 percent moisture which will remain through the period of short-term storage and disposal. The mechanical nature of the ash handling and disposal operations, in enclosed combined systems when possible with the employee safety program will minimize the potential for inhalation, ingestion or body contact with the material.

Ash disposal will be at the regional Lee/Hendry County landfill located in Hendry County. The design of the landfill conforms with the design and performance standards set forth in Chapter 17-701, FAC. As currently proposed, the liner system includes (from bottom to top) a 12-inch low permeability base layer (1 x 10^{-5} cm/sec) overlain by a 60-mil high density polyethylene (HDPE) liner, a composite polynet geotextile drainage material, overlain by a primary 60-mil HDPE liner and a 24-inch drainage layer. Both a primary and secondary leachate collection system are included. This double synthetic liner system will provide assurance of total containment of ash and solid waste materials, while reducing the potential for contamination of soils, and ground and surface waters. Separate disposal cells (monofills) will be used for the disposal of ash and municipal solid waste. At this time, Lee County plans to employ monofill disposal areas for ash and municipal solid waste. However, Chapter 17-702, FAC, allows codisposal and the use of ash as cover material. Lee County may utilize these disposal options in the future if they are deemed appropriate. The method of disposal at the landfill will not change the County's operations at the energy recovery facility.

It is anticipated that leachate generated by the landfill will be sampled quarterly, at a minimum, to establish baseline leachate quality characteristics. In addition, the ash will be analyzed quarterly for the following parameters using "Test Methods for Evaluation; Solid Waste Physical/Chemical Methods" EPA Publication SW-846 (3rd Edition as amended, Update #1, December 1987) or other test methods as appropriate.

Parameters for Ash Testing

pH	TDS	Dc	Pb	Ag
BOC	TSS	Cr	Hg	N
COD	As	Cu	N	Se

In addition, quarterly testing will be performed using EPA Method 3050, "Acid Digestion of Sediments; Sludges and Soils For All Priority Pollutants."

As part of the total ash management program, the County will be alert to potential uses of ash. Currently, various pilot projects are underway in Florida and other states to study the possibility of reusing the ash. For example, several communities are studying the effects of incorporating ash materials into asphalt and concrete aggregate materials used in roadway pavements. This work is still in the development and research stages, however, and will require additional study regarding mixing ratios, leachability, and encapsulation techniques for the material. If these programs are successful, Lee County may pursue ash reuse programs of its own. At this time, however, Lee county has no plans to use ash in any other process or product.

3.7.2 HAZARDOUS WASTES

No hazardous wastes will be generated on-site, nor will any be accepted for processing with the solid waste; therefore, there will be no hazardous waste disposal. Section 5.4.2 describes the procedures that will be followed if any apparently hazardous materials are identified by the crane operators or scale house personnel.

3.8 ONSITE DRAINAGE SYSTEM

The stormwater management system for the energy recovery facility is designed to use as much of the natural drainage pattern as possible while protecting the existing wetlands on-site. The natural drainage basins have been delineated on Figure 3-5.

The north basin includes approximately 21 acres within the site that contribute runoff to wetlands located north of the site. The central basin consists of 93 acres of uplands and wetlands. The southeast basin includes 34 acres. Runoff from the southeast basin is stored in isolated wetlands which make up approximately 9 acres of the basin.

During large rain events, stormwater runoff from each of the existing basins discharges to the southwest (through a series of wetlands) and west (along Buckingham Road) where it eventually flows under Buckingham Road (two 10' x 2.2' box culverts) and SR 82 (two 10' x 4' box culverts) into the Six Mile Cypress Slough (see Figure 2-25).

A five-acre wet retention pond is proposed to provide treatment and storage

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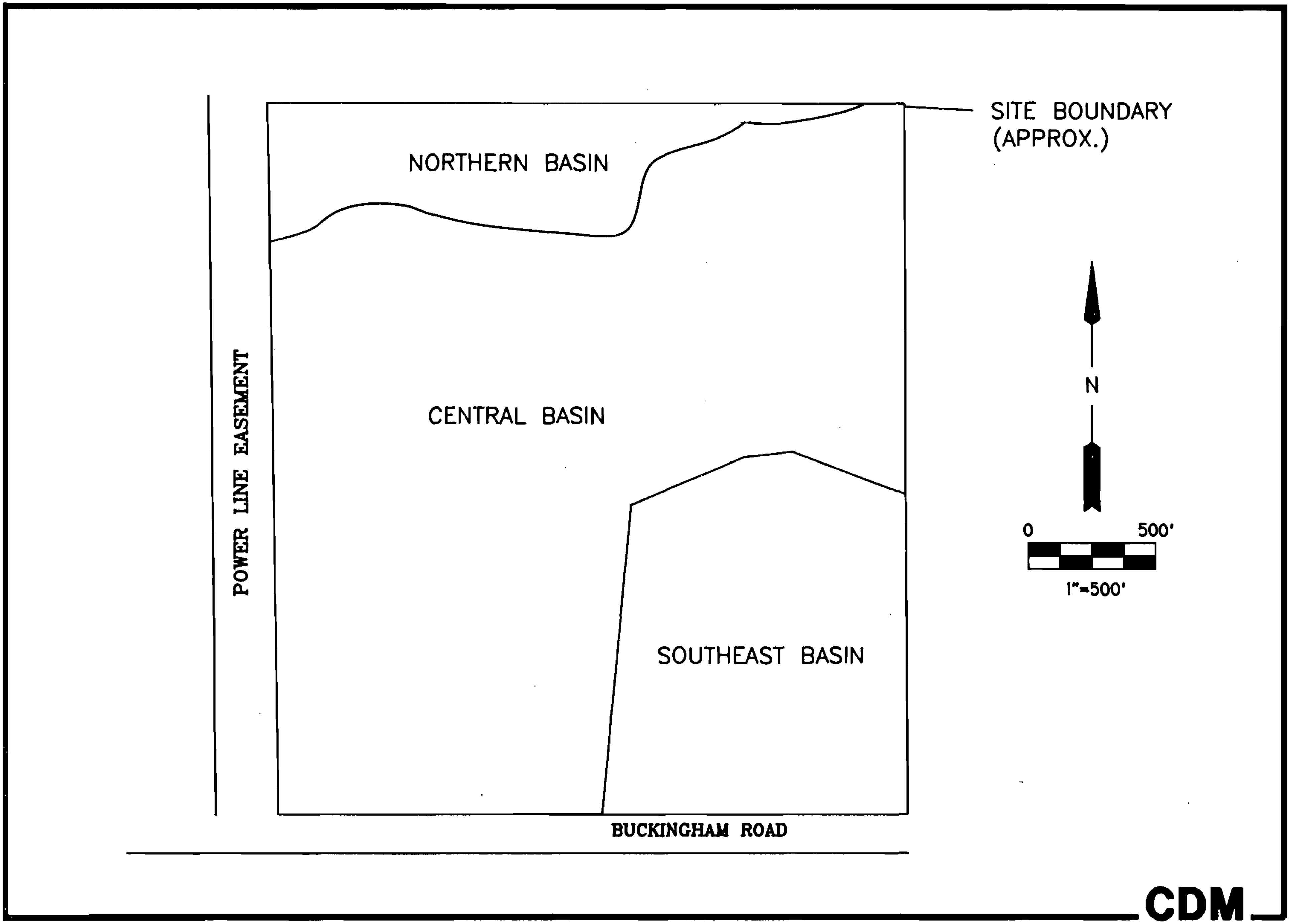


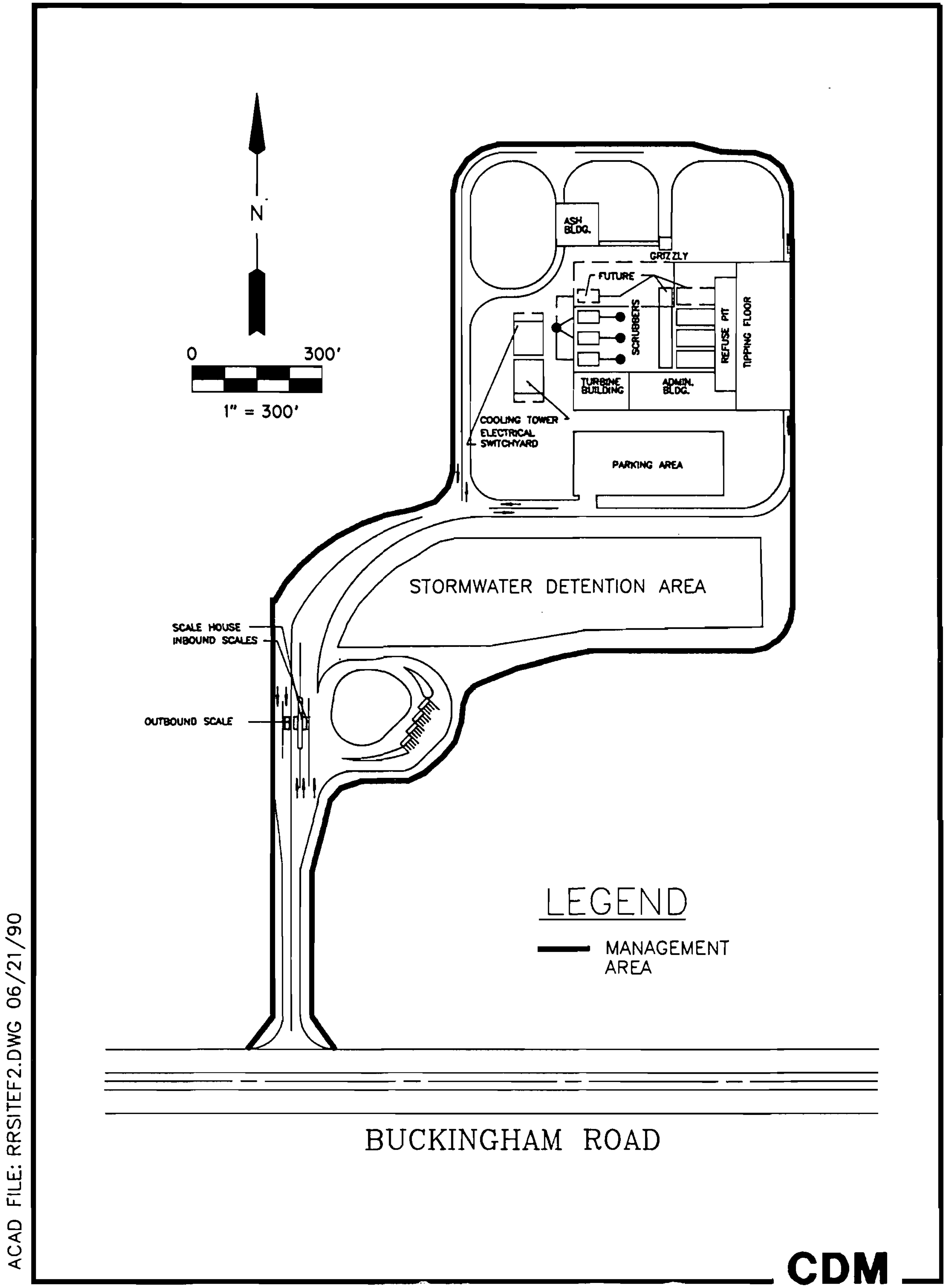
Figure 3-5

Predevelopment Surface Water Drainage Basins - Lee County Energy Recovery Facility of runoff from the developed portion of the site. In accordance with SFWMD criteria, peak discharge from the developed site will be limited to 37 cubic feet per second per square mile for a 25-year, 72-hour, storm event (10.33 inches of rainfall). The 37-csm criteria imposed by SFWMD is based on the Six Mile Cypress Watershed allowable discharge limit and equates to 1.7 cfs for the developed site. Discharge will be directed south to Buckingham Road after passing through isolated wetlands which will provide additional treatment. It is proposed that the wet retention pond be included in the early stages of construction to ensure storage and treatment of runoff and dewatering from the construction site.

The on-site drainage (Figure 3-6) system is designed to meet both surface water runoff quality (Chapter 17-25, Florida Administrative Code), and quantity Chapter 40E-4 (SFWMD) criteria. Water quality criteria require that wet retention systems provide storage for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater. Commercial or industrial projects are also required to provide at least one-half inch of dry retention pretreatment. There are also water quantity regulations regarding peak flow from the site. Generally, SFWMD criteria are based upon: (1) historic discharges (post development peak discharge rates from the 25-year, 72-hour storm event must not exceed the predevelopment runoff rate from the same storm); (2) amounts determined in previous District permit actions; or (3) amounts specified in District criteria (basin-specific limits). As stated above, the energy recovery facility site is restricted to 37 csm based on basin specific limits (see Appendix 7.3).

3.9 MATERIALS HANDLING

The energy recovery facility will have four or five independent process trains. Common elements, such as the waste feed crane, ash conveyers, and boiler feedwater systems, will have redundant capabilities. Initially, three 600-tpd trains will be constructed if stoker waterwall combustion/steam generation units are used. If rotary waterwall units are selected, four 450-tpd units will be constructed for an initial installed



Surface Water Management Area
Lee County Energy Recovery Facility

FIGURE 3-6

capacity of 1,800 tpd. A fourth or fifth train of the selected type, rated at 600 tpd, will later be added to reach the ultimate capacity of 2,400 tpd as the demand on the Facility increases. This ultimate capacity is expected to be constructed around the years 2002 to 2005. The independent processing trains will provide flexibility during operation of the Facility, allowing solid waste processing and energy production to continue if one train breaks down or needs to be shut down for scheduled maintenance. Lee County will defer some capital expenditure by not constructing the final 600-tpd train until it is needed.

The refuse bunker and tipping floor area will be under slight negative air pressure to prevent the escape of odors and dust. The underfire and overfire fans which supply the combustion system with air will draw all the necessary air from the refuse bunker and tipping floor area. Vents installed on the walls opposite the air intakes will induce a cross-flow ventilation. The dust particles and odors generated in the area will be directed into the combustion zone, thereby minimizing odors outside the refuse bunker and tipping floor area. The combustion process destroys odorous compounds.

Two overhead solid waste handling cranes will be installed to charge the combustion units and maintain the solid waste storage area. The cranes will be of the traveling bridge type, employing a polyp-type grapple. Each crane will be capable of meeting the solid waste handling requirements of the entire Facility.

No heavy equipment such as large cranes, or plant components such as boilers, will be transported to the site, unloaded, stored, or moved around the site during normal operation or maintenance of the Facility. The room in which the steam turbine generator is housed will have an overhead crane for maintenance of the generator. The Facility's dump condenser will be capable of condensing all steam if the generator is inoperable or being serviced.

Lime for the acid gas dry scrubber will be delivered weekly and will be pneumatically transferred to an on-site storage silo. The lime will be slaked and pumped in a slurry form to the scrubber unit; approximately 36 tons will be used each day. Ash residue (which includes the spent lime) will be hauled on a six-day per week basis to the landfill/ashfill in Hendry County, except for holidays.

3.10 ASSOCIATED FACILITIES

In conjunction with the energy recovery facility, a landfill/ashfill will be constructed in Hendry County. The location of the proposed landfill/ashfill is shown in Figure 2-16. A separate permit is under preparation for this proposed facility; excerpts from the draft permit, including the transmittal letter, table of contents, and FDER form 17-7.130(1), are presented in Appendix 7.1.

The proposed landfill/ashfill will serve the disposal needs of both Lee and Hendry counties. The landfill site consists of approximately 1,720 acres, of which 400 acres will be used for waste disposal. Approximately 260 acres have been designated for a Class I bypass and ash landfill. Approximately 40 acres will be used for the disposal of construction and demolition wastes. About 60 acres have been designated as a sludge composting/dry trash area. The sludge composting facility will be permitted separately at a later date. No hazardous wastes will be accepted at the facility. The anticipated life of the landfill is 40 years.

The proposed liner system for the Class I and ash fill areas is a double flexible membrane liner with primary and secondary leachate collection systems. A single synthetic liner with a leachate collection system is proposed for the Class III disposal area for construction and demolition debris. A minimum of 14 groundwater monitoring wells, 18 piezometric wells, and two surface water monitoring stations will be installed to assess any potential environmental impacts.

SECTION 4.0

ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED FACILITIES CONSTRUCTION

4.0 ENVIRONMENTAL EFFECTS OF SITE PREPARATION, AND FACILITY AND ASSOCIATED FACILITIES CONSTRUCTION

An overview of anticipated construction activities is provided as a preface to the discussion of the effects of site preparation and construction.

The duration of field construction for the Lee County energy recovery facility will be approximately 28 months. Personnel training, equipment testing, and calibration will be provided when construction is substantially complete. The entire design, construction, and start-up period will extend for approximately 36 months, from notice to proceed award to full plant operation.

The principal construction phases will include site preparation (site clearing and preparation, excavation, pile construction and backfilling), construction of the facility (foundations, building and process equipment erection, electrical and mechanical systems installation, instrumentation), and finalization (road construction and paving, final grading, painting, landscaping, and clean-up). Completion of final construction activities may extend into the start-up period. The estimated time required to complete field construction activities is shown on Figure 4-1.

The initial phase of construction will involve the clearing of trees and stumps, and stabilization of the site access road. This activity will be followed by construction of the retention basin and topsoil removal.

Upon completion of the retention basin, dewatering procedures for refuse bunker excavation will begin, if necessary. Refuse bunker excavation will commence when the groundwater has dropped to an appropriate level. After initial excavation, sheet pile driving, if required, will begin for further excavation of the refuse bunker. Dewatering will continue until the concrete walls for the refuse bunker have been placed and cured to an elevation above the existing groundwater level. Construction of the refuse bunker, and the associated dewatering is planned to occur during the dry season.

