STATE OF FLORIDA

DEPARTMENT

OF

ENVIRONMENTAL PROTECTION

Conditions of Certification

Florida Power & Light Company

Martin Power Plant

Units 3,4, 8 and Solar Energy Center

PA89-27O

XX/XX/2021

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SECTION A: GENERAL CONDITIONS

I. SCOPE Replaces Conditions I. Certification Control and XXI. Certified Site

A. Pursuant to Sections 403.501-518, F.S., the Florida Electrical Power Plant Siting Act (PPSA), Florida Statutes (F.S.), and Chapter 62-17, Florida Administrative Code (F.A.C.), this Certification is issued to Florida Power and Light Company (FPL) owner/operator of the Martin Power Plant. Subject to the requirements contained in these Conditions of Certification (Conditions) FPL will operate the Martin Power Plant, consisting of two nominal 450 (each) megawatts (MW) natural gas-fired Combined Cycle Units (Units 3 and 4) , a nominal 1100 MW "4 on 1" Combined Cycle Gas Turbine facility (Unit 8), ancillary equipment, and the Martin Solar Energy Center (a solar thermal steam generating facility with a nominal capacity of up to 100 MW integrated into the existing steam cycle for Unit 8) . These units are located on an 11,300-acre site located in southwestern Martin County. The UTM coordinates are: Zone 17, 543.22 kilometers (km) East, and 2992.85 km North.

B. The Certified Facility includes but is not limited to the following major associated facilities:

- Units 3 and 4 – each a nominal 450 MW combined cycle unit
- Unit 8 - a nominal 1100 MW "4 on 1" Combined Cycle Gas Turbine facility
- Cooling tower; On-site roadways; Parking and laydown areas; Administration building and warehouse; Stormwater management system; Gas metering station; On-site gas pipeline; On-site switchyard; Off-site transmission interconnection; Off-site access roadway improvements
- Martin Solar Energy Center - a solar thermal steam generating facility with a nominal capacity of up to 100 MW integrated into the existing steam cycle for Unit 8)

C. These Conditions, unless specifically amended or modified, are binding upon the Licensee and shall apply to the construction, operation, and maintenance of the Certified Facility. If a conflict should occur between the design criteria of this Certified Facility and the Conditions, the Conditions shall prevail unless amended or modified. In any conflict between any of these Conditions, the more specific condition governs. Replaces Condition XXV. Effect of Certification

D. Within 60 days after completion of construction of the electrical power plant as defined by Section 403.503(14), F.S., but excluding off-site linear and non-linear associated facilities, the Licensee shall provide to the Department in .pdf format: a survey map signed by a professional land surveyor, or acceptable equivalent documentation such as an official legal description, delineating the boundaries of the site as defined by Section 403.503(28), F.S., and an aerial photograph delineating the boundaries of the site. The survey map and aerial photograph shall be identified as the Site Delineation and attached hereto as part of Attachment A (Maps).

The Licensee shall notify the Department of any change to the site boundary depicted in the Site Delineation in Attachment A (Maps). The notification shall be accompanied by an updated land survey map (or legal description) and aerial photograph delineating the new boundaries of the site for review by the Department. Such changes may constitute a

modification and may require additional Land Use and Zoning review by the local government. If a modification is required, it will be processed pursuant to Section 403.516, F.S.

E. If both certified and uncertified Facilities lie within the boundaries of the site, the Licensee shall also comply with the requirements of this paragraph. Within 60 days after completion of construction of the plant and on-site associated facilities, but excluding off-site linear and non-linear associated facilities, the Licensee shall provide to the Department in .pdf format acceptable documentation identifying the certified and non-certified facilities within the site such as an aerial photograph. Certified facilities identified within the site shall include both the certified electrical power plant's generating facilities as defined in Section 403.503(28), F.S., and its on-site certified associated facilities (including on-site linear facilities) as defined by Section 403.503(7), F.S. The document shall be known as the Certified Facilities Identification and attached hereto as part of Attachment A (Maps).

F. Within 120 days after completion of construction of any certified off-site associated non-linear facilities, the Licensee shall provide to the Department in .pdf format; a survey map signed by a professional land surveyor, or acceptable equivalent documentation such as an official legal description, delineating the site boundaries for each off-site non-linear facility. The survey map(s) and aerial photograph(s) shall be known as Delineation of the Boundaries of the Certified Off-Site Non-Linear Facilities and attached hereto as part of Attachment A (Maps).

G. Within 180 days after completion of construction of any new off-site associated linear facilities, as defined by Section 403.503(7), F.S., the Licensee shall provide; an aerial photograph(s)/map(s) at a scale of at least 1:400, or acceptable equivalent documentation such as an official legal description or survey map(s) signed by a professional land surveyor, delineating the boundaries of the certified site for the linear facilities, following acquisition of all necessary property interests and the corridor narrowing as described in Section 403.503(11), F.S., which shall be known as the Delineation of Certified Off-Site Linear Facilities and attached as part of Attachment A (Maps).

Following any post-certification approvals that require a change to the boundaries of the certified facility(ies) depicted in the Delineation of Certified Off-Site Linear Facilities in Attachment A (Maps), the Licensee shall submit an updated aerial photograph/map, survey map, or legal description.

[Sections 403.511, 403.5113, F.S.; Rules 62-4.160(1), (2), and 62-17.205(2), F.A.C.]

II. APPLICABLE DEPARTMENT RULES **Replaces Conditions II. Applicable Rules and XXX. Compliance**

The construction, operation, and maintenance of the Certified Facility shall be in accordance with all applicable non-procedural provisions of Florida Statutes and Florida Administrative Code, including, but not limited to, the applicable non-procedural portions of the following Department regulations, except to the extent a variance, exception, exemption, or other relief is granted in the Final Order of Certification or in a subsequent modification to the Conditions, under any federal permit, or as otherwise provided under Chapter 403, F.S.:

Florida Administrative Code:
18-2 (Management of Uplands Vested in the Board of Trustees)
18-14 (Administrative Fines for Damaging State Lands)

18-20 (Florida Aquatic Preserves)
18-21 (Sovereignty Submerged Lands Management)
62-4 (Permits)
62-17 (Electrical Power Plant Siting)
62-40 (Water Resource Implementation Rule)
62-150 (Hazardous Substance Release Notification)
62-160 (Quality Assurance)
62-204 (Air Pollution Control-General Provisions)
62-210 (Stationary Sources-General Requirements)
62-212 (Stationary Sources-Preconstruction Review)
62-213 (Operation Permits for Major Sources of Air Pollution)
62-256 (Open Burning)
62-296 (Stationary Sources-Emission Standards)
62-297 (Stationary Sources-Emission Monitoring)
62-302 (Surface Water Quality Standards)
62-303 (Identification of Impaired Surface Waters)
62-304 (Total Maximum Daily Loads)
62-330 (Environmental Resource Permitting)
62-340 (Delineation of the Landward Extent of Wetlands and Surface Waters)
62-342 (Mitigation Banks)
62-345 (Uniform Mitigation Assessment Method)
62-520 (Ground Water Classes, Standards, and Exemptions)
62-528 (Underground Injection Control)
62-531 (Water Well Contractor Licensing Requirements)
62-532 (Water Well Permitting and Construction Requirements)
62-550 (Drinking Water Standards, Monitoring, and Reporting)
62-555 (Permitting, Construction, Operation, and Maintenance of Public Water Systems)
62-560 (Requirements for Public Water Systems That Are Out of Compliance)
62-600 (Domestic Wastewater Facilities)
62-604 (Collection Systems and Transmission Facilities)
62-610 (Reuse of Reclaimed Water and Land Application)
62-620 (Wastewater Facilities and Activities Permitting)
62-621 (Generic Permits)
62-650 (Water Quality Based Effluent Limitations)
62-660 (Industrial Wastewater Facilities)
62-699 (Classification and Staffing of Water or Domestic Wastewater Treatment Plants and Water Distribution Systems)
62-701 (Solid Waste Management Facilities)
62-709 (Criteria for Organics Processing and Recycling Facilities)
62-710 (Used Oil Management)
62-730 (Hazardous Waste)
62-737 (The Management of Spent Mercury-Containing Lamps and Devices Destined for Recycling)
62-740 (Petroleum Contact Water)
62-761 (Underground Storage Tank Systems)

62-762 (Aboveground Storage Tank Systems)
62-769 (Florida Petroleum Liability and Restoration Insurance Program)
62-777 (Contaminant Cleanup Target Levels)
62-780 (Contaminated Site Cleanup Criteria)
62-814 (Electric and Magnetic Fields)

III. REVISIONS TO DEPARTMENT STATUTES AND RULES Replaces Condition XXIII. Modification of Conditions, paragraphs A. and B

A. The Licensee shall comply with rules adopted by the Department subsequent to the issuance of the Certification under the PPSA which prescribe new or stricter criteria, to the extent that the rules are applicable to electrical power plants. Except when a variance, exception, exemption, or other relief has been granted, subsequently adopted Department rules which prescribe new or stricter criteria shall operate as automatic modifications to this Certification.

B. Upon written notification to the Department, the Licensee may choose to operate the certified electrical power plant in compliance with any rule subsequently adopted by the Department which prescribes criteria more lenient than the criteria required by the terms and conditions in the certification which are not site-specific.

[Sections 403.511(5)(a) and (b), F.S.; Rule 62-4.160(10), F.A.C.]

IV. DEFINITIONS Replaces Condition III. Definitions

The meaning of terms used herein shall be governed by the applicable definitions contained in Chapters 253, 373, 379, and 403, F.S., and any regulation adopted pursuant thereto. In the event of any dispute over the meaning of a term used in these Conditions which is not defined in such statutes or regulations, such dispute shall be resolved by reference to the most relevant definitions contained in any other state or federal statute or regulation, or in the alternative, by the use of the commonly accepted meaning. As used herein, the following shall apply:

A. "Application" or "SCA" as defined in Section 403.503(6), F.S. For purposes of this license, "Application" shall also include materials submitted for post-certification amendments and petitions for modification to the Conditions of Certification, as well as supplemental applications.

B. "Associated Facilities" as defined by Section 403.503(7), F.S.

C. "Certified Facility" or "Certified Facilities" means the certified electrical power generation facilities and all certified on- or off-site Associated Facilities and structures identified/described in the Application, in the final order of certification, or in a post-certification amendment or modification.

D. "DEO" means the Florida Department of Economic Opportunity.

E. "DEM" shall mean the Florida Division of Emergency Management.

F. "DEP" or "Department" means the Florida Department of Environmental Protection.

G. "DHR" means the Florida Department of State, Division of Historical Resources.

H. "DOT" means the Florida Department of Transportation.

I. "Emergency conditions" or "Emergency reporting" means urgent circumstances involving potential adverse consequences to human life or property as a result of weather conditions or other calamity.

J. "Feasible" or "Practicable" means reasonably achievable considering a balance of land use impacts, environmental impacts, engineering constraints, and costs.

K. "FWC" means the Florida Fish and Wildlife Conservation Commission.

L. "Licensee" means an applicant that has obtained a certification order for the subject project.

M. "Post-certification submittal" shall mean a submittal made by the Licensee pursuant to a Condition of Certification.

N. "Right-of-Way" or "ROW" as defined in Section 403.503(27), F.S.

O. "SCA" means the Site Certification Application (i.e., the Application)

P. "SCO" means the Department's Siting Coordination Office.

Q. "Site" as defined in Section 403.503(28).

R. "State Water Quality Standards" shall mean the numerical and narrative criteria applied to specific water uses or classifications set forth in Chapters 62-302 and 62-520, F.A.C.

S. "Surface Water Management System", "SWMS", or "System" means a stormwater management system, dam, impoundment, reservoir, appurtenant work, or works, or any combination thereof. The terms "surface water management system", "SWMS", or "system" include areas of dredging or filling, as those terms are defined in Sections 373.403(13) and (14), F.S.

T. "NED, NWD, CD, SED, SWD, SD" shall mean the applicable DEP district office.

U. "NWF, SR, SJR, SWF, or SFWMD" means the Northwest Florida, Suwannee River, St. Johns River, Southwest Florida, or South Florida Water Management District, respectively.

V. "Wetlands" shall mean those areas meeting the definition set forth in Section 373.019(27), F.S., as delineated pursuant to Chapter 62-340, F.A.C.

V. FEDERALLY DELEGATED OR APPROVED PERMIT PROGRAMS

Replaces Conditions IV. Air, V. Surface Water Discharge, XII. Change in Discharge, XIV. Facilities Operation, and XXII. Review of Site Certification,

Subject to the conditions set forth herein, this certification shall constitute the sole license of the state and any agency as to the approval of the location of the site and any associated facility and the construction and operation of the proposed electrical power plant, except for the issuance of Department Licenses required under any federally delegated or approved permit program. This Certification is not a waiver of any other Department approval that may be required under federally delegated or approved programs. In the event of a conflict between the certification process and federally required procedures, the applicable federal requirements shall control.

[Sections 403.5055, 403.508(8), and 403.511(1), F.S.]

VI. DESIGN AND PERFORMANCE CRITERIA Replaces Condition XXIX. Design and Performance Criteria

Certification, including these Conditions, is predicated upon preliminary designs, concepts, and performance criteria described in the SCA or in testimony and exhibits in support of Certification. Final engineering design will be consistent and in substantial compliance with the preliminary information described in the SCA or as explained at the certification hearing (if any). Conformance to those criteria, unless specifically modified in accordance with Sections 403.516, F.S., and Rule 62-17.211, F.A.C., is binding upon the Licensee in the design, construction, operation, and maintenance of the Certified Facility.

[Sections 403.511(2)(a), 403.516, F.S.; Rules 62-4.160(2), 62-17.211, F.A.C.]

VII. NOTIFICATION Replaces Condition XIII. Noncompliance Notification

A. If, for any reason, the Licensee does not comply with or will be unable to comply with any condition or limitation specified in this License, the Licensee shall provide the appropriate DEP District and/or Branch Office with the following information:

1. A description of and cause of noncompliance; and

2. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance. The Licensee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this Certification.

All notifications which are made in writing shall additionally be provided to the SCO via email to SCO@dep.state.fl.us.

[Rule 62-4.160(8), F.A.C.]

B. The Licensee shall promptly notify the SCO in writing (email acceptable) of any previously submitted information concerning the Certified Facility that is later discovered to be inaccurate.

[Rule 62-4.160(15), F.A.C.]

C. Within 60 days after certification of an associated linear facility the Licensee shall file a notice of the certified route with the Department's clerk - Office of General Counsel and the clerk of the circuit court for each county through which the corridor will pass.

The notice shall consist of maps or aerial photographs in the scale of 1:24,000 which clearly show the location of the certified route and shall state that the certification of the corridor will result in the acquisition of rights-of-way within the corridor.

[Section 403.5112, F.S.]

VIII. EMERGENCY CONDITION NOTIFICATION AND RESTORATION New

If the Licensee is temporarily unable to comply with any of the conditions of the License due to breakdown of equipment or destruction by hazard of fire, wind, or following an emergency as defined by Sections 252.34(4), (7), (8), or (10), F.S., the Licensee shall immediately notify the Department. Notification shall include pertinent information as to the

cause of the problem, and what steps are being taken to correct the problem and to prevent its recurrence, and where applicable, the owner's intent toward reconstruction of destroyed facility(ies). Such notification does not release the Licensee from any liability for failure to comply with Department rules. Any exceedances and/or violations recorded during emergency conditions shall be reported as such, but the Department acknowledges that it intends to use its enforcement discretion during this timeframe. This acknowledgement by the Department does not constitute a waiver or variance from any requirements of any federal permit. Relief from any federal agency must be separately sought.

[Rule 62-4.130, F.A.C.]

IX. CONSTRUCTION PRACTICES New

A. Local Building Codes

Subject to the conditions set forth herein, this Certification constitutes the sole license of the state and any agency as to the approval of the location of the site and any associated facility and the construction and operation of any Certified Facility. The Licensee is not required to obtain building permits for Certified Facilities. However, this Certification shall not affect in any way the right of any local government to charge appropriate fees or require that construction of installations used by the electric utility that are not an integral part of a generating plant, substation, or control center (such as, office buildings, warehouses, garages, machine shops, and recreational buildings) be in compliance with applicable building construction codes.

[Section 403.511(4), F.S.]

B. Open Burning

Prior to open burning in connection with land clearing, the Licensee shall seek authorization from the Florida Forest Service in accordance with the requirements of Chapters 62-256 and 5I-2, F.A.C.

[Chapters 5I-2 and 62-256, F.A.C.]

C. Vegetation

For areas located in any Florida Department of Transportation (DOT) ROW, Chapter 3.18 of the 2017 Florida DOT *Utility Accommodation Manual* available on the DOT website (https://www.fdot.gov/programmanagement/utilities/default.shtm) shall serve as guidelines for best management practices.

D. Existing Underground Utilities

The Licensee must follow all applicable portions of the Underground Facility Damage Prevention and Safety Act, Chapter 556, F.S. The Licensee shall provide the affected local government and the SCO with copies of valid tickets obtained from Sunshine State One Call of Florida upon request. Tickets shall be available for request until the underground work is completed for the affected area.

[Chapter 556, F.S.]

E. Electric and Magnetic Fields (EMF)

Any associated transmission lines and electrical substations shall comply with the applicable requirements of Chapter 62-814, F.A.C.

[Chapter 62-814, F.A.C.]

F. Existing Wells

Any existing wells to be impacted in the path of construction of Certified Facilities that will no longer be used shall be abandoned by a licensed well contractor. All abandoned wells shall be filled and sealed in accordance with Rule 62-532.500(5), F.A.C., or with the rules of the authorizing agency, or consistent with these Conditions.

[Rules 62-532.400 and 62-532.500(5), F.A.C.]

G. Abandonment of Existing Septic Tanks

Any existing septic tanks to be impacted by construction and that will no longer be used shall be abandoned in accordance with Rule 64E-6.011, F.A.C., unless these Conditions provide otherwise.

[Chapter 64E-6, F.A.C.]

X. RIGHT OF ENTRY Replaces Condition XVI. Right of Entry

A. Upon presentation of credentials or other documents as may be required by law, the Licensee shall allow authorized representatives of the Department or other agencies with jurisdiction over a portion of the Certified Facility and any authorized off-site mitigation/compensation or otherwise associated areas:

1. At reasonable times, to enter upon the Certified Facility in order to monitor activities within their respective jurisdictions for purposes of assessing compliance with this certification; or

2. During business hours, to enter the Licensee's premises in which records are required to be kept under this Certification; and to have access to and copy any records required to be kept under this Certification.

B. When requested by the Department, on its own behalf or on behalf of another agency with regulatory jurisdiction, the Licensee shall within 10 working days, or such longer period as may be mutually agreed upon by the Department and the Licensee, furnish any information required by law, which is needed to determine compliance with the Certification.

[Rules 62-4.160(7)(a) and 62-4.160(15), F.A.C.]

XI. DISPUTE RESOLUTION Replaces Condition XXXII. Dispute Resolution

A. General

If a situation arises in which mutual agreement between either the Department and the Licensee, or, the Department and an agency with substantive regulatory jurisdiction over a matter cannot be reached, the Department can act as a facilitator in an attempt to resolve the issue. If the dispute is not resolved in this initial informal meeting, Licensee may request a second informal meeting in which both Licensee and the agency with substantive regulatory jurisdiction over the matter at issue can participate in an attempt to resolve the issue. If, after

such meetings, a mutual agreement cannot be reached between the parties, then the matter shall be referred to the Division of Administrative Hearings (DOAH) for disposition in accordance with the provisions of Chapter 120, F.S. The Licensee or the Department may request DOAH to establish an expedited schedule for the processing of such a dispute. Any filing with DOAH shall state with particularity the specific project and geographic location to which the dispute relates. Work unrelated to the specific project and in areas other than the location to which the dispute relates will not be affected by the dispute.

B. Modifications

If written objections are filed regarding a modification, and the objections address only a portion of a requested modification, then the Department shall issue a Final Order approving the portion of the modification to which no objections were filed, unless that portion of the requested modification is substantially related to or necessary to implement the portion to which written objections are filed.

C. Post-Certification Submittals

If it is determined, after assessment of a post-certification submittal, that compliance with the Conditions will not be achieved for a particular portion of a submittal, the Department may make a separate assessment of other portions of the submittal, unless those portions of the submittal are substantially related to or necessary to implement that portion for which it has been determined that compliance with the Conditions will not be achieved.

[Section 120.57, F.S.; Rule 62-17.211, F.A.C.]

XII. SEVERABILITY Replaces Condition XX. Severability

The provisions of this Certification are severable, and if any provision of this Certification or the application of any provision of this Certification to any circumstance is held invalid, the remainder of the Certification or the application of such provision to other circumstances shall not be affected thereby.

XIII. ENFORCEMENT Replaces Condition XXVII. Enforcement

A. The terms, conditions, requirements, limitations, and restrictions set forth in these Conditions are binding and enforceable pursuant to Sections 403.141, 403.161, 403.514, 403.727, and 403.859 through 403.861, F.S., as applicable. Any noncompliance by the Licensee with these Conditions constitutes a violation of Chapter 403, F.S., and is grounds for enforcement action, license termination, license revocation, or license revision. The Licensee is placed on notice that the Department may review this Certification periodically and may initiate enforcement action for any violation of these Conditions.

B. All records, notes, monitoring data, and other information relating to the construction or operation of the Certified Facility which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the Certified Facility and arising under the Florida Statutes or Department rules, subject to the restrictions in Sections 403.111 and 403.73, F.S. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

[Sections 403.121, 403.131, 403.141, 403.151, 403.161, and 403.514, F.S.; Rules 62-4.160(1) and (9), F.A.C.]

XIV. REVOCATION OR SUSPENSION Replaces Condition XVII. Revocation or Suspension

The Certification shall be final unless revised, revoked or suspended pursuant to law. This Certification may be suspended or revoked pursuant to Sections 403.512, F.S. This Certification is valid only for the specific processes and operations identified in the SCA and approved in the Final Order of Certification and indicated in the testimony and exhibits in support of Certification or approved in a subsequent amendment or modification of the Certification. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this approval may constitute grounds for revocation and enforcement action by the Department. Any enforcement action, including suspension and revocation, shall only affect the portion(s) of the Certified Facility that are the cause of such action, and other portions of the Certified Facility shall remain unaffected by such action.

[Sections 403.512, F.S.; Rule 62-4.160(2), F.A.C.]

XV. REGULATORY COMPLIANCE Replaces Conditions VIII. Safety and XVIII. Civil and Criminal Liability

As provided in Sections 403.087(7) and 403.722(5), F.S., except as specifically provided in the Final Order of Certification, a subsequent modification or amendment, or these Conditions, the issuance of this License does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This License is not a waiver of or approval of any other Department license/permit that may be required for other aspects of the Certified Facility which are not addressed in this License. This license does not relieve the Licensee from liability for harm or injury to human health or welfare, animal, or plant life, or public or private property caused by the construction or operation of the Certified Facility, or from penalties therefore.

[Rules 62-4.160(3) and (5), F.A.C.]

XVI. CIVIL AND CRIMINAL LIABILITY Replaces Condition XVIII. Civil and Criminal Liability

Except to the extent a variance, exception, exemption, or other relief is granted in the Final Order of Certification, in a subsequent modification to these Conditions, or as otherwise provided under Chapter 403, F.S., this Certification does not relieve the Licensee from civil or criminal penalties for noncompliance with any Condition of Certification, applicable rules or regulations of the Department, or any other state statutes or regulations which may apply.

[Sections 403.141, 403.161, 403.511, F.S.]

XVII. USE OF STATE LANDS Replaces Condition XIX Property Rights

A. Except as specifically provided in the Final Order of Certification or these Conditions, the issuance of this License conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless the necessary title or leasehold interests have been obtained from the

State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

B. If any portion of the Certified Facility is located on sovereign submerged lands, state-owned uplands, or within an aquatic preserve, then the Licensee must comply with the applicable portions of Chapters 18-2, 18-20, and 18-21, F.A.C., and Chapters 253 and 258, F.S., except as specifically provided in the Final Order of Certification or these Conditions. If any portion of the Certified Facility is located on sovereign submerged lands, the Licensee must submit section F of Form 62-330.060(1), *Application for Individual and Conceptual Approval Environmental Resource Permit* (State 404 Program Permit) *and Authorization to Use State-Owned Submerged Lands* to the Department prior to construction. If any portion of the Certified Facility is located on state-owned uplands, the Licensee must submit an Upland Easement Application to the Department prior to construction.

C. If a portion of the Certified Facility is located on sovereign submerged lands or state-owned uplands owned by the Board of Trustees of the Internal Improvement Trust Fund, pursuant to Article X, Section 11 of the Florida Constitution, then the proposed activity on such lands requires a proprietary authorization. Under such circumstances, the proposed activity is not exempt from the need to obtain a proprietary authorization. Unless otherwise provided in the Final Order of Certification or these Conditions, the Department has the responsibility to review and take action on requests for proprietary authorization in accordance with Rule 18-2.018 or 18-21.0051, F.A.C.

D. The Licensee is hereby advised that Florida law states: "A person may not commence any excavation, construction, or other activity involving the use of sovereign or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund under this chapter, until the person has received the required lease, license, easement, or other form of consent authorizing the proposed use." Pursuant to Chapter 18-14, F.A.C., if such work is done without consent, or if a person otherwise damages state land or products of state land, the Board of Trustees may levy administrative fines of up to $10,000 per offense.

E. The terms, conditions, and provisions of any required lease or easement issued by the State shall be met. Any construction activity associated with the Certified Facility shall not commence on sovereign submerged lands or state-owned uplands, title to which is held by the Board of Trustees of the Internal Improvement Trust Fund, until all required lease or easement documents have been executed.

[Chapters 253 and 258, F.S.; Chapters 18-2, 18-14, 18-21, 62-340, and Rules 62-330.060(1) and 62-4.160(4), F.A.C.]

XVIII. PROCEDURAL RIGHTS New

Except as specified in Chapter 403, F.S., or Chapter 62-17, F.A.C., no term or Condition of Certification shall be interpreted to preclude the post-certification exercise by any party of whatever procedural rights it may have under Chapter 120, F.S., including those related to rule-making proceedings.

[Sections 403.511(5)(c), F.S.]

XIX. AGENCY ADDRESSES FOR POST-CERTIFICATION SUBMITTALS AND NOTICES New

Where a Condition requires post-certification submittals and/or notices to be sent to a specific agency, the following agency addresses shall be used unless the Conditions specify otherwise or unless the Licensee and the Department are notified in writing of an agency's change in address for such submittals and notices:

Florida Department of Environmental Protection
Siting Coordination Office, MS 5500
2600 Blair Stone Road
Tallahassee, Florida 32399-3000
SCO@dep.state.fl.us

Florida Department of Environmental Protection
Southeast District Office
3301 Gun Club Rd
MSC 7210-1
West Palm Beach, FL 33406

Florida Department of Economic Opportunity
Bureau of Community Planning and Growth
107 East Madison Street
Tallahassee, Florida 32399-2100

Florida Fish & Wildlife Conservation Commission
Conservation Planning Services
620 South Meridian Street, MS 5B5
Tallahassee, Florida 32399-1600
FWCConservationPlanningServices@myfwc.com

Florida Department of Transportation
District Administration
605 Suwannee Street
Tallahassee, Florida 32399-0450

Florida Department of Agriculture and Consumer Services
Office of General Counsel
407 South Calhoun Street
Tallahassee, Florida 32399-0800

South Florida Water Management District
Office of General Counsel
3301 Gun Club Road
West Palm Beach, FL 33406

Florida Department of State
Division of Historical Resources

500 South Bronough Street
Tallahassee, Florida 32399-0250

Martin County
County Attorney
2401 SE Monterey Road,
Stuart, Florida 34996

Village of Indiantown
Attorney of Law
Community and Economic Development Department
16550 SW Warfield Blvd
Indiantown, Florida 34956

[Section 403.511, F.S.]

XX. PROFESSIONAL CERTIFICATION New

To ensure protection of public health, safety, and welfare, any construction, modification, or operation of an installation which may be a source of pollution, or of a public drinking water supply, shall be in accordance with sound professional engineering practices pursuant to Chapter 471, F.S.; and all final geological papers or documents involving the practice of the profession of geology shall be in accordance with sound professional geological practices pursuant to Chapter 492, F.S. Where required by Chapter 471 or 492, F.S., applicable portions of amendment requests, petitions for modifications, post certification submittals, and supporting documents which are submitted to the Department for public record shall be signed and sealed by the professional(s) who prepared or approved them.

[Rule 62-4.050, F.A.C.]

XXI. PROCEDURES FOR POST-CERTIFICATION SUBMITTALS Replaces Condition XXXIII. Post Certification Submittals

A. Purpose of Submittals

Conditions which provide for the post-certification submittal of information to DEP or other agencies by the Licensee are for the purpose of facilitating the agencies' monitoring of the effects arising from the location of the Certified Facility and the construction and maintenance of the Certified Facility. This monitoring is for DEP to assure, in consultation with other agencies with applicable regulatory jurisdiction, continued compliance with these Conditions, without further agency action. A submittal of information or determination of compliance pursuant to a post-certification submittal under this Condition does not provide a point of entry for a third party.

B. Filings

All post-certification submittals of information by Licensee are to be filed with the agency or office that requires the submittal pursuant to these Conditions. The SCO shall be copied on all post-certification submittals in electronic .pdf format (unless other formats are requested), via email to SCO@dep.state.fl.us. Each submittal shall clearly identify the Certified

Facility name, PA#, and the Condition number(s) (i.e. Section X, Condition XX.y.(z)) requiring the submittal. As required by Section 403.5113(2), F.S., each post-certification submittal will be reviewed by each agency with regulatory authority over the matters addressed in the submittal on an expedited and priority basis.

[Section 403.5113, F.S.; Rule 62-17.191(3), F.A.C.]

C. Completeness

DEP shall review each post-certification submittal for completeness. This review may include consultation with the other agency(ies) receiving the post-certification submittal with regulatory jurisdiction over the matter addressed in the submittal. DEP's finding of completeness shall specify the area of the Certified Facility affected and shall not delay further processing of the post-certification submittal for non-affected areas.

If any portion of a post-certification submittal is found to be incomplete, the Licensee shall be so notified. Failure to issue such a notice within 30 days after filing of the submittal shall constitute a finding of completeness. Subsequent findings of incompleteness, if any, shall address only the newly filed information.

[Rule 62-17.191(1)(c)2., F.A.C.]

D. Interagency Meetings

DEP may conduct an interagency meeting with other agencies that received a post-certification submittal. The purpose of such an interagency meeting shall be for the agency(ies) with regulatory jurisdiction over the matters addressed in the post-certification submittal to discuss whether compliance with these Conditions has been provided. Failure of DEP to conduct an interagency meeting or failure of any agency to attend an interagency meeting shall not be grounds for DEP to withhold a determination of compliance with these Conditions nor to delay the timeframes for review established by these Conditions. At DEP's request, a field inspection shall be conducted with the Licensee and the agency representative in conjunction with the interagency meeting.

E. Determination of Compliance

DEP shall give written notification within 90 days, to the Licensee and the other agency(ies) to which the post-certification information was submitted of DEP's determination of whether there is demonstration of compliance with these Conditions. If it is determined that compliance with the Conditions has not been provided, the Licensee shall be notified with particularity of the deficiencies and possible corrective measures suggested. Failure to notify Licensee in writing within 90 days of receipt of a complete post-certification submittal shall constitute a determination of compliance. A post-certification compliance review may be the basis for initiating modifications to the relevant Condition or to other related Conditions.

F. Commencement of Construction

If DEP does not object within the time period specified in paragraph E., above, Licensee may begin construction pursuant to the terms of these Conditions and the subsequently submitted construction details.

G. Revisions to Design Previously Reviewed for Compliance

If revisions to site-specific designs occur after submittal, the Licensee shall submit revised plans prior to construction for review in accordance with the post-certification process specified in this Condition.

[Sections 120.569, 373.413, 373.416, 403.511, F.S.; Rules 62-17.191 and 62-17.205, F.A.C.]

XXII. POST-CERTIFICATION SUBMITTAL REQUIREMENTS SUMMARY New

Within 90 days after certification, and within 90 days after any subsequent modification or certification, the Licensee shall provide the SCO a complete summary of those post-certification submittals that are identified in these Conditions when due-dates for the information required of the Licensee have been identified. A summary shall be provided as a separate document for each transmission line, if any. Such submittals shall include, but are not limited to, monitoring reports, management plans, wildlife surveys, etc. The summary shall be provided to the SCO, in a sortable spreadsheet, electronically, in the format shown below or equivalent. For subsequent modifications and certifications, a Post-Certification Submittal Requirements Summary shall be required for only those resulting in new or altered post-certification requirements.

Condition Number	Requirement and Timeframe	Due Date	Name of Agency or Agency Subunit to whom the submittal is required to be provided

[Section 403.5113, F.S.; Rule 62-17.191(3), F.A.C.]

XXIII. POST-CERTIFICATION AMENDMENTS New

If, subsequent to certification, the Licensee proposes any material change to the SCA and revisions or amendments thereto, as certified, the Licensee shall submit a written request for amendment and a description of the proposed change to the SCA to the Department. Within 30 days after the receipt of a complete request for an amendment, the Department shall determine whether the proposed change to the SCA requires a modification to the Conditions.

A. If the Department concludes that the change would not require a modification to the Conditions, the Department shall provide written notification of the approval of the proposed amendment to the Licensee, all agencies, and all other parties to the Certification.

B. If the Department concludes that the change would require a modification to the Conditions, the Department shall provide written notification to the Licensee that the proposed change to the SCA requires a request for modification pursuant to Section 403.516, F.S.

[Section 403.5113, F.S.]

XXIV. MODIFICATION OF CERTIFICATION Replaces Conditions XII. Change in Discharge and XXIII. Modification of Conditions

A. Pursuant to Sections 403.516(1)(a), F.S., and Rule 62-17.211, F.A.C., the Siting Board hereby delegates the authority to the Department to modify any Condition which would not otherwise require approval by the Siting Board, after notice and receipt of no objection by a party to the certification within 45 days after notice by mail to the party's last address of record, and if no other person whose substantial interests will be affected by the modification objects in writing within 30 days of public notice.

B. The Department may modify Conditions, in accordance with Section 403.516(1)(b), F.S., which are inconsistent with the terms of any subsequent and separately DEP-issued permits, permit amendments, permit modifications, or permit renewals under a federally delegated or federally approved permit program. Such modification may be made without further notice if the matter has been previously noticed under the requirements for any federally delegated or approved permit program.

C. In accordance with Section 403.516(1)(c), F.S., the Licensee may file a petition for modification with the Department, or the Department may initiate the modification upon its own initiative.

D. Any anticipated facility expansions, production increases, or process modifications which may result in new, different or increased discharge or emission of pollutants, change in fuel, or expansion in generating capacity must be reported by submission of an appropriate request for an amendment, modification, or certification.

E. Any anticipated facility change that results in a change to the Site Delineation, attached hereto as part of Attachment A (Maps), may be considered a modification, and must be accompanied by a map or aerial photo showing the proposed new boundaries of the site. Within 120 days after completion of construction of the approved facility change, the Licensee shall provide the information required by Section A. General Conditions, Condition I. Scope, paragraphs D., E., F., or G., as appropriate.

F. Replacement of any portion of the gas pipeline, transmission lines, or access roads constructed under these Conditions necessitated by emergency conditions shall not be considered a modification. A verbal report of any such emergency shall be made to DEP as soon as possible. Within 14 calendar days after correction of an emergency which would require the Licensee to perform an activity not in accordance with the conditions of certification, a report to the DEP shall be made outlining the details of the emergency and the steps taken for its temporary relief. The report shall be a written description of all of the work performed and shall set forth any pollution control measures or mitigative measures which were utilized or are being utilized to prevent pollution of waters, harm to sensitive areas, or alteration of archaeological or historical resources. Moved from Condition XXIII. Modification of Conditions, paragraph F

[Section 403.516, F.S.; Rule 62-17.211, F.A.C.]

XXV. COASTAL ZONE CONSISTENCY New

Pursuant to Sections 373.428 and 403.511, F.S., certification of the Facility constitutes the State's concurrence that the licensed activity or use is consistent with the federally approved program under the Florida Coastal Management Act.

[Sections 373.428, 380.23, and 403.511(7), F.S.]

XXVI. WATER QUALITY CERTIFICATION Replaces Condition XXXIV Transmission and Pipeline ROW, paragraph B, 9.

Pursuant to the Operating Agreement between the Department, Water Management Districts and U.S. Army Corps of Engineers, a written Final Order granting 'certification' constitutes certification by the Department that the project activities comply with applicable state water quality standards.

[2012 Operating Agreement, Jacksonville District USACOE, DEP and Water Management Districts, Section II.A.1.(f)]

XXVII. TRANSFER OF CERTIFICATION New

A. This Certification is transferable in whole or in part, upon Department approval, to an entity determined to be able to comply with these Conditions. A transfer of certification of all or part of the Certified Facility may be initiated by the Licensee's filing of a Notice of Intent to Transfer Certification with the Department's SCO. The Notice of Intent shall: identify the intended new certification holder or Licensee; identify current, and new entity responsible for compliance with the certification; and include a written agreement from the intended Licensee/Transferee to abide by all Conditions of Certification, as well as, applicable laws and regulations. Upon receiving a complete notice of intent, the transfer shall be approved by the Department unless the Department objects to the transfer on the grounds that the new Licensee will be unable to comply with the Conditions of Certification, specifies in writing its reasons for its objections, and gives notice and an opportunity to petition and administrative hearing pursuant to Section 120.57, F.S. Upon approval, the Department will initiate a modification to the Conditions to reflect the change in ownership in accordance with Rule 62-17.211, F.A.C.

B. In the event of the dissolution of the Licensee, the Department may transfer certification to successor entities which are determined to be competent to construct, operate, and maintain the Certified Facility in accordance with the Conditions of Certification and which are proper applicants as defined by the PPSA. Upon determination that such a successor entity complies with the requirements for transfer of certification, the Department will initiate a modification to the Conditions to reflect the change in ownership in accordance with Rule 62-17.211, F.A.C.

[Chapter 120, F.S.; Rule 62-17.211, F.A.C]

XXVIII. LABORATORIES AND QUALITY ASSURANCE Replaces Condition XIV. Facilities Operation

Chemical, physical, biological, microbiological, and toxicological data collected as a requirement of these Conditions must be reliable and collected and analyzed by scientifically sound procedures. Unless otherwise specified in these Conditions, the Licensee shall adhere to the minimum field and laboratory quality assurance, methodological and reporting requirements of the Department as set forth in Chapter 62-160, F.A.C.

[Chapter 62-160, F.A.C.]

XXIX. ENVIRONMENTAL RESOURCES Replaces Conditions XXXI. ROW Delineation and Compliance Verification, XXXIV. Transmission and Pipeline ROWs, and XXXV. Treasure Coast Regional Planning Council, paragraph B. All ROWs have been acquired and constructed

A. General

1. Submittals for Construction Activities

a. Prior to the commencement of construction of new facilities and/or associated facilities the Licensee shall provide to the appropriate DEP District for review, all information necessary for a complete *Application for Individual and Conceptual Approval Environmental Resource Permit and Authorization to Use State-Owned Lands* (ERP), DEP Form 62-330.060(1), F.A.C., or other applicable ERP authorization form. A copy of the submittal shall also be provided to the SCO.

This form may: a) be submitted concurrently with a SCA; b) be submitted as part of an amendment request or a petition for modification; or c) be submitted as a post-certification submittal following approval of a Project through certification, modification, or amendment. Such ERP submittals, once received, shall be reviewed in accordance with the non-procedural standards and criteria for issuance of an ERP, including all the provisions related to reduction and elimination of impacts, conditions for issuance, additional conditions for issuance, and mitigation contained in Chapter 62-330, F.A.C., as applicable, unless otherwise stated in these Conditions. While the information is provided for review via submittal of the ERP form, consistent with Section 403.511, F.S., there shall be no issuance of a separate ERP for Certified Facilities.

Those forms submitted as part of a SCA, an amendment, or modification, shall be processed concurrently with, and under the respective certification, amendment, or modification procedures. Those forms submitted as a post-certification submittal (after certification, modification, or amendment and prior to construction) shall be processed in accordance with Section A. General Conditions, Condition XXI., Procedures for Post-Certification Submittals. Post-certification submittal information may be submitted for discrete portions of the Certified Facilities for a determination of compliance with these Conditions of Certification.

No construction shall commence on a Project feature, or in a particular segment for a linear facility, until the Department has determined that there is a demonstration of compliance with these Conditions. For post-certification submittal reviews, the Department's determination is governed by Section A. General Conditions, Condition XXI., Procedures for Post-Certification Submittals.

b. Concurrent with submittal of the DEP form required in subparagraph A.1.a., above, the Licensee shall submit, as applicable, a survey of wetland and surface water areas as delineated in accordance with Chapter 62-340, F.A.C., and verified by appropriate agency staff for Department compliance review. Available DEP-approved wetland and surface water delineations within the boundaries of a certified site or a portion thereof may be used and reproduced for this delineation submittal and verification.

[Section 373.416, F.S.; Chapters 62-330 and 62-340, F.A.C.]

2. Construction, operation, and maintenance of the proposed Project (including any access roads and structures constructed within wetlands and other surface waters, and/or associated facilities) shall satisfy any applicable non-procedural requirements in the Department rules.

[Section 373.414(1)(a), F.S.]

3. Any delineation of the extent of a wetland or other surface water submitted as part of the DEP ERP Application Form required by subparagraph A.1.a., above, including plans or other supporting documentation, shall not be considered binding on the Department unless a specific condition of this Certification or a formal wetlands jurisdictional determination under Section 373.421(2), F.S., provides otherwise.

[Sections 373.421, 403.504, F.S.]

B. Surface Water Management Systems

1. Information regarding surface water management systems (SWMS) will be reviewed for consistency with the applicable non-procedural requirements under Part IV of Chapter 373, F.S., following submittal of Form 62-330.060(1), F.A.C., to the appropriate DEP District.

2. All construction, operation, and maintenance of the SWMS(s) for the Certified Facilities shall be as set forth in the plans, specifications, and performance criteria contained in the SCA and other materials presented during the certification proceeding, post-certification submittals, and as otherwise approved. If specific requirements are necessary for construction, operation, and/or maintenance of an approved SWMS, those requirements shall be incorporated into a SWMS Plan for that system and included in Attachment B (Surface Water Management System Plans). Any alteration or modification to the SWMS Plan or the SWMS as certified requires prior approval from the Department.

3. To allow for stabilization of all disturbed areas, prior to construction, during construction of the SWMS, and for a period of time after construction of the SWMS, the Licensee shall implement and maintain erosion and sediment control best management practices, such as silt fences, erosion control blankets, mulch, sediment traps, polyacrylamide (PAM), temporary grass seed, permanent sod, and floating turbidity screens to retain sediment on-site and to prevent violations of state water quality standards. These devices shall be installed, used, and maintained at all locations where the possibility exists of transferring suspended solids into the receiving waterbody due to the licensed work, and shall remain in place at all locations until construction in that location is completed and soils are permanently stabilized. All best management practices shall be in accordance with the guidelines and specifications described in the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual* (Florida Department of Transportation and Florida Department of Environmental Protection, by HydroDynamics Incorporated in cooperation with Stormwater Management Academy, June 2007) unless a project-specific erosion and sediment control plan is approved as part of this License. If project-specific Conditions require additional measures during any phase of construction or operation to prevent erosion or control sediments beyond those specified in the approved erosion and sediment control plan, the Licensee shall implement additional best management practices as necessary, in accordance with the guidelines and specifications in the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual*. The Licensee

shall correct any erosion or shoaling that causes adverse impacts to the water resources as soon as feasible. Once project construction is complete in an area, including the re-stabilization of all side slopes, embankments, and other disturbed areas, and before conversion to the operation and maintenance phase, all silt screens and fences, temporary baffles, and other materials that are no longer required for erosion and sediment control shall be removed.

4. The Licensee shall complete construction of all aspects of the SWMS described in the ERP Application Form, submitted as part of a post-certification submittal, amendment, modification, or SCA including water quality treatment features, and discharge control facilities prior to use of the portion of the Certified Facility being served by the SWMS.

5. At least 48 hours prior to beginning the authorized activities, the permittee shall submit to the Agency a fully executed Form 62-330.350(1), "Construction Commencement Notice," (October 1, 2013), (http://www.flrules.org/Gateway/reference.asp?No=Ref-02505),incorporated by reference herein, indicating the expected start and completion dates. A copy of this form may be obtained from the Agency, as described in subsection 62-330.010(5), F.A.C., and shall be submitted electronically or by mail to the Agency. However, for activities involving more than one acre of construction that also require a NPDES stormwater construction general permit, submittal of the Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities, DEP Form 62-621.300(4)(b), shall also serve as notice of commencement of construction under this chapter and, in such a case, submittal of Form 62-330.350(1) is not required.

6 Each phase or independent portion of the approved system must be completed in accordance with the submitted DEP Form prior to the operation of the portion of the Certified Facility being served by that portion or phase of the system.

7. Within 30 days, or such other date as agreed to by DEP and the Licensee, after completion of construction of any new portions of the SWMS, the Licensee shall submit to the appropriate DEP District, and copy the SCO, a written statement of completion and certification by a registered professional engineer (P.E.), or other appropriate registered professional, as authorized by law, utilizing the required "As-Built Certification and Request for Conversion to Operation Phase" (DEP Form 62-330.310(1), F.A.C.). Additionally, if deviations from the approved drawings are discovered, the As-Built Certification must be accompanied by a copy of the approved drawings with deviations noted.

8. Any substantial deviation from the approved drawings, exhibits, specifications, or Conditions, may constitute grounds for revocation or enforcement action by the Department.

9. The operation phase of any new SWMS approved by the Department shall not become effective until the Licensee has complied with the requirements of the conditions herein, the Department determines the system to be in compliance with the approved plans, and the entity approved by the Department accepts responsibility for operation and maintenance of the system.

10. The DEP District must be notified in advance of any proposed construction dewatering. If the dewatering activity is likely to result in off-site discharge or sediment transport into wetlands or surface waters, a written dewatering plan must be submitted to and approved by the Department prior to the dewatering event.

[Section 373.414, F.S.; Chapters 62-302, 62-330, and Rule 62-4.242, F.A.C.]

C. Wetland and Other Surface Water Impacts

1. All Certified Facilities shall be constructed in a manner which will eliminate or reduce adverse impacts to on-site and/or adjacent wetlands or other surface waters to the extent practicable or otherwise comply with substantive criteria for elimination or reduction. When impacts to wetlands will occur as a result of a future amendment, modification, or certification, and cannot be practicably eliminated or reduced, the Licensee may propose, and the Department or Board shall consider, mitigation to offset otherwise unpermittable activities under the ERP review process pursuant to subparagraph A.1., above.

2. Proposed mitigation plans submitted with the DEP ERP Application forms required in subparagraph A.1.a., above, or submitted and approved as part of an amendment, modification, or certification, and that are deemed acceptable by DEP, shall include applicable construction conditions, success criteria, monitoring plans, and remedial actions (if applicable), and shall be incorporated into these Conditions as Attachment C (Wetland Mitigation Plans).

[Sections 373.413, 373.414, 373.4145, 403.511, 403.814(6, F.S.; Chapters 62-312, 62-330, 62-340, 62-342, and 62-345, F.A.C.]

XXX. THIRD PARTY IMPACTS New

The Licensee is responsible for maintaining compliance with these Conditions even when third party activities authorized by the Licensee occur in or on the certified site.

[Sections 403.506(1), F.S.]

XXXI. FACILITY OPERATION Replaces Conditions XIV. Facilities Operation, XV. Adverse Impact, and XXIX. Design and Performance Criteria

The Licensee shall properly operate and maintain the Certified Facility and systems of treatment and control (and related appurtenances) that are installed and used by the Licensee to achieve compliance with these Conditions, as required by the Final Order of Certification, these Conditions, or a post-certification amendment or modification. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the Final Order of Certification, these Conditions, or a post-certification amendment or modification. Further, the Licensee shall take all reasonable steps to minimize any adverse impact resulting from noncompliance with any limitation specified in this certification, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying event.

[Rule 62-4.160(6), F.A.C.]

XXXII. RECORDS MAINTAINED AT THE FACILITY Replaces Condition XIV. Facilities Operation

A. These Conditions or a copy thereof shall be kept at the site.

B. The Licensee shall hold at the site, or other location designated by these Conditions, records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation required by these Conditions, copies of all reports required by these Conditions, and records of all data used to complete the SCA for this approval. These materials shall be retained at least 3 years

from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

C. Records of monitoring information shall include:

1. the date, exact place, and time of sampling or measurements;
2. the person responsible for performing the sampling or measurements;
3. the dates analyses were performed;
4. the person responsible for performing the analyses;
5. the analytical techniques or methods used; and
6. the results of such analyses.

[Rules 62-4.160(12) and (14)(b), F.A.C.]

XXXIII. WATER DISCHARGES Replaces Condition XIV. Facilities Operation

A. Except as otherwise authorized by a permit issued by the Department under a federally approved or delegated program or to the extent a variance, exception, exemption or other relief is granted or authorized by these Conditions, the Licensee shall not discharge to surface or ground waters of the State, wastes in concentrations, which, alone or in combinations with other substances or components of discharges (whether thermal or non-thermal), are carcinogenic, mutagenic, or teratogenic to human beings (unless specific criteria are established for such components in Rule 62-520.400, F.A.C.) or are acutely toxic to indigenous species of significance to the aquatic community within surface waters affected by the ground water at the point of contact with surface waters.

B. Except as otherwise authorized by a permit issued by the Department under a federally approved or delegated program or to the extent a variance, exception, exemption, or other relief is granted or authorized by these Conditions, all discharges and activities must be conducted so as to not cause a violation of the water quality standards set forth in Chapters 62-4, 62-302, 62-520, 62-550, and 62-620, F.A.C., including the provisions of Rules 62-4.243, 62-4.244, and 62-4.246, F.A.C., the antidegradation provisions of Rules 62-4.242(1)(a), (1)(b), and 62-302.300, F.A.C., and any special standards for Outstanding Florida Waters and Outstanding National Resource Waters set forth in Rules 62-4.242(2) and (3), F.A.C.

C. Except as otherwise authorized by a permit issued by the Department under a federally approved or delegated program or to the extent a variance, exception, exemption, or other relief is granted or authorized by these Conditions, all dewatering discharges must be in compliance with Rule 62-621.300, F.A.C.

[Chapters 62-4, 62-302, 62-520, 62-550, 62-620, and 62-621, F.A.C.]

XXXIV. SOLID AND HAZARDOUS WASTE Replaces Condition XIV. Facilities Operation

A. Solid Waste Moved with revisions from Condition XI. Solid Waste Storage and Disposal

The Licensee shall comply with all applicable non-procedural provisions of Chapter 62-701, F.A.C., for any solid waste generated within the Certified Facility during construction,

operation, maintenance, and closure. Solid waste produced by the operation of the Martin Expansion Project shall be disposed of on site or in a permitted disposal facility.

[Chapter 62-701, F.A.C.]

B. Hazardous Waste, Used Oil, Petroleum Contact Water, and Spent Mercury

The Licensee shall comply with all applicable non-procedural provisions of Chapter 62-730, F.A.C., for any hazardous waste generated within the Certified Facility. An EPA identification number must be obtained before beginning hazardous waste activities unless the facility is a Very Small Quantity Generator (VSQG). VSQGs generate no more than 100 kg (220 lbs) of hazardous waste in any month.

The Licensee shall comply with all applicable non-procedural provisions of Chapter 62-710, F.A.C., for any used oil and used oil filters generated within the Certified Facility.

The Licensee shall comply with all applicable non-procedural provisions of Chapter 62-737, F.A.C., for any spent mercury-containing lamps and devices generated within the Certified Facility.

The Licensee shall comply with all applicable provisions of Chapter 62-740, F.A.C., for any petroleum contact water located within the Certified Facility.

[Chapters 62-710, 62-730, 62-737, and 62-740, F.A.C.]

C. Hazardous Substance Release Notification Replaces Condition X. Toxic, Deleterious or Hazardous Materials

1. Any owner or operator of a facility who has knowledge of any release of a hazardous substance from a Certified Facility in a quantity equal to or exceeding the reportable quantity in any 24-hour period shall notify the Department by calling the STATE WARNING POINT, (800) 320-0519, as soon as possible, but not later than one working day of discovery of the release.

2. Releases of mixtures and solutions are subject to these notification requirements only where a component hazardous substance of the mixture or solution is released in a quantity equal to or greater than its reportable quantity.

3. Notification of the release of a reportable quantity of solid particles of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, or zinc is not required if the mean diameter of the particles released is larger than 100 micrometers (0.004 inches).

[Chapter 62-150, F.A.C.]

D. Contaminated Site Cleanup

The Licensee shall comply with all applicable non-procedural provisions of Chapter 62-780, F.A.C., for any violations of relevant provisions of Chapter 376 or 403, F.S., that result in legal responsibility for site rehabilitation pursuant to those chapters. This responsibility for site rehabilitation does not affect any activity or discharge permitted or exempted pursuant to Chapter 376 or 403, F.S., or rules promulgated pursuant to Chapter 376 or 403, F.S.

[Chapter 62-780, F.A.C.]

XXXV. STORAGE TANK SYSTEMS New

Registration, construction, installation, operation, maintenance, repair, closure, and disposal of storage tank systems within a Certified Site that store regulated substances shall be in accordance with Chapters 62-761 and 62-762, F.A.C., in order to minimize the occurrence and environmental risks of releases and discharges. Mineral acid storage tank systems are subject only to Rule 62-762.891, F.A.C.

A. Incident Notification Requirements.

Notification of any condition or situation indicating that a release or discharge may have occurred from a storage tank system or system component shall be made to the County in writing or electronic format on Form 62-761.900(6), Incident Notification Form (INF), within 72 hours of discovery or before the close of the County's next business day.

B. Discharge Reporting Requirements

Notification of the discovery of a discharge of a regulated substance shall be made to the county in writing or electronic format on Form 62-761.900(1), Discharge Report Form (DRF) within 24 hours of the discovery or before the close of the County's next business day, unless the discovery is a non-petroleum, de minimis discharge referenced in Rule 62-780.550, F.A.C., or a petroleum or petroleum product de minimis discharge referenced in Rule 62-780.580(1), F.A.C. A de minimis discharge is exempt from the notification requirements as long as discharge is removed and properly treated or properly disposed, or otherwise remediated pursuant to the applicable provisions of Chapter 62-780, F.A.C.

C. Discharge Cleanup

If a discharge of a regulated substance occurs at a certified facility, actions shall be taken immediately to contain, remove, and abate the discharge under all applicable Department rules. The Licensee is advised that other federal, state, or local requirements may apply to these activities. If the contamination present is subject to the provisions of Chapter 62-780, F.A.C., corrective action, including free product recovery, shall be performed in accordance with that Chapter.

D. Out of Service and Closure Requirements

Storage tank systems shall be taken out-of-service and/or closed as necessary in accordance with Rules 62-761.800, 62-762.801 and 62-762.802, F.A.C., as applicable.

[Chapters 62-761, 62-762, and 62-780, F.A.C.]

SECTION B. SPECIFIC CONDITIONS

I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

A. Environmental Control Program Moved from Condition VII. Control Measures During Construction, paragraph B.

The Licensee shall establish an environmental control program under the supervision of a qualified person to assure that all construction activities conform to good environmental practices and the applicable conditions of certification. A written plan for controlling pollution during construction shall be submitted to DEP within sixty days of issuance of the Certification for the applicable phase. The plan shall identify and describe all pollutants and wastes generated during construction and the methods for control, treatment and disposal. The Licensee shall notify DEP's Southeast District Office by telephone within 24 hours, if possible, if unexpected harmful effects or evidence of irreversible environmental damage are detected by it during construction, shall immediately report in writing to DEP, and shall within two weeks provide an analysis of the problem and a plan to eliminate or significantly reduce the harmful effects or damage and a plan to prevent reoccurrence.

