



CALPINE
BLUE HERON
ENERGY CENTER

*Site Certification
Application*

*Volume 4
Chapter 10
Appendices 10.1.2 - 10.10*

Submitted by



Prepared by



October 2000

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DEC 05 2000

BUREAU OF AIR REGULATION

APPENDIX 10.1.2

**JOINT ENVIRONMENTAL RESOURCE PERMIT/
SECTION 404 APPLICATION/PLANS**

SECTION A

FOR AGENCY USE ONLY	
ACOE Application #	DEP/WMD Application #
Date Application Received	Date Application Received
Proposed Project Lat.	Fee Received \$
Proposed Project Long.	Fee Receipt #

PART 1:
Are any of the activities described in this application proposed to occur in, on, or over wetlands or other surface waters? yes no
Is this application being filed by or on behalf of a government entity or drainage district? yes no

A. Type of Environmental Resource Permit Requested (check at least one). See Attachment 2 for thresholds and descriptions.

- Noticed General - include information requested in Section B.
- Standard General (Single Family Dwelling) - include information requested in Sections C and D.
- Standard General (all other Standard General projects) - include information requested in Sections C and E.
- Individual (Single Family Dwelling) - include information requested in Sections C and D.
- Individual (all other Individual projects) - include information requested in Sections C and E.
- Conceptual - include information requested in Sections C and E.
- Mitigation Bank Permit (construction) - include information requested in Sections C and F. (If the proposed mitigation bank involves the construction of a surface water management system requiring another permit defined above, check the appropriate box and submit the information requested by the applicable section.)
- Mitigation Bank (conceptual) - include information requested in Sections C and F.

B. Type of activity for which you are applying (check at least one)

- Construction or operation of a new system, other than a solid waste facility, including dredging or filling in, on or over wetlands and other surface waters.
- Construction, expansion or modification of a solid waste facility.
- Alteration or operation of an existing system which was not previously permitted by a WMD or DEP.
- Modification of a system previously permitted by a WMD or DEP.
Provide previous permit numbers: _____
 - Alteration of a system
 - Abandonment of a system
 - Removal of a system
 - Extension of permit duration
 - Construction of additional phases of a system

C. Are you requesting authorization to use Sovereign Submerged Lands?
 yes no
(See Section G and Attachment 5 for more information before answering this question.)

D. For activities in, on, or over wetlands or other surface waters, check type of federal dredge and fill permit requested:

<input type="checkbox"/> Individual	<input type="checkbox"/> Programmatic General	<input checked="" type="checkbox"/> General
<input type="checkbox"/> Nationwide	<input type="checkbox"/> Not Applicable	

E. Are you claiming to qualify for an exemption? yes no
If yes, provide rule number if known. _____

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PART 3: A. OWNER(S) OF LAND	B. ENTITY TO RECEIVE PERMIT (IF OTHER THAN OWNER)
Name Mark Smidebush	Name Robert Alff
Title and Company Plant Manager, Ocean Spray Cranberries, Inc.	Title and Company Sr. Vice President, Calpine Construction Finance Company, L.P.
Address 925 74th Avenue, SW	Address The Pilot House, 2nd Floor, Lewis Wharf
City, State, Zip Vero Beach, FL 32968-9702	City, State, Zip Boston, MA 02110
Telephone and Fax 561/562-0800, ext. 176; 561/562-1215 (FAX)	Telephone and Fax 617/723-7200, ext. 303; 617/723-7635 (FAX)
C. AGENT AUTHORIZED TO SECURE PERMIT	D. CONSULTANT (IF DIFFERENT FROM AGENT)
Name Timothy Eves	Name Doreen Donovan
Title and Company Director-Business Development, Calpine	Title and Company Sr. Associate Scientist, ECT, Inc.
Address 4890 W. Kennedy Blvd., Suite 600	Address 5405 Cypress Center Drive, Suite 200
City, State, Zip Tampa, FL 33609	City, State, Zip Tampa, FL 33609
Telephone and Fax 813/637-3523; 813/637-3597 (FAX)	Telephone and Fax 813/289-9338; 813/289-9388 (FAX)

PART 4: (Please provide metric equivalent for federally funded projects):

- A. Name of Project, including phase if applicable: Blue Heron Energy Center
- B. Is this application for part of a multi-phase project?
 yes no
- C. Total applicant-owned area contiguous to the project?
50.5 ac.; _____ ha.
- D. Total area served by the system: 50.5 ac.; _____ ha.
- E. Impervious area for which a permit is sought: 19.9 ac.; _____ ha.
- F. Volume of water that the system is capable of impounding:
32.6 ac. ft.; _____ m
- G. What is the total area of work in, on, or over wetlands or other surface waters?
0.004 ac.; _____ ha. 179.7 sq. ft.; _____ sq. m.
- H. Total volume of material to be dredged: 29 cubic yd; _____ m
- I. Number of new boat slips proposed: N/A wet slips; _____ dry slips

PART 5:

Project location (use additional sheets if needed):

County(ies) Indian River

Section(s) 36

Township 33S

Range 38E (Site and construction
laydown area)

Section(s) 18, 19, 30, 31

Township 33S

Range 39E (Primary water pipeline
route)

Section(s)

Township

Range

Land Grant name, if applicable:

Tax Parcel Identification Number: _____

Street Address Road or other location: 74th Avenue

City, Zip Code, if applicable: _____

PART 6: Describe in general terms the proposed project, system, or activity.

The proposed project is a nominal 1,080 megawatt natural gas-fired power plant to be constructed on approximately 25.1 acres of the 50.5-acre site. No wetlands will be impacted by facility construction. Included in proposed development in addition to the generating facilities will be a storm water detention pond, gas regulating station, administration and warehouse buildings, water treatment facilities, and parking. A construction laydown area will be temporarily located north of the proposed plant site location. In addition to the generating facility and associated development, a natural gas pipeline and a cooling and plant process water pipeline are directly associated facilities to be certified in this PPSA proceeding. Certification of a gas pipeline corridor will be sought as part of this PPSA proceeding. A separate ERP application will be filed for this aspect of the project once the gas pipeline corridor is certified and a right of way within this corridor is selected. Cooling water and other plant process water will consist of excess water withdrawn from the Indian River Farms Water Control District canal system via a to-be-constructed pumping station and an approximately 3.5-mile water supply pipeline. This ERP addresses the approximately 0.004-acre impacts to canal bottoms and littoral vegetation due to construction of the pumping station. The conveyance pipeline will be constructed in upland right-of-ways and will not impact wetlands.

PART 7:

A. If there have been any pre-application meetings, including on-site meetings, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.

June 7,2000; Blue Heron Energy Center site; James Carr, FDEP; Informal Wetland Determination—ERP/File No. 31-270976-001

B. Please identify by number any MSSW/Wetland Resource/ERP/ACOE Permits pending, issued or denied for projects at the location, and any related enforcement actions.

Agency	Date	No.\Type of Application	Action Taken
<u>N/A</u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>

C. Note: The following information is required for projects proposed to occur in, on or over wetlands that need a federal dredge and fill permit or an authorization to use state owned submerged lands. Please provide the names, addresses and zip codes of property owners whose property directly adjoins the project (excluding application) and/or (for proprietary authorizations) is located within a 500 ft. radius of the applicant's land. Please attach a plan view showing the owner's names and adjoining property lines. Attach additional sheets if necessary.

- | | |
|----------------------|----|
| 1. | 2. |
| See Appendix 10.1.4. | |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |

PART 8:

A. By signing this application form, I am applying, or I am applying on behalf of the applicant, for the permit and any proprietary authorizations identified above, according to the supporting data and other incidental information filed with this application. I am familiar with the information contained in this application and represent that such information is true, complete and accurate. I understand this is an application and not a permit, and that work prior to approval is a violation. I understand that this application and any permit issued or proprietary authorization issued pursuant thereto, does not relive me of any obligation for obtaining any other required federal, state, water management district or local permit prior to commencement of construction. I agree, or I agree on behalf of the applicant, to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a responsible operation entity. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Timothy Eves

Typed/Printed Name of Applicant (If no Agent is used) or Agent (If one is so authorized below)

Timothy R. Eves

10/24/00

Signature of Applicant/Agent

Date

Director—Business Development
(Corporate Title if applicable)

AN AGENT MAY SIGN ABOVE ONLY IF THE APPLICANT COMPLETES THE FOLLOWING:

B. I hereby designate and authorize the agent listed above to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish, on request, supplemental information in support of the application. In addition, I authorize the above-listed agent to bind me, or my corporation, to perform any requirements which may be necessary to procure the permit or authorization indicated above. I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C. Section 1001.

Robert Alff

Typed/Printed Name of Applicant

Robert K. Alff

Signature of Applicant

10/23/00

Date

Senior Vice President

(Corporate Title if applicable)

Please note: The applicant's original signature (not a copy) is required above.

PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

C. I either own the property described in this application or I have legal authority to allow access to the property, and I consent, after receiving prior notification, to any site visit on the property by agents or personnel from the Department of Environmental Protection, the Water Management District and the U.S. Army Corps of Engineers necessary for the review and inspection of the proposed project specified in this application. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review and inspection. Further, I agree to provide entry to the project site for such agents or personnel to monitor permitted work if a permit is granted.

Typed/Printed Name of Applicant

Signature of Applicant

Date

OPTION AGREEMENT BETWEEN CALPINE AND OCEAN SPRAY CRANBERRIES FOR PURCHASE OF THE PROPERTY GRANTS CALPINE ACCESS TO THE PROPERTY AT ALL REASONABLE TIMES.

(Corporate Title if applicable)

SECTION C

Environmental Resource Permit Notice of Receipt of Application

Note: this form does not need to be submitted for noticed general permits.

This information is required in addition to that required in other sections of the application. Please submit five copies of this notice of receipt of application and all attachments with the other required information. Please submit all information on 8 1/2" x 11" paper.

Project Name Blue Heron Energy Center
County Indian River
Owner Ocean Spray Cranberries, Inc.
Applicant: Calpine Construction Finance Company, L.P.
Applicant's Address: Mr. Robert Alff, Sr. Vice President
 The Pilot House, 2nd Floor
 Lewis Wharf
 Boston, MA 02110

1. Indicate the project boundaries on a USGS quadrangle map. Attach a location map showing the boundary of the proposed activity. The map should also contain a north arrow and a graphic scale; show Section(s), Township(s), and Range(s); and must be of sufficient detail to allow a person unfamiliar with the site to find it.

See Figure 2.1.0-2 for the plant Site and laydown area and Figure 3.5.1-1 for the water supply pipeline route.

2. Provide the names of all wetlands, or other surface waters that would be dredged, filled, impounded, diverted, drained, or would receive discharge (either directly or indirectly), or would otherwise be impacted by the proposed activity, and specify if they are in an Outstanding Florida Water or Aquatic Preserve:

For the water supply pipeline, the surface water to be impacted by construction of an intake structure is a canal within the Indian River Farms Water Control District canal system.

3. Attach a depiction (plan and section views), which clearly shows the works or other facilities proposed to be constructed. Use multiple sheets, if necessary. Use a scale sufficient to show the location and type of works.

See attached, sealed Figures 1 and 2 for locational, plan, and section views of the intake structure to be constructed in the canal for the water supply pipeline.

4. Briefly describe the proposed project (such as "construct dock with boat shelter", "replace two existing culverts", "construct surface water management system to serve 150 acre residential development"):

The project will include one length of 20-inch-diameter pipeline to supply water to the generating facility. The water supply pipeline will be approximately 3.5 miles in length. The pipeline will require the construction of a pumping structure which will impact the edge of the canal.

5. Specify the acreage of wetlands or other surface waters, if any, that are proposed to be filled, excavated, or otherwise disturbed or impacted by the proposed activity:

Filled 0.004 ac.; excavated 0.004 ac.

6. Provide a brief statement describing any proposed mitigation for impacts to wetlands and other surface waters (attach additional sheets if necessary):

None proposed.

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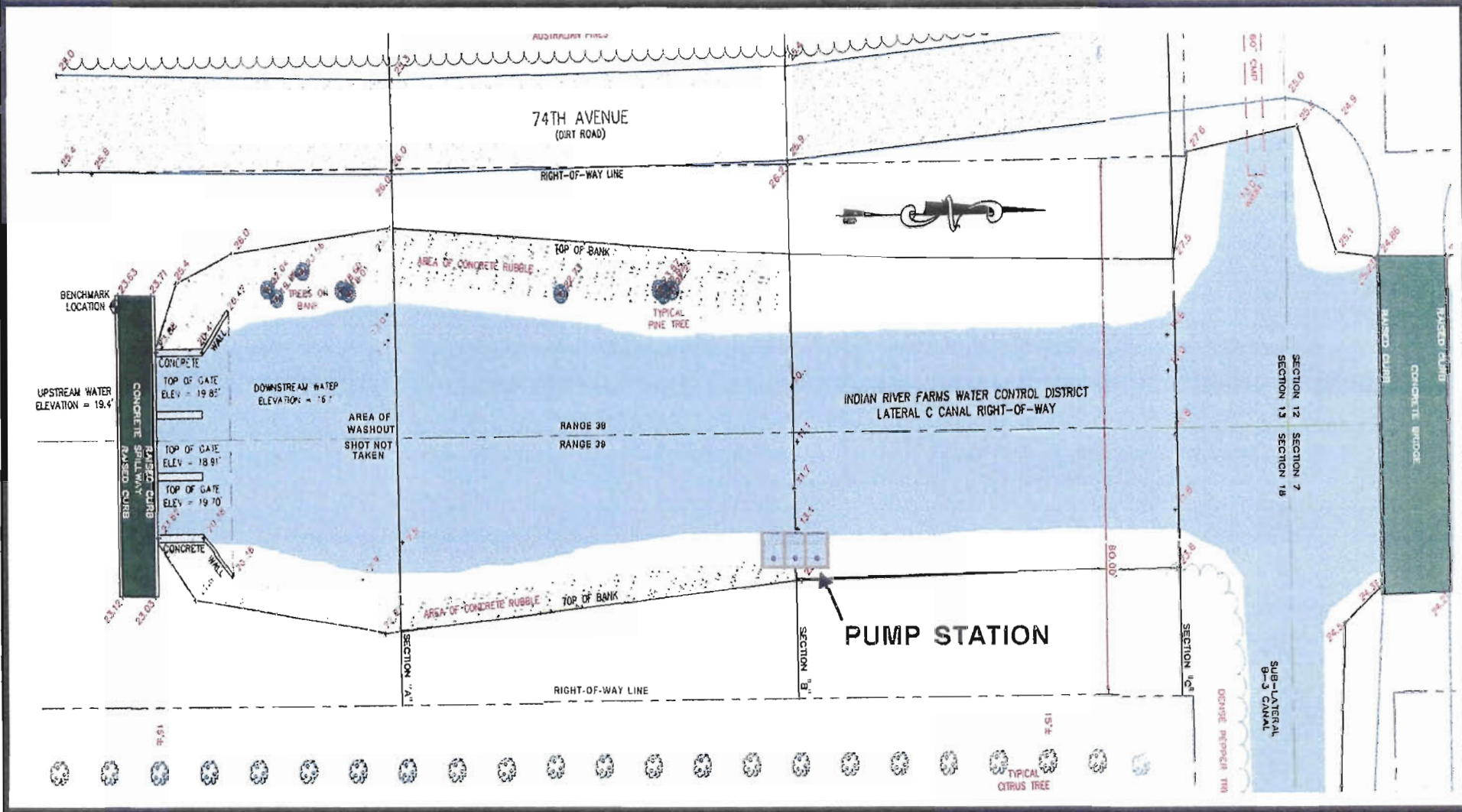
Application Name:
Application Number:
Office where the application can be inspected:

Note to Notice recipient: The information in this notice has been submitted by the applicant, and has not been verified by the agency. It may be incorrect, incomplete or may be subject to change.

Handwritten notes: Harold A. Frediani, Jr. 10/20/07

Harold A. Frediani, Jr. Florida P. E. Number 36394
Foster Wheeler Environmental Corporation
759 South Federal Highway - Suite 100 - Stuart, Florida 34994
Certificate of Authorization Number 7130

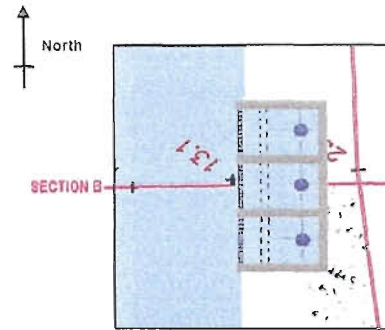
FIGURE 1. MAKEUP WATER PUMP STRUCTURE LOCATION



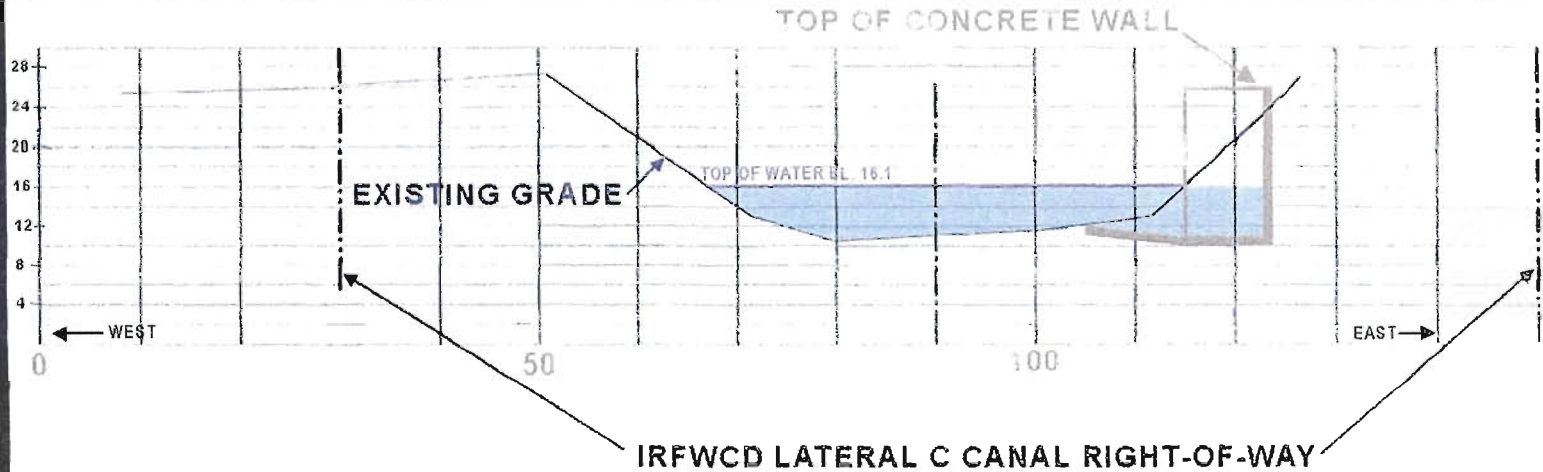
Harold A. Frediani, Jr. Florida P. E. Number 36394
Foster Wheeler Environmental Corporation
759 South Federal Highway - Suite 100 - Stuart, Florida 34994
Certificate of Authorization Number 7130

Harold A. Frediani, Jr.
10/22/00

FIGURE 2. MAKEUP WATER PUMP STATION CROSS SECTION



KEY PLAN



SECTION E

INFORMATION REQUESTED FOR STANDARD GENERAL, INDIVIDUAL AND CONCEPTUAL ENVIRONMENTAL RESOURCE PERMIT APPLICATIONS NOT RELATED TO A SINGLE FAMILY DWELLING UNIT

Please provide the information requested below if the proposed project requires either a standard general, individual, or conceptual approval environmental resource permit and is not related to an individual, single family dwelling unit, duplex or quadruplex. The information listed below represents the level of information that is usually required to evaluate an application. The level of information required for a specific project will vary depending on the nature and location of the site and the activity proposed. Conceptual approvals generally do not require the same level of detail as a construction permit. However, providing a greater level of detail will reduce the need to submit additional information at a later date. If an item does not apply to your project, proceed to the next item. Please submit all information that is required by the Department on either 8 1/2 in. X 11 in. paper or 11 in. X 17 in. paper. Larger drawings may be submitted to supplement but not replace these smaller drawings.

I. Site Information

- A. Provide a map(s) of the project area and vicinity delineating USDA/SCS soil types.
See Figure 2.3.1-11.
- B. Provide recent aerials, legible for photo interpretation with a scale of 1" = 400 ft, or more detailed, with project boundaries delineated on the aerial.
See Figure 2.3.5-2 for the plant site and Figure 6.3.2-1 for the water supply pipeline route.
- C. Identify the seasonal high water or mean high tide elevation and normal pool or mean low tide elevation for each on site wetland or surface water, including receiving waters into which runoff will be discharged. Include dates, datum, and methods used to determine these elevations.
For water supply pipeline, water level in the canal is maintained at 15.5 ft-NGVD for lower pool. The receiving water for the plant site runoff will be the canal-upper pool at 18.5 ft-NGVD.
- D. Identify the wet season high water tables at the locations representative of the entire project site. Include dates, datum, and methods used to determine these elevations.
At the plant site, wet season high water levels were surveyed for the two wetlands onsite. The northernmost wetland has a SHW at 22.9 ft-NGVD; the central wetland has a SHW at 23.6 ft-NGVD. These were determined using water marks, lichen lines, adventitious roots, etc. on vegetation and surveyed during an April 2000 site survey. A minimum 15-ft and an average of over 25-ft buffer will be preserved surrounding the two onsite wetlands.

II. Environmental Considerations

- A. Provide results of any wildlife surveys that have been conducted on the site, and provide any comments pertaining to the project from the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service.
See Section 2.3.6.1—Terrestrial Systems-Fauna.
- B. Provide a description of how water quantity, quality, hydroperiod, and habitat will be maintained in on-site wetlands and other surface waters that will be preserved or will remain undisturbed.
The major source of surface runoff to undisturbed wetlands is west of the portion of the Site to be developed. Therefore, effects on water relations in wetlands will be minimal.

C. Provide a narrative description of any proposed mitigation plans, including purpose, maintenance, monitoring, and construction sequence and techniques, and estimated costs.

None proposed; no wetland impacts will occur at the plant site; minor impacts (about 0.004 acre) will occur on a canal bank associated with construction of water intake pumping structure.

D. Describe how boundaries of wetlands or other surface waters were determined. If there has ever been a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination, or a revalidated jurisdictional determination, provide the identifying number.

Federally regulated wetland and surface waters boundaries were determined using methodologies defined in the 1987 Corps of Engineers Wetlands Delineation Manual. State of Florida regulated wetlands and surface waters were identified and delineated as per methodologies outlined in Chapter 62-340, FAC.

E. Impact Summary Tables:

1. For all projects, complete Tables 1, 2 and 3 as applicable. **Table 1 is applicable.**

2. For docking facilities or other structures constructed over wetlands or other surface waters, provide the information requested in Table 4.

3. For shoreline stabilization projects, provide the information requested in Table 5.

III. Plans

Provide clear, detailed plans for the system including specifications, plan (overhead) views, cross sections (with the locations of the cross sections shown on the corresponding plan view), and profile (longitudinal) views of the proposed project. The plans must be signed and sealed by an appropriate registered professional as required by law. Plans must include a scale and a north arrow. These plans should show the following:

A. Project area boundary and total land area, including distances and orientation from roads or other land marks. **See Figures 2.1.0-2 and 2.3.5-1.**

B. Existing land use and land cover (acreage and percentages), and on-site natural communities, including wetlands and other surface waters, aquatic communities, and uplands. Use the Florida Land Use Cover & Classification System (FLUCCS)(Level 3) for projects proposed in the South Florida Water Management District, the St. Johns River Water Management District, and the Suwannee River Water Management District and use the National Wetlands Inventory (NWI) for projects proposed in the Southwest Florida Water Management District. Also identify each community with a unique identification number which must be consistent in all exhibits. **See Figures 2.3.5-2 and 2.3.5-3.**

C. The existing topography extending at least 100 feet off the project area, and including adjacent wetlands and other surface waters. All topography shall include the location and a description of known benchmarks, referenced to NGVD. For systems waterward of the mean high water (MHW) or seasonal high water lines, show water depths, referenced to mean low water (MLW) in tidal areas or seasonal low water in non-tidal areas, and list the range between MHW and MLW. For docking facilities, indicate the distance to, location of, and depths of the nearest navigational channel and access routes to the channel. **See Appendix 10.5-Monitoring Programs, 0.1 ft. contour map.**

D. If the project is in the known flood plain of a stream or other water course, identify the following: 1) the flood plain boundary and approximate flooding elevations; and 2) the 100-year flood elevation and floodplain boundary of any lake, stream or other watercourse located on or adjacent to the site. **See Figure 2.1.0-5.**

E. The boundaries of wetlands and other surface waters within the project area. Distinguish those wetlands and other surface waters that have been delineated by any binding jurisdictional determination. **See Figure 2.3.5-2, FLUCFCS categories 617 and 641. Informal FDEP jurisdictional done June 7, 2000.**

F. Proposed land use, land cover and natural communities (acreage and percentages), including wetlands and other surface waters, undisturbed uplands, aquatic communities, impervious surfaces, and water management areas. Use the same classification system and community identification number used in III (B) above. **See Figure 4.4.1-1.**

G. Proposed impacts to wetlands and other surface waters, and any proposed connections/outfalls to other surface waters or wetlands. **No impacts to wetlands on the plant site; see Section 6.3.7.2 for proposed water supply pipeline impacts to a canal (about 0.004 acre).**

H. Proposed buffer zones. **Buffers to onsite wetlands will range from a minimum of 15 ft with an average of at least 25 ft in width.**

I. Pre- and post-development drainage patterns and basin boundaries showing the direction of flows, including any off-site runoff being routed through or around the system; and connections between wetlands and other surface waters. **See Appendix 10.1.3, Storm Water Management Plan.**

J. Location of all water management areas with details of size, side slopes, and designed water depths. **See Appendix 10.1.3.**

K. Location and details of all water control structures, control elevations, any seasonal water level regulation schedules; and the location and description of benchmarks (minimum of one benchmark per structure). **See Appendix 10.1.3.**

L. Location, dimensions and elevations of all proposed structures, including docks, seawalls, utility lines, roads, and buildings. **See Appendix 10.1.3.**

M. Location, size, and design capacity of the internal water management facilities. **See Appendix 10.1.3.**

N. Rights-of-way and easements for the system, including all on-site and off-site areas to be reserved for water management purposes, and rights-of-way and easements for the existing drainage system, if any. **See Appendix 10.1.3.**

O. Receiving waters or surface water management systems into which runoff from the developed site will be discharged. **See Appendix 10.1.3.**

Location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all permanent control measures to be implemented in post-development conditions. **See Appendix 10.1.3.**

Q. Location, grading, design water levels, and planting details of all mitigation areas. **See Appendix 10.1.3.**

R. Site grading details, including perimeter site grading. **See Appendix 10.1.3.**

S. Disposal site for any excavated material, including temporary and permanent disposal sites. **See Appendix 10.1.3.**

T. Dewatering plan details. **See Appendix 10.1.3.**

U. For marina facilities, locations of any sewage pumpout facilities, fueling facilities, boat repair and maintenance facilities, and fish cleaning stations. **N/A**

V. Location and description of any nearby existing offsite features which might be affected by the proposed construction or development such as stormwater management ponds, buildings or other structures, wetlands or other surface waters. **N/A**

W. For phased projects, provide a master development plan. **N/A**

IV. Construction Schedule and Techniques

Provide a construction schedule, and a description of construction techniques, sequencing and equipment. This information should specifically include the following:

A. Method for installing any pilings or seawall slabs. N/A

B. Schedule of implementation of temporary or permanent erosion and turbidity control measures.

Construction is scheduled to begin no later than January 2002.

C. For projects that involve dredging or excavation in wetlands or other surface waters, describe the method of excavation, and the type of material to be excavated. **Excavation activities for the pumping structure will be primarily accomplished by backhoe equipment.**

D. For projects that involve fill in wetlands or other surface waters, describe the source and type of fill material to be used. For shoreline stabilization projects that involve the installation of riprap, state how these materials are to be placed, (i.e., individually or with heavy equipment) and whether the rocks will be underlain with filter cloth. **Concrete to be used for side walls and pumphouse, to be constructed in the canal.**

E. If dewatering is required, detail the dewatering proposal including the methods that are proposed to contain the discharge, methods of isolating dewatering areas, and indicate the period dewatering structures will be in place (Note: a consumptive use or water use permit may be required). N/A

F. Methods for transporting equipment and materials to and from the work site. If barges are required for access, provide the low water depths and draft of the fully loaded barge. **Local roads.**

G. Demolition plan for any existing structures to be removed. N/A

H. Identify the schedule and party responsible for completing monitoring, record drawings, and as-built certifications for the project when completed. **To be determined.**

V. Drainage Information (See Appendix 10.1.3, Surface Water Management Plan)

A. Provide pre-development and post-development drainage calculations, signed and sealed by an appropriate registered professional, as follows:

1. Runoff characteristics, including area, runoff curve number or runoff coefficient, and time of concentration for each drainage basin;

2. Water table elevations (normal and seasonal high) including aerial extent and magnitude of any proposed water table draw down;

3. Receiving water elevations (normal, wet season, design storm);

4. Design storms used including rainfall depth, duration, frequency, and distribution;

5. Runoff hydrograph(s) for each drainage basin, for all required design storm event(s);

6. Stage-storage computations for any area such as a reservoir, close basin, detention area, or channel, used in storage routing;

7. Stage-discharge computations for any storage areas at a selected control point, such as control structure or natural restriction;

8. Flood routings through on-site conveyance and storage areas;

9. Water surface profiles in the primary drainage system for each required design storm event(s);

10. Runoff peak rates and volumes discharged from the system for each required design storm event(s);
 11. Tail water history and justification (time and elevation); and
 12. Pump specifications and operating curves for range of possible operating conditions (if used in system).
- B. Provide the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions;
- C. Provide the acreage, and percentages of the total project, of the following:
1. Impervious surfaces, excluding wetlands;
 2. Pervious surfaces (green areas, not including wetlands);
 3. Lakes, canals, retention areas, other open water areas; and
 4. Wetlands.
- D. Provide an engineering analysis of floodplain storage and conveyance (if applicable), including:
1. Hydraulic calculations for all proposed traversing works;
 2. Backwater water surface profiles showing upstream impact of traversing works;
 3. Location and volume of encroachment within regulated floodplain(s); and
 4. Plan for compensating floodplain storage, if necessary, and calculations required for determining minimum building and road flood elevations.
- E. Provide an analysis of the water quality treatment system including:
1. A description of the proposed stormwater treatment methodology that addresses the type of treatment, pollution abatement volumes, and recovery analysis; and
 2. Construction plans and calculations that address stage-storage and design elevations, which demonstrate compliance with the appropriate water quality treatment criteria.
- F. Provide a description of the engineering methodology, assumptions and references for the parameters listed above, and a copy of all such computations, engineering plans, and specifications used to analyze the system. If a computer program is used for the analysis, provide the name of the program, a description of the program, input and output data, two diskette copies, if available, and justification for model selection.

VI. Operation and Maintenance and Legal Documentation

A. Describe the overall maintenance and operation schedule for the proposed system. **The proposed SWM system is a gravity system that does not require an operation schedule. Maintenance of the SWM facilities (ponds, banks, swales, inlets, culverts) will be provided regularly as needed.**

B. Identify the entity that will be responsible for operating and maintaining the system in perpetuity if different than the permittee, a draft document enumerating the enforceable affirmative obligations on the entity to properly operate and maintain the system for its expected life, and documentation of the entity's financial responsibility for long-term maintenance. If the proposed operation and maintenance entity is not a property owner's association, provide proof of the existence of an entity, or the future acceptance of the system by an entity which will operate and maintain the system. If a property owner's association is the proposed operation and maintenance entity, provide copies of the articles of incorporation for the association and copies of the declaration, restrictive covenants, deed restrictions, or other

operational documents that assign responsibility for the operation and maintenance of the system. Provide information ensuring the continued adequate access to the system for maintenance purposes. Before transfer of the system to the operating entity will be approved, the permittee must document that the transferee will be bound by all terms and conditions of the permit. **The permittee will be responsible for the operation and maintenance of the SWM system in accordance with the criteria set forth by the water management district.**

C. Provide copies of all proposed conservation easements, storm water management system easements, property owner's association documents, and plats for the property containing the proposed system. **NA.**

D. Provide indication of how water and waste water service will be supplied. Letters of commitment from off-site suppliers must be included. **Water and wastewater service will be provided by Indian River County Utilities. Letters of commitment are forthcoming.**

E. Provide a copy of the boundary survey and/or legal description and acreage of the total land area of contiguous property owned/controlled by the applicant. **Please see Appendix 10.10.**

VII. Water Use

- A. Will the surface water system be used for water supply, including landscape irrigation, or recreation.
N/A.
- B. If a Consumptive Use or Water Use permit has been issued for the project, state the permit number.
N/A.
- C. If no Consumptive Use or Water Use permit has been issued for the project, indicate if such a permit will be required and when the application for a permit will be submitted.
Consumptive use permit will be required. The application is included in Appendix 10.1.4.
- D. Indicate how any existing wells located within the project site will be utilized or abandoned.
Existing monitoring wells will be abandoned in accordance with SJRWMD requirements.

TABLE I
Project Impact Summary

WL & SW ID	WL & SW TYPE	WL & SW SIZE (ac.) ON SITE	WL & SW ACRES NOT IMPACTED	PERMANENT IMPACTS TO WL & SW		TEMPORARY IMPACTS TO WL & SW		MITIGATION ID
				IMPACT SIZE (acres)	IMPACT CODE	IMPACT SIZE (acres)	IMPACT CODE	
641	Marsh	0.7	0.7	None	N/A	0	N/A	
617	Forested wetland	3.5	3.5	None	N/A	0	N/A	
Lateral C Canal	Canal	*	N/A	0.004	F	N/A	N/A	

WL = Wetland; SW = Surface water, ID = Identification number, letter, etc.

Wetland Type: Use an established wetland classification system and, in the comments section below, indicate which classification system is being used.

Impact Code (Type): D = dredge; F = fill; H = change hydrology; S = shading; C = clearing; O = other. Indicate the final impact if more than one impact type is proposed in a given area. For example, show F only for an area that will first be demucked and then backfilled.

Note: Multiple entries per cell are not allowed, except in the "Mitigation ID" column. Any given acreage of wetland should be listed in one row only, such that the total of all rows equals the project total for a given category (column). For example, if Wetland No. 1 includes multiple wetland types and multiple impact codes are proposed in each type, then each proposed impact in each wetland type should be shown on a separate row, while the size of each wetland type found in Wetland No. 1 should be listed in only one row.

Comments: *Canal not onsite; see Figure 6.3.1-1 for intake location and Section 6.3 for description.

TABLE 2
ON-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
PROJECT TOTALS:												

CODES (multiple entries per cell not allowed): Target Type or Type = target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

COMMENTS:

TABLE 3
OFF-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
PROJECT TOTALS:												

CODES (multiple entries per cell not allowed):
 Target Type=target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

TABLE 4
DOCKING FACILITY SUMMARY

Type of Structure*	Type of Work**	Number of Identical Docks	Length (feet)	Width (feet)	Height (feet)	Total square feet over water	Number of slips	
*Dock, Pier, Finger Pier, or other structure (please specify what type) **New, Replaced, Existing (unaltered), Removed, or Altered/Modified					TOTALS:		Existing	Proposed
					Number of Slips			
					Square Feet over the water			

Use of Structure:

Will the docking facility provide:

- Live-aboard Slips? If yes, Number:
- Fueling Facilities? If yes, Number
- Sewage Pump-out Facilities? If yes, Number:
- Other Supplies or Services Required for Boating (excluding refreshments, bait and tackle)
- Yes No

Type of Materials for Decking and Pilings (i.e., CCA, pressure treated wood, plastic, or concrete)

- Pilings
- Decking
- Proposed Dock-Plank Spacing (if applicable)

Proposed Size (length and draft), Type, and Number of Boats Expected to Use or Proposed to be Mooring at the facility)

Table 5: SHORELINE STABILIZATION
IF YOU ARE CONSTRUCTING A SHORELINE STABILIZATION PROJECT, PLEASE PROVIDE THE
FOLLOWING:

Type of Stabilization Being Done	Length (in feet) of New	Length (in feet) of Replaced	Length (in feet) of Repaired	Length (in feet) of Removed	Slope: H: V:	Width of the Toe (in feet)
Vertical Seawall						
Seawall plus Rip-Rap						
Rip-Rap						
Rip-Rap plus Vegetation						
Other Type of Stabilization Being Done:						

Size of the Rip Rap: _____

Type of Rip Rap: _____

COMMENTS:

APPENDIX 10.1.3

STORM WATER MANAGEMENT PLAN

STORM WATER MANAGEMENT PLAN

**BLUE HERON ENERGY CENTER
INDIAN RIVER COUNTY, FLORIDA**

Prepared for:



CALPINE
BLUE HERON
ENERGY CENTER

CALPINE CONSTRUCTION FINANCE COMPANY, L.P.
Boston, Massachusetts

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

*3701 Northwest 98th Street
Gainesville, Florida 32606*

ECT No. 000105-0200

October 2000



Environmental Consulting & Technology, Inc.

**Professional Engineer Statement
for Blue Heron Energy Center Site Certification Application**

I, the undersigned, hereby certify that to the best of my knowledge, there is reasonable assurance that the stormwater management system that will serve the Blue Heron Energy Center has been designed in accordance with and meets the criteria set forth by Indian River County, the Indian River Farms Water Control District and the St. Johns River Water Management District.

Juan A. Chan

Juan A. Chan

Florida Professional Engineer Registration No. 48102
Environmental Consulting & Technology, Inc.
8651 Commodity Circle
Orlando, FL 32819

10/3/2006

Date

(Seal)

8651 Commodity Circle
Orlando, FL
32819

(407)
903-0005

Fax (407)
903-0030

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REFERENCES

LIST OF FIGURES

- Figure 1 BHEC Site Plan (SC 301)
- Figure 2 Topographic Map/Survey Drawing
- Figure 3 BHEC Grading and Drainage Plan (SC 304)
- Figure 4 BHEC Site Section and Details (SC 308)
- Figure 5 BHEC Sediment and Erosion Control Plan (SC 309)
- Figure 6 BHEC Sediment and Erosion Control Plan
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- Figure 7 BHEC Sediment and Erosion Control Plan
Detail Sheet 2 (SC 311)
- Figure 8 Construction Laydown Area Drainage Plan

ATTACHMENT—STORM WATER MANAGEMENT CALCULATIONS

1.0 INTRODUCTION

This Storm Water Management Plan (SWMP) describes measures that will be implemented to control storm water runoff on the site of the Blue Heron Energy Center (BHEC) located in Indian River County, Florida. The SWMP includes storm water control measures that will be used during the construction and operation phases of the project.

1.1 PROJECT DESCRIPTION

The BHEC will be a natural gas-fired, combined cycle electric generating facility with a nominal operating capacity of 1,080 megawatts. The plant will be constructed on a 50.5-acre Site located in southern Indian River County, east of Interstate 95 (I-95), just north of the St. Lucie County line (See Figure 1). The Project Site is located within the Indian River Farms Water Control District (IRFWCD), a local drainage district under the jurisdiction of the St. Johns River Water Management District (SJRWMD).

1.2 SITE DESCRIPTION

The BHEC Site consists of 50.5 acres of wooded undeveloped land, inhabited with pine and palmetto scrub (See Figure 2). It is bounded on the west by I-95, the north by the IRFWCD Sublateral C-7 Canal, the west by 74th Avenue/Lateral C Canal, and the south by the County Line canal. The Site is relatively flat, with changes in general grade of less than 1 foot (ft) throughout the project area, ranging in elevation from 23 to 24 feet above the national geodetic vertical datum (ft-NGVD), 1929. There are two isolated wetlands onsite (classified as Class III surface waters). The wetland on the northwest corner of the Site is approximately 3.5 acres and may be hydraulically connected to Sublateral C-7 Canal along the Site's northern boundary during storm events in excess of the 25-year storm. The wetland near the center of the property is approximately 0.7-acre and is not connected hydraulically to any surface water body. Typically, the wetlands have standing water during the wet season and may become dry during the dry season. The northern part of the Site drains towards Sublateral C-7 Canal along the northern boundary. The southern part of the Site drains towards the eastern boundary, along 74th Avenue/Lateral

C Canal. Excess runoff is conveyed to the adjacent lateral canals via overland flow. According to Flood Insurance Rate Map Panel No. 1201190165-E, dated May 4, 1989, the Site is located within Zone X, classified as an area determined to be outside the 500-year flood plain. Offsite drainage is limited to minor contributions from part of the undeveloped roadway along the eastern perimeter (74th Avenue) and I-95 right-of-way green areas.

Based on the U.S. Department of Agriculture Soil Survey of Indian River County, the predominant soils on the Site are Oldsmar, Pineda, EauGallie, and Wabasso fine sands. These soils are poorly drained and nearly level, with slow to moderate permeability rates. The water table varies approximately 10 to 40 inches below existing grade during the wet and dry seasons, respectively.

The storm water runoff from the BHEC Site will be controlled by structures and procedures described in this SWMP and in the Environmental Resource Permit Application (see Appendix 10.1.2) for the BHEC Project.

2.0 DESIGN CRITERIA

Storm water control measures used on the BHEC Site are designed to comply with requirements of all applicable local, state, and federal regulations. Storm water runoff calculations, runoff volumes, peak discharges, and control structures were determined or designed using methods presented by the SRJWMD in the *Applicant's Handbook, Regulation of Storm Water Management Systems* (1995), the *Applicant's Handbook, Management and Storage of Surface Waters* (1996), and the criteria set forth by Indian River County and the IRFWCD. The design of the system is summarized in Section 3.8 of the Site Certification Application (SCA).

2.1 SITE GRADING

The Site will be filled and graded to provide a level surface for construction of structures and associated facilities, including roadways, parking areas, storm water detention basin(s), and conveyances, etc. The grading will provide positive drainage for all buildings, structures and working areas. Site drainage will be accomplished by gravity flow, utilizing a surface drainage system consisting of mild surface slopes (minimum slopes will vary from approximately 1 to 2 percent adjacent to buildings to 0.3 percent on other open areas), drainage ditches, swales, and culverts. Ground floors of all habitable buildings will be set at elevation 26.0 ft-NGVD or above.

2.2 ROADS AND PARKING AREAS

A roadway system will provide access to various portions of the Site. These will include permanent, paved roads, or driveways with minimum 20-ft-wide, asphalt-paved surfaces and minimum 12-ft-wide, aggregate-paved roads or drives. During the construction phase, all roadways will be surfaced with aggregate.

A parking area surfaced with asphalt pavement will be provided adjacent to the administration building. Other aggregate-surfaced parking areas will be provided at different locations on the Site during both construction and permanent operation phases.

Based on the current Site layout, approximately 4.57 acres (199,069 square feet [ft²]) of impervious area associated with roads and parking will be constructed. All impervious areas will be sloped to avoid ponding of storm water and to direct storm water into the Site surface drainage system, through which storm water will travel to the Site detention pond for collection and treatment as described below.

2.3 OTHER PERVIOUS AND IMPERVIOUS AREAS

Of the total 50.5-acre Site, the total project impervious area encompasses 19.9 acres (2,200,648 ft²). In addition to the 4.57 acres of roads and parking, there will be approximately 7.6 acres (331,056 ft²) of gravel/crushed stone area and 7.73 acres (336,719 ft²) of impervious area associated with buildings, slabs, and other structures. The remaining Project Site area includes 21.3 acres (927,828 ft²) of pervious (grassed, landscaped natural) area, 4.1 acres (178,596 ft²) of wetlands, and a 5.2-acre (226,512 ft²) detention pond.

2.4 DRAINAGE DITCHES AND SWALES

Drainage ditches (concrete lined) and swales (grassed) will be designed to convey the 25-year, 24-hour peak storm runoff flows from the portions of the Site they serve. Side slopes will be three horizontal to one vertical, while ditch bottom slopes in the direction of flow will range from 0.2 to 0.5 percent, depending on location on the Site. Ditch or swale angles will be provided with appropriate erosion control measures to protect against erosion of bank surfaces during high storm water flow.

The swale (grassed) system will be designed to place the swale bottom above the normal ground water elevation, where possible, to ensure that runoff from small rainfall events can be detained within the drainage system and allowed to percolate into the soil.

2.5 CULVERTS

Drainage culverts will be installed at road crossings and embankments. Culverts will be constructed using reinforced concrete or high-density polyethylene pipe or equivalent. All drainage culverts that convey storm water under roadways on the Site will be designed to accommodate the 25-year, 24-hour storm water flows without development of a

headwater elevation that would exceed the elevation of the roadway base course. A culvert to convey runoff from the Site under 74th Avenue will be designed to pass the peak flow of the 50-year, 24-hour storm from the onsite detention pond. All culverts will be designed to support AASHTO HS20 and construction equipment traffic loads.

2.6 DETENTION POND

A Site storm water pond will be designed as a triangular-shaped wet detention basin with a surface area of 5.2 acres at elevation 24 ft-NGVD (approximate finished grade around the pond). This detention basin will be located in the southern part of the power plant Site, at which point it can receive runoff conveyed by a drainage ditch/swale system as described above (see Figure 3).

The detention pond will be excavated to have a permanent pool volume to provide at least a 21-day residence time during the wet season (June through October) to assure adequate treatment of storm water runoff. This residence time is 50 percent greater than the normal 14-day residence time due to the non-littoral zone option chosen for the pond design. Under normal conditions, the permanent pool elevation (normal water elevation or control elevation) of the detention pond will be at approximately 21.0 ft-NGVD, based on the *in-situ* soils and water table elevations in the area. The permanent pool volume at the normal water elevation is approximately 17.66 acre-feet. A 3.5-inch-diameter orifice located in the detention pond discharge structure will maintain the permanent pool at the control elevation.

In addition to the detention pond, the drainage ditch/swale system that will convey runoff to the wet detention pond will provide additional detention volume and percolation for runoff from small storms, and will augment the 25-year, 24-hour design storm capacity of the detention pond.

The wet detention pond has been designed to provide water quality treatment in excess of 4.21 acre-feet of storm water runoff. This treatment volume is based on the greater of 1.0 inch of runoff from the developed Site or 2.5 inches of runoff from the developed im-

pervious area. The detention pond outfall structure has been designed to release the detained volume at a rate such that 50 percent of the detained volume will be released from the pond during the first 48 to 60 hours following the rainfall event. The first 20.4 inches of detention basin storage above the 21.0 ft-NGVD permanent pool elevation will provide the design treatment volume.

For the 25-year, 24-hour storm event, the detention pond will function as a detention system to control runoff from the Site such that maximum runoff rate does not exceed the 26.5 cubic feet per second (cfs) flow experienced under predevelopment conditions. In addition, as required by the IRFWCD, the offsite discharge is limited to less than 2 inches over the Project Site during the 25-year, 24-hour storm, which equals 8.42 acre-feet. For storm events in which the runoff exceeds the treatment volume and IRFWCD maximum discharge volume, (i.e., when the detention basin water surface elevation exceeds 22.7 ft-NGVD) water will begin to flow over a 6.6-ft-long weir in the discharge structure and the outfall culvert will convey the runoff under 74th Avenue to Lateral C Canal, the receiving body.

During construction, the southern portion of the storm water detention pond will serve as a sedimentation basin to prevent transport of eroded sediment off the Site. The detention basin will be constructed to allow use of sediment removal equipment to maintain the working volume of the detention pond, especially during and immediately after the construction phase of the Project. A mosquito control program will be implemented throughout the construction phase and operational life of the Project.

Supporting calculations for the wet detention pond system are found in the Attachment to this plan.

2.7 EROSION CONTROL

During construction, Site erosion will be controlled by maintaining finished surface slopes to approximately 0.5 to 1.0 percent at all locations not otherwise configured to accommodate specific facility construction activity. Silt fencing and straw bale barriers will

be utilized to control transport of sediment into drainage ditches. Drainage ditches and swales will be designed to convey the 25-year, 24-hour storm runoff flows at velocities that will avoid erosion of ditch or swale surfaces. All ditch bottoms and side slopes will be stabilized to protect against erosion using grassing and/or fabric erosion control matting, as required. Erosion control measures will be placed at all culvert outlets to limit erosion at those locations. Please refer to Figures 5, 6, and 7 for erosion and sediment control details.

3.0 STORM WATER MANAGEMENT PLAN AND PRACTICES

Figure 3, the BHEC Drainage and Grading Plan, reflects the Site layout, general arrangement of equipment and facilities, arrangement and locations of storm water runoff control structures, locations of storm water runoff outfall structures, and offsite storm water runoff receiving areas. Control practices for storm water during both construction and operational periods are described below.

3.1 CONSTRUCTION PHASE STORM WATER CONTROL MEASURES AND PRACTICES

During construction of the BHEC, a combination of silt fencing, straw bale sediment barriers and the storm water detention basin will be used to control erosion on the Site and to reduce the potential for transport of eroded sediment offsite. (see Figure 5 for the erosion control practices to be implemented during construction). All grading will be accomplished in phases, with each graded area seeded after construction of the BHEC is complete to reduce potential for surface erosion.

A portion of the storm water detention basin will be constructed in the initial phase of Site preparation to serve as a sedimentation basin. Subsequently, the drainage ditch system will be constructed to convey storm water to the detention/sedimentation basin to remove suspended matter from runoff.

Movement of sediment off of graded areas will initially be controlled by use of silt fences that will provide continuous silt barriers on the downgradient sides of all actively graded areas. Interception of runoff by drainage ditches established early in the construction phase will allow removal of sediment by straw bale fences, with subsequent conveyance of runoff to the storm water detention pond.

Although Site dewatering flows are expected to be minimal, they will also be routed through the drainage ditch system to the detention pond for treatment before offsite discharge. A silt fence/straw bale barrier will be used for initial removal of sediment from

dewatering flows as they enter the drainage ditch system to minimize sedimentation impacts on detention pond storage volume during construction. Available capacity of the detention pond will be monitored during dewatering activity to assure that adequate capacity remains available to provide detention for the 25-year, 24-hour design storm event. Sediment collected in ditches, secondary detention/sedimentation basins, and the primary detention pond will be monitored and removed periodically as needed to maintain ditch and basin capacity. Sediment removed from these facilities will be disposed onsite for landscaping applications.

3.2 OPERATING PHASE STORM WATER CONTROL MEASURES AND PRACTICES

The BHEC drainage swale/ditch system will be constructed to entirely intercept runoff from the developed Site area under design storm conditions and convey it to the storm water detention pond at the southern part of the Site. Storm water runoff will travel by gravity flow through the drainage ditch/swale system to the detention pond. To minimize runoff from loading and materials storage areas, appropriate containment features such as earth berms will be provided. Runoff from oil and fuel storage areas will be collected for treatment by an onsite oil/water separator before being discharged to the SWM system.

The detention pond has been sized to retain and treat the runoff volume that results from 1.0 inch of runoff from the Site area. In addition, the pond will to serve as a detention basin to control the rate of runoff from the 25-year, 24-hour storm event in accordance with design requirements of the SJRWMD and the IRFWCD.

4.0 CONSTRUCTION LAYDOWN AREA

As described in Section 4.1 of this SCA, a temporary construction laydown area approximately 30 acres in size is located 500 ft north of the Project Site along 74th Avenue. The area currently consists of an abandoned citrus grove with scattered trees remaining and previously cleared trees collected in wood waste piles. Shallow drainage ditches running east-west currently direct excess storm runoff into a main ditch running north-south that eventually discharges into the IRFWCD canal system.

The construction laydown area will be cleared of all vegetation, graded for proper drainage, and covered with gravel or crushed shell base material. A storm water management system meeting the criteria set forth by SJRWMD, IRFWCD, and the county will be constructed and will remain in place after construction activities cease.

The proposed storm water management system for the area consists of a storm water pond designed as a rectangular-shaped wet detention basin with a surface area of 2.7 acres at elevation 24 ft-NGVD (approximate finished grade around the pond). This detention basin will be located in the northwestern part of the laydown area, at which point it can receive runoff conveyed by overland flow (see Figure 8).

The detention pond will be excavated to have a permanent pool volume to provide at least a 21-day residence time during the wet season (June through October) to assure adequate treatment of storm water runoff. This residence time is 50 percent greater than the normal 14-day residence time due to the non-littoral zone option chosen for the pond design. Under normal conditions, the permanent pool elevation (normal water elevation or control elevation) of the detention pond will be at approximately 21.0 ft-NGVD, based on the *in-situ* soils and water table elevations in the area. The permanent pool volume at the normal water elevation is approximately 4.28 acre-feet. A 2.8-inch-diameter orifice located in the detention pond discharge structure will maintain the permanent pool at the control elevation.

The wet detention pond has been designed to provide water quality treatment equal to 2.78 acre-feet of storm water runoff. This treatment volume is based on 1.0 inch of runoff from the gravel area assuming 50 percent imperviousness (as discussed with SJRWMD staff). The detention pond outfall structure has been designed to release the detained volume at a rate such that 50 percent of the detained volume will be released from the pond during the first 48 to 60 hours following the rainfall event. The first 24 inches of detention basin storage above the 21.0 ft-NGVD permanent pool elevation will provide the design treatment volume.

For the 25-year, 24-hour storm event, the detention pond will function as a detention system to control runoff from the Site such that maximum runoff rate does not exceed the 17.51 cfs flow experienced under predevelopment conditions. In addition, as required by the IRFWCD, the offsite discharge is limited to less than 2 inches over the Project Site during the 25-year, 24-hour storm, which equals 5.0 acre-feet. For storm events in which the runoff exceeds the treatment volume and IRFWCD maximum discharge volume, (i.e., when the detention basin water surface elevation exceeds 23.0 ft-NGVD) water will begin to flow over a 10.2-ft-long weir in the discharge structure and the outfall culvert will convey the runoff to the existing north-south ditch that eventually discharges into the IRFWCD canal system.

During construction, the northern portion of the storm water detention pond will serve as a sedimentation basin to prevent transport of eroded sediment off the Site. The detention basin will be constructed to allow use of sediment removal equipment to maintain the working volume of the detention pond, especially during and immediately after the construction phase of the project. A mosquito control program will be implemented throughout the construction phase of the project.

Supporting calculations for the wet detention pond system are found in the Attachment to this plan.

REFERENCES

St. Johns River Water Management District (SJRWMD). 1995. Applicant's Handbook: Regulation of Storm Water Management Systems. Palatka, Florida.

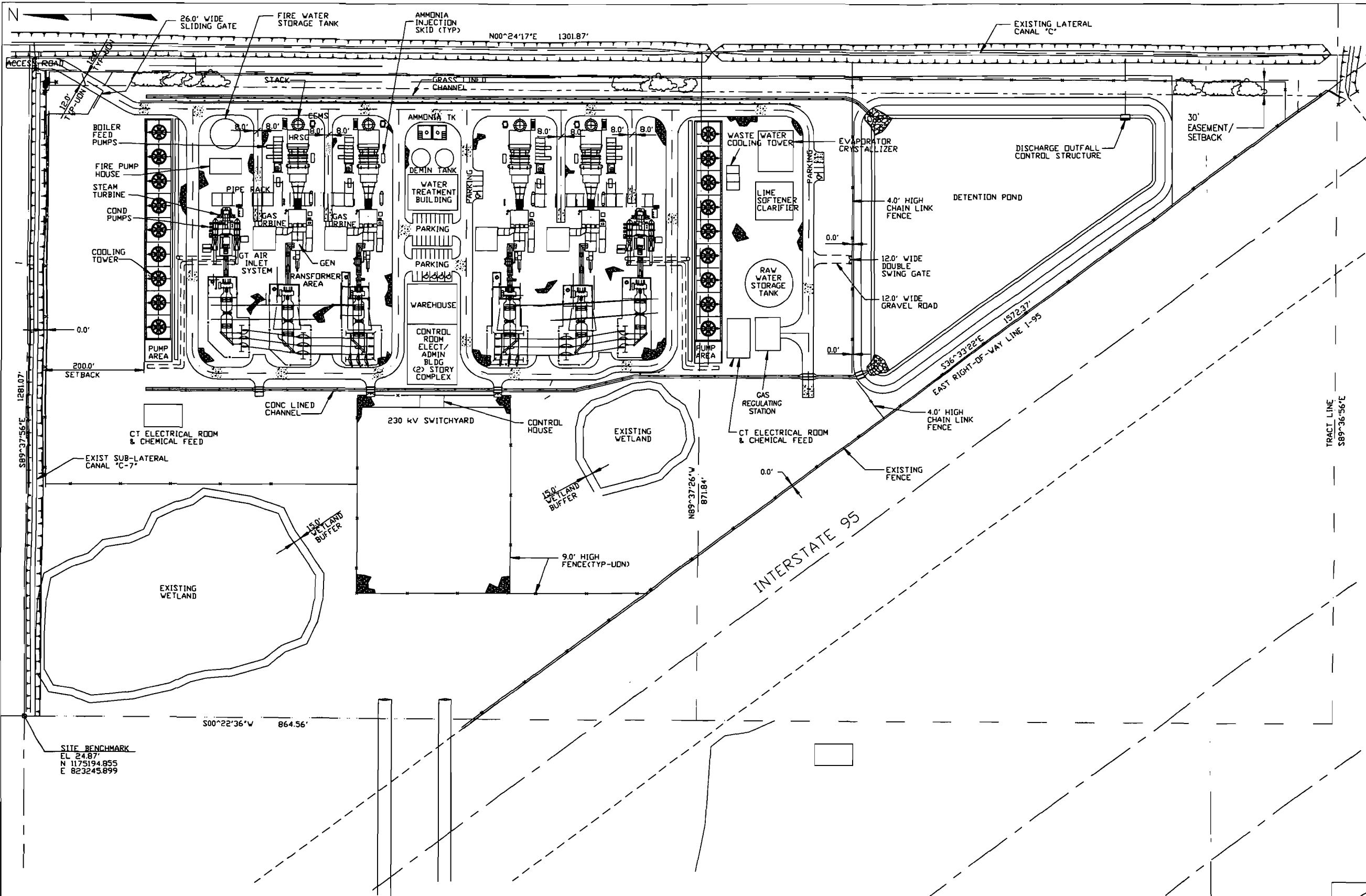
St. Johns River Water Management District (SJRWMD). 1996. Applicant's Handbook: Management and Storage of Surface Waters. Palatka, Florida.

Indian River County Storm Water Management Criteria.

Indian River Farms Water Control District Storm Water Discharge Criteria.

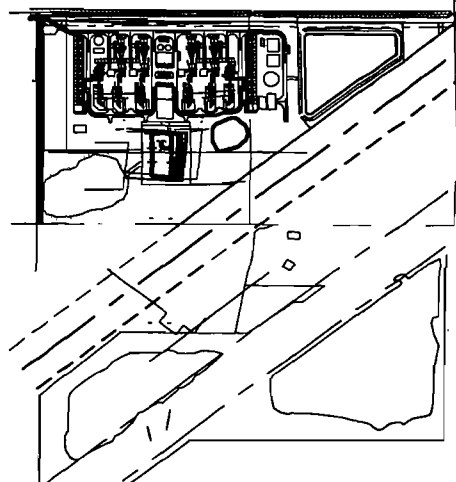
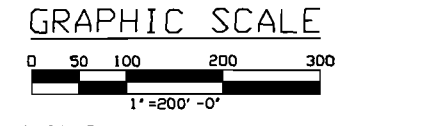
New Smyrna Beach Power Project Site Certification Application. October 1998. Prepared by Environmental Consulting & Technology, Inc.

FIGURES



NOTE
 1. SURVEY INFORMATION ARE TAKEN FROM BOUNDARY SURVEY DRAWING PREPARED BY MASTELLER, MOLER & REED INC., DATED 3/20/2000.

- LEGEND**
- WETLANDS BOUNDARY
 - - - PROPERTY LINE
 - x - NEW FENCE
 - NEW FACILITY
 - ▬ NEW CHANNEL
 - ▬ NEW GUARDRAIL
 - ▨ CONCRETE PAVING
 - ▩ CRUSHED STONE
 - ▧ RIPRAP APRON
 - ☁ BUFFER ZONE
 - ☁ WETLAND BUFFER



KEY PLAN

BUILDINGS, ROADS, EQUIPMENT AND CONCRETE AREA = 12.3 ACRES (±)
 GRAVEL/CRUSHED STONE AREA = 7.6 ACRES (±)
 GREEN SPACE = 21.3 ACRES (±)
 WETLANDS = 4.1 ACRES (±)
 DETENTION POND = 5.2 ACRES (±)

FIGURE 1.

CALPINE BLUE HERON ENERGY CENTER PROJECT FLORIDA

SITE PLAN

BURNS AND ROE ENTERPRISES, INC.
 Engineers and Constructors - Bradell, NJ

Rev No	Revision	Date	Bun	Chkd	Approved Chief Engr	Drawing Control				
						Purpose	Approved By	Date	Released By	Date
						For Information				
						For Comment				
						For Bid				
						For Construction				

Engineering Review		
Disc	Engr	Date
Mech		
Elec		
Civil		
Arch		
Nuc		

Reviewed By: _____
 Manager - Design & Drafting

Approved for Construction: _____ Date: _____
 Chief CIVIL Engineer

Work Order: 2349
 Drawing No: SC301
 Scale: 1"=200'
 Rev: K

REPORT OF SURVEY:

- TYPE OF SURVEY: BOUNDARY
- SURVEYOR IN RESPONSIBLE CHARGE: ROD REED P.S.M. 3916
- MASTELLER, MOLER & REED, INC. CERTIFICATE OF AUTHORIZATION L.B. 4644
2205 14TH AVENUE
VERO BEACH, FLORIDA 32960 - PHONE (561) 564-8050
- THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER. ADDITIONS OR DELETIONS TO THE SURVEY MAP AND/OR REPORT OF SURVEY BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED WITHOUT WRITTEN CONSENT OF THE SIGNING PARTY OR PARTIES.
- ACCURACY: THE EXPECTED USE OF THE LAND, AS CLASSIFIED IN THE MINIMUM TECHNICAL STANDARDS (81G17-8 FAC) IS URBAN. THE MINIMUM RELATIVE DISTANCE ACCURACY FOR THIS TYPE OF BOUNDARY SURVEY IS 1 FOOT IN 7500 FEET. THE ACCURACY OBTAINED BY MEASUREMENT AND CALCULATION OF A CLOSED GEOMETRIC FIGURE WAS FOUND TO MEET OR EXCEED THIS REQUIREMENT.
- THE LAST DATE OF FIELD WORK: 3/20/2000
- THE BEARING BASE FOR THIS SURVEY IS AS FOLLOWS:
A) GRID NORTH
B) THE BEARING BETWEEN INDIAN RIVER COUNTY GPS MONUMENTS GPS 43 AND GPS 44
C) THE BEARING IS N00°35'17"E
- NO INSTRUMENTS OF RECORD REFLECTING EASEMENTS, RIGHTS-OF-WAY AND/OR OWNERSHIP WERE FURNISHED TO THE SURVEYOR EXCEPT AS SHOWN. NO TITLE OPINION IS EXPRESSED OR IMPLIED.
- THIS SURVEY DOES NOT CERTIFY TO THE EXISTENCE OR LOCATION OF ANY FOUNDATIONS, UTILITIES, UNDERGROUND ENCROACHMENTS OR IMPROVEMENTS EXCEPT AS SHOWN.
- THE PARCEL OF LAND SHOWN HEREON IS LOCATED IN FLOOD ZONE "X" PER FLOOD INSURANCE RATE MAP 12081C0185 E, DATED MAY 4TH, 1989.
- UNLESS A COMPARISON IS SHOWN, PLAT VALUES & MEASURED VALUES ARE THE SAME.
- THE ELEVATIONS AS SHOWN ON THIS SURVEY ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
- THE HORIZONTAL VALUES SHOWN HEREON REFER TO THE STATE PLANE COORDINATE SYSTEM, FLORIDA EAST ZONE, NAD 83 (NGS ADJUSTMENT OF 1990).

LEGAL DESCRIPTION:

THAT PORTION OF TRACTS 8 AND 16, LYING EAST OF THE EAST RIGHT-OF-WAY FOR INTERSTATE 95, LOCATED IN SECTION 36, TOWNSHIP 33 SOUTH, RANGE 38 EAST, ACCORDING TO THE LAST GENERAL PLAT OF THE LANDS OF THE INDIAN RIVER FARMS COMPANY SUBDIVISION, FILED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF ST. LUCIE COUNTY, FLORIDA, IN PLATBOOK 2, PAGE 23. SAID LAND NOW LYING AND BEING IN INDIAN RIVER COUNTY, FLORIDA.

SAID LANDS CONTAINING 48.74 ACRES MORE OR LESS

LEGEND AND ABBREVIATIONS

IRC	IRON ROD AND CAP	SM	SANITARY MANHOLE	SP	SIGN
LB	LICENSED BUSINESS	DM	DRAINAGE MANHOLE	LP	LIGHT POLE
NO.	NUMBER	W	WELL	MP	MAIL OR PAPERBOX
R/W	RIGHT OF WAY	H	HYDRANT	SB	SOUTHERN BELL BOX
CM	CONCRETE MONUMENT	WV	WATER VALVE	CTV	CABLE TV BOX
MEAS.	MEASURED	WM	WATER METER	PP	POWERPOLE
P.U.D.E.	PUBLIC UTILITY AND DRAINAGE EASEMENT	CL	CLEANOUT	EB	ELECTRIC BOX
FD	FOUND	CB	CATCH BASIN	GW	GUY WIRE
O.R.B.	OFFICIAL RECORD BOOK	CI	CURB INLET		
P.R.M.	PERMANENT REFERENCE MONUMENT				
P.C.P.	PERMANENT CONTROL POINT				
B.M.	BENCHMARK				
F.F.	FINISH FLOOR				
ELEV.	ELEVATION				
E.O.P.	EDGE OF PAVEMENT				
R	RADIUS				
Δ	DELTA				
L	LENGTH				
I.D.	IDENTIFICATION				
SEC.	SECTION				
TWP.	TOWNSHIP				
RGE.	RANGE				

**BOUNDARY SURVEY
PERFORMED FOR
CALPINE CORPORATION**

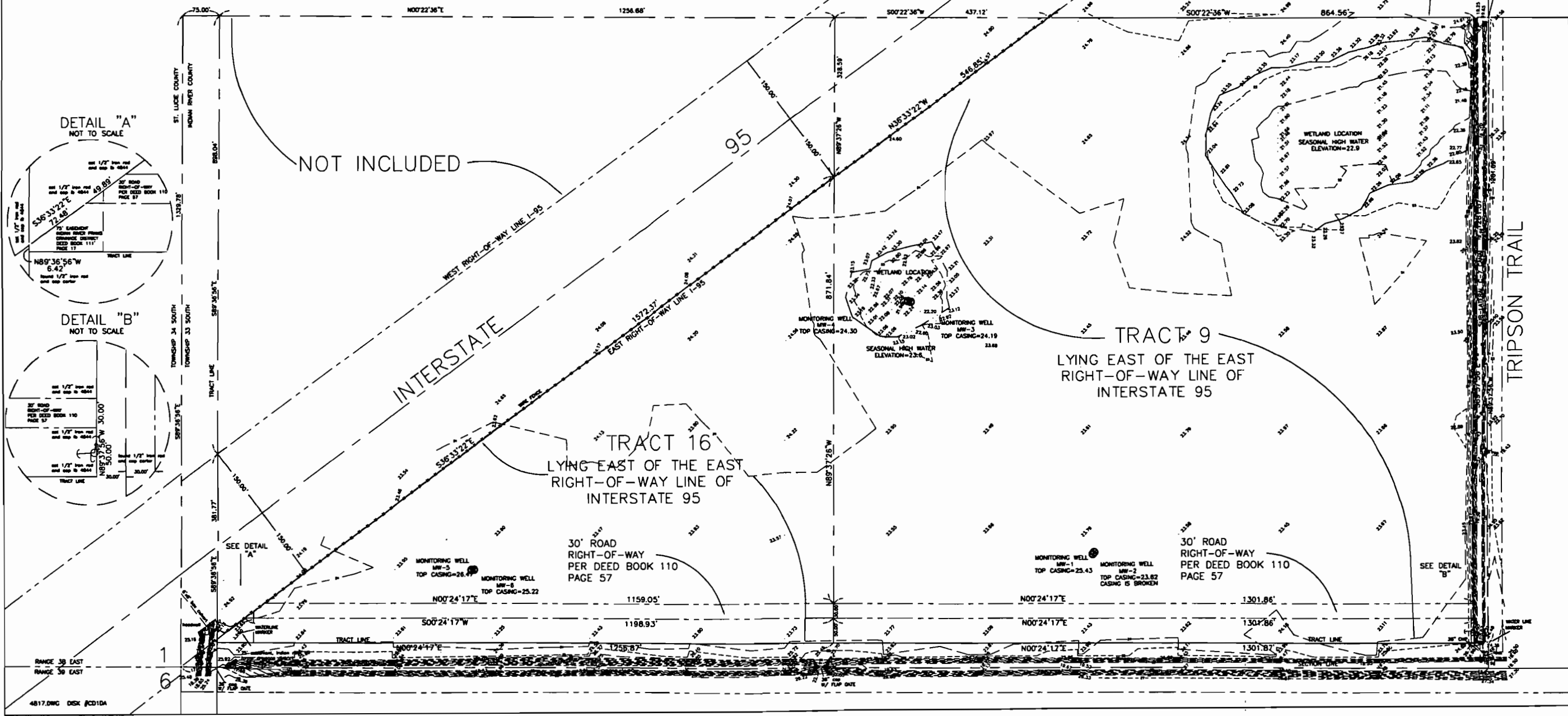
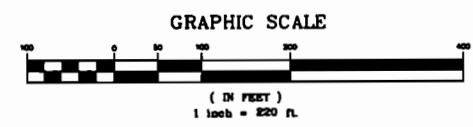


FIGURE 2.

NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

ROD REED P.S.M. 3916

MAP OF SURVEY FOR

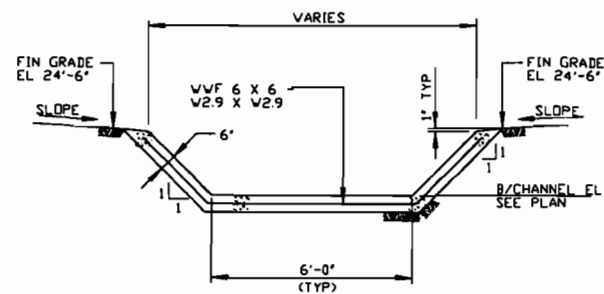
CALPINE CORPORATION

MASTELLER, MOLER & REED INC.
PROFESSIONAL SURVEYORS AND MAPPERS
LAND SURVEYING BUSINESS #4644
2205 14th Avenue Vero Beach, Florida 32960 (561)564-8050

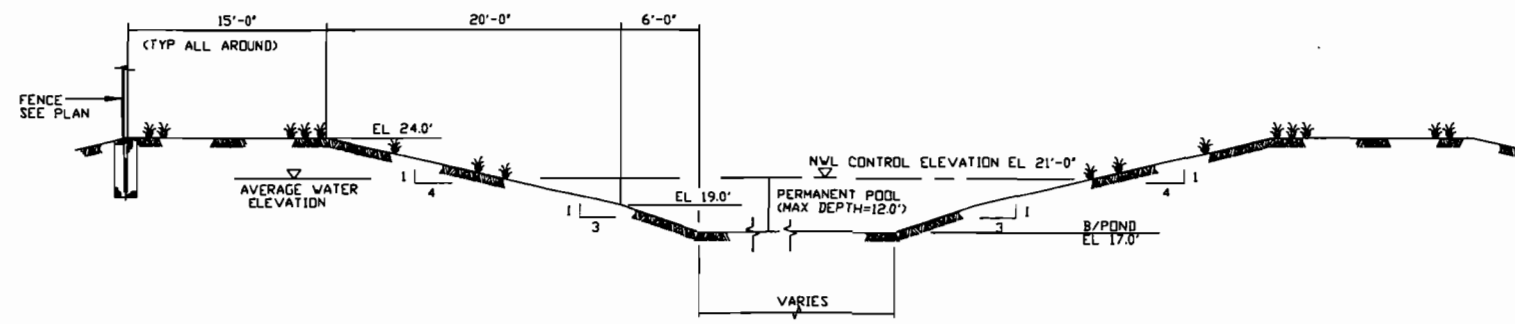
TYPE: BOUNDARY
DATE: 3/20/2000
PROJECT NO.: 00-4817
DRAWN BY: CIG
CHECKED BY: RR
SCALE: 1"=220'
SHEET: 2 OF 2

NOTES

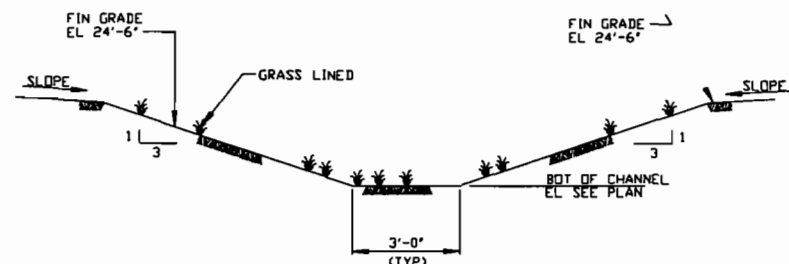
1. FOR SEDIMENT AND EROSION CONTROL NOTES SEE DWG SC310



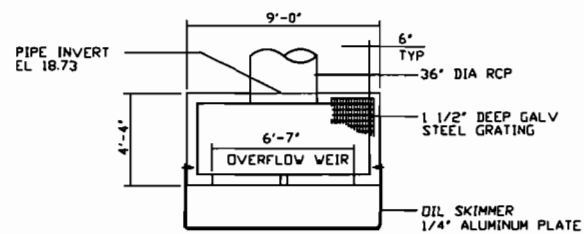
GRASS LINED DITCH
SECTION A-A



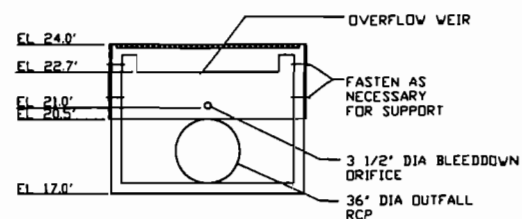
WET DETENTION POND DETAIL
SECTION C-C



GRASS LINED SWALE
SECTION B-B
NTS



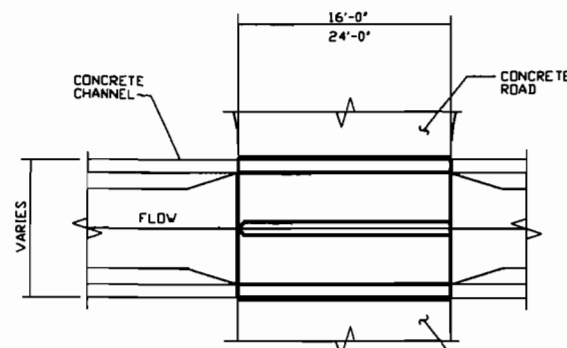
PLAN



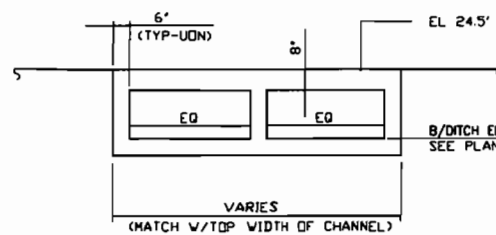
ELEVATION

DISCHARGE OUTFALL
CONTROL STRUCTURE

DETAIL 1
NTS



PLAN



CONCRETE CULVERT

DETAIL 2
NTS

FIGURE 4.



CALPINE
BLUE HERON
ENERGY CENTER PROJECT
FLORIDA

SITE SECTIONS AND DETAILS

BURNS AND ROE ENTERPRISES, INC.
Engineers and Constructors - Dradell, NJ

Rev No	Revision	Date	By	Chkd	Approved Chief Engr

Drawing Control				
Purpose	Approved By	Date	Released By	Date
For Information				
For Comment				
For Bid				
For Construction				

Engineering Review		
Disc	Engr	Date

Reviewed By					
Manager - Design & Drafting					

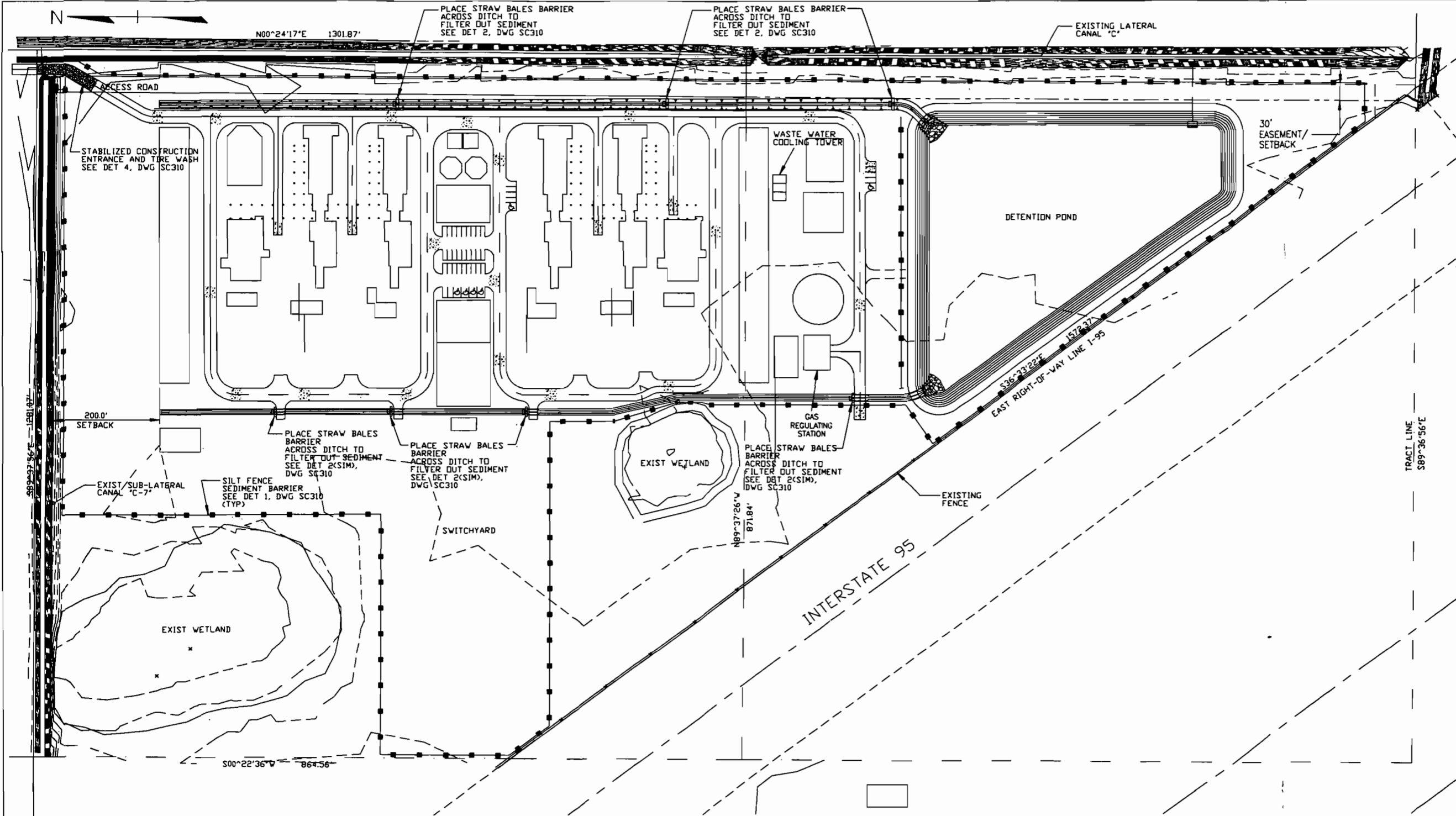
Approved for Construction	Date		
Chief	CIVIL	Engineer	

Scale	
None	

Work Order	
2349	

Drawing No	
SC308	

Rev	
A	



NOTE
 1. FOR SEDIMENTATION AND EROSION CONTROL NOTES SEE DRAWING SC310.

LEGEND

- WETLANDS BOUNDARY
- WETLANDS EASEMENT
- PROPERTY LINE
- NEW SILT FENCE
- █ NEW CHANNEL

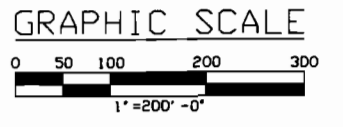




FIGURE 5.


 CALPINE
 BLUE HERON
 ENERGY CENTER PROJECT
 FLORIDA

SEDIMENT AND EROSION CONTROL PLAN


BURNS AND ROE ENTERPRISES, INC.
 Engineers and Constructors - Dradell, NJ

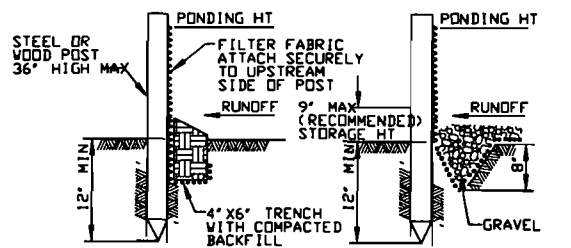
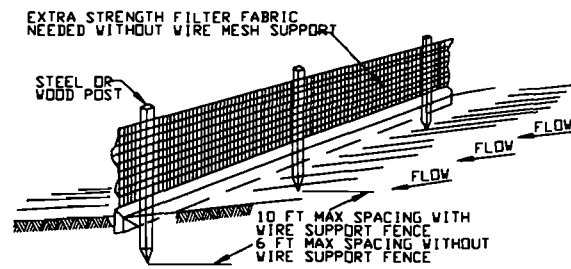
Rev No	Revision	Date	By	Chkd	Approved Chief Engr

Engineering Review			Drawing Control		
Disc	Engr	Date	Purpose	Approved By	Date
Mech			For Information		
Elec			For Comment		
Civil			For Bid		
Arch			For Construction		
Nuc					

Reviewed By: _____
 Manager - Design & Drafting

Approved for Construction Date: _____
 Chief CIVIL Engineer

Work Order: 2349
 Drawing No: SC309 A



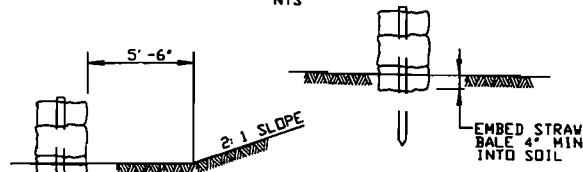
STANDARD DETAIL TRENCH WITH NATIVE BACKFILL
ALTERNATE DETAIL TRENCH WITH GRAVEL

NOTES:

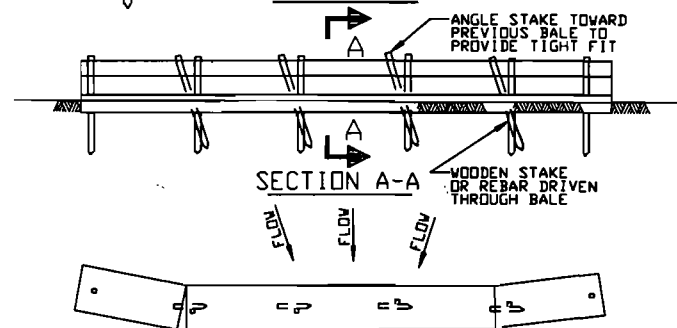
1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

SILT FENCE DETAIL-1

NTS



SECTION A-A



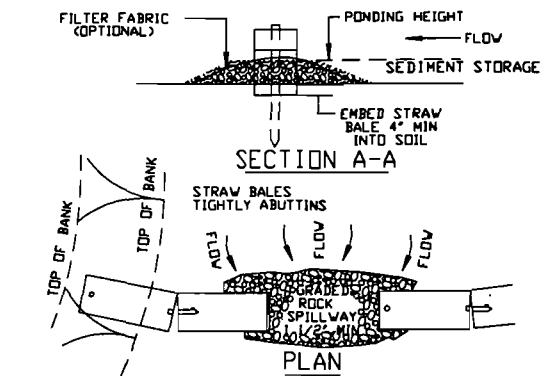
PLAN

NOTES:

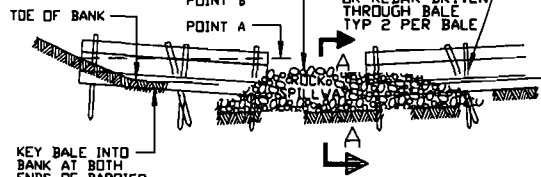
1. THE STRAW BALES SHALL BE PLACED ON SLOPE CONTOUR, NECESSARY.
2. BALES TO BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING, USE STRAW, ROCKS, OR FILTER FABRIC TO FILL GAPS BETWEEN THE BALES AND TAMP THE BACKFILL MATERIAL TO PREVENT EROSION OR FLOW AROUND BALES.

