# TAMPA ELECTRIC COMPANY

# POLK POWER STATION
**Polk County, Florida**

# SITE CERTIFICATION APPLICATION

## VOLUME 5

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**July 1992**

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## LIST OF ACRONYMS

| | |
|---|---|
| 7Q10 | 7-day, 10-year flow rate |
| AADT | average annual daily trips |
| AAQS | ambient air quality standard |
| ACSR | aluminum conductor steel reinforced |
| Agrico | Agrico Chemical Company |
| AM | amplitude modulation |
| A/RR | Agricultural/Residential Rural |
| ASTM | American Society for Testing and Materials |
| BACT | best available control technology |
| BEBR | Bureau of Economic and Business Research |
| BLIS | BACT/LAER information system |
| BOCC | Board of County Commissioners |
| BOD | biochemical oxygen demand |
| Btu | British thermal unit |
| Btu/$ft^3$ | British thermal units per cubic foot |
| Btu/gal | British thermal units per gallon |
| Btu/lb | British thermal units per pound |
| °C | degree Celsius |
| $CaCO_3$ | calcium carbonate |
| CC | combined cycle |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CFRPC | Central Florida Regional Planning Council |
| cfs | cubic foot per second |
| CG | coal gasification |
| CGCU | cold gas cleanup |
| CITES | Convention on International Trade in Endangered Species |
| cm | centimeter |
| cm/sec | centimeter per second |

LIST OF ACRONYMS
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| | |
|---|---|
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| COD | chemical oxygen demand |
| COS | carbonyl sulfide |
| CPT | cone penetration test |
| CR | County Road |
| $CS_2$ | carbon disulfide |
| CSM | cubic foot per second per square mile |
| CT | combustion turbine |
| CUP | Conditional Use Permit |
| CWA | Clean Water Act |
| ° | degree |
| d | Shannon Weaver diversity index |
| dBA | A-weighted decibel |
| dbh | diameter at breast height |
| DO | dissolved oxygen |
| DOE | U.S. Department of Energy |
| DSM | demand-side management |
| ECT | Environmental Consulting & Technology, Inc. |
| EEI | Edison Electric Institute |
| EIS | environmental impact statement |
| EIV | Volume of Environmental Information |
| EMF | electromagnetic field |
| EMS | emergency medical services |
| EPA | U.S. Environmental Protection Agency |
| EPRI | Electric Power Research Institute |
| °F | degree Fahrenheit |
| F.A.C. | Florida Administrative Code |
| FCC | Federal Communications Commission |

| | |
|---|---|
| FCG | Florida Electric Power Coordinating Group |
| FCREPA | Florida Committee on Rare and Endangered Plants and Animals |
| FDACS | Florida Department of Agriculture and Consumer Services |
| FDCA | Florida Department of Community Affairs |
| FDER | Florida Department of Environmental Regulation |
| FDER/PSES | FDER Point Source Evaluation Section |
| FDHR | Florida Division of Historical Resources |
| FDLES | Florida Department of Labor and Employment Security |
| FDNR | Florida Department of Natural Resources |
| FDOT | Florida Department of Transportation |
| FEECA | Florida Energy Efficiency and Conservation Act |
| FEMA | Federal Emergency Management Agency |
| FEPPSA | Florida Electrical Power Plant Siting Act |
| FGD | flue gas desulfurization |
| FGFWFC | Florida Game and Fresh Water Fish Commission |
| FGS | Florida Geological Survey |
| FGT | Florida Gas Transmission Company |
| FLUCCS | Florida Land Use and Cover Classification System |
| FLUCFS | FDOT Land Use, Cover, and Forms Classification System |
| FM | frequency modulation |
| FNAI | Florida Natural Areas Inventory |
| FPC | Florida Power Corporation |
| FPSC | Florida Public Service Commission |
| FR | Federal Register |
| F.S. | Florida Statutes |
| FSRI | Florida Sinkhole Research Institute |
| ft | foot |
| ft bls | foot below land surface |
| ft/day | foot per day |

| | |
|---|---|
| $ft^2$/day | square foot per day |
| $ft^3$/day | cubic foot per day |
| $ft^3$/day/$ft^3$ | cubic foot per day per cubic foot |
| ft/ft | foot per foot |
| $ft^3$/hr | cubic foot per hour |
| ft-msl | foot above mean sea level |
| ft-NGVD | foot national geodetic vertical datum |
| FTE | full-time equivalent |
| GE | General Electric Company |
| GEESI | General Electric Environmental Systems, Inc. |
| gpd | gallon per day |
| gpm | gallon per minute |
| gpm/ft | gallon per minute per foot |
| gpm/$ft^2$ | gallon per minute per square foot |
| gr/scf | grains per standard cubic foot |
| gr/100 scf | grains per 100 standard cubic feet |
| $H_2S$ | hydrogen sulfide |
| $H_2SO_4$ | sulfuric acid |
| HGCU | hot gas cleanup |
| HHV | higher heating value |
| HRSG | heat recovery steam generator |
| HUD | Housing Urban Development |
| IGCC | integrated coal gasification combined cycle |
| IWTP | industrial wastewater treatment plant |
| kg | kilogram |
| km | kilometer |
| kV | kilovolt |
| kV/m | kilovolt per meter |
| kw | kilowatt |

## LIST OF ACRONYMS
(Continued, Page 5 of 8)

| | |
|---|---|
| kwh | kilowatt hour |
| LAER | lowest achievable emission rate |
| lb/day | pound per day |
| $lb/ft^3$ | pound per cubic foot |
| lb/hr | pound per hour |
| lb/MMBtu | pound per million British thermal units |
| $L_{dn}$ | day-night sound level |
| $L_{eq}$ | equivalent noise level |
| $L_{eq}(24)$ | equivalent sound level for 24-hour periods |
| LHV | lower heating value |
| LOLP | loss of load probability |
| LOS | level of service |
| LRU | logical reclamation unit |
| m | meter |
| $m^2$ | square meter |
| MCR | maximum current rating |
| mG | milligauss |
| mg/L | milligram per liter |
| MGD | million gallons per day |
| $mi^2$ | square mile |
| mL | milliliter |
| mph | miles per hour |
| MVA | megavolt amperes |
| MW | megawatt |
| NAS | National Audubon Society |
| NEPA | National Environmental Policy Act of 1969 |
| NESC | National Electrical Safety Code |
| NESHAPS | National Emission Standard for Hazardous Air Pollutants |
| NGVD | National Geodetic Vertical Datum |

| | |
|---|---|
| $NH_3$ | ammonia |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxides |
| NPDES | National Pollutant Discharge Elimination System |
| NSCR | non-selective catalytic reduction |
| NSPS | new source performance standards |
| NSR | New Source Review |
| NTU | nephelometric turbidity unit |
| NWS | National Weather Service |
| $O_3$ | ozone |
| OAQPS | Office of Air Quality Planning and Standards |
| organisms/$m^2$ | organisms per square meter |
| PCB | polychlorinated biphenyl |
| pCi/L | picoCurie per liter |
| persons/$mi_2$ | persons per square mile |
| PHX | primary heat exchanger |
| PM | particulate matter |
| $PM_{10}$ | particulate matter less than or equal to 10 micrometers aerodynamic diameter |
| POS | plan of study |
| POTW | publicly owned treatment works |
| ppb | part per billion |
| ppm | part per million |
| ppmv | part per million volumetric |
| ppmvd | dry volume parts per million |
| PRECO | Peace River Electric Cooperative |
| PSD | prevention of significant deterioration |
| psia | pound per square inch absolute |
| psig | pound per square inch gauge |

| | |
|---|---|
| Pt-Co | platinum-cobalt |
| PVC | polyvinyl chloride |
| QA/QC | quality assurance/quality control |
| R-1 | Residence |
| RC | Rural Conservation |
| RCC | Rural-Cluster Center |
| R.O. | reverse osmosis |
| RCRA | Resource Conservation and Recovery Act |
| RMD | Rural Mixed-Use Development |
| rpm | revolutions per minute |
| RRD | Rural Residential |
| RV | recreational vehicle |
| SARA | Superfund Amendment and Reauthorization Act |
| SCA | Site Certification Application |
| scf | standard cubic foot |
| SCR | selective catalytic reduction |
| SCS | Soil Conservation Services |
| SF-1M | Single Family-Mixed |
| SIC | Standard Industrial Classification |
| SMSA | Standard Metropolitan Statistical Area |
| SNCR | selective non-catalytic reduction |
| $SO_2$ | sulfur dioxide |
| $SO_3$ | sulfur trioxide |
| SOP | standard operating procedure |
| SPCC | Spill Prevention, Control, and Countermeasure |
| SPT | standard penetration test |
| SR | State Road |
| ST | steam turbine |
| stpd | short-tons per day |

| | |
|---|---|
| SUS | Saybolt Universal seconds |
| SWFWMD | Southwest Florida Water Management District |
| TCLP | toxicity characteristic leaching procedure |
| TDS | total dissolved solids |
| Texaco | Texaco, Inc. |
| tpd | ton per day |
| tpy | ton per year |
| TSP | total suspended particulate |
| TSS | total suspended solids |
| UE&C | United Engineers & Constructors |
| $\mu$g/L | microgram per liter |
| $\mu g/m^3$ | microgram per cubic meter |
| $\mu$mhos/cm | micromhos per centimeter |
| U.S.C. | United States Code |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UTM | Universal Transverse Mercator |
| VOC | volatile organic compound |
| WUP | water use permit |

# APPENDIX 11.2

## STATE PERMIT APPLICATIONS

11.2.1 APPLICATION TO CONSTRUCT/OPERATE AIR POLLUTION SOURCES
11.2.2 WATER USE PERMIT APPLICATION
11.2.3 SURFACE WATER MANAGEMENT CONCEPTUAL PERMIT APPLICATION
11.2.4 CONCEPTUAL FDOT DRIVEWAY CONNECTION REVIEW REQUEST

# 11.2.1 APPLICATION TO CONSTRUCT/OPERATE AIR POLLUTION SOURCES

STATE OF FLORIDA

# DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

## APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Electrical Power Generation [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [X] Construction [ ] Operation [ ] Modification

COMPANY NAME: Tampa Electric Company COUNTY: Polk

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Polk Power Station Unit No. 1 and Future CC/CT Units

SOURCE LOCATION: Street State Road 37 City

UTM: East 402.45 North 3067.35

Latitude 27 ° 43 ' 43 "N Longitude 81 ° 59 ' 23 "W

APPLICANT NAME AND TITLE: A. Spencer Autry, Director, Environmental

APPLICANT ADDRESS: P.O. Box 111, Tampa, Florida 33601-0111

### SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Tampa Electric Company

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: [signature]

A. Spencer Autry, Director, Environmental
Name and Title (Please Type)

Date: 7/24/92 Telephone No. 813/228-4838

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed Thomas W. Davis

Thomas W. Davis
Name (Please Type)

Environmental Consulting & Technology, Inc.
Company Name (Please Type)

P.O. Box 8188, Gainesville, Florida 32605-8188
Mailing Address (Please Type)

Florida Registration No. 36777 Date: July 25, 1992 Telephone No. 904/336-0444

## SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Construction of a nominal 1,150-MW power plant. Unit No. 1 will consist of a nominal 260-MW integrated coal gasification combined cycle facilty, including ancillary equipment. The remaining generating facilities will be made up of stand-alone combined cycle units and combustion turbines.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction January 1994 Completion of Construction July 1995

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See Section 4.0 of the PSD Permit Application (SCA Appendix 11.1.3).

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Not applicable.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr 8760; if seasonal, describe:

Note: some generating units will be permitted for less than 8760 hr/yr of operation.

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No

   a. If yes, has "offset" been applied?

   b. If yes, has "Lowest Achievable Emission Rate" been applied?

   c. If yes, list non-attainment pollutants.

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes*

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. Yes*

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes*

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants?

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

* See PSD Permit Application.

## SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable: See SCA Section 3.0.

| Description | Contaminants | | Utilization Rate - lbs/hr | Relate to Flow Diagram |
|---|---|---|---|---|
| | Type | % Wt | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

B. Process Rate, if applicable: (See Section V, Item 1) Not applicable.

1. Total Process Input Rate (lbs/hr): ____________________

2. Product Weight (lbs/hr): ____________________

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary) See Sections 2.0 and 4.0 of PSD Permit Application.

| Name of Contaminant | Emission[1] | | Allowed[2] Emission Rate per Rule 17-2 | Allowable[3] Emission lbs/hr | Potential[4] Emission | | Relate to Flow Diagram |
|---|---|---|---|---|---|---|---|
| | Maximum lbs/hr | Actual T/yr | | | lbs/yr | T/yr | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4) See Section 4.0 of PSD Permit Application.

| Name and Type (Model & Serial No.) | Contaminant | Efficiency | Range of Particles Size Collected (in microns) (If applicable) | Basis for Efficiency (Section V Item 5) |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

E. Fuels See SCA Section 3.3.

| Type (Be Specific) | Consumption* | | Maximum Heat Input (MMBTU/hr) |
|---|---|---|---|
| | avg/hr | max./hr | |
| | | | |
| | | | |
| | | | |
| | | | |

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: ______ lbs/gal Typical Percent Nitrogen: ______

Heat Capacity: ______ BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating. Not applicable.

Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

See SCA Sections 3.5, 3.6, and 3.7.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

See Section 2.0 of PSD Permit Application.

Stack Height: ______ ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM ______ DSCFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

## SECTION IV: INCINERATOR INFORMATION Not applicable.

| Type of Waste | Type O (Plastics) | Type I (Rubbish) | Type II (Refuse) | Type III (Garbage) | Type IV (Patholog-ical) | Type V (Liq.& Gas By-prod.) | Type VI (Solid By-prod.) |
|---|---|---|---|---|---|---|---|
| Actual lb/hr Inciner-ated | | | | | | | |
| Uncon-trolled (lbs/hr) | | | | | | | |

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer ______

Date Constructed ______ Model No. ______

| | Volume $(ft)^3$ | Heat Release (BTU/hr) | Fuel | | Temperature (°F) |
|---|---|---|---|---|---|
| | | | Type | BTU/hr | |
| Primary Chamber | | | | | |
| Secondary Chamber | | | | | |

Stack Height: ______ ft. Stack Diamter: ______ Stack Temp. ______

Gas Flow Rate: ______ ACFM ______ DSCFM* Velocity: ______ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) ______

Brief description of operating characteristics of control devices: ______________________

______________________

______________________

______________________

______________________

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

______________________

______________________

______________________

______________________

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

## SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]
   Not applicable.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made. See Sections 2.0 and 4.0, and Appendix A of PSD Permit Application.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
   See Sections 2.0 and 4.0, and Appendix A of PSD Permit Application.
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.) See Section 4.0 of PSD Permit Applicatio
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency). See Section 4.0 of PSD Permit Application.
6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. See Section 2.0 of PSD Permit Application.
7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
   See Section 2.0 of PSD Permit Application.
8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.
   See Section 2.0 of PSD Permit Application.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

## SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

See Section 4.0 of PSD Permit Application.

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

| Contaminant | Rate or Concentration |
|---|---|
| | |
| | |
| | |
| | |

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

| Contaminant | Rate or Concentration |
|---|---|
| | |
| | |
| | |
| | |

C. What emission levels do you propose as best available control technology?

| Contaminant | Rate or Concentration |
|---|---|
| | |
| | |
| | |
| | |

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

| Contaminant | Rate or Concentration |
|---|---|
| | |
| | |
| | |
| | |

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy [2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1] Explain method of determining efficiency.
[2] Energy to be reported in units of electrical power – KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

| Contaminant | Rate or Concentration |
|---|---|
| | |
| | |
| | |

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

| Contaminant | Rate or Concentration |
|---|---|
| | |
| | |
| | |

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

## SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. 2 no. sites 2 PM-10 ~~TSP~~ 1 ( ) $SO^{2}$* 1 Wind spd/dir

Period of Monitoring 04 / 01 / 91 to 03 / 31 / 92
month day year month day year

Other data recorded Ozone--1 site; other meteorological parameters--1 site

Attach all data or statistical summaries to this application. See SCA Appendix 11.11.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [X] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[X] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 5 Year(s) of data from 01 / 01 / 82 to 12 / 31 / 86 (month day year, month day year)

2. Surface data obtained from (location) Tampa, Florida

3. Upper air (mixing height) data obtained from (location) Ruskin, Florida

4. Stability wind rose (STAR) data obtained from (location) Tampa, Florida

C. Computer Models Used

1. SCREEN (Version 88300) Modified? If yes, attach description.

2. ISCST2 (Version 92062) Modified? If yes, attach description.

3. ISCLT2 (Version 92062) Modified? If yes, attach description.

4. MESOPUFF-II (Version 85360) Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data See Section 2.0 of PSD Permit Application.

| Pollutant | Emission Rate | |
|---|---|---|
| TSP | | grams/sec |
| $SO^2$ | | grams/sec |

E. Emission Data Used in Modeling See Section 6.0 of PSD Permit Application.

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review. See PSD Permit Application.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources. See SCA Section 7.0.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology. See PSD Permit Application.

## 11.2.2 WATER USE PERMIT APPLICATION

# INDIVIDUAL WATER USE PERMIT APPLICATION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 • (904)796-7211 or FLORIDA WATS 1(800)423-1476
*(SEE LAST PAGE OF THIS FORM FOR YOUR LOCAL PERMITTING OFFICE)*

## USE FOR QUANTITIES OF 500,000 GALLONS PER DAY OR GREATER

THIS FORM MUST BE COMPLETED FOR ALL APPLICANTS REQUESTING ANNUAL AVERAGE QUANTITIES OF 500,000 GPD OR GREATER. OTHER APPLICANTS MUST COMPLETE THE APPLICATION FORM CORRESPONDING TO THE PROPOSED QUANTITY. THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

*AN ASTERISK IDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE WUP APPLICATION.

**PLEASE SUBMIT *THREE COPIES* OF THIS APPLICATION ALONG WITH THREE COPIES OF THE APPROPRIATE SUPPLEMENTAL FORM (IF REQUIRED), DRAWINGS, CALCULATIONS, ETC.**

## I. GENERAL INFORMATION

1. Type of Application (Check One): ☒ New ☐ Renewal ☐ Modification
2. Water Use Permit Number (If application is for renewal or modification): N/A

***NOTE:*** "Applicant" is the name under which the permit will be issued (examples: Robert Jones; Baker Groves, Inc., Acme Industries, City of Sundale.) All correspondence will be addressed to the applicant unless an alternate contact is requested in Item 4.

**3. APPLICANT**

NAME Tampa Electric Company TELEPHONE ( 813 ) 228-4111
ADDRESS Post Office Box 111 COUNTY Hillsborough
CITY, STATE, ZIP Tampa, Florida 33601-0111
Applicant is: ☐ Owner ☐ Lessee ☒ Other Tampa Electric will own the site prior to project construction

**4. CONTACT OR CONSULTANT - Address all correspondence to the person identified below?** ☒ **Yes** ☐ **No**

NAME A. Spencer Autry
ADDRESS Post Office Box 111 TELEPHONE ( 813 ) 228-4111
CITY, STATE, ZIP Tampa, Florida 33601-0111

**5. OWNER (IF OTHER THAN APPLICANT)**

NAME
ADDRESS TELEPHONE ( )
CITY, STATE, ZIP

## II. PROPERTY CONTROL

1. Provide a legal description of the property served by this application. ☒ Attached

2. This property is: ☒ Owned by the applicant ☐ Leased by the applicant ☐ Applicant has other legal control

3. Leased property: Provide a copy of either (check type of document that is attached):
   ☐ Copy of lease ☐ Letter signed by the property owner describing the lease arrangement and the duration of the lease

***NOTE:*** Permits will not be issued for a duration longer than the lease, unless the lease is renewable. If renewable, the applicant may be required by Permit Condition to provide a copy of the renewed lease at the appropriate time. The property owner and the lessee must sign this application in Section VII.

4. Other Legal Control: If the applicant has legal control over the property other than a lease agreement, please provide a description on an attached sheet ☐ Attached ☒ N/A

## III. CLASSIFICATION

**SECTION A** - *Quantity*

1. Annual average quantity applied for, in gallons per day (gpd). This quantity should reflect the amount needed six years and ten years hence, or for the remainder of permit duration, if the application is for a modification:

   6 years: 6,600,000 (gpd) 10 years: 6,600,000 (gpd) Other: 6,600,000 (gpd)

2. Indicate the requested peak monthly pumpage quantity. See Section 3 of the *Basis of Review* for an explanation of this quantity.

   6 years 9,300,000 (gpd) 10 years 9,300,000 (gpd) Other: 9,300,000 (gpd)

**SECTION B** - *Water Use*

3. *Indicate all that apply. Information Supplements must be filled out for all uses. See Section 3 of the Basis of Review for explanations of the use classifications.*

   ☐ Public Supply ☐ Recreation or Aesthetic ☐ Agricultural
   ☒ Industrial or Commercial ☒ Mining or Dewatering

4. Indicate the date on which the use of water was initiated or is proposed for initiation (month/day/year): 03/01/94

5. Indicate the quantity and source of any reuse water used by the applicant:
   Annual Average Quantity 779,215 gpd; Peak Month Quantity 951,224 gpd; Source: Industrial waste streams

## IV. SITE/WITHDRAWAL INFORMATION

**SECTION A** - *Acreage*

1. Number of acres Owned: 4,348 ; Leased: ______ ; Serviced ______ .

2. Describe the location of the property contained in thie application by Section, Township, Range, I/4 Section:
   Sections 34,35 , Township 31 South , Range 23 East I/4 Section See Figure 11.2.2-1
   1-4, 7-12 32 South 23 East See Figure 11.2.2-1

**SECTION B** - *Location Maps*

See Figure 11.2.2-2

3. Provide a recent aerial map showing: (a) a north arrow; (b) a scale designation - all maps should have a minimum scale of 1"= 2,000'; (c) landmarks such as roads and political boundaries; (d) property boundaries - include approximate lengths of boundaries in feet; (e) withdrawal point locations - label withdrawal points, indicate the distance from the with drawal points to the nearest property boundaries in feet , *(If the withdrawal points are located on non-contiguous parcels, provide separate large-scale maps in addition to a large-scale map which includes all parcels); (f) the area serviced or irrigated, *(if the area serviced or irrigated is a distance from the withdrawal locations, provide separate map[s]).

   *May require separate or additional maps.

4. Use a Map (not necessarily an aerial) or a sketch of the applicant's property and surrounding area to indicate:

   See Figure 11.2.2-3

   a. Approximate location of other wells not owned by the applicant including domestic wells, irrigation wells, public water supply wells, etc. within the distance set forth in Item 5, Table 1, below. Supplemental locations at a greater distance may be required.
   b. Location of monitoring wells, including reference numbers.
   c. Wetlands greater than 0.5 acre in size, covering the area within the distance set forth in Item 5, below. Substantial off-site drawdown impacts may require additional aerial coverage. Mining applicants requirements differ, and are provided on the Mining and Dewatering Supplemental Form, Form No. WUP-6. See Figures 11.2.2-4 and 11.2.2-5

**SECTION C** - ***Adjacent Property Owners***

5. Submit a listing of the names and mailing addresses of property owners near the property contained in this application, based on the quantity to be withdrawn and the table provided below. You may choose a distance from either your property boundary or your withdrawal point. The District may require additional potentially affected property owners to be submitted.

*Section C, Item 5 continued on Page 3*

*Section C, Item 3 continued from Page 2*

***TABLE 1*** **- FOR WELL OR MINE PIT WITHDRAWALS OF:**

| Average GPD on an Annual Basis | *OR* Maximum GPD During Any Single Day | Provide Information on the Following: |
|---|---|---|
| 500,000 gpd but less than 1,000,000 gpd | More than 5,000,000 but not more than 10,000,000 gpd | All property owners within 1,320' of the well, or within 200' of your property boundary |
| 1,000,000 gpd or greater | More than 10,000,000 | All property owners within 2,640' of the well, or within 400' of your property boundary |

***TABLE 2*** **- FOR SURFACE WATER WITHDRAWALS:**

If your withdrawal is from a lake with a surface area of 80 acres or less, list below all riparian owners on the lake or impoundement.

If your withdrawal is from a lake larger than 80 acres, list below all riparian owners in either direction 660' from point where applicant's property intersects the shoreline.

If your withdrawal is from a stream and if the maximum daily average pumpage is less than 5,000,000 gpd, list below all riparian owners 660' upstream and 1,320' downstream from your property boundaries at the shoreline.

If your withdrawal is from a stream and if the maximum daily average pumpage is greater than or equal to 5,000,000 gpd, list below all riparian owners 1,320' upstream and 2,640' downstream from your property boundaries at the shoreline.