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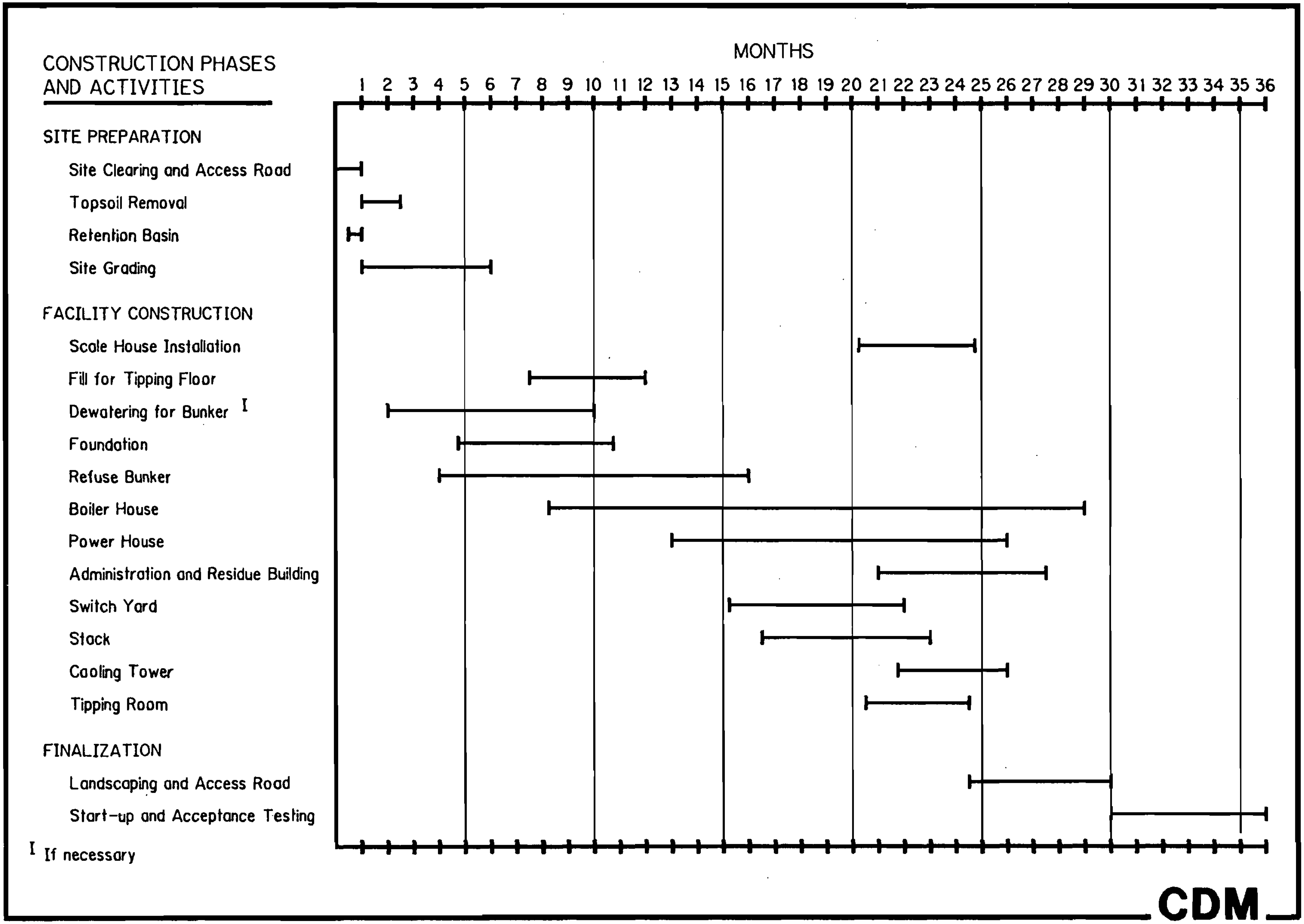

FIGURE 4-1

Construction Phases and Activities - Lee County Energy Recovery Facility

If the dewatering activities associated with facility construction must occur during the wet season and active growing season, additional measures will be taken to ameliorate the impacts to the on-site wetlands. These measures may include: the maintenance of water levels as close as practical to normal wet season elevations through the use of a rotating schedule of wetland inundation; development of a system of wetland discharge which encourages sheet flow discharge into the wetlands and prevent the formation of channel flow; or spray irrigation over a large area comprised of wetlands and uplands for dewatering discharge. All these alternative measures will conform with applicable state standards for turbidity and other water quality parameters. Dewatering is not expected to continue for more than six months. An NPDES permit application is being filed with EPA to allow discharge of this water to an on-site retention pond (Appendix 6.1).

Permanent and temporary drainage structures will be built during various phases of construction to control surface water runoff. The surface runoff collected in drainage ditches will be directed to a retention pond constructed in the early stage of construction. Water from the retention pond will be used for dust control, when necessary.

There will be no discharge of process water or wastewater to any surface water bodies, other than typical stormwater runoff and dewatering discharges during construction. This Facility is not classified under the NPDES Stormwater with Industrial Activity permitting category. It is anticipated that a general NPDES for non-point stormwater runoff will be necessary in the future. At this time, there is not an application process in place for the general NPDES stormwater runoff.

Only SFWMD permits are currently required for stormwater runoff (see Appendix 7.3). The contractor will be responsible for obtaining any required dewatering permits other than the NPDES permit (see Appendix 6.1) and SFWMD dewatering permit (see Appendix 7.4).

Erosion will be controlled by various methods depending on the extent and type of excavation and grading. During construction, exposed areas will be left bare for as little time as practical. Due to the flat topography of the site, minimal erosion is anticipated during construction. The greatest potential for erosion will be on the side slopes of the elevated tipping floor area. When erosion control is necessary, typical methods will be used, such as sodding, netting, or mulch seeding.

Backfill will be placed concurrent with excavation activities. Backfill will be required for elevation of the tipping floor and its associated access ramps. Some backfill material may be obtained from suitable material excavated for the building foundations and refuse storage pit.

On-site borrow material from the retention pond will be used to the extent possible if found to be suitable. Off-site material will be imported for additional fill as required.

The Facility foundation will be constructed, or by installing deep end-bearing and/or friction pilings. A detailed discussion of Facility support can be found in Section 2.3.1. Construction of the foundation will require about six to nine months.

The erection of steel superstructures for on-site facilities is expected to commence during the 50th week of construction and continue for a period of approximately 20 weeks. These steel superstructures will range in height from about 50 to 160 feet above existing ground elevation, and will cover an estimated area of four acres.

As shown on Figure 4-1, the longest construction time will be required for installation of major equipment such as: boilers, grate or rotary combustion system, air pollution control devices, turbine generators, cooling towers, and steam and process piping. In most cases, the installation of this equipment will begin as the steel superstructure of each building nears completion. Major equipment installation is expected to span a period of 65 weeks. This activity will begin in approximately the 58th week and will continue until the end of the Facility construction.

Completion of construction will involve such activities as paving of the access road, painting, and general landscaping. Non-critical activities such as painting and landscaping are expected to continue into the start-up period.

The final construction activity is Facility start-up and acceptance testing. The Facility will be tested under various operating conditions and monitored to determine compliance with environmental, capacity, and energy standards. Start-up and acceptance testing will be performed by the Facility's operating staff and various specialists and regulatory personnel.

During routine construction activities, it is anticipated that six to ten pieces of major equipment will be operating on the site. This average equipment requirement will vary with the phases of construction. The very early and final stages of construction will typically have reduced equipment requirements. The largest quantity of equipment will be operating during the peak construction period from the 12th to the 56th week.

Specific equipment used during construction will depend on the vendor/contractor chosen to construct the energy recovery facility. The vendor/contractor may choose to rent specialized equipment during various phases of construction. When rented equipment is used for a particular phase of construction, the vendor/contractor typically will complete all activities requiring this rented equipment in one stage, rather than staggering the work.

Table 4-1 lists typical equipment that will be used during construction of the energy recovery facility. This equipment list does not include the vehicles needed to haul concrete or the general traffic associated with the work force entering and leaving the site.

4.1 LAND IMPACT

4.1.1 GENERAL CONSTRUCTION IMPACTS

Impact on Solid Waste Generation and Disposal

During construction of the energy recovery facility, a variety of solid wastes will be generated, including vegetation matter, wood, paper products, concrete, scrap metal and lumber, and miscellaneous oils and

TABLE 4-1

ESTIMATE OF
CONSTRUCTION EQUIPMENT REQUIREMENTS

Estimated Equipment	Quantity
EARTHMOVING	
Dozers	2
Front End Loader	2
Backhoe	2
Scraper	1
Trucks	7
Grader	1
Paver	1
MATERIAL HANDLING	
Cranes	4
Derrick	1
Pile Driver	1
Concrete Pump	1
Fork Lift	1
IMPACT	
Pneumatic Tools	10
Jack Hammers	2
MISCELLANEOUS	
Vibrators	3
Pumps	6
Compressors	2
Generators	2
Welders	4
Saw	3

fluids required for equipment operation. These will be disposed of periodically using a licensed waste hauler to transport to the wastes to properly permitted disposal facilities.

Site clearing procedures will generate debris such as vegetation matter and wood. Approximately 20 acres of vegetative ground cover will be removed before facility construction begins. Any non-marketable wood debris generated by the removal of trees will go to the Class III landfill in Hendry County or burned on-site.

Small quantities of waste oils and solvents may be generated on-site during equipment maintenance and various construction activities. Waste oil will be generated at a rate of about one drum (55-gallon barrel) every two to three months. Typically, fewer waste solvents would be generated than waste oils, except during certain phases of equipment installation. For example, installation of piping and electrical systems could generate twice as much solvent as oil. Drums of waste oils and solvents will be stored on pallets within a bermed area. They will be properly labeled and covered with a weatherproof canvas or plastic drop cloth. Neither waste oils nor solvents will be stored on-site for longer than 90 days. Transport and disposal of these wastes will be handled by properly licensed contractors.

It is estimated that approximately 120 tons of solid waste will be generated by the Facility construction (see Figure 4-2). Whenever practical, recyclable materials will be recovered from this waste stream. It is anticipated that roll-off containers will be used to collect and haul non-recyclable materials to the Lee County landfill. The pattern of waste generation will correspond to the types and levels of activity occurring on the construction site. An initial peak is associated with site preparation and clearing. After site preparation activities, waste generation will drop until building construction and equipment installation begin. Higher generation rates will coincide with construction and installation.

Staging, Material Laydown, and Work Force Parking Areas

The staging, materials laydown, storage, and work force parking areas must be assigned to locations where construction activities are minimal. Areas

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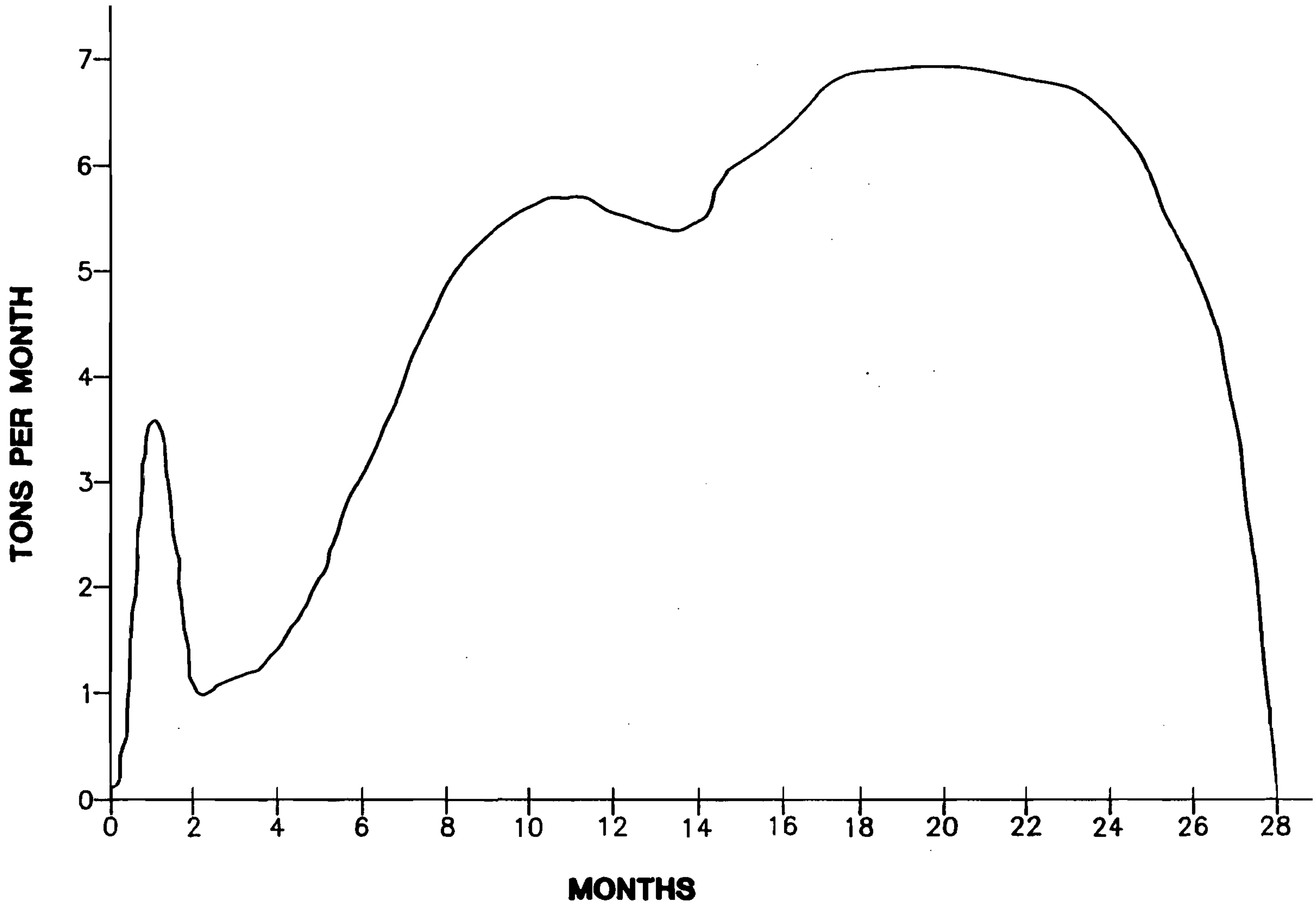

CDM

FIGURE 4-2

Estimated Solid Waste Generated During Construction - Lee County Energy Recovery Facility north and east of the Facility site proper are suited as material laydown areas, since there is sufficient space away from jurisdictional wetlands. Staging will be assigned to an area adjacent to the main Facility which will keep staged work as close to the actual construction area as possible, most likely to the east. General work force parking and a construction office will be located near the material laydown area.

Land Disturbance

A detailed discussion of construction activities that disturb existing terrain was presented in the introduction to Section 4.0. These activities are listed below.

1. Initial site clearing and stabilization of the access road.

2. Construction of the stormwater retention pond.

3. Excavation for the refuse bunker.

4. Fill placement for the tipping floor and other structures.

It should be noted that all of these activities are typical for this type of construction project.

4.1.2 ROADS

The project site will be accessed from Buckingham Road. An access road to the Facility will be constructed as shown in Figure 2-6. Other than this access road, there will be no other paved roads on-site. An existing, unimproved road in the proposed powerline corridor may be stabilized (but not paved) to provide access to electrical transmission lines.

4.1.3 FLOOD ZONES

The Facility site is not within the 100-year flood plain designated by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. Consequently, this section does not apply to this project.

4.1.4 TOPOGRAPHY AND SOILS

The site topography will be altered by the proposed Facility. As construction progresses, a portion of the site area will be covered with impervious surfaces such as roads and buildings. When initial construction is complete, the site will have 12.3 acres of impervious surface. The remaining acres will be covered by the stormwater retention pond and buffer areas.

The creation of impervious surfaces will change the site drainage features and percolation rates. The hydrologic analysis is summarized in the SFWMD stormwater permit application (Appendix 7.3). One retention basin will be constructed between the Facility and a cypress dome wetland located on the southern property boundary. It will cover a total of five acres and will have an average depth of four feet. The stormwater retention basin will be one of the first site improvements constructed so that runoff generated during construction of the remaining facilities can be diverted to the basin.

Modification to near ground surface soil conditions will result from construction of the proposed foundation and building support (installation of piles). Building support can be accomplished using load-bearing piles installed underneath areas of the main structure which will bear the heaviest loads (e.g., the boiler and the stack). A discussion of site improvement techniques is provided in Section 2.3.1.

The following measures will be taken by the vendor/contractor to control soil erosion and air pollutants during construction.

- On-site traffic will be limited to stabilized access roads as much as possible.

- All dirt roads will be watered as needed to minimize dust.

- Use of siltation barriers (i.e., haybales, sedimentation fencing) will be employed during any dewatering activities.

- Selective clearing will be used whenever possible to allow natural seeding to stabilize the disturbed soil and berms, and to minimize wind erosion.

A buffer zone will be maintained along the site border to limit visual impacts during construction.

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 IMPACT ASSESSMENT

Minimal impact to surface water bodies and uses is anticipated due to site preparation and construction activities. There are no proposed intake or discharge structures for cooling water or other process waters; therefore, an NPDES Discharge Application is not applicable, except for the dewatering activities.

There are site preparation and construction activities which will have temporary impacts. Dewatering of the uppermost aquifer to construct the refuse bunker will be necessary. Water from the dewatering effort will be discharged to the stormwater retention pond, and to a temporary retention basin created specifically for the temporary dewatering. The construction of the refuse bunker is scheduled to occur during the dry season which should minimize the quantity of water that must be removed. The construction of the refuse bunker should be completed within six months, of which dewatering may be necessary for four months. Surface water may be discharged from the stormwater retention pond, and the temporary dewatering retention pond to on-site wetlands or drainage ditches after the suspended solids have settled from the dewatering discharge. An NPDES General

Discharge Permit is being submitted to EPA and is included in Appendix 6.1 An application permit for dewatering is being submitted to SFWMD and is included in Appendix 7-4.