STRAW BAILE BARRIER DETAIL-2

NTS



PLAN



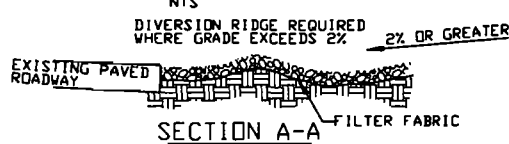
VIEW LOOKING UPSTREAM

NOTES:

1. PLACE BALES PERPENDICULAR TO FLOW
2. EMBED THE BAILE 4" INTO THE SOIL AND "KEY" THE END BAILES INTO THE CHANNEL BANKS.
3. BALES PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW, ROCKS OR FILTER FABRIC TO FILL ANY GAPS BETWEEN BAILES AND TAMP BACKFILL MATERIALS TO PREVENT EROSION OR FLOW AROUND THE BAILES.
4. POINT "A" SHALL BE HIGHER THAN POINT "B"
5. SPILLWAY SHALL NOT EXCEED 14".

SEMI-PERVIOUS STRAW BAILE SEDIMENT BARRIER DETAIL-3

NTS



SECTION A-A



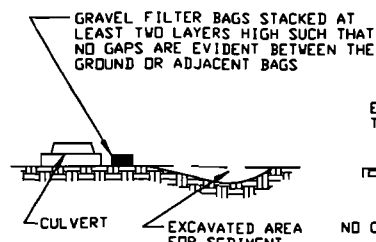
PLAN

NOTES:

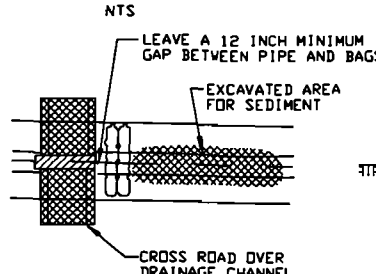
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE DETAIL-4

NTS



SIDE VIEW



TOP VIEW

SEDIMENT TRAP LOCATED WITHIN A STORMWATER CONVEYANCE CHANNEL DETAIL-5

EACH BAG IS TO CONSIST OF 3/4" INCH DIAMETER GRAVEL CONTAINED IN PREVIOUS BURLAP BAGS OR SYNTHETIC NET BAGS (1/8" INCH MESH) AND BE APPROXIMATELY 24" INCHES LONG 12" INCHES WIDE AND 6" INCHES HIGH

NOTES

1. ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCES, OR IN THEIR PROPER SEQUENCE, AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
2. ANY DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN 60 DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC WILL IMMEDIATELY RECEIVE A TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS WILL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO STATE STANDARDS.
3. PERMANENT VEGETATION TO BE SEED OR SODDED ON ALL EXPOSED AREAS WITHIN FIFTEEN (15) DAYS AFTER FINAL GRADING. MULCH WILL BE USED FOR PROTECTION UNTIL SEEDING IS ESTABLISHED.
4. SOIL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH FLORIDA STATE AND EPA REQUIREMENTS.
5. A SUB-BASE COURSE WILL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING AND INSTALLATION OF IMPROVEMENT IN ORDER TO STABILIZE ROADS, DRIVEWAYS AND PARKING AREAS. IN AREAS WHERE NO UTILITIES ARE PRESENT, THE SUB-BASE SHALL BE INSTALLED WITHIN 15 DAYS OF PRELIMINARY GRADING.
6. IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING ALL CRITICAL AREAS SUBJECT TO EROSION (I.E., STEEP SLOPES) WILL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH OR A SUITABLE EQUIVALENT, AT A RATE OF TWO (2) TONS PER ACRES.
7. ANY STEEP SLOPES RECEIVING PIPELINE INSTALLATION WILL BE BACKFILLED AND STABILIZED DAILY, AS THE INSTALLATION PROCEEDS (I.E.: SLOPES GREATER 3:1).
8. A 50 FOOT LONG (MINIMUM) STABILIZED CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT POINTS OF INGRESS AND EGRESS TO MINIMIZE TRACKING OF SOIL ONTO A PUBLIC RIGHT OF WAY AND INTO ITS DRAINAGE STRUCTURES.
9. IN ACCORDANCE WITH THE STANDARDS FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION, ANY SOIL HAVING A PH OF 4 OR LESS OR CONTAINING IRON SULFIDES SHALL BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A PH OF 5 OR MORE PRIOR TO SEEDBED PREPARATION.
10. CONDUIT OUTLET PROTECTION MUST BE INSTALLED AT ALL REQUIRED OUTFALLS PRIOR TO THE DRAINAGE SYSTEM BECOMING OPERATIONAL.
11. ANY CHANGES TO THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLANS WILL REQUIRE THE SUBMISSION OF REVISED SOIL EROSION AND SEDIMENT CONTROL PLANS TO THE DISTRICT FOR RE-CERTIFICATION. THE REVISED PLANS MUST MEET ALL CURRENT STATE SOIL EROSION AND SEDIMENT CONTROL STANDARDS.
12. CONTRACTOR SHALL PERFORM ALL WORK REQUIRED TO CONTROL DUST ON THE CONSTRUCTION SITE. DUST CONTROL MAY CONSIST OF BUT IS NOT LIMITED TO THE FOLLOWING:
 - A. STABILIZATION WITH MULCH
 - B. SPRINKLING UNTIL SURFACE IS SUFFICIENTLY WET
 - C. CALCIUM CHLORIDE SURFACE TREATMENT - CALCIUM CHLORIDE SHALL BE FINE ENOUGH TO FEED THROUGH COMMONLY USED SPREADERS AT A RATE THAT WILL KEEP THE SURFACE MOIST BUT NOT CAUSE POLLUTION OR PLANT DAMAGE.
13. SELECTION OF HAY BAILE, SILT FENCE OR STONE BARRIER ALTERNATE WILL BE AT CONTRACTOR'S OPTION.
14. SILT FENCE FOR EROSION CONTROL SHALL BE GEDFAB AS MANUFACTURED BY MERCANTILE DEVELOPMENT, WESTPORT CT. OR APPROVED EQUAL. INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATION.
15. CONTRACTOR SHALL AT ALL TIMES CONDUCT THE OPERATIONS IN SUCH A MANNER THAT TRANSIENT UNSTABLE SOIL CONDITIONS ARE MINIMIZED, AND THAT DURING THOSE TRANSIENT UNSTABLE CONDITIONS, EROSION THAT MAY OCCUR, IS ENTIRELY UNDER CONTROL.
16. SEEDING SPECIFICATION
 - A. TEMPORARY SEEDING SPECIFICATIONS
 - APPLY 10-10-10 FERTILIZER AT A RATE OF 500 LBS. PER ACRE OR 11 LBS. PER 1,000 SQ. FEET.
 - APPLY ANNUAL RYEGRASS AT A RATE OF 40 LBS. PER ACRE OR 0.9 LB. PER 1,000 SQ. FT.
 - B. PERMANENT SEEDING (BY OTHERS)
 - C. TEMPORARY SEEDBED PREPARATIONS
 - WORK LIME AND FERTILIZER INTO SOIL WITH A DISC, SPRINGTOOTH HARROW, ETC.
 - APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DROP SEEDER, DRILL, CULTIPACKER ETC. INCORPORATE SEED INTO THE SOIL BY RAKING OR DRAGGING.
 - D. CONTRACTOR SHALL MAINTAIN SEEDED AREAS. MAINTENANCE SHALL INCLUDE: PROTECTION AGAINST TRAFFIC, REPAIR OF DAMAGED AREAS AND WATERING TO KEEP GRASSES AREAS MOIST.
17. ANY AREAS WHICH SHOW SIGNS OF EROSION SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.
18. SEDIMENT LEVELS IN THE BASINS WILL BE MONITORED. EXCESS SEDIMENT SHALL BE REMOVED TO MAINTAIN BASIN EFFICIENCY.

FIGURE 6.

CALPINE BLUE HERON ENERGY CENTER PROJECT FLORIDA

SEDIMENT & EROSION CONTROL DETAILS - SHEET 1

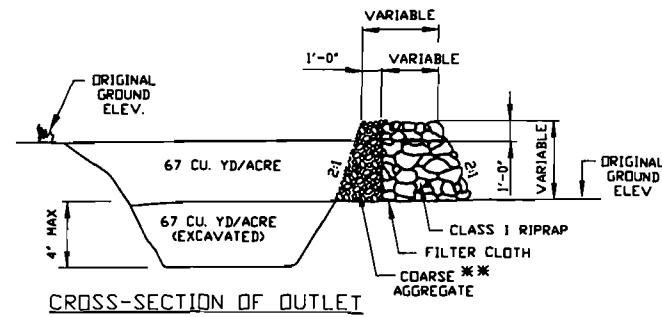
BURNS AND ROE ENTERPRISES, INC. Engineers and Constructors - Dradell, NJ

Disc	Engr	Date
Mech		
Elec		
Civil		
Arch		
Nvc		
Num	Chkd	SI
Reviewed By	Approved for Construction Date	Work Order
Manager-Design & Drafting	Chief CIVIL Engineer	2349
		SC310
		A

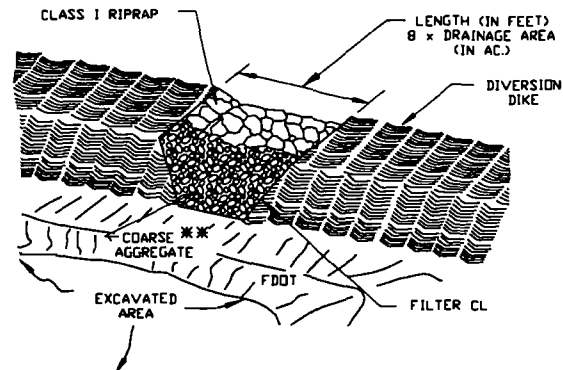
Rev No	Revision	Date	Drawn	Checked	Approved Chief Engr	Purpose	Approved By	Date	Released By	Date
						For Information				
						For Comment				
						For Bid				
						For Construction				

NOTES

1. FOR SEDIMENT AND EROSION CONTROL NOTES SEE DRAWING SC310.



CROSS-SECTION OF OUTLET

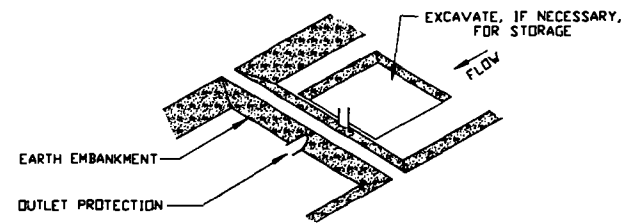


COARSE AGGREGATE SHALL BE FDOT #3, #357 OR #5

OUTLET (PERSPECTIVE VIEW)

STONE OUTLET SEDIMENT TRAP

DETAIL 1



EMBANKMENT SECTION THRU RISER

CONSTRUCTION SPECIFICATIONS

1. area under embankment shall be cleared, grubbed and stripped of any vegetation and root mat. The pool area shall be cleared.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVERSIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
6. TILE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
8. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
9. AT LEAST THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH 1/2 INCH DIAMETER HOLES SPACED 8 INCHES VERTICALLY AND 10 - 12 INCHES HORIZONTALLY.
10. FILL MATERIAL AROUND PIPE SPILLWAY SHALL BE HAND COMPACTED IN 4 INCH LAYERS. A MINIMUM OF TWO FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.

PIPE OUTLET SEDIMENT TRAP

DETAIL 2

FIGURE 7.



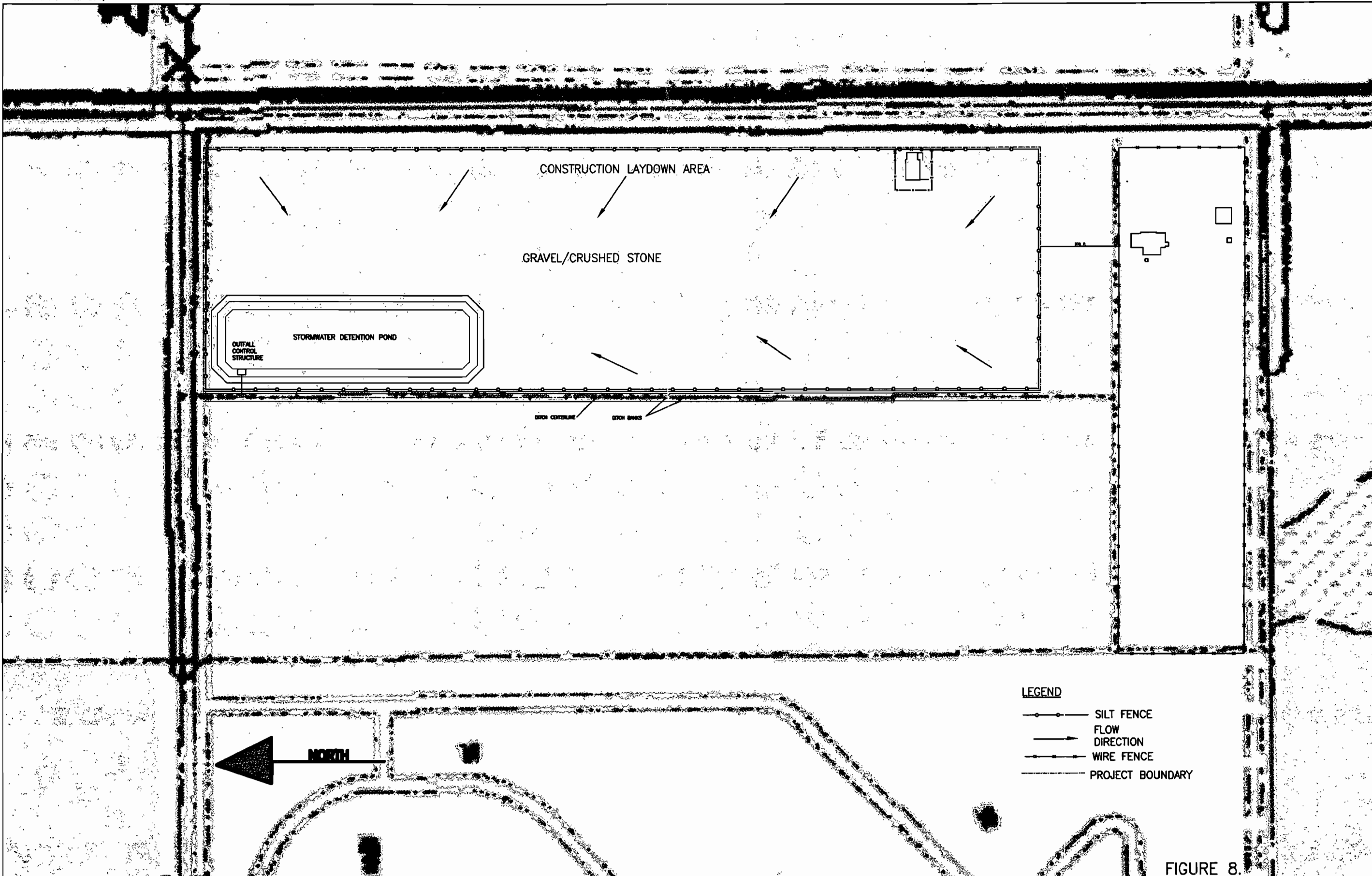
CALPINE
BLUE HERON
ENERGY CENTER PROJECT
FLORIDA

SEDIMENT & EROSION CONTROL
DETAILS - SHEET 2

BURNS AND ROE ENTERPRISES, INC.
Engineers and Constructors - Dradell, NJ

Engineering Review			Disc		Engr		Date	
Disc	Engr	Date						
Mech								
Elec								
Civil								
Arch								
Nuc								
Disc	Chkd	Sl						
Disc	Chkd	Sl						
Reviewed By	Approved for Construction		Date	Work Order	Drawing No	Rev		
Manager - Design & Drafting	Chief	CIVIL	Engineer	Scale	2349	SC311	a	

Rev No	Revision	Date	Svn	Chkd	Approved Chief Engr	Drawing Control				
						Purpose	Approved By	Date	Released By	Date
						For Information				
						For Comment				
						For Bid				
						For Construction				



LEGEND
 ○—○— SILT FENCE
 —→— FLOW DIRECTION
 —+—+— WIRE FENCE
 ———— PROJECT BOUNDARY

FIGURE 8.

NO.	DATE	REVISION	BY	APPROVED	DATE	DRN.	SCALE
					9/22/2000	SM/JC	1"=230'
					10/19/2000	JC	PROJECT: 000105-0200-1100
						APPV.	

ECT
 Environmental Consulting & Technology, Inc.

CALPINE CORPORATION

CONSTRUCTION LAYDOWN AREA
 DRAINAGE PLAN

ATTACHMENT
STORM WATER MANAGEMENT CALCULATIONS

STORM WATER MANAGEMENT CALCULATIONS

**St. Johns River Water Management District
Indian River Farms Water Control District
Indian River County**

Prepared for:



CALPINE
BLUE HERON
ENERGY CENTER

**CALPINE CONSTRUCTION FINANCE COMPANY, L.P.
Boston, Massachusetts**

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

***3701 Northwest 98th Street
Gainesville, Florida 32606***

October 2000

Wet Detention SWM System Criteria (St. Johns River Water Management District)

Pond Design

- Water quality treatment volume based on the greater of 1 inch over the project area or 2.5 inches over the Project's impervious area.
- Permanent pool volume is based on 14-day residence time during wet season (June – October). If no littoral zone is incorporated, a 50 percent increase in volume is required (equivalent 21-day residence).
- Pond side slopes no steeper than 3:1 (H:V).
- Mean depth of the permanent pool volume should be between 2 and 8 feet (ft).
- Littoral zone at least 30 percent of pond surface area 2 to 3 ft below control elevation.
- Littoral zone slopes no steeper than 6:1 (H:V).
- Maximum pond depth of 12 ft below control elevation (Permanent Pool Volume).
- Pond configuration with average length to width ratio of 2:1 or larger.
- Water level fluctuation less than 18 inches between control elevation and overflow elevation for littoral zone protection.
- Provide a maintenance area with slope not greater than 8:1 (H:V) and minimum width of 15 ft completely around and outside the storm water pond submerged by the 25-year/24-hour design storm (as per Indian River County criteria).
- Pond area should be fenced with a minimum 4 feet high fence or suitable landscaping material unless the pond is designed to serve as an aesthetic amenity to the development (as per Indian River County criteria).

Outfall Control Structure

- Design to limit offsite discharge to less than 2 inches per 24 hours during the 25-year storm event as per Indian River County requirements.
- Bleed down ½ of treatment volume within 48 to 60 hours after design storm event (SJRWMD criteria).
- Anti-clogging device required if bleeder is less than 3 inches wide or v-notch is less than 20 degrees (SJRWMD criteria).

Calculations

LAND USE

Total

Project Area: 50.5 acres

Impervious 19.9 acres

Buildings/Roads/Parking

Slabs/Other Structures: 12.3 acres

Gravel/Crushed Stone; 7.6 acres

Pervious 21.3 acres

Green Area: 20.6 acres

Pond 15' Maint. Easement: 0.7 acre

Detention Pond: 5.2 acres

Wetlands: 4.1 acres

PROJECT DATA

Proposed Elevations

Building Floors: 26.0' NGVD

Roads/Parking: 25.0' NGVD

Pervious (Avg.): 24.0' NGVD

Average Water Table

Elevation: 21.0' NGVD

Receiving Body Tailwater Elevation

(IRFWCD Canals – Upper Pool) 18.5' NGVD

Floodplain Base Elevation:

ZONE X – Area outside of 500-year flood plain

HYDROLOGY

Rainfall

10-yr/24-hr Storm: 8.0 inches

25-yr/24-hr Storm: 9.0 inches

100-yr/24-hr Storm: 11.5 inches

Total Wet Season Rainfall

(153 days, June – October): 32.0 inches

Soils

<u>Land Use</u>	<u>Hydrologic Group.</u>	<u>Area (ac)</u>	<u>SCS Curve No.</u>
Undeveloped - Pine Flatwoods & Cabbage Palms	B/D	50.50	55

STAGE-STORAGE

- ▶ 21.3 acres of pervious areas provide linear storage starting at el. 23.0 ft-NGVD
- ▶ 4.1 acres of pond surface area provide vertical storage starting at el. 17.0 ft-NGVD
- ▶ 1.1 acres of pond banks provide linear storage starting at el. 17.0 ft-NGVD

Please refer to stage-storage table for specific storage information.

SCS PRE-DEVELOPMENT RUNOFF __

25-year storm, P = 9.0"

Soil Storage (S)

$$\begin{aligned} S &= 1000/\text{CN} - 10 \\ &= 1000/55 - 10 \\ S &= 8.18 \text{ inches} \end{aligned}$$

Runoff Depth (Q)

$$\begin{aligned} Q &= \frac{(P - .2S)^2}{(P + .8S)} \\ &= \frac{(9.0 - .2(8.18))^2}{(9.0 + .8(8.18))} \\ Q &= \underline{3.49} \text{ inches} \end{aligned}$$

Runoff (V)

$$\begin{aligned} V &= A \times Q \\ &= 50.5 \text{ ac} \times 3.49 \text{ in} \times 1\text{ft}/12 \text{ in} \\ V &= \underline{14.69} \text{ ac-ft} \end{aligned}$$

Allowable runoff volume based on IRC 2" over 24-hour period

$$\begin{aligned} V &= 50.5 \text{ ac} \times 2.0 \text{ in} \times 1\text{ft}/12 \text{ in} \\ V &= \underline{8.42} \text{ ac-ft} \end{aligned}$$

Peak Discharge Rate (Q₂₅) from SCS Runoff Hydrograph, 25-year storm event

$$Q_{25} = \underline{26.46} \text{ ft}^3/\text{s}$$

WET DETENTION POND DESIGN

WATER QUALITY TREATMENT VOLUME (V_Q) BASED ON:

1.0" over the project site

$$V_Q = 1.0'' \times 50.5 \text{ ac} \times 1'/12'' = \underline{4.21} \text{ ac-ft.}$$

2.5" over the impervious area (excludes pond area and wetlands)

$$V_Q = 2.5'' \times (50.5 \text{ ac} - 5.2 \text{ ac} - 4.1 \text{ ac})(.4830) \times 1'/12'' = \underline{4.15} \text{ ac-ft.}$$

Thus the required treatment volume is 4.21 ac-ft.

PERMANENT WET POOL VOLUME (PPV)

Based on 14 day residence time with Littoral Zone Option

$$PPV = A \times C \times P \times R \times 1'/12''$$

A = Contributing Area

C = Composite Rational Runoff Number

P = Historic Average Wet Season Rainfall [153 days, June – October] (32"/153d)

R = Residence Time (14 days)

$$C = \frac{(.95)(19.90) + (.20)(21.30 \text{ ac})}{50.5 - 5.2 - 4.1 \text{ ac}} = \underline{0.56}$$

$$PPV = 50.5 \text{ ac} \times .56 \times 32'' \times 14\text{d}/153\text{d} \times 1'/12'' = \underline{6.90} \text{ ac-ft}$$

Based on no littoral zone option (21 day residence time)

$$PPV = 50.5 \text{ ac} \times .56 \times 32'' \times 21\text{d}/153\text{d} \times 1'/12'' = \underline{10.35} \text{ ac-ft}$$

PPV from pond stage-storage = 17.66 ac-ft @ control elev. 21.0' NGVD. - OK

MEAN DEPTH OF POND (MD)

$$MD = PPV/A_P$$

A_P = Area of pond measured at the control elevation (21.0' NGVD)

@ el 17 - 4.0 ac

@ el 21 - X? ac $X = 4.0 \text{ ac} + (5.2 \text{ ac} - 4.0 \text{ ac})(21-17)/(24-17) = \underline{4.69} \text{ ac}$

@ el 24 - 5.2 ac

MD = 17.66 ac-ft/ 4.69 ac = 3.77 ft. – OK (between 2' and 8').

CONTROL STRUCTURE

- ▶ The required water quality treatment volume from pond design, $V = 4.21$ ac-ft
- ▶ The IRC 2"/24 hr maximum discharge volume, $V = 8.42$ ac-ft
- ▶ Set invert of bleeddown orifice at the control (NWL) el. = 21.0' NGVD
- ▶ Set overflow weir at the top of the treatment volume storage to discharge runoff volume greater than WQ treatment volume or IRC 2"/24hr volume, whichever is more restrictive.
- From pond stage-storage curve, interpolate between elevation 21.0 and 24.0.

$$\text{Weir elev.} = 21 \text{ ft} + (24 \text{ ft} - 21 \text{ ft}) \frac{(8.42 \text{ ac-ft})}{(32.5 \text{ ac-ft} - 17.66 \text{ ac-ft})} = \underline{22.70 \text{ ft.}}$$

- set weir crest @ el. = 22.7' NGVD
- ▶ Size a circular orifice to discharge 2"/24hr volume in 24 hours or 1/2 of water quality treatment volume in 48 hrs (the latter is more restrictive).

- Treatment volume depth (h_1) = $21 \text{ ft} + (24 \text{ ft} - 21 \text{ ft}) \frac{(4.21 \text{ ac-ft})}{(32.5 \text{ ac-ft} - 17.66 \text{ ac-ft})} = \underline{21.85 \text{ ft.}}$

- Calculate the stage at half the treatment volume.

$$\text{Stage for } \frac{1}{2} \text{ of treatment volume} = 21 \text{ ft} + (24 \text{ ft} - 21 \text{ ft}) \frac{\frac{1}{2} (4.21 \text{ ac-ft})}{(32.5 \text{ ac-ft} - 17.66 \text{ ac-ft})} = \underline{21.43 \text{ ft.}}$$

- 1/2 treatment volume depth (h_2) = $21.85 \text{ ft} - 21.43 \text{ ft} = \underline{0.42 \text{ ft}}$

- Average depth above orifice invert (h) = $\frac{(h_1 + h_2)}{2} = \frac{(0.85 \text{ ft} + 0.42)}{2} = \underline{0.64 \text{ ft}}$

- Average flow rate (Q) required to draw down 1/2 the treatment volume in 48 hours,

$$Q = \frac{TV}{2tCF}, \quad \begin{array}{l} TV = \text{Treatment Volume (ft}^3\text{)} \\ t = \text{Recovery Time} \\ CF = \text{Conversion Factor} = 3600 \text{ sec/hr} \end{array}$$

$$Q = \frac{(2.11 \text{ ac-ft} \times 43,560 \text{ ft/ac})}{2 (48 \text{ hr})(3600 \text{ sec/hr})} = \underline{0.27 \text{ ft}^3/\text{s}}$$

- Find the cross-sectional area (A) of the orifice

$$\begin{aligned} A &= Q/C (2gh)^{1/2}, \quad C \text{ (orifice coefficient)} = 0.6, \quad g = 32.2 \text{ ft/sec}^2 \\ &= \frac{0.27 \text{ ft}^3/\text{s}}{0.6(2 \times 32.2 \times 0.64 \text{ ft})^{1/2}} \\ &= \underline{0.07 \text{ ft}^2} \end{aligned}$$

- Find the orifice diameter (D)

$$\begin{aligned}
 D &= [4(A)/\pi]^{1/2} \\
 &= [4(0.07 \text{ ft}^2)/3.1416]^{1/2} \\
 &= 0.30 \text{ ft} = \underline{3.6 \text{ in}}
 \end{aligned}$$

Thus the bleeddown will be provided by an 3-1/2 " diameter circular orifice.

- ▶ Determine weir crest length

- 25 year runoff = 14.69 ac-ft
- Find zero discharge stage corresponding to 14.69 ac-ft in *Site* stage-storage curve above weir crest elevation: interpolating, @ el 22.7 there is approx. 25.93 ac-ft
adding 14.69 ac-ft = 40.62 ac-ft
approximate stage @ 40.62 ac-ft of storage = 23.88 ft
- The maximum design head on the weir = 23.88 – 22.70 (weir crest elevation) = 1.18 ft
- Compute weir length

$$\text{Peak pre-development discharge} = \underline{26.46} \text{ ft}^3/\text{s}$$

$$\text{Basic discharge equation } Q = 3.13LH^{1.5}, \text{ Solving for } L, L = Q/3.13H^{1.5}$$

$$L = 26.46 \text{ ft}^3/\text{s} / 3.13(1.18)^{1.5} = \underline{6.59} \text{ ft}$$

The weir crest length is 6.60 ft

The control structure is a 6.60' wide weir with a crest at elevation 22.7' NGVD and a 3-1/2" diameter orifice with an invert at elevation 21.0' NGVD.

- ▶ Check discharge for 10-year storm event utilizing control structure

10-year storm, P = 8.0"

Runoff Depth (Q)

$$\begin{aligned}
 Q &= \frac{(P - .2S)^2}{(P + .8S)} \\
 &= \frac{(8.0 - .2(8.18))^2}{(8.0 + .8(8.18))}
 \end{aligned}$$

$$Q = \underline{2.78} \text{ inches}$$

Runoff (V)

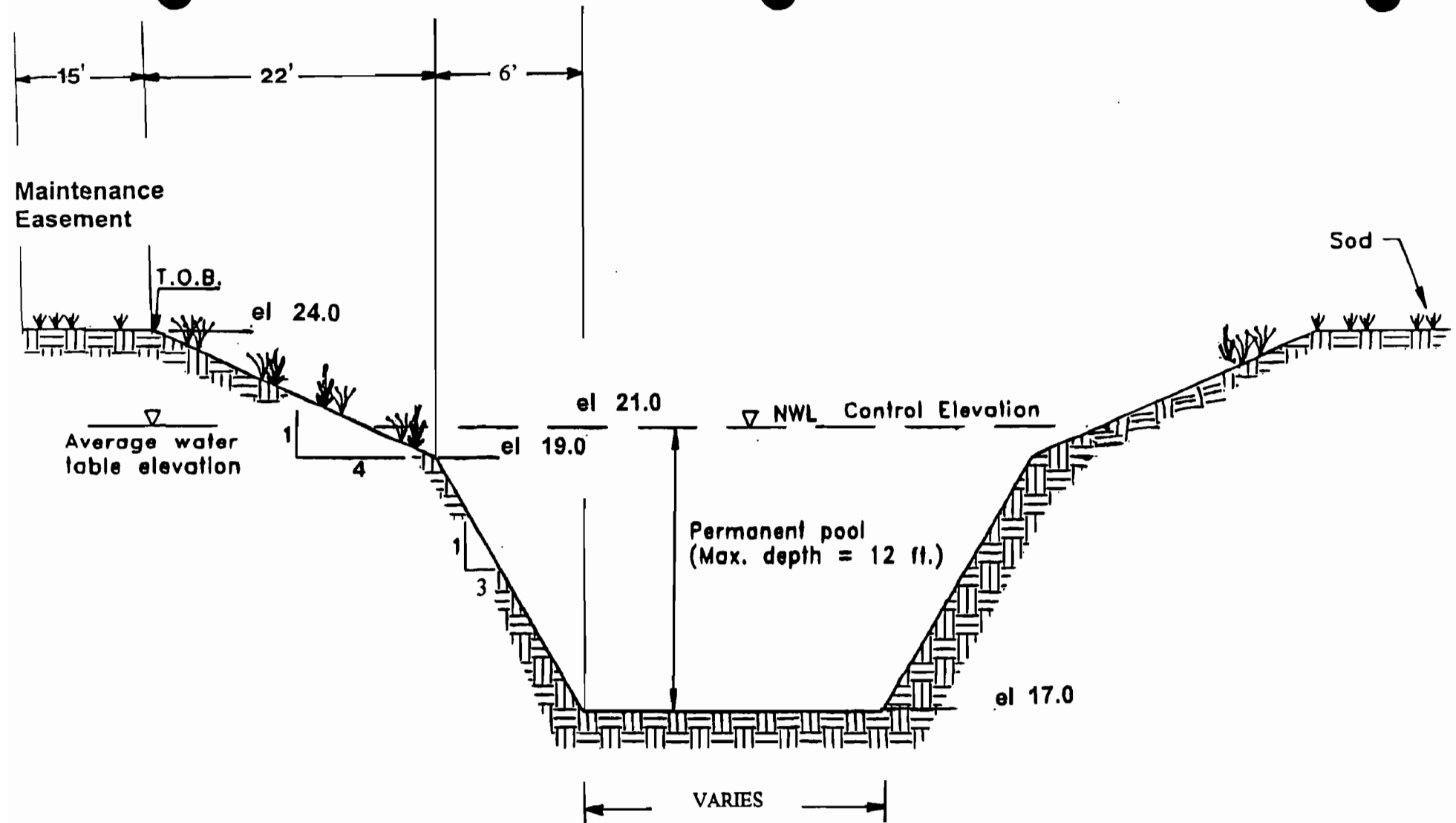
$$\begin{aligned}
 V &= A \times Q \\
 &= 50.5 \text{ ac} \times 2.78 \text{ in} \times 1 \text{ ft}/12 \text{ in}
 \end{aligned}$$

$$V = \underline{11.70} \text{ ac-ft}$$

- Find zero discharge stage corresponding to 11.72 ac-ft in *Site* stage-storage curve above weir crest elevation: interpolating, @ el 22.7 there is approx. 25.93 ac-ft
adding 11.72 ac-ft = 37.65 ac-ft
approximate stage @ 37.65 ac-ft of storage = 23.74 ft
- The maximum design head on the weir = 23.74 – 22.7 (weir crest elevation) = 1.04 ft
- Compute weir discharge, $Q = 3.13LH^{1.5}$

$$Q = 3.13 (6.60 \text{ ft})(1.04)^{1.5} = \underline{21.91} \text{ ft}^3/\text{s}$$

$$21.91 \text{ ft}^3/\text{s} < 26.46 \text{ ft}^3/\text{s} - \text{OK}$$



Wet Detention (N.T.S.)

ECT

Environmental Consulting & Technology, Inc.

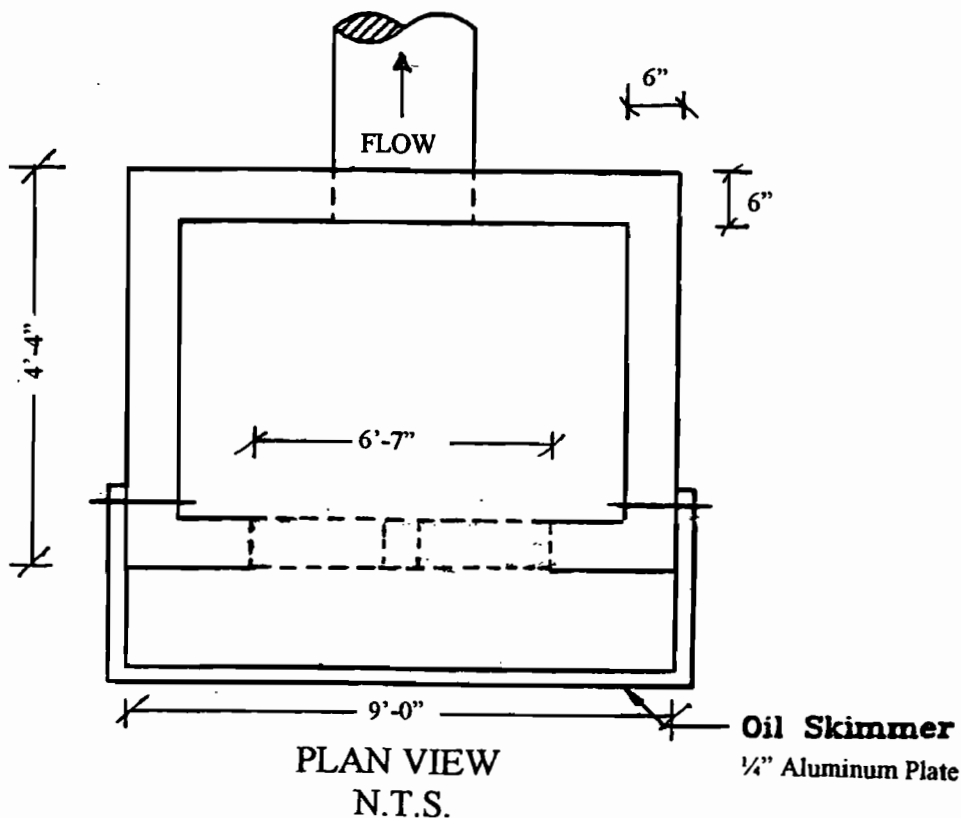
JOB _____

SHEET NO. _____ OF _____

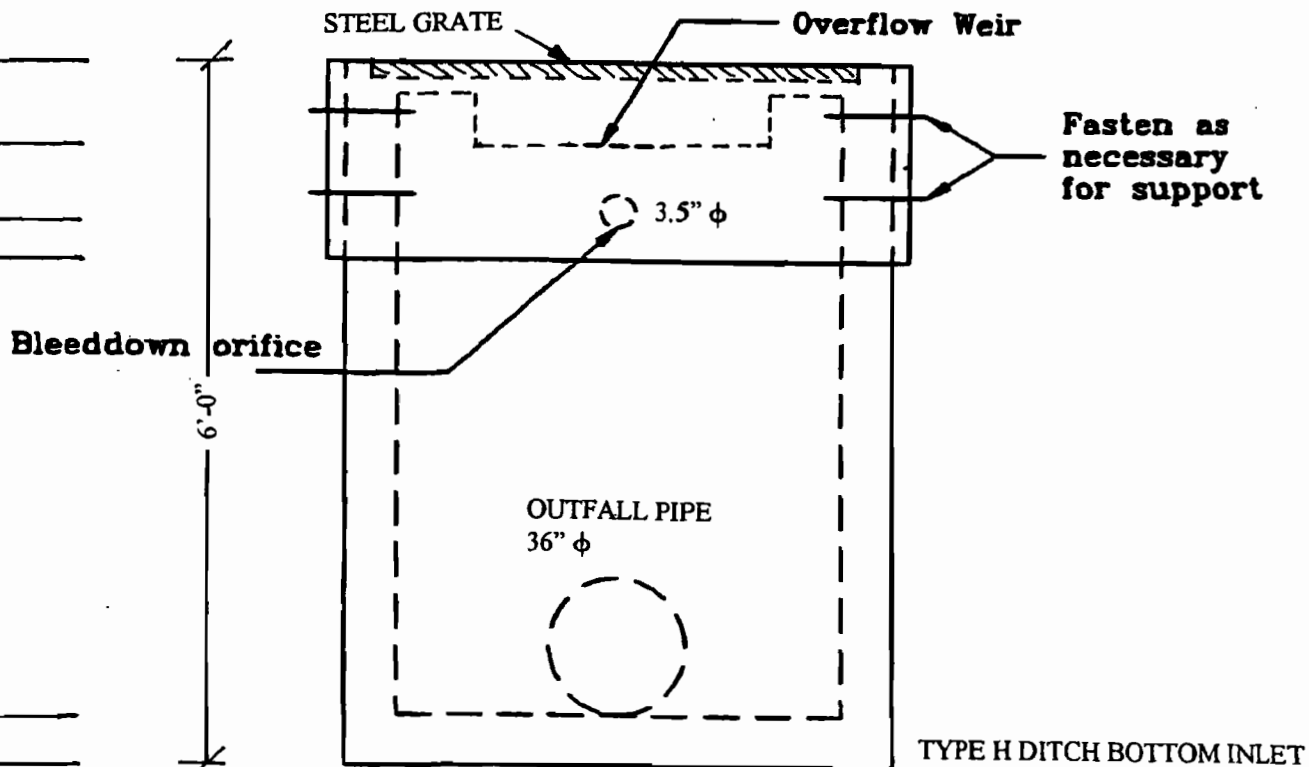
CALCULATED BY JAC DATE 9/7/00

CHECKED BY _____ DATE _____

SCALE _____



- EL 24.0 _____
- EL 22.7 _____
- EL 21.0 _____
- EL 20.5 _____



- EL 18.5 _____
- EL 18.0 _____

FRONT VIEW
N.T.S.

POND

Stage - Storage Computations

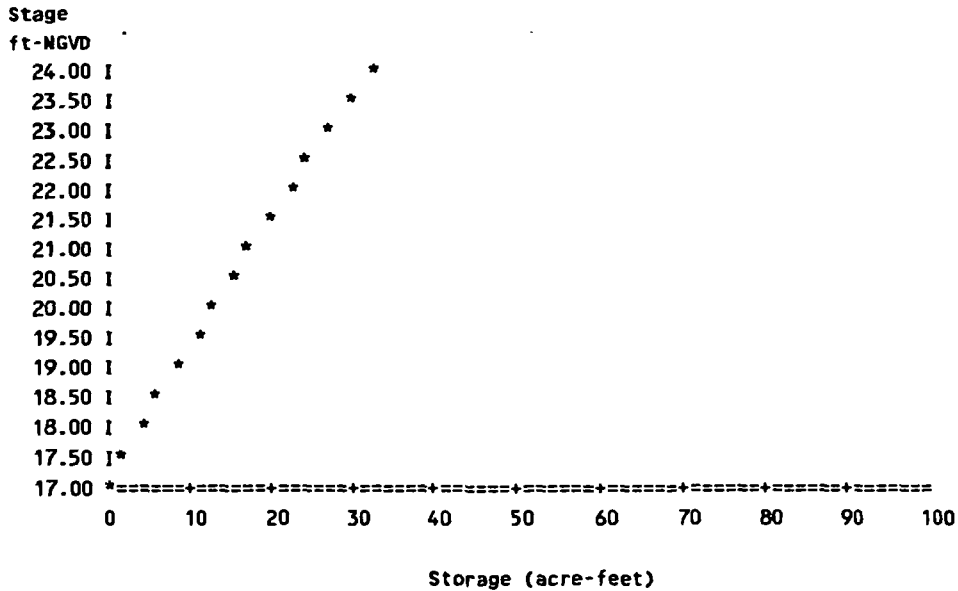
Stage Feet NGVD	4.1 ac Pond Storage ac-ft	1.1 ac PondBanks Storage ac-ft	Total Storage ac-ft
-----------------	---------------------------	--------------------------------	---------------------

```

*****          * 24
*****          **
*****          ***
*****          ****
***** 17      ***** 17
  
```

17.00	0.00	0.00	0.00
17.50	2.05	0.02	2.07
18.00	4.10	0.08	4.18
18.50	6.15	0.18	6.33
19.00	8.20	0.31	8.51
19.50	10.25	0.49	10.74
20.00	12.30	0.71	13.01
20.50	14.35	0.96	15.31
21.00	16.40	1.26	17.66
21.50	18.45	1.59	20.04
22.00	20.50	1.96	22.46
22.50	22.55	2.38	24.93
23.00	24.60	2.83	27.43
23.50	26.65	3.32	29.97
24.00	28.70	3.85	32.55

Stage vs Storage



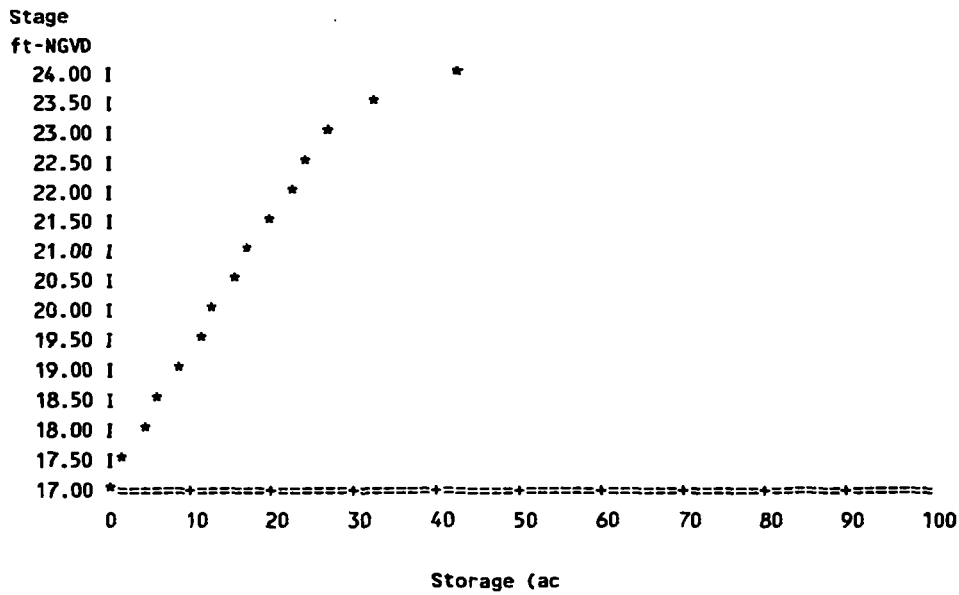
SITE

Stage - Storage Computations

Stage Feet NGVD	4.1 ac pond Storage ac-ft	1.1 ac pondbanks Storage ac-ft	21.3 ac pervious Storage ac-ft	Total Storage ac-ft
	*****	* 24	* 24	
	*****	**	**	
	*****	***	***	
	*****	****	****	
	***** 17	***** 17	***** 23	

17.00	0.00	0.00	0.00	0.00
17.50	2.05	0.02	0.00	2.07
18.00	4.10	0.08	0.00	4.18
18.50	6.15	0.18	0.00	6.33
19.00	8.20	0.31	0.00	8.51
19.50	10.25	0.49	0.00	10.74
20.00	12.30	0.71	0.00	13.01
20.50	14.35	0.96	0.00	15.31
21.00	16.40	1.26	0.00	17.66
21.50	18.45	1.59	0.00	20.04
22.00	20.50	1.96	0.00	22.46
22.50	22.55	2.38	0.00	24.93
23.00	24.60	2.83	0.00	27.43
23.50	26.65	3.32	2.66	32.63
24.00	28.70	3.85	10.65	43.20

Stage vs Storage



Hydrograph Plot

English

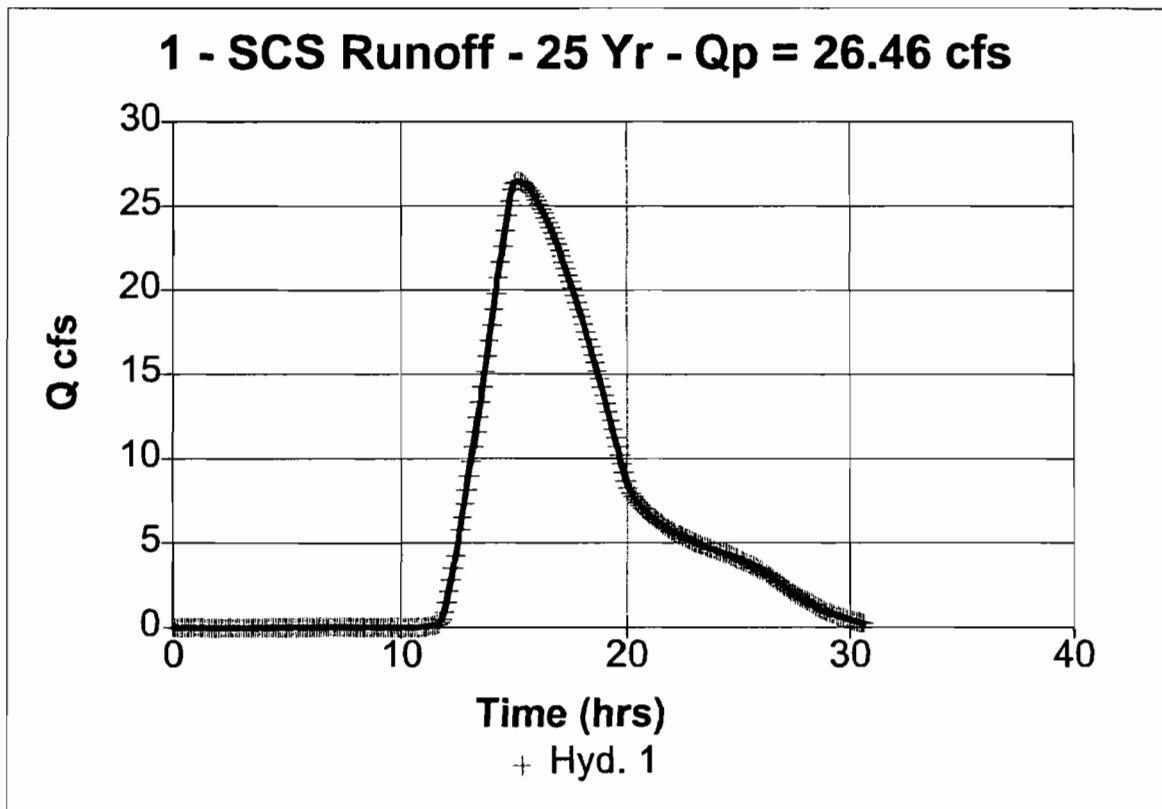
Hyd. No. 1

25yr Pre-Dev

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 50.50 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 9.00 in
Storm duration = 24 hrs

Peak discharge = 26.46 cfs
Time interval = 6 min
Curve number = 55
Hydraulic length = 800 ft
Time of conc. (Tc) = 311.5 min
Distribution = Type II
Shape factor = 484

Total Volume = 14.738 acft



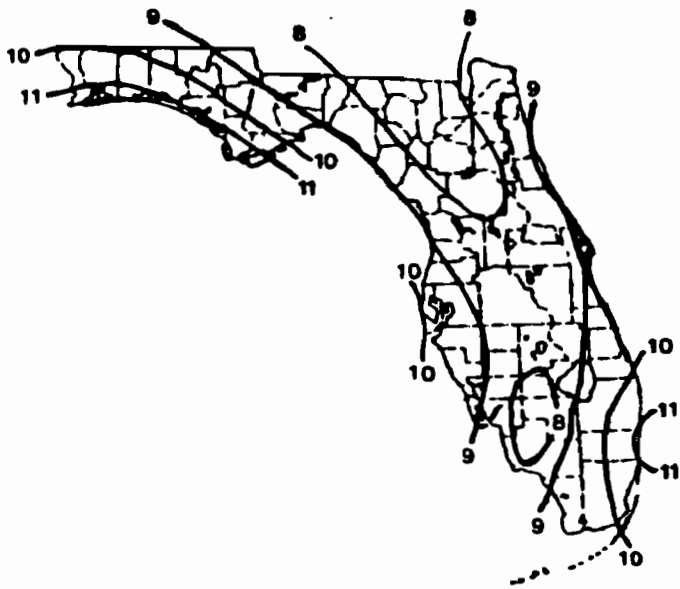


Figure 5-2d
25 Year 24 Hour Rainfall
(inches)

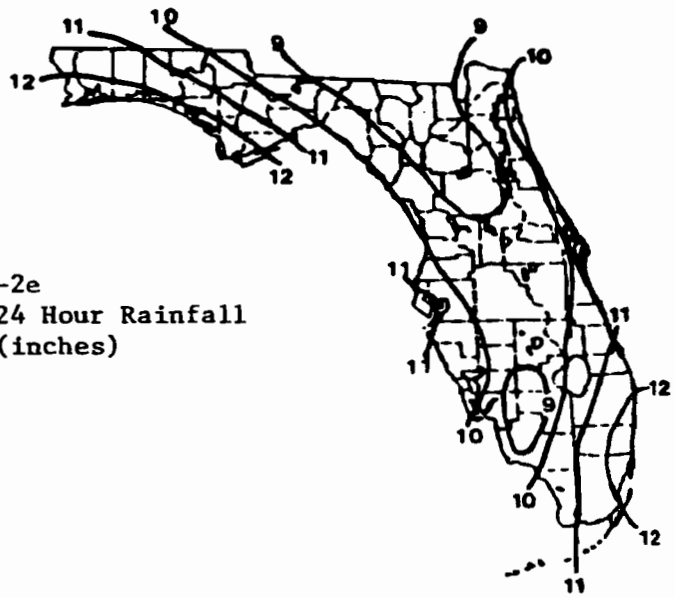


Figure 5-2e
50 Year 24 Hour Rainfall
(inches)

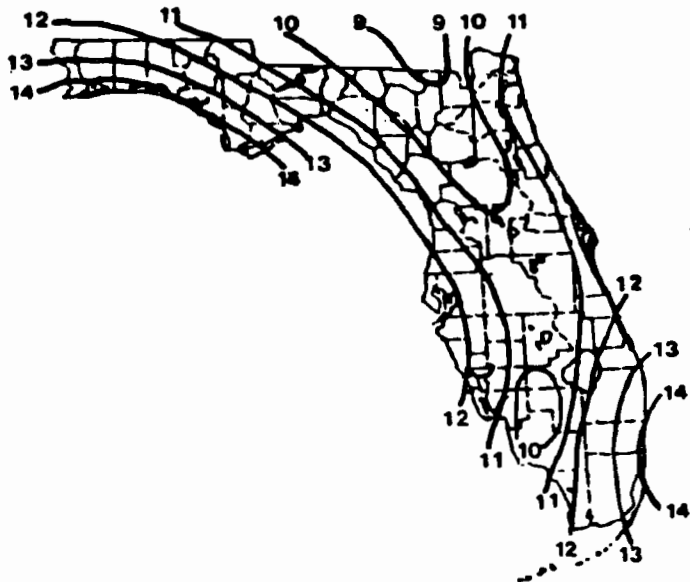


Figure 5-2f
100 Year 24 Hour Rainfall
(inches)

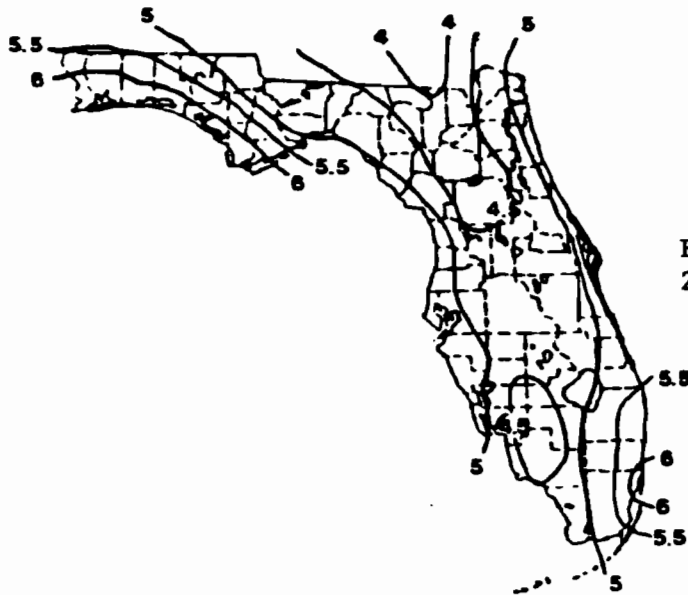


Figure 5-2.
2 Year 24 Hour Rainfall
(inches)

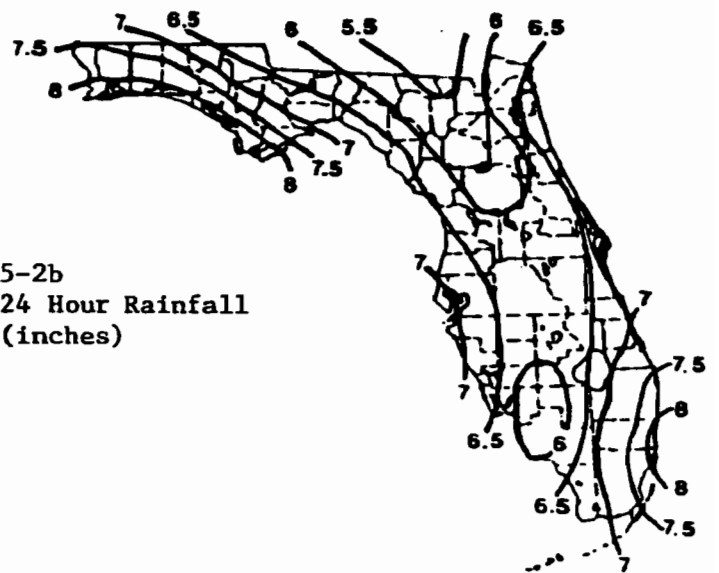


Figure 5-2b
5 Year 24 Hour Rainfall
(inches)

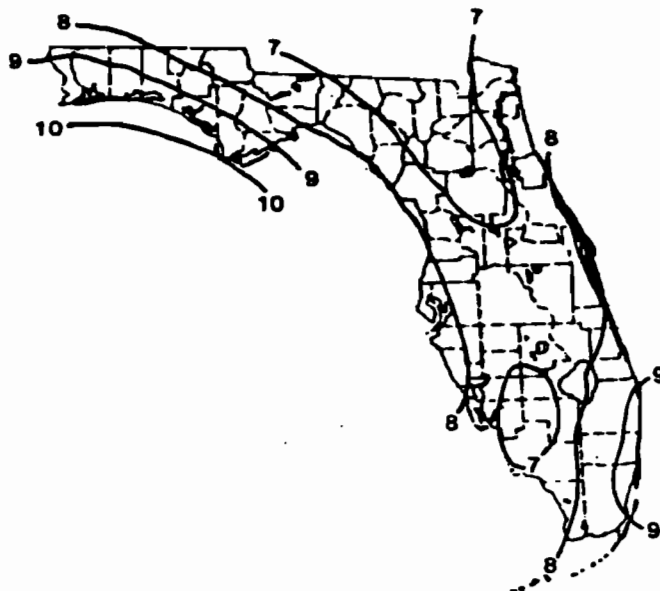


Figure 5-2c
10 Year 24 Hour Rainfall
(inches)

BHEC 25yr/1-DAY
POST-DEVELOPMENT

MULTI-BASIN ROUTING MODEL - OUTPUT

SANTA BARBARA METHOD USED FOR ROUTING

PROJECT NAME : BHEC
REVIEWER : JAC
PROJECT NUMBER - 000105-0200

THE ROUTING IS COMPLETE WHEN THE DISCHARGE FOR BASIN 1 IS REDUCED TO .35CFS

***** BASIN 1 *****

AREA - 50.50 ACRES GROUND STORAGE - 2.00 INCHES

TIME STEP - 1.00 HOURS TIME OF CONCENTRATION - .50 HOURS

RETURN FREQUENCY - 25.00 YEARS RAINFALL DISTRIBUTION : 1- DAY 24-HOUR RAINFALL - 9.00 INCHES

STAGE (FT)	STORAGE (AF)
17.00	.00
18.00	4.18
19.00	8.51
20.00	13.01
21.00	17.66
22.00	22.46
23.00	27.43
24.00	43.20

MULTI-BASIN ROUTING MODEL - OUTPUT

DISCHARGE STRUCTURE INFORMATION

STRUCT NO.	PIPE	DIAMETER (FT)	ROUGHNESS	LENGTH (FT)	WEIR	WEIR LENGTH	HEAD INVERT ELEVATION	TAIL INVERT ELEVATION	
	SLOPE (%)				WEIR CREST TYPE/ELEV				
1	.010	3.0	.012	100.00	SHARP/ 22.70	6.60	18.00	17.00	BASIN 1 TO BASIN 2

BLEEDER INFORMATION

STRUCT NO.	BLEEDER TYPE	DIAMETER OR WIDTH (FT)	ORIFICE	AREA (FT2)	V-NOTCH		
			INVERT ELEVATION (FT-NGVD)		ANGLE (DEG)	INVERT ELEVATION (FT-NGVD)	TOP ELEVATION (FT-NGVD)
1	CIRCLE	.3	21.0	.1			

OFFSITE RECEIVING WATER

TIME (HR)	STAGE (FT-NGVD)
.00	18.50
1000.00	18.50

MULTI-BASIN ROUTING MODEL - OUTPUT

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
.00	1	1	.0	.0	.0	.0	.00	17.00	1	2	
1.00	1	1	.1	.0	.0	.0	.00	17.00	1	2	NO FLOW
2.00	1	1	.2	.0	.0	.0	.00	17.00	1	2	NO FLOW
3.00	1	1	.3	.0	.0	.0	.00	17.00	1	2	NO FLOW
4.00	1	1	.4	.0	.0	.0	.00	17.00	1	2	NO FLOW
5.00	1	1	.6	.0	1.2	.7	.00	17.00	1	2	NO FLOW
6.00	1	1	.7	.1	2.8	2.0	.00	17.03	1	2	NO FLOW
7.00	1	1	1.0	.1	4.7	3.9	.00	17.09	1	2	NO FLOW
8.00	1	1	1.2	.2	6.9	6.0	.00	17.19	1	2	NO FLOW
9.00	1	1	1.5	.4	9.8	8.6	.00	17.33	1	2	NO FLOW
10.00	1	1	1.9	.7	13.6	12.2	.00	17.54	1	2	NO FLOW
11.00	1	1	2.4	1.0	22.1	18.8	.00	17.83	1	2	NO FLOW
12.00	1	1	5.9	4.0	285.8	182.9	.00	19.16	1	2	NO FLOW

MULTI-BASIN ROUTING MODEL - OUTPUT

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
13.00	1	1	6.9	5.0	32.9	60.8	.12	21.15	1	2	BLEEDER
14.00	1	1	7.4	5.4	20.0	26.6	.29	21.83	1	2	BLEEDER
15.00	1	1	7.6	5.7	13.1	15.3	.34	22.15	1	2	BLEEDER
16.00	1	1	7.9	5.9	13.1	13.4	.37	22.38	1	2	BLEEDER
17.00	1	1	8.1	6.1	7.9	8.7	.40	22.55	1	2	BLEEDER
18.00	1	1	8.2	6.3	7.9	8.0	.41	22.68	1	2	BLEEDER
19.00	1	1	8.4	6.4	7.9	7.9	1.07	22.80	1	2	WEIR
20.00	1	1	8.6	6.6	7.9	7.9	2.33	22.90	1	2	WEIR
21.00	1	1	8.7	6.7	5.3	5.7	3.24	22.96	1	2	WEIR
22.00	1	1	8.8	6.8	5.3	5.3	3.77	23.00	1	2	WEIR
23.00	1	1	8.9	6.9	5.3	5.3	3.95	23.01	1	2	WEIR
24.00	1	1	9.0	7.0	5.3	5.3	4.07	23.01	1	2	WEIR
25.00	1	1	9.0	7.0	.0	.7	3.91	23.00	1	2	WEIR
26.00	1	1	9.0	7.0	.0	.1	3.16	22.96	1	2	WEIR
27.00	1	1	9.0	7.0	.0	.0	2.46	22.91	1	2	WEIR
28.00	1	1	9.0	7.0	.0	.0	1.96	22.88	1	2	WEIR

MULTI-BASIN ROUTING MODEL - OUTPUT

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
29.00	1	1	9.0	7.0	.0	.0	1.59	22.85	1	2	WEIR
30.00	1	1	9.0	7.0	.0	.0	1.31	22.82	1	2	WEIR
31.00	1	1	9.0	7.0	.0	.0	1.10	22.80	1	2	WEIR
32.00	1	1	9.0	7.0	.0	.0	.94	22.79	1	2	WEIR
33.00	1	1	9.0	7.0	.0	.0	.81	22.77	1	2	WEIR
34.00	1	1	9.0	7.0	.0	.0	.71	22.76	1	2	WEIR
35.00	1	1	9.0	7.0	.0	.0	.63	22.75	1	2	WEIR
36.00	1	1	9.0	7.0	.0	.0	.57	22.74	1	2	WEIR
37.00	1	1	9.0	7.0	.0	.0	.52	22.73	1	2	WEIR
38.00	1	1	9.0	7.0	.0	.0	.48	22.72	1	2	WEIR
39.00	1	1	9.0	7.0	.0	.0	.44	22.71	1	2	WEIR
40.00	1	1	9.0	7.0	.0	.0	.42	22.71	1	2	WEIR
41.00	1	1	9.0	7.0	.0	.0	.41	22.70	1	2	BLEEDER
42.00	1	1	9.0	7.0	.0	.0	.41	22.69	1	2	BLEEDER
43.00	1	1	9.0	7.0	.0	.0	.41	22.68	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
44.00	1	1	9.0	7.0	.0	.0	.41	22.68	1	2	BLEEDER
45.00	1	1	9.0	7.0	.0	.0	.41	22.67	1	2	BLEEDER
46.00	1	1	9.0	7.0	.0	.0	.41	22.66	1	2	BLEEDER
47.00	1	1	9.0	7.0	.0	.0	.41	22.66	1	2	BLEEDER
48.00	1	1	9.0	7.0	.0	.0	.41	22.65	1	2	BLEEDER
49.00	1	1	9.0	7.0	.0	.0	.41	22.64	1	2	BLEEDER
50.00	1	1	9.0	7.0	.0	.0	.41	22.64	1	2	BLEEDER
51.00	1	1	9.0	7.0	.0	.0	.41	22.63	1	2	BLEEDER
52.00	1	1	9.0	7.0	.0	.0	.41	22.62	1	2	BLEEDER
53.00	1	1	9.0	7.0	.0	.0	.40	22.62	1	2	BLEEDER
54.00	1	1	9.0	7.0	.0	.0	.40	22.61	1	2	BLEEDER
55.00	1	1	9.0	7.0	.0	.0	.40	22.60	1	2	BLEEDER
56.00	1	1	9.0	7.0	.0	.0	.40	22.60	1	2	BLEEDER
57.00	1	1	9.0	7.0	.0	.0	.40	22.59	1	2	BLEEDER
58.00	1	1	9.0	7.0	.0	.0	.40	22.58	1	2	BLEEDER
59.00	1	1	9.0	7.0	.0	.0	.40	22.58	1	2	BLEEDER
60.00	1	1	9.0	7.0	.0	.0	.40	22.57	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
61.00	1	1	9.0	7.0	.0	.0	.40	22.56	1	2	BLEEDER
62.00	1	1	9.0	7.0	.0	.0	.40	22.56	1	2	BLEEDER
63.00	1	1	9.0	7.0	.0	.0	.40	22.55	1	2	BLEEDER
64.00	1	1	9.0	7.0	.0	.0	.40	22.54	1	2	BLEEDER
65.00	1	1	9.0	7.0	.0	.0	.39	22.54	1	2	BLEEDER
66.00	1	1	9.0	7.0	.0	.0	.39	22.53	1	2	BLEEDER
67.00	1	1	9.0	7.0	.0	.0	.39	22.52	1	2	BLEEDER
68.00	1	1	9.0	7.0	.0	.0	.39	22.52	1	2	BLEEDER
69.00	1	1	9.0	7.0	.0	.0	.39	22.51	1	2	BLEEDER
70.00	1	1	9.0	7.0	.0	.0	.39	22.50	1	2	BLEEDER
71.00	1	1	9.0	7.0	.0	.0	.39	22.50	1	2	BLEEDER
72.00	1	1	9.0	7.0	.0	.0	.39	22.49	1	2	BLEEDER
73.00	1	1	9.0	7.0	.0	.0	.39	22.48	1	2	BLEEDER
74.00	1	1	9.0	7.0	.0	.0	.39	22.48	1	2	BLEEDER
75.00	1	1	9.0	7.0	.0	.0	.39	22.47	1	2	BLEEDER
76.00	1	1	9.0	7.0	.0	.0	.39	22.47	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
77.00	1	1	9.0	7.0	.0	.0	.38	22.46	1	2	BLEEDER
78.00	1	1	9.0	7.0	.0	.0	.38	22.45	1	2	BLEEDER
79.00	1	1	9.0	7.0	.0	.0	.38	22.45	1	2	BLEEDER
80.00	1	1	9.0	7.0	.0	.0	.38	22.44	1	2	BLEEDER
81.00	1	1	9.0	7.0	.0	.0	.38	22.43	1	2	BLEEDER
82.00	1	1	9.0	7.0	.0	.0	.38	22.43	1	2	BLEEDER
83.00	1	1	9.0	7.0	.0	.0	.38	22.42	1	2	BLEEDER
84.00	1	1	9.0	7.0	.0	.0	.38	22.41	1	2	BLEEDER
85.00	1	1	9.0	7.0	.0	.0	.38	22.41	1	2	BLEEDER
86.00	1	1	9.0	7.0	.0	.0	.38	22.40	1	2	BLEEDER
87.00	1	1	9.0	7.0	.0	.0	.38	22.40	1	2	BLEEDER
88.00	1	1	9.0	7.0	.0	.0	.37	22.39	1	2	BLEEDER
89.00	1	1	9.0	7.0	.0	.0	.37	22.38	1	2	BLEEDER
90.00	1	1	9.0	7.0	.0	.0	.37	22.38	1	2	BLEEDER
91.00	1	1	9.0	7.0	.0	.0	.37	22.37	1	2	BLEEDER
92.01	1	1	9.0	7.0	.0	.0	.37	22.36	1	2	BLEEDER
93.01	1	1	9.0	7.0	.0	.0	.37	22.36	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
94.01	1	1	9.0	7.0	.0	.0	.37	22.35	1	2	BLEEDER
95.01	1	1	9.0	7.0	.0	.0	.37	22.35	1	2	BLEEDER
96.01	1	1	9.0	7.0	.0	.0	.37	22.34	1	2	BLEEDER
97.01	1	1	9.0	7.0	.0	.0	.37	22.33	1	2	BLEEDER
98.01	1	1	9.0	7.0	.0	.0	.37	22.33	1	2	BLEEDER
99.01	1	1	9.0	7.0	.0	.0	.37	22.32	1	2	BLEEDER
100.01	1	1	9.0	7.0	.0	.0	.36	22.32	1	2	BLEEDER
101.01	1	1	9.0	7.0	.0	.0	.36	22.31	1	2	BLEEDER
102.01	1	1	9.0	7.0	.0	.0	.36	22.30	1	2	BLEEDER
103.01	1	1	9.0	7.0	.0	.0	.36	22.30	1	2	BLEEDER
104.01	1	1	9.0	7.0	.0	.0	.36	22.29	1	2	BLEEDER
105.01	1	1	9.0	7.0	.0	.0	.36	22.29	1	2	BLEEDER
106.01	1	1	9.0	7.0	.0	.0	.36	22.28	1	2	BLEEDER
107.01	1	1	9.0	7.0	.0	.0	.36	22.27	1	2	BLEEDER
108.01	1	1	9.0	7.0	.0	.0	.36	22.27	1	2	BLEEDER
109.01	1	1	9.0	7.0	.0	.0	.36	22.26	1	2	BLEEDER

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
110.01	1	1	9.0	7.0	.0	.0	.36	22.26	1	2	BLEEDER
111.01	1	1	9.0	7.0	.0	.0	.36	22.25	1	2	BLEEDER
112.01	1	1	9.0	7.0	.0	.0	.35	22.24	1	2	BLEEDER
113.01	1	1	9.0	7.0	.0	.0	.35	22.24	1	2	BLEEDER
114.01	1	1	9.0	7.0	.0	.0	.35	22.23	1	2	BLEEDER
115.01	1	1	9.0	7.0	.0	.0	.35	22.23	1	2	BLEEDER
116.01	1	1	9.0	7.0	.0	.0	.35	22.22	1	2	BLEEDER
117.01	1	1	9.0	7.0	.0	.0	.35	22.21	1	2	BLEEDER

MULTI-BASIN ROUTING MODEL - OUTPUT

STRUCTURE NO.	PEAK DISCHARGE (CFS)	TIME OF QPEAK	PEAK STAGE (FT-NGVD)	TIME OF HPEAK
1	4.1	24.1	23.0	24.1

BASIN NO.	TOTAL INFLOW (AC-FT)	TOTAL RUNOFF (AC-FT)	TOTAL OUTFLOW (AC-FT)	FINAL TIME (HOURS)	FINAL STAGE (FT-NGVD)	FINAL STORAGE (AC-FT)
1	.00	29.36	5.85	117.64	22.21	23.51

STORMWATER MANAGEMENT CALCULATIONS CONSTRUCTION LAYDOWN AREA

LAND USE

Total

Project Area:	30.0 acres
Impervious	26.73 acres
Gravel/Crushed Stone:	26.73 acres
Detention Pond:	2.70 acres
Pond 15' Maint. Easement (Perv.)	0.57 acres

SITE DATA

Proposed Elevations

Laydown Area/Parking:	24.0' NGVD
Site (Avg.):	24.0' NGVD

Average Water Table Elevation:	21.0' NGVD
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Receiving Body Tailwater Elevation (IRFWCD Canals – Upper Pool)	18.5 ' NGVD
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Floodplain Base Elevation:	ZONE X – Area outside of 500-year flood plain
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HYDROLOGY

Rainfall

10-yr/24-hr Storm:	8.0 inches
25-yr/24-hr Storm:	9.0 inches
100-yr/24-hr Storm:	11.5 inches
Total Wet Season Rainfall (153 days, June – October):	32.0 inches

Soils

<u>Land Use</u>	<u>Hydrologic Group.</u>	<u>Area (ac)</u>	<u>SCS Curve No.</u>
Abandoned Citrus Groves	B/D	30.0	55

STAGE-STORAGE

- ▶ 27.3 acres of site area provide linear storage starting at el. 23.0' NGVD
- ▶ 2.0 acres of pond surface area provide vertical storage starting at el. 19.0' NGVD
- ▶ 0.7 acre of pond banks provide linear storage starting at el. 19.0' NGVD

Please refer to stage-storage table for specific storage information.

SCS PRE-DEVELOPMENT RUNOFF

25-year storm, P = 9.0"

Soil Storage (S)

$$\begin{aligned} S &= 1000/CN - 10 \\ &= 1000/55 - 10 \\ S &= \underline{8.18} \text{ inches} \end{aligned}$$

Runoff Depth (Q)

$$\begin{aligned} Q &= \frac{(P - .2S)^2}{(P + .8S)} \\ &= \frac{(9.0 - .2(8.18))^2}{(9.0 + .8(8.18))} \\ Q &= \underline{3.49} \text{ inches} \end{aligned}$$

Runoff (V)

$$\begin{aligned} V &= A \times Q \\ &= 30.0 \text{ ac} \times 3.49 \text{ in} \times 1\text{ft}/12 \text{ in} \\ V &= \underline{8.72} \text{ ac-ft} \end{aligned}$$

Allowable runoff volume based on IRC 2" over 24-hour period

$$\begin{aligned} V &= 30.0 \text{ ac} \times 2.0 \text{ in} \times 1\text{ft}/12 \text{ in} \\ V &= \underline{5.0} \text{ ac-ft} \end{aligned}$$

Peak Discharge Rate (Q₂₅) from SCS Runoff Hydrograph, 25-year storm event

$$Q_{25} = \underline{17.51} \text{ ft}^3/\text{s}$$

WET DETENTION POND DESIGN

WATER QUALITY TREATMENT VOLUME (V_Q) BASED ON:

1.0" over the project site

$$V_Q = 1.0" \times 30.0 \text{ ac} \times 1'/12" = \underline{2.5} \text{ ac-ft.}$$

2.5" over the impervious area (excludes pond area)

Note: Gravel area is considered 50% impervious (as per SJRWMD Staff)

$$V_Q = 2.5'' \times (30.0 - 3.27)(.50) \times 1'/12'' = 2.78 \text{ ac-ft.}$$

Thus the required treatment volume is 2.78 ac-ft.

PERMANENT WET POOL VOLUME (PPV)

Based on 14 day residence time with Littoral Zone Option

$$PPV = A \times C \times P \times R \times 1'/12''$$

A = Contributing Area

C = Composite Rational Runoff Number

P = Historic Average Wet Season Rainfall [153 days, June – October] (32"/153d)

R = Residence Time (14 days)

$$C = 0.35$$

$$PPV = 30.0 \text{ ac} \times .35 \times 32'' \times 14\text{d}/153\text{d} \times 1'/12'' = \underline{2.56} \text{ ac-ft}$$

Based on no littoral zone option (21 day residence time)

$$PPV = 30.0 \text{ ac} \times .35 \times 32'' \times 21\text{d}/153\text{d} \times 1'/12'' = \underline{3.84} \text{ ac-ft}$$

PPV from pond stage-storage = 4.28 ac-ft @ control elev. 21.0' NGVD. - OK

MEAN DEPTH OF POND (MD)

$$MD = PPV/A_P$$

A_P = Area of pond measured at the control elevation (21.0' NGVD)

@ el 19 - 2.0 ac

@ el 21 - X? ac $X = 2.0 \text{ ac} + (2.7 \text{ ac} - 2.0 \text{ ac})(21-19)/(24-19) = \underline{2.18} \text{ ac}$

@ el 24 - 2.7 ac

$$MD = 4.28 \text{ ac-ft} / 2.18 \text{ ac} = \underline{2.0} \text{ ft.} - \text{OK (between 2' and 8').}$$

CONTROL STRUCTURE

- ▶ The required water quality treatment volume from pond design, $V = \underline{2.78}$ ac-ft
- ▶ The IRC 2"/24 hr maximum discharge volume, $V = \underline{5.0}$ ac-ft
- ▶ Set invert of bleeddown orifice at the control (NWL) el. = 21.0' NGVD
- ▶ Set overflow weir at the top of the treatment volume storage to discharge runoff volume greater than WQ treatment volume or IRC 2"/24hr volume, whichever is more restrictive.

- From pond stage-storage curve, interpolate between elevation 21.0 and 24.0.

$$\text{Weir elev.} = 21 \text{ ft} + (24 \text{ ft} - 21 \text{ ft}) \frac{(5.0 \text{ ac-ft})}{(11.75 \text{ ac-ft} - 4.28 \text{ ac-ft})} = \underline{23.0} \text{ ft.}$$

- set weir crest @ el. = 23.0' NGVD
- ▶ Size a circular orifice to discharge 2"/24hr volume in 24 hours or 1/2 of water quality treatment volume in 48 hrs (the latter is more restrictive).

- Treatment volume depth (h_1) = $21 \text{ ft} + (24 \text{ ft} - 21 \text{ ft}) \frac{(2.78 \text{ ac-ft})}{(11.75 \text{ ac-ft} - 4.28 \text{ ac-ft})} = \underline{22.11} \text{ ft.}$

- Calculate the stage at half the treatment volume.

$$\text{Stage for } \frac{1}{2} \text{ of treatment volume} = 21 \text{ ft} + (24 \text{ ft} - 21 \text{ ft}) \frac{\frac{1}{2} (2.78 \text{ ac-ft})}{(11.75 \text{ ac-ft} - 4.28 \text{ ac-ft})} = \underline{21.56} \text{ ft.}$$

- 1/2 treatment volume depth (h_2) = $22.11 \text{ ft} - 21.56 \text{ ft} = \underline{0.55} \text{ ft}$

- Average depth above orifice invert (h) = $\frac{(h_1 + h_2)}{2} = \frac{(22.11 \text{ ft} + 0.55)}{2} = \underline{0.83} \text{ ft}$

- Average flow rate (Q) required to draw down 1/2 the treatment volume in 48 hours,

$$Q = \frac{TV}{2tCF}, \quad \begin{array}{l} TV = \text{Treatment Volume (ft}^3\text{)} \\ t = \text{Recovery Time} \\ CF = \text{Conversion Factor} = 3600 \text{ sec/hr} \end{array}$$

$$Q = \frac{(1.39 \text{ ac-ft} \times 43,560 \text{ ft/ac})}{2 (48\text{hr})(3600\text{sec/hr})} = \underline{0.18} \text{ ft}^3/\text{s}$$

- Find the cross-sectional area (A) of the orifice

$$\begin{aligned} A &= Q/C (2gh)^{1/2}, \quad C \text{ (orifice coefficient)} = 0.6, \quad g = 32.2\text{ft/sec}^2 \\ &= \frac{0.18 \text{ ft}^3/\text{s}}{0.6(2 \times 32.2 \times 0.75)^{1/2}} \\ &= \underline{0.04} \text{ ft}^2 \end{aligned}$$

- Find the orifice diameter (D)

$$\begin{aligned}
 D &= [4(A)/\pi]^{1/2} \\
 &= [4(0.04 \text{ ft}^2)/3.1416]^{1/2} \\
 &= 0.23 \text{ ft} = \underline{2.8 \text{ in}}
 \end{aligned}$$

Thus the bleeddown will be provided by an 2.8 ” diameter circular orifice.

► Determine weir crest length

- 25 year runoff = 8.72 ac-ft
- Find zero discharge stage corresponding to 8.72 ac-ft in *Site* stage-storage curve above weir crest elevation: @ el 23.0 there is approx. 9.12 ac-ft
adding 8.72 ac-ft = 17.84 ac-ft
approximate stage @ 17.84 ac-ft of storage = 23.67 ft NGVD
- The maximum design head on the weir = 23.67 – 23.0 (weir crest elevation) = 0.67 ft
- Compute weir length

$$\text{Peak pre-development discharge} = \underline{17.51 \text{ ft}^3/\text{s}}$$

$$\text{Basic discharge equation } Q = 3.13LH^{1.5}, \text{ Solving for } L, L = Q/3.13H^{1.5}$$

$$L = 17.51 \text{ ft}^3/\text{s} / 3.13(0.67)^{1.5} = \underline{10.20 \text{ ft}}$$

The weir crest length is 10.20 ft

The control structure is a 10.20’ wide weir with a crest at elevation 23.0’ NGVD and a 2.8” diameter orifice with an invert at elevation 21.0’ NGVD.