Name Mailing Address

(1) American Cyanamid Company, P.O. Box 5290, Lakeland, Florida 33807

(2) Agrico Chemical Company, A Division of Freeport MacMoran, Ltd.
P.O. Box 1110, Mulberry, Florida 33860

(3) Guy A. Lamb, 723 Northeast 7th Street, Fort Meade, Florida 33841

See Figure 11.2.2-3

**Section D -** ***Withdrawal Points*** See Figure 11.2.2-3

6. **Groundwater Withdrawals.** Include all wells on property greater than 2" in diameter, whether active or inactive, and whether existing or proposed, in the table on the following page:

**TABLE LEGEND:**
***SWFWMD I.D. No.*** - the withdrawal number assigned by the District, if existing.
***Owner I.D . No.*** - the owner's I.D. number.
***Construction Date*** - the approximate date that withdrawal point became operable.
***Average Withdrawal Rate*** - the total quantity of water to be withdrawn in one year divided by 365.
***Peak Monthly Withdrawal Rate*** - the maximum quantity to be withdrawn in a single month.
***Maximum Daily Withdrawal Rate*** - the maximum quantity to be withdrawn in any single day.
***Standby*** - refers to status of wells that would not be used unless another well becomes inoperable.
***Cap*** - the well is capped.
***Meter*** refers to whether a flow meter is installed: if several withdrawals are connected to the same meter (ganged), indicated by placing a letter character (a, b, etc.) instead of a check mark, linking those interconnected withdrawals by like characters.
***Monitor*** refers to water level or water quality monitors. Indicate the type of monitor by placing an L ("Level") , Q ("Quality"), or both in the space provided. The absence of checkmarks or letters indicates active status.
***Mainline Diameter*** - refers to the outside diameter of the main discharge pipe.
***Proposed*** - *check if the withdrawal point is proposed rather than existing.*

*Section D, continued on Page 4*

*Section D, continued from Page 3*

| ID No. SWFWMD | ID No. Owner | Diameter | Total Depth | Depth Cased | Construction Date | Pump Capacity (gpm) | Withdrawal Rate | | Proposed | Status (check): | | | | Mainline Diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Average Annual | Peak Month | | Mon. | Stdby. | Cap. | Met. | |
| -- | P1 | 10" | 900 | 300 | 12/94 | 290 | 369,580 | 412,037 | X | L | | | X | 12" est. |
| -- | P2 | 10" | 900 | 300 | 12/94 | 290 | 369,580 | 412,037 | X | L | X | | X | 12" est. |
| -- | P3 | 24" | 900 | 300 | 12/98 | 2,900 | 3,061,000 | 4,156,000 | X | L | | | X | 24" est. |
| -- | P4 | 24" | 900 | 300 | 12/98 | 2,900 | 3,061,000 | 4,156,000 | X | L | | | X | 24" est. |
| | | | | | | | | | | | | | | |

7. Indicate the future use of any capped source: N/A

8. Indicate the parameters sampled for any monitor wells listed above: Water levels

9. **Surface Water Withdrawals** - See the Groundwater withdrawal section above for explanation of most terms. Source name is the name of a lake, stream or other waterbody N/A

| ID No. SWFWMD | ID No. Owner | Source Name | Lake Acreage | Intake Diameter | Pump Capacity (gpm) | Withdrawal Rate | | Proposed | Status (check): | | | Mainline Diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Average Annual | Peak Month | | Active | Stdby. | Metered | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

10. **Other Sources** - Describe any other sources of water, such as from utilities, treated waste water effluent, etc. List annual average and peak month quantities for each additional source: Industrial wastewater effluent, sanitary effluent, and membrane process brine effluent account for 779,215 gpd and 951,224 gpd, average annual and maximum rates, respectively. These treated waste streams are used as a portion of the makeup into cooling water reservoir.

## V. IMPACTS

Are you aware of any adverse impacts that your withdrawals have or may have on other water users, offsite land uses, the water resources, or environmental features? If so, provide a detailed explanation of the impact and your plans to deal with it.

None Anticipated ☐ Explanation Attached ☒

See SCA Sections 4.3 and 5.3.2, Constructional and Operational Withdrawal Impacts
See SCA Sections 11.7.6 and 11.7.7, Constructional and Operational Withdrawal Impacts

## VI. HYDROGEOLOGY

Provide any information available on regional and site-specific hydrogeology, including aquifer characteristics, for all aquifers existing in the area of your withdrawals. Provide documentation and references in support of this information. If you do not have such information, hydrogeologic testing may be required either as additional information in support of your application, as a condition of the permit, or both. The District may use appropriate regional data in lieu of or in addition to submitted information to assess the impacts of your withdrawals. New hydrogeologic testing should follow the guidelines of Part C, *Permit Information Manual.*

See SCA Section 2.3.1, Geohydrology
See SCA Section 2.3.2, Subsurface Hydrology

## VII. APPLICANT CERTIFICATION

I hereby certify that the information contained herein is true and accurate and that I have legal authority to undertake the activities described herein and execute this application.

Applicant Signature — Date: 07/30/92

I hereby certify that the applicant has sufficient legal control of the property described in this application.

Property Owner (if other than applicant) — Date

## *APPLICANT CHECK LIST:*

Attachments requested in support of this application:

| | Attached | N/A |
|---|---|---|
| 1. (Section II-1)Copy of Legal Description | ☒ | ☐ |
| 2. (Section II-2)Copy of Current Lease | ☐ | ☒ |
| 3. (Section II-3)Description of Other Legal Property Control | ☐ | ☒ |
| 4. (Section IV-3)Aerial Map | ☒ | ☐ |
| 5. (Section IV-4)Site Map | ☒ | ☐ |
| 6. (Section IV-5)Adjacent Property Owners | ☒ | ☐ |
| 7. (Section VI)Hydrologic Information | ☒ | ☐ |
| 8. Appropriate Supplemental Form | ☒ | ☐ |

TAMPA ELECTRIC
A TECO ENERGY COMPANY

To Whom It May Concern:

Please be advised that A. Spencer Autry, Director of Environmental, is the authorized representative of Tampa Electric Company concerning matters with which this permit application deals.

Sincerely,

C R Black

Charles R. Black
Vice President
Project Management

/Permit2

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601-0111 (813) 223-0888

An Equal Opportunity Company

TAMPA ELECTRIC
A TECO ENERGY COMPANY

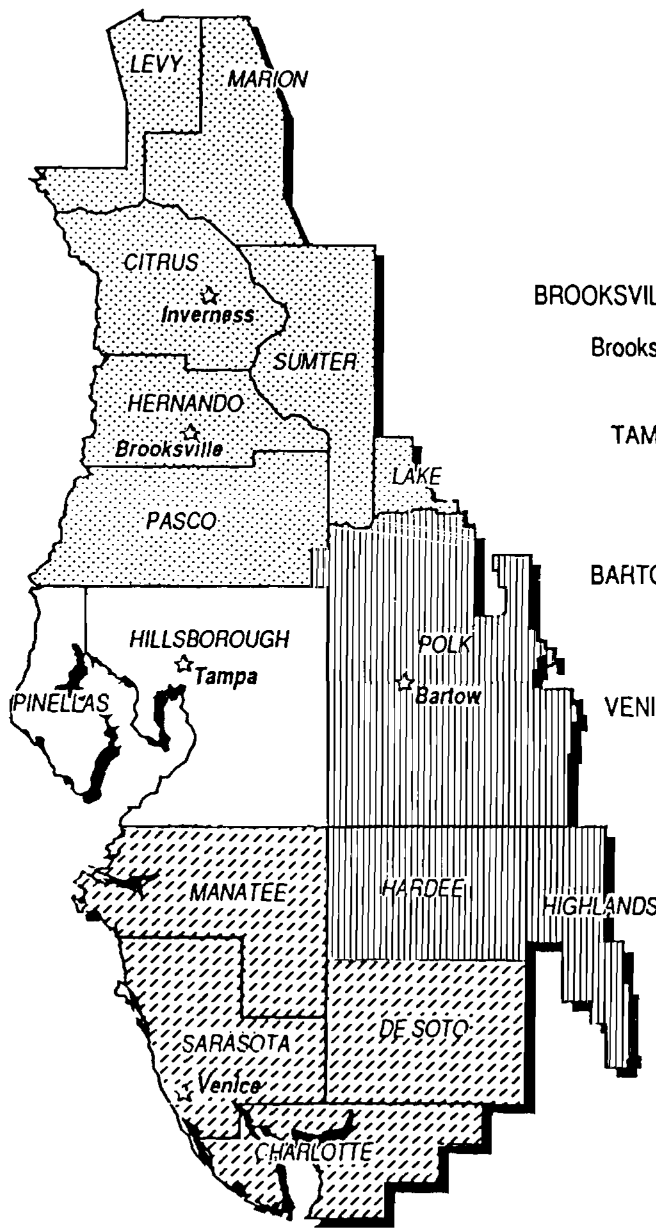
To Whom It May Concern:

Tampa Electric Company intends to acquire all lands designated in this application for the Polk Power Station and its associated facilities prior to the commencement of construction. This land will be used for construction of these facilities as described in the application.

Charles R. Black
Vice President
Project Management

/wp78

## DISTRICT PERMITTING REGIONS:




BROOKSVILLE PERMITTING DEPT.
2379 Broad Street
Brooksville, Florida 34609-6899
Phone (904) 796-7211
SUNCOM 628-4150

TAMPA PERMITTING DEPT.
7601 U.S. Hwy. 301
Tampa, Florida 33637
Phone (813) 985-7481
SUNCOM 578-2070

BARTOW PERMITTING DEPT.
970 East Main, Suite A
Bartow, Florida 33830
Phone (813) 534-7080

VENICE PERMITTING DEPT.
111 Corporation Way
Venice, Florida 34292
Phone (813) 488-4666

☆ District Service Office Location

Permit applications for water use, surface water management, and well construction may be submitted to any district service office. Permitting evaluation and field services for projects within the designated areas will be conducted by the appropriate division.

# WATER USE PERMIT APPLICATION SUPPLEMENTAL FORM

*SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT*

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 •(904) 796-7211 or FLORIDA WATS 1 (800) 423-1476

## INDUSTRIAL OR COMMERCIAL

ANSWER ALL QUESTIONS. IF A QUESTION IS NOT APPLICABLE, ENTER N/A. IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS AND REFER TO THE APPLICATION QUESTION NUMBER. PROVIDE DOCUMENTATION AND REFERENCES WHERE APPROPRIATE. IF THERE ARE OTHER USES, COMPLETE THE APPROPRIATE SUPPLEMENTAL FORM(S). THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

*NOTE:* IF PROCESSING OF MATERIALS IS ASSOCIATED WITH MINING OR DEWATERING, USE THE **MINING AND DEWATERING SUPPLEMENTAL FORM, WUP FORM NO 6**, AND INCLUDE THE INDUSTRIAL/COMMERCIAL USES ON THAT FORM.

*AN ASTERISK IDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE APPLICATION FORM.

**PLEASE SUBMIT *THREE COPIES* OF THIS SUPPLEMENTAL FORM ALONG WITH YOUR APPLICATION, DRAWINGS, CALCULATIONS, ETC.**

### I. GENERAL INFORMATION

APPLICANT: Tampa Electric Company WUP No.(If Existing): N/A

(Same as shown on WUP application)

### II. SITE INFORMATION

**SECTION A - *Fire Flow***

Describe fire flow and standby capacity (identify withdrawal points and when they would be used).

Attached

**SECTION B - *Existing Wellfields***

Describe the existing wellfield operation schedule, if applicable. Include in the description those wells that are primary, secondary, stand-by, and the well rotation schedule, if any. Description Attached ☐ N/A ☒

**SECTION C - *Surface Water Management System***

Is a surface water management system proposed? Yes ☒ No ☐ Existing? Yes ☐ permit no. ______ No ☒

If so, an evaluation of the impact of the proposed withdrawal on the surface water management system, and conversely, the impact of the surface water management system on the withdrawal and water availability at the project site must be submitted.

See SCA Section 2.3.4, Surficial Hydrology

See SCA Section 5.3, Impacts on Water Supplies

**SECTION D - *Discharge/Recirculation***

Identify the following items on a map or maps: 1. Discharge points; 2. Recirculation or settling ponds.

Number the ponds, and list the acreage of each pond:

| Pond No. | Acreage | |
|---|---|---|
| 1 | 727 | See Figure 11.2.2-3 |

## III. WATER USE

**SECTION A -** ***Annual Average Quantities in gallons per day (gpd)***

| AVERAGE ANNUAL BASIS IN GPD: | Present | Projected 6 Year | Projected 10 Year |
|---|---|---|---|
| 1. Potable and sanitary needs | 10,500 | 10,500 | 10,500 |
| 2. Lawn and landscape irrigation | | | |
| 3. Outside use (washing, maintenance) | | | |
| 4. Fire protection (testing, maintenance) | | | |

5. Provide a Water Balance diagram, indicating all water sources (ground water from wells, ground water from water table dewatering or drainage, surface water, rainfall, recycled water, etc.), the amount of water entering and leaving each step in the process, all water losses (e.g. evaporation, product moisture, steam losses, waste-material entrainment, offsite discharge, recycle, etc.), and the final disposition of water. These diagrams should be based on the annual average daily quantity and the peak monthly quantity. All flows must be in units of gallons per day, and the total of all sources must equal the total of all losses.

| | *Present* | *6 Year* | *10 Year* |
|---|---|---|---|
| 6. **Total Water Demand** (*Total Items 1-5*) | 6,600,000 | 6,600,000 | 6,600,000 |
| 7. Provide the percentage unaccounted water (total system throughout minus all accounted and in-plant use | | | |
| 8. Population served (works/visitors) | | | |

**SECTION B -** ***Lawn & Landscape Irrigation***

If any of the projected water use will be for irrigation of lawns, landscaping of recreational areas, respond to Items 1 through 6 below. If not, please check N/A. [X] N/A

If these quantities are greater than 100,000 gpd annual average, you must fill out the recreational supplemental information form, WUP 8.