B. Construction Dewatering Effluent Moved from Condition VII. Control Measures During Construction, paragraph C.

Should the Licensee's dewatering operation create shoaling in adjacent water bodies, the Licensee is responsible for removing such shoaling. All offsite discharges resulting from dewatering activities must be in compliance with water quality standards required by DEP Chapters 62-4 and 62-302, F.A.C., or such standards as issued through a variance by DEP.

C. Groundwater Monitoring Moved from Condition V. Surface Water Discharges, paragraph B.

1. Within six months of issuance of the certification of the applicable phase (Phase I), the Licensee shall develop and implement a new ground water monitoring plan: a) acceptable to DEP; b) detailed according to the criteria of Rule 62-520.600, F.A.C., and c) specifically addressing seepage from the cooling pond and the area expected to be affected by seepage. A zone of discharge is granted within the applicant's property.

2. Pursuant to Rule 62-520.520(8), F.A.C., the existing Martin cooling pond is exempt from secondary drinking water standards for chloride, sulfate and total dissolved solids. ***Moved with revisions from Condition V. Surface Water Discharges, paragraph A.***

D. Transmission and Pipeline ROW Moved from Conditions XXXIII. Transmission and Pipeline ROWs, paragraph B, 6. and 13

1. All materials used for any purpose related to the construction of the transmission lines or other linear facilities shall come from fill sources in compliance with applicable local ordinances. No fill materials shall be obtained from any excavated wetlands unless authorized by DEP and SFWMD in accordance with a mitigation plan submitted in compliance with certification.

2. Following construction, a plan for maintenance and control of exotic invasive plant species within the ROWs shall be developed by the Licensee in consultation with DEP. The Licensee shall abide by the plan. This maintenance clause refers to the planting or natural recruitment of the referenced plants.

E. Wastewater Facilities

1. The Licensee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility or activity and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment.

[Rule 62-620.610 (15), F.A.C.]

2. The Licensee shall at all times properly operate and maintain any wastewater facilities and systems of treatment and control, and related appurtenances, that are installed and used by the Licensee to achieve compliance with applicable rules.

[Rule 62-620.610(7), F.A.C.]

II. DEPARTMENT OF TRANSPORTATION Moved with revisions from Condition XXXVII. Department of Transportation

A. The Florida Department of Transportation (FDOT) reviewed and approved FPL's highway traffic analysis which noted that the capacity of State Road 710 was adequate for the construction and operation of Units 3, 4, 8 and the Martin Solar Energy Center, subject to certain conditions, which have already been met.

B. The adequacy of highway capacity on State Road 710 to serve the operation of future projects at the Martin Plant shall be addressed by FPL and FDOT within any future site certification applications.

C. FPL and FDOT each reserve the right to take any position with respect to questions of potential impacts of rail traffic on highway traffic regarding construction and operation of future Martin Plant projects.

D. Post Certification Review Items

1. Access Management to the State Highway System

Any new access to the State Highway System will be subject to the requirements of Rule Chapters 14-96, State Highway System Connection Permits, and 14-97, State Highway System Access Control Classification System and Access Management, Florida Administrative Code, which may require a right of way access connection permit from FDOT.

[Chapters 14-96 and 14-97, F.A.C.]

2. Overweight or Over Dimensional Loads

Operation of overweight or overdimensional loads by the applicant on State transportation facilities during construction and operation of the utility facility will be subject to the safety and permitting requirements of Chapter 316, Florida Statutes, the Florida Uniform Traffic Control Law, and Rule Chapter 14-26, Safety Regulations and Permit Fees for Overweight and Overdimensional Vehicles, Florida Administrative Code.

[Chapter 316, F.S.; Chapter 14-26, F.A.C.]

3. Use of State of Florida Right of Way or Transportation Facilities

Any use of State of Florida right of way and certain activities on State transportation facilities will be subject to the requirements of the Utilities Procedures Manual

(Document # 710-030-001) and the Utilities Accommodation Manual; Rule Chapter 14-46, Utilities Installation or Adjustment, Florida Administrative Code; Design Standards for Design, Construction, Maintenance and Utility Operation on the State Highway System; Standard Specifications for Road and Bridge Construction; and pertinent sections of the Florida Department of Transportation's Project Development and Environmental Manual. The placement of pipelines should take into consideration the planned widening of state transportation facilities. The cost of relocating or reconstructing the pipeline will be borne by the applicant to the extent required by Section 337.403, Florida Statutes, and Rule Chapter 14-46, Florida Administrative Code.

[Sections 337.403 and 337.404, F.S.; Chapters 14-15 and 14-46, F.A.C.]

4. Drainage

Any drainage onto State of Florida right of way and transportation facilities will be subject to the requirements of Rule Chapter 14-86, Drainage Connections, Florida Administrative Code. FPL shall submit information to FDOT on adopted agency forms demonstrating compliance with applicable drainage-related standards. That submittal shall be governed by the procedures of Section A. Conditions XXXII and XXXIII for post-certification submittals. FPL shall locate and construct transmission lines in such a manner so as not to interfere with, obstruct, or otherwise adversely impact any drainage from FDOT's existing or announced planned transportation facilities. FPL agrees to provide FDOT with a drainage easement to accommodate such transportation facilities in or across the fee-owned transmission line right of way consistent with the operation of the transmission line, if such becomes necessary to comply with the requirements of a water management district or the Department of Environmental Protection (DEP).

[Chapter 14-86, F.A.C.]

E. Best Management Practices

1. Transportation Control

Traffic control will be maintained during plant construction and maintenance in compliance with the standards contained in Level of Service Targets for the State Highway System, Topic Number 000-525-006; Statewide Minimum Level of Service Standards, Florida Administrative Code; Florida Department of Transportation's Design Standards; and Florida Department of Transportation's Specifications for Roads and Bridge Construction, whichever is more stringent.

2. Overweight/Overdimensional Vehicles

If the applicant uses contractors for the delivery of any overweight or overdimensional loads to the site during construction, the applicant should assure that its contractors adhere to the necessary standards and receive the necessary permits required under Chapter 316, Florida Statutes, and Rule Chapter 14-26, Safety Regulations and Permitting Fees for Overweight and Overdimensional Vehicles, Florida Administrative Code.

[Chapter 316, F.S.; Chapter 14-26, F.A.C.]

III. SOUTH FLORIDA WATER MANAGEMENT DISTRICT Moved with revisions from Condition VI. South Florida Water Management District

A. Legal/Administrative

1. General

a. Responsible Entity

The Licensee shall be responsible for compliance with the Certification Conditions. If contractual rights, duties, or obligations are transferred under this Certification, notice of such transfer or assignment, including the identification of the entity responsible for compliance with the Certification, shall immediately be submitted to the Florida Department of Environmental Protection and the SFWMD by the previous certification holder (Licensee) and the Assignee. Any assignment or transfer shall carry with it the full responsibility for the limitations and Conditions of this Certification. The previous Licensee shall be responsible for informing the Assignee of all authorized facilities and uses and the Conditions under which they were authorized. The previous Licensee shall remain liable for corrective actions that may be required as a result of any violations prior to transfer or assignment of any contractual rights, duties, or obligations under this Certification.

[Sections 373.223, 373.342, and 373.4l3, F.S.; Rules 40E-2.091, 40E-2.301, 40E-2.38l, and 40E-3.101(1), F.A.C.]

b. Minimum Standards

This Certification is based on the Licensee's submitted information to the SFWMD that reasonably demonstrates that harm to the water resources will not be caused by the authorized activities. The plans, drawings and design specifications submitted by the Licensee shall be considered the minimum standards for compliance.

[Sections 373.219, 373.223, 373.229, 373.308, and 373.316, F.S.; Rules 40E-2.091, 40E-2.301, 40E-2.381, and 40E-3.500-.531, F.A.C.]

c. Compliance Requirements

This project must be constructed, operated and maintained in compliance with and meet all nonprocedural requirements set forth in Chapter 373, F.S., and Chapters 40E-2 (Consumptive Use), 40E-3 (Water Wells) and 40E-6 (Utilization of District Works), F.A.C.

[Sections 373.219, 373.223, 373.229, 373.308, and F.S.: 40E-2.041, 40E-2.301, 40E-2.381, 40E-3.051, 40E-3.301, and 40E-3.411, F.A.C.]

d. Off-Site Impacts.

It is the responsibility of the Licensee to ensure that adverse off site water resource related impacts do not occur during the construction, operation, and maintenance of the project.

[Sections 373.223 and 373.309, F.S.; Rules 40E-2.09l, 40E-2.38l, 40E-3.301(3), and 40E-3.301(4), F.A.C.]

e. Liability.

The Licensee shall hold and save SFWMD harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, operation, maintenance and/or use of any facility authorized by this Certification, to the extent allowed under Florida law.

[Section 373.223, F.S.; Rules 40E-2.091, and 40E-2.381, F.A.C.]

f. Construction, Operation, and Maintenance Responsibilities. The Licensee shall be responsible for the construction, operation, and maintenance of all facilities installed for the proposed project. All structures on SFWMD works or lands constructed by the Licensee shall remain the property of the Licensee, who shall be solely responsible for ensuring that such structures and other uses remain in a safe condition and comply with all applicable federal, state, and local safety standards. SFWMD assumes no duty with regard to ensuring that such uses are so maintained and assumes no liability with regard to injuries caused others by any such failure. SFWMD further assumes no duty to ensure that the permitted use complies with the safety standards of other governmental entities. SFWMD is not responsible for any damages to installations located within its rights-of-way. The Licensee shall be responsible for the repair and/or replacement of existing facilities located within the SFWMD's rights-of-way. Canal right-of-way disturbed during construction, installation or maintenance of any authorized facilities shall be restored to original or better condition.

[Sections 373.309, F.S.; Rule 40E-3.301, F.A.C., Chapter 40E-6, F.A.C.]

g. Non-interference with District Operations.

Except as may be authorized by this Certification, the Licensee shall not engage in any activity regarding the authorized use which interferes with the construction, alteration, maintenance or operation of the works of SFWMD, including, but not limited to:

(1) discharging pollutants, debris or aquatic weeds into SFWMD works;

(2) causing erosion or shoaling within SFWMD works; and

(3) planting trees or shrubs or erecting structures which limit or prohibit access by SFWMD equipment aid vehicles.

The Licensee shall be responsible for any costs incurred by SFWMD resulting from any such interference.

g. Access.

SFWMD representatives shall be allowed reasonable escorted access to the power plant site, any associated linear facilities and the wetland mitigation/restoration area to inspect and observe any activities associated with the construction of the proposed project and/or the operation and/or maintenance of the on-site wells, surface water withdrawal pumps, and/or surface water management system in order to determine compliance with the conditions of this Certification. The Licensee shall not refuse immediate entry or access upon reasonable notice to any SFWMD representative who requests entry for purpose of the above noted inspection and presents appropriate credentials.

h. Post Certification Information Submittals.

Information submitted to SFWMD subsequent to Certification, in compliance with the conditions of this Certification, shall be for the purpose of SFWMD determining the Licensees compliance with the Certification conditions and the non-procedural criteria contained in Chapters 40E-2, 40E-3, 40E-4, and 40E-6, F.A.C., as applicable, prior to the commencement of the subject construction, operation, and/or maintenance activity covered thereunder.

i. Post Certification Permit Modification.

Once the final Certification for a phase of the project, including the transmission line and gas pipeline, has been issued, SFWMD will require modification of the appropriate permits issued by SFWMD for any affected entities to reflect the activities authorized by the certification order.

j. Enforcement.

The SFWMD may confer with FDEP to request FDEP to take any and all lawful actions that are necessary to enforce any condition of this Certification based on the authorizing statutes and rules of the SFWMD.

k. Post Certification Construction Notifications.

At least 30 days prior to the commencement of construction of any phase of this project, the Licensee or Project Engineer shall notify SFWMD staff in the Martin/St. Lucie Service Center Environmental Resource Compliance Division (using the appropriate SFWMD form) of the actual or anticipated construction start date and the expected completion date/duration of construction. Annual construction status reports shall be submitted by the Licensee to the SFWMD Environmental Resource Compliance Division (using the appropriate SFWMD form) beginning one year after the initial construction date.

2. Processing of Informational Requests.

a. At least ninety (90) days prior to the commencement of construction of any portion of the project for which additional information must be submitted, the Licensee shall submit to SFWMD staff, for a completeness and sufficiency review, any pertinent additional information required under SFWMD's site specific standards and the conditions of Certification for that portion proposed for construction. If SFWMD staff does not issue a written request for additional information within thirty (30) days, the information will be presumed to be complete and sufficient.

b. Within sixty (60) days of the determination by SFWMD staff that the additional information is complete and sufficient, the SFWMD shall determine and notify the Licensee in writing whether the proposed activities conform to SFWMD non procedural criteria, as required by Chapters 40E-2, 40E-3, 40E-4, and 40E-6, F.A.C., and the conditions of Certification. If necessary, SFWMD shall identify what items remain to be addressed. No construction activities shall begin until SFWMD has determined either in writing, or by failure to notify the Licensee in writing, that the activities are in compliance with the applicable SFWMD criteria.

c. Since this Certification is the only form of permit required from any agency, it is understood that the Licensee and SFWMD shall strive to resolve disputes by mutual agreement.

d. If mutual agreement cannot be reached, then the matter shall be immediately referred to the Division of Administrative Hearings (DOAH) for disposition in accordance with the provisions of Chapter 120, F.S.

e. Subsequent modifications to the drawings and supporting calculations submitted to the SFWMD which may alter the quantity and/or quality of waters discharged off site shall be made pursuant to Section 403.516, F.S., and Rule 62-17.211, F.A.C. They shall also be submitted to SFWMD for a determination that the modifications are in compliance with the non-procedural provisions of Chapters 40E-2, 40E-3, 40E-4, and 40E-6, F.A.C., prior to the commencement of construction.

f. SFWMD and the Licensee may jointly agree to vary the informational requirements.

B. Water Use Conditions

1. General

a. Water Shortage Compliance.

In the event of a declared water shortage, the Licensee must comply with any water withdrawal reductions or monitoring requirements ordered by SFWMD in accordance with the Water Shortage Plan, Chapter 40E-21, F.A.C.

b. Impacts on Existing Legal Uses.

The Licensee shall mitigate any adverse impact on existing legal uses caused by the ground water withdrawals authorized by this Certification. When adverse impacts occur or are imminent, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of Condition A.1.j of these conditions. The adverse impacts can include:

(1) A reduction in well water levels that impairs the ability of an adjacent well, including a domestic well, lawn irrigation well, or public water supply well, to produce by 10% or greater;

(2) A significant reduction in water levels in an adjacent water body such as a lake, pond, wetland, or canal system that impairs the ability to produce water by 10% or greater;

(3) Saline water intrusion or induced movement of pollutants into the water supply of an adjacent water user, resulting in a significant reduction in water quality; and/or

(4) A change in water quality caused by the Licensee that results in significant impairment or loss of use of a well or water body.

c. Impacts on Existing Off Site Land Uses. The Licensee shall mitigate any adverse impacts on existing off-site land uses that are a consequence of the groundwater withdrawals authorized by this Certification. If increased withdrawals cause an adverse impact on existing land uses, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of Condition A.1.j of these conditions. Adverse impacts can include:

(1) A significant reduction in water levels in an adjacent water body, including impoundments, to the extent that the designed function of the water body is impaired;

(2) Land collapse or subsidence caused by a reduction in water levels; and/or

(3) Damage to crops and other types of vegetation.

d. Impacts to Natural Resources. The Licensee shall mitigate any adverse impacts to natural resources as a consequence of the groundwater withdrawals authorized by this Certification. When adverse impacts occur, or are imminent, the SFWMD reserves the right to curtail future withdrawal rates pursuant to the enforcement provisions of Condition A.1.j of these conditions. Adverse impacts can include:

(1) A reduction in ground water levels that results in significant lateral movement of the fresh water/salt water interface;

(2) A reduction in water levels that adversely impacts the hydroperiod of protected wetland environments;

(3) A significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond;

(4) Induced movement or induction of pollutants into the water supply resulting in a significant reduction in water quality; and/or

(5) Harm to the natural system including damage to habitat for rare or endangered species.

e. Well System Operation. At any time, if there is an indication that the well casing, valves, or controls associated with an on-site well system leak or have become inoperative, the Licensee shall be responsible for making the necessary repairs or replacement to restore the well system to an operating condition acceptable to SFWMD. Failure to make such repairs shall be cause for requiring that the well be filled and abandoned in accordance with the procedures outlined in Chapter 40E-3 (Water Wells), F.A.C.

2. Site Specific Standards Design Requirements

a. Authorized Daily Withdrawals. This Certification authorizes a maximum daily withdrawal of 0.067 MGD from the surficial aquifer for potable water demands, and a continued maximum daily withdrawal of 518.40 MGD from the St. Lucie Canal (C-44) as provided in the June 14, 1983, Revised Permit Agreement Between SFWMD and FPL to supplement evaporation, seepage and cooling losses from the on-site cooling pond upon build out of Units 3 and 8. This Certification also authorizes, on an interim basis, a maximum withdrawal of 9.6 MGD from the on-site cooling pond for the processing and related industrial water demands of Units 3, 4 and 8 until such time as additional generating units are constructed and operational or the withdrawals authorized by this Certification are modified pursuant to Condition VI.B.2.e, whichever occurs first. These authorizations also include the daily applicable surface water demands of the existing Units 1 and 2.

b. Authorized Annual Withdrawals. This Certification authorizes a maximum annual withdrawal of 10.22 MGY from the surficial aquifer, and a continued maximum

annual withdrawal of 26,808.50 MGY from the St. Lucie Canal (C-44) as provided in the June 14, 1983, Revised Permit Agreement Between SFWMD and FPL to supplement evaporation, seepage and cooling losses from the on-site cooling pond upon buildout of Units 3, 4, 5, 6 and 8. These authorizations also include the applicable annual surface water demands of the existing Units 1 and 2. This Certification also authorizes, on an interim basis, a maximum annual withdrawal of 2,911.74 MGY from the on-site cooling pond for the processing and related industrial water demands of Units 3, 4 and 8 until such time as any additional generating units are constructed and operational or the withdrawals authorized by this Certification are modified pursuant to Condition VI.B.2.e. whichever occurs first.

c. Authorized Withdrawal Facilities:

1 -- 8" X 100’ X 50 GPM well cased to 50’ withdrawing from the surficial aquifer

4 -- 1000 HP X 90,000 GPM surface water pumps with an intake elevation of 8.00 ft. NGVD withdrawing from the C 44 canal

4 -- 50 HP X 550 GPM surface water pumps with an intake elevation of 7.50 ft. NGVD withdrawing from the C-44 canal (for screen wash purposes)

1 -- 3 HP X 200 GPM surface water pump with an intake elevation of 7.0 ft. NGVD withdrawing from the C-44 canal (for screen wash purposes)

2 -- 25 HP X 1500 GPM surface water pumps withdrawing from the on site cooling pond on a temporary basis to meet processing and related industrial water demands of Units 3 and 4, consistent with Conditions V.B.2.a, b, and e

2 – 100 HP X 4000 GPM surface water pumps withdrawing from the on-site cooling pond (to meet make-up water demands of Unit 8

2 – 150 HP X 4000 GPM surface water pumps with an intake elevation of 7.0 ft. NGVD withdrawing from the C-44 Canal (for emergency back-up for Unit 8.

d. Cooling Pond Maximum Elevation. In accordance with Amendment Two to the June 14, 1983, Revised Permit Agreement between SFWMD and FPL, the Licensee, is authorized to fill the cooling pond at the Martin Plant to surface water elevations of 33.67 NGVD during the period of October 16 through May 14 of each year ("dry season") and 32.83 feet NGVD during the period May 15 through October 15 of each year ("wet season"), provided that if rainfall events cause these dry and wet season water levels to be exceeded, the Licensee shall refrain from adding make-up water to the cooling pond from the St. Lucie (C-44) Canal via the 90,000 GPM intake pumps until such time as seepage and evaporative losses or flood control releases have lowered the cooling pond elevation below these levels.

e. Modification of Authorized Withdrawals. By June 13, 2003, and every ten years thereafter, unless extended by mutual agreement between the Licensee and SFWMD the Licensee shall submit to the SFWMD a report on the project’s consumptive water use which contains the information required by Chapter 40E-2, F.A.C., as in effect at that time. Within 90 days after receipt of the report, SFWMD shall evaluate the information, and issue a written notification to DEP and the Licensee as to whether the maximum annual withdrawals of water for consumptive use authorized by this Certification remains in compliance with the provisions of Chapter 373, F.S., and Chapter 40E-2, F.A.C., as in effect at that time. If the notification indicates

that the withdrawals are not in compliance with those provisions, it shall recommend possible alternatives for bringing the withdrawals into compliance or otherwise meeting the minimum consumptive water use needs of the certified project. If mutual agreement cannot be reached within 180 days after issuance of the written notification on whether the maximum annual withdrawals of water for consumptive use remain in compliance, then the written notification shall be immediately referred to the Division of Administrative Hearings (DOAH) for resolution in accordance with the procedural provisions of Sections 403.516(1)(c) and 120.57, F.S. (1989). In any proceeding conducted pursuant to this Condition of Certification, SFWMD shall demonstrate that the authorized water uses are no longer consistent with SFWMD's nonprocedural criteria. The Licensee shall then demonstrate its entitlement to maintaining the authorized water uses by showing that the authorized water use is consistent with the nonprocedural criteria of SFWMD for such water uses or that a variance or other relief is warranted. The Administrative Law Judge shall submit a recommended order to the Siting Board on whether the authorized water uses should be modified. The Siting Board shall then enter a final order on the matter, which order will constitute final agency action.

3. Additional Information Requirements

a. Dewatering Operations. Prior to the commencement of construction of those portions of the project which involve dewatering activities, including any dewatering activities that may be associated with the construction of the proposed transmission line and fuel pipeline, a detailed plan for the proposed dewatering activities must be reviewed by SFWMD for a determination of compliance with the nonprocedural provisions of Chapter 40E-2, 40E-3, and 40E-4, F.A.C. The following information must be submitted:

(1) A detailed site plan which shows the locations of the proposed dewatering areas;

(2) The methods of dewatering operations;

(3) The maximum depth for each dewatering operation;

(4) The location and specifications for all proposed wells and/or pumps associated with each dewatering operation;

(5) The discharge method, route, and location of receiving waters generated by each dewatering operation, including the measures (best management practices) to be taken to prevent water quality problems in the receiving waters;

(6) The duration of each dewatering operation;

(7) An analysis of the impacts of the proposed dewatering operations which indicates that no significant impacts will occur to any existing on site and/or off site legal users or wetlands and that the stability of the dike for the on-site cooling pond will not be threatened. FPL may submit the existing plans that were submitted and reviewed during the site Certification application sufficiency review process, which require the installation of sheet pilings and infiltration trenches to protect the stability of the dike and the adjacent wetlands, to meet this requirement if no changes are made in the proposed dewatering activities which would impact the assumptions on which the analysis is based;

(8) The location of any infiltration trenches; and

(9) All plans must be signed and sealed by a State of Florida registered Professional Engineer and a state of Florida registered Professional Geologist.

b. Monthly Reporting Requirements.

(1) Both groundwater and surface water withdrawal quantities, separated by source, as authorized by this Certification for the project, shall be submitted to SFWMD on a monthly basis beginning with the month following issuance of this Certification. FPL shall also submit, on a monthly basis, end of the month cooling pond stages, monthly seepage loss, monthly evaporation loss, monthly withdrawal from the cooling pond, and the accumulated totals of each for the year. Surface water withdrawal quantities shall be reported in millions of gallons and acre/feet.

(2) Prior to the first day of the month, the Licensee shall notify SFWMD of its projected monthly withdrawal requirements and the date of any proposed withdrawals from the St. Lucie Canal (C-44). Copies of the monthly notification shall be provided to the Director of the Operations and Control Department, the Director of the Operations Control Division, the Director of the Water Supply Department, and the Director of the Water Use Regulation Division. The notification should include the current stage elevation of the cooling reservoir. The Licensee must receive prior approval from SFWMD for any withdrawals from the St. Lucie Canal (C-44). Subject to the enforcement provisions of Condition VI.A.1.j and the water shortage compliance provisions of Condition VI.B.1.a of these conditions, the SFWMD reserves the right to limit or terminate withdrawals by the Licensee from the St. Lucie Canal (C-44) depending upon water availability at the time of notification. In addition, during periods of declared water shortage, pursuant to the provisions of Condition VI.B.1.a of these conditions, the Licensee should coordinate with the Director of the Water Use Regulation Division to project the seasonal withdrawal requirements from the St. Lucie Canal (C-44) through the end of the restriction period.

c. Existing Well Repair, Replacement, Abandonment. If, in the future, any of the existing on site wells require repair, replacement and/or abandonment as defined by Chapter 373, Part II.E, F.S., the Licensee shall submit the information described in Chapter 40E-3, F.A.C., for review and approval by SFWMD prior to initiating such activities.

d. New Well Construction. If any new wells are required to replace the existing on site wells, and the proposed well locations are different from the locations of the previously authorized wells, the Licensee shall submit to SFWMD for review and approval an evaluation of the impacts of pumpage from the proposed well locations ions on adjacent existing legal users, pollution sources, environmental features, the saline water interface, and water bodies.

e. Water Conservation Plan. By June 13, 2003, the Licensee shall submit a Water Conservation Plan as required by Chapter 40E-2, F.A.C., in effect at that time, for review and approval by SFWMD staff. The plan shall, at a minimum, incorporate the following components:

(1) An audit of the amount of water needed in the Licensee s operational processes. If found to be cost effective in the audit, the following measures shall be implemented within one year of completion of the audit:

(a) Implementation of a leak detection and repair program;

(b) Implementation of a recovery/recycling or other program providing for technological, procedural or programmatic improvements to the Licensee's facilities; and

(c) Use of processes to decrease water consumption.

(2) Development and Implementation of an employee awareness program concerning water conservation.

C. SFWMD Lands

1. Future Modifications

If, in the future, the Licensee proposes modifications and/or additions to any existing, permitted power plant, transmission line and/or fuel pipeline facilities that are currently located within SFWMD's right-of-way that were not anticipated in the Site Certification Application submitted, complete drawings showing the proposed and/or modified facility(ies) shall be submitted for review by SFWMD for a determination of compliance with Chapter 40E-6, F.A.C., prior to the commencement of construction of any facilities which will cross over, on, under, or otherwise use SFWMD's right-of-way. These drawings shall depict the proposed use in both plan and profile views and shall show, as a minimum:

a. For aerial electrical transmission/ distribution crossings:

(1) The canal right-of-way lines;

(2) The top of the canal bank and its elevation;

(3) The centerline of the levee and its elevation;

(4) The canal maintenance berm and its elevation at its highest point;

(5) The location of any poles, towers, access roads, pipelines, etc., located within SFWMD's right-of-way;

(6) The location of any anchors, downguys or spanguys within SFWMD's right-of-way;

(7) The elevation of the lowest line, wire, or cable crossing over SFWMD's right-of-way, given at the lowest point of sag in the span within SFWMD's right-of-way;

(8) The location and elevation of any buried facilities; and

(9) The location of the facilities in relation to a section line, major road, or other prominent well-known landmark by which the facilities have been located in the field.

b. For bridges and other pile supported crossings and arch, free span and subaqueous crossings (such as gas, fuel oil, water, sewage, communications lines, etc.):

(1) The canal right-of-way lines;

(2) The top of the canal bank and its elevation;

(3) The width and elevation of any berms or levees;

(4) The existing cross section of the canal taken at the centerline of the point of crossing plus one cross section each taken 50’ upstream and 50’ downstream of the faces of the proposed crossing. The cross sections will be taken at 10’ intervals from top of bank to top of bank and shall be plotted on standard 10 x 10 cross section paper to the same horizontal and vertical scale using NGVD datum. If applicable, the ultimate design section for the canal shall also be plotted on the cross sections submitted;

(5) If applicable the locations at which the crossing shall enter and emerge from the banks or berms;

(6) If applicable, the pile spacing measured center to center for any and all approach spans and measured face to face for the pile bents of the center span;

(7) If applicable the burial depth below the bank, berm and bottom elevation;

(8) If applicable the elevation of the bottom and top of any pipe, conduit or casing;

(9) If applicable, the wall thickness or "schedule" of the pipe;

(10) If applicable, any appurtenances such as fences, guardrails, security enclosures, paving, meters, valves, blow off lines, cathodic protection systems (whether buried or exposed), etc.;

(11) The location of the proposed facilities in relation to a section line, major road or other prominent well-known landmark by which the facilities have been located in the field;

(12) If applicable, the locations of any existing facilities located within SFWMD’s right-of-way at the proposed project site; and

(13) If applicable, the manner in which SFWMD will be provided access to bridge approaches, including drop curbing, reinforced sidewalk sections, guardrail openings, stabilized berm ramps having a minimum top width of 15 feet with a maximum slope of 1 vertical to 10 horizontal.

c. For general short term construction activities on SFWMD right-of-way or where the use of the right of way is proposed for short or long term access to the site:

(1) If applicable, any work areas, spoil disposal or drying areas, materials storage areas, temporary construction or office trailer sites;

(2) If applicable, any temporary or permanent ingress/egress routes to the work site; and

(3) The location of the proposed facilities in relation to a section line, major road or other prominent well-known landmark by which the facilities have been located in the field.

IV. FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION Replaces Conditions XXVIII. Endangered and Threatened Species, XXXIV. Transmission and Pipeline ROWs, paragraph B, and XXXV. Treasure Coast Regional Planning Council, paragraph B.

A. General Listed Species Surveys

1. The Licensee shall follow the current survey protocols for all listed species that may occur within the Certified Facility(ies), including those related to the Solar Energy Farm, as well as accessible appropriate buffers within the property or rights-of-way as defined by the listed species' survey protocols, prior to conducting detailed surveys. Guidance related to species-specific survey protocols can be found in the FWC's Florida Wildlife Conservation Guide at http://myfwc.com/conservation/value/fwcg/. Surveys shall be conducted prior to clearing and construction in accordance with the survey protocols.

[Article IV, Section 9, Florida Constitution; Section 379.2291, F.S.; Chapter 68A-27 and Rule 62-17.191, F.A.C.]

B. Specific Listed Species Surveys

1. This survey shall be conducted in accordance with U.S. Fish and Wildlife Service (USFWS) or FWC guidelines and methodologies by a person or firm that is knowledgeable and experienced in conducting flora and fauna surveys for each potentially occurring listed species.

2. Available survey protocols may be downloaded from https://myfwc.com/wildlifehabitats/wildlife/species-guidelines/.

3. FWC's permitting guidelines for the gopher tortoise may be downloaded from https://myfwc.com/media/11854/gt-permitting-guidelines.pdf.

4. Wildlife surveys shall be conducted in the reproductive or "active" season for each species that falls before the projected clearing activity schedule unless otherwise approved by the FWC.

5. If total avoidance of state-listed wildlife species is not feasible, the Licensee shall consult with the FWC to determine the steps appropriate for the species involved to avoid, minimize, mitigate, or otherwise appropriately address potential impacts.

6. New or irregular activities planned within 660 feet of a bald eagle nest should follow the USFWS Eagle Management Guidelines (https://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf) unless an eagle permit is issued. Information about federal eagle permits is available online (https://www.fws.gov/southeast/our-services/permits/eagles/) or by contacting the regional USFWS Migratory Bird Office directly at (404) 679-7070 or permitsR4MB@fws.gov.

[Article IV, Section 9, Florida Constitution; Section 379.2291, F.S.; Chapter 68A-27, and Rules 68A-16.002 and 62-17.191, F.A.C.]

V. DEPARTMENT OF STATE – DIVISION OF HISTORICAL RESOURCES Replaces Condition XXXIV. Transmission and Pipeline ROWs, paragraph B.

A. Prior to new construction in areas not previously surveyed, the Licensee shall conduct a survey of sensitive cultural resource areas, as determined in consultation with the Department of State, Division of Historical Resources (DHR). A qualified cultural resources

consultant will identify an appropriate work plan for this project based on a thorough review of the Certified Facility. Prior to beginning any field work, the work plan will be reviewed in consultation with DHR. Upon completion of the survey, the results will be compiled into a report which shall be submitted to DHR. If feasible, sites considered to be eligible for the National Register shall be avoided during construction of the project and access roads, and subsequently during maintenance. If avoidance of any discovered sites is not feasible, impact shall be mitigated through archaeological salvage operations or other methods acceptable to DHR, as appropriate.

B. If historical or archaeological artifacts or features are discovered at any time within the Certified Facility, the Licensee shall notify the appropriate DEP District office(s) and the DHR, R.A. Gray Building, 500 South Bronough Street, Room 423, Tallahassee, Florida 32399-0250, telephone number (850) 245-6333, and the Licensee shall consult with DHR to determine appropriate action.

[Sections 267.061, 403.531, and 872.02, F.S.]

VI. DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

Only herbicides registered by the U.S. Environmental Protection Agency and the Florida Department of Agriculture and Consumer Services shall be used at Certified Facilities. Herbicide applications will be in accordance with label directions and will be carried out by a licensed applicator, in compliance with all federal, state and local regulations. Herbicide applications shall be selectively applied to targeted vegetation. Broadcast application of herbicide shall not be used unless effects on non-targeted vegetation are minimized.

[Chapter 487, F.S.]

VII. DEPARTMENT OF HEALTH New

A. Onsite Sewage Treatment and Disposal

1. Systems and septage stabilization facilities established after July 31, 2018 shall be placed no closer than the minimum distances indicated for the following:

(a) Seventy-five feet from a private potable well as defined in paragraph 64E-6.002(44)(a), F.A.C., or a multi-family water well as defined in paragraph 64E-6.002(44)(c), F.A.C.

(b) One-hundred feet from a public drinking water well as defined in paragraph 64E-6.002(44)(b), F.A.C., if such a well serves a facility with an estimated sewage flow of 2000 gallons or less per day.

(c) Two-hundred feet from a public drinking water well as defined in paragraph 64E-6.002(44)(b), F.A.C., if such a well serves a facility with an estimated sewage flow of more than 2000 gallons per day.

3. Following installation of the onsite sewage treatment and disposal system, but prior to covering the system with earth, the system will require inspection by the representatives of the Florida Department of Health in Martin County (DOH in Martin County). Additional inspections are required for incomplete or noncompliant items. The high-water table conditions require a mound installation therefore a second inspection is necessary after the system is covered with earth and stabilized with sod. The DOH in Martin County shall require the design engineer to

certify that the installed system complies with the approved design and installation requirements per 64E-6.004(4), F.A.C.

[Rules 64E-6.003(2), 64E-6.004(4) and 64E-6.009(3)(f), F.A.C.]

4. The facility is an industrial-equivalent zoned activity therefore an annual inspection by a representative of the DOH in Martin County will be required to verify ongoing compliance with the requirements of section 381.0065(4)(i), F.S.

[Section 381.0065(4)(i)3, F.S. and Applicant Agreement]

5. If the onsite sewage treatment and disposal system require repair, replacement, modification, or abandonment, such action shall be taken in accordance with the nonprocedural requirements of Chapter 64E-6, F.A.C. and Section 381.0065, F.S. If a modification to the Conditions is required then such action shall be taken in accordance with Section 403.516, F.S. and Rule 62-17.211, F.A.C.

[Sections 381.0065(4) and 403.516, F.S. and Rules 64E-6.001(4), .003(1),.0015(1) and 62-17.211, F.A.C.]

6. Prior to construction, pursuant to Chapter 62-191, F.A.C. and Section A. Condition XXI. Procedure for Post-Certification Submittals, , the following shall be submitted to the DOH in Martin County;

- a floor plan in sufficient detail to verify the domestic wastewater sizing criteria, and,
- a plumbing diagram sufficient to demonstrate that only domestic wastewater will be routed to the onsite sewage treatment and disposal system and that industrial wastewater and floor drains will be routed to alternative DEP-regulated systems.

[Rule 64E-6.004(3)(b) F.A.C]

7. Prior to construction, a “to scale” site plan that depicts the following information per Rule 64E-6.004(a) is required and shall be submitted for review in accordance with Section A. Condition XXI. Procedure for Post-certification Submittals:

a. A plan or plat of the lot or total site ownership. The site plan shall be drawn to scale and shall be for the property where the system is to be installed.

(i) The site plan shall show boundaries with dimensions and any of the following features that exist or that are proposed:

(1) Structures;

(2) Swimming pools;

(3) Recorded easements;

(4) Onsite sewage treatment and disposal system components;

(5) Slope of the property;

(6) Wells;

(7) Potable and non-potable water lines and valves;

(8) Drainage features;

(9) Filled areas;

(10) Excavated areas for onsite sewage systems;

(11) Obstructed areas;

(12) Surface water bodies; and

(13) Location of the reference point for system elevation.

b. If an individual lot is five acres or greater, the applicant may draw a minimum one-acre parcel to scale showing all required features, or the minimum size drawing necessary to properly exhibit all required features, whichever is larger. The applicant must also show the location of that one acre or larger parcel inside the total site ownership.

[Rules 64E-6.004(a) and 62-17.191, F.A.C.]

8. Unless a dosing tank system is to be utilized, the outlet pipe between the septic tank and the distribution box for the Switch Yard system shall be a 4" pipe on the system details sheet.

[Rule 64E-6.014(2)(b) F.A.C.]

9. For Low-Pressure distribution systems, prior to construction, a system diagram and calculations page shall be submitted to verify all conditions of Rule 64E-6.014(3) are being met and shall be processed in accordance with Section A. Condition XXI. Procedures for Post-certification Submittals.

[Rules 64E-6.014(3) and 62-17.191, F.A.C.]

10. Low-Pressure Dosed systems shall be designed as per Rule 64-E6.014(3) or where the total drainfield area is greater than 1000 square feet but not more than 2000 square feet, the Licensee may, in lieu of low-pressure dosing, choose to split the drainfield into two drainfields, equal in size, each having no more than 1000 square feet, with each drainfield being lift-dosed.

[Rule 64-E6.014(3)(a), F.A.C.]

11. DOH will require an inlet device if any effluent is to be pumped to the septic tank as per 64E-6.013(10)(c). Tanks will be required to have multiple chambers to assist with settling as per 64E-6.013(2)(a).

[Rule 64-E6.013(10)(c) and (2)(a), F.A.C.]

B. Sanitary Wastes Moved with revisions from Condition VII. Control Measures During Construction

Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the DOH in Martin County.

VIII. MARTIN COUNTY Moved with revisions from Condition XXXVI. Martin County

A. The Certified Facilities shall be constructed in a manner that complies with any applicable non-procedural County flood protection requirements, either by flood proofing or by raising the elevation of the facilities above the 100-year flood level. Moved with revisions from Condition XXIV Flood Control Protection

B. Prior to construction of any transmission line crossing a Martin County road or property, FPL shall submit all information necessary for Martin County to review and determine compliance in accordance with Section A. Condition XXI. Procedures for Post-certification submittals.

C. Prior to construction of each natural gas pipeline crossing a road between the junction of the Florida Turnpike and SR 714, FPL shall submit all information necessary for Martin County to review and determine compliance with applicable non-procedural rules or ordinances in accordance with Section A. Condition XXI. Procedures for Post-certification Submittals.

D. In the construction of associated transmission lines, FPL shall:

1. Follow the standards of Martin County, Florida for a U 2 Permit unless FPL and Martin County subsequently agree to the contrary.

2. Make all crossings as nearly perpendicular to and place all transmission Line structures as far from state and county road rights of-way as practicable in order to allow future widening and expansion.

E. In the construction of natural gas pipeline crossings, FPL shall:

1. Follow the standards of Martin County, Florida for a U 2 Permit unless FPL and Martin County subsequently agree to the contrary.

2. Avoid locating pipeline facilities in road rights-of-way to the greatest extent practicable; in order to minimize conflict with future roadway improvements.

IX. VILLAGE OF INDIANTOWN New

A. Construction and operation of the Martin Expansion Project shall be undertaken in accordance with the first amendment to the planned unit development (industrial) agreement between the Licensee and Martin County, Florida, dated June 3, 2008 to which the Village of Indiantown is the successor in interest to Martin County pursuant to the transfer of planning authority effectuated by Sec. 11(6) of Ch. 2017-195, Laws of Florida, and by operation of Ch. 163, Fla. Stat. Said agreement is incorporated into these Conditions of Certification by this reference and shall be complied with and enforced as if the provisions of that agreement were contained in these Conditions.

B. Prior to construction of any transmission line crossing a Village of Indiantown road or property, FPL shall submit all information necessary for the Village of Indiantown to determine compliance with applicable non-procedural ordinances in accordance with Section A. Condition XXI. Post-Certification Submittals.

C. In the construction of associated transmission lines, FPL shall:

1. Follow the standards of The Village of Indiantown for a Right of Way Use Permit unless FPL and the Village of Indiantown subsequently agree to the contrary.

2. Make all crossings as nearly perpendicular to and place all transmission Line structures as far from state and county road rights of-way as practicable in order to allow future widening and expansion.

D. In the construction of natural gas pipeline crossings, FPL shall:

1. Follow the standards of the Village of Indiantown for a Right of Way Use Permit unless FPL and the Village of Indiantown subsequently agree to the contrary.

2. Avoid locating pipeline facilities in road rights-of-way to the greatest extent practicable; in order to minimize conflict with future roadway improvements.

[Chapter 155, Article 2, Village of Indiantown transitional Code of Ordinances]

X. FLORIDA DIVISION OF EMERGENCY MANAGEMENT Replaces Condition XXXIV. Department of Community Affairs

The Licensee shall develop and maintain a comprehensive hurricane preparation and recovery plan for the Martin Power Plant. The plan shall be updated every 5 years and be submitted to the Martin County Office of Emergency Management.

XI. TROUP-INDIANTOWN IRRIGATION DISTRICT

A. FPL shall locate all transmission line structures installed as part of the proposed transmission line upgrade within the existing FPL right-of-way where it crosses any canal or roadway under the jurisdiction of the Troup-Indiantown Irrigation District (District). Prior to installing any new transmission line structures as part of this Project within any canal or road rights-of-way under the jurisdiction of the District, FPL shall consult with District staff on the appropriate location of such structures so as to avoid any conflict or interference with the District's activities within those rights-of-way.

B. Upon completion of construction of the transmission line structures, FPL shall supply the District with drawings or other appropriate information depicting the location of those transmission line structures installed adjacent to roads and canals under the District's jurisdiction.

[Final Order of Certification - 2/21/1991]

XII. TREASURE COAST REGIONAL PLANNING COUNCIL

A. FPL shall modify its land management practices in the areas along the west and southwest sides of the existing cooling pond west and south of the distribution line paralleling the pond dike shown on Attachment A. In these areas FPL shall discontinue mowing and allow natural vegetation to establish itself. The goal of this practice modification will be to create a naturally vegetated corridor for wildlife passing through this area between other natural areas onsite and in the region. This practice modification shall take place consistent with safety, inspection and maintenance procedures for the dike and the adjacent distribution line and with continued access to ditches, equipment and other related facilities. To the extent feasible, within FPL routine land management practices for the site, FPL shall attempt to control exotics (specifically Melaleuca, Australian Pine and Brazilian Pepper) within this corridor.

B. FPL shall reserve the remainder of the Northwest Parcel, over and above those portions identified by FPL during these proceedings for wetland restoration, enhancement and preservation, for use in future ecological mitigation activities or preservation, and activities related to such purposes (including education and passive recreation), as may be required for the Martin

Expansion project or any other project of FPL, and shall not use or develop the remainder of the Northwest Parcel for any other purpose. However, any future wetland creation undertaken within this area shall avoid conversion of high-quality forested uplands. To the extent feasible, within FPL's routine land management practices for the site, FPL shall attempt to control exotic vegetation (specifically Melaleuca, Australian Pine, and Brazilian Pepper) within this area.

[Original Certification 2/21/1990]

XIII. NOISE Moved from Condition XXVI. Noise

To mitigate the effects of noise produced by the steam blowout of steam boiler tubes, the Licensee shall conduct public awareness campaigns prior to such activities to forewarn the public of the estimated time and duration of the noise.

XIV. SCREENING Moved from Condition IX. Screening

The Licensee shall provide screening of the site to the extent feasible through the use of aesthetically acceptable structures, vegetated earthen walls and/or existing or planted vegetation.

HISTORY

Certification Issued 02/21/91; signed by Governor Chiles
Modification 08/11/93; signed by Secretary Wetherell
Modification 09/27/94; signed by Secretary Wetherell
Modification 04/28/95; signed by Secretary Wetherell
Modification 04/22/96; signed by Secretary Wetherell
Modification 11/23/98; signed by Secretary Green
Modification 08/21/00; signed by Deputy Secretary Green
Modification 06/15/01; signed by Secretary Struhs
Expansion Project Certification Issued 04/14/03; signed by Governor Bush
Modification (H) 09/14/04; signed by Program Administrator Oven
Modification (I) 05/20/05; signed by Program Administrator Oven
Modification (J) withdrawn 12/28/05
Modification (K) 11/15/06; signed by Program Administrator Oven
Modification (L) 07/09/07; signed by Program Administrator Halpin
Modification (M) 08/21/08; signed by Program Administrator Halpin
Modification (N) 01/12/10; signed by Program Administrator Halpin
Modification (O) XX/XX/2020; signed by Program Administrator Mulkey

ATTACHMENT A: Maps

LEGEND

Certified Area*

2,000 0 2,000 Feet

* Based on Original CG/CC Certified Site and Certified Facilities Areas

REV.	DATE	DES		REVISION DESCRIPTION	GIS	CHK	RVW
0							

PROJECT

FPL
MARTIN PLANT
SITE CERTIFICATION BOUNDARY

TITLE

CERTIFIED BOUNDARY

REFERENCES

1. Certified Area, FPL 2003
2. Bing Imagery Supplied by Microsoft® Virtual Earth Bing Map™ License Under ESRI Inc. ©2010 Microsoft Corporation and its Data Suppliers. Accessed 9/25/2013

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901 Feet
Projection: Transverse Mercator
Datum: North American 1983

Golder Associates

PROJECT No.		123-87654	FILE No.	12387654_A005
DESIGN	KFK	25 Sep. 2013	SCALE: AS SHOWN	REV. 0
GIS	NRL	25 Sep. 2013		
CHECK	KFK	25 Sep. 2013		
REVIEW	KFK	25 Sep. 2013		

FIGURE: 1

G:\PROJECTS\FPL_Certified_Sites\A_12387654\Figures\12387654_A005_Martin.mxd

ATTACHMENT B: Surface Water Management System Operation and Maintenance Requirements

1. In accordance with Section 373.416(2), F.S., unless revoked or abandoned, all stormwater management systems, dams, impoundments, reservoirs, appurtenant works, or works permitted under Part IV of Chapter 373, F.S., must be operated and maintained in perpetuity. The operation and maintenance shall be in accordance with the designs, plans, calculations, and other specifications that are submitted with any amendment or modification and approved by the Department.

2. A registered professional must perform inspections annually after conversion of the project to the operation and maintenance phase to identify if there are any deficiencies in structural integrity, degradation due to insufficient maintenance, or improper operation of the stormwater management system or other surface water management systems that may endanger public health, safety, or welfare, or the water resources, and to insure that systems are functioning as designed and approved. Within 30 days of the inspection, a report shall be submitted electronically or in writing to the Department using Form 62-330.311(1), "Operation and Maintenance Inspection Certification".

3. If deficiencies are found, the Martin Power Plant will be responsible for correcting the deficiencies so that the project is returned to the operational functions as designed and approved. The corrections must be done a timely manner to prevent compromises to flood protection and water quality.

4. If the operational maintenance and corrective measures are insufficient to enable the systems to meet the performance standards of this chapter, the Martin Power Plant must either replace the systems or construct an alternative design.

5. The Martin Power Plant shall provide for periodic inspections in addition to the annual inspections, especially after heavy rain. It must maintain a record of each inspection, including the date of inspection, the name and contact information of the inspector, whether the system was functioning as designed and approved, and make such record available upon request of the Department. Within 30 days of any failure of any system or deviation from the permit, a report shall be submitted electronically or in writing to the Department using Form 62-330.311(1), "Operation and Maintenance Inspection Certification," describing the remedial actions taken to resolve the failure or deviation.

6. The Martin Power Plant shall immediately notify the Department by telephone whenever a serious problem occurs at this facility. Notification shall be made to the Southeast District Office at (561)681-6600. Within 7 days of telephone notification, a report shall be submitted electronically or in writing to the Department using Form 62-330.311(1), "Operation and Maintenance Inspection Certification," describing the extent of the problem, its cause, the remedial actions taken to resolve the problem.

7. The following operational maintenance activities shall be performed on approved systems on a regular basis or as needed:

(1) Removal of trash and debris from the surface water management systems,

(2) Inspection of culverts, culvert risers, pipes and screwgates for damage, blockage, excessive leakage or deterioration, if applicable,

(3) Inspection of stormwater berms, if applicable,

(4) Inspection of pipes for evidence of lateral seepage,

(5) Inspection of flapgates for excessive backflow or deterioration, if applicable,

(6) Removal of sediments when the storage volume or conveyance capacity of the surface water management system is below design levels,

(7) Stabilization and restoration of eroded areas,

(8) Inspection of pump stations for structural integrity and leakage of fuel or oil to the ground or surface water, if applicable, and

(9) Inspection of monitoring equipment, including pump hour meters and staff gauges, for damage and operational status, if applicable.

8. In addition to the practices listed above, specific operational maintenance activities are required, if applicable, depending on the type of approved system, as follows:

(1) Overland flow systems shall include provisions for:

a. Mowing and removal of clippings, and

b. Maintenance of spreader swales and overland flow areas to prevent channelization.

(2) Spray irrigation systems for reuse/disposal shall include provisions for:

a. Inspection of the dispersal system, including the sprayheads or perforated pipe for damage or clogging, and

b. Maintenance of the sprayfield to prevent channelization.

(3) Treatment systems which incorporate isolated wetlands shall include provisions for:

a. Stabilization and restoration of channelized areas, and

b. Removal of sediments which interfere with the function of the wetland or treatment system.

ATTACHMENT C: Mitigation Plans

ATTACHMENT C - MITIGATION PLAN

On February 20, 1991, Florida Power & Light Company (FPL) received approval from the Governor and Cabinet (serving as the Siting Board) to construct and operate the Martin Coal Gasification/Combined Cycle Facility (Units 3 & 4). Unit 8 (A&B) was approved in 2000 through a modification to the original site certification application. The Unit 8 Expansion project was approved through Final Order by the Siting Board on April 14, 2003. On August 21, 2008, the Martin Solar Energy Center was approved through modification.

Wetland Impacts and Mitigation

Project Phase	Date	SED Tracking	Wetland Impacts	Mitigation	Status
Site Certification – Units 3 - 4			37 acres forested or shrubby wetlands; 148 acres of herbaceous wetlands; 1,388 acres of uplands dominated by pine flatwoods and dry prairie	Restoration of approximately 460 acres of impacted forested wetlands, preservation of approximately 100 acres of adjacent upland forest and management of these preserve areas in perpetuity.	SFWMD deemed successful in 2001

In October of 1988, an application was filed with Martin County for rezoning of the project area from agricultural to industrial PUD. In August of 1989, the Martin County Board of County Commissioners formally approved these changes. The PUD rezoning process concluded in a PUD agreement establishing a comprehensive wetland (and. upland) mitigation program. Wetland restoration will take place on FPL-owned property adjacent to the north side of the cooling pond (Northwest Parcel). Figure 4.4.1-1 shows wetland restoration areas in the Northwest Parcel. This figure has been included as an exhibit to PUD agreement with Martin County. Areas A, B, and C are designated for wetlands restoration, enhancement, and preservation. Area C also includes valuable uplands including some unusual tropical hammock components which will be preserved while at the same time restoring adjacent cypress areas. The restoration of the 400-ac Barley Barber Swamp at the Martin Site shows both the likelihood of. successful restoration and the FPL corporate commitment to fulfill mitigation programs undertaken.

The Barley Barber Swamp is a private landholding of FPL for which the primary purpose is environmental protection. It is approximately 2 mi from the Martin CG/CC Project. This freshwater swamp of 400 ac, plus the surrounding land, was purchased by FPL in 1972. When

the cooling pond for the existing Martin Plant was constructed, the Barley Barber Swamp was set aside as a nature preserve. It is managed as a unique wetland and upland community as it may have existed over 100 years ago. The swamp is surrounded by the Martin cooling pond on three sides and drains to the west through culverts to Canal L-65. This canal was completed in October 1970 and water levels are presently regulated by the SFWMD, at about 19 ft above MSL. Surface runoff from the Barley Barber swamp has also been regulated at this same level by 19-ft flashboards which are positioned, along with culverts, at the westward end of the outflow from the swamp. Gravity drainage to Canal L-65 decreases to below 19 ft only during the dry season (February through April), when ground-water seepage is probably the only major source of drainage water from the swamp. Seepage from the Martin cooling pond is contributing significant amounts of water to the Barley Barber Swamp and regardless of climatic conditions, the water elevation is now artificially maintained at a hydroperiod which varies seasonally between 19 and 22 ft MSL.

The Northwest Mitigation Area (NWMA), a 1,130-acre area on the northwest portion of the Martin Plant site, is managed as wetland mitigation by FPL. The construction of the Martin Solar Energy Center (MSEC) was mitigated through the NWMA. The 1993 Mitigation Plan and the 2009 Wetland Monitoring Plan are included with this Attachment

The MSEC is located within the larger CG/CC Project Area. Impacts to aquatic and wetland systems associated with the CG/CC Project Area were fully mitigated previously as part of the Martin CG/CC Project. This mitigation included restoration, enhancement, and preservation of approximately 1,130 acres of high-quality forested wetlands, freshwater marsh, cypress swamp, palmetto prairie, pine flatwoods, upland hardwood forest, and shrub and brushland within the Northwest Mitigation Area. The mitigation plan was approved by the USACE [Permit #SAJ-1989-91140 (IP-MAM)] and the Siting Board (Site Certification PA89-27, 2/21/1991).

Pursuant to that mitigation plan, a conservation easement for the Northwest Mitigation Area was granted to the SFWMD in July 1993. Restoration and enhancement activities conducted between 1994 and 1997 were documented through submittal of a baseline monitoring report in 1994 and 5 years of annual monitoring reports between 1997 and 2001. Based upon the information provided in the compliance monitoring reports, fulfillment of restoration success criteria, and SFWMD field inspection of the Northwest Mitigation Area, the mitigation effort was deemed complete in 2001. In April 2006, FPL received USACE authorization for extension of the expiration date on the USACE permit through April 2009 [SAJ-1989-91140 (IP-MAM), Modification #2: Time Extension]. A brief summary of the now completed and accepted mitigation plan is provided as background information.

Three areas in the Northwest Parcel were approved for restoration, enhancement, and preservation (Figure 3). Restoration Area A included a forested wetland which was suffering from reduced hydroperiod. Restoration Area B contained forested wetlands which were impacted by excessive draining and use by cattle. Restoration Area C included pine and wet prairie lands enhanced through the removal of cattle and feral hogs. Preservation Area E contained upland hardwood forests as well as mixed wetland hardwoods. A total of approximately 317 acres of

wetlands occur within the Northwest Parcel, with 166 acres of enhanced and restored wetlands and 95 acres of wetlands converted from uplands within Restoration Areas A, B, and C, and upland Preservation Area E. Mitigation activities were designed to restore habitats impacted by hydroperiod alterations, cattle grazing, feral hog damage, soil loss, invasion by non-native species, and fire. Specific measures included the following:

- Removal of cattle;
- Maintenance of wetland buffer zones;
- Removal and maintenance of feral hog populations;
- Restoration of wetland hydroperiod to halt the transition from wetland to upland, and enhanced development of hydric soils and wetland vegetation;
- Maintenance removal of Brazilian pepper and Melaleuca; and
- Construction of wood stork foraging ponds and development of sandhill crane habitat.

Hydroperiod restoration was designed to ameliorate historical impacts related to agricultural use of the property. The natural floodplain of Black Bottom Slough had been reduced through construction of drainage ditches to increase acreage suitable for cattle grazing. The restoration of historical hydroperiod was achieved through installation of water control structures, sumps, and a berm and weir across a narrow portion of Black Bottom Slough. Water levels are adjusted at the control structures to prolong the hydroperiod and simulate the historical periods of inundation and dry season conditions, similar to the design successfully implemented at the FPL Barley Barber Swamp located adjacent to the cooling pond.