► Check discharge for 10-year storm event utilizing control structure

10-year storm, P = 8.0”

Runoff Depth (Q)

$$\begin{aligned}
 Q &= \frac{(P - .2S)^2}{(P + .8S)} \\
 &= \frac{(8.0 - .2(8.18))^2}{(8.0 + .8(8.18))} \\
 Q &= \underline{2.78 \text{ inches}}
 \end{aligned}$$

Runoff (V)

$$\begin{aligned}
 V &= A \times Q \\
 &= 30.0 \text{ ac} \times 2.78 \text{ in} \times 1\text{ft}/12 \text{ in} \\
 V &= \underline{6.95 \text{ ac-ft}}
 \end{aligned}$$

- Find zero discharge stage corresponding to 6.95 ac-ft in *Site* stage-storage curve above weir crest elevation: @ el 23.0 there is approx. 9.12 ac-ft
adding 6.95 ac-ft = 16.07 ac-ft
approximate stage @ 16.07 ac-ft of storage = 23.60 ft NGVD
- The maximum design head on the weir = 23.6 – 23.0 (weir crest elevation) = 0.60 ft
- Compute weir discharge, $Q = 3.13LH^{1.5}$
 $Q = 3.13 (10.2 \text{ ft})(0.60)^{1.5} = \underline{14.83} \text{ ft}^3/\text{s}$
 $14.83 \text{ ft}^3/\text{s} < 17.51 \text{ ft}^3/\text{s} - \text{OK}$

Hydrograph Plot

English

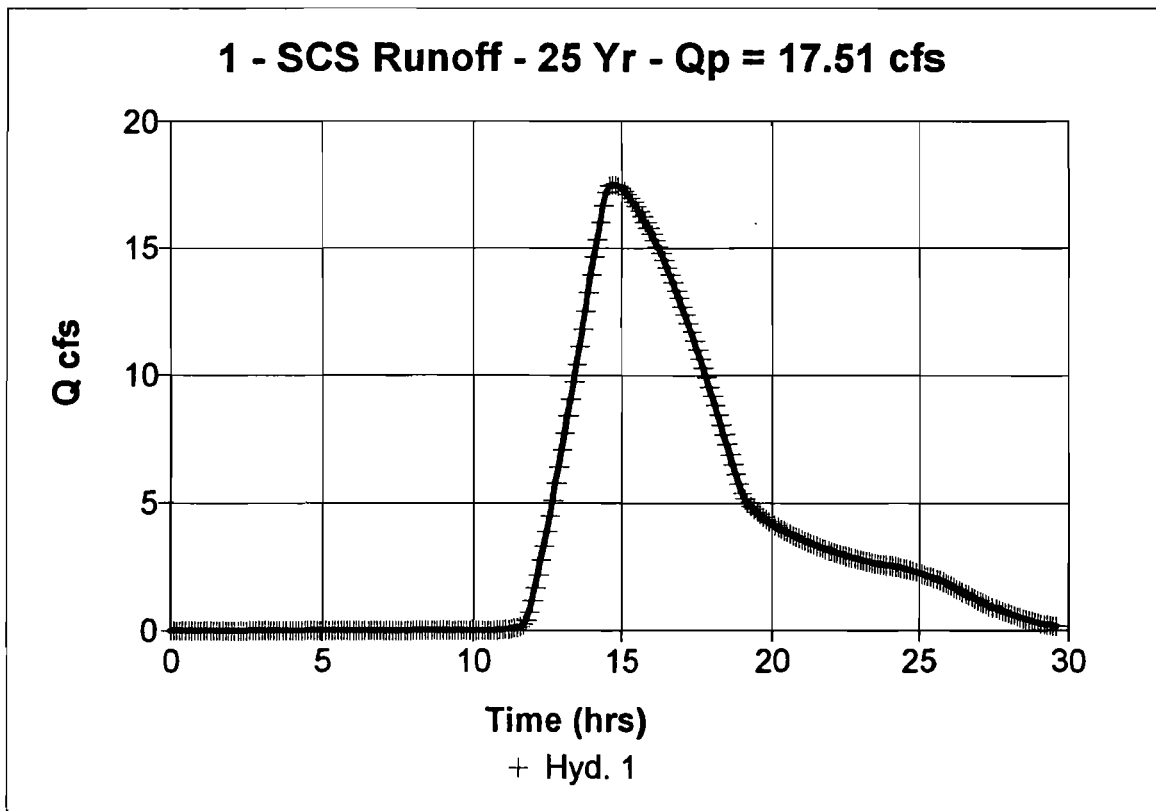
Hyd. No. 1

Constr.Ldwn Area 25yr PreDev

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 30.00 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 9.00 in
Storm duration = 24 hrs

Peak discharge = 17.51 cfs
Time interval = 6 min
Curve number = 55
Hydraulic length = 600 ft
Time of conc. (Tc) = 267.7 min
Distribution = Type II
Shape factor = 484

Total Volume = 8.720 acft



Stage - Storage Computations

CONSTRUCTION
LAYDOWN AREA

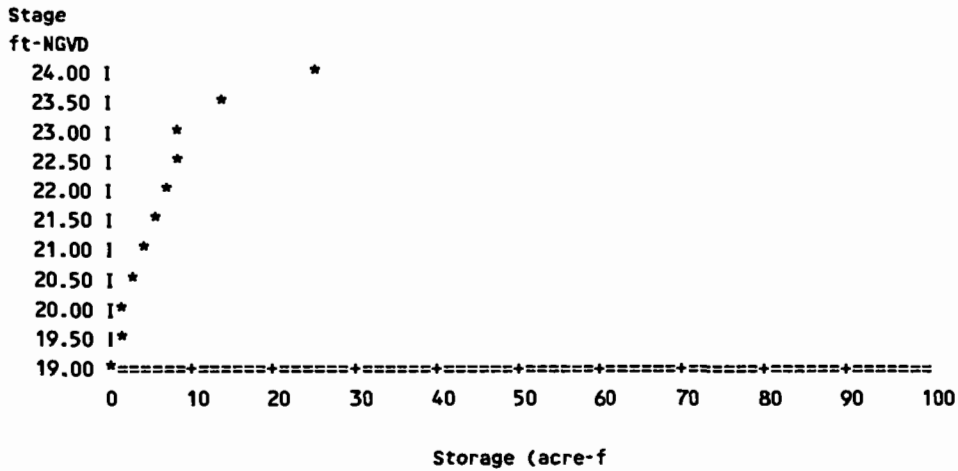
Stage Feet NGVD	2 ac POND Storage ac-ft	.7 ac PONDBANKS Storage ac-ft	27.3 ac SITE Storage ac-ft	Total Storage ac-ft
-----------------	-------------------------	-------------------------------	----------------------------	---------------------

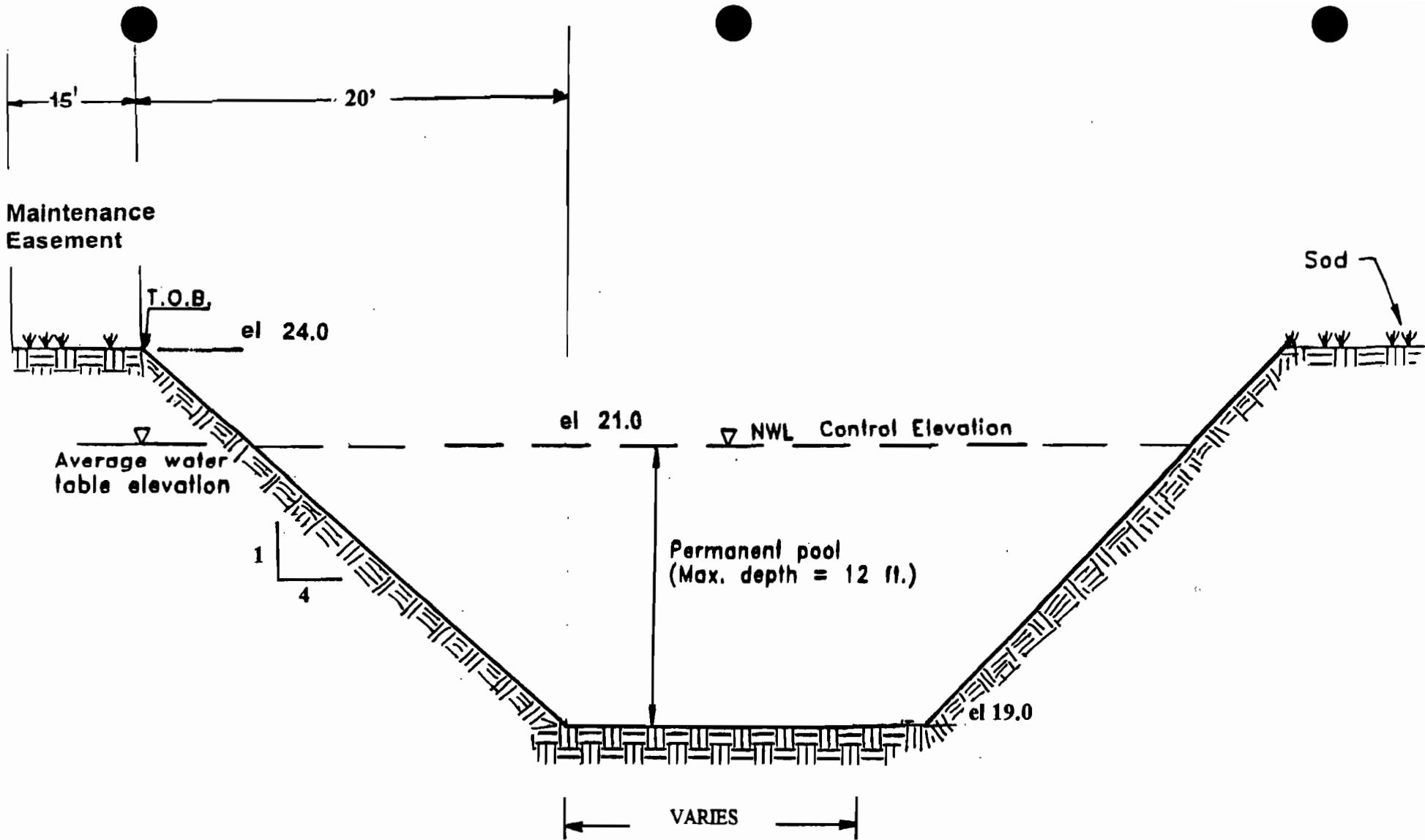
```

*****          * 24          * 24
*****          **           **
*****          ***           ***
*****          ****          ****
***** 19      ***** 19    ***** 23
    
```

19.00	0.00	0.00	0.00	0.00
19.50	1.00	0.02	0.00	1.02
20.00	2.00	0.07	0.00	2.07
20.50	3.00	0.16	0.00	3.16
21.00	4.00	0.28	0.00	4.28
21.50	5.00	0.44	0.00	5.44
22.00	6.00	0.63	0.00	6.63
22.50	7.00	0.86	0.00	7.86
23.00	8.00	1.12	0.00	9.12
23.50	9.00	1.42	3.41	13.83
24.00	10.00	1.75	13.65	25.40

Stage vs Storage





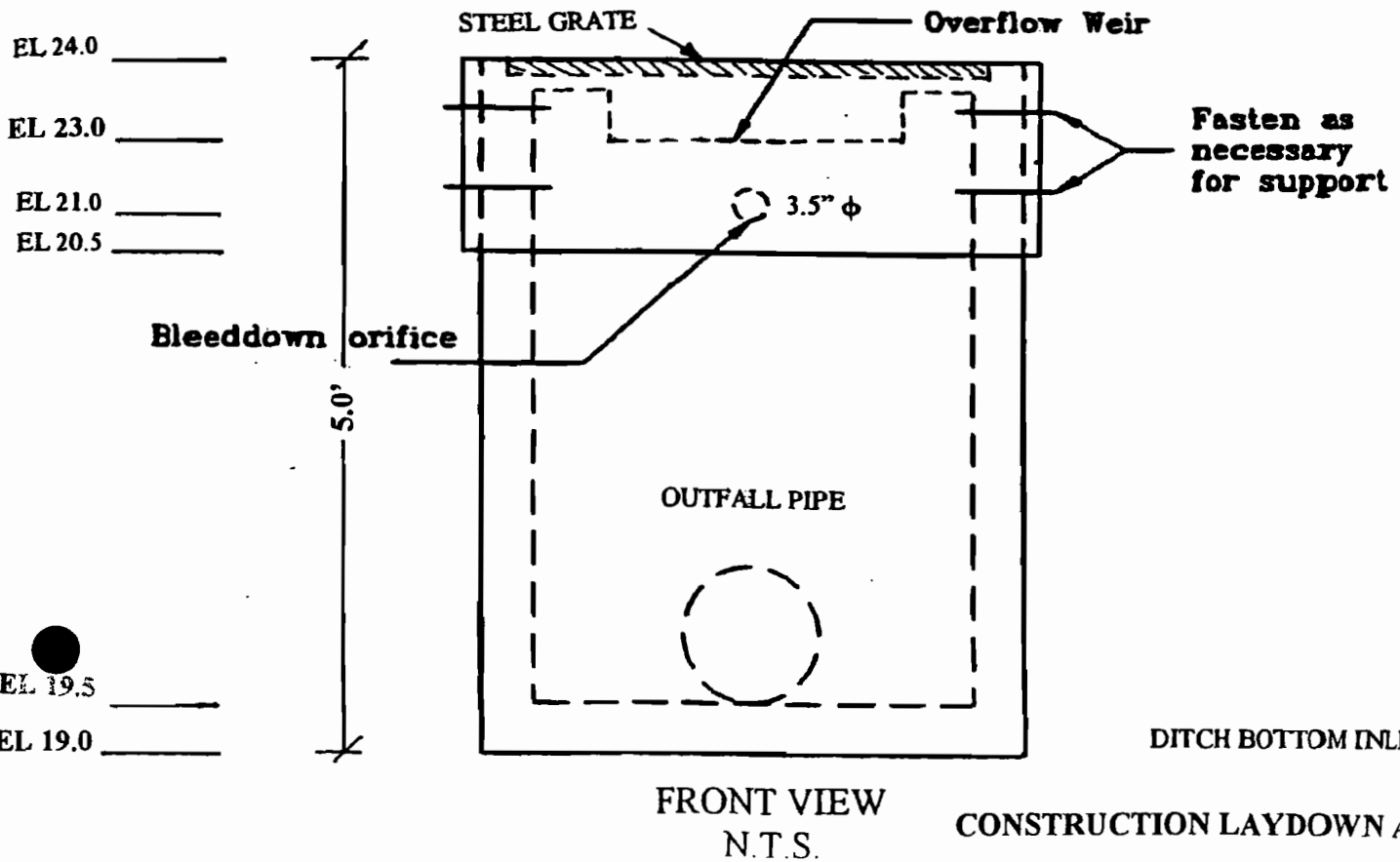
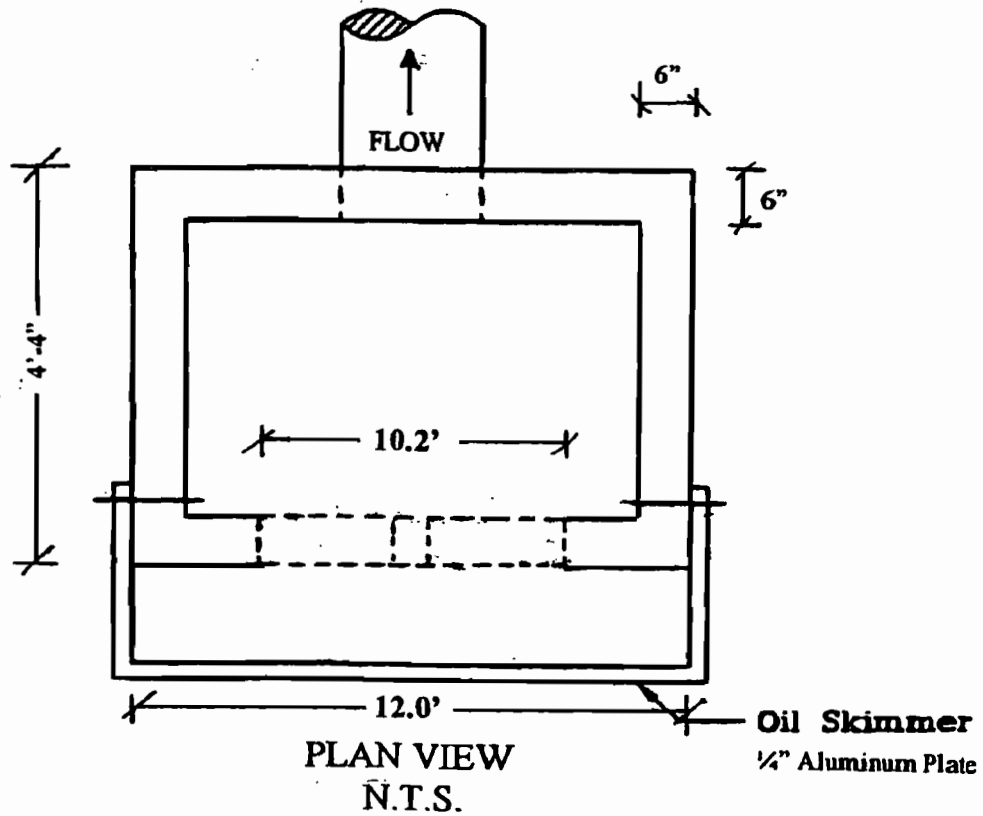
Wet Detention (N.T.S.)

CONSTRUCTION LAYDOWN AREA

ECT

Environmental Consulting & Technology, Inc.

JOB _____
SHEET NO. _____ OF _____
CALCULATED BY JAC DATE 9/2/00
CHECKED BY _____ DATE _____
SCALE _____



BHEC
CONSTRUCTION LAYDOWN AREA
25 YR / 1-DAY POST DEVELOPMENT

MULTI-BASIN ROUTING MODEL - OUTPUT

SANTA BARBARA METHOD USED FOR ROUTING

PROJECT NAME : BHEC
 REVIEWER : JAC
 PROJECT NUMBER - 000105-0200

THE ROUTING IS COMPLETE WHEN THE DISCHARGE FOR BASIN 1 IS REDUCED TO .35CFS

***** BASIN 1 *****

AREA - 30.00 ACRES GROUND STORAGE - 2.00 INCHES

TIME STEP - 1.00 HOURS TIME OF CONCENTRATION - .50 HOURS

RETURN FREQUENCY - 25.00 YEARS RAINFALL DISTRIBUTION : 1- DAY 24-HOUR RAINFALL - 9.00 INCHES

STAGE (FT)	STORAGE (AF)
19.00	.00
20.00	2.07
21.00	4.28
22.00	6.63
23.00	9.12
24.00	25.40

DISCHARGE STRUCTURE INFORMATION

STRUCT NO.	PIPE		ROUGHNESS	LENGTH (FT)	WEIR		HEAD INVERT ELEVATION	TAIL INVERT ELEVATION	
	SLOPE (%)	DIAMETER (FT)			WEIR CREST TYPE/ELEV	WEIR LENGTH			
1	.017	2.0	.012	30.00	SHARP/ 23.00	10.20	19.50	19.00	BASIN 1 TO BASIN 2

MULTI-BASIN ROUTING MODEL - OUTPUT

BLEEDER INFORMATION

STRUCT NO.	BLEEDER TYPE	DIAMETER OR WIDTH (FT)	ORIFICE		V-NOTCH		TOP ELEVATION (FT-NGVD)
			INVERT ELEVATION (FT-NGVD)	AREA (FT2)	ANGLE (DEG)	INVERT ELEVATION (FT-NGVD)	
1	CIRCLE	.3	21.0	.0			

OFFSITE RECEIVING WATER

<u>TIME (HR)</u>	<u>STAGE (FT-NGVD)</u>
.00	18.50
1000.00	18.50

SUMMARY REPORT

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
.00	1	1	.0	.0	.0	.0	.00	19.00	1	2	
1.00	1	1	.1	.0	.0	.0	.00	19.00	1	2	NO FLOW
2.00	1	1	.2	.0	.0	.0	.00	19.00	1	2	NO FLOW
3.00	1	1	.3	.0	.0	.0	.00	19.00	1	2	NO FLOW
4.00	1	1	.4	.0	.0	.0	.00	19.00	1	2	NO FLOW
5.00	1	1	.6	.0	.7	.4	.00	19.01	1	2	NO FLOW
6.00	1	1	.7	.1	1.6	1.2	.00	19.04	1	2	NO FLOW
7.00	1	1	1.0	.1	2.8	2.3	.00	19.11	1	2	NO FLOW
8.00	1	1	1.2	.2	4.1	3.5	.00	19.22	1	2	NO FLOW
9.00	1	1	1.5	.4	5.8	5.1	.00	19.40	1	2	NO FLOW
10.00	1	1	1.9	.7	8.1	7.2	.00	19.64	1	2	NO FLOW
11.00	1	1	2.4	1.0	13.1	11.2	.00	20.00	1	2	NO FLOW
12.00	1	1	5.9	4.0	169.8	108.7	.17	21.51	1	2	BLEEDER
13.00	1	1	6.9	5.0	19.5	36.1	1.48	23.11	1	2	WEIR
14.00	1	1	7.4	5.4	11.9	15.8	3.51	23.21	1	2	WEIR
15.00	1	1	7.6	5.7	7.8	9.1	4.41	23.25	1	2	WEIR
16.00	1	1	7.9	5.9	7.8	8.0	4.87	23.27	1	2	WEIR
17.00	1	1	8.1	6.1	4.7	5.1	5.02	23.28	1	2	WEIR
18.00	1	1	8.2	6.3	4.7	4.8	5.00	23.28	1	2	WEIR
19.00	1	1	8.4	6.4	4.7	4.7	4.97	23.28	1	2	WEIR
20.00	1	1	8.6	6.6	4.7	4.7	4.94	23.27	1	2	WEIR

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
21.00	1	1	8.7	6.7	3.1	3.4	4.80	23.27	1	2	WEIR
22.00	1	1	8.8	6.8	3.1	3.2	4.62	23.26	1	2	WEIR
23.00	1	1	8.9	6.9	3.1	3.2	4.45	23.25	1	2	WEIR
24.00	1	1	9.0	7.0	3.2	3.1	4.30	23.25	1	2	WEIR
25.00	1	1	9.0	7.0	.0	.4	3.97	23.23	1	2	WEIR
26.00	1	1	9.0	7.0	.0	.1	3.55	23.22	1	2	WEIR
27.00	1	1	9.0	7.0	.0	.0	3.18	23.20	1	2	WEIR
28.00	1	1	9.0	7.0	.0	.0	2.86	23.18	1	2	WEIR
29.00	1	1	9.0	7.0	.0	.0	2.58	23.17	1	2	WEIR
30.00	1	1	9.0	7.0	.0	.0	2.34	23.16	1	2	WEIR
31.00	1	1	9.0	7.0	.0	.0	2.13	23.15	1	2	WEIR
32.00	1	1	9.0	7.0	.0	.0	1.94	23.14	1	2	WEIR
33.00	1	1	9.0	7.0	.0	.0	1.78	23.13	1	2	WEIR
34.00	1	1	9.0	7.0	.0	.0	1.63	23.12	1	2	WEIR
35.00	1	1	9.0	7.0	.0	.0	1.50	23.11	1	2	WEIR
36.00	1	1	9.0	7.0	.0	.0	1.39	23.10	1	2	WEIR
37.00	1	1	9.0	7.0	.0	.0	1.28	23.10	1	2	WEIR
38.00	1	1	9.0	7.0	.0	.0	1.19	23.09	1	2	WEIR
39.00	1	1	9.0	7.0	.0	.0	1.11	23.08	1	2	WEIR
40.00	1	1	9.0	7.0	.0	.0	1.04	23.08	1	2	WEIR
41.00	1	1	9.0	7.0	.0	.0	.97	23.07	1	2	WEIR
42.00	1	1	9.0	7.0	.0	.0	.91	23.07	1	2	WEIR

TIME (HR)	STRUCT NO	BASIN NO	CUMULATIVE RAINFALL (INCHES)	CUMULATIVE RUNOFF (INCHES)	INSTANT. RUNOFF (CFS)	RUNOFF HYDROGRAPH (CFS)	DISCHARGE (CFS)	INSTANT. STAGE (FT)	FROM	TO	STRUCTURE CONTROL
13.00	1	1	9.0	7.0	.0	.0	.85	23.06	1	2	WEIR
14.00	1	1	9.0	7.0	.0	.0	.80	23.06	1	2	WEIR
15.00	1	1	9.0	7.0	.0	.0	.76	23.06	1	2	WEIR
16.00	1	1	9.0	7.0	.0	.0	.71	23.05	1	2	WEIR
17.00	1	1	9.0	7.0	.0	.0	.68	23.05	1	2	WEIR
18.00	1	1	9.0	7.0	.0	.0	.64	23.04	1	2	WEIR
19.00	1	1	9.0	7.0	.0	.0	.61	23.04	1	2	WEIR
20.00	1	1	9.0	7.0	.0	.0	.58	23.04	1	2	WEIR
21.00	1	1	9.0	7.0	.0	.0	.55	23.04	1	2	WEIR
22.00	1	1	9.0	7.0	.0	.0	.53	23.03	1	2	WEIR
23.00	1	1	9.0	7.0	.0	.0	.51	23.03	1	2	WEIR
24.00	1	1	9.0	7.0	.0	.0	.49	23.03	1	2	WEIR
25.00	1	1	9.0	7.0	.0	.0	.47	23.03	1	2	WEIR
26.00	1	1	9.0	7.0	.0	.0	.45	23.02	1	2	WEIR
27.00	1	1	9.0	7.0	.0	.0	.43	23.02	1	2	WEIR
28.00	1	1	9.0	7.0	.0	.0	.42	23.02	1	2	WEIR
29.00	1	1	9.0	7.0	.0	.0	.40	23.02	1	2	WEIR
30.00	1	1	9.0	7.0	.0	.0	.39	23.01	1	2	WEIR
31.00	1	1	9.0	7.0	.0	.0	.38	23.01	1	2	WEIR
32.00	1	1	9.0	7.0	.0	.0	.37	23.01	1	2	WEIR
33.00	1	1	9.0	7.0	.0	.0	.36	23.01	1	2	WEIR
34.00	1	1	9.0	7.0	.0	.0	.35	23.01	1	2	WEIR

MULTI-BASIN ROUTING MODEL - OUTPUT

STRUCTURE NO.	PEAK DISCHARGE (CFS)	TIME OF QPEAK	PEAK STAGE (FT-NGVD)	TIME OF HPEAK
1	5.0	17.1	23.3	17.1

BASIN NO.	TOTAL INFLOW (AC-FT)	TOTAL RUNOFF (AC-FT)	TOTAL OUTFLOW (AC-FT)	FINAL TIME (HOURS)	FINAL STAGE (FT-NGVD)	FINAL STORAGE (AC-FT)
1	.00	17.44	8.22	64.57	23.01	9.22

APPENDIX 10.1.4

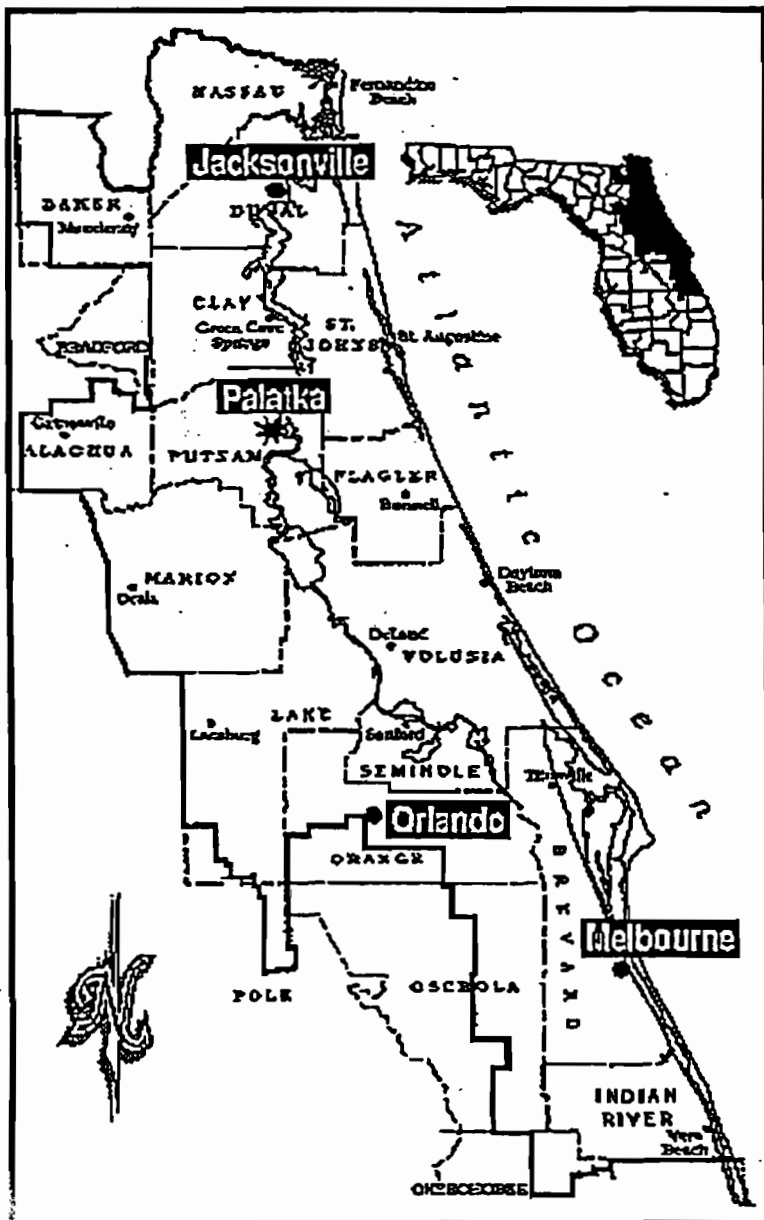
**CONSUMPTIVE WATER USE PERMIT APPLICATION
(SURFACE WATER)**

The application for Consumptive Use Permit (CUP) consists of the SJRWMD application form, supported by a technical report describing the potential impacts from surface water withdrawals, which is provided as Attachment 10.1.4-A. Another report associated with the CUP application is the Water Supply Alternatives Analysis, which is included as Attachment 10.1.4-B.



St. Johns River Water Management District

PERMIT APPLICATION FOR CONSUMPTIVE USES OF WATER



Please mail to the nearest
District Service Center:
St. Johns River Water Management District

District Headquarters:

P.O. Box 1429
Highway 100 West
Palatka, Florida 32178
FAX: 904-329-4490

Jacksonville Service Center:

7775 Baymeadows Way
Suite 102
Jacksonville, Florida 32256
FAX: 904-730-6267

Orlando Service Center:

618 East South Street
Suite 200
Orlando, Florida 32801
FAX: 407-897-4354

Melbourne Service Center:

305 East Drive
Melbourne, Florida 32904
FAX: 407-722-5357

INTRODUCTION

Unless expressly exempted by law or District regulation, a consumptive use permit is required for any use, diversion or withdrawal of surface or ground water which meets any of the following criteria:

1. Average annual daily withdrawal exceeding one hundred thousand (100,000) gallons average per day on an annual basis.
2. Withdrawal equipment or other facility which have a capacity of more than one million (1,000,000) gallons per day.
3. Withdrawals from a combination of wells or of other facilities, having a combined capacity of more than one million (1,000,000) gallons per day.
4. Withdrawals from a well in which the outside diameter of the largest permanent water bearing casing is six inches or greater. For purposes of this paragraph, the diameter of the well at ground surface will be presumed to be the diameter of the well for the entire length unless the well owner or well contractor can demonstrate that the well has a smaller diameter water bearing casing below ground surface.
5. Within the Delineated Area as set forth in 6.7.1.6, Applicant's Handbook: Consumptive Uses of Water, withdrawals from a well in which the inside diameter of the largest permanent water bearing casing is five inches or greater. For purposes of this paragraph, the diameter of the well at ground surface will be presumed to be the diameter of the well for the entire length unless the well owner or well contractor can demonstrate that the well has a smaller diameter water bearing casing below ground surface.
6. Within the Delineated Area as set forth in 6.7.1.6, Applicant's Handbook: Consumptive Uses of Water, for freeze protection uses of water on agricultural and nursery property greater than 5 acres in size.
7. Any secondary use, as defined in paragraph 2.0(w) of the Applicant's Handbook: Consumptive Uses of Water, which exceeds 100,000 gallons per day estimated on an average annual basis.

PROCESSING

Processing of permit applications is in accordance with provisions of the Water Resources Act, Chapter 373, Florida Statutes, Chapter 120, Florida Statutes, Chapters 28-106, 28-107, 40C-1, 40C-2 and 40C-20, Florida Administrative Code and the Applicant's Handbook: Consumptive Uses of Water

The District will notify an applicant if an application is incomplete within 30 days of receipt and will inform the applicant of what additional information is required to make the application complete. For those permits processed as individual permits, the Board will issue or deny permits within 90 days of receipt of the completed application. Those permits processed as general permits will be issued within 30 days of receipt of a completed application.

Failure to obtain a permit prior to undertaking a regulated activity is a violation of District requirements, even if the project would receive a favorable review in a standard permitting process. The District may initiate administrative, civil or criminal actions against violators, and may require restorative steps.

PERMIT APPLICATION FOR CONSUMPTIVE USES OF WATER



Permit Type: Individual CUP <input checked="" type="checkbox"/> Secondary Use <input type="checkbox"/> Standard General CUP <input type="checkbox"/>
Application is for: New use <input checked="" type="checkbox"/> Renewal <input type="checkbox"/> Modification of Existing Permit <input type="checkbox"/>

APPLICANT INFORMATION

ORGANIZATION NAME (please print all responses)
Calpine Construction Finance Company, LP

LAST NAME (please print all responses) FIRST NAME
Alff Robert

STREET NO. STREET NAME CITY
The Pilot House, 2nd Floor, Lewis Wharf Boston

STATE ZIP PHONE
MA 02110 (617) 723-7200 ext. 303

Same as above **AGENT OF CONSULTANT**

ORGANIZATION NAME (please print all responses)
Calpine

LAST NAME (please print all responses) FIRST NAME
Eves Timothy

STREET NO. STREET NAME CITY
4890 West Kennedy Blvd., Suite 600 Tampa

STATE ZIP PHONE
FL 33609 (813) 637-3523

Same as applicant **OWNER INFORMATION**

ORGANIZATION NAME (please print all responses)

LAST NAME (please print all responses) FIRST NAME

STREET NO. STREET NAME CITY

STATE ZIP PHONE

Robert Alff Robert W. Alff 10/23/00
 APPLICANT'S NAME (Please print) APPLICANT'S SIGNATURE DATE

If a person other than applicant has completed this form, that person certifies by his signature below that he is acting as an authorized agent of the applicant and his signature will be certification that he is in fact the authorized agent.

Timothy Eves Timothy R. Eves 10/24/00
 AGENT'S NAME (Please print) AGENT'S SIGNATURE DATE

SITE INFORMATION

COUNTY Indian River ACRES OWNED 50.5
SECTION 36 TOWNSHIP 33 RANGE 38
PROJ. NAME Blue Heron Energy Center PROJECT ACRES 25.1
COUNTY PARCEL NO. 36-33-38-00001-0090-00001.0

TYPE OF USE

DARKEN ALL THAT APPLY

- AESTHETIC AGRICULTURAL AQUACULTURAL COOLING AND AIR CONDITIONING
DEWATERING COMMERCIAL AND INDUSTRIAL ESSENTIAL FREEZE PROTECTION
GOLF COURSE RECREATION AREA HOUSEHOLD TYPE LIVESTOCK
NURSERY URBAN LANDSCAPE IRRIGATION WATER BASED RECREATION
UNACCOUNTED FOR WATER OTHER

Previous Permit No. _____

**AMOUNT
REQUESTED**

INCHES PER YEAR _____
MILLION GALLONS PER YEAR 2,373 average/2,738 peak
MILLION GALLONS PER DAY 6.5 average/7.5 peak
DATE OF START OF USE October 2003

**REQUESTED
PERMIT
DURATION**

20 YEARS
Other (Specify Years): _____

WATER USE MONITORING

All permittees are required to measure their water usage on a continuous basis. All users must report their use using form EN-50 to the District at the intervals specified in their permit. If used, meters must be 95% accurate, verifiable and installed according to manufacturers' specifications. Meters or alternative methods utilized by the water supplier to charge for the water may suffice as a water use monitoring tool.

Alternative methods must be 90% accurate and verifiable. All alternative methods must be approved in advance and in writing by District staff.

Same as applicant

COMPLIANCE ENTRY

Consumptive Use Permits require the periodic submittal of data to the District. Please provide the name, address and phone number of the person who will be responsible for ensuring that the permitted conditions are met. Submittal of this information does not relieve the permit holder from the responsibility for compliance.

Name: Timothy Eves
Address: Calpine
4890 West Kennedy Blvd., Suite 600
Tampa, FL 33609

Phone Number: (813) - 637-3523

SECONDARY TYPE USE

Not Applicable.

Please supply information regarding the source(s) of water for your activities.

1. The name of the supplier of water. _____
2. Is this source of water potable or non-potable? (circle one)
3. What percentage of your total water use is from this supplier? _____
4. If 100% of your water use is not provided from the supplier, please indicate what uses are self supplied.
5. The applicant must also complete other packages which address the requested consumptive use identified in question 4.

Description of Use Classes: Each permit shall be identified with one or more of the following use classifications:

- (a) **Aesthetic use** - the use of water for fountains, waterfalls, and landscape lakes and ponds where such uses are entirely ornamental and decorative.
- (b) **Agricultural use** - use of water for the commercial production of crops or the growing of farm products including, but not limited to, vegetables, citrus and other fruits, pasture, rice and sod.
- (c) **Aquacultural use** - the use or withdrawal of water for cultivation of animal and plant life in a water environment, including but not limited to food fish, aquatic bait, game fish, aquatic plants (i.e. watercress), alligators, tropical fish, shellfish, and turtles.
- (d) **Commercial and industrial process use** - the use of water essential to the production of the goods or services provided by a business establishment.
- (e) **Cooling and air conditioning use** - the use of water for heating or cooling, or for air conditioning.
- (f) **Dewatering use** - the removal of water from a specific area to facilitate mining or construction.
- (g) **Essential use** - the use of water strictly for fire fighting purposes, health and medical purposes and the use of water to satisfy federal, state or local public health and safety requirements.
- (h) **Freeze protection** - the periodic and infrequent use of water to protect agricultural and nursery crops from damage due to low temperatures.
- (i) **Golf course use** - water used to irrigate an establishment designed and used for playing golf.
- (j) **Household use** - the use of water for personal needs or for household purposes such as drinking, bathing, heating, cooking, sanitation or cleaning, whether the use occurs in a residence or in a business or industrial establishment.
- (k) **Livestock use** - the use of water for watering or washing of livestock.
- (l) **Nursery use** - the use of water on premises on or in which nursery stock is grown, propagated or held for sale or distribution or sold or reshipped.
- (m) **Recreation area use** - the use of water for the maintenance and support of intensive recreational areas such as, but not limited to, playgrounds, football, baseball, and soccer fields.
- (n) **Urban landscape irrigation** - the outside watering or sprinkling of shrubbery, trees, lawns, grass, ground covers, plants, vines, gardens and other such flora which are situated in such diverse locations as residential landscaping, recreational areas, cemeteries, public, commercial and industrial establishments, public medians and rights of way.
- (o) **Water based recreation use** - water used for public or private swimming and wading pools, including water slides. This term does not include pools specifically maintained to provide habitat for aquatic life.
- (p) **Water utility use** - water used for withdrawal, treatment, transmission and distribution by potable water systems.

SOURCES OF WATER (Summary Data Sheet)

Please supply information regarding the source(s) of water for your activities. Include information regarding all wells/pumps on the property.

Table 1.
SUMMARY OF GROUND WATER SOURCES

Well or Pump Number	Wellfield or Facility Name	Casing Dia. (in)	Casing Depth (ft)	Total Depth (ft)	Operation Hrs/Wk	Pump Capacity (gpm)	Date Drilled	Existing or Proposed (date)	Type of Use
None									

* - See use descriptions on page 4. If more than one use type, show predominate use

Table 2
SUMMARY OF SURFACE WATER SOURCES

Pump Number	Pump Capacity (gpm)	Operation Hrs/Wk	Acreage of Surface Water Body	Name of Source	Status (date if proposed)	Type of Use
3 pumps	2,600 to 3,000 gpm each	168	780	IRFWCD, Lateral C Canal	October 2003	Industrial

IRFWCD = Indian River Farms Water Control District.

PROPERTY CONTROL AND LOCATION

I. PROPERTY CONTROL

1. Property Ownership - Provide a copy of the excuted deed indicating the current owner of the property which is the subject of this application.
Attached
2. Leased Property - Provide a copy of the current lease, or a letter signed by the property owner describing the lease arrangement and the duration of the lease. Attached

II. LOCATION MAPS

Provide a recent map (preferably a USGS topographic quadrangle, a map from a county plat directory, or survey map) indicating the following:

- See Figures 1 and 2
- See Figures 3 and 4
- (a) property boundaries (include approximate lengths of boundaries in feet); (public supply water uses please show service areas)
 - (b) All existing and proposed withdrawal point locations. Indicate well number and casing size for ground water withdrawals, and pump number and maximum pump capacity for surface water withdrawals;
 - (c) a north arrow;
 - (d) a scale designation - all maps should have a minimum scale of 1 inch = 2,000 feet; and
 - (e) labeled landmarks such as roads and political boundaries.

Please provide identification numbers and date permitted if you obtained or are in the process of obtaining any of the following permits for this project

Environmental Resource Permit (ERP)	<u>in process of obtaining</u>
EPA Ordered Environmental Impact Statements	<u>N/A</u>
Agricultural Discharge	<u>N/A</u>
FDEP Wastewater Site Identification No.	<u>N/A</u>
FDEP Public Water Supply (PWS) Identification No.	<u>N/A</u>

III. ADJACENT PROPERTY OWNERS
(not applicable to Secondary Users Permits)

Provide a complete list of adjacent property owners and mailing address as prescribed in Tables #3 and 4. Attach additional sheets as needed.

Name	Address	City	State	Zip Code
------	---------	------	-------	----------

See attached table.

USE OF LOWEST ACCEPTABLE QUALITY WATER SOURCE

1. Are you proposing to use the most appropriate (lowest quality) source of water?
Yes; see Attachment 10.1.4-A, Surface Water Use Impacts Assessment and Attachment 10.1.4-B, Water Supply Alternatives Analysis.
2. Is reclaimed water readily available as a source of water?
Typically yes, from Indian River County Reclaimed Water System to be used on an as-available basis.

WATER CONSERVATION

A water conservation plan must be submitted with this application. Please refer to Section 12.0 and Appendix I, Applicant's Handbook, Consumptive Uses of Water, for information on how to meet the District's requirements regarding water conservation. Available water conservation measures must be implemented pursuant to requirements in sections 10.3(e) and 12.0, A.H. These measures must be explained as part of this application.

See Attachment 10.1.4-B.

Table 3 - Ground Water Withdrawals

Withdrawal Amount	Property Owners to be Listed
less than 1,000,000 gallons maximum per day -and- less than 100,000 gallons per day annual average	None required
max day is between 1 and 5 million gallons -or- average day is between 100,000 and 500,000 gallons	All property owners within 600 feet of well or 100 feet of property boundary.
max day is between 5 and 10 million gallons -or- average day between 500,000 and 1,000,000 gallons	All property owners within 1,320 feet of each well or 200 feet of the property boundary.
max day exceeding 10 million gallons -or- average day exceeds 1,000,000 gallons	All property owners within 2,640 feet of the well, or 400 feet of the property boundary.

Table 4 - Surface Water Withdrawals

Withdrawal Amount	Property Owners to be Listed
surface area of the withdrawal lake is less than 80 acres	All riparian land owners on lake and those up to 600 feet downstream if the lake has an outlet
surface area of the withdrawal lake is greater than 80 acres	All riparian land owners up to 600 feet from the withdrawal point
Withdrawals from a stream and average daily pumpage is less than 5 million gallons	All riparian land owners up to 600 feet upstream and 1,320 feet downstream from the withdrawal point
Withdrawals from a stream and average daily pumpage is greater than 5 million gallons	All riparian land owners up to 1,320 feet upstream and 2,640 downstream from the withdrawal point

SECTION III

Applicant Checklist

Please verify that the following information has been provided as part of this application package:

	<u>Attached</u>
1. Appropriate Fee	\$ <u>Included in SCA fee</u>
2. Signature of Applicant and/or Agent	<u>X</u>
3. Authorization from Owner for Agent (if Agent is listed on application)	<u>X</u>
4. Copy of Executed Deed or Lease Agreement	<u>X</u>
5. Location Map	<u>X</u>
6. List of adjacent land owners	<u>X</u>
7. Completed Water Use Type Package*	<u>X</u>
8. Water Conservation Plan, or water Audit as appropriate	<u>X</u>

*NOTE: Applications for Public Supply, Commercial/Industrial, Agricultural, Aquacultural, Nursery/Fern, Golf Course Irrigation, Dewatering, and Landscape Irrigation water uses must also include the supplemental water use package specific to each use type. Those applying for a **Secondary Use Permit** must complete and submit each of the supplemental water use packages that applies to their type use.



COMMERCIAL/INDUSTRIAL TYPE USES

(Submit 2 copies of application, supplemental information drawings, calculations, etc.)

I. PROJECT DESCRIPTION

1. Type of business and/or operation, please describe:

Electric Power Plant

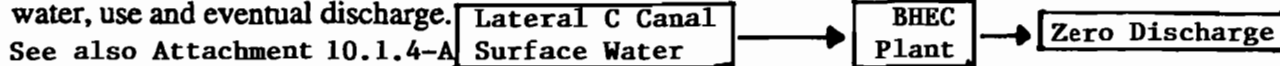
2. Requested Water Use:

	Existing (mgd)	Proposed (mgd) 5 years	Proposed (mgd) 10 years	Proposed (mgd) 15 years	Proposed (mgd) 20 years
Average Daily Use	0	6.5	6.5	6.5	6.5
Maximum Daily Use	0	7.5	7.5	7.5	7.5
Average Off-Site Discharge	0	0	0	0	0

*mgd - million gallons per day

3. Provide a graph (month vs mgd) or table summarizing monthly water use for the previous 3 years. Not applicable

4. Provide a flow chart (schematic diagram) depicting the flow of all sources of water, use and eventual discharge.



5. Please provide a table projecting expected growth over the next 20 years. What is the reason for the expected growth?

No expected growth. Maximum proposed consumption is 7.5 mgd.

II. WASTEWATER DISPOSAL

Describe in detail the flow of wastewater from the plant to its ultimate disposal. Also, provide the applicable Florida Department of Environmental Protection, Environmental Protection Agency permit numbers (EPA, FDEP) issued for discharge to surface waters. Attach daily flow amounts for effluent discharged to surface waters for the last 12 months. Include this information in the above requested schematic diagram.

Zero discharge. The Blue Heron Energy Center will not have any direct discharges to ground water, surface water or percolation ponds. The BHEC is designed as a "zero wastewater discharge" facility.

III REUSE

1. Provide water quality data for effluent discharged from this facility during the last 12 months. **Not applicable**
2. Provide the level of water quality required for each individual manufacturing and cooling process. Provide supporting documentation as to water quality and quantity limitation of reuse for each component of the process.

When utilizing a controlled heat dissipation device like a cooling tower, the water quality can be controlled by treatment of either the makeup water or a side stream from the device itself. The water within the cooling tower needs to be maintained within the narrow quality window between being scale-forming and being corrosive.

To accomplish this control, two indexes have been defined. The theoretically based Langelier Index is defined as the difference between the actual pH and the pH at which a given water would be saturated with calcium carbonate. When the index is positive, the system has a tendency to deposit scale, but when it is negative, the system is considered to be corrosive. The desirable range for operation is between 0.5 and 1.0.

Limits in cooling waters for other dissolved materials have been established by experience and are presented in the following table.

Desirable Limits on Cooling Water Quality

Parameter (mg/L unless otherwise noted)	Limit
pH (standard units)	6.8 to 7.5
Calcium hardness (as CaCO ₃)	20 to 300
Sum of calcium and sulfate concentrations (as CaCO ₃)	<1,500
Product of calcium and sulfate concentrations	<400,000
Silica (as SiO ₂)	<150
Iron	<0.5
Manganese	<0.5
Aluminum	<1
Sulfides	<5
TDS	<2,500
Total suspended solids	<100
Product of magnesium and silica concentrations	<30,000

Source: FWENC, 1992.

BOARD OF COUNTY COMMISSIONERS

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October 17, 2000

Mr. Tim Eves
Calpine Eastern Corporation
Two Urban Centre
4890 West Kennedy Blvd., Suite 600
Tampa, FL 33609

RE: Calpine Blue Heron Energy Center

Dear Mr. Eves:

This letter is to confirm that Indian River Farms Water Control District ("District") and Indian River County ("County"), Florida are actively engaged in negotiations to the end of reaching a three party agreement with Calpine Eastern Corporation ("Calpine") to provide water from some combination of reuse, canal, managed storm water, reverse osmosis discharge and other available sources in sufficient quantities for the operation of the Blue Heron Energy Center. Ancillary to the agreement to be reached and under negotiations is the possibility of installation of pump structures and/or intake structures in District or County right-of-way and extension of water lines to the Blue Heron Energy Center.

Very truly yours,

A handwritten signature in cursive script that reads "Fran B. Adams".

Fran B. Adams, Chairman
Board of County Commissioners

FBA:kim

1840 25th Street, Suite N-158
Vero Beach, FL 32960-3365
Telephone: (561)567-8000 x490 Fax: (561)770-5334
Suncom: 224-1490 e-mail: kmassung@bcc.co.indian-river.fl.us

INDIAN RIVER FARMS WATER CONTROL DISTRICT

4400 20th Street
VERO BEACH, FLORIDA 32966
(561) 562-2141

JOHN S. J. AMOS
Secretary-Treasurer

Board of Supervisors
W. C. GRAVES, IV
D. E. GUNTER
SCOTT W. LAMBETH

October 13, 2000

Mr. Tim Eves
Calpine Eastern Corporation
Two Urban Centre
4890 West Kennedy Blvd.
Suite 600
Tampa, FL 33609

Re: Calpine Blue Heron Energy Center

Dear Tim:

This letter is to confirm that Indian River Farms Water Control District ("District") and Indian River County, Florida ("County"), are actively engaged in negotiations to the end of reaching a three party agreement with Calpine Eastern Corporation ("Calpine") to provide water from some combination of reuse, canal, managed storm water, reverse osmosis discharge and other available sources in sufficient quantities for the operation of the Blue Heron Energy Center. Ancillary to the agreement to be reached and under negotiation is the possibility of installation of pump structures and/or intake structures in District or County right-of-way and extension for water lines to the Blue Heron Energy Center.

Very truly yours,

Indian River Farms Water Control District

By: 

Date: 10/13/00

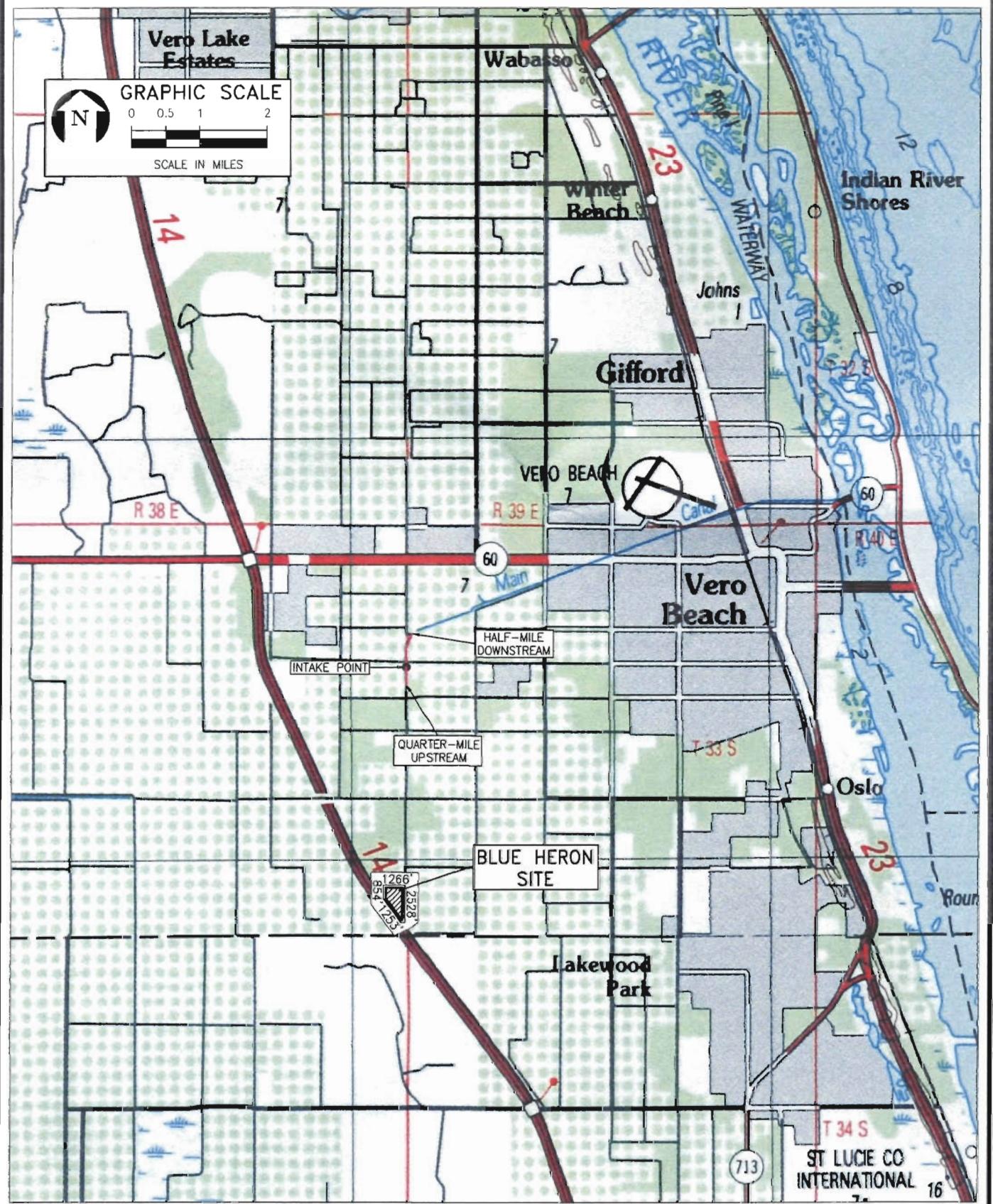


FIGURE 1.
SITE MAP

Sources: USGS 1 X 2 Degree QUAD: FT. PIERCE, FL. 1988; ECT, 2000.

ECT
Environmental Consulting & Technology, Inc.

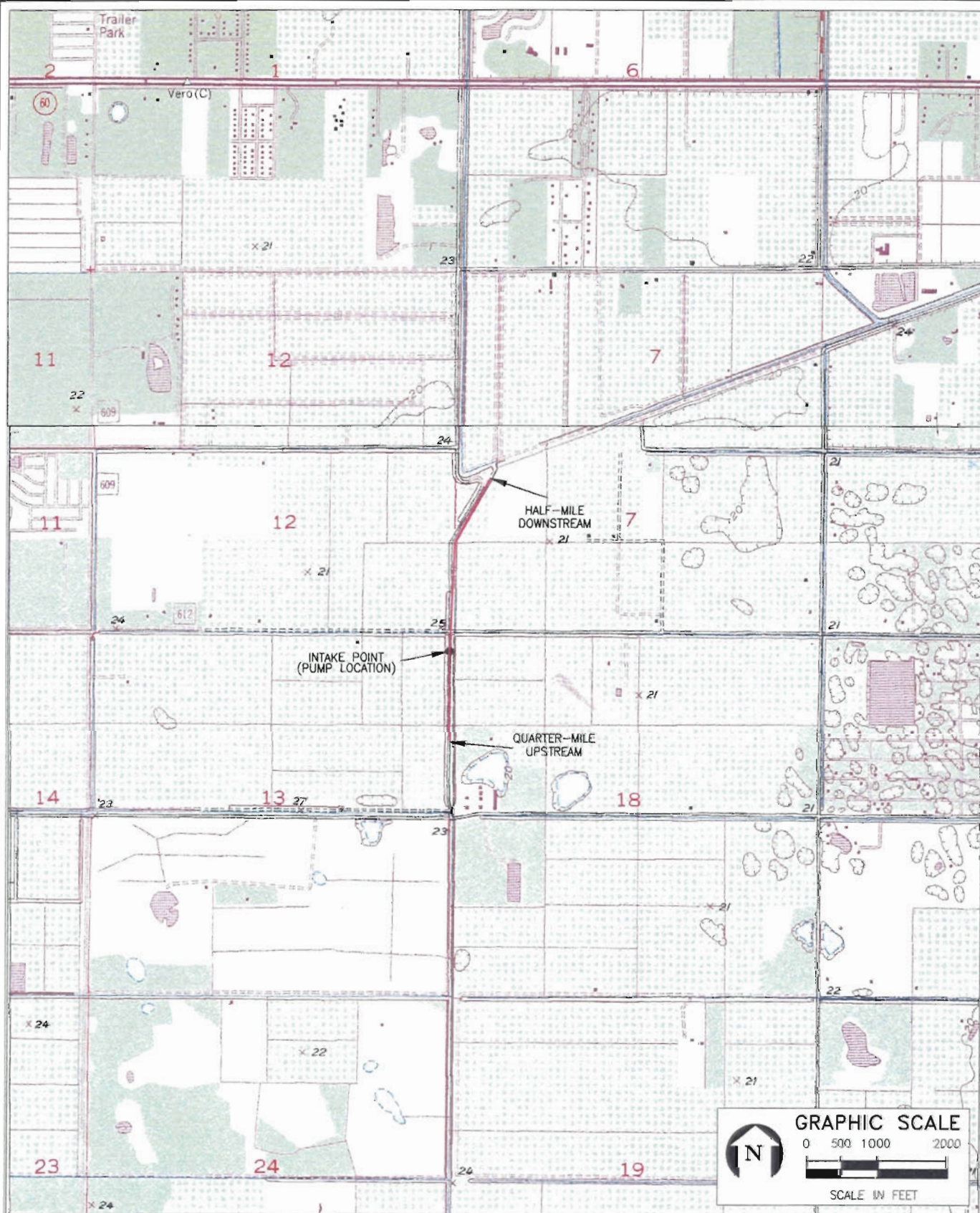


FIGURE 2.
SURFACE WATER INTAKE LOCATION

Sources: USGS Quads: Vero Beach and Oslo, FL, 1983; ECT, 2000.



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 ENERGY CENTER

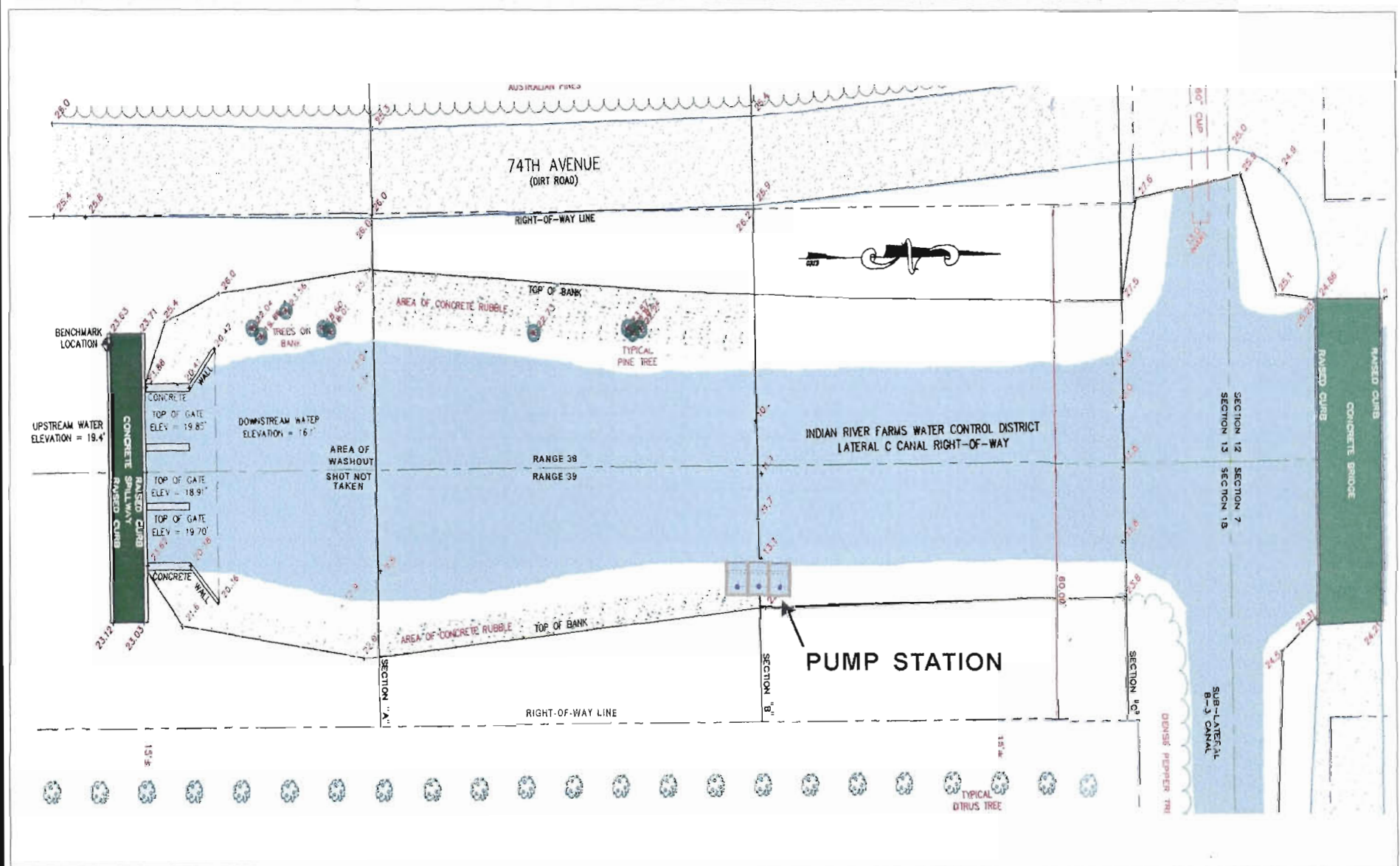
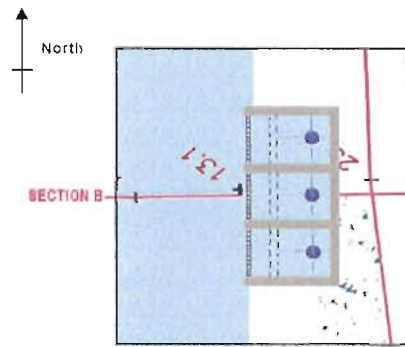


FIGURE 3.
MAKEUP WATER PUMP STRUCTURE LOCATION

Sources: Foster Wheeler Environmental, 2000; ECT, 2000.





KEY PLAN

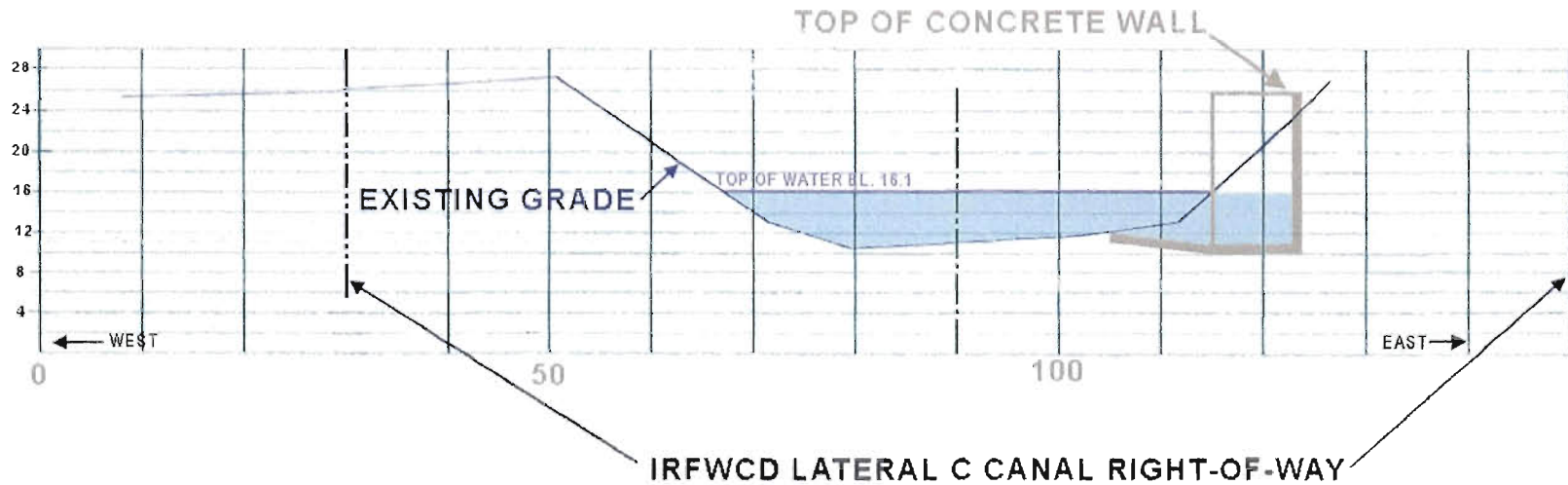


FIGURE 4.
MAKEUP WATER PUMP STATION CROSS-SECTION

Sources: Foster Wheeler Environmental, 2000; ECT, 2000.



CALPINE
BLUE HERON
ENERGY CENTER

Adjacent Property Owners

No.	Name	Address	Parcel ID No.
1	Kennedy, Sara C	P. O. Box 189 Wabasso, FL 32970-0189	00001009000007.0
2	Kennedy, Kenneth P.	P.O. Box 189 Wabasso, FL 32970-0189	00001009000006.0
3	Holbrook, Sue K.	P.O. Box 189 Wabasso, FL 32970-0189	00001009000005.0
4	Kennedy, Purnell C.	P.O. Box 189 Wabasso, FL 32970-0189	00001009000004.0
5	Kennedy, Clyde	P.O. Box 189 Wabasso, FL 32970-0189	00001009000003.0
6	Kennedy, Nannie Lou	P.O. Box 189 Wabasso, FL 32970-0189	00001009000001.0
7	Lykes Bros Inc.	P.O. Box 1690 Tampa, FL 33601-1690	00001001000001.0
8	Beaty, Donald S.	P.O. Box 1259 Lake Wales, FL 33859-1259	00001016000001.0
9	Metz, Henry Kenneth Sr & Helen	5866 37th Street Vero Beach, FL 32960-6501	00001008000001.0
10	Gaidry, Deon D (TR)	7905 4th Street Vero Beach, FL 32968-9590	00001009000001.0
11	Cahill, Leo S Jr.	1195 43rd Avenue Vero Beach, FL 32960-6111	00001012000001.0
12	Indian River County, (LOC 4000 #5174)	(LOC 4000 #5174) 1840 25th Street Vero Beach, FL 32960-3384	00001012000001.0
13	Taylor, Beverly C.	7380 4th Street Vero Beach, FL 32968-9577	00001005000001.0
14	Detko, Catherine C.	P.O. Box 3234 Vero Beach, FL 32964	00001004000001.0
15	Freeman, Paul H (TR) c/o SE Citrus Capital Co.	11006 Okeechobee Road Ft Pierce, FL 34945-2347	00001011000001.0
16	Holbrook, Sue K (3/5) &	P.O. Box 189 Wabasso, FL 32970	00001012000003.0
17	Hale Family 1999 Limited Prtn, c/o Indian River Groves	P.O. Box 700217 Wabasso, FL 32970	00001013000001.0

ATTACHMENT 10.1.4-A
SURFACE WATER USE IMPACT ASSESSMENT

SURFACE WATER USE IMPACT ASSESSMENT

**BLUE HERON ENERGY CENTER
INDIAN RIVER COUNTY, FLORIDA**

Prepared for:



CALPINE
BLUE HERON
ENERGY CENTER

CALPINE CONSTRUCTION FINANCE COMPANY, L.P.
Boston, Massachusetts

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

5405 Cypress Center Drive, Suite 200

Tampa, Florida 33609

ECT No. 000105-0200

October 2000

PROFESSIONAL CERTIFICATION

This is to certify that the hydrologic analyses presented in this report for the Calpine Blue Heron Energy Center Project have been conducted by us or under our direction, and were found to be in conformity with sound engineering principles applicable to such projects.

Prepared by: Richard J. Stebnisky
Richard J. Stebnisky, P.G.
Principal Hydrogeologist

Date: 10-20-00

Prepared by: Ivan B. Chou
Ivan Chou, P.E.
Principal Engineer

Date: 10-23-00

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1.0 INTRODUCTION AND OBJECTIVES

This impact assessment of surface water withdrawals was developed in conjunction with the site certification application (SCA) for Calpine's proposed Blue Heron Energy Center (BHEC). This Site is located in the southeastern portion of Indian River County, approximately 5 miles southwest of the city of Vero Beach (Figure 1-1). Surface water use is proposed for the Project at an average rate of 6.5 million gallons per day (MGD), and a peak month use of 7.5 MGD. The source of the surface water is the canal system owned and operated by the Indian River Farms Water Control District (IRFWCD).

The primary objective of this impact assessment is to fulfill federal, state, regional, and local regulatory requirements regarding the withdrawal and use of surface water for process makeup purposes for the Project. This report specifically addresses the Consumptive Use Permit (CUP) application elements that would normally be required by the St. Johns River Water Management District (SJRWMD). The CUP application for surface water withdrawals consists of the SJRWMD application form (Form 40C-2-1082-1), this impact assessment report (Attachment 10.1.4-A), and the Water Supply Alternatives Analysis, which is included as Attachment 10.1.4-B.

The purpose of this evaluation is to determine whether the proposed surface water use will cause significant detrimental impacts to the environment or to existing legal users of water. The impact assessment methods, results, and conclusions are provided in this report as supporting information for the SCA and the associated proposed use of surface water for the BHEC Project.

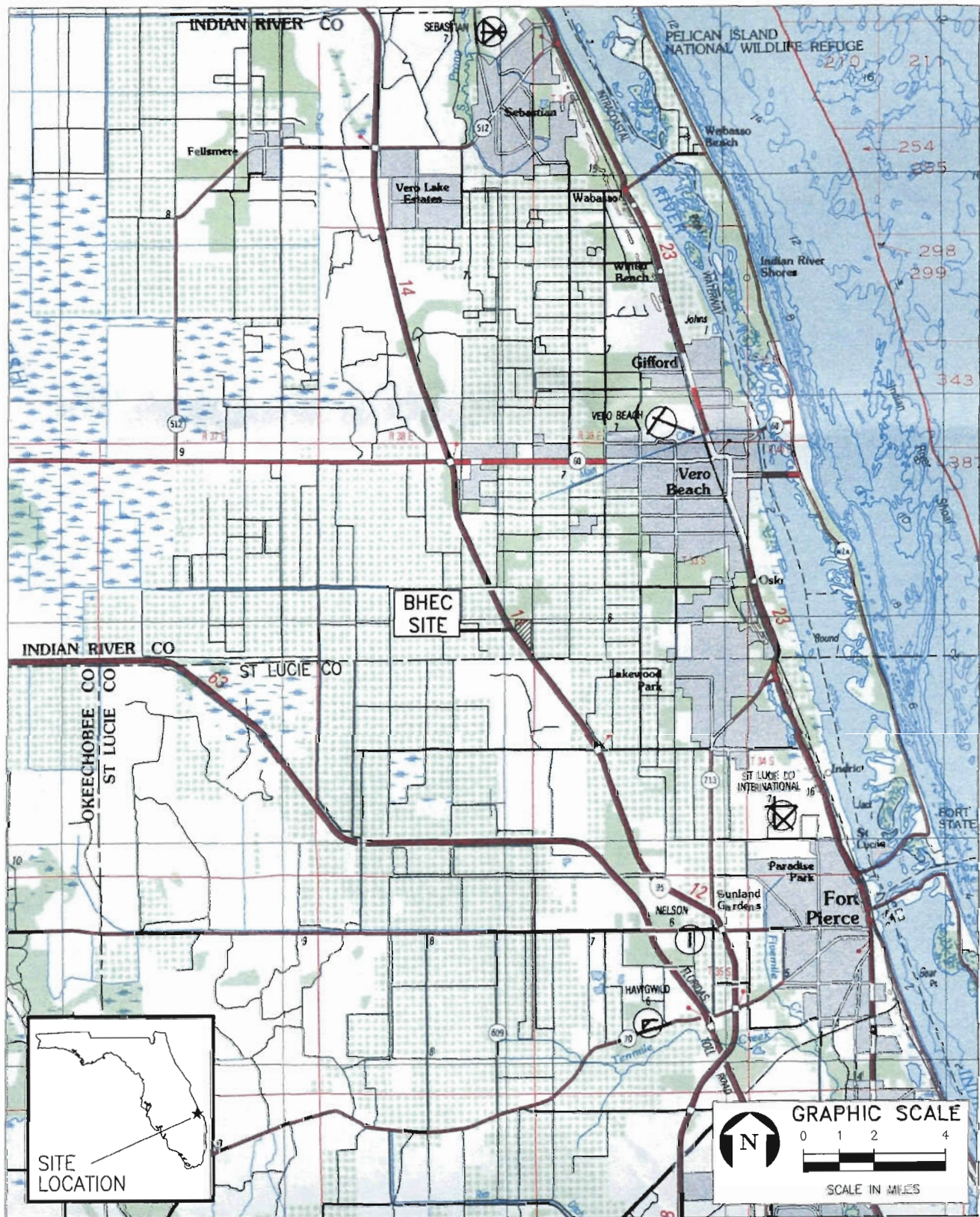


FIGURE 1-1.
BHEC SITE LOCATION MAP

Sources: USGS Quad: Ft. Pierce, FL, 1988; ECT, 2000.



2.0 HYDROLOGIC SETTING AND WATER SUPPLY PLAN

2.1 HYDROLOGIC SETTING

A variety of hydrologic studies providing information for the Site area are available in the literature. Some of these studies have included modeling efforts completed and published by SJRWMD. These reports document climatic and hydrologic data in the Site area. Hydrologic information provided in this section is intended only as a summary of the more extensive descriptions provided in SCA Sections 2.3.3 (Site Water Budget and Area Users), and 2.3.4 (Surficial Hydrology). This section focuses on hydrologic aspects that are most pertinent to the CUP application, and the associated water supply plan and impact assessment.

The Project Site is located within the Indian River Farms Water Control District (IRFWCD). The IRFWCD was formed in 1919 to provide drainage and flood protection for a watershed area encompassing approximately 50,600 acres, and supplies water to local agriculture and golf course communities to assist with their irrigation needs. This area includes an interconnected canal network that is comprised of approximately 200 miles of canals. A system of levees shields the canal system from surface water inflow from outside the canal system. Figure 2-1 shows the layout of the canal system.


Agricultural use for irrigation is the primary use of ground water and fresh surface water in the county. Citrus groves are sometimes flood irrigated, wherein water is pumped from the canals into the groves to raise the water table temporarily. Following irrigation, the water is released into the nearest drainage canal. When water levels in the canals drop, ground water is released into the canals so as to be available for pumping. Low-volume irrigation systems, either jet spray or drip, are most commonly used. Although these systems generally rely on ground water from the Floridan aquifer, flood irrigation is used as a supplement during drought periods (SJRWMD, June 1994).

LEGEND:

Total Area = 49,915 Acres

--- Drainage District Boundary

— Waterways

 Radial Gates

● Rain Gage (Recording)

■ Artesian Pressure Recorder

▲ U.S.G.S. Discharge Gage (Recording)

× Stage Gaging Station (Recording)

● Drop Spillway

 Salinity Control Structure

SCALE

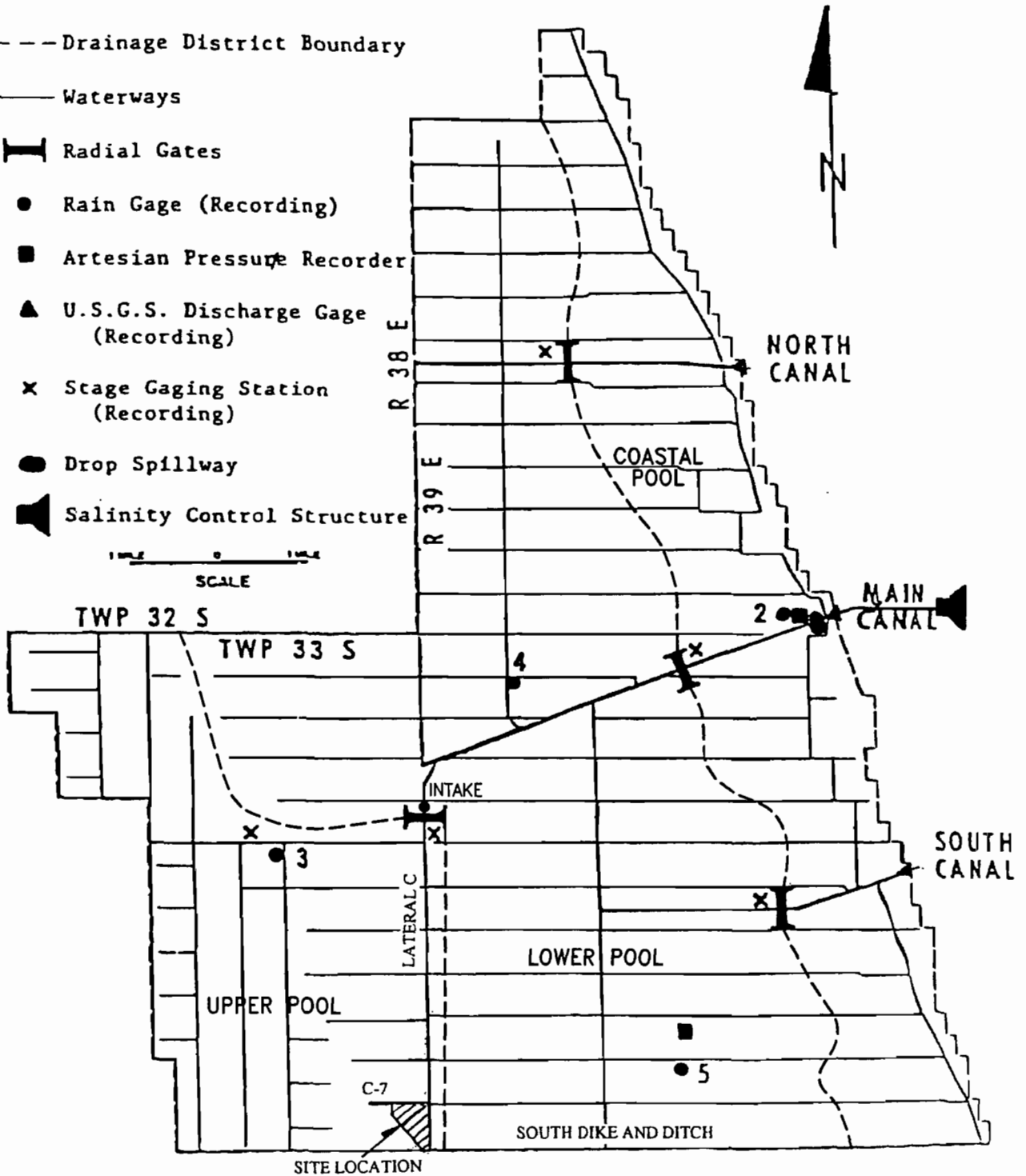


FIGURE 2-1.
IRFWCD CANAL NETWORK AND GATE LOCATIONS

Sources: Carter Associates, 1990; ECT, 2000.



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The IRFWCD manages and controls water levels throughout its canal system. These actions are conducted under the jurisdiction of the SJRWMD. The IRFWCD maintains a consumptive use permit allowing withdrawal of up to 14.33 billion gallons annually for use in irrigation, plus additional water use for freeze protection. The IRFWCD operates four radial gate structures controlling water levels in the canals. These structures are operated for flood control and to maintain water storage for irrigation. Excess water in the canal system is discharged to the Indian River Lagoon. The terms of the consumptive use permit call for the IRFWCD to operate the gates to maximize the storage volume for irrigation, and minimize the discharge flow to the Indian River Lagoon.

Discharges from the canal system into the Indian River Lagoon occur at three primary outfalls, which are located at the eastern ends of the Main Canal, the North Relief Canal, and the South Relief Canal. The combined discharge from the canal system outfalls into the lagoon averages approximately 95 MGD (or 147 cubic feet per second), as described further in Section 3.1 of this report.

The Indian River Lagoon is a long and shallow estuary system that stretches along Florida's east coast for 156 miles, from Volusia County to Palm Beach County. The system encompasses several water bodies, including the Indian River in the south and the Banana River and Mosquito Lagoon in the north. The SJRWMD, in conjunction other agencies, has been working under the state's Surface Water Improvement and Management (SWIM) Act to address problems and major issues associated with the Indian River Lagoon. The SWIM plan identifies the lagoon's major problem as excessive inflow of freshwater, primarily storm water runoff, which degrades shellfish habitat and introduces soils and pollutants (mainly nitrogen and phosphorus) that foster algae growth and kill seagrasses (SJRWMD, 1998).

The portion of the lagoon adjacent to Indian River County is known as the South Central Indian River Lagoon segment. The primary sources of pollutant loadings to this segment are urban and agricultural runoff conveyed by extensive drainage canal systems, and ef-

fluent from the City of Vero Beach wastewater treatment plant (SJRWMD, 1998). In terms of lagoon water quality, the nutrient (total phosphorus) levels in this segment are higher than anywhere else in the Indian River Lagoon system, and low salinity values are attributed to the large volume of freshwater discharge flowing into the lagoon.

Surface waters in direct proximity to the Site include: the IRFWCD Sublateral C-7 Canal abutting the northern property boundary; Lateral C Canal, which is across 74th Avenue directly east of the Site; and an east-west trending drainage ditch along the southern property boundary (parallel to the Indian River and St. Lucie County line).