1. Acres to be irrigated ______
2. Type(s) of vegetation to be irrigated ______
3. Irrigation method ______
4. Approximate peak monthly water use ______
5. Approximate annual average water use ______
6. Show irrigated area(s) on map.* ______

**SECTION C -** ***Peak Month Quantity***

Provide the peak month quantity needed at present, in 6 years and in 10 years, and provide calculations supporting these quantities.

| | *Present* | *6 Year* | *10 Year* |
|---|---|---|---|
| 9. **Total peak month quantity (gpd)** | 9,300,000 | 9,300,000 | 9,300,000 |

## IV. DISPOSAL

**SECTION A -** ***Methods of Disposal***

SPECIFY THE PERCENTAGE FOR EACH, TO TOTAL 100%:

1. Individual septic tank ______ %
2. Percolation pond 18.6 %
3. Offsite discharge ______ %
4. Spray irrigation ______ %
5. Other ______ % Specify ______
6. Discharge to other location 81.4 % Name Outfall to Little Payne Creek
   NPDES, DER Discharge Permit Nos. N/A--See SCA Appendix 11.1.1
7. Discharge to other location ______ % Name ______
   NPDES, DER Discharge Permit Nos. ______

**TOTAL** 100%

## V. WATER CONSERVATION

1. Attach a description of water conservation practices currently employed or planned. If planned, include an estimated time-frame for implementation. [X] Attached

2. Include plans to recycle waste water, and provide present and future quantities. [X] Attached
   See Figures 11.2.2-6 and 11.2.2-7

# WATER USE PERMIT APPLICATION SUPPLEMENTAL FORM

*SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT*

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899 • (904)796-7211 or FLORIDA WATS 1(800)423-1476

## MINING OR DEWATERING

ANSWER ALL QUESTIONS. IF A QUESTION IS NOT APPLICABLE, ENTER N/A. IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS AND REFER TO THE APPLICATION QUESTION NUMBER. PROVIDE DOCUMENTATION AND REFERENCES WHERE APPROPRIATE. IF THERE ARE OTHER USES, COMPLETE THE APPROPRIATE SUPPLEMENTAL FORM(S). THIS INFORMATION IS REQUESTED IN ACCORDANCE WITH RULES 40D-2.101 AND 40D-2.301, FLORIDA ADMINISTRATIVE CODE.

***NOTE***: IF INDUSTRIAL/COMMERCIAL USES, SUCH AS PROCESSING OF MATERIALS, ARE ASSOCIATED WITH THE MINING OR DEWATERING, INCLUDE THESE USES ON THIS FORM INSTEAD OF COMPLETING THE INDUSTRIAL/COMMERCIAL USES SUPPLEMENTAL FORM, FORM. NO. WUP-5.

* AN ASTERISK IDENTIFIES ITEMS TO BE INDICATED ON SITE MAP; YOU MAY USE THE MAP REQUESTED IN ITEM IV, SECTION B OF THE WUP APPLICATION.

**PLEASE SUBMIT *THREE COPIES* OF THIS SUPPLEMENTAL FORM ALONG WITH YOUR APPLICATION, DRAWINGS, CALCULATIONS, ETC.**

### I. GENERAL INFORMATION

1. APPLICANT: Tampa Electric Company  WUP No.(If Existing): N/A
   (Same as shown on WUP application)

2. Check the material mined: ☐ Limestone ☐ Phosphate ☐ Sand ☐ Shell ☐ Peat ☒ Other(Describe):
   Dewatering during construction of cooling reservoir for Tampa Electric Company Polk Power Station site.

### II. SITE INFORMATION

**SECTION A -** ***Site Map***

In addition to the map requirements stated in Item IV, Section B of the Application Form No. WUP-1 identify the following items on a map or maps (you may use the map required in Item IV B of Form No. WUP-1).

1. Discharge points, existing and proposed. See Figure 11.2.2-3
2. Locations of existing and proposed recirculation or settling ponds. See Figure 11.2.2-3
3. Boundaries of parcels to be dewatered and mined, indicating the approximate month and year each activity will take place for each parcel, for a period up to six years hence for permit applications of greater than or equal to 500,000 gpd average annual quantities, or up to 10 years for permit applications of less than 500,000 gpd average annual quantities. See Figure 11.2.2-3
4. Location(s) of any irrigated areas. N/A
5. Identify all land uses adjacent to the property to be mined or dewatered (e.g. residential, citrus grove, wetland, etc.) See Figure 11.2.2-8
6. Outparcels within the owned or controlled property, including outparcel property owners names identified in the list of adjacent property owners in the Application Form No. WUP-1. N/A
7. Indicate any surface drainage ditches used to lower the water table, cross-referenced to Item V, Section 6, below. N/A
8. Indicate any wetlands to be preserved under a DER permit or DRI Development Order, any wetlands to be reclaimed under a DNR Reclamation Plan, or any other onsite wetlands that will not be mined. See Figures 11.2.2-4 and 11.2.2-5

**SECTION B -** ***Surface Water Management System***

Is a surface water management system proposed? Yes ☒ No ☐ Existing? Yes ☐ Permit No. ________ No ☒

If "yes," provide an evaluation of the impact of the proposed withdrawal on the surface water management system, and conversely, the impact of the surface water management system on the wiithdrawal and water availability at the project site.

See SCA Section 2.3.4, Surficial Hydrology
See SCA Section 5.3, Impacts on Water Supplies

**SECTION C -** ***Recirculation***

Indicate the acreage and depth relative to NGVD of each recirculation or settling pond, and each dewatered pit, and reference each pond number to the map required in Section A above.

| Pond No. | Acreage | Pit Depth | Maximum Dewater Depth |
|---|---|---|---|
| 1 | 727 | 120 ft | 120 ft |
| | | | |
| | | | |

**SECTION D** - ***Fire Flow***
Describe fire flow and standby capacity (identify withdrawal points and when they would be used).

Attached to Industrial or Commercial Supplemental Form

**SECTION E** - ***Existing Wellfields***
Describe the existing typical wellfield operation or mine dewatering schedule, if applicable. Include in the description those wells that are primary, secondary, stand-by, and the well rotation schedule, if any.

N/A

## III. WATER USE

**SECTION A** - ***Annual Average Quantities in gallons per day (gpd)***

| | Present | Projected 6 Year | Projected 10 Year |
|---|---|---|---|
| 1. Potable and sanitary needs | 10,500 | 10,500 | 10,500 |
| 2. Lawn and landscape irrigation | | | |
| 3. Outside use (washing, maintenance) | | | |
| 4. Fire protection (testing, maintenance) | | | |

5. Provide a Water Balance diagram, indicating all water sources (ground water from wells, ground water from water table dewatering or drainage, surface water, rainfall, recycled water, etc.), the amount of water entering and leaving each step in the process, all water losses (evaporation, product moisture, steam losses, waste-material entrainment, offsite discharge, recycle, etc.), and the final disposition of water. These diagrams should be based on the annual average daily quantity and the peak monthly quantity. All flows must be in units of gallons per day, and the total of all sources must equal the total of all losses.

**NOTE**: If Industrial/Commercial uses, such as processing of materials, are associated with the mining or dewatering, a water balance diagram combining these activities is recommended. However, separate water balances may be submitted provided that they are linked where appropriate, and provided that all quantities are accounted.

6. Total water demand - total the water needs of items 1-5; Present 6,600,000 6 yr. 6,600,000 10 yr. 6,600,000

7. Attach a description of the dewatering quantities anticipated through time on a monthly, annual, or other appropriate basis, for each pit proposed to be dewatered within the permit term (6 or 10 years). ☒ Attached ☐ N/A
See SCA Sections 4.3 and 11.7.6

8. Provide the percentage unaccounted water (total system throughout minus all accounted and in-plant uses): ____________

9. Population served (work/visitor): Present 100 6 yr. 210 10 yr. 210

**Provide calculations and/or references for all responses above.**

**SECTION B** - ***Lawn and Landscape Irrigation***
If any of the projected water use will be for irrigation of lawns, landscaping of recreational areas, respond to Items 1 through 5 below; if not, please check N/A. N/A ☒
If these quantities are greater than 100,000 gpd annual average, you must fill out the Recreational Supplemental Information Form, WUP 8.

1. Acres to be irrigated ____________
2. Type(s) of vegetation to be irrigated ____________
3. Irrigation system (method) ____________
4. Approximate maximum monthly water use ____________
5. Approximate average annual water use ____________
6. Show irrigated area(s) on map. ____________

**SECTION C** - ***Peak Month Quantity***
Provide the peak month quantity needed at present, in 6 years, and in 10 years. Provide calculations supporting these quantities. Present 9,300,000 6 Years 9,300,000 10 Years 9,300,000

**SECTION D** - ***Fire Flow***
Describe fire flow and standby capacity (identify withdrawal points and when they would be used).

Attached to Industrial or Commercial Supplemental Form

**SECTION E** - ***Existing Wellfields***
Describe the existing typical wellfield operation or mine dewatering schedule, if applicable. Include in the description those wells that are primary, secondary, stand-by, and the well rotation schedule, if any.

N/A

## III. WATER USE

**SECTION A** - ***Annual Average Quantities in gallons per day (gpd)***

| | Present | Projected 6 Year | Projected 10 Year |
|---|---|---|---|
| 1. Potable and sanitary needs | 10,500 | 10,500 | 10,500 |
| 2. Lawn and landscape irrigation | | | |
| 3. Outside use (washing, maintenance) | | | |
| 4. Fire protection (testing, maintenance) | | | |

5. Provide a Water Balance diagram, indicating all water sources (ground water from wells, ground water from water table dewatering or drainage, surface water, rainfall, recycled water, etc.), the amount of water entering and leaving each step in the process, all water losses (evaporation, product moisture, steam losses, waste-material entrainment, offsite discharge, recycle, etc.), and the final disposition of water. These diagrams should be based on the annual average daily quantity and the peak monthly quantity. All flows must be in units of gallons per day, and the total of all sources must equal the total of all losses.

**NOTE**: If Industrial/Commercial uses, such as processing of materials, are associated with the mining or dewatering, a water balance diagram combining these activities is recommended. However, separate water balances may be submitted provided that they are linked where appropriate, and provided that all quantities are accounted.

6. Total water demand - total the water needs of items 1-5; Present 6,600,000 6 yr. 6,600,000 10 yr. 6,600,000

7. Attach a description of the dewatering quantities anticipated through time on a monthly, annual, or other appropriate basis, for each pit proposed to be dewatered within the permit term (6 or 10 years). ☒ Attached ☐ N/A
See SCA Sections 4.3 and 11.7.6

8. Provide the percentage unaccounted water (total system throughout minus all accounted and in-plant uses): ______

9. Population served (work/visitor): Present 100 6 yr. 210 10 yr. 210

**Provide calculations and/or references for all responses above.**

**SECTION B** - ***Lawn and Landscape Irrigation***
If any of the projected water use will be for irrigation of lawns, landscaping of recreational areas, respond to Items 1 through 5 below; if not, please check N/A. N/A ☒
If these quantities are greater than 100,000 gpd annual average, you must fill out the Recreational Supplemental Information Form, WUP 8.

1. Acres to be irrigated ______
2. Type(s) of vegetation to be irrigated ______
3. Irrigation system (method) ______
4. Approximate maximum monthly water use ______
5. Approximate average annual water use ______
6. Show irrigated area(s) on map. ______

**SECTION C** - ***Peak Month Quantity***
Provide the peak month quantity needed at present, in 6 years, and in 10 years. Provide calculations supporting these quantities. Present 9,300,000 6 Years 9,300,000 10 Years 9,300,000

## SUPPORTING INFORMATION - II. Site Information

### FIRE FLOW/PROTECTION PLAN

The fire protection system is designed for 3,000-gpm flow. Main piping loops will be utilized around the gasification area, fuel oil storage area, fuel unloading areas, and coal storage, at a minimum. The fire protection water loops will extend in phases as additional natural gas CC and CT units are added so that an adequate level of coverage and protection is provided at all times.

Fire protection water is drawn from the filtered water tank and also from the cooling reservoir. The water storage tank will provide two hours of storage at 150 percent of the specified fire pump capacity. From the storage tank, the electric drive fire pump delivers water at 1,000 gpm. Figure 11.2.2-9 depicts the overall service and fire delivery system.

The service water pump takes suction from the same filtered water tank and keeps the fire water system pressurized. The fire water pump automatically delivers additional flow through the service piping when the service water flow exceeds 100 gpm or when the service water pressure drops below 95 pounds per square inch gauge (psig). Shutdown of this pump will require action by an operator. The cooling reservoir provides supplemental fire protection flow via two 1,500-gpm diesel driven pumps located at the intake structure. These pumps will have remote start capability and will have separate fuel sources. A fire pump test manifold will be located near the intake structure to allow annual testing of the fire pumps.

All aspects of the fire prevention system will meet the requirements of the 1988 Polk County Fire Prevention Code.

## SUPPORTING INFORMATION - V. Water Conservation Plan

## WATER CONSERVATION PLAN

Several design aspects of the Tampa Electric Company Polk Power Station were planned to conserve water consumption. Theses include (1) the construction of the cooling water reservoir; (2) the reuse of industrial and domestic wastewater streams; (3) the efforts to minimize potable requirements; and (4) the avoidance of water use for lawn irrigation.

Construction of the Cooling Water Reservoir: The cooling water reservoir was designed in intersect the water table of the surficial aquifer. This design takes advantage of the existing mine cuts to minimize disturbance to the subsurface environment. This will eliminate the initial need for make up to fill the reservoir and minimize the amount of water required for long-term make up. The long-term make up requirements were determined by complicated groundwater modeling efforts. The minimum amount of make up was requested that provided acceptable water quality results within the reservoir, surficial aquifer, and reservoir discharge. The discharge from the reservoir into the Little Payne Creek will provide water into a surficial water system that was previously reduced due to mining effects on the drainage basin area.