On December 7, 1988, EPA proposed rules for the NPDES Permit Application Regulation for Stormwater Discharges. These proposed rules are compiled in the December 7, 1988 Federal Register, Volume 53, Number 235, Environmental Protection Agency, Part III. A review of these proposed regulations has been made in order to provide the best possible information regarding the need for compliance for this Facility. Based on this information, as well as communications with EPA, the energy recovery facility will not be classified as industrial activity (Appendix 6.2). Therefore, an NPDES Industrial Activity Stormwater permit application is not anticipated to be needed. A written supporting statement from EPA regarding this information has been requested by Lee County.

It is anticipated that general NPDES stormwater runoff inventories, rules, and applications will be forthcoming by 1992. This information will be tracked accordingly, and submittals will be made as needed to comply with applicable requirements.

4.2.2 MEASURING AND MONITORING PROGRAMS

During construction activities that involve dewatering, surface water may be released from retention ponds to on-site wetlands or existing drainage ditches. Periodic water quality sampling will be conducted at the discharge points from the retention basins. The parameters for analysis will include at least field pH, field specific conductivity, metals, total dissolved solids, and suspended solids.

Stormwater runoff will not directly discharge to wetlands within the project site. Furthermore, since the energy recovery facility is fully enclosed and roofed, no significant impacts to the quality of surface waters in the vicinity are expected.

As described in Section 3.8, stormwater runoff from the developed site will be directed to a five-acre retention basin. In accordance with SFWMD requirements, dry pretreatment will also be provided. This allows for siltation and filtration of stormwater before it reaches the retention basin. The discharge structure for the retention basin will include a baffle to provide additional protection against the discharge of floatables and sediments. Since the majority of storm events in the Lee County area are less than one inch in total rainfall depth, appreciable discharge from the site will occur infrequently.

To confirm the operational efficiency of the surface water management system, the County proposes to conduct periodic samplings of stormwater discharges from the site (four to six storm events). Sampling will be performed to ensure compliance with Class III water quality standards as described in FAC 17-3. Sampling is also proposed before construction to establish ambient conditions.

4.3 GROUNDWATER IMPACTS

4.3.1 IMPACT ASSESSMENT

The saturated thickness of the surficial aquifer below the site varies depending upon seasonal precipitation patterns and varying depths to the confining layer. During the wet season, the water table of the surficial aquifer is within one to five feet below ground surface. In the dry season, the water table of the surficial aquifer declines to depths of about three to seven feet below ground surface. The overall thickness of the surficial aquifer formation is about 20 feet (see Section 2.3.2).

The refuse pit is the only proposed structure that will require extensive excavation and dewatering. It will be necessary to dewater the surficial aquifer during construction of the refuse pit. The maximum proposed depth of the refuse pit is less than 20 feet below ground surface. A wellpoint system or a system of drains and pumps may be used during the dewatering. Regional data indicates that the water table aquifer has a transmissivity of 80,000 gpd/ft in spite of its relative thinness of 20 feet (see Section 2.3.2). A large amount of water must be pumped to establish local drawdown in an aquifer of high transmissivity, and the effects of the drawdown cone will extend outward to a large radius. A proposed dewatering scheme to construct the 80 foot x 300 foot refuse bunker less than 20 feet below ground surface may require removal of about 1 mgd average daily withdrawal to keep the excavation dry. Such a withdrawal may generate a water table drawdown of three feet at a distance of about 1,000 feet from the refuse bunker, and one foot at a distance of about 2,500 feet. Because of the proximity of the refuse bunker and the abandoned landfills on Buckingham Road, a water use permit will be required for the dewatering (see Appendix 7.4). The withdrawals for dewatering will have no affect on any permitted water supply wells.

No adverse impact on wetlands is anticipated because the dewatering will be temporary and is currently planned to occur during the dry season. Some of the dewatered water may return to wetlands via the surface water retention pond (see Section 4.2).

Construction of the reuse bunker is scheduled as six months during the dry season. Dewatering during construction will be scheduled for approximately four out of the six months.

4.3.2 MEASURING AND MONITORING PROGRAMS

A groundwater monitoring program will be established to monitor water elevations of the water table aquifer during dewatering. Monitor wells or piezometers will be installed before the initiation of construction so that they can be used to measure the decline and subsequent recovery of water levels during and following dewatering procedures for construction.

A groundwater water quality monitoring program will be established for Facility operation. This program should will be initiated before Facility construction begins to establish background water quality data.

4.4 ECOLOGICAL IMPACTS

4.4.1 IMPACT ASSESSMENT

Impacts to fish and wildlife populations caused by construction of the proposed Facility are expected to be minimal. The Facility will occupy 17.3 acres of the property. The Facility will be located in a disturbed upland area predominated by wax-myrtle.

Limited low-quality wetlands do exist on the site. Impacts to these wetlands have been avoided as much as possible. The following impacts are anticipated.

(1) The power transmission lines will be routed along the eastern and northern sides of the northeast quarter of Section 24. To minimize impacts to jurisdictional wetlands, the power lines will be run along an existing, unimproved road which can be seen on Figure 2-5b. The road will be improved and stabilized (but not paved) to provide access for maintenance of the transmission lines. The road will have a maximum width of 25 feet. Culverts will be installed as needed to allow contiguous flow through wetland areas. Approximately 2.7 acres of fill will be needed to construct the road (see Figure 2-6). The total area of wetlands impacted by the transmission line is 2.7 acres. This includes 0.7 acres of cypress/pine (624), 0.3 acres of wet prairie (643), and 1.7 acres of wet pine flatwoods (415) (Figure 2-26). The cypress/pine (624) area impacted is on the fringe of this vegetation habitat type and is dominated by pines with cypress scattered throughout the fringe. Therefore, the impacts to this habitat type are anticipated to be minimal due to the low number of cypress.

(2) Impacts caused during the construction phase of this proposed project for the Facility are anticipated to be minimal. The construction area will be isolated to the highly disturbed wax-myrtle (429)

vegetation habitat. It is proposed that Facility construction will be initiated in August 1991. During the first six-months of construction, a stormwater retention pond and refuse pit will be constructed. These on-site wetlands will not be drained by construction of the stormwater retention pond. Construction of the stormwater retention pond will be complete prior to the construction and dewatering of the refuse pit. It is currently planned that the stormwater retention pond and refuse pit be constructed during the dry season of the year. The stormwater retention pond will be constructed so that sediment in runoff settles out before the overflow discharges to wetlands in the southeast quarter of the proposed site.

Construction of the refuse pit will require dewatering. No impacts from dewatering of the refuse pit are anticipated to surrounding wetlands from sedimentation or dewatering (drying) of wetlands. The water table within the immediate area of the refuse pit will be lowered to keep the excavation dry during construction only. Dewatering of the refuse pit will take approximately four months. Dewatering water from the refuse pit will be discharged to the stormwater retention pond and a temporary retention pond. The temporary retention pond will be constructed in the farm pasture (210) vegetation habitat in the northwest quarter of the project site. Excess water will be drained to existing ditches and surrounding wetlands by a bleeder system. Therefore, some wetlands most likely to be affected by a drawdown during the dewatering period may be inundated thus increasing their hydroperiod and overall functionality. See Section 4.3.1 and Appendix 7.4 for details of the groundwater hydrology for the dewatering of the refuse pit.

Appendix 6.5 contains the COE/DER "Joint Application for Activities in the Waters of the State of Florida," which addresses ecological impacts in detail.

The Facility site is not an area of unique habitat. This is a previously disturbed site that has been vegetationally and hydrologically altered by logging, drainage, and grazing activities over the course of 20 years. Species diversity and composition on-site should not undergo any major alterations as a result of Facility construction. When construction of the energy recovery facility begins, the resident wildlife population will relocate to non-impacted areas adjacent to the site. The present diversity of on-site habitats should not be impacted by significantly impacted by the Facility.

The results of the wildlife survey indicate that gopher tortoise burrows and burrowing owl burrows are not located on-site. Suitable habitats for Audubon's crested caracara, scrub jay, and red-cockaded woodpeckers were not found on-site. No suitable nesting sites for bald eagles are present, although eagles do feed southeast of the proposed site.

The Florida panther (Felis concolor coryi) may use part of the area as a corridor of movement according to information supplied by the FGFWFC. Available habitat of pine flatwoods (map number 411) for the Florida panther is small, about 17.9 acres or 11.1 percent of the total site; these areas will not be disturbed by the energy recovery facility construction.

Wetland bird fauna, the tricolored heron, snowy egret, and little blue heron, will not be impacted. Limited, if any, wetland habitat will be disturbed.

The big cypress fox squirrel may also be on-site. No negative impacts on this species are anticipated.

4.4.2 MEASURING AND MONITORING PROGRAMS

No wildlife monitoring programs are proposed since impacts will be minimal during the construction phase of this proposed project. Wetland monitoring will be conducted on affected wetlands during pre- and post-construction of the Facility (see Appendix 7.3). The wetland monitoring program conducted on affected wetlands is described in the mitigation plan for the stormwater permit application (see Exhibit A, Appendix 7.3).

The measurement program used to determine ecological conditions is discussed in Section 2.3.6.

4.5 AIR IMPACT

4.5.1 EMISSION RATES

Construction activities may cause localized, short-term, adverse air quality impacts. Potential impacts include:

- o Fugitive dust emissions from land clearing, site preparation activities, and temporary travel on unpaved surfaces; and

- o Emissions from fuel combustion by construction equipment at the construction site.

Because neither a vendor nor a construction contractor have yet been selected for this project, a detailed construction schedule and plan have not yet been developed. It is anticipated that Facility construction will take a total of approximately 28 months.

Internal combustion engines, primarily diesel-fuel, are associated with the dozers, backhoes, tractors, graders, trucks, concrete mixers, cranes, generators, compressors, and some smaller equipment that will be used. This equipment will emit, in decreasing order by total mass: nitrogen oxides, carbon monoxide, sulfur dioxide, hydrocarbons, and particulates. These emissions will not likely be great enough to cause any local excesses of any ambient air quality standards.

Fugitive dust will be generated throughout the construction period by land clearing, fill placement, excavation, grading, travel on unpaved surfaces, and wind erosion of unvegetated areas. Studies performed for EPA (Cowherd and Grelinger, 1988; Williams et al., 1988) show that generation of PM_{10} at construction sites is dependent on soil silt content and moisture, and that the dominant source is travel on unpaved surfaces.

Trucks carrying fill and concrete may travel on temporary on-site dirt access roads during construction. Several mitigating measures may be used to reduce particulate emissions from these roads. Routine watering would reduce roadway emissions by approximately 50 percent. A watering truck will be on-site for various other activities. This truck could be partially dedicated to roadway watering, or an additional truck could be provided for this purpose. Surface treatment with penetrating wetting agents could provide up to a 50 percent reduction in particulate emissions, depending on the frequency of application. The application of penetrating wetting agents is more costly than routine watering, but fewer applications are required when wetting agents are used. The costs of reducing roadway particulate emissions using these methods would include the expense of purchasing and mixing wetting agents, and the expense of using a watering truck or other vehicle.

Soil stabilization may also be used to reduce roadway particulate emissions. Soil stabilization is performed when the roadway is developed, and can achieve a 50 percent emission reduction by binding up surface soil. The advantage of soil stabilization is that the roadway becomes more driveable. Paving can reduce roadway particulate emissions by nearly 85 percent. Road paving can be accomplished by soil compaction and the addition of base coarse material, or by soil stabilization with an asphalt cap.

Good construction practice requires a developed access road when extensive truck traffic is necessary. Because the access road must eventually be able to handle heavy trucks on this site, it should be built at least to base coarse level or it will require improvement during construction. Thus, paving of this roadway would be cost-effective and is typically a recommended method for reducing particulate emissions.

General site emissions—particulate emissions across open and active construction areas—are best controlled by a comprehensive watering program which can reduce emissions by 50 percent. Other methods used to control emissions are not practical because soil is usually in a state of transition during construction. An excessive amount of wetting agents would be required, and binding agents would be continually broken up. Since a watering truck is available on-site for other construction activities, use of this truck for site watering should not impose a significant cost.

Particulate emissions in completed cut and fill areas can be reduced by 65 to 80 percent by using vegetation or binding agents. Since these areas are not active and would not receive traffic, vegetation can grow undisturbed and binding agents need only infrequent applications. Embankments brought up to grade and no longer subject to construction activity should be immediately landscaped or vegetated. Till piles or embankments requiring future activity should be treated with a binder.

Good site maintenance will be practiced. Most site maintenance practices are not costly, and the extra effort they require is usually outweighed by the benefits they offer. As part of the construction agreement with Lee County, the vendor/contractor will be required to employ proper dust control techniques to minimize fugitive emissions.

4.6 IMPACT ON HUMAN POPULATIONS

The construction of the energy recovery facility may create both positive and negative impacts on the local and regional populations. Positive impacts are anticipated to include the creation of construction jobs, the secondary influx of monies into the local economy from the construction work force, and revenues from the purchase of construction materials for the Facility. Negative impacts are anticipated to include possible short-term visual and noise impacts and traffic increases due to construction worker arrivals and deliveries of equipment and supplies.

4.6.1 SENSITIVE RECEPTORS

Sensitive receptors are individuals, institutions, or enterprises that are located in proximity to the project site that are affected by the construction. A summary of the demography and existing land use within a five-mile radius of the project site is presented in Section 2.2.3. Based on the demographic and land use section of this report, the predominant land uses on the Facility site's periphery include a Florida Power and Light power transmission line and associated easement, forested uplands, and wetlands.

Sensitive receptors in the immediate vicinity of the Facility site include the low density residential area of Lehigh Acres located from approximately one-half to five miles east of the project site. The majority of the residentially zoned area of Lehigh Acres within two miles of the Facility site is vacant. This area and the undeveloped forested future county park on the east side of the Facility site buffers the developed residential area of Lehigh Acres from the Facility site. In addition, wetlands, forested uplands, cropland, and pastureland are located between the Facility site and this primarily vacant area, and act as a buffer. Additional low density residential areas are located approximately one to four miles north of the Facility site. This rural area is buffered from the Facility site by wetlands, forested uplands, cropland, and pastureland which surround the site.

No effect on sensitive receptors is anticipated. The distance from the Facility site to the residential areas, and the presence of the buffer areas are the reasons for this determination.

4.6.2 WORK FORCE

During construction of the energy recovery facility, the daily work force is expected to average between 145 and 300 people. The initial phase of construction, including site clearing, access road development, and excavation of retention basins, will require a work force of approximately

100 people while peak phases will require approximately 325 persons. The work force, from the eighth to the twenty-second month of the construction schedule, should average from 275 to 290 people. Throughout the course of the Facility construction a total of approximately 1,200 people will be employed. Figure 4-3 illustrates the estimated work force requirements during Facility construction.

Work Shifts

The majority of activities required for the construction of the energy recovery facility will take place on an eight-hour per day shift, five-day per week schedule. Depending on construction progress and deadline constraints, alternative schedules, such as shifts of ten hours per day, four, five, or six days per week and overtime, (over 40-hour per week schedules) may be implemented. Dewatering of the refuse bunker excavation which will not exceed a period of six months is expected to require 24-hour per day operation of the dewatering pumps. The placement of concrete for the refuse bunker will require a period of continuous pour. The requirements for 24-hour per day concrete placement will be determined based on final design and the method of construction to be used. All the remaining construction activities outlined on Figure 4-3 will be conducted during eight- to ten-hour per day shifts.

Work Force Revenues

Operation of the energy recovery facility and associated landfill/ashfill will require approximately five administrative staff, 40 operations personnel, and nine maintenance personnel. Based on the assumption that most Lee County positions are filled by individuals from within the County labor pool whenever possible, the newly created payroll generated from the energy recovery staff will be a major long-term benefit to the region. Additional staff to meet Facility needs are anticipated to be procured in proximity to Lee County.