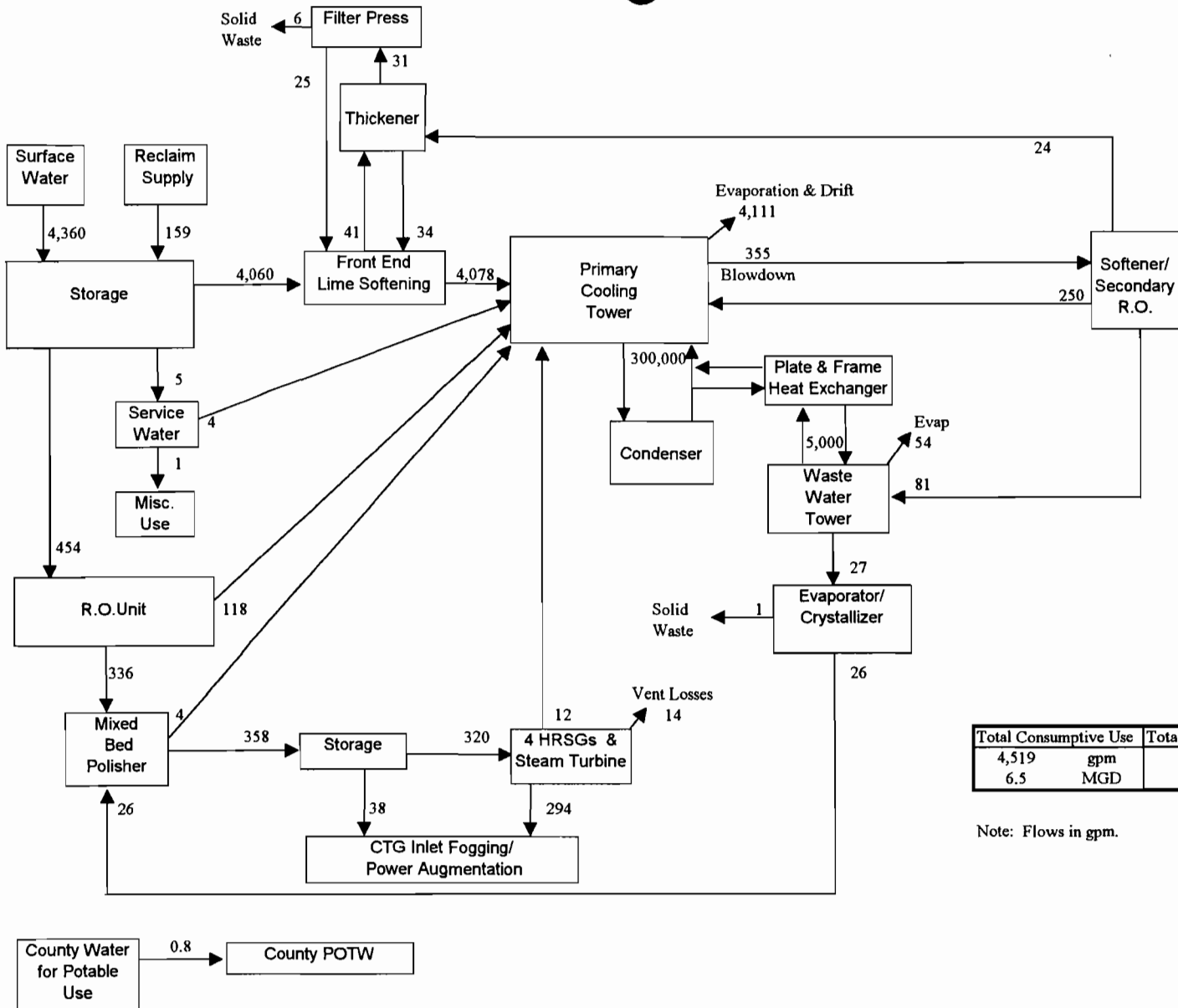
2.2 WATER SUPPLY PLAN

After consideration of various alternatives (see the Water Supply Alternatives Analysis, Attachment 10.1.4-B), the Calpine proposes surface water from the IRFWCD canal system as the primary water source for the BHEC. Section 3.5 of the SCA describes plant water use and provides detailed water balance diagrams for the expected annual average water use of 6.5 MGD, and for the peak water use of 7.5 MGD. Those water balance diagrams are reproduced here as Figures 2-2 and 2-3, respectively.

A pump station will be constructed at the withdrawal point, within the “lower pool”, in the Lateral C Canal at a location just south of 8th Street (Glendale Road), and just downstream of a radial gate structure which separates the upper and lower pools (Figure 2-1). This location is approximately 3.5 miles due north of the Site. A water supply pipeline will be constructed through existing IRFWCD rights-of-way from the withdrawal point to the plant Site.

By agreement with the IRFWCD, the Project may be required to cease withdrawals from the canal system under severe drought conditions. Specifically, canal water use will be discontinued whenever the lower pool water level falls below 14.8 feet above mean sea level (ft-msl) at the upstream side of the Main Canal radial gate structure. This water level may

7



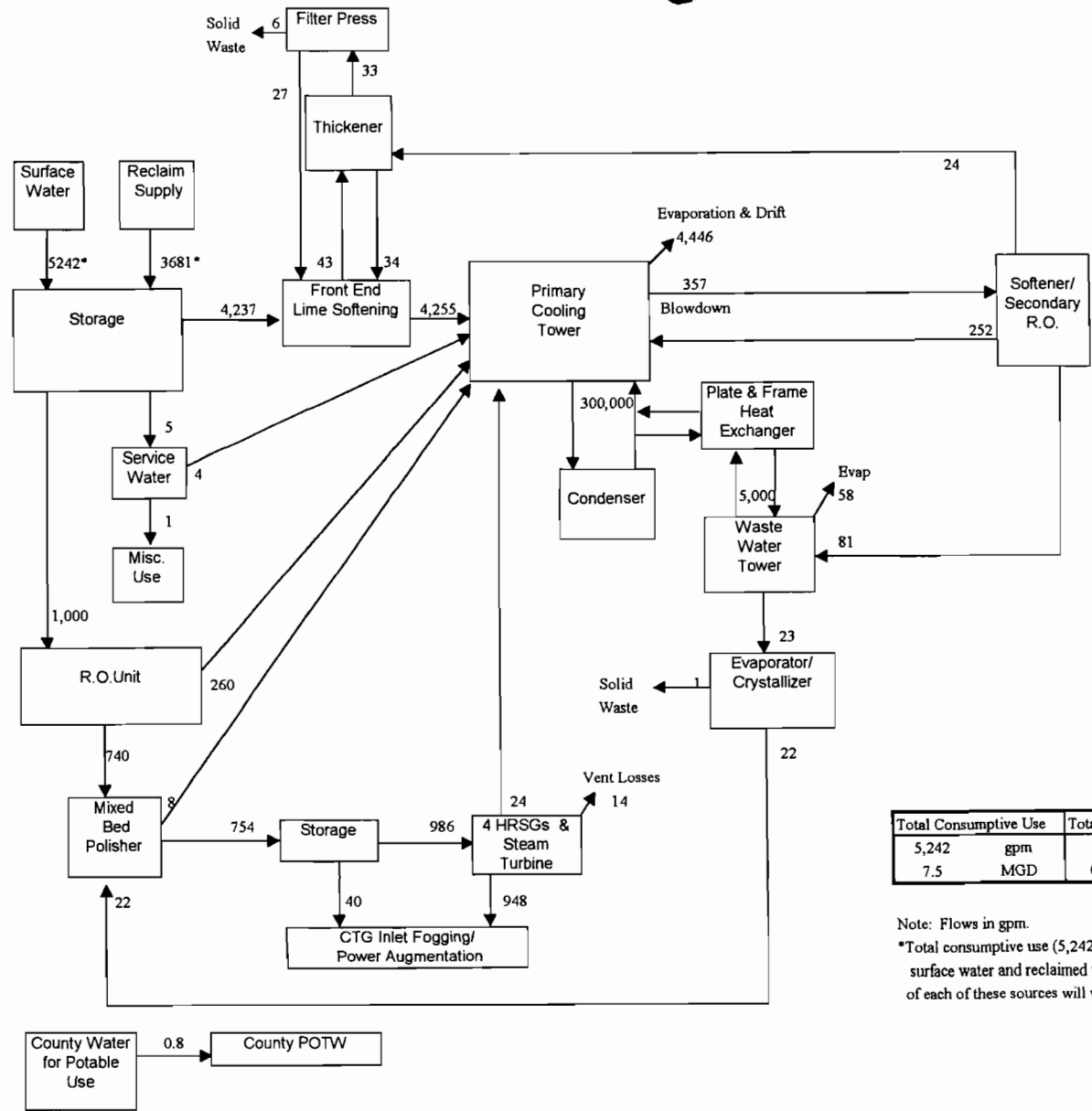
Total Consumptive Use	Total Wastewater Flow
4,519 gpm	0 gpm
6.5 MGD	0.0 MGD

Note: Flows in gpm.

FIGURE 2-2.
WATER BALANCE—ANNUAL AVERAGE DAILY WATER USE

Source: FWENC, 2000.





Total Consumptive Use		Total Wastewater Flow	
5,242	gpm	0	gpm
7.5	MGD	0.0	MGD

Note: Flows in gpm.
 *Total consumptive use (5,242 gpm) is based on input from surface water and reclaimed water. The proportional input of each of these sources will vary. Figures shown are not additive.

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FIGURE 2-3.
WATER BALANCE—PEAK DAILY WATER USE

Source: FWENC, 2000.



be subject to change if IRFWCD changes the invert control elevation of the Main, South, and North Canal radial gate structures.

The BHEC plans to use excess reclaimed water as available from the Indian River County reclaimed water system. Subject to certain limitations, the Project is willing to use as much reclaimed water as the county system can provide under normal conditions. However, the actual quantities of reclaimed water that will be available to the Project are variable, uncertain, and may potentially be unavailable at certain times of the year. Therefore, the reclaimed water quantities are not included as part of this CUP application; those quantities will simply offset actual withdrawals from the canal.

The plant will be connected to the Indian River County potable water and wastewater treatment systems for potable water supply and disposal of sanitary wastewaters, respectively.

The BHEC will be a zero wastewater discharge facility with regard to the National Pollutant Discharge Elimination System (NPDES) program. This means it will have no point source discharges of wastewaters or contaminated storm water to surface waters. Also, the BHEC will not withdraw or use ground water.

3.0 METHODS AND RESULTS OF SURFACE WATER IMPACTS ASSESSMENT

This section describes the analytical methods and results of evaluations that were used to assess potential impacts from the proposed surface water use. The impact assessment results in this section are discussed further in Section 4.0.

3.1 EVALUATION OF HISTORIC FLOW DATA

As previously discussed, the IRFWCD drainage basin, with a total drainage area of approximately 50,600 acres, is characterized by a network of interconnecting drainage canals with a total length of approximately 200 miles. The canal system can be divided into three zones: upper pool, lower pool, and coastal pool (Figure 2-1). The water level in the upper pool is controlled by a radial gate located in the Lateral C Canal, and is generally maintained at approximately 18.5 ft-msl. The upper pool discharges into the lower pool. The water level in the lower pool is controlled by three radial gate structures located in the Main Canal, North Canal, and South Canal. The water level in the lower pool is generally maintained at approximately 15.5 ft-msl. The lower pool discharges into the coastal pool. The lower portion of the coastal pool is hydraulically connected to the Indian River Lagoon at three primary outfalls located at the eastern ends of the Main Canal, South Canal, and North Canal.

Since 1949, the U.S. Geological Survey (USGS) has maintained three flow gauging stations located at the Main Canal outfall (USGS Station No. 02253000), the North Canal outfall (USGS Station No. 02252500), and the South Canal outfall (USGS Station No. 02253500). These flow gauging stations measure daily discharges from the coastal pool into the Indian River Lagoon. The long-term discharge flow data from January 1, 1949, through February 19, 2000, are summarized as follows:

Flows (MGD)	Main Canal	North Canal	South Canal	Total
Average	48.3	20.8	25.7	94.7
Daily maximum	1,182.7	1,021.2	1,150.4	3,121.6
Daily minimum	0.01	0.39	0.35	3.65

These flow data represent the combined contributions from all three pools in terms of discharge to the Indian River Lagoon. The data indicate an average net discharge of 94.7 MGD, and a minimum net discharge of at least 3.65 MGD on any given day in the past 50 years. Monthly average and minimum discharge flow rates at each of the three canal outfalls are shown in Figures 3-1 and 3-2, respectively.

These historic flow (discharge) data represent total outflows from the canal system, including the coastal pool. Because the proposed water use source is the lower pool, the downstream coastal pool's contribution to these flows must be factored out in order to assess the Project's induced effects on the lower pool's water levels and discharge flows. The coastal pool drainage area is approximately 10,860 acres, or 21.5 percent of the total drainage basin of IRFWCD. Therefore, the total daily discharge from the lower pool was computed to be 78.5 percent of the total flow from three USGS gauging stations. (Data from January 1, 1949, through November 30, 1950, were discarded due to frequent missing values. As such, the daily flow data from December 1, 1950, through February 19, 2000, were used for this analysis.)

The computed results of the lower pool daily discharge rate for the historic 50-year data record is summarized as follows:

12

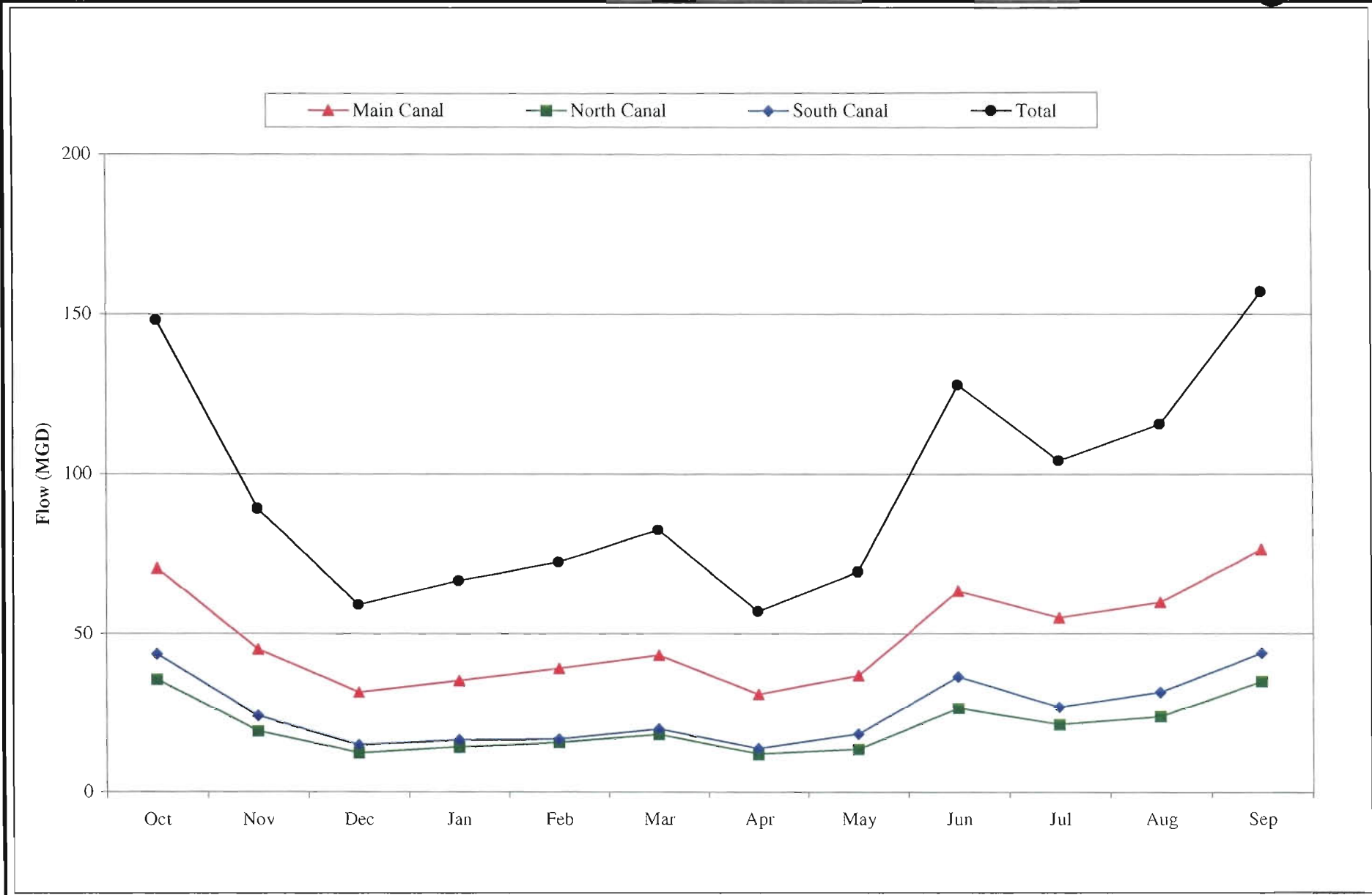


FIGURE.3-1.

MAIN, NORTH, AND SOUTH CANALS—MONTHLY AVERAGE FLOW
 (1/1/49—9/30/96)
 Sources: USGS, 2000; ECT, 2000.



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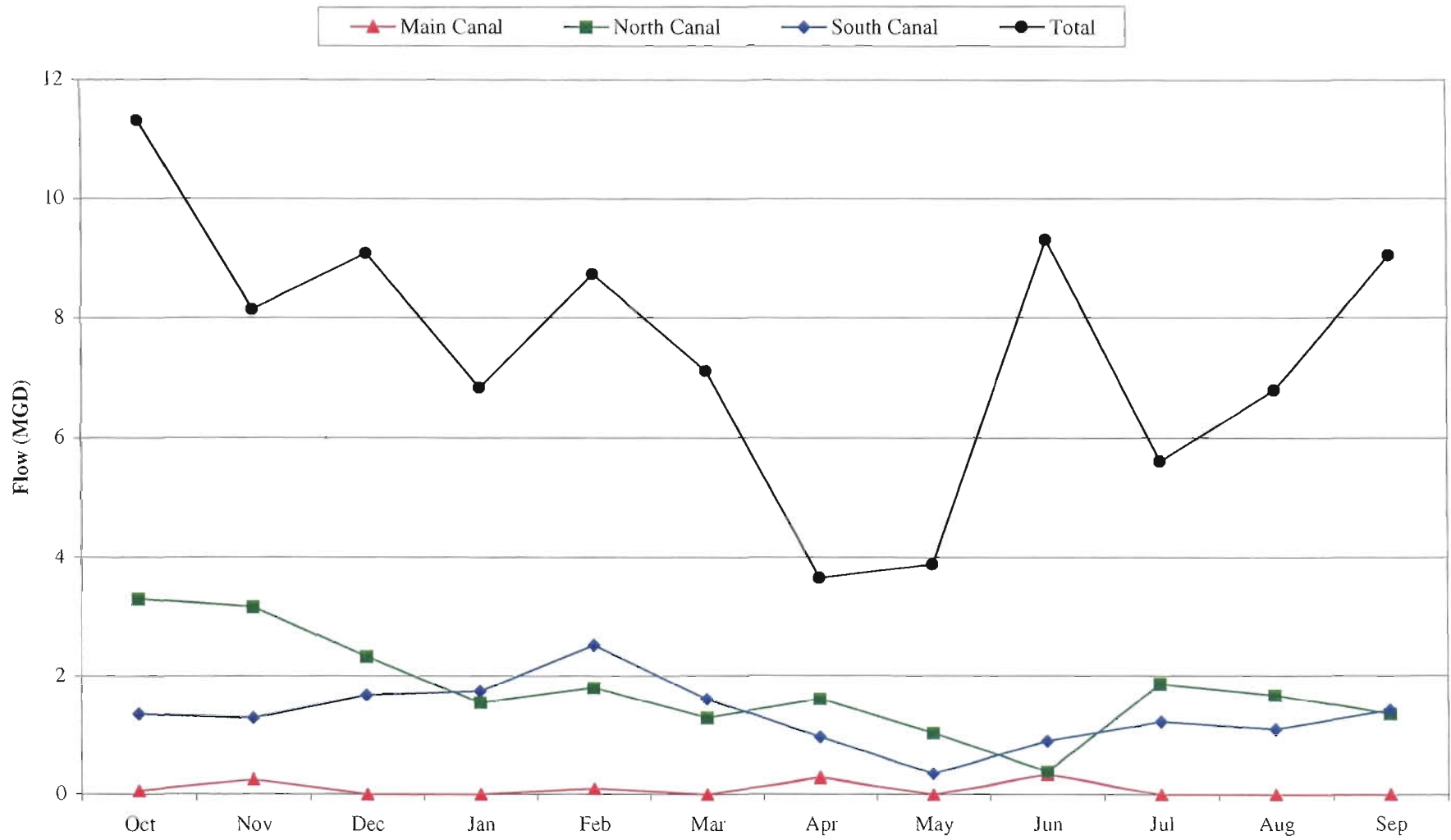


FIGURE 3-2.

MAIN, NORTH, AND SOUTH CANALS—MINIMUM MONTHLY FLOWS

(1/1/49—9/30/96)

Sources: USGS, 2000; ECT, 2000.



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Parameter	Flows (MGD)
Daily average	74.8
Daily minimum	2.86
Daily maximum	2,452
Minimum 10-day average	6.91
Minimum 11-day average	7.71

The computed values indicate that the average discharge flow rate from the lower pool was 74.8 MGD, and the lowest daily flow in 50 years was 2.86 MGD.

3.2 IMPACTS TO FLOWS AND WATER LEVELS

BHEC proposes to withdraw water from the lower pool at a location immediately downstream of the Lateral C radial gate. The estimated monthly average and maximum water use rates are as follows:

Month	Average Water Use (MGD)	Maximum Water Use (MGD)
January	5.8	6.5
February	5.8	6.5
March	6.0	6.5
April	6.1	6.5
May	6.2	6.6
June	7.5	7.5
July	7.5	7.5
August	7.5	7.5
September	7.5	7.5
October	6.2	6.5
November	6.0	6.6
December	5.8	6.4
Average	6.5	6.8

The proposed annual average water withdrawal rate from the lower pool is 6.5 MGD, and the maximum withdrawal rate is 7.5 MGD for any given month.

Detailed hydrologic analyses were conducted to assess potential hydrologic impacts from the proposed water use; specifically, water level drawdowns in the lower pool, and reduced discharge flow rates from the lower pool to the coastal pool. Real-time simulations were conducted for a 50 year period using historic daily discharge rates from the lower pool (Section 3.1) and the Project's monthly average withdrawal rates (above) to predict:

1. The daily lower-pool water-level elevation; and
2. The daily lower-pool discharge rate to the coastal pool.

The calculations were based on the mass balance in the lower pool, which has a water surface area of approximately 780 acres at 15.5 ft-msl, and the stage/discharge relations at the radial gates. Each of the radial gates consists of a composite rectangular weir with two control elevations. The lower invert elevations at the North Canal, Main Canal, and South Canal radial gates were 15.08 ft-msl, 15.11 ft-msl, and 15.48 ft-msl, respectively.

Subsequently, a variety of statistical analyses were used to evaluate the 50 years of daily data.

Results of the 50-year real-time simulations of the lower pool water levels and discharge flow rates are summarized as follows:

Parameters	Historic Condition	BHEC Use Condition
Daily average flow (MGD)	74.8	68.3
Minimum daily flow (MGD)	2.86	0.0
Probability of zero flow (%)	0	0.27
Number of days with zero flow in 50 years	0	49
Median water level (ft-msl)	15.79	15.72
Average water level (ft-msl)	15.95	15.88
Minimum water level (ft-msl)	15.23	15.03
Maximum drawdown below existing water level (ft)	—	0.40
Average drawdown below existing water level (ft)	—	0.07
Maximum drawdown below weir invert (ft)	—	0.05
Maximum consecutive days when water level is below weir invert	—	9

The simulation results indicate the proposed water use would reduce the average discharge from the lower pool by 8.7 percent, from 74.8 MGD to 68.3 MGD. The average water-level drawdown in the lower pool would be approximately 0.07 ft below the existing water level and there is a 10 percent probability (i.e., frequency) of a 0.11 ft drawdown below the existing water level. These conditions would not cause significant adverse impacts of any kind.

During extremely dry periods, the proposed withdrawal may cause the water level to drop below the weir control elevation. The proposed water use, under the worst-case conditions, would preclude discharges from the lower pool only 0.27 percent of the time, or less than 1 day per year. Assuming the maximum pumping rate by BHEC, the absolute worst-case day for the 50 years simulated showed that the lowest water level in the lower pool would be 0.05 ft below the weir control elevation, and the maximum water-level drawdown would be approximately 0.40 ft below the existing water level for the worst-case day of the 50-year period. The longest consecutive days with no discharge from the lower pool would be 9 days and this would occur only once in 50 years. Further, it is estimated that the maximum withdrawal rate may change the canal flow velocity by no more than 0.05 feet per second, a negligible amount.

The results of the hydraulic analyses indicate there is sufficient water supply in the IRFWCD to support the proposed water use for the Project. The induced drawdown in the lower pool would average only 0.07 ft below the existing water level. The lower pool has a large storage volume, and the worst-case minimum water level (or maximum drawdown) would only be approximately 0.05 ft below the weir control elevation. Therefore, the proposed water use will not cause significant adverse impacts on the IRFWCD's water supply system.

Regarding water quality impacts, the proposed BHEC facility is a zero wastewater discharge facility. All wastewater will be reused or evaporated, and the residual solids will be disposed at a permitted site. Therefore, the proposed Project will have no adverse surface water quality impacts.

4.0 DISCUSSION AND CONCLUSIONS OF IMPACTS ASSESSMENT

SJRWMD utilizes specific criteria, “a three fold- test,” to evaluate potential impacts from a new surface water use that is proposed in the context of a CUP application. To satisfy the SJRWMD Conditions for Issuance of Permits (Section 40C-2.301[2], Florida Administrative Code [F.A.C.]), the applicant must establish that the proposed use of water:

1. Is a reasonable beneficial use.
2. Is consistent with the public interest.
3. Will not interfere with any presently existing legal use of water.

The *Applicant's Handbook: Consumptive Uses of Water* (the “Handbook” [SJRWMD, 1999]) provides guidance on the interpretation of these criteria. Further, a proposed use explicitly does not satisfy these criteria if the proposed use will:

- Significantly induce saline water encroachment; or
- Cause a water level to be lowered so that stages or vegetation will be adversely and significantly affected on lands not controlled by the applicant; or
- Cause a ground water level to be lowered so that significant and adverse impacts will affect existing legal users; or
- Require the use of water that has been reserved from use by Rule 40C-2.301(6); or
- Cause a violation of *minimum flows* for surface waters established in Chapter 40C-8, F.A.C.; or
- Cause a violation of *minimum levels* for surface waters or ground waters established in Chapter 40C-8, F.A.C.

The proposed use of surface water by the Project is evaluated below with regard to these specific criteria and in light of the impacts assessment results. As described below, the proposed use of surface water for the Project is a reasonable beneficial use that will not interfere with any presently existing legal use. Further, the proposed use of water for the Project is consistent with the public interest and will not cause any significant adverse impacts.

4.1 REASONABLE BENEFICIAL USE

A reasonable beneficial use is defined in Section 373.019(4), Florida Statutes, as:

the use of water in such quantity as is necessary for economic and efficient utilization for a purpose and in a manner which is both reasonable and consistent with the public interest.

Based on statutory guidance and a list of factors to consider from State Water Policy, SJRWMD has identified 13 specific criteria that must be met in order for a water use to be considered reasonable beneficial. The 13 criteria are listed in Section 10.3 of the Handbook (SJRWMD, 1999). Many of these criteria evaluations are manifest in Sections 4.2 through 4.6 below.

All of the statutory and SJRWMD rule criteria for a reasonable beneficial use will be satisfied by the proposed use of surface water for the BHEC. This conclusion is supported by the evaluations set forth in the SCA, the Water Supply Alternatives Analysis (see Attachment 10.1.4-B), and this CUP application impacts assessment report.

The source of the water (the IRFWCD canal system) is clearly capable of producing the proposed quantities of water. The proposed water source is the lowest acceptable-quality water source available that can provide the needed quantities and be consistent with the public interest. Other sources of water considered are described in the Water Supply Alternatives Analysis, which is included as Attachment 10.1.4-B.

The proposed use of 6.5 MGD for an electrical power plant that will generate 1,080 MW (nominal) is quite reasonable. Indeed, most combined cycle power plants use more water per MW than the proposed Project. Typically, combined cycle (CC) power plants have used fuel oil as an alternate fuel, which usually results in the use of additional water to control the facility's airborne emissions of oxides of nitrogen (NO_x). A typical 1,000-megawatt CC facility burning fuel oil would use approximately 1 MGD more than the Project will need to produce an equivalent amount of electricity.

The project has been designed to maximize recycling of water, and minimize the use of water, to the greatest extent practicable. The project also has been designed to preclude the use of potable-quality water for process and cooling water needs. The use of reclaimed water from the Indian River County system, as available, will also preclude the use of better quality water from other sources. Of the 6.5 MGD of water needed for the Project on an annual average basis, it is anticipated that the county reclaimed system will typically provide between 0.0 MGD and 5.3 MGD on an as-available basis. Water used will be repeatedly recycled in an extremely efficient manner. The Water Conservation Plan is provided in the Water Supply Alternatives Analysis, which is included as Attachment 10.1.4-B.

The BHEC is proposed to be a zero wastewater discharge facility with regard to the NPDES program. This means it will have no point source discharges of wastewaters or contaminated storm water to surface waters. All wastewater will be repeatedly recycled and eventually evaporated, and the residual solids will be disposed at a permitted site. Therefore, the proposed water use will not cause or contribute to a violation of state water quality standards in receiving waters of the state; the Project will have no adverse impacts on surface water quality.

4.2 THE PUBLIC INTEREST

For the reasons set forth below, the proposed Project is consistent with the public interest. Indeed, the Project will provide a variety of significant environmental and economic benefits to the public. In turn, the proposed use of water for the Project is consistent with the public interest.

As explained in Chapter 1.0 of the SCA, peninsular Florida has an immediate need for the electrical power that will be generated by the Project.

The Project will use clean natural gas and state-of-the-art technology to generate electricity in an extremely efficient and environmentally friendly manner. As described in Section 1.0 of the SCA, the Project will use less fuel to generate electricity than most power plants. The Project also is expected to displace electrical production at older, less efficient, and more polluting facilities. Thus, the Project will provide needed electrical power, while producing less pollution than most other facilities, thereby reducing the overall impacts of power generation activities in Florida.

Chapter 1.0 of the SCA describes the need for the Project within the Peninsular Florida electrical system. The Project is needed for electrical system reliability and integrity. Also, the Project will assist in fulfilling the need for adequate electricity supply at a reasonable cost. The Project will sell electricity to other utilities. The Project will be more cost effective than over 34,000 MW or more of existing generating capacity in Peninsular Florida. Consequently, when the Project sells power, it will enable other utilities to enjoy cost savings, which presumably will be passed on to the utilities' retail customers throughout peninsular Florida.

In the region of the Project, the SJRWMD is currently discouraging use of ground water and encouraging ground water users to convert to surface water sources. In the public interest, this Project proposes no use of ground water. Rather, this Project proposes to meet its water needs through use of surface water from the IRFWCD canal system as reclaimed water, on an as-available basis, from the county system.

The BHEC is proposed to be a zero wastewater discharge facility with regard to the NPDES program. This means it will have no point source discharges of wastewaters or contaminated storm water to surface waters. This also means that water use will be extremely efficient.

The Project will help protect water quality in the Indian River Lagoon in ways that are fully consistent with the Master Storm Water Management Plan for the east Indian River

County—Indian River Lagoon watershed (see SCA Section 2.3.4). Various publications by the SJRWMD indicate that excessive freshwater discharges to the Indian River Lagoon are considered a major problem. The excessive freshwater discharges tend to reduce salinity and introduce sediments and nutrient pollutants to the lagoon, which have the effect of degrading shellfish habitat, fostering algae growth, and killing seagrasses. The proposed withdrawals from the IRFWCD canal system for this Project will induce beneficial effects by reducing these problematic freshwater discharges from the coastal pool to the Indian River Lagoon by an average of 7 percent. Consequently, the canal water withdrawals will reduce by approximately 7 percent the ongoing nutrient pollutant loading to the lagoon, and may slightly boost the lagoon salinity levels locally. These beneficial effects are clearly in the public interest.

Similar benefits in the public interest will result from the Project's use of reclaimed wastewater on an as-available basis from the county system. The Indian River County system may discharge reclaimed water into the IRFWCD canal system, which ultimately discharges into the Indian River Lagoon. These discharges are most likely to occur during wet weather conditions when the county's customers have little or no need for the reclaimed water. The Project will reduce the potential for discharges to the Indian River Lagoon because the Project will use the available reclaimed water, even during wet weather conditions, provided that the plant is operating. Subject to certain limitations, the Project will use as much reclaimed water as the county system can provide under normal conditions. Thus, unlike the county's other customers, the Project will provide the county with a relatively consistent and reliable method of *using* its reclaimed water during wet weather conditions, instead of discharging this resource into the Indian River Lagoon. Under dry weather conditions, the Project will accept water in excess of the quantity directed to SJRWMD's preferred use of irrigation. As such, the Project will help reduce the amount and frequency of any discharges from the system to the Indian River Lagoon, which will reduce the potential for any impacts that may be associated with that discharge. For all of these reasons, this water use is clearly consistent with the goals of the aforementioned Master Storm Water Management Plan.

4.3 INTERFERENCE WITH PRESENTLY EXISTING LEGAL USES

The SJRWMD Handbook (Section 9.4.4) presumes that an interference with a legal use of water occurs when a new withdrawal would result in a 10 percent or greater reduction in the withdrawal capacity of the existing legal use, or when the existing user experiences economic, health, or other type of hardship as a result of the new use. As a practical matter, this criteria is more often a concern with new ground water use impacts on other ground water users, and less often a concern with surface water use.

Section 3.3 in the SCA identifies existing legal users of water in the area of the Project. Based on the impact assessment results, only 0.07 ft of water level drawdown would occur in the lower pool of the canal under the average conditions evaluated. This minimal drawdown will not cause a 10 percent reduction in the withdrawal capacity of any existing legal use of water, and it would not cause any existing user to experience economic, health, or other type of hardship. Similarly, no significant adverse impacts are expected to occur under severe drought and maximum use conditions.

These evaluations indicate that the proposed withdrawals are not likely to cause significant adverse impacts to any existing legal use of water.

4.4 SALINE WATER ENCROACHMENT

A CUP may be denied by SJRWMD if the proposed use would cause significant saline water intrusion. The SJRWMD defines significant saline water intrusion as saline water encroachment which detrimentally affects the applicant or other existing legal users of water, or is otherwise detrimental to the public interest.

As previously described, the proposed surface water source is from the lower pool of the IRFWCD canal system. Fresh water flows out of the canal system and discharges into the relatively saline Indian River Lagoon. The lower-pool gate-structures are situated at elevations that are above the water levels in the coastal pool and the Indian River Lagoon (which

are hydraulically connected). The proposed withdrawals from the lower pool will have no affect on these relationships. Consequently, saline water in the Indian River Lagoon cannot encroach into the fresh water lower pool. Therefore, the proposed withdrawals will not cause significant saline water intrusion.

4.5 OFFSITE DAMAGES

A proposed water use that would cause an unmitigated adverse impact on an existing adjacent land use is considered inconsistent with the public interest; any such impacts must be mitigated by the permittee. Examples of adverse impacts include: significant reductions in water levels in an adjacent surface water body; significant potential for land collapse or subsidence caused by a reduction in water levels; and damage to crops, wetlands, or other types of vegetation.

Wetlands can show adverse impacts if significant drawdowns are maintained permanently or for long periods of time. As a general rule of thumb, the SJRWMD staff tends to view a sustained drawdown of as little as 0.35 ft as having potential to cause adverse impacts to some types of wetlands. The surface water drawdown estimates indicate an average of only 0.07 ft, and only a 10 percent probability (i.e., frequency) of drawdowns of 0.11 ft in the lower pool of the canal system. Therefore, the proposed withdrawals are not expected to cause significant adverse impacts to any offsite wetlands or to the functions of any such wetlands.

Land use adjacent to the withdrawal point in the Lateral C Canal is dominated by agriculture use (see Figure 2.2.3-1 in the SCA). Surface water drawdowns are estimated to be quite minimal. These drawdowns are not expected to cause any unmitigated adverse impact on agricultural crops, vegetation, or any other existing adjacent land use.

The surface water withdrawals are not expected to induce land subsidence and will not cause or contribute to flood damage in any way.

The proposed water use is not expected to cause any unmitigated adverse impact on existing adjacent land use. Further, the BHEC will mitigate adverse impacts on an existing adjacent land use if any should occur.

4.6 MINIMUM FLOWS AND MINIMUM LEVELS

Chapter 40C-8, F.A.C., has established minimum flows and water levels for specified water bodies. None of these specified water bodies are in close proximity to the Site area. Section 3.0 of this report presents the estimated effects of the proposed canal water withdrawals. The proposed withdrawals will have no influence, and therefore no adverse impacts, on any of the specified water bodies. Similarly, the project will not require the use of water that has been reserved from use by Rule 40C-2.301(6), F.A.C.

REFERENCES

- St. Johns River Water Management District (SJRWMD). 1994. Evaluation of Pollutant Loadings and Best Management Practices for Discharges from Primary Water Control Districts in Indian River County to the Indian River Lagoon Basin.
- St. Johns River Water Management District (SJRWMD). 1998. The Indian River Lagoon: Fast Facts.
- St. Johns River Water Management District (SJRWMD). 1999. Applicant's Handbook, Consumptive Uses of Water.

ATTACHMENT 10.1.4-B

WATER SUPPLY ALTERNATIVES ANALYSIS

WATER SUPPLY ALTERNATIVES ANALYSIS

**BLUE HERON ENERGY CENTER
INDIAN RIVER COUNTY, FLORIDA**

Prepared for:



CALPINE
BLUE HERON
ENERGY CENTER

CALPINE CONSTRUCTION FINANCE COMPANY, L.P.
Boston, Massachusetts

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

*3701 Northwest 98th Street
Gainesville, Florida 32606*

ECT No. 000105-0200

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1.0 INTRODUCTION AND BACKGROUND

Calpine Construction Finance Company, L.P. (Calpine) is planning to construct and operate a new electric power plant in Indian River County, Florida. The Blue Heron Energy Center (BHEC) will be located on an approximately 50.5-acre parcel in southeastern Indian River County, approximately 5 miles southwest of Vero Beach, Florida (see Figure 1-1).

The natural gas-fired 1,080-megawatt (MW) (nominal) power plant will use Siemens Westinghouse Power Electric Corporation 501 combustion turbine generators (CTGs). The plant's three main water needs are for heat dissipation, potable/sanitary, and process water systems. The heat dissipation system is expected to consist of a circulating water (condenser and auxiliaries cooling) system with evaporative cooling towers. Process water needs will be used for CTG steam injection, heat recovery steam generators (HRSGs) makeup, and inlet air foggers. As with most power plants, the largest consumptive need will be for cooling. The design operational plans for the facility indicate that the power plant will require, on the average, approximately 6.5 million gallons of water per day (MGD), and the expected peak demand is on the order of 7.5 MGD.

Potential water sources identified for the plant's use include: (1) ground water from the surficial aquifer; (2) ground water from the Floridan aquifer; (3) excess surface water from the Indian River Farms Water Control District (IRFWCD) canal system; (4) brackish water from the Indian River Lagoon; (5) reclaimed water from the existing Indian River County reclaimed water system; (6) storm water; (7) reverse osmosis (RO) discharge water from the county's potable water treatment plant; and (8) Indian River County storm water park. These sources were examined in terms of water quantity available, water quality, and technical and economical feasibility. Acceptable sources were matched to the plant's water needs such that the lowest quality water available and feasible was used for each need.

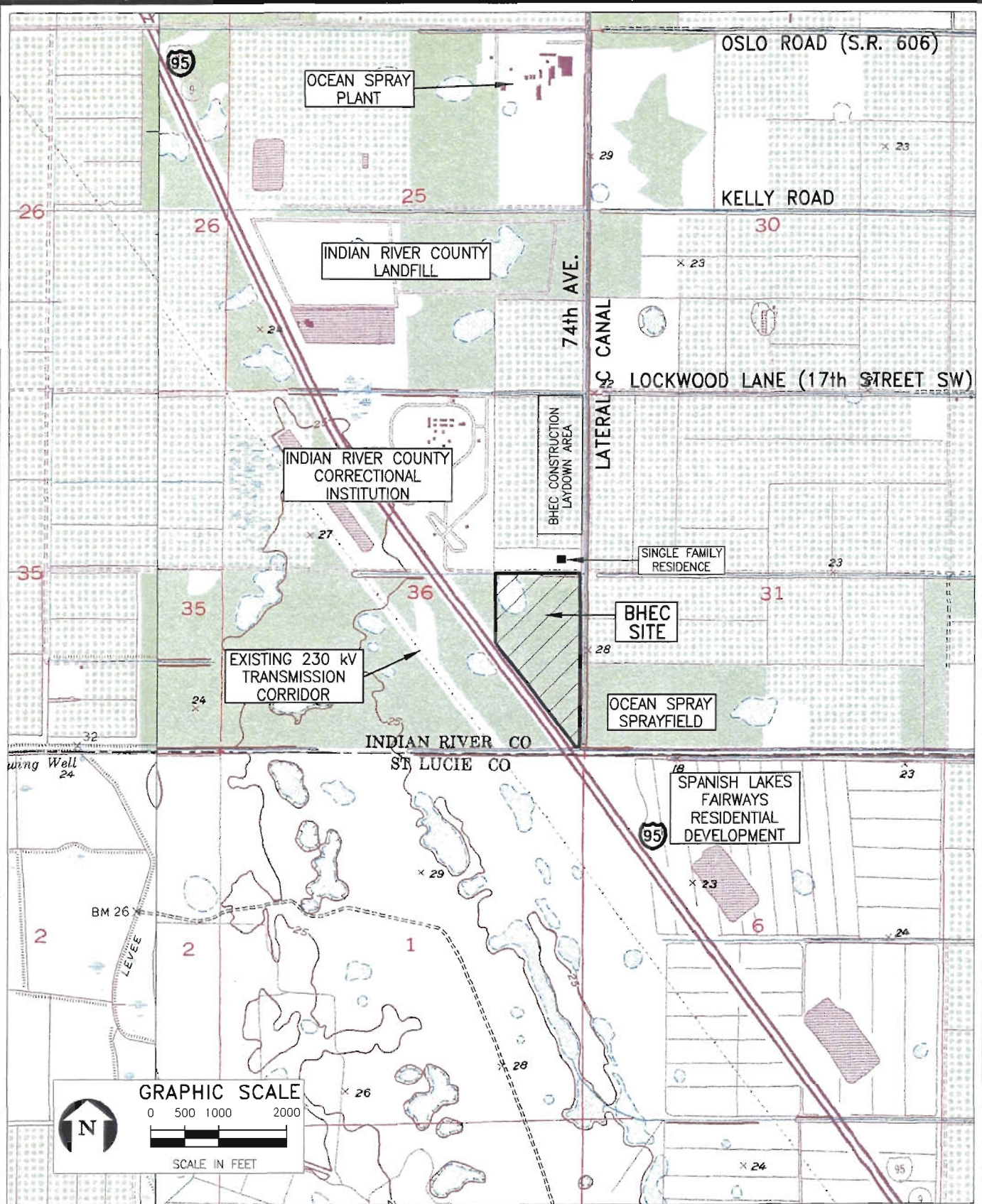


FIGURE 1-1.
SITE VICINITY MAP

Sources: USGS Quads: Oslo and East of Glum Slough, FL, 1983; ECT, 2000.



Throughout the planning process, Calpine worked closely with representatives of Indian River County, IRFWCD, and the St. Johns River Water Management District (SJRWMD). In evaluating potential sources for the various water needs for the Project, Calpine was encouraged to: (1) utilize the lowest quality of water available; (2) use ground water as a supply only after other water supply sources have proven infeasible; and (3) consider all possible water supply alternatives. Also, Calpine was encouraged to integrate the Project's water use plans into the master storm water planning program currently being developed by Indian River County, SJRWMD, and IRFWCD.

This report provides Calpine's evaluation of potential water supply alternatives for the BHEC. Section 2.0 summarizes the power plant water requirements, and includes water balances that have been prepared on the basis of the latest information on estimated water use. Section 3.0 lists the water supply alternatives considered and an evaluation of each alternative. Section 4.0 presents the summary and conclusions, and constitutes Calpine's proposed plan for supplying water for its various needs at the BHEC facility.

2.0 PROJECT WATER REQUIREMENTS AND PLANT WATER USES

2.1 PROJECT WATER REQUIREMENTS

The BHEC, like all steam combined cycle power plants, requires makeup water for various in-plant uses. Water is required for makeup to the plant cooling system, which is primarily used in condensing the steam turbine exhaust, and cooling other plant equipment. Water is also needed for makeup to the steam cycle and miscellaneous plant services.

Figure 2-1 shows a quantitative water balance for the plant for the expected annual average water use, and Figure 2-2 shows the projected peak water use. As shown in these figures, expected annual average daily water consumption is approximately 6.5 MGD, and the projected peak daily water consumption is approximately 7.5 MGD.

2.2 PLANT WATER USES

2.2.1 COOLING TOWER MAKEUP

The single largest requirement for water is cooling tower makeup, used to replace water that evaporates during the cooling process or is discharged from the cooling tower basin during normal operation. Cooling tower discharge, or blowdown, is necessary to control the accumulation of solids in the cooling tower and circulating water systems.

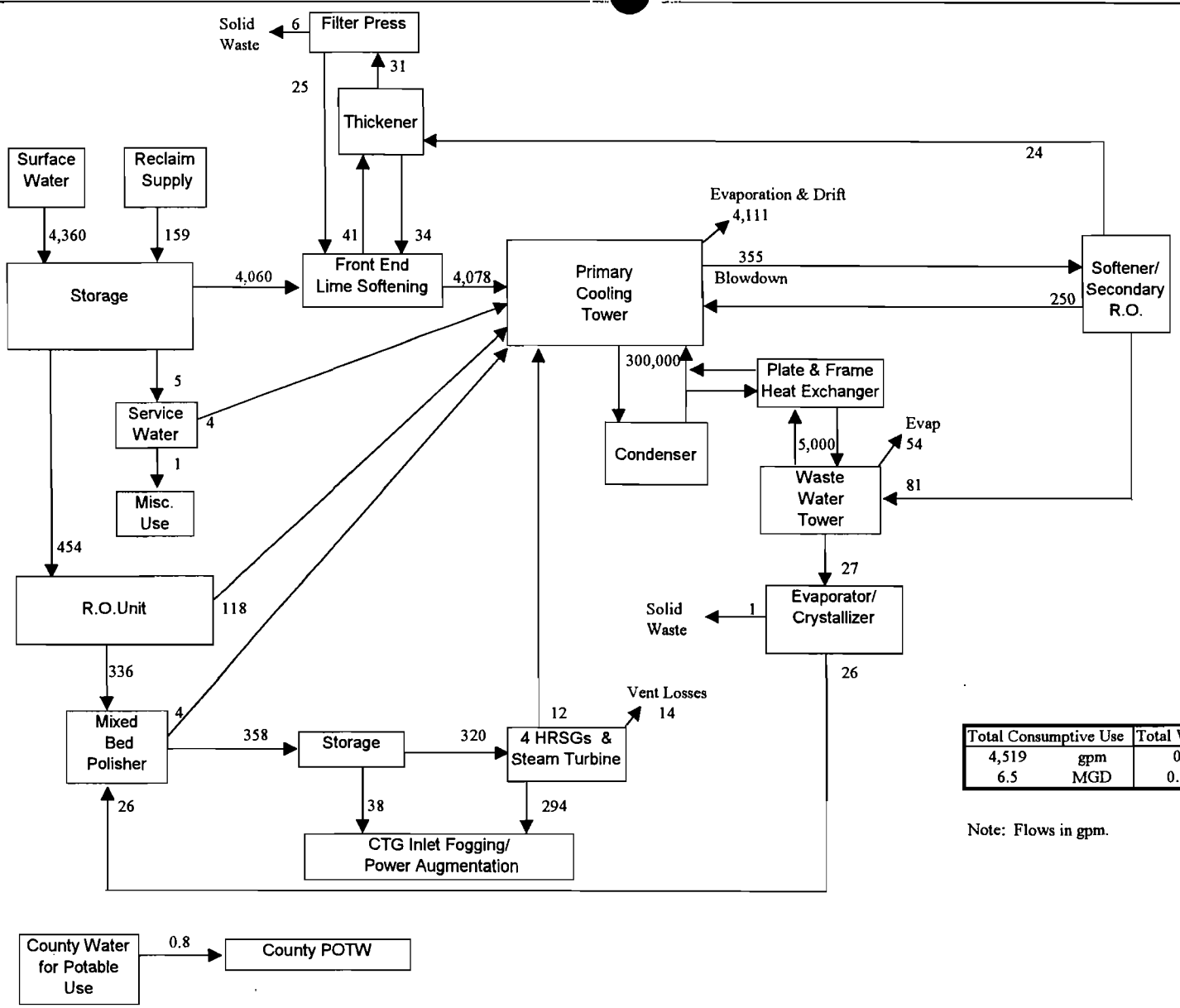
2.2.2 STEAM CYCLE MAKEUP

Steam cycle makeup is required to replace water that is vented as steam, or is blowdown from the HRSGs' steam drums to prevent an accumulation of solids in the boiler water.

2.2.3 MISCELLANEOUS

Other water uses at the plant include the following:

- Combustion turbine evaporative coolers.
- Plant equipment component cleaning and maintenance.
- Plant fire water system.
- Potable water for drinking water, emergency eye wash and shower station(s), and for use in sanitary facilities.



Total Consumptive Use		Total Wastewater Flow	
4,519	gpm	0	gpm
6.5	MGD	0.0	MGD

Note: Flows in gpm.

FIGURE 2-1.
WATER BALANCE—ANNUAL AVERAGE DAILY WATER USE

Source: FWENC, 2000.



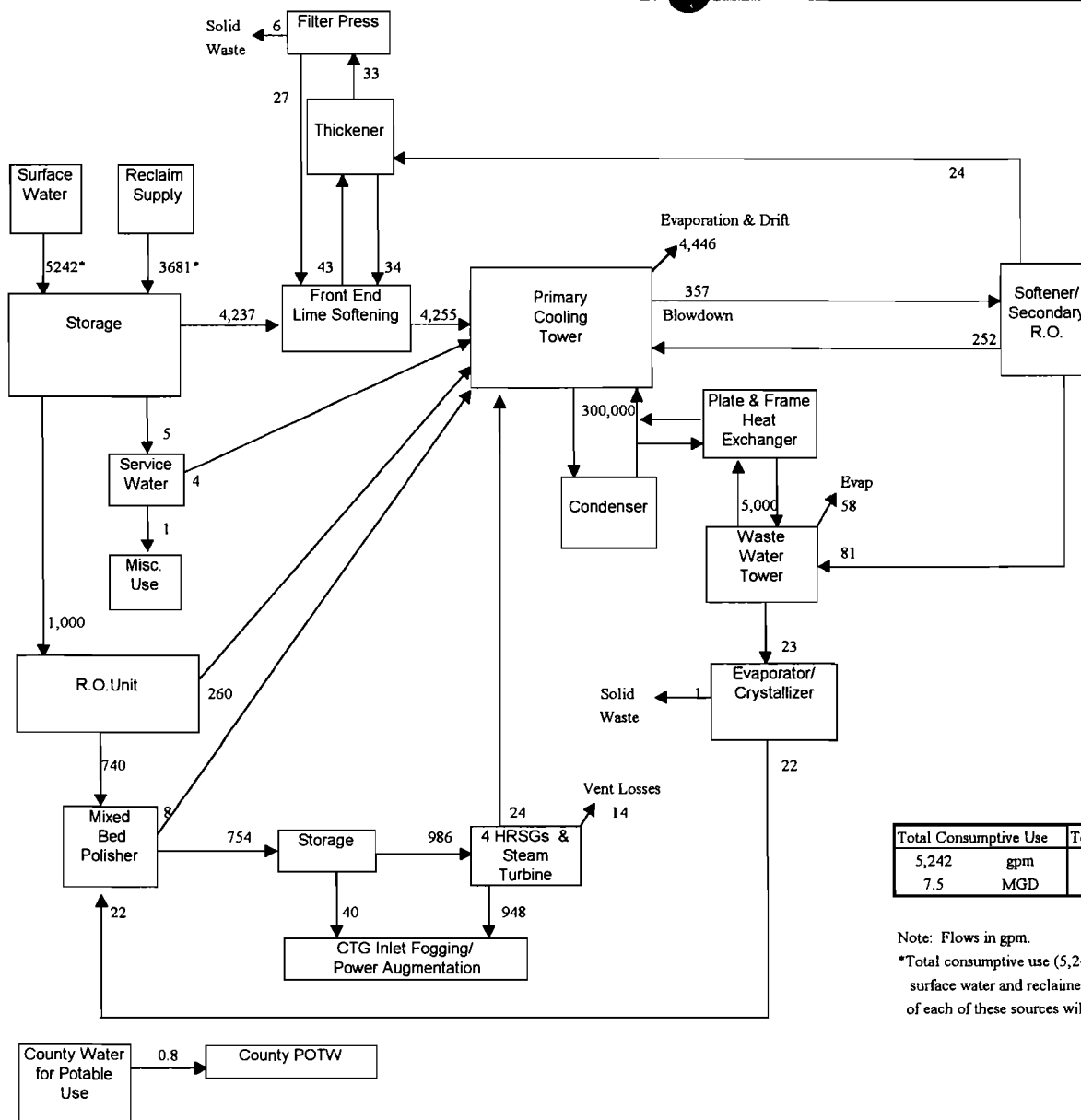


FIGURE 2-2.
WATER BALANCE—PEAK DAILY WATER USE

Source: FWENC, 2000.



3.0 ANALYSIS OF POTENTIAL WATER SOURCES

3.1 GROUND WATER

Indian River County is underlain by two distinct aquifer systems capable of supplying water to the BHEC for potable and non-potable uses. Each aquifer will be addressed in turn.

3.1.1 SURFICIAL AQUIFER

The surficial aquifer system at the Site extends to approximately 130 feet below land surface (ft bls). Based on review of the available literature, wells completed in the surficial aquifer could be expected to yield on the order of 500 gallons per minute (gpm), or approximately 0.7 MGD. Based on the results of ground water sampling conducted by ECT in April 2000, water quality is generally satisfactory with chloride concentration of approximately 10 milligrams per liter (mg/L), and total dissolved solids (TDS) of approximately 315 mg/L. Two production wells could be expected to yield approximately 1.4 MGD, which is inadequate to support the water needs of the plant. Furthermore, considerable drawdown in the surficial aquifer under this pumping scenario would be expected, likely negatively impacting the two existing wetlands onsite, and thereby negating the feasibility of utilizing the surficial aquifer for the quantities of non-potable water needed by the BHEC facility. Lastly, use of this high quality water is inconsistent with the SJRWMD preferences of utilizing the lowest quality of water for supply and avoiding ground water as a water source.

3.1.2 FLORIDAN AQUIFER

The Upper Floridan aquifer is presently utilized extensively in the vicinity of the Site, for some industrial use, but mostly to provide water for agricultural use. Based on review of the available literature, individual production wells completed at the Site could be expected to yield on the order of 1.2 to 1.5 MGD. In contrast to the surficial aquifer, water quality in the Upper Floridan aquifer is poor, with TDS in ground water from area wells on the order of 1,500 mg/L.

Some concerns with this alternative include: heavy pumping from this aquifer at the Site could possibly affect existing users; water quality is not consistent with the plant's requirements; the well yields would be likely inadequate for supplying the plant's needs; and ground water use is being discouraged by SJRWMD. Ground water from the Floridan aquifer was not considered as a reasonable water supply alternative for these reasons.

3.2 SURFACE WATER FROM INDIAN RIVER FARMS WATER CONTROL DISTRICT

The IRFWCD maintains a network of over 200 miles of interconnected drainage canals. Average (mean) combined daily discharge into the Indian River Lagoon estuary from the three principal canals (Main Canal, North Canal, and South Canal) is nearly 100 MGD based on the past approximately 50 years of record. Median daily flow is just under 50 MGD. The excess water from this canal system provides a viable source of water for the BHEC. Use of this water would also provide a considerable environmental benefit to the region, because it would reduce freshwater flows and pollutant loadings to the Indian River Lagoon system.

Water quality sampling of the canal system conducted by ECT indicates that the water quality is suitable for the plant's non-potable water needs with some pre-treatment. Water can be delivered to the plant utilizing a pipeline, approximately 3.5 miles in length, connecting the plant to the lower pool of the canal system. This water supply alternative is viable for meeting the plant's needs in terms of water quantity and quality, and provides an additional environmental benefit in reducing freshwater discharge to the Indian River Lagoon. This alternative has been selected to serve as the primary source of cooling water and other plant process for the BHEC.

3.3 INDIAN RIVER LAGOON (BRACKISH WATER)

The Indian River Lagoon system was also considered as a potential source of cooling water/plant process water for the BHEC. This resource could be used to supply water to the facility via a pipeline approximately 8 miles in length. This alternative would require an intake structure to be constructed in the Indian River. The water quality in the Indian

River is brackish; a water sample collected by ECT in March 2000 contained 26,000 mg/L TDS.

Implementation of this potential water supply option would be expected to pose a number of technical, environmental, and permitting issues. First, obtaining a suitable route for construction of the pipeline would be difficult, especially through the more urbanized area of the eastern portions of the County. Next, environmental and permitting issues related to the construction of the pipeline and construction of an intake structure in the Indian River would be considerable. Potential impingement/entrainment impacts on the Indian River Lagoon aquatic ecosystem would require extensive data collection and assessments. Based on these technical, environmental, and permitting considerations, implementation of this alternative would be considerably more expensive than the other surface water supply alternatives and would involve the potential for greater environmental impacts. Also, the use of this brackish water would create the need for additional extensive and expensive water treatment systems at the BHEC. Thus, this alternative was not considered reasonably feasible for the BHEC facility.

3.4 RECLAIMED WATER

Indian River County currently operates a reclaimed water system which supplies water for irrigation purposes to housing and golf course developments. Currently, the pipeline for the reclaimed water system runs along Lockwood Lane, crossing 74th Avenue approximately 0.5 mile north of the BHEC. Under the Project's current plans, the reclaimed water pipeline will be extended to the Site. Water quality of the reclaimed water system is consistent with the needs of the BHEC facility. According to information provided by Indian River County, the reclaimed water system has up to approximately 5.3 MGD available during the wet season for the BHEC Project use, which is inadequate to supply all the Project's requirements. During the drier seasons, most of the county's reclaimed water is used for irrigation purposes; therefore, little or not reclaimed water would be available for BHEC use. However, the County's reclaimed water system can be used to provide a portion of the plant's required water supply needs on an as-available basis.

3.5 ALTERNATIVE WATER SUPPLIES

SJRWMD, Indian River County, Vero Beach, and IRFWCD are currently in the process of developing a master storm water management plan for the east Indian River County-Indian River Lagoon watershed within the IRFWCD. The purposes of this storm water master plan will be to address flood control, water quality, natural and recreational areas, and water reuse in the watershed, as well as to provide information necessary for a National Pollutant Discharge Elimination System (NPDES) Phase II compliance program. The specific goals of this program are to develop and implement hydrologic and hydraulic design alternatives for storm water storage, flood attenuation, and water quality treatment to achieve, as feasible, a 50-percent or greater reduction in pollutant loads and a significant reduction in freshwater discharges to the Indian River Lagoon.

In support of this SJRWMD, Indian River County, and IRFWCD program, Calpine will consider obtaining the water supply for the BHEC from storm water storage and treatment facilities that may be developed as part of the master planning program as an alternative to its current Project plans for water supply. Calpine will evaluate using this alternative water source on the basis of environmental, technical, and economic considerations, as well as the schedule for construction and availability of the water storage facilities for use by the Project.

Another potential alternative water supply for the BHEC facility is RO discharge from Indian River County's potable water treatment plants. These plants treat ground water withdrawn from the Floridan aquifer to produce drinking water. According to the county, up to 2.0 MGD of RO discharge could be provided to the BHEC, which is insufficient to supply all the Project's needs. The county has the goal of eliminating the discharge of this water to surface waters that currently flow to Indian River Lagoon. However, because of the poor quality of this water, the BHEC has limited capacity to accept the RO discharge as part of the process/cooling water used by the plant. Also, since the BHEC will not be operational at all times during the year, the Project could not accept the RO discharge 100 percent of the time, which means the county would still need to discharge this water to surface waters when the BHEC is not operating. Calpine will evaluate this alternative, supplemental water source on the basis of environmental, technical, and economic con-

siderations as well as the logistics, construction feasibility, and availability of the pipeline and pumping station(s) necessary to deliver this water to the BHEC facility.

4.0 SUMMARY AND CONCLUSIONS

4.1 SELECTED ALTERNATIVES

Section 3.0 of this report presented the potential water supply sources for Calpine's BHEC. Each alternative was analyzed with respect to its technical feasibility, potential environmental impacts, permitting considerations, and cost. Based on the results of the analysis of the alternatives, Calpine has selected the following combination of alternatives to provide the BHEC water supply:

- The primary source of cooling makeup water and other plant process water for the Project will be excess surface water withdrawn from the IRFWCD drainage canal system. Calpine will require approvals to use this water source to meet 100 percent of the Project's water supply needs since it is the only water source that is available with adequate quantities on a consistent basis.
- The Project will also use, on an as-available basis, reclaimed water from the Indian River County reclaimed water system.
- Indian River County will provide potable water and sanitary wastewater service.

The BHEC will be designed and operated as a zero wastewater discharge facility. All plant wastewaters, including cooling tower blowdown, water treatment wastewaters, plant and equipment drains, boiler blowdown, and other process wastewaters, will be treated and reused, and evaporated in the zero-discharge wastewater treatment system. The solids resulting from the treatment system will be disposed in a permitted landfill.

Calpine's plan to use excess surface water and reclaimed water for the plant's water supply, in combination with a wastewater treatment system that will have zero water discharge, will provide significant environmental benefits to the area, particularly during wet weather conditions. These plans are consistent with and supportive of SJRWMD, Indian River County, and IRFWCD current goals and programs to reduce freshwater flows and pollutant loadings to the Indian River Lagoon system.

Also, in support of the SJRWMD, Indian River County, Vero Beach, and IRFWCD program, Calpine will consider obtaining the water supply for the BHEC Project from storm

water storage and treatment facilities that may be developed as part of the master planning program as an alternative to its current Project plans for water supply. Since this alternative involves the use of excess surface water within the IRFWCD drainage basin, potential environmental impacts (i.e., benefits) would be similar to the currently planned water supply plans for the Project. Similarly, Calpine will consider accepting some quantity of the RO discharge water from the county's potable water treatment plants.

4.2 WATER CONSERVATION PLAN

The Water Conservation Plan for the BHEC is effectively manifest in the water supply alternatives that have been selected in combination with the Project's zero wastewater discharge designs. Following are some of the water conservation measures that will be implemented:

- The Project intends to use available reclaimed water, especially during wet weather conditions.
- The Project will not use ground water.
- The Project will use the lowest quality water that is reasonably available and suitable for the Project needs.
- The Project will conserve water by using surface water (from the IRFWCD canal system) that otherwise would discharge to the Indian River Lagoon, and thereby be lost as a fresh water supply source.
- The Project intends to maximize recycling of water by treating and reusing cooling water blowdown and other plant wastewaters to the maximum extent possible. As a result of these extensive water reuse measures, the Project will be extremely efficient in its water use and will operate as a zero wastewater discharge facility.
- The BHEC will rely solely on natural gas for combustion. Other projects have employed distillate fuel oil as a backup fuel, or even as a primary fuel. Use of this fuel would require the use of demineralized water to be injected into the combustion chamber of the CTGs for nitrogen oxides emission control. Given that this water will not be needed, the Project's use of natural gas as the sole source of fuel will result in significant water conservation.

- As an alternative to its current plans for water supply, the Project will consider obtaining water supply from storm water storage and treatment facilities that may be developed in the future as part of the region's Master Storm Water Management Plan.
- The Project will consider use of some quantity of RO discharge from the Indian River County potable water treatment plants.

APPENDIX 10.1.5

COASTAL ZONE MANAGEMENT CERTIFICATIONS

10.1.5 COASTAL ZONE MANAGEMENT CERTIFICATIONS

It is the understanding of the applicant that the BHEC may be subject to the Florida Coastal Management Program (FCMP) because the State of Florida's coastal zone includes the area encompassed by the 67 counties that comprise the state. The preparation and submittal of the SCA provides the necessary data collection, surveys, maps, and analyses necessary to determine the probable effects of the proposed Project on the State's water, cultural, historic, and biological resources; its compliance with growth management provisions; its impact on public infrastructure; and its impact on submerged lands.

Based on the information provided in this SCA, Calpine has determined and certifies that the BHEC Project complies with the requirements of the FCMP and the proposed Project will be conducted in a manner consistent with the requirements of the FCMP.

APPENDIX 10.1.6

LAND USE SPECIAL EXCEPTION APPLICATION

APPLICATION FOR SPECIAL EXCEPTION USE

**BLUE HERON ENERGY CENTER
INDIAN RIVER COUNTY, FLORIDA**

Prepared for:



**CALPINE CONSTRUCTION FINANCE COMPANY, L.P.
Boston, Massachusetts**

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

*5405 Cypress Center Drive, Suite 200
Tampa, Florida 33609*

ECT No. 000105-0300

October 2000

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

Calpine Construction Finance Company, L.P. (Calpine) wishes to construct and operate a nominal 1,080 megawatt (MW) natural gas-fired electrical power plant (the Project) called the Blue Heron Energy Center (BHEC). The proposed Project will be located on approximately 50.5 acres of undeveloped land (the Site) in unincorporated Indian River County. Figure 1 is a map depicting the general location of the Site. The legal description of the Site is included in Attachment A.

The Site currently is zoned as Agriculture (A-1). Under the county's land development regulations, the Project is a "Public and Private Utility—Heavy", which is authorized within the A-1 zoning district as a Special Exception Use.

This application has been prepared by Calpine to demonstrate that the BHEC satisfies the county's requirements for a Special Exception Use. Pursuant to Section 971.05(6)(b) b of the Indian River County Code, Calpine respectfully requests the county's approval of a Special Exception Use, based on Calpine's conceptual site plan for the BHEC. Calpine understands that the final approval for the Project will not occur until Calpine submits and the county approves a final site plan.

The applicant for the Project is:

Calpine Construction Finance Company, L.P.
The Pilot House, 2nd Floor
Lewis Wharf
Boston Massachusetts 02110
617/723-7200

The current owner of the Site is:

Ocean Spray Cranberries, Inc.

The authorization for Calpine to proceed with the submittal of this application for a Special Exception Use is provided in Attachment B.

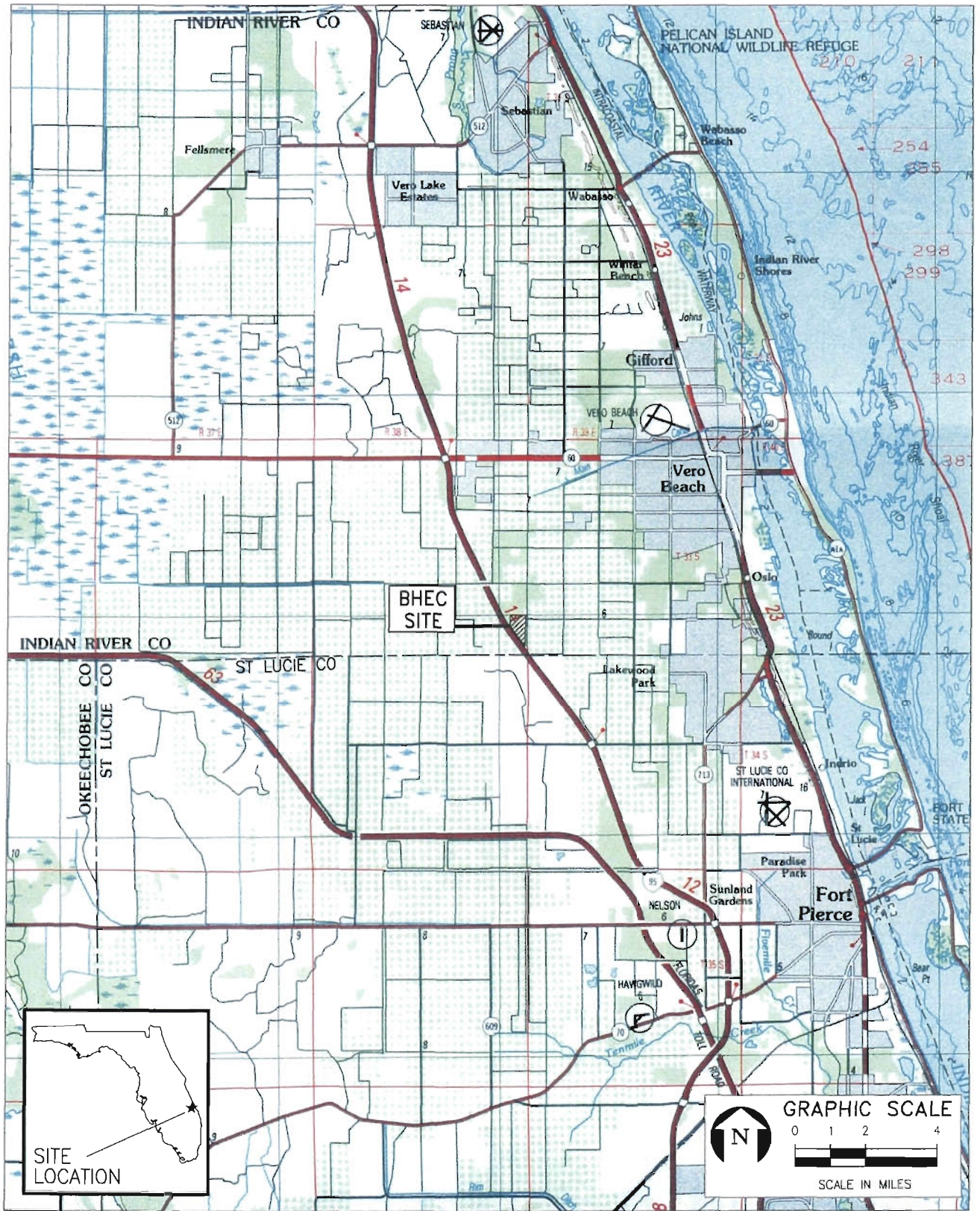


FIGURE 1.
BHEC SITE LOCATION MAP

Sources: USGS Quad: Ft. Pierce, FL, 1988; ECT, 2000.



CALPINE
BLUE HERON
ENERGY CENTER

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The Site comprises approximately 50.5 acres located in southeastern Indian River County (Section 36, Township 33 South, Range 38 East) at the southern terminus of 74th Avenue, just east of Interstate 95 (I-95). The City of Vero Beach is located approximately 5 miles northeast of the Site.

Figure 2 is a Site location map, based on the U.S. Geological Survey's 7.5-minute quadrangle maps for Oslo and East of Gum Slough. The legal description and the boundary survey for the Site are included in Attachment A. No street address has been assigned to the Site, but the Project will have access to an extension of 74th Avenue along the eastern property boundary. The tax parcel number is:

36-33-38-00001-0090-00001.0

2.2 PROJECT DESCRIPTION

The Project primarily consists of four combined-cycle combustion turbine generators (CTGs), four heat recovery steam generators, and two steam turbines capable of producing a nominal total of 1,080 MW of electricity. Cooling towers, a water treatment system, a zero discharge wastewater treatment system, and other associated and ancillary facilities also will be included in the Project.

The CTGs will be fired with natural gas only. The natural gas will be delivered via a new pipeline that will be constructed to the Site from a Gulfstream Natural Gas System, L.L.C. (Gulfstream) metering station located in St. Lucie County, approximately 15 miles south of the Site.

Power from the Project will be transmitted via two new 230 kilovolt (kV) transmission lines, which will connect to the existing electrical transmission lines located west of I-95.

The Project will occupy approximately 25.1 acres of the 50.5-acre Site.

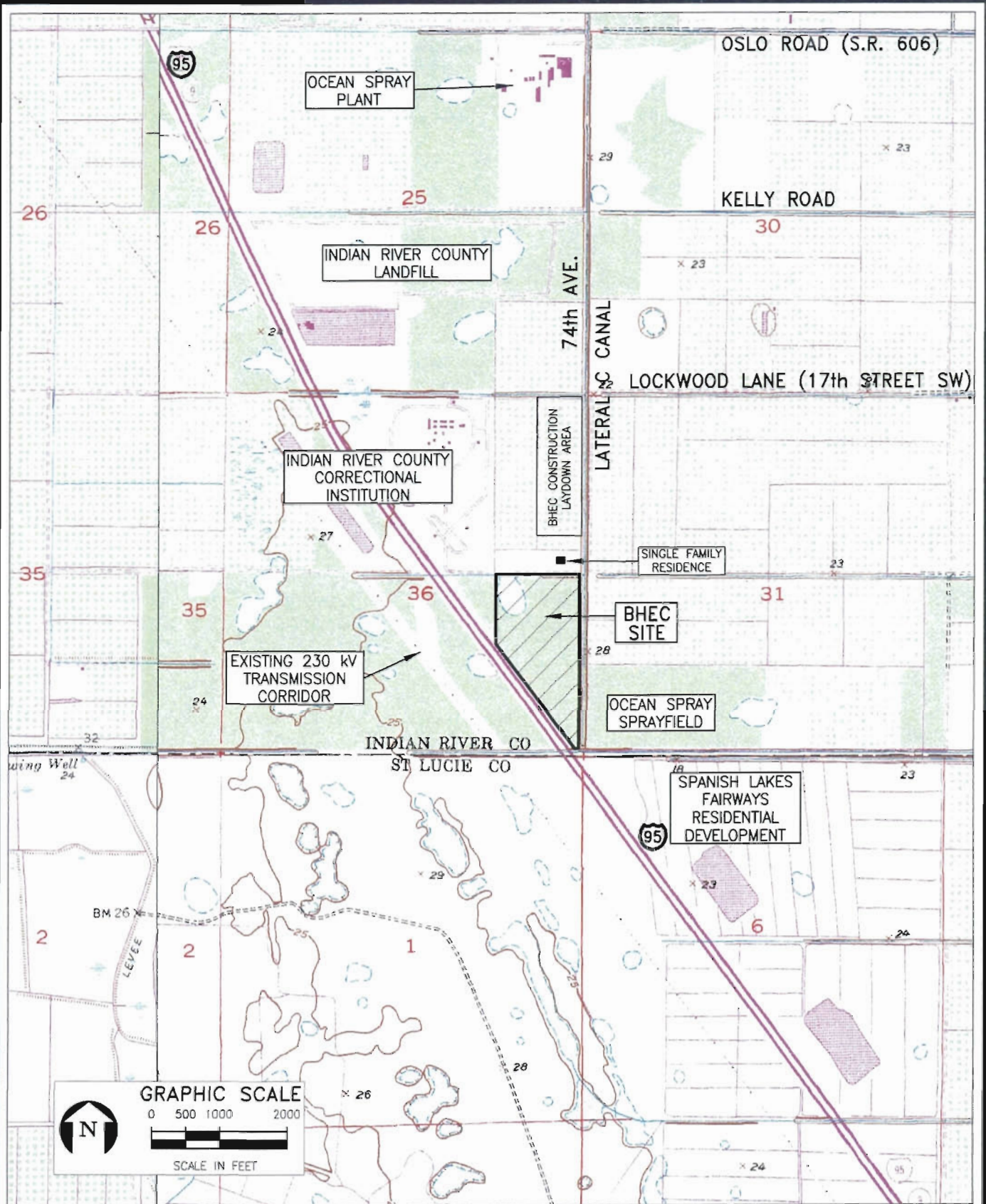


FIGURE 2.
SITE VICINITY MAP

Sources: USGS Quads: Oslo and East of Glum Slough, FL, 1983; ECT, 2000.



CALPINE
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The Project will need approximately 36 employees when operational. An average of approximately 234 employees will be needed during the 27-month construction period.

More detailed descriptions of the Site, the Project, and the Project's impacts are contained in Calpine's Site Certification Application (SCA), which is being filed with the Florida Department of Environmental Protection (FDEP) pursuant to the Florida Electrical Power Plant Siting Act (PPSA). An Executive Summary of the SCA is contained in Attachment C, and incorporated herein by reference.

2.3 COMPREHENSIVE PLAN, ZONING AND EXISTING LAND USES

The Site is in the county's A-1 (Agriculture) zoning district. Electric power plants are expressly allowed within this zoning district with the approval of a Special Exception Use. The surrounding properties in Indian River County to the north, west, and east also are zoned A-1. The nearest properties to the south are in St. Lucie County and are zoned AG-1 (Agricultural) and PUD (Planned Unit Development).

The Site is located within the Agriculture (AG-1) land use designation on the Indian River County Comprehensive Plan Future Land Use Map. The Agriculture land use designation allows public facilities, such as the Project. Properties to the east, west, and north of the Site are also designated Agriculture. The area located northwest of the Site is designated Public. The land use designations in St. Lucie County for the lands located south of the Site are Residential Urban and Special District.

The Site is currently undeveloped. The properties to the east of the Site include a permitted wastewater sprayfield, which currently is not being utilized, and a citrus grove. I-95 is located along a portion of the Site's western property line. West of I-95 is agricultural land. Northwest of the Site is housing for the guards employed at the Indian River County correctional institution. North of the Site is a single-family residence, a barn, and small sheds. Southwest of the Site is undeveloped land and southeast is a subdivision of single-family homes. The nearest single-family residence to the southeast is located approximately 600 feet (ft) from the Site's southern property boundary and approximately 1,500 ft from the nearest proposed structure. The nearest residence to the north is ap-

proximately 400 ft from the closest proposed structure on the Site. The guards' housing is located approximately 1,100 ft from the nearest proposed structure on the Site.

2.4 ENVIRONMENTAL SETTING

The Site is level at an approximate elevation of 23 to 24 ft above the 1929 National Geodetic Vertical Datum. The Site is heavily vegetated, primarily in a pine flatwoods community. An overstory of slash pine with an understory of saw palmetto, wax myrtle, and gallberry is the predominant vegetative community onsite. Figure 3 depicts the two wetlands on the Site.

According to the soil survey of Indian River County (Soil Conservation Service, 1987), the onsite soil types are EauGallie fine sand, Oldsmar fine sand, Wabasso fine sand, and Pineda fine sand. The majority of the Site is underlain by EauGallie fine sand and Pineda fine sand. Both soil types are nearly level and poorly drained. EauGallie fine sand is found on broad flatwoods. The seasonal high water table is at a depth of less than 10 inches. In Indian River County, this soil mainly supports natural vegetation (Florida slash pine and saw palmetto). The Pineda fine sand soil type is found on low hammocks and in broad, poorly defined sloughs. The water table is above the surface for short periods, but recedes to within 10 inches of the surface for 1 to 6 months. This soil type underlies the two wetland areas onsite.

2.5 OTHER REQUIRED PERMITS AND APPROVALS

The following is a list of major permits and approvals required for this Project prior to construction and/or operation:

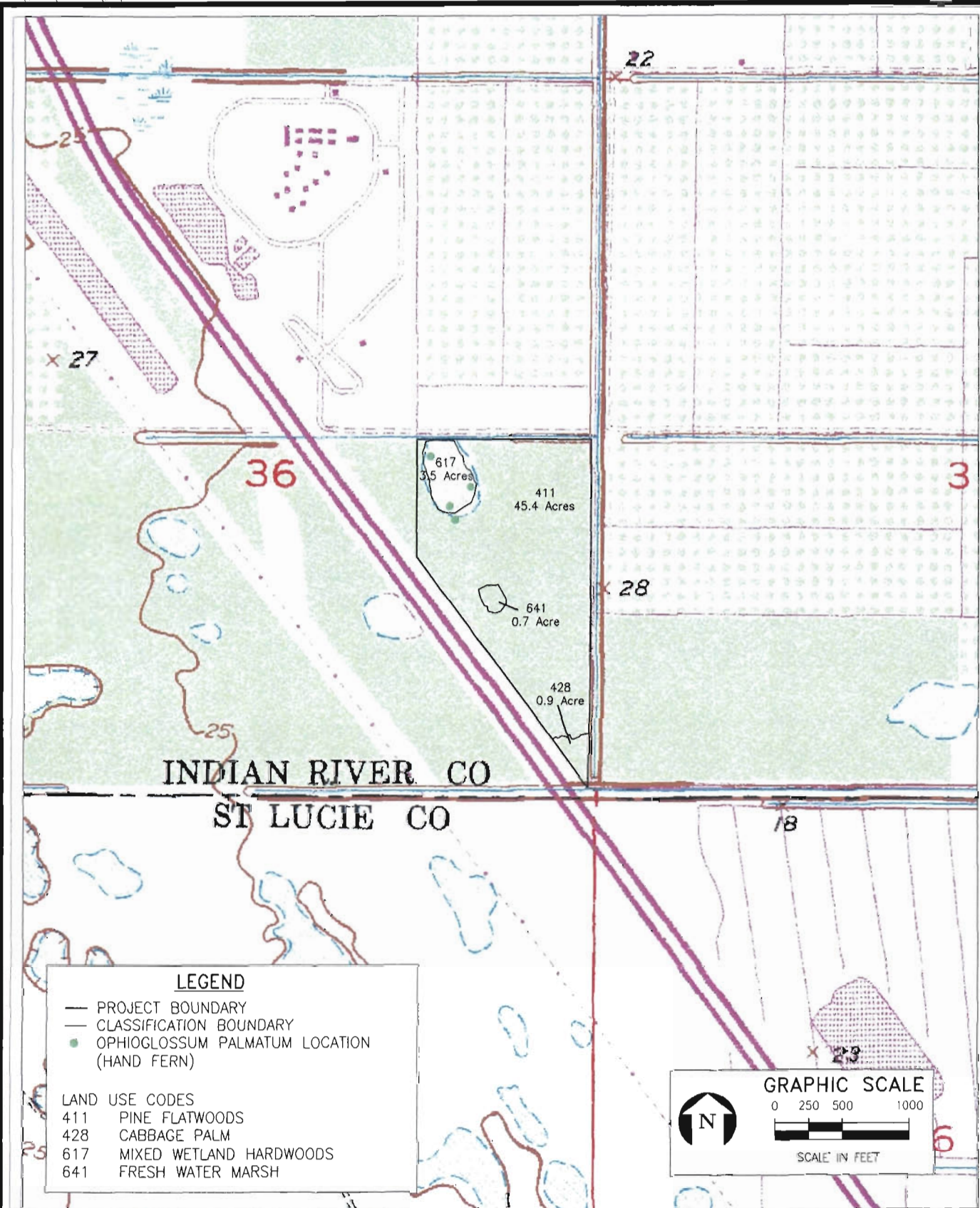


FIGURE 3.
EXTENT OF WETLANDS

Sources: USGS Quad: Oslo, FL, 1983; ECT, 2000.



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Permit/Approval	Agency	Reason Required
Florida Electrical Power Plant Siting Act (PPSA)/Site Certification Application (SCA)	Florida Department of Environmental Protection (FDEP), Siting Board	To ensure electrical power plants have minimal adverse effects on human health and the environment.
Consumptive Use Permit (issued under PPSA)	St. Johns River Water Management District (SJRWMD)	To ensure protection of surface and ground water resources.
Prevention of Significant Deterioration (PSD) Air Permit for Construction	FDEP	To ensure air emissions and impacts meet state and federal standards.
Environmental Resource Permit (issued under PPSA)	FDEP, SJRWMD	To ensure protection of wetlands and storm water is controlled to meet regulations.
Section 404 Permit	U.S. Army Corps of Engineers (USACE)	To ensure protection of wetlands
National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Management During Construction	U.S. Environmental Protection Agency	Manage storm water during construction of the project.