Figure 4.4.1-1

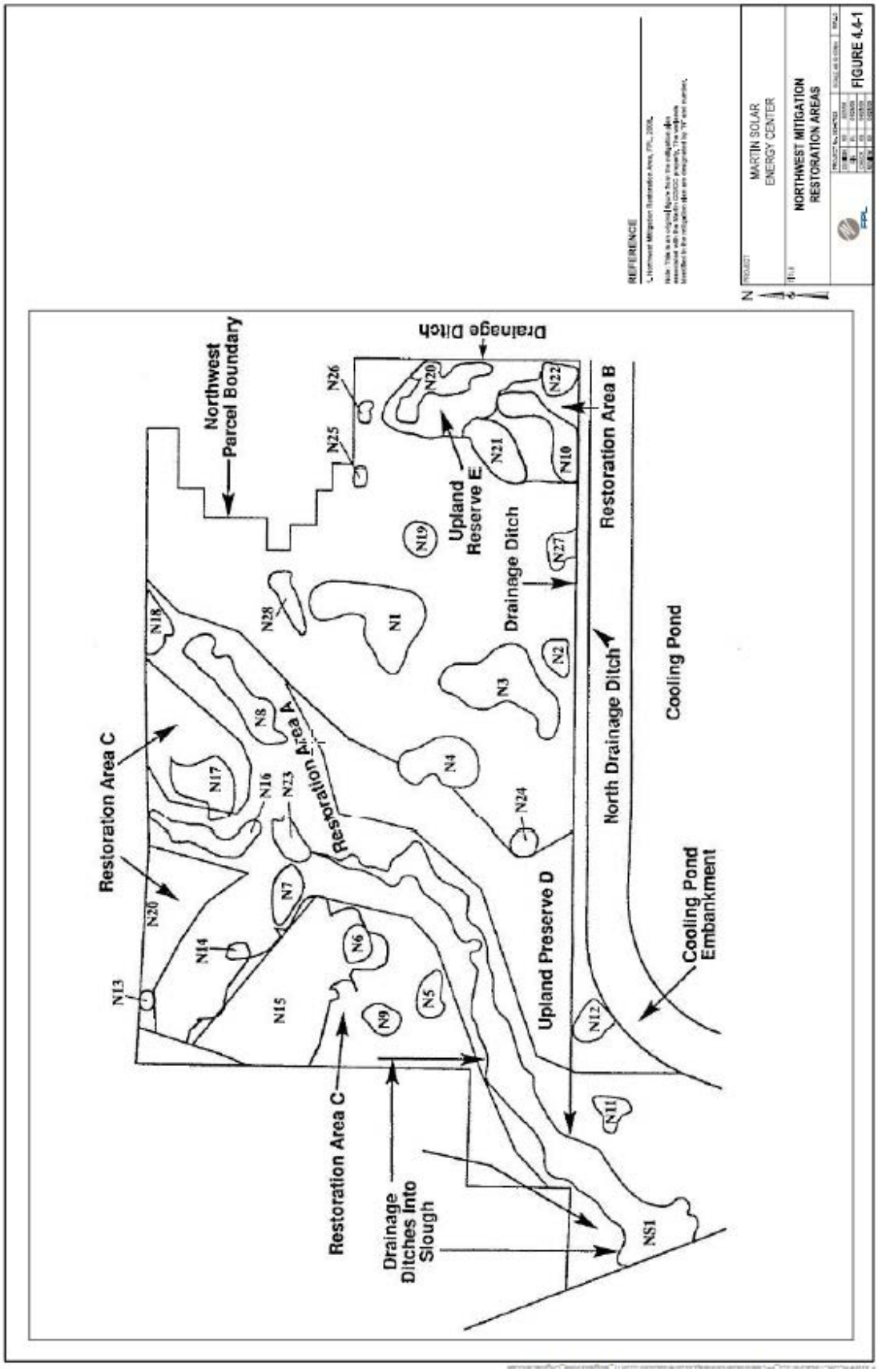
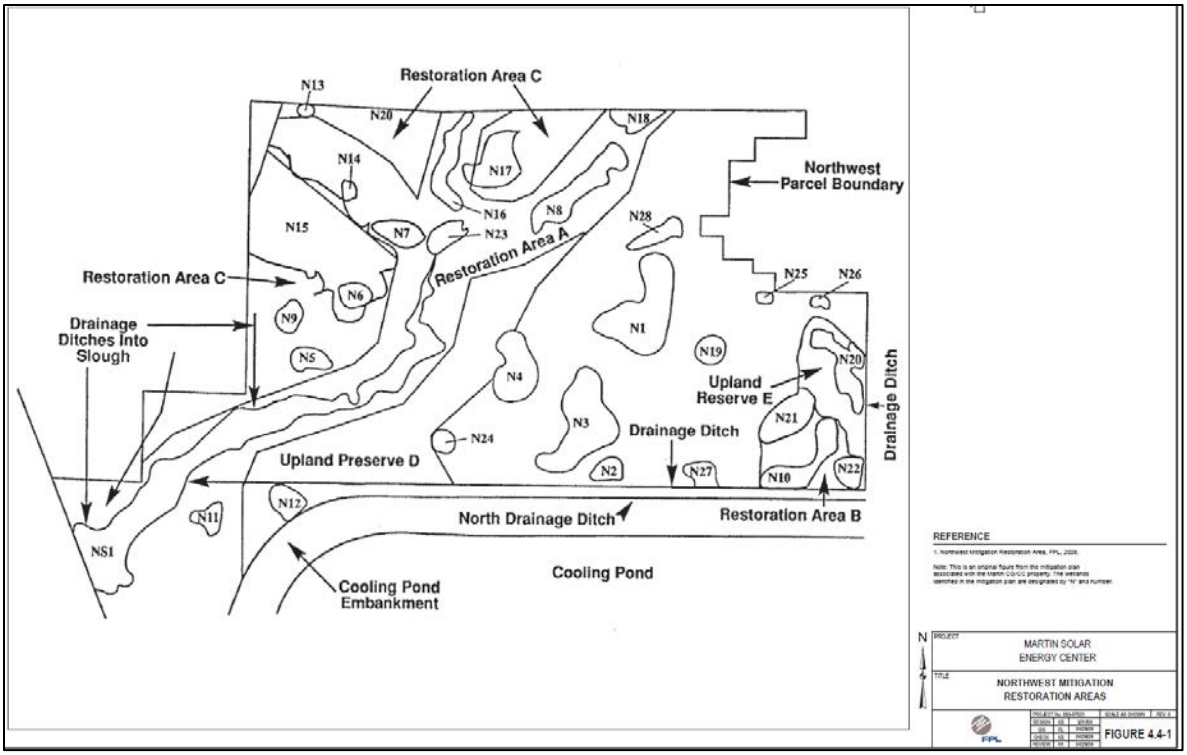

Northwest Parcel Boundary
Drainage Ditch
Restoration Area B
Upland Reserve E
Drainage Ditch
Restoration Area A
Restoration Area C
North Drainage Ditch
Cooling Pond
Upland Preserve D
Cooling Pond Embankment
Restoration Area C
Drainage Ditches Into Slough
N1
N2
N3
N4
N5
N6
N7
N8
N9
N10
N11
N12
N13
N14
N15
N16
N17
N18
N19
N20
N21
N22
N23
N24
N25
N26
N27
N28
NS1
REFERENCE
MARTIN SOLAR ENERGY CENTER
NORTHWEST MITIGATION RESTORATION AREAS
FIGURE 4.4-1

Figure 3:


Restoration Area C
N13
N20
N18
N14
N17
Northwest
Parcel Boundary
N16
N8
N28
N15
N7
N23
Restoration Area A
Restoration Area C
N25
N26
N6
N9
N1
Drainage
Ditches Into
Slough
N5
N19
N20
N4
Upland
Reserve E
Drainage Ditch
N21
N3
N24
Drainage Ditch
Upland Preserve D
N2
N27
N10
N22
N12
N11
North Drainage Ditch
Restoration Area B
NS1
Cooling Pond
Cooling Pond
Embankment
REFERENCE
MARTIN SOLAR
ENERGY CENTER
NORTHWEST MITIGATION
RESTORATION AREAS
FIGURE 4.4-1

MARTIN CG/CC PROJECT

MITIGATION, MONITORING, AND MAINTENANCE PLAN

PREPARED FOR FPL

BY

EBASCO ENVIRONMENTAL

OCTOBER 1993

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1.0 INTRODUCTION

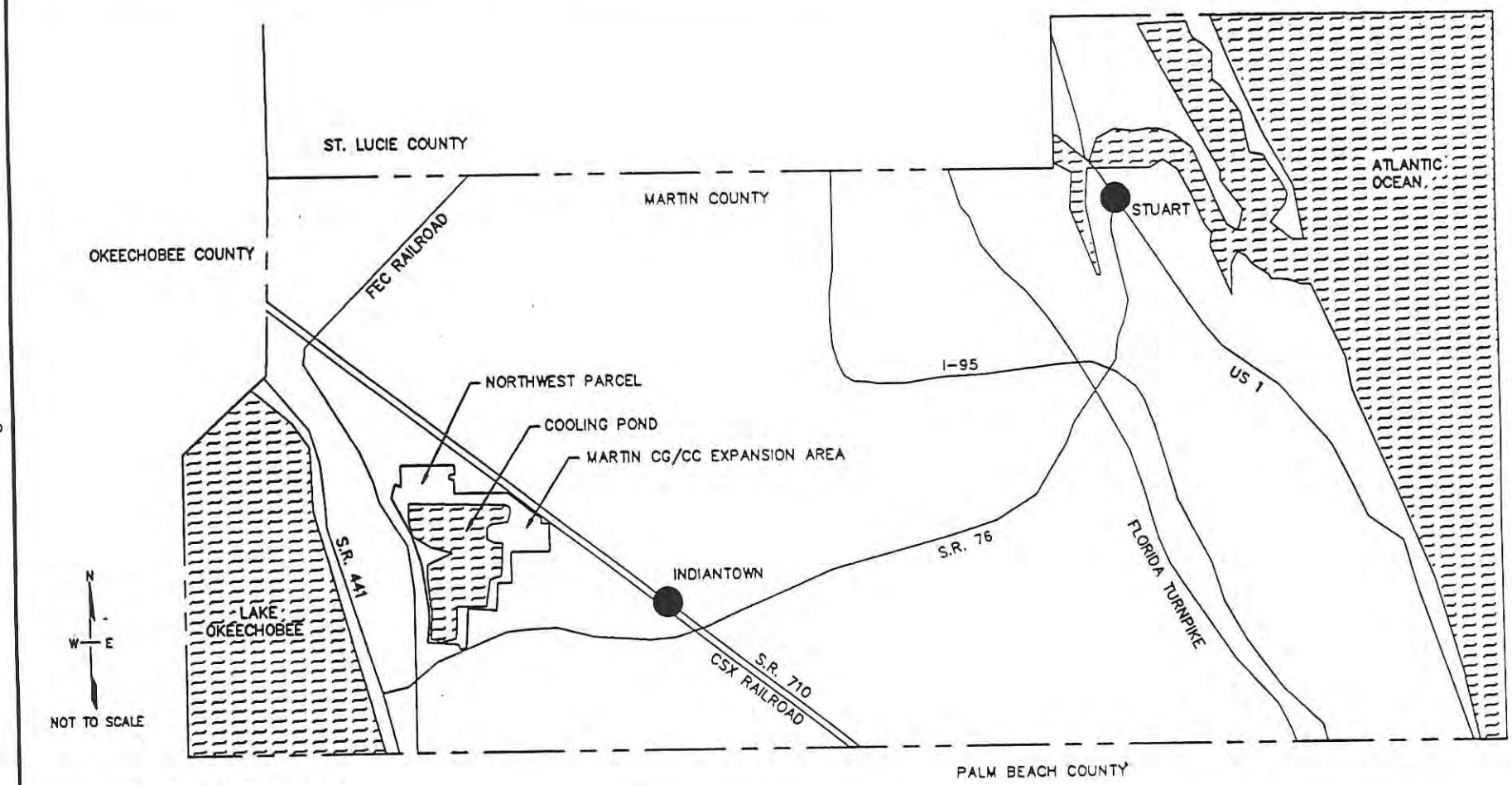
1.1 Martin Coal Gasification/Combined Cycle Project Background

Florida Power & Light's (FPL) Martin Coal Gasification/Combined Cycle Project (Project) was approved by the Governor and Cabinet on February 20, 1991 (Final Order For Martin Coal Gasification/Combined Cycle Project Power Plant, DOAH Case No. 90-0259). The conceptual Project mitigation plan was approved at that time as part of the site certification process. The Project involves a phased expansion of the generating capacity at the existing Martin Plant Site through the addition of combustion turbines, heat recovery steam generators and coal gasification facilities. The associated linear facilities include a transmission line upgrade and a new natural gas pipeline. Construction of Phase I, which includes combined cycle Units 3 and 4 and their associated linear facilities, is well under way. Units 3 and 4 are scheduled for commercial operation in January and May 1994, respectively. The 23 mile natural gas pipeline has been constructed, and construction of the transmission line upgrade is under way.

The Project is located at FPL's existing Martin Plant Site in the western portion of Martin County, Florida (Figure 1). The nearest community, Indiantown, lies about seven miles to the southeast. The site is bounded on the west by the Florida East Coast Railway and adjacent South Florida Water Management District (SFWMD) Canal L-65; on the south by the St. Lucie Canal; and on the north and east by State Road 710 and the adjacent CSX railroad.

1.2 Selection of Project Mitigation Area

The Martin Site had two areas for potential development of the Project (Figure 1). These included the planned expansion area east of the existing units and an area adjacent to the northwest edge of the cooling pond called the Northwest Parcel (NWP). Both areas were evaluated using the selection criteria shown in Table 1. Results of environmental studies of both areas undertaken during the site certification process favored the expansion area for project development. This decision was made in part to avoid wetlands which were felt to be more valuable in the NWP. Additionally, use of existing facilities, structures, and the presence of cleared land in the expansion area would result in less use of undeveloped land. During the early site selection studies, a bald eagle's nest was found in the NWP. Power plant development at that site would be limited by the regulated primary protection zone of 40 acres, secondary protection zone of 162 acres, and protected access to bald eagle feeding areas.



SOURCE: EBASCO ENVIRONMENTAL, 1993

FIGURE 1
LOCATION MAP FOR MARTIN CG/CC PROJECT
AND THE 1200 ACRE NORTHWEST PARCEL

Martin CG/CC Project
FPL

TABLE 1: WETLANDS RESTORATION, ENHANCEMENT AND PRESERVATION SELECTION CRITERIA

Criterion	Description
Ecological Successional Maturity	The more mature wetlands such as cypress and red maple swamps represent the greater investment on the part of nature. These systems are relatively stable, provide wildlife cover, moderate water temperatures and can provide habitat for protected species.
Size	Larger wetlands provide more habitat for wildlife home ranges and territories, more water availability in dry seasons and more habitat for plant populations than do small wetlands.
Level of Disturbance	Disturbances such as desiccation, fire, grazing, and human activity reduce the ability of a habitat to provide life history needs to biota. Removal of disturbances may provide good opportunities for significant functional value increases.
Fish and Wildlife Usage	The ability or potential ability of a wetland to provide food, cover and water to important fish and wildlife species was taken into account based on site specific evidence.
Presence of Threatened and Endangered Species/Habitat	High priority was placed on wetland areas which have been reported to harbor threatened and endangered species. Less significance was placed on the occurrence of threatened and endangered migratory bird species that do not use the site during the breeding or wintering seasons. In terms of protected plant species, greater priority was placed on habitats with those species uncommon on the site such as water fern (Ceratopteris ssp.) and less to species relatively common to the site such as shoe-string fern (Vittaria lineata).
Location	High priority was given to restoration, enhancement and preservation of wetlands near the Martin CG/CC Project.

At the beginning of the site certification studies, it was also noted that NWP wetlands, though stressed, were potentially more valuable with restoration than expansion area wetlands. Northwest Parcel wetlands include both isolated herbaceous wetlands and forested cypress communities. Areas of 100-200 year old cypress trees represent a greater "investment" by nature, than herbaceous wetlands. The NWP contains around 30 acres of cypress community compared to 12.6 acres of cypress forest on the expansion site. Also, portions of Black Bottom Slough in the NWP were in relatively good condition. Some upland sections of the NWP were also found to include tropical hammock components which the expansion area did not have. The NWP was selected as the Project Mitigation Area in part because of the reasons presented in Table 2.

In October of 1988, an application was filed with Martin County for rezoning of the proposed project area (expansion area) from agricultural to industrial Planned Unit Development (PUD). In August of 1989, the Martin County Board of County Commissioners formally approved these changes. The rezoning process concluded in a PUD agreement between Martin County and FPL establishing a wetland (and upland) mitigation program which included wetland restoration in the FPL-owned Northwest Parcel.

1.3 Overall Mitigation Design

Existing NWP wetlands to be used for mitigation exhibit a gradient of conditions ranging from severely degraded and requiring restoration, to slightly disturbed and suitable for enhancement. Selected wetlands and former wetlands within the NWP will either be restored or enhanced and some upland areas will be converted to wetlands as compensation for potential impacts associated with construction and operation of the Project and its directly associated linear facilities. The upland and wetland area dedicated to the Project is more than one half of the total area of the NWP. Wetland restoration will involve the re-establishment of wetlands in areas that were historically wetlands but now have minimal or no hydrological function. This includes areas now functioning as uplands which several decades ago were wetlands or wetland transition zones. Wetlands enhancement will involve improvement of degraded wetlands to higher functional levels. Wetlands creation will involve the establishment of wetlands through conversion of uplands.

Currently there are two mitigation programs approved for the NWP. One, the Martin Project Linear Facilities Mitigation, Monitoring, and Maintenance Plan involves monitoring a created

TABLE 2: NORTHWEST PARCEL MITIGATION SELECTION RESULTS	
Criterion	Results
Maturity	Ample areas of forested wetlands exist in the area.
Size	Relatively large areas of existing wetlands and wetlands succeeding to uplands available for restoration.
Level of Disturbance	Most wetlands are significantly disturbed providing opportunities for significant functional value increases with mitigation.
Fish and Wildlife Usage	Known use of the area by both game and non-game animals indicates enhancement of wetlands will result in enhancement of wildlife habitat.
Presence of Threatened and Endangered Species/Habitat	Bald eagle nest is adjacent to wetlands in the area. Tropical hammock species are present, including state endangered satinleaf (Chrysophyllum oliviforme) as well as state threatened plant species.
Location	The Northwest Parcel is close to the Martin CG/CC Site.

wetland specifically designated as mitigation for the Project's linear facilities wetland impacts (Martin natural gas pipeline and Indiantown-Martin transmission line upgrade). The second, the Crane-Bridge-Plumosus Mitigation, Monitoring, and Maintenance Plan involves monitoring a created wetland outside the area reserved for the Martin Project. The acreage of the Crane-Bridge-Plumosus mitigation area is not included in the acreage dedicated to the Martin Project. With approval of the Plan submitted herein, there will be three approved mitigation plans in the NWP encompassing two separate FPL projects.

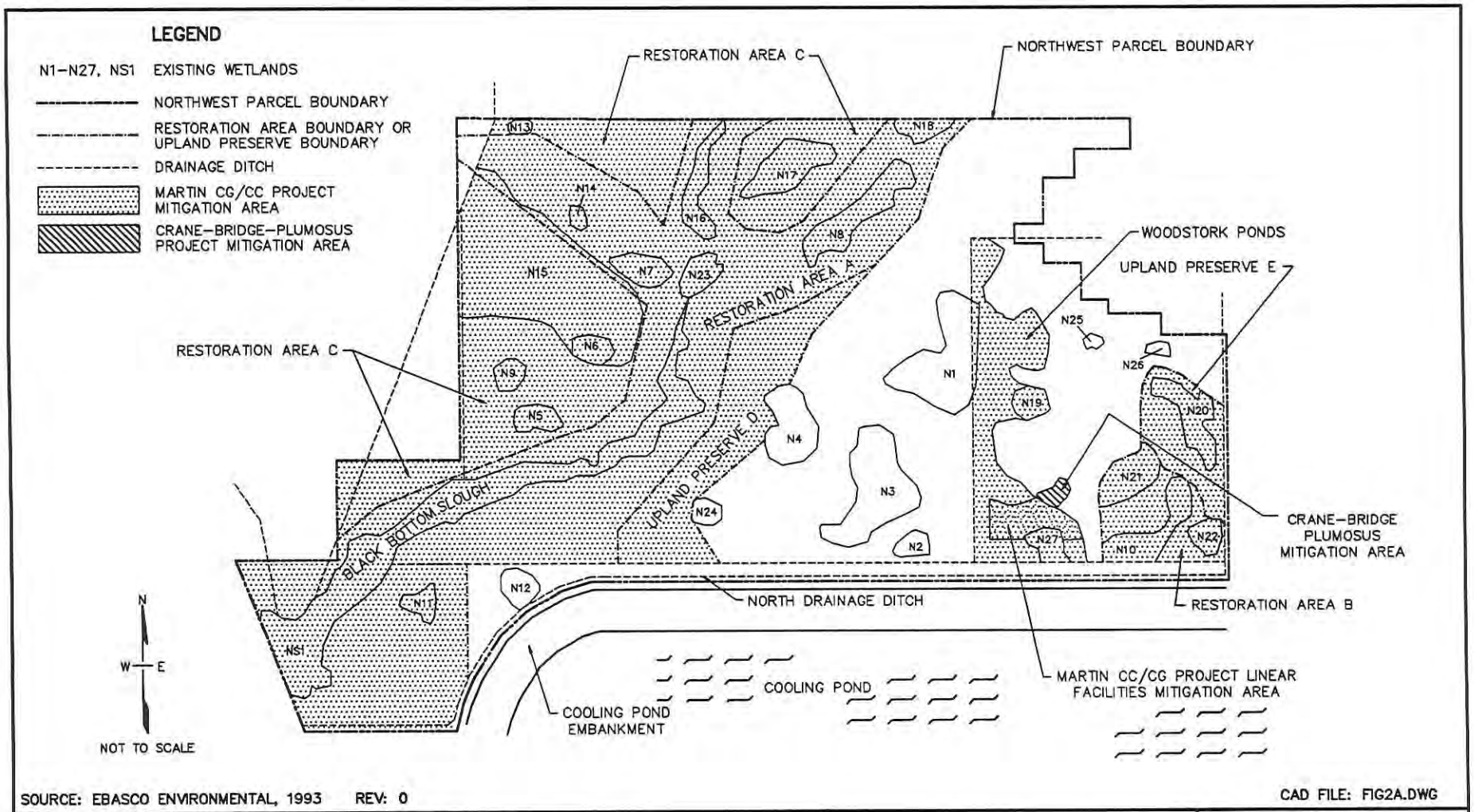
2.0 PROPOSED MITIGATION

2.1 Existing Conditions and Selection of Mitigation Areas

Most wetlands in the NWP have been affected to some degree by drainage, upland plant invasion, organic soil loss, cattle overgrazing, and feral hog activity. The overall layout of the NWP including existing wetlands and drainage ditches is shown on Figure 2. Initially, three areas in the NWP were selected for wetland compensation: Restoration Area A, Restoration Area B, and Restoration Area C. Following the hydrological design, an additional area of inundation was established between Restoration Area A/C and Restoration Area B.

Restoration Area A was selected because it includes forested wetlands which, in some areas, have lost several inches of organic topsoil through oxidation as a result of a decreased hydroperiod. Additionally, some areas have been invaded by upland species. Recent and historical aerial photography indicates that drainage through Restoration Area A has been southwestward toward Black Bottom Slough through the three northern "arms" of this area. Over the last several decades several large and small drainage ditches have been constructed in the region to render off-site areas more suitable for development and agriculture. Furthermore, Restoration Area A also includes the bald eagle nest previously mentioned and the wet season ponds most heavily used by water birds.

Restoration Area B was selected because it has restorable forested wetlands and upland tropical hammock components within its boundary. Flows through Restoration Area B have been from northeast to southwest through poorly defined drainages amid the cypress stands and oak/palm hammocks. The cypress community is not functioning to its greatest potential due to excessive draining and use by cattle. Several inches of organic topsoil have been lost through oxidation and upland plant species have invaded and become established where natural water levels would have prohibited their occurrence. Undoubtedly, the area has been adversely impacted by the close proximity of two drainage ditches to the south and one to the east (Figure 2). The upland oak/palm hammocks within Restoration Area B contains pockets of tropical species such as: mastic (Mastichodendron foetidissimum), satinleaf (Chrysophyllum oliviforme), lancewood (Ocotea coriacea), pull-and-hold-back (Pisonia rotundata), gumbo limbo (Bursera simaruba), wild lime (Zanthoxyllum fagara), graytwig (Schoepfia chysophylloides), twinberry (Myrcianthes fragrans), white stopper (Eugenia axillaris), and marlberry (Ardisia escallonioides). Most of these tropical species are either near or at the northern and inland extent of their range. One



SOURCE: EBASCO ENVIRONMENTAL, 1993 REV: 0

CAD FILE: FIG2A.DWG

FIGURE 2
NORTHWEST PARCEL LAYOUT INCLUDING EXISTING WETLANDS AND DRAINAGE DITCHES

Martin CG/CC Project

FPL

of these species, satinleaf, is classified as endangered by the Florida Department of Agriculture and Consumer Services, and another species, twinberry, is a candidate for listing by the U.S. Fish and Wildlife Service (Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida, November 1, 1992). The upland oak/palm hammock areas with tropical components will not be flooded but will remain as upland preserve areas or upland buffer zones.

Restoration Area C includes upland pine flatwoods, hydric pine flatwoods, palmetto prairies and ponded wet prairies in a relatively undisturbed state worthy of preservation. The area's isolated wet prairies will benefit significantly from the removal of cattle and a reduced feral hog population.

The proposed inundation area between Restoration Area A/C and Restoration Area B includes pastureland, a herbaceous/shrub wetland, a small red maple (Acer rubrum) swamp, old groves, and some second growth oak/palm hammock. This area was also heavily used by cattle. Wetland restoration, enhancement, and creation will occur in this area. The 9.2 acre Martin Linear Facilities Mitigation Area has been established as part of this inundation area.

Baseline vegetation monitoring data and pre-inundation photographic documentation have been obtained for the Project Mitigation Area. These data are discussed in detail in Section 3.1 and 3.2 respectively.

2.2 Mitigation Methods

Wetland restoration, enhancement, creation, and preservation in the Project Mitigation Area will include the following:

- Removal of cattle
- Initial removal and maintenance removal of feral hogs
- Hydrologic restoration and wetland creation
- Establishment of upland preserves and wetland buffer areas
- Initial removal and maintenance removal of exotic plants
- Creation of woodstork foraging ponds

2.2.1 Removal of Cattle

The Project Mitigation Area has a history of overgrazing by cattle. Cattle were removed from the entire Northwest Parcel in August 1991. There has been a dramatic recovery in the vegetation of existing wetlands (and uplands) in the NWP since the removal of cattle.

2.2.2 Initial Removal and Maintenance Removal of Feral Hogs

Wetlands (and uplands) in the Project Mitigation Area are widely disturbed by feral hog activity. Removal of feral hogs in the entire Northwest Parcel has been occurring since October 1991 and will continue for the life of the facility. There has been a notable improvement in the vegetation of existing wetlands in the NWP since the reduction in the feral hog population.

2.2.3 Hydrologic Restoration and Wetland Creation

The restoration of a hydroperiod necessary to reverse the current successional trend from wetland to upland vegetation is proposed. In general, the restoration and enhancement process will occur as follows:

- Implement alterations to the mitigation area's drainage system in order to improve hydrologic conditions once inundated.

- Provide an initial water level elevated enough to "shock" upland species in the target wetland areas.

- Implement a scheduled water level regime which will provide appropriate seasonal water level changes to establish wetlands vegetation characteristic of sloughs or isolated wetlands.

During the site certification process, topographic information of the drainages, sloughs and isolated wetlands in the NWP was obtained. Some topographic elevation information of adjacent properties was also obtained. These data provided the detail necessary to plan drainage realignments and control structure locations and elevations discussed below. The focus of the mitigation hydrological engineering effort has been to reestablish former surface drainage patterns without negatively affecting adjacent properties.

Preliminary examination of topographic maps of the area has indicated that installation of a berm and control structure in Black Bottom Slough will provide the initial shock to upland species by raising the water level to the 24.0 ft NGVD elevation contour. Elevating water to this level will back water upstream in the slough several thousand feet and will inundate much of the historical flood plain while minimally affecting the downstream segment. The downstream segment is in relatively good condition because of water input from existing drainage ditches (see Project Mitigation Area Plan View, Attachment 1). Waters on neighboring properties will not be elevated since the 24.0 ft NGVD contour does not leave the property and the northern boundary of the Northwest Parcel approximates a drainage divide.

The location of the berm and control structure was designed to coincide with a natural narrowing of the slough. The berm will not be constructed in a straight line but will wind its way across the slough with no removal of cypress trees. Maintenance of canopy closure will reduce chances for invasion by exotic plant species, help maintain cooler water temperatures, and reduce the risk of wind damage to the slough. (For detailed information of the proposed berm and control structure see Attachment 2.)

The new berm will continue northward from Black Bottom Slough then turn westward along the north boundary of the Project Mitigation Area (Attachment 1). A groundwater interceptor swale will be constructed north of the berm to further protect adjacent property owners from mitigation area waters. The swale will also prevent storm water build-up behind the berm by carrying the water westward to existing drainage ditches. For drainage calculations and elevations of homes north of the NWP, see response to SFWMD Question #15 and Attachment 8 in Second Sufficiency Responses submitted January 22, 1993 and responses to SFWMD Questions #4, 5, and 6 in Third Sufficiency Responses submitted June 15, 1993.

Restoration Area B has one relatively large ditch east of its boundary and two ditches south of its location (Figure 2). Other smaller man-made drainages are in the vicinity. Currently Restoration Area B is separated from its local drainage ditches by a small elevated berm. This small berm to the south of Restoration Area B will be elevated in order to maintain the water level at 26.5 NGVD during the wet season (Attachment 2). This level will also preclude backing water onto adjacent properties.

For detailed engineering information on the Project Mitigation Area including civil design criteria, civil calculations, geotechnical design criteria, and hydraulic calculations, see

Attachment D in Responses to Conditions of Certification submitted to SFWMD January 20, 1992.

As mentioned earlier, tropical hammock components occur in Restoration Area B. The lowest elevation of these areas is at 27.1 ft NGVD. Consequently, the hydroperiod restoration process should not affect these areas negatively. The tropical hammock areas of Restoration Area B will be monitored to ensure that its presence and species composition is not threatened. The presence of water in Restoration Area B will help moderate freezing air temperatures and thus provide additional protection to tropical vegetation. The presence of water will also help lessen the chance of severe fire, which is detrimental to hammock communities.

The inundation area between Restoration Area A/C and Restoration Area B contains two existing wetlands (a maple swamp and a shrubby wet prairie), pastureland, old groves, and some second growth oak/palm hammock. Inundation to 26.5 ft NGVD will restore more historic water levels to the wetlands and reverse their succession toward drier community types. Much of the pasture land in this area has been dedicated to compensate for the 9.2 acre wetlands impacts associated with the construction and operation of the Project's linear facilities (Figure 2 and Attachment 1). Wetland creation will take place in this area according to the Martin CG/CC Project Linear Facilities Mitigation, Monitoring, and Maintenance Plan submitted to SFWMD in October 1993. Creation of a 16 acre woodstork feeding pond will also occur in this area in the old groves and second growth oak/palm hammock.

Adjacent to the northeast edge of the Linear Facilities Mitigation Area is the 3.25 acre Crane-Bridge-Plumosus Mitigation Area (Figure 2). Inundation and wetland creation in this area will occur in conjunction with the inundation of the Martin Project Mitigation Area even though the two areas provide mitigation for two separate projects.

Isolated wetlands in Restoration Area C (Figure 2) will be enhanced with the removal of cattle and the reduction in the feral hog population. Many of these wetlands are in relatively good condition and worthy of preservation. However, the area is expected to benefit secondarily from hydroperiod restoration in Restoration Area A.

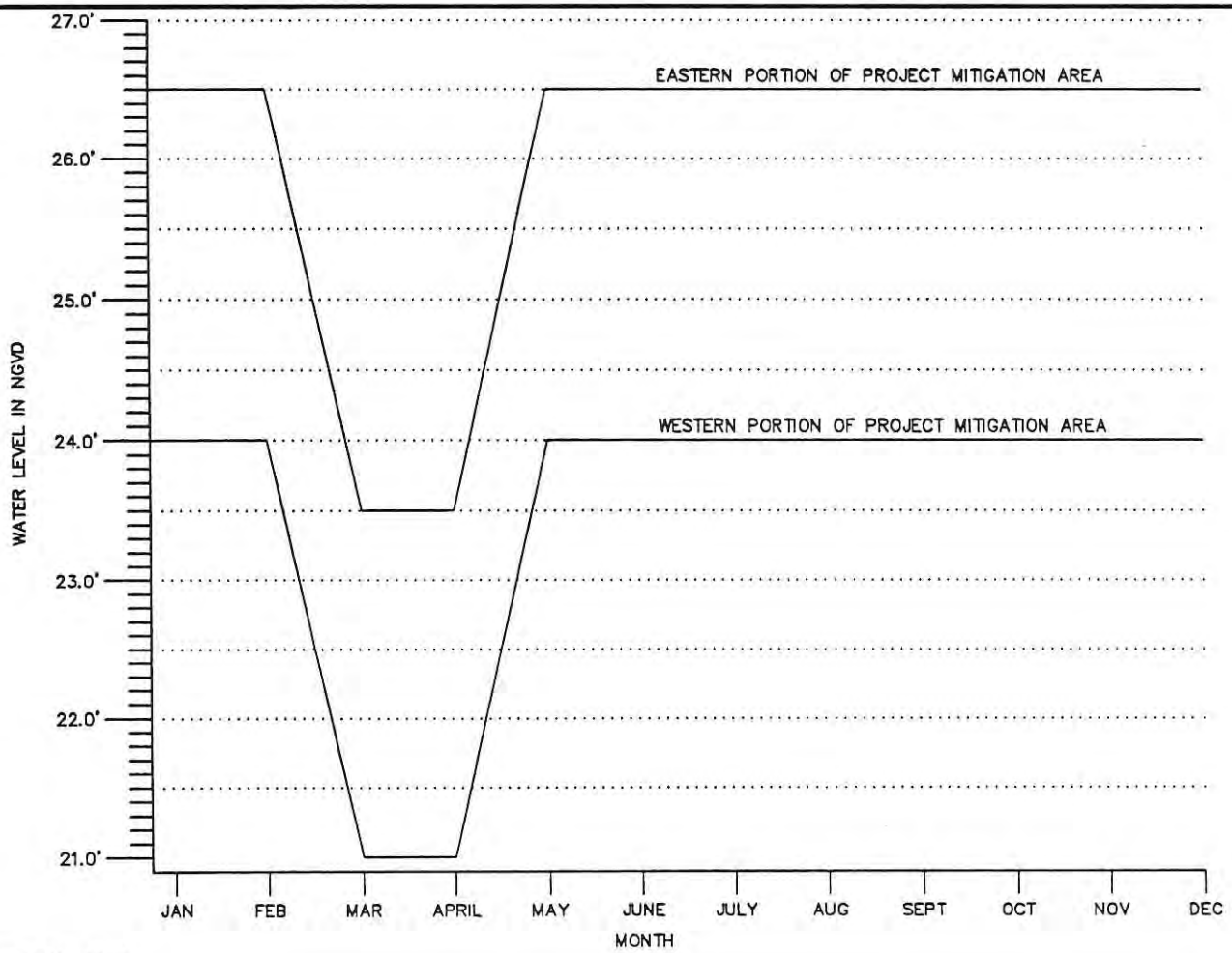
As shown in Attachment 1, pumped seepage from sumps 25 and 26 will be rerouted into the eastern inundation area north of, and between, these two sumps. During the wet season, the water level will be maintained at elevation 26.5 ft NGVD in the eastern area by control structure

B. Excess water will flow out through Control Structure B and into a swale that will carry this runoff to the eastern leg of Restoration Area A. Dimensions of this swale are shown in Attachment 2. From the top of Restoration Area A, the water will flow via natural channels into Black Bottom Slough. Pumped seepage from sump 24 will be rerouted to the western inundation area north of that sump (Attachment 1). Any excess flow from this sump and/or the flow from the eastern leg of Restoration Area A will be routed through Control Structure A downstream to Black Bottom Slough. The use of cooling pond seepage water for mitigation purposes in the NWP was approved as part of the conceptual Project mitigation plan certified by the Governor and Cabinet on February 20, 1991.

Water levels will be adjusted at the control structures to prolong the hydroperiods and to simulate the historical periods of inundation and dry season conditions. High water levels will be maintained from May through January (Figure 3). In February, the levels will be gradually lowered at the rate of about 0.1 ft per day for 30 days until the beginning of March. The low level (3 feet lower than the high water level) will be sustained through March. During April, the water levels will be gradually raised for 30 days at the same rate they were lowered until their full inundation level is reached at the beginning of May. This has been the method used for successful restoration of the Barley Barber Swamp.

In addition to the construction of berms, swales, and control structures, pre-inundation selective clearing of uplands will occur between the edge of the existing inundated areas (wetlands and sloughs) and the 24 ft NGVD or 26.5 ft NGVD contours, depending upon location within the Project Mitigation Area. However, sufficient upland buffer and areas of upland preservation will remain around created and enhanced wetlands as shown in Attachment 1. Pre-inundation clearing of uplands in Restoration Area A will occur in the area near proposed control structure "A" between the existing wetland (NS1) and the 24-foot NGVD contour (Figure 2 and Attachment 1). The uplands in the area of proposed control structure "A" are primarily dense saw palmetto prairie and dense pine flatwoods. The majority of the uplands in Restoration Area A are <u>not</u> proposed for clearing since they are either above the 24-foot NGVD contour or they are considerably less dense than the area near control structure "A".

No pre-inundation clearing of uplands is presently expected for Restoration Area B. Minor clearing of saw palmetto prairie may be conducted north of proposed control structure "A" in Restoration Area C.



SOURCE: EBASCO ENVIRONMENTAL, 1993

FIGURE 3
ANNUAL INUNDATION SCHEDULE FOR PROJECT MITIGATION AREA

Martin CG/CC Project

FPL

Pre-inundation clearing of uplands will be conducted in the unnamed inundation area between Restoration Area A/C and Restoration Area B (area includes Martin Linear Facilities Mitigation Area, Crane-Bridge-Plumosus Mitigation Area, and woodstork ponds). The majority of the uplands to be cleared in this area are pastureland and old groves. Some additional clearing in the unnamed restoration area may be required in second growth oak/palm hammock below the 26.5-foot NGVD contour. In all cases where pre-inundation upland clearing is proposed, as described above, clearing would only occur below inundation elevations (24-foot NGVD in the western area and 26.5-foot NGVD in the eastern area).

Cooling pond seepage water will be pumped into the Project Mitigation Area by the 3 sumps following pre-inundation clearing. It should be noted that, as a means of control, FPL will maintain the ability to reverse sump water back into the cooling pond instead of pumping into the Project Mitigation Area if the need arises. After inundation, the area will remain relatively undisturbed for 3-4 months to allow the water to stabilize. Then, the Project Mitigation Area will be surveyed and mapped again. Detailed survey and mapping after inundation will allow for a precise evaluation of the areas of inundation.

The results of the area and depth survey conducted after the initial inundation will be used to determine the need for limited additional clearing and grading of the substrate to provide proper water depths required for wetland species establishment. This "fine-tuning" of the contours may be necessary to assure that adequate wetland acreages will be present. The specific designation of areas where additional clearing and grading may be conducted after inundation cannot be determined at this time. As shown in the plan view (Attachment 1), significant upland areas would be available within the Martin Project Mitigation Area after inundation. To be as specific as possible at this time, large upland buffer areas that would be available include the uplands around lower Black Bottom Slough downstream of Control Structure "A" (dense pine flatwoods), upland areas in Restoration Area C (pine flatwoods and saw palmetto prairie), and upland areas in the northern "arms" of Restoration Area A (pine flatwoods, saw palmetto prairie, and immature oak/palm hammock).

The upland area in Restoration Area B would not be considered for post-inundation clearing because it is composed of mature oak/palm hammock with "pockets" of tropical species interspersed. Additionally, the Martin Project Mitigation Area could be expanded along the eastern boundary of the unnamed restoration area by clearing and grading upland old groves around the woodstork pond and thereby expanding the area of inundation.

In summary, minimal land clearing of quality uplands is expected both prior to and following inundation. Upland community types where clearing will be conducted include pastureland, old groves, saw palmetto prairie, some dense pine flatwoods, and possibly some second growth oak/palm hammock.

It is the opinion of FPL that the approach of establishing the hydrologic regime and then manipulating substrate conditions to achieve appropriate vegetation distribution will enhance the long term success of the restoration effort. This approach to hydrological control was basically the same one used to successfully restore the nearby Barley Barber Swamp.

2.2.4 Establishment of Upland Preserves and Wetland Buffer Areas

Designated upland preservation will take place in Upland Preserve Areas D and E (Figure 2). Upland areas within the Project Mitigation Area, but outside Upland Preserve Areas D and E, are wetland buffer areas. The preservation of wetland buffer zones is considered essential for enhanced wildlife usage and maintenance of wetland stability. However, some of the larger wetland buffer zones will retain the potential for wetland mitigation for the Martin Project, as described above, and other project opportunities if the need arises.

It is noted that Figure 2 has been revised. Restoration Area A has been expanded into an area that was designated as part of Upland Preserve D. As explained above, the original mitigation area design was established during the Martin County rezoning process in 1988. Restoration Areas A, B, and C and Upland Preserves D and E were delineated at that time. In the later phases of the site certification process, photogrametrically determined elevations of the mitigation area were obtained and further overall design was implemented. The conceptual design, as approved during the site certification process, contained the original restoration area/upland preserve boundaries. For clarification, the more accurate layout is shown on the revised Figure 2 of this document.

During the rezoning process in 1988, Martin County required the preservation of 219 acres (10% of the expansion site) of upland preserve for the development of the Martin CG/CC Project. Upland preserve areas totaling 313 acres were designated both within the Martin Project Mitigation Area and in the expansion area. Two of the preserve areas contain some functional wetlands bringing the total down to 299 acres of upland preserve. Additionally, with the boundary realignment between Restoration Area A and Upland Preserve Area D (Figure 2),

26 acres of upland preserve are being subtracted bringing the total upland preserve area down to 273 (still 54 acres beyond the required 219 acres).

Designated Upland Preserve Areas D and E contain 39 acres and 20 acres of upland, respectively, totaling 59 acres of upland preserve in the Project Mitigation Area. The remaining 214 acres of upland preserve for the Martin Project occur in the expansion area.

2.2.5 Initial Removal and Maintenance Removal of Exotic Plants

Techniques for removal of exotic plants from the NWP were developed after consultation with Don C. Schmitz (Chairman, Exotic Pest Plant Council), Patricia Cunningham-Pascatore (Manager of Fern Forest, Broward County Parks and Recreation), and use of the Exotic Woody Plant Control Manual (Ken Langeland, Editor).

Brazilian pepper (Schinus terebinthifolius) and punk tree (Melaleuca quinquenervia) are the only exotic plants within the Project Mitigation Area on the Exotic Pest Plant Council's list of the most invasive exotic pest plants in Florida (EPPC Newsletter, January 1991, Vol. 1, Number 1). Therefore, efforts will consist of the removal of the existing brazilian pepper and punk tree and a follow up maintenance program to ensure that re-establishment is inhibited.

Tree and shrub size individuals will be cut with machetes and/or chain saws. The cambium of the stumps will then be treated within 1 hour of cutting with Garlon 3A, Redeem, or Remedy either undiluted or up to a 1:1 mixture with water. Seedlings and saplings will either be manually removed or sprayed with a mixture of Garlon 3A, Redeem, or Remedy diluted 50-400:1 with water and an approved nonionic surfactant. All personnel working with the herbicide will be certified by the Florida Department of Agriculture and Consumer Services.

Cuttings will be collected in locations as near to the removal site as possible to help minimize the spread of seeds. All cuttings will then be burned on site.

The inundation program alone should greatly inhibit the re-establishment of brazilian pepper (Patricia Cunningham-Pascatore, personnel communication). Additionally, plants will be removed annually (following the initial removal) using the same methods described above.

2.2.6 Creation of Woodstork Foraging Ponds

During site certification ecological studies, the expansion area where development will occur was occupied infrequently by woodstorks feeding in excavations created to provide water for cattle during the dry season. There are several such excavations in the expansion area totaling less than three acres in area. Discussions with the U.S. Fish and Wildlife Service (USFWS) indicated that it is appropriate to mitigate for this habitat loss. Consequently, creation of such a habitat type is proposed for the Project Mitigation Area.

Two ponds totalling approximately 16 acres will be constructed. One pond will be maintained at a depth between 10 and 20 inches during the wet season and the other pond maintained at similar depths during the dry season. These ponds will be connected to allow the higher pond to repopulate from fish stock in the lower pond with the onset of wet season water level management. The elevation of the bottom of the upper pond will average about 25.5 ft NGVD. The bottom of the lower pond will be between 24 ft NGVD and 24.5 ft NGVD. An area east of Control Structure B (Attachment 1) has been selected for creation of the woodstork foraging habitat with input from the USFWS. The required land at this location will be scraped to the appropriate elevations. The ponds will be "saucer" shaped and connected without control structures. It is intended that at least some water be allowed to flow through the lower pond and exit at Control Structure B during the dry season. Small islands of upland will be left during the contouring process to provide some cover for prey fish. Additionally, some logs and brush will be left in the ponds and submergent and emergent vegetation will be allowed to develop. After achieving about 40 percent vegetative coverage, the ponds will be monitored to determine the need for vegetation control (using sterile grass carp or mechanical means). The overall wetland restoration, enhancement, and creation program will result in the establishment of other suitable woodstork foraging habitat, however, the "ponds" will be the only area specifically managed for that purpose.

2.3 Comprehensive Schedule

The comprehensive schedule for the Project Mitigation Area is provided on Figure 4. The schedule begins with the approval by the Governor and Cabinet of the conceptual Project Mitigation Plan as part of the site certification process on February 20, 1991. Following site certification, some aspects of the mitigation plan presented here were initiated. For example, vegetation monitoring transects where established in February 1991 and semi-annual monitoring

EARLY START	EARLY FINISH	
	20FEB91A	SITE CERTIFICATION APPROVAL
1FEB91A	28FEB91A	Collect Dry Season Baseline Vegetation Data
1JUL91A	31JUL91A	Collect Wet Season Baseline Vegetation Data
1AUG91A	31AUG91A	Remove Cattle
1OCT91A	31OCT91A	Initiate Feral Hog Removal Program
1MAR92A	31MAR92A	Collect Dry Season Vegetation Data
15SEP92A	30SEP92A	Extend Transects, Establish Photostations, and Install PVC Transect Stations Markers
15SEP92A	30SEP92A	Collect Wet Season Vegetation Data
	8OCT92A	Submit Linear Facilities Mitigation Area Video to SFWMD
	20NOV92A	Submit Martin CC/CG Project Linear Facilities Mitigation, Monitoring, and Maintenance Plan to SFWMD
	14DEC92A	Submit Linear Facilities Mitigation Area Conservation Easement
	4FEB93A	Submit 2nd Sufficiency Responses For The Northwest Parcel Mitigation Area
1APR93A	15MAY93A	Collect Dry Season Vegetation Data
	24SEP93A	PROJECT MITIGATION AREA PLAN DISTRICT APPROVAL
18OCT93A	18OCT93A	Meeting to Discuss Schedule Logic
19OCT93A	20OCT93A	Revise Mitigation Schedule
21OCT93A	21OCT93A	FPL Review Revised Mitigation Schedule
22OCT93	22OCT93	Incorporate FPL Mitigation Schedule Comments
25OCT93	25OCT93	FPL Final Mitigation Schedule Review
	25OCT93	Submit Project Mitigation Plan to SFWMD
	25OCT93	Submit Revised Linear Facilities Mitigation Plan to SFWMD
28OCT93	19NOV93	Site Prep Flagging/Routing/Pre-Inundation Survey
25OCT93	19NOV93	Contractor Procurement
22NOV93	7DEC93	Contractor Mobilize & Site Preparation
8DEC93	21DEC93	Jack & Bore Sump 24
26JAN94	1FEB94	Pipe Installation Sump 24
2FEB94	8FEB94	Construct Sump 24 Energy Dissipation Structure
22DEC93	6JAN94	Jack & Bore Sump 25 & 26
26JAN94	1FEB94	Pipe Installation Sump 25 & 26
2FEB94	8FEB94	Construct Sump 25 Energy Dissipation Structure
2FEB94	8FEB94	Construct Sump 26 Energy Dissipation Structure
8DEC93	3FEB94	Construct Berm & Ditch System

Plot Date 21OCT93
Data Date 21OCT93
Project Start 1FEB91
Project Finish 15FEB99

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

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Sheet 1 of 5

FIGURE 4 MARTIN PROJECT
MITIGATION AREA SCHEDULE
PROJECT SCHEDULE

Date	Revision	Checked	Approved

EARLY START	EARLY FINISH	
22NOV93	31MAR94	Construct Woodstork Ponds & Linear Facilities Mitigation Areas
22NOV93	31MAR94	Crane Bridge Earthwork & Initial Tree Relocation
1APR94	1APR94	Crane Bridge Install Staff Gages
1APR94	30JUN94	Crane Bridge Herbaceous Wetland Vegetation
1JUL94	15JUL94	Crane Bridge Perform (Time 0) Baseline Survey And Issue Report to SFWMD
1DEC93	31JAN94	Remove Exotic Vegetation
15NOV93	14DEC93	Procure 5 Staff Gages & 3 Water Level Recorders
25MAR94	31MAR94	Install 5 Staff Gages & 3 Water Level Recorders
22NOV93	25JAN94	Sump Modifications Construction
8DEC93	24MAR94	Construct Control, Gage & Recorder Structures
8DEC93	24MAR94	Construct Culverts & Swales System
22NOV93	10MAR94	Clear Selected Upland Areas Between the Edge of the Existing Inundated Areas (Wetlands & Sloughs) and the 24 ft or 26.5 ft NGVD Contours
10CT93A	29OCT93	Collect Wet Season Vegetation Data Wildlife Observation Data & Baseline Macroinvertebrate Data
1NOV93	30NOV93	Prepare Draft Monitoring Report
1DEC93	7DEC93	FPL Review Draft Monitoring Report
8DEC93	10DEC93	Finalize Monitoring Report
13DEC93	15DEC93	FPL Review Final Monitoring Report
	15DEC93	Submit Annual Monitoring Report to SFWMD
15MAR94	31MAR94	Collect Dry Season Vegetation Data and Wildlife Observation Data
1APR94		BEGIN INUNDATION OF MITIGATION AREA WETLANDS
1APR94	15JUN94	Hydric Stabilization of Inundation Areas
16JUN94	15AUG94	Detailed Survey & Mapping of Inundation Areas
16AUG94	15NOV94	Fine Tune Elevation Contours in Wetland Creation Areas (IF DETERMINED NECESSARY)
30CT94	31OCT94	Collect Wet Season Vegetation Data, Wildlife Observation Data & Macroinvertebrate Data
1NOV94	30NOV94	Prepare Draft Monitoring Report
1DEC94	7DEC94	FPL Review Draft Monitoring Report
8DEC94	12DEC94	Finalize Monitoring Report
13DEC94	15DEC94	FPL Review Final Monitoring Report
	15DEC94	Submit Annual Monitoring Report to SFWMD

1991 1992 1993 1994 1995 1996 1997 1998

Plot Date 21OCT93
Data Date 21OCT93
Project Start 1FEB91
Project Finish 15FEB99

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

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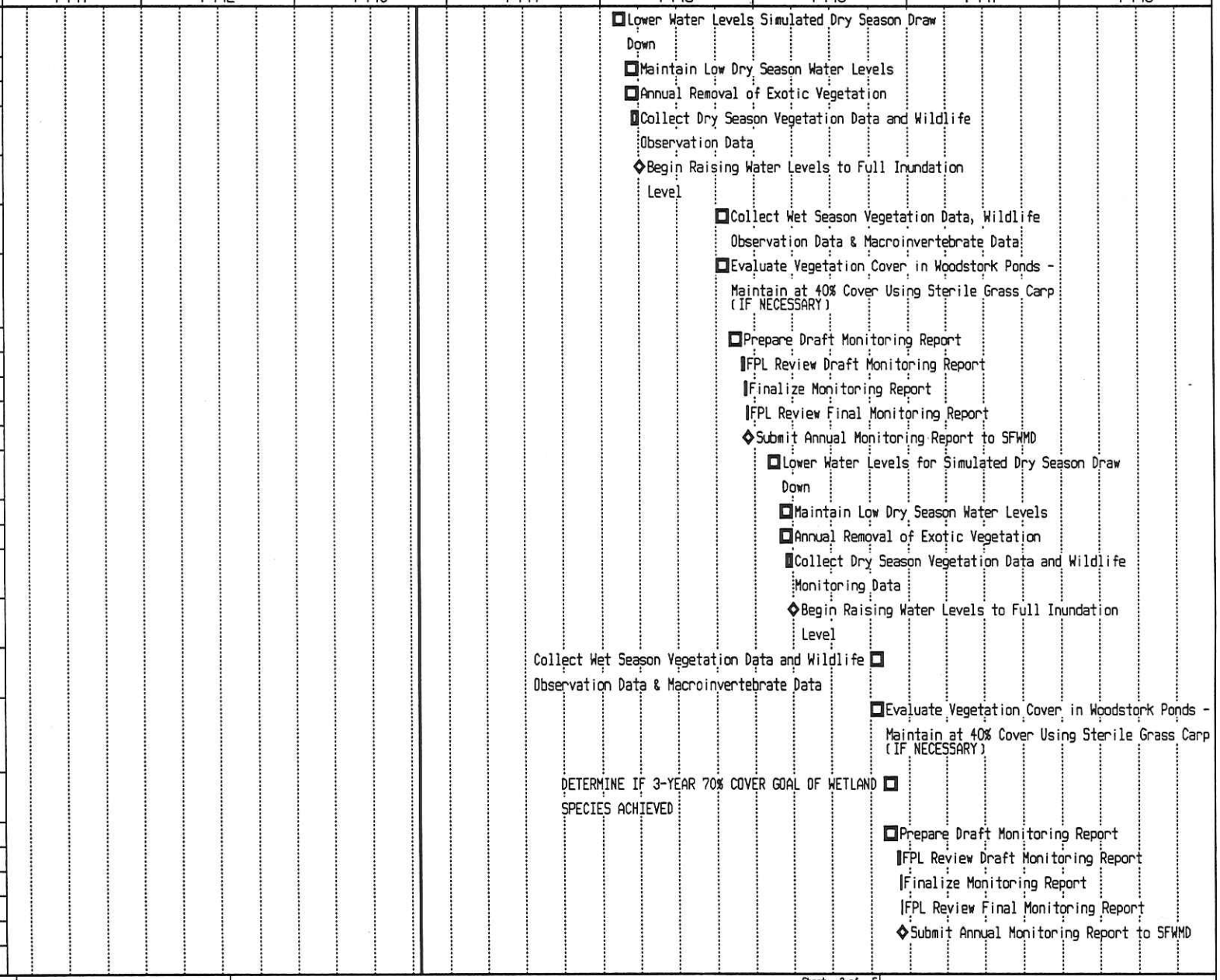
FIGURE 4 MARTIN PROJECT
MITIGATION AREA SCHEDULE
PROJECT SCHEDULE