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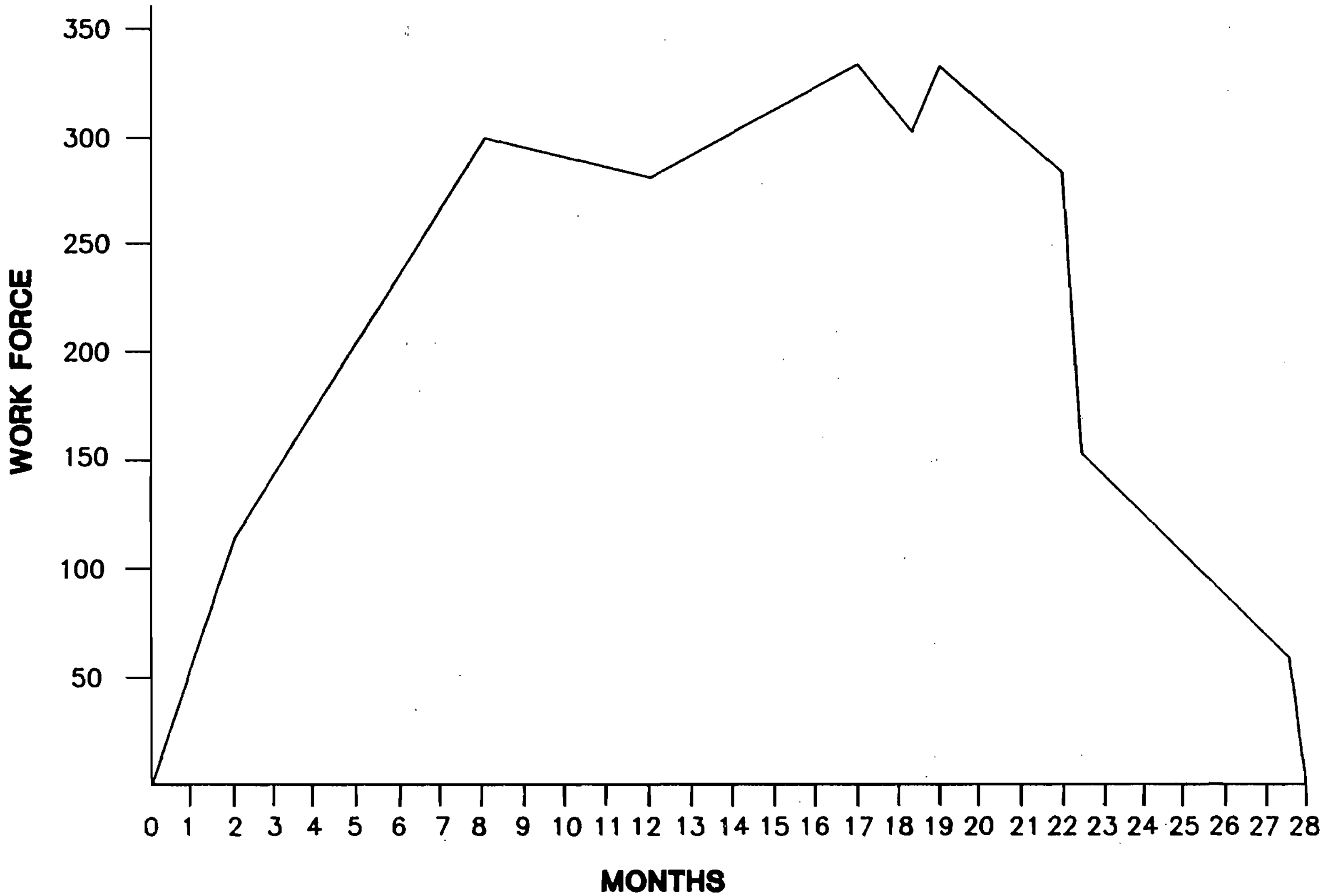

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Figure 4–3

Estimated Work Force Requirements During Construction – Lee County Energy Recovery Facility

On a short-term basis, the energy recovery facility construction phase will supply the region with benefits associated with a construction project in the range of a $155 to $170 million. The construction phase will provide jobs for the construction labor and will create additional revenue for the local economy from the purchase of construction materials and services. Secondary benefits will include the secondary spending into the local economy from the construction labor force and related employment increases in these service sector jobs, and increased employment opportunities and sales revenues for businesses providing construction materials and services to the Facility project site.

Work Force Availability

The majority of the work force for the energy recovery facility is anticipated to be provided by the existing labor pool in Lee County and adjacent county areas. Because no major relocation and influx of construction workers and their families is expected, no increased demand and impact on the available housing stock and public facilities is anticipated.

4.6.3 TRAFFIC ASSOCIATED WITH CONSTRUCTION

A traffic impact study, performed to assess the impacts associated with Facility construction and operation, indicates that the energy recovery facility will have no adverse impact on the surrounding roadway network (the study is provided in Appendix 11.2, Volume II).

The traffic impact study considered trip generation, trip distribution, area of influence, existing traffic conditions, future traffic conditions, link and intersection capacity, and level of service. It was determined that there was a significant impact on only one of the links within the area of influence—Buckingham Road between SR 82 and the site access drive. Since Buckingham Road is currently posted at 50 mph, a left-turn lane for east-bound traffic will need to be constructed to service the vehicles accessing the site. No other roadway improvements should be required to accommodate development traffic from the Facility.

4.7 IMPACT ON LANDMARKS AND SENSITIVE AREAS

The energy recovery facility construction may impact Buckingham Community Park, a 135-acre park located adjacent to the eastern boundary of the project site. The park is scheduled to be developed in the fall of 1991. The park is still in the planning stage and, while impacts to the park are difficult to ascertain without knowing the park program and layout, the park is anticipated to include active-based recreation. The active-based recreation, usually in the form of ball fields and court games, normally is not as sensitive to noise and visual impacts as a passive-based recreation area, so impacts to this park are not expected to be significant. The energy recovery facility is not anticipated to significantly impact other parks in the study area based on the distance from the project site to the parks.

4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

No impacts on significant archaeological or historic sites are expected as a result of construction activities. As discussed in Section 2.5, an archaeological survey of the Eastern half section of Section 24 which includes the energy recovery facility site, uncovered only two archaeological/historic sites, neither of which is considered to be a regionally significant cultural resource. Data on these two sites will be recorded prior to initiating construction, but they are not considered eligible for nomination to the National Register of Historic Places. If a potential archaeological site should be unearthed during construction, officials of the State Division of Historical Resources will be contacted to determine its significance.

4.9 SPECIAL FEATURES

This section discusses the special features associated with site preparation and Facility and associated facilities construction that may influence the environment and ecological systems of the site and adjacent areas. These features may include the generation of solid and liquid waste as a result of construction activities.

During construction, solid and liquid wastes will be generated. This waste may consist of discarded packaging materials, refuse produced by construction workers, earth spoils, sanitary wastes, or waste oils and other wastes associated with this type of construction activity. Earth spoils will be transferred to the Class III landfill. Sanitary wastes and waste oils will be handled by the appropriate licensed haulers. The aesthetic and ecological integrity of the site will be maintained.

4.10 SUMMARY OF IMPACTS AND BENEFITS FROM CONSTRUCTION

Benefits from construction of the energy recovery facility include:

- o The employment of construction laborers throughout the course of construction, approximately 1,200 workers will be employed.

- o Additional income to the area generated by the construction work force retail and service oriented businesses will benefit from increased sales to the construction laborers.

- o The sale of goods and services relating to construction operations this should include increased employment for construction product companies providing goods and services to the construction site.

In addition to these benefits during construction, long-term benefits associated with the energy recovery facility include a safe method of solid waste processing and disposal, the reduction of landfilling requirements, increased protection of groundwater supplies, the generation of electric power for resale, the conservation of oil and gas, and increased employment associated with a permanent work force at the Facility.

Impacts from construction of the energy recovery facility include:

- o An increase in solid waste generated due to construction activities.

- o The disturbance of existing terrain.

- o The alteration of site topography.

- o Minimal, temporary aquifer drawdown due to dewatering during construction of the refuse pit.

- o Minimal impacts to low-quality wetlands due to fill areas.

- o Localized, short-term air quality impacts from fugitive dust and fuel combustion emissions.

- o Short-term visual and noise nuisances, and traffic congestion during construction.

4.11 VARIANCES

No variances from any standards or guidelines are anticipated or requested.

SECTION 5.0

EFFECTS OF FACILITY OPERATION

5.0 EFFECTS OF PLANT OPERATION

This section describes (1) the interaction of the energy recovery Facility with the environment, and (2) Lee County's plans for monitoring the environmental impacts during operation of the Facility. In the discussion which follows, irreversible or unavoidable environmental effects are distinguished from those which are unavoidable, but temporary, or suitable for later amelioration. Mitigation actions are described when applicable. The impacts of Facility operations are quantified whenever possible, and the source of each impact is identified. The relationship between short- and long-term effects is also discussed.

5.1 EFFECTS OF THE OPERATION OF THE HEAT DISSIPATION SYSTEM

As described in Section 3.0, cooling towers will be used on-site. There will be no thermal discharges to surface water bodies; therefore, Section 316 demonstrations for thermal discharges are not applicable.

5.1.1 TEMPERATURE EFFECT ON RECEIVING WATER BODY

This section is not applicable to the Facility since there will be no discharge to surface waters from the Facility. Cooling water will be treated and reused as much as possible. A limited volume of spent cooling process and sanitary wastewater (maximum 150,000 gpd) will be discharged to a sewer. Prior to discharge, all applicable pretreatment requirements will be met.

5.1.2 EFFECTS ON AQUATIC LIFE

This section does not apply to this Facility. There will be no discharge to surface water or groundwater, and no impacts on aquatic life in the area will occur as a result of Facility operations.

5.1.3 BIOLOGICAL EFFECTS OF MODIFIED CIRCULATION

This section is not applicable. The energy recovery facility will use reclaimed water supplied by pipeline from the Fort Myers Central WWTP. No surface water intake structure will be required.

5.1.4 EFFECTS OF OFFSTREAM COOLING

The cooling towers of the proposed Facility will use about 1,500,000 gallons per day (gpd) of reclaimed water from the Central WWTP to "make up" for water lost to evaporation at its ultimate capacity of 2,400 tpd. Chlorine or other equivalent compounds will be used for disinfection of the reclaimed water in conformance with Chapter 17-6 of the Florida Administrative Code. High-level disinfection (HLDI) will provide 1.0 mg/L total chlorine residual after 15 minutes contact time at maximum daily flow or after 30 minutes contact time at average daily flow, whichever provides a higher level of public health protection for the proposed Facility in accordance with Chapter 17-610.460, FAC. The reclaimed water received from the Central WWTP will be pretreated as required to a maximum of 5.0 milligrams per liter of suspended solids prior to high-level disinfection. Filtration will be provided for control of total suspended solids (TSS). Chemical feed facilities for TSS removal will be provided as required. All process water will be treated in compliance with the City of Fort Myers Sewer Use Ordinance.

During the cooling process, approximately 0.015 percent of the makeup water is lost as droplets in the cooling tower exhaust (cooling water "drift"). The drift will be of approximately the same quality as the reclaimed water used as makeup water. When the droplets of water composing the drift are vented from the tower, they are carried away from the Facility. The distance traveled is dependent on the size of the droplets formed. Aerosol particles or droplets larger than 600 microns in diameter (approximately 70 percent of the drift mass) would settle within 400 feet of the tower. Smaller particles would be carried farther (Furlong, 1974). At the proposed energy recovery facility, the nearest residential area will be about one mile away from the tower, with trees in between as buffer. Thus, all particles or droplets should settle out, or dissipate, before reaching a residential area.

To determine if viruses and bacteria could be emitted from the cooling tower, a computerized literature search was conducted to identify all data available on this topic. Two data bases were searched and a combined total of more than 7,500 journals, books, reports, conference proceedings and research papers were accessed—a total of approximately 100,000 records. Only a small number of articles and reports were found that specifically address the use of treated wastewater as cooling tower makeup water, and these studies were conducted at large power plants rather than energy recovery facilities. The results of these studies are discussed below.

Levels of total bacteria have been measured directly at the exit vent from a cooling tower which uses secondary effluent by Adams, et al. (1980). These results are not representative of the proposed Facility because a lower level of wastewater treatment was provided, and effluent was held in a basin prior to use which can allow the regrowth of organisms. Both of these factors could result in higher counts of bacteria than would be expected at the proposed Lee County Facility. As measured by Adams, et al. (1980), total bacteria counts exiting the vent of a cooling tower on four occasions ranged from 299 to 1,220 particles/m^3.

Rogozen, et al. (1981) sampled emissions from two cooling towers ("Olive 1" and "Magnolia 4") which used municipal effluent from the Burbank Water Reclamation Plant as makeup water. This plant treats wastewater to a level of treatment similar to that of the Fort Myers Central WWTP. Rogozen attempted to sample stack emissions isokinetically (air enters the sampler at the same velocity as it leaves the stack). At the Olive 1 tower, the exit velocity was 10.4 meters per second and the total volume of air sampled was 770 cubic meters. No fecal coliform or fecal streptococci bacteria were detected. Total coliform bacteria were greater than or equal to 1.6 most probable number (MPN) of organisms/m^3. E. coliphage were enumerated at 0.07 plaque forming units (PFU)/m^3. At the Magnolia 4 tower, no bacteria or viruses were detected during isokinetic sampling.

In addition to literature on the use of effluent as cooling tower makeup, the results of virological studies at treatment plants similar to the Fort Myers Central WWTP were examined. Findings are summarized below.

Studies of virus inactivation using chlorine have shown almost complete inactivation of viruses in advanced wastewater treatment (AWT) effluents. Dryden et al. (1979) found that suitable combinations of AWT processes could achieve overall reductions of up to 99.6 percent of viruses. Dryden also studied the use of chlorine for inactivation of AWT effluents seeded with poliovirus type 1. After two hours of contact with a final combined chlorine residual of 4.9 to 5.4 mg/L, an inactivation rate of 99.90 to 99.99 percent was achieved. Many field tests and pilot plant studies substantiate these results.

Virus testing was conducted during a three-day period at the Sand Lake Road pilot wastewater treatment Facility located in Orange County, Florida (Wellings, 1983a). The pilot plant employed a shallow bed dual media filter with pre- and post-chlorination, alum, and alum plus polymer. While the influent wastewater contained from 262 to 397 PFU/1, chlorinated effluent (free chlorine residuals from trace to 1.7 parts per million) contained no detectable virus.

At the McCleod Road wastewater treatment plant in Sarasota County, Florida, sampling was conducted from June 21 to June 27, 1983 (Wellings, 1983b). Influent densities of viruses ranged from greater than 383 PFU/liter to greater than 593 PFU/liter. Again, no viruses were detected in the chlorinated effluent.

The City of St. Petersburg, Florida provides sand media filtration and disinfection prior to urban reuse of its reclaimed water. Virological testing was conducted at the three plants currently employing urban reuse in 1985 and 1986. As shown in Table 5-1, resulting virus levels ranged from non-detectable to 0.0070 PFU/liter.

TABLE 5-1

RESULTS OF VIROLOGICAL TESTING
CITY OF ST. PETERSBURG
(PLAQUE FORMING UNITS PER LITER)

	Wastewater Treatment Plants		
	Northeast	Northwest	Southwest
1985			
August	0	0	0.0027
September	0	0	0
October	0	0	0
November	0	0	0.0027
December	0	0	0.0070
1986			
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0

SOURCE: Department of Public Utilities, City of St. Petersburg, June 2, 1987.

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6/27/90

The City of Fort Myers uses the Bardenpho process to provide AWT. This process provides an excellent source of reuse water for the Facility cooling water processes in that it produces a high quality effluent low in suspended solids, nitrogen, and phosphorus. Based on the results from similar facilities, the drift emanating from the proposed Lee County Facility will not present a virological health hazard to residents of nearby areas if reclaimed water from the Central WWTP is used as cooling tower makeup. The Pinellas and Hillsborough energy recovery facilities are using a similar cooling system, and there have been no reported problems. As discussed previously in this section, high-level disinfection of the Facility's cooling water will be implemented in accordance with Chapter 17-610.460, FAC. To assure the absence of viruses in the makeup water of the proposed Facility, a monitoring program will be instituted as described in the following section.

5.1.5 MEASUREMENT PROGRAM

Samples of influent and chlorinated effluent will be collected daily at the Central WWTP for one week during compliance testing. Sufficient sample volumes will be collected to allow accurate analysis and identification of microorganisms. Samples will be analyzed for total bacteria, total and fecal coliform bacteria, fecal streptococci, and total virus particles (as plaque forming units). Analysis techniques specified in Standard Methods for the Examination of Water and Wastewater, and required by the U.S. Environmental Protection Agency, will be followed.

The discharge system will include continuous on-line monitoring for turbidity prior to disinfection and total chlorine residual (or other disinfectants) at the compliance monitoring point. Prior to Facility start-up, an operating protocol, designed to ensure that the high-level disinfection criteria will be met, will be submitted to DER for review and approval in compliance with 17-610.463, FAC.

5.2 EFFECTS OF CHEMICAL AND BIOCIDE DISCHARGES

5.2.1 INDUSTRIAL WASTEWATER DISCHARGES

There will be no industrial discharges to surface waters from operation of the energy recovery Facility. Cooling water will be treated and reused; a maximum of 150,000 gpd of sanitary wastewater and spent process water will be routed to the Central WWTP following pretreatment as required to meet Fort Myers sewer use requirements. All applicable local, state and federal discharge regulations and water quality standards for domestic wastewater and industrial wastewater, including chemical and biocidal wastes and oil and grease, will be satisfied.

Water quality data for the reclaimed water is provided in Table 3-4. This data has been provided to the various vendors who are currently negotiating for the energy recovery facility contract. The vendor/contractor selected to build and operate the Facility will design facilities to treat the reclaimed water prior to use in the cooling tower, as needed to meet a maximum wastewater discharge limitation of 0.15 mgd. At a minimum, dual media filtration will be provided.

5.2.2 COOLING TOWER BLOWDOWN

Reclaimed water from the Central WWTP will be used as cooling water for the Facility. The capacity of the Central WWTP is currently 11 mgd and is much greater than the total water demand of the energy recovery facility (1.5 mgd at build-out). Consequently, there is ample wastewater effluent available for cooling water usage at the energy recovery facility. When a pipeline is constructed to supply the reclaimed water, other potential reuse projects in the area will be analyzed, and the pipe will be sized to serve these needs as well as those of the proposed Facility. Cooling tower blowdown will be treated and reused at the energy recovery facility to the greatest extent possible. Cooling tower blowdown not reused at the Facility will be blended with sanitary wastewater and discharged to the Central WWTP via sewer.

5.2.3 MEASUREMENT PROGRAMS

There will be periodic monitoring of the energy recovery facility treatment operations and wastewater discharge to the sewer. The frequency of monitoring of wastewater discharge will be in accordance with the City of Fort Myers Sewer Use Ordinance.

5.3 IMPACTS ON WATER SUPPLIES

5.3.1 SURFACE WATER

There are no long-term impacts to surface water associated with the operation of the proposed energy recovery Facility. A stormwater pond designed to contain the Facility's runoff during a 25-year storm event will be constructed between the Facility and a cypress dome located on the property's southern boundary. An overflow conveyance will be constructed to direct excess stormwater through the isolated cypress dome to maintain its historical flooding cycle.