Reuse of Industrial and Domestic Wastewater Streams: Wastewater streams from the various industrial and domestic processes onsite are treated and then routed into the cooling reservoir. This also applies to the stormwater runoff from the industrial area of the facility and leachate collection systems.

Efforts to Minimize Potable Requirements: The facility will utilize all available measures to minimize domestic water demand. These efforts will include the use of low volume showerheads, toilets, and faucets. Onsite maintenance personnel will ensure that all water leaks are repaired promptly.

Avoidance of/Minimize Water Use for Lawn Irrigation: The facilities have been designed and will be landscaped to minimize the consumption of water for aesthetics.

Polk Power Station Legal Description of Lands

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<u>LANDS FROM FREEPORT MACMORAN RESOURCE PARTNERS, LIMITED PARTNERSHIP</u>

LANDS TO THE EAST OF STATE ROAD 37:

TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 1

That part of the West 330.00 feet of the East 1/2 of the West 1/2 of said Section 1, lying southwesterly of Fort Green Road, AND all that part of the West 1/4 of said Section 1 lying southwesterly of Fort Green Road.

SECTION 2

a. The West 848.00 feet of the NW 1/4 of the NW 1/4.
b. The South 3/4 LESS that part described as; Begin 400.00 feet West of the NE corner of said South 3/4, run thence West 3600.00 feet; thence South 150.00 feet; thence East 450.00 feet; thence South 200.00 feet; thence East 700.00 feet; thence North 200.00 feet; thence East 2450.00 feet; thence North 150.00 feet to the POINT OF BEGINNING.

SECTION 3

All lying East of State Road 37.

SECTION 4

All lying East of State Road 37.

SECTION 9

BEGIN at the NE corner of said Section 9 and proceed S.00°04'08"E. along the East line of said Section 9 for 2117.07 feet; thence N.88°05'57"W. for 323.11 feet; thence S.88°42'07"W. for 983.72 feet; thence N.89°51'23"W. for 1058.61 feet; thence S.39°38'56"W. for 454.20 feet; thence N.13°09'59"W. for 538.34 feet to the easterly right-of-way line of State Road No. 37 (being 80 feet at right angles from centerline); thence N.27°31'59"E. along said right-of-way line for 2184.60 feet to the North line of said Section 9; thence N.89°32'05"E. along said North line for 1765.11 feet to the POINT OF BEGINNING.

SECTION 10

BEGIN at the NE corner of said Section 10 and proceed S.00°00'02"E. along the East line of said Section 10 for 1885.69 feet thence N.88°45'46"W. for 324.02 feet; thence S.01°25'49"W. for 1761.69 feet; thence N.89°56'27"W. for 3504.25 feet; thence N.02°46'52"W. for 454.48 feet; thence N.61°33'02"W. for 320.02 feet; thence N.00°22'41"W. for 641.25 feet; thence N.46°54'10"W. 372.71 feet; thence N.88°05'57"W. for 820.69 feet; to the West line of said Section 10; thence N.00°04'08"W. for 2117.07 feet to the NW corner of said Section 10; thence S.89°53'15"E. along the North line of said Section 10 for 5274.75 feet to the POINT OF BEGINNING.

SECTION 11

BEGIN at the NE corner of said Section 11 and proceed S.00°13'13"E. along the East line of said Section 11 for 731.09 feet; thence S.22°01'06"W. for 60.15 feet; thence S. 04°41'20"W. for 1038.35 feet; thence S.16°25'50"E. for 399.84 feet again to the East line of said Section 11; thence S.00°13'13"E. along said East line for 448.50 feet to the East Quarter Section Corner of said Section 11; thence S.00°19'20"W. along the East line of the SE 1/4 of said Section 11 for 277.57 feet; thence S.83°10'34"W. for 845.66 feet; thence N.80°44'17"W. for 775.80 feet; thence N.04°00'31"W. for 937.40 feet; thence N.88°45'46"W. for 3637.10 feet to the West line of said Section 11; thence N.00°00'02"W. for 1885.69 feet to the NW corner of said Section 11; thence N.89°55'04"E. for 5298.52 feet to the POINT OF BEGINNING.

SECTION 12

BEGIN at the NW corner of said Section 12 and proceed S.88°52'09"E. along the North line of the NW 1/4 of said Section 12 for 1649.70 feet to a concrete monument number 1943; thence S.00°19'05"W. for 75.98 feet; thence S.89°23'48"W. for 614.63 feet; thence S.10°48'34"W. for 155.81 feet; thence S.43°38'11"W. for 211.14 feet; thence S.82°21'29"W. for 355.22 feet; thence N.84°53'22"W. for 385.84 feet; thence S.22°01'06"W. for 320.75 feet to the West line of said Section 12; thence N.00°13'13"W. along said West line for 731.09 feet to the POINT OF BEGINNING.

LANDS TO THE WEST OF STATE ROAD 37:

TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 3

The part of the South 1/2 of the NW 1/4 lying West of State Road No. 37. LESS existing county maintained right-of-way for Bethlehem Road.

SECTION 4

The SE 1/4 of the SW 1/4, LESS existing county maintained right-of-way for Albritton Road. The SE 1/4 of said Section 4 lying North and West of State Road No. 37, LESS existing county maintained right-of-way for Albritton Road, and subject to GAS PIPELINE EASEMENT in O.R. Book 219 on Page 341 of the Public Records of Polk County, Florida. That part of the South 1/2 of the NE 1/4 of said Section 4 lying North and West of State Road No. 37, LESS existing county maintained right-of-way for Bethlehem Road, and subject to GAS PIPELINE EASEMENT in O.R. Book 219 on Page 341 of the Public Records of Polk County, Florida.

TOWNSHIP 32, SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 7

The NE 1/4, LESS the NE 1/4 of the NE 1/4, AND LESS the North 416.00 feet of the East 209.00 feet of the NW 1/4 of the NE 1/4, AND LESS existing county maintained right-of-way for Albritton Road.
The SE 1/4, LESS right-of-way for State Road No. 674.
The SW 1/4, LESS right-of-way for State Road No. 674.
The NW 1/4, LESS the NE 1/4 of the NW 1/4, AND LESS existing county maintained right-of-way for Albritton Road. Said Section 7 being subject to existing Florida Gas Transmission Co. Pipeline Easement.

SECTION 8

The NE 1/4, LESS the West 1/2 of the NW 1/4 of the NE 1/4.
The SE 1/4 of Section 8, LESS right-of-way for State Road No. 674.
The SW 1/4 of Section 8, LESS right-of-way for State Road No. 674.
The South 1/2 of the NW 1/4.

SECTION 9

ALL, lying West of State Road No. 37 LESS existing county maintained right-of-way for Albritton Road, AND LESS right-of-way for State Road No. 674.

LANDS FROM AMERICAN CYANAMID COMPANY

TOWNSHIP 31 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 34

All the part of the S-3/4 of E-3/4 of the section lying east of the right-of-way of State Road 37 and also lying south of the right-of-way of County Road 630 (formerly designated State Road 630).

SECTION 35

All the part of the S-3/4 of the section lying south of the right-of-way of County Road 630 (formerly designated State Road 630) and also lying west of the right-of-way of the Brewster-Fort Green Road.

TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 2

a. The N-1/2 of N-1/2, LESS the west 848 feet thereof, and SUBJECT TO existing right-of-way of the Brewster-Fort Green Road at the northeast corner thereof.

b. The part of the S-1/2 of N-1/2 (being part of U.S. Government Lot 1 in the NW-1/4 and of U.S. Government Lot 1 in the NE-1/4) described as: begin at a point on the north boundary of said S-1/2 of N-1/2 located 400 feet west of the northeast corner thereof (measured along said north boundary), thence west along said north boundary 3600 feet, thence south 150 feet, thence east 450 feet, thence south 200 feet, thence east 700 feet, thence north 200 feet, thence east 2450 feet, thence north 150 feet to the point of beginning. (The directions "north" and "south" meaning the bearing of the east boundary of Section 2, and the directions "east" and "west" meaning the bearing of the north boundary of said S-1/2 of N-1/2 of Section 2.)

Source: Andrew Edgemon & Associate, 1991.

90263 0100 TECO 01/91

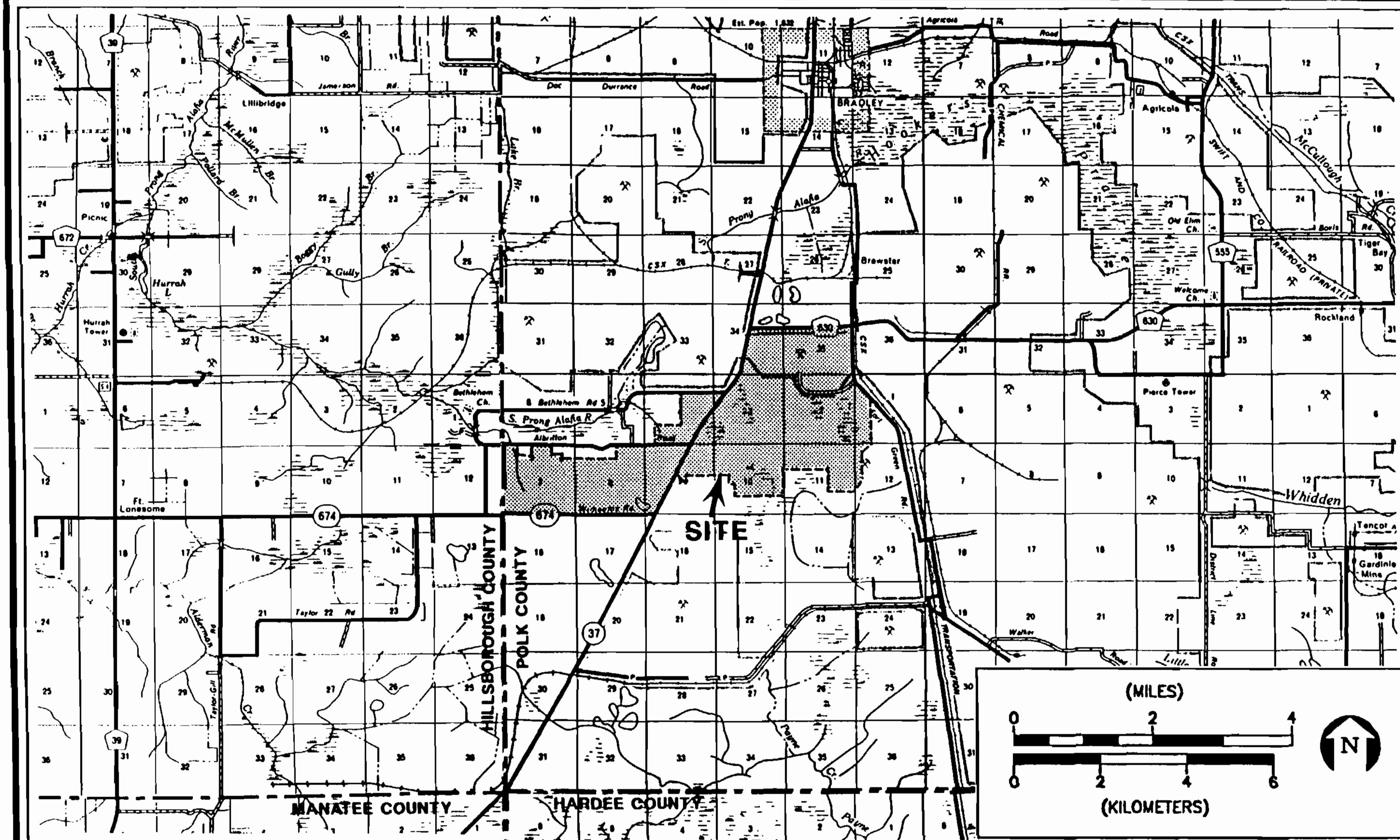



FIGURE 11.2.2-1.