Date	Revision	Checked	Approved

EARLY START	EARLY FINISH	Activity
1FEB95	28FEB95	Lower Water Levels Simulated Dry Season Draw Down
1MAR95	31MAR95	Maintain Low Dry Season Water Levels
1MAR95	31MAR95	Annual Removal of Exotic Vegetation
15MAR95	31MAR95	Collect Dry Season Vegetation Data and Wildlife Observation Data
3APR95		Begin Raising Water Levels to Full Inundation Level
20CT95	31OCT95	Collect Wet Season Vegetation Data, Wildlife Observation Data & Macroinvertebrate Data
20CT95	31OCT95	Evaluate Vegetation Cover in Woodstork Ponds - Maintain at 40% Cover Using Sterile Grass Carp (IF NECESSARY)
1NOV95	30NOV95	Prepare Draft Monitoring Report
1DEC95	7DEC95	FPL Review Draft Monitoring Report
8DEC95	12DEC95	Finalize Monitoring Report
13DEC95	15DEC95	FPL Review Final Monitoring Report
	15DEC95	Submit Annual Monitoring Report to SFWMD
1FEB96	29FEB96	Lower Water Levels for Simulated Dry Season Draw Down
1MAR96	29MAR96	Maintain Low Dry Season Water Levels
1MAR96	29MAR96	Annual Removal of Exotic Vegetation
15MAR96	29MAR96	Collect Dry Season Vegetation Data and Wildlife Monitoring Data
1APR96		Begin Raising Water Levels to Full Inundation Level
10CT96	31OCT96	Collect Wet Season Vegetation Data and Wildlife Observation Data & Macroinvertebrate Data
10CT96	31OCT96	Evaluate Vegetation Cover in Woodstork Ponds - Maintain at 40% Cover Using Sterile Grass Carp (IF NECESSARY)
1NOV96	2DEC96	DETERMINE IF 3-YEAR 70% COVER GOAL OF WETLAND SPECIES ACHIEVED
1NOV96	2DEC96	Prepare Draft Monitoring Report
3DEC96	9DEC96	FPL Review Draft Monitoring Report
10DEC96	11DEC96	Finalize Monitoring Report
12DEC96	13DEC96	FPL Review Final Monitoring Report
	13DEC96	Submit Annual Monitoring Report to SFWMD



Plot Date 21OCT93
Data Date 21OCT93
Project Start 1FEB91
Project Finish 15FEB99

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

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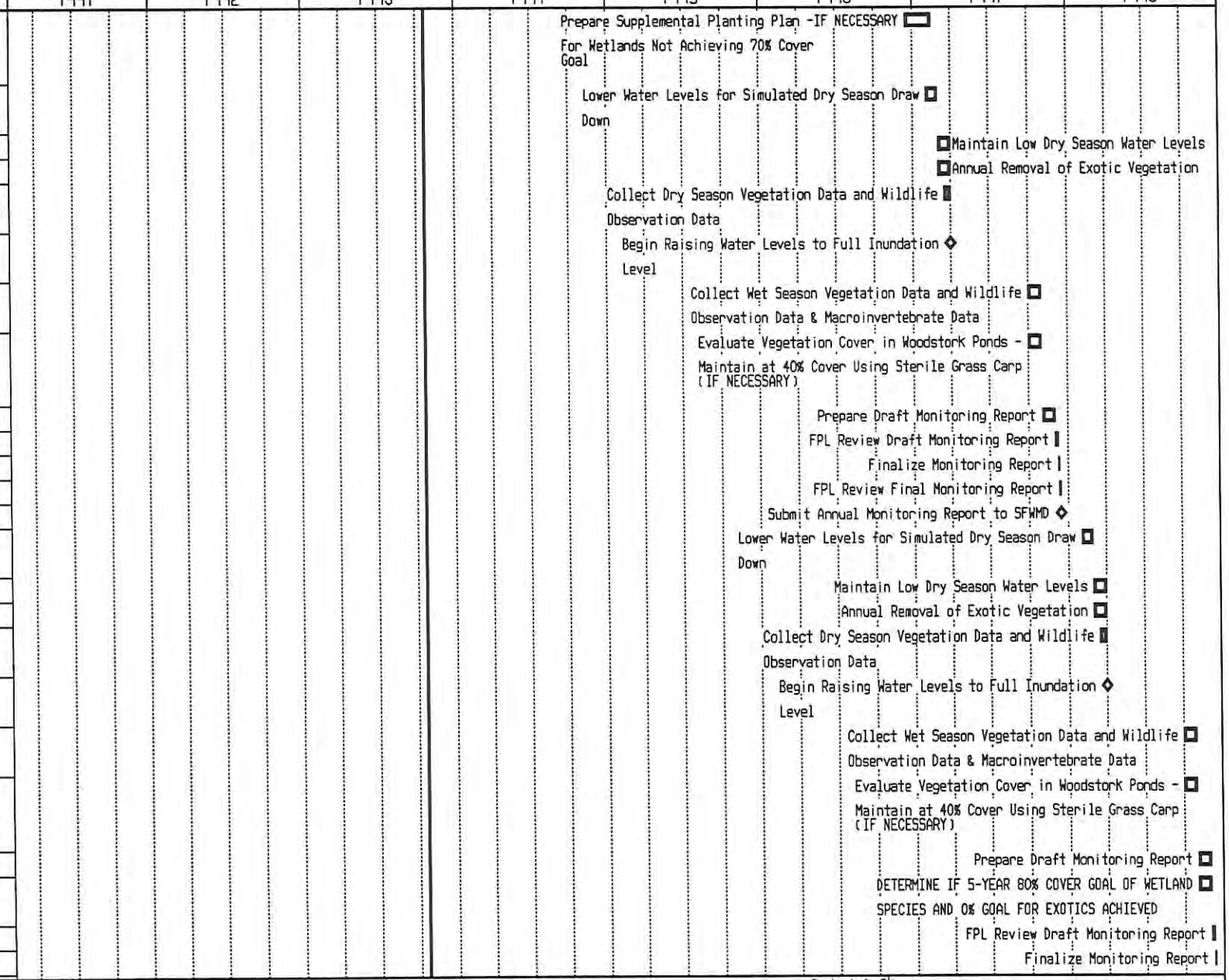
FIGURE 4 MARTIN PROJECT
MITIGATION AREA SCHEDULE
PROJECT SCHEDULE

Date	Revision	Checked	Approved

EARLY START	EARLY FINISH	
16DEC96	14FEB97	Prepare Supplemental Planting Plan -IF NECESSARY For Wetlands Not Achieving 70% Cover Goal
3FEB97	28FEB97	Lower Water Levels for Simulated Dry Season Draw Down
3MAR97	31MAR97	Maintain Low Dry Season Water Levels
3MAR97	31MAR97	Annual Removal of Exotic Vegetation
17MAR97	31MAR97	Collect Dry Season Vegetation Data and Wildlife Observation Data
1APR97		Begin Raising Water Levels to Full Inundation Level
1OCT97	31OCT97	Collect Wet Season Vegetation Data and Wildlife Observation Data & Macroinvertebrate Data
1OCT97	31OCT97	Evaluate Vegetation Cover in Woodstork Ponds - Maintain at 40% Cover Using Sterile Grass Carp (IF NECESSARY)
3NOV97	2DEC97	Prepare Draft Monitoring Report
3DEC97	9DEC97	FPL Review Draft Monitoring Report
10DEC97	11DEC97	Finalize Monitoring Report
12DEC97	15DEC97	FPL Review Final Monitoring Report
	15DEC97	Submit Annual Monitoring Report to SFWMD
2FEB98	27FEB98	Lower Water Levels for Simulated Dry Season Draw Down
2MAR98	31MAR98	Maintain Low Dry Season Water Levels
2MAR98	31MAR98	Annual Removal of Exotic Vegetation
16MAR98	31MAR98	Collect Dry Season Vegetation Data and Wildlife Observation Data
1APR98		Begin Raising Water Levels to Full Inundation Level
1OCT98	30OCT98	Collect Wet Season Vegetation Data and Wildlife Observation Data & Macroinvertebrate Data
1OCT98	30OCT98	Evaluate Vegetation Cover in Woodstork Ponds - Maintain at 40% Cover Using Sterile Grass Carp (IF NECESSARY)
2NOV98	1DEC98	Prepare Draft Monitoring Report
2NOV98	1DEC98	DETERMINE IF 5-YEAR 80% COVER GOAL OF WETLAND SPECIES AND 0% GOAL FOR EXOTICS ACHIEVED
2DEC98	8DEC98	FPL Review Draft Monitoring Report
9DEC98	11DEC98	Finalize Monitoring Report



Plot Date 21OCT93
Data Date 21OCT93
Project Start 1FEB91
Project Finish 15FEB99

Activity Bar/Early Dates
Critical Activity
Progress Bar
◇/P Milestone/Flag Activity

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FIGURE 4 MARTIN PROJECT
MITIGATION AREA SCHEDULE
PROJECT SCHEDULE

Sheet 4 of 5

Date	Revision	Checked	Approved

EARLY START	EARLY FINISH	
14DEC98	15DEC98	FPL Review Final Monitoring Report
	15DEC98	Submit Annual Monitoring Report to SFWMD
16DEC98	15FEB99	Prepare Supplemental Planting Plan-If Necessary For Wetlands not Achieving 80% Cover Goal

1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998

Plot Date 21OCT93
Data Date 21OCT93
Project Start 1FEB91
Project Finish 15FEB99

Activity Bar/Early Dates
Critical Activity
Progress Bar
◇/P Milestone/Flag Activity

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FIGURE 4 MARTIN PROJECT
MITIGATION AREA SCHEDULE
PROJECT SCHEDULE

Date	Revision	Checked	Approved

began. Furthermore, cattle were removed in August 1991 and feral hog removal began in October of that same year. In November 1992, the Martin Linear Facilities Mitigation, Monitoring, and Maintenance Plan was submitted and approved by the SFWMD. The Project Mitigation Area Plan was approved by the SFWMD on September 24, 1993.

Construction activities are scheduled to begin October 20, 1993 and conclude on March 31, 1994. Activities will include surveying and flagging, construction of berms and ditch systems, construction of woodstork ponds and linear facilities mitigation area, construction of Crane Bridge mitigation area, exotic vegetation removal, sump modifications, construction of control structures, culverts, and swale systems, and clearing of selected upland areas.

Inundation of the Project Mitigation Area is scheduled to begin on April 1, 1994. Approximately 2-1/2 months will be allowed for hydric stabilization in the inundation areas. Then detailed surveying and mapping will be conducted and elevation contours will be "fine tuned", if determined necessary.

After the Project Mitigation Area is considered sufficiently stabilized and "fine tuned" to achieve Project mitigation goals (Section 2.5), the operating inundation schedule (Figure 3) will be implemented. The semi-annual collection of monitoring data and the annual submittal of monitoring reports will continue until December 1998 or until release from SFWMD (SFWMD Condition of Certification IV.D.2.b.8). Three and five year vegetative cover goals have been set for December 11, 1996 and December 15, 1998 at 70% and 80% cover respectively for enhanced, restored, and created wetlands. Supplemental planting plans will be prepared following each date if the set goals are not achieved.

Activities which will continue for the life of the Martin CG/CC Project include the annual inundation schedule (Figure 3), the removal of feral hogs, and the annual removal of specified exotic plants (Section 2.2.5).

2.4 Mitigation Acreage Summary

Table 3 provides a breakdown of the Project's wetland impacts and the proposed mitigation acreage. For purposes of power plant impact assessment, FPL has treated 161 acres of potential wetland impacts on the Project site, where development will occur, as being lost (Site Certification Application Sufficiency Responses, SFWMD Comment #15, May 8, 1990).

TABLE 3: MARTIN PROJECT MITIGATION ACRES	
	ACRES
Potential wetland impacts in expansion area	161
Wetland impacts from construction/operation of linear facilities	+9.2
Total potential wetland impacts associated with the Martin Project	**170.2**
Potential wetlands to be restored/enhanced	166
Potential wetlands to be created (including 16 acre woodstork ponds)	+167
Total potential wetlands	**333**
Designated upland preserves dedicated to the Martin Project within the Project Mitigation Area	59
Potential upland buffer areas retaining mitigation potential for the Martin Project, if needed	+236
Total potential area dedicated to the Martin Project	**628**
Potential SFWMD wetland mitigation credit from Impact Assessment Report	178
Total potential wetland impacts associated with the Martin Project	-170.2
Potential Wetland credit remaining in Martin Project Mitigation Area	7.8

Wetland impacts associated with the construction and operation of the Project's linear facilities will total 9.2 acres (Linear Facilities Mitigation, Monitoring and Maintenance Plan, November 1992). As determined by SFWMD during the site certification process, approximately 178 acres of wetland mitigation credit will be available in the NWP with the implementation of the mitigation plan for offsetting wetland impacts as a result of the construction and operation of the Project (SFWMD Impact Assessment Report, August 9, 1990). The area in the NWP dedicated to the Project totals 628 acres in size. Existing wetlands to be restored or enhanced total 166 acres. Created wetlands will total 167 acres for a grand total of 333 acres of wetlands after inundation (including 16 acres of woodstork ponds). Conversely, upland acreage within the Project Mitigation Area will decrease from 446 acres before inundation to 295 acres after inundation. Table 4 provides an up-to-date acreage summary of mitigation projects in the Northwest Parcel.

2.5 Mitigation Goals

The success of this program shall be based upon an assessment of the measured progress toward achieving a restored, functional hydrologic regime, the improvement of hydric soils within appropriate areas and the natural, beneficial changes in vegetation composition, diversity, and canopy characteristics within the Project Mitigation Area wetlands.

Specifically, as stated in Condition of Certification IV.D.2.b.8, measured success shall be determined by the establishment in wetland areas of 80% cover of desirable wetland plant species and complete removal of exotic plants. As shown in the comprehensive schedule (Figure 4), three and five year vegetative cover goals have been set for December 20, 1996 and December 15, 1998 at 70% and 80% cover respectively for created wetlands. Supplemental planting plans will be prepared following each date if the set goals are not achieved. The functional value goals for other agencies are as stated in the Martin CG/CC Project - Compliance with Federal Policy of No Net Less of Wetlands Functional Values, November 1991.

TABLE 4: NORTHWEST PARCEL MITIGATION BANKING ACRES	
	ACRES
Total area of Northwest Parcel	1,200
Proposed Martin Project Mitigation Area	-628
Crane-Bridge-Plumosus Project Mitigation Area	-3.25
Potential Area remaining for future mitigation projects	**568.75**

3.0 MONITORING AND MAINTENANCE

3.1 Vegetation Monitoring

Improvements to the Project Mitigation Area have occurred since baseline data was first recorded at the beginning of the mitigation effort in 1991. There has been a notable improvement in the quality of most habitats since the removal of cattle and the reduction in the feral hog population. As a result, only the 1991 vegetation data represent true baseline conditions even though the 1992 data has been collected prior to the inundation of Project Mitigation Areas.

Dry and wet season vegetation data for 1991 and 1992 have been collected for the Project Mitigation Area and are provided in Attachment 3. The baseline data is presented by transect and season. Each table has transect station numbers across the x-axis and species by stratum along the y-axis encompassing the entire transect, which may include multiple vegetation community types. The transition between these types is observed by relatively sharp differences between species and cover characteristics. Figure 5 contains an example of the data forms used in the field during monitoring. From the data collected, the species percent cover by stratum and the species composition of a given wetland can be estimated.

Originally, in early 1991, seven vegetative sampling transects were established and labeled NWP1 through NWP7. However, transects were lengthened in September 1992 (wet season survey) in order to better represent adjacent upland plant communities. Additionally, Transect NWP8 which was first sampled in February 1989, during the Site Certification process, was incorporated into the current monitoring program. Transect NWP8 was resampled during the wet season survey of September 1992. Transect NWP9 was also added at this time to monitor the proposed created wetland in the Project's Linear Facilities Mitigation Area.

Each vegetation transect has been established and marked with 1 inch schedule 40 PVC pipe. As existing markers deteriorate, new PVC markers will be placed over rebar to provide a more durable marker. These markers will not be subject to rotting or vulnerable to fire.

At each station, canopy trees (diameter at breast height [dbh] greater than 10cm) and middlestory trees (2.5cm to 10cm dbh) were sampled in 10m by 10m plots, shrubs (dbh less than 2.5cm and height greater than 1m) were sampled in nested 5m by 5m plots, and herbaceous species (height

FIGURE 5: Vegetation Monitoring Field Data Form

____ of ____

Site: Martin Site
Owner: FPL
Transect: _____
Date: ____/____/____
Station Location: _____
Interval: _____
Observers: _____, _____, _____

Sample Area Size: Quadrats for Tree Layer _____
Middlestory _____
Shrub Layer _____ <5m
Herbaceous Layer _____

Species	Herb. Layer	% Cover

Species	Shrub Layer	% Cover

Bare Ground _____
Litter _____
Open Water _____
Water Depth _____

Soil Moisture _____
Soil Type _____

Species	Canopy	% Cover	DBH

Species	Middle Story	% Cover	DBH

Wildlife observations:

Remarks:

less than 1m) were sampled in nested 1m by 1m plots. Different criteria were used for sampling cabbage palms since dbh measures are generally inappropriate for sampling palms. Cabbage palms greater than 5m high were placed in the canopy, those 3m to 5m high in the middlestory, those 1m to 3m high in the shrub layer, and those less than 1m high were placed in the herbaceous layer.

The dbh of all woody species greater than 2.5cm dbh was measured and the percent cover per stratum per species was estimated. Additional data collected during vegetation sampling include notes on the development of an organic topsoil layer, water depth within each 1m by 1m herbaceous plot, and general notes on wildlife observations. All monitoring will be conducted by qualified personnel with at least a bachelor's degree and appropriate experience in the field of botany, wetland ecology, hydrology, and wildlife.

Collection of vegetation data will allow for the analysis of changes in species composition and species dominance per stratum over time. Species composition and dominance will be used to determine if SFWMD success criteria have been achieved. The annual monitoring reports submitted to SFWMD will describe any changes in vegetative species composition and dominance or other relevant conditions observed. This data will be presented in tabular and graphic formats when appropriate.

3.2 Photographic Documentation

Fixed point panoramic photographs of the Project Mitigation Area will be conducted semi-annually during vegetation monitoring. The photographs provided with this document (Attachment 4) represent conditions after removal of cattle and a reduction in the feral hog population. The photographs were taken during May 1993 at the established photostation locations shown in Attachment 1. At each station, panoramic photographs will be taken with the direction of view noted as shown in Attachment 4. The photostations are situated so that at least each vegetation community type per transect is documented. Semi-annual photographs will be provided to SFWMD annually as part of the monitoring report.

3.3 Wildlife Monitoring

Observations of wildlife utilization in the Project Mitigation Area will be conducted semi-annually near the time of vegetation monitoring. Surveys will be conducted along vegetation

transects shown on the plan view in Attachment 1. Wildlife utilization will be documented by numbers of individuals and type of observation (seen, heard, tracts, scat, feeding, nesting, etc.). Data will be recorded in the field using the example form shown on Figure 6.

Wildlife monitoring data will be provided to SFWMD as part of the annual monitoring report submittal. Wildlife data will be presented in each report as frequency of occurrence (number of individuals seen per species) during the wet and dry seasons and percent change by species over time.

3.4 Macroinvertebrate Monitoring

Annual qualitative macroinvertebrate samples will be collected during the wet season from permanent monitoring stations setup to evaluate the conditions of the wetland areas within the Project Mitigation Area. Station locations will be established more precisely during the first sampling effort scheduled for the October 1993 wet season survey. In general, stations will be located along the established vegetation transects shown in Attachment 1. All habitats per transect will be sampled during each collection.

Qualitative samples will be collected using a kick or dip net held in the water body while the habitat immediately in front of the collection device is disturbed. Qualitative samples will be analyzed by transferring the samples to a white background and the collected organisms removed and identified to the family level in the field. Regionally, appropriate taxonomic keys will be used if necessary. Abundance of taxa will be determined as very abundant, abundant, common, rare, and very rare. Analysis of this type allows for rapid assessment of the existing conditions. All information regarding the benthic macroinvertebrate populations will be recorded on the field data form shown on Figure 7.

Field personnel will also measure wetland and air temperature, wetland pH, wetland dissolved oxygen concentration, and wetland conductivity (specific conductance) on the date that the benthic macroinvertebrates are collected. Instrument calibrations will follow manufacturer's directions and be recorded in the field logbook and on all pertinent forms. Instrument calibrations will be conducted at the beginning and end of each day's activities.

Data analysis will begin with the tabulation of the data recorded during the field collections. Separate tables will be constructed for each station listing the taxa collected in each replicate.

FIGURE 6: Wildlife Monitoring Field Data Form

Site: Martin Site
Transect: _____
Observers: _____, _____

Owner: FPL
Date: _____
Duration: _____

SPECIES	# OF INDIVIDUALS	TYPE OF OBSERVATION *

* Observation Key: S = seen, H = heard, T = tracts, SC = scat
N = nesting, F = feeding, O = other

FIGURE 7: Macroinvertebrate Monitoring Field Data Form

SITE _____ DATE _____

STATION _____ TIME _____

COLLECTORS _____

PHOTOS _____

GENERAL WATER BODY CHARACTERISTIC

BANK CONDITION _____

BANK VEGETATION _____

AQUATIC VEGETATION _____

WATER CHEMISTRY

AIR TEMPERATURE _____ WATER TEMPERATURE _____

CONDUCTIVITY _____ FIELD CALIBRATION _____

pH _____ FIELD CALIBRATION _____

DISSOLVED OXYGEN _____ FIELD CALIBRATION _____

BENTHIC MACROINVERTEBRATE POPULATION

FAMILY	ABUNDANCE	NUMBER
_____	VA A C R VR	_____
_____	VA A C R VR	_____
_____	VA A C R VR	_____
_____	VA A C R VR	_____
_____	VA A C R VR	_____
_____	VA A C R VR	_____

These data will be tabulated to present the data collected during the entire study. A written comparison of the study stations over time will also be prepared and submitted with the tabular data to SFWMD as part of the annual monitoring report.

3.5 Water Quality, Level, and Rainfall Monitoring

A water quality monitoring program is being proposed for the Project Mitigation Area for two reasons: to monitor the quality of water discharged from the mitigation area and to monitor and quantify the treatment of the cooling pond seepage used in this wetland treatment system. Monitoring this system for several years will verify its usefulness in creation of wetlands as well as in treatment of wastewaters of this type in other similar circumstances.

Water quality samples will be collected once each quarter at six stations which can be easily be located on the plan view in Attachment 1:

1. Discharge from Sump 26 into the mitigation area
2. Discharge from Sump 25 into the mitigation area
3. Discharge from Sump 24 into the mitigation area
4. West end of swale in north central portion of mitigation area
5. Discharge from proposed control structure A upstream of Black Bottom Slough
6. Discharge from existing control structure at downstream end of Black Bottom Slough

Water quality and water flow data will be collected during this monitoring program. Water quality data will include field data (pH, DO, temperature, and conductivity) and laboratory analytical data (BOD_5, total Kjeldahl nitrogen, and total ammonia, nitrates, nitrites, phosphates, iron, mercury, zinc, copper, sodium and lead). These parameters were chosen because they are useful indicators of wastewater treatment or because they are constituents of concern in the cooling pond seepage.

Surface water flow data will be collected at the sources of input to the Project Mitigation Area (sump discharges) and at the existing control structure discharge from Black Bottom Slough. Pump logs will be used to determine the daily input of cooling pond leachate to the system from the three sumps and direct measurement of the flow over the Black Bottom Slough discharge control structure will be used to measure discharge from the mitigation area. No attempt will

be made to measure other surface and ground water inputs to the mitigation area. However, water levels will be recorded weekly at seven staff gauges and by three water level recorders at locations shown in Attachment 1. Style C Water Mark staff gauges and Campbell Scientific CR10 Measurement and Control System water level recorders will be used (see Attachment 5 for specifications).

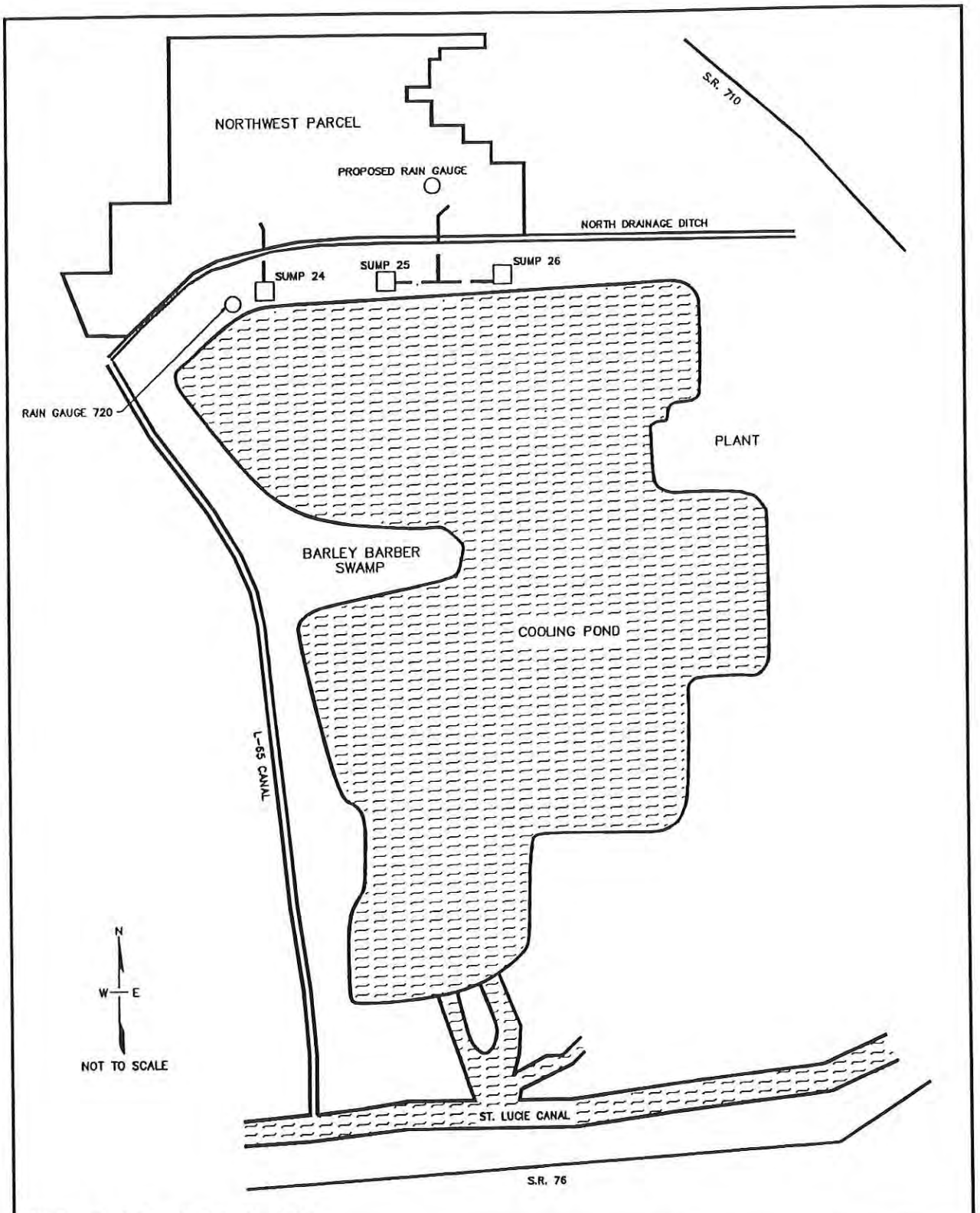
Water levels will provide a relative indication of the influence of the local water table on surface water levels in the mitigation area. Daily rainfall will be measured at an existing FPL rain gauge (#720) located near Sump 24 and a proposed rain gauge in the Project's Linear Facilities Mitigation Area (Figure 8). All Weather Rain Gauges made to U.S. Weather Bureau specifications will be used (see Attachment 5).

Data reports, including all data collected during each calendar quarter, will be prepared one month after the end of the calendar quarter. These reports will include all field and laboratory data, water level information, sump flow records, rainfall data, and discharges measured at the Black Bottom Slough discharge control structure. This information will be presented in tabular and graphic formats and, as appropriate, will display accumulated data. The tables and graphs along with a written evaluation will be provided to SFWMD as part of the annual monitoring report.

3.6 Maintenance

FPL is obligated to maintain the integrity of the restored, enhanced, preserved, and created wetlands in the Project Mitigation Area for the life of the Martin CG/CC project. Activities which will continue for the life of the Martin CG/CC Project include the annual inundation schedule (Figure 3), the maintenance removal of feral hogs, and the maintenance removal of specified exotic plants (Section 2.2.5).

In the event that FPL does not ultimately impact or otherwise fill all of the wetlands in the expansion area (Figure 1) to the extent determined in the site certification process, FPL may apply those portions of the Project Mitigation Area which are not required for mitigation of the Project's wetland impacts toward mitigation of impacts to wetlands or other natural systems for other projects undertaken by FPL to the extent permissible under law.



SOURCE: EBASCO ENVIRONMENTAL, 1993

FIGURE 8
MARTIN SITE
RAIN GAUGE LOCATION MAP

Martin CG/CC Project
FPL

The Barley Barber Swamp is a showcase wetland annually visited by 4,000 to 5,000 visitors. The Northwest Parcel will be maintained more as a wilderness area once mitigation programs are fully implemented. Access will be allowed only in response to approved special requests to FPL to conduct ecological research and for mitigation program monitoring. Martin County and the Treasure Coast Regional Planning Council have approved this concept.

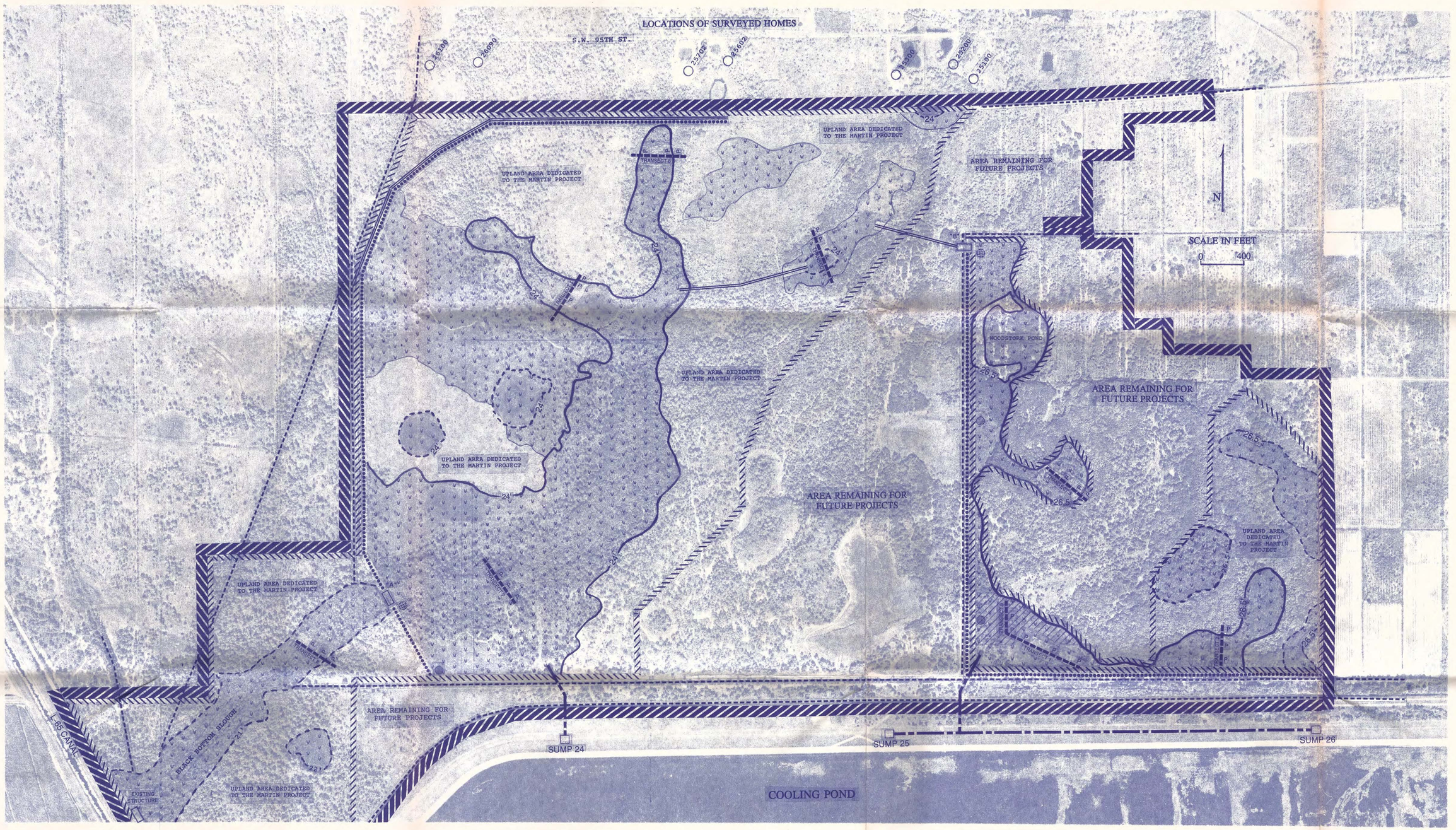
Two draft conservation easements (Attachment 6) have been prepared which together encompass the entire area dedicated to the Project. One document is specifically for the Martin CG/CC Linear Facilities Mitigation Area while the other deeds the remainder of the Project Mitigation Area.

4.0 ATTACHMENTS

Attachment 1	Martin Project Mitigation Area Plan View
Attachment 2	Detailed Design Drawing for Martin Project Mitigation Area
Attachment 3	Tabulated Vegetation Data for Wet and Dry Seasons, 1991 and 1992
Attachment 4	Fixed Point Panoramic Photographs, May 1993
Attachment 5	Rain Gauge, Staff Gauge, and Water Level Recorder Specifications
Attachment 6	Conservation Easements and Surveys for Martin Project Mitigation Area • Martin Linear Facilities • Martin Mitigation Area

ATTACHMENT 2

DETAILED DESIGN DRAWING FOR
MARTIN PROJECT MITIGATION AREA



NORTHWEST PARCEL BOUNDARY

MARTIN PROJECT MITIGATION AREA BOUNDARY (wetlands and uplands)

RESTORED, ENHANCED, AND CREATED WETLANDS DEDICATED TO THE MARTIN PROJECT

MARTIN LINEAR FACILITIES MITIGATION AREA

24' and 26.5' DIRECT INUNDATION CONTOUR

24' and 26.5' INDIRECT INUNDATION CONTOUR

BERM

EXISTING DRAINAGE DITCH

SWALE

SUMP WATER DISCHARGE PIPE

VEGETATION TRANSECT

STAFF GAGE

STAFF GAGE AND WATER LEVEL RECORDER

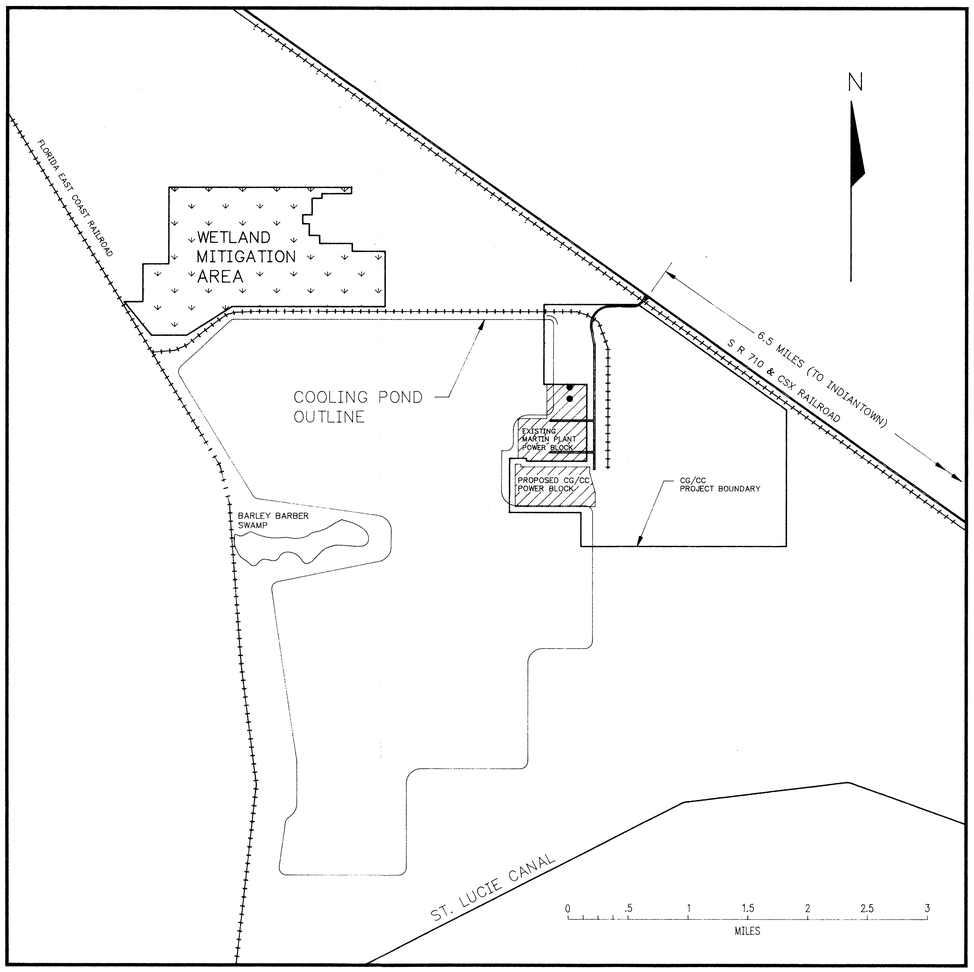
CONTROL STRUCTURE

P PHOTOSTATION

FLORIDA POWER & LIGHT COMPANY
MARTIN SITE

NORTHWEST PARCEL

MARTIN MITIGATION AREA PLAN VIEW



FLORIDA POWER & LIGHT CO.

MARTIN CG/CC PROJECT

WETLAND MITIGATION

EBASCO SERVICES INC.

759 SOUTH FEDERAL HWY

STUART, FLORIDA 34994

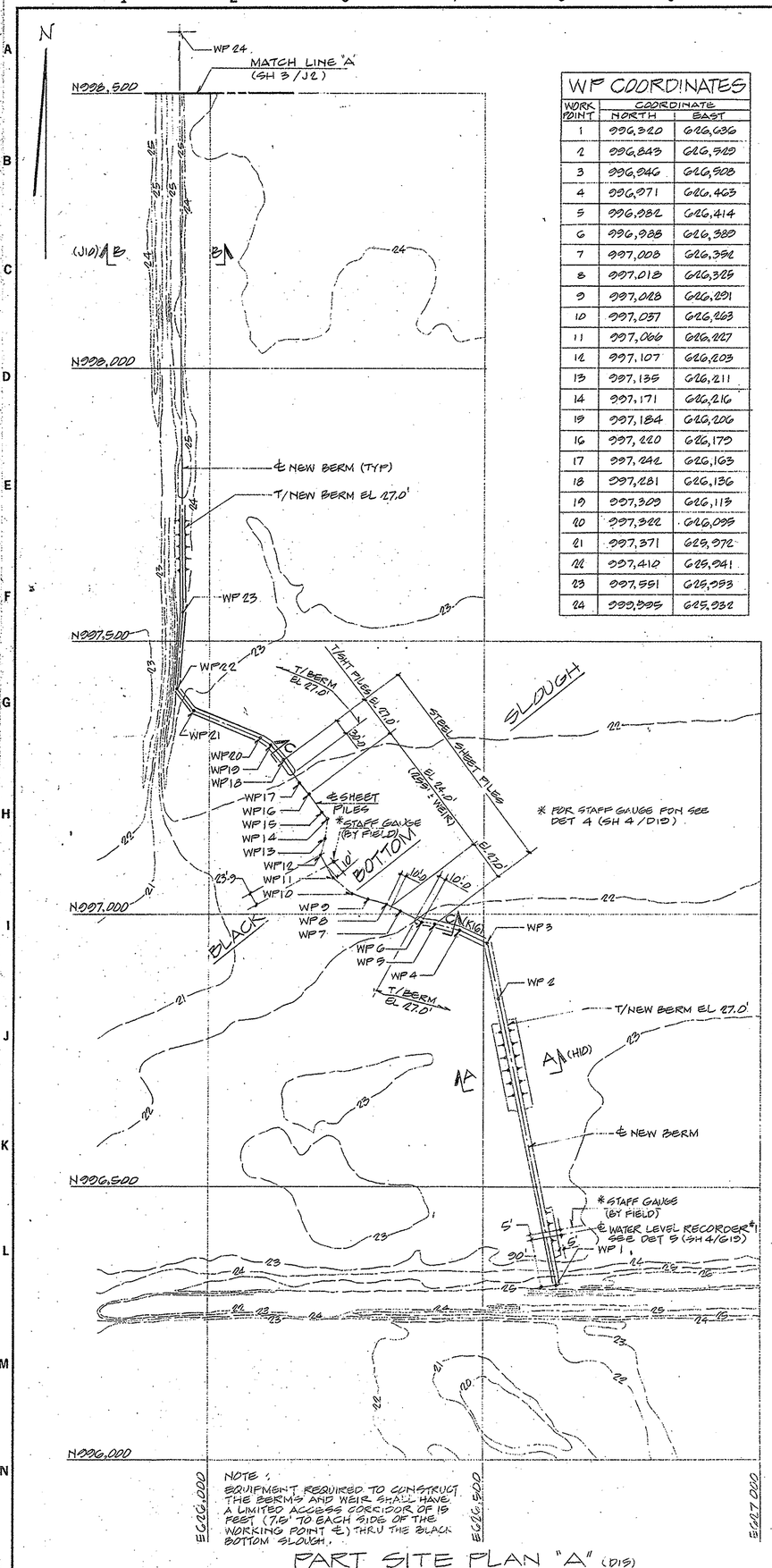
EBASCO SERVICES INCORPORATED		
SCALE: AS NOTED	APPROVED	DATE: 2-13-92
DIV CIVIL	Ralph Ruiz	
DR BBLUM		
CH		

SYSTEM	DISCIPLINE	PLANT/UNIT: MARTIN PLANT–NORTHWEST PARCEL
SCALE	CAD FILE NAME	TITLE: WETLAND MITIGATION WATER RETENTION & FLOW CONTROL STRUCTURES
DRAWING SIZE	FPL ARCHIVE NAME	
DRAWING NUMBER: 7933.625–C–001		SHEET 1 OF 4 / REV 0

FPL

REV	DATE	REVISION DESCRIPTION	BY	CH	COR	APP	ORG

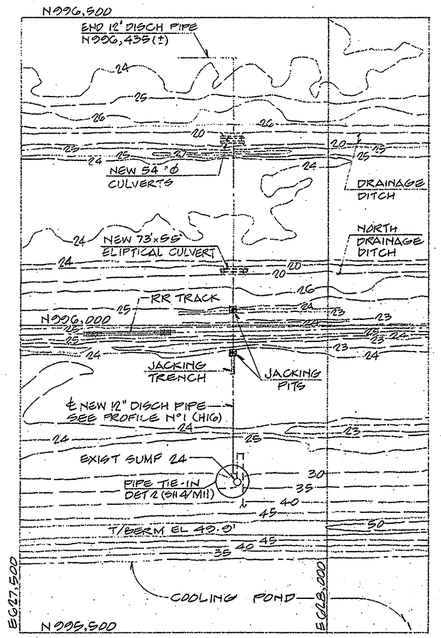
CAD FILE: 00000455



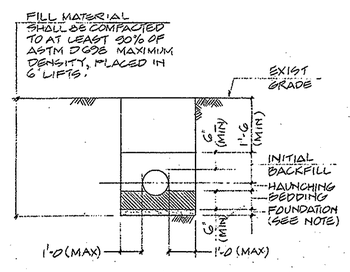
NOTE:
EQUIPMENT REQUIRED TO CONSTRUCT THE BERMS AND WEIR SHALL HAVE A LIMITED ACCESS CORRIDOR OF 15 FEET (7.5' TO EACH SIDE OF THE WORKING POINT ℄) THRU THE BLACK BOTTOM SLOUGH.

PART SITE PLAN "A" (D13)
1" = 100'

WP COORDINATES		
WORK POINT	COORDINATE NORTH	COORDINATE EAST
1	996,320	626,636
2	996,843	626,510
3	996,946	626,508
4	996,971	626,463
5	996,982	626,414
6	996,988	626,380
7	997,008	626,351
8	997,018	626,325
9	997,028	626,291
10	997,057	626,263
11	997,086	626,227
12	997,107	626,203
13	997,135	626,211
14	997,171	626,216
15	997,184	626,206
16	997,220	626,170
17	997,242	626,163
18	997,281	626,136
19	997,309	626,113
20	997,322	626,095
21	997,371	625,972
22	997,410	625,941
23	997,591	625,793
24	999,995	625,532

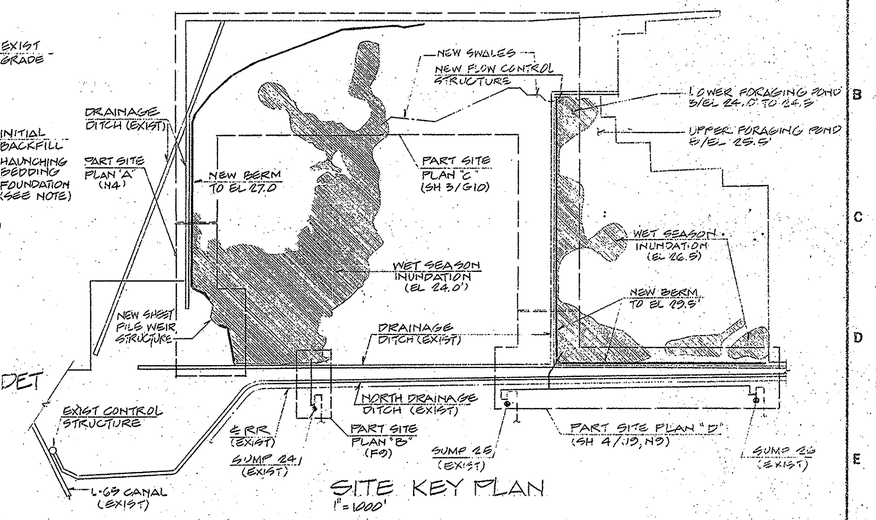


PART SITE PLAN "B" (E16)
1" = 100'

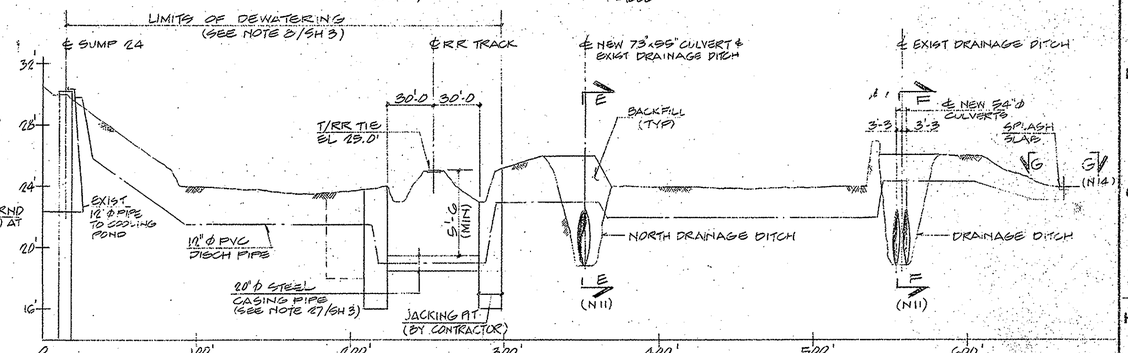


FOUNDATION NOTE:
EXTEND EXCAVATION AT LEAST 12" DEEPER IF PEAT, MUCK, ORGANIC SOIL OR OTHER UNSUITABLE MAT'L IS FOUND. FILL MATERIAL SHALL BE USED FOR FOUNDATION.

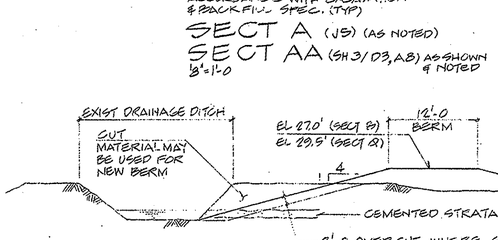
TYP PIPE TRENCH DET
NO SCALE



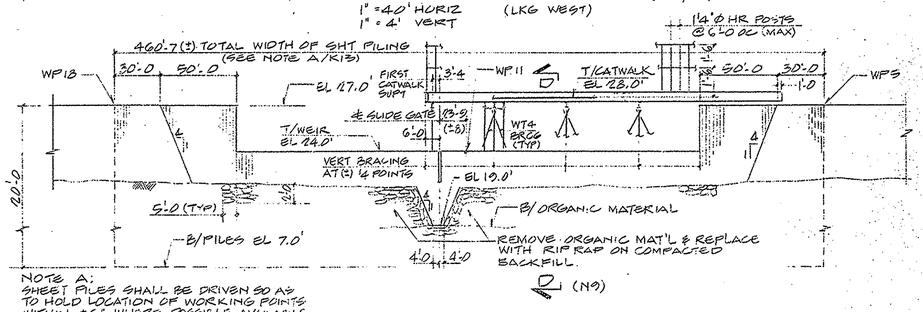
SITE KEY PLAN
1" = 1000'



PROFILE No. 1 AS SHOWN (D9)
PROFILE No. 2 (SIMILAR (SH 4/F7) (LKG WEST)
1" = 40' HORIZ
1" = 4' VERT



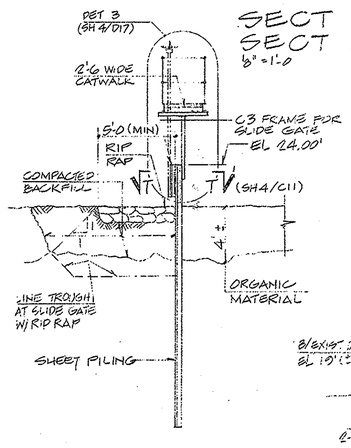
SECT B (C1) (SH 3/12)
SECT Q (SH 3/K16) (SH 4/C7, E16, K4)
1/8" = 1'-0



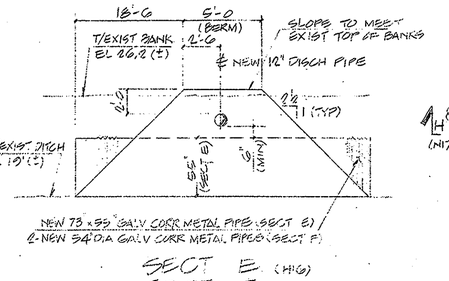
NOTE A:
SHEET PILES SHALL BE DRIVEN SO AS TO HOLD LOCATION OF WORKING POINTS WITHIN ±6". WHERE POSSIBLE, AVAILABLE CLOSURE SECTIONS SHALL BE USED TO MINIMIZE DEVIATION FROM THE COORDINATES. SHEET PILES SHALL BE INSTALLED WITHIN 1:0 OF VERTICAL.

SECT C (14)
1" = 40' HORIZ
1" = 4' VERT

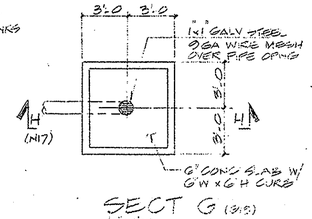
NOTES:
1. FOR GENERAL NOTES SEE SH 3
2. FOR REFERENCE DRAWINGS SEE SH 4.



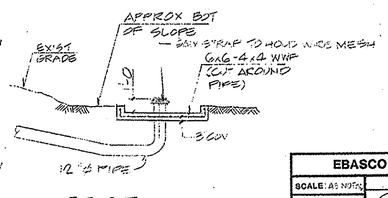
SECT D (K17)
1/4" = 1'-0



SECT E (H16)
SECT F (H13)
NO SCALE



SECT G (N13)
1/4" = 1'-0



SECT H (M13)
1/4" = 1'-0

NOTE B:
C3 CHANNEL FRAME SHALL BE SET TO PROVIDE FOR A SLIDE GATE OPENING 1'-0 WIDE x 2'-0 DEEP. COORDINATE WITH SLIDE GATE SHOP DRAWINGS.

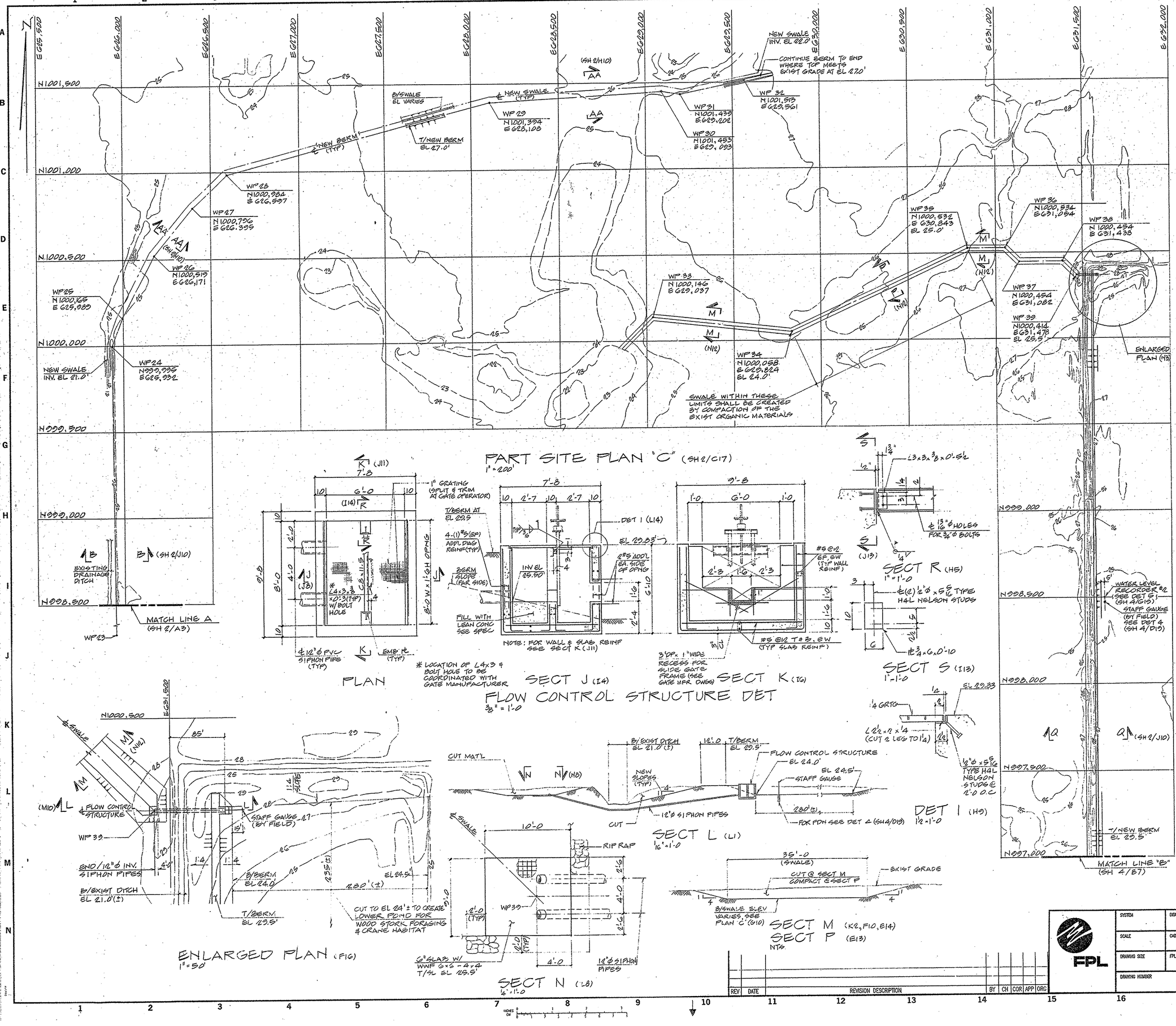
REV	DATE	REVISION DESCRIPTION	BY	CH	COR	APP	ORG

EBASCO SERVICES INCORPORATED

SCALE: AS NOTED	APPROVED	DATE 2-13-92
DIV CIVIL		
DR B BLUM		
CH		

FPL

SYSTEM	DISCIPLINE	PLANT/UNIT: MARTIN PLANT - NORTHWEST PARCEL
SCALE	CAD FILE NAME	TITLE: WETLAND MITIGATION WATER RETENTION & FLOW CONTROL STRUCTURES PLANS, SECTIONS & DETAILS
DRAWING SIZE	FPL ARCHIVE NAME	
DRAWING NUMBER: 7933.625-C-001	SHEET 2 OF 4	REV 0



GENERAL NOTES:

1. ALL WORK IS TO BE DONE IN ACCORDANCE WITH THE CODES AND STANDARDS OF THE DEPARTMENT OF ENVIRONMENTAL REGULATION (DER).