The proposed Facility will use reclaimed water for cooling tower makeup. Spent process water will be recycled for other uses such that the minimum possible discharge occurs from the Facility. Sanitary wastewater and a small amount of spent process water will be transmitted to the Central WWTP following pretreatment.

5.3.2 GROUNDWATER

The primary source of cooling water and potable water will be the City of Fort Myers and Lee County, respectively. The proposed principal source to meet the estimated 1.5 mgd demand for cooling water is treated reclaimed water from the Central WWTP in Fort Myers. The site's administrative building and other on-site facilities requiring potable water will be tied into the County's potable water distribution network. It is necessary to establish a back-up supply of cooling water. It is proposed that groundwater wells in the sandstone aquifer be installed to provide a back-up supply of water for cooling.

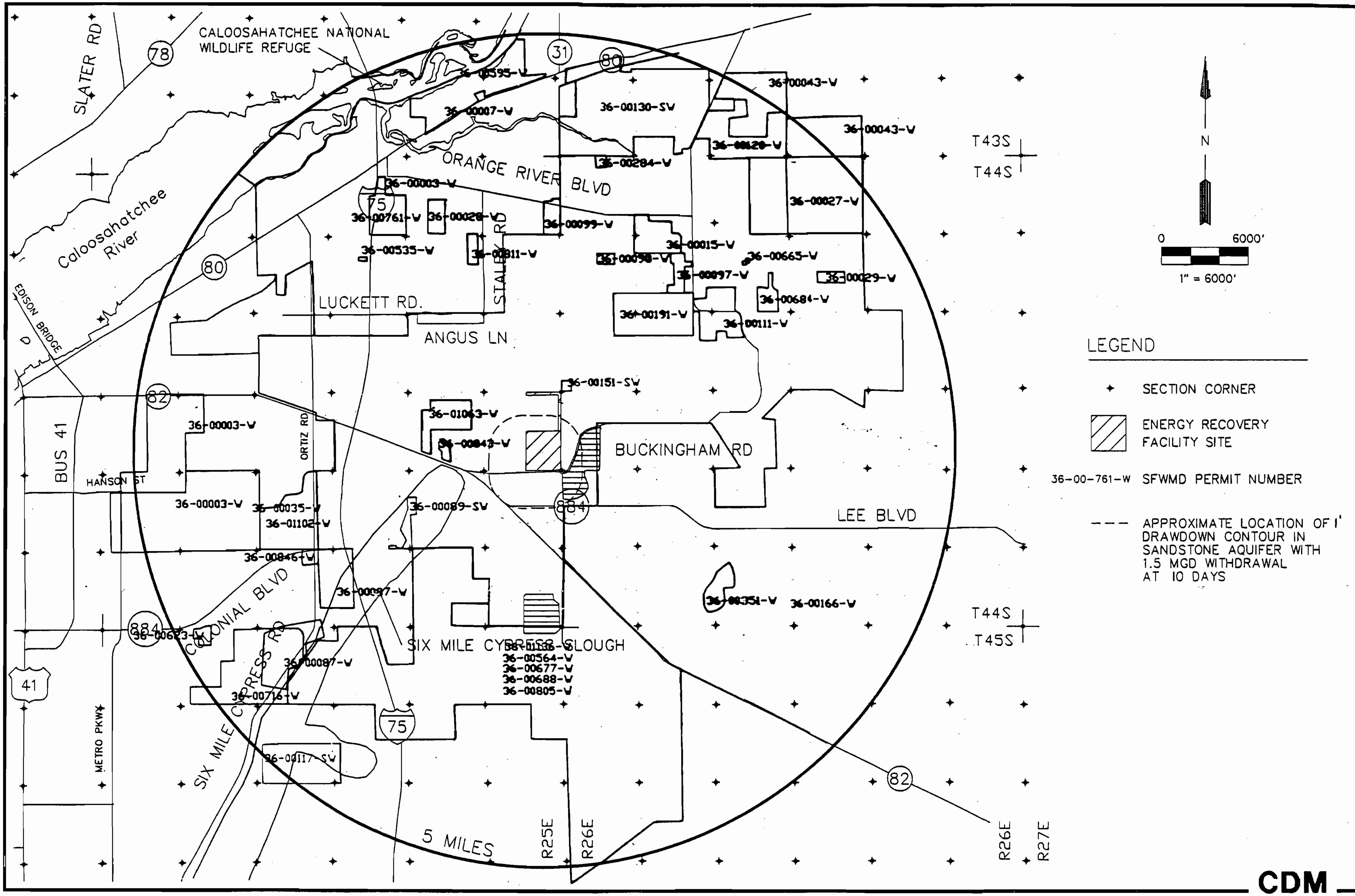
These proposed wells would only be used as an emergency supply for back-up cooling water. The wells would not be used during normal operation or normal conditions. The anticipated annual withdrawal from the wells is expected to be very small because the primary source of cooling water, treated reclaimed water from the Central WWTP, is rated at Class I Reliability-the highest reliability rating.

No impact of the emergency back-up wells on other legal users is anticipated because of the infrequent use of the wells. Figure 5-1 illustrates locations of permitted withdrawals within a five-mile radius of the site. The potential off-site drawdown for a hypothetical pumping scheme is shown on Figure 5-1. The drawdown contour within the sandstone aquifer after 10 days of pumping is shown for illustration only. It is unlikely that the emergency wells will be used at all, and the period of time for their use would be short. No impact on surface waters or wetlands are anticipated due to pumping from the sandstone aquifer because of the low leakance rate through the upper Hawthorn confining unit. In any case, impacts would be negligible because they would be of very short duration on an emergency basis.

There is one existing groundwater well at the project site. It has been used in small quantity applications to support previous agricultural practices. The on-site well is a two-inch diameter well that flows at ground surface. It has an existing shut-off valve. This well will not be used for on-site operations, and will be abandoned and grouted in accordance with SFWMD requirements.

No sources of groundwater contamination from the Facility structures or site operations are anticipated. All solid waste and ash will be stored in enclosed buildings to prevent contact with stormwater runoff. The storage structures for the solid waste and ash will be constructed of concrete and constructed watertight to eliminate the potential for any releases to groundwater or surface waters.

The bottom of the concrete refuse storage bunker (which will be four to five feet and hydrostatically stable) will be completely sealed to prevent groundwater from seeping into the bunker. Any moisture or liquids inherent



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Drawdown Effects On Neighboring Wells – Lee County Energy Recovery Facility

FIGURE 5-1

to the municipal solid waste will be bound to the waste materials and incorporated into the main storage mass and combusted with the solid wastes. Thus, there will not be any free leachate in the refuse bunker.

There are some potential sources of off-site upgradient contamination including the current site of the County landfill located three miles south of the ERF site, and the former Buckingham Road landfill(s) located one-half mile east and southeast of the ERF site. There are active groundwater quality monitoring programs at these locations.

The surficial groundwater system and the confining unit that underlies the site have a high clay content. Clays have a large adsorptive capacity for organic and inorganic (including metal) contaminants in groundwater. The subsurface clayey materials will tend to bind up or adsorb a high proportion of contaminants and thus retard their migration within the groundwater matrix.

5.3.3 DRINKING WATER

Drinking water and potable water supply needs on-site will be met by distribution from the Lee County system. All municipal water supply systems in the area are approximately 2.5 miles away. The closest supply well fields that produce more than 1 mgd are located upgradient and withdraw primarily from the sandstone aquifer. No impacts on drinking water sources are anticipated.

5.3.4 LEACHATE AND RUNOFF

Runoff collected in the stormwater retention/detention basins following start-up of the Facility operations will be collected from vegetated areas, paved surfaces, and roof tops. All refuse or residue storage areas will be enclosed so that no runoff will occur from these surfaces. Groundwater and surface water quality is thereby protected from unprocessed waste and residue.

The proposed landfill to be located in Hendry County will be used to dispose of the noncombustible material from the energy recovery facility. The ashfill/landfill has been designed in accordance with applicable DER regulations using state-of-the-art construction methods which include double synthetic liners, leachate collection and treatment, and groundwater monitoring. Ash and Class I wastes will be disposed in separate areas (monofilling).

5.3.5 GROUNDWATER MODELING AND MONITORING

A groundwater monitoring program will be established. Some groundwater monitoring wells should be installed before Facility construction and operation to establish site-specific background water quality data.

5.4 SOLID/HAZARDOUS WASTE DISPOSAL IMPACTS

5.4.1 SOLID WASTE

This section discusses impacts not yet discussed in Section 5.2 or 5.3 which are imposed by the processing of solid wastes on the site. This section also describes the potential benefits to be gained from the combustion of solid wastes.

Section 2.2.7 described the existing Lee County solid waste management system. Existing and future quantities of solid waste generated in the County were also presented.

The proposed energy recovery facility will have a net beneficial impact on solid waste disposal in Lee and Hendry counties. The estimated processible solid waste quantities expected to be delivered annually to the energy recovery facility through the year 2010 are shown in Table 5-2. If these quantities of solid waste were to be landfilled rather than combusted, they would require about 888,000 cubic yards of landfill space (including cover) in 1993, increasing annually to about 1,850,000 cubic yards of landfill space in 2016. Instead, by achieving a 90 percent volume reduction through combustion, the ash residue to be landfilled would require only about

89,000 cubic yards of landfill space in 1993, ultimately increasing to about 185,000 cubic yards of landfill space in 2016. Therefore, the potential savings in landfill capacity is considerable. The prolonged life of the landfill will decelerate the need for future landfill sites in Lee and Hendry counties (landfill volume calculations based on 1,000 lb/cy^3).

A ferrous materials recovery system will be incorporated in the Facility. A magnetic belt for ferrous removal, associated conveying systems, enclosed ferrous storage area, and enclosed loading area will be provided. However, landfill disposal capacity has been calculated assuming no ferrous material recovery.

In addition to ferrous metal recovery at the proposed Facility, Lee County is incorporating an aggressive recycling program as an integral component of its total solid waste management system. This program is expected to include the curbside collection of recyclables from county residences; a materials recovery facility (MRF) for the initial processing of materials required by end-use markets (e.g., sorting, crushing, baling, shredding, etc.); drop-off/buy-back centers for the collection of recyclables from condominium developments, apartment complexes, and mobile home parks; a commercial recycling program for the recovery of cardboard, glass, aluminum, and high-grade paper from shopping centers, restaurants, and office complexes; and an institutional waste recovery program for the collection of newspaper and aluminum from county schools and hospitals. Additionally, separate areas will be designated at the landfill for the separation, processing, or disposal of special wastes (e.g., batteries, used oil, construction/demolition debris, and used tires) and yard wastes. These activities are currently being phased in over a five-year planning period; the entire recycling/materials recovery program will be fully implemented by 1994 to meet the state's 30 percent reduction goal set in the 1988 Solid Waste Management Act.

TABLE 5-2

PROJECTED SOLID WASTE QUANTITIES
LEE & HENDRY COUNTIES 1995-2030

TARGET YEAR	TONS PER YEAR	TONS PER DAY
LEE COUNTY		
1995	591,492	1,620
2000	759,238	2,080
2005	913,346	2,502
2010	1,010,924	2,770
2015	1,106,402	3,031
2020	1,211,059	3,318
2025	1,322,686	3,624
2030	1,445,861	3,961
HENDRY COUNTY		
1995	31,226	86
2000	33,554	92
2005	35,883	98
2010	38,212	105
2015	40,541	111
2020	42,869	117
2025	46,922	124
2030	51,357	130

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5.4.2 HAZARDOUS WASTE

This section is not applicable to the proposed Facility, since there will be no handling or disposal of hazardous wastes at this Facility. The Facility will accept only municipal solid waste which includes residential, commercial, and non-hazardous industrial wastes (e.g., office and packing wastes). Public and private users of the Facility will be informed of these limitations. Signs will be posted at the weigh station to indicate what wastes are accepted at the Facility. Routine visual inspections by weigh station personnel will monitor the types of wastes received upon arrival at the Facility gates. The crane operator will be trained to visually inspect waste in the bunker. Additionally, spotters will be stationed on the tipping floor to ensure that loads are inspected prior to unloading into the refuse storage bunker. Finally, contractual agreements between Lee County and the selected vendor will stipulate shared responsibilities in the prevention of hazardous materials entering the Facility. If hazardous materials are discovered to have entered the Facility, the materials will be isolated or temporarily stored. A licensed hazardous materials contractor will be notified to collect and transport these materials to a proper treatment or disposal Facility.

A chemical and toxicity analysis of the combined ash residue (including both combustion residue and air pollution control device residues) will be conducted during acceptance testing and quarterly thereafter, to verify that the ash is not toxic or hazardous. Test methods will be in conformance with Rule 17-702, FAC, Solid Waste Combustor Ash Management.

It is expected, based upon tests at similar facilities, that the ash residue will be non-hazardous according to the regulations of the U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Regulation (FDER). This waste material will be suitable for disposal in a Class I permitted sanitary landfill.

5.5 SANITARY AND OTHER WASTE DISCHARGES

Solid waste generated by Facility operations (employee refuse, packing material, etc.) will be collected from receptacles located throughout the Facility and deposited into the main solid waste refuse storage pit. Materials not suitable for placement into the solid waste pit will be separated for off-site disposal at the Hendry County landfill/ashfill or other appropriate Facility. All sanitary wastewater and spent cooling water up to a maximum of 150,000 gpd wastewater will be collected and discharged to the Central WWTP. Therefore, no impacts associated with waste discharges are anticipated during the operations of the Facility.

5.6 AIR QUALITY IMPACTS

5.6.1 IMPACT ASSESSMENT

The air quality modeling analysis was conducted in three phases:

1. Screening analysis - This analysis identified the combustor type and operating condition (based on waste throughput and heat content) which would have the greatest calculated air quality impact. The screening model runs were made using the Industrial Source Complex-Short Term (ISCST) dispersion model and 48 worst case meteorological conditions.

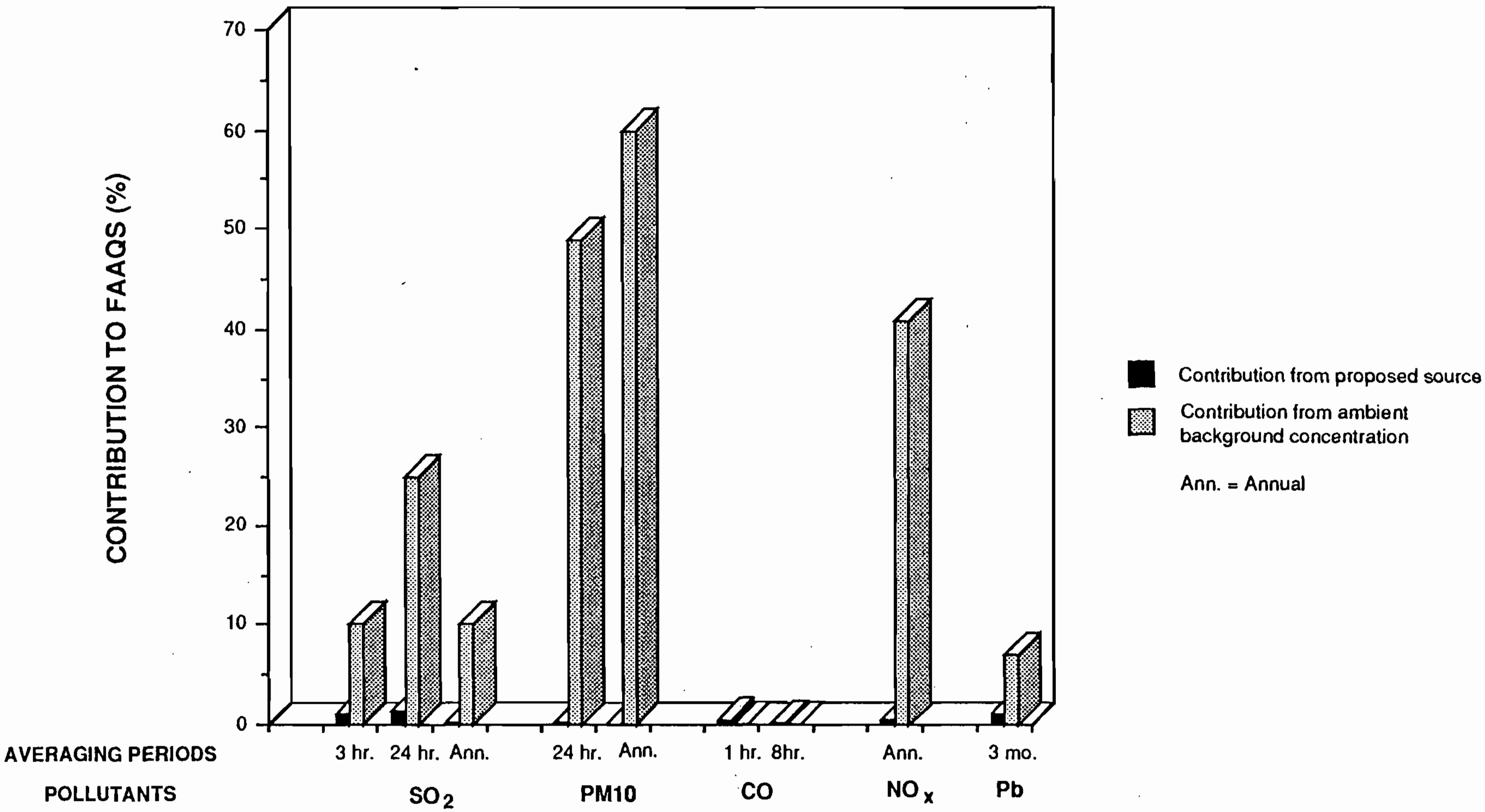
2. Refined Modeling Analysis - The refined modeling analysis was conducted using two postulated worst-case combustor operating conditions for the rotary waterwall design, and a receptor grid, was selected on the basis of the outcome of the screening analysis. The refined modeling analysis identified the maximum ground-level impacts for pollutants emitted from the Facility. The refined modeling was completed using the ISCST model, and five years (1982 to 1986) of surface meteorological data from Page Field Airport in Fort Myers and upper air data from Tampa International Airport.