VICINITY MAP AND BOUNDARIES OF POLK POWER STATION SITE

Sources: FDOT Map, FL. ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

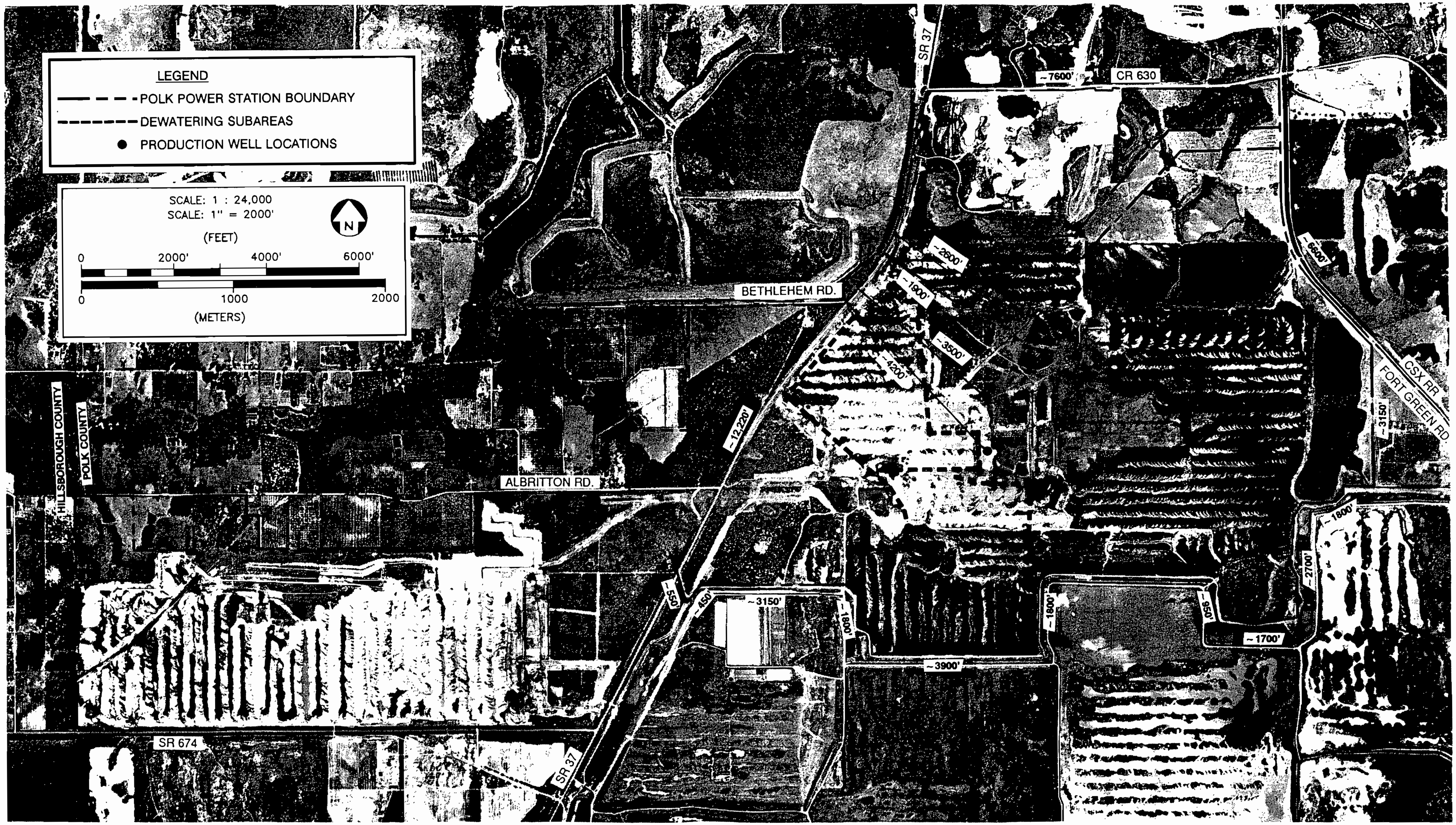



FIGURE 11.2.2-2.
POLK POWER STATION SITE AND ADJACENT LANDS
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: SRMC, 1992; ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

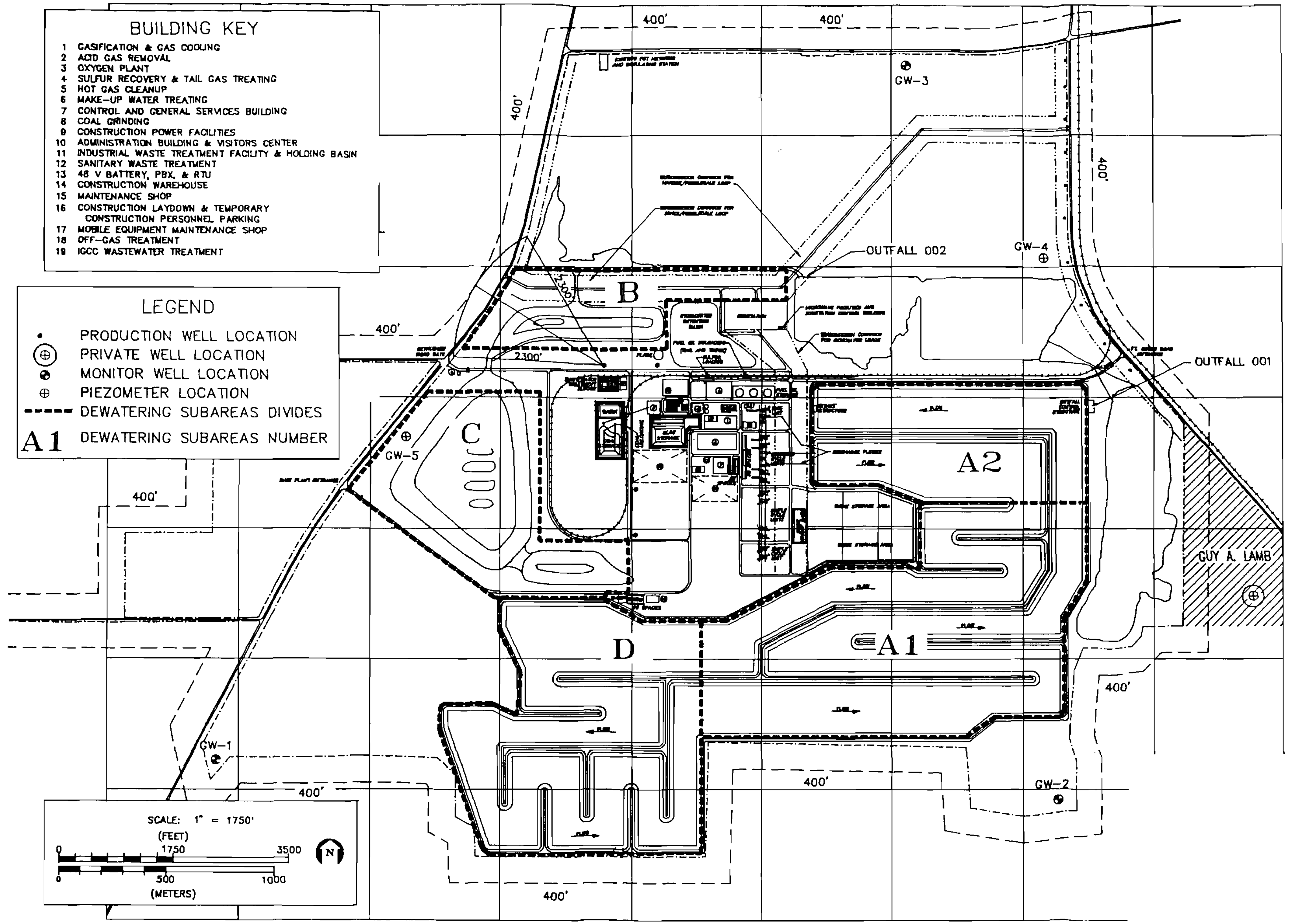


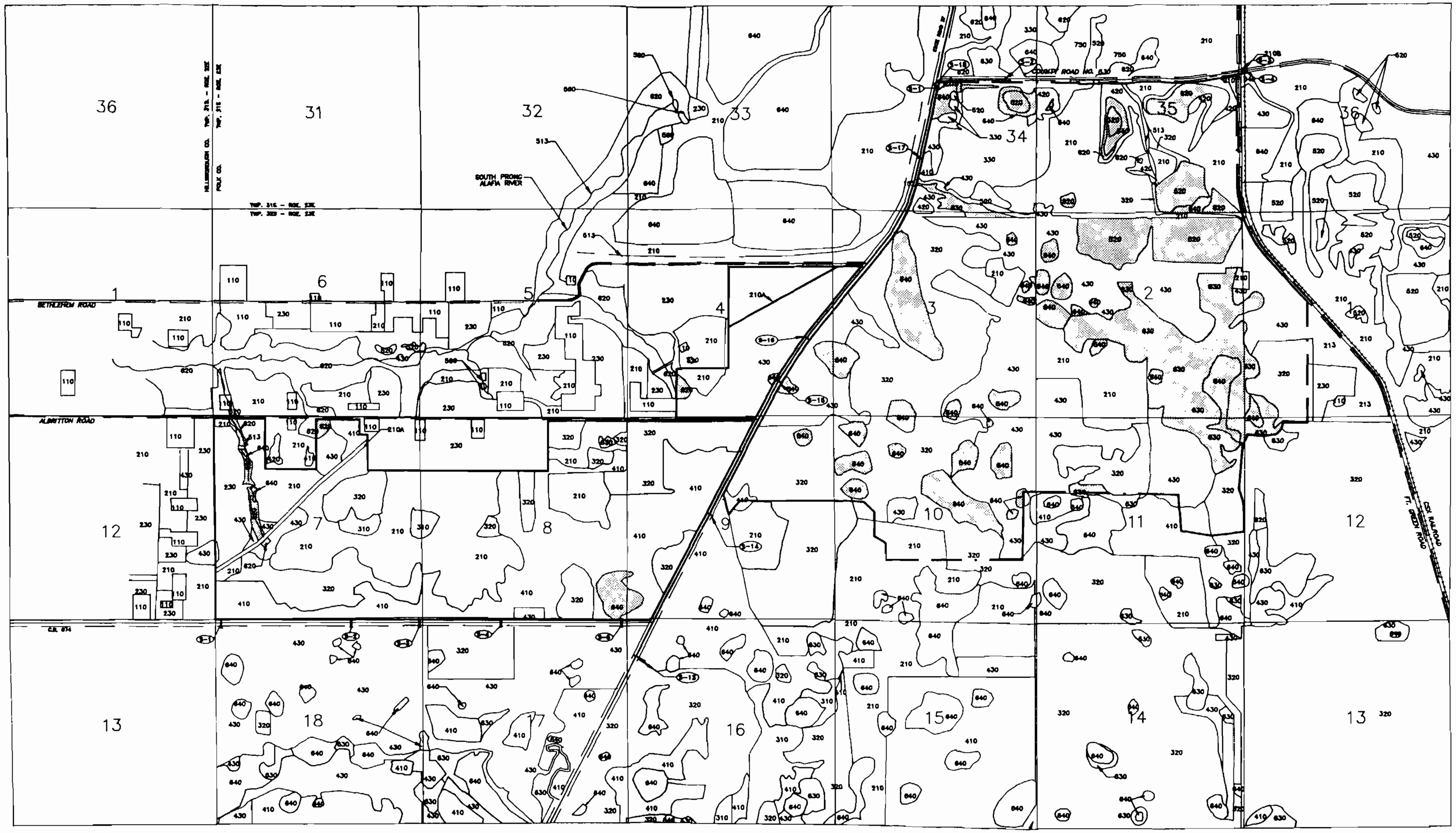

FIGURE 11.2.2-3.

400' PERIMETER OF SITE AND PRODUCTION WELL LOCATION MAP

Sources: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION




| | PREMINING VEGETATION WITHIN PROJECT BOUNDARY | NON-MANDATORY ACRES | MANDATORY ACRES | TOTAL ACRES |
|---|---|---|---|---|
| 210A | PASTURE OVER GAS TRANSMISSION LINE | 0 | 13 | 13 |
| 210 | PASTURE | 226 | 660 | 884 |
| 230 | CITRUS | 0 | 59 | 59 |
| 310 | GRASSLAND | 0 | 20 | 20 |
| 320 | SHRUBLAND | 0 | 995 | 995 |
| 330 | MIXED RANGELAND | 12 | 147 | 159 |
| 410 | CONIFEROUS FOREST | 0 | 439 | 439 |
| 420 | UPLAND HARDWOOD FOREST | 42 | 11 | 53 |
| 430 | UPLAND MIXED FOREST | 34 | 831 | 865 |
| 520 | LAKES | 140 | 7 | 147 |
| 620 | WETLAND HARDWOOD FOREST | 52 | 16 | 68 |
| 630 | WETLAND MIXED FOREST | 0 | 267 | 267 |
| 640 | HERBACEOUS WETLAND | 17 | 260 | 277 |
| | | | TOTAL | 4346 |