2. EXISTING PLANT ELEVATIONS AND COORDINATES ARE PER MARTIN PLANT SYSTEM AND SHOWN ON TOPOGRAPIC REFERENCE DRAWINGS, TOPO 1, 2 & 3 NORTHWEST PARCEL, PROVIDED BY BECHTEL AND FIELD SURVEY INFORMATION PROVIDED BY RICHARD SHEPPARD SURVEYING CO. ELEVATIONS ARE BASED ON USC & GS ANSL EL 0.00.

3. CONTRACTOR SHALL FIELD VERIFY ALL ELEVATIONS & DIMENSIONS SHOWN ON DRAWINGS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.

4. THE CONTRACTOR SHALL CLEAR, GRUB, EXCAVATE, FILL AND GRADE FOUNDATION SUBGRADES. BACKFILL MATERIAL USED AT ANY LOCATION SHALL BE FROM PLANT AREA EXCAVATION OR DESIGNATED BORROW AREAS. COMPACTION SHALL BE DONE WITH SUITABLE ROLLERS OR OTHER MEANS TO ATTAIN A COMPACTION OF 90% MODIFIED PROCTOR (ASTM D-1557) MAXIMUM DENSITY UNLESS NOTED OTHERWISE. EXTREME CAUTION SHALL BE EXERCISED FOR ALL EXCAVATION TO AVOID DAMAGE TO ANY UNDERGROUND ITEMS. CONTRACTOR SHALL EXCAVATE TO THE REQUIRED DEPTH ONLY. ANY INTERFERENCE WITH SUBSURFACE ITEMS SHALL BE IMMEDIATELY REPORTED TO THE FPL ENGINEER.

5. FILL MATERIAL SHALL BE SITE SAND FREE OF ORGANIC MATTER OR OTHER UNSUITABLE MATERIAL. THE SITE SAND SHALL HAVE NO MORE THAN 40 PERCENT PASSING THE NO 200 SIEVE WITH A MAXIMUM ALLOWABLE SIZE OF 3 INCHES. FILL SHALL BE PLACED IN HORIZONTAL LIFTS WITH A MAXIMUM LIFT THICKNESS OF 8 INCHES. COMPACTION SHALL BE TO 90 PERCENT OF THE ASTM 1557 MAXIMUM DENSITY. MOISTURE CONTENT AT THE TIME OF COMPACTION SHALL BE WITHIN PLUS OR MINUS 4 PERCENT OF OPTIMUM.

6. ROCK RIPRAP SHALL BE WELL GRADED FROM 24 INCHES TO 2 INCHES IN DIAMETER WITH A MINIMUM OF 50 PERCENT BY WEIGHT GREATER THAN 15 INCHES IN DIAMETER, A MINIMUM OF 20 PERCENT BY WEIGHT GREATER THAN 20 INCHES IN DIAMETER AND A MAXIMUM OF 25 PERCENT BY WEIGHT OF WELL GRADED MATERIAL BETWEEN 2 INCHES TO 12 INCHES IN DIAMETER.

7. THE CONTRACTOR SHALL MAINTAIN ALL EXCAVATIONS FREE OF WATER FROM ANY SOURCE AT ALL TIMES. THE INFILTRATION OF GROUNDWATER SHALL BE CONTROLLED WITH WELLPOINTS. SPECIAL ATTENTION SHALL BE GIVEN TO EXCAVATIONS NEAR THE COOLING POND EMBANKMENT. THE FPL COMPANY REPRESENTATIVE SHALL BE IMMEDIATELY NOTIFIED OF ANY SEEPS/BOILS THAT ARE OBSERVED. EXCAVATIONS THAT DEVELOP SEEPS/BOILS SHALL BE IMMEDIATELY BACKFILLED UNTIL WELLPOINTS CAN BE INSTALLED.

8. EXCAVATION WITHIN THESE LIMITS SHALL ONLY BE PERFORMED IN THE PRESENCE OF THE FPL COMPANY REPRESENTATIVE.

9. PUMP DISCHARGE PIPING SHALL BE PVC PIPING CONFORMING TO ASTM D 1784, D 1785 AND D 2466. GRAVITY FLOW PIPING SHALL BE PVC PIPING CONFORMING TO ASTM D 1784 AND D 3034. ALL PIPING SHALL BE FIELD RUN.

10. INSTALLATION OF THE 8" DISCHARGE PIPES UNDER THE RAILROAD TRACK SHALL BE IN ACCORDANCE WITH THE FLORIDA EAST COAST RAILWAY COMPANY "GENERAL SPECIFICATION FOR SUBGRADE AND ABOVE GRADE CROSSINGS OF RAILROAD RIGHT OF WAY."

11. THE CONTRACTOR SHALL PERFORM ALL TRENCH EXCAVATIONS ACCORDING TO OSHA STANDARD 29 CFR 1926.650 SUBPART P. WRITTEN ASSURANCE THAT THE CONTRACTOR UNDERSTANDS AND SHALL COMPLY WITH THE TRENCH SAFETY STANDARD IS REQUIRED. THE PRECAUTIONS IN EFFECT SHALL BE SPECIFIED. THE CONTRACTOR SHALL IDENTIFY THE COSTS OF SUCH COMPLIANCE IN ACCORDANCE WITH THE FLORIDA TRENCH SAFETY ACT (90-96 LAWS OF FLORIDA).

12. STEEL SHEET PILING IN THE "BLACK BOTTOM SLOUGH" SHALL BE Z PILING, SECTION PZ22, BY THE BETHLEHEM STEEL CO., ASTM A 328, OR APPROVED EQUAL.

13. THE WATER LEVEL CONTROL GATE IN THE CONCRETE FLOW CONTROL STRUCTURE SHALL BE A 12" HIGH X 18" WIDE FABRICATED SLIDE GATE, SERIES 763W, AS MANUFACTURED BY THE RODNEY HUNT CO. OR APPROVED EQUAL.

14. THE WATER LEVEL CONTROL GATE INSTALLED IN THE STEEL SHEET PILE WEIR STRUCTURE SHALL BE A 24" HIGH X 12" WIDE FABRICATED SLIDE GATE, SERIES 763W, AS MANUFACTURED BY THE RODNEY HUNT CO., OR APPROVED EQUAL.

15. STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO THE "STANDARD SPECIFICATION FOR STRUCTURAL STEEL," ASTM A36.

16. WELDED CONNECTIONS SHALL USE E-70XX ELECTRODES AND SHALL CONFORM TO THE LATEST AISC SPECIFICATION AND THE AWS D1.1 STRUCTURAL WELDING CODE.

17. BOLTED CONNECTIONS SHALL USE A307 BOLTS.

18. THE FABRICATION OF STRUCTURAL STEEL SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS, AS PUBLISHED BY THE AMERICAN INSTITUTE FOR STEEL CONSTRUCTION, IX EDITION, 1989.

19. GRATING SHALL BE RECTANGULAR WELDED TYPE WITH 1"x 3/16" BEARING BARS SPACED 1-3/16" ON CENTERS AND CROSSBARS SPACED NOT MORE THAN 4" ON CENTERS. GRATING SHALL BE SECURELY FASTENED WITH CLAMPS TO SUPPORTING STEEL. ALL PERMANENT NUTS, BOLTS, WASHERS AND GRATING SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A-123 AND A-153.

20. ALL NEW STRUCTURAL AND MISCELLANEOUS STEEL SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A 123 OR A 153.

21. ALL BREAKS IN THE GALVANIZING SHALL BE THOROUGHLY CLEANED AND TOUCHED-UP WITH A ZINC-RICH PAINT SUCH AS CARBOLINE 858 OR EQUAL MEETING VOC REQUIREMENTS.

22. ALL CONCRETE SHALL BE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI.

23. REINFORCING STEEL SHALL BE DEFORMED BILLET STEEL AS PER ASTM A615, GRADE 60.

24. ALL REINFORCING BAR DETAILING AND PLACEMENT OF CONCRETE SHALL CONFORM TO ACI BUILDING CODE 318-89.

25. ALL REINFORCING BARS SHALL HAVE A 2 INCH (MIN) CONCRETE COVER UNLESS OTHERWISE NOTED.

26. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL PROVIDE TO THE FPL COMPANY REPRESENTATIVE A MARKED UP COPY OF THE DRAWINGS SHOWING THE AS BUILT PIPE ROUTING. THE AS BUILT INFORMATION SHALL INCLUDE THE PIPE CENTERLINE COORDINATES AND TOP OF THE PIPE ELEVATIONS AT ALL DIRECTIONAL CHANGES OF THE PIPING.

27. RAILROAD CROSSING CASING PIPE SHALL BE 20" DIA., 5/16 WALL THICKNESS, ASTM A 139, AND SHALL BE PROTECTED WITH A BLACK BITUMINOUS COATING FOR PROTECTION AGAINST CORROSION.

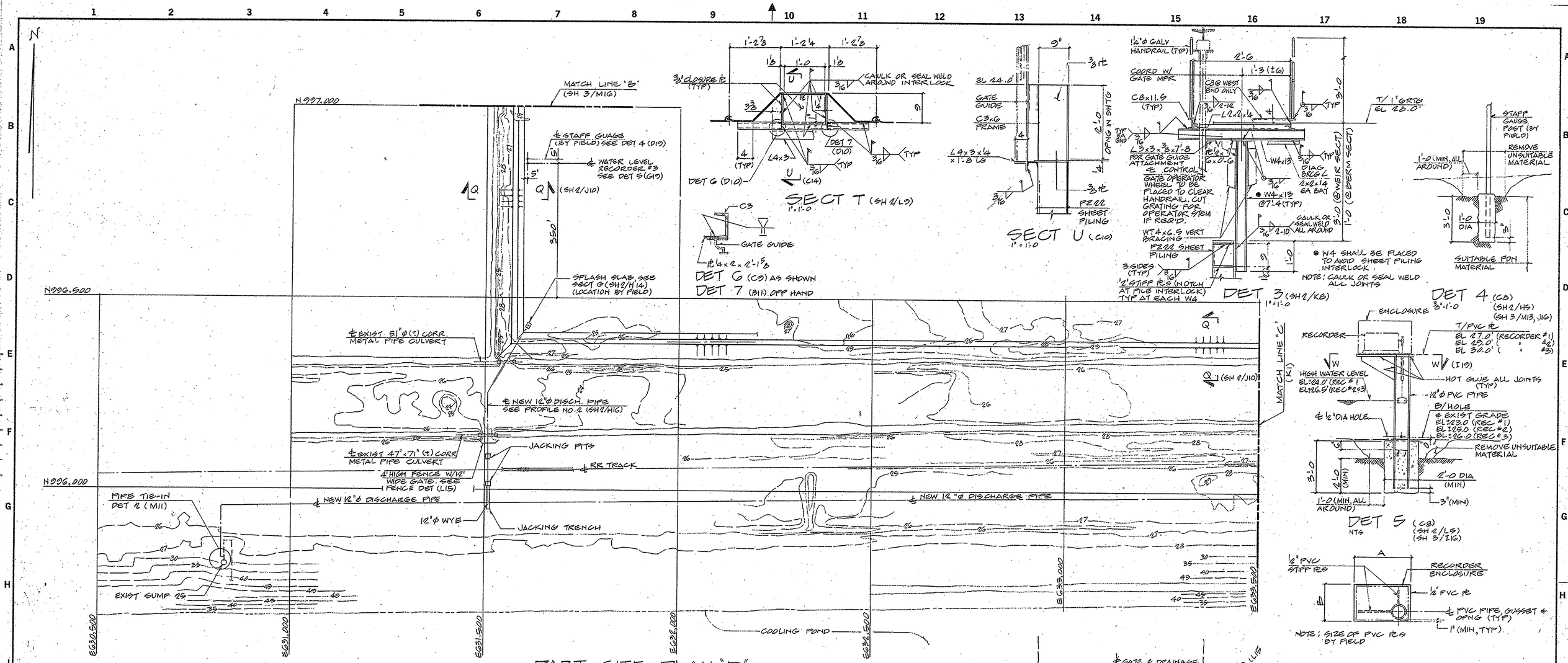
REV	DATE	REVISION DESCRIPTION	BY	CH	COR	APP	ORG

EBASCO SERVICES INCORPORATED

SCALE: AS NOTED	APPROVED	DATE 2-13-92
DIV CIVIL		
DR BELUM		
CH		

FPL

SYSTEM	DISCIPLINE	PLANT/UNIT: MARTIN PLANT - NORTHWEST PARCEL
SCALE	CAD FILE NAME	TITLE: WETLAND MITIGATION WATER RETENTION & FLOW CONTROL STRUCTURES PLANS, SECTIONS & DETAILS
DRAWING SIZE	FPL ARCHIVE NAME	
DRAWING NUMBER: 7933.625-C-001		SHEET 3 OF 4 REV 0



REFERENCE DRAWINGS:
MID-VALLEY INC DRAWINGS - MARTIN PLANT - CIRC WATER RESERVOIR

EMBANKMENT MODS - EMBANKMENT PLAN, NORTHWEST SECT	R-104-3C
EMBANKMENT MODS - TRENCH DRAIN & SUMPS, PLAN & SECT	R-104-12C
EMBANKMENT MODS - TRENCH DRAIN, SUMP & SAND TRAP DET	R-104-13C
RAIL TRACKAGE - LAYOUT & VICINITY MAP	R-106-1B
RAIL TRACKAGE - NORTH RAILROAD LAYOUT	R-106-7C
RR, MAINT. RD & DRAINAGE DITCH - CLEARING & EARTHWORK	R-106-8B

BECHTEL DRAWINGS

TOPO 1 - NORTHWEST PARCEL	DFN=ZF21242,021 TOPO 1
TOPO 2 - NORTHWEST PARCEL	DFN=ZF21242,021 TOPO 2
TOPO 3 - NORTHWEST PARCEL	DFN=ZF21242,021 TOPO 3

RICHARD L. SHEPPARD SURVEYING CO.

SURVEY NOTES	PAGES 23 THRU 28, 34 THRU 39
SURVEY COORDINATES	SH 1 & 2 OF 2

NOTES:
1. VALVES SHALL BE FURNISHED W/ 150# FLANGES.
2. ONLY ONE (1) SUMP SHALL BE OUT-OF-SERVICE AT ANY ONE TIME.
3. INDIVIDUAL SUMP OUTAGE SHALL NOT EXCEED ONE (1) CALENDAR DAY.

REV	DATE	REVISION DESCRIPTION	BY	CH	COR	APP	ORG

EBASCO SERVICES INCORPORATED

SCALE: AS NOTED — APPROVED — DATE 2-13-92
DIV CIVIL
DR BOBLUM
CH

FPL

SYSTEM	DISCIPLINE	PLANT/UNIT	MARTIN PLANT - NORTHWEST PARCEL
SCALE	CAD FILE NAME	TITLE	WETLAND MITIGATION WATER RETENTION & FLOW CONTROL STRUCTURES PLANS, SECTIONS & DETAILS
DRAWING SIZE	FPL ARCHIVE NAME		
DRAWING NUMBER	7933.625-C-001	SHEET 4 OF 4	REV 0

ATTACHMENT 3

TABULATED VEGETATION DATA FOR WET AND DRY SEASONS, 1991 AND 1992

February 1991 Dry Season Baseline Vegetation Monitoring Data

TRANSECT NWP1 – Dry Season

February 1991

PERCENT COVER

STATION (INTERVAL 15 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SHRUB LAYER																
WAX MYRTLE	*Myrica cerifera*		30	10	10		15	35	20							
BRAZILIAN PEPPER	*Schinus terebinthifolius*		20		5	5		5	+							
SAWGRASS	*Cladium jamaicense*		5		+											
CABBAGE PALM	*Sabal palmetto*			5												
PEPPER VINE	*Ampelopsis arborea*							+								
SOFT RUSH	*Juncus effusus*										+					
HERBACEOUS LAYER																
FALSE PIMPERNELS	*Lindernia grandiflora*	+		+	+	+	+	+	+	+	10					
DOG FENNEL	*Eupatorium capillifolium*	+		+	+							+	+	+		+
CARPETWEED	*Lippia nodiflora*	60	10	20	20		80	50	55	35	40	10	30			
COINWORT	*Centella asiatica*	30	10	20			15	20	20	10	15	5	5			
YELLOW WOOD SORREL	*Oxalis florida*	+			+	+				5	+					
RED LUDWIGIA	*Ludwigia repens*	10		+	5					5	10					
BIG CARPETGRASS	*Axonopus furcatus*	5	70	50	60			20	10	+	10	10	50	+	+	
MARSH PENNYWORT	*Hydrocotyle umbellata*	+		+	+		+			5	5	40				
ORCHID	*Zeuxine strateumatica*	+		+												
PIPEWORT	*Lachnocaulon sp.*	+	+				+		+	+	+		+			
HERB	*Richardia sp.*	+	5	+	5	+						5	+			
CABBAGE PALM	*Sabal palmetto*		15		+	5			+							
COAST BACOPA	*Bacopa monnieri*			+				+	15	35		5				
STINKWEED	*Pluchea rosea*			+	+		5									
BEAKRUSH	*Rhynchospora sp.*			5										10		
UNKNOWN GRASS				+	+	5	+	+	+	10		15	5			
CLIMBING HEMPWEED	*Mikania scandens*					+										
FALSE NETTLE	*Boehmeria cylindrica*					+										
BRAZILIAN PEPPER	*Schinus terebinthifolius*					5										
DAYFLOWER	*Commelina diffusa*					+										
PEPPER VINE	*Ampelopsis arborea*					+										
WAX MYRTLE	*Myrica cerifera*					+		+								
MERMAID WEED	*Proserpinaca pectinata*					+						+				
VIRGINIA CREEPER	*Parthenocissus quinquefolia*					+										
GRASS	*Dichanthelium sp.*					5				+						
LEMON BACOPA	*Bacopa caroliniana*						+		+		5					
BUTTONWEED	*Diodia virginiana*						+	+	+	+	+	+	+			
WAX WEED	*Cuphea carthagenenis*							+	+		+	+	+			
UNKNOWN HERB									+			10				
FLAT SEDGE	*Cyperus sp.*										5	+	5			
SUMMER GRAPE	*Vitus aestivalis*										+					
FLAT TOP GOLDENROD	*Euthamia minor*												5	+	+	
INNOCENCE	*Hedyotis sp.*													20	30	20
THALIA LOVEGRASS	*Eragrostis astrovirens*													+	40	25
INDIA CRABGRASS	*Digitaria longiflora*													70	20	50
BLACKROOT	*Pterocaulon virgatum*															+
Bare Ground		5	+	+	5	10	5	5	0	+	+	0	0	10	5	+
Litter		+	+	0	5	70	5	5	0	+	+	5	+	+	5	5
Water Depth		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

TRANSECT NWP2 – Dry Season		February 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		1	2	3	4	5
BALD CYPRESS	*Taxodium distichum*	10		10		5
CABBAGE PALM	*Sabal palmetto*			15	50	40
WAX MYRTLE	*Myrica cerifera*			5		
MULBERRY	*Morus rubra*			+		
HERBACEOUS LAYER						
PELLITORIES	*Parietaria floridana*	30	10	20	5	
CABBAGE PALM	*Sabal palmetto*	10	+	+	10	10
MARSH PENNYWORT	*Hydrocotyle umbellata*	+	5	5	+	5
DOG FENNEL	*Eupatorium capillifolium*	+				
FALSE NETTLE	*Boehmeria cylindrica*	+	+	+		
SUMMER GRAPE	*Vitis aestivalis*		+			
LIZARD TAIL	*Saururus cernuus*		60	25	10	
RED MAPLE	*Acer rubrum*		+	+		+
SWAMP FERN	*Blechnum serrulatum*		+			
CREEPING CUCUMBER	*Melothria pendula*		5	+		
DAYFLOWER	*Commelina diffusa*			+		
BRAZILIAN PEPPER	*Schinus terebinthifolius*			+		
BUTTONWEED	*Dioda virginiana*			+		
WOODSGRASS	*Oplismenus setarius*			+		
MYRSINE	*Rapanea punctata*				15	
FERN	*Thelypteris hispidula*				+	
CYPRESS TRUNK	*Taxodium distichum*				25	
WILD COFFEE	*Psychotria sulzneri*					+
SWORD FERN	*Nephrolepis exaltata*					+
Bare Ground		0	0	5	5	10
Litter		60	70	50	40	70
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

TRANSECT NWP3 – Dry Season		February 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		2	3	4	5	6
CABBAGE PALM	*Sabal palmetto*	5		95		25
WAX MYRTLE	*Myrica cerifera*		5			10
HERBACEOUS LAYER						
CABBAGE PALM	*Sabal palmetto*	70				
BUTTONWEED	*Dioda virginiana*	+	+			+
SOUTHERN FLEABANE	*Erigeron quercifolius*	+				
BREAKRUSH	*Rhynchospora sp.*	5				
SAND VINE	*Cynanchum scoparium*	+				
COINWORT	*Centella asiatica*		+			
THIN PASPALUM	*Paspalum setaceum*		5			
DAYFLOWER	*Commelina diffusa*				5	
FALSE NETTLE	*Boehmeria cylindrica*				+	10
RED MAPLE	*Acer rubrum*				+	
CARPETWEED	*Lippia nodiflora*				15	
MILD WATER PEPPER	*Polygonum hydropiperoides*				+	
PELLITORIES	*Parietaria floridana*				5	5
MARSH PENNYWORT	*Hydrocotyle umbellata*					+
Bare Ground		+	0	0	+	+
Litter		90	100	100	75	85
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

TRANSECT NWP4 – Dry Season		February 1991					
		PERCENT COVER					
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)					
SHRUB LAYER		2	3	4	5	6	7
WAX MYRTLE	Myrica cerifera	20					
SOFT RUSH	Juncus effusus					+	
CORDGRASS	Spartina bakeri						5
HERBACEOUS LAYER							
COAST BACOPA	*Bacopa monnieri*	+		5		5	
CARPETWEED	*Lippia nodiflora*	30	35	10			40
LIVE OAK	*Quercus virginiana*	5					
HERB	*Richardia sp.*	+					+
SOUR PASPALUM	*Paspalum conjugatum*	60					
INDIA CRABGRASS	*Digitaria longiflora*	+					
VETCH	*Vicia acutifolia*	+					
UNKNOWN HERB		+	10	+			+
INNOCENSE	*Hedyotis procumbens*		35	20			30
YELLOW WOOD SORREL	*Oxalis florida*		+	5			15
BUTTONWEED	*Dioda virginiana*		+	+		+	+
DOG FENNELL	*Eupatorium capillifolium*		+	+			
FALSE PIMPERNELS	*Lindernia grandiflora*		+	+			
RED LUDWIGIA	*Ludwigia repens*		+	+			+
BERMUDAGRASS	*Cynodon dactylon*		20	50		25	20
THIN PASPALUM	*Paspalum setaceum*		10				5
BEAKRUSH	*Rhynchospora sp.*		+	10		30	
COINWORT	*Centella asiatica*		+	5			+
MARSH PENNYWORT	*Hydrocotyle umbellata*			10			+
MILD WATER PEPPER	*Polygonum hydropiperoides*				90	40	+
BULRUSH	*Scirpus sp.*						+
Bare Ground		+	15	5	+	+	+
Litter		5	5	5	10	0	0
Water Depth		N/A	N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry	Moist	Moist	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

TRANSECT NWP5 – Dry Season		February 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
		2	3	4	5	6
SHRUB LAYER						
WAX MYRTLE	*Myrica cerifera*	+				5
CABBAGE PALM	*Sabal palmetto*	+				
HERBACEOUS LAYER						
COINWORT	*Centella asiatica*	+	+		5	5
BRAZILIAN PEPPER	*Schinus terebinthifolius*	30				
SOUTHERN FLEABANE	*Erigeron quercifolius*	+				
CABBAGE PALM	*Sabal palmetto*	15				
BEAKRUSH	*Rhynchospora sp.*	+	10			5
MUSKY MINT	*Hyptis alata*	+				
HYSSOP	*Bacopa monnieri*	5	20	5	20	
SLASH PINE	*Pinus elliottii*	+				
BLAZING STAR	*Liatris teneafolia*	+				+
BEAKRUSH	*Rhynchospora sp.*	5				5
STINKWEED	*Pluchea rosea*	+				
MORNING GLORY	*Ipomoea sagittata*	+				
UNKNOWN GRASS		+			30	
CARPETWEED	*Lippia nodiflora*	25	+			+
BEDSTRAW	*Galium tinctorium*	+				
PICKERELWEED	*Pontederia cordata*		+			
RED LUDWIGIA	*Ludwigia repens*		5	20		+
BUTTONWEED	*Dioda virginiana*		+	5		
TORPEDOGRASS	*Panicum repens*		30		10	
FALSE PIMPERNELS	*Lindernia grandiflora*		30	25	25	
MILD WATER PEPPER	*Polygonum hydropiperoides*			15		
BLUE HYSSOP	*Bacopa caroliniana*			20		
SO. JOINTED SPIKERUSH	*Eleocharis interstincta*			10	30	
CORKWOOD	*Stillingia aquatica*				5	
BIG CARPETGRASS	*Axonopus furcatus*				5	5
MARSH PENNYWORT	*Hydrocotyle umbellata*				+	
INNOCENSE	*Hedyosis procumbens*					5
MILKWORT	*Polygala sp.*					+
KNOTROOT FOXTAIL	*Setaria geniculata*					30
Bare Ground		10	5	5	0	50
Litter		20	0	0	0	10
Water Depth		N/A	N/A	1"	N/A	N/A
Soil Moisture		Dry	Wet	Wet	Wet	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

TRANSECT NWP6 – Dry Season		February 1991			
		PERCENT COVER			
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)			
SHRUB LAYER		3	4	5	6
CABBAGE PALM	*Sabal palmetto*	10	10		70
WAX MYRTLE	*Myrica cerifera*		35	+	
SWAMPBAY	*Persea palustris*		5		
RED MAPLE	*Acer rubrum*			10	
HERBACEOUS LAYER					
SWAMP FERN	*Blechnum serrulatum*	5	5	5	
CABBAGE PALM	*Sabal palmetto*	5		+	10
RED MAPLE	*Acer rubrum*	10	5	10	
SWAMP DOGWOOD	*Cornus foemina*	+			
LIZZARD TAIL	*Saururus cernuus*		10	20	
MARSH PENNYWORT	*Hydrocotyle umbellata*			+	
BEAKRUSH	*Rhynchospora sp.*			+	
MUSKY MINT	*Hyptis alata*			+	
SWITCHGRASS	*Panicum virgatum*			10	
MUSCADINE GRAPE	*Vitis munsoniana*			+	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*			+	
Bare Ground		0	0	0	0
Litter		90	90	80	100
Water Depth		N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Moist	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

Remarks: Habenaria sp. orchid in fruit.

TRANSECT NWP7 – Dry Season		February 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		2	3	4	5	6
SAW PALMETTO	*Serenoa repens*	15	+			
PERSIMMON	*Diospyros virginiana*	5				
WAX MYRTLE	*Myrica cerifera*		+			
CABBAGE PALM	*Sabal palmetto*		15	40		65
BALD CYPRESS	*Taxodium distichum*			+		
GOLDEN LEATHER FERN	*Acrostichum aureum*				5	
HERBACEOUS LAYER						
SWAMP FERN	*Blechnum serrulatum*	5	20	20	15	20
LIVE OAK	*Quercus virginiana*	+				
SAW PALMETTO	*Serenoa repens*	+				
GRASS	*Dichanthelium sp.*		+			
WILD COFFEE	*Psychotria sulzneri*		+			
POISON IVY	*Toxicodendron radicans*		+	10		
WAX MYRTLE	*Myrica cerifera*		5			
UNKNOWN GRASS			5			+
CABBAGE PALM	*Sabal palmetto*			+		
DOWNY SHIELD FERN	*Thelypteris dentata*			+	15	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*			+		
GOLDEN POLYPODY	*Phlebodium aureum*			+		
UNKNOWN HERB					+	
MARSH PENNYWORT	*Hydrocotyle umbellata*				+	
LIZARD TAIL	*Saururus cernuus*					10
POPASH	*Fraxinus caroliniana*					+
LAUREL OAK	*Quercus laurifolia*					+
CYPRESS TRUNK	*Taxodium distichum*					5
Bare Ground		0	5	0	20	5
Litter		100	70	75	40	90
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry	Moist	Moist

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

TRANSECT NWP8 – Dry Season		February 1989			
		PERCENT COVER			
STRATUM	SPECIES	STATION (INTERVAL 15 METERS)			
CANOPY		3	4	5	6
CABBAGE PALM	*Sabal palmetto*	15			
BALD CYPRESS	*Taxodium distichum*	10	35	30	15
LAUREL OAK	*Quercus laurifolia*	55			
POISON IVY	*Toxicodendron radicans*	+	5		
WILLOW	*Salix caroliniana*		5	5	
WAX MYRTLE	*Myrica cerifera*		+	5	
RED MAPLE	*Acer rubrum*			5	10
GREENBRIAR	*Smilax sp.*			+	
MIDDLESTORY					
CABBAGE PALM	*Sabal palmetto*	25			
LAUREL OAK	*Quercus laurifolia*		+	+	
WILLOW	*Salix caroliniana*		20	20	20
BALD CYPRESS	*Taxodium distichum*		35		
WAX MYRTLE	*Myrica cerifera*		20	40	45
POISON IVY	*Toxicodendron radicans*			+	
VIRGINIA WILLOW	*Itea virginica*			+	
SWAMPBAY	*Persea palustris*				5
SHRUB LAYER					
CABBAGE PALM	*Sabal palmetto*	20			
MYRSINE	*Rapanea punctata*	10			
VIRGINIA WILLOW	*Itea virginica*		+	10	
WAX MYRTLE	*Myrica cerifera*		20		+
BALD CYPRESS	*Taxodium distichum*		5		
ROYAL FERN	*Osmunda regalis*		+	5	
GOLDEN LEATHER FERN	*Acrostichum aureum*		+		5
FERN	*Thelypteris sp.*		+	10	
POND APPLE	*Annona glabra*			5	
WILLOW	*Salix caroliniana*			+	
FALSE NETTLE	*Boehmeria cylindrica*			5	
EASTERN BACCHARIS	*Baccharis halimifolia*			+	
FERN	*Thelypteris palustris*				+
CLIMBING HEMP–WEED	*Mikania scandans*				+
HERBACEOUS LAYER					
SWAMPBAY	*Persea palustris*	5			
VIRGINIA CREEPER	*Parthenocissus quinquefolia*	+			
LIZARD'S TAIL	*Saururus cernuus*	+		20	+
FERN	*Thelypteris sp.*	15	15		
SWAMP FERN	*Blechnum serrulatum*	+	10		
RED LUDWIGIA	*Ludwigia repens*		+		
WAX MYRTLE	*Myrica cerifera*		+		
SALVINIA	*Salvinia minima*		+	40	25
UNKNOWN GRASS				35	
MOSQUITO FERN	*Azolla caroliniana*			30	30
CLIMBING HEMP–WEED	*Mikania scandans*			+	
COMMON DUCKWEED	*Lemna minor*			+	10
VIRGINIA WILLOW	*Itea virginica*				10
Bare Ground		0	0	0	0
Litter		90	90	0	0
Open Water		0	10	0	30
Soil Moisture		Moist	Wet	Wet	Wet

+ = Less than 5% cover

Remarks: Habenaria sp. orchid present; Encyclia tampensis at stations 4, 5, and 6; fire scarred cypress trees; several dead pond apple trees.

TRANSECT NWP9 – Dry Season		February 1991		
Martin Natural Gas Pipeline Mitigation Area (in part)				
		PERCENT COVER		
STRATUM	SPECIES	STATION (INTERVAL 15 METERS)		
SHRUB LAYER		1	2	3
N/A				
HERBACEOUS LAYER				
DOG FENNEL	*Eupatorium capillifolium*	+		+
BIG CARPETGRASS	*Axonopus furcatus*	+	+	
BEAKRUSH	*Rhynchospora sp.*	10		
FLAT TOP GOLDENROD	*Euthamia minor*	+	+	
INNOCENCE	*Hedyotis sp.*	20	30	20
THALIA LOVEGRASS	*Eragrostis astrovirens*	+	40	25
INDIA CRABGRASS	*Digitaria longiflora*	70	20	50
BLACKROOT	*Pterocaulon virgatum*			+
Bare Ground		10	5	+
Litter		+	5	5
Water Depth		N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey

July 1991 Wet Season Baseline Vegetation Monitoring Data

TRANSECT NWP1 – Wet Season

July 1991

PERCENT COVER

STATION (INTERVAL 15 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CANOPY																
RED MAPLE	*Acer rubrum*		30													
WAX MYRTLE	*Myrica cerifera*			25	10	20		15								
PEPPER VINE	*Ampelopsis arborea*			10	10	5		5								
CAROLINA WILLOW	*Salix caroliniana*								5							
CABBAGE PALM	*Sabal palmetto*															40
MUSCADINE GRAPE	*Vitis munsoniana*															+
MIDDLESTORY																
WAX MYRTLE	*Myrica cerifera*			30	20	20	40	40			10	10				
PEPPER VINE	*Ampelopsis arborea*				+	20	15	25								
BRAZILIAN PEPPER	*Schinus terebinthifolius*					10			15							
VIRGINIA CREEPER	*Parthenocissus quinquefolia*							+								
CAROLINA WILLOW	*Salix caroliniana*								10							
CABBAGE PALM	*Sabal palmetto*															20
SHRUB LAYER																
WAX MYRTLE	*Myrica cerifera*		10	10	+		10	35	15			5				
SAWGRASS	*Cladium jamaicense*		5		+							+				
BRAZILIAN PEPPER	*Schinus terebinthifolius*		10		+	10		10	+							
CABBAGE PALM	*Sabal palmetto*			5								+				
PEPPER VINE	*Ampelopsis arborea*							+								
SOFT RUSH	*Juncus effusus*										+					
HERBACEOUS LAYER																
MITERWORT	*Mitreola petiolata*	+		+												
CARPETWEED	*Lippia nodiflora*	30	20	30	25		40		15	5		10	40	+		
COINWORT	*Centella asiatica*	30	15	25	20		10	15	40		25	25	15	+		
BOG BUTTONS	*Lachnocaulon sp.*	+														
HERB	*Richardia sp.*	+	+		5	5		+				+	+	+		
RED LUDWIGIA	*Ludwigia repens*	20		+			5		+	10	20					
DOG FENNEL	*Eupatorium capillifolium*	+	+	+								10	+		10	+
BUTTONWEED	*Diodia virginiana*	5		10	+		15	35	15	35	10	+	+			
YELLOW WOOD SORREL	*Oxalis florida*	+												+		
BIG CARPETGRASS	*Axonopus furcatus*	20	50	40	50		20	20	5	15	5	50	40		+	
SEDGE	*Fimbristylis sp.*	5	5		5								+	5		
HEDGEHYSSOP	*Gratiola ramosa*															
CABBAGE PALM	*Sabal palmetto*		10			15										
KNOTROOT FOXTAIL	*Setaria genticulata*		+					20	5	+			15			
UNKNOWN GRASS			+	+		10		10					5			
HYSSOP	*Bacopa monnieri*			10				15	5	10						
FALSE PIMPERNELS	*Lindernia grandiflora*			25	20	+	10		+	40						
BEAKRUSH	*Rhyncospora sp.*			+	+		5	10			15	10			+	
FLAT SEDGE	*Cyperus sp.*			+	+		+	+	+	+	5		5	5	+	5
GRASS	*Panicum sp.*				10				+							
WAX WEED	*Cuphea carthagenensis*				+			+				+	+			
FALSE NETTLE	*Boehmeria cylindrica*					15										
GRASS	*Dichanthelium sp.*					5										
DAYFLOWER	*Commelina diffusa*					+										
MERMAID WEED	*Proserpinaca pectinata*					+						+				
PEPPER TREE	*Schinus terebinthifolius*					+						10				
CREEPING CUCUMBER	*Melothria pendula*					+										
WAX MYRTLE	*Myrica cerifera*					+										
VIRGINIA CREEPER	*Parthenocissus quinquefolia*					+										
PEPPER VINE	*Ampelopsis arborea*					+		5								

TRANSECT NWP1 – Wet Season

July 1991

PERCENT COVER

STATION (INTERVAL 15 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HERBACEOUS LAYER CONTINUED																
MARSH PENNYWORT	*Hydrocotyle umbellata*					+	+			5	+	+				
UNKNOWN MINT						15										
UNKNOWN VINE						5										
FLAT SEDGE	*Cyperus sp.*						+		+	+						5
LEMON BACOPA	*Bacopa caroliniana*						20		5		10					
FLAT SEDGE	*Cyperus sp.*						15									
PICKERELWEED	*Pontederia cordata*						+									
PASPALUM	*Paspalum acuminatum*								60	5	+					
BALD RUSH	*Psilocarya nitens*									20	20					
LITTLESEED BEAKRUSH	*Rhynchospora microcarpa*										5					
FLATTOP GOLDENROD	*Euthamia minor*											+	10	25	10	+
UNKNOWN HERB												5			+	5
INDIA CRABGRASS	*Digitaria longiflora*											10		90	60	40
CAMPHORWEED	*Pluchea ordorato*											10				
COW PEA	*Vigna luteola*												+	+		
THALIA LOVEGRASS	*Eragrostris astrovirens*													5	25	50
Bare Ground		+	+	+	+	10	0	0	0	0	0	0	0	5	10	5
Litter		+	10	5	+	70	0	0	0	0	0	+	+	+	10	+
Open water		0	0	0	0	0	+	5	5	20	10	0	0	0	0	0
Water Depth		N/A	N/A	N/A	N/A	N/A	1/2"	1"	2"	2"	2"	N/A	N/A	N/A	N/A	N/A
Soil Moisture		Moist	Moist	Moist	Moist	Moist	Wet	Wet	Wet	Wet	Wet	Wet	Moist	Moist	Moist	Dry

+ = Less than 5% cover

TRANSECT NWP2 – Wet Season		July 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
		1	2	3	4	5
CANOPY						
BALD CYPRESS	*Taxodium distichum*	35	15	100	100	100
CAROLINA WILLOW	*Salix caroliniana*	5				
RED MAPLE	*Acer rubrum*		30	+		10
CABBAGE PALM	*Sabal palmetto*		30	15	20	10
SUMMER GRAPE	*Vitis aestivalis*					10
LAUREL OAK	*Quercus laurifolia*					15
MIDDLESTORY						
BALD CYPRESS	*Taxodium distichum*	15	5	5	25	60
RED MAPLE	*Acer rubrum*	45				+
SWAMP BAY	*Persea palustris*			15		
MULBERRY	*Morus rubra*			5		
WAX MYRTLE	*Myrica cerifera*			+		
CABBAGE PALM	*Sabal palmetto*				15	10
SHRUB LAYER						
BALD CYPRESS	*Taxodium distichum*	15		20		
CABBAGE PALM	*Sabal palmetto*			20	30	40
WAX MYRTLE	*Myrica cerifera*			5		+
MULBERRY	*Morus rubra*			+		
HERBACEOUS LAYER						
CABBAGE PALM	*Sabal palmetto*	10	15	+	20	10
MARSH PENNYWORT	*Hydrocotyle umbellata*	5	+	10		10
LIZARD TAIL	*Saururus cernuus*		35	20	+	
RED MAPLE	*Acer rubrum*		+			+
CREEPING CUCUMBER	*Melothria pendula*		+	+		
FALSE NETTLE	*Boehmeria cylindrica*		+	+		
SWAMP FERN	*Blechnum serrulatum*		5			
DAYFLOWER	*Commelina diffusa*		+			
WOODSGRASS	*Oplismenus setarius*			20		15
VIRGINIA CREEPER	*Parthenocissus quinquefolia*			+		
BRAZILIAN PEPPER	*Schinus terebinthifolius*			+		+
BUTTONWEED	*Dioda virginiana*			+		
FERN	*Thelypteris kunthii*			20		
MYRSINE	*Rapanea punctata*				15	
CYPRESS TRUNK	*Taxodium distichum*				20	15
WILD COFFEE	*Psychotria sulzneri*					10
SWORD FERN	*Nephrolepis sp.*					5
FERN	*Thelypteris hispidula*					5
GRASS	*Dichanthelium sp.*					+
Bare Ground		0	0	40	60	40
Litter		75	70	40	20	20
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Moist	Moist	Moist	Moist	Moist

+ = Less than 5% cover

Wildlife observations: Pileated woodpecker; Barred owl

TRANSECT NWP3 – Wet Season		July 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
CANOPY		2	3	4	5	6
RED MAPLE	*Acer rubrum*		70	50	80	50
PEPPER VINE	*Ampelopsis arborea*		5			
DAHOON HOLLY	*Ilex cassine*				10	
MIDDLESTORY						
WAX MYRTLE	*Myrica cerifera*		30		5	5
PEPPER VINE	*Ampelopsis arborea*		5			
DAHOON HOLLY	*Ilex cassine*				+	
RED MAPLE	*Acer rubrum*				20	
CABBAGE PALM	*Sabal palmetto*				35	
SHRUB LAYER						
CABBAGE PALM	*Sabal palmetto*	5		100		25
WAX MYRTLE	*Myrica cerifera*					5
HERBACEOUS LAYER						
CABBAGE PALM	*Sabal palmetto*	70	+			
BUTTONWEED	*Diodia virginiana*	5	+		10	
GRASS	*Dichanthelium sp.*	+				
PERSIMMON	*Diospyros virginiana*	5				
UNKNOWN GRASS		5	5			
SWITCHGRASS	*Panicum virgatum*		15			5
COINWORT	*Centella asiatica*		10			
PEPPER VINE	*Ampelopsis arborea*		10			
FALSE NETTLE	*Boehmeria cylindrica*				25	20
LIZARD TAIL	*Saururus cernuus*				15	
DAYFLOWER	*Commelina diffusa*				5	
CREEPING CUCUMBER	*Melothria pendula*				10	
CARPETWEED	*Lippia nodiflora*				15	
RED MAPLE	*Acer rebrum*				+	
MARSH PENNYWORT	*Hydrocotyle umbellata*				15	
BLUEHEART	*Buchneria americana*				15	
MILD WATER PEPPER	*Polygonum hydropiperoides*				10	
PICKERELWEED	*Pontederia cordata*				+	
Bare Ground		5	10	0	10	20
Litter		90	90	100	70	80
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Moist	Moist	Moist

+ = Less than 5% cover

Remarks: Harrisella filiformis orchid on red maple at station 6.

TRANSECT NWP4 – Wet Season		July 1991					
		PERCENT COVER					
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)					
		2	3	4	5	6	7
CANOPY							
LAUREL OAK	*Quercus laurifolia*	30					
MIDDLESTORY							
LIVE OAK	*Quercus virginiana*	25					
SHRUB LAYER							
WAX MYRTLE	*Myrica cerifera*	20					
MILD WATERPEPPER	*Polygonum hydropiperoides*				20	10	
SAND CORDGRASS	*Spartina bakeri*						5
HERBACEOUS LAYER							
CARPETWEED	*Lippia nodiflora*	10		10			50
LIVE OAK	*Quercus virginiana*	+					
FROSTWEED	*Verbesina virginica*	5					
SOUR PASPALUM	*Paspalum conjugatum*	60	20	10			10
BIG CARPET GRASS	*Axonopus furcatus*	30					
HYSSOP	*Bacopa monnieri*	5	+	+			
CATBRIER	*Smilax bona–nox*	+					
COINWORT	*Centella asiatica*	+		50			
VETCH	*Vicia acutifolia*	+					
BUTTONWEED	*Diodia virginiana*	+		15			15
WAX MYRTLE	*Myrica cerifera*	+					
BUSH ASTER	*Aster dumosus*		25				15
DOG FENNELL	*Eupatorium capillifolium*		+	10			
KNOTROOT FOXTAIL	*Setaria genticulata*		+				55
INDIA CRABGRASS	*Digitaria longifolia*		75	15			10
FLATSEDGE	*Cyperus sp.*		+	+			
MITERWORT	*Mitreola petiolata*		+	5			10
PICKERELWEED	*Pontederia cordata*		+				
INNOCENSE	*Hedyotis procumbens*		5				
FALSE PIMPERNALS	*Lindernia grandiflora*		10	10			10
RED LUDWIGIA	*Ludwigia repens*		+	+			10
MARSH PENNYWORT	*Hydrocotyle umbellata*		+	15			+
STINKWEED	*Pluchea rosea*			+			
MUSKY MINT	*Hyptis alata*			+			
DWARF ST. JOHN'S WORT	*Hypericum mutilum*			20			
BRASILIAN ELODEA	*Egeria densa*			35			
BEAKRUSH	*Rhynchospora sp.*			10			
MILD WATER PEPPER	*Polygonum hydropiperoides*				100	100	
UNKNOWN GRASS						5	
PASPALUM	*Paspalum sp.*						10
UNKNOWN HERB							5
BAY LOBELIA	*Lobelia feayana*						+
Bare Ground		5	+	0	0	0	0
Litter		25	0	0	0	0	0
Open Water		0	0	5	0	+	0
Water Depth		N/A	N/A	1/2"	2"	1 1/2"	N/A
Soil Moisture		Moist	Moist	Wet	Wet	Wet	Wet

+ = Less than 5% cover

TRANSECT NWP5 – Wet Season		July 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
CANOPY		2	3	4	5	6
N/A						
MIDDLESTORY						
N/A						
SHRUB LAYER						
CABBAGE PALM	*Sabal palmetto*	+				
WAX MYRTLE	*Myrica cerifera*	+				5
BRAZILIAN PEPPER	*Schinus terebinthifolius*	+				
HERBACEOUS LAYER						
UNKNOWN SEDGE		5				30
UNKNOWN GRASS		5				5
KNOTROOT FOXTAIL	*Setaria genticulata*	+				30
UNKNOWN HERB		10				+
CABBAGE PALM	*Sabal palmetto*	25				
SLASH PINE TRUNK	*Pinus elliottii*	10				
BRAZILIAN PEPPER	*Schinus terebinthifolius*	55				
CABBAGE PALM TRUNK	*Sabal palmetto*	15				
CARPETWEED	*Lippia nodiflora*	10				10
MORNING GLORY	*Ipomoea sagittata*	+				
MITERWORT	*Mitreola petiolata*	+				+
STINKWEED	*Pluchea rosea*	+				+
WHITE TOP	*Dichromena colorata*	5				30
COINWORT	*Centella asiatica*	+				+
HYSSOP	*Bacopa monnieri*	10	+	+	+	
RED LUDWIGIA	*Ludwigia repens*	+				+
BEAKRUSH	*Rhynchospora sp.*	+				20
BALDWIN'S ERYNGIUM	*Eryngium baldwinii*	+				
TORPEDOGRASS	*Panicum repens*		85		50	
PICKERELWEED	*Pontederia cordata*		+			
MARSH PENNYWORT	*Hydrocotyle umbellata*		+		+	
BLUE HYSSOP	*Bacopa caroliniana*		+	10		
SO. JOINTED SPIKERUSH	*Eleocharis interstincta*			70	15	
MILD WATER PEPPER	*Polygonum hydropiperoides*			25		
BUTTONWEED	*Diodia virginiana*				+	+
MEADOW BEAUTY	*Rhexia mariana*					+
FALSE PIMPERNALS	*Lindernia grandiflora*					+
CLIMBING HEMPWEED	*Mikania scandens*					+
BAY LOBELIA	*Lobelia feayana*					+
Bare Ground		5	0	0	0	5
Litter		20	0	0	0	5
Open Water		0	10	20	50	0
Water Depth		N/A	8"	10"	6"	N/A
Soil Moisture		Moist	Wet	Wet	Wet	Wet

+ = Less than 5% cover

TRANSECT NWP6 – Wet Season		July 1991			
		PERCENT COVER			
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)			
		3	4	5	6
CANOPY					
CABBAGE PALM	*Sabal palmetto*	20	30		25
RED MAPLE	*Acer rubrum*	80	30	95	
POISON IVY	*Toxicodendron radicans*	5	10	5	
GOLDEN POLYPODY	*Phlebodium aureum*		+		
SHOESTRING FERN	*Vittaria lineata*		+		
LAUREL OAK	*Quercus laurifolia*		10	5	100
MUSCADINE GRAPE	*Vitis munsoniana*			+	
MIDDLESTORY					
RED MAPLE	*Acer rubrum*	30	10	70	
POP ASH	*Fraxinus caroliniana*	10			
CABBAGE PALM	*Sabal palmetto*	15	20	25	10
WAX MYRTLE	*Myrica cerifera*		20	5	
CATBRIER	*Smilax bona–nox*		+		
POISON IVY	*Toxicodendron radicans*		+	5	
SWAMP BAY	*Persea palustris*		+	5	
LAUREL OAK	*Quercus laurifolia*				30
SHRUB LAYER					
CABBAGE PALM	*Sabal palmetto*	+	10		60
WAX MYRTLE	*Myrica cerifera*		10	+	
SWAMP BAY	*Persea palustris*		+		
SUMMER GRAPE	*Vitis aestivalis*		+		
HERBACEOUS LAYER					
CABBAGE PALM	*Sabal palmetto*	10	+	15	20
SWAMP FERN	*Blechnum serrulatum*	5	+	+	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*	+		+	
SWAMP DOGWOOD	*Cornus foemina*	+		5	
LIZZARD TAIL	*Saururus cernuus*		10	+	
RED MAPLE	*Acer rubrum*		+	10	
MARSH PENNYWORT	*Hydrocotyle umbellata*		+		
CATBRIER	*Smilax bona–nox*			+	
FALSE NETTLE	*Boehmeria cylindrica*			+	
MUSCADINE GRAPE	*Vitis munsoniana*			5	
BEAKRUSH	*Rhynchospora sp.*			15	
SUMMER GRAPE	*Vitis aestivalis*			+	
POISON IVY	*Toxicodendron radicans*				+
LAUREL OAK	*Quercus laurifolia*				+
Bare Ground		20	5	15	0
Litter		70	50	60	100
Open Water		+	50	5	0
Water Depth		1"	3"	1"	N/A
Soil Moisture		Wet	Wet	Wet	Moist

+ = Less than 5% cover

Remarks: Numerous Habenaria odontopetala orchids near flowering. Growing on mounds in maple swamp and in surrounding oak hammock. Encyclia tampensis orchid on live oak at station 6.

TRANSECT NWP7 – Wet Season		July 1991				
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
		2	3	4	5	6
CANOPY						
CABBAGE PALM	*Sabal palmetto*	5	60	15	10	
GOLDEN POLYPODY	*Phlebodium aureum*	+	5			
SHOESTRING FERN	*Vittaria lineata*	+		+		
CATBRIER	*Smilax bona–nox*	+				
LIVE OAK	*Quercus virginiana*	50				
MUSCADINE GRAPE	*Vitis munsoniana*	5				
LAUREL OAK	*Quercus laurifolia*		40			50
POISON IVY	*Toxicodendron radicans*		+			+
BALDCYPRESS	*Taxodium distichum*			55	90	50
RED MAPLE	*Acer rubrum*			5		60
POP ASH	*Fraxinus caroliniana*				20	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*				5	
MIDDLESTORY						
PERSIMMON	*Diospyros virginiana*	10	5			
CATBRIER	*Smilax bona–nox*	5				
DAHOON HOLLY	*Ilex cassine*	5				
LIVE OAK	*Quercus virginiana*	+	5			
BALDCYPRESS	*Taxodium distichum*		10	50	25	10
LAUREL OAK	*Quercus laurifolia*		15	5	5	
POP ASH	*Fraxinus caroliniana*		+	25	35	
SWAMP BAY	*Persea palustris*		5			
POISON IVY	*Toxicodendron radicans*		5			
CABBAGE PALM	*Sabal palmetto*				35	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*				+	
SHRUB LAYER						
SAW PALMETTO	*Serenoa repens*	10				
PERSIMMON	*Diospyros virginiana*	5				
CABBAGE PALM	*Sabal palmetto*		10	50		70
WAX MYRTLE	*Myrica cerifera*		+			
BALDCYPRESS	*Taxodium distichum*			+		
GIANT LEATHER FERN	*Acrostichum danaeifolium*				5	
HERBACEOUS LAYER						
LIVE OAK	*Quercus virginiana*	+	10			
SWAMP FERN	*Blechnum serrulatum*	20	45	25	15	40
SAW PALMETTO	*Serenoa repens*	25				
MUSCADINE GRAPE	*Vitis munsoniana*	+				
POISON IVY	*Toxicodendron radicans*		+	5		
GRASS	*Dichanthelium sp.*		+			
WAX MYRTLE	*Myrica cerifera*		+			
WILD COFFEE	*Psychotria sulzneri*		+			
VIRGINIA CREEPER	*Parthenocissus quinquefolia*		+			
CABBAGE PALM	*Sabal palmetto*		+			
BEAKRUSH	*Rhynchospora sp.*		5			
DOWNY SHIELD FERN	*Thelypteris dentata*				20	+
MARSH PENNYWORT	*Hydrocotyle umbellata*				+	
RED LUDWIGIA	*Ludwigia repens*				+	+
WHISK FERN	*Psilotum nudum*				+	
POP ASH	*Fraxinus carolinana*					+
LAUREL OAK	*Quercus laurifolia*					+
LIZARD TAIL	*Saururus cernuus*					+
UNKNOWN GRASS						+
Bare Ground		+	5	0	0	0
Litter		100	80	50	20	30
Open Water		0	0	50	75	75
Water Depth		N/A	N/A	1"	6"	3"
Soil Moisture		Dry	Moist	Wet	Wet	Wet

+ = Less than 5% cover

Remarks: Encyclia tampensis orchid on pop ash at station 4.