3.0 REVIEW STANDARDS

The Code of Indian River County establishes both general and specific criteria for a Special Exception Use. Section 3.1 below addresses the county's general criteria and Section 3.2 addresses the specific criteria for the land use proposed in this case.

3.1 GENERAL CRITERIA FOR REVIEW OF SPECIAL EXCEPTION USES

3.1.1 CONSISTENCY WITH THE INDIAN RIVER COUNTY COMPREHENSIVE PLAN

The following paragraphs demonstrate that the Project is consistent with the applicable elements of the county's Comprehensive Plan. For brevity's sake, this application does not discuss those provisions in the Comprehensive Plan that are not relevant or applicable to the Project.

FUTURE LAND USE ELEMENT GOALS, OBJECTIVES, AND POLICIES

OBJECTIVE 3: LEVELS OF SERVICE

Through 2020, the provision of public services and infrastructure in Indian River County will be at a level consistent with this plan.

Policy 3.1: For all facilities and services, the minimum levels of service established in this and other elements of the comprehensive plan will be maintained.

Policy 3.2: Regardless of land use designation or zoning district, no development shall be approved unless it is consistent with the concurrency management system in the capital improvements element, and the levels of service established in this element and other elements of the Comprehensive Plan.

Policy 3.4: Consistent with the Capital Improvements, Infrastructure, Transportation, and Recreation and Open Space Elements of this plan, county land development regulations shall ensure that level of service (LOS) standards for potable water service, sanitary sewer service, solid waste disposal service, storm water management, traffic circulation, and parks and recreation are maintained. Those standards must be met by all proposed development prior to building permit.

RESPONSE:

Section 3.1.5 of this document discusses the Project's impacts on public services and infrastructure. The LOS standards established by the county will be met. The Project will

not adversely affect the county's ability to meet or maintain compliance with the adopted LOS standards.

OBJECTIVE 7: PROTECTION ON NATURAL RESOURCES

Policy 7.5: Storm water runoff from new development shall not negatively impact adjacent properties or receiving surface waterbody quality.

RESPONSE:

The Site's storm water management system has been designed to meet the applicable water quality and quantity requirements established by the county, the St. Johns River Water Management District (SJRWMD), and other agencies. Consequently, the storm water runoff from the Site will not negatively impact adjacent properties or receiving surface water body quality.

OBJECTIVE 8: PROTECTION OF HISTORIC RESOURCES

Policy 8.3: All public and private development or redevelopment proposals shall be reviewed for their impact upon designated historic resources.

Policy 8.4: Public and private development and redevelopment activities shall cease, at least temporarily, if historic or archaeological artifacts are discovered, in order to allow for evaluation of historic significance.

RESPONSE:

Calpine has received a letter from the State Historic Preservation Officer which indicates that historic and archaeological resources are not expected on the Site, based on a review of the State's master site files. In the event that historic or archaeological resources are encountered during construction, coordination with the applicable agencies will occur.

INFRASTRUCTURE ELEMENT

SANITARY SEWER SUB-ELEMENT GOALS, OBJECTIVES, AND POLICIES

Policy 1.1: New development within the unincorporated portion of Indian River County shall be approved only when capacity is available, either on-site or off-site, to provide needed sanitary sewer service.

RESPONSE:

Existing sanitary sewer pipelines are located approximately one-half (0.5) mile north of the Site. The sewer pipeline will be extended to the Site at Calpine's expense. The county system has adequate capacity to meet the nominal needs of the Project during operations. During construction, portable toilets will be used.

Policy 1.3: The county hereby adopts a sanitary sewer LOS standard of 250 gallons per day per equivalent residential unit with a peak monthly flow factor of 1.25. That standard shall be utilized for determining the availability of facility capacity and the demand generated by a development.

RESPONSE:

The County's standard is not appropriate in this case because the standard is based on the flow that would be generated by equivalent residential units (ERU), not electrical power plants. In the electrical power industry, a more typical value is 35 gallons per day (gpd) per employee. Using this value, Calpine estimates that its 36 employees will produce approximately 1,260 gpd of wastewater.

Section 201.07 of the county's Code does not expressly address the water and sewer generation rates for electrical power plants. However, Subsection 22 of Section 201.07 indicates that one ERU should be assumed for every five employees at an industrial facility that does not use water for processing. Although the BHEC does not fit the county's description of an industrial facility, the county's formula suggests that Calpine's Project will create water and wastewater demands of eight ERU or 2,000 gpd.

In any event, regardless of whether the Project uses 1,260 or 2,000 gpd, the county's system has adequate capacity to support the Project's operations.

OBJECTIVE 4: WATER CONSERVATION

Through 2020, 100% of the wastewater effluent produced by the county centralized sanitary sewer facilities will be reused.

RESPONSE:

The county's regulations do not require Calpine to use the county's treated wastewater. Nonetheless, Calpine is willing to use reclaimed water for this Project if reclaimed water is available, particularly during wet weather conditions when the county has excess quantities of reclaimed water. Calpine will not use reclaimed water when it is needed by others for irrigation purposes.

POTABLE WATER SUB-ELEMENT GOAL, OBJECTIVES, AND POLICIES

OBJECTIVE 1: SERVICE CONCURRENT WITH DEVELOPMENT

Through 2020, there will be sufficient capacity in the regional potable water system to accommodate all new development within the urban service area.

Policy 1.1: New development within the unincorporated portion of the Indian River County shall be approved only when capacity is available, either onsite or offsite, to provide needed potable water service.

RESPONSE:

The county's existing potable water supply pipeline is located approximately 0.5 mile north of the Site. The existing potable water line will be extended to the Site at Calpine's expense. The existing system has adequate capacity to support the Project's operations. Bottled water will be supplied to the employees on the Site during construction.

Policy 1.3: The county hereby adopts a potable water LOS standard of 250 gpd per equivalent residential unit. That standard shall be utilized for determining the availability of facility capacity and the demand generated by a development.

RESPONSE:

The county's standard is not appropriate in this case because the standard is based on the needs of an ERU, rather than an electrical power plant. In the electrical power industry, a more typical value is 35 gpd per employee. Since Calpine will have approximately 36 employees at the Site during operations, the Project's estimated potable water demand is 1,260 gpd.

As noted above, Section 201.07 of the county's Code does not expressly address the water supply needs of an electrical power plant. Although Subsection 22 of Section 201.07 does not directly apply to Calpine's Project, if we use the formula in Subsection 22 for industrial facilities, we can calculate that the Project's water demand will be eight ERU or 2,000 gpd.

Regardless of whether the Project's demand is 1,260 or 2,000 gpd, the county's existing potable water system has adequate capacity to support the Project's operations.

OBJECTIVE 4: WATER CONSERVATION

Policy 4.2: The county shall continue to apply the requirements of Chapter 926 of its land development regulations, which require the use of drought tolerant vegetation, the use of efficient irrigation systems, and the preservation of existing native vegetation.

Policy 4.5: The county shall require new structures to install water saving devices and appliances. This requirement shall be implemented through the county's building/plumbing codes.

RESPONSE:

Natural vegetation on the Site will be preserved, as part of the buffer area, particularly along the western and northern property boundaries. Drought-tolerant vegetation and xeriscaping will be incorporated into the Site's landscape design. Water conserving devices and appliances will be used in accordance with the applicable building and plumbing codes.

SOLID WASTE SUB-ELEMENT GOALS, OBJECTIVES, AND POLICIES

Policy 1.2: New development within the Indian River County Solid Waste Disposal District service area shall continue to be approved only when capacity is available at the active segment of the landfill. If the active segment of the landfill is at 90% of its capacity and a new segment is not ready, additional development shall not be permitted.

Policy 1.3: The following LOS standards are hereby adopted, and shall be used as the basis for determining the availability of facility capacity and the demand generated by new development:

Service Area
County-wide

Average Solid Waste Generation Rate
6.5 pounds per capita per day; or
1.97 cubic yards per capita per year.

RESPONSE:

The Indian River County Solid Waste Management facility can meet the needs of Indian River County through the year 2020, according to the Comprehensive Plan. Based on the adopted LOS of 6.5 pounds per person per day, the Project's employees will generate approximately 234 pounds of solid waste per day. In addition, the Project's zero-discharge system will generate approximately 41 cubic yards of nonhazardous solid waste per day. The capacity of the county's landfill is adequate to meet the needs of the Project.

OBJECTIVE 2: SPECIAL WASTE AND HAZARDOUS WASTE

During the 1998 to 2010 planning timeframe, there will be no cases of improperly managed or illegally disposed of hazardous waste in the county.

RESPONSE:

The Project will generate only small quantities (less than 100 kilograms per month [kg/month]) of hazardous waste. All hazardous wastes will be properly stored, transported, and disposed by a licensed hazardous waste contractor, in compliance with all applicable regulations. A spill containment and prevention plan will be prepared for the Project.

NATURAL GROUND WATER AQUIFER RECHARGE SUB-ELEMENT
GOALS, OBJECTIVES, AND POLICIES

Policy 1.5: The county shall continue to protect existing and future public water supply wells from contamination by continuing to implement Chapter 931 of the county's land development regulations and by prohibiting any non-residential land use which stores, handles, or produces a toxic degradation or petroleum-based product, or any substance regulated under 40 Code of Federal Regulations (CFR) 302, 40 CFR 122.21, and/or Chapter 487, F.S. from locating within 1,000 feet of a public water supply well.

RESPONSE:

The Project will not contaminate surface or ground water. Moreover, the nearest public water supply wellfield is located approximately 4 miles east of the Site.

OBJECTIVE 3: PRESERVING THE QUANTITY OF THE FLORIDAN AQUIFER

Policy 3.3: The county shall continue to require that new developments install a minimum of 50% water-conserving xeriscape plant material, as specified in the Landscape Ordinance.

Policy 3.4: The county shall reuse 100% of treated wastewater effluent for irrigation to prevent over pumping of the Floridan aquifer.

RESPONSE:

The landscape design for the Project will comply with Policy 3.3 because it will incorporate portions of the existing upland habitat and xeriscape plant material in compliance with the applicable provisions of the county's Landscape Ordinance. The Project will comply with Policy 3.4 by using reclaimed water, if available. The Project will not use ground water from the Floridan aquifer.

STORMWATER MANAGEMENT SUB-ELEMENT GOALS, OBJECTIVES AND POLICIES

GOAL

Provide a drainage system for Indian River County which reduces the risk of property damage and inconvenience from long term flooding, promotes stormwater recharge of the shallow aquifer, reduces stormwater pollutant loading of the Indian River Lagoon and receiving waters and provides proper floodplain management.

OBJECTIVE 1: FLOOD PROTECTION

By 2020, all existing and new development in the unincorporated section of Indian River County will be protected from flooding from a 25 year/24 hour storm event.

Policy 1.1: The county hereby adopts the following level-of-service standard for all new drainage systems within the unincorporated county: New development requiring major site plan approval or subdivision platting shall construct a drainage system capable of mitigating the impacts of a 25 year/24 hour design rainfall event using the Natural Resource Conservation Service Type 2 modified rainfall curves. Post development runoff shall not exceed pre-development runoff unless a maxi-

maximum discharge rate has been adopted for the applicable drainage basin and the discharge does not exceed that rate. If a maximum discharge rate has not been adopted for the applicable basin, post development discharge may not exceed pre-development discharge.

RESPONSE:

The Project's storm water management system and detention ponds will meet the county's adopted LOS standards and the requirements of the SJRWMD.

Policy 1.2: The finished floor elevation of any new buildings constructed within a flood zone, as designated in the 1989 Federal Emergency Management Agency (FEMA) Flood Insurance Study—Indian River County and Incorporated Areas, shall be subject to the following requirements...

RESPONSE:

The Site is not located within a flood zone, as designated by FEMA.

OBJECTIVE 2: STORMWATER MANAGEMENT FACILITIES

By 2010, all drainage basins in Indian River County shall, at a minimum, meet the Flood Protection LOS for a 10 year/24 hour storm event.

Policy 2.4: The county shall require all new development sites to be designed with retention systems capable of accommodating 1.25 times the impervious surface area, or 0.5 inch times the project area.

RESPONSE:

The Project's storm water management system will meet the county's adopted LOS standards.

OBJECTIVE 5: PRESERVATION OF FLOODPLAINS AND FLOODWAY

Policy 5.4: The county will preserve the natural functions and values of wetlands by implementing the policies listed under Objective 5 of the Conservation Element.

RESPONSE:

Calpine will preserve the two existing wetlands on the Site. The Project's storm water management system will be designed to maintain the hydroperiod of those wetlands.

OBJECTIVE 6: RECHARGE OF THE SURFICIAL AQUIFER

Policy 6.1: The county will continue to require onsite retention/detention in accordance with SJRWMD and FDEP performance standards, as outlined in the Stormwater Management and Flood Protection ordinance.

Policy 6.2: The county will continue to require reuse of stormwater runoff for irrigation of golf courses and other developments with wet detention/retention ponds with a surface area greater than one (1) acre.

RESPONSE:

The Project's storm water management system will be designed to meet the Indian River County LOS standards and the regulatory requirements of FDEP and SJRWMD. Storm water or other surface water will be used to irrigate the Site. Ground water will not be used for irrigation or other purposes.

OBJECTIVE 7: STORM WATER QUALITY

Policy 7.3: The county will continue to require applicants to submit an erosion control plan prior to issuance of a land clearing permit.

RESPONSE:

An erosion control plan has been prepared and is included with Calpine's application for an Environmental Resource Permit (Appendix 10.1.2) and Storm Water Management Plan (Appendix 10.1.3).

Policy 7.12: The county will require all new surface water bodies to include littoral zones for created surface waterbodies greater than one-half (½) acre.

RESPONSE:

The Project's storm water pond has been designed in accordance with the applicable standards adopted by the county and SJRWMD.

TRANSPORTATION ELEMENT GOALS, OBJECTIVES AND POLICIES

OBJECTIVE 1: ADEQUATE TRANSPORTATION SYSTEM

The county acknowledges that there are no existing roadway capacity deficiencies within the county. Through 2020, the county traffic circulation system will continue to operate at or above the minimum service levels specified in Policy 1.1.

Policy 1.1: The county hereby adopts traffic circulation LOS standards. These standards are as follows: LOS "C" shall be maintained for rural principal arterials and rural freeways during peak hour, peak season and peak direction conditions. During peak hour, peak season and peak direction conditions, LOS "D" or better shall be maintained on all other freeway, arterial and collector roadways. For Florida Intrastate Highway System roadways, LOS "B" is adopted for rural areas, and LOS "C" is adopted for urban areas.

Policy 1.4: No development project shall be approved if the projected impacts of the project would serve to reduce service levels of any roadway on the traffic circulation system below the standards identified in Policy 1.1.

RESPONSE:

When the Project is operational, the traffic generated by the Project will not reduce the LOS in the county's roadway network below acceptable levels. Construction-related traffic impacts will only be temporary.

OBJECTIVE 5: TRAFFIC CONTROL

Through 2020, all development projects approved by the county will provide for adequate traffic control.

Policy 5.2: The county shall review all proposed land developments in order to ensure consistency with the goals, objectives and policies of this plan, and the county shall require coordination of traffic circulation plans and improvements with land use and infrastructure plans before development approval.

Policy 5.5: The county will review onsite traffic flow for all proposed development projects to ensure that circulation for motorized and non-motorized vehicles and pedestrians can be accommodated safely.

Policy 5.6: The county will, through its land development regulations, continue to require that all development projects provide a sufficient number of parking spaces for both motorized and non-motorized vehicles. Sufficient will be based upon information from parking studies regarding demand by use category. The county will periodically review its off-street parking requirements, identifying minimum spaces

per land use category, delineating space size, providing for shared parking, setting internal circulation standards, and addressing other parking characteristics.

RESPONSE:

Development of the proposed Project will not adversely impact the county's existing roadway network. Access to the Site will be provided by extending 74th Avenue, which will be completed at Calpine's expense. Sufficient parking spaces will be provided, and onsite traffic flow will be provided safely, in accordance with the Indian River County land development regulations.

ECONOMIC DEVELOPMENT ELEMENT, GOALS, OBJECTIVES, AND POLICIES

GOAL

It is the goal of Indian River County to have balanced and orderly economic growth.

OBJECTIVE 1: LOW UNEMPLOYMENT RATE

By 2000, the county will have an average annual unemployment rate that is within two percentage points of the State of Florida's average annual unemployment rate.

Policy 1.2: The county shall utilize existing industries as a magnet to attract new industries, including support businesses for industries located in Indian River and surrounding counties.

Policy 1.6: The county, as part of setting its list of target industries, shall target different employment sectors whose seasons supplement the seasons of the citrus industry and tourist industry.

RESPONSE:

The Project will help the county reduce its unemployment rate. The Project will provide an average of approximately 234 construction jobs. The Project will provide approximately 36 full-time jobs after the Project commences operations

OBJECTIVE 2: DIVERSIFIED ECONOMIC GROWTH

By 2001, in order to upgrade the quality of jobs and the average wage and salary scale, manufacturing jobs (Standard Industrial Classification (SIC) code 20 through 39) in Indian River County will increase by 767 to represent at least 8.00% of the county's average annual total employment.

Policy 2.5: The county, through the solid waste disposal district, will provide land adjacent to the landfill for appropriate businesses to locate.

RESPONSE:

The Project will help the county diversify its tax base and economic opportunities in the community. Although the proposed Project is not one of the targeted manufacturing jobs within SIC Codes 20 through 39, the Project will provide high quality jobs and with very attractive wages and salaries. The proposed Project also will comply with Policy 2.5 because the Project can be located near the county's landfill.

CAPITAL IMPROVEMENTS ELEMENT, GOALS, OBJECTIVES AND POLICIES

GOAL

It is the goal of Indian River County to provide needed capital improvements through the use of sound fiscal decision making.

OBJECTIVE 3: MAINTENANCE OF ESTABLISHED LEVEL-OF-SERVICE STANDARDS

Through 2004, adopted levels-of-service will be maintained for all concurrency facilities.

Policy 3.1: The county hereby adopts the concurrency management system as described within this element. The county shall maintain Land Development Regulations (LDR) Ch. 910, Concurrency Management System, which implements the plan's concurrency management system. In accordance with the concurrency management system of this plan and LDR CH. 910, the county will not approve any development project where the impacts of such a project would lower the existing LOS on any facility below that facility's adopted minimum level-of-service standard.

Policy 3.2: The county shall approve development only in accordance with the utility connection matrix identified in the Sanitary Sewer and Potable Water Sub-Elements.

RESPONSE:

The proposed Project will not cause the LOS for any facility to fall below its adopted minimum standard. The proposed Project will comply with the utility connection matrix.

OBJECTIVE 4: FUTURE DEVELOPMENT'S SHARE OF CAPITAL COSTS

Through 2004, new developments will bear a proportionate share of the cost required to maintain adopted level-of-service standards.

RESPONSE:

The development of the proposed Project will not require any upgrades to existing public facilities, except for the paved extension of 74th Avenue, which Calpine will pay to construct. Calpine's Project will not impose any meaningful demands on public services or schools, but Calpine will pay significant ad valorem taxes.

CONSERVATION ELEMENT GOALS, OBJECTIVES, AND POLICIES

OBJECTIVE 1: AIR QUALITY

Through 2020, air quality within Indian River County will continue to exceed state and federal minimum ambient air quality standards.

Policy 1.4: To reduce air-borne pollution, land clearing and tree removal associated with urban development shall meet the criteria contained in county land development regulations. These criteria include, but are not limited to: phased clearing, minimizing cleared areas, and stabilizing cleared areas with ground cover. Bona fide agricultural operations will remain exempt from permitting requirements.

RESPONSE:

The Project will not significantly affect air quality in Indian River County. The Project will not cause or contribute to a violation of any ambient air quality standards. Land clearing operations on the Site will be conducted in accordance with the applicable land development regulations, including the preparation and implementation of an erosion control plan.

OBJECTIVE 3: GROUND WATER QUALITY AND QUANTITY

Through 2020, there will be no reduction in the quality or quantity of water in either the surficial "shallow" aquifer or the Floridan aquifer in Indian River County. For the purpose of this objective, water quality will be based on primary and secondary MCLs as defined by the FDEP in Chapter 17-550, F.A.C. Surficial aquifer water quantity will be measured at the 1995 average well depth of 90 feet for domestic wells that tap the surficial aquifer; Floridan aquifer water quantity will be based on

the 1995 average yield of 650 gpm for water supply wells that tap the Floridan aquifer; and the SJRWMD's GWBRAI.

Policy 3.4: The county will require landscaped areas for new developments to consist of a minimum of 50 percent drought-tolerant species, and to use treated wastewater effluent for irrigation, if available.

RESPONSE:

The Project will not reduce the quality or quantity of water in the surficial aquifer or the Floridan aquifer. The Project will not use ground water. No wells or septic tanks will be installed on the Site. The Project will not discharge any domestic or industrial wastewater into ground or surface waters. The Project will use drought-tolerant plant species in landscaped areas, and will use reclaimed water, if available, consistent with the county's land development regulations.

OBJECTIVE 5: WETLANDS

Through 2020, there will be no net loss of the natural functions and values of wetlands or deepwater habitats in Indian River County.

Policy 5.3: Indian River County shall require a buffer zone of native upland edge vegetation to be retained around wetland and open water habitats which are constructed or preserved on new development sites.

RESPONSE:

The two wetlands on the Site will be preserved. A buffer zone (minimum 15 ft and average of at least 25 ft) of native upland vegetation will be retained around the preserved wetlands, in accordance with the applicable land development regulations.

OBJECTIVE 6: UPLAND VEGETATION COMMUNITIES

Sufficient upland vegetative communities to sustain viable populations of all native plant and animal species and representative stands of each habitat type in Indian River County will be preserved. Using 1990 conservation land acreage as a baseline, Indian River County shall, by 2010, preserve a minimum of 1,000 additional acres of upland native plant communities through the establishment of conservation easements and/or fee simple acquisition in partnership with other government agencies.

Policy 6.12: In accordance with LDR Chapter 929, the county shall continue to require development projects five (5) acres or larger, excluding bona fide agricultural operations, to preserve a minimum of 15 percent, or ten (10) percent if preserved in a non-linear, contiguous manner, of the total acreage of native upland area of the project site. The upland set-aside area shall be overlain with a conservation easement dedicated in perpetuity to Indian River County. The following upland ecological communities described in this element shall be subject to the native upland set-aside requirement:

- South Florida flatwoods, including pine flatwoods and dry prairies.

RESPONSE:

The Site design incorporates native habitat into the buffer areas along the western property boundary and a portion of the northern property boundary. More than 15 percent of the existing South Florida flatwoods habitat on the Site will be preserved.

OBJECTIVE 7: WILDLIFE AND MARINE HABITAT

Through 2020, there will be no reduction in the critical habitat of endangered or threatened aquatic and terrestrial species of flora and fauna occurring in Indian River County. For the purpose of this objective, “critical habitat” is defined as the minimum required sum of environmental conditions in a specific area necessary to sustain a given species. The protection of critical habitat shall be measured and evaluated on a site development basis.

Policy 7.2: The protection of critical habitat shall be measured and evaluated on a site development basis. For developments on property known to support endangered or threatened species of plants or animals, or on property expected to significantly contribute to such species’ habitat needs, the developer shall be required to notify the appropriate regional, state and federal agencies and provide proper protection to the maximum extent feasible.

RESPONSE:

A threatened and endangered species survey has been conducted on the Site. Four listed plant species were found in or adjacent to the wetland on the northern portion of the Site. This wetland system and the adjacent buffer areas will be preserved, thus maintaining the habitat of the state-listed plants.

The four listed plant species found on the Site are the royal fern, cinnamon fern, giant wild pine, and hand fern. Royal fern and cinnamon fern are listed because they are commercially exploited, rather than endangered. The giant wild pine is an epiphytic plant

species that is listed as endangered due to an introduced insect larvae that burrows into the plant stem, causing damage. The endangered hand fern was noted at four locations in the boots of cabbage palms. All of these cabbage palms will be protected.

OBJECTIVE 10: SOIL EROSION

Policy 10.2: The county shall enforce its tree protection ordinance to ensure that wind and water erosion associated with urban land-clearing activities is minimized through the use of erosion control techniques such as temporary seeding and mulching, sodding, diversion berms, interceptor ditches, sediment barriers, sediment basins, and related appurtenances or devices.

RESPONSE:

An erosion control plan has been prepared and is included with Calpine's application for an Environmental Resource Permit (Appendix 10.1.2) and Storm Water Management Plan (Appendix 10.1.3).

COASTAL MANAGEMENT ELEMENT GOALS, OBJECTIVES AND POLICIES

OBJECTIVE 2: ESTUARINE WATER QUALITY

Through 2020, there will be no significant reduction in the water quality of the Indian River Lagoon or the St. Sebastian River.

Policy 2.6: Indian River County shall improve the quality of and reduce the overall amount of freshwater inflow to the Indian River Lagoon by:

- **Requiring all new development in the coastal zone to utilize onsite retention or detention methods consistent with the provisions of the Stormwater Management Sub-Element prior to being discharge to the IRL;**
- **Requiring new development to utilize natural drainage features, such as impounded and unimpounded wetlands and swales, to the maximum extent possible for storm water management;**
- **Requiring all new development to retain, at a minimum, the first one (1) inch of storm water runoff. In addition, the county will require retrofitting to achieve compliance with existing storm water requirements where renovations or additions of greater than 50% to existing structures occur;**
- **Initiating a program to regularly inspect storm water management facilities to ensure proper operation and maintenance, and invoke penalties for malfunctioning, altered, abused, or neglected systems; and**
- **Requiring any new storm water retention pond greater than one-half (1/2) acre in size to have a native littoral vegetation, unless deemed unnecessary**

from a water quality standpoint by the St. Johns River Water Management District (SJRWMD).

RESPONSE:

The Project's storm water management systems have been designed to meet all of the applicable county and SJRWMD requirements.

When operational, the Project will provide a significant environmental benefit by reducing the amount of freshwater flow into the Indian River Lagoon. The Project will use the excess surface water in the Indian River Farms Water Control District's (IRFWCD) canals as the Project's primary source of cooling and process water. In this fashion, the Project will reduce freshwater discharges into the Indian River Lagoon by an average of 6.5 million gallons per day.

OBJECTIVE 9: HISTORIC RESOURCES

Through 2020, there will be no significant impact to roads, sites, or structures deemed historically or archaeologically significant in Indian River County.

Policy 9.4: Developments which include historical resource sites shall be required to submit archaeological surveys prior to commencing construction activities. Developers shall be required to preserve these resources while maintaining a reasonable use of the land.

RESPONSE:

There are no known historic or archeological resources on the Site.

3.1.2 CONSISTENCY WITH THE ZONING CODE

The Site is in an A-1 zoning district. The proposed use of the Site for an electrical power plant is expressly authorized as a Special Exception Use under the category of "Public and Private Utilities—Heavy." The proposed use of the Site is consistent with the zoning code's provisions for the A-1 district.

As previously noted, the Site is currently undeveloped. Development of the Site will not remove any acreage currently in agricultural use. The Project will not detrimentally im-

pact the ability for surrounding properties to remain in agricultural use. As explained in Sections 3.1 and 3.1.5, the Project will have only a minimal impact on public facilities and services.

3.1.3 COMPATIBILITY WITH SURROUNDING LAND USES

The Project will be compatible with the adjacent and surrounding land uses. Existing land uses in Indian River County south of Oslo Road, between 74th Avenue and I-95, include the Ocean Spray processing plant, the Indian River County landfill, the Indian River County correctional institution, one single-family residence, and citrus groves. East of the Site are citrus groves and a wastewater sprayfield. I-95 and agricultural lands are located west of the Site. In St. Lucie County, south of the Site, there is a single-family residential subdivision, undeveloped land, and a transmitter tower.

The proposed power plant will be compatible with the public facilities, agricultural, and institutional uses located near the Site in Indian River County. The Project will not adversely affect the one residence north of the Site because a 200-ft existing, natural vegetative buffer will be preserved along the northern Site boundary to minimize any potential effects on nearby land uses. Similarly, there is a canal, a berm, and an existing mature vegetative buffer between the Site and the nearest residence in St. Lucie County.

3.1.4 NO ADVERSE IMPACTS ON HUMAN HEALTH AND WELFARE

The construction and operation of the Project will be thoroughly evaluated in the PPSA review process. Potential impacts on air quality, water quality, human health, and the environment will be considered. The PPSA review will supplement the normal requirements for the PSD permit (prevention of significant deterioration of air quality), Environmental Resource Permit (surface water, wetlands and ecology), and Consumptive Use Permit (use of surface or ground water and related impacts) that would be required for the Project. These review processes will ensure that the Project will not have any adverse effects on human health or the environment.

3.1.5 PROMOTE ORDERLY DEVELOPMENT

The following is a brief concurrency analysis for the Project. The public facilities and services relevant to the Project for which levels of service have been established within the Indian River County Comprehensive Plan are potable water, sanitary sewer, solid waste, storm water management, and transportation and recreation. The concurrency requirement can be met through one of the following conditions or actions:

- The necessary facilities and services are in place at the time a development permit is issued.
- A development permit is issued subject to the condition that the necessary facilities and services will be in place when the impacts of the development occur;
- The necessary facilities are under construction at the time a development permit is issued.
- The necessary facilities and services are guaranteed in an enforceable development agreement. The agreement shall guarantee that the necessary facilities and services will be in place when the impacts of the development occur.

Potable Water

The construction contractor will be responsible for providing potable water and nonpotable water to the Site during construction. There will be no demand on the county's public water supplies or services during the construction of the Project. If necessary, nonpotable water will be delivered to the Site by truck and stored in temporary storage tanks.

The county's potable water distribution lines are located approximately 0.5 mile north of the Site. The pipeline will be extended to the Site at Calpine's expense. The potable water demand for the estimated 36 employees when the plant is operational, based on industry standards, is approximately 1,260 gpd. This projected demand compares favorably with the potential residential development of the Site with 10 homes (based on the current agricultural zoning of the Site) with an estimated potable water demand of 2,500 gpd. Connection to the county's potable system will be made in accordance with applicable county regulations.

Sanitary Sewer

It is anticipated that portable toilets will be used during the construction of the Project. There will be no demand on public sewage treatment facilities during construction.

The county's sanitary sewer mains are located approximately 0.5 mile north of the Site and will be extended to the Site at Calpine's expense. The domestic wastewater generated by the estimated 36 employees when the plant is operational, based on the industry standards, is approximately 1,260 gpd. This projected demand compares favorably with the potential residential development of 10 homes (based on current zoning) with an estimated domestic wastewater generation of 2,500 gpd. The disposal of the Project's domestic wastewater will not significantly affect the capacity of the county's sanitary sewer facilities.

Solid Waste

During the construction of the Project, the contractor will be responsible for the offsite transport and disposal of construction-related debris. Indian River County has a Class I landfill and a construction and demolition landfill near the Site, which could accept the Project's solid waste. When the Project is operational, an estimated 234 pounds of solid waste will be generated daily based on approximately 36 employees, using the county's adopted LOS of 6.5 pounds per person per day. In addition, the plant's zero-discharge wastewater treatment system will generate approximately 41 cubic yards per day of non-hazardous solid waste. The Indian River County landfill also could be used for the disposal of these nonhazardous solid wastes. The solid waste generated by the Project will not significantly affect the county's solid waste facilities.

Drainage

Storm water treatment systems will be constructed for the Project in accordance with the rules of the county and SJRWMD. In accordance with the Indian River County LOS, the design storm will be the 25-year, 24-hour event.

Roads

The Project will have access to 74th Avenue, which Indian River County has designated as a local street. Project traffic will connect to the area roadway network at the intersection of 74th Avenue and 9th Street, which is classified as a rural minor arterial. The adopted LOS for rural minor arterial roadways is D, which for a two-lane undivided roadway is 680 trips in the peak hour or an estimated 6,800 trips per day. During operations, the Project will employ approximately 36 persons, with up to 32 persons on the Site on any given day. Using a trip generation rate of 2.35 trip ends per person and a vehicle occupancy of 1.1 persons, the Project will generate approximately 68 daily trips or approximately 1.0 percent of the roadway capacity of 9th Street. According to the Indian River County Roads Department, the current LOS on 9th Street is acceptable and there is sufficient capacity for the development of the Project.

Construction traffic on local roads will be more significant, but it will only be temporary.

Parks and Recreation

The Project does not have a residential component. In addition, most of the construction and permanent employees are anticipated to be hired from the surrounding area. Consequently, there will not be a significant impact on Indian River County's park and recreational facilities as a result of the construction and operation of the Project.

3.2 SPECIFIC CRITERIA FOR UTILITIES, PUBLIC AND PRIVATE, HEAVY

The following information is provided in accordance with Section 971.44(2) of the Indian River County Code.

3.2.1 SITE PLAN

The attached Site plan (Attachment D) identifies the location of onsite structures and improvements. The Site plan depicts an onsite vehicular roadway, the parking area, and an anticipated loading area. Required setbacks and buffers are identified and the proposed right-of-way for the extension of 74th Avenue is shown. The proposed Project and existing use of the Site can be summarized as follows:

Use	Existing Undeveloped	Proposed Electrical Power Plant
Hours of Operation	N/A	24 hours/day
Number of Employees	N/A	36 full time employees (3 shifts)
Total Area	50.5 acres	50.5 acres
Pervious Area (with wetlands)	50.5 acres	Approximately 25 acres
Impervious Area (without detention pond)	0 acre	Approximately 20 acres
Storm Water Detention Pond	0 acre	Approximately 5.2 acres
Wetlands	4.2 acres	4.2 acres
Structures	None	Turbines, water tanks, air emission stacks, substation, administration building, storage building, gas meter building.
Parking	0	44 spaces
Density	0	N/A
Housing Units	None (up to 10 units allowed)	0

3.2.2 UTILITY SYSTEM

The Project will include a switchyard from which two electrical transmission lines will extend westward across I-95 to connect to the existing Florida Power & Light Company (FP&L) 230-kV transmission lines on the west side of I-95. Located within the southern portion of the Site will be a gas regulating-station for the natural gas pipeline to the Project. Calpine will build a new pipeline from the Site to the terminus of the Gulfstream pipeline, which will be located in the vicinity of the FP&L Midway substation near I-95 and Midway Road in St. Lucie County. The new pipeline will be located adjacent to or near the existing FPL 230-kV transmission lines. The current termini for the nearest water main, sanitary sewer forcemain, and reclaimed water line are at 74th Avenue, approximately 0.5 mile north of the Site. These public utility pipelines will be extended southward along 74th Avenue to the Site.

3.2.3 CONSISTENCY WITH THE INDIAN RIVER COMPREHENSIVE PLAN

Section 3.1.1. of this application explains why the Project is consistent with the county's Comprehensive Plan.

3.2.4 HAZARDOUS WASTES

Generation of hazardous wastes at the Project will be limited to small quantities (less than 100 kg/month), primarily consisting of spent solvents and other chemicals. No process waste streams will be hazardous wastes.

The following hazardous or regulated chemicals may potentially be utilized onsite:

- Nitrite or molybdate corrosion inhibitor
- Ethylene glycol or propylene glycol antifreeze
- Aqueous ammonia
- Trisodium phosphate
- Sodium hypochlorite
- Polyacrylate or polyacralmide-dispersant
- Sulfuric acid
- Sodium hydroxide
- Sodium bisulfite
- Sodium hypochlorite
- Scale inhibitor
- Potassium permanganate
- Miscellaneous detergents
- Lubricating oils and greases

The usage and handling of these chemicals will be done in a manner that fully contains and properly controls the chemicals and any resulting effluent or waste stream. All wastes will be managed in accordance with FDEP and U.S. Environmental Protection Agency rules. The disposal of these materials will be performed by licensed contractors at appropriately licensed treatment/disposal facilities. In addition, all chemical handling, storage and usage will be in accordance with Department of Transportation and Occupational Safety and Health Administration Hazardous Communication standards. Proper controls will be established to avoid accidental leaks or spills of chemicals. Emergency response mechanisms will be maintained to address any accidental spill or release.

3.2.5 ADDITIONAL CRITERIA

1: Definition of Utilities, public and private -heavy -- All major electrical generating plants (generating fifty MW or more), major sewage treatment and disposal facilities, and major water purification plants.

RESPONSE:

The proposed nominal 1,080-MW Project meets this definition.

2: Any power generation facility shall be consistent with the provisions of the PPSA.

RESPONSE:

An SCA and Petition for Determination of Need for the Project will be prepared and submitted to the appropriate agencies for approval in accordance with the provisions of the PPSA.

3: All below-ground high voltage cables within a utility right-of-way shall be known to the public through the use of signs.

RESPONSE:

If any high voltage cables are located below ground in a utility right-of-way, appropriate signs will be used to inform the public.

4: The disposal of all waste, gaseous, liquid or solid, shall comply with all federal, state and local laws.

RESPONSE:

During construction and operation of the Project, Calpine will comply with all applicable laws regarding waste disposal.

5: Between all above-ground facilities and adjacent properties having a residential land use designation, a Type "A" buffer shall be provided.

RESPONSE:

A Type "A" buffer will be provided at the Site's southern and northern property boundaries. The other adjacent land use designations are agricultural or public facilities.

6: In all zoning districts, all equipment, machinery, and facilities that cannot be located within an enclosed building shall be separated from adjacent properties with a residential land use designation by a Type "D" buffer.

RESPONSE:

A Type "D" or greater buffer will be provided along the Site's boundaries.

7: Driveways located in proximity to adjacent properties having a residential land use designation shall provide a six to eight-foot opaque screening.

RESPONSE:

Appropriate screening will be provided for that portion of the access road located in proximity to the single residence north of the Site.

ATTACHMENT A
LEGAL DESCRIPTION

LEGAL DESCRIPTION

INDIAN RIVER COUNTY 2000

THAT PORTION OF TRACTS 9 AND 16, LYING EAST OF THE EAST RIGHT-OF-WAY FOR INTERSTATE 95, LOCATED IN SECTION 36, TOWNSHIP 33 SOUTH, RANGE 38 EAST, ACCORDING TO THE LAST GENERAL PLAT OF THE LANDS OF THE INDIAN RIVER FARMS COMPANY SUBDIVISION, FILED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF ST. LUCIE COUNTY, FLORIDA, IN PLATBOOK 2, PAGE 25. SAID LAND NOW LYING AND BEING IN INDIAN RIVER COUNTY, FLORIDA.

ATTACHMENT B

**AUTHORIZATION TO PROCEED WITH
SPECIAL EXCEPTION USE**

LETTER OF AUTHORIZATION

May 19, 2000

Robert M. Keating, Director
Community Development
Indian River County
1840 25th St.
Vero Beach, FL 32960

Dear Mr. Keating:

Ocean Spray Cranberries, Inc., hereby authorizes Calpine Eastern Corporation, a Delaware corporation, and Bruce Barkett/Collins, Brown, Caldwell, Barkett & Garavaglia, Chartered, as its agents to make application and proceed with site plan approval, right-of-way abandonment, and all related applications for the Blue Heron Energy Center to be located on the property described on Exhibit A, attached hereto.

Very truly yours,

OCEAN SPRAY CRANBERRIES, INC.

By: Innovation Technology Manager
Name: Brian Bogard
Its: BRIAN BOGARD

ATTACHMENT C

**EXECUTIVE SUMMARY OF CALPINE'S
SITE CERTIFICATION APPLICATION**

EXECUTIVE SUMMARY

Calpine Construction Finance Company, L.P. (Calpine), plans to certify, permit, construct, own, and operate a new 1,080-megawatt (MW) electrical power generating plant (Project) in Indian River County, Florida. The new power plant, called the Blue Heron Energy Center (BHEC), will use clean natural gas fuel and state-of-the-art, highly efficient combined cycle generating and pollution control technologies and equipment to produce cost-effective electric power in an environmentally friendly manner. The main electric generating facilities will consist of four combustion turbine generators (CTGs), four heat recovery steam generators, and two steam turbine generators. Calpine has designed the BHEC to avoid or minimize all potential impacts on the environment.

This Executive Summary describes the key features of the BHEC, including its potential environmental impacts and positive benefits in the local, regional, and Peninsular Florida areas. More detailed information on the BHEC is provided in the comprehensive site certification application (SCA) filed by Calpine pursuant to the Florida Electrical Power Plant Siting Act (PPSA).

SITE CERTIFICATION APPLICATION AND NEED FOR THE PROJECT

The certification of electrical power plants in Florida requires compliance with applicable federal, state, and local laws, regulations, and ordinances. The most comprehensive state law governing the licensing of the BHEC is the PPSA, which establishes the State's policy to balance the need for new power plant facilities with the potential effects of the facility's construction and operation on human health, welfare, and the environmental resources of the State. The PPSA establishes a centrally coordinated permitting process that is initiated when the applicant files a SCA with the Florida Department of Environmental Protection, which administers and coordinates the process with affected state, regional, and local agencies, governmental entities, and other parties. The process concludes with the approval or certification of the power plant by the Governor and Cabinet, sitting as the Siting Board.

The BHEC is needed to provide reliable, competitively priced electric power in Peninsular Florida and to meet Florida's increasing power demands, without creating economic risks for Florida's retail electric customers. Peninsular Florida is projected to need more than 11,000 MW of new generating capacity to maintain acceptable winter reserve margins in the 2003 to 2010 time frame, without implementing load management and interruptible power measures. The BHEC's electrical power will be sold to Florida's retail-serving utilities to meet these projected electrical needs. As a competitive facility in the wholesale market, the BHEC must produce power at the lowest possible cost relative to other generating plants in Florida in order to sell capacity and energy to retail-serving utilities. The BHEC will be more cost effective than approximately 34,000 MW or more of the generating capacity that is projected to be available in Peninsular Florida in 2003. The BHEC will provide a cost benefit to the utilities purchasing wholesale power from the Project, which then can provide benefits to their retail customers.

SITE AND VICINITY

The BHEC will be constructed on an approximately 50.5-acre property (Site) in southeastern unincorporated Indian River County. The Site is immediately east of Interstate 95 (I-95), immediately north of the St. Lucie County line, and approximately 5 miles southwest of the City of Vero Beach. The Site primarily consists of pine flatwood vegetative communities. Two wetland areas (i.e., one approximately 3.5-acre mixed hardwood forest and a 0.7-acre marsh) are present on the Site, but these two areas will not be impacted by the construction and operation of the Project. Hand ferns, which are listed by the State as an endangered plant species, have been identified at four locations within or adjacent to the hardwood forest wetland system. An upland buffer area (minimum width of 15 feet [ft] and an average width greater than 25 ft) will surround and protect both wetland areas and also protect the ferns. Several inactive gopher tortoise burrows occur on the Site and this species is probably present in small numbers. It is unlikely that other listed species use the Site. The Site does not contain any surface water bodies, significant wildlife habitats, or known historic or archaeological resources.

The Site is located in an area that has been affected by a variety of agricultural, industrial, institutional, and residential activities. The Site is bordered on the east by the 74th Street

right-of-way, the Indian River Farms Water Control District (IRFWCD) Lateral C Canal, the Ocean Spray Cranberries' industrial wastewater sprayfield, and citrus groves. The IRFWCD Sublateral C-7 Canal, a single-family residence, abandoned citrus groves, and the Indian River County solid waste landfill and correctional institution are located to the north of the Site. I-95 runs along the western Site boundary. Several borrow pits, an electric transmission line corridor, a natural gas pipeline corridor, and undeveloped brushland are located to the west of I-95. In St. Lucie County, open pasturelands and the Spanish Lakes Fairways residential development are located southwest and southeast, respectively, of the Site. The Site is separated from the Spanish Lakes development by a drainage ditch, berm, and existing buffer of mature trees and vegetation.

AIR EMISSION CONTROLS

The BHEC will use the best available control technology (BACT) to minimize the Project's airborne emissions. Emissions of nitrogen oxides (NO_x) will be reduced to very low levels (3.5 parts per million, dry volume) through the use of dry low-NO_x technology and a selective catalytic reduction (SCR) system. Emissions of other pollutants also will be reduced to very low levels by using clean-burning natural gas and advanced combustion turbines.

The Project's impacts on ambient air quality will be minimal. The Project will not cause or contribute to any violations of any state or national ambient air quality standards (AAQS), or any Class I or II increments for the prevention of significant deterioration of air quality. The Project's impacts on ambient air quality will be significantly less than the impacts allowed under the AAQS, which have been set by the U.S. Environmental Protection Agency to protect human health and the environment, including the health of the young, the elderly, and those with respiratory diseases.

WATER USE AND SUPPLY

The primary water uses for the BHEC operations will be for cooling tower makeup; boiler makeup; CTG inlet air evaporative cooling; and potable, sanitary, and other miscellaneous plant process water purposes. Cooling tower makeup is by far the largest use. The Project's consumptive water use will be approximately 6.5 million gallons per day

(MGD) on an average annual daily basis, and 7.5 MGD on a peak daily basis. The primary source of water for the Project's operations will be excess surface water withdrawn from the IRFWCD drainage canal system. The Project will also use reclaimed water, on an as-available basis, from the Indian River County reclaimed water system. Potable water and sanitary wastewater service will also be provided by Indian River County. No ground water will be used or impacted by the Project.

The use of excess surface water and reclaimed water, especially during wet weather conditions, will provide significant environmental benefits to the area. The Project's water use plans support the current goals of the master storm water planning program of the St. Johns River Water Management District (SJRWMD), Indian River County, City of Vero Beach, and IRFWCD, which call for a reduction in freshwater flows and pollutant loadings to the Indian River Lagoon system. The Project's water use will reduce freshwater flows from the IRFWCD canal system to the Indian River Lagoon by an average of 7 percent. To further support these programs, Calpine will consider the alternative of obtaining the Project's water supply from storm water storage and treatment facilities that will be developed in the future as part of the current master storm water planning program. In addition, Calpine will consider accepting some quantity of the reverse osmosis system discharge from the County's potable water treatment plants as a supplemental water supply.

ZERO WASTEWATER DISCHARGES

The BHEC will be designed and operated as a *zero wastewater discharge* facility. All plant wastewaters will be collected, treated, recycled, and evaporated on the Site. There will be no discharges of wastewaters from the Project to surface waters. The nonhazardous solids resulting from the wastewater treatment system will be disposed in a permitted landfill.

The Project's zero wastewater discharge system will provide significant environmental benefits by removing all pollutants in the water supply from the area's surface water canal system. Thus, the Project operations will reduce pollutant loadings to the Indian River Lagoon.

STORM WATER MANAGEMENT

The drainage facilities for the BHEC will be constructed and operated to control and treat storm water runoff on the Site during construction and operation. The Project's storm water management systems will be designed to comply with all applicable Indian River County, SJRWMD, and IRFWCD criteria and requirements. A 5.2-acre storm water detention pond will be constructed on the Site to control peak runoff from a 25-year, 24-hour storm event and limit the offsite discharge to less than 2 inches over a 24-hour period. Excess flows from the detention pond will be directed to the Lateral C Canal, which is located east of the Site.

TRAFFIC AND PUBLIC SERVICES

During the construction of the BHEC, there will be a temporary increase in traffic on local roads, but the roads will continue to operate at acceptable levels (level of service "C" or greater). Calpine will pave the extension of 74th Street to the Site early in the construction phase. The long-term operation of the BHEC will not cause any significant impacts on traffic or public services.

ZONING AND COMPREHENSIVE LAND USE PLAN

The Site is currently zoned Agriculture (A-1). According to the Indian River County Planning Department, public facilities and utilities, including power plants, are allowed within this zoning district with the approval of a Special Exception Use. Calpine is working with the County to obtain this approval.

The Future Land Use Map in Indian River County's Comprehensive Plan designates the Site as Agriculture (AG-1). This designation allows the construction of public facilities, including public utilities. According to the County's staff, the Project is in compliance with the current land use designation and will not require an amendment or modification of the County's Comprehensive Plan.

NOISE

The Project will use various noise suppression techniques and equipment. In addition, a 200-ft, heavily vegetated buffer area will be left undisturbed along the northern Site boundary to attenuate potential noise impacts at the residence and correctional institution located to the north of the Site. Noise modeling analyses demonstrate that the Project will comply with the Indian River County noise limits for the areas near the Site. The noise modeling analyses also demonstrate that the Project will comply with St. Lucie County's noise limits for residential uses in the Spanish Lakes Fairways development, which is south of the Site. The existing ambient noise levels at the northwesternmost portion of Spanish Lakes Fairways (i.e., the area closest to the Site) are primarily due to traffic on I-95. The Project will cause the sound levels at this location to increase less than 1 A-weighted decibel (dBA), which would not be perceptible or measurable.

LINEAR FACILITIES

The BHEC will require the construction of several linear facilities to interconnect the Project with existing facilities and services in the Site vicinity. For the primary water supply, a new intake/pumping structure will be constructed in the IRFWCD Lateral C Canal, just south of Glendale Road (State Road 612), and an approximately 3.5-mile water supply pipeline will be installed within the IRFWCD right-of-way adjacent to the canal from the new intake structure to the Site. Natural gas for the Project will be supplied to the Site via a new pipeline running approximately 15-miles from the Gulfstream Natural Gas System, LLC, metering station in St. Lucie County. The new pipeline will be located in a 50-ft right-of-way within a 0.25-mile-wide corridor, which generally follows and is centered on the Florida Power & Light Company's (FPL's) two 230-kilovolt (kV) transmission lines on the west side of I-95. Calpine is seeking certification of the water supply pumping station, the water pipeline, and the natural gas pipeline corridor in the PPSA proceeding for the Project.

The BHEC will be interconnected with the Florida power grid by two new 230-kV transmission lines running approximately 1,400 ft from the Site to FPL's two existing 230-kV lines located west of I-95. These new transmission lines will be certified by Calpine in the PPSA proceeding for the Project.

ECONOMIC BENEFITS

The Project's direct economic benefits will include:

- Approximately \$2.6 to \$3.0 million annually in additional ad valorem tax revenue to Indian River County.
- Approximately \$3.1 to \$3.6 million annually in additional tax revenues to the Indian River County School District.
- Approximately \$6.3 to \$7.2 million annually in additional total tax revenues.
- Approximately 36 new permanent jobs with a total payroll of approximately \$2.0 million annually.
- An average of approximately 234 construction jobs (full time equivalent) and construction wages of approximately \$24.5 million over the 27-month construction period.
- A capital investment of about \$500 million to build the Project.

In addition to the direct benefits, numerous indirect benefits will accrue as a result of the construction and operation of the Project.

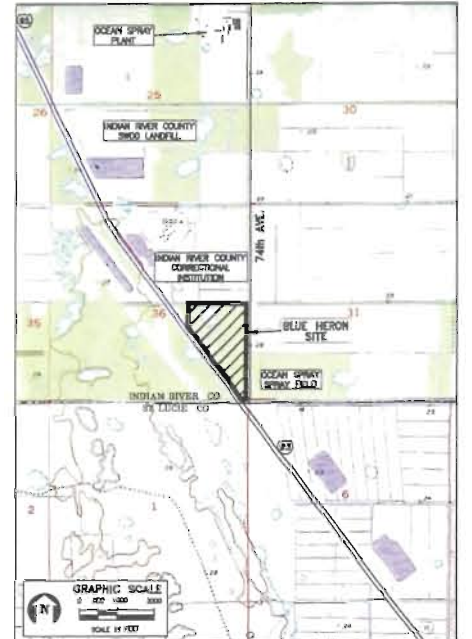
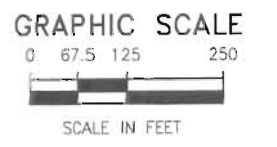
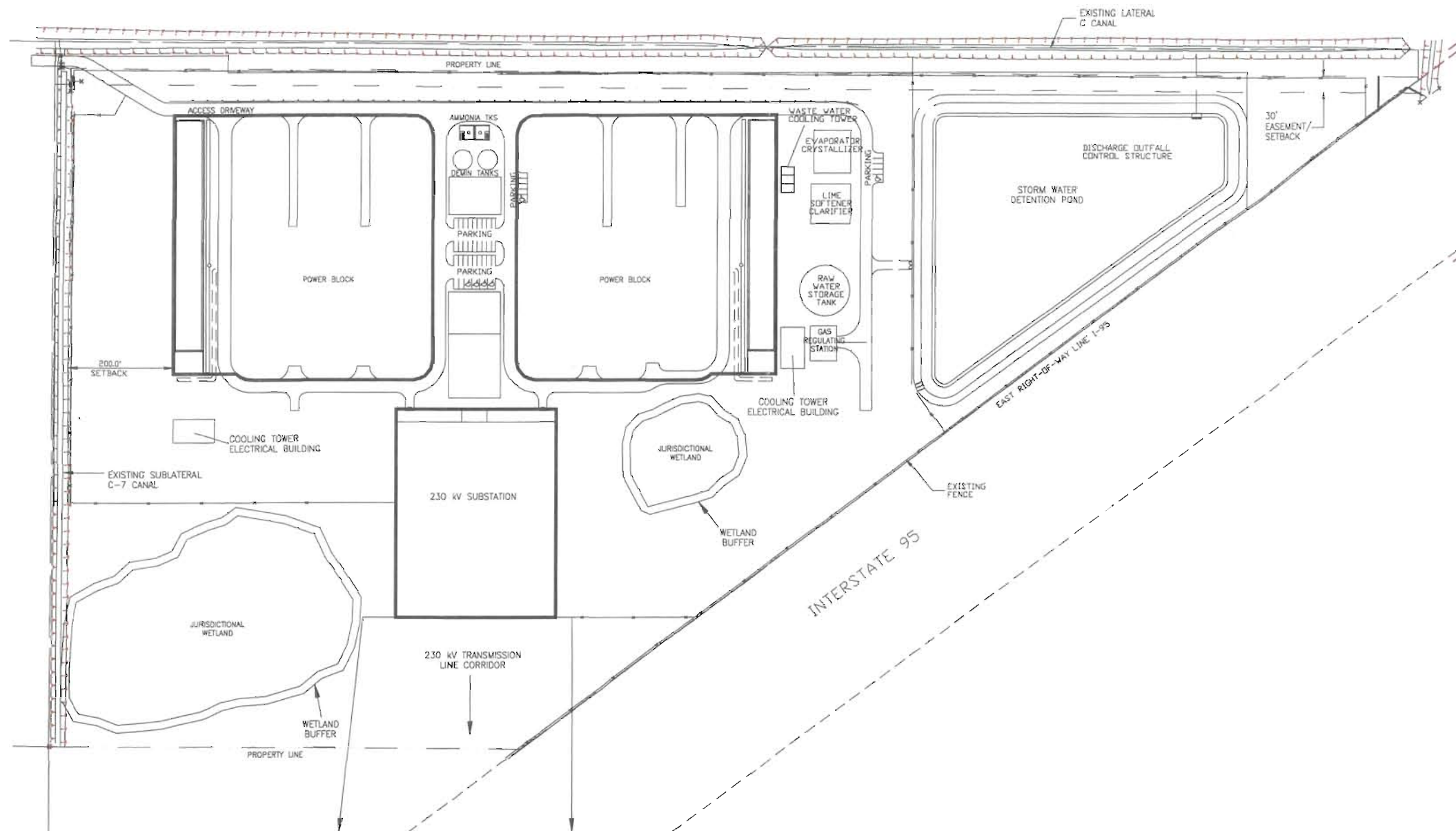
ENVIRONMENTAL PROTECTION AND BENEFITS

Throughout its development efforts for the BHEC, Calpine has selected and implemented Project designs that avoid or minimize potential environmental impacts. These environmentally protective designs include:

- Use of combined cycle technology with advanced CTGs, which provides higher efficiency electric generation and lower environmental impacts than other technologies.
- Use of natural gas only as fuel for the CTGs, which produces lower air emissions than coal- or oil-fired power plants.
- Use of advanced dry low-NO_x combustor design for the CTGs and SCR systems, which represent BACT for minimizing NO_x air emissions.
- Development of a facility layout that avoids and preserves existing wetlands on the Site.

- Use of excess surface water and reclaimed water for plant water supply, which is consistent with SJRWMD's consumptive water use criteria (i.e., avoid use of ground water) and supportive of the current master storm water planning program for the IRFWCD drainage basin, which seeks to reduce pollutant loadings and freshwater flows to the Indian River Lagoon.
- Use of a zero wastewater discharge treatment system to eliminate cooling tower blowdown and wastewater discharges to surface waters. This system also is consistent with the local and SJRWMD plans to reduce pollutant loadings and freshwater inflows to the Indian River Lagoon.

ATTACHMENT D
CONCEPTUAL SITE PLAN

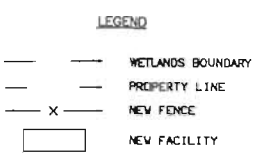


LAND USE SCHEDULE

LAND USE	EXISTING* (ACRES)	%	PROPOSED DEVELOPMENT	%
PINE FLATWOODS	45.4	89.9	10.1	20.0
CABBAGE PALM	0.9	1.8	0.9	1.8
WETLAND HARDWOOD FOREST	3.5	6.9	3.5	6.9
FRESH WATER MARSH	0.7	1.4	0.7	1.4
WETLAND BUFFER	0	-	.5	1.0
STORM WATER POND (1)	0	-	5.2	10.3
IMPERVIOUS SURFACE (2)	0	-	12.30	24.4
SWITCHYARD / SUBSTATION	0	-	7.60	15.0
GREEN SPACE/PERVIOUS AREAS	0	-	9.7	19.2
TOTAL	50.5	100.0	50.5	100.0
PARKING SPACES	0	-	44	-

DENSITY AND IMPERVIOUS SPACE 12.3 ACRES + 7.6 ACRES + 50.5 ACRES = .39
 ESTIMATED PERCENT OF OPEN SPACE = 81% (30.6 ACRES)
 STORM WATER POND = APPROXIMATELY 5.2 ACRES OR 10.3% OF THE SITE.

NOTE:
 * THE ENTIRE EXISTING VEGETATION IS NATIVE VEGETATION. THERE IS NO EXISTING DEVELOPMENT ONSITE.
 (1) APPROXIMATE SIZE OF STORM WATER POND
 (2) BUILDINGS, EQUIPMENT, ASPHALT AND CONCRETE



PARKING
 REQUIREMENT FOR INDUSTRIAL USE IS 1 SPACE PER 500 SQUARE FEET. TOTALLY OCCUPIED SQUARE FEET OF BUILDING IS 17,000 OR AN EQUIVALENT OF 34 PARKING SPACES. A TOTAL OF 44 SPACES ARE PROVIDED BASED ON THE NUMBER OF EMPLOYEES OF THE LARGEST SHIFT AND VISITORS.

UPLAND PLANT COMMUNITY SET ASIDE
 REQUIREMENT FOR 15% SET ASIDE OF THE NATIVE UPLAND PLANT COMMUNITY: 46.3 ACRES X 15% = 6.9 ACRES
 THE TOTAL ACREAGE OF PINE FLATWOODS AND CABBAGE PALM TO REMAIN IS GREATER THAN 6.9 ACRES.

ESTIMATED AVERAGE DAILY TRAFFIC (ADT)
 32 FULL TIME EMPLOYEES AT A TRIP GENERATION RATE FOR POWER PLANTS OF 2.35 AND VEHICLE OCCUPANCY RATE OF 1.1:
 $32 \times 2.35 \times 1.1 = 88$
 THERE WILL BE 5 TO 10 ESTIMATED DELIVERIES PER DAY FOR A TOTAL ESTIMATED ADT OF 73 TO 78 TRIPS

- Notes:**
- This site plan is provided with a conceptual special exception application. Future submittals to Indian River County include:
 - Tree removal permit application;
 - Erosion plan;
 - Land clearing permit application;
 - Type A Storm Water Management System Permit application;
 - Site grading plan;
 - Right-of-way permit application;
 - Water well permit application;
 - Wetlands resource permit application;
 - Reclaimed water agreements, if applicable; and
 - Environmental survey of potentially endangered flora and fauna.
 - All nuisance exotic vegetation onsite shall be removed in conjunction with site development.
 - Potable water demands will be met through connection to the public water system.
 - Sanitary sewer services will be provided through connection to the public sanitary sewer system.
 - Setbacks:
 - All building and improvements will be located at least 200 feet from the northern property boundary.
 - All buildings and improvements (except for the entrance road) will be located at least 30 feet from the eastern property boundary.

8. Buffers:
 - A Type A buffer or its equivalent will be provided along the northern property boundary.
 - A Type B buffer or its equivalent will be provided along the eastern property boundary.
 - Natural vegetation will be retained, to the extent possible, along the southern and western property boundaries.
7. Existing 30 foot Right-of-Way will be abandoned.
8. Equipment, buildings, and parking areas as shown are approximate locations and may shift with final design.
9. Subject property is located in Flood Zone X.
10. According to the State Historic Preservation Office's review of the Florida Master Site File, there are no Historical or Archaeological features known onsite.

ATTACHMENT D.
CONCEPTUAL SITE PLAN
CALPINE - BLUE HERON ENERGY CENTER PROJECT
 Sources: Burns & Roe, 2000; ECT, 2000.



APPENDIX 10.2
ZONING DESCRIPTIONS

10.2 ZONING DESCRIPTIONS

Appendix 10.2 contains relevant Indian River County and St. Lucie Land Development regulations. The Indian River documents include Chapter 901, Definitions (utilities, public or private, heavy); Chapter 911, Zoning, with a description of the existing Agriculture-1 and -2 zoning districts; Chapter 971, Regulations for Specific Land Uses (special exception use Section 971.05); and a description of the approval criteria for utilities, public and private-heavy (special exception Section 974.44[44][2]). The Special Use Exception Application is found in Attachment 10.1.6.

The St. Lucie County Land Development Code includes: Chapter 3 Zoning District Use Regulations; and Chapter 7, Development Design and Improvement Standards.

CHAPTER 901. DEFINITIONS

- Sec. 901.01. Title.
 Sec. 901.02. Purpose and intent.
 Sec. 901.03. Definitions in alphabetical order.

Section 901.01. Title.

This chapter, the terms and definitions contained herein shall be known as the "Indian River County, Definitions Chapter."
 (Ord. No. 90-16, § 1, 9-11-90)

Section 901.02. Purpose and intent.

It is the purpose of this chapter to maintain the definitions of terms for all of the land development regulations of Indian River County, Florida.
 (Ord. No. 90-16, § 1, 9-11-90)

Section 901.03. Definitions in alphabetical order.

Abandon to discontinue a use or activity for more than six (6) consecutive months.

Abandonment to cease or discontinue a use or activity without intent to resume, but excluding temporary or short term interruptions to a use or activity during periods of remodeling, maintaining, or otherwise improving or re-arranging a facility, or during normal periods of vacation or seasonal closure.

Abandonment, right-of-way an action by the board of county Commissioners, closing, abandoning, vacating, surrendering, discontinuing, reissuing and releasing any interest the county may have in the subject right-of-way.

Abutting having a common border with, or being separated from such a common border by a right-of-way, alley, or easement.

Abutting property property that is immediately adjacent to or contiguous to property that is subject to review or property that is located immediately across any road or public right-of-way from the property subject to review.

Acceleration lane the portion of a roadway adjoining the traveled way for the purpose of enabling a vehicle entering a roadway to increase its speed to a rate at which it can more safely merge with through traffic.

Access, point of a driveway or other opening for vehicles onto a public street.

Accessory apartment a second dwelling unit, either in or added to an existing single-family detached dwelling, or in a separate accessory structure on the same lot as the main dwelling, for use as a complete, independent living facility with provision for cooking, eating, sanitation, and sleeping. Such a dwelling is an accessory use to the main dwelling.

Accessory structure a structure which is customarily associated with, subordinate in size and incidental in use to the principal structure and located on the same site. Examples are tool sheds and garages.

Accessory use a use which:

- (a) Is clearly incidental to, customarily found in association with, and serves a principal use;
- (b) Is subordinate in purpose, area, and extent to the principal use served; and
- (c) Is located on the same lot as the principal use, or on an adjoining lot in the same ownership as that of the principal use.

Accessway a paved area intended to provide ingress and egress of vehicular traffic from a public or private right-of-way to an off-street parking area.

Addition (to an existing building) for purposes of County Code Chapter 930 relating to flood protection, means any walled and roofed expansion to the perimeter of a building in which the addition is connected by a common load-bearing wall other than a firewall. Any walled and roofed addition which is connected by a firewall or is separated by independent perimeter load-bearing walls is new construction.

Adjacent a lot or parcel of land that is nearby and not necessarily abutting. The lots or parcels may be separated by streets, rights-of-way, power lines, or similar open areas.

Administrative permit use a use that would not be appropriate generally or without restriction throughout the zoning district but which, if con-

Unenclosed storage the temporary placement of recreational vehicles, boats, trailers and similar recreational equipment in an open area or accessory structure without walls. For the purposes of this section, recreational vehicles and similar equipment stored in accessory garages or attached carports shall be considered to be in enclosed areas.

Unincorporated county the entire geographic area of Indian River County, except for municipalities.

Unserviceable vehicle see "junk vehicle."

Use any activity on a site or within a structure.

Use, change of a change in an existing or previous use on a site or within a structure from one principal use to another principal use such that the change would require a different application of the land development regulations to the latter principal use than what is applicable to the former principal use.

User charge a revenue source to recover all or part of the cost of goods or services from those directly benefitting from them.

Utilities, public or private, heavy all major electrical generation plants (generating fifty (50) megawatts or more), major sewage treatment and disposal facilities, and major water purification plants.

Utilities, public or private, limited the following, when they are the principal use on a lot: electrical substations, package treatment plants, water purification, storage and pumping facilities, sewage pumping facilities, and similar utility uses.

Vacant a housing unit in which no one is living, unless the occupants are only temporarily absent. New units not yet occupied are counted as a dwelling but considered vacant when windows and doors are in place, finish floors are laid, and the building exterior is weatherproof.

Variance a dispensation permitted on individual parcels of property as a method of alleviating unnecessary hardship by allowing a reasonable use of the building, structure, or property, which, because of unusual or unique circumstances, is

denied by the terms of Chapter 911, Zoning; or Chapter 930, Stormwater Management and Flood Protection.

Vegetation survey an aerial photograph (or blueprint thereof) or sketch prepared to a scale no smaller than one inch equals two hundred (200) feet which delineates native upland plant communities by general category and distinguishes such communities from non-native plant communities and/or disturbed areas occurring on a site. "Native upland plant community general category" includes coastal strand, coastal/tropical hammocks, pine flatwoods, dry prairies, xeric scrub, cabbage palm hammocks, and upland hardwood hammocks.

Vehicle any wheeled conveyance, whether motor powered, animal drawn or self propelled. The term shall include any trailer in tow of any size, kind or description.

Vehicular access a driveway, roadway, apron or other travelway to facilitate vehicular movement to and from property adjoining a highway. Includes only that part of a driveway that lies within the highway right-of-way boundaries.

Vehicular race track see "commercial amusement," unenclosed.

Vines any of a group of woody or herbaceous plants which may climb by twining, by means of aerial rootlets or by means of tendrils, or which may simply sprawl over the ground or other plants.

Violation, for purposes of County Code Chapter 930 relating to flood protection, means the failure of a structure or other development to be fully compliant with the provisions of county regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance is presumed to be in violation until such time as that documentation is provided.

Visible light see "illuminate."

Volume (traffic) the number of vehicles to pass a predetermined location during a specified period of time.

CHAPTER 911. ZONING

- Sec. 911.01. Short title, purpose and intent.
- Sec. 911.02. Definitions.
- Sec. 911.03. Establishment of districts.
- Sec. 911.04. Application of district regulations.
- Sec. 911.05. Zoning atlas and boundaries.
- Sec. 911.06. Agricultural and rural districts.
- Sec. 911.07. Single-family districts.
- Sec. 911.08. Multiple-family districts.
- Sec. 911.09. Mobile home districts.
- Sec. 911.10. Commercial districts.
- Sec. 911.11. Industrial districts.
- Sec. 911.12. Conservation districts.
- Sec. 911.13. Special districts.
- Sec. 911.14. Planned development district.
- Sec. 911.15. General provisions.
- Sec. 911.16. Administrative procedures.
- Sec. 911.17. Airport zoning.
- Sec. 911.18. Wabasso Corridor regulations.
- Sec. 911.19. SR 60 Corridor special development regulations.

Section 911.01. Short title, purpose and intent.

(1) *Short title.* This chapter shall be known as the Indian River County Zoning Ordinance.

(2) *Purpose and intent.* In order to lessen congestion in the streets, to secure safety from fire, panic and other dangers; to promote health and general welfare; to provide adequate light and air; to prevent the overcrowding of land; to avoid undue concentration of population; to facilitate the adequate provisions of transportation, potable water, sanitary sewer, schools, parks and other public improvements; to conserve the value of buildings and to encourage the most appropriate use of land within the area delineated on the official zoning map, exclusive of all incorporated areas, there is hereby adopted and established the official zoning plan pursuant to the authority conferred on the board of county commissioners of Indian River County.

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-7, § 3, 2-27-91)

Section 911.02. Definitions.

All terms defined in Chapter 901, Definitions, are applicable in this chapter.

(Ord. No. 90-16, § 1, 9-11-90)

Section 911.03. Establishment of districts.

In order to classify, regulate and restrict the use of land, water, buildings, and structures; to regulate and restrict the height and bulk of buildings; to regulate the area of yards and other open spaces about buildings; to regulate the intensity of land use and implement the comprehensive plan, the unincorporated area of Indian River County, Florida is divided into districts as follows:

Agricultural districts

Rural districts

Single-family residential districts

Multiple-family residential districts

Mobile home districts

Commercial districts

Industrial districts

Conservation districts

Special purpose districts

Planned development district

These zoning districts are provided to implement the intent of the comprehensive plan and the land use designations on the future land use map as indicated below:

	<i>Land Use Designations</i>	<i>Maximum Density (units / acre)</i>
C-1	Conservation - 1	0
C-2	Conservation - 2	1:40
C-3	Conservation - 3	1:2½
AG-1	Agriculture - 1	1:5
AG-2	Agriculture - 2	1:10
AG-3	Agriculture - 3	1:20
R	Rural	1:1
L-1	Low - 1	3:1
L-2	Low - 2	6:1
M-1	Medium - 1	8:1
M-2	Medium - 2	10:1
Rec	Recreation	
Pub	Public	
C/I	Commercial/Industrial	

RELATIONSHIP OF THE ZONING DISTRICTS WITH THE FUTURE LAND USE MAP DESIGNATIONS

Zoning District	Land Use Designation											
	C-1	C-2	C-3	AG-1	AG-2	AG-3	R	L-1	L-2	M-1	M-2	C/I
A-1	—	—	—	X	—	—	—	—	—	—	—	—
A-2	—	—	—	X	X	—	—	—	—	—	—	—
A-3	—	—	—	X	X	X	—	—	—	—	—	—
RFD	—	—	—	—	—	—	X	T	T	—	—	—
RS-1	—	—	—	—	—	—	X	T	T	—	—	—
RS-2	—	—	—	—	—	—	—	X	X	—	—	—
RS-3	—	—	—	—	—	—	—	X	X	T	—	—
RS-6	—	—	—	—	—	—	—	—	X	X	T	—
RT-6	—	—	—	—	—	—	—	—	X	X	T	—
RM-3	—	—	—	—	—	—	—	X	X	T	—	—
RM-4	—	—	—	—	—	—	—	—	X	T	—	—
RM-6	—	—	—	—	—	—	—	—	X	X	X	—
RM-8	—	—	—	—	—	—	—	—	—	X	X	—
RM-10	—	—	—	—	—	—	—	—	—	—	X	—
RMH-6	—	—	—	—	—	—	—	—	—	X	X	—
RMH-8	—	—	—	—	—	—	—	—	—	X	X	—
PRO	—	—	—	—	—	—	—	X	X	X	X	X
OCR	—	—	—	—	—	—	—	—	—	—	—	X
MED	—	—	—	—	—	—	—	—	—	—	—	X
CN	—	—	—	X	X	X	X	X	X	X	X	—
CL	—	—	—	—	—	—	—	—	—	—	—	X
CG	—	—	—	—	—	—	—	—	—	—	—	X
CH	—	—	—	—	—	—	—	—	—	—	—	X
IL	—	—	—	—	—	—	—	—	—	—	—	X
IG	—	—	—	—	—	—	—	—	—	—	—	X
Con-1	X	—	—	—	—	—	—	—	—	—	—	—
Con-2	—	X	—	—	—	—	—	—	—	—	—	—
Con-3	—	—	X	—	—	—	—	—	—	—	—	—
CRVP	See Special District Requirements											
R-BCID	"						"	"				
Rose-4	—	—	—	—	—	—	—	—	X	X	—	—
AIR-1	—	—	—	X	X	X	X	X ¹	—	—	—	—
PD	—	X	X	X	X	X	X	X	X	X	X	X

X - District permitted

T - District permitted when used as transition from less intense/dense development or consistent with existing development

— - District not permitted

¹ Only within development where airstrips existed prior to February 13, 1990.

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-7, § 4, 2-27-91; Ord. No. 91-48, § 9, 12-4-91; Ord. No. 98-9, § 9, 5-19-98)

Section 911.04. Application of district regulations.

(1) *Establishment of district regulations.*

- (a) Use classes, generally. In order to implement the purpose and intent and provisions of this chapter, the following use classes are hereby established:

Agricultural uses

Residential uses

Institutional uses

Community service uses

Recreation uses

Commercial uses

Industrial uses

Transportation uses

Utility uses

- (b) Designation of specific uses by use class and sub-class. The use classes established above may be divided into various use sub-classes. These sub-classes shall comprise the various specific uses as set forth in the zoning districts, as established in section 911.03.
- (c) Interpretation of use classes and sub-classes. Where the terms listed in section 911.04(1)(a), above, are used in this code in reference to specific land use activities, they shall refer to the use sub-classes which comprise those terms, unless the context of the ordinance otherwise requires.

(2) *Allowed uses.*

- (a) [Generally.] It is the intent of this ordinance to permit certain uses, not otherwise illegal, to locate in specified zoning districts, as permitted uses, uses requiring administrative permits, or special exception uses.

(b) *Unlisted uses.*

1. *Uses not specifically listed.* In the event that a particular use is not listed anywhere in this chapter and that no listed use describes the land use activity in

question and that such use is not determined to be an accessory use, then it shall be considered the same as the use having the most similar characteristics. An unlisted use shall be determined to be a permitted use, use requiring an administrative permit or special exception use based on the similarities to other uses listed or defined elsewhere in this chapter.

2. *Criteria for reviewing uses not listed.*

Upon application for a use not herein listed, the community development director shall determine whether or not the use shall be allowed in the specific zoning district and whether it shall be listed as a permitted use, use requiring an administrative permit, or special exception use.

The basis for reviewing unlisted uses shall be the Standard Industrial Classification (SIC) Code, which shall be used to determine the general classification of uses. Other factors which may be considered shall be traffic generation volume, type of traffic attracted to and generated by the site, parking requirements, compatibility to surrounding land uses, noise, lighting and visual impacts, hours of operation, intensity of use. The community development director may after review of the criteria herein set forth determine that certain uses are prohibited uses and shall not be allowed in any zoning district. In the event that any use is determined to be a prohibited use, record of the reasons given for that decision shall be kept onfile and shall be used as guidelines for subsequent use determinations.

3. *Appeals of decisions on unlisted uses.*

Such decisions may be appealed to the planning and zoning commission in conformance with the provisions of Chapter 902, Administrative Mechanisms.

- (c) *Permitted uses.* No structure shall be erected, constructed, reconstructed or struc-

turally altered, nor shall any structure or land or combination thereof be used unless the use to which the structure and/or land is to be put is listed in the permitted use section of the applicable zoning district and the use fully complies with all of the applicable district regulations, except for non-conformities as provided in Chapter 904.

- (d) *Accessory uses.* No accessory use or structure, as defined in Chapter 901, shall hereafter be constructed, remodeled, established, altered or enlarged unless such accessory use or structure complies with the provisions of Chapter 917, Accessory Uses and Structures.
- (e) *Uses requiring an administrative permit.* It is the intent of this chapter to allow any use requiring an administrative permit in the appropriate zoning district, provided the criteria established for such use in Chapter 971, Specific Land Use Criteria, are satisfied and such use is reviewed and approved pursuant to the procedures of Chapter 914, Site Plan.
- (f) *Special exception uses.* It is the intent of this chapter to allow any use requiring a special exception approval in the appropriate zoning district, provided the criteria established in Chapter 971, Specific Land Use Criteria, are satisfied and such use is reviewed pursuant to the procedures of Chapter 914, Site Plan.
- (g) *Agricultural uses within L-1 and L-2 land use designations.* The following agricultural uses which serve as or enhance open space and green belt functions are allowed in the A-1 (Agricultural - 1) zoning district within the L-1 and L-2 land use designations.
 1. General farming
 2. Livestock and poultry raising
 3. Stables
 4. Tree farms
 5. Kennel and animal boarding*
 6. Specialty farms*
 7. Nursery and greenhouses*
 8. Fish farms*
 9. Aquaculture*

10. Similar uses as determined by the community development director.

*These uses are allowed if substantial open space or green areas meeting or exceeding applicable zoning district standards are involved in the use.

(3) *Establishment of size and dimension criteria.* In order to carry out the purpose and intent provisions of this chapter, size and dimension criteria for particular zoning districts are hereby established. Such size and dimension criteria shall be applied in accordance with this section and other applicable provisions of the land development regulations. The minimum area for yards and other open spaces for each and every building hereafter erected, constructed or structurally altered shall not be encroached upon or considered as area, yard or open space requirements or intensity of use requirements for any other building. Variances from these provisions, excluding the maximum density limitations, may be granted by the board of adjustment pursuant to the procedures and criteria of the land development regulations.

- (a) *Maximum density.* In no instance shall the maximum density specified for a given zoning district be exceeded in the approval of any permit or development order unless it is provided for in section 911.14, Planned Development. Maximum density shall be expressed in number of dwelling units per gross residential acre. In the determination of the maximum number of units to be allowed on a lot, the permitted number shall be made proportional to any fraction of an acre(s) that is a part of the lot. Gross residential area shall mean the area of a lot devoted to residential uses and related open space, yards, parking and circulation, drainage, recreation, waterbodies, and other related or accessory facilities, exclusive of commercial, industrial, and other nonresidential uses.
- (b) *Lot size requirements.*
 1. *Generally.* Except as may be qualified by the provisions of the land development regulations, including Chapter

904, Nonconformities, no structure or part thereof shall hereafter be constructed or relocated onto a lot which does not meet all of the minimum lot size requirements established for the zoning district in which the structure is or is to be located. Furthermore, no structure or land shall hereafter be used, occupied or arranged for use on a lot which does not meet all of the minimum lot size requirements presented for the district in which such structure or land is located, unless such lot meets the criteria of section 911.04 (3)(b)5. below. Properties upon which essential services uses are located are exempt from minimum lot size requirements.

2. *Reduction of lot size or yards; subdivision.* No lot or yard existing at the effective date of this chapter shall thereafter be reduced in size, dimension, or area below the minimum requirements set out herein, except by reason of a portion being acquired for public use in any manner, including dedication, condemnation, purchase, and the like. Lots or yards created after the effective date of this chapter shall meet the minimum requirements established herein.
3. *Applicability to all uses.* All permitted uses, all administrative permit uses, and all special exception uses shall be subject to the lot size requirements specified for a given district, unless other minimum requirements are specified for such uses elsewhere in the land development regulations.
4. *Structure built on two (2) lots.* A building constructed on a site consisting of two (2) lots must be located either within the required setback of the individual lot or the setback from the common or unified lot line. Any person wishing to build a structure on two (2) lots must provide legal assurance, approved by the county

attorney, which demonstrates unity of title for both lots. In those cases where construction does not commence, such unity of title may be released upon approval of the community development director and recording of a dissolution of unity of title in the public records.

5. *Lots of record less than minimum size.* Any lot of record legally created prior to the adoption of this chapter which contains less lot area or width than required in the district in which it is located may be used for a use in such district. This provision shall not be construed to permit more than one dwelling unit on a lot with less lot area per dwelling than required for the district in which such lot is located.
6. *Use of lots in single-family districts.* In single-family districts, every building hereafter erected or structurally altered shall be located on a lot as herein defined, and in no case shall there be more than the principal building and the customary accessory buildings on one plot or parcel of land.
 - (c) *Minimum yard and setback requirements.*
 1. *Generally.* Minimum yard requirements shall be as specified for a given zoning district. The yard requirements shall apply to all buildings and structures, as they relate to the respective lot lines, except as otherwise specifically provided in this chapter or as exempted in section 911.04(3)(c)2.
 2. *Accessory uses and structures.* Special yard requirements related to accessory uses and/or structures are provided in Chapter 917.
 3. *Yard encroachments.* See section 911.15(2), encroachments into required yards.
 4. *Required yards for lawfully created nonconforming lots.* Lawfully cre-

ated nonconforming lots shall have required yards; provided, however, that the buildable width of such lot shall not be reduced by front or side yard requirements to less than thirty (30) feet and provided further that no accessory structure on a corner lot shall project into the required front yard on any street. In those instances where the thirty-foot minimum applies, the house shall be centered between the lot lines, unless an alternate siting arrangement is approved by the community development director.

5. *Yards adjacent to agricultural operations.* Subdivision and planned development projects located within the urban area proposing new residential lots adjacent to active agricultural operations (e.g. citrus groves and field crops) shall include provisions for a special buffer. Said buffer shall be provided between the proposed residential use and the agricultural operation and shall consist of native vegetation planted in a twenty-five-foot (or wider) Type "B" buffer with a six-foot opaque feature, as described in Chapter 926. Where required, said buffer shall be treated as a required subdivision improvement for the project or project phase in which the buffer is to be located. The buffer and opaque feature shall be maintained until such time as the adjacent property being buffered is converted to a non-agricultural use.
6. *Residential setbacks, generally.* No dwelling shall be erected closer to another dwelling than double the minimum setback restrictions.
7. *Yard requirements for residential uses in nonresidential zoning districts.* Whenever a dwelling is to be erected in a district other than an agricultural or residential district, it shall conform to the minimum setback requirements of the RM-8 district.

(d) *Maximum building height.* Maximum building height, where specified, shall apply to all structures located in the zoning district except those structures and appurtenances excluded in section 911.15(1), height exceptions. Further, no structure shall exceed any airport height limitations.

(e) *Maximum building coverage.* Maximum building coverage, where specified, shall mean that portion of a lot, expressed as a percentage, occupied by all buildings or structures which are roofed or otherwise not open to the sky and that extend more than three (3) feet above the surface of the ground level.

(f) *Minimum open space.* The open space requirements presented for a given zoning district shall be considered as a minimum, and such open space shall be located on the same lot as the primary use or structure, except as specifically provided otherwise in the land development regulations. Open space shall be expressed as a percentage and shall be generally defined as the required exterior open area clear from the ground upward, devoid of residential, commercial and industrial buildings, accessory structures and impervious area.

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-48, §§ 10, 11, 12-4-91; Ord. No. 93-8 § 29, 3-18-93; Ord. No. 97-18, § 1, 5-27-97)

Section 911.05. Zoning atlas and boundaries.