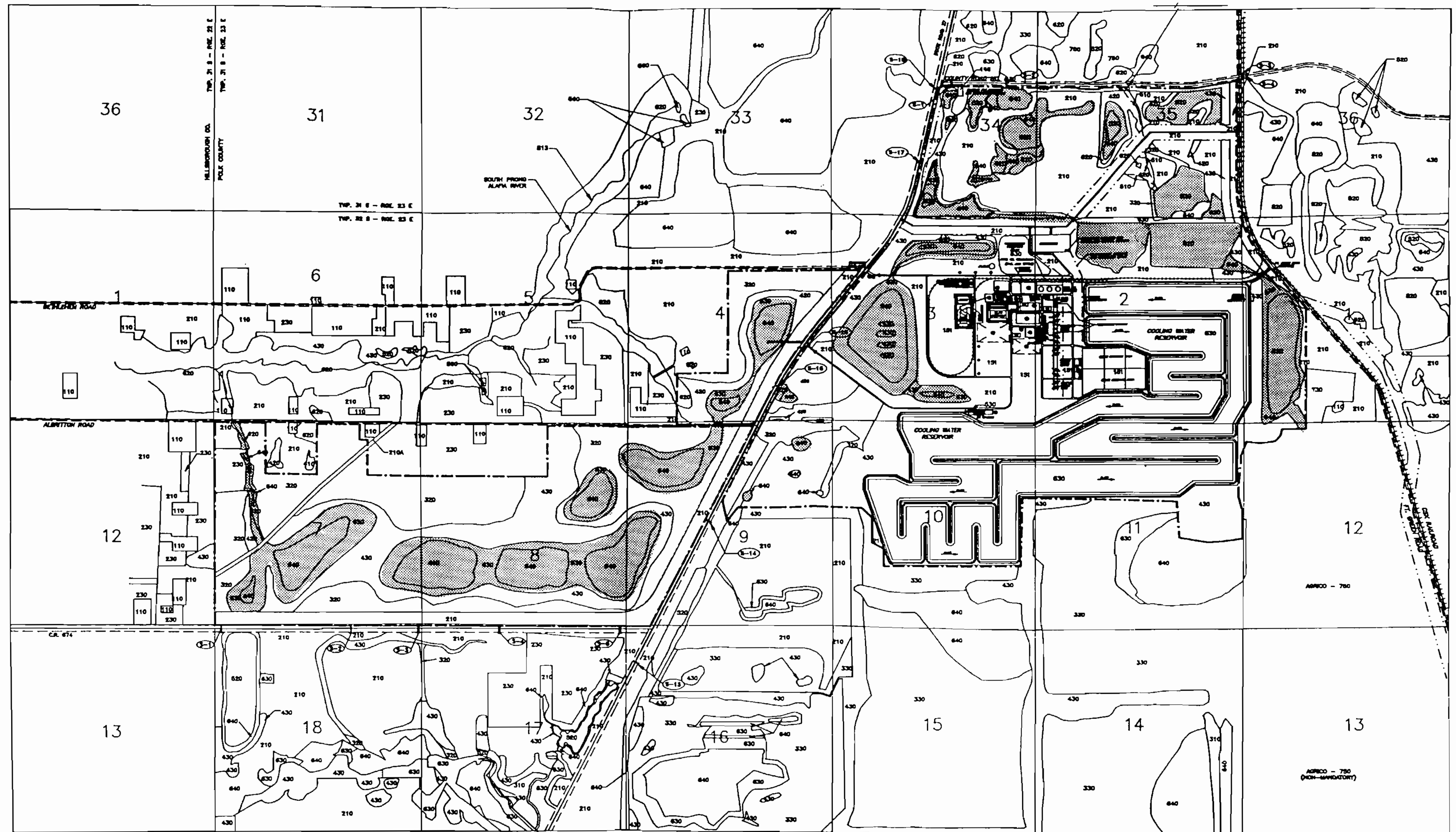
FIGURE 11.2.2-4.

EXISTING WETLANDS

Source: ECT. 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION



| | POST RECLAMATION VEGETATION WITHIN PROJECT BOUNDARY | NON-MANDATORY ACRES | MANDATORY ACRES | TOTAL ACRES |
|---|---|---|---|---|
| 140 | TRANSPORTATION | 0 | 3 | 3 |
| 148 | GAS TRANSMISSION SUBSTATION | 0 | 1 | 1 |
| 151 | ELECTRICAL POWER FACILITY | 0 | 337 | 337 |
| 210A | PASTURE OVER GAS TRANSMISSION LINE | 0 | 13 | 13 |
| 210 | PASTURE | 211 | 430 | 641 |
| 230 | CITRUS | 0 | 18 | 18 |
| 320 | SHRUBLAND | 4 | 577 | 581 |
| 330 | MIXED RANGELAND | 6 | 0 | 6 |
| 420 | UPLAND HARDWOOD FOREST | 29 | 72 | 101 |
| 430 | UPLAND MIXED FOREST | 34 | 722 | 756 |
| 520 | LAKES | 165 | 87 | 262 |
| 530 | RESEVOIRS | 0 | 840 | 840 |
| 620 | WETLAND HARDWOOD FOREST | 40 | 21 | 61 |
| 630 | WETLAND MIXED FOREST | 11 | 299 | 310 |
| 640 | HERBACEOUS WETLAND | 23 | 405 | 428 |
| | | TOTAL 523 | TOTAL 3825 | TOTAL 4348 |