3. Additional Class I Area Impact Analysis - This analysis modeled concentrations of regulated pollutants with Prevention of Significant Deterioration (PSD) increments, and modeled the affects of the Facility's plume on visibility at Class I and air-quality-sensitive areas. A detailed discussion of the air impacts is contained in Section 6.8, Comparison with PSD Increments and in Section 7.2, Visibility (Volume III - Air Quality).

Under the applicable regulations, short-term average air quality standard (24 hours or less) is not violated until a receptor exceeds the standard twice in any given year. The highest value of the second highest concentrations (HSH) is chosen from the potential impacts, and the ambient background monitoring data to allow for a single short-term violation. Since a single annual average is calculated for each receptor, the highest annual concentrations were used for comparison.

SO_2, NO_2, CO, PM_{10}, lead, and ozone are regulated federally through the National Ambient Air Quality Standards (NAAQS), and by the State of Florida through the Florida Ambient Air Quality Standards (FAAQS). The predicted Facility impacts for all these pollutants, except ozone, are compared in Table 5-5 and Figure 5-2 to the more stringent of the NAAQS or FAAQS. Ozone is not directly emitted from the Facility, but is formed in the atmosphere as a secondary pollutant. Non-methane hydrocarbons, considered a precursor to ozone formation, are regulated under PSD, and will be minimized by employment of combustion control techniques which represent BACT (see Section 4.0 of Volume III - Air Quality).

As Figure 5-2 shows, the modeled impacts of the proposed Facility are very small in comparison with the existing background concentrations. As shown in Table 5-3 and Figure 5-2, the greatest ground-level pollutant concentration due to the Facility is estimated to be no more than two percent of the applicable NAAQS/FAAQS standards. The 24-hour SO_2 concentration would be 1.3 percent of the standard. The three-hour SO_2 predicted concentration would be 1.1 percent of the FAAQS. The 24-hour average concentration for lead was used as a conservative estimate of the



LEE COUNTY
ENERGY RECOVERY FACILITY
Application for Power Plant Certification
Camp Dresser & McKee Inc.

FIGURE 5-2
AIR QUALITY IMPACT COMPARED TO FAAQS

TABLE 5-3

COMPARISON OF PREDICTED IMPACTS FROM THE LEE COUNTY ENERGY RECOVERY FACILITY AND AMBIENT BACKGROUND CONCENTRATIONS TO THE NAAQS/FAAQS
(concentration in ug/m^3)

Pollutant	Averaging Time	Rank[a]	NAAQS/ FAAQS[b]	Facility Impact	Facility Impact as Percent of Standard	Ambient Background Concentration	Total Impact	Total Impact as Percent of Standard
Sulfur Dioxide	3-Hour	HSH	1,300 (1,300)	14.70	1.1	136	151.0	12
	24-Hour	HSH	260	3.46	1.3	65	68.5	26
	Annual	H	60	0.25	0.4	6	6.25	10
Nitrogen Dioxide	Annual	H	100 (100)	0.54	0.5	45	45.5	46
Particulate	24-Hour	HSH	150 (150)	0.45	0.3	73	73.5	49
Matter (as PM_{10})	Annual	H	50 (50)	0.032	0.06	30	30.0	60
Carbon Monoxide	1-Hour	HSH	40,000	63.10	0.16	7	70.0	0.18
	8-Hour	HSH	10,000	8.21	0.08	5	13.0	0.13
Lead	3-Month	H	1.5 (1.5)	0.017[c]	1.1	0.10	0.12	8

SOURCE: Camp Dresser & McKee Inc., 1990

[a] Abbreviations: H = Highest
HSH = Highest, Second-Highest

[b] The more stringent of federal or state standard is given. Secondary standards are shown in parentheses.

[c] Highest 24-Hour average concentration used to conservatively estimate 30-day or 3-month average concentration.

three-month average lead concentration. The lead concentration would be 1.1 percent of the quarterly standard. All other pollutants contribute less than one percent of the applicable NAAQS/FAAQS.

Since the proposed Lee County Facility is considered a major source of SO_2, TSP, PM_{10}, and NO_2, the impacts of these pollutants are compared to the applicable Class II PSD increment for each specified averaging period. As shown in Table 5-4, the Facility is expected to consume less than four percent of any allowable increment. Cumulative modeling of any other PSD-consuming background source was not required because the pollutant impacts did not exceed any of the Significant Impact Levels (see Section 6.5 in Volume III).

The impact of the proposed Facility was also evaluated for visibility, soils, and vegetation. Visibility modeling of the plume was performed for the Everglades National Park, a PSD Class I Area, and for the Big Cypress National Preserve, an air-quality-sensitive area, to determine whether the Facility would have an effect on the clarity of the air in these pristine areas. Discrete receptors for both areas were placed along the boundaries closest to the Facility. Using a worst-case screening analysis (the EPA-approved VISCREEN model), no visibility degradation is predicted. The predicted maximum annual concentrations are well below the thresholds which are considered harmful to soils and plants. Detailed analyses of these air quality issues are presented in Section 7.0, Additional Impact Analyses (Volume III - Air Quality).

5.6.2 MONITORING PROGRAM

No post-construction ambient air monitoring plan is proposed for the Lee County energy recovery Facility. The monitoring network operated by DER is sufficient to monitor ambient air quality levels in the vicinity of the site. However, a continuous in-stack monitoring program will be operated for opacity, and oxygen or carbon dioxide concentrations. The equipment will be installed, calibrated and maintained in accordance with Chapter 17-2.710, FAC and 40 CFR 51, Appendix P. Compliance testing will also be conducted for pollutants with emission limiting standards in accordance with Chapter 17-2.700, FAC and 40 CFR 60 as applicable. This testing will include, but will not be limited to, testing for particulate emissions, SO_2, NO_x, CO, Pb, and non-methane VOC.

TABLE 5-4

COMPARISON OF IMPACTS FROM THE LEE COUNTY ENERGY RECOVERY Facility
TO PSD CLASS II INCREMENTS

Pollutant	Averaging Period	Rank[a]	Maximum Impacts from Facility (ug/m^3)	PSD Class II Increment	Total Impact as a Percent of Increment
Sulfur Dioxide (SO_2)	Annual	H	0.25	20	1.3
	24-hour	HSH	3.46	91	3.8
	3-hour	HSH	15.0	512	2.9
Total Suspended Particulate Matter (TSP)	Annual	H	0.032	19	0.17
	24-hour	HSH	0.45	37	1.2
Particulate[b] Matter (PM_{10})	Annual	H	0.032	17[c]	0.19
	24-hour	HSH	0.45	30[c]	1.5
Nitrogen Dioxide (NO_2)	Annual	H	0.54	25	2.2

SOURCE: Camp Dresser & McKee Inc., 1990.

[a] Abbreviations: H = Highest
HSH = Highest, Second-Highest

[b] Conservative estimate assuming all TSP is in the form of PM_{10}.

[c] Proposed EPA standard (54 FR 41218, October 5, 1989).

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Dispersion modeling of maximum Facility pollutant emissions has demonstrated that the estimated highest ground-level concentrations are below the PSD de minimis monitoring levels shown in Table 2-24. Therefore, in accordance with 40 CFR 52.21(i)(8), the Facility should be exempted from pre-construction monitoring requirements. In light of the modeling results presented in Table 2-24 and in Section 6.5 of Volume III, the Applicant requests the Florida DER to concur in this determination that pre-construction monitoring is not required.

5.7 NOISE

A technical noise analysis was performed for the proposed Facility. This noise study is contained in Appendix 11 of Volume II. The study explains the methodologies used in estimating the operational impacts of the Facility and the results of the analysis. Ambient noise levels were measured at three locations in the site vicinity to establish baseline conditions during day and night periods. Impacts were modeled at seven locations at the property boundary and in the vicinity.

Equipment noise levels were attenuated and combined with the ambient noise levels at each monitoring site. The results show that Facility noise levels will not cause a discernible impact (an increase of more than three dBA) at any sensitive receptor (see Table 5-5).

Table 5-5 compares the expected Facility noise level at each monitoring station to the County standards. The Facility noise levels are predicted to be lower than both the day-time standard and the night-time standard at all property boundary locations during Facility operations.

Traffic noise was determined using the noise prediction model, STAMINA 2.0 (FHWA, 1982). Using this model, traffic noise levels were compared with and without Facility traffic. Modeling showed that Facility truck traffic would not be audible at any of the nearest residences.

TABLE 5-5

LEE COUNTY ENERGY RECOVERY FACILITY
FACILITY NOISE LEVELS (DBA)

Receptor Location	Distance (FEET)	Period	Background Noise Level (L_{EQ})	Projected Noise Level (L_{EQ})	County Standard	Increase in Noise Level (L_{EQ})
Boundary B1	850	Day	48.0	50.4	66	2.4
		Night	35.0	42.2	55	9.2
Boundary B2	2,200	Day	52.0	52.5	66	0.5
		Night	50.0	50.2	55	0.2
Boundary B3	200	Day	48.0	57.1	66	9.1
		Night	42.0	50.1	55	8.1
Boundary B4	1,500	Day	52.0	53.0	66	1.0
		Night	50.0	50.4	55	0.4
Residence R1	2,400	Day	55.0	55.1	66	0.1
		Night	42.0	42.9	55	0.9
Residence R2	2,850	Day	55.0	55.1	66	0.1
		Night	42.0	42.7	55	0.7
Residence R3	3,000	Day	55.0	55.1	66	0.1
		Night	42.0	42.6	55	0.6

SOURCE: Camp Dresser & McKee Inc., 1990.

5.8 CHANGES IN NON-AQUATIC SPECIES POPULATIONS

5.8.1 IMPACT

Minimal impacts on species populations and long-term species diversity are expected. Limited wetland areas will be impacted by construction, as described in Appendix 6.5 (Dredge and Fill Permit) and Section 4.4.1 (Ecological Impact Assessment). Given the disturbed nature of the present site, development of the Facility site may actually cause a net positive effect on species diversity, abundance, and composition.

No adverse impacts to wetlands are anticipated from the long-term operation of the proposed energy recovery Facility. The stormwater management pond will be designed for a 25-year, 72-hour stormwater event. During design rainfall events, the stormwater pond design will provide a maximum discharge of 1.7 cubic feet per second (cfs) and an average discharge of <=0.5 cfs (see Volume II, Section 7.3). This discharge will flow to the wetlands in the southeast quarter of the property site which should enhance these wetlands and not adversely impact them. Groundwater seepage from the stormwater pond should also be toward these same wetlands. Therefore, these wetlands should have enhanced hydroperiods and thus greater wildlife utilization during the operational phase of the proposed project.

5.8.2 MONITORING

Minimal impacts on species populations are anticipated; therefore, no long-term wildlife monitoring is necessary. Post-construction wetland monitoring of wetlands will be conducted until the agencies' success criteria for the wetlands have been satisfied.

5.9 OTHER FACILITY OPERATION EFFECTS

Florida Transportation Engineering (FTE) was contracted to perform an analysis of the traffic impacts of the proposed Facility. FTE has performed many similar studies in Lee County, and is familiar with the project area. Based on the results of their study, the energy recovery facility will have no adverse impact on the surrounding roadway network. Existing Level of Service (LOS) for those roadway sections to be affected by the project are currently established at LOS A. 1992 peak season traffic with development of the project remain at LOS A. However, the study does recommend that a left-turn lane for eastbound traffic be constructed to service vehicles accessing the site due to the fact that Buckingham Road is currently posted at 50 miles per hour. The complete FTE report can be found in Appendix 11.2 (Volume II).

5.10 ARCHAEOLOGICAL SITES

An archaeological and historic survey was conducted by Piper Archaeological Reasearch, Inc. for the Facility site (see Appendix 10.2). Two archaeological/historic sites were found:

1. A prehistoric campsite, marked by a single chert waste flake; and

2. An early 20th-century structure of board-and-batten construction, highly modified and in poor condition.

These sites were located within the study area for the archaeological/historic survey, but are not located on the Facility site. Neither of these sites has significance for inclusion in the National Register of Historic Places. Therefore, no significant prehistoric or historic archaeological resources will be impacted by the proposed energy recovery facility.

5.11 RESOURCES COMMITTED

Numerous natural and human resources will be consumed, converted or made unavailable for future use if the proposed Facility is implemented.

The resources used in the construction of the Facility will be committed to this project. Some building materials will be irretrievably used in construction of the energy recovery facility or irreversibly committed to the Facility. Certain lumber products and concrete structures will be committed, as well as glass, ceramics, paint, insulation, and paving materials. In addition to the materials consumed during construction, the energy and human labor expended could not be retrieved. However, this type of commitment of resources is typical for major capital intensive projects. Financial commitments include dedication of bond issue funds or other sources of construction funds. As with the commitment of labor and materials, the financial requirements for a major capital project are very typical.

The combustion process chemically alters many of the compounds within the waste stream. Many of the heat releasing reactions, practically speaking, are irreversible. Therefore the materials consumed in the combustion process are permanently lost. This, however, is considered a positive reuse of a material for the generation of energy which otherwise would have been buried in a landfill. The Facility will generate over 6.42 billion kilowatt hours of electricity during a 20-year life (assuming no expansion takes place). In addition to the revenue earned on the electricity sold to the power company, the energy production translates into a $8.25 million reduction on oil expenditures over 20 years and the reduction in consumption of over 11 million barrels of oil. The alternative processing of 1,800 tons per day of municipal solid waste by the Facility will conserve approximately 243,000 tons per year of coal which would otherwise be consumed for power production. It also offers the potential for recovery of reusable materials (ferrous metals).

Thus, the resources committed to this project will benefit the community by providing an environmentally preferred alternative to conventional landfilling, reducing the amount of solid waste to be landfilled and the associated environmental risks, supplying an alternative source of energy, conserving natural resources, and stimulating the economy (by providing new jobs, consuming goods and services from local businesses, etc.).

5.12 VARIANCES

It is not anticipated that variances from applicable standards will be sought as part of the site certification process.

SECTION 6.0

TRANSMISSION LINES

AND

OTHER LINEAR FACILITIES

6.0 TRANSMISSION LINES AND OTHER LINEAR FACILITIES

Linear facilities are those which must be routed over land, including transmission lines and pipelines. This section discusses the proposed routes for power transmission, water, wastewater, and reclaimed water for the Lee County energy recovery facility.

6.1 TRANSMISSION LINES

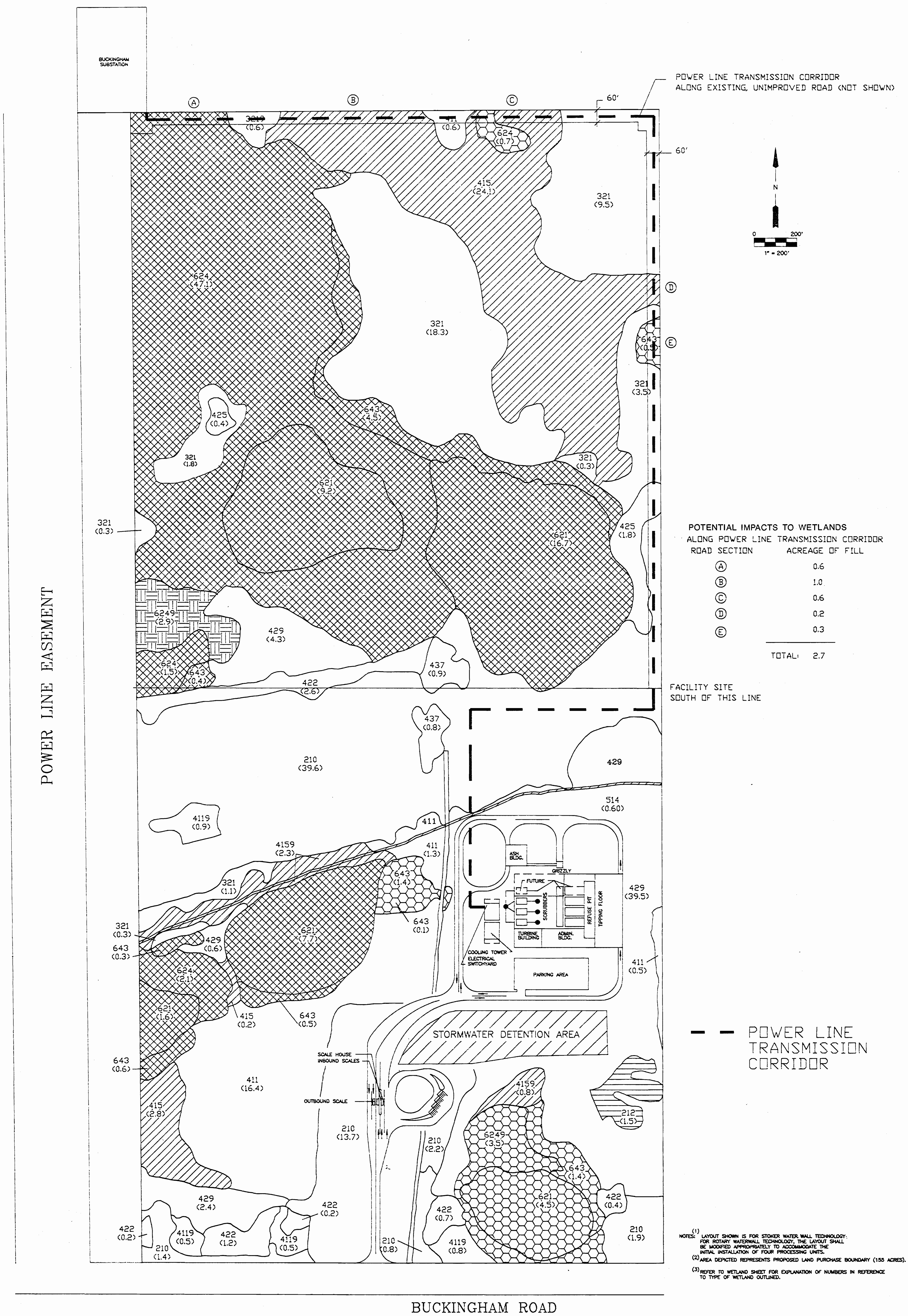
The Facility site is bounded on the west by a Florida Power and Light easement, through which FP&L transmission lines run. About one-half mile north of the site (on the northern boundary of the northeast quarter of Section 24) is FP&L's Buckingham substation. Power generated at the energy recovery facility will be routed to this substation.