(1) *Establishment of official zoning atlas.* The boundaries of all zoning districts are hereby fixed and established as shown in the official zoning atlas, consisting of sectional maps which are identified by section, township and range. This zoning atlas is on file in the community development department and the office of the board of county commissioners of Indian River County, Florida. Each sectional map is hereby adopted

and made a part of this chapter as if the matters and information set forth by said maps were fully described herein.

(2) *Interpretation of district boundaries.* The boundaries of the various districts as shown in the zoning atlas and the sectional map sheets shall be determined by the boundaries as shown and outlines thereon and, when not clearly so determined, by use of the scale shown on said maps unless actual dimensions are noted. Where uncertainty exists as to the exact location of said boundaries, the following rules shall apply:

- (a) *Centerline as boundaries.* Where district boundaries lie on or within streets, highways, road rights-of-way or public water, the district boundaries shall be the centerline of the same.
- (b) *District boundaries which bisect blocks.* Where district boundary lines approximately bisect blocks, the boundaries are the median lines of such blocks between the centerline of boundary streets.
- (c) *District boundaries parallel to rights-of-way.* Where district boundaries are approximately parallel to a street, highway, road, alley, railroad right-of-way public water, the distance of such boundaries from the centerline thereof shall be, unless otherwise shown by dimension, the median block line.
- (d) *District boundaries of lots adjacent to bodies of water.* Where district boundaries are adjacent to bodies of water, the following criteria shall be applied:
 1. For lots bordering or containing lakes or other bodies of water, such lakes and bodies of water will be included in the lot size determination.
 2. Submerged bottomlands of the Indian River and St. Sebastian River will not be included in the lot size determination, but the density of the Conservation-2 district of one unit per acre, transferable to the contiguous upland portion of the lot not to exceed one hundred fifty (150) percent of the total number of units permitted on the receiving site by the land use designation, will be applied to planned developments (PDs).
- (e) *District boundaries dividing parcels of land.* In unplatted property or where a district boundary divides an unplatted lot, the location of such boundary, unless the same is indicated by dimensions, shall be determined by the use of a scale appearing on the district map. Where a district boundary divides a platted lot, the zone classification of the greater portion shall prevail throughout the lot.
- (f) *Action in case of uncertainty.* In case any further uncertainty exists, the planning and zoning commission shall interpret the intent of the district map as to location of such boundaries.
- (g) *Street and right-of-way abandonments.* Where a public road, street, alley or other right-of-way is officially vacated or abandoned, the regulations applicable to the property to which it reverts shall apply.
- (h) *Excluded areas.* Unless an area is classified on or by the official zoning atlas of Indian River County, or the appropriate classification can be established by the rules above, such area shall be considered to be classified as Agriculture-1 (A-1), unless such area is determined to be within an AG-2 or AG-3 area as designated by the comprehensive plan land use map in which case the zoning designation shall be A-2 in the AG-2 area and A-3 when in an AG-3 area, until such time as the land is rezoned by the board of county commissioners.
- (i) *Amendment to the official zoning atlas.* No changes or amendments to the official atlas shall be initiated, except in compliance and conformity with all procedures and requirements of this chapter and Chapter 902, Administrative Mechanisms. If in accordance with the procedures of this chapter changes are made in district boundaries or other such information portrayed

on the official zoning atlas, such changes shall be made promptly after adoption of the amendment. It shall be unlawful for any person to make any unauthorized change in the official zoning atlas.

(3) *Conservation district boundaries.* General boundaries of Con-1, Con-2 and Con-3 zoning districts shall be depicted in the official zoning atlas. Specific conservation district boundaries shall be determined on a site-by-site basis, as follows:

- (a) *Environmentally sensitive estuarine wetlands.* The Con-2 Conservation District adjacent to the Indian River Lagoon and the St. Sebastian River reflects the extent of environmentally sensitive estuarine wetlands. Specific boundaries of the Con-2 district shall be determined on a site-by-site basis by a site boundary survey. Wetland boundaries shall be determined based on the broadest delineation of jurisdictional wetland regulatory agencies.
- (b) *Con-1 conservation district boundaries.* The Con-1 conservation district reflects environmentally sensitive and environmentally important lands under public ownership. In cases where the boundary of the Con-1 district is under dispute, the boundary shall be verified based on the extent of public ownership. Likewise, the Con-1 district boundary as depicted in the official zoning atlas shall be periodically updated to correspond with public land acquisition or sale.
- (c) *St. Sebastian River Con-3 Conservation District boundaries.* The boundaries of the St. Sebastian River Con-3 district shall be depicted in the official zoning atlas. The eastern boundary of the Con-3 district shall be the west right-of-way line of Roseland Road. The western boundary of the district shall be generally depicted in the official zoning atlas. The specific boundary of the Con-3 district shall be determined on a site-by-site basis by a boundary survey, based on soil types and the existence of xeric scrub vegetation as

verified by county environmental planning staff, in consultation with the Florida Game and Fresh Water Fish Commission (GFC) and other appropriate agencies. Orsino fine sand or Electra sand, in combination with xeric scrub vegetation, shall be indicative of the Con-3 district. Upland areas east of the St. Sebastian River, within the generalized Con-3 boundaries, that are determined by site specific survey not to have the xeric scrub characteristics described herein, shall have an RS-1 district designation.

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-48, § 12, 12-4-91)

Section 911.06. Agricultural and rural districts.

(1) *Purpose and intent.* The agricultural, rural fringe development, and RS-1, single-family districts, are established to implement the policies of the Indian River County Comprehensive plan for managing land that is not part of the designated urban service area of the county, as well as land within the urban service area which warrants a very low density designation, by providing areas suitable for agriculture, silviculture, and the conservation and management of open space, vegetative cover, natural systems, aquifer recharge areas, wildlife areas and scenic areas. These districts are also intended to provide opportunities for residential uses at very low densities to promote housing opportunities in the county. These districts are further intended to permit activities which require non-urban locations and do not detrimentally impact lands devoted to rural and agricultural activities. Finally, the RFD, and RS-1 districts are intended to buffer active agricultural areas from urbanization.

(2) *Districts established.* The following districts are established to implement the provisions of this chapter.

A-1, A-2, and A-3 agricultural districts.

RFD, rural fringe development district.

RS-1, single-family district.

(3) *Relationship with land use map.*

- (a) The agricultural and rural districts may be established in the following land use designations:

District	Land Use Designation					REC
	AG-1	AG-2	AG-3	R	PUB	
A-1	X	-	-	-	X	X
A-2	-	X	-	-	X	X
A-3	-	-	X	-	X	X
RFD	-	-	-	X	-	X
RS-1	-	-	-	X	-	X

X - District permitted

- - District not permitted

- (b) The existing Agricultural-1 and rural districts may continue within the Urban Service Area when those areas are currently used for agricultural uses, serve as or enhance open space or green belt areas of the county.

(4) *Uses.* Uses in the agricultural and rural districts are classified as permitted uses, administrative permit uses and special exception uses.

Site plan review shall be required for the construction, alteration and use of all structures and buildings except single-family dwellings and agricultural uses.

No residential development in agriculturally designated areas shall occur unless such development is approved as a planned development and meets the requirements of section 911.14; the following activities shall be exempt from this requirement:

- (a) Construction of a single-family dwelling unit on a tract or parcel existing on October 1, 1990.
- (b) Division of a tract or parcel into two (2) lots, each meeting or exceeding the minimum lot size of the agricultural zoning district; any subsequent split of such property shall require approval as a planned development project.
- (c) Division of a tract into parcels of at least forty (40) acres in size.

Uses	District				
	A-1	A-2	A-3	RFD	RS-1
<i>Agricultural</i>					
General farming	P	P	P	-	-
Dairy farming	A	A	A	-	-
Livestock and poultry raising	P	P	P	-	-
Stables (noncommercial)	P	P	P	A	A
Stable (commercial)	P	P	P	-	-
Sludge spreading	A	A	A	-	-
Tree farms	P	P	P	-	-
<i>Kennel and animal boarding places</i>					
Commercial	A	A	A	-	-
Noncommercial	P	P	P	P	A
Fruit and vegetable juice extractions and packing houses	A	A	A	-	-
Small animal specialty farms	A	A	A	-	-
Tenant dwelling	S	S	S	-	-
Residential migrant housing facility	S	S	S		
<i>Nursery and greenhouses</i>					
Noncommercial	P	P	P	A	A

<i>Uses</i>	<i>District</i>				
	<i>A-1</i>	<i>A-2</i>	<i>A-3</i>	<i>RFD</i>	<i>RS-1</i>
Commercial (cultivation, wholesaling, and off-site landscaping services allowed; no retail sales allowed on-site)	P	P	P	-	-
Agricultural businesses, excluding wholesaling and processing	S	S	S	-	-
Agricultural industries	S	S	S	-	-
Fish farms	A	A	A	-	-
Agricultural research facilities	A	A	A	-	-
Aquaculture	A	A	A	A	A
Fruit spreading (subject to section 917.06(15))	P	P	P	-	-
<i>Residential</i>					
Accessory single-family dwelling unit	A	A	A	A	A
Single-family dwelling	P	P	P	P	P
Mobile homes	A	A	A	-	-
Accessory housing for nightwatchman	A	A	A	-	-
Guest cottage or servant's quarters	A	A	A	A	A
Single-family docks on vacant lots	A	A	A	A	A
Bed and breakfast	A	A	A	-	-
<i>Institutional</i>					
Child or adult care facilities	A	A	A	A	S
Foster care facilities	P	P	P	P	P
Cemeteries	S	S	S	S	S
Places of worship	P	P	P	S	S
<i>Community Service</i>					
Emergency services	P	P	P	P	P
Educational centers, including primary and secondary schools	S	S	S	S	S
Correctional institutions	S	S	S	-	-
Cultural and civic facilities	S	S	S	S	S
Governmental administrative building	S	S	S	S	S
Colleges and universities	S	-	-	S	S
<i>Recreation</i>					
Country clubs	A	A	A	S	S
Golf courses	A	A	A	S	S
Public parks and playgrounds	A	A	A	A	A
Major sports and recreation areas and facilities	S	S	S	-	-
Dude ranch	S	S	S	-	-
Retreats and camps	S	S	S	S	S
Commercial hunting and fishing lodges	S	S	S	-	-
Off road vehicle tracts (commercial and noncommercial)	S	S	S	-	-
<i>Commercial</i>					
Fruit and vegetable stands	A	A	A	-	-
Veterinary clinic or animal hospital	A	A	A	-	-
Driving ranges	S	S	S	-	-
<i>Transportation and Utilities</i>					

Uses	District				
	A-1	A-2	A-3	RFD	RS-1
Airports and airstrips	S	S	S	S	-
Communications towers					
Amateur radio (accessory use)					
Less than 80 feet	P	P	P	P	P
80 feet or taller (see 971.44(4) for special criteria)	S	S	S	S	S
Commercial					
Up to 70 feet:					
Camouflaged	P	P	P	P	P
Non-camouflaged	P	P	P	-	-
70 feet to 150 feet:					
Camouflaged	A	A	A	A	A
Monopole (minimum of 2 users)	A	A	A	-	-
Not camouflaged and not monopole	A/S*	A/S*	A/S*	-	-
Over 150 feet:					
All tower types (see 971.44(1) for special criteria)	-	S	S	-	-
Utility					
Public and private utilities, limited	A	A	A	S	S
Public and private utilities, heavy	S	S	S	S	S
Industrial					
Recycling center	A	A	A	-	-
Mining	A	A	A	-	-
Very Heavy Industrial					
Demolition debris site	S	S	S	-	-

P - Permitted use

A - Administrative permit use

S - Special exception use

*The requirements of section 917.06(11), of the Accessory Uses and Structures Chapter, shall apply to towers.

(5) Accessory uses and structures as provided in section 917.

(6) Size and dimension criteria:

Regulation	Unit	A-3	A-2	A-1	RFD	RS-1 ¹
Maximum density	du/gr.ac.	0.05	0.1	0.2	0.4	1
Minimum lot size	sq. feet	870,000	430,000	200,000	85,000	40,000
Minimum lot width	feet	150	150	150	150	125
Minimum yard setback	feet					
Front		30	30	30	30	30
Side		30	30	30	30	20
Rear		30	30	30	30	30
Maximum building height	feet	35	35	35	35	35
Maximum building coverage	% of lot	10	10	20	30	30
Minimum open space	% of lot	80 ²	80 ²	60 ²	50	50

<i>Regulation</i>	<i>Unit</i>	<i>A-3</i>	<i>A-2</i>	<i>A-1</i>	<i>RFD</i>	<i>RS-1¹</i>
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¹Nonconforming lots of record lawfully created prior to April 11, 1985 shall meet the RS-6 yard requirements

Legally created lots of record existing prior to June 18, 1991, in the A-1, A-2, and A-3 districts may be developed for one single-family dwelling each, regardless of density; provided all other regulations and codes are satisfied. These lots must meet requirements of the RS-1 district for the size and dimension criteria.

²For properties containing manmade bodies of water, the open water area may be excluded entirely from the open space calculation (e.g. excluded from gross area and from open space area credit).

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-7, §§ 5, 28, 2-27-91; Ord. No. 91-48, §§ 13, 14, 12-4-91; Ord. No. 92-39, §§ 7, 10, 9-29-92; Ord. No. 93-29, §§ 3C, 11B, 9-7-93; Ord. No. 94-1, §§ 1B, 2B, 1-5-94; Ord. No. 95-10, § 8B, 5-31-95; Ord. No. 96-5, § 1(A), 2-27-96; Ord. No. 97-16, § 3(1), 5-6-97; Ord. No. 97-29, §§ 1, 5(A), 12-16-97; Ord. No. 98-9, § 9, 5-19-98)

Section 911.07. Single-family residential districts.

(1) *Purpose and intent.* The single-family districts are established to implement the policies of the Indian River County Comprehensive Plan for managing land designated for residential uses, providing single-family housing opportunities, and ensuring adequate public facilities to meet the needs of residents. These districts are also intended to implement the county's housing policies by providing opportunities for a varied and diverse housing supply.

(2) *Districts established.* The following districts are established to implement the provisions of this code:

- RS-2
- RS-3
- RS-6
- RT-6

(3) *Relationship with land use map.* Single-family districts may be established in the following land use designations:

<i>Zoning District</i>	<i>Land Use Designations</i>				
	<i>L-1</i>	<i>L-2</i>	<i>M-1</i>	<i>M-2</i>	<i>REC</i>
RS-2	X	X	-	-	X
RS-3	X	X	-	-	X
RS-6	-	X	X	T	X
RT-6	-	X	X	T	X

- X - District permitted
- T - District permitted when used as transition from less intense/dense development or consistent with existing development
- - District not permitted

(4) *Uses.* Uses in the single-family districts are classified as permitted uses, administrative permit uses, and special exception uses. Site plan review shall be required for the construction, alteration and use of all structures and buildings except for single-family dwellings.

CHAPTER 971. REGULATIONS FOR SPECIFIC LAND USES

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Sec. 971.40.	Recreation uses.
Sec. 971.41.	Residential uses.
Sec. 971.42.	Sales, general merchandise.
Sec. 971.43.	Transportation uses.
Sec. 971.44.	Utility uses.
Sec. 971.45.	Vehicular sales, services and storage.

Section 971.01. Title.

This chapter, the terms and the provisions contained herein shall be known as the "Regulations for Specific Land Uses Ordinance" of Indian River County.

(Ord. No. 90-16, § 1, 9-11-90)

Section 971.02. Purpose and intent.

It is the intent of this chapter to provide the minimum procedures and criteria for the review of uses which may require an administrative permit or special exception.

(Ord. No. 90-16, § 1, 9-11-90)

Section 971.03. Definitions.

See Chapter 901.

(Ord. No. 90-16, § 1, 9-11-90)

Section 971.04. Review of uses requiring an administrative permit.

(1) *Administrative permit uses requiring planning and zoning commission approval.*

(a) *Purpose and intent.* This section is established to provide for the approval of administrative permits by the planning and zoning commission. Administrative permit approval is required for certain activities which, because of their scale, duration or nature, would not generally have an adverse impact on their surroundings when regulated in accord with the standards set forth in this chapter. Unless otherwise specified in sections 971.07 through 971.45 for particular uses, administrative permit requests shall be reviewed for approval by the planning and zoning commission.

(b) *Establishment of uses requiring administrative permits.* The district regulations of Chapter 911, Zoning, specify those uses which require an administrative permit. Such uses shall be permitted only after being approved pursuant to the procedures established in this section and only after satisfying the specific use criteria established in this chapter.

(c) *Authorization.* The planning and zoning commission is hereby authorized to decide all applications for administrative permits, as set forth in these provisions, subsequent to a recommendation by the community development director.

(d) *Conditions and safeguards.* The planning and zoning commission may attach to its approval of an administrative permit any reasonable conditions, limitations or requirements which are found necessary in its judgement to effectuate the purposes of this section and carry out the spirit and purpose of the chapter.

(e) *Procedures for review of uses requiring administrative permits.* Uses requiring an administrative permit shall be reviewed by the planning and zoning commission, pursuant to the procedures and notice requirements established in Chapter 914, Site Plans.

(f) *Standards.* No administrative permit shall be approved by the planning and zoning commission unless:

1. *Specific requirements.* The proposal is in compliance with all applicable specific land use regulations of Chapter 971 and all other applicable regulations.
2. *Comprehensive plan.* The proposal is determined to be consistent with the Indian River County Comprehensive Plan.

(g) *Status of decisions.* Actions taken by the planning and zoning commission regarding administrative permits shall be deemed final unless appealed to the board of county commissioners, pursuant to the site plan appeal procedures of Chapter 914.

(2) *Administrative permit uses approved at staff level.* As indicated in sections 971.07 through 971.45, certain specific administrative permit uses shall be reviewed and approved at a staff level. Such uses may be approved by the community development director or his designee when accompanied by an administrative approval site plan request. When accompanied by a request reviewed as a minor site plan, such uses may be approved by the technical review committee. Staff shall apply conditions and safeguards and standards as stated in section 971.04(1), above. Actions taken by staff shall be final unless appealed, pursuant to the site plan appeal procedures set forth in Chapter 914.

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 95-10, §§ 15A, 18, 5-31-95)

Section 971.05. Review of uses requiring a special exception.

(1) *Purpose and intent.* This section is intended to identify the procedures and reference the specific criteria for considering the approval of special exception uses. The procedures established herein are intended to ensure that a careful examination and findings of fact will be made by appropriate county entities during the review of special exception uses. Such review shall consider the nature, extent and potential external impacts associated with special exception uses.

(2) *Establishment of special exception uses.*

(a) *Special exception uses, generally.* Special exception uses are those types of uses that would not generally be appropriate throughout a particular zoning district. However, when special exception uses are carefully controlled as to number, area, location, and/or relationship to the vicinity, such uses would not adversely impact the public health, safety, comfort, good order, appearance, convenience, morals and general welfare and as such would be compatible with permitted uses within the particular zoning district.

(b) *Special exception uses, specifically.* The zoning districts which are established in Chapter 911 designate those uses and activities which shall be regulated as special exception uses. Those uses which are designated as special exception uses shall be permitted only after being approved pursuant to the procedures established in this section and further satisfying the specific use criteria established in this chapter.

(3) *Expansions and modifications to existing special exception uses that are not planned development projects (PD/PDR).* Project applications proposing to expand an existing or approved special exception use to more than ten (10) percent or ten thousand (10,000) square feet of floor area whichever is less, above the original or approved project intensity shall comply with all specific land use criteria contained herein that are specified for the use(s) involved in the proposed project and shall comply with the public hearing procedures of this chapter (971).

Modifications to an existing or approved special exception use that do not expand that use to more than ten (10) percent or to more than ten thousand (10,000) square feet of floor area, whichever is less, above the original or approved project intensity shall comply with all specific land use criteria contained herein that are specified for the use(s) involved in the proposed project. However, the public hearing provisions of this chapter shall not apply. Applications for expansions or modifications that conflict with special exception use approval conditions approved by the board of county

commissioners that limit project development intensity shall comply with the public hearing procedures of this chapter (971).

Expansions and modifications of planned development projects (PD/PDR) shall be governed by the regulations of Chapter 915, Planned Development (PD) Process and Standards for Development.

(4) *Special exception uses; approval authority.* The Indian River County Board of County Commissioners is hereby authorized to decide all applications for special exception uses, subsequent to a recommendation by the planning and zoning commission.

(5) *Conditions and safeguards.* In granting any special exception, the board of county commissioners may prescribe appropriate special conditions and safeguards to ensure that the use is compatible with surrounding uses in the district. Violation of such conditions and safeguards, when made a part of the terms under which the special exception is granted, shall be deemed a violation of these land development regulations. Such conditions and safeguards may include, but are not limited to:

- (a) *Time limitations.* Reasonable time limits within which the action for which the special exception is required shall be begun or completed or maintained, as well as provisions for extension or renewals.
 - (b) *Guarantees.* The posting by the applicant of a guarantee or bond in an appropriate form and reasonable amount.
 - (c) *Buffers.* The establishment of additional buffers or setbacks as deemed necessary.
- (6) *Procedures for review of special exception uses.*
- (a) *Pre-application conference.* Prior to filing an application for a special exception use approval, the applicant shall confer with the

planning and development division staff to discuss informally the requirements of this section and the nature of his proposal. For the purposes of this conference, the applicant shall provide a sketch plan of the proposal drawn to scale, showing the general layout, the relationship to the surrounding area, and the general development proposal.

(b) *Filing of application.* Following the pre-application conference, the applicant may file an application for a special exception use approval, prepared in compliance with the forms on file at the planning division. The appropriate number of applications shall be filed with the planning and development division.

1. *Site plan required; optional conceptual special exception approval.*

a. *Concurrent site plan and special exception approval.* Applications for special exception uses shall include a site plan, prepared in accordance with the provisions of Chapter 914, Site Plan Approval, and shall include all additional information required in Chapter 971, regulation for specific land uses.

b. *Conceptual special exception approval.* An applicant for special exception approval may elect to submit a conceptual site plan, rather than a complete site plan pursuant to the requirements of Chapter 914. Applicants wishing to obtain special exception approval based on a conceptual site plan shall submit details of the project, as required by the community development director, and a statement that he or she will comply with any conditions which may be attached by the board of county commissioners. If the applicant is granted conceptual special exception approval, the approval shall not be considered final until a complete site plan satisfying all conditions of special exception ap-

proval has been reviewed and approved pursuant to Chapter 914, Site Plans.

2. *Request for waivers of modifications.* Any requirements of this chapter which the applicant is requesting be waived or modified as may be allowed under this section, shall be clearly indicated by section and paragraph numbers in the application, together with the rationale for the request.

3. *Staff review.* Upon receipt of the application, the community development director shall forward it to all appropriate county reviewing agencies, and shall initiate his review of the application for conformance with the standards of this section. The community development director or his designee may require the submission of additional information, as needed, in order to adequately review a complete application.

(c) *Planning and zoning commission review.*

1. *Notice and hearing.* The planning and zoning commission shall hold a public hearing on the application within a reasonable period of time following its receipt of the application from the director. Notice shall be provided in accordance with the notification requirements for a rezoning.

2. *Decision.* Within a reasonable period of time following the close of the public hearing on the application, the planning and zoning commission shall make its report and recommendation to the board of county commissioners for approval, approval with conditions or denial of the application, stating in writing its reasons for any recommendation of denial.

(d) *Board of county commissioners review.*

1. *Notice and hearing.* The board of county commissioners shall hold a public hearing on the application, report, and recommendation of the planning and

zoning commission within a reasonable period of time following receipt from the planning and zoning commission. Notice shall be provided in accordance with the notification requirements for a rezoning.

2. **Decision.** Within a reasonable period of time following the close of the public hearing, the board of county commissioners shall approve, approve with conditions or deny the application, furnishing the applicant a written statement of the reasons for any denial. A special exception use shall be granted upon an affirmative vote of at least a simple majority of the board of county commissioners present.

(7) Required finding by the reviewing body. Before any application regarding a special exception use shall be approved, the reviewing body shall make a finding that it is empowered under the provisions of this chapter to review the specific use applied for, and that the granting of the special exception will not adversely affect the public interest. The reviewing body shall also make findings certifying that both the general and specific criteria for the review of special exceptions have been satisfied and that adequate special conditions have been imposed to ensure compatibility between the special exception use and surrounding land uses with regard but not limited to:

- (a) Ingress and egress to property and proposed structures thereon with particular reference to automotive and pedestrian safety and convenience, traffic flow and control, and access in case of fire or catastrophe;
- (b) Off-street parking and loading areas, where required, with particular attention to the items in (1) above and the economic, noise, glare, or odor effects of the special exception on adjoining properties and properties generally in the district;
- (c) Utilities with reference to location, availability and compatibility;
- (d) Screening and buffering with reference to type, dimensions and character;

- (e) Signs, if any, and proposed exterior lighting with reference to glare, traffic safety, economic effects, and compatibility and harmony with properties in the district;
- (f) Required yards and other open space;
- (g) Any special requirements set forth in the zoning district regulations for the particular use involved.

(8) Status of decisions. Actions taken by the board of county commissioners regarding the granting of special exceptions along with any appropriate conditions and safeguards shall be deemed final unless an appeal is filed pursuant to the procedures of Chapter 902.

(9) General criteria for review of special exception uses. Prior to approval by the board of county commissioners, a special exception use applicant must present evidence of compliance with the below cited general criteria as well as specific criteria for the respective special exception use cited herein in Chapter 971, regulations for specific land uses. The applicant shall have the burden of establishing, by competent material and substantial evidence, the existence of the facts and conditions which this chapter requires for approval. The applicant shall have the responsibility to present evidence in the form of testimony, exhibits, documents, models, plans and the like to support the application for approval of a special exception use.

- (a) **Consistency with comprehensive plan and zoning code.** The proposed use shall be consistent with the comprehensive plan and with the stated purpose and intent of the appropriate district regulations and all applicable regulations within this chapter.
- (b) **Compatibility with surrounding land uses.** The proposed use and its location shall be compatible with surrounding land uses and the general character of the area, based on consideration of such potential impacts as traffic generation, drainage, nuisance impacts, lighting, appearance, and other factors potentially impacting the character and stability of the surrounding area.
- (c) **No adverse impacts on public health, safety, and general welfare.** The proposed use and

its location and method of operation shall promote the public health, safety, and general welfare. The proposal shall include any landscape and structural improvements, public facility expansions, and operational restrictions or procedures required to effectively mitigate potential negative impacts of the use.

- (d) *Promote orderly development.* The use and proposed location shall promote orderly and efficient development considering such factors as impact on public facilities, preservation of neighborhood integrity, and similar factors impacting orderly development of the area.

(10) *Specific criteria for review of special exception uses.* In addition to satisfying the general criteria for reviewing special exception uses as established herein, a special exception use must also be found to satisfy the specific criteria for the particular land use, as established in this chapter. (Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-7, § 23, 2-27-91; Ord. No. 91-48, § 85, 12-4-91; Ord. No. 93-29, § 6, 9-7-93)

Section 971.06. Table of uses in alphabetical order.

[The following is a table of uses in alphabetical order:]

<i>Use</i>	<i>Section</i>
Accessory housing for night-watchmen	971.41(1)
Adult congregate living facility (ACLF)	971.28(3)
Adult entertainment businesses	971.07(1)
Agricultural businesses (excluding wholesaling and processing)	971.08(1)
Agricultural industries	971.08(2)
Agricultural research facilities	971.08(3)
Airports and airstrips	971.43(1)
Appliance store	971.42(2)
Aquaculture	971.08(4)
Auction facilities, unenclosed	971.42(1)
Automotive fluids, products, sales and service other than gasoline	971.45(1)
Automotive fuel sales	971.45(2)
Barber shop	971.13(3)

<i>Use</i>	<i>Section</i>
Bars and lounges	971.21(1)
Beauty shop	971.13(3)
Bed and breakfast establishments	971.41(2)
Boardinghouses	971.41(3)
Boat sales and rentals	971.35(1)
Book and card stores	971.13(3)
Bottle clubs	971.21(2)
Building material sales and lumberyards	971.12(1)
Carry out restaurants and restaurants excluding curb service, drive-in, drive-through and similar type establishments	971.21(3)
Cemeteries	971.28(8)
Child care and adult care facilities	971.28(1)
Civic and social membership organizations	971.28(2)
Colleges/universities	971.14(7)
Commercial fisheries	971.35(2)
Commercial hunting and fishing lodges	971.40(4)
Commercial marinas	971.35(3)
Community centers	971.14(1)
Correctional institutions	971.14(2)
Country clubs	971.40(1)
Cultural or civic facility	971.14(3)
Dairy farming	971.08(5)
Demolition debris sites	971.27(1)
Department store, furniture and appliance sales, showroom catalog stores and variety store	971.42(2)
Driving ranges	971.11(1)
Drug stores	971.42(3)
Dude ranch	971.40(2)
Educational centers, including primary and secondary schools	971.14(4)
Emergency services	971.14(5)
Fish farms	971.08(6)
Flea market	971.42(4)
Florist	971.13(3)
Fruit and vegetable juice extraction and packing houses	971.26(1)
Fruit and vegetable stands	971.13(1)
Furniture store	971.42(2)
Garment pressing	971.13(3)
Gasoline service stations	971.45(3)
Gift stores	971.13(3)
Golf courses and accessory facilities	971.40(3)
Governmental administrative building	971.14(6)
Group homes: Levels I, II, III, and residential centers	971.28(3)

<i>Use</i>	<i>Section</i>
Guest cottages and servant quarters	971.41(4)
Health and fitness clubs	971.10(1)
Heliports and helipads	971.43(2)
Homes for the aged, including nursing homes, rest homes, and convalescent homes	971.28(4)
Junk and salvage yards	971.27(2)
Kennel or animal boarding place, commercial	971.08(7)
Kennel or animal boarding place, non-commercial	971.08(8)
Laundry/laundromat	971.13(3)
Libraries	971.14(8)
Major sports and recreation areas and facilities	971.40(5)
Marine repair and service	971.35(4)
Miniature golf courses	971.11(2)
Mining	971.22(1)
Mobile homes	971.41(5)
Mobile home trailer sales	971.45(4)
Model mobile home display	971.24(1)
Multiple-family dwellings	971.41(6)
News stands	971.13(3)
Nurseries and greenhouses, non-commercial	971.08(9)
Off-road vehicle tracks	971.40(6)
Optical goods	971.13(3)
Outdoor storage (unenclosed)	971.12(2)
Parks and playgrounds open to the public	971.40(7)
Photographic studios	971.13(3)
Places of worship	971.28(5)
Public/private multi-slip facilities	971.40(8)
Recreational vehicle sales	971.45(6)
Recycling centers	971.26(2)
Residential migrant housing facility	971.08(14)
Residential treatment centers	971.28(6)
Retreats and camps	971.40(11)
Self-service storage facilities	971.12(3)
Shoe repair	971.13(3)
Single-family docks constructed prior to construction of a principal single-family dwelling unit	971.41(7)
Sludge-spreading	971.08(10)
Specialty farms	971.08(11)
Stables, non-commercial	971.08(12)
Subdivisions with special side yards	971.41(8)
Tenant dwellings	971.08(13)
Tennis clubs and beach clubs	971.40(9)
Total care facilities	971.28(7)
Transmission towers (radio, TV and microwave)	971.44(1)

<i>Use</i>	<i>Section</i>
Unenclosed amusements, excluding miniature golf courses and driving ranges	971.11(3)
Uses and structures accessory to OCR projects	971.13(3)
Used vehicle sales	971.45(5)
Utilities, public and private - heavy	971.44(2)
Utilities, public and private - limited	971.44(3)
Veterinary clinic or animal hospital	971.13(2)
Yacht clubs	971.40(11)

(Ord. No. 90-16, § 1, 9-11-90; Ord. No. 91-7, § 24, 2-27-91; Ord. No. 91-48, § 62, 12-4-91; Ord. No. 93-8, § 14, 3-18-93; Ord. No. 93-29, § 3D, 9-7-93)

Section 971.07. Adult entertainment.

(1) *Adult entertainment businesses (special exception).*

(a) *Districts requiring special exception approval, (pursuant to the provisions of 971.05):* IL IG.

(b) *Additional information requirements:*

1. A site plan meeting all requirements of Chapter 914 which shows the zoning and use of all properties within one thousand (1,000) feet of the site;
2. Written verification of compliance with all applicable state and local ordinances shall be provided;
3. Written verification from the property owner that the property may be used for operation of an adult entertainment business.

(c) *Criteria for adult entertainment businesses:*

1. The site shall be located a minimum of one thousand (1,000) feet from other adult businesses, residential uses or zones, places of worship, secondary or primary schools, parks or playgrounds, or any areas where large numbers of minors regularly travel or congregate. This required separation distance shall be measured by following the shortest route of ordinary pedestrian travel along the public thoroughfare from the main entrance of such place of busi-

(12) consecutive months, then the tower shall be dismantled and removed from the site.

(a) Prior to release of an approved tower site plan, the property owner shall acknowledge in writing, in a manner acceptable to the county attorney's office, his or her responsibilities as the property owner to perform or contract to perform and pay all costs associated with dismantling and properly removing and disposing of an abandoned tower.

16. Except where superseded by applicable state or federal regulations, non-camouflaged towers shall be painted or constructed in neutral color (e.g. non-contrasting gray or blue) to blend into the surrounding environment.

17. Except for the exemptions cited below, non-camouflaged towers over one hundred fifty (150) feet tall shall be separated as follows:

a. Proposed lattice towers over one hundred fifty (150) feet in height shall be separated a distance of at least five thousand (5,000) feet from existing or approved lattice towers over one hundred fifty (150) feet in height, and at least one thousand five hundred (1,500) feet from existing or approved non-lattice towers (over one hundred fifty (150) feet in height).

b. Proposed non-lattice towers over one hundred fifty (150) feet in height shall be separated a distance of at least one thousand five hundred (1,500) feet from existing and approved non-camouflaged towers over one hundred fifty (150) feet in height.

Exemptions.

Tower applications shall be exempt from the separation distance requirements specified above, as follows:

- (1) Where the tower is proposed to be located more than two thousand five hundred (2,500) feet from any public road and from any existing residence; or
- (2) Where the applicant can demonstrate that applying the separation distance criteria to his or her application would result in a net increase in the number of communications towers needed.
- (3) Where the tower is proposed to be clustered with another tower(s) by being located no more than two hundred (200) feet from the tower(s) within the cluster.

(2) *Utilities, public and private; heavy (special exception).*

(a) *Districts requiring special exception approval, (pursuant to the provisions of 971.05): A-1 A-2 A-3 RFD RS-1 RS-2 RS-3 RS-6 RT-6 RM-3 RM-4 RM-6 RM-8 RM-10 RMH-6 RMH-8 CH IL IG.*

(b) *Additional information requirements:*

1. A site plan showing the proposed utility site, pursuant to the requirements of Chapter 914;
2. A plan of the utility system, showing how the proposed facility will connect with any existing utility system;
3. A statement shall be submitted which explains the function of the proposed utility and its consistency with the goals objectives and policies of the Indian River County Comprehensive Plan;

4. A statement identifying any radioactive, toxic or other hazardous wastes which may be generated or utilized on the premises.
- (c) *Criteria for utilities, public and private—heavy:*
1. See Chapter 901 for definition of utilities, public and private—heavy;
 2. Any power generation facility shall be consistent with the provisions of the Florida Electrical Power Plan Citing Act, Chapter 23, Section 23.09191 F.S.;
 3. All below-ground high voltage cables within a utility right-of-way shall be made known to the public through the use of signs posted therein;
 4. The disposal of all waste, gaseous, liquid or solid, shall comply with all federal, state and local laws;
 5. Between all above-ground facilities, (except distribution and collection facilities) and adjacent properties having a residential land use designation, a Type "A" buffer (reduce to "B" buffer where abutting a local roadway, reduce to "C" buffer where abutting a Thoroughfare Plan roadway) (with six-foot opaque screening) as specified in Chapter 926, Landscaping shall be provided;
 6. In all zoning districts except the industrial districts, all equipment, machinery, and facilities which cannot, by their size or nature, be located within an enclosed building shall be separated from adjacent properties having a residential land use designation by a Type "D" buffer (with six-foot opaque screening) as specified in Chapter 926, Landscaping;
 7. Driveways located in close proximity to adjacent properties having a residential land use designation shall provide a six-foot opaque screening between the driveway and adjacent property. An eight-foot opaque screen may be required if deemed necessary to mitigate noise and visual impacts.
- Note: Where more than one buffer and/or screening requirement can be adequately provided together in one buffer area, the board of county commissioners may approve plans to allow the buffer/screening requirements to "overlap."
- (3) *Utilities, public and private; limited (administrative permit and special exception).*
- (a) *Districts requiring administrative permit approval, (pursuant to the provisions of 971.04):* RMH-6 RMH-8 OCR MED CN CL CG CH A-1 A-2 A-3.
 - (b) *Districts requiring special exception approval, (pursuant to the provisions of 971.05):* RFD RS-1 RS-2 RS-3 RS-6 RT-6 R-BCID ROSE-4 RM-3 RM-4 RM-6 RM-8 RM-10 AIR-1 CRVP.
 - (c) *Additional information requirements:*
 1. A site plan showing the proposed utility system together with the major components of the existing utility system within the county, of which the proposed system will be an integral part, pursuant to the requirements of Chapter 914;
 2. A statement shall be submitted which explains the function of the proposed improvement and its consistency with an overall utility system plan, as well as the comprehensive plan.
 - (d) *Criteria for utilities, public and private—limited:*
 1. See Chapter 901 for definition of utilities, public and private—limited;
 2. Between all above-ground facilities (except distribution and collection facilities) and adjacent property having a residential land use designation a Type "B" buffer (reduce to Type "C" where abutting a local roadway, reduce to "D" buffer where abutting a thoroughfare plan roadway)

(with six-foot opaque screening) as specified in Chapter 926, Landscaping, shall be provided;

3. All below-ground high voltage cables within a utility right-of-way shall be made known to the public through the use of signs posted therein;
4. In all zoning districts except the industrial districts, all equipment, machinery and facilities which cannot by their size or nature be located within an enclosed building shall be separated from adjacent properties having a residential land use designation by a Type "D" buffer (with six-foot opaque screening) as specified in Chapter 926, Landscaping;
5. Driveways located in close proximity to adjacent properties having a residential land use designation shall provide a six-foot opaque screening between the driveway and adjacent property. An eight-foot opaque screen may be required if deemed necessary to mitigate noise and visual impacts.

Note: Where more than one buffer and/or screening requirement can be adequately provided together in one buffer area, the Board of County Commissioners may approve plans to allow the buffer/screening requirements to "overlap."

(4) *Amateur radio communications towers over eighty (80) feet.*

- (a) Districts requiring special exception use approval: A-1, A-2, A-3, RFD, RS-1, RS-2, RS-3, RS-6, RT-6, RM-3, RM-4, RM-6, RM-8, RM-10, RMH-6, RMH-8, PRO, OCR, MED, CN, CL, CG, CH, IL, IG, Con-2, Con-3, R-BCID, ROSE-4, and AIR-1.

(b) Information requirements:

1. Site plan application in accordance with the site plan ordinance (Chapter 914).
2. Applicant's copy of current, valid FCC license for amateur radio operation.
3. Site plan sketch showing all proposed structures (e.g. support struc-

tures, anchorage) and setbacks from such structures to property boundaries.

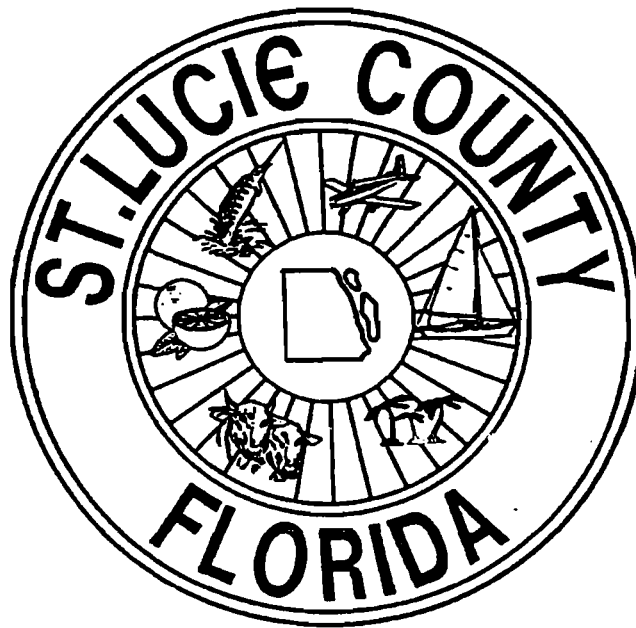
(c) Criteria for amateur radio towers over eighty (80) feet:

1. Said tower shall be accessory to a legal, principal use on site (e.g. residence).
2. Structures, including towers, shall meet the setback requirements delineated in Chapter 917, Accessory Uses and Structures.
3. Applicant shall commit in writing that the tower will be erected in accordance with manufacturer's recommendations.
4. If more than two hundred twenty (220) voltage is present in the ground grid or in the tower, a sign shall be attached to the tower and shall display in large bold letters the following: "HIGH VOLTAGE—DANGER."
5. No tower shall be permitted to encroach into or through any established public or private airport approach path as provided in the airport height limitations. All proposed towers shall satisfy the airport zoning ordinance requirements.
6. All towers shall submit a conceptual tower lighting plan. Louvers or shields may be required as necessary to keep light from shining down on surrounding properties. Where lighting is required by a government agency, dual (day/night) lighting must be used unless otherwise directed by other agencies.

(Ord. No. 90-16, § 1, 9-11-90; Ord. No 91-48, §§ 72—75, 12-4-91; Ord. No. 93-29, § 5L, 9-7-93; Ord. No. 94-1, §§ 2M, 9B, 9C, 1-5-94; Ord. No. 97-16, §§ 4, 6(1), (2), 7, 5-6-97; Ord. No. 97-29, § 2(C), 12-16-97)

ST. LUCIE COUNTY

LAND DEVELOPMENT CODE



ADOPTED ON: AUGUST 1, 1990

Ordinance 90-036

Revised Through: November 1, 1997

**St. Lucie County
Board of County Commissioners**

**Gary D. Charles, Sr
Paula A. Lewis.
Cliff Barnes
John Bruhn
Ken Sattler**

**Chairman
Vice-Chairman
Commissioner
Commissioner
Commissioner**

**Douglas Anderson, County Administrator
Ray Wazny, Community Development Director**

CHAPTER III ZONING DISTRICTS

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CHAPTER III ZONING DISTRICTS

3.00.00 ZONING DISTRICTS

3.00.01 ZONING DISTRICTS ESTABLISHED

In order to carry out the goals and policies of the St. Lucie County Comprehensive Plan and the purposes of this Code, the following zoning districts are hereby created:

A.	AG-1	Agricultural - 1	P.	RM-15	Residential, Multiple-Family - 15
B.	AG-2.5	Agricultural - 2.5	Q.	CN	Commercial, Neighborhood
C.	AG-5	Agricultural - 5	R.	CO	Commercial, Office
D.	R/C	Residential/Conservation	S.	CG	Commercial, General
E.	AR-1	Agricultural, Residential - 1	T.	IL	Industrial, Light
F.	RE-1	Residential, Estate - 1	U.	IH	Industrial, Heavy
G.	RE-2	Residential, Estate - 2	V.	IX	Industrial, Extraction
H.	RS-2	Residential, Single-Family - 2	W.	U	Utilities
I.	RS-3	Residential, Single-Family - 3	X.	I	Institutional
J.	RS-4	Residential, Single-Family - 4	Y.	RF	Religious Facilities
K.	RMH-5	Residential, Mobile Home - 5	Z.	RVP	Recreational Vehicle Park
L.	RM-5	Residential, Multiple-Family - 5	AA.	HIRD	Hutchinson Island Residential District
M.	RM-7	Residential, Multiple-Family - 7	BB.	PUD	Planned Unit Development
N.	RM-9	Residential, Multiple-Family - 9	CC.	PNRD	Planned Non-Residential Development
O.	RM-11	Residential, Multiple-Family - 11	DD.	PMUD	Planned Mixed Use Development

3.01.03 ZONING DISTRICTS

A. AG-1 AGRICULTURAL - 1

1. Purpose

The purpose of this district is to provide and protect an environment suitable for productive commercial agriculture, together with such other uses as may be necessary to and compatible with productive agricultural surroundings. Residential densities are restricted to a maximum of one (1) dwelling unit per gross acre. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this Code.

2. Permitted Uses

- a. Agricultural production - crops (01)
- b. Agricultural production - livestock & animal specialties (02)
- c. Agricultural services (07)
- d. Family day care homes. (999)
- e. Family residential homes provided that such homes shall not be located within a radius of one thousand (1,000) feet of another existing such family residential home and provided that the sponsoring agency or Department of Health and Rehabilitative Services (HRS) notifies the Board of County Commissioners at the time of home occupancy that the home is licensed by HRS. (999)
- f. Fishing, hunting & trapping (09)
- g. Forestry (08)
- h. Kennels. (0752)
- i. Research Facilities, Noncommercial (8733)
- j. Riding stables. (7999)
- k. Single-family detached dwellings. (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Table 1 in Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Table 1 in Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Agricultural labor housing. (999)

- b. Aircraft storage and equipment maintenance. (4581)
- c. ~~Airports and flying, landing, and takeoff fields.~~ (4581)
- d. Family residential homes located within a radius of one thousand (1,000) feet of another such family residential home. (999)
- e. Farm products warehousing and storage. (4221/4222)
- f. Gasoline service stations. (5541)
- g. Industrial wastewater disposal. (999)
- h. Manufacturing:
 - (1) Agricultural chemicals (287)
 - (2) Food & kindred products (20)
 - (3) Lumber & wood products, except furniture (24)
- i. Mining and quarrying of nonmetallic minerals, except fuels. (14)
- j. Retail trade:
 - (1) Farm equipment and related accessories. (999)
 - (2) Apparel & accessory stores. (56)
- k. Sewage disposal subject to the requirements of Section 7.10.13. (999)
- l. Telecommunication Towers - subject to the standards of Section 7.10.23 (999)
- m. Camps - sporting and recreational. (7032)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Mobile homes subject to the requirements of Section 7.10.05.
- b. Retail trade and wholesale trade - subordinate to the primary authorized use or activity.
- c. Guest house subject to the requirements of Section 7.10.04. (999)

B. AG-2.5 AGRICULTURAL - 2.5

1. Purpose

The purpose of this district is to provide and protect an environment suitable for productive commercial agriculture, together with such other uses as may be necessary to and compatible with productive agricultural surroundings. Residential densities are restricted to a maximum of one dwelling unit per two and one half (2.5) gross acres. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Agricultural production - crops (01)
- b. Agricultural production - livestock & animal specialties (02)
- c. Agricultural services (07)
- d. Family day care homes. (999)
- e. Family residential homes provided that such homes shall not be located within a radius of one thousand (1,000) feet of another existing such family residential home and provided that the sponsoring agency or Department of Health and Rehabilitative Services (HRS) notifies the Board of County Commissioners at the time of home occupancy that the home is licensed by HRS. (999)
- f. Fishing, hunting & trapping (09)
- g. Forestry (08)
- h. Kennels. (0752)
- i. Research Facilities, Noncommercial (8733)
- j. Riding stables. (7999)
- k. Single-family detached dwellings. (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00

7. Conditional Uses

- a. Agricultural labor housing. (999)
- b. Aircraft storage and equipment maintenance. (4581)
- c. Airports and flying, landing, and takeoff fields. (4581)

- d. Family residential homes located within a radius of one thousand (1,000) feet of another such family residential home. (999)
- e. Farm products warehousing and storage. (4221/4222)
- f. Gasoline service stations. (5541)
- g. Industrial wastewater disposal. (999)
- h. Manufacturing:
 - (1) Agricultural chemicals (287)
 - (2) Food & kindred products (20)
 - (3) Lumber & wood products, except furniture (24)
- i. Mining and quarrying of nonmetallic minerals, except fuels. (14)
- j. Radio, television, and microwave communication stations and towers. (999)
- k. Retail trade:
 - (1) Farm equipment and related accessories. (999)
 - (2) Apparel & accessory stores. (56)
- l. Sewage disposal subject to the requirements of Section 7.10.13. (999)
- m. Camps - sporting and recreational. (7032)
- n. Outdoor shooting ranges, providing site plan approval is obtained according to the provisions of Sections 11.02.07 through 11.02.09 and Section 7.10.19 of this Code.

8. Accessory Uses:

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Mobile homes subject to the requirements of Section 7.10.05.
- b. Retail trade and wholesale trade - subordinate to the primary authorized use or activity.
- c. Guest house subject to the requirements of Section 7.10.04. (999)

C. AG-5 AGRICULTURAL - 5

1. Purpose

The purpose of this district is to provide and protect an environment suitable for productive commercial agriculture, together with such other uses as may be necessary to and compatible with productive agricultural surroundings. Residential densities are restricted to a maximum of one dwelling unit per five (5) gross acres. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Agricultural production - crops (01)
- b. Agricultural production - livestock & animal specialties (02)
- c. Agricultural services (07)
- d. Family day care homes. (999)
- e. Family residential homes provided that such homes shall not be located within a radius of one thousand (1,000) feet of another existing such family residential home and provided that the sponsoring agency or Department of Health and Rehabilitative Services (HRS) notifies the Board of County Commissioners at the time of home occupancy that the home is licensed by HRS. (999)
- f. Fishing, hunting & trapping (09)
- g. Forestry (08)
- h. Kennels. (0752)
- i. Research Facilities, Noncommercial (8733)
- j. Riding stables. (7999)
- k. Single-family detached dwellings. (999)
- j. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping Requirements are subject to Section 7.09.00

7. Conditional Uses

- a. Agricultural labor housing. (999)
- b. Aircraft storage and equipment maintenance. (4581)

- c. Airports and flying, landing, and take-off fields. (4581)
- d. Family residential homes located within a radius of one thousand (1,000) feet of another such family residential home. (999)
- e. Farm products warehousing and storage. (4221/4222)
- f. Gasoline service stations. (5541)
- g. Industrial wastewater disposal. (999)
- h. Manufacturing:
 - (1) Agricultural chemicals (287)
 - (2) Food & kindred products (20)
 - (3) Lumber & wood products, except furniture (24)
- i. Mining and quarrying of nonmetallic minerals, except fuels (14)
- j. Retail trade:
 - (1) Farm equipment and related accessories (999)
 - (2) Apparel & accessory stores (56)
- k. Sewage disposal subject to the requirements of Section 7.10.13 (999)
- l. Camps - sporting and recreational (7032)
- m. Off-Road Vehicle Parks, except go-cart raceway operation or rentals (7999), subject to the requirements of Section 7.10.21 (999)
- n. Outdoor shooting ranges, providing site plan approval is obtained according to the provisions of Sections 11.02.07 through 11.02.09 and Section 7.10.19 of this Code.

8. Accessory Uses:

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Mobile homes subject to the requirements of Section 7.10.05.
- b. Retail trade and wholesale trade - subordinate to the primary authorized use or activity.
- c. Guest house subject to the requirements of Section 7.10.04. (999)

D. R/C RESIDENTIAL/CONSERVATION

1. Purpose

The purpose of this district is to provide and protect an environment suitable for single-family dwellings at a maximum gross density of one (1) dwelling unit per five (5) gross acres, together with such other uses as may be necessary for and compatible with low density residential surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Family day care homes. (999)
- b. Family residential homes provided that such homes shall not be located within a radius of one thousand (1,000) feet of another existing such family residential home and provided that the sponsoring agency or Department of Health and Rehabilitative Services (HRS) notifies the Board of County Commissioners at the time of home occupancy that the home is licensed by HRS. (999)
- c. Single-family detached dwellings. (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking Requirements

Off-street parking requirements shall be in accordance with Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements shall be subject to Section 7.09.00.

7. Conditional Uses

- a. Family residential homes located within a radius of one thousand (1,000) feet of another such family residential home. (999)
- b. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Guest house subject to the requirements of Section 7.10.04. (999)

N. RM-9 RESIDENTIAL, MULTIPLE-FAMILY - 9

1. Purpose

The purpose of this district is to provide and protect an environment suitable for single-family, two-family, three-family, and multiple-family dwellings at a maximum density of nine (9) dwelling units per gross acre, together with such other uses as may be necessary for and compatible with low and medium density residential surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Community residential homes subject to the provisions of Section 7.10.07 of this Code. (999)
- b. Family day care homes. (999)
- c. Family residential homes provided that such homes shall not be located within a radius of one thousand (1,000) feet of another existing such family residential home and provided that the sponsoring agency or the Department of Health and Rehabilitative Services (HRS) notifies the Board of County Commissioners at the time of home occupancy that the home is licensed by HRS. (999)
- d. Multiple-family dwellings (3 or more units) (999)
- e. Single-family detached dwellings. (999)
- f. Two-family dwellings. (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking Requirements

Off-street parking requirements shall be in accordance with Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements shall be in accordance with Section 7.09.00.

7. Conditional Uses

- a. Family residential homes located within a radius of one thousand (1,000) feet of another such family residential home. (999)
- b. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00.

Q. CN COMMERCIAL, NEIGHBORHOOD

1. Purpose

The purpose of this district is to provide and protect an environment suitable for limited retail trade and service activities covering a relatively small area and that is intended to serve the population living in surrounding neighborhoods. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Accounting, auditing and bookkeeping services. (872)
- b. Beauty and barber services. (723/724)
- c. Depository Institutions (60)
- d. Engineering, accounting, research, management & related services (87)
- e. Health services (except nursing homes (805) and hospitals (806).) (80)
- f. Insurance carriers, agents, brokers and services (63,64)
- g. Laundering and drycleaning (self-service). (7215)
- h. Membership organizations (86)
- i. Non-depository institutions (61)
- j. Real estate (65)
- k. Repair services:
 - (1) Electrical repair. (762)
 - (2) Shoe repairs (725)
 - (3) Watch, clock, jewelry, and musical instrument repair. (7631)
- l. Retail trade:
 - (1) Apparel and accessories. (56)
 - (2) Auto parts and related specialty installation services (5531)
 - (3) Books and stationery. (5942/5943)
 - (4) Cameras and photographic supplies. (5946)
 - (5) Drugs and proprietary. (5912)
 - (6) Eating places (5812)
 - (7) Florists. (5992)
 - (8) Food stores (54)
 - (9) Gifts, novelties, and souvenirs. (5947)
 - (10) Hobby, toy and game shops (5945)
 - (11) Household appliances (572)
 - (12) Jewelry. (5944)
 - (13) Newspapers and magazines. (5994)
 - (14) Optical goods. (5995)
 - (15) Nurseries, lawn and garden supplies. (526)
 - (16) Radios, TV's, consumer electronics and music supplies (573)
 - (17) Sporting goods and bicycles. (5941)
 - (18) Tobacco products. (5993)
 - (19) Used merchandise stores (5932)
- m. Travel agencies (4724)
- n. Video tape rental (784)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Day care - adult (8322)
- child (8351)
- b. Postal services. (4311)
- c. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00 and include the following:

- a. Drinking places (undistilled alcoholic beverages) accessory to an eating place. (999)
- b. One dwelling unit contained within the commercial building, for on-site security purposes. (999)
- c. Retail trade:
 - (1) Gasoline services - accessory to retail food stores under SIC-5411. (999)
 - (2) Undistilled alcoholic beverages accessory to retail sale of food. (5921 - Except for liquor)

S. CG COMMERCIAL, GENERAL

1. Purpose

The purpose of this district is to provide and protect an environment suitable for a wide variety of commercial uses intended to serve a population over a large market area, which do not impose undesirable noise, vibration, odor, dust, or offensive effects on the surrounding area, together with such other uses as may be necessary to and compatible with general commercial surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Adjustment/collection & credit reporting services (732)
- b. Advertising (731)
- c. Amphitheatres (999)
- d. Amusements & recreation services - except stadiums, arenas, race tracks, amusement parks and bingo parlors (79)
- e. Apparel & accessory stores (56)
- f. Automobile dealers (55)
- g. Automotive rental, repairs & serv. (except body repairs) (751,753,754)
- h. Beauty and barber services (723/724)
- i. Building materials, hardware and garden supply (52)
- j. Cleaning services (7349)
- k. Commercial printing (999)
- l. Communications - except towers (48)
- m. Computer programming, data processing & other computer serv. (737)
- n. Contract construction serv. (office & interior storage only) (15/16/17)
- o. Cultural activities and nature exhibitions (999)
- p. Duplicating, mailing, commercial art/photo. & stenog. serv. (733)
- q. Eating places (581)
- r. Educational services - except public schools (82)
- s. Engineering, accounting, research, management & related services (87)
- t. Equipment rental and leasing services (735)
- u. Executive, legislative, and judicial functions (91/92/93/94/95/96/97)
- v. Farm labor and management services (076)
- w. Financial, insurance, and real estate (60/61/62/63/64/65/67)
- x. Food stores (54)
- y. Funeral and crematory services (726)
- z. Gasoline service stations (5541)
- aa. General merchandise stores (53)
- bb. Health services (80)
- cc. Home furniture and furnishings (57)
- dd. Landscape & horticultural services (078)
- ee. Laundry, cleaning and garment services (721)
- ff. Membership organizations - except for religious organizations as provided in Section 8.02.01(H) of this code (86)
- gg. Miscellaneous retail (see SIC Code Major Group 59):
 - (1) Drug stores (591)

- (2) Used merchandise stores (593)
- (3) Sporting goods (5941)
- (4) Book & stationary (5942/5943)
- (5) Jewelry (5944)
- (6) Hobby, toy and games (5945)
- (7) Camera & photographic supplies (5946)
- (8) Gifts, novelty and souvenir (5947)
- (9) Luggage & leather goods (5948)
- (10) Fabric and mill products (5949)
- (11) Catalog, mail order and direct selling (5961/5963)
- (12) Liquefied petroleum gas (propane) (5984)
- (13) Florists (5992)
- (14) Tobacco (5993)
- (15) News dealers/newsstands (5994)
- (16) Optical goods (5995)
- (17) Misc. retail (See SIC Code for specific uses) (5999)
- hh. Miscellaneous personal services (see SIC Code Major Group 72):
 - (1) Tax return services (7291)
 - (2) Misc. retail (See SIC Code for specific uses) (7299)
- ii. Miscellaneous business services (see SIC Code Major Group 73):
 - (1) Detective, guard and armored car services (7381)
 - (2) Security system services (7382)
 - (3) News syndicate (7383)
 - (4) Photofinishing laboratories (7384)
 - (5) Business services - misc. (7389)
- jj. Mobile home dealers (527)
- kk. Mobile food vendors (eating places, fruits & vegetables-retail) (999)
- ll. Motion pictures (78)
- mm. Motor vehicle parking - commercial parking & vehicle storage. (752)
- nn. Museums, galleries and gardens (84)
- oo. Personnel supply services (736)
- pp. Photo finishing services (7384)
- qq. Photographic services (722)
- rr. Postal services (43)
- ss. Recreation facilities (999)
- tt. Repair services (76)
- uu. Retail trade-indoor display and sales only, except as provided in Section 7.00.00. (999)
- vv. Social services:
 - (1) Individual & family social services (832/839)
 - (2) Child care services (835)
 - (3) Job training and vocational rehabilitation services (833)
- ww. Travel agencies (4724)
- xx. Veterinary services (074)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Adult establishments subject to requirements of Sec. 7.10.10. (999)
- b. Drinking places (alcoholic beverages) - free-standing. (5813)
- c. Disinfecting & pest control services. (7342)
- d. Amusement parks. (7996)
- e. Go-cart tracks. (7999)
- f. Hotels & motels. (701)
- g. Household goods warehousing and storage-mini-warehouses (999)
- h. Marina - recreational boats only. (4493)
- i. Motor vehicle repair services - body repair. (753)
- j. Sporting and recreational camps. (7032)
- k. Retail trade:
 - (1) Liquor stores. (592)
- k. Stadiums, arenas, and race tracks. (794)
- l. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Drinking places (alcoholic beverages as an accessory use to a restaurant and/or civic, social, and fraternal organizations).
- b. Detached single-family dwelling or mobile home, (for on-site security purposes).
- c. Retail trade:
 - (1) Undistilled alcoholic beverages (accessory to retail sale of food).

T. IL INDUSTRIAL, LIGHT

1. Purpose

The purpose of this district is to provide and protect an environment suitable for light manufacturing, wholesale, and warehousing activities that do not impose undesirable noise, vibration, odor, dust, or other offensive effects on the surrounding area, together with such other uses as may be necessary to and compatible with light industrial surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Business services (73)
- b. Communications - including telecommunication towers - subject to the standards of Section 7.10.23 (48)
- c. Construction services:
 - (1) Building construction - general contractors (15)
 - (2) Other construction - general contractors (16)
 - (3) Construction - special trade contractors (17)
- d. Engineering, architectural and surveying services (871)
- e. Commercial fishing (091)
- f. Laundry, cleaning & garment services (721)
- g. Local & suburban transit (41)
- h. Manufacturing:
 - (1) Food and kindred products (20)
 - (2) Tobacco products (21)
 - (3) Textile mill products (22)
 - (4) Apparel & other finished products (23)
 - (5) Furniture & fixtures (25)
 - (6) Printing, publishing and allied industries (27)
 - (7) Drugs (283)
 - (8) Leather & leather products (31)
 - (9) Glass:
 - (a) Flat glass (321)
 - (b) Glass & glassware - pressed or blown (322)
 - (c) Glass products - made of purchased glass (323)
 - (10) Fabricated metal prod. - except machinery & transport. equip.:
 - (a) Metal cans & shipping containers (341)
 - (b) Cutlery, handtools & general hardware (342)
 - (c) Heating equipment, except electric and warm air, and plumbing fixtures (343)
 - (d) Fabricated structural metal products (344)
 - (e) Coating, engraving & allied services (347)
 - (f) Miscellaneous fabricated metal products -
 - (1) Wire products (3495)
 - (2) Misc. fabricated wire products (3496)
 - (3) Metal foil & leaf (3497)
 - (4) Fabricated metal products - NEC (3499)
 - (11) Industrial/commercial machinery & computer equipment:
 - (a) Metalworking machinery & equipment (354)

- (b) Special industry machinery, except metalworking machinery (355)
- (c) General industrial machinery & equipment (356)
- (d) Computers & office equipment (357)
- (12) Electronic & other electrical equipment and components, except computer equipment:
 - (a) Household appliances (363)
 - (b) Electric lighting & wiring equipment (364)
 - (c) Household audio & video equipment (365)
 - (d) Communications equipment (366)
 - (e) Electronic components & accessories (367)
 - (f) Misc. electrical machinery equipment & supplies (369)
- (13) Measuring, analyzing and controlling instruments (38)
- (14) Photographic, medical and optical goods (38)
- (15) Watches & clocks (38)
- (16) Misc. manufacturing industries:
 - (a) Jewelry, silverware, and platedware. (391)
 - (b) Musical instruments and parts. (393)
 - (c) Dolls, toys, games & sporting goods (394)
 - (d) Pens, pencils, & other office & artists' materials. (395)
 - (e) Costume jewelry, costume novelties, and notions. (396)
 - (f) Brooms and brushes. (3991)
 - (g) Signs and advertising displays. (3993)
 - (h) Morticians goods. (3995)
 - (i) Manufacturing industries, NEC. (3999)
- (17) Plastic products - fabrication, molding, cutting, extrusion, and injection processing. (308)
- i. Marinas (4493)
- j. Millwork and structural wood members. (243)
- k. Motion pictures (78)
- l. Motor freight transportation & warehousing. (42)
- m. Repair services:
 - (1) Automotive & automotive parking (75)
 - (2) Electrical (762)
 - (3) Watch, clock & jewelry repair (763)
 - (4) Reupholstery & furniture repair (764)
 - (5) Misc. repairs & services (769)
- n. Retail trade:
 - (1) Lumber & other building materials (521)
 - (2) Paint, glass & wallpaper (523)
 - (3) Hardware (525)
 - (4) Nurseries, lawn & garden supplies (526)
 - (5) Mobile home dealers (527)
 - (6) Automotive/boat/RV/motorcycle dealers (55)
 - (7) Gasoline service (55)
 - (8) Furniture & furnishings (57)
- o. Research, development, and testing services. (873)
- p. Ship, boat building & repairing - less than forty-five (45) ft. (373)
- q. Sorting, grading & packaging services - citrus/vegetables (8723)
- r. Vocational Schools (824)
- s. Wholesale trade - durable goods:

- (1) Motor vehicle and automotive equipment. (501)
- (2) Furniture and home furnishings. (502)
- (3) Lumber and other building materials. (503)
- (4) Professional & commercial equipment/supplies. (504)
- (5) Metals & minerals except petroleum. (505)
- (6) Electrical goods. (506)
- (7) Hardware, plumbing and heating equipment, and supplies. (507)
- (8) Machinery, equipment, and supplies. (508)
- (9) Misc. durable goods:
 - (a) Sporting and recreational goods (5091)
 - (b) Toys & hobby goods (5092)
 - (c) Jewelry, watches, precious stones & metals. (5094)
 - (d) Durable goods NEC (5099)
- t. Wholesale trade - nondurable goods:
 - (1) Paper and paper products. (511)
 - (2) Drugs (512)
 - (3) Dry goods and apparel. (513)
 - (4) Groceries and related products. (514)
 - (5) Farm products - raw materials. (515)
 - (6) Chemicals, and allied products. (516)
 - (7) Beer, wine, and distilled alcoholic beverages. (518)
 - (8) Misc. nondurable goods:
 - (a) Farm supplies (5191)
 - (b) Books, periodicals & newspapers (5192)
 - (c) Flowers, nursery stock & florists' supplies (5193)
 - (d) Tobacco/tobacco products (5194)
 - (e) Paints, varnishes & supplies (5198)
 - (f) Nondurable goods, NEC (5199)
- u. Mobile food vendors (999)
- v. Single family detached dwelling units provided that the single family dwelling unit is located on an existing lot or parcel or record, as further defined in this code, that was existing on or before August 1, 1990. (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Offstreet Parking and Loading Requirements

Offstreet parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Airports, landing and takeoff fields - general aviation (4581)
- b. Manufacturing:
 - (1) Cut stone and stone products. (328)
 - (2) Motorcycles, bicycles, and parts. (375)
 - (3) Wood containers, wood buildings and mobile homes. (244/245)
- c. Ship, boat building & repairing (excluding ship or boat salvaging) - Forty-five (45) to one-hundred fifty (150) ft (373)
- d. Wholesale:
 - (1) Petroleum bulk stations and terminals.
- e. Scrap and waste materials - subject to the provisions of Section 7.10.12.A.

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00 and include the following:

- a. Co-generation facilities. (999)
- b. Fueling facilities. (999)
- c. Industrial wastewater disposal. (999)
- d. One detached single-family dwelling or mobile home for on-site security purposes per property. (999)
- e. Retail trade accessory to the primary manufacturing or wholesaling use. (999)

V. IX INDUSTRIAL EXTRACTION

1. Purpose

The purpose of this district is to provide and protect an environment suitable for the extraction of natural resources from the ground, together with such other uses as may be necessary to and compatible with industrial extraction surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Mining and quarrying of nonmetallic minerals, except fuels. (14)
- b. Mobile food vendors. (999)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Detached single-family dwelling unit or mobile home, for on-site security purposes. (999)

W. U UTILITIES

1. Purpose

The purpose of this district is to provide and protect an environment suitable for utilities, transportation, and communication facilities, together with such other uses as may be compatible with utility, transportation, and communication facility surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Air transportation services (451,452)
- b. Agriculture, including farms, groves, and ranches. (01,02)
- c. Communication. (48)
- d. Electric services (491)
- e. Electric transmission rights-of-way. (491)
- f. Gas pipeline rights-of-way. (492)
- g. Gas production and distribution (492)
- h. Industrial wastewater disposal. (999)
- i. Railroad, rapid rail transit, & street railway transportation. (40,41)
- j. Sanitary services (495)
- k. Transportation services (47)
- l. Telecommunication towers - subject to the standards of Section 7.10.23 (999)
- m. Water supply and irrigation systems. (494,497)
- n. Water transportation (44)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Airports. (458)
- b. Electric generation plants. (491)
- c. Gas production plants. (492)
- d. Natural or manufactured gas storage and distribution points. (492)

- e. Protective functions and their related activities. Correctional institutions (9223)
- f. Solid waste disposal. (4953)
- g. Outdoor shooting ranges, providing site plan approval is obtained according to the provisions of Sections 11.02.07 through 11.02.09 and Section 7.10.19 of this Code. (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00 and include the following:

- a. Automobile and truck rental services.
- b. Restaurants. (Including the sale of alcoholic beverages for on premises consumption only.)
(999)

X. L INSTITUTIONAL

1. Purpose

The purpose of this district is to provide and protect an environment suitable for institutional, public, and quasi-public uses, together with such other uses as may be compatible with institutional, public, and quasi-public surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

- a. Community residential homes subject to the provisions of Section 7.10.07. (999)
- b. Family day care homes. (999)
- c. Family residential homes provided that such homes shall not be located within a radius of one thousand (1000) feet of another existing such family residential home and provided that the sponsoring agency or the Department of Health and Rehabilitative Services (HRS) notifies the Board of County Commissioners at the time of home occupancy that the home is licensed by HRS. (999)
- d. Institutional residential homes. (999)
- e. Parks. (999)
- f. Police & fire protection (9221,9224)
- g. Recreational activities. (999)
- h. Religious organizations (866)

3. Lot Size Requirements

Lot size requirements shall be in accordance with Section 7.04.00.

4. Dimensional Regulations

Dimensional requirements shall be in accordance with Section 7.04.00.

5. Off-street Parking and Loading Requirements

Off-street parking and loading requirements are subject to Section 7.06.00.

6. Landscaping Requirements

Landscaping requirements are subject to Section 7.09.00.

7. Conditional Uses

- a. Amphitheaters. (999)
- b. Cemeteries. (6553)
- c. Membership organizations (86)
- d. Correctional institutions. (9223)
- e. Cultural activities and nature exhibitions. (999)
- f. Educational services and facilities (82)
- g. Executive, legislative, and judicial functions. (91,92,93,94,95,96,97)

- h. Fairgrounds. (999)
- i. Funeral and crematory services. (726)
- j. Theaters. (999)
- k. Medical and other health services. (80)
- l. Postal service. (43)
- m. Residential care facilities for serious or habitual juvenile offenders. (999)
- n. Social services (83)
- o. Sporting and recreational camps (7032)
- p. Stadiums, arenas, race tracks (794)
- q. Telecommunication towers - subject to the standards of Section 7.10.23 (999)

8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Drinking places (alcoholic beverages related to civic, social, and fraternal uses). (999)
- b. Restaurants. (Including the sale of alcoholic beverages for on-premises consumption only.) (999)
- c. Funeral and crematory services. (726)
- d. Heliport landing/takeoff pads. (999)
- e. Detached single-family dwelling unit or mobile home, for on-site security purposes. (999)
- f. Residence halls or dormitories. (999)

U. IL INDUSTRIAL, HEAVY

1. Purpose

The purpose of this district is to provide an environment suitable for heavy manufacturing and other activities that may impose undesirable noise, vibration, odor, dust, or other offensive effects on the surrounding area together with such other non-residential uses as may be necessary to and compatible with heavy industrial surroundings. The number in "()" following each identified use corresponds to the SIC code reference described in Section 3.01.02(B). The number 999 applies to a use not defined under the SIC code but may be further defined in Section 2.00.00 of this code.

2. Permitted Uses

Any use permitted in the Industrial Light (IL) zoning district:

- a. Agricultural services (07)
- b. Construction services:
 - (1) Building construction - general contractor (15)
 - (2) Other construction - general contractors (16)
 - (3) Construction - special trade contractors (17)
- c. Docks and boathouses (private). (999)
- d. Engineering services (871)
- e. Manufacturing:
 - (1) Food & kindred products (20)
 - (2) Tobacco products (21)
 - (3) Textile mill products (22)
 - (4) Apparel and other finished products (23)
 - (5) Lumber and wood products, except furniture (24)
 - (6) Furniture and fixtures (25)
 - (7) Printing and publishing and allied industries (27)
 - (8) Chemicals & allied products:
 - (a) Drugs (283)
 - (b) Soap, detergents and cleaning preparations; perfumes, cosmetics and other toilet preparations (284)
 - (c) Agricultural chemicals (287)
 - (9) Rubber & misc. plastic products (30)
 - (10) Leather & leather products (31)
 - (11) Glass
 - (a) Flat glass (321)
 - (b) Glass & glassware - pressed or blown (322)
 - (c) Glass products - made of purchased glass (323)
 - (12) Fabricated metal products (except ammunition and ordnance) (34)
 - (13) Industrial/commercial machinery & computer equipment. (35)
 - (14) Electronic & other electrical equipment and components, except computer equipment. (36)
 - (15) Transportation equipment (37)
 - (16) Measuring, analyzing and controlling instruments (38)
 - (17) Misc. manufacturing industries:
 - (a) Jewelry, silverware, and platedware. (391)
 - (b) Musical instruments and parts. (393)

- (c) Dolls, toys, games & sporting goods (394)
- (d) Pens, pencils & other office & artists' materials. (395)
- (e) Costume jewelry, costume novelties, and notions. (396)
- (f) Brooms and brushes. (3991)
- (g) Signs and advertising displays. (3993)
- (h) Morticians goods. (3995)
- (i) Manufacturing industries, NIC. (3999)
- (18) Paper and allied products:
 - (a) Paperboard containers & boxes (265)
 - (b) Converted paper & paperboard products (267)
- f. Local & suburban transit (41)
- g. Water transportation. (44)
- h. Transportation services. (47)
- i. Communications. (48)
- j. Motor freight transportation & warehousing. (42)
- k. Motion pictures. (78)
- l. Membership organizations (86)
- m. Personal & business services. (72)
- n. Research, development, and testing services. (873)
- o. Repair services:
 - (1) Automotive & automotive parking (75)
 - (2) Electrical (762)
 - (3) Watch, clock & jewelry repair (763)
 - (4) Reupholstery & furniture repair (764)
 - (5) Misc. repairs & services (769)
- p. Retail trade:
 - (1) Lumber & other building materials (521)
 - (2) Paint, glass & wallpaper (523)
 - (3) Hardware (525)
 - (4) Nurseries, lawn & garden supplies (526)
 - (5) Mobile home dealers (527)
 - (6) Automotive/boat/RV/motorcycle dealers (55)
 - (7) Gasoline service (55)
 - (8) Furniture & furnishings (57)
- q. Telecommunication towers - subject to the standards of Section 7.10.23 (999)
- r. Wholesale trade - durable goods:
 - (1) Motor vehicle and automotive equipment. (501)
 - (2) Furniture and home furnishings. (502)
 - (3) Lumber and other building materials. (503)
 - (4) Professional & commercial equipment/supplies. (504)
 - (5) Metals & minerals, except petroleum. (505)
 - (6) Electrical goods. (506)
 - (7) Hardware, plumbing and heating equipment, and supplies. (507)
 - (8) Machinery, equipment, and supplies. (508)
 - (9) Misc. Durable goods:
 - (a) Sporting and recreational goods (5091)
 - (b) Toys & hobby goods (5092)
 - (c) Jewelry, watches, precious stones & metals. (5094)
 - (d) Durable goods NEC (5099)
- s. Wholesale trade - nondurable goods:

- (1) Paper and paper products. (511)
 - (2) Drugs (512)
 - (3) Dry goods and apparel. (513)
 - (4) Groceries and related products. (514)
 - (5) Farm products - raw materials. (515)
 - (6) Chemicals, and allied products. (516)
 - (7) Beer, wine, and distilled alcoholic beverages. (518)
 - (8) Misc. Nondurable Goods:
 - (a) Farm supplies (5191)
 - (b) Books, periodicals, & newspapers (5192)
 - (c) Flowers, nursery stock & florists' supplies (5193)
 - (d) Tobacco/tobacco products (5194)
 - (e) Paints, varnishes & supplies (5198)
 - (f) Nondurable goods, NEC (5199)
- t. Mobile food vendors (999)
3. Lot Size Requirements
- Lot size requirements shall be in accordance with Section 7.04.00.
4. Dimensional Regulations
- Dimensional requirements shall be in accordance with Section 7.04.00.
5. Offstreet Parking and Loading Requirements
- Offstreet parking and loading requirements are subject to Section 7.06.00.
6. Landscaping Requirements
- Landscaping requirements are subject to Section 7.09.00.
7. Conditional Uses
- a. Airport, landing and takeoff fields - general aviation. (4581)
 - b. Manufacturing:
 - (1) Paper & allied products (26)
 - (2) Chemicals & allied products (28)
 - (3) Petroleum refining & related products (29)
 - (4) Stone, clay, glass & concrete products (32)
 - (5) Primary metal industries (33)
 - (6) Ammunition & ordinance (348)
 - c. Natural or manufactured gas storage and distribution points. (492)
 - d. Scrap and waste materials - subject to the provisions of Section 7.10.12(B).
 - e. Warehousing and storage services - stockyards. (999)
 - f. Wholesale trade - nondurable goods:
 - (1) Petroleum & petroleum products (999)
8. Accessory Uses

Accessory uses are subject to the requirements of Section 8.00.00, and include the following:

- a. Co-generation facilities. ⁽⁹⁹⁹⁾
- b. Fueling facilities. ⁽⁹⁹⁹⁾
- c. Industrial wastewater disposal. ⁽⁹⁹⁹⁾
- d. One detached single-family dwelling or mobile home, for on-site security purposes per property. ⁽⁹⁹⁹⁾
- e. Retail:
 - (1) Bottled gas. ⁽⁹⁹⁹⁾
 - (2) Fuel oil. ⁽⁹⁹⁹⁾
 - (3) Gasoline service stations. ⁽⁹⁹⁹⁾
 - (4) Retail trade accessory to the primary manufacturing or wholesaling use. ⁽⁹⁹⁹⁾

CHAPTER VII

DEVELOPMENT DESIGN AND IMPROVEMENT STANDARDS

7.00.00 GENERAL PROVISIONS

7.00.01 PURPOSE

The purpose of this Chapter is to provide development design and improvement standards applicable to development activity in the unincorporated area of the County.

7.01.00 PLANNED UNIT DEVELOPMENT

7.01.01 PURPOSE

The Planned Unit Development (PUD) District is intended to achieve residential land development of superior quality through the encouragement of flexibility and creativity in design options that:

- A. permit creative approaches to the development of residential land reflecting changes in the technology of land development;
- B. allow for the efficient use of land, which can result in smaller networks of utilities and streets and thereby lower development costs;
- C. allow design options that encourage an environment of stable character, compatible with surrounding land uses; and
- D. permit the enhancement of neighborhoods through the preservation of natural features, the provision of underground utilities, and the provision of recreation areas and open space.

7.01.02 PERMITTED USES

Any use permitted in the Agricultural-1 (AG-1); Agricultural-2.5 (AG-2.5); Agricultural-5 (AG-5); Residential/Conservation (RC); Residential, Estate-1 (RE-1); Residential, Estate-2 (RE-2); Residential, Single-Family-2 (RS-2); Residential, Single-Family-3 (RS-3); Residential, Single-Family-4 (RS-4); Residential, Multiple-Family-5 (RM-5); Residential, Mobile Home-5 (RMH-5); Residential, Multiple-Family-7 (RM-7); Residential, Multiple-Family-9 (RM-9); Residential, Multiple-Family-11 (RM-11); and Residential, Multiple-Family-15 (RM-15) zoning districts of this Code may be permitted in a Planned Unit Development District for a variety of residential densities. Uses of the types permitted in the Commercial, Neighborhood (CN) District are also permitted up to an amount not to exceed three (3) percent of the gross area of the Planned Unit Development. In addition, playgrounds, public and non-public parks, golf courses, country clubs, bicycle paths, racquet sports facilities, riding stables, marinas, clubhouses, and lodges may be permitted in a Planned Unit Development District.

7.01.03 STANDARDS AND REQUIREMENTS

Standards and requirements for a Planned Unit Development shall be as follows:

A. MINIMUM SIZE

A Planned Unit Development shall be a minimum of ten (10) contiguous acres of land under common ownership or control.

B. DENSITY

The maximum possible permitted density of a Planned Unit Development shall not exceed the density reflected in the Future Land Use Maps of the Comprehensive Plan. On North and South Hutchinson Island, the provisions of Section 3.01.03(AA)(8) shall govern.

C. AREA, YARD, AND HEIGHT REQUIREMENTS

Area, yard, and height requirements shall be determined at the time of Preliminary and Final Development Plan approval, except that for any structure on North or South Hutchinson Island that has not been occupied, constructed, or has not received a building permit, site plan or other County development approval as a permitted use prior to January 10, 1995 the requirements of Section 4.01.00, Hutchinson Island - Building Height Overlay Zone shall apply.

D. PUBLIC FACILITIES

1. The Planned Unit Development shall be designed and located so there will be no net public cost for the provision of water lines, sewage lines, storm and surface drainage systems, and other utility systems.
2. The minimum size of all water mains used, or intended for use, in fire protection activities is six (6") inches. Actual water main requirements will be determined by the St. Lucie County-Ft. Pierce Fire Prevention Bureau.
3. The minimum size of all water mains used, or intended for use, in fire protection activities, that are located on a dead-end water main is eight (8") inches. Actual water main requirements will be determined by the St. Lucie County-Ft. Pierce Fire Prevention Bureau.

The maximum number of fire hydrants that may be located on any dead end water main is one (1).

4. Fire hydrants shall be provided at a minimum spacing of one every six hundred (600) feet unless otherwise approved by the St. Lucie County-Ft. Pierce Fire Prevention Bureau.

E. TRAFFIC AND PEDESTRIAN CIRCULATION

1. Every dwelling unit, or other use permitted in the Planned Unit Development shall have

access to a public street either directly or through an approved private road, a pedestrian way, or other area dedicated to public or private use.

2. Principal vehicular access points shall be designed to permit smooth traffic flow with controlled turning movement and minimum hazards to vehicular or pedestrian traffic. Minor streets within the Planned Unit Development shall not be connected to streets outside the development so as to encourage their use by through traffic.
3. The proposed Planned Unit Development shall be designed so that it will not create traffic congestion on the arterial and collector roads surrounding the project, or such surrounding collector or arterial roads shall be improved so that they will not be adversely affected.
4. All non-residential land uses within the Planned Unit Development shall have direct access to a collector or arterial street without creating traffic hazards or congestion on any street.
5. Streets in a Planned Unit Development may be dedicated to public use or retained under private ownership. Said streets and associated improvements shall comply with all pertinent County regulations and ordinances.
6. All roads and streets shall intersect at an approximate $\pm 5^\circ$ angle of ninety degrees (90°) unless circumstances acceptable to St. Lucie County indicate a need for a lesser angle of intersection.
7. Street jogs or centerline offsets between any local street or road with another local street or road, shall be no less than one hundred fifty feet (150).
8. The intersection of any two local roads or streets with a Major Collector or Arterial Roadway shall be separated by a minimum distance of six hundred sixty feet (660), as measured from centerline to centerline.
9. Permanent dead-end streets shall not exceed one thousand feet (1000) in length. Cul-de-sacs shall be provided at the end of all dead end roads or streets greater than five hundred and one (501) feet in length. The length of a dead-end street shall be measured along the centerline of the street from the its point of perpendicular intersection with the centerline of intersecting street to the end of the dead-end street or roadway. All cul-de-sacs shall have a minimum right-of-way diameter of one hundred (100) feet.