TRANSECT NWP9 – Wet Season			July 1991	
Martin Natural Gas Pipeline Mitigation Area (in part)				
		PERCENT COVER		
STRATUM	SPECIES	STATION (INTERVAL 15 METERS)		
		1	2	3
CANOPY				
CABBAGE PALM	*Sabal palmetto*			40
MUSCADINE GRAPE	*Vitis munsoniana*			+
MIDDLESTORY				
CABBAGE PALM	*Sabal palmetto*			20
SHRUB LAYER				
N/A				
HERBACEOUS LAYER				
INDIA CRABGRASS	*Digitaria longiflora*	90	60	40
THALIA LOVEGRASS	*Eragrostris astrovirens*	5	25	50
FLATTOP GOLDENROD	*Euthamia minor*	25	10	+
CARPETWEED	*Lippia nodiflora*	+		
COINWORT	*Centella asiatica*	+		
HERB	*Richardia sp.*	+		
YELLOW WOOD SORREL	*Oxalis florida*	+		
SEDGE	*Fimbristylis sp.*	5		
FLAT SEDGE	*Cyperus sp.*	5	+	5
COW PEA	*Vigna luteola*	+		
DOG FENNEL	*Eupatorium capillifolium*		10	+
BIG CARPETGRASS	*Axonopus furcatus*		+	
BEAKRUSH	*Rhyncospora sp.*		+	
UNKNOWN HERB			+	5
FLAT SEDGE	*Cyperus sp.*			5
Bare Ground		5	10	5
Litter		+	10	+
Open water		0	0	0
Water Depth		N/A	N/A	N/A
Soil Type		Sand	Sand	Sand
Soil Moisture		Moist	Moist	Dry

+ = Less than 5% cover

March 1992 Dry Season Vegetation Monitoring Data

March 1992

TRANSECT NWP1 – Dry Season

PERCENT COVER

STATION (INTERVAL 15 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SHRUB LAYER																
WAX MYRTLE	*Myrica cerifera*		5	10	+		10	20	10			5				
BRAZILIAN PEPPER	*Schinus terebinthifolius*		+	+	10	25		20				+				
SAWGRASS	*Cladium jamaicense*		+			+						+				
CABBAGE PALM	*Sabal palmetto*		+	15								+	5			
PEPPER VINE	*Ampelopsis arborea*							+								
HERBACEOUS LAYER																
DOG FENNEL	*Eupatorium capillifolium*	5										10	+	15	15	
CARPETWEED	*Lippia nodiflora*	20	5	15	5		30	+		5	+		40	+		
YELLOW WOOD SORREL	*Oxalis florida*	+												+		
RED LUDWIGIA	*Ludwigia repens*	15		+				+		+			+			
BIG CARPETGRASS	*Axonopus furcatus*	5	40	55	40		+	+		+		80	10			
HERB	*Richardia sp.*	+	5		5			+	+			+	+	+		
STINKWEED	*Pluchea rosea*	+		+			+									
RED MAPLE	*Acer rubrum*	10	5	+												
FALSE PIMPERNEL	*Lindernia grandiflora*	+		+			+			5			+			
BUTTONWEED	*Diodia virginiana*	5		+			+	+	5		+	+				
UNKNOWN HERB		10		5		5	+			+					5	
THALIA LOVEGRASS	*Eragrostis astrovirens*	5												60	95	40
GRASS	*Eragrostis sp.*	15											+			
COINWORT	*Centella asiatica*	75	35	40	50	10	60	50	90	70	95	10	50			
UNKNOWN GRASS		+	+		+	25	+	10	15	10		+	15	5		10
BAY LOBELIA	*Lobelia feayana*	+											5			
HEDGEHYSSOP	*Gratiola ramosa*	+														
LOVEGRASS	*Eragrostis gangetica*	5														
PIPEWORT	*Lachnocaulon sp.*	+														
SWAMP BAY	*Persea palustris*		+													
LAUREL OAK	*Quercus laurifolia*		+			+										
CABBAGE PALM	*Sabal palmetto*		20			10			5	+			+			
HYSSOP	*Bacopa monnieri*		5	+				25	20	25	10					
BEAKRUSH	*Rhynchospora sp.*		5	10	+						5		10			
WAX WEED	*Cuphea carthagenenis*		+		+											
SEDGE	*Bulbostylis sp.*		10		+											
LEMON BACOPA	*Bacopa caroliniana*			+			20				5					
LANCE–LEAVED VIOLET	*Viola lanceolata*			+												
FLAT SEDGE	*Cyperus sp.*				+		+	5					+	+		+
PANICUM	*Panicum sp.*				5											
MELOTHRIA	*Melothria pendula*				+	+										
MARSH PENNYWORT	*Hydrocotyle umbellata*					10	20	20	5	20	+	10				
VIRGINIA CREEPER	*Parthenocissus quinquefolia*					+										
FALSE NETTLE	*Boehmeria cylindrica*					5										
CLIMBING HEMPWEED	*Mikania scandens*					10	+									
GRASS	*Dichanthelium sp.*					30										
MERMAID WEED	*Proserpinaca pectinata*					5										
PEPPER VINE	*Ampelopsis arborea*					+		5								
BRAZILIAN PEPPER	*Schinus terebinthifolius*					+						+				
DAYFLOWER	*Commelina diffusa*					+										
UNKNOWN LEGUME						5										
SIDA	*Sida cordifolia*					15										
BUSH ASTER	*Aster dumosus*						5		10	+	+	+				
KNOTROOT	*Setaria geniculata*							10								
ALLIGATORWEED	*Alternanthera sp.*								+							
WAX MYRTLE	*Myrica cerifera*											5				
BEGGARWEED	*Desmodium sp.*													+	5	
INDIA CRABGRASS	*Digitaria longiflora*														30	20	60

March 1992

TRANSECT NWP1 – Dry Season

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 15 METERS) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HERBACEOUS LAYER CONTINUED																
FLAT TOP GOLDENROD	*Euthamia minor*													10	+	
PASPALUM	*Paspalum sp.*													5	+	
Bare Ground		0	0	0	0	5	0	0	0	0	0	0	0	5	5	0
Litter		5	55	35	50	50	10	10	5	10	10	35	10	60	70	50
Water Depth		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Moist	Dry	Dry	Moist	Moist	Moist	Moist	Moist	Moist	Dry	Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey.

TRANSECT NWP2 – Dry Season					March 1992	
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		1	2	3	4	5
BALD CYPRESS	*Taxodium distichum*	20		30		
CABBAGE PALM	*Sabal palmetto*			25	25	40
WAX MYRTLE	*Myrica cerifera*			5		+
HERBACEOUS LAYER						
PELLITORIES	*Parietaria floridana*	80		25	5	+
CABBAGE PALM	*Sabal palmetto*	15	10		+	20
MARSH PENNYWORT	*Hydrocotyle umbellata*	45	15	5	+	20
VIRGINIA CREEPER	*Parthenocissus quinquefolia*	+	+		+	
FALSE NETTLE	*Boehmeria cylindrica*		5	5		
SUMMER GRAPE	*Vitis aestivalis*		+			
LIZARD TAIL	*Saururus cernuus*		60	20	+	
RED MAPLE	*Acer rubrum*		+			
SWAMP FERN	*Blechnum serrulatum*		5			
DAYFLOWER	*Commelina diffusa*		+	+		
BRAZILIAN PEPPER	*Schinus terebinthifolius*			+		
CYPRESS TRUNK	*Taxodium distichum*				25	
MYRSINE	*Rapanea punctata*				15	
FERN	*Thelypteris hispidula*					20
SWORD FERN	*Nephrolepis exaltata*					40
WAX MYRTLE	*Myrica cerifera*					15
WILD COFFEE	*Psychotria sulzneri*					+
WOODSGRASS	*Oplismenus setarius*					35
Bare Ground		0	0	20	20	10
Litter		10	30	70	75	40
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Moist	Moist	Moist	Moist	Moist

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey.

TRANSECT NWP3 – Dry Season						March 1992
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		2	3	4	5	6
CABBAGE PALM	*Sabal palmetto*	10		100		30
WAX MYRTLE	*Myrica cerifera*					5
HERBACEOUS LAYER						
CABBAGE PALM	*Sabal palmetto*	75				
UNKNOWN GRASS		+				+
GRASS	*Dichanthelium sp.*	+				
HERB	*Richardia sp.*	+				
GOLDENROD	*Solidago sp.*	+				
SOUTHERN FLEABANE	*Erigeron quercifolius*	+				
SAND VINE	*Cynanchum scoparium*	+				
SWITCHGRASS	*Panicum virgatum*		5			
RED MAPLE	*Acer rubrum*		+	+	+	
COINWORT	*Centella asiatica*		5			
PEPPER VINE	*Ampelopsis arborea*		5			
SEDGE	*Carex sp.*		+			
BUTTONWEED	*Dioda virginiana*		+		5	5
LIZARD TAIL	*Saururus cernuus*				10	
DAYFLOWER	*Commelina diffusa*				+	
FALSE NETTLE	*Boehmeria cylindrica*				5	40
CARPETWEED	*Lippia nodiflora*				5	
MARSH PENNYWORT	*Hydrocotyle umbellata*				10	20
BRAZILIAN PEPPER	*Schinus terebinthifolius*				+	
MILD WATER PEPPER	*Polygonum hydropiperoides*				15	
PELLITORIES	*Parietaria floridana*					20
RED LUDWIGIA	*Ludwigia repens*					+
STINKWEED	*Pluchea odorata*					5
Bare Ground		5	0	0	+	5
Litter		90	95	100	70	90
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Dry	Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey.

TRANSECT NWP4 – Dry Season							March 1992
		PERCENT COVER					
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)					
		2	3	4	5	6	7
SHRUB LAYER							
WAX MYRTLE	*Myrica cerifera*	20					
SWAMP HIBISCUS	*Hibiscus grandiflorus*	+					
SOFT RUSH	*Juncus effusus*					5	
SAND CORDGRASS	*Spartina bakeri*						5
HERBACEOUS LAYER							
CARPETWEED	*Lippia nodiflora*	+	50	5			10
LIVE OAK	*Quercus virginiana*	5					
HERB	*Richardia sp.*	+					
SOUR PASPALUM	*Paspalum conjugatum*	80					
COINWORT	*Centella asiatica*	5	10	95			35
VETCH	*Vicia acutifolia*	10					
UNKNOWN HERB		+					
CREEPING CUCUMBER	*Melothria pendula*	+					
WAX MYRTLE	*Myrica cerifera*	+					
FLEABANE	*Erigeron sp.*	+					
LITTLESEED BEAKRUSH	*Rhynchospora microcarpa*		5				
GOLDENROD	*Solidago sp.*		+				
ALLIGATORWEED	*Alternanthera sp.*		5				
SPREADING BEAKRUSH	*Rhynchospora divergens*		5				
FLATSEDGE	*Cyperus sp.*		+	+			
BUSH ASTER	*Aster demosus*		+	+			
KNOTROOT FOXTAIL	*Setaria geniculata*		5				50
LOVEGRASS	*Eragrostis gangetica*		15				5
STINKWEED	*Pluchea rosea*		+				+
HYSSOP	*Bacopa monnieri*		10	+		10	20
YELLOW WOOD SORREL	*Oxalis florida*		+				
FALSE PIMPERNELS	*Lindernia grandiflora*		20				
RED LUDWIGIA	*Ludwigia repens*		5	+			+
BIG CARPETGRASS	*Axonopus furcatus*		5				
MARSH PENNYWORT	*Hydrocotyle umbellata*			+			+
UNKNOWN GRASS				20		+	5
MILD WATER PEPPER	*Polygonum hydropiperoides*				20	55	
BUTTONWEED	*Dioda virginiana*					+	+
BERMUDAGRASS	*Cynodon dactylon*					40	
SHEATHED CYPERUS	*Cyperus haspan*						+
CANADA GERMANDER	*Teucrium canadense*						15
SAND CORDGRASS	*Spartina bakeri*						5
Bare Ground		0	0	0	0	0	0
Litter		30	10	15	90	25	45
Water Depth		N/A	N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Moist	Moist	Moist	Moist	Moist

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey.

TRANSECT NWP5 – Dry Season						March 1992
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		2	3	4	5	6
WAX MYRTLE	*Myrica cerifera*	5				5
BRAZILIAN PEPPER	*Schinus terebinthifolius*	+				
CABBAGE PALM	*Sabal palmetto*	+				
HERBACEOUS LAYER						
COINWORT	*Centella asiatica*	10	+		+	5
BRAZILIAN PEPPER	*Schinus terebinthifolius*	25				
SOUTHERN FLEABANE	*Erigeron quercifolius*	+				10
CABBAGE PALM	*Sabal palmetto*	40				
GOLDENROD	*Solidago sp.*	5				
WAX MYRTLE	*Myrica cerifera*	+				
HEDGEHYSSOP	*Gratiola ramosa*	+				
WHITETOP	*Dichromena colorata*	+				50
BUSH ASTER	*Aster demosus*	+				
BROOMSEDGE	*Andropogon sp.*	5				
COAST BACOPA	*Bacopa monnieri*	+	25	+	20	+
SLASH PINE	*Pinus elliottii*	+				
STINKWEED	*Pluchea rosea*	+				+
UNKNOWN GRASS		+				
CARPETWEED	*Lippia nodiflora*	15				5
KNOTROOT FOXTAIL	*Setaria geniculata*	+				
RED LUDWIGIA	*Ludwigia repens*		+	5		
BUTTONWEED	*Dioda virginiana*		+			
TORPEDOGRASS	*Panicum repens*		90		80	
FALSE PIMPERNELS	*Lindernia grandiflora*		10	5	40	
BLUE HYSSOP	*Bacopa caroliniana*		+	30	+	
SO. JOINTED SPIKERUSH	*Eleocharis interstinct*		5	90	5	
MILD WATER PEPPER	*Polygonum hydropiperoides*			5		
MARSH PENNYWORT	*Hydrocotyle umbellata*				+	
SHEATHED CYPERUS	*Cyperus haspan*				+	
BEAKRUSH	*Rynchospora sp.*					20
GRASS	*Panicum sp.*					5
FLATTOP GOLDENROD	*Euthamia minor*					10
UNKNOWN HERB						+
Bare Ground		5	0	0	0	5
Litter		30	25	30	30	70
Water Depth		N/A	N/A	N/A	N/A	N/A
Soil Moisture		Dry	Moist	Moist	Moist	Moist

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey.

TRANSECT NWP6 – Dry Season		March 1992			
		PERCENT COVER			
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)			
SHRUB LAYER		3	4	5	6
CABBAGE PALM	*Sabal palmetto*	5	20		75
WAX MYRTLE	*Myrica cerifera*		20	10	
SWAMPBAY	*Persea palustris*		5		
SWAMP DOGWOOD	*Cornus foemina*		+		
PERSIMMON	*Diospyros virginiana*			+	
HERBACEOUS LAYER					
BRAZILIAN PEPPER	*Schinus terebinthifolius*	+	+		
GRASS	*Dichanthelium sp.*	+			
SWAMP FERN	*Blechnum serrulatum*	15		5	
CABBAGE PALM	*Sabal palmetto*	5	+	+	10
RED MAPLE	*Acer rubrum*	+	5	5	
SWAMP DOGWOOD	*Cornus foemina*	+		+	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*	5			
LIZARD'S TAIL	*Saururus cernuus*		20	10	
MARSH PENNYWORT	*Hydrocotyle umbellata*			+	
BEAKRUSH	*Rhynchospora sp.*			15	
MUSKY MINT	*Hyptis alata*			+	
LAUREL OAK	*Quercus laurifolia*				+
POISON IVY	*Toxicodendron radicans*				10
Bare Ground		0	0	0	0
Litter		90	90	95	100
Water Depth		N/A	N/A	N/A	N/A
Soil Moisture		Moist	Moist	Moist	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during dry season survey.

TRANSECT NWP7 – Dry Season						March 1992
		PERCENT COVER				
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)				
SHRUB LAYER		2	3	4	5	6
SAW PALMETTO	*Serenoa repens*	20	5			
PERSIMMON	*Diospyros virginiana*	10				
GREENBRIAR	*Smilax bona–nox*	+				
WAX MYRTLE	*Myrica cerifera*		+			
CABBAGE PALM	*Sabal palmetto*		10	35		60
BALD CYPRESS	*Taxodium distichum*			+		
GOLDEN LEATHER FERN	*Acrostichum aureum*				10	
HERBACEOUS LAYER						
SWAMP FERN	*Blechnum serrulatum*	15	30	35	20	50
LIVE OAK	*Quercus virginiana*	5				
SAW PALMETTO	*Serenoa repens*	30				
MUSCADINE	*Vitis munsoniana*	+				
GRASS	*Dichanthelium sp.*		5			+
WILD COFFEE	*Psychotria sulzneri*		5			
POISON IVY	*Toxicodendron radicans*		5	20		
WAX MYRTLE	*Myrica cerifera*		+			
CABBAGE PALM	*Sabal palmetto*		+	+		+
RED LUDWIGIA	*Ludwigia repens*			+		+
UNKNOWN HERB				+		
POPASH	*Fraxinus caroliniana*			+		+
DOWNY SHIELD FERN	*Thelypteris dentata*				30	+
WHISK FERN	*Psilotum nudum*				+	
LIZARD TAIL	*Saururus cernuus*					+
LAUREL OAK	*Quercus laurifolia*					+
Bare Ground		0	+	20	+	0
Litter		100	80	75	80	95
Water Depth		N/A	N/A	1"	1"	1"
Soil Moisture		Dry	Moist	Wet	Wet	Wet

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during the dry season survey.

TRANSECT NWP9 – Dry Season				March 1992
Martin Natural Gas Pipeline Mitigation Area (in part)				
		PERCENT COVER		
STRATUM	SPECIES	STATION (INTERVAL 15 METERS)		
SHRUB LAYER		1	2	3
N/A				
HERBACEOUS LAYER				
INDIA CRABGRASS	*Digitaria longiflora*	30	20	60
THALIA LOVEGRASS	*Eragrostris astrovirens*	60	95	40
DOG FENNEL	*Eupatorium capillifolium*	15	15	
FLATTOP GOLDENROD	*Euthamia minor*	10	+	
UNKNOWN GRASS		5		10
CARPETWEED	*Lippia nodiflora*	+		
HERB	*Richardia sp.*	+		
YELLOW WOOD SORREL	*Oxalis florida*	+		
FLAT SEDGE	*Cyperus sp.*	+		+
GRASS	*Paspalum sp.*	5	+	
BEGGERS TICKS	*Desmodium sp.*	5		
UNKNOWN HERB			5	
Bare Ground		5	5	0
Litter		60	70	50
Open water		0	0	0
Water Depth		N/A	N/A	N/A
Soil Type		Sand	Sand	Sand
Soil Moisture		Dry	Dry	Dry

+ = Less than 5% cover

NOTE: Canopy and middlestory layers not sampled during the dry season survey.

September 1992 Wet Season Vegetation Monitoring Data

TRANSECT NWP1 – Wet Season

September 1992

Community Types: Shrubby wet prairie/marsh; Disturbed upland

PERCENT COVER

STATION (INTERVAL 15 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CANOPY																
RED MAPLE	*Acer rubrum*		30													
VIRGINIA CREEPER	*Parthenocissus quinquefolia*		+													
WAX MYRTLE	*Myrica cerifera*			30		10		5								
PEPPER VINE	*Ampelopsis arborea*			5		5										
CABBAGE PALM	*Sabal palmetto*															40
MUSCADINE GRAPE	*Vitus munsoniana*															15
MIDDLESTORY																
WAX MYRTLE	*Myrica cerifera*			30	15	10	35	25	5		10	10				
PEPPER VINE	*Ampelopsis arborea*				10	5	5	10								
BRAZILIAN PEPPER	*Schinus terebinthifolius*					30			20							
CABBAGE PALM	Sabal palmetto															20
SHRUB LAYER																
DOG FENNEL	*Eupatorium capillifolium*	10	5		10	10		+				5	30	10	40	5
BUSHY BEARD BLUESTEM	*Andropogon glomeratus*	5			+											
WAX MYRTLE	*Myrica cerifera*		10	10	5		20	20	10			5				
SAWGRASS	*Cladium jamaicense*		5			+										
BRAZILIAN PEPPER	*Schinus terebinthifolius*		10	+	10	30		5	10			+				
CABBAGE PALM	*Sabal palmetto*		+	10								+	5			
GOLDENROD	*Solidago sp.*			+												
PEPPER VINE	*Ampelopsis arborea*				5	+										
EASTERN BACCHARIS	*Baccharis halimifolia*				+	+		+	+							
CLIMBING HEMP–WEED	*Mikania scandens*				+											
PICKERELWEED	*Pontederia cordata*							+								
ASTER	*Aster demosus*							+								
THALIA LOVEGRASS	*Eragrostris astrovirens*										+					
HERBACEOUS LAYER																
CARPETWEED	*Lippia nodiflora*	40	+	40	25		60	5		+			20	+		
COINWORT	*Centella asiatica*	30	5	30	40	+	10	5	+		+	25	20			
RED LUDWIGIA	*Ludwigia repens*	20		+	+											
DOG FENNEL	*Eupatorium capillifolium*	10	5	5									+	+	5	
BUTTONWEED	*Diodia virginiana*	10	+	10	+	+	5	+		5	5		5			
WATERWILLOW	*Justicia angusta*	10		+			+									
RED MAPLE	*Acer rubrum*	+	+													
BIG CARPETGRASS	*Axonopus furcatus*	5	20	5	+		5	+		+	+					
HYSSOP	*Bacopa monnieri*	5		+			15	30	+	40	5					
FALSE PIMPERNELS	*Lindernia grandiflora*	5					+									
THALIA LOVEGRASS	*Eragrostris astrovirens*	10														
BAHIA GRASS	*Paspalum notatum*		25										5	5	10	95
CABBAGE PALM	*Sabal palmetto*		20			20										
SEDGE	*Fimbristylis sp.*		5													
KNOTROOT FOXTAIL	*Setaria genticulata*		5				+	10					30	5		
SHEATHED CYPERUS	*Cyperus haspan*		5					+				5				
LITTLESEED BEAKRUSH	*Rhynchospora microcarpa*		5		+						10		10			
SWAMP BAY	*Persea palustris*		+													
UNKNOWN GRASS				30	+							25	10			
SPIKERUSH	*Eleocharis sp.*			20	5			30		5	+					
ASTER	*Aster demosus*			10			+				5	+				
WHITETOP	*Dichromena colorata*			5												
HYDROLEA	*Hydrolea corymbosa*			5					10		5					
GRASS	*Panicum sp.*			+	20		5						+			

TRANSECT NWP1 – Wet Season

September 1992

PERCENT COVER

STATION (INTERVAL 15 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HERBACEOUS LAYER CONTINUED																
CAMPHORWEED	*Pluchea ordorato*			+												
FLAT SEDGE	*Cyperus sp.*				5					+						5
PEPPER VINE	*Ampelopsis arborea*				5	+	+	15								
WAX WEED	*Cuphea carthagenensis*				+								+			
PENNYWORT	*Hydrocotyle umbellata*				+	+	+					+				
MERMAID WEED	*Proserpinaca pectinata*					5						+				
LAUREL OAK	*Quercus laurifolia*					5										
FALSE NETTLE	*Boehmeria cylindrica*					25										
CREEPING CUCUMBER	*Melothria pendula*					+										
PASPALUM	*Paspalum acuminatum*					25	+	+	60	5						
CORDGRASS	*Spartina sp.*					40										
DAYFLOWER	*Commelina diffusa*					+										
SIDA	*Sida cordifolia*					10										
HERB	*Richardia sp.*						+						+	+		
LEMON BACOPA	*Bacopa caroliniana*						+		10	40	40					
PICKERELWEED	*Pontederia cordata*										10					
FLATTOP GOLDENROD	*Euthamia minor*												+	50	25	
HEDGEHYSSOP	*Gratiola ramosa*												5			
BEGGARWEED	*Desmodium sp.*												5			
INDIA CRABGRASS	*Digitaria longiflora*													50	70	
GRASS	*Dichanthelium sp.*														5	
CYLINDER FLATSEDGE	*Cyperus retrorsus*														+	+
INNOCENCE	*Hedyotis procumbens*															5
Bare Ground		0	+	0	0	0	+	0	0	0	0	0	0	5	10	5
Litter		5	20	5	5	50	+	0	0	0	0	75	+	+	10	+
Open water		0	0	0	0	0	5	20	40	20	20	0	0	0	0	0
Water Depth		N/A	N/A	N/A	N/A	N/A	1/2"	3"	4"	6"	3"	N/A	N/A	N/A	N/A	N/A
Soil Type		Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Soil Moisture		Moist	Moist	Moist	Moist	Moist	Wet	Wet	Wet	Wet	Wet	Moist	Moist	Moist	Moist	Dry

+ = Less than 5% cover

TRANSECT NWP2 – Wet Season **September 1992**

Community Types: Cypress swamp; High hammock

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS) 1	2	3	4	5	6	7
CANOPY								
BALD CYPRESS	*Taxodium distichum*	20	15	100	100	95		
RED MAPLE	*Acer rubrum*		40	5		15		
CABBAGE PALM	*Sabal palmetto*		30	20	20	10	80	60
SUMMER GRAPE	*Vitis aestivalis*				10	10		+
LAUREL OAK	*Quercus laurifolia*					20	20	
POISON IVY	*Toxicodendron radicans*						+	+
VIRGINIA CREEPER	*Parthenocissus quinquefolia*						+	+
SWORD FERN	*Nephrolepis sp.*						+	
MULBERRY	*Morus rubra*							10
GUMBO LIMBO	*Bursea simaruba*							40
HACKBERRY	*Celtis laevigata*							10
SHOESTRING FERN	*Vittaria lineata*							+
GOLDEN POLPODY	*Phlebodium aureum*							+
MIDDLESTORY								
BALD CYPRESS	*Taxodium distichum*	30	+	+	20	50		
RED MAPLE	*Acer rubrum*	50				+		
SWAMP BAY	*Persea palustris*			10			15	
CABBAGE PALM	*Sabal palmetto*							15
MULBERRY	*Morus rubra*							15
SHRUB LAYER								
BALD CYPRESS	*Taxodium distichum*	10		15				
THALIA	*Thalia geniculata*		+	5				
CABBAGE PALM	*Sabal palmetto*			25	40	35	40	
WAX MYRTLE	*Myrica cerifera*			5				
MULBERRY	*Morus rubra*			+				
LANCEWOOD	*Ocotea coriacea*						+	10
BEAUTYBERRY	*Callicarpa americana*						10	10
WHITE STOPPER	*Eugenia axillaris*						+	
MARLBERRY	*Ardisia escallonioides*							30
HERBACEOUS LAYER								
CABBAGE PALM	*Sabal palmetto*	15	20			20	15	
MARSH PENNYWORT	*Hydrocotyle umbellata*	+				+		
LIZARD TAIL	*Saururus cernuus*		30	50	+			
RED MAPLE	*Acer rubrum*		+					
SWAMP FERN	*Blechnum serrulatum*		+					
DAYFLOWER	*Commelina diffusa*		+	+				
WHITETOP	*Dichromena colorata*			5				
BUTTONWEED	*Dioda virginiana*			5				
FERN	*Thelypteris kunthii*				+			
MYRSINE	*Rapanea punctata*				5			
CYPRESS TRUNK	*Taxodium distichum*				20	5		
WOODSGRASS	*Oplismenus setarius*					5		
WILD COFFEE	*Psychotria nervosa*					+		
WILD COFFEE	*Psychotria sulzneri*					+		
SWORD FERN	*Nephrolepis sp.*					80		
FERN	*Thelypteris hispidula*					15		
PERSIMMON	*Diospyros virginiana*						+	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*							+
MARLBERRY	*Ardisia escallonioides*							70
SATINLEAF	*Chrysophylum oliviforme*							+
LAUREL OAK	*Quercus laurifolia*							+
LANCEWOOD	*Ocotea coriacea*							10
WHITE STOPPER	*Eugenia axillaris*							+
ROUGE PLANT	*Rivina humilis*							+
UNKNOWN VINE								+

TRANSECT NWP2 – Wet Season								September 1992
		PERCENT COVER						
STRATUM	SPECIES	STATION (INTERVAL 20 METERS)						
HERBACEOUS LAYER CONTINUED		1	2	3	4	5	6	7
POISON IVY	*Toxicodendron radicans*							+
SNOWBERRY	*Chiococca alba*							+
SANDVINE	*Cynanchum scoparium*							5
Bare Ground		0	0	10	30	5	15	0
Litter		95	95	80	50	25	70	20
Open Water		0	20	5	0	0	0	0
Water Depth		N/A	1/2"	N/A	N/A	N/A	N/A	N/A
Soil Type		Muck	Muck	Muck	Sand	Sand	Sand	Sand
Soil Moisture		Wet	Wet	Moist	Moist	Moist	Moist	Moist

+=Less than 5% cover

TRANSECT NWP3 – Wet Season **September 1992**

Community Types: Oak/palm hammock; Wet prairie; Maple swamp

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS)							
		1	2	3	4	5	6	7	8
CANOPY									
LIVE OAK	*Quercus virginiana*	65	15						50
CABBAGE PALM	*Sabal palmetto*	25				5		25	
MULBERRY	*Morus rubra*	5							
MUSCADINE	*Vitis munsoniana*	+							
GOLDEN POLPODY	*Phlebodium aureum*	+						+	
RED MAPLE	*Acer rubrum*			80		80	30	60	20
PEPPER VINE	*Ampelopsis arborea*			5					
MIDDLESTORY									
SWAMP BAY	*Persea palustris*	5							
LAUREL OAK	*Quercus laurifolia*	5							
WAX MYRTLE	*Myrica cerifera*			35			5		
CABBAGE PALM	*Sabal palmetto*				5	25		10	
RED MAPLE	*Acer rubrum*					10			
SHRUB LAYER									
SAW PALMETTO	*Serenoa repens*	50							
CORALBEAN	*Erythrina herbacea*	5							
WAX MYRTLE	*Myrica cerifera*	+					5		
BEAUTYBERRY	*Callicarpa americana*	+							
MYRSINE	*Rapanea punctata*	+							
FROSTWEED	*Verbesina virginica*	+							
CABBAGE PALM	*Sabal palmetto*		5		100		30	30	
DOG FENNEL	*Eupatorium capillifolium*		+	+				+	
PERSIMMON	*Diospyros virginiana*		+						
FALSE NETTLE	*Boehmeria cylindrica*					+			
UNKNOWN GRASS									+
HERBACEOUS LAYER									
SAW PALMETTO	*Serenoa repens*	35							
GRASS	*Dichanthelium sp.*	+	10	+				+	5
MUSCADINE	*Vitis munsoniana*	+		+					
BEAUTYBERRY	*Callicarpa americana*	+							
CABBAGE PALM	*Sabal palmetto*		80	5	25			30	
FLATSEDGE	*Cyperus sp.*		5	+				5	
PRAIRIE IRIS	*Iris hexagona*		5						
BUTTONWEED	*Dioda virginiana*		+	+		5			
UNKNOWN LEGUME			+						
UNKNOWN HERB			+						
COINWORT	*Centella asiatica*			5					
UNKNOWN GRASS				5		+			
SWITCHGRASS	*Panicum virgatum*			30			5		
LIZARD TAIL	*Saururus cernuus*					10			
CARPETWEED	*Lippia nodiflora*					+		-	
MILD WATERPEPPER	*Polygonum hydropiperoides*					10			
DUCKWEED	*Lemna sp.*						20		
FALSE NETTLE	*Boehmeria cylindrica*						5		
RED LUDWIGIA	*Ludwigia repens*						+		
MARSH PENNYWORT	*Hydrocotyle umbellata*							25	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*							10	
BRAZILIAN PEPPER	*Schinus terebinthifolius*							+	
OAK TRUNK	*Quercus virginiana*								75
Bare Ground		40	5	25	0	0	0	5	15
Litter		20	80	25	100	0	25	30	10
Open Water		0	0	0	10	95	60	0	0
Water Depth		N/A	N/A	N/A	1/2"	5"	6"	N/A	N/A
Soil Type		Sand	Sand	Sand	Sand	Muck	Muck	Sand	Sand
Soil Moisture		Moist	Moist	Moist	Wet	Wet	Wet	Moist	Moist

+=Less than 5% cover

TRANSECT NWP4 – Wet Season **September 1992**

Community Types: Oak/palm hammock; Wet prairie/marsh

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS) 1	2	3	4	5	6	7	8
CANOPY									
CABBAGE PALM	*Sabal palmetto*	70							5
LIVE OAK	*Quercus virginiana*	20							80
LAUREL OAK	*Quercus laurifolia*		30						
MUSCADINE	*Vitis munsoniana*		+						20
SLASH PINE	*Pinus elliottii*								20
PERSIMMON	*Diospyros virginiana*								10
MIDDLESTORY									
CABBAGE PALM	*Sabal palmetto*	20							30
WAX MYRTLE	*Myrica cerifera*	15	10						
LIVE OAK	*Quercus virginiana*	10							20
PERSIMMON	*Diospyros virginiana*								40
MUSCADINE	*Vitis munsoniana*								5
GREENBRIAR	*Smilax sp.*								5
SHRUB LAYER									
CABBAGE PALM	*Sabal palmetto*	10							25
BRAZILIAN PEPPER	*Schinus terebinthifolius*	+							
WAX MYRTLE	*Myrica cerifera*		15						
SWAMP HIBISCUS	*Hibiscus grandiflorus*		5						
SLIMFLOWER LOVEGRASS	*Eragrostis gangetica*		+	50				10	
BUSHY BLUESTEM	*Andropogon glomeratus*		+	+					
DOG FENNEL	*Eupatorium capillifolium*			5					
MILD WATERPEPPER	*Polygonum hydropiperoides*					80	20		
THALIA	*Thalia geniculata*					5			
PICKERELWEED	*Pontederia cordata*					+	+		
BULRUSH	*Scirpus sp.*						+	10	
SOFT RUSH	*Juncus effusus*						+		
SAND CORDGRASS	*Spartina bakeri*							5	
LIVE OAK	*Quercus virginiana*								+
PERSIMMON	*Diospyros virginiana*								+
HERBACEOUS LAYER									
ELEPHANT'S FOOT	*Elephantopus carolinianus*	10							
CABBAGE PALM	*Sabal palmetto*	5							20
BEGGARWEED	*Desmodium sp.*	+							
GOLDENROD	*Solidago sp.*	+							
FLATSEDGE	*Cyperus sp.*	+							
GRASS	*Dichanthelium sp.*	+							15
SOUR PASPALUM	*Paspalum conjugatum*	+	60	+					
FROSTWEED	*Verbesina virginica*	+	5						
WAX MYRTLE	*Myrica cerifera*		10						
BIG CARPETGRASS	*Axonopus furcatus*		5						
VIRGINIA LIVE OAK	*Quercus virginiana*		5						
CREEPING CUCUMBER	*Melothria pendula*		5						
COINWORT	*Centella asiatica*		+	25	+			10	
HYSSOP	*Bacopa monnieri*		+	5	+			5	
SWAMP FERN	*Blechnum serrulatum*		+						
CARPETWEED	*Lippia nodiflora*		+	20	+			+	
DOG FENNEL	*Eupatorium capillifolium*			5					
KNOTROOT FOXTAIL	*Setaria geniculata*			30	+			25	
WATER WILLOW	*Justica augusta*			20	10			10	
BEAKRUSH	*Rhynchospora sp.*			10					
BUSH ASTOR	*Aster dumosus*			10	+		+		
RED LUDWIGIA	*Ludwigia repens*			5					
HYDROLEA	*Hydrolea corymbosa*			5					

TRANSECT NWP4 – Wet Season

September 1992

PERCENT COVER

STATION (INTERVAL 20 METERS)

STRATUM	SPECIES	1	2	3	4	5	6	7	8
HERBACEOUS LAYER CONTINUED									
MARSH PENNYWORT	*Hydrocotyle umbellata*			+					5
SHEATHED CYPERUS	*Cyperus haspan*			+					
SEDGE	*Carex sp.*			+					
FALSE PIMPERNEL	*Lindernia grandiflora*			+					
REDTOP PANICUM	*Panicum repens*				15				
BUTTONWEED	*Dioda virginiana*				5			+	
BROOK PASPALUM	*Paspalum acuminatum*				+		40		
MILD WATERPEPPER	*Polygonum hydropiperoides*					95	40		
SAND CORDGRASS	*Spartina bakeri*							20	
CANADA GERMANDER	*Teucrium canadense*							20	
MAIDENCANE	*Panicum hemitomon*							10	
MORNING GLORY	*Ipomoea sagittata*							5	
CLIMBING HEMPWEED	*Mikania scandens*							+	
CABBAGE PALM TRUNK	*Sabal palmetto*								15
POISON IVY	*Toxicodendron radicans*								+
BRAZILIAN PEPPER	*Schinus terebinthifolius*								+
Bare Ground		5	10	0	0	0	0	0	5
Litter		80	40	5	5	0	5	5	50
Open Water		0	0	25	80	5	25	5	0
Water Depth		N/A	N/A	6"	12"	24"	18"	6"	N/A
Soil Type		Sand	Sand	Muck	Muck	Muck	Muck	Muck	Sand
Soil Moisture		Moist	Moist	Wet	Wet	Wet	Wet	Wet	Moist

+=Less than 5% cover

Wildlife observations: Pig frogs and lepard frogs; white ibis; recent feral hog activity along wetland margins.

TRANSECT NWP5 – Wet Season **September 1992**

Community Types: Pine flatwoods; Wet prairie/marsh

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS) 1	2	3	4	5	6	7	8
CANOPY									
CABBAGE PALM	*Sabal palmetto*	50						20	
LIVE OAK	*Quercus virginiana*	+							
SLASH PINE	*Pinus elliottii*	+						30	
GOLDEN POLYPODY	*Phlebodium aureum*	+							
MIDDLESTORY									
CABBAGE PALM	*Sabal palmetto*	15							
GREENBRIAR	*Smilax laurifolia*	+							
SHRUB LAYER									
SAW PALMETTO	*Serenoa repens*	95						45	100
CABBAGE PALM	*Sabal palmetto*	5	+					5	
PERSIMMON	*Diospyros virginiana*	+							
FROSTWEED	*Verbesina virginica*	+							
GREENBRIAR	*Smilax laurifolia*	+							
BUSHY BLUESTEM	*Andropogon glomeratus*		5						
BRAZILIAN PEPPER	*Schinus terebinthifolius*		+						
WAX MYRTLE	*Myrica cerifera*		+				5	+	
SO. JOINTED SPIKERUSH	*Eleocharis interstincta*				70				
MILD WATERPEPPER	*Polygonum hydropiperoides*				20				
PICKERELWEED	*Pontederia cordata*				+				
BROADLEAF ARROWHEAD	*Sagittaria latifolia*				+				
SLASH PINE	*Pinus elliottii*							+	
HERBACEOUS LAYER									
SAW PALMETTO	*Serenoa repens*	60							15
SHINY BLUEBERRY	*Vaccinium myrsinites*	20							
POISON IVY	*Toxicodendron radicans*	10							
GOLDENROD	*Solidago sp.*	10							
ST. ANDREW'S CROSS	*Hypercium hypericoides*	10							
GREENBRIAR	*Smilax laurifolia*	5							
GALACTIA	*Galactia elliottii*	+							
FETTERBUSH	*Lyonia lucida*	+							5
LIVE OAK	*Quercus virginiana*	+							
GRASS	*Dichanthelium sp.*	+						+	+
CLIMBING HEMPWEED	*Mikania cordifolia*	+							
MISTFLOWER	*Conoclinium coelestinum*	+							
BRAZILIAN PEPPER	*Schinus terebinthifolius*		50						
CABBAGE PALM	*Sabal palmetto*		30						
TORPEDOGRASS	*Panicum repens*		10	90		80			
BUSHY BLUESTEM	*Andropogon glomeratus*		5						
EASTERN BACCHARIS	*Baccharis halimifolia*		5						
COINWORT	*Centella asiatica*		5				+		
SLASH PINE	*Pinus elliottii*		+						
STINKWEED	*Pluchea rosea*		+						
PEPPERVINE	*Ampelopsis arborea*		+						
HYSSOP	*Bacopa monnieri*		+	+		5			
CARPETWEED	*Lippia nodifloria*		+				+		
KNOTROOT FOXTAIL	*Setaria geniculata*		+				+		
BUSH ASTOR	*Aster dumosus*		+		+				
BUTTONWEED	*Dioda virginiana*		+	+		+			
MORNING GLORY	*Ipomoea sagittata*		+					+	
WHITETOP	*Dichromena colorata*		+				10		
PICKERELWEED	*Pontederia cordata*			5					
SHEATHED CYPERUS	*Cyperus haspan*			5		10			
LEMON HYSSOP	*Bacopa caroliniana*			+	30	+			
SO. JOINTED SPIKERUSH	*Eleocharis interstincta*				80	20			

TRANSECT NWP5 – Wet Season

September 1992

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS)							
HERBACEOUS LAYER CONTINUED		1	2	3	4	5	6	7	8
MILD WATERPEPPER	*Polygonum hydropiperoides*				15				
HYDROLEA	*Hydrolea corymbosa*					+			
FALSE PIMPERNALS	*Lindernia grandiflora*					+			
MARSH ELDER	*Iva microcephala*						40		
GOOBERGRASS	*Amphicarpum muhlenbergianum*						5	5	
HEDGE HYSSOP	*Gratolia ramosa*						+	+	
WIREGRASS	*Aristida stricta*							80	
Bare Ground		+	5	0	0	0	5	0	+
Litter		10	10	5	+	+	40	25	90
Open Water		0	0	20	5	5	0	0	0
Water Depth		N/A	N/A	10"	12"	8"	N/A	N/A	N/A
Soil Type		Sand	Sand	Muck	Muck	Muck	Sand	Sand	Sand
Soil Moisture		Moist	Moist	Wet	Wet	Wet	Moist	Moist	Moist

+ =Less than 5% cover

Wildlife observations: Pileated woodpecker in adjacent pine flatwoods

TRANSECT NWP6 – Wet Season **September 1992**

Community Types: Oak/palm hammock; Maple swamp

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS)							
		1	2	3	4	5	6	7	8
CANOPY									
LIVE OAK	*Quercus virginiana*	75	25					90	40
CABBAGE PALM	*Sabal palmetto*	20	40	15	40		30	20	40
MUSCADINE	*Vitis munsoniana*	5	5						+
POISON IVY	*Toxicodendron radicans*	5	+	5	10	5		10	
SLASH PINE	*Pinus elliottii*	+					+		
RED MAPLE	*Acer rubrum*		40	90	40	95			
VIRGINIA CREEPER	*Parthenocissus quinquefolia*		+						
LAUREL OAK	*Quercus laurifolia*			5		10	100		25
SUMMER GRAPE	*Vitis aestivalis*				+	+		5	
GOLDEN POLPODY	*Phlebodium aureum*				+		+		
RED MULBERRY	*Morus rubra*							5	
RATTAN VINE	*Berchemia scandens*							10	
MIDDLESTORY									
SWAMP BAY	*Persea palustris*	10			5	5		+	
WAX MYRTLE	*Myrica cerifera*	5			15				
LIVE OAK	*Quercus virginiana*	5						10	5
CABBAGE PALM	*Sabal palmetto*	+	5	10	25	25	10	20	50
GREENBRIAR	*Smilax laurifolia*	+							
DAHOON HOLLY	*Ilex cassine*		5						
RED MAPLE	*Acer rubrum*			20	15	70			
POP ASH	*Fraxinus caroliniana*			15					
POISON IVY	*Toxicodendron radicans*					5		+	
LAUREL OAK	*Quercus laurifolia*						25		
RATTAN VINE	*Berchemia scandens*							+	
SHRUB LAYER									
CABBAGE PALM	*Sabal palmetto*	30		20	10		60	5	60
LIVE OAK	*Quercus virginiana*	5							
BRAZILIAN PEPPER	*Schinus terebinthifolius*	+							
SAW PALMETTO	*Serenoa repens*		50					15	10
MARLBERRY	*Ardisia escallonoides*		+						
RED MAPLE	*Acer rubrum*			+					
WAX MYRTLE	*Myrica cerifera*				10	+		10	
MYRSINE	*Rapanea punctata*				+			10	
SWAMP BAY	*Persea palustris*				+				
HERBACEOUS LAYER									
GRASS	*Dichanthelium sp.*	10							
UNKNOWN GRASS		10		+		25			
UNKNOWN LEGUME		5							
CEASER'S WEED	*Urena lobata*	5							
FROSTWEED	*Verbesina virginica*	+							
CARPETWEED	*Lippia nodifloria*	+							
BUTTONWEED	*Dioda virginiana*	+							
SAW PALMETTO	*Serenoa repens*		70						
POISON IVY	*Toxicodendron radicans*		+					5	
VIRGINIA CREEPER	*Parthenocissus quinquefolia*		+	+		+			
SWAMP FERN	*Blechnum serrulatum*			20	10	10		+	
LIZARD'S–TAIL	*Saururus cernuus*			10	20	20			
CABBAGE PALM	*Sabal palmetto*			5	+	30	50	5	35
HYSSOP	*Bacopa monnieri*			+					
SWAMP DOGWOOD	*Cornus foemina*			+					
BRAZILIAN PEPPER	*Schinus terebinthifolius*			+			+	+	
RED MAPLE	*Acer rubrum*				+	5			

TRANSECT NWP6 – Wet Season

September 1992

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS)							
HERBACEOUS LAYER CONTINUED		1	2	3	4	5	6	7	8
SEDGE	*Carex sp.*					10			
MUSCADINE	*Vitis munsoniana*					5			
ST. ANDREW'S CROSS	*Hypercium hypericiodes*					+			
UNKNOWN GRASS						+			
WOODSGRASS	*Oplismenus setarius*							20	
MYRSINE	*Rapanea punctata*							15	
BEAUTYBERRY	*Callicarpa americana*							+	
Bare Ground		25	+	10	5	5	5	10	0
Litter		70	40	60	70	20	95	50	80
Open Water		0	0	0	20	0	0	0	0
Water Depth		N/A	N/A	N/A	1/2"	N/A	N/A	N/A	N/A
Soil Type		Sand	Muck	Muck	Muck	Muck	Muck	Muck	Sand
Soil Moisture		Moist	Moist	Wet	Wet	Wet	Moist	Moist	Moist

+ =Less than 5% cover

Wildlife observations: Otter in maple swamp; grey squirel; red–shouldered hawk; pileated woodpecker; recent feral hog activity at station 1.

Remarks: Haberaria odontopetala orchid in fruit throughout transect; H. quinqueseta orchid in oak hammock; 2 Encyclia tampensis orchids on muscadine vine at station 2; E. tampensis orchid at station 6.

TRANSECT NWP7 – Wet Season **September 1992**

Community Types: Oak/pine upland; Mixed swamp

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS) 1	2	3	4	5	6	7	8
CANOPY									
LAUREL OAK	*Quercus laurifolia*	75		40			15	60	30
VIRGINIA CREEPER	*Parthenocissus quinquefolia*	+							
GREENBRIAR	*Smilax laurifolia*	+							5
LIVE OAK	*Quercus virginiana*		60						
CABBAGE PALM	*Sabal palmetto*		5	50	20			5	
MUSCADINE	*Vitis munsoniana*		+					5	5
GOLDEN POLPODY	*Phlebodium aureum*		+	+					
POISON IVY	*Toxicodendron radicans*			+	+		+		
BALD CYPRESS	*Taxodium distichum*				60	90	40		
POPASH	*Fraxinus caroliniana*					25			
RED MAPLE	*Acer rubrum*						50		
SLASH PINE	*Pinus elliottii*							25	5
MIDDLESTORY									
PERSIMMON	*Diospyros virginiana*	+	10	5				10	5
MUSCADINE	*Vitis munsoniana*	+							5
WAX MYRTLE	*Myrica cerifera*	+							5
LAUREL OAK	*Quercus laurifolia*	+		5	10	5		25	50
DAHOON HOLLY	*Ilex cassine*		5						5
LIVE OAK	*Quercus virginiana*		+	10					
BALD CYPRESS	*Taxodium distichum*			10	50	30	5		
POISON IVY	*Toxicodendron radicans*			5					
POP ASH	*Fraxinus caroliniana*			+	25	35			
SWAMP BAY	*Persea palustris*			+					
CABBAGE PALM	*Sabal palmetto*				+		15		
VIRGINIA CREEPER	*Parthenocissus quinquefolia*					+			
RUSTY LYONIA	*Lyonia ferruginea*								5
GREENBRIAR	*Smilax laurifolia*								5
SHRUB LAYER									
SAW PALMETTO	*Serenoa repens*	80	15	+				90	40
WAX MYRTLE	*Myrica cerifera*	5	+	+					+
MUSCADINE	*Vitis munsoniana*	+							
PERSIMMON	*Diospyros virginiana*		5						
CEASER'S WEED	*Urena lobata*		+						
BEAUTYBERRY	*Callicarpa americana*		+						
CABBAGE PALM	*Sabal palmetto*			5	30		60	+	
SWAMP FERN	*Blechnum serrulatum*				5	5	50		
BALD CYPRESS	*Taxodium distichum*				+				
GIANT LEATHER FERN	*Acrostichum danaeifolium*				+	10			
DOWNY SHIELD FERN	*Thelypteris dentata*					5			
FERN	*Thelypteris kunthii*						+	-	
POISON IVY	*Toxicodendron radicans*						+		
LAUREL OAK	*Quercus laurifolia*								5
HERBACEOUS LAYER									
SAW PALMETTO	*Serenoa repens*	60	30					25	10
SWAMP FERN	*Blechnum serrulatum*		40	50	50	10	55	20	10
LIVE OAK	*Quercus virginiana*		+						
CEASER'S WEED	*Urena lobata*		+						
GRASS	*Dichanthelium sp.*			+					
WILD COFFEE	*Psychotria sulzneri*			+					
POISON IVY	*Toxicodendron radicans*			+				+	
POPASH	*Fraxinus caroliniana*				+				
RED LUDWIGIA	*Ludwigia repens*				+				
GIANT LEATHER FERN	*Acrostichum danaeifolium*					10			
DOWNY SHIELD FERN	*Thelypteris dentata*					20			
FERN	*Thelypteris kunthii*						5		

TRANSECT NWP7 – Wet Season

September 1992

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 20 METERS)							
HERBACEOUS LAYER CONTINUED		1	2	3	4	5	6	7	8
LAUREL OAK TRUNK	*Quercus laurifolia*							15	
ORCHID	*Habenaria odontopetala*							+	
SAW PALMETTO TRUNKS	*Serenoa repens*								25
Bare Ground		10	+	20	0	0	0	5	10
Litter		30	80	50	25	5	10	30	50
Open Water		0	0	0	60	80	30	0	0
Water Depth		N/A	N/A	N/A	4"	10"	3"	N/A	N/A
Soil Type		Sand	Sand	Muck	Muck	Muck	Muck	Sand	Sand
Soil Moisture		Moist	Moist	Moist	Wet	Wet	Moist	Moist	Moist

+ =Less than 5% cover

Wildlife observations: Recent feral hog activity at station 2; Gambusia in water.

Remarks: Encyclia tampensis orchid on cypress at station 4; freshwater sponges present.

TRANSECT NWP8 – Wet Season **September 1992**

Community Types: Oak/palm hammock; Cypress swamp

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 15 METERS) 1	2	3	4	5	6	7
CANOPY								
CABBAGE PALM	*Sabal palmetto*	60	50	30				
LAUREL OAK	*Quercus laurifolia*	35	10	75				
MUSCADINE	*Vitis munsoniana*	15	+					
GREENBRIAR	*Smilax laurifolia*	5						
GOLDEN POLPODY	*Phlebodium aureum*	+	+					
BALD CYPRESS	*Taxodium distichum*		25	20	95	70	50	100
POISON IVY	*Toxicodendron radicans*		10	+	+	+	+	
SHOESTRING FERN	*Vitteria lineata*		+					
RED MAPLE	*Acer rubrum*					10	10	10
CAROLINA WILLOW	*Salix carolinia*					+		
MIDDLESTORY								
WAX MYRTLE	*Myrica cerifera*	5	+		40	70	70	40
CABBAGE PALM	*Sabal palmetto*		15			5		20
SWAMP BAY	*Persea palustris*		5	+				
BALD CYPRESS	*Taxodium distichum*		5		10			25
LAUREL OAK	*Quercus laurifolia*		+		10			
POISON IVY	*Toxicodendron radicans*				+	+		
POND APPLE	*Annona glabra*					5		
CAROLINA WILLOW	*Salix caroliniana*					+	20	10
CLIMBING ASTER	*Aster carolinianus*					5		
SARCOSTEMMA	*Sarcostemma clausum*					+		
BRAZILIAN PEPPER	*Schinus terebinthifolius*						+	
VIRGINIA WILLOW	*Itea virginica*						+	
POP ASH	*Fraxinus caroliniana*							25
SHRUB LAYER								
SAW PALMETTO	*Serenoa repens*	70						
CABBAGE PALM	*Sabal palmetto*	20	10	30	10			20
SWAMP FERN	*Blechnum serrulatum*	+			25		20	
POISON IVY	*Toxicodendron radicans*	+						
BALD CYPRESS	*Taxodium distichum*			5				5
MYRSINE	*Rapanea punctata*			+				
PERSIMMON	*Diospyros virginiana*			+				
FERN	*Thelypteris kunthii*				10	20	5	10
GIANT LEATHER FERN	*Acrostichum danaeifolium*				+			+
WAX MYRTLE	*Myrica cerifera*					40	5	10
ROYAL FERN	*Osmunda regalis*					5		
THALIA	*Thalia genticulata*					5	+	
EASTERN BACCHARIS	*Baccharis halimifolia*					+		
PRIMROSE WILLOW	*Ludwigia peruviana*					+		
SWAMP FERN	*Blechnum serrulatum*							50
WILD COFFEE	*Psychotria sulzneri*							+
CINNAMON FERN	*Osmunda cinnamonea*							+
FALSE NETTLE	*Boehmeria cylindrica*							+
VIRGINIA WILLOW	*Itea virginica*							+
HERBACEOUS LAYER								
SAW PALMETTO	*Serenoa repens*	75						
SWAMP FERN	*Blechnum serrulatum*	10		+	45			25
GRASS	*Dichanthelium sp.*	5						
ST. ANDREW'S CROSS	*Hypercium hypericoides*	5						
MUSCADINE	*Vitis munsoniana*	+						
BEAUTYBERRY	*Callicarpa americana*	+						
FLATSEDGE	*Cyperus sp.*	+						
HERB	*Richardia sp.*	+						

TRANSECT NWP8 – Wet Season

September 1992

STRATUM	SPECIES	PERCENT COVER STATION (INTERVAL 15 METERS)						
HERBACEOUS LAYER CONTINUED		1	2	3	4	5	6	7
FERN	*Thelypteris kunthii*			10	10	10		5
SWAMP BAY	*Persea palustris*			+				
CABBAGE PALM	*Sabal palmetto*			+				
WATER LETTUCE	*Pistia stratiotes*					+		
WATER SPANGLES	*Salvinia minima*					95	5	30
WATERHORN FERN	*Ceratopteris pteridoides*							5
Bare Ground		5	0	0	0	0	0	0
Litter		20	100	90	0	0	0	0
Open Water		0	0	0	45	+	95	40
Water Depth		N/A	N/A	N/A	6"	24"	18"	12"
Soil Type		Sand	Muck	Muck	Muck	Muck	Muck	Muck
Soil Moisture		Moist	Moist	Wet	Wet	Wet	Wet	Wet

+ =Less than 5% cover

Remarks: Harrisella filiforme orchid on wax myrtle at stations 5 and 6; many dead Encyclia tampensis orchids at station 5.

TRANSECT NWP9 – Wet Season									September 1992
Martin Natural Gas Pipeline Mitigation Area									
Community Type: Disturbed upland									
		PERCENT COVER							
STRATUM	SPECIES	STATION (INTERVAL 15 AND 20 METERS)							
CANOPY		1	2	3	4	5	6	7	8
CABBAGE PALM	*Sabal palmetto*			40	25				20
MUSCADINE GRAPE	*Vitis munsoniana*			15					
GOLDEN POLYPODY	*Phlebodium aureum*				+				+
MIDDLESTORY									
CABBAGE PALM	*Sabal palmetto*			20					
PEPPER TREE	*Schinus terebinthifolius*								+
SHRUB LAYER									
DOG FENNEL	*Eupatorium capillifolium*	10	40	5	+			+	15
FLATTOP GOLDENROD	*Euthamia minor*				+		10		+
PEPPER TREE	*Schinus terebinthifolius*				10				
FROSTWEED	*Verbesina virginica*				+				
HERBACEOUS LAYER									
FLATTOP GOLDENROD	*Euthamia minor*	50	25		20	20	25	10	25
INDIA CRABGRASS	*Digitatria longifolia*	50	70		30		20		+
KNOTROOT FOXTAIL	*Seteria genticulata*	5					+		
DOG FENNEL	*Eupatorium capillifolium*	+	5		20				
HERB	*Richardia sp.*	+			+				
THIN PASPALUM	*Paspalum setaceum*	5						10	10
CARPETWEED	*Lippia nodiflora*	+							
BAHIA GRASS	*Paspalum notatum*	5	10	95	20	80	30	80	60
FLAT SEDGE	*Cyperus retrorsus*		+	+					
GRASS	*Dichanthelium sp.*		5						
FLAT SEDGE	*Cyperus sp.*			5	+	+		+	+
INNOCENSE	*Hedyotis procumbens*			5	+				5
FLAT SEDGE	*Cyperus sp.*			+					
BUTTONWEED	*Diodia virginiana*				+				
HERB	*Aster sp.*				5				
SPURGE	*Chamaesyce sp.*				+				
FROSTWEED	*Verbesina virginica*				10				
UNKNOWN HERB					+				
CABBAGE PALM	*Sabal palmetto*				+				
SABAL PALM TRUNK					10				
UNKNOWN GRASS						+			
BEAKRUSH	*Rhynchospora sp.*								+
Bare Ground		5	10	5	+	0	10	+	5
Litter		+	10	+	20	+	20	5	5
Open Water		0	0	0	0	0	0	0	0
Water Depth		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soil Type		Sand	Sand	Sand	Sand	Sand	Sand	Sand	Sand
Soil Moisture		Moist	Moist	Moist	Moist	Moist	Moist	Moist	Moist

+ = Less than 5% cover.