The power line transmission will be routed north along the eastern border of Section 24, then west along its northern border to tie in with the substation. The corridor will be 60 feet in width with 10,000-square foot corners in the northeast and northwest corners of the northeast quarter of Section 24 as shown in Figure 6-1. These corners will accommodate guy wires for the transmission lines.

Along this route, approximately 2.7 acres of wetlands would be impacted. These impacts are described in detail in Appendix 6.5 (Dredge and Fill Permit) and Section 4.4.1 (Ecological Impact Assessment).

Electric and Magnetic Fields

As part of construction of the Facility, an electrical transmission corridor will be constructed to establish the electrical interconnection between the energy recovery facility and the Florida Power and Light (FP&L) transmission grid. The interconnect transmission line will traverse a 60-foot wide corridor for approximately 2,400 feet north and 2,600 feet west to the existing FP&L Buckingham substation. The interconnect line size will have a specified capacity of 138 kV. The conceptual design



POTENTIAL IMPACTS TO WETLANDS
ALONG POWER LINE TRANSMISSION CORRIDOR

ROAD SECTION	ACREAGE OF FILL
A	0.6
B	1.0
C	0.6
D	0.2
E	0.3
TOTAL:	2.7

NOTES:
(1) LAYOUT SHOWN IS FOR STOKER WATER WALL TECHNOLOGY: FOR ROTARY WATERWALL TECHNOLOGY, THE LAYOUT SHALL BE MODIFIED APPROPRIATELY TO ACCOMMODATE THE INITIAL INSTALLATION OF FOUR PROCESSING UNITS.
(2) AREA DEPICTED REPRESENTS PROPOSED LAND PURCHASE BOUNDARY (155 ACRES).
(3) REFER TO WETLAND SHEET FOR EXPLANATION OF NUMBERS IN REFERENCE TO TYPE OF WETLAND OUTLINED.

LEE COUNTY ENERGY RECOVERY
POWER LINE TRANSMISSION CORRIDOR

CAMP DRESSER & McKEE INC.
environmental engineers, scientists, planners, & management consultants CDM

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
DATE: JUNE 1990

REV. NO.	DATE	DRWN	CHKD.	REMARKS

PROJECT NO.
SHEET NO.
FIGURE 6-1

elements of the interconnect transmission line have been addressed in relation to power line geometry, pole spacing, height, ground clearance, current, and voltage. These elements combined with other design variables will be used as input into the Bonneville Power Administrative Corona and Field Effects Model to determine compliance with Chapter 17-244, FAC, Electric and Magnetic Fields. In any case, compliance will be demonstrated for the requirements of Chapter 17-274.450(3)(b) and (d) in regard to a maximum electric field of 8 kV/M beneath the line and 150 milliGauss at the edge of the transmission line right-of-way. Additional consideration will be given to any cumulative effects of the existing FP&L transmission corridor, the existing substation, and an adjacent residential service line corridor. This information is included in Appendix 7.5, Volume II of this application.

6.2 ASSOCIATED LINEAR FACILITIES

Currently, there are no municipal water and wastewater utilities serving the project area. Surrounding residences use private wells and septic tanks. In order to service the proposed energy recovery facility, three transmission pipelines must be constructed, as shown in Figure 6-2.

Pipelines will be needed to convey potable water and reclaimed water to the site, and wastewater from it. The reclaimed water and wastewater lines will lay side by side along SR 82 (Anderson Avenue), from the site westward under Interstate 75 to the intersection of Ortiz Avenue. The potable water line will lay in a separate trench in accordance with guidelines for the proper separation of water and wastewater pipelines.

The potable water line will be routed north along Ortiz Avenue, and will tie into an existing distribution system near the intersection of Highcotton Lane. Water will be supplied by the County's Corkscrew Water Treatment Plant. A minimum pipe size of eight inches will be used; this pipe size may be increased to serve other County needs when the line is constructed. Potable water use at the project site will be about 75,000 gallons per day (gpd).

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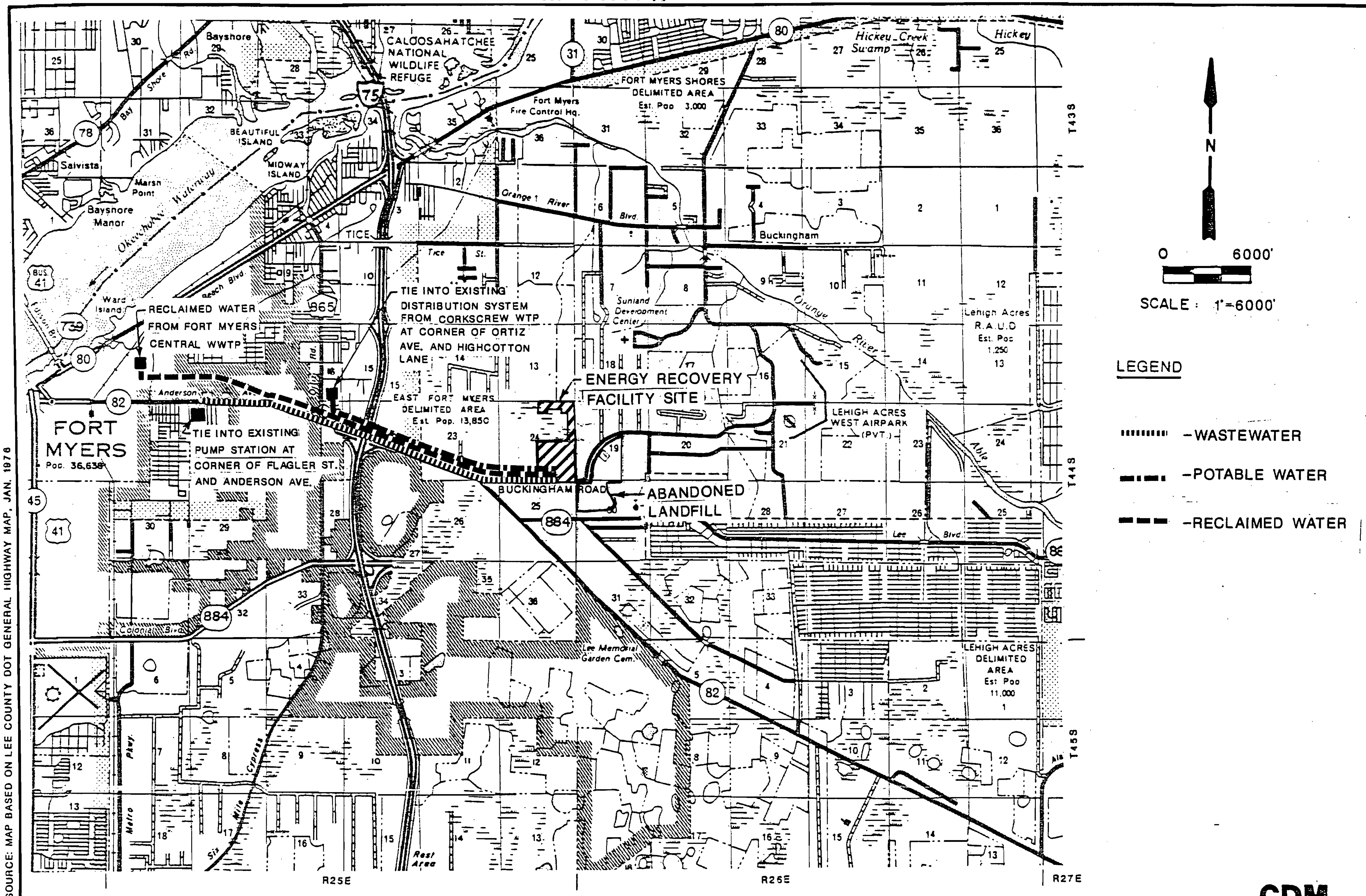

SOURCE: MAP BASED ON LEE COUNTY DOT GENERAL HIGHWAY MAP, JAN. 1976

CDM

FIGURE 6-2

Proposed Utility Transmission Routes - Lee County Energy Recovery Facility

Reclaimed water will be supplied by the City of Fort Myers Central Wastewater Treatment Plant. The supply line will be routed from the Central WWTP eastward along Michigan Avenue, turning south along Michigan Link Avenue, then traveling west again along SR 82 to the common junction at the intersection of Ortiz Avenue. To convey the 1.5 million gallons per day (mgd) of reclaimed water needed, a minimum pipe size of 12 inches will be used. Again, this may be up-sized in the future to serve other reuse areas.

The energy recovery facility will generate a maximum of approximately 150,000 gpd of wastewater, which will be treated at the Central WWTP. West of Ortiz Avenue, the wastewater transmission line will be routed to travel along SR 82 to the intersection of Flagler Street, where it will tie into an existing pump station. A minimum pipe size of six inches will be used for the sewer force main.

The proposed water, reclaimed water, and wastewater transmission lines are roughly three and one-third, six, and five miles in length, respectively. These lines will all be constructed in existing city and County rights-of-way. The proposed routes avoid major intersections and congested areas to the greatest extent possible. No environmental impacts are anticipated beyond those normally associated with this type of construction.

The Facility will also use an on-site well to provide back-up water for the cooling tower. Complete information on the well can be found in Appendix 7.2.

SECTION 7.0

ECONOMIC AND SOCIAL EFFECTS

OF

FACILITY CONSTRUCTION & OPERATION

7.0 ECONOMIC AND SOCIAL EFFECTS OF PLANT CONSTRUCTION AND OPERATIONS

Construction and operation of the energy recovery facility will provide a number of benefits. Specifically, the Facility will:

- Meet the intent of the state Legislature [Section 377.709(1), Florida Statutes to encourage energy conservation, to dispose of solid refuse in a proper manner, and to use an environmentally preferred alternative to conventional solid waste disposal.

- Provide an improved process for the disposal of solid waste which remains after recycling that minimizes ecological impacts;

- Provide a long-term economic method of solid waste disposal for those materials which remain after recycling.

- Decrease the amount of land required to be committed for sanitary landfilling purposes;

- Recover energy from the combustion of solid waste;

- Generate revenues from the sale of energy;

- Reduce the demand for auxiliary energy sources;

- Stabilize or reduce future disposal cost increases; and

- Become an intregral component of the total solid waste management program.

Quantifying the economic and social ramifications of the construction and operation of the energy recovery facility is a difficult task. Economic impacts are more readily identifiable while social impacts are more difficult to calculate. The following sections discuss the socioeconomic benefits and costs related to the energy recovery facility.

7.1 SOCIOECONOMIC BENEFITS

Land disposal of solid waste is becoming more difficult in most areas. The operation of sanitary landfills has been constrained by public resistance, a decrease of available land, a decrease in suitable land away from urban sprawl, increasing environmental regulations regarding landfill operations, increased concerns about sanitary landfills and the protection of limited groundwater resources for an expanding population. These issues have created increased popularity in the energy recovery process as the best current method of solid waste disposal for the waste which remains after recycling.

The investments in energy recovery are initially higher than sanitary landfilling, but long term costs and benefits create a situation where energy recovery is preferable. The costs of acquiring and committing large tracts of land for landfill purposes, permitting and operations costs of landfilling and probable increased energy costs counterbalance the start-up costs associated with the energy recovery facility.

After expansion, the energy recovery facility will have a continuous design-rated capacity of 2,400 tons per day (tpd). Some noncombustible materials will be transported directly to the landfill/ashfill in Hendry County. However, of the 2,400 tpd to be processed by the energy recovery facility, less than 40 percent (containing less than 4.0 percent combustible debris) will require landfilling. This significant decrease in waste tonnage corresponds with a 90 percent reduction in waste volumes. Because of this, a related 90 percent reduction in the annual space requirements for landfilling should be expected. The energy recovery process will increase the landfill/ashfill lifespan to over forty years.

The environmental benefits relating to energy recovery operations are anticipated to include improved protection of the limited, valuable and sensitive groundwater and surface water resources in the area. Materials processed by energy recovery operations consist of combusted matter which is relatively inert (less than four percent combustible material).

Another benefit related to the Facility is the generation of a minimum of 321 million kilowatt hours (kWh) of electricity per year or 642 billion kWh over the life of the facility (based on an average 550,500 tons per year over a 20-year period, and 575 kWh/ton net output). This production corresponds to a decrease in the use of crude oil by 550,500 barrels per year (or a minimum of 11 million barrels over the life of the Facility). At 1990 oil prices ($15/barrel), the decreased demand for crude oil translates into a reduction of about $8.25 million per year in spending or $165 million over the 20-year life of the Facility. These figures do not address expected inflation, which will increase the savings related to reduced crude oil demands.

Local economic benefits from energy recovery operations includes the full-time employment of approximately 54 personnel, including 5 administrative, 40 operations and 9 maintenance positions. The annual payroll for the personnel is expected to be about $2.5 million which will contribute over $33.3 million into the local economy over a 20-year period. Increased retail sales from energy recovery personnel will contribute $0.62 million or approximately twenty-five percent of their annual income to local establishments. An estimated additional $0.83 million in personal income will be generated by local residents. The total of $35 million in estimated annual economic gains for the region is anticipated as a result of the energy recovery facility.

There are additional anticipated beneficial economic impacts related to facility construction. The local economy and labor market will benefit from the $165 million construction project estiamted in the range of $155-170 million. Increased revenues from construction-related goods and services purchases and secondary increased jobs from this spending will benefit the area. A significant amount of construction supplies such as concrete, structural steel, glass, piping, fittings, landscape material, etc. is anticipated to be purchased from local businesses. There will also be indirect benefits to retail and service sector establishments supplying the work force with goods and services throughout the course of the project. There will be over 325 construction workers employed during the peak of construction activities, with a total of over 1,200 workers employed throughout the construction process.

The regional economic impact of the project construction can be estimated utilizing a regional multiplier with regard to industries involved in the construction process. The multiplier measures the increased monies generated into an industry and the changes in household income and related expenditures. The applicable industry sectors include:

Contractors: General Building, Heavy and Special Trade
Stone and Glass Products
Fabricated Metal Products
Machinery
Electrical Equipment and Supplies
Services

Each of the industries receives a portion of the construction costs. The product of the industry's percentage of construction costs and the regional multiplier provides an estimate of the change in total gross output in the region for the applicable industry. Table 7-1 shows the total gross output for the project and the estimated economic impact for each industrial sector.

7.2 SOCIOECONOMIC COSTS

This section is an overview of the costs related to the construction and operation of the energy recovery facility over a 20-year period.

Construction of the Facility will require approximately 20 acres of the 155 acre project site. Because land represents a long-term resource commitment, the cost of obtaining the land for the Facility is included in the total Facility costs.

Total bonded debt for Facility development is estimated to range between $220-240 million. The County will finance these costs by system revenue bonds and user fees which will be levied to service the debt. The following is an approximation of costs related to the energy recovery facility.

TABLE 7-1

REGIONAL ECONOMIC IMPACT

Industry Sector	Regional Multiplier	Input	Gross Output
Contractors	2.79	33.0	92.07
Stone and Glass Products	3.00	24.75	74.25
Fabricated Metal Products	2.25	16.6	37.35
Machinery	2.38	41.25	98.18
Electrical Equipment/ Supplies	2.59	33.0	85.47
Services	3.00	16.5	49.50
	TOTAL	165.0	436.82

NOTE: Input and gross output are expressed in millions of dollars. The regional multiplier is from the United States Water Resources Council, January 1977, Guideline 5 Regional Multiplier, Washington, D.C.

Contractor Cost	$155 - 170 million
Permits and Fees	2
Additional County Costs	3
TOTAL ESTIMATED CAPITAL COSTS	$160 - 175 million

The operator of the Facility will receive an annual operating and maintenance fee of approximately $8-9.5 million from Lee County (based on 550,500 tons/year). Operation and maintenance costs are fixed but subject to escalation indices over the life of the service agreement.

There are several land use, comprehensive plan and zoning components which will minimize the long-term land use impacts on the project site's immediate area. The following land use configurations and future land use and zoning regulations will serve in this function:

> As Lehigh Acres develops toward the west and the energy recovery facility, residential uses may be eventually within one mile of the project site. Buckingham Park, a 135-acre parcel of land, will be immediately adjacent to the project's eastern boundary. The presence of this large park combined with the FP&L transmission corridor between the project site and the future residential area will maintain a permanent green space buffer to this future residential population. The park will be owned by Lee County.