If the dead end roadway is five hundred (500) feet or less in length, a "Y" or "T" type of turn around may be approved.

If a dead end street is temporary in nature then a temporary cul-de-sac shall be required until the roadway is connected to another street or road.

In the center of the cul-de-sac an unpaved island, surrounded by a curb, improved with grass and landscaping that will not interfere with sight distance, may be provided. Center islands shall have a diameter of not less than seventeen (17) feet, unless otherwise approved

through the review of the Planned Unit Development.

10. All roadways, exclusive of interior parking and access aisles areas, regardless of ownership, shall be located a minimum of ten (10) feet from any exterior building walls, except for security gate houses or similar security structures located in a private street or road right-of-way.
11. Any pedestrian circulation system and its related walkways shall be insulated from the vehicular street system. This shall include, when deemed to be necessary by the Board of County Commissioners, pedestrian underpasses or overpasses in the vicinity of playgrounds and other recreation areas, local shopping areas, and other neighborhood uses which generate a considerable amount of pedestrian traffic.
12. Access points on all collector or arterial streets serving a Planned Unit Development shall be located and spaced so that traffic moving into and out of the arterial streets do not cause traffic congestion.

F. PARKING AND LOADING

1. General Provisions

- a. The number, type, and location of parking spaces shall be determined at the time of final Planned Unit Development plan approval. The determination of the number of spaces required shall be based on Section 7.06.01(F) of this Code. The number of parking spaces required by this section may be reduced based on substantial competent evidence that the reduced number of spaces is adequate for the proposed use or that parking may be shared by proximate uses that operate at different times or on different days.
- b. Reserved parking spaces may be provided, in lieu of paved spaces, subject to Section 7.06.02(C) of this Code.

2. Off Street Parking and Loading

Off-street parking and loading requirements are governed by Sections 7.06.02 and 7.06.03 of this Code, and the following standards:

- a. Off-street parking and loading areas shall be designed to provide travelways between adjacent uses while discouraging through traffic.
- b. Off-street parking and loading areas shall be screened from adjacent roads and pedestrian walkways with hedges, dense planting, or changes in grades or walls.

3. On Street Parking

In Planned Unit Developments, on street parking may be used so long as the road on which

the on-street parking is proposed lies entirely within the limits of the defined Planned Unit Development and such parking would not contravene any other provision of this Code or the St. Lucie County Code of Ordinances. Where such on street parking and loading is used, it shall be consistent with the following design standards:

a. The minimum size of a parking stall shall be as follows:

parallel	8 feet X 23 feet
angled	10 feet X 18 feet
handicapped(parallel)	12 feet X 23 feet
handicapped(angled)	12 feet X 18 feet

b. Handicapped parking spaces shall be appropriately marked.

c. Access for emergency fire vehicles shall be in accordance with NFPA standards.

d. No more than fifteen (15) parking spaces shall be permitted in a continuous row without being interrupted by a minimum landscape area of 360 square feet.

G. LIGHTING

All lighting facilities shall be arranged in such a manner so as to prevent direct glare or hazardous interference of any kind to adjoining streets or properties.

H. LANDSCAPING AND NATURAL FEATURES

1. Native trees and vegetation and other natural features shall be preserved to the extent practicable.
2. All sensitive environmental vegetation, trees and areas shall be preserved to the extent practicable.
3. Landscaping for off-street parking and loading areas shall meet the minimum requirements of Section 7.09.00.

I. OPEN SPACE STANDARDS

1. A minimum of thirty-five (35) percent of the gross area of land to be committed to a Planned Unit Development must be for use as parks, recreation areas, marinas, swimming beaches, open space, planting, or other public purposes other than rights-of-way, above ground utilities, and parking areas.

Of the required 35 percent open space, a minimum of 15 percent of any remaining native habitat on the property, is to be preserved in its natural condition. For each acre of preserved native habitat above the required minimum 15 percent that is preserved in its original state, credit shall be given at a rate of 150 percent per acre towards the remaining open space

requirement.

Areas that are floodways, lakes, wetlands, and stormwater retention areas may be applied to satisfy the total open space requirement as to the availability of and provision of such open space, which may consist of:

- a. Advance dedication of all such open space as a prior condition of Planned Unit Development approval;
 - b. Conveying the land to a public agency that will, upon acceptance, agree to maintain the common open space and any buildings, structures or improvements that have been placed on it.
2. No such parcel of land dedicated for open space shall be less than one (1) contiguous acre, and all such areas shall be physically part of the Planned Unit Development. Open space provided to meet other requirements shall not be considered as meeting this open space requirement.

J. SETBACKS FROM AGRICULTURAL LAND

Planned Unit Developments adjacent to land used for agricultural purposes, or designated for agricultural use on the Future Land Use Map of the St. Lucie County Comprehensive Plan, shall provide setbacks from the agricultural land sufficient to protect the function and operation of those uses from the encroachment of Urban activities or uses.

K. PHASING

1. A Planned Unit Development may be developed in more than one stage or phase.
2. If a Final Development Site Plan approved by the Board of County Commissioners is to be developed in stages or phases, each successive phase shall be constructed and developed in a reasonably continuous fashion. No more than two (2) years shall elapse between the completion of any stage or phase, and the final stage or phase shall be completed within ten (10) years of the date of Final Development Site Plan approval. Extensions of the above requirements are subject to approval by the Board of County Commissioners. Unless otherwise amended by the Board of County Commissioners through the Final Development Site Plan review process, the following sequence of development must be adhered to:
 - a. One or more major recreation facilities and other major amenities, planned to serve the entire development, shall be completed or adequate security posted prior to the issuance of building or mobile home permits of more than forty (40) percent, or other percentage as determined by the Board to be appropriate based on circumstances that include the size of the project and the proposed phasing schedule, of the total number of authorized dwelling units. Recreation facilities or facilities and other amenities planned to serve one (1) phase of a multi-phased development shall be completed or appropriate security posted prior to issuance of building or mobile

home permits or the recording of any final plat within that phase.

- b. No commercial facility shall be permitted prior to the completion of at least forty (40) percent of the total number of authorized dwelling units; and,
- c. For Planned Unit Developments to be constructed in stages or phases, the net density of an individual stage or phase may vary from the approved Final Site Plan subject to the requirements in Section 11.02.05.

7.02.00 PLANNED NON-RESIDENTIAL DEVELOPMENT

7.02.01 PURPOSE

The Planned Non-Residential Development (PNRD) District is intended to achieve non-residential land development of superior quality through the encouragement of flexibility and creativity in design options that:

- A. Permit creative approaches to the development of non-residential land reflecting changes in the technology of land development;
- B. Allow for the efficient use of land, which can result in smaller networks of utilities and streets and thereby lower development costs;
- C. Allow design options that encourage an environment of stable character, compatible with surrounding land uses; and
- D. Permit the enhancement of neighborhoods through the preservation of natural features, the provision of underground utilities, and the provision of recreation areas and open space.

7.02.02 PERMITTED USES

The following general guidelines shall be used in determining the permitted use possibilities in any Planned Nonresidential Zoning Development:

- A. For properties located in any Residential or Agricultural classified land use area:

Any permitted, conditional or accessory use, including any standards, conditions and requirements for those uses, as identified in the Commercial, Neighborhood (CN); Commercial, Office (CO); Institutional (I) Zoning Districts, and in the Agricultural land use classified areas only, any non-residential permitted or accessory use identified in the Agriculture-1 (AG-1), Agricultural-2.5 (AG-2.5), or Agricultural-5 (AG-5) zoning districts of this Code.

The general standards, conditions and requirements, as found in this Code, that pertain to conditional and accessory uses shall be used in the determination of the compatibility of the proposed use(s) with the surrounding land uses in the review of the Planned Nonresidential Development. All applications for Planned Nonresidential Development shall include a complete identification of all planned uses and activities.

- B. For properties located in any Commercial or Industrial classified land use area:

Any permitted, conditional or accessory use, including any standards, conditions and requirements for those uses, as identified in the Commercial, Neighborhood (CN); Commercial, Office (CO); Commercial, General (CG); Industrial Light (IL); Industrial Heavy (IH), Utility (U) and (I) Institutional zoning districts, and any non-residential permitted or accessory use identified in the Agriculture-1 (AG-1), Agricultural-2.5 (AG-2.5), or Agricultural-5 (AG-5) zoning districts of this Code.

The general standards, conditions and requirements, as found in this Code, that pertain to conditional and accessory uses shall be used in the determination of the compatibility of the proposed use(s) with the surrounding land uses in the review of the Planned Nonresidential Development. All applications for Planned Nonresidential Development shall include a complete identification of all planned uses and activities.

7.02.03 STANDARDS AND REQUIREMENTS

Standards and requirements for a Planned Non-Residential Development shall be as follows:

A. MINIMUM SIZE

The minimum lot size requirements for a Planned Non-Residential Development shall be as follows:

1. Any Planned Non-Residential Development in a Residential Land Use classification shall comply with the minimum lot requirements in the Commercial Neighborhood (CN) Zoning District.
2. Any Planned Non-Residential Development in a Commercial, Industrial or Mixed Use Land Use classification shall comply with the minimum lot requirements in the Commercial General (CG) Zoning District.
3. All Planned Non-Residential Development shall be under common ownership or control.

B. DIMENSIONAL REQUIREMENTS

Dimensional requirements shall be in accordance with Table 7.10 in Section 7.04.01, provided, however, that the Board of County Commissioners may condition approval of a Planned Non-Residential Development upon compliance with more stringent or restrictive dimensional requirements in order to ensure compatibility with surrounding land uses, to mitigate impact on the environment and natural resources, to ensure public safety and to ensure compliance with the St. Lucie County Comprehensive Plan; and,

any structure on North or South Hutchinson Island that has not been occupied, constructed, or has not received a building permit, site plan or other County development approval as a permitted use prior to January 10, 1995, the requirements of Section 4.01.00, Hutchinson Island - Building Height Overlay Zone shall apply.

C. PUBLIC FACILITIES

1. The Planned Non-Residential Development shall be designed and located so there will be no net public cost for the provision of water lines, sewage lines, storm and surface drainage systems, and other utility systems in order to ensure compatibility with surrounding land uses, to mitigate impact on the environment and natural resources, to ensure public safety and to ensure compliance with the St. Lucie County Comprehensive Plan.

2. The minimum size of all water mains used, or intended for use, in fire protection activities is six (6") inches. Actual water main requirements will be determined by the St. Lucie County-Ft. Pierce Fire Prevention Bureau.
3. The minimum size of all water mains used, or intended for use, in fire protection activities, that are located on a dead-end water main is eight (8") inches. Actual water main requirements will be determined by the St. Lucie County-Ft. Pierce Fire Prevention Bureau.

The maximum number of fire hydrants that may be located on any dead end water main is one (1).

4. Fire hydrants shall be provided at a minimum spacing of one every six hundred (600) feet unless otherwise approved by the St. Lucie County-Ft. Pierce Fire Prevention Bureau.

D. TRAFFIC AND PEDESTRIAN CIRCULATION

1. Every use permitted in a Planned Non-Residential Development shall have access to a public street either directly or through an approved private road, vehicular accessway, a pedestrian way, or other area dedicated to public or private use.
2. Principal vehicular access points shall be designed to permit smooth traffic flow with controlled turning movement and minimum hazards to vehicular or pedestrian traffic. Minor streets within the Planned Non-Residential Development shall not be connected to streets outside the development so as to encourage their use by through traffic.
3. The proposed Planned Non-Residential Development shall be designed so that it will not create traffic congestion on the arterial and collector roads surrounding the project, or such surrounding collector or arterial roads shall be improved so that they will not be adversely affected.
4. Streets in a Planned Non-Residential Development may be dedicated to public use or retained under private ownership. Said streets and associated improvements shall comply with all pertinent County regulations and ordinances.
5. Any pedestrian circulation system and its related walkways shall be insulated from the vehicular street system.
6. All roads and streets shall intersect at an approximate $\pm 5^\circ$ angle of ninety degrees (90°) unless circumstances acceptable to St. Lucie County indicate a need for a lesser angle of intersection.
7. Street jogs or centerline offsets between any local street or road with another local street or road, shall be no less than one hundred fifty feet (150).
8. The intersection of any two local roads or streets with a Major Collector or Arterial Roadway shall be separated by a minimum distance of six hundred sixty feet (660), as measured from

centerline to centerline.

9. Permanent dead-end streets shall not exceed one thousand feet (1000) in length. Cul-de-sacs shall be provided at the end of all dead end roads or streets greater than five hundred and one (501) feet in length. The length of a dead-end street shall be measured along the centerline of the street from the its point of perpendicular intersection with the centerline of intersecting street to the end of the dead-end street or roadway. All cul-de-sacs shall have a minimum right-of-way diameter of one hundred (100) feet.

If the dead end roadway is five hundred (500) feet or less in length, a "Y" or "T" type of turn around may be approved.

If a dead end street is temporary in nature then a temporary cul-de-sac shall be required until the roadway is connected to another street or road.

In the center of the cul-de-sac an unpaved island, surrounded by a curb, improved with grass and landscaping that will not interfere with sight distance, may be provided. Center islands shall have a diameter of not less than seventeen (17) feet, unless otherwise approved through the review of the Planned Unit Development.

10. All roadways, exclusive of interior parking and access aisles areas, regardless of ownership, shall be located a minimum of ten (10) feet from any exterior building walls, except for security gate houses or similar security structures located in a private street or road right-of-way.
11. Access points on all collector or arterial streets serving a Planned Non-Residential Development shall be located and spaced so that traffic moving into and out of the arterial streets does not cause traffic congestion.

E. PARKING AND LOADING

1. General Provisions

- a. The number, type, and location of parking spaces shall be determined at the time of final Planned Nonresidential Development plan approval. The determination of the number of spaces required shall be based on Section 7.06.02 of this Code. The number of parking spaces required by this section may be reduced based on substantial competent evidence that the reduced number of spaces is adequate for the proposed use or that parking may be shared by proximate uses that operate at different times or on different days.
- b. Reserved parking spaces may be provided, in lieu of paved spaces, subject to Section 7.06.02(B)(4) of this Code.

2. Off Street Parking and Loading

Off-street parking and loading requirements are governed by Sections 7.06.02 and 7.06.03 of this Code, and the following standards:

- a. Off-street parking and loading areas shall be designed to provide travelways between adjacent uses while discouraging through traffic.
- b. Off-street parking and loading areas shall be screened from adjacent roads and pedestrian walkways with hedges, dense planting, or changes in grades or walls.

3. On Street Parking

In Planned Non-Residential Developments, on street parking may be used so long as the road on which the on-street parking is proposed lies entirely within the limits of the defined Planned Nonresidential Development and such parking would not contravene any other provision of this Code or the St. Lucie County Code of Ordinances. Where such on street parking and loading is used, it shall be consistent with the following design standards:

- a. The minimum size of a parking stall shall be as follows:

parallel	8 feet X 23 feet
angled	10 feet X 18 feet
handicapped (parallel)	12 feet X 23 feet
handicapped (angled)	12 feet X 18 feet
- b. Handicapped parking spaces shall be appropriately marked.
- c. Access for emergency fire vehicles shall be in accordance with NFPA standards.
- d. No more than fifteen (15) parking spaces shall be permitted in a continuous row without being interrupted by a minimum landscape area of 360 square feet.

F. LIGHTING

All lighting facilities shall be arranged in such a manner so as to prevent direct glare or hazardous interference of any kind to adjoining streets or properties.

G. LANDSCAPING AND NATURAL FEATURES

1. Native trees and vegetation and other natural features shall be preserved to the extent practicable.
2. All sensitive environmental vegetation, trees and areas shall be preserved to the extent practicable.
3. Landscaping for off-street parking and loading areas shall meet the minimum requirements of Section 7.09.00.

H. OPEN SPACE STANDARDS

1. For development projects of less than ten (10) acres, a minimum of twenty (20) percent of the gross area of land to be committed to a Planned Non-Residential Development must be for use as parks, recreation areas, marinas, swimming beaches, open space, planting, or other public purposes other than rights-of-way, utility easements, and parking areas.

For development projects of ten (10) acres or more, a minimum of thirty-five (35) percent of the gross area of land to be committed to a Planned Non-Residential Development must be for use as parks, recreation areas, marinas, swimming beaches, open space, planting, or other public purposes other than rights-of-way, utility easements, and parking areas.

At the request of the developer, and subject to the approval of the Board of County Commissioners, use of recreational facilities may be offered to the general public.

Of the required open space, a minimum of fifteen (15) percent of any remaining native habitat on the property is to be preserved in its natural condition. For each acre of preserved native habitat above the required minimum 15 percent that is preserved in its original state, credit shall be given at a rate of 150 percent per acre towards the remaining open space requirement.

Areas that are floodways, lakes, wetlands, and stormwater retention areas may be applied to satisfy the total open space requirement.

2. All land dedicated for open space shall be physically part of the Planned Non-Residential Development.

I. PHASING

1. A Planned Non-Residential Development may be developed in more than one (1) stage or phase.
2. If a Final Development Plan approved by the Board of County Commissioners is to be developed in stages or phases, each successive phase shall be constructed and developed in a reasonably continuous fashion. The final stage or phase shall be completed within ten (10) years of the date of final development plan approval. Any extension of the above requirement is subject to approval by the Board of County Commissioners unless otherwise amended by the Board of County Commissioners.

J. SIGNS

1. Signs within any Planned Non-Residential Development located in a Residential or Agriculturally classified land use area shall comply with the provisions of Chapter 9 applicable to the Commercial Neighborhood (CN) Zoning District; provided, however, that the Board of County Commissioners may condition approval of a Planned Non-Residential Development upon compliance with more stringent sign regulations in order to ensure design consistency

throughout the proposed development, to ensure compatibility with surrounding land uses, to ensure public safety and prevent public harm, and to ensure compliance with the St. Lucie County Comprehensive Plan.

2. Signs within any Planned Non-Residential Development located in a commercially or industrially classified Land Use Area shall comply with the provisions of Chapter 9 applicable in the Commercial General (CG), Zoning District; provided, however, that the Board of County Commissioners may condition approval of a Planned Non-Residential Development upon compliance with more stringent sign regulations in order to ensure design consistency throughout the proposed development, to ensure compatibility with surrounding land uses, to ensure public safety and prevent public harm, and to ensure compliance with the St. Lucie County Comprehensive Plan.

APPENDIX 10.3

LAND USE PLAN DESCRIPTIONS

10.3 LAND USE PLAN DESCRIPTIONS

Appendix 10.3 contains relevant excerpts from the Future Land Use Element of the Indian River County and St. Lucie comprehensive plans, including an overview of the Future Land Use Element and a description of the future land use categories for the Project Site and the natural gas transmission corridor. Appendix 10.2 included a review of the consistency of the Project with elements of the Indian River Comprehensive Plan.



Indian River County 2020 Comprehensive Plan

Chapter 2

Future Land Use Element

**Indian River County Community Development Department
Adopted: March 17, 1998**

INTRODUCTION

The Future Land Use Element defines the physical plan for the future development of Indian River County. This element designates the appropriate location for future land uses and sets forth the policies regulating the location and development of all land uses. These policies are not just limited to the density and intensity of appropriate land uses, but also address other land use development factors including timing, cost and current development trends.

Like the other elements of the Comprehensive Plan, the Future Land Use Element is a significant planning document capable of standing on its own merits. The Future Land Use Element is, however, the keystone of the Comprehensive Plan and, as such, must be consistent with all other elements and must incorporate the goals, objectives and policies of these other elements into the specific land use policies.

Included in this element are the Existing Land Use Map which describes the location and distribution of land uses in Indian River County in 1995 and the Future Land Use Map which indicates the proposed location and distribution of land uses in the year 2020. All policies contained in the Comprehensive Plan must be consistent with the Future Land Use Map, and all land development regulations in effect subsequent to the adoption of this plan must also be consistent with the Future Land Use Map. Indian River County's land development regulations shall rely on the map for their rational basis.

The scope of this element is the unincorporated land of Indian River County. Land uses within the municipalities of the County will not be governed by this plan; however, because of the influence of the municipalities on surrounding areas and, vice versa, some mention must be made of these uses. Likewise, adjacent land uses in surrounding counties are also included.

Policy 1.2: Indian River County hereby adopts the following land use designations to be depicted on the Future Land Use Map:

- C-1, Conservation-1 (zero density)
- C-2, Conservation-2 (up to 1 unit/40 acres)
- C-3, Conservation-3 (up to 1 unit/2½ acres)
- AG-1, Agriculture-1 (up to 1 unit/5 acres)
- AG-2, Agriculture-2 (up to 1 unit/10 acres)
- AG-3, Agriculture-3 (up to 1 unit/20 acres)
- R, Rural Residential (up to 1 unit/acre)
- L-1, Low-Density Residential-1 (up to 3 units/acre)
- L-2, Low-Density Residential-2 (up to 6 units/acre)
- M-1, Medium-Density Residential-1 (up to 8 units/acre)
- M-2, Medium-Density Residential-2 (up to 10 unit/acre)
- BCID, Blue Cypress Improvement District (up to 10 unit/acre)
- C/I, Commercial/Industrial
- RC, Regional Commercial
- PUB, Public Facilities
- REC, Recreation
- Mixed Use (floating land use designation; not depicted on the future land use map)

Policy 1.3: Indian River County shall maintain, periodically review, and revise if necessary, its various zoning districts (including special districts) and overlay districts as may be warranted to ensure the implementation of the comprehensive plan. The zoning districts shall be based on the comprehensive plan and shall directly govern specific land uses, lot area, building type, and size and dimension criteria.

Additionally, Indian River County shall maintain, periodically review, revise if necessary, and enforce land development regulations. Those land development regulations shall be the primary mechanism through which the county shall implement the Comprehensive Plan. The criteria and standards established in the various elements of the comprehensive plan shall be the basis for the land development regulations. Those regulations shall include, but not be limited to, provisions for:

- The use of land and water consistent with the Future Land Use Map and the Comprehensive Plan;
- The subdivision of land;
- The use of areas subject to periodic flooding and the provision of adequate drainage and stormwater protection;
- The protection of potable water wellfields;
- The protection of environmentally sensitive lands;
- The regulation of signage, landscaping and other aesthetic controls;
- The provision of safe on-site and off-site traffic circulation and adequate parking;
- The review of all development applications and modifications to ensure that all provisions of the Comprehensive Plan are enforced.

his agent at the time of application for any development permit (other than a comprehensive plan amendment or rezoning).

The county environmental planning staff shall not make its determination of importance or sensitivity until after consultation with all appropriate local, state and federal agencies. Such consultation shall be ongoing, as required for proper coordination, throughout the land development permit approval process.

Policy 1.8: C-2 and C-3 designated lands shall be considered for public acquisition.

Policy 1.9: The Agricultural Land Use designations shall be applied to those areas of the county that have been traditionally used for agricultural purposes and are sufficiently removed from urban areas. The Agricultural Land Use categories will ensure the continuation of the agriculture industry, protect agricultural lands from urban encroachment, and provide valuable green and open space.

Policy 1.10: Development of agriculturally designated lands shall be limited to the following:

Agricultural Uses such as Farming, Groves, Range and Livestock Activities and Forestry

Excavation Activities

Residential Uses

up to 1 unit/5 acres in AG-1 designated areas

up to 1 unit/10 acres in AG-2 designated areas

up to 1 unit/20 acres in AG-3 designated areas

Agricultural Research Uses

Agriculturally Related Businesses

Recreational Uses

Public Facilities

Institutional Uses

Public Schools (Public schools shall be permitted on agriculturally designated lands only within mixed use projects and traditional neighborhood design projects, or on sites located outside of, but contiguous to, the urban service area boundary.)

Residential development in agriculturally designated areas shall be limited to approved Planned Developments that meet the requirements of Future Land Use Element Policy 5.8. One of those requirements shall be that the county shall require the clustering of residential lots to limit the impact of development on agricultural lands. The following activities shall be exempt from the requirements of this policy:

- Construction of one single-family dwelling unit on a tract or parcel existing on October 1, 1990;

- Division of a tract or parcel into two lots, each meeting or exceeding the minimum lot size of the agricultural zoning district; any subsequent split of either resulting lot shall require approval as a PD project.
- Division of a tract into parcels of at least 40 acres in size.

Policy 1.11: The Low-Density Residential Land Use designations shall be applied to those areas which are suitable for urban and suburban scale development. Except for two areas that are adjacent to the City of Fellsmere, Low-Density Residential designated areas shall be limited to lands that are located within the urban service area and near existing urban centers.

The two exceptions are the L-1 designated Homewood Subdivision generally located along the City of Fellsmere’s south boundary, and the L-2 designated Tropical Village Estates and Morningside Subdivisions located at the southeast corner of CR 512 and 130th Avenue.

Policy 1.12: Development in low-density residential areas shall be limited to the following:

Single-Family Residential Uses

- up to 1 unit/acre in R designated areas
- up to 3 units/acre in L-1 designated areas
- up to 6 units/acre in L-2 designated areas

Multiple-Family Residential Uses

- up to 3 units/acre in L-1 designated areas
- up to 6 units/acre in L-2 designated areas

Recreational Uses

Public Facilities

Institutional Uses

Public Schools

Excavation Activities (in R designated areas only)

Agricultural Uses (as permitted in Future Land Use Policy 6.3)

Policy 1.13: The Medium-Density Residential Land Use designations shall be applied to those areas which are suitable for urban scale development and intensities. Those areas shall be limited to lands that are located within the urban service area and near existing urban centers.

Policy 1.28: The Public Facilities designation shall be applied to land used for public facilities and services including, but not limited, to government offices, service centers, public utilities and transportation facilities, schools, parks, libraries, police and fire stations, dredged spoil disposal, and landfills and related uses such as recycling equipment operations, composting facilities and operations, incineration of solid waste, borrow pit operations for fill material, industrial waste and leachate treatment and management, equipment storage and maintenance, and water and wastewater treatment facilities. Not all public land uses are shown on the Future Land Use Map. Public facilities are not limited to the Public Facilities Land Use designation.

Policy 1.29: The Recreation Land Use designation shall be applied to land used for public parks and recreation facilities. Not all recreation sites are shown on the Future Land Use Map. Public parks and recreation facilities are not limited to this land use designation.

Policy 1.30: The Blue Cypress Improvement District (BCID) is a special land use designation that shall be applied to the existing Blue Cypress Fish Camp on the western shore of Blue Cypress Lake.

Development within this district shall be limited to single-family and mobile home residential uses and conditioned on the provisions outlined in Ordinance 85-55. The BCID is not intended for expansion to adjacent or otherwise undeveloped property. Densities in the BCID shall not exceed 10 units/acre.

Policy 1.31: The county zoning code shall contain provisions for a Professional Office District. That district shall be limited to land that is within the medium- and low-density residential land use designations and is located along arterial roadways. The purpose of this zoning district shall be to encourage infill development and the redevelopment of blighted or declining residential areas which are no longer appropriate for strictly single-family use but are not considered appropriate for a broad range of commercial uses, as permitted in other commercial zoning districts.

Policy 1.32: Indian River County shall regulate the use of land in proximity to large scale public facilities such as airports and landfills in order to protect the facilities from encroachment by non-compatible uses and protect the public from any potentially hazardous impacts.

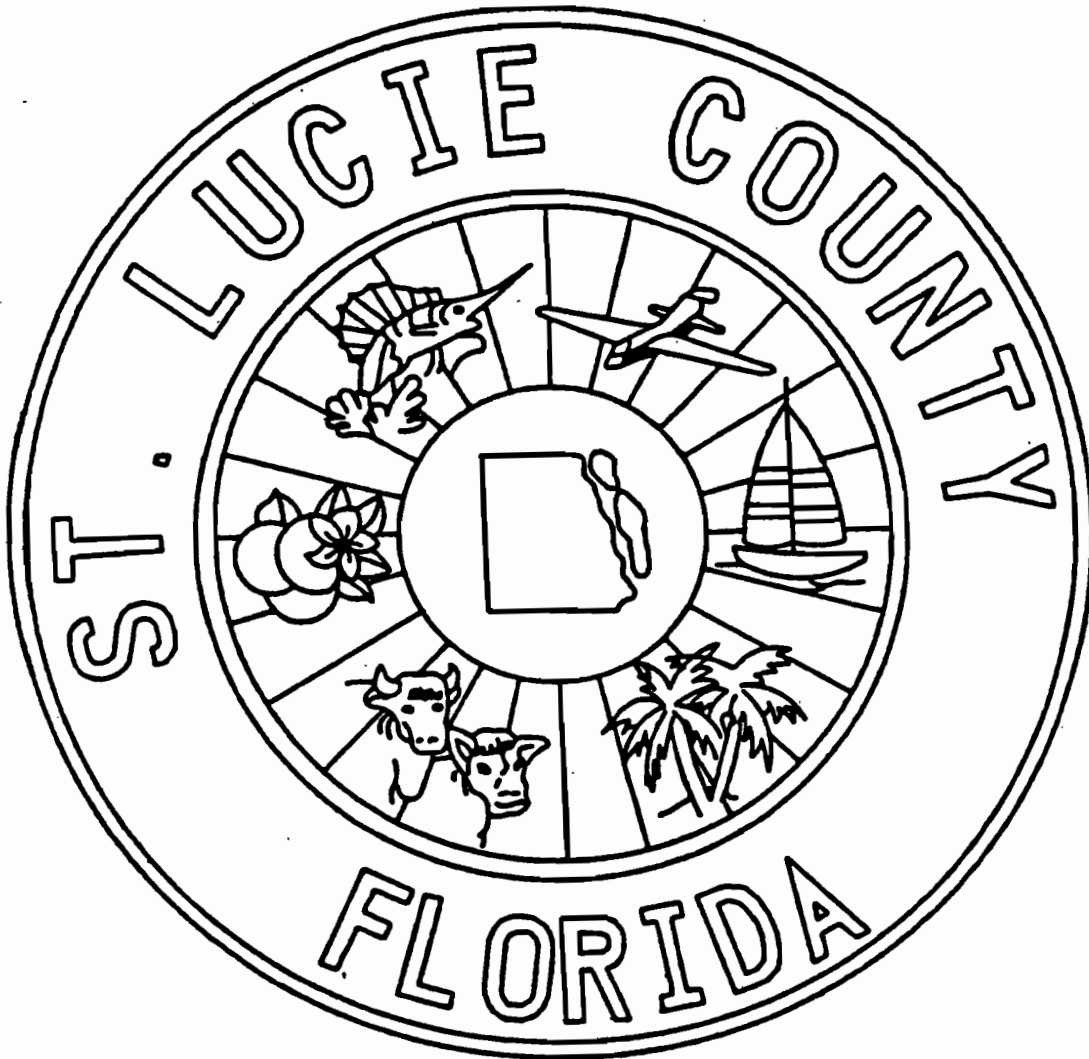
Policy 1.33: The county shall maintain a concurrency database which identifies areas with facility surpluses and deficiencies. Development shall be directed to areas with adequate facility capacity through publication of this information and through implementation of the county's concurrency management system.

Policy 1.34: The mixed use land use designation shall be a floating zone which may be overlaid on any property with an agricultural land use designation (AG-1, AG-2, and AG-3). Each mixed use designation shall be approved as a Planned Development (PD) and shall meet the requirements of Policy 1.35.

THE COMPREHENSIVE PLAN

FOR

ST. LUCIE COUNTY, FLORIDA



should also be noted that most of the intense land use designations correspond with those areas identified as vacant or undeveloped of the existing land use map, Figure 1-4.

This particular pattern of development is somewhat different than the typical coastal community in Southeast Florida. Yet it should be pointed out that St. Lucie County has certain physical differences that serve to discourage the intense urbanization of its easternmost regions. Concerns about the further degradation of the quality of the riverine systems of the Indian River Lagoon, the North Fork of the St. Lucie River as well as the Savannas, which could be accelerated through the discharge of stormwater run-off, has lead St. Lucie County to recognize the need to move west with its more intense development patterns. Other considerations for developing areas along the western edges of the current urban form are the physical and fiscal constraints faced with increasing development intensities, and providing the necessary transportation and community services in this area. By directing future land development into areas that do not have major environmental constraints, it will be possible to more effectively provide for the future needs of the community.

Future Land Use Designations

The following descriptions are those of the future land use designations portrayed on the Future Land Use Map (Figure 1-8). These descriptions provide the intent as well as recommend permitted/preferred uses within each designation. Further descriptions include other uses related to the predominant use which are consistent with the intent of the designation and which would be permitted at the discretion of the County. All residential densities are given in dwelling units per gross acre (du/ac).

Also included in this section is a description of how the Future Land Use Map addresses certain non-residential uses. As explained later, specific non-residential uses are permitted within a variety of future land use designations without requiring amendments to the map.

Finally, Table 1-6 provides a land use district/zoning district compatibility chart that is intended to provide assistance in the application of compatible zoning districts, as currently found in St. Lucie County's Land Development Regulations.

TABLE 1-6
(continued)
ST. LUCIE COUNTY
LAND USE DESIGNATION/ZONING DISTRICT
COMPATABILITY CHART

LAND USE
DISTRICT

ZONING DISTRICT

	<u>CN</u>	<u>CO</u>	<u>CT</u>	<u>CG</u>	<u>IL</u>	<u>IH</u>	<u>IX</u>	<u>U</u>	<u>I</u>	<u>RF</u>	<u>PUD</u>	<u>PNRD</u>	<u>HIRD</u>	<u>MXD</u>	<u>RVP</u>
AG-5 :	X	X					X	X	X	X	X	X		X	
AG-2.5 :	X	X					X	X	X	X	X	X		X	
RE :	X	X					X	X	X	X	X	X	X	X	
RS :	X	X					X	X	X	X	X	X	X	X	
RU :	X	X					X	X	X	X	X	X	X	X	
RM :	X	X					X	X	X	X	X	X	X	X	
RH :	X	X					X	X	X	X	X	X	X	X	
R/C :							X	X	X	X	X	X	X	X	
Cpub :							X	X	X						
COM :	X	X	X	X			X	X	X	X		X	X	X	X
IND :				X	X	X	X	X	X			X		X	
P/F :							X	X	X	X	X	X	X	X	
MXD :	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SD :									X		X	X	X	X	
H :	X	X					X	X	X	X	X	X	X	X	

January 9, 1990

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LAND USE

LAND USE CATEGORIES

AGRICULTURAL - 5 (AG-5)

The AG-5 land use designation is intended for those areas of the County outside of the planned urban service area which are associated with agricultural and agricultural-related activities. These areas are recognized for first being appropriate for the production of citrus, cash crops, or ranching activities. These areas are acknowledged as potentially suitable for limited residential development under the following criteria:

- o All residential development must be in accordance with applicable standards and restrictions as set forth in the Land Development Regulations;
- o All residential development proposals in excess of 10 units must be approved through the Planned Unit Development (PUD) process as provided for in the Land Development Regulations;
- o Any activity other than crop or food product related production, including combinations of properties/uses, in excess of 200 acres should be in conjunction with the establishment of a Community Development District, pursuant to Chapter 190, Florida Statutes, for the purpose of providing the necessary infrastructure facilities to support that development; and,
- o Residential densities are set at a maximum of one (1) unit per 5 gross acres.

AGRICULTURAL - 2.5 (AG-2.5)

The AG-2.5 land use designation is intended for those areas of the County outside of the planned urban service area which are associated with agricultural and agricultural-related activities. These areas are recognized for first being appropriate for the production of citrus, cash crops, or ranching activities. These areas are acknowledged as potentially suitable for limited residential development under the following criteria:

- o All residential development must be in accordance with applicable standards and restrictions as set forth in the Land Development Regulations;
- o All residential development proposals in excess of 10 units must be approved through the Planned Unit Development (PUD) process as provided for in the Land Development Regulations;

- o Any activity other than crop or food product related production, including combinations of properties/uses, in excess of 200 acres should be in conjunction with the establishment of a Community Development District, pursuant to Chapter 190, Florida Statutes, for the purpose of providing the necessary infrastructure facilities to support that development; and,
- o Residential densities are set at a maximum of one (1) unit per 2.5 gross acres.

RESIDENTIAL ESTATE (RE)

The Residential Estate (RE) land use category is intended to act as a transitional area between the agricultural areas and the more intense residential areas in the eastern portion of the County. This category is found predominantly along the western edge of the urban form, but is also appropriate for areas of special environmental concern such as along the North Fork of the St. Lucie River and the Indian River Lagoon.

The RE designation is intended for large lot, single-family detached residential dwellings, at a density of one unit per gross acre. These areas are not required to be served with central utilities, however when at all practical, service connections should be provided.

The RE designation is acknowledged as potentially suitable for limited residential development under the following criteria:

- o All residential development must be in accordance with applicable standards and restrictions as set forth in the Land Development Regulations;
- o All residential development proposals in excess of 10 units must be approved through the Planned Unit Development (PUD) process as provided for in the Land Development Regulations;
- o Any residential development in excess of 200 acres should be in conjunction with the establishment of a Community Development District, pursuant to Chapter 190, Florida Statutes, for the purpose of providing the necessary infrastructure facilities to support that development; and,
- o Residential densities are set at a maximum of one (1) unit per one (1) gross acre.

RESIDENTIAL SUBURBAN (RS)

The Residential Suburban (RS) land use category is intended to act as a transitional area between the agricultural areas and the more intense residential areas in the eastern portion of the County. This category is found predominantly along the western edge of the urban form, but is also appropriate for areas of special environmental concern such as along the North Fork of the St. Lucie River and the Indian River Lagoon.

The RS designation is intended for large lot, single-family detached residential dwellings, at a density of one to two units per gross acre. These areas are not required to be served with central utilities, however when at all practical, service connections should be required.

RESIDENTIAL URBAN (RU)

The Residential Urban (RU) classification is the predominant residential land use category in the County. This residential land use category provides for a maximum density of 5 dwelling units per gross acre. The RU designation is generally found between the identified urban service areas and the transitional RS areas. These properties need to be serviced with central water and wastewater services. These services may be provided by either a public utility or through private on-site facilities, as would be permitted in accordance with all applicable regulations.

New development in the RU areas can occur using traditional single-family or multi-family zoning designations or through the Planned Unit Development process.

RESIDENTIAL MEDIUM (RM)

The Residential Medium (RM) land use category is to be applied to those areas that are within, or planned to be within, areas of central community services. A maximum residential density of nine dwelling units per gross acre is permitted under this land use designation. If required, the actual density is subject to the satisfactory completion of the rezoning process, which would include complete review of the physical suitability of the property for development at the proposed intensity.

Medium density residential land uses can act as a transition between the lower intensity RU areas and the more intense land use designations. Zoning applications within the RM land use area include single-family, multi-family, or PUD zoning.

RESIDENTIAL HIGH (RH)

Areas designated Residential High (RH) are intended to accommodate high density development, not to exceed 15 dwelling units per gross acre. In order to develop at this intensity, it must be possible to connect into a central water and wastewater service facility, and the subject property must be located in an area of the County which has available all urban services and facilities including fire protection, police, recreation, roadways, and schools.

MIXED USE DEVELOPMENT (MXD)

The intent of the Mixed Use Development (MXD) designation is to identify those areas where innovative land use concepts are encouraged. Application of this district should be with prudence, and should be only to those areas where traditional land use classifications do not afford the desired flexibility and community input in land use planning necessary to address local concerns. Candidates for this district include all I-95 interchange areas, the St. Lucie County International Airport, Community Development Districts created pursuant to Chapter 190, Florida Statutes and areas of special or unique environmental consideration that may not be appropriate for traditional land use designations.

Uses within the areas classified as Mixed Use should be segregated as to intensity and indicated in the form of a concept master plan which is to be included as a part of the the land use designation process. The following criteria, in addition to those as cited in Objective 1.1..6, are to be used in the development of Mixed Use areas:

- o Unless otherwise compliant with the identified intensity classification, any change in zoning shall be to the Planned Unit Development (PUD), Planned Non-residential Development (PNRD) or Mixed Use Development (MXD), as described in the St. Lucie County Land Development Regulations. Those properties with compatible existing zoning designations are encouraged to develop under the PUD, PNRD or MXD regulations.
- o Residential development shall be regulated by the intensity district in which it is to take place. In no case should gross residential density exceed 15 du/ac.
- o All uses shall be compatible with internal and external adjacent land uses.

SPECIAL DISTRICT (SD)

The intent of the Special District (SD) designation is to identify those areas where through the specific legislative action of the Governor and Cabinet of the State of Florida (i.e.; Chapter 190 Community Development District, Florida Quality Developments, etc.) approval for a site specific development plan or concept has been granted. A Special District designation may not be applied to a traditional application of zoning or Application for Development of Regional Impact unless specific approval for that project is required from the Governor and Cabinet. Application of this district should be with prudence, and should be only to those areas where traditional land use classifications do not afford the desired flexibility and community input in land use planning necessary to address local concerns.

Residential densities within an area designated as a Special District are limited to what the current land use designation authorizes. Any increase over the present designation may be considered only through the Plan Amendment process.

At the date of adoption of this plan, only one area of the County is scheduled to receive this designation, which is the area 4a described as the Capron Trail Community Development District. In 1988, this area was approved by the Florida Cabinet as a F.S. Chapter 190, Community Development District. Included with that approval was the submission of a development concept that described how the creation of this district would take place and what its ultimate development profile would be represented as in this case, residential at a gross density of one unit to the acre.

The Special District designation applied to this property indicates an acknowledgment on the part of St. Lucie County of the special district sanctioned by the State of Florida. This acknowledgment does in no way relieve or otherwise provide relief to the owners/developers of these properties from complying with the concurrency and level of service standards of this plan and any other lawful development review process.

COMMERCIAL (COM)

The Commercial (COM) land use designation is applicable to areas of future commercial development, in addition to those existing developed commercial areas. Future commercial areas should be located at points of high transportation access, with specific action taken to prevent the development of new linear commercial strips.

Although this plan supports the location of higher intensity commercial uses at the intersection of arterial roadways, it

should not be interpreted to mean that every intersection should be designated for commercial activities. Unless otherwise designated on the future land use maps, applications for commercial use should be done in conjunction with a detailed review of the impacts of such development on adjacent property, specifically noting what, if any, negative neighborhood impacts could result.

The Commercial (COM) designation is intended to accommodate all commercial zoning districts as identified under St. Lucie County's Land Development Regulations. Office and general retail uses are considered the principal uses within the COM designated areas.

INDUSTRIAL (IND)

This land use designation is applied to specific areas of the County identified as suitable for industrial use. This land use designation is intended to be implemented through both the heavy and light industrial zoning districts, with the specific criteria for zoning application as provided for under the policies of the Future Land Use Element.

Areas designated for Industrial activities must have available all necessary services and facilities prior to development, supplied by either public or private sources as permitted. In addition, developments proposing to incorporate heavy industrial uses will be required to be adequately buffered from any adjacent use that would be incompatible.

PUBLIC FACILITIES (P/F)

The Public Facilities (P/F) land use designation is applied to properties used for such activities as education and places of worship. This designation may also be applied to other public uses such as jails and administrative buildings.

TRANSPORTATION/UTILITIES (T/U)

The purpose of this district is to recognize the Transportation or Utility use of property. This designation may be applied as appropriate subject to review of the specific application and intended use of the property.

The Transportation/Utilities (T/U) land use designation has been applied principally to four areas:

- 1) St. Lucie County International Airport;

- 2) The St. Lucie County Landfill;
- 3) The St. Lucie Power Plant site located on South Hutchinson Island; and,
- 4) The Florida Power and Light - Midway switching station along West Midway Road.

HISTORIC (H)

The Historic (H) land use designation is applied to properties of historic significance as identified by the national historic register, or State of Florida.

CONSERVATION

The Conservation land use designation has been divided into two categories: Residential/Conservation (R/C) and Conservation-Public (Cpub). These designations are intended to identify areas of the County which exhibit unique or special environmental characteristics, and may be either publicly or privately held. The designations are described in more detail below.

Residential/Conservation (R/C): The Residential/Conservation category is intended to identify those privately controlled lands which contain unique vegetation or have characteristics which warrant special attention prior to their being developed. The Residential/Conservation designation is not intended to prevent development activities. Instead, its purpose is to identify those areas that, due to special environmental or other unique constraints, location, property configuration, or topography should be more closely examined before final development approvals are authorized.

Areas designated Residential/Conservation carry a development potential of one (1) dwelling unit per five (5) gross acres. Areas within the R/C designation should be developed using the following criteria:

- o The development is supplied with central water and sewer service; unless otherwise permitted by the appropriate authority.
- o Any development within an area designated R/C should, as a requirement for building permit approval, demonstrate compliance with all applicable environmental protection regulations as set forth in the Land Development Regulations for St. Lucie County.
- o Any residential development proposal in excess of 10 acres, or involving more than 10 units, should be

under the Planned Unit Development regulations as set forth in the Land Development Regulations for St. Lucie County.

Conservation-Public (Cpub): Areas designated Conservation-Public are those lands which exhibit unique environmental characteristics and are owned by federal, state, regional, or local public agencies. They are intended solely for preservation and/or recreational use. No residential or commercial development may occur other than that typically related to park service and security functions.

Non-Residential Uses

Future development in St. Lucie County will take place in many different styles, uses, configurations and combinations of uses. Some of this development may seem contradictory to the land use designation in which it is located. Non-residential uses which support residents and provide alternatives to the lifestyles of future residents are important when considering future land use issues. Table 1-6 identifies two categories under the current St. Lucie County Zoning Ordinance that would be compatible with each land use category identified in this plan.

The following zoning districts may occur in one or more of the future land use categories without requiring a change in land use designation, provided these performance standards are met.

Commercial Neighborhood, Commercial Office, Planned Non-Residential: Limited commercial uses may occur in areas designated Agriculture or any residential category not indicated as a Preferred Residential area, if all of the following criteria are met:

- 1) The intent of the commercial use is to provide easily accessible, convenience-type uses to immediately surrounding residents;
- 2) The property for which the commercial designation is sought is located on an Arterial or Major Collector;
- 3) Conversion of the petitioned property would not promote any strip commercial use of land;
- 4) The use is compatible with surrounding land uses and is provided with adequate screening and buffering of any adjacent residential property;
- 5) The site does not have direct driveway access onto any local or Minor Collector street; and,

GOALS, OBJECTIVES, AND POLICIES

GOAL 1.1

ENSURE A HIGH QUALITY LIVING ENVIRONMENT THROUGH A MIXTURE OF LAND USES THAT WILL ENHANCE ST. LUCIE COUNTY'S NATURAL AND MAN-MADE RESOURCES WHILE MINIMIZING ANY THREAT TO THE HEALTH, SAFETY, AND WELFARE OF THE COUNTY'S CITIZENS THROUGH INCOMPATIBLE LAND USES AND ENVIRONMENTAL DEGRADATION.

OBJECTIVE 1.1.1:

To identify on the Future Land Use Map land use designations sufficient to portray the future development patterns of St. Lucie County.

Policy 1.1.1.1:

The following land use designations/intensities, as indicated on the Future Land Use Maps are provided as the pattern for the future development of the area within unincorporated St. Lucie County.

<u>Land Use Category</u>		<u>Residential Density/ Max. Lot Cov. by Structure</u>
AG-5	Agriculture - 5	1 du/5 acres (.2 du/1 acre)
AG-2.5	Agriculture - 2.5	1 du/2.5 acres
RE	Residential Estate	1 du/1 acre
RS	Residential Suburban	2 du/1 acre
RU	Residential Urban	5 du/1 acre
RM	Residential Medium	9 du/1 acre
RH	Residential High	15 du/1 acre
R/C	Residential/Conservation	1 du/5 acres (.2 du/1 acre)
Cpub	Conservation - Public	0 du/5 -10% ^{1 4}
COM	Commercial	0 du/40-50% ^{1 4}
IND	Industrial	0 du/40-50% ^{1 4}

<u>Land Use Category</u>	<u>Residential Density/ Max. Lot Cov. by Structure</u>
--------------------------	--

P/F	Public Facilities	0 du/40-50% ^{1 4}
T/U	Transportation/Utilities	0 du/40-50% ^{1 4}
MXD	Mixed Use Development	.2-15 du/acre ^{2 3} 40% - 50% ⁴
H	Historic	0 du/40-50% ^{1 4}
SD	Special District	.2-15 du/acre ^{2 3} 40% - 50% ⁴

- 1.) Residential uses permitted only as accessory to primary permitted use. Refer to Zoning/Land Development Regulations for special restrictions.
- 2.) Maximum Densities subject to compliance with intensity plans for each mixed use area, as set forth in Policy 1.1.6.4.
- 3.) Special restrictions apply. Refer to Policy 1.1.6.5.
- 4.) For specific non-residential land use intensities, refer to zoning/land development regulations.

OBJECTIVE 1.1.2: Provide in the land development regulations provisions for a compatible and coordinated land use pattern which establishes agriculture as the primary use outside of the urban service boundary and promote retention of agricultural activities, preserve natural resources and maintain native vegetative habitats.

Policy 1.1.2.1: Require that new developments within agricultural land uses not exceed the gross densities provided in Policy 1.1.1.1; however, for developments in excess of four units require approval through the PUD process and include provisions in the land development regulations requiring clustering of such developments.

Policy 1.1.2.2: All future non-agricultural development within the agricultural land use categories will be required to preserve open space (defined as agricultural activities such as groves and range land as well a preservation of natural areas) according to the following criteria:

APPENDIX 10.4

EXISTING STATE PERMITS

10.4 EXISTING STATE PERMITS

There are no existing state permits in effect for the Site, proposed power plant, or associated facilities.

APPENDIX 10.5
MONITORING PROGRAMS

10.5 MONITORING PROGRAMS

Selected monitoring and field data collection programs were carried out by ECT and other contractors retained by Calpine in support of the BHEC Project. The following table summarizes the data gathering by technical discipline:

Environmental Discipline	Site/Area Reconnaissance	Field Data Collection
Air Quality/Meteorology	✓	
Geohydrology	✓	✓
Surface Water Quality	✓	✓
Vegetation/Land Use	✓	
Ecology	✓	✓
Site Topography	✓	✓
Socioeconomics/Land Use/Archaeology	✓	
Noise	✓	✓

For the field data collection efforts indicated in the above technical disciplines, summary descriptions of the programs are provided in the following paragraphs. As appropriate, monitoring data (such as laboratory reports) are included in this section. The preceding sections of this document, notably Section 2.0, provide a more detailed analysis of the data, summarized herein, relevant to the characterization of the environment.

AIR QUALITY/METEOROLOGY

No monitoring program for measuring ambient air quality or meteorological data collection was necessary. The existing database was adequate to characterize the ambient conditions in the Project site and vicinity.

GEOHYDROLOGY

Ground Water Aquifer Systems—Nearly all of the required information necessary to characterize the hydrogeology of the Project Site and vicinity was obtained from the available literature. Nevertheless, additional site-specific data for impact assessment on the aquifer system were collected.

Surficial Aquifer—The characteristics of the surficial aquifer were primarily determined through review and analysis of published reports. To supplement this information, ECT conducted single-well aquifer (slug) tests on April 26, 2000, in three of the existing shallow monitoring wells on the Site. Aquifer property data were determined, and the results of the slug tests are included in Attachment A.

Ground Water Quality, Surficial Aquifer—On April 27, 2000, ECT collected ground water samples for laboratory analysis from two onsite shallow monitoring wells. The ground water sampling results are discussed in Section 2.3.2.

Floridan Aquifer—The Floridan aquifer has been extensively studied in the vicinity of the Project Site, and review of the existing published reports provided sufficient information to document the aquifer system, as described in Section 2.3.2.

SURFACE WATER QUALITY

Indian River Farms Water Control District (IRFWCD)—Several comprehensive rounds of surface water sampling were conducted during the course of the project. The IRFWCD canal system will provide the water supply for the BHEC facility. On March 22, 2000, water quality samples were collected from the major canals of the IRFWCD system, including Main Canal (two locations), North Canal (two locations), South Canal, Lateral C Canal, and the Indian River (see Table 10.5.0-1). On July 12, 2000, surface water samples were again collected from the Main Canal and Lateral C canal, along with sediment samples from both locations. The results of the water quality analyses are presented in Table 10.5.0-2 and discussed in Section 2.3.4.

Reclaim Water System Quality—On July 22, 2000, a water sample was collected from the Indian River County reclaimed water system, with the sampling station located at the County's west WWTP. The water quality results are included in Table 10.5.0-2.

Table 10.5.0-1. Indian River County Surface Water Samples, March 2000 Sampling Event (mg/L unless otherwise indicated)

Constituent	North Canal	South Canal	Main Canal	WWTP Canal	Lateral C	Sublateral C-7	Indian River
Aluminum	< 0.050	< 0.050	0.061	< 0.050	0.05	0.093	0.26
Antimony	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Arsenic	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Barium	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Beryllium	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Boron	0.11	0.10	0.11	0.14	0.13	< 0.10	3.5
Cadmium	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Calcium	97	100	97	96	100	80	360
Chromium	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cobalt	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Copper	0.0025	0.0028	0.0033	0.0039	0.0042	< 0.0010	0.0018
Iron	0.23	0.099	0.13	0.29	0.23	1.9	0.18
Lead	0.006	0.006	< 0.050	< 0.050	< 0.050	0.005	0.005
Magnesium	31	26	36	35	35	3.2	1,100
Manganese	0.017	< 0.010	0.014	0.015	0.016	< 0.010	0.012
Mercury	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020	< 0.00020
Molybdenum	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.024
Nickel	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Selenium	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Silicon	5.8	2.7	4.6	6.6	5.5	3.9	4
Silver	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Sodium	120	120	180	200	170	< 50	9,000
Thallium	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020	< 0.0020
Tin	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Titanium	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Zinc	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Alkalinity (as CaCO ₃)	180	190	160	140	170	170	140
Ammonia-N	< 0.030	0.04	0.04	< 0.030	0.05	0.09	0.04

Table 10.5.0-1. Indian River County Surface Water Samples, March 2000 Sampling Event (mg/L unless otherwise indicated)

Constituent	North Canal	South Canal	Main Canal	WWTP Canal	Lateral C	Sublateral C-7	Indian River
BOD	< 2.0	< 2.0	< 2.0	3	< 2.0	< 2.0	< 2.0
Chloride (total)	300	270	410	580	380	66	19,000
COD	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	3,100
Specific conductivity, mmhos/cm	1,400	1,400	1,800	1,700	1,600	590	36,000
Cyanide (total)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Fluoride	0.4	0.3	0.4	0.5	0.4	< 0.20	0.7
Hardness (as CaCO ₃)	390	380	430	460	410	240	88
Nitrate-N	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.02	< 0.020
Nitrite-N	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nitrate-Nitrite-N	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.02	< 0.020
Total Kjeldahl-N	0.62	0.87	0.65	1	0.68	2.6	1.7
Nitrogen, total organic	0.62	0.83	0.61	1	0.63	2.5	1.7
Phosphorus (total)	0.21	0.19	0.16	0.12	0.12	0.37	0.13
pH, S.U.	8	8.1	8	8.1	8	8	8.1
Sulfate (total)	91	73	86	47	72	12	1,900
Sulfide (total)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TDS	820	750	960	970	890	340	26,000
Total organic carbon	12	13	10	10	11	19	6
TSS	2	4	2	3	4	8	20
Turbidity, NTU	2	2	2	3	2	10	5
Bromide	1.04	0.86	1.32	1.32	1.2	0.215	58.5
Sulfite	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
DDT	< 0.05	< 0.05	0.28	< 0.05	0.46	< 0.05	< 0.05

Source: ENCO Laboratories, 2000.

Table 10.5.0-2. Indian River County Surface Water, Sediment, and Reclaimed Water Samples, July 12, 2000 Sampling Event

Constituent	Water Sample Reclaimed Water System	Water Sample Main Canal	Water Sample Lateral C Canal	Sediment Sample Main Canal	Sediment Sample Lateral C Canal
<u>Metals (mg/L)</u>					
Aluminum	0.12	NA	NA	NA	NA
Antimony	<0.005	NA	NA	NA	NA
Arsenic	<0.010	NA	NA	NA	NA
Barium	<0.10	NA	NA	NA	NA
Beryllium	<0.0010	NA	NA	NA	NA
Boron	0.41	NA	NA	NA	NA
Cadmium	<0.0010	NA	NA	NA	NA
Calcium	39	NA	NA	NA	NA
Chromium	<0.010	NA	NA	NA	NA
Cobalt	<0.050	NA	NA	NA	NA
Copper	<0.050	NA	NA	NA	NA
Iron	0.063	NA	NA	NA	NA
Lead	<0.0050	NA	NA	NA	NA
Magnesium	12	NA	NA	NA	NA
Manganese	0.014	NA	NA	NA	NA
Mercury	<0.00020	NA	NA	NA	NA
Molybdenum	<0.010	NA	NA	NA	NA
Nickel	<0.010	NA	NA	NA	NA
Selenium	<0.010	NA	NA	NA	NA
Silicon	8.7720	NA	NA	NA	NA
Silver	<0.010	NA	NA	NA	NA
Sodium	130	NA	NA	NA	NA
Thallium	<0.20	NA	NA	NA	NA
Tin	<0.100	NA	NA	NA	NA
Titanium	<0.0050	NA	NA	NA	NA
Zinc	0.11	NA	NA	NA	NA

Table 10.5.0-2. Indian River County Surface Water, Sediment, and Reclaimed Water Samples, July 12, 2000 Sampling Event

Constituent	Water Sample Reclaimed Water System	Water Sample Main Canal	Water Sample Lateral C Canal	Sediment Sample Main Canal	Sediment Sample Lateral C Canal
<u>Miscellaneous (mg/L)</u>					
Alkalinity (as CaCO ₃)	70	140	120	NA	NA
Ammonia-N	<0.030	<0.030	0.040	2.5	1.5
BOD	4	5.0	6.0	NA	NA
Bromide	<0.010	0.690	0.9100	NA	NA
Chloride (total)	210	250	350	NA	NA
COD	28	51	93	NA	NA
Conductivity, umhos/cm	870	1,100	1,300	NA	NA
Cyanide (total)	<0.010	<0.010	<0.010	NA	NA
Fluoride	1.0	0.70	0.80	NA	NA
Hardness (as CaCO ₃)	140	300	350	NA	NA
Nitrate-Nitrite-N	0.74	<0.020	0.12	0.4	0.9
Total Kjeldahl-N	0.87	1.2	1.6	17	12
Nitrogen, total organic	0.87	1.2	1.6	14	10
Oil and Grease	<1.0	<1.0	<1.0	10	215
Phenolics, total recoverable	<0.050	<0.050	<0.050	NA	NA
Phosphorus (total)	0.11	0.18	0.23	2.5	2.2
pH (S.U.)	6.6	7.9	7.4	5.8	5.8
Sulfate (total)	72	74	99	<65	80
Sulfide (total)	<1.0	<1.0	<1.0	<13	<12
Sulfite	<0.10	0.20	<0.10	NA	NA
TDS	560	740	890	NA	NA
Total organic carbon	8.8	17	18	3,040	17,500
TSS	<1.0	9.0	9.6		
Turbidity (NTU)	3.0	5.0	8.1	NA	NA

Table 10.5.0-2. Indian River County Surface Water, Sediment, and Reclaimed Water Samples, July 12, 2000 Sampling Event

Constituent	Water Sample Reclaimed Water System	Water Sample Main Canal	Water Sample Lateral C Canal	Sediment Sample Main Canal	Sediment Sample Lateral C Canal
<u>Radionuclides (pCi/L)</u>					
Gross alpha	<1.9+/-1.2	NA	NA	NA	NA
Gross beta	16.1+/-1.5	NA	NA	NA	NA
Radium-226	<0.3+/-0.1	NA	NA	NA	NA
Radium-228	<1.1+/-0.7	NA	NA	NA	NA
<u>Bacteriological (CFU/100/mL)</u>					
Fecal coliform	1.0	NA	NA	NA	NA
<u>VOCs (µg/L)</u>					
Chloromethane	2.8	NA	NA	NA	NA
Chloroform	50	NA	NA	NA	NA
Bromodichloromethane	44	NA	NA	NA	NA
Dibromochloromethane	21	NA	NA	NA	NA
Bromoform	2.5	NA	NA	NA	NA
<u>Organochlorine Pesticides (µg/L)</u>					
4,4'-DDT	<0.073	<0.073	<0.073	<2.0	<2.0
Beta-BHC	0.38	NA	NA	NA	NA
<u>Polyaromatic Hydrocarbons (µg/L)</u>					
Fluorene	0.16	NA	NA	NA	NA

**Table 10.5.0-2. Indian River County Surface Water, Sediment, and Reclaimed Water Samples, July 12, 2000
Sampling Event**

Constituent	Water Sample Reclaimed Water System	Water Sample Main Canal	Water Sample Lateral C Canal	Sediment Sample Main Canal	Sediment Sample Lateral C Canal
<u>Chlorinated Herbicides (µg/L)</u>					
Dalapon	5.3	NA	NA	NA	NA
MCPA	300	NA	NA	NA	NA
2,4-D	1	NA	NA	NA	NA
2,4-DB	1	NA	NA	NA	NA

Note: PCi/L = picocuries per liter.
CFU/100mL = colony forming units per 100 milliliters.

∞ Sediment sampling results are shown in milligrams per kilogram, except for 4,4'-DDT, which is in micrograms per kilogram.
Water sampling results are shown in milligrams per liter.

In addition to the constituents shown, the reclaimed sample was analyzed for semivolatile organic compounds (EPA Method 625), and organophosphorus pesticides (Method 614). No constituents in these analytical groups were present above their respective method detection limits.

Specific conductivity was measured in the field.

Sample identification numbers include (in parentheses) the depth at which each sample was collected.

Samples were analyzed by ENCO Laboratories for all constituents except for fecal coliform, which was analyzed by Harbor Branch Analytical Laboratory, sulfite and bromide, which were analyzed by TestAmerica, and radiological constituents analyzed by Florida Radiochemistry Laboratories.

VEGETATION/LAND USE

During the course of the SCA, three site visits (February 15, April 10, and April 26, 2000) were conducted to characterize and map the vegetation and land use types present at the Site. In addition to characterizing the vegetation communities at the Site, the effort included the characterization of vegetation and land use within a 5-mile radius of the Site. The detailed descriptions of the vegetation and land use are provided in Section 2.3.5.

ECOLOGY

The ecological assessment of the site included field surveys to characterize the important natural communities, flora, and fauna at the Site. In addition, a literature search was performed to determine state and federal listed species that could potentially be present. Vegetation field surveys (Section 2.3.6.1) were conducted in February and April 2000. A comprehensive wildlife field investigation was conducted on February 15, 2000, and from April 10 through 12, 2000. Wetlands were delineated during the field investigations, and were subsequently verified with FDEP and USACE. The results of the preliminary Site reconnaissance and detailed field investigations, addressing vegetation communities, fauna, threatened and endangered species, and wetlands were presented in Section 2.3.6.

SITE TOPOGRAPHY

As an initial element of the Project, a detailed boundary and topographic survey was performed by Masteller, Moler & Reed, Inc., under contract to Calpine. The fieldwork was completed on March 20, 2000. The survey included a legal description of the Project site, boundary survey, topography, and location of pertinent site features, such as existing monitoring wells and wetlands. The survey report, entitled Map of Survey for Calpine Corporation, is included in Appendix 10.10 of the SCA.

SOCIOECONOMICS/LAND USE/ARCHAEOLOGY/HISTORY

A windshield survey of the surrounding area land uses was conducted in February 2000. All accessible roadways in the vicinity of the Project were driven to document current land use. Observations were made to note commercial/industrial land uses along 74th Avenue and intersecting roads, and the density of residential development, ranging from

rural residential to suburban. Residence types, such as single family or mobile home parks were also noted. The survey also included documenting the extent of undeveloped land in the vicinity. The presence of recreational amenities, such as local, county or state parks, designated natural areas, etc., was also documented in the general vicinity of the Project.

During the course of the Project, the Florida Department of State, DHR, performed a review of the Florida Site File and the National Register of Historic Places to determine if any known archaeological, historical or architecturally valuable sites were present on the Project site. In its letter dated March 13, 2000, The DHR concluded that “. . . the proposed project will have no effect on historic places listed, or eligible for listing, in the National Register of Historic Places, or otherwise of historical, archaeological, or architectural value.” A copy of the DHR letter is included in Appendix 10.6 of the SCA.

NOISE

A baseline ambient noise data survey was conducted on April 11 and 12, 2000, to assess the existing noise levels at the Project Site. Two monitoring stations were established in the northern and southern portions of the Property, to provide monitoring stations at locations representative of potential noise-sensitive receptors. Continuous noise level monitoring was conducted for a 24-hour period. Measurements of the A-weighted sound levels were measured using Type I (precision) sound-level meters equipped with integral data loggers. The results of the noise survey were presented in Section 2.3.8.

ATTACHMENT A

Well: MW-1
 Site: Blue Heron
 Client: Calpine

Type of Test Pump Out
 Method of Analysis Bouwer & Rice (1976, 1989)

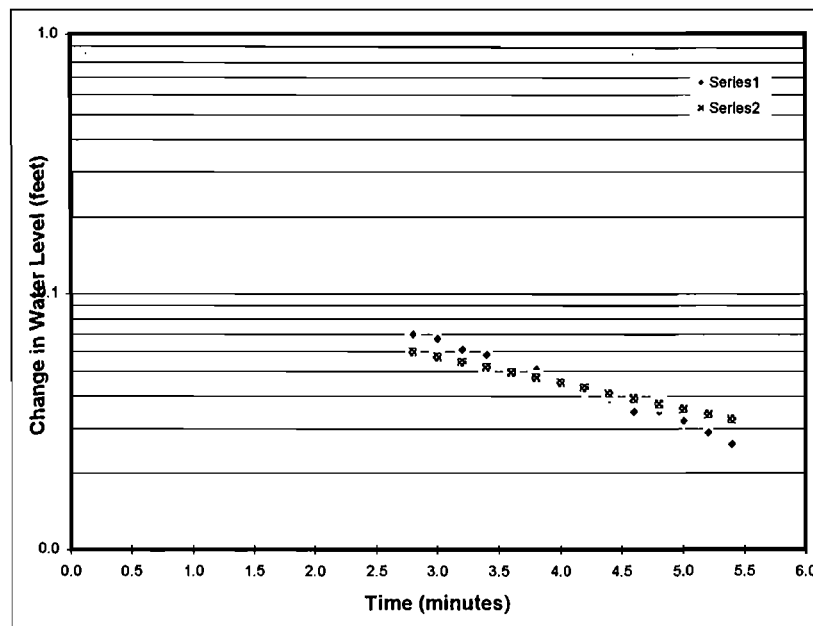
Test By: Crystal Robbins
 Test Date: April 26, 2000
 Analysis By: Alex Sorondo

WELL & AQUIFER INPUT DATA

r_c = 0.08 Radius of well casing (ft)
 n = 0.30 Porosity of filter pack
 r_w = 0.42 Radius of borehole (ft)
 L_w = 33.65 Height of water table above bottom of well (ft)
 H = 50.48 Height of water table above base of aquifer (or $1.5 * L_w$)
 L_e = 32.12 Saturated screen length (ft)

TIME - DRAWDOWN DATA

Time (minutes)	Changes in Water Levels	
	Observed	Predicted
2.80	0.07	0.06
3.00	0.067	0.06
3.20	0.061	0.05
3.40	0.058	0.05
3.60	0.051	0.05
3.80	0.051	0.05
4.00	0.045	0.04
4.20	0.042	0.04
4.40	0.039	0.04
4.60	0.035	0.04
4.80	0.035	0.04
5.00	0.032	0.04
5.20	0.029	0.03
5.40	0.026	0.03



GRAPHICAL INPUT DATA

y_0 = 0.1148 Maximum displacement or change in water level (ft)
 y_t = 0.045 Change in water level at time t (minutes)
 t = 4 Time at y_t (minutes)

CALCULATED VALUES

A = 4.72 Well geometry factor from Bouwer & Rice
 B = 0.99 Well geometry factor from Bouwer & Rice
 C = 3.60 Well geometry factor from Bouwer & Rice
 r_e = 0.24 Effective radius of well (ft)
 $\ln(R_e/r_w)$ = 3.16 If Partial penetrating Well
 = NA If Fully Penetrating Well
 K = 6.55E-04 Hydraulic Conductivity (feet/minute)
 = 0.9 Hydraulic Conductivity (feet/day)

Well: MW-3
 Site: Blue Heron
 Client: Calpine

Type of Test Pump Out
 Method of Analysis Bouwer & Rice (1976, 1989)

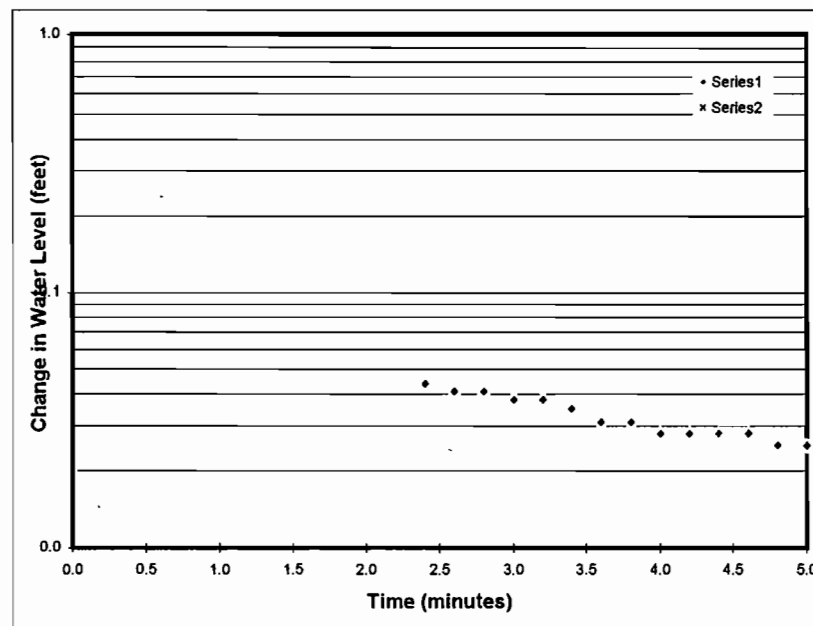
Test By: Crystal Robbins
 Test Date: April 26, 2000
 Analysis By: Alex Sorondo

WELL & AQUIFER INPUT DATA

r_c = 0.08 Radius of well casing (ft)
 n = 0.30 Porosity of filter pack
 r_w = 0.42 Radius of borehole (ft)
 L_w = 38.54 Height of water table above bottom of well (ft)
 H = 57.81 Height of water table above base of aquifer (or $1.5 * L_w$)
 L_e = 32.80 Saturated screen length (ft)

TIME - DRAWDOWN DATA

Time (minutes)	Changes in Water Levels	
	Observed	Predicted
2.40	0.044	#REF!
2.60	0.041	#REF!
2.80	0.041	#REF!
3.00	0.038	#REF!
3.20	0.038	#REF!
3.40	0.035	#REF!
3.60	0.031	#REF!
3.80	0.031	#REF!
4.00	0.028	#REF!
4.20	0.028	#REF!
4.40	0.028	#REF!
4.60	0.028	#REF!
4.80	0.025	#REF!
5.00	0.025	#REF!



GRAPHICAL INPUT DATA

y_0 = 0.0606 Maximum displacement or change in water level (ft)
 y_t = 0.031 Change in water level at time t (minutes)
 t = 3.6 Time at y_t (minutes)

CALCULATED VALUES

A = 4.76 Well geometry factor from Bouwer & Rice
 B = 1.00 Well geometry factor from Bouwer & Rice
 C = 3.64 Well geometry factor from Bouwer & Rice
 r_e = 0.24 Effective radius of well (ft)
 $\ln(R_e/r_w)$ = #REF! If Partial penetrating Well
 = NA If Fully Penetrating Well
 K = #REF! Hydraulic Conductivity (feet/minute)
 #REF! Hydraulic Conductivity (feet/day)

Well: MW-4
 Site: Blue Heron
 Client: Calpine

Type of Test: Pump Out
 Method of Analysis: Bouwer & Rice (1976, 1989)

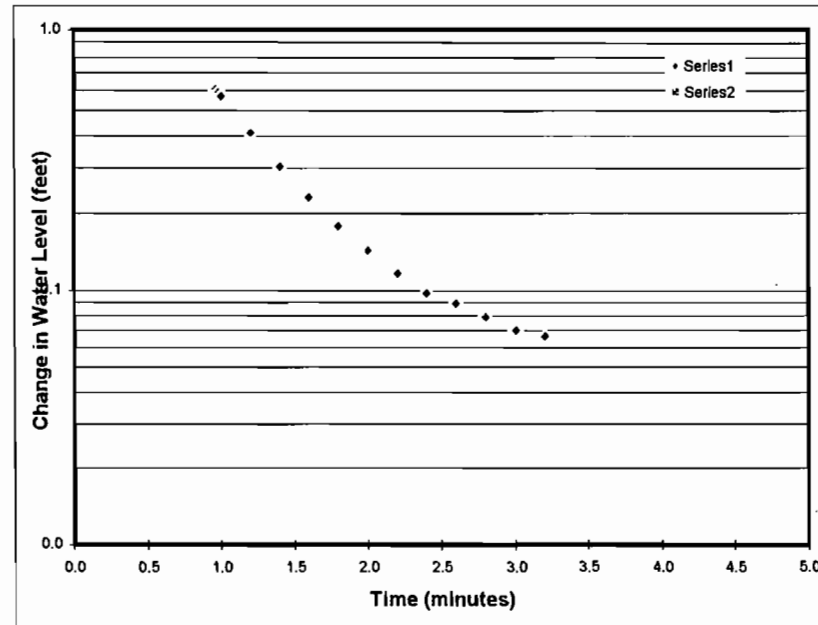
Test By: Crystal Robbins
 Test Date: April 26, 2000
 Analysis By: Alex Sorondo

WELL & AQUIFER INPUT DATA

$r_c = 0.08$ Radius of well casing (ft)
 $n = 0.30$ Porosity of filter pack
 $r_w = 0.42$ Radius of borehole (ft)
 $L_w = 32.04$ Height of water table above bottom of well (ft)
 $H = 48.06$ Height of water table above base of aquifer (or $1.5 * L_w$)
 $L_e = 27.65$ Saturated screen length (ft)

TIME - DRAWDOWN DATA

Time (minutes)	Changes in Water Levels	
	Observed	Predicted
0.9666	0.604	#REF!
0.9833	0.588	#REF!
1.0000	0.569	#REF!
1.2000	0.41	#REF!
1.4000	0.302	#REF!
1.6000	0.229	#REF!
1.8000	0.178	#REF!
2.0000	0.143	#REF!
2.2000	0.117	#REF!
2.4000	0.098	#REF!
2.6000	0.089	#REF!
2.8000	0.079	#REF!
3.0000	0.07	#REF!
3.2000	0.066	#REF!



GRAPHICAL INPUT DATA

$y_o = 1.407$ Maximum displacement or change in water level (ft)
 $y_t = 0.178$ Change in water level at time t (minutes)
 $t = 1.8$ Time at y_t (minutes)

CALCULATED VALUES

$A = 4.47$ Well geometry factor from Bouwer & Rice
 $B = 0.91$ Well geometry factor from Bouwer & Rice
 $C = 3.33$ Well geometry factor from Bouwer & Rice
 $r_e = 0.24$ Effective radius of well (ft)
 $\ln(R_e/r_w) = \#REF!$ If Partial penetrating Well
 = NA If Fully Penetrating Well
 $K = \#REF!$ Hydraulic Conductivity (feet/minute)
 $\#REF!$ Hydraulic Conductivity (feet/day)

APPENDIX 10.6

CORRESPONDENCE WITH FDEP AND FDHR



Environmental Consulting & Technology, Inc.

February 11, 2000

Ms. Heather Warner
The Florida Master Site File
Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Delivery Via Facsimile: 850.921.0372

Re: Request for Information for property located in Section 36, Township 33S, and Range 38E

Dear Ms. Warner:

As per our conversation, please regard this correspondence as a request for information for the above-referenced property.

Environmental Consulting & Technology, Inc., a multidisciplinary environmental consulting firm, is conducting an environmental audit as a prelude to a property transaction for the referenced property. As part of this investigation, we are interested in learning whether the subject property has any historical or archeological significance, or whether the subject property is located near any sites of historical or archeological significance. The subject property is located in Section 36, Township 33S and Range 38E. Thank you for your assistance in this matter.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Alejandro Sorondo
Associate Engineer II

7600 Southland Blvd.
Suite 100
Orlando, FL
32809

(407)
816-0932

FAX (407)
816-0934



FLORIDA DEPARTMENT OF STATE
DIVISION OF HISTORICAL RESOURCES

February 14, 2000

Mr. Alejandro Soronda
ECT, Inc.
7600 Southland Blvd, Suite 100
Orlando, Florida
32809

Dear Mr. Soronda:

In response to your inquiry of February 11, 2000, the Florida Master Site File lists no cultural resources in the following parcel:

T33S, R38E, Section 36.

In interpreting the results of our search, please remember the following points:

- Areas which have not been completely surveyed, such as yours, may contain unrecorded archaeological sites, unrecorded historically important structures, or both.
- As you may know, state and federal laws require formal environmental review for some projects. Record searches by the staff of the Florida Master Site File do not constitute such a review of cultural resources. If your project falls under these laws, you should contact the Compliance Review Section of the Bureau of Historic Preservation at 850-487-2333 or at this address.

Sincerely,

Handwritten signature of Daniel McClarnon.

Daniel McClarnon, 850-487-2299
Data Analyst, Florida Master Site File
Division of Historical Resources
R. A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

State SunCom: 277-2299
Fax line: 850-921-0372
Email: fmsfile@mail.dos.state.fl.us
Web: <http://www.dos.state.fl.us/dhr/fmsf/>

DIRECTOR'S OFFICE

R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • (850)488-1480
FAX: (850) 488-3353 • WWW Address <http://www.dos.state.fl.us>
 ARCHAEOLOGICAL RESEARCH HISTORIC PRESERVATION HISTORICAL MUSEUMS
C:\WINDOWS\Desktop\veg.doc February 14, 2000

DIVISIONS OF FLORIDA DEPARTMENT OF STATE

Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services



MEMBER OF THE FLORIDA CABINET

State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE

Katherine Harris

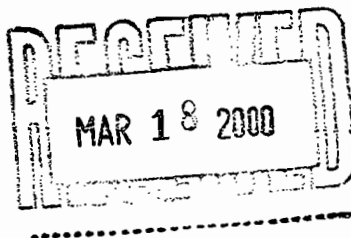
Secretary of State

DIVISION OF HISTORICAL RESOURCES

Mr. Darren L. Stowe
Environmental Consulting & Technology, Inc.
5405 Cypress Center Drive, Suite 200
Tampa, Florida 33609

March 13, 2000

RE: DHR Project File No. 2000-01164
Cultural Resource Assessment Request
Blue Heron Energy Center
Indian River County, Florida



Dear Mr. Stowe:

In accordance with Chapter 403, *Florida Statutes*, and implementing state regulations, we have reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*.

We have reviewed the Florida Master Site File and our records and no historic properties are known to exist in the area of potential effect. Therefore, based on the information provided, it is the opinion of this office that no historic properties will be affected by this undertaking.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservation Planner, at 850-487-2333 or 800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Ese

R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • <http://www.flheritage.com>

- Director's Office (850) 488-1480 • FAX: 488-3355
- Archaeological Research (850) 487-2299 • FAX: 414-2207
- Historic Preservation (850) 487-2333 • FAX: 922-0496
- Historical Museums (850) 488-1484 • FAX: 921-2503
- Historic Pensacola Preservation Board (850) 595-5985 • FAX: 595-5989
- Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476
- St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044
- Tampa Regional Office (813) 272-3843 • FAX: 272-2340



Environmental Consulting & Technology, Inc.

April 24, 2000
ECT No. 000105-0600

Mr. Daniel McClarnon
Data Analyst, Florida Master Site File
Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Re: Request for Information for Linear Facility in Indian River and St. Lucie Counties

Dear Mr. McClarnon:

On behalf of Calpine Blue Heron Energy Center (BHEC), Environmental Consulting & Technology, Inc. (ECT), is conducting baseline environmental studies to support the licensing of a new natural gas-fired power plant in Indian River County west of Vero Beach (T33S, R38E, S36). A previous inquiry has been made through your office by Mr. Alejandro Soronda of ECT for the plant site proper.

This request is for a master site file review of the associated natural gas pipeline that will run from Midway Road near Interstate 95 in St. Lucie County to the BHEC site in Indian River County. The attached map indicates the proposed 0.25-mile-wide corridor for this pipeline.

ECT is interested in learning whether this route has the potential to impact any known historical or archaeological resources. The route follows an existing electrical transmission line most of the way and crosses primarily citrus lands or pasture.