Wildlife observations: Red–shouldered hawk flying nearby; bob–white quail in adjacent woods; white–tail deer nearby.

Remarks: Stations 4–8 added during September 1992; soil moist because of recent rains.

ATTACHMENT 4

FIXED POINT PANORAMIC PHOTOGRAPHS, MAY 1993

Transect NWP1. Photostation 1. Location: vegetation station #1. View: 295° Date: May 1993

Transect NWP1. Photostation 2. Location: vegetation station #9. View: 295° Date: May 1993

Transect NWP1. Photostation 3. Location: vegetation station #13. View: 295° Date: May 1993

Transect NWP2. Photostation 1. Location: vegetation station #1. View: 0° Date: May 1993

Transect NWP2. Photostation 2. Location: vegetation station #4. View: 0° Date: May 1993

Transect NWP2. Photostation 3. Location: vegetation station #7. View: 0° Date: May 1993

Transect NWP3. Photostation 1. Location: vegetation station #1. View: 290° Date: May 1993

Transect NWP3. Photostation 2. Location: vegetation station #2. View: 290° Date: May 1993

Transect NWP3. Photostation 3. Location: vegetation station #5. View: 290° Date: May 1993

Transect NWP4. Photostation 1. Location: vegetation station #1. View: 160° Date: May 1993

Transect NWP4. Photostation 2. Location: vegetation station #2. View: 160° Date: May 1993

Transect NWP4. Photostation 3. Location: vegetation station #5. View: 160° Date: May 1993

Transect NWP5. Photostation 1. Location: vegetation station #1. View: 220° Date: May 1993

Transect NWP5. Photostation 2. Location: vegetation station #2. View: 220° Date: May 1993

Transect NWP5. Photostation 3. Location: vegetation station #4. View: 220° Date: May 1993

Transect NWP6. Photostation 1. Location: vegetation station #2. View: 270° Date: May 1993

Transect NWP6. Photostation 2. Location: vegetation station #3. View: 270° Date: May 1993

Transect NWP6. Photostation 3. Location: vegetation station #7. View: 270° Date: May 1993

Transect NWP7. Photostation 1. Location: vegetation station #1. View: 330° Date: May 1993

Transect NWP7. Photostation 2. Location: vegetation station #3. View: 330° Date: May 1993

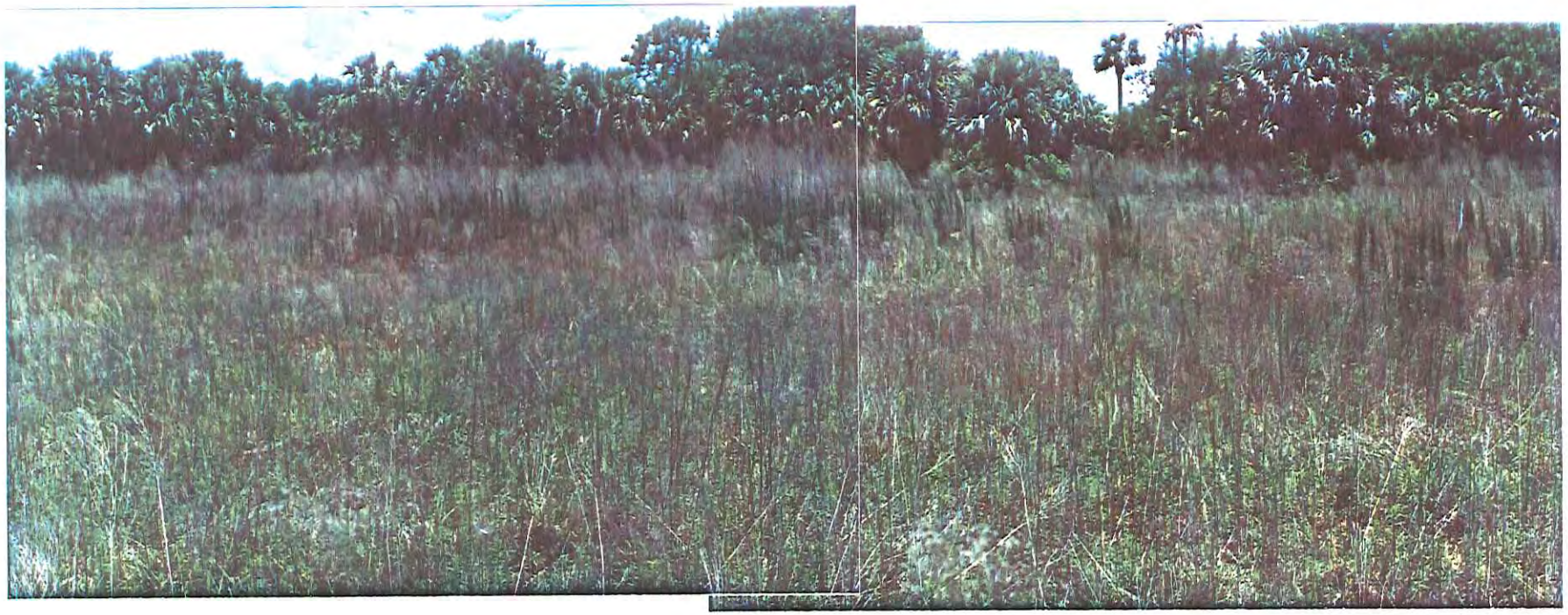
Transect NWP7. Photostation 3. Location: vegetation station #4. View: 330° Date: May 1993

Transect NWP8. Photostation 1. Location: vegetation station #1. View: 310° Date: May 1993

Transect NWP8. Photostation 2. Location: vegetation station #2. View: 310° Date: May 1993

Transect NWP8. Photostation 3. Location: vegetation station #4. View: 310° Date: May 1993

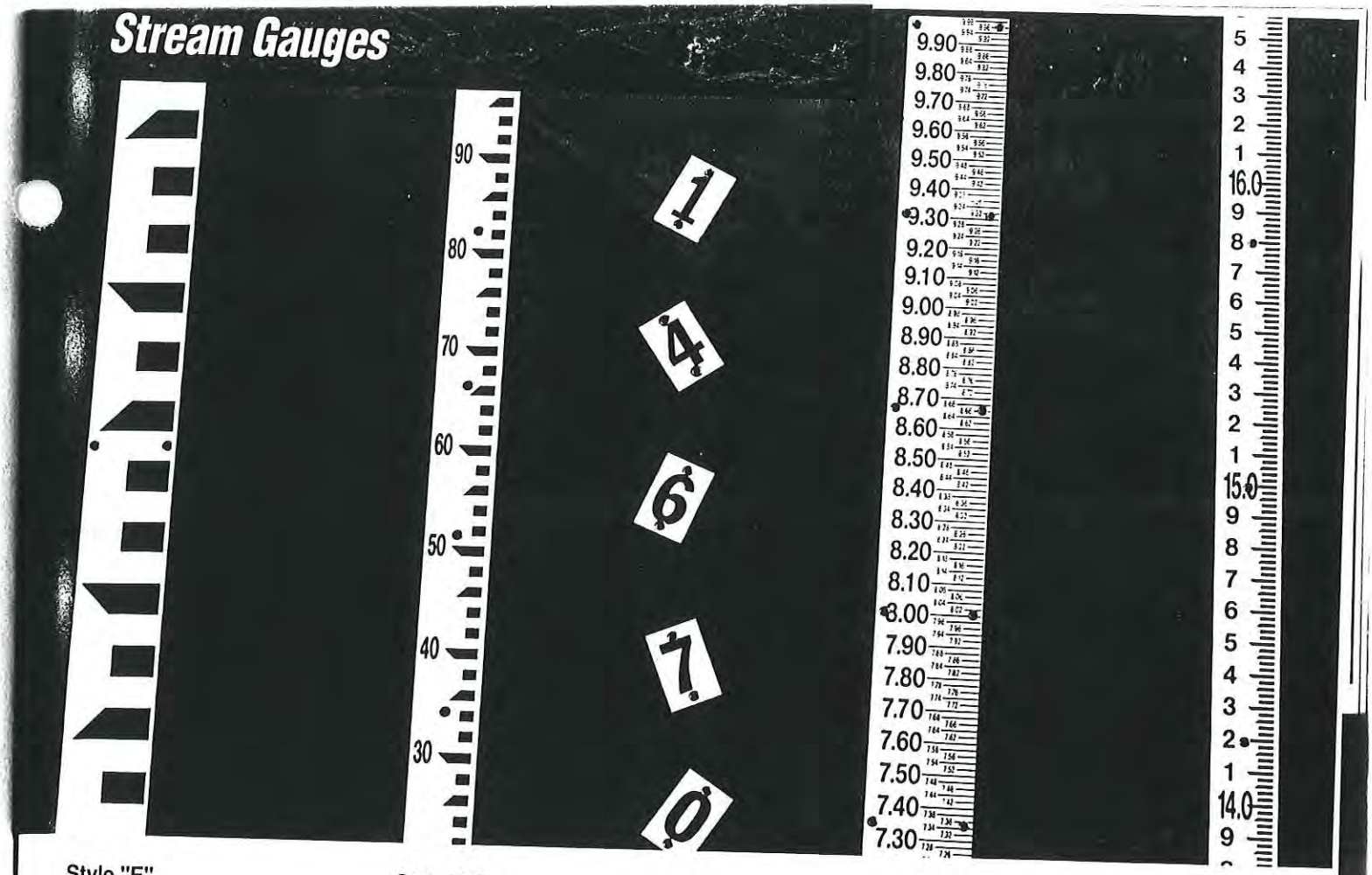
Transect NWP9. Photostation 1. Location: vegetation station #4. View: 0° Date: May 1993
Martin CG/CC Project Linear Facilities Mitigation Area



Transect NWP9. Photostation 2. Location: vegetation station #6. View: 0° Date: May 1993
Martin CG/CC Project Linear Facilities Mitigation Area

ATTACHMENT 5

RAIN GAUGE, STAFF GAUGE, AND WATER LEVEL RECORDER SPECIFICATIONS



Style "E" Style "M" Style "A" Style "C"

WATER•MARK® *Stream Gauges*

WaterMark is our exclusive line of high quality stream gauges! Finished with a special porcelain enamel to ensure easy reading and to resist rust or discoloration. Can even be used in salt water! Each gauge or gauge section is accurately graduated and is provided with grommeted holes for fastening with No. 8 round head screws. Available in four standard styles.

Style "E"

3-1/2" Wide, graduated in feet and tenths, unnumbered. Available in 1', 2' and 5' sections. Separate number plates (optional and extra) are fastened on a plank or pier wall to number any elevations desired.

39739 1' Section (1 lb.) $21.00
39740 2' Section (1-1/4 lbs.) $25.95
39741 5' Section (3 lbs.) $41.50

Style "M"

Metric gauge, 65 mm wide. Divided into centimeters with each decimeter numbered. Gauges for any elevation may be assembled by using separate number plates (optional and extra).

39742 1 Meter section (1-1/2 lbs.) $28.00

Number Plates (For E and M Gauges)

Each Number Plate consists of a black numeral on a 2" x 3" white porcelain enameled iron plate. (2 oz.)

39744	Number 1	39749	Number 6
39745	Number 2	39750	Number 7
39746	Number 3	39751	Number 8
39747	Number 4	39752	Number 9
39748	Number 5	39743	Number 0
39753	Minus figures (-)	$6.00	

Style "A"

4" Wide, marked at every foot, tenth and 0.02 foot with total elevations. Available in 3-1/3' sections for numbering to 13.33'.

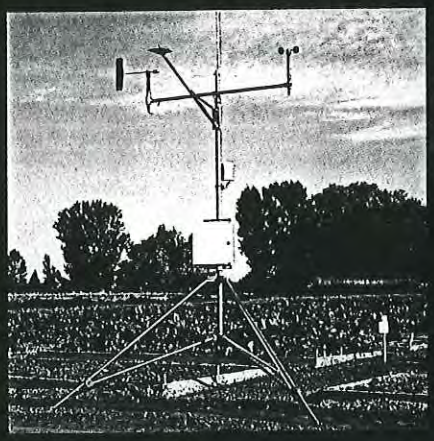
39725 Graduated 0-3.33' (2-1/4 lbs.) $37.50
39726 Graduated 3.33-6.66' (2-1/4 lbs.) $37.50
39727 Graduated 6.66-10.0' (2-1/4 lbs.) $37.50
39728 Graduated 10.0-13.33' (2-1/4 lbs.) $37.50

Style "C"

2-1/2" Wide, graduated to hundredths and marked at every foot and every tenth. Numbered 3-1/3' sections are available to 20'.

39729 Graduated 0-1.06' (8 oz.) $18.00
39730 Graduated 0-1.56' (12 oz.) $21.00
39731 Graduated 0-2.06' (1 lb.) $23.00
39732 Graduated 0-3.33' (1-1/2 lbs.) $27.25
39733 Graduated 3.33-6.66' (1-1/2 lbs.) $27.25
39734 Graduated 6.66-10.0' (1-1/2 lbs.) $27.25
39735 Graduated 10.0-13.33' (1-1/2 lbs.) $27.25
39736 Graduated 13.33-16.66' (1-1/2 lbs.) $27.25
39737 Graduated 16.66-20.0' (1-1/2 lbs.) $27.25
39738 Graduated 0-5.06' - two sections (2-1/2 lbs.) $52.00

CR10 Measurement & Control System

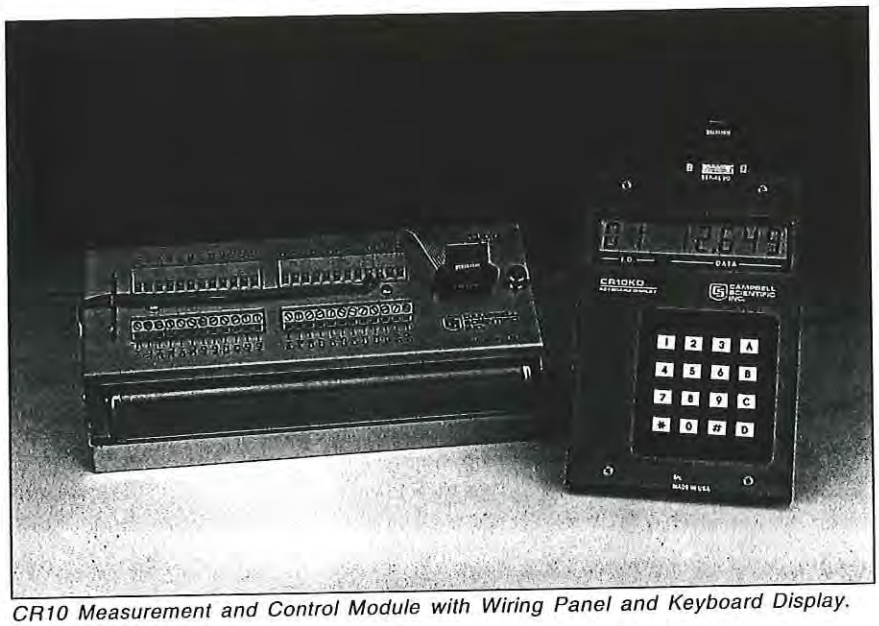


CAMPBELL SCIENTIFIC, INC.

CR10 Measurement and Control System

A Rugged, Operational Instrument with Research Grade Performance

The CR10 combines a micro-computer, clock, multimeter, calibrator, scanner, timer, frequency counter, and controller in a compact, sealed, stainless steel package.



CR10 Measurement and Control Module with Wiring Panel and Keyboard Display.

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Data Storage and Transfer . . 4

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Enclosures, Power Supplies, and Towers 8

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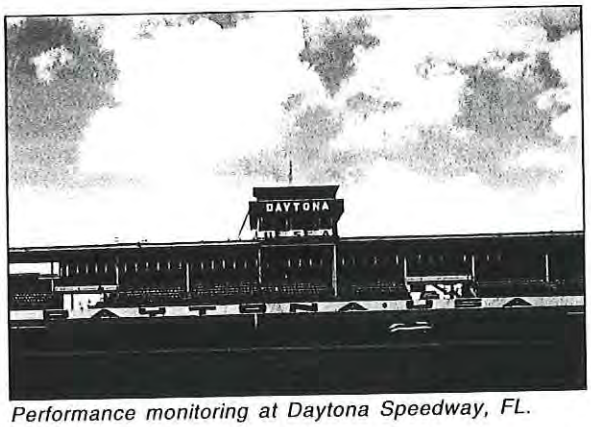
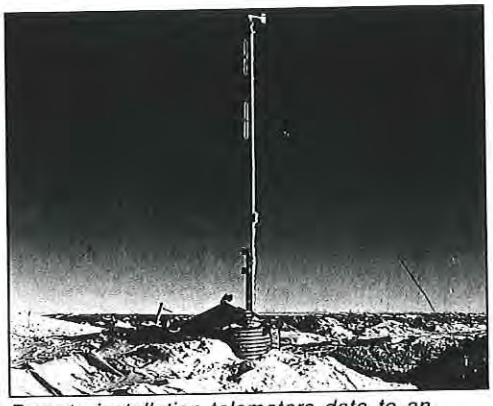
Assurance of Quality/ Customer Support 10

Campbell Scientific data acquisition systems deliver accurate, reliable measurement and control capability, even in extreme environments. Our systems have collected data on every continent and in space.

Meteorologic data collection at the Sphinx will determine an appropriate course for preservation and restoration.



Performance monitoring at Daytona Speedway, FL.



Remote installation telemeters data to an adjacent valley (Bear River Range, Wasatch Mountains, UT).

Wave height spectra are determined and data telemetered via satellite (Bering Sea, AK). Photo courtesy Brown & Caldwell.

Cover Photos At left: CR10 Measurement and Control Module. From top right: (INDUSTRY) Turbine performance and hook load testing, photo courtesy Aerospatiale Helicopters, Inc.; (RESEARCH) NASA CELSS Research Lab, Utah State University, Logan, UT; (AGRICULTURE) Agricultural Research Plots, Logan, UT; (HYDROLOGY) Weir in Reynolds Creek drainage, southeast of Boise, ID

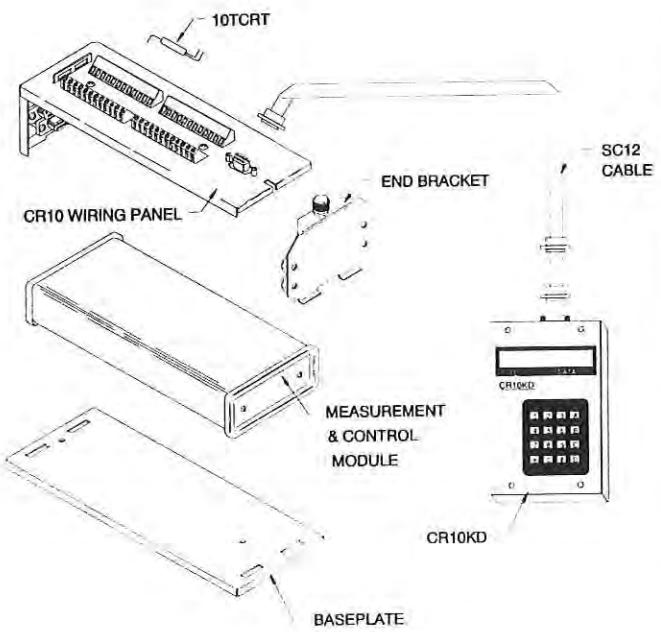
System Description

The primary components of the CR10 are the Measurement and Control Module and the detachable Wiring Panel. The CR10 Keyboard Display is recommended for on-site communication, station setup and trouble shooting, but may be replaced by a computer where environmental conditions allow.

12 Analog Inputs - (single-ended channels, each pair differential*) Five software selectable input voltage ranges. Resolution is 0.33 µV on the 2.5 mV range (0.006°C on type E thermocouple). An AM416 multiplexer provides additional inputs. Vibrating wire sensors may be read with any analog input.

8 Digital Inputs/Outputs for output control, sensing status, or reading SDM peripherals or SDI-12 sensors.

9-Pin Serial I/O Port for connection of data storage, retrieval, and telecommunications peripherals.



2 Pulse Counting Channels are software selectable for switch closures, high frequency pulses, or low level AC measurement.

3 Switched Excitation Channels for precision excitation of sensors or short-term actuation of external devices. Excitation is programmable over a ±2500 mV range.

Power and Ground Connections for 12 VDC external batteries or peripherals.

CR10 MEASUREMENT AND CONTROL MODULE

Protected in a sealed, rugged, stainless steel cannister, the programmable module provides sensor measurement, timekeeping, communication, data reduction, data/program storage and control functions. A multi-tasking operating system allows simultaneous communication and measurement functions. Operating temperature range is -25° to +50°C, standard; -55° to +85°C, on request.

The standard CR10 instruction set includes 30 measurement instructions, 43 processing/math instructions, and 15 program control instructions. Optional instructions are available for specialized measurement or processing capabilities.

The CR10's standard memory configuration allows storage of 29,900 data points in two Final Storage areas. The SM192 and SM716 Storage Modules provide additional on-site data storage, if required.

The Measurement and Control Module interfaces with the Wiring Panel via two D-style connectors. The CR10's electronics are RF shielded and glitch protected by the sealed, stainless steel packaging. A "watchdog" hardware reset function restores normal microprocessor function if lost due to an input transient or intermittent component failure.

WIRING PANEL

The stainless steel Wiring Panel consists of a top panel and end bracket. The top panel includes screw terminals for sensor connections and a 9-pin serial I/O port; the end bracket attaches the Wiring Panel to the Control Module and to an enclosure-mounted or free-standing baseplate. The Control Module easily disconnects from the Wiring Panel for quick field replacement thus avoiding the need to rewire sensors. All wiring panel connections are protected with spark gaps or transzorbs.

CR10KD KEYBOARD/DISPLAY

The portable CR10KD is used to program the CR10, manually initiate data transfer, and display sensor readings, stored values, or flag/port status. One CR10KD may be carried from station to station in a CR10 network. The CR10KD features an 8-character LCD and a 16-character keyboard. Operating temperature range is -25° to +50°C. The CR10KD is powered by the CR10's power supply.

10TCRT THERMOCOUPLE REFERENCE

The 10TCRT thermistor provides a temperature reference in thermocouple applications. It requires one single-ended analog input. Overall accuracy is typically better than ±0.25°C over the range -33° to +48°C.

PERIPHERALS

The CR10 must be powered by a 9.6 to 16 VDC supply and housed in a weather-resistant enclosure (page 8). Measurement, control, and data storage/transfer peripherals are optional depending upon the user's application (pages 4 and 5).

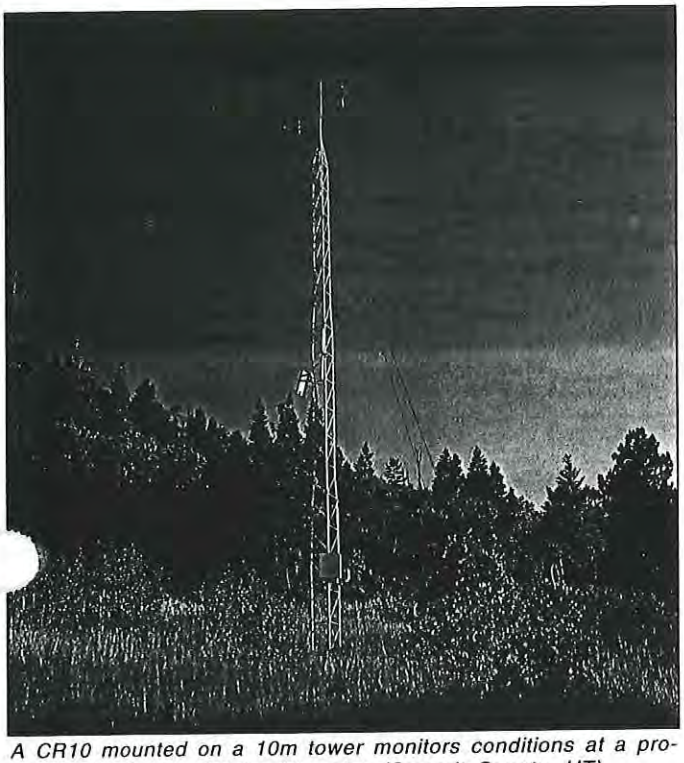
*A differential measurement measures the difference in voltage between two inputs. A single-ended measurement measures the input with respect to ground. All inputs must be within the ±2.5 V common mode range of the CR10.

Applications

The CR10's combination of measurement precision, flexibility, long-term reliability, and economical price has resulted in its widespread use in scientific, commercial, and industrial applications. Popular applications are discussed below.

METEOROLOGY

The CR10 is designed for long-term climatological monitoring, meteorological research, and routine weather measurement applications. Standard CR10 outputs include wind vector averaging, sigma theta, histograms, saturation vapor pressure, and vapor pressure from wet/dry bulb temperatures.



A CR10 mounted on a 10m tower monitors conditions at a proposed site for the Winter Olympics (Summit County, UT).

Typical meteorologic measurements:

- WIND SPEED is measured with voltage, photo-chopped, switch closure, or magnetic pulse type anemometers. Expansion peripherals allow wind profile studies.
- WIND DIRECTION is measured by a precision potentiometer wind vane.
- SOLAR RADIATION is measured with a silicon cell or thermopile pyranometer.
- TEMPERATURE sensors include thermistors, thermocouples, RTD's, or silicon types.
- RELATIVE HUMIDITY is measured with wet/dry bulb psychrometers, AC resistive sensors, strain gage or capacitive sensors. Capacitive probes include signal conditioning.
- DEWPOINT is calculated from temperature and relative humidity data or measured by cooled mirror or lithium chloride sensors. Dew point sensors require external power.

PRECIPITATION data is provided by a tipping bucket switch closure rain gage or a weighing gage.

- EVAPORATION is measured with standard pans or lysimeters fitted with a potentiometer or strain gage.
- BAROMETRIC PRESSURE is sensed by capacitance or strain gage pressure transducers.
- SOIL WATER POTENTIAL is obtained using AC conductivity moisture blocks or analog output tensiometers.
- LEAF WETNESS is detected by a resistance grid.

Applications include:

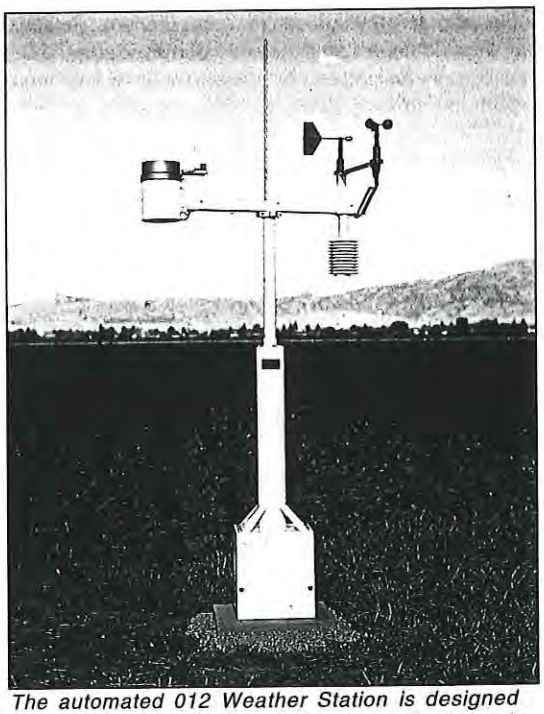
WEATHER STATION NETWORKS provide regional and local real-time meteorological data for weather monitoring, forecasting, and local warnings. Other applications include climatic modeling, agricultural meteorology, and "ground truth" for satellite imagery.

AIR QUALITY applications use the CR10's automatic control of calibration sequences and conditional averaging where invalid data taken during power failures, calibration intervals, or other conditions are excluded.

AGRICULTURE

In addition to meteorological monitoring, the CR10's versatility allows measurement of agricultural processes and equipment in applications such as:

- plant water research
- canopy energy balance
- crop management decisions
- irrigation scheduling
- integrated pest management
- erosion studies
- machinery performance
- food processing/storage
- frost prediction
- plant pathology



The automated 012 Weather Station is designed for routine climatological monitoring. Features include a modular design, prewired sensors, and a standard program (Franklin County, ID).

HYDROLOGY

The CR10 is well-suited to remote, unattended monitoring of hydrologic conditions. Many hydrologic sensors interface directly to the CR10, including the new SDI-12 compatibles.

Gaging station equipped with CR10-controlled sampler takes samples based on flow (Little Platte River, WI).

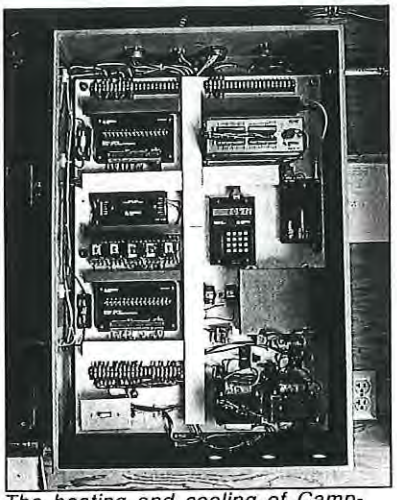
Typical hydrologic measurements:

- WATER LEVEL is read directly with an incremental shaft encoder, strain gage or vibrating wire pressure transducer. Some shaft encoders require a QD1 Interface. Vibrating wire transducers require an AVW1 or AVW4 Interface.
- WELL DRAW-DOWN TESTS use a pressure transducer measured either logarithmically or at a rate based on incremental changes in water level.
- IONIC CONDUCTIVITY measurements use the AC excitation from one of the CR10's three switched excitation ports.
- WATER QUALITY samplers are controlled by the datalogger as a function of time, water level thresholds, or rate of change.
- ALARM AND PUMP ACTUATION is controlled through any of the eight digital I/O ports which operate external relay drivers.

INDUSTRY

The growing number of applications where the CR10 can inexpensively automate data collection and improve productivity and quality include:

- HVAC systems
- Vehicle/machinery testing
- Transportation
- Process control
- Water and sewage treatment
- Regulatory compliance
- Routine operations and maintenance
- Structural or fatigue analysis
- Energy management/ conservation
- Environmental testing



The heating and cooling of Campbell Scientific's factory is controlled by a CR10 and peripherals (Logan, UT).

More specifically, the CR10 can:

MEASURE input from

- load cells
- strain gages
- flow sensors
- speed sensors
- humidity sensors
- v/mV transducers
- temperature probes
- pressure transducers
- 4-20 mA transducers*

MONITOR conditions of

- valves
- filters
- boilers
- generators
- engines
- refrigerators
- appliances
- vehicles
- compressors
- turbines
- chillers
- pumps
- batteries
- transformers
- weighing scales

CONTROL based on time or measured parameters

- pumps
- solenoids
- motors
- resistive loads
- relays
- alarms

VEHICLE TESTING

The CR10 is ideal for applications requiring compact packaging such as:

- engine test cell monitoring
- durability testing
- fleet monitoring
- solar vehicle "C-studies"
- vehicle performance verification

Datalogger monitors and records pressure on hydraulic rams of haulage trucks (Oquirrh Mtns., UT).

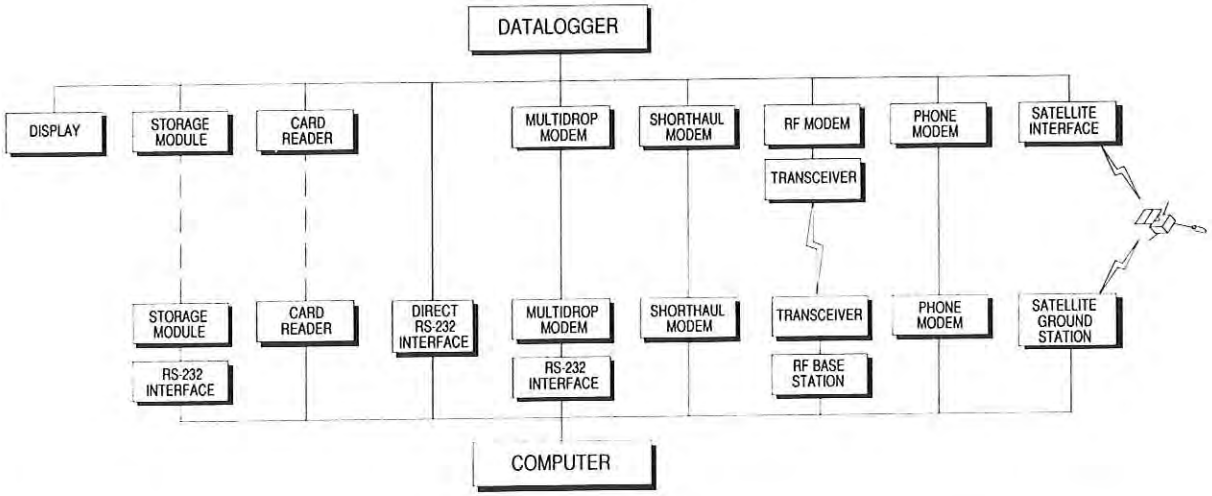
Common parameters for vehicle monitoring and durability testing are listed below:

- TEMPERATURE sensors include thermocouples and infrared (IR) detectors. The linearization for K-type thermocouples extends from -50° to 1370°C, allowing measurements from ambient to extreme exhaust temperatures.
- PRESSURE, FORCE, TORQUE, AND ACCELERATION measurements are accomplished with strain gage transducers.
- FUEL FLOW, ENGINE RPM, AND VEHICLE SPEED usually require magnetic pulse transducers or incremental encoders, either of which connect directly to the CR10 pulse counter inputs.
- THROTTLE POSITION is measured with potentiometers.
- TIMING EVENTS are output to the datalogger in period, pulse width, frequency, counts, or time intervals with the SDM-INT8 Interval Timer.
- FREQUENCY DISTRIBUTION HISTOGRAMS allow data compression over extended performance tests.
- RAINFLOW COUNTING HISTOGRAMS allow fatique analysis tests.

*Contact Campbell Scientific for proper wiring configuration.

Data Storage and Transfer

Up to 29,900 raw or processed data points can be stored in the CR10's memory. Data are transferred to a computer via one or more communications options including multidrop or short-haul modems, radios, phone lines, or satellite. On-site data retrieval options include direct line, storage module, RAM cards, display, or printer.



SOFTWARE

PC208 Datalogger Support Software supports telecommunications, programming, and data processing functions. With an appropriate communication link, PC208 provides two-way communication between Campbell dataloggers and IBM-PC or compatible computers. A Monitor mode allows real-time graphical display of datalogger measurements.

DISPLAY

The CR10KD Keyboard/Display provides on-site review of data values and program instructions. On-site connection to a terminal or computer is also possible (Direct Line Options).

STORAGE MODULES

Rugged, battery-backed RAM storage modules reliably store data over a -35° to +65°C (extended range on request) temperature range. The SM192 or SM716 Storage Module (96K or 358K data values, respectively) can be left connected to the CR10 or carried to the field to retrieve data from the CR10's memory. Up to eight storage modules can be connected to one CR10. The SC532 Interface is used to transfer data or programs between the storage module and an MS-DOS computer. Consult Campbell Scientific if data playback to a non-MS-DOS computer is required.

CARD STORAGE MODULE

The CSM1 Card Storage Module is a microprocessor-based read/write module that either remains with the CR10 or is transported to the datalogger site. Battery-backed RAM memory cards are inserted into the CSM1 for data or program transfer. Currently manufactured "credit-card-sized" RAM cards store from 128k bytes to 4M bytes (65,408 and 2,097,000 data points respectively). The system operates over a -20 to +60°C range and was developed for use with the CR10 by Campbell Scientific Limited, U.K.

Record temperature of -69°F was monitored via radio telemetry (Peter Sinks, UT).

Data from a remote site is monitored via telecommunications and PC208 Software.

DIRECT LINE OPTIONS

Direct Datalogger-to-Computer Interface

The SC32A RS-232 Interface supplies an optically isolated connection between the CR10 and a computer over distances up to 50 feet.

Short Haul Modems

Short haul modems provide local communication between the CR10 and a computer with an RS-232 serial port. The modem transmits data up to 5 miles over four-wire unconditioned line (two twisted pairs).

Coax Network

The MD9 Multidrop Interface links a central computer to over 200 dataloggers on a single coaxial cable. Total coax cable length can be up to three miles.

RADIO FREQUENCY (RF) COMMUNICATION

Campbell Scientific's RF communication system uses the RF95 modem and a low-powered transceiver at the remote station(s), and a transceiver connected to an RF232 Base Station at the computer site. Up to 255 stations can be interrogated over a single UHF or VHF frequency. Any station can serve as a repeater to extend the line-of-sight transmission of the base station.

TELEPHONE NETWORKS

Telephone communication links require a DC112 modem at the CR10 site and a Hayes-compatible 300 or 1200 baud modem at the calling end. Remote RF or MD9 networks are also accessible by telephone. Communication via cellular telephone is also possible; consult the factory for details.

Channel Expandability

The following peripherals expand CR10 measurement or control capability. Contact Campbell Scientific regarding the suitability of these peripherals for your application.

SYNCHRONOUS DEVICES FOR MEASUREMENT (SDM's)

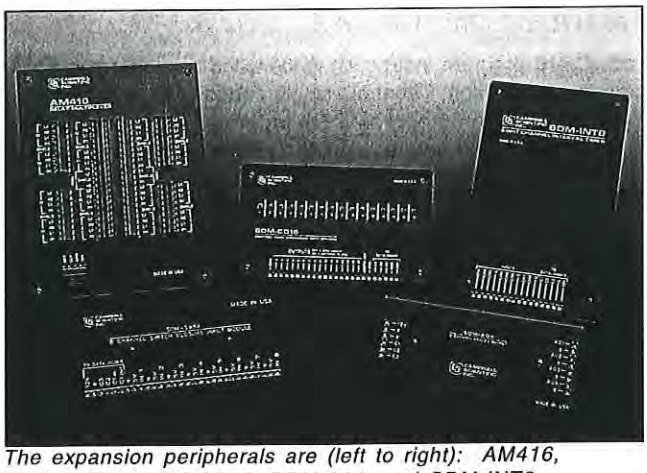
SDM's are addressable peripherals that expand digital control ports, analog output ports, and datalogger measurement capabilities. Up to 16 SDM's may be connected to three control ports on one CR10. SDM operation is controlled by datalogger instructions 101-104.

SDM-A04 Four Channel Continuous Analog Output Module provides four independent continuous analog outputs for proportional control or strip chart recording.

SDM-CD16 Control Port Module has 16 digital control ports with drivers to activate external relays, solenoids, or resistive loads. A manual override toggle switch is provided for each port.

SDM-INT8 Eight Channel Interval Timer expands the number of pulse count channels in the system and outputs processed timing data to the datalogger. Timing events are captured with ±1 microsecond resolution over a maximum range of 16.77 seconds. Output options include period, pulse width, frequency, counts, and interval time.

SDM-SW8A Pulse Counter is an 8-channel pulse count expansion for switch closure measurements. Channels can be individually configured for single-pole double-throw (SPDT), single-pole single-throw (SPST), or voltage pulse measurements. Output options include signal state, duty cycle, or counts.



The expansion peripherals are (left to right): AM416, SDM-SW8A, SDM-CD16, SDM-A04, and SDM-INT8.

MULTIPLEXER

The AM416 Relay Multiplexer increases the number of sensors that can be measured by a CR10. The AM416 sequentially multiplexes sixteen groups of four lines at a time (a total of sixty-four lines). Compatible sensors include thermistors, thermocouples, potentiometers, load cells, strain gages, vibrating wires, and soil moisture blocks. Multiple AM416's can be controlled by a single CR10.

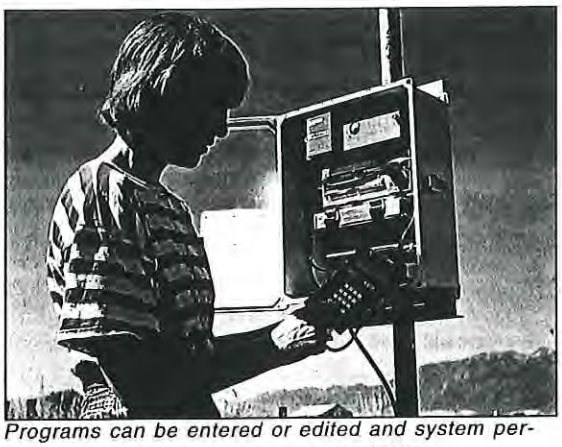
The Datalogger Program

The CR10's ability to make measurements, calculations, logical decisions, and phone calls stems from its internal program. The CR10's program can be extremely powerful, yet is composed of simple instructions. Knowledge of a high level programming language, such as FORTRAN or BASIC, is not required.

PROGRAM DEVELOPMENT

A CR10 program consists of a series of instructions designed to perform measurement, data processing, data storage, and logical control functions. To construct a program, the user selects application-specific instructions from a library of PROM-based instructions. These instructions, developed for data acquisition and control, allow the CR10 to measure most sensor types without the need for external signal conditioning.

Program development can be accomplished with a prompt sheet and a CR10KD keyboard. In addition, a prompt-driven, computer-based datalogger program editor (EDLOG) is available in Campbell Scientific's PC208 Datalogger Support Software.



Programs can be entered or edited and system performance verified on-site with a CR10KD.

INSTRUCTION FORMAT

Each CR10 program instruction is identified by a number. For example, Instruction 1 controls single-ended voltage measurements, Instruction 55 applies a 5th order polynomial to incoming data, Instruction 83 sets up an if/then statement, and Instruction 101 controls operation of an SDM device (SDM-INT8). The variety of instructions allows users to select measurement, processing, data storage and control sequences that precisely fit their application.

The CR10's instructions can be grouped into four functional categories. A listing of the standard CR10 instruction set follows; more detailed information is available in the CR10 manual and prompt sheet.

INPUT/OUTPUT INSTRUCTIONS are primarily for sensor measurement, but also control and communicate with external devices. Some internal functions, such as control of the CR10's timer, are also classified as I/O instructions. Specific examples include:

- Single-Ended (SE) Volts
- Differential (DIFF) Volts
- Pulse Count
- Excite, Delay, SE Volts
  AC Half Bridge
  Full Bridge
- Three-Wire Half Bridge
- Excite, Delay, DIFF Volts
- Full Bridge with Measured Excitation
- Battery Voltage
- 107 Temperature Probe
- 207 RH Probe
- Thermocouple Temperature (SE)
- Thermocouple Temperature (DIFF)
- Platinum RTD Temperature
- Internal Temperature
- Time
- Signature
- Set Digital Ports
- Read Digital Ports
- Burst
- Excitation With Delay
- Timer
- Period Interval Measurement
- Vibrating Wire Measurement
- Set/Control External Device (e.g. SDM's)

PROCESSING INSTRUCTIONS allow data reduction, entry of simple algorithms, or conversion of raw data into engineering units. In the following instructions, X, Y, and Z are Input Locations where incoming data values or processed results are temporarily stored; F refers to a fixed value (constant).

- Z = F
- Z = X
- Z = Z+1
- Z = X+Y
- Z = X+F
- Z = X-Y
- Z = X*Y
- Z = X*F
- Z = X/Y
- Z = SQRT(X)
- Z = LN(X)
- Z = EXP(X)
- Z = 1/X
- Z = ABS(X)
- Z = FRAC(X)
- Z = INT(X)
- Z = X MOD F
- Z = X↑Y
- Z = SIN(X)
- Z = ARCTAN (X/Y)
- Spatial Maximum
- Spatial Minimum
- Spatial Average
- Scaling Array
- 5th Order Polynomial
- Saturation Vapor Pressure
- Wet/Dry Bulb Temp to Vapor Pressure
- Low Pass Filter
- Resistance from Bridge Output

OUTPUT PROCESSING INSTRUCTIONS process measured values, collected over time.

- Sample
- Average
- Totalize
- Maximize
- Minimize
- Histogram
- Windvector
- Real Time
- High/low Resolution
- Sample on Max or Min
- Redirect Output to Input Storage
- Standard Deviation

PROGRAM CONTROL INSTRUCTIONS allow logic based on time or data. They also control serial data output and CR10-initiated telecommunications.

- Subroutine
- Loop
- If X Compared to Y
- If X Compared to F
- If Flag/Port
- If Time
- If Case/Begin Case
- Else
- End
- Control Serial Data Output
- Initiate Telecommunications
- Send Serial Character

Once an instruction is selected, a set of associated parameters is queued in the datalogger's program memory. Each parameter controls a specific aspect of the instruction's operation. Depending on the versatility of the instruction, from 1 to 12 parameters are required. For example, the parameters associated with Instruction 2 (DIFFerential voltage measurement) are:

1 - REPS - Defines the number of times an instruction executes (allows one instruction to measure several identical sensors).

2 - RANGE - Defines the full scale range of the voltage to be measured. Ranges are ± 2.5, 7.5, 25, 250, and 2500 mV. Fast (272 µs), slow (2.72 ms), 60 Hz rejection, and 50 Hz rejection integration times are also selected with this parameter.

3 - INPUT CHANNEL - Defines the analog input channel that will make the first measurement.

4 - LOCATION - Defines the first Input Storage location.

5 - MULTIPLIER - Allows multiplication of data; for example, 1.8 is entered to convert a temperature measurement from °C to °F.

6 - OFFSET - Allows addition or subtraction of an offset value; for example, 32 is entered to complete the above temperature conversion.

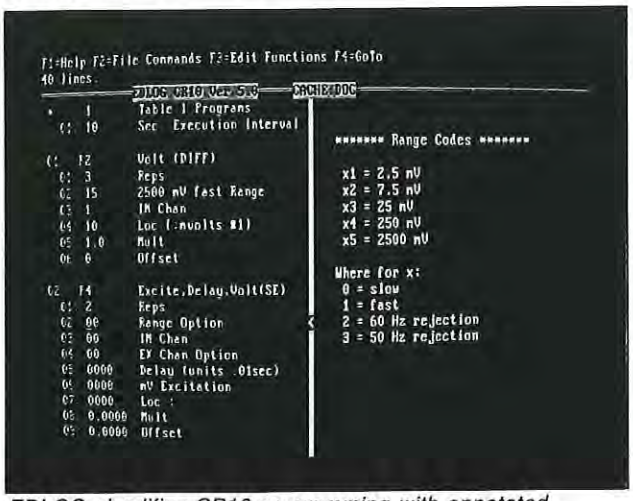
Once the parameters have been entered, the next instruction is selected. This procedure is followed until a specific program has been created. Following program entry, the datalogger checks for errors, then begins executing the program and acquiring data.

SCAN RATE, DATA STORAGE

The maximum rate at which the datalogger can execute its program is 64 times per second. (The maximum rate at which a single input can be measured is 750 samples per second.) After measurement and analog-to-digital conversion, data are directed to Input Storage locations which hold the measurement value for viewing, subsequent processing, or until transfer to Final Storage. Data can be selectively stored based on user-defined events or intervals and need not be tied to scan rate. Data remains in Input Storage until written over by subsequent measurement or processing.

EDLOG

Datalogger program development is supported by PC208 software (EDLOG). Help screens are available to define all instructions and parameter options. Input locations can be annotated with alphanumeric labels so that computer-monitored data is labelled. Once the program has been created, it can be downloaded to the CR10 directly, through telecommunications, or to a storage module for later transfer.



EDLOG simplifies CR10 programming with annotated instructions, parameters, and labels.

SAMPLE PROGRAM

Every five minutes, the following program measures air temperature (°C) at six locations within a greenhouse. Critical maximum temperature is 30°C (86°F); if any temperature exceeds that threshold, a control port trips a relay that activates an exhaust fan. The average temperature value measured by each thermistor is recorded hourly.

SENSOR CONNECTIONS
In this example, sensor signal leads are connected to CR10 single-ended input channels 1 through 6, excitation leads are connected to excitation channel 1, and sensor grounds are connected to any analog ground terminal. Port 1 controls the exhaust fan.

	Program		Comments
	* 1	Table 1 Programs	*Executes the following program every 5 minutes.*
	01: 300	Sec. Execution Interval	
Measurement & Processing	01: P11	Temp 107 Probe	*Measures six Model 107 Thermistors and places the results in Input Locations 1-6.*
	01: 6	Reps	
	02: 1	IN Chan	
	03: 1	Excite all reps w/EXchan 1	
	04: 1	Loc [:TEMP #1]	
	05: 1	Mult	
	06: 0	Offset	
	02: P49	Spatial Maximum	*Analyzes the incoming data and places the highest temperature in Input Location 7.*
	01: 6	Swath	
	02: 1	First Loc TEMP #1	
	03: 7	Max Value Loc [:MAX TEMP]	
Exhaust Fan Control	03: P89	If X <=> F	*Compares that temp. against 30°. If the measured temp. is higher, the exhaust fan is activated (or remains active),*
	01: 7	X Loc MAX TEMP	
	02: 3	>=	
	03: 30	F	
	04: 41	Set high Port 1	
	04: P94	Else	*else, if lower*
	05: P86	Do	*the exhaust fan is turned off or remains off.*
	01: 51	Set low Port 1	
	06: P95	End	
Data Output	07: P92	If time is	*The following data is ouput to Final Storage every hour:*
	01: 0	minutes into a	
	02: 60	minute interval	
	03: 10	Set high Flag 0 (output)	
	08: P77	Real Time	*date, hour, minute;*
	01: 110	Day,Hour-Minute	
	09: P71	Average	*average temp. measured by <u>each</u> sensor. (Each average is based on 12 measurements.)*
	01: 6	Reps	
	02: 1	Loc TEMP #1	
	10: P	End Table 1	

With PC208 software and an appropriate telecommunications link, a researcher can monitor real-time data or control the exhaust fan remotely. Data transfer to a computer can be selected as binary, comma-delineated or printable ASCII.

Enclosures, Power Supplies, and Towers

A CR10 housed in a weather-resistant enclosure is engineered for data collection under extremely harsh conditions. A low power design allows the CR10 to operate one year on 7.0 Ahr, unregulated 12 volt source, depending on scan rate, number of sensors scanned, and external temperature. For field installations, Campbell Scientific can provide towers and mounting accessories.

ENCLOSURES

A protective enclosure for the CR10 is required in indoor or outdoor areas where dust, water, sunlight, or environmental pollutants are present.

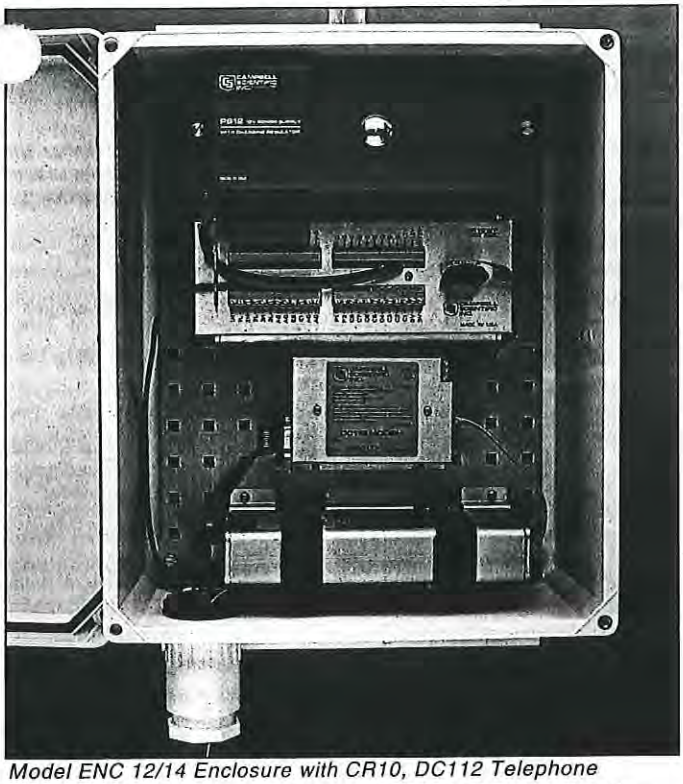
Our NEMA 4X enclosures are modified for cable entry and attach either to a flat surface or a vertical mast (1.00" to 1.25" IPS pipe). The white fiberglass-reinforced polyester enclosures are UV-stabilized and reflect solar radiation, reducing temperature gradients inside the housing. An internal mounting plate is prepunched for easy system configuration and exchange of equipment in the field. A lockable hasp provides additional security.

Two standard enclosures are available for the CR10, its power supply, and peripherals.

MODEL ENC 10/12 houses the CR10, a power supply, and one data retrieval peripheral such as a storage module. Inside dimensions are 12" x 10" x 4.5"; weight is 9 pounds.

MODEL ENC 12/14 houses the CR10, power supply, and one or more peripherals. Inside dimensions are 14" x 12" x 5.5"; weight is 12 pounds.

While these enclosures satisfy most application requirements, larger sizes can be specially ordered.



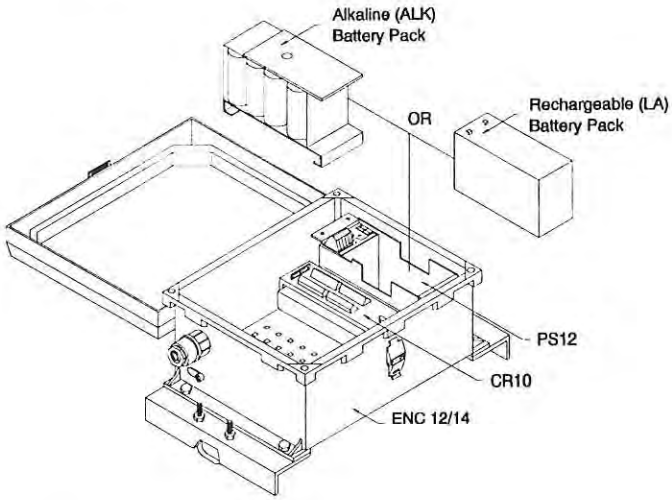
Model ENC 12/14 Enclosure with CR10, DC112 Telephone Modem, SM716 Storage Module, and PS12ALK Power Supply.

POWER SUPPLIES

The **PS12 Power Supply with Charging Regulator** accepts 16 to 26 VDC or AC input and provides a charging voltage to the 12 volt rechargeable battery option or to an external 12 volt battery. The battery options shown below are:

PS12ALK contains eight non-rechargeable 'D'-cell alkaline batteries with a 7.5 Ahr rating at 20°C.

PS12LA rechargeable battery option includes one 12 volt, 7 Ahr, rechargeable battery, and AC transformer. It is float-charged with AC power or a solar panel.



SOLAR PANELS

MODEL MSX5 and MSX10 unregulated solar panels are used to float-charge the PS12LA rechargeable battery option. Based on an illumination of 1 kW/m^2 and ambient temperature of 20°C, a peak voltage of 17 volts is supplied. Call Campbell Scientific if regulated solar panels for recharging customer-supplied 12 volt batteries are required.

TOWERS & MOUNTS

For field installations, Campbell Scientific manufactures durable tripods and towers designed for easy installation and adjustable placement of sensor mounts.

CM6 and CM10 TRIPODS are portable, sturdy tripods that support six and ten foot measurement heights, respectively. They can be staked down or secured to concrete pads.

10-METER TOWER is an aluminum instrument tower designed for fixed applications. Its triangular sections are bolted together with zigzag bracing. Models are available for cementing into the ground or securing to a flat surface. They can be further stabilized by guy wires.

Specifications

The following electrical specifications are valid for an ambient temperature range of -25° to +50°C unless otherwise specified.

OGRAM EXECUTION RATE

System tasks initiated in sync with real-time up to 64 Hz. One measurement with data transfer is possible at this rate without interruption. A single input may be measured over short intervals at rates up to 750 Hz using Burst Measurement.

ANALOG INPUTS

NUMBER OF CHANNELS: 6 differential or up to 12 single-ended. Each differential channel can be configured as two single-ended channels.