The energy recovery facility will become an extension of the industrial and utility uses that exist or are foreseen in the area by zoning and/or future land use regulations. The existing industrial use along SR 82 is a gravel pit. In addition, the majority of SR 82 frontage within two miles east of Interstate 75 is zoned for industrial, commercial or mixed uses. The mixed use area, surrounding Six Mile Cypress Slough near SR 82, will benefit from siting commercial uses near SR 82 and residential uses away from the roadway. The existing utility uses include a landfill and a major transmission power line adjacent to the project site. The energy recovery facility is compatible with these existing uses.

The majority of land surrounding the Facility site to the north of SR 82 is designated in the Lee County Land Use Plan as rural land use although currently zoned agricultural (AG-2). The rural future land use category limits residential development in this area to approximately one dwelling unit per acre. The zoning classification limits residential uses in this area. These regulations will limit future residential development and prevent land use incompatibilities near the proposed facility.

The wetlands and associated resource protection areas located adjacent to and north of the site will have limited development potential and will further buffer the site from existing and potential residential development to the north.

SECTION 8.0

SITE AND FACILITY DESIGN ALTERNATIVES

8.0 SITE AND FACILITY DESIGN ALTERNATIVES

Many factors were evaluated during the planning of the Lee County energy recovery project, including alternative sites, solid waste management methods, ownership and financing options, and Facility size and boiler configuration. The energy recovery facility is as an integral component of the County's total solid waste management system currently being implemented. This system also incorporates an aggressive recycling/materials recovery program which includes the curbside collection of recyclables from county residences; a materials recovery facility (MRF) for the initial processing of materials required by end-use markets (e.g., sorting, crushing, baling, shredding, etc.); drop-off/buy-back centers for the collection of recyclables from condominium developments, apartment complexes, and mobile home parks; a commercial recycling program for the recovery of cardboard, glass, aluminum, and high-grade paper from shopping centers, restaurants, and office complexes; and an institutional waste recovery program for the collection of newspaper and aluminum from County schools and hospitals. Additionally, separate areas will be designated at the landfill for the separation, processing, or disposal of special wastes (e.g., batteries, used oil, construction/demolition debris, and used tires) and yard wastes. These activities are currently being phased in over a five-year planning period; the entire recycling/materials recovery program will be fully implemented by 1994 in order to meet the state's goal of 30 percent reduction (1988 Solid Waste Management Act).

8.1 SITE ALTERNATIVES

In March 1990, following discussion and review at a public hearing, the Lee County Board of County Commissioners approved the selected site location. The site is located in east-central Lee County, fairly close to the county's waste generation centroid. The site offers a good access road, a large area of land, and buffer zones.

The present site was selected after a number of in-depth analyses. The first was performed by Camp Dresser & McKee Inc. (CDM) in August 1989 to review potential sites throughout Lee and Hendry counties. A specific siting methodology was used to eliminate unsuitable sites on the basis of flood potential, well field impacts, airport proximity, urban development, environmental sensitivity, and proximity to surface water bodies. The result of this study was the identification of several viable candidate sites.

In February 1990, CDM prepared a more detailed analysis of six candidate sites. This analysis compared the sites in terms of availability of water and wastewater services, proximity to existing electrical transmission facilities, transportation impacts and access, zoning and land use, haul cost, air quality, flood plains, wetlands, wildlife, soils and geology with respect to earthwork and foundation requirements, hydrologic conditions, and relative cost. The results of the February 1990 study are presented in Appendix 4.0. The preferred energy recovery facility site was selected based on these criteria and additional information received during Board of County Commissioners meetings.

8.2 ALTERNATIVE WATER SOURCES

Reclaimed water from the City of Fort Myers Central WWTP will be used for cooling purposes at the proposed Facility. This primary supply was selected because of its guaranteed availability in a region where potable water supplies are extensively developed. By using reclaimed water to meet its ultimate cooling water demand of 1.5 mgd, the Facility will drastically reduce the burden on fresh water resources in Lee County. In addition, valuable use will be made of an as yet untapped resource. The Central WWTP produces a consistently high quality effluent, meeting 5-5-3-1 or better, yet this reclaimed water is currently being discharged to the Caloosahatchee River. Reuse at the energy recovery facility, along with other city and County reuse projects currently in the planning stages, will help eliminate this discharge to surface waters.

Alternative sources of cooling water include city and County water supplies, and an on-site well. These sources were rejected as a primary cooling water supply because of the availability of reclaimed water and the need to preserve potable water resources in the area. However, a back-up cooling water supply will be needed in the event that reclaimed water becomes unavailable; this is expected to occur only for short periods of time, if at all. After an evaluation of potential back-up supplies, it was determined that an on-site well installed in the sandstone aquifer would best meet emergency cooling water needs. A permit application for the emergency supply well is included in Appendix 7.2.

Potable water for the Facility will be supplied by the County. An eight inch diameter line (minimum pipe size) will be constructed from an existing force main, as discussed in Section 6. Wastewater from the Facility will be pumped to the Fort Myers Central WWTP for treatment. The city and County utilities are considered reliable sources of potable water and wastewater treatment, such that no back-up systems are needed for these Facility services.

SECTION 9.0

COORDINATION

9.0 COORDINATION

Development of the Lee County energy recovery project has required coordination with numerous federal, state, regional, county, and local government agencies. Information was obtained through meetings, telephone calls, and correspondence between Camp Dresser & McKee Inc. and representatives from these agencies. Table 9-1 provides a list of government agencies and individuals who were contacted during preparation of this permit application.

TABLE 9-1

CONTACTS AND CORRESPONDENCE

Agency	Contact	Date	Subject
Department of Lee County Utilities	George E. Reilly	3/13/90	Letter: Environmental Power Corp information
		3/13/90	Meeting: Site Layout
		3/20/90	Meeting: Zoning and Land-Use Issues
		4/9/90	Letter: Cost Impacts of a "Zero" versus "Limited" Discharge Facility
		4/11/90	Letter: PPSA Fees and FERC Applications
		4/17/90	Meeting: Site Utilities Issues
		4/19/90	Transmittal: Site Preliminary Foundation and Soil Study
		4/20/90	Letter: Three Proposed Layouts for Transmission Facilities
		4/24/90	Meeting: Ecological Scoping Meeting
	Jesslyn Arnold	5/7/90	Letter: Federal Energy Regulatory Commission

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Lee County Utilities (Continued)	Neal Haslett	4/2/90	Letter: Acreage Requirements
Office of County Lands	Karen Forsyth	4/12/90	Transmittal: To CDM, 9 Section Tax Map with Owners Key
Department of Environmental Regulation	Patrick Kenny	4/5/90	Meeting: Field Visit to Review Lines of Jurisdiction
	Ron Blackburn Phil Barbaccia	4/24/90	Meeting: Ecological Scoping
South Florida Water Management District (SFWMD)	Peter Comeau	12/18/89	Telephone: Dewatering Permit Requirements
	Karen Johnson	4/5/90	Meeting: Field Visit to Review Lines of Jurisdiction
	Vern Kaiser	4/9/90	Telephone: Request Consumptive Use Permits
	Vern Kaiser	4/12/90	Letter: Request Consumptive Use Permits
	Edward Lopez	4/25/90	Telephone: Surface Water Dry Pretreatment Requirements
	Vern Kaiser	5/1/90	Telephone: Status of Consumptive Use Permit Inventory
	Clyde Dabbs	5/16/90	Telephone: Surface Water 37 csm Discharge Limit

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
SFWMD (continued)	Karen Johnson	5/17/90	Telephone: Surface Water Wetlands
	Bill Haight	5/17/90	Telephone: CUP Clarifications
	Bill Kirk	5/29/90	Telephone: Fire Protection Needs for CUP and Cooling System Requirements
Suncoast Experimental Station (IFAS)	Gary Clark	5/11/90	Telephone: Estimating ET Potential of Native Habitats
Florida Game and Fresh Water Fish Commission	Kim Drysen	4/24/90	Meeting: Ecological Scoping
Federal Aviation Administration	James Walter	4/2/90	Letter: New Site Location
		4/10/90	Letter: Revised "Notice of Proposed Construction or Alteration"
Department of Environmental Regulation; Bureau of Air Quality (DER)	Steve Smallwood	3/26/90	Meeting: DER's Draft Air Toxics Policy to Energy Recovery Facilities
	John Glunn	4/6/90	Telephone: Request Copy of DER's Draft Air Toxics Policy Document

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DER (continued)	John Glunn	4/6/90	Transmittal: To CDM, Draft Air Toxics Policy Document
	Tom Rogers	4/13/90	Telephone: Notification of Project, Guidance on Air Quality Issues
		5/9/90	Letter: Site Location
National Park Service; Air Quality Division; Denver Service Center	Bud Rolofson	4/19/90	Telephone: Visibility and ISC Modeling for Class I Areas
National Park Service South East Region	Julie Thomas	4/20/90 4/25/90	Telephone: National Park, Class I Area, Sensitive Area Boundaries for Prevention of Signification
Lee County Environmental Division	Rick Mraz	4/5/90	Meeting: Field Visit to Review Lines of Jurisdiction
US Army Corps of Engineers (COE)	Skip Bergman	4/5/90	Meeting: Field Visit to Review Lines and Jurisdiction
		4/18/90	Telephone: Dredge and Fill Spoil Areas
		4/24/90	Meeting: Ecological Scoping Meeting
	Mr. Powell	4/18/90	Telephone: Request Dredge and Fill Spoil Areas Information

6/27/90
MLCL18/3

TABLE 9-1
(Continued)

Agency	Contact	DAte	Subject
COE (continued)	Walter Jones	4/18/90	Letter: Request Dredge and Fill Spoil Areas Information
	Diane Grace	4/23/90	Telephone: Identified Dredge and Fill Spoil Areas
		4/26/90	Transmittal: Dredge abd Fill Spoil Areas Information Received Lee County
Lee County Division of Water Resources	Roland Banks	4/9/90	Telephone: Request Water Well Information
		4/12/90	Letter: Request Water Well Information
	Roland Ottolini	4/30/90	Telephone: Information for the 5-Mile radius to be Provided
		5/25/90	Telephone: Surface Water Discharge Location
Department of Environmental Regulation; Office of Coastal Management (DER)	David Worley	5/29/90	Telephone: Coastal Zone Zone Management
		5/29/90	Letter: Coastal Zone Management

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DER (continued)	Ted Hoehn	5/30/90	Telephone: Coastal Zone Management Consistency
	Lynn Griffin	5/31/90	Telephone: Coastal Zone Management Consistency
		6/4/90	Letter: Coastal Zone Management Consistency Received
Lee County Department of Community Services; Division of Planning and Construction	Al Whitworth	4/5/90	Telephone: Request County Parks Information
		4/12/90	Letter: Request County Parks Information
		4/23/90	Letter: County Parks Information Received
South Florida Regional Planning Council (SFRPC)	Walter Daltry	4/9/90	Telephone: Request Areas of Concern and Indian Reservations Information
		4/12/90	Letter: Request Areas of Concern and Indian Reservations Information

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
SFRPC (Continued)	Glenn Heath	4/25/90	Letter: Areas of Concern and Indian Reservations Information Received
City of Fort Myers Recreational Department	Nancy Campbell	4/6/90	Telephone: Request City Parks Information
		4/12/90	Letter: Request City Parks Information
	Irene Rensing	4/19/90	Letter: City Parks Information Received
Department of Natural Resources; Division of Recreation and Parks	Robert Dye	4/6/90	Telephone: Request State Parks Information
		4/12/90	Letter: Request State Parks Information
		4/20/90	Letter: State Parks Information Received
Department of Agriculture and Consumer Services	Ty Alexander	4/6/90	Telephone: Request State Forest Information
		4/12/90	Letter: Request State Forest Information
	Kevin Moore	4/19/90	Letter: State Forest Information Received

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Community Affairs; Bureau of Land and Water Management	Jim Quinn	4/20/90	Telephone: Request Areas of Critical State Concern
		4/23/90	Letter: Request Areas of Critical State Concern
		5/2/90	Letter: Areas of Critical State Concern Information Received
South Florida Water Management District; Save Our Rivers Division	Fred Davis	4/9/90	Telephone: Request Save Our Rivers Lands Information
		4/12/90	Letter: Request Save Our Rivers Lands Information
	Lee Henderson	4/20/90	Transmittal: Save Our Rivers Lands Information Received
Department of Environmental Regulation; Bureau of Surface Water Management (DER)	Eric Shaw	4/11/90	Telephone: Request Outstanding Florida Waters Information
		4/12/90	Letter: Request Outstanding Florida Waters Information

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DER (Continued)	Eric Shaw	4/19/90	Letter: Outstanding Florida Waters Information Received
Department of Natural Resources; Division of State Lands; Southwest Florida Aquatic Preserves	Bob Repenning	4/12/90	Telephone: Request Aquatic Preserves Information
		4/12/90	Letter: Request Aquatic Preserves Information
		4/17/90	Letter: Aquatic Preserves Information Received
Department of Natural Resources; Florida Natural Areas Inventory (DNR)	Steve Friedman	4/9/90	Telephone: Request Special Plants and Animals Information
		4/12/90	Letter: Request Special Plants and Animals Information
		4/20/90	Letter: Special Plants and Animal Information Received for Previous Site
		5/1/90	Telephone: Status of Special Plants and Animals Information Request

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
DNR (Continued)	Steve Friedman	5/25/90	Telephone: Status of Special Plants and Animals Information Request
		5/30/90	Telephone: Use of Special Plants and Animals Information from 4/20/90
		5/30/90	Letter: Confirmation of Special Plants and Animals Information Use From 4/20/90
Department of Natural Resources; Division of State Lands	Linda Sumarlidason	4/6/90	Telephone: Request Submerged Lands Information
	Leonard Niro	4/12/90	Letter: Request Submerged Lands Information
	Elaine Richardson	5/1/90	Telephone: Status Submerged Lands Information
		5/25/90	Telephone: Status Submerged Lands Information
		5/31/90	Telephone: Status Submerged Lands Information
		6/8/90	Letter: Submerged Lands Information Received

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Natural Resources; Division of Land Resources	Gary Knight	4/9/90	Telephone: Request Conservation and Recreation Lands Information
	Greg Brock	4/12/90	Letter: Request Conservation and Recreation Lands Information
		5/1/90	Telephone: Status Conservation and Recreation Lands Information
		5/25/90	Telephone: Status Conservation and Recreation Information
		5/25/90	Letter: Faxed 4/12/90 Letter to Greg Brock
		5/31/90	Letter: Conservation and Recreation Information Received
Lee County Department of Community Development; Division of Zoning	B. Spikowski P. Camilia	3/20/90	Meeting: Rezoning Facility Site
	Brian Kilner	4/10/90	Meeting: Rezoning Facility Site
Lee County Division of Zoning	Kay Deselum	5/2/90	Telephone: Pre-Application Conference

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Lee County Division of Zoning (Continued)	Hal McNemar	5/3/90	Telephone: Pre-Application Conference
	Mike Pavese	5/25/90	Telephone: Zoning Application
	Mary Gibbs	5/10/90	Meeting: Rezoning
Environmental Protection Agency	Marshall Hyatt	12/18/89	Telephone: NPDES Dewatering and Surface Water Discharge Permit
		1/31/90	Telephone: NPDES Dewatering Permit
		5/15/90	Telephone: NPDES Dewatering Permit
		5/17/90	Telephone: NPDES Dewatering Permit
	Tammy Bradley	5/15/90	Telephone: NPDES Stormwater Discharge Permit
	Chris Thomas	12/18/89	Telephone: NPDES Stormwater Discharge Permit
		12/19/89	Telephone: NPDES Stormwater Discharge Permit
		4/12/90	Telephone: NPDES Stormwater Discharge Permit

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Lee County Mapping Department United States Geological Survey	______	4/23/90	Telephone: Topography Maps
	Henry La Rose	5/2/90	Telephone: USGS Wells
United States Environmental Protection Agency/ Region IV Atlanta	Lew Nagler	5/21/90	Telephone: Air Toxics Contact People at State Agencies in Region IV
North Carolina Division of Environmental Management	Kevin Eldridge Tom Allen	5/22/90	Telephone: North Carolina Toxic Air Pollutant Regulations and Applicability
South Carolina Department of Health and Environmental Control; Bureau of Air Quality Control	John Hursey	5/22/90	Telephone: South Carolina Toxic Air Pollutant Regulations (proposed) and Applicability
Kentucky Department of Environmental Protection; Division for Air Quality	Marjorie Mullen	5/22/90	Telephone: Kentucky Toxic Air Pollutant Regulations
Tennessee Division of Air Pollution Control; Department of Health and Environment	Ron Redus	5/22/90	Telephone: Tenessee Guidelines to Assess Air Toxics Ground-level Impacts

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Alabama Department of Environmental Management; Air Division	Bob Cowne	5/25/90	Telephone: Georgia Guidelines for Air Toxics Ground-level Concentrations and Proposed Regulations
Georgia Department of Natural Resources	Jean Drew	5/25/90	Telephone: Georgia Guidelines for Air Toxics Predicted Pollutant Impacts
Mississippi Department of Natural Resources; Bureau of Pollutant Control	Connie Simmons	5/29/90	Telephone: Mississippi Guidelines for Air Toxics Presicted Ground-level Effects
Florida Department of Environmental Regulation; Bureau of Air Monitoring and Assessment	Brian Kerckhoff	6/18/90	Telephone: Air Quality Monitoring Information
National Marine Fisheries Service Habitat Conservation	Mark Thompson	6/21/90	Telephone: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information
		6/21/90	Letter: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information

TABLE 9-1
(Continued)

Agency	Contact	Date	Subject
Department of Interior Fish and Wildlife Service	David Ferrell	6/21/90	Telephone: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information
		6/21/90	Letter: Request Marine Sanctuaries Estuarine Sanctuaries National Seashores Information

SECTION 10.0

REFERENCES

10.0 REFERENCES

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