If you should need more detail on this proposed route, please do not hesitate to contact me. Thank you for your assistance in this matter.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Philip W. Simpson
Principal Scientist

PWS/dlm

cc: D. Donovan, ECT, w/att
D. Kraus, ECT, w/att

3701 Northwest
98th Street
Gainesville, FL
32606

(352)
332-0444

FAX (352)
332-6722

Y:\GDP-00\CALPINE\BHEC\PWS0424.DOC.1

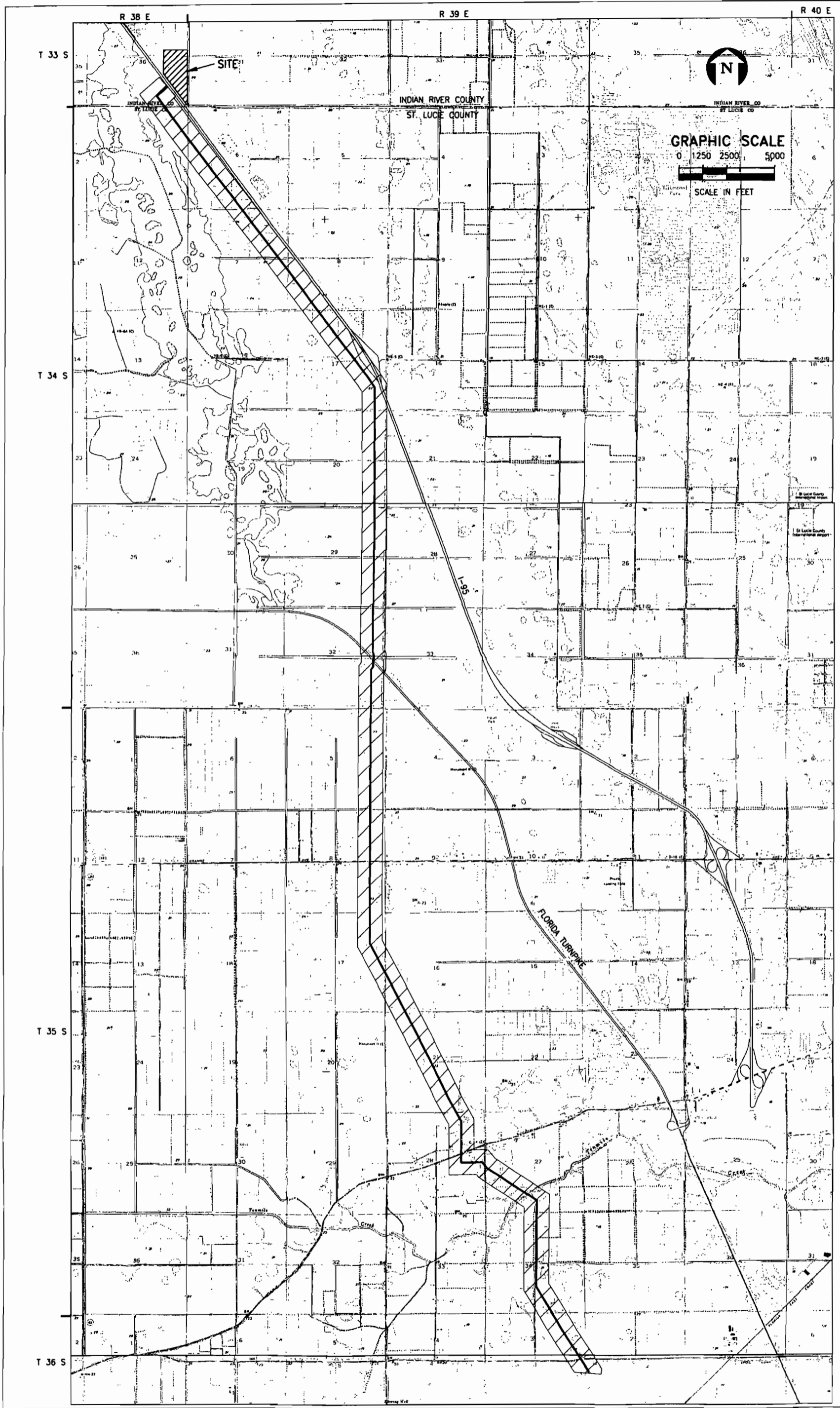


FIGURE 6-2.
PROPOSED NATURAL GAS PIPELINE CORRIDOR

Sources: USGS Quods: Oslo, FL, 1983, Fort Pierce NW, FL, 1983, Fort Pierce SW, FL, 1983; ECT, 2000.





FLORIDA DEPARTMENT OF STATE
DIVISION OF HISTORICAL RESOURCES

April 27, 2000

Mr. Phil Simpson
ECT, Inc.
Fax # 352-332-6722

Dear Mr. Simpson:

In response to your inquiry of April 27, 2000, the Florida Master Site File lists seven previously recorded cultural resources in the following parcel:

T33S, R38E, Section 36,
T34S, R39E, Sections 6-8, 16-18, 21, 22, 28, 29, 32, 33,
T36S, R39E, Sections 2, 3.

T34S, R38E, Sections 1, 12, 13,
T35S, R39E, Sections 4, 5, 8, 9, 16, 17,
20, 21, 27, 28, 34,

In interpreting the results of our search, please remember the following points:

- Areas which have not been completely surveyed, such as yours, may contain unrecorded archaeological sites or historical structures.
- While many of our records relate to historically significant properties, the entry of an archaeological site or an historical structure on the Florida Master Site File does not necessarily mean that the structure is significant.
- Since vandalism is common at Florida sites, we ask that you limit the distribution of location information on archaeological sites.
- As you may know, federal and state laws require formal environmental review for some projects. Record searches by the staff of the Florida Master Site File do not constitute such a review. If your project falls under these laws, you should contact the Compliance Review Section of the Bureau of Historic Preservation at 850-487-2333 or at this address.

If you have any further questions concerning the Florida Master Site File, please contact us as below.

Sincerely,

Handwritten signature of Daniel McClarnon in black ink.

Daniel McClarnon, 850-487-2299
Data Analyst, Florida Master Site File
Division of Historical Resources
R. A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

State SunCom: 277-2299
Fax line: 850-921-0372
Email: fmsfile@mail.dos.state.fl.us
Web: <http://www.dos.state.fl.us/dhr/msf/>

DIRECTOR'S OFFICE

R.A Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • (850)488-1480

FAX: (850) 488-3353 • WWW Address <http://www.dos.state.fl.us>

ARCHAEOLOGICAL RESEARCH HISTORIC PRESERVATION HISTORICAL MUSEUMS

CULTURAL RESOURCES REPORT

SITEID	FORMNO	T-R-S	CR	SITENAME	NRLIST	SURVEY	LOCATION	OTHER
SL00092	MELD	35S/39E/28	SS	WILLIAMS, TATE HOUSE	2369	3620	ELEVEN MILE ROAD	Uses: RESI, RESI; Built: 1930
SL00094	MELD	35S/39E/34	SS	10499 MULLER ROAD	2369	10499	MULLER ROAD	Uses: RESI, RESI; Built: 1925C
SL00096	MELD	35S/39E/28	SS	DICKEY, WALTER HOUSE	2369	11065	SR 70	Uses: RESI, VACA; Built: 1920
SL00097	MELD	35S/39E/28	SS	LETTS HOUSE	2369	11006	SR 70	Uses: RESI, RESI; Built: 1920
SL00098	MELD	35S/39E/27	SS	OLD STANDARD GROWER'S HO	2369	9751	SR 70	Uses: RESI, RESI; Built: 1915C
SL00206	MELD	35S/39E/28	SS	BOYKIN HOUSE	2369	3684	11 MILE ROAD	Uses: RESI, RESI; Built: 1902C
SL01131	199702	35S/39E/28	SS	3425 MATHEWS ROAD	5175	3425	MATHEWS RD, FORT PIERCE	Uses: BSTO, RESI, RESI; Built: 1930

7 records printed.



Department of Environmental Protection

Jeb Bush
Governor

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

David B. Struhs
Secretary

Doreen B. Donovan
Environmental Consulting & Technology, Inc.
5405 Cypress Center Drive, Suite 2100
Tampa, Fl 33609

Indian River County – ERP / File No. 31-270976-001
Calpine-Blue Heron Energy Center
Informal Wetland Determination

Dear Ms. Donovan:

It was a pleasure meeting with you on June 7, 2000 at the proposed Calpine-Blue Heron Energy Center site in Section 36, Township 33 South, Range 38 East, Indian River County

The properties are situated East of Interstate 95 and west of 74th Avenue, and they encompass approximately 47 acres. The site visit consisted of reviewing wetland boundary lines that were previously established by you.

It appears based upon the site inspection, that your wetland boundary lines accurately reflect the limits of wetlands as prescribed in Section 62-340 Florida Administrative Code (F.A.C.).

Additionally, we reviewed the abandoned citrus field north of this site. At a minimum it appears that the north-south ditch system on this site will also be considered a wetland, and therefore any dredge or fill activity within this ditch will require permitting from this office. The east-west swales do not appear to contain sufficient wetland plant species, or hydric soils and/or hydrologic indicators to meet the criteria established in F.A.C. 62-340.

Permits may also be required from the Army Corps of Engineers (407-453-3020), and Indian River County (561-567-8000).

This is an informal preapplication jurisdictional determination pursuant to Sections 373 Florida Statutes (F.S.). It does not bind the Department, its agents or employees, nor does it convey any legal rights, expressed or implied. Persons obtaining this informal preapplication jurisdictional determination are not entitled to rely upon it for purposes of compliance with Sections 373 F.S., nor any other provision of law or Department rules. A binding jurisdictional determination may be obtained by petitioning the Department for a jurisdictional declaratory statement pursuant to F.A.C. Rule 62-343.040 or by applying for a dredge and fill permit.

Please contact me at the letterhead address or by calling 407/893-3307, between the hours of 8:00 a.m. and 5:00 p.m., should you have any questions.

Sincerely,

James L. Carr II
Environmental Specialist
Submerged Lands and Environmental
Resource Permitting

Date:

7/4/00

JC/dv

cc: Indian River County Environmental Planning

"More Protection, Less Process"

APPENDIX 10.7

**SEASONAL AND ANNUAL COOLING
TOWER DRIFT ANALYSIS**

Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

0 1 0 2 1 0 1 1 3 1 5
27.34 80.29 1.0 10.1 .0
18.9 42.67 803.79 13350.5
.61.62.63.61.59.55.57.56.55.56.60.60
14.3417.4020.5322.7523.0822.2122.4621.2418.6916.2714.8013.34
cd144.tap
fort.2
fort.3
fort.4
prep.out
mixht.tap

Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Wastewater Tower
0 1 0 2 1 0 1 1 3 1 5
27.34 80.29 1.0 10.1 .0
6.4 5.54 14.49 314.3
.61.62.63.61.59.55.57.56.55.56.60.60
14.3417.4020.5322.7523.0822.2122.4621.2418.6916.2714.8013.34
cd144.tap
fort.2
fort.3
fort.4
prep.out
mixht.tap

 EPRI PLUME AND DRIFT ANALYSIS SYSTEM PREPROCESSOR CODE, PRE-RELEASE VERSION 09-01-90
 CASE STUDY: Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

INPUT INFORMATION

SURFACE TAPE TYPE: CD144
 TOWER TYPE: LINEAR MECHANICAL DRAFT
 TOWER HEIGHT (M): 18.90
 TOWER DIAMETER (M): 42.67
 TOWER HEAT (KW): 803790.00
 TOWER AIR FLOW (KG/S): 13350.50
 SITE LATITUDE: 27.34
 SITE LONGITUDE: 80.29
 SITE TIME ZONE: EASTERN
 ROUGHNESS HEIGHT (CM): 1.00
 REFERENCE HEIGHT (M): 10.10

 RECORD STOPPING SWITCH: 0
 RECORD SKIPPING FACTOR: 1
 HOURLY RECORD PRINT LOG: NOT SELECTED
 BI-DAILY MIXING HEIGHT TAPE: SELECTED
 MIXING HEIGHT TYPE: RURAL
 FOGGING/ICING OPTION: SELECTED
 DRIFT OPTION: SELECTED

MONTHLY CLEARNESS INDEX

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
.610	.620	.630	.610	.590	.550	.570	.560	.550	.560	.600	.600

TOTAL DAILY SOLAR ENERGY DEPOSITION
 (LONG-TERM AVERAGE FOR MONTH)

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
14.34	17.40	20.53	22.75	23.08	22.21	22.46	21.24	18.69	16.27	14.80	13.34

1 ***** WIND SPEED FREQUENCY TABLE *****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

WIND SPEED RANGE (M/S)		*****WIND FROM*****																*****WIND HEADED*****		
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW			
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM		
0 TO 1	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1 TO 2	2	0.003	0.001	0.001	0.000	0.001	0.001	0.001	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.038
2 TO 3	3	0.011	0.004	0.003	0.002	0.004	0.006	0.007	0.007	0.015	0.009	0.010	0.011	0.013	0.009	0.014	0.017	0.014	0.143	
3 TO 4	4	0.008	0.003	0.004	0.006	0.010	0.010	0.013	0.007	0.015	0.007	0.008	0.008	0.007	0.006	0.010	0.012	0.014	0.134	
4 TO 5	5	0.006	0.003	0.008	0.011	0.023	0.017	0.017	0.008	0.012	0.005	0.005	0.006	0.005	0.005	0.007	0.009	0.014	0.147	
5 TO 6	6	0.006	0.003	0.008	0.017	0.031	0.025	0.019	0.008	0.006	0.003	0.003	0.004	0.003	0.003	0.007	0.006	0.014	0.154	
6 TO 7	7	0.005	0.005	0.010	0.016	0.032	0.027	0.022	0.010	0.005	0.002	0.002	0.002	0.003	0.003	0.005	0.006	0.014	0.154	
7 TO 8	8	0.005	0.003	0.007	0.013	0.023	0.019	0.020	0.009	0.004	0.001	0.002	0.002	0.002	0.001	0.003	0.003	0.018	0.158	
8 TO 9	9	0.002	0.001	0.003	0.007	0.014	0.011	0.009	0.005	0.002	0.001	0.000	0.000	0.001	0.001	0.001	0.002	0.059	0.159	
9 TO 10	10	0.001	0.000	0.002	0.004	0.006	0.004	0.004	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.029	0.160	
10 TO 11	11	0.001	0.000	0.001	0.003	0.004	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.161	
11 TO 12	12	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.162	
12 TO 13	13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.163	
13 TO 14	14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.164	
14 TO 15	15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.165	
15 TO 20	20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.166	
20 TO 25	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	
25 TO 30	30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.168	
30 TO OVER	OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.169	

AVERAGE	5.32220	VARIANCE	4.97086	STD DEV	2.22954
STD ERR	0.01729	SKEWNESS	1.22163	KURTOSIS	1.64048

1 ***** RELATIVE HUMIDITY FREQUENCY TABLE *****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

RELATIVE HUMIDITY		*****WIND FROM*****																	
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		

RANGE (%)		*****WIND HEADED*****																
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0	TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	TO 20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	TO 30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	TO 40	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.005
40	TO 50	0.003	0.002	0.003	0.004	0.005	0.002	0.002	0.001	0.001	0.000	0.002	0.002	0.002	0.003	0.001	0.003	0.035
50	TO 60	0.006	0.006	0.011	0.017	0.023	0.013	0.012	0.006	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.122
60	TO 70	0.008	0.005	0.014	0.028	0.046	0.033	0.030	0.016	0.007	0.003	0.004	0.004	0.005	0.004	0.006	0.007	0.219
70	TO 80	0.009	0.004	0.012	0.022	0.049	0.039	0.041	0.017	0.014	0.005	0.005	0.004	0.004	0.005	0.009	0.013	0.252
80	TO 90	0.008	0.003	0.004	0.007	0.020	0.025	0.021	0.012	0.019	0.008	0.007	0.008	0.008	0.008	0.014	0.015	0.167
90	TO 100	0.013	0.003	0.002	0.003	0.006	0.008	0.010	0.009	0.019	0.012	0.013	0.015	0.013	0.010	0.015	0.019	0.170
100	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007

 AVERAGE 74.43840 VARIANCE 211.08568 STD DEV 14.52879
 STD ERR 0.11266 SKEWNESS 1.05171 KURTOSIS 1.13648

1 *****DEW POINT TEMPERATURE FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

DEW POINT TEMP RANGE (C)		*****WIND FROM*****																
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	SUM
		*****WIND HEADED*****																
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
-45	TO -40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	TO -35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-35	TO -30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	TO -25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-25	TO -20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	TO -15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	TO -10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-10	TO -5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
-5	TO 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003
0	TO 5	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.005
5	TO 10	0.003	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.009	0.008	0.032
10	TO 15	0.010	0.006	0.012	0.017	0.021	0.005	0.003	0.001	0.002	0.001	0.001	0.002	0.003	0.005	0.010	0.016	0.117
15	TO 20	0.013	0.006	0.014	0.031	0.050	0.029	0.034	0.016	0.011	0.007	0.009	0.009	0.009	0.006	0.013	0.015	0.274
20	TO 25	0.018	0.010	0.019	0.031	0.075	0.084	0.075	0.041	0.048	0.023	0.023	0.025	0.023	0.016	0.016	0.017	0.546
25	TO 30	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.021
30	TO 35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	TO 40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	TO 45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

 AVERAGE 19.36729 VARIANCE 21.63785 STD DEV 4.65165
 STD ERR 0.03607 SKEWNESS 1.05967 KURTOSIS 1.14896

1 *****DRY BULB TEMPERATURE FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

DRY BULB TEMP RANGE (C)		*****WIND FROM*****																
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	SUM
		*****WIND HEADED*****																
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
-45	TO -40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	TO -35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-35	TO -30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	TO -25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-25	TO -20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	TO -15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	TO -10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-10	TO -5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-5	TO 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	TO 5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.003
10	TO 15	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.010	0.010	0.029
15	TO 20	0.011	0.002	0.003	0.005	0.005	0.002	0.002	0.001	0.003	0.003	0.003	0.004	0.005	0.006	0.015	0.021	0.093
20	TO 25	0.023	0.011	0.020	0.039	0.067	0.040	0.042	0.023	0.027	0.014	0.015	0.016	0.016	0.012	0.016	0.020	0.403
25	TO 30	0.010	0.008	0.019	0.031	0.062	0.064	0.057	0.030	0.029	0.012	0.013	0.012	0.011	0.008	0.007	0.007	0.382
30	TO 35	0.001	0.002	0.004	0.006	0.016	0.016	0.015	0.005	0.004	0.003	0.004	0.004	0.004	0.003	0.002	0.001	0.089
35	TO 40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	TO 45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

0.0 TO 0.2	0.076	0.071	0.001	0.038	0.348	0.096	0.017	0.000	0.000
0.2 TO 0.4	0.001	0.000	0.000	0.004	0.018	0.001	0.005	0.000	0.000
0.4 TO 0.6	0.001	0.000	0.000	0.003	0.013	0.001	0.003	0.000	0.000
0.6 TO 0.8	0.001	0.000	0.000	0.004	0.011	0.000	0.004	0.000	0.000
0.8 TO 1.0	0.001	0.000	0.000	0.003	0.009	0.001	0.004	0.000	0.000
1.0 TO 1.2	0.001	0.000	0.000	0.004	0.009	0.000	0.003	0.000	0.000
1.2 TO 1.4	0.000	0.000	0.000	0.002	0.007	0.001	0.003	0.000	0.000
1.4 TO 1.6	0.000	0.000	0.000	0.003	0.006	0.001	0.003	0.000	0.000
1.6 TO 1.8	0.000	0.000	0.000	0.002	0.005	0.000	0.003	0.000	0.000
1.8 TO 2.0	0.000	0.000	0.000	0.003	0.004	0.000	0.003	0.000	0.000
2.0 TO 2.2	0.000	0.000	0.000	0.004	0.004	0.000	0.003	0.000	0.000
2.2 TO 2.4	0.000	0.000	0.000	0.003	0.004	0.000	0.003	0.000	0.000
2.4 TO 2.6	0.000	0.000	0.000	0.003	0.004	0.000	0.003	0.000	0.000
2.6 TO 2.8	0.000	0.000	0.000	0.003	0.005	0.000	0.002	0.000	0.000
2.8 TO 3.0	0.000	0.000	0.000	0.001	0.003	0.000	0.002	0.000	0.000
3.0 TO 3.2	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.000	0.000
3.2 TO 3.4	0.000	0.000	0.000	0.002	0.003	0.000	0.002	0.000	0.000
3.4 TO 3.6	0.000	0.000	0.000	0.002	0.002	0.000	0.002	0.000	0.000
3.6 TO 3.8	0.000	0.000	0.000	0.002	0.002	0.000	0.002	0.000	0.000
3.8 TO 4.0	0.000	0.000	0.000	0.002	0.002	0.000	0.003	0.000	0.000
4.0 TO 4.2	0.000	0.000	0.000	0.001	0.002	0.000	0.001	0.000	0.000
4.2 TO 4.4	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.000	0.000
4.4 TO 4.6	0.000	0.000	0.000	0.002	0.002	0.000	0.003	0.000	0.000
4.6 TO 4.8	0.000	0.000	0.000	0.001	0.002	0.000	0.001	0.000	0.000
4.8 TO 5.0	0.000	0.000	0.000	0.002	0.002	0.000	0.001	0.000	0.000
5.0 TO 5.2	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
5.2 TO 5.4	0.000	0.000	0.000	0.002	0.002	0.000	0.001	0.000	0.000
5.4 TO 5.6	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.000	0.000
5.6 TO 5.8	0.000	0.000	0.000	0.000	0.002	0.000	0.001	0.000	0.000
5.8 TO 6.0	0.000	0.000	0.000	0.002	0.002	0.000	0.001	0.000	0.000
6.0 TO 6.2	0.000	0.000	0.000	0.000	0.002	0.000	0.001	0.000	0.000
6.2 TO 6.4	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000
6.4 TO 6.6	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
6.6 TO 6.8	0.000	0.000	0.000	0.001	0.002	0.000	0.001	0.000	0.000
6.8 TO 7.0	0.000	0.000	0.000	0.001	0.002	0.000	0.001	0.000	0.000
7.0 TO 7.2	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000
7.2 TO 7.4	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
7.4 TO 7.6	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
7.6 TO 7.8	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000
7.8 TO 8.0	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
8.0 TO 8.2	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000
8.2 TO 8.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.4 TO 8.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8.6 TO 8.8	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
8.8 TO 9.0	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
9.0 TO 9.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.2 TO 9.4	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
9.4 TO 9.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.6 TO 9.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9.8 TO 10.0	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000

*****PLUME LENGTH-K-STABILITY FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Main Towers

PLUME LENGTH RANGE (M)	STABILITY CATEGORY 1			STABILITY CATEGORY 2			STABILITY CATEGORY 3		
	K1	K2	K3	K1	K2	K3	K1	K2	K3
10.0 TO 10.4	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
10.4 TO 10.8	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.000
10.8 TO 11.2	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
11.2 TO 11.6	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
11.6 TO 12.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12.0 TO 12.4	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000
12.4 TO 12.8	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000
12.8 TO 13.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13.2 TO 13.6	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.000	0.000
13.6 TO 14.0	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
14.0 TO 14.4	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
14.4 TO 14.8	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000
14.8 TO 15.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15.2 TO 15.6	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
15.6 TO 16.0	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
16.0 TO 16.4	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000
16.4 TO 16.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16.8 TO 17.2	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
17.2 TO 17.6	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
17.6 TO 18.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18.0 TO 18.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18.4 TO 18.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18.8 TO 19.2	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000

19.2 TO 19.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19.6 TO 20.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20.0 TO 21.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21.0 TO 22.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22.0 TO 23.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23.0 TO 24.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.0 TO 25.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25.0 TO 26.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26.0 TO 27.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27.0 TO 28.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28.0 TO 29.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29.0 TO 30.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30.0 TO 31.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31.0 TO 32.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32.0 TO 33.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33.0 TO 34.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34.0 TO 35.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35.0 TO 36.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36.0 TO 37.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37.0 TO 38.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38.0 TO 39.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39.0 TO 40.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40.0 TO OVER	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000

1 CAT NUM TYPE UH WX DBT DTDZ DPT VE TE MXHT PLGT FREQ REFERENCE HEIGHT= 10. M

1	FOG	10.0	0.25	263.1	-0.010	262.6	7.9	292.3	500.	135.32	0.0000
2	FOG	15.0	0.25	263.1	-0.010	262.6	7.9	292.3	500.	171.98	0.0000
3	FOG	12.0	0.25	263.1	-0.010	263.1	7.9	292.1	500.	48.23	0.0000
4	FOG	17.0	0.25	263.1	-0.010	263.1	7.9	292.1	500.	52.80	0.0000
5	FOG	15.0	0.25	263.1	-0.010	258.6	7.9	291.9	500.	22.16	0.0000
6	FOG	12.5	0.25	273.1	-0.010	272.4	8.0	296.5	500.	66.36	0.0000
7	FOG	16.5	0.25	273.1	-0.010	269.4	8.0	296.0	500.	9.75	0.0000
8	FOG	15.0	0.25	283.1	-0.010	282.4	8.2	301.0	500.	33.29	0.0000
9	FOG	16.5	0.25	283.1	-0.010	279.4	8.2	300.3	500.	1.66	0.0000
10	FOG	15.5	0.25	293.1	-0.010	291.1	8.4	305.7	500.	0.91	0.0012
11	PLUME	3.5	0.15	302.2	-0.018	294.4	8.5	308.4	921.	0.01	0.0761
12	PLUME	2.9	0.25	299.3	-0.010	294.0	8.5	307.8	1338.	0.01	0.0381
13	PLUME	2.4	0.30	298.4	0.030	293.9	8.5	307.7	1439.	0.01	0.0171
14	PLUME	6.1	0.15	302.5	-0.018	293.8	8.5	308.3	1155.	0.01	0.0706
15	PLUME	6.1	0.25	298.8	-0.010	292.1	8.4	307.0	1379.	0.01	0.3478
16	PLUME	3.6	0.30	294.8	0.030	289.0	8.4	305.3	1266.	0.01	0.0002
17	PLUME	10.6	0.15	300.6	-0.018	292.1	8.5	307.3	1298.	0.00	0.0010
18	PLUME	9.3	0.25	298.3	-0.010	290.9	8.4	306.5	1375.	0.00	0.0958
19	PLUME	3.1	0.15	298.0	-0.018	294.8	8.5	307.9	665.	0.30	0.0009
20	PLUME	2.7	0.25	297.8	-0.010	294.5	8.5	307.8	1215.	0.20	0.0043
21	PLUME	2.3	0.30	297.2	0.030	293.6	8.5	307.3	1390.	0.18	0.0045
22	PLUME	5.3	0.15	295.9	-0.018	291.7	8.4	306.4	523.	0.10	0.0002
23	PLUME	5.5	0.25	295.8	-0.010	291.8	8.4	306.4	1231.	0.28	0.0182
24	PLUME	4.1	0.30	299.8	0.030	297.1	8.5	309.2	1626.	0.30	0.0001
25	PLUME	9.0	0.25	293.1	-0.010	288.8	8.4	304.9	1176.	0.00	0.0012
26	PLUME	3.0	0.15	297.3	-0.018	294.1	8.5	307.5	628.	0.45	0.0007
27	PLUME	2.9	0.25	297.7	-0.010	294.6	8.5	307.8	1201.	0.38	0.0034
28	PLUME	2.5	0.30	295.8	0.030	292.1	8.4	306.5	1365.	0.35	0.0031
29	PLUME	5.1	0.15	292.6	-0.018	287.4	8.3	304.3	351.	0.23	0.0001
30	PLUME	5.3	0.25	295.4	-0.010	291.6	8.4	306.3	1189.	0.45	0.0125
31	PLUME	3.6	0.30	299.3	0.030	296.5	8.5	308.9	1319.	0.40	0.0001
32	PLUME	8.7	0.25	294.3	-0.010	290.8	8.4	305.8	1117.	0.00	0.0014
33	PLUME	2.8	0.15	296.9	-0.018	294.0	8.5	307.4	617.	0.68	0.0010
34	PLUME	2.6	0.25	296.7	-0.010	293.6	8.4	307.3	1291.	0.49	0.0039
35	PLUME	4.0	0.25	295.9	-0.010	292.7	8.4	306.8	1281.	0.71	0.0232
36	PLUME	4.6	0.25	295.9	-0.010	293.0	8.4	306.9	1227.	0.97	0.0260
37	PLUME	4.0	0.25	295.1	-0.010	292.3	8.4	306.5	1213.	1.37	0.0286
38	PLUME	3.7	0.25	294.8	-0.010	292.3	8.4	306.4	1214.	1.82	0.0315
39	PLUME	3.9	0.25	294.8	-0.010	292.7	8.4	306.6	1214.	2.38	0.0289
40	PLUME	3.2	0.25	294.1	-0.010	292.2	8.4	306.3	1210.	3.21	0.0260
41	PLUME	3.4	0.25	294.6	-0.010	293.1	8.4	306.7	1229.	4.06	0.0284
42	PLUME	3.7	0.25	294.5	-0.010	293.2	8.4	306.7	1161.	5.32	0.0292
43	PLUME	3.4	0.25	293.4	-0.010	292.3	8.4	306.2	1151.	7.49	0.0286
44	PLUME	3.0	0.25	295.1	-0.010	294.5	8.4	307.4	1149.	12.01	0.0287
45	PLUME	3.9	0.25	292.9	-0.010	292.6	8.4	306.2	1062.	27.58	0.0187

MET RECORDS READ : 43824
RECORDS DISCARDED: 26304
CALM RECORDS: 889

TOTAL TO NEW FILE: 17520

fort.3
mult.out
fort.8

Blue Heron Project, FL-- Met Data (West Palm Beach Arpt)--Main Towers

2	1	1	0	1000.0	0	18	0	1	0	0
58.52				9.14						
43.89				9.14						
29.26				9.14						
14.63				9.14						
0.11				9.14						
-14.63				9.14						
-29.26				9.14						
-43.89				9.14						
-58.52				9.14						
58.52				-9.14						
43.89				-9.14						
29.26				-9.14						
14.63				-9.14						
0.11				-9.14						
-14.63				-9.14						
-29.26				-9.14						
-43.89				-9.14						
-58.52				-9.14						

3		0.0		45.0				90.0		
1	1	2	3	3	3	2	1	1	1	2
				131.67				33.53		90.0

Blue Heron Project--Typical Drift Emission Spectrum

8		378.80	0.0082	2.17
10.0		0.6000	0.0	
50.0		0.2000	0.0	
100.0		0.1000	0.0	
150.0		0.0480	0.0	
250.0		0.0364	0.0	
400.0		0.0126	0.0	
500.0		0.0019	0.0	
1000.0		0.0011	0.0	

```

fort.3
mult.out
fort.8
Blue Heron Project, FL-- Met Data (West Palm Beach Arpt)--Wastewater Tower
 2 1 1 0 10000.0      0 3 0 1 0 0
    5.90  0.11
    0.11  0.11
   -5.68  0.11
 3      0.0      45.0      90.0
 1 1 2 3 3 3 2 1 1 1 2 3 3 3 2 1
      17.37      7.62      90.0
    0.00      0.00
Blue Heron Project--Typical Drift Emission Spectrum
8      1.578  0.1040  2.17
    10.0  0.8000  0.0
    50.0  0.1000  0.0
   100.0  0.0500  0.0
   150.0  0.0240  0.0
   250.0  0.0182  0.0
   400.0  0.0063  0.0
   500.0  0.0010  0.0
  1000.0  0.0005  0.0

```


RANGE (%)		*****WIND HEADED*****																
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
0	TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	TO 20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	TO 30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.003
30	TO 40	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.005
40	TO 50	0.003	0.002	0.003	0.004	0.005	0.002	0.002	0.001	0.001	0.000	0.002	0.002	0.003	0.001	0.003	0.002	0.035
50	TO 60	0.006	0.006	0.011	0.017	0.023	0.013	0.012	0.006	0.004	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.122
60	TO 70	0.008	0.005	0.014	0.028	0.046	0.033	0.030	0.016	0.007	0.003	0.004	0.004	0.005	0.004	0.006	0.007	0.219
70	TO 80	0.009	0.004	0.012	0.022	0.049	0.039	0.041	0.017	0.014	0.005	0.005	0.004	0.004	0.005	0.009	0.013	0.252
80	TO 90	0.008	0.003	0.004	0.007	0.020	0.025	0.021	0.012	0.019	0.008	0.007	0.008	0.008	0.008	0.014	0.015	0.187
90	TO 100	0.013	0.003	0.002	0.003	0.006	0.008	0.010	0.009	0.019	0.012	0.013	0.015	0.013	0.010	0.015	0.019	0.170
100	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.007

 AVERAGE 74.43840 VARIANCE 211.08568 STD DEV 14.52879
 STD ERR 0.11266 SKEWNESS 1.05171 KURTOSIS 1.13648

1 *****DEW POINT TEMPERATURE FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Wastewater Tower

DEW POINT TEMP RANGE (C)		*****WIND HEADED*****																
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
-45	TO -40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	TO -35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-35	TO -30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	TO -25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-25	TO -20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	TO -15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	TO -10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-10	TO -5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
-5	TO 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003
0	TO 5	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.005
5	TO 10	0.003	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.001	0.032
10	TO 15	0.010	0.006	0.012	0.017	0.021	0.005	0.003	0.001	0.002	0.001	0.001	0.002	0.003	0.005	0.010	0.016	0.117
15	TO 20	0.013	0.006	0.014	0.021	0.029	0.029	0.034	0.016	0.011	0.007	0.009	0.009	0.009	0.006	0.013	0.015	0.274
20	TO 25	0.018	0.010	0.019	0.031	0.045	0.044	0.075	0.041	0.048	0.023	0.023	0.025	0.023	0.016	0.016	0.017	0.546
25	TO 30	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.021
30	TO 35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	TO 40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	TO 45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

 AVERAGE 19.36729 VARIANCE 21.63785 STD DEV 4.65165
 STD ERR 0.03607 SKEWNESS 1.05967 KURTOSIS 1.14896

1 *****DRY BULB TEMPERATURE FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Wastewater Tower

DRY BULB TEMP RANGE (C)		*****WIND HEADED*****																
		S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	SUM
-45	TO -40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-40	TO -35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-35	TO -30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-30	TO -25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-25	TO -20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-20	TO -15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-15	TO -10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-10	TO -5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-5	TO 0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	TO 5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003
10	TO 15	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.010	0.010	0.029
15	TO 20	0.011	0.002	0.003	0.005	0.005	0.002	0.002	0.001	0.003	0.003	0.003	0.004	0.005	0.006	0.015	0.021	0.093
20	TO 25	0.023	0.011	0.020	0.039	0.067	0.040	0.042	0.023	0.027	0.014	0.015	0.016	0.016	0.012	0.016	0.020	0.403
25	TO 30	0.010	0.008	0.019	0.031	0.062	0.064	0.057	0.030	0.029	0.012	0.013	0.012	0.011	0.008	0.007	0.007	0.362
30	TO 35	0.001	0.002	0.004	0.006	0.016	0.016	0.015	0.005	0.004	0.003	0.004	0.004	0.004	0.003	0.002	0.001	0.089
35	TO 40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	TO 45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
45	TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE 24.48485 VARIANCE 20.64217 STD DEV 4.54337
 STD ERR 0.03523 SKEWNESS 1.04554 KURTOSIS 1.11937

 1 *****STABILITY CLASS FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Wastewater Tower
 *****WIND FROM*****
 STABILITY CLASS N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW
 *****WIND HEADED*****
 S SSW SW WSW W WNW NW NNW N NNE NE ENE E ESE SE SSE SUM

1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.002	0.001	0.002	0.002	0.004	0.003	0.002	0.001	0.002	0.001	0.002	0.001	0.002	0.002	0.001	0.002	0.001	0.001	0.001
3	0.006	0.003	0.006	0.008	0.019	0.019	0.017	0.007	0.006	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.024
4	0.024	0.014	0.033	0.060	0.104	0.078	0.071	0.037	0.026	0.013	0.013	0.012	0.013	0.012	0.022	0.024	0.024	0.024	0.556
5	0.009	0.003	0.005	0.010	0.018	0.018	0.019	0.010	0.018	0.007	0.007	0.008	0.008	0.007	0.012	0.016	0.016	0.016	0.176
6	0.006	0.002	0.002	0.001	0.003	0.004	0.006	0.005	0.010	0.007	0.007	0.009	0.009	0.005	0.009	0.012	0.012	0.012	0.096
7	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.016

AVERAGE 4.22458 VARIANCE 0.91282 STD DEV 0.95542
 STD ERR 0.00741 SKEWNESS 1.07428 KURTOSIS 1.20741

 1 *****K FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Wastewater Tower
 *****WIND FROM*****
 K (UA/VE) RANGE N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW
 *****WIND HEADED*****
 S SSW SW WSW W WNW NW NNW N NNE NE ENE E ESE SE SSE SUM

0.0 TO 0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1 TO 0.2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
0.2 TO 0.3	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012
0.3 TO 0.4	0.004	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.004	0.003	0.005	0.004	0.005	0.004	0.005	0.006	0.006	0.006	0.049
0.4 TO 0.5	0.006	0.002	0.002	0.002	0.003	0.004	0.005	0.004	0.007	0.004	0.006	0.006	0.008	0.005	0.008	0.008	0.008	0.008	0.079
0.5 TO 0.6	0.006	0.002	0.003	0.002	0.004	0.004	0.004	0.004	0.010	0.005	0.005	0.006	0.005	0.005	0.007	0.009	0.009	0.009	0.081
0.6 TO 0.7	0.005	0.002	0.003	0.002	0.004	0.004	0.004	0.004	0.008	0.005	0.007	0.005	0.006	0.004	0.004	0.007	0.007	0.007	0.088
0.7 TO 0.8	0.003	0.002	0.005	0.007	0.013	0.011	0.010	0.005	0.007	0.004	0.003	0.004	0.003	0.002	0.004	0.006	0.006	0.006	0.090
0.8 TO 0.9	0.003	0.001	0.004	0.006	0.013	0.010	0.011	0.004	0.006	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.004	0.078
0.9 TO 1.0	0.003	0.002	0.005	0.006	0.012	0.011	0.009	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.070
1.0 TO 1.2	0.006	0.005	0.009	0.019	0.038	0.029	0.026	0.011	0.006	0.002	0.003	0.003	0.003	0.003	0.003	0.008	0.009	0.009	0.181
1.2 TO 1.4	0.004	0.003	0.009	0.015	0.026	0.025	0.023	0.010	0.006	0.002	0.002	0.002	0.002	0.001	0.004	0.004	0.004	0.004	0.138
1.4 TO 1.6	0.003	0.003	0.004	0.011	0.018	0.012	0.011	0.006	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.003	0.003	0.072
1.6 TO 1.8	0.001	0.000	0.002	0.005	0.007	0.004	0.003	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.030
1.8 TO 2.0	0.001	0.000	0.001	0.003	0.004	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017
2.0 TO 2.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
2.5 TO 3.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
3.0 TO OVER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE 0.95706 VARIANCE 0.16230 STD DEV 0.40286
 STD ERR 0.00312 SKEWNESS 1.22942 KURTOSIS 1.67320

 1 *****VSTAR FREQUENCY TABLE*****
 Blue Heron Power Plant--LMDCT--5 Yr Met Data (West Palm Beach)--Wastewater Tower
 *****WIND FROM*****
 VSTAR RANGE N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW
 *****WIND HEADED*****
 S SSW SW WSW W WNW NW NNW N NNE NE ENE E ESE SE SSE SUM

0 TO 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1 TO 2	0.036	0.022	0.046	0.080	0.145	0.117	0.109	0.054	0.049	0.022	0.023	0.025	0.028	0.023	0.034	0.039	0.039	0.039	0.852
2 TO 3	0.005	0.001	0.001	0.001	0.002	0.003	0.003	0.004	0.006	0.004	0.006	0.006	0.005	0.004	0.008	0.010	0.009	0.009	0.069
3 TO 4	0.002	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.019
4 TO 5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006
5 TO 6	0.002	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.003	0.002	0.002	0.001	0.002	0.001	0.002	0.002	0.002	0.002	0.021
6 TO 7	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.009
7 TO 8	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.011
8 TO 9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
9 TO 10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
10 TO 11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11 TO 12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 TO 13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13 TO 14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14 TO 15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15 TO 20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20 TO 25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25 TO 30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30 TO OVER	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.007

19.2 TO 19.6	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19.6 TO 20.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20.0 TO 21.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21.0 TO 22.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22.0 TO 23.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23.0 TO 24.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24.0 TO 25.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25.0 TO 26.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26.0 TO 27.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27.0 TO 28.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28.0 TO 29.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29.0 TO 30.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30.0 TO 31.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31.0 TO 32.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32.0 TO 33.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
33.0 TO 34.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
34.0 TO 35.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35.0 TO 36.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
36.0 TO 37.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
37.0 TO 38.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
38.0 TO 39.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
39.0 TO 40.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40.0 TO OVER	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1 CAT NUM	TYPE	UH	WX	DBT	DTDZ	DPT	VE	TE	MXHT	PLGT	FREQ	REFERENCE HEIGHT=	10. M						

1	FOG	10.0	0.25	263.1	-0.010	262.6	10.8	287.5	500.	259.82	0.0000		
2	FOG	15.0	0.25	263.1	-0.010	262.6	10.8	287.5	500.	264.19	0.0000		
3	FOG	12.0	0.25	263.1	-0.010	261.1	10.8	287.3	500.	46.98	0.0000		
4	FOG	17.0	0.25	263.1	-0.010	261.1	10.8	287.3	500.	39.96	0.0000		
5	FOG	15.0	0.25	263.1	-0.010	258.6	10.8	287.1	500.	14.02	0.0000		
6	FOG	12.5	0.25	273.1	-0.010	272.4	11.0	292.5	500.	67.35	0.0000		
7	FOG	16.5	0.25	273.1	-0.010	269.4	11.0	291.9	500.	4.43	0.0000		
8	FOG	15.0	0.25	283.1	-0.010	282.4	11.3	297.8	500.	21.63	0.0000		
9	FOG	16.5	0.25	283.1	-0.010	279.4	11.2	297.0	500.	0.00	0.0000		
10	FOG	15.5	0.25	293.1	-0.010	291.1	11.5	303.2	500.	0.00	0.0000		
11	PLUME	4.2	0.15	301.9	-0.018	294.1	11.7	306.0	976.	0.01	0.1274		
12	PLUME	3.9	0.25	298.2	-0.010	293.2	11.6	305.0	1345.	0.01	0.1798		
13	PLUME	2.4	0.30	297.4	0.030	293.7	11.6	305.0	1410.	0.01	0.0378		
14	PLUME	7.7	0.15	302.9	-0.018	294.3	11.7	306.3	1225.	0.01	0.0234		
15	PLUME	7.1	0.25	298.3	-0.010	291.6	11.6	304.3	1355.	0.01	0.3791		
16	PLUME	17.5	0.15	296.5	-0.018	294.8	11.6	305.3	1769.	0.00	0.0001		
17	PLUME	12.1	0.25	297.7	-0.010	289.5	11.6	303.4	1455.	0.01	0.0086		
18	PLUME	3.9	0.15	301.7	-0.018	294.4	11.7	306.1	1164.	0.01	0.0017		
19	PLUME	3.4	0.25	295.4	-0.010	292.9	11.6	304.3	1270.	0.20	0.0085		
20	PLUME	2.2	0.30	295.4	0.030	292.8	11.6	304.3	1398.	0.16	0.0044		
21	PLUME	6.7	0.15	305.9	-0.018	293.1	11.7	306.3	1468.	0.23	0.0001		
22	PLUME	6.9	0.25	293.9	-0.010	290.7	11.5	303.1	1094.	0.08	0.0049		
23	PLUME	3.4	0.15	299.5	-0.018	294.2	11.7	305.6	1054.	0.01	0.0006		
24	PLUME	3.4	0.25	295.7	-0.010	293.4	11.6	304.6	1229.	0.32	0.0096		
25	PLUME	2.1	0.30	296.4	0.030	294.3	11.6	305.1	1403.	0.37	0.0055		
26	PLUME	8.7	0.15	307.0	-0.018	294.8	11.8	307.2	1485.	0.38	0.0001		
27	PLUME	6.9	0.25	292.1	-0.010	288.3	11.5	301.8	1081.	0.11	0.0040		
28	PLUME	11.8	0.25	292.6	-0.010	290.4	11.5	302.7	1067.	0.58	0.0001		
29	PLUME	4.6	0.15	302.2	-0.018	294.8	11.7	306.3	1167.	0.02	0.0008		
30	PLUME	3.4	0.25	295.4	-0.010	293.2	11.6	304.5	1107.	0.47	0.0091		
31	PLUME	2.4	0.30	295.2	0.030	293.0	11.6	304.3	1364.	0.50	0.0051		
32	PLUME	6.9	0.15	307.0	-0.018	294.8	11.8	307.2	1689.	0.55	0.0001		
33	PLUME	7.1	0.25	293.2	-0.010	290.3	11.5	302.8	991.	0.44	0.0039		
34	PLUME	6.2	0.30	297.0	0.030	295.3	11.7	305.7	914.	0.85	0.0001		
35	PLUME	3.6	0.15	295.3	-0.018	293.2	11.6	304.4	879.	0.85	0.0003		
36	PLUME	3.6	0.25	295.2	-0.010	293.0	11.6	304.3	1207.	0.58	0.0070		
37	PLUME	2.4	0.30	295.9	0.030	294.0	11.6	304.9	1392.	0.70	0.0034		
38	PLUME	6.7	0.25	293.5	-0.010	291.0	11.5	303.2	1136.	0.56	0.0037		
39	PLUME	4.1	0.25	294.0	-0.010	291.8	11.6	303.6	1184.	0.91	0.0100		
40	PLUME	3.7	0.25	293.3	-0.010	291.3	11.5	303.3	1180.	1.40	0.0269		
41	PLUME	3.1	0.25	295.5	-0.010	294.1	11.6	304.9	1261.	2.20	0.0301		
42	PLUME	4.0	0.25	294.4	-0.010	293.1	11.6	304.2	1135.	3.30	0.0281		
43	PLUME	3.3	0.25	293.1	-0.010	292.0	11.5	303.5	1181.	5.83	0.0292		
44	PLUME	3.2	0.25	295.2	-0.010	294.7	11.6	305.1	1112.	13.26	0.0288		
45	PLUME	3.1	0.25	292.6	-0.010	292.3	11.5	303.5	1098.	38.53	0.0179		

MET RECORDS READ : 43824
RECORDS DISCARDED: 26304
CALM RECORDS: 889

TOTAL TO NEW FILE: 17520

***** PLUME SALT DEPOSITION TABLE (KG./(KM.**2-MO.)) *****
 Blue Heron Project, FL-- Met Data (West Palm Beach Arpt)--Wastewater Tower
 SEASON=ANNUAL

DISTANCE FROM TOWER (M)	WIND FROM																ALL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	PLUME HEADED																AVG
	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	
100.	72.86	47.88	28.58	51.96	79.58	60.51	61.07	139.72	93.43	46.51	24.73	17.43	20.89	16.74	21.46	75.83	53.70
200.	30.65	17.62	16.18	44.41	69.15	52.73	36.87	52.26	42.46	21.60	15.08	14.32	17.11	13.74	15.78	35.85	30.99
300.	7.98	4.21	5.72	8.10	15.03	12.96	14.97	11.27	11.19	5.47	4.49	5.21	5.33	4.05	6.19	9.94	8.26
400.	7.69	4.14	1.87	6.05	10.83	9.30	5.44	10.81	10.54	5.21	2.15	3.03	3.14	2.22	2.75	9.37	5.91
500.	6.80	3.53	1.33	5.61	10.01	8.00	3.50	9.23	9.20	4.36	1.13	1.64	1.73	1.30	1.67	8.06	4.82
600.	3.40	1.30	1.31	5.61	10.01	8.00	3.42	2.92	4.75	2.58	1.11	1.64	1.73	1.30	1.56	4.87	3.47
700.	0.80	0.33	1.30	3.07	5.53	4.60	3.39	0.65	1.11	0.67	1.11	1.40	1.44	1.09	1.51	1.04	1.82
800.	0.26	0.09	1.29	0.69	1.28	1.35	3.34	0.27	0.47	0.27	0.98	1.07	1.07	0.81	1.41	0.46	0.94
900.	0.23	0.07	1.26	0.68	1.22	1.29	3.22	0.26	0.41	0.23	0.86	0.89	0.91	0.69	1.29	0.41	0.87
1000.	0.23	0.07	1.11	0.54	0.99	0.91	2.69	0.26	0.41	0.22	0.64	0.58	0.58	0.48	1.05	0.41	0.70
1100.	0.23	0.07	1.11	0.54	0.99	0.90	2.69	0.26	0.41	0.22	0.64	0.58	0.57	0.48	1.05	0.41	0.70
1200.	0.23	0.07	1.26	0.68	1.22	1.29	3.22	0.26	0.41	0.22	0.56	0.55	0.54	0.45	0.86	0.41	0.57
1300.	0.23	0.07	0.23	0.50	0.92	0.80	0.67	0.26	0.41	0.22	0.36	0.48	0.48	0.40	0.53	0.41	0.44
1400.	0.23	0.07	0.06	0.19	0.35	0.31	0.29	0.26	0.41	0.22	0.24	0.20	0.19	0.12	0.34	0.41	0.24
1500.	0.23	0.07	0.04	0.12	0.21	0.18	0.19	0.26	0.41	0.22	0.12	0.08	0.08	0.06	0.14	0.41	0.18
1600.	0.22	0.06	0.04	0.12	0.21	0.18	0.17	0.24	0.40	0.20	0.06	0.08	0.08	0.06	0.07	0.38	0.16
1700.	0.22	0.06	0.04	0.12	0.21	0.18	0.17	0.24	0.39	0.19	0.06	0.08	0.08	0.06	0.07	0.36	0.16
1800.	0.21	0.06	0.04	0.12	0.21	0.18	0.17	0.23	0.37	0.18	0.06	0.08	0.08	0.06	0.07	0.34	0.15
1900.	0.19	0.05	0.03	0.12	0.21	0.18	0.15	0.23	0.34	0.15	0.06	0.08	0.08	0.06	0.07	0.30	0.14
2000.	0.19	0.05	0.03	0.12	0.21	0.18	0.10	0.23	0.34	0.15	0.06	0.08	0.08	0.06	0.06	0.30	0.14
2100.	0.10	0.03	0.03	0.12	0.21	0.18	0.10	0.10	0.15	0.07	0.06	0.08	0.08	0.06	0.06	0.17	0.10
2200.	0.07	0.02	0.03	0.12	0.21	0.18	0.10	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.14	0.09
2300.	0.07	0.02	0.03	0.12	0.21	0.18	0.10	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.13	0.09
2400.	0.07	0.02	0.03	0.12	0.21	0.18	0.10	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.13	0.09
2500.	0.07	0.02	0.03	0.12	0.21	0.18	0.10	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.13	0.09
2600.	0.07	0.02	0.03	0.12	0.21	0.18	0.10	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.13	0.09
2700.	0.07	0.02	0.03	0.12	0.21	0.18	0.10	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.13	0.09
2800.	0.07	0.02	0.03	0.12	0.21	0.18	0.09	0.06	0.10	0.05	0.06	0.08	0.08	0.06	0.06	0.13	0.09
2900.	0.07	0.02	0.03	0.12	0.21	0.18	0.09	0.06	0.10	0.05	0.05	0.08	0.08	0.06	0.06	0.13	0.09
3000.	0.07	0.02	0.03	0.11	0.21	0.18	0.09	0.06	0.10	0.05	0.04	0.07	0.07	0.05	0.06	0.13	0.08
3100.	0.07	0.02	0.03	0.11	0.20	0.18	0.09	0.06	0.10	0.05	0.04	0.06	0.07	0.05	0.05	0.12	0.08
3200.	0.06	0.02	0.02	0.11	0.20	0.17	0.08	0.05	0.08	0.04	0.03	0.06	0.06	0.04	0.04	0.10	0.07
3300.	0.05	0.02	0.02	0.11	0.20	0.17	0.08	0.04	0.07	0.04	0.03	0.05	0.06	0.04	0.04	0.09	0.07
3400.	0.05	0.02	0.02	0.11	0.20	0.17	0.08	0.04	0.06	0.03	0.03	0.05	0.05	0.04	0.04	0.07	0.07
3500.	0.04	0.01	0.02	0.11	0.20	0.17	0.08	0.04	0.06	0.03	0.03	0.05	0.05	0.04	0.04	0.06	0.06
3600.	0.04	0.01	0.02	0.11	0.20	0.17	0.08	0.03	0.06	0.03	0.03	0.05	0.05	0.04	0.04	0.06	0.06
3700.	0.04	0.01	0.02	0.11	0.20	0.17	0.06	0.03	0.06	0.03	0.02	0.05	0.05	0.03	0.03	0.06	0.06
3800.	0.04	0.01	0.00	0.10	0.17	0.14	0.01	0.03	0.06	0.03	0.00	0.02	0.02	0.02	0.00	0.06	0.05
3900.	0.04	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.06	0.03	0.00	0.01	0.01	0.01	0.00	0.06	0.04
4000.	0.03	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.05	0.02	0.00	0.01	0.01	0.01	0.00	0.04	0.04
4100.	0.02	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.04	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.04
4200.	0.02	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.04	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.04
4300.	0.02	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.04	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.04
4400.	0.02	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.04	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.04
4500.	0.02	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.04	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.04
4600.	0.02	0.01	0.00	0.10	0.17	0.12	0.01	0.03	0.04	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.04
4700.	0.01	0.01	0.00	0.10	0.17	0.12	0.01	0.01	0.02	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.03
4800.	0.00	0.00	0.00	0.10	0.17	0.12	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.03
4900.	0.00	0.00	0.00	0.10	0.17	0.12	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.03
5000.	0.00	0.00	0.00	0.10	0.17	0.12	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.03

APPENDIX 10.8

PROPOSED NATURAL GAS PIPELINE PLANS

APPENDIX 10.8.1

**UPLAND EROSION CONTROL, REVEGETATION,
AND MAINTENANCE PLAN**

APPENDIX 10.8.1

PROPOSED NATURAL GAS PIPELINE

**UPLAND EROSION CONTROL, REVEGETATION,
AND MAINTENANCE PLAN**

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN

PRECONSTRUCTION FILING

- A. Before construction begins on a project that will disturb more than 5 acres of land, Calpine will file an Storm Water Pollution Prevention Plan prepared for compliance with the U.S. Environmental Protection Agency's National Storm Water Program General Permit requirements. This plan must be available in the field on each construction spread and shall include a Spill Prevention, Containment, and Countermeasure Plan.

SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during active construction or restoration.
2. Environmental Inspectors shall have peer status with all other activity inspectors.
3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the permits or other authorizations and order corrective action.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Ensuring compliance with the requirements of this Plan, the Procedures, the environmental conditions of the Florida Department of Environmental Protection/U.S. Army Corps of Engineers (DEP/COE) permit, the mitigation measures proposed by the applicant, and other environmental permits and approvals;
2. Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;
3. Verifying the location of drainage and irrigation systems;
4. Identifying stabilization needs in all areas;
5. Locating dewatering structures and slope breakers to ensure they will not direct water into known cultural resources sites or locations of sensitive species;
6. Verifying that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge into a wetland or water body. If such deposition is occurring, the dewatering activity shall be stopped and the design of the discharge shall be changed to prevent reoccurrence;

7. Testing subsoil and topsoil in agricultural and residential areas to measure compaction and determine the need for corrective action;
8. Advising the Chief Inspector when conditions (such as wet weather) make it advisable to restrict construction activities in agricultural areas;
9. Ensuring restoration of contours and topsoil;
10. Approving imported soils for use in agricultural and residential areas;
11. Ensuring that temporary erosion controls are properly installed and maintained, daily if necessary;
12. Inspecting temporary erosion control measures at least:
 - on a daily basis in areas of active construction or equipment operation;
 - on a weekly basis in areas with no construction or equipment operation; and
 - within 24 hours of each 0.5 inch of rainfall;
13. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification;
14. Keeping records of compliance with the environmental conditions; and
15. Establishing a program to monitor the success of restoration. Implementation of this program may be transferred to the company's operating section upon completion of construction and restoration activities.

PRECONSTRUCTION PLANNING

The project sponsor shall do the following before construction:

A. DRAIN TILE AND IRRIGATION SYSTEMS

1. Contact landowners to locate fields containing drainage tiles and irrigation systems.
2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.

B. GRAZING DEFERMENT

Develop grazing deferment plans with willing landowners, grazing permittee, and land management agencies to minimize grazing disturbance of revegetation efforts.

C. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

D. DISPOSAL PLANNING

Determine methods and locations for the disposal of timber, slash, chips, and excess rock. Off-site disposal is subject to compliance with all applicable survey and mitigation requirements.

E. AGENCY COORDINATION

1. Coordinate with all of the appropriate agencies.
2. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding erosion control and revegetation specifications, both temporary and permanent. Have available all written recommendations from these or other agencies for erosion control and revegetation specifications at the project location.
3. Develop specific procedures in coordination with the appropriate agency to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Confine construction activity and ground disturbance to approved areas with the exception of storm water diversion structures, and the associated discharge, required as part of sound erosion control best management practices.
2. The construction right-of-way shall not exceed that described in the project sponsor's application unless otherwise modified by a permit condition. However, additional construction right-of-way may be used (subject to compliance with all applicable survey and mitigation requirements) in limited areas for full right-of-way width topsoil segregation or where topographic conditions, such as side-slopes, require it to ensure safe construction.

B. TOPSOIL SEGREGATION

1. Use topsoil segregation methods in all residential areas and when the construction right-of-way is wider than 30 feet in:
 - annually cultivated or rotated agricultural lands (except pasture);
 - hayfields; and
 - other areas at the landowner's request.
2. Prevent the mixing of topsoil with subsoil by stripping topsoil from the trench and subsoil storage area (ditch plus spoilsides method).
3. In residential areas topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation.

4. In deep soils (more than 12 inches of topsoil), segregate at least 12 inches of topsoil. In soils with less than 12 inches of topsoil make every effort to segregate the entire topsoil layer.

C. DRAIN TILES

1. Mark drain tile locations identified during construction.
2. Probe all drainage tile systems within the area of disturbance to check for damage.
3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.
4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems or develop alternate drain tile configurations which result in the same or better quality of drainage while accommodating the installation of the pipeline. For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe conditions at all road crossings in accordance with the road crossing plans.
2. If crushed stone access pads are used in residential or active agricultural areas, place the stone on synthetic fabric to facilitate removal.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers
 - a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.
 - b. Construct temporary slope breakers using the written recommendations of the local soil conservation authorities. In the absence of these recommendations, install temporary slope breakers at the following spacing:

<u>Slope (%)</u>	<u>Spacing (feet)</u>
5 - 15	300
>15 - 30	200
>30	100

- c. Extend each temporary slope breaker marginally off of the disturbed right-of-way so that the outfall exits onto a stable, well vegetated area. If a stable well vegetated area does not exist, construct a energy dissipater at the end of the slope breaker.
- d. Inspect and maintain temporary slope breakers.
- e. Slope breakers are not to be installed where right-of-way grading, spoil pile placement and /or ditch configurations preclude the stable diversion of runoff beyond the construction right-of-way. In such cases, run-off will be managed on the construction right-of-way utilizing available discharge opportunities.

2. Sediment Barriers

- a. Sediment barriers are intended to stop the flow of sediment. They may be constructed of materials such as silt fence, staked hay or straw bales, or sand bags.
- b. Install temporary sediment barriers at the base of slopes which are in excess of 10 percent and within 50 feet of road crossings until disturbed vegetation has been re-established.
- c. Install temporary sediment barriers at appropriate locations to prevent siltation into water bodies or wetlands crossed by or near the construction work area (as required in the Procedures).
- d. Inspect and maintain all temporary sediment barriers.
- e. Maintain all temporary sediment barriers in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, water bodies, or roads are stabilized.
- f. Remove temporary sediment barriers from an area when that area is successfully restored.
- g. Small openings are to be left in the sediment barriers to allow temporary and permanent slope breakers to exit the right-of-way.

3. Mulch

- a. Mulch is intended to stabilize the soil surface. Mulch can consist of straw, erosion control fabric, or some functional equivalent.
- b. Apply mulch in accordance with the specifications outlined in this section except, if mulching before seeding, increase mulch application on all slopes within 100 feet of water bodies and wetlands to a rate of 3 tons/acre.
- c. Mulch before seeding if:
 - final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 10 days after the trench in that area is backfilled; or
 - construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions;
- d. On all dry, sandy sites and slopes greater than 8 percent, spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority makes other recommendations in writing. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).
- e. If a mulch blower is used, the strands of the mulching material shall be at least 8 inches long to allow anchoring.
- f. Ensure that mulch is anchored to minimize loss by wind and water.
- g. When anchoring by mechanical means, use a mulch anchoring tool to properly crimp the mulch to a depth of 2 to 3 inches.
- h. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or water bodies.
- i. Install erosion control fabric, such as jute thatching or bonded fiber blankets, at a minimum, on water body banks at the time of final bank recontouring. Anchor the erosion control fabric with staples or other appropriate devices.
- j. In agricultural land, mulch requirements shall be determined in consultation with the landowner and the soil conservation service.

RESTORATION

A. CLEANUP

1. Make every effort to complete final cleanup of an area (including final grading and installation of permanent erosion control structures) within 10 days after backfilling the trench in that area. If this schedule cannot be met, final cleanup must be com-

pleted as soon as possible. In no case shall final cleanup be delayed beyond the end of the next recommended seeding season.

2. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed and inspected and maintained. When access is no longer required the travel lane must be removed and the right-of-way restored.
3. Excess rock, including blast rock may be used to backfill the trench to the top of the existing bedrock profile.
4. Remove excess rock from at least the top 12 inches of trench backfill areas to the extent practicable in all rotated and permanent cropland, hayfields, pastures, residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. Make diligent efforts to remove stones greater than 4 inches if the off right-of-way areas do not contain stones greater than 4 inches. The landowner may approve other rock size provisions in writing.
5. Remove construction debris from the right-of-way and grade the right-of-way to leave the soil in the proper condition for planting.

B. PERMANENT EROSION CONTROL DEVICES

1. Trench Breakers

- a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.
- b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and up-slope of permanent slope breakers.
- c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required or as directed by an engineer or similarly qualified professional.
- d. Install trench breakers at the base of slopes which are in excess of 10 percent within 50 feet of water bodies and wetlands and where needed to avoid draining of a wetland or as directed by an engineer or similarly qualified professional.

2. Permanent Slope Breakers

- a. Permanent slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Permanent slope breakers may be constructed of materials such as soil and sand bags.

- b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns and other areas indicated by the landowner, using the spacing recommendations obtained from the local soil conservation authority. In the absence of written recommendations, use the spacing for temporary slope breakers provided in previous section.
- c. Construct slope breakers with a 2 to 8 percent outslope to divert surface flow to a stable area. In the absence of a stable area, construct appropriate energy-dissipating devices off the construction right-of-way. Where slope breakers extend beyond the edge of the construction right-of-way to direct runoff into stabilized areas, they are subject to compliance with all applicable survey requirements.

C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to identify approximate pre-construction conditions. Use COE-style cone penetrometers or other appropriate devices to conduct tests.
2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. Alternatively, make arrangements with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.
3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General
 - a. The project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities.
 - b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.
2. Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority or land management agencies. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as possible after application.

3. Seeding Requirements

- a. Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.
- b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or land management agencies, except in upland areas where landowners request alternative seed mixes. Seeding and mulching in cultivated cropland shall conform with the adjacent off right-of-way area unless otherwise requested by the landowner in writing.
- c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Lawns may be seeded on a schedule established with the landowner.
- d. Seed slopes steeper than 33 percent immediately after final grading, weather permitting.
- e. Seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting.
- f. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.
- g. Treat legume seed with an inoculant specific to the species. For conventional seeding, use 4 times the manufacturer's recommended rate of inoculant. For hydroseeding, use 10 times the recommended rate of inoculant.
- h. Uniformly apply and cover seed in accordance with the written recommendations of the local soil conservation authorities or land management agencies.
- i. In the absence of recommendations referred to above, a seed drill equipped with a cultipacker is preferred for application, but broadcast or hydroseeding can be used at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding.

OFF-ROAD VEHICLE CONTROL

To each owner or manager of forested lands offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

- signs;
- fences with locking gates;
- slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and
- conifers or other appropriate trees or shrubs across the right-of-way.

POST-CONSTRUCTION ACTIVITIES

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas after the first and second growing seasons to determine the success of revegetation.
2. Monitor crops for at least 2 years to determine the need for additional restoration.
3. Revegetation shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation (or crops in cultivated cropland) are similar in density and cover to adjacent undisturbed lands. If vegetative cover and density are not similar or there are excessive noxious weeds after two full growing seasons, a professional agronomist shall determine the need for additional restoration measures (such as fertilizing or reseeding). Implement the measures recommended by the agronomist.
4. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in active agricultural areas.
5. Routine vegetation maintenance clearing shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in a herbaceous state. In no case shall routine vegetation maintenance clearing occur between April 15 and August 1 of any year.
6. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, revegetation is successful, and all temporary erosion control devices are removed.
7. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and vehicle trails as necessary.

B. REPORTING

1. The project sponsor shall maintain records that identify by milepost:
 - a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
 - b. acreage treated;
 - c. dates of backfilling and seeding; and
 - d. names of landowners requesting special seeding treatment and a description of the follow-up actions.

APPENDIX 10.8.2

**WETLAND AND WATER BODY CONSTRUCTION
AND MITIGATION PROCEDURES**

APPENDIX 10.8.2

PROPOSED NATURAL GAS PIPELINE

**WETLAND AND WATER BODY CONSTRUCTION AND
MITIGATION PROCEDURES**

ENVIRONMENTAL INSPECTORS

- A. At least one Environmental Inspector having knowledge of the wetland and water body conditions in the project area is required for each construction spread.
- B. The Environmental Inspector's responsibilities are outlined in the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

PRECONSTRUCTION PLANNING

A. SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE (SPCC) PLAN

Prepare a SPCC Plan that, at a minimum:

1. Identifies typical fuel, lubricants, and hazardous materials stored or used in the project area, and the location, quantity, and method of storage;
2. Describes the preventive and mitigative measures to avoid or minimize impacts of spills of fuel, lubricants, or hazardous materials, especially within any municipal watershed area or within 100 feet of any water body or wetland;
3. Requires fueling and lubricating to be done in areas designated for such purposes and specifies measures to avoid or minimize spills when construction equipment (such as pontoon-mounted backhoes and pumps) will be refueled in or within 100 feet of any water body or wetland;
4. Identifies emergency notification procedures in the event of a spill;
5. Requires each construction crew to have sufficient supplies of absorbent and barrier materials on-hand to allow the rapid containment and recovery of any spills;
6. Includes procedures for collection and disposal of waste generated during spill cleanup or equipment maintenance;
7. Includes procedures regarding excavation and disposal of any soil or materials contaminated by a spill; and
8. Identifies names and telephone numbers of all state agencies and individuals that will be contacted in the event of a spill.

B. AGENCY COORDINATION

Coordinate with the appropriate agencies as specified in other sections of this document.

WATER BODY CROSSINGS

A. NOTIFICATION PROCEDURES AND PERMITS

1. Obtain permits from the U.S. Army Corps of Engineers (COE), Florida Department of Environmental Protection (FDEP) or South Florida Water Management District (SFWMD), and counties as appropriate of the proposed construction activities.
2. Notify state authorities that request such notification at least 48 hours before beginning trenching or blasting within the water body.

B. INSTALLATION

1. Time Window for Construction

Unless expressly permitted or further restricted by the appropriate state agency in writing on a site-specific basis, crossings must be constructed during the following time windows:

2. Extra Work Areas

- a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water body boundaries, where topographic conditions permit. If topographic conditions do not permit a 50-foot setback, these areas must be located at least 10 feet from the water's edge.
- b. Limit clearing of vegetation between extra work areas and the edge of the water body to the approved construction right-of-way.
- c. Limit the size of extra work areas to the minimum needed to construct the water body crossing.

3. General Crossing Procedures

- a. Comply with section 404 permit program terms and conditions (33 CFR Part 330) and FDEP or SFWMD permit conditions.
- b. Construct crossings as close to perpendicular to the axis of the water body channel as engineering and routing conditions permit.
- c. If the pipeline parallels a water body, attempt to maintain at least 15 feet of undisturbed vegetation between the water body and the right-of-way except at the crossing location.
- d. Where water bodies meander or have multiple channels, route the pipeline to minimize the number of water body crossings.

- e. Maintain adequate flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.
 - f. Do not store hazardous materials, chemicals, fuels, lubricating oils, within 100 feet of any water body or within any designated municipal watershed area (except at locations designated for these purposes by an appropriate governmental authority).
 - g. Attempt to refuel all construction equipment at least 100 feet from any water body. If construction equipment must be refueled within 100 feet of a water body, follow the procedures outlined in the project-specific SPCC Plan.
4. Spoil Pile Placement and Control
- a. All spoil from minor and intermediate water body crossings less than 50 feet in width, and upland spoil from major water body crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas.
 - b. Use sediment barriers to prevent the flow of spoil into any water body.
5. Equipment Bridges
- a. Only clearing equipment may cross water bodies before installation of equipment bridges. Limit the number of such crossings of each water body to one per piece of equipment.
 - b. Construct equipment bridges using one of the following methods
 - (1) equipment pads and culvert(s) where culverts are necessary to support the equipment pads;
 - (2) clean rockfill, timber rip rap, and/or sand bags and culvert(s);
 - (3) Salvaged flat bed rail cars or equivalent, or
 - (4) flexi-float or portable bridges.
- Do not use soil to construct or stabilize equipment bridges.
- c. Design and maintain each equipment bridge to accommodate the highest flow reasonably expected to occur while the bridge is in place as determined by historical records for the expected construction period or by an engineer in consultation with applicable state agencies and the COE.
 - d. Maintain equipment bridges to prevent soil from entering the water body.

- e. Remove equipment bridges as soon as possible after permanent seeding unless the COE and/or FDEP authorize it as a permanent bridge.
 - f. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove equipment bridges as soon as possible after final cleanup.
6. Dam-and-Pump
- a. The dam-and-pump method may be used without prior approval for crossings of minor water bodies where fluming is not required by these procedures.
7. Crossings of Minor Water Bodies
- a. For crossings of all state-designated fisheries, all construction equipment must cross the water body on an equipment bridge.
 - b. Equipment bridges are not required at minor water bodies that do not have a state-designated fishery classification (for example, agricultural or intermittent drainage ditches). Gulfstream may install timber mats or similar support to stabilize the channel bottom at the point of crossing.
 - c. For crossings of warmwater fisheries considered significant by the state, route water body flow across the trench using a flume pipe, and install the pipeline using all of the following "dry-ditch" techniques:
 - (1) install flume pipe after blasting, but before trenching;
 - (2) use sand bag or sand bag and plastic sheeting diversion structure, or equivalent;
 - (3) properly align flume pipe;
 - (4) do not remove flume pipe during trenching, pipelaying, or backfilling activities; and
 - (5) remove all flume pipes and dams that are not also part of the equipment after final cleanup but before permanent seeding.

This requirement is only applicable where the topography allows the use of a pipe string which can be manipulated under the installed flumes and to streams where the monthly mean flow can be accommodated by 42- inch flume pipes based on inlet control and a safety factor of 1.3.

- d. For all other minor water body crossings, complete construction in the water body (not including blasting) within 24 hours. Limit use

of equipment operating in the water body to that needed to construct the crossing.

8. Crossings of Intermediate Water Bodies

- a. Limit use of equipment operating in the water body to that needed to construct the crossing.
- b. All other construction equipment must cross on an equipment bridge.
- c. Attempt to complete trenching and backfill work within the water body (not including blasting) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible.

9. Crossings of Major Water Bodies

- a. All major water body crossings must be constructed in accordance with the measures contained in these Procedures to the maximum extent practicable.
- b. Calpine shall develop and file with the Secretary detailed, site-specific construction procedures (including scaled drawings identifying all areas to be disturbed by construction) for each major water body crossing for review and written approval by the COE/FDEP before construction.

10. Temporary Erosion and Sediment Control

Install sediment barriers immediately after initial disturbance of the water body or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration or of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

- a. Install sediment barriers across the entire construction right-of-way at all water body crossings with provisions to access any equipment bridges present.
- b. Where water bodies are adjacent to the construction right-of-way, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the right-of-way.
- c. Use trench plugs at all non-flumed water body crossings to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the water body.

Trench plugs must be of sufficient size to withstand upslope water pressure.

11. Trench Dewatering

Dewater trench in such a manner that no heavily silt-laden water flows into any water body.

C. RESTORATION

1. Stabilize water body banks and install temporary sediment barriers within 24 hours of completing the crossing. For dry ditch crossings, complete bank stabilization before returning flow to the water body channel.
2. Return all water body banks to preconstruction contours or to a stable configuration when the pre-construction contour was deemed unstable by an engineer or similarly qualified personnel.
3. Application of riprap must comply with section 404 permit program terms and conditions (33 CFR Part 330) and FDEP permit conditions.
4. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as flexible channel liners.
5. Revegetate disturbed riparian areas with conservation grasses and legumes or native plant species, preferably woody species.
6. Remove all temporary sediment barriers when restoration of adjacent upland areas is successful.
7. For each water body crossed, install a permanent slope breaker and a trench breaker at the base of slopes near the water body. Locate the trench breaker immediately upslope of the slope breaker. This requirement is not applicable where the slope breaker must be installed on cultivated land or where the approach slope does not exceed 10 percent within 50 feet of the water body.

D. POST-CONSTRUCTION MAINTENANCE

1. Limit vegetation maintenance adjacent to water bodies to allow a riparian strip at least 25 feet wide, as measured from the water body's mean high water mark, to permanently revegetate with native plant species across the entire right-of-way. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state. In addition, trees that are located within 15 feet of the pipeline that are greater than 15 feet in height may be cut and removed from the right-of-way.

2. Do not use herbicides or pesticides in or within 100 feet of a water body except as specified by the appropriate land management or state agency.

WETLAND CROSSINGS

A. GENERAL

1. Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. In addition, locate the new pipeline no more than 35 to 50 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.

Calpine is proposing the use of three techniques to effect wetland crossings. The three techniques include:

Type I Dry or Moist Wetlands with Low Groundwater Level—Unsaturated or cohesive soils where equipment can traverse the wetland without the support of mats and the trench is stable. Topsoil stripping is possible.

Type II Saturated, Non-Cohesive Soils—Difficult trenching conditions where trench widths for a 36-inch pipeline can readily approach 40 feet in width and supplemental support in the form of timber rip-rap or prefabricated equipment mats is required. Topsoil stripping is impossible due to saturation.

Type III Flooded Wetland—Areas of standing surface water or groundwater at the surface. Supplemental support is required for excavation equipment only. All other equipment must move around. Topsoil stripping is impossible due to the flooded conditions.

Techniques will be selected based on site specific wetland conditions. Workspace requirements within the wetlands for each of the three techniques are as follows:

24 Inch Pipe

	Workspace	Reason
Type I	95 feet working right-of-way	topsoil stripping, general spread access
Type II	95 feet working right-of-way	wide unstable ditch; large and unstable spoil pile
Type III	75 feet working right-of-way in the wetland with extra workspace required in an adjacent upland area or Type I or II wetland to stage the crossing	Push-Ditch construction, pipe make-up in staging area, general spread access across wetland not needed

16 Inch Pipe

	Work space	Reason
Type I	80 feet working right-of-way	Topsoil stripping, general spread access necessary
Type II	80 feet working right-of-way	Wide unstable ditch; large and unstable spoil pile
Type III	75 feet working right-of-way in the wetland with extra work space required in an adjacent upland area or Type I or II Wetland to stage the crossing	Push-Ditch construction, pipe make-up in staging area, general spread access across wetland not needed.

Wetland requirements, including work space limitations are not applicable to farmed wetlands which are, or have been, cultivated. For these farmed wetlands, the normal working right-of-width of 95 feet for 24 inch pipe (80 feet for 16 inch) and normal upland construction with topsoil stripping will be utilized.

4. Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations.

C. INSTALLATION

1. Extra Work Areas and Access Roads

- a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, where topographic conditions permit. If topographic conditions do not permit a 50-foot setback, these areas must be located at least 10 feet from the wetland's edge. This requirement is not applicable where the wetland is adjacent to a water body crossing where extra workspace is required for spoil stockpiles and staging of the water body crossing.
- b. Limit clearing of vegetation between extra work areas and the edge of the wetland to the approved construction right-of-way.
- c. Limit the size of extra work areas to the minimum needed to construct the wetland crossing.
- d. The only access roads, other than the construction right-of-way, that can be used in wetlands are those existing roads that can be used with no modification and no impact on the wetland.

2. Crossing Procedures

- a. Comply with FDEP/SFWMD and section 404 nationwide permit program terms and conditions (33 CFR Part 330).

- b. For Type III wetlands assemble the pipeline in an upland area and use “push-pull” or “float” techniques to place pipe in trench where water and other site conditions allow.
- c. Minimize the duration of construction-related disturbance within wetlands.
- d. Limit construction equipment operating in Type II and Type III wetland areas to that needed to clear the right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the right-of-way. All other construction equipment shall use access roads located in upland areas to the maximum extent practicable. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the right-of-way.
- e. Cut vegetation off at ground level, leaving existing root systems in place, and remove it from the wetland for disposal.
- f. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related construction constraints require removal of tree stumps from under the working side of the right-of-way.
- g. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water or saturated soils are present. After backfilling is complete, restore the segregated topsoil to its original location.
- h. Do not store hazardous materials, chemicals, fuels, lubricating, oils, in a wetland, or within 100 feet of any wetland boundary.
- i. Attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary. If construction equipment must be refueled in a wetland or within 100 feet of any wetland boundary, follow the procedures outlined in the project-specific SPCC Plan.
- j. Do not use rock (except as allowed by item k. below), soil imported from outside the wetland, tree stumps, or brush riprap to stabilize the right-of-way.
- k. If standing water or saturated soils are present, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or geotextile fabric overlain with gravel. Geotextile fabric used for this purpose must

be strong enough to allow removal of all gravel and fabric from the wetland.

- l. Do not cut trees outside of the construction right-of-way to obtain timber for riprap or equipment mats. Upland timber may be used for riprap provided it was obtained from the approved right-of-way.
- m. Attempt to use no more than two layers of timber riprap to stabilize the right-of-way.
- n. Remove all timber riprap, prefabricated equipment mats, geotextile fabric, and overlying gravel upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after back-filling of the trench). Maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan. Best management practices for temporary sediment control are not required for wetlands that have been or are cultivated.

- a. Install sediment barriers across the entire construction right-of-way (with provisions for access where necessary) immediately upslope of the wetland boundary (at the edge of the disturbance) at all wetland crossings, as necessary to prevent sediment flow into the wetland.
- b. Where wetlands are adjacent to the construction right-of-way, install sediment barriers along the edge of the construction right-of-way as necessary to prevent sediment flow into the wetland.
- c. Install sediment barriers along the downslope edge of the construction right-of-way as necessary to contain spoil and sediment within the right-of-way. Remove these sediment barriers during right-of-way cleanup.

4. Trench Dewatering

Dewater trench in such a manner that no heavily silt-laden water flows into any wetland or water body except as authorized by a relevant National Pollutant Discharge Elimination System (NPDES) point source discharge permit.

D. RESTORATION

1. Where the pipeline trench may drain a wetland, construct trench breakers and/or seal the trench bottom as necessary to maintain the original wetland hydrology.
2. For each wetland crossed, install a permanent slope breaker and a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Locate the trench breaker immediately upslope of the slope breaker. This requirement is not applicable where the slope breaker must be installed on cultivated land or where approach slopes do not exceed 10 percent within 50 feet of the crossing.
3. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate land management or state agency.
4. Consult with the appropriate land management or state agency and develop plans for natural revegetation of wetlands affected by construction. In the absence of detailed revegetation plans or until the appropriate seeding season for permanent wetland vegetation, temporarily revegetate the right-of-way with annual ryegrass at a rate of 40 pounds/acre, unless standing water is present.
5. Ensure that all disturbed areas permanently revegetate with native wetland herbaceous and/or woody plant species.
6. Develop specific procedures in coordination with the appropriate land management or state agency, where necessary, to prevent the invasion or spread of undesirable exotic vegetation.
7. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful.

E. POST-CONSTRUCTION MAINTENANCE

1. Do not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state. In addition, trees within 15 feet of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the right-of-way.
2. Do not use herbicides or pesticides in or within 100 feet of a wetland, except as specified by the appropriate land management agency or state agency.
3. Monitor the success of wetland revegetation annually for the first 3 to 5 years after construction. Revegetation should be considered successful as per permit conditions. If revegetation is not successful at the end of 3 years,

develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate the wetland with native wetland herbaceous and woody plant species. Continue revegetation efforts until wetland revegetation is successful.

HYDROSTATIC TESTING

A. NOTIFICATION PROCEDURES AND PERMITS

1. Apply for state-issued withdrawal permits, as required.
2. Apply for NPDES or state-issued discharge permits, as required.
3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. GENERAL

1. Perform 100 percent radiographic inspection of all pipeline section welds or hydrotest the pipeline sections, before installation under water bodies or wetlands.
2. If pumps used for hydrostatic testing are within 100 feet of any water body or wetlands, address the operation and refueling of these pumps in the SPCC Plan.

C. INTAKE SOURCE AND RATE

1. Screen the intake hose to prevent entrainment of fish.
2. Do not use state-designated exceptional value waters, water bodies which provide habitat for federally listed threatened or endangered species, or water bodies designated as public water supplies, unless appropriate federal, state, and/or local permitting agencies grant written permission.
3. Maintain adequate flow rates to protect aquatic life, provide for all water body uses, and provide for downstream withdrawals of water by existing users.
4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

D. DISCHARGE LOCATION, METHOD, AND RATE

1. Regulate discharge rate, use energy dissipation devices(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.

2. Do not discharge into state-designated exceptional value waters, water bodies which provide habitat for federally listed threatened or endangered species, or water bodies designated as public water supplies, unless appropriate federal, state, or local permitting agencies grant written permission.

APPENDIX 10.9
WATER SUPPLY AGREEMENT

BOARD OF COUNTY COMMISSIONERS

Fran B. Adams
Chairman
District 1

Caroline D. Ginn
Vice Chairman
District 5



Ruth M. Stanbridge
District 2

Kenneth R. Macht
District 3

John W. Tippin
District 4

October 17, 2000

Mr. Tim Eves
Calpine Eastern Corporation
Two Urban Centre
4890 West Kennedy Blvd., Suite 600
Tampa, FL 33609

RE: Calpine Blue Heron Energy Center

Dear Mr. Eves:

This letter is to confirm that Indian River Farms Water Control District ("District") and Indian River County ("County"), Florida are actively engaged in negotiations to the end of reaching a three party agreement with Calpine Eastern Corporation ("Calpine") to provide water from some combination of reuse, canal, managed storm water, reverse osmosis discharge and other available sources in sufficient quantities for the operation of the Blue Heron Energy Center. Ancillary to the agreement to be reached and under negotiations is the possibility of installation of pump structures and/or intake structures in District or County right-of-way and extension of water lines to the Blue Heron Energy Center.

Very truly yours,

A handwritten signature in cursive script that reads "Fran B. Adams".

Fran B. Adams, Chairman
Board of County Commissioners

FBA:kim

1840 25th Street, Suite N-158
Vero Beach, FL 32960-3365
Telephone: (561)567-8000 x490 Fax: (561)770-5334
Suncom: 224-1490 e-mail: kmassung@bcc.co.indian-river.fl.us

INDIAN RIVER FARMS WATER CONTROL DISTRICT

4400 20th Street
VERO BEACH, FLORIDA 32966
(561) 562-2141

JOHN S. J. AMOS
Secretary-Treasurer

Board of Supervisors
W. C. GRAVES, IV
D. E. GUNTER
SCOTT W. LAMBETH

October 13, 2000

Mr. Tim Eves
Calpine Eastern Corporation
Two Urban Centre
4890 West Kennedy Blvd.
Suite 600
Tampa, FL 33609

Re: Calpine Blue Heron Energy Center

Dear Tim:

This letter is to confirm that Indian River Farms Water Control District ("District") and Indian River County, Florida ("County"), are actively engaged in negotiations to the end of reaching a three party agreement with Calpine Eastern Corporation ("Calpine") to provide water from some combination of reuse, canal, managed storm water, reverse osmosis discharge and other available sources in sufficient quantities for the operation of the Blue Heron Energy Center. Ancillary to the agreement to be reached and under negotiation is the possibility of installation of pump structures and/or intake structures in District or County right-of-way and extension for water lines to the Blue Heron Energy Center.

Very truly yours,

Indian River Farms Water Control District

By: 

Date: 10/13/00

APPENDIX 10.10

SITE SURVEY