CHANNEL EXPANSION: The Model AM416 Relay Multiplexer allows an additional 64 single-ended channels to multiplex into four CR10 single-ended channels. Up to three AM416's can be connected to one CR10.

ACCURACY OF VOLTAGE MEASUREMENTS AND ANALOG OUTPUT VOLTAGES:
0.2% of FSR, 0.1% of FSR (0 to 40°C)

RANGE AND RESOLUTION: Ranges are software selectable for any channel. Resolution for a single-ended measurement is twice the value shown.

Full Scale Range	Resolution
± 2500 millivolts	333 microvolts
± 250 millivolts	33.3 microvolts
± 25 millivolts	3.33 microvolts
± 7.5 millivolts	1.00 microvolts
± 2.5 millivolts	0.33 microvolts

INPUT SAMPLE RATES: The fast A/D conversion uses a 0.25 ms signal integration time and the slow conversion uses a 2.72 ms signal integration. Two integrations, separated in time by 1/2 of an AC line cycle, are used with the 60 Hz or 50 Hz noise rejection option. Differential measurements include a second sampling with reversed input polarity to reduce thermal offset and common mode errors. Input sample rates are the time required to measure and convert the result to engineering units.

Fast single-ended voltage:	2.6 ms
Fast differential voltage:	4.2 ms
Slow single-ended voltage:	5.1 ms
Slow differential voltage:	9.2 ms
Differential with 60 Hz rejection:	25.9 ms
Fast differential thermocouple:	8.6 ms

INPUT NOISE VOLTAGE:

Fast differential ---	0.82 microvolts RMS
Slow differential ---	0.25 microvolts RMS
Differential with 60 Hz rejection ---	0.18 microvolts RMS

COMMON MODE RANGE: ± 2.5 volts.

DC COMMON MODE REJECTION: > 140 dB.

NORMAL MODE REJECTION: 70 dB
(60 Hz with slow differential measurement).

INPUT CURRENT: 3 nanoamps maximum.

INPUT RESISTANCE: 200 gigohms.

EXCITATION OUTPUTS

DESCRIPTION: The CR10 has 3 switched excitations, active only during measurement, with only one output active at any time. The off state is high impedance.

RANGE: ± 2.5 volts.

RESOLUTION: 0.67 millivolts.

ACCURACY: Same as voltage input.

OUTPUT CURRENT: 20 mA @ ± 2.5 V; 35 mA @ ± 2.0 V; 50 mA @ ± 1.5 V.

FREQUENCY SWEEP FUNCTION: A swept frequency, square wave output between 0 and 2.5 volts is provided for vibrating wire transducers. Timing and frequency range are specified by the instruction.

RESISTANCE AND CONDUCTIVITY MEASUREMENTS

ACCURACY: 0.015% of full scale bridge output, limited by the matching bridge resistors. The excitation voltage should be programmed so the bridge output matches the full scale input voltage range.

MEASUREMENT TYPES: 6-wire and 4-wire full bridge, 4-wire, 3-wire, and 2-wire half bridge. Bridge measurements are ratiometric and dual polarity to eliminate thermal emf. AC resistance measurements use a dual polarity 0.75 ms excitation pulse for ionic depolarization, with the signal integration occurring over the last 0.25 ms.

PERIOD AVERAGING MEASUREMENTS

DEFINITION: The time period for a specified number of cycles of an input frequency is measured, then divided by the number of cycles to obtain the average period of a single cycle.

INPUTS: Any single-ended analog channel; signal dividing or AC coupling is normally required.

INPUT FREQUENCY RANGE:

Range Code	Peak to Peak Volts Required @ Max. Freq.*	Maximum Frequency
1	2 mV	8 kHz
2	3 mV	20 kHz
3	12 mV	50 kHz
4	2000 mV	200 kHz

*AC voltage; must be centered around CR10 ground

REFERENCE ACCURACY: (-25° to 0°C) ± 80 ppm
(0° to +50°C) ± 30 ppm

RESOLUTION: ± 100 nanoseconds divided by the number of cycles measured. Resolution is reduced by signal noise and for signals with a slow transition through the zero voltage threshold.

TIME REQUIRED FOR MEASUREMENT: Signal period times the number of cycles measured plus 1.5 cycles.

PULSE COUNTERS

NUMBER OF PULSE COUNTER CHANNELS: 2 eight bit or 1 sixteen bit; software selectable.

MAXIMUM COUNT RATE: 2000 Hz, eight bit counter; 250 kHz, sixteen bit counter. Pulse counter channels are scanned at 8 Hz.

MODES: Switch closure, high frequency pulse, and low level AC.

SWITCH CLOSURE MODE
Minimum Switch Closed Time: 5 milliseconds.
Minimum Switch Open Time: 6 milliseconds.
Maximum Bounce Time: 1 millisecond open without being counted.

HIGH FREQUENCY PULSE MODE
Minimum Pulse Width: 0.002 milliseconds.
Maximum Input Frequency: 250 kHz.
Voltage Thresholds: Count upon transition from below 1.5 V to above 3.5 V.
Maximum Input Voltage: ± 20 V.

LOW LEVEL AC MODE
(Typical of magnetic pulse flow transducers or other low voltage, sine wave outputs).
Minimum AC Input Voltage: 6 mV RMS.
Input Hysteresis: 11 mV.
Maximum AC Input Voltage: 20 V RMS.

Frequency Range:

AC Input (RMS)	Range
20 mV	1 Hz to 100 Hz
50 mV	0.5 Hz to 400 Hz
150 mV to 20 V	0.3 Hz to 1000 Hz

(Consult factory if higher frequencies are desired.)

DIGITAL I/O PORTS

8 ports, software selectable as binary inputs or control outputs.

OUTPUT VOLTAGES (no load): high 5.0 V ± 0.1V; low < 0.1 V.

OUTPUT RESISTANCE: 500 Ω.

INPUT STATE: high 3.0 V to 5.5 V; low -0.5 V to 0.8 V.

INPUT RESISTANCE: 100 kΩ.

SDI-12 INTERFACE STANDARD

This communication protocol, developed for microprocessor-based hydrologic and environmental sensors, is available as a software option in the CR10.

SENSOR CONNECTIONS: Digital I/O Port #8 (for asynchronous communication), 12V power, and ground. Up to ten SDI-12 sensors can be connected to a CR10.

TRANSIENT PROTECTION

All input and output connections to the CR10 module are protected using RC filters or transzorbs connected to a heavy copper bar between the circuit card and the case. The CR10WP Wiring Panel includes additional spark gap and transzorb protection.

CPU AND INTERFACE

PROCESSOR: Hitachi 6303.

MEMORY: 32K ROM, 64K RAM.

DISPLAY: 8 digit LCD (0.5" digits).

PERIPHERAL INTERFACE: 9 pin D-type connector for keyboard display, storage module, modem, printer, card storage module, and RS-232 adapter. Baud rates selectable at 300, 1200, 9600 and 76,800. ASCII communication protocol is one start bit, one stop bit, eight data bits (no parity).

CLOCK ACCURACY: ± 1 minute per month.

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 16 volts.

TYPICAL CURRENT DRAIN: 0.7 mA quiescent, 13 mA during processing, and 35 mA during analog measurement.

BATTERIES: Any 12 volt battery can be connected as a primary power source. Several power supply options are available from Campbell Scientific.

PHYSICAL SPECIFICATIONS

SIZE: 7.8" x 3.5" x 1.5" - Measurement & Control Module; 9" x 3.5" x 2.9" - with CR10WP Wiring Panel. Additional room required for connectors.

WEIGHT: 2 lbs.

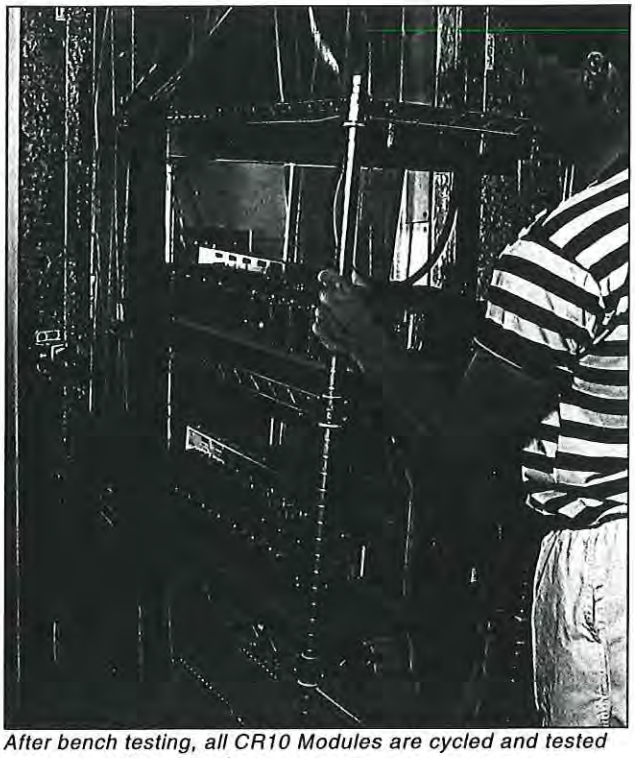
WARRANTY

Three years against defects in materials and workmanship.

Additional Information

ASSURANCE OF QUALITY

Campbell Scientific has been producing portable research-grade dataloggers for over seventeen years. Our commitment to quality is evidenced in the design and workmanship of the CR10 Measurement and Control System. Tailored for demanding field use, the CR10 features durable components, compact size, low power consumption, wide temperature tolerance, an internal "watchdog" timer, and glitch protection.



After bench testing, all CR10 Modules are cycled and tested between -35° and +65°C in an environmental chamber.

Every CR10 is calibrated and thoroughly tested to ensure consistent, dependable performance. The CPU, system components, and all I/O connections are tested. The datalogger's results are calibrated against the National Institute of Standards and Technology (NIST), formerly known as the National Bureau of Standards (NBS). A test report and calibration certificate including NIST traceable numbers are shipped with each CR10.

WARRANTY AND REPAIR

The CR10 is backed with a three-year warranty covering parts and labor. Our experienced Mean Time Between Failure (MTBF) is over 80 years.

If repair is required, our professional staff of technicians will repair and recalibrate the CR10 to original specifications.

FOR MORE INFORMATION

For more information on the products mentioned in this brochure, please contact a Campbell Scientific applications engineer. Customers supported by our U.S. factory should contact our environmental, water resources, or industrial groups.

Pricing and ordering information is available from our price list or from our order entry staff. Contact our Customer Service and Marketing Department for information on customized training sessions or authorized representatives in your area.

Campbell Scientific's U.S. factory is located in Logan, Utah.

Please call us today, we would like to discuss your application needs with you.

CAMPBELL SCIENTIFIC, INC.

815 W. 1800 N.
Logan, UT 84321-1784
USA
Phone (801) 753-2342
TLX 453058
FAX (801) 752-3268

Campbell Scientific Canada Corp.
9525 41st Avenue
Edmonton, Alberta T6E 5X7
CANADA
Phone (403) 461-5158
TLX 037-2966 (EDM)
FAX (403) 450-2531

Campbell Scientific Ltd.
14-20 Field Street
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ENGLAND
Phone (44) 509 601141
FAX (44) 509 601091

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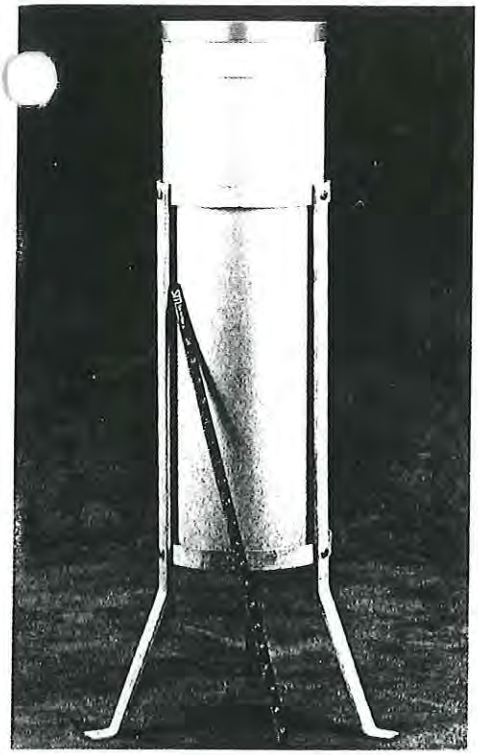
Campbell Scientific, Inc.

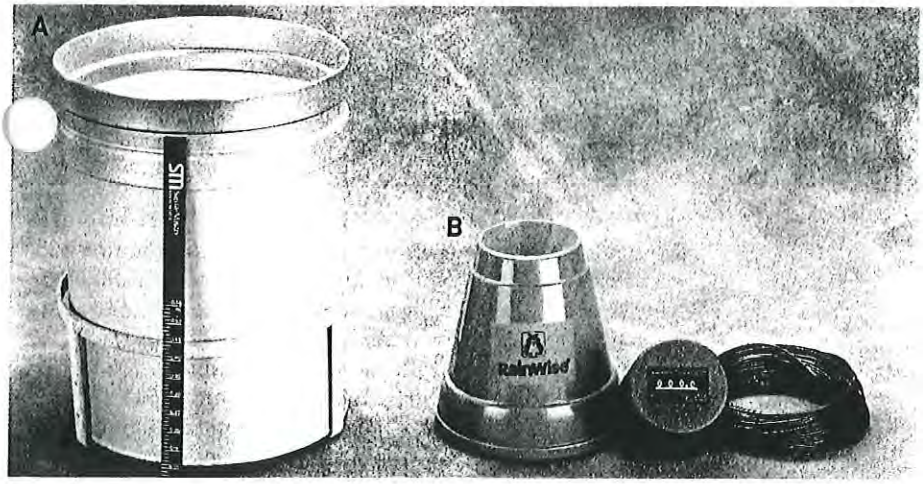
Printed on Recycled Paper Printed Dec. 1992



U.S. Weather Bureau Type Rain and Snow Gauge

For professionally accurate rainfall measurements. This all aluminum gauge has a total capacity of 20" of rainfall. The upper portion of the funnel is cylindrical in shape and is turned to a sharp edge. Rainwater falling into the funnel is delivered into the copper receiver. The ratio of the area of the orifice to the area of the receiver is 10:1, so that 1" of rainfall delivers 10" of water to the receiver and can be read to 0.01". The capacity of the receiver is 2" of rainfall. Any excess overflows into the outer chamber where it can be measured after the quantity in the receiver has been removed using the funnel. When used as a snow gauge, the receiver and funnel are detached and snowfall is measured directly. Furnished with black lamacoid measuring stick. 8-1/4" diameter x 27" high overall. Tripod sold separately.

89018 Gauge (20 lbs.) $235.00
89019 Tripod (1 lb.) $82.00
89020 Replacement Measuring Stick (1-1/4 lbs.) $16.00



A. Forester's Rain Gauge

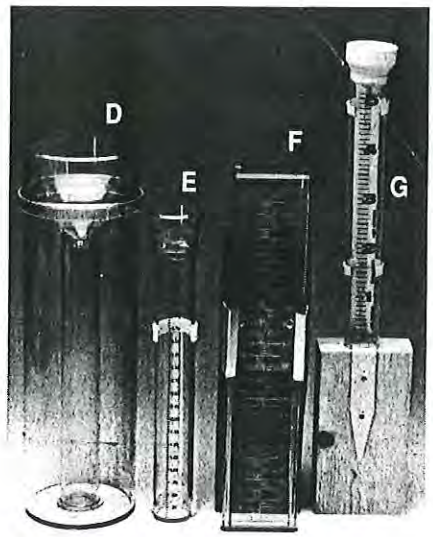
Aluminum rain gauge has a total capacity of 7" and measures to 0.01". Consists of a receiver, overflow cylinder, measuring cup and stick. Gauge is 7-1/4" diameter x 10" high. USFS Specification No. 5100-451B. Order mounting support separately.

89048 Gauge (5 lbs.) $172.00
89049 Replacement Measuring Stick (5 oz.) $16.00
89114 Support for mounting gauge on post (1 oz.) $45.00

B. Rainwise Automatic Electronic Rain Gauge

Measures each 0.1" or 0.01" of rainfall, signals to remote indicator, then empties itself. Never needs draining. Indicator shows up to 99.99" of rainfall. 60' Cable included so unit can be located on desk or table top. Powered by one 9V battery (not included). Accumulates total inches of rainfall over any period you choose. Pushing the reset button starts a new period of counting. No need to empty or check the outdoor collector.

88992 Measures to 0.1", 60' cable, without collecting pan (1-3/4 lbs.) $71.50
88993 Measures to 0.01", 60' cable, with collecting pan (3 lbs.) $94.00
02179 9V Alkaline Battery (8 oz.) $3.95



D. All Weather Rain Gauge

Made to U.S. Weather Bureau specifications. Collects rain in top, funnels it to removable inner tube graduated in English or metric. Overflow chamber catches excess for later measurement. Rugged butyrate plastic. Mounting bracket, one year rainfall record included. (2-1/4 lbs.)

88991 11" x 0.01" Capacity $26.50
88994 27.9 cm x 2 mm Capacity $28.95

E. Taylor See-Thru Rain Gauge

Accurate and inexpensive. For nurserymen, gardeners, ranchers, farmers and homeowners. Tenite butyrate plastic will not crack or become brittle with age. Capacity is 5" by .05".

89068 (1 lb.) $12.95

F. Tru-Check Direct-Reading Rain Gauge

Graduated one side from 0.01" to 6", other side from 1/10 mm to 150 mm. Easy-to-read, permanently marked graduations. Heavy, weather-resistant plastic. 13" Long. Aluminum mounting bracket included.

89011 (12 oz.)	1-9	$7.95
	10+	$7.15
	20+	$5.95

G. Far View Rain and Sprinkler Gauge

For lawn, garden, nursery or general use. 5" Capacity with 0.1" graduations. Magnifier funnel makes accumulation easy to read from a distance! Mounted on a 16" sharpened steel frame. Push it into the ground in your lawn, garden or field as a rain or sprinkler gauge. Also mounts on a post.

88990 (12 oz.) $7.95

ATTACHMENT 6

CONSERVATION EASEMENTS AND SURVEYS FOR
MARTIN PROJECT MITIGATION AREA

MARTIN LINEAR FACILITIES
MARTIN MITIGATION AREA

DOC-DEED $ 70 MARSHA STILLER
DOC-MTG $ _____ MARTIN COUNTY
DOC-ASM $ _____ CLERK OF CIRCUIT COURT
INT. TAX $ _____ BY _____ D.C.

RECORD VERIFIED

RECEIVED
MAY 04 1993
REGULATION DEPT. - 401

THIS INSTRUMENT PREPARED BY AND SHOULD BE RETURNED TO FLORIDA POWER & LIGHT CO.
Duane O. Bateman
Land Management - Golden Bear
11770 U.S. Highway #1
North Palm Beach, Fl 33408-8801

1009658

DEED OF CONSERVATION EASEMENT

THIS DEED OF CONSERVATION EASEMENT is given this 10th day of June, 1993, by Florida Power & Light Company at P.O. Box 088801, North Palm Beach, Florida 33408-8801 ("Grantor") to the South Florida Water Management District, created under Chapter 373, Florida Statutes for the purpose of water resource protection, and whose principal address is 3301 Gun Club Road, West Palm Beach, FL 33406 ("Grantee").

W I T N E S S E T H

WHEREAS, the Grantor is the owner of certain lands situated in Martin County, Florida, containing 9.2 acres and more specifically described in Exhibit A attached hereto and incorporated herein ("Property"); and

WHEREAS, the Grantor desires to construct multiple combined cycle electrical generating units, coal gasification facilities and other associated linear facilities ("Project") in several phases at the FPL Martin Plant Site ("Site") in Martin County, which Project will impact during its several phases wetlands under the regulatory jurisdiction of Grantee and other public regulatory agencies; and

WHEREAS, the first phase of the Project, which includes certain linear facilities, has been certified for construction and operation as part of the FPL Martin Coal

Governing Board Order No. 93-30

Gasification/Combined Cycle CG/CC Project pursuant to the Power Plant Siting Act, Sections 403.501 - 403.518, Florida Statutes, by certification order dated February 20, 1991 ("Certification Order"); and

WHEREAS, the Certification Order authorized in part such impacts to wetlands during the construction of the associated linear facilities including a natural gas pipeline lateral and an upgrade of an existing electrical transmission line; and

WHEREAS, the Certification Order requires the Grantor to provide compensation and/or mitigation for impacts to wetlands occurring as a result of the Project; and

WHEREAS, the Grantor has developed and proposed pursuant to the Certification Order a wetlands mitigation program named the "Martin CG/CC Project Linear Facilities Mitigation, Monitoring and Maintenance Plan" dated November 20, 1992 ("Linear Facilities Mitigation Plan"), involving enhancement, restoration and preservation of 9.2 acres of wetland systems on the Property to compensate for the impacts to wetlands resulting from construction of the linear facilities; and

WHEREAS, the Grantee was a party to the proceeding in which the Certification Order was issued; and

WHEREAS, the Grantor, in consideration of the consent granted by the Certification Order, is agreeable to granting and securing to the Grantee the enforcement of a perpetual conservation easement as defined in Section 704.06, Florida Statutes (1991), over the Property.

OR BK 1021 PG 1611

NOW, THEREFORE, in consideration of the issuance of the Certification Order to construct and operate the Project including, but not limited to, the authorization to impact wetlands within the corridors for the linear facilities, Grantor hereby grants, creates, and establishes a perpetual conservation easement for the Grantee upon the Property which shall run with the land and be binding upon the Grantor, its heirs, successors and assigns, and remain in full force and effect forever.

The scope, nature, and character of this conservation easement shall be as follows:

1. It is the purpose of the conservation easement to ensure that no activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, wetlands or fish and wildlife habitat preservation are undertaken on the Property, except for those activities of the Grantor or its agents in preserving, enhancing or restoring the wetands on the Property in accordance with the requirements of the Certification Order or the Linear Facilities Mitigation Plan. To carry out this purpose, the following rights are conveyed to Grantee by this easement:

(a) To enter upon the Property at reasonable times to enforce the rights herein granted upon prior notice to Grantor, its heirs, successors or assigns, in a manner that will not unreasonably interfere with the use and quiet enjoyment of the Property by Grantor, its heirs, successors or assigns, at the time of such entry; and

ORBK1021PG1612

(b) To enjoin any activity on or use of the Property that is inconsistent with the purpose of this conservation easement and to enforce the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use.

2. The following activities are prohibited in or on the Property except as otherwise authorized in the Linear Facilities Mitigation Plan or the Certification Order as they now exist or as they may be amended in the future:

(a) Construction or placing of buildings, roads, signs, billboards or other advertising, utilities, or other structures on or above the ground.

(b) Dumping or placing of soil or other substance or material as landfill, or dumping or placing of trash, waste, or unsightly or offensive materials.

(c) Removal or destruction of trees, shrubs, or other vegetation except for removal of noxious or exotic vegetation as required in the Linear Facilities Mitigation, Monitoring, and Maintenance Plan.

(d) Excavation, dredging, or removal of loam, peat, gravel, soil, rock, or other material substance in such manner as to affect the surface.

(e) Surface use except for purposes that permit the land or water area to remain predominantly in its natural condition or which receive prior written approval from the Grantee.

OR BK 1021 PG 1613

(f) Activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation.

(g) Acts or uses detrimental to such retention of land or water areas, or which are detrimental to the preservation of any wetlands on the property.

(h) Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or cultural significance.

3. Grantor reserves to itself, its heirs, successors or assigns all rights as owner of the Property, including the right to engage in all uses of the Property that are not prohibited herein.

4. No right of access by the general public to any portion of the Property is conveyed by this conservation easement.

5. Grantor shall bear all costs and liabilities of any kind related to the operation, upkeep and maintenance of the Property and does hereby indemnify and hold Grantee harmless therefrom, except where such costs or liabilities are created or caused by the Grantee, its successors, assigns or contractors.

6. Grantor shall pay any and all real property taxes and assessments levied by competent authority on the property.

7. Any costs incurred by Grantee in enforcing, judicially or otherwise, the terms and restrictions of this conservation easement against Grantor, its heirs, successors or assigns, shall

ORBK 1021 PG 1614

be borne by and recoverable against Grantor, its heirs, successors or assigns, as long as Grantee is the prevailing party in such proceedings.

8. Enforcement of the terms and provisions of the conservation easement shall be at the reasonable discretion of Grantee, and any forbearance on behalf of Grantee to exercise its rights hereunder in the event of any breach hereof by Grantor, its heirs, successors or assigns, shall not be deemed or construed to be a waiver of Grantee's rights hereunder in the event of a subsequent breach.

9. Grantee will hold this conservation easement exclusively for conservation purposes. Grantee will not assign its rights and obligations under this conservation easement without prior written consent of the Grantor or its successors and except to another organization qualified to hold such interests under the applicable state and federal laws and committed to holding this conservation easement exclusively for conservation purposes. Grantor agrees that it will not sell the Property which is subject to this Easement without giving Grantee at least sixty (60) days written notice prior to transfer of title.

10. If any provision of this conservation easement or the application thereof to any person or circumstances is found to be invalid, the remainder of the provisions of this conservation easement and the applications of such provision to persons or circumstances other than those as to which it is found to be invalid shall not be affected thereby, as long as the purpose of

OR BK 1021 PG 1615

the conservation easement is preserved.

11. All notices, consents, approvals or other communications hereunder shall be in writing and shall be deemed properly given if sent by United States certified mail, return receipt requested, addressed to the appropriate party or successor-in-interest.

12. The terms, conditions, restrictions and purposes of this conservation easement will be inserted by Grantor in any subsequent deed or other legal instrument by which Grantor divests itself of any interest in the Property. Any future purchaser of the Grantor's interest in the Property shall be notified in writing by Grantor of this conservation easement.

13. This conservation easement may be amended, altered, released or revoked only by written agreement between the parties hereto or their heirs, assigns and successors-in-interest.

TO HAVE AND TO HOLD unto Grantee, its successors and assigns forever. The covenants, terms, conditions, restrictions and purposes imposed with this conservation easement shall not only be binding upon Grantor, but also its agents, heirs, assigns and all other successors to it in interest, and shall continue as a servitude running in perpetuity with the Property.

ORBK 1021 PG 1616

IN WITNESS WHEREOF, Florida Power & Light Company has hereunto set its authorized hand this 23rd day of APRIL, 1993.

Signed, sealed and delivered in our presence as witnesses:

Duane O. Bateman

Print Name: Duane O. Bateman

FLORIDA POWER & LIGHT COMPANY, a Florida corporation

By: _____

Print Name: Jay W. Molyneaux

Title: Director of Land Management, and Assistant Secretary

Patricia A. Goudreau

Print Name: Patricia A. Goudreau

STATE OF FLORIDA)
)ss:
COUNTY OF PALM BEACH)

On this 23rd day of APRIL, 1993 before me, the undersigned notary public, personally appeared Jay W. Molyneaux, personally known to me to be the person who subscribed to the foregoing instrument and did not take an oath, as the Director of Land Management and Assistant Secretary, of Florida Power & Light Company, a Florida corporation, and acknowledged that he executed the same on behalf of said corporation and that he was duly authorized to do so.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Barbara C. Hill

NOTARY PUBLIC, STATE OF FLORIDA

Barbara C. Hill

Print Name

My Commission Expires:

NOTARY PUBLIC STATE OF FLORIDA
MY COMMISSION EXP. OCT. 13,1995
BONDED THRU GENERAL INS. UND.

OR BK 10211 PG 1617

IN WITNESS WHEREOF, South Florida Water Management District has hereunto set its authorized hand this 11th day of June, 1993.

Signed, sealed and delivered in our presence as witnesses:

Joni L. Martin
Print Name: JONI L. MARTIN

Cheilyn Gerkovich
Print Name: CHEILYN GERKOVICH

South Florida Water Management District

By: T. K. MacVicar
Print Name: THOMAS K. MACVICAR
Title: DEPUTY EXECUTIVE DIRECTOR, SOUTH FLORIDA WATER MANAGEMENT DISTRICT

STATE OF FLORIDA)
) ss:
COUNTY OF PALM BEACH)

On this 11th day of JUNE, 1993 before me, the undersigned notary public, personally appeared THOMAS K. MACVICAR, personally known to me to be the person who subscribed to the foregoing instrument and did not take an oath, as DEPUTY EXECUTIVE DIRECTOR of South Florida Water Management District, and acknowledged that he executed the same on behalf of said corporation and that he was duly authorized to do so.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Penelope Ann Bell
NOTARY PUBLIC

PENELOPE ANN BELL
Print Name

PENELOPE ANN BELL
MY COMMISSION EXPIRES
APRIL 22, 1997
CC 279299
Bonded thru
Troy Fain-Insurance
NOTARY PUBLIC, STATE OF FLORIDA

My Commission Expires:

FILED WITH THE CLERK OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT
ON June 15, 1993
BY Benny Miller
DEPUTY CLERK

J:\JLMRLEST\ACQU\LINEAR.EAS

OR BK 1021 PG 1618

PROPOSED MARTIN CG/CC PROJECT LINEAR FACILITIES
MITIGATION AREA

A PARCEL OF LAND LYING IN SECTION "13", TOWNSHIP 39 SOUTH, RANGE 37 EAST, MARTIN COUNTY, FLORIDA.

COMMENCING AT THE IRON ROD, AS FOUND AT THE SOUTHWEST CORNER OF SECTION 13, TOWNSHIP 39 SOUTH, RANGE 37 EAST, BY SURVEY OF THE MITIGATION AREA, BY R.L.S. LAND SURVEY IN 1991; THENCE WITH A BEARING OF NORTH 00° 45' 06" WEST, ALONG THE WEST LINE OF SECTION 13, A DISTANCE OF 732.96 FEET; THENCE WITH A BEARING OF NORTH 87° 17' 02" EAST. A DISTANCE OF 399.53 FEET TO THE POINT OF BEGINNING OF THE FOLLOWING DESCRIBED PARCEL;

THENCE IN A CLOCKWISE DIRECTION AROUND THE PARCEL THE FOLLOWING DESCRIBED COURSE AND DISTANCE:

A) THENCE WITH A BEARING OF NORTH 02° 00′ 39" WEST, A DISTANCE OF 69.64 FEET;

B) THENCE WITH A BEARING OF SOUTH 74° 32′ 33" EAST, A DISTANCE OF 47.09 FEET;

C) THENCE WITH A BEARING OF NORTH 89° 29′ 24" EAST, A DISTANCE OF 163.02 FEET;

D) THENCE WITH A BEARING OF NORTH 70° 51′ 51" EAST, A DISTANCE OF 133.38 FEET;

E) THENCE WITH A BEARING OF NORTH 43° 20′ 47" EAST, A DISTANCE OF 86.44 FEET;

F) THENCE WITH A BEARING OF SOUTH 19° 22′ 56", EAST, A DISTANCE OF 152.76 FEET;

G) THENCE WITH A BEARING OF SOUTH 40° 09′ 23" EAST, A DISTANCE OF 129.38 FEET;

H) THENCE WITH A BEARING OF SOUTH 44° 49′ 19" EAST, A DISTANCE OF 159.62 FEET;

I) THENCE WITH A BEARING OF SOUTH 85° 44′ 26" EAST, A DISTANCE OF 68.27 FEET;

J) THENCE WITH A BEARING OF NORTH 85° 53' 28" EAST, A DISTANCE OF 86.37 FEET;

K) THENCE WITH A BEARING OF SOUTH 55° 49' 35" EAST, A DISTANCE OF 177.46 FEET;

L) THENCE WITH A BEARING OF SOUTH 45° 07′ 28" EAST, A DISTANCE OF 104.07 FEET;

M) THENCE WITH A BEARING OF SOUTH 09° 27′ 02" EAST, A DISTANCE OF 99.89 FEET;

N) THENCE WITH A BEARING OF SOUTH 74° 56′ 04" WEST, A DISTANCE OF 74.09 FEET;

O) THENCE WITH A BEARING OF SOUTH 71° 24′ 10" WEST, A DISTANCE OF 83.31 FEET;

P) THENCE WITH A BEARING OF NORTH 40° 19′ 04" WEST, A DISTANCE OF 113.31 FEET;

Q) THENCE WITH A BEARING OF NORTH 64° 21′ 57" WEST, A DISTANCE OF 80.68 FEET;

R) THENCE WITH A BEARING OF NORTH 39° 44′ 45 WEST, A DISTANCE OF 67.10 FEET;

S) THENCE WITH A BEARING OF SOUTH 82° 05′ 22" WEST, A DISTANCE OF 143.58 FEET;

T) THENCE WITH A BEARING OF SOUTH 53° 49′ 19" WEST, A DISTANCE OF 116.20 FEET;

U) THENCE WITH A BEARING OF SOUTH 60° 16′ 26" WEST, A DISTANCE OF 58.24 FEET;

V) THENCE WITH A BEARING OF SOUTH 65° 56′ 47" WEST, A DISTANCE OF 75.93 FEET;

W) THENCE WITH A BEARING OF SOUTH 15° 02′ 18" WEST, A DISTANCE OF 84.71 FEET;

X) THENCE WITH A BEARING OF NORTH 90° 00′ 00" WEST, A DISTANCE OF 294.03 FEET;

Y) THENCE WITH A BEARING OF NORTH 05° 48′ 05" WEST, A DISTANCE OF 129.19 FEET;

Z) THENCE WITH A BEARING OF NORTH 05° 48′ 05" WEST, A DISTANCE OF 109.10 FEET;

AA) THENCE WITH A BEARING OF NORTH 03° 16′ 33" WEST, A DISTANCE OF 125.43 FEET;

BB) THENCE WITH A BEARING OF NORTH 07° 30′ 24" EAST, A DISTANCE OF 124.58 FEET;

CC) THENCE WITH A BEARING OF NORTH 02° 00′ 59" WEST, A DISTANCE OF 78.80 FEET;
MORE OR LESS TO THE POINT OF BEGINNING.

CONTAINING 9.21 ACRES MORE OR LESS.

FILED FOR RECORD
MARTIN CO., FLA.
93 JUL 15 PM 3:46
MARSHA STILLER
CLERK OF CIRCUIT COURT
BY D.C.

J:\JUMP\LESTVACOU\LINEAR.FAC

1012746

RECORD VERIFIED

DOC-DEED $ 70 MARSHA STILLER

DOC-MTG $ _____ MARTIN COUNTY

DOC-ASM $ _____ CLERK OF CIRCUIT COURT

INT. TAX $ _____ BY WT D.C.

THIS INSTRUMENT PREPARED BY:
Douglas S. Roberts - Hopping Boyd Green & Sams, Tallahassee, FL.
AND SHOULD BE RETURNED TO FLORIDA POWER & LIGHT CO.
Duane O. Bateman
Land Management - Golden Bear
11770 U.S. Highway #1
North Palm Beach, Fl 33408-8801

DEED OF CONSERVATION EASEMENT

THIS DEED OF CONSERVATION EASEMENT is given this 15th day of July, 1993, by Florida Power & Light Company at _____ ("Grantor") to the South Florida Water Management District, created under Chapter 373, Florida Statutes for the purpose of water resource protection, and whose principal address is 3301 Gun Club Road, West Palm Beach, FL 33406 ("Grantee").

W I T N E S S E T H

WHEREAS, the Grantor is the owner of certain lands situated in Martin County, Florida, and more specifically described in Exhibit A attached hereto and incorporated herein ("Property"); and

WHEREAS, the Grantor desires to construct multiple combined cycle electrical generating units, coal gasification facilities and other associated facilities ("Project") in several phases at the FPL Martin Plant Site ("Site") in Martin County, which Project will impact during its several phases wetlands under the regulatory jurisdiction of Grantee and other public regulatory agencies; and

WHEREAS, the first phase of the Project has been certified for construction and operation as part of the FPL Martin Coal Gasification/Combined Cycle CG/CC Project pursuant to the Power Plant Siting Act, Sections 403.501 - 403.518, Florida Statutes, by

GOVERNING BOARD ORDER NO. 93-48

certification order dated February 20, 1991 ("Certification Order"); and

WHEREAS, the Certification Order authorized such impacts to approximately 166 acres of wetlands within the Site during all phases of the Project as shown on Exhibit B attached hereto and incorporated herein; and

WHEREAS, the Certification Order requires the Grantor to provide compensation and/or mitigation for impacts to wetlands occurring as a result of the Project; and

WHEREAS, the Grantor has developed and proposed pursuant to the Certification Order a wetlands mitigation program named the "Martin CG/CC Project Northwest Parcel Mitigation, Monitoring and Maintenance Plan" dated June,1993 ("NWP Mitigation Plan"), as that Plan may be revised mutually by the parties hereto, involving enhancement, restoration and preservation of various wetland systems on the Property to compensate for the impacts to wetlands resulting from the Project; and

WHEREAS, the Grantee was a party to the proceeding in which the Certification Order was issued; and

WHEREAS, the Grantor, in consideration of the consent granted by the Certification Order, is agreeable to granting and securing to the Grantee the enforcement of a perpetual conservation easement as defined in Section 704.06, Florida Statutes (1991), over the Property.

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NOW, THEREFORE, in consideration of the issuance of the Certification Order to construct and operate the Project including, but not limited to, the authorization to impact approximately 166 acres of wetlands within the Site during all phases of the Project, Grantor hereby grants, creates, and establishes a perpetual conservation easement for the Grantee upon the Property which shall run with the land and be binding upon the Grantor, its heirs, successors and assigns, and remain in full force and effect forever.

The scope, nature, and character of this conservation easement shall be as follows:

1. It is the purpose of the conservation easement to ensure that no activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, wetlands or fish and wildlife habitat preservation are undertaken on the Property, except for those activities of the Grantor or its agents in preserving, enhancing or restoring the wetlands on the Property in accordance with the requirements of the Certification Order or the NWP Mitigation Plan. To carry out this purpose, the following rights are conveyed to Grantee by this easement:

(a) To enter upon the Property at reasonable times to enforce the rights herein granted upon prior notice to Grantor, its heirs, successors or assigns, in a manner that will not unreasonably interfere with the use and quiet enjoyment of the Property by Grantor, its heirs, successor or assigns, at the time of such entry; and

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(b) To enjoin any activity on or use of the Property that is inconsistent with the purpose of this conservation easement and to enforce the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use.

2. The following activities are prohibited in or on the Property except as otherwise authorized in the NWP Mitigation Plan or the Certification Order as they now exist or as they may be amended in the future:

(a) Construction or placing of buildings, roads, signs, billboards or other advertising, utilities, or other structures on or above the ground.

(b) Dumping or placing of soil or other substance or material as landfill, or dumping or placing of trash, waste, or unsightly or offensive materials.

(c) Removal or destruction of trees, shrubs, or other vegetation except for removal of noxious or exotic vegetation as required in the Northwest Parcel Mitigation, Monitoring, and Maintenance Plan.

(d) Excavation, dredging, or removal of loam, peat, gravel, soil, rock, or other material substance in such manner as to affect the surface.

(e) Surface use except for purposes that permit the land or water area to remain predominantly in its natural condition or which receive prior written approval from the Grantee.

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(f) Activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation.

(g) Acts or uses detrimental to such retention of land or water areas, or which are detrimental to the preservation of any wetlands on the property.

(h) Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or cultural significance.

3. Grantor reserves to itself, its heirs, successors or assigns all rights as owner of the Property, including the right to engage in all uses of the Property that are not prohibited herein.

4. No right of access by the general public to any portion of the Property is conveyed by this conservation easement.

5. Grantor shall bear all costs and liabilities of any kind related to the operation, upkeep and maintenance of the Property and does hereby indemnify and hold Grantee harmless therefrom, except where such costs or liabilities are created or caused by the Grantee, its successors, assigns or contractors.

6. Grantor shall pay any and all real property taxes and assessments levied by competent authority on the Property.

7. Any costs incurred by Grantee in enforcing, judicially or otherwise, the terms and restrictions of this conservation easement against Grantor, its heirs, successors or assigns, be borne by and

OR BK 1024 PG 1139

recoverable against Grantor, its heirs, successors or assigns, as long as Grantee is the prevailing party in such proceedings.

8. Enforcement of the terms and provisions of the conservation easement shall be at the reasonable discretion of Grantee, and any forbearance on behalf of Grantee to exercise its rights hereunder in the event of any breach hereof by Grantor, its heirs, successors or assigns, shall not be deemed or construed to be a waiver of Grantee's rights hereunder in the event of a subsequent breach.

9. Grantee will hold this conservation easement exclusively for conservation purposes. Grantee will not assign its rights and obligations under this conservation easement without prior written consent of the Grantor or its successors and except to another organization qualified to hold such interests under the applicable state and federal laws and committed to holding this conservation easement exclusively for conservation purposes. Grantor agrees that it will not sell the Property which is subject to this Easement without giving Grantee at least sixty (60) days written notice prior to transfer of title.

10. If any provision of this conservation easement or the application thereof to any person or circumstances is found to be invalid, the remainder of the provisions of this conservation easement and the applications of such provision to persons or

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circumstances other than those as to which it is found to be invalid shall not be affected thereby, as long as the purpose of the conservation easement is preserved.

11. All notices, consents, approvals or other communications hereunder shall be in writing and shall be deemed properly given if sent by United States certified mail, return receipt requested, addressed to the appropriate party or successor-in-interest.

12. The terms, conditions, restrictions and purposes of this conservation easement will be inserted by Grantor in any subsequent deed or other legal instrument by which Grantor divests itself of any interest in the Property. Any future purchaser of the Grantor's interest in the Property shall be notified in writing by Grantor of this conservation easement.

13. This conservation easement may be amended, altered, released or revoked only by written agreement between the parties hereto or their heirs, assigns and successors-in-interest.

14. The intent of this Easement is to retain in its natural or restored state the amount of land within the Property that is actually required to compensate for the wetland impacts resulting from the development of the Project. The parties to this agreement recognize that the actual amount of land required to be subject to this Easement will not be capable of final determination until completion of the NWP Mitigation Plan. The Grantor and Grantee therefore agree that the extent of the Property to be subject

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ultimately and perpetually to this Easement shall be evaluated upon the successful conclusion of the wetlands mitigation program set forth in the NWP Mitigation Plan. The purpose of that evaluation shall be to determine whether the amount of land subject to this Easement, as described in Exhibit A attached hereto, may be adjusted or reduced and whether Exhibit A hereto may be amended based upon the final results of the implementation of the NWP Mitigation Plan.

TO HAVE AND TO HOLD unto Grantee, its successors and assigns forever. The covenants, terms, conditions, restrictions and purposes imposed with this conservation easement shall not only be binding upon Grantor, but also its agents, heirs, assigns and all other successors to it in interest, and shall continue as a servitude running in perpetuity with the Property.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
BY ITS GOVERNING BOARD

GOVERNING BOARD OF SOUTH FLORIDA WATER MANAGEMENT DISTRICT
STATE OF FLORIDA
SEAL
Established 1949

BY: _____
Deputy Executive Director

ATTEST:

By: _____
Assistant Secretary

FILED WITH THE CLERK OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT
ON July 20, 1993
BY Barbara Fronczek
DEPUTY CLERK

ORBK 1024 PG 1142

IN WITNESS WHEREOF, Florida Power & Light Company has hereunto set its authorized hand this 18 day of JUNE, 1993.

Signed, sealed and delivered in our presence as witnesses:

FLORIDA POWER & LIGHT COMPANY, a Florida corporation

Maureen M. Kerrison
Name: MAUREEN M. KERRISON

By:
Name: Jay W. Molyneaux
Title: Director of Land Management, and Assistant Secretary
P.O. Box 14000, Juno Beach, FL 33408-0420

Patricia A. Goudreau
Name: Patricia A. Goudreau

STATE OF FLORIDA:
COUNTY OF PALM BEACH

On this 18 day of JUNE, 1993, before me, the undersigned notary public, personally appeared Jay W. Molyneaux, personally known to me to be the person who subscribed to the foregoing instrument and did not take an oath, as Assistant Secretary, of Florida Power & Light Company, a Florida corporation and acknowledged that he executed the same on behalf of said District and that he was duly authorized to do so.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Barbara C. Hill
NOTARY PUBLIC
Barbara C. Hill
Name

My Commission Expires:

NOTARY PUBLIC STATE OF FLORIDA
MY COMMISSION EXP.OCT. 13,1995
BONDED THRU GENERAL INS. UND.

OR BK 1024 PG 1143

FPL

DEPARTMENT OF
ENVIRONMENTAL PROTECTION
MAR 18 2009
SITING COORDINATION

March 17, 2009

James J. Golden, AICP
Lead Planner
Environmental Resource Regulation Department
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33401

RE: **SITE CERTIFICATION PA89-27M**
WETLAND MONITORING PLAN
FPL MARTIN NEXT GENERATION SOLAR ENERGY CENTER

Dear Mr. Golden,

On Friday February 27, 2009, FPL met with the South Florida Water Management District (SFWMD), specifically Mindy Parrott. We discussed the recent post-certification submittals regarding dewatering and wetland impacts at the Martin Next Generation Solar Energy Center. This correspondence provides information requested by District during that meeting.

The Wetland Monitoring Plan is attached. This plan describes the proposed monitoring for wetlands during dewatering and post-construction monitoring of the temporary haul road. This plan is being submitted for your review and approval.

If you should have any questions regarding this letter and the attachment, please do not hesitate to contact me at 561-691-7065.

Sincerely,

Stacy M. Foster

Stacy M. Foster
Environmental Project Manager
FPL Environmental Services

Cc: Melinda Parrott – SFWMD Martin/St. Lucie Service Center
Mike Halpin – FDEP Siting Office

WETLAND MONITORING PLAN
MARTIN NEXT GENERATION SOLAR ENERGY CENTER
MARTIN COUNTY, FLORIDA

Prepared For:
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408

Prepared By:
Golder Associates Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500

March 2009

0938-7562

FPL MARTIN NEXT GENERATION SOLAR ENERGY CENTER WETLAND MONITORING PLAN

I. INTRODUCTION

The approved Martin Next Generation Solar Energy Center being constructed by Florida Power & Light Company (FPL) includes the use of two borrow areas, one on the east side of the site and one northeast of the site. The excavation of the borrow areas may require dewatering. There are wetlands within 1,000 feet of the proposed borrow areas that are not permitted for dredge or fill, and South Florida Water Management District (SFWMD) has requested that the water level in these wetlands be monitored throughout the dewatering period to document any hydrologic impacts associated with the adjacent dewatering activities.

Access to the borrow area northeast of the solar facility will be via a temporary haul road, the construction of which has resulted in 0.34 acre of impact to wet prairie wetlands. The temporary haul road will be removed once the borrow operation has been completed, and the pre-existing grade of the wetlands within the footprint of the road will be restored. The wetlands will then be allowed to revegetate naturally. SFWMD has also requested that the restoration and recovery process of these temporarily-impacted wetlands be monitored.

II. WETLAND HYDROLOGY MONITORING

The excavation of the borrow areas may require dewatering. Three wetland areas have been identified as being within 1,000 feet of the borrow areas (Figure 1). A piezometer and staff gauge will be placed in each wetland as depicted, and one piezometer and staff gauge will be placed in a reference wetland more than 1,000 feet from the borrow areas. Groundwater and/or surface water levels will be measured weekly throughout the dewatering period, and the results will be provided to SFWMD monthly. A final report will be provided at the end of the monitoring period.

III. WETLAND RESTORATION MONITORING

Access to the borrow area northeast of the solar facility will be via a temporary haul road. The haul road will be removed once the borrow operation has been completed, the pre-existing grade of the wetlands within the footprint will be restored, and the areas will be allowed to revegetate naturally.

Monitoring will include photo documentation of the temporary wetland impact areas (Figure 1) before and immediately after regrading, 6 months after regrading, and 1 year post grading. In addition, the vegetative community will be documented, including species composition and relative percent cover within the restoration areas. Reports will be submitted to SFWMD documenting the vegetative succession after the 6- and 12-month monitoring events, including a description of the progress of the restored wetlands toward meeting the restoration success criteria below.

a. Success Criteria

1. At least 80-percent cover by appropriate native herbaceous species (FAC, FACW, and OBL) has been obtained.

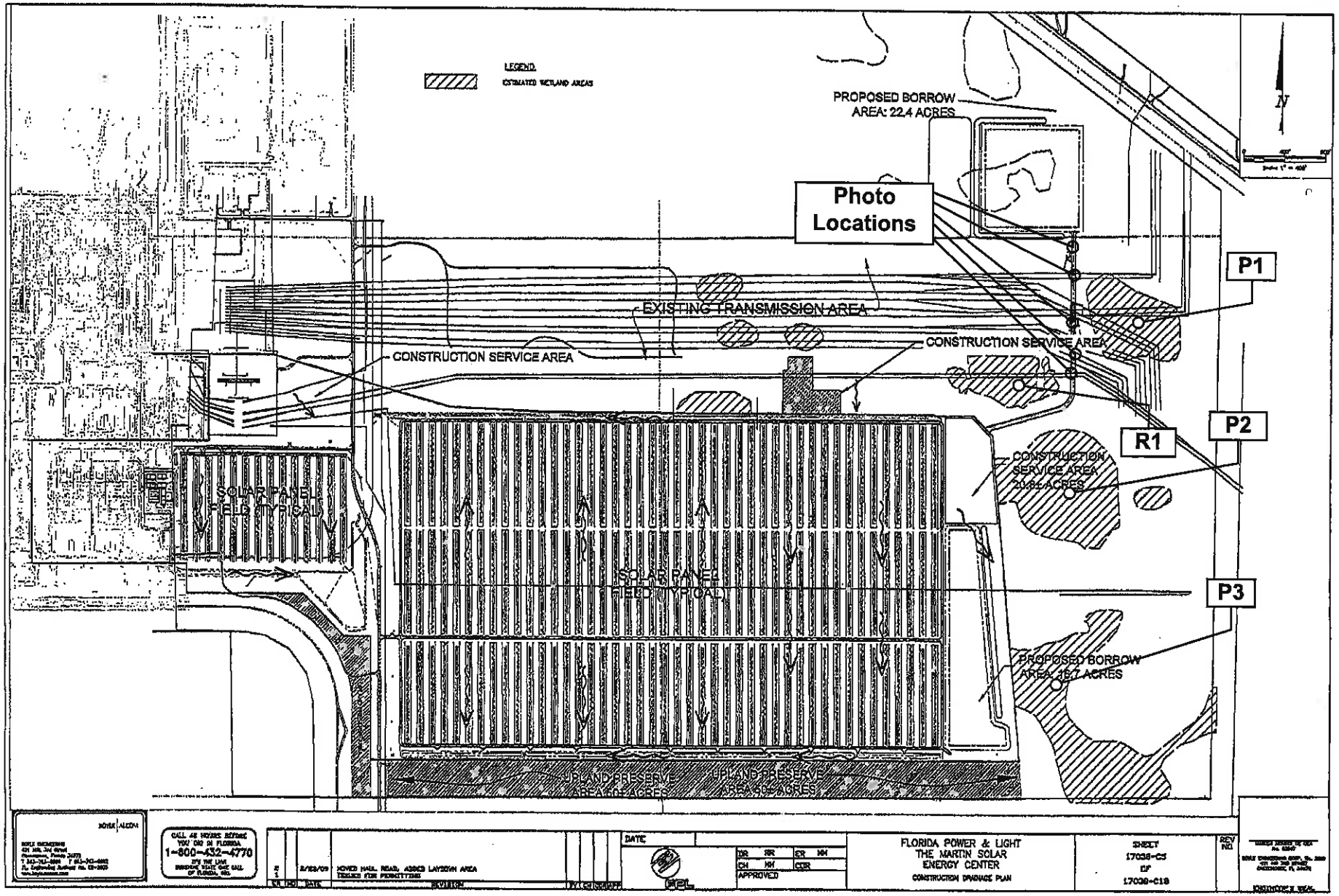
2. The above criteria have been achieved by the end of a 1-year period following initial grading.

If the restored wetlands demonstrate successful establishment of native vegetation within the temporarily impacted areas and fulfill success criteria within 1 year following restoration of natural grade, no further monitoring will be required. If the success criteria are not met at the end of 1 year post-grading, a supplemental planting plan will be submitted to SFWMD for their approval prior to implementation.

March 2009

Figure 1

P938-7562



Key:
P1-P3 = monitoring piezometers
R1 = reference piezometer

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

LAN 04-06

March 25, 2009

Ms. Stacy M. Foster
Principal Environmental Specialist
Florida Power and Light Company
Environmental Services Department
700 Universe Boulevard
Juno Beach, FL 33408

Dear Ms. Foster:

Subject: FPL Martin Solar Energy Center, PA 89-27M
Post-Certification Submittal
Stormwater Management System Construction Plans
Authorization to Commence Construction

South Florida Water Management District (SFWMD) staff has reviewed the proposed stormwater management plans for the above subject project submitted on December 24, 2008, and revised on February 26, 2009, March 18, 2009 (inclusion of Wetland Monitoring Plan), and March 24, 2009 (revised Wetland Monitoring Plan) in response to the Conditions of Certification that pertain to matters that require SFWMD approval prior to the commencement of construction.

The construction plans for the proposed stormwater management system for the Unit 8 solar project, including the related borrow pits and temporary haul road, are consistent with SFWMD criteria and the applicable Conditions of Certification for the FPL Martin project. This authorization to commence construction presumes that all construction and maintenance activities will be performed in compliance with:

(1) The construction plans and specifications, as contained in the detailed engineering drawings submitted by FPL on the above listed dates;

(2) The wetland monitoring plan for the temporary haul road/borrow pits submitted by FPL on the above listed dates;

(3) The construction dewatering plans for the proposed borrow pits submitted by FPL on March 11, 2009, and approved under separate authorization letter by the SFWMD on this date; and

(4) All of the conditions in the Certification Order that are applicable to the FPL Martin project including, in particular, those conditions that address activities during and after construction

This letter shall not be construed as a waiver by the SFWMD of any of the requirements specified in any of the Certification Conditions contained in the Certification Order.

Prior to commencement of construction activities, please contact Scott McNabb and Guy Boisclair at (772) 223-2600 to schedule a pre-construction meeting and an inspection of the silt fence/turbidity barrier, respectively.

Further inquiries regarding this matter should be directed to Jim Golden at (561) 682-6862.

Sincerely,

Anthony M. Waterhouse, P.E.
Deputy Director
Environmental Resource Regulation Department

AMW/jg

c: Michael P. Halpin, DEP

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

LAN 04-06

March 25, 2009

Ms. Stacy M. Foster
Principal Environmental Specialist
Florida Power & Light Company
Environmental Services Department
700 Universe Boulevard
Juno Beach, FL 33408

Dear Ms. Foster:

Subject: FPL Martin Solar Energy Center, PA 89-27M
Post Certification Submittal
Borrow Pit Construction
Authorization to Commence Construction Dewatering Activities

South Florida Water Management District (SFWMD) staff has reviewed the construction dewatering plans for the above subject project submitted on March 11, 2009 in response to the Conditions of Certification that pertain to matters that require SFWMD approval prior to commencement of construction.

The proposed construction dewatering plans for Unit 8 solar project borrow pits are consistent with SFWMD criteria and the applicable Conditions of Certification for the FPL Martin project. This authorization to commence construction dewatering activities presumes that the proposed dewatering activities will be performed in compliance with:

(1) The construction dewatering plans and specifications, as contained in the detailed engineering drawings submitted by FPL on the above date; and

(2) The wetland monitoring plan for the temporary haul road/borrow pits submitted by FPL on March 18, 2009, and revised on March 24, 2009, and approved under separate authorization letter by the SFWMD on this date.

Prior to commencement of construction activities within the power block area, or any other areas of the proposed project where construction dewatering activities may be necessary, the Licensee or the Licensee's consultants shall submit the details of the proposed construction dewatering activities to the SFWMD for review and approval, pursuant to Certification Condition VI.B.3.a.

At least 72 hours prior to commencement of dewatering activities, please contact Jay Floyd at (561) 682-6971 to schedule a site inspection.

Further inquiries regarding this matter should be directed to Jim Golden at (561) 682-6862.

Sincerely,

James Harmon, P.G.
Water Use Division Director

JH/jg

c: Michael P. Halpin, DEP

ATTACHMENT D: Groundwater Monitoring Requirements (if applicable)