**FIGURE 11.2.2-5.**

POST RECLAMATION WETLANDS

Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

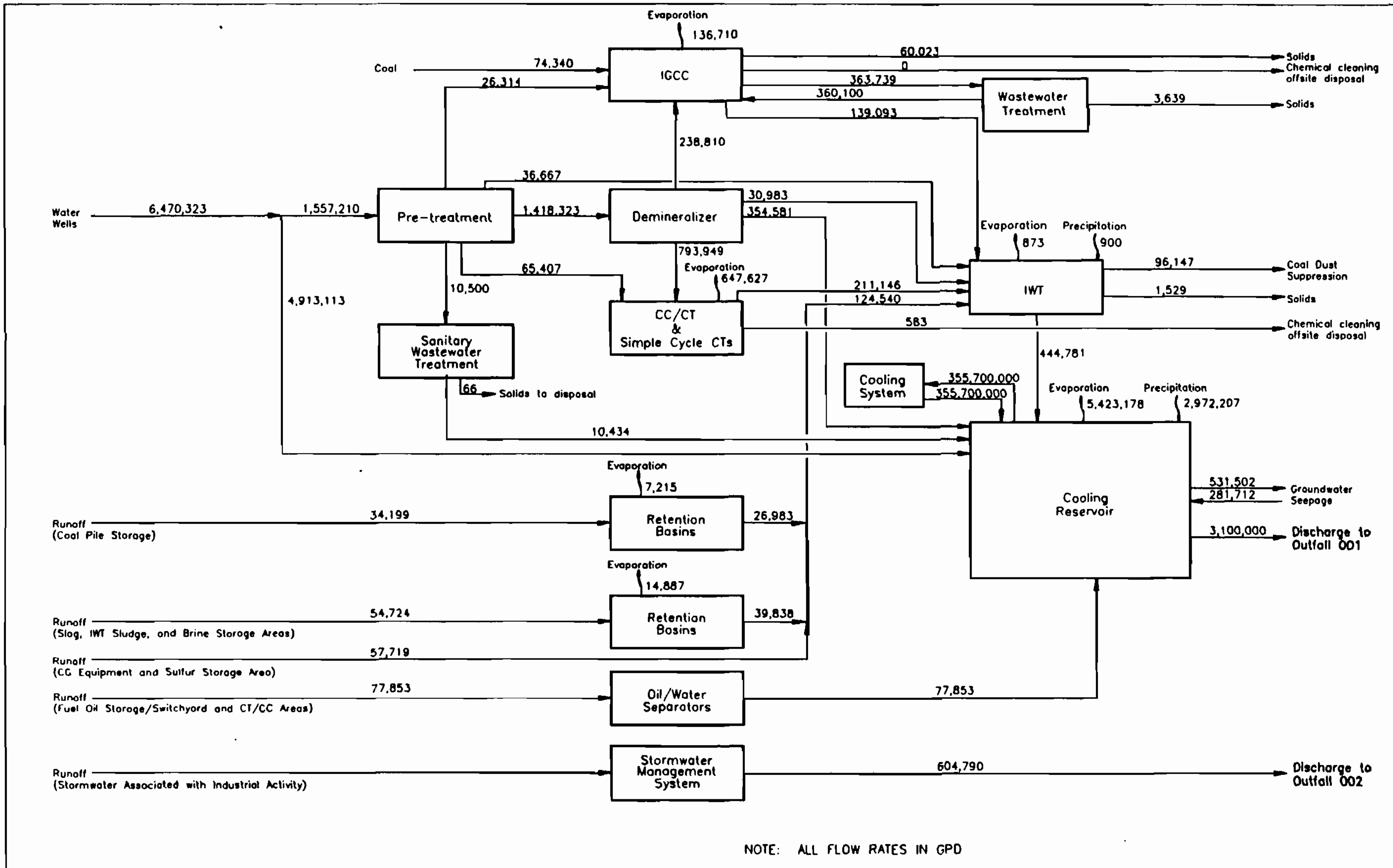


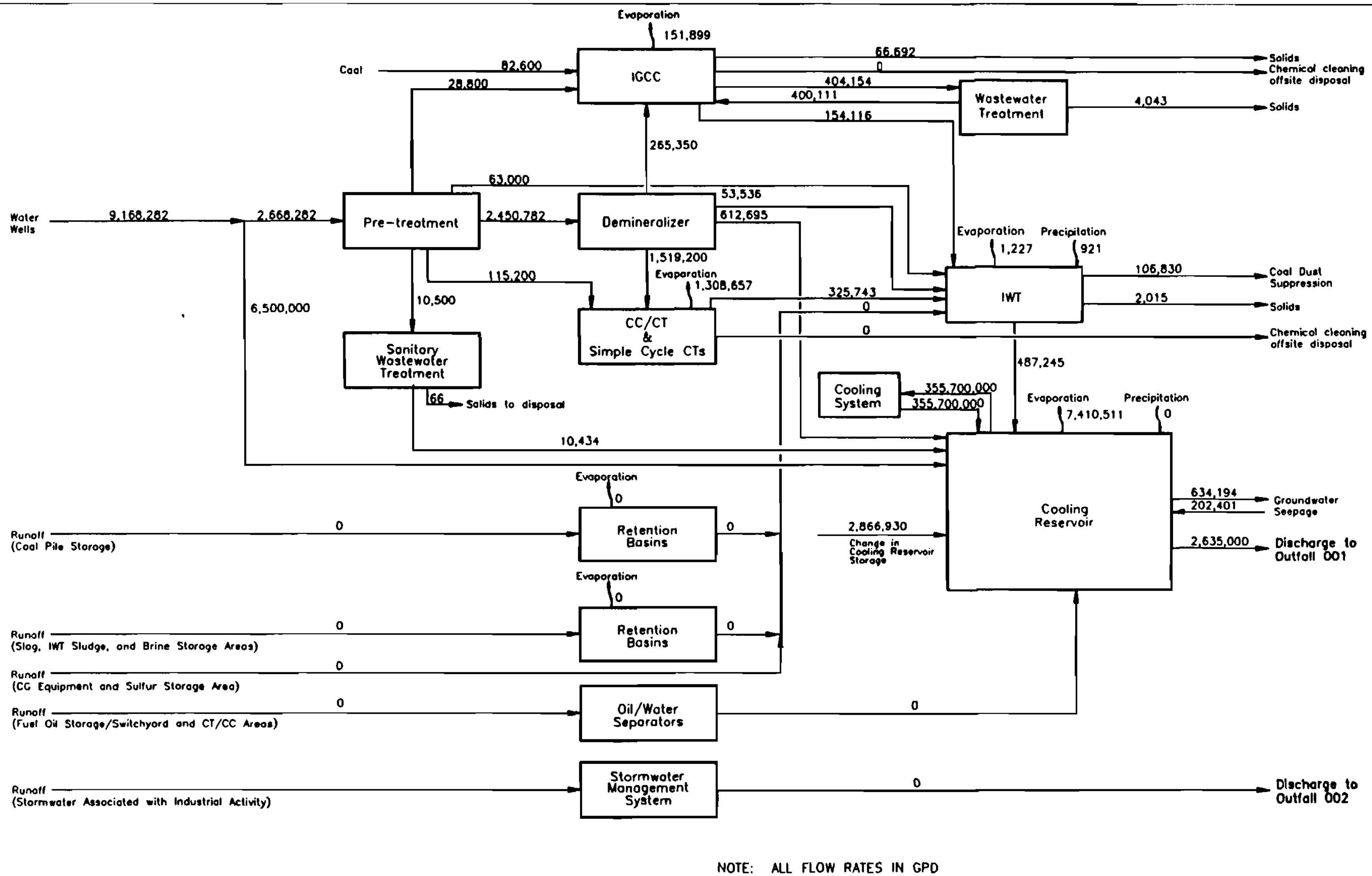

**FIGURE 11.2.2-6.**

**WATER MASS BALANCE, ANNUAL AVERAGE MAKEUP**

Source: UE&C, 1992. ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**




NOTE: ALL FLOW RATES IN GPD

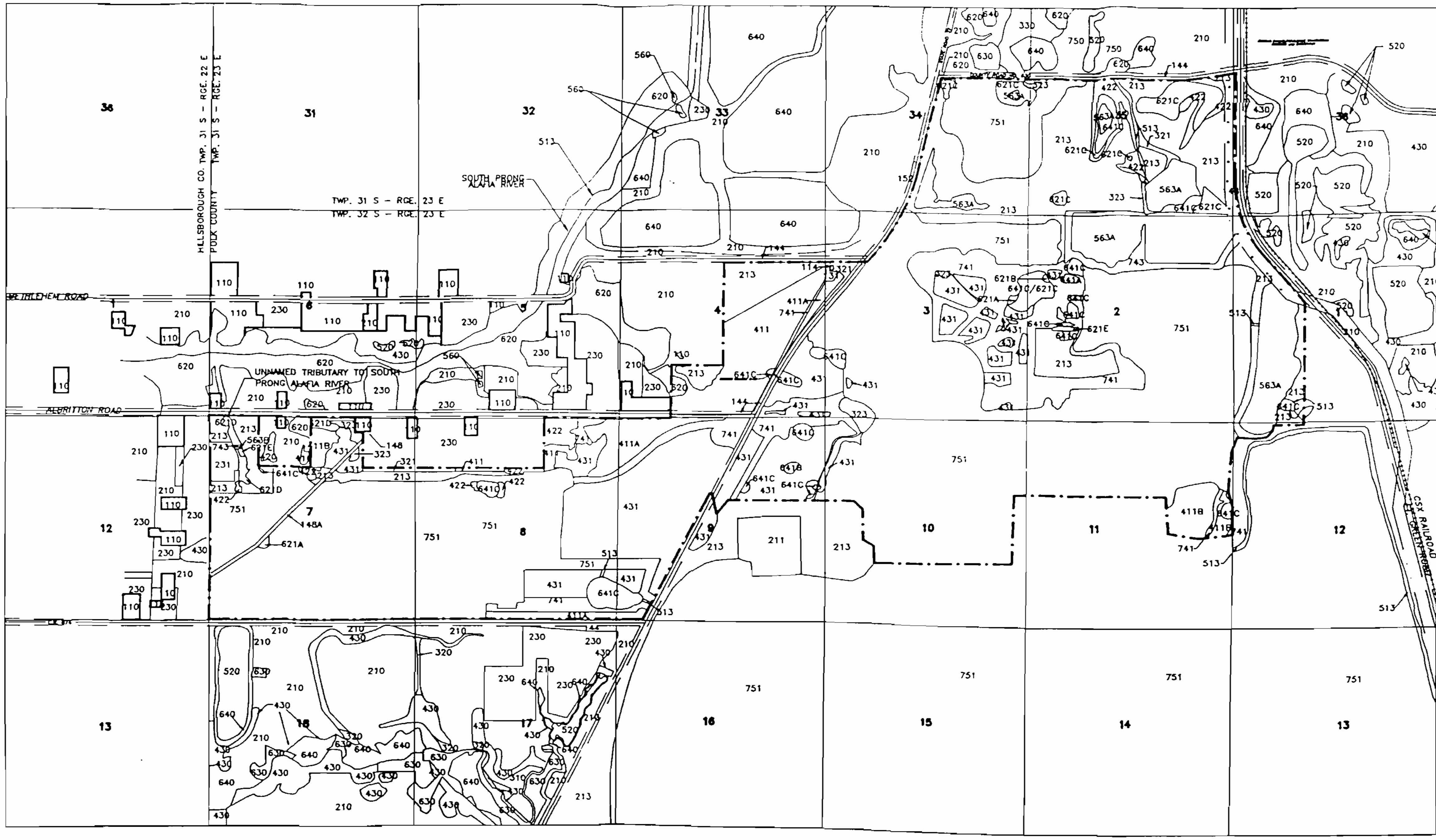
**FIGURE 11.2.2-7.**

**WATER MASS BALANCE, MAXIMUM DAILY MAKEUP**

Source: UE&C, 1992. ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**




LEGEND (FLUCCS, 1976)

| | | | | | |
|---|---|---|---|---|---|
| 110 | RESIDENTIAL | 323 | SHRUB AND BRUSHLAND | 621 | WETLAND FORESTED |
| 114 | MOBILE HOME | 330 | MIXED RANGELAND | A | BAY HEAD SWAMP |
| 131 | LIGHT INDUSTRIAL | 410 | CONIFEROUS FOREST | B | RED MAPLE SWAMP |
| 144 | ROADS AND HIGHWAYS | 411A | SLASH PINE FLATWOODS | C | WILLOW – ELDERBERRY SWAMP |
| 148A | FGT GAS PIPELINE | 411B | LONGLEAF PINE FLATWOODS | D | MIXED HARDWOOD SWAMP |
| 148B | TAMPA ELECTRIC COMPANY 230-KV TRANSMISSION LINE (HARDEE-PEBBLEDALE) | 420 | HARDWOOD FOREST | E | PRIMROSE WILLOW SWAMP |
| 152 | OVERHEAD TRANSMISSION LINES | 422 | OAK HAMMOCK | 630 | WETLAND – MIXED FOREST |
| 210 | CROP AND PASTURELAND | 430 | MIXED UPLAND FOREST | 640 | WETLAND – VEGETATED NON-FORESTED |
| 211 | ROWCROPS | 431 | MIXED OAK/PINE FOREST | 641 | NON-FORESTED WETLAND |
| 213 | IMPROVED PASTURE | 520 | LAKES | A | MAIDENCANE MARSH |
| 230 | CITRUS GROVE | 513 | CANAL/DITCH | B | MAIDENCANE – BOTTONBUSH |
| 231 | ORANGE GROVE | 563 | PONDS | C | DISTURBED MIXED MARSH |
| 310 | GRASSLAND | 560 | OTHER WATER AREAS | 741 | SCRAPED AREAS/OLD FIELDS |
| 320 | SHRUB AND BRUSHLAND | A | MINE PONDS | 751 | PHOSPHATE MINED LANDS |
| 321 | PALMETTO PRAIRIE | B | OTHER WATER AREAS | 743 | VEGETATED SPOIL BANK |
| | | 620 | WETLAND – HARDWOOD FOREST | | |

NOTE:

INFORMATION TAKEN FROM AERIAL PHOTOGRAPH DATED 6-13-91 BY I.F. ROOKS & ASSOCIATES, INC. 106 NORTHWEST DRANE STREET PLANT CITY, FLORIDA 33566 AND MODIFIED USING INFORMATION COLLECTED DURING GROUND TRUTHING ON 12-19-91

SCALE: 1 : 36,000
SCALE: 1" = 3000'
(FEET) 0 1000 2000 3000 6000
0 500 1000 1500 (METERS)
N

**FIGURE 11.2.2-8.**
**EXISTING LAND USE/LAND COVER**
**TAMPA ELECTRIC COMPANY**
**POLK POWER STATION**
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

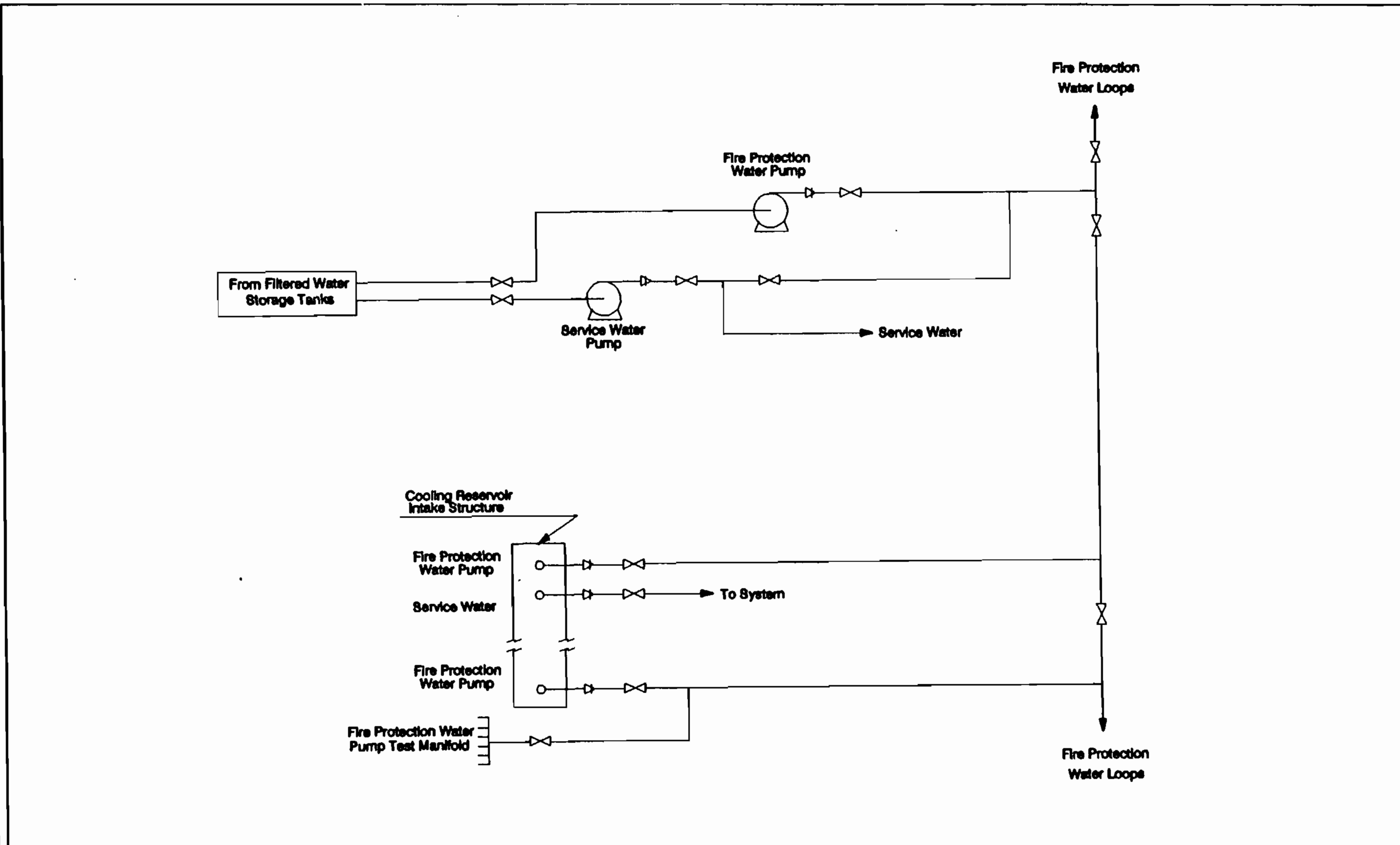



FIGURE 11.2.2-9.

SERVICE AND FIRE PROTECTION WATER DELIVERY SYSTEM

Sources: Texaco, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

# 11.2.3 SURFACE WATER MANAGEMENT CONCEPTUAL PERMIT APPLICATION

# PERMIT APPLICATION

SWFWMD USE ONLY


SOUTHWEST FLORIDA
WATER MANAGEMENT DISTRICT

2379 BROAD STREET • BROOKSVILLE, FL 34609-6899
(904) 796-7211 or FLORIDA WATS 1 (800) 423-1476


## SURFACE WATER MANAGEMENT — CONCEPTUAL PERMIT

PERMITS ARE REQUIRED PURSUANT TO SECTION 373.413, FLORIDA STATUTES (F.S.) AND RULES 40D-4.041, 40D-40.041 AND 40D-40.042, FLORIDA ADMINISTRATIVE CODE (F.A.C.). THIS APPLICATION WILL BE PROCESSED IN ACCORDANCE WITH THE PROCEDURE DESCRIBED IN RULE 40D-1.603, F.A.C. WITHIN 30 DAYS AFTER RECEIPT OF THIS APPLICATION, THE DISTRICT WILL NOTIFY YOU IF THE APPLICATION IS COMPLETE OR MAY REQUEST ADDITIONAL INFORMATION NECESSARY TO COMPLETE THE APPLICATION. IF YOU HAVE ANY QUESTIONS REGARDING THE APPLICATION, YOU ARE ENCOURAGED TO SCHEDULE A PRE-APPLICATION CONFERENCE WITH THE DISTRICT STAFF BY CALLING THE APPROPRIATE DISTRICT PERMITTING DIVISION WHICH HANDLES PERMITS FOR PROJECTS WITHIN YOUR COUNTY.

- **PROVIDE ALL APPLICABLE INFORMATION BELOW. ATTACH ADDITIONAL INFORMATION IF NECESSARY.**
- **PLEASE SUBMIT FOUR COPIES OF APPLICATION, DRAWINGS, CALCULATIONS, ETC.**
- **A PROCESSING FEE IS REQUIRED WITH THIS APPLICATION IN ACCORDANCE WITH RULE 40D-0.201.**

### I. GENERAL INFORMATION

PLEASE CHECK APPROPRIATE BOX: [X] CONCEPTUAL PERMIT [ ] MODIFICATION OF EXISTING PERMIT, NO.:

| OWNER(S) OF LAND: | AGENT OF OWNER, AUTHORIZED TO SECURE PERMIT *(IF APPLICABLE)*: |
|---|---|
| NAME: Tampa Electric Company | NAME: Gregory M. Nelson, P.E. |
| ADDRESS: Post Office Box 111 | ADDRESS: Post Office Box 111 |
| CITY, STATE, ZIP: Tampa, Florida 33602-0111 | CITY, STATE, ZIP: Tampa, Florida 33602-0111 |
| TELEPHONE: (813) 228-4111 | TELEPHONE: (813) 228-4111 |

| PERSON WHO PREPARED PLANS AND SPECIFICATIONS: | PERSON WHO WILL CONSTRUCT PROPOSED WORK *(IF KNOWN)*: |
|---|---|
| NAME: Ivan B. Chou, P.E. | NAME: N/A |
| ADDRESS: 5200 Newberry Road, Suite E-1 | ADDRESS: |
| CITY, STATE, ZIP: Gainesville, Florida 32607 | CITY, STATE, ZIP: |
| COMPANY: Environmental Consulting & Technology, Inc. — TELEPHONE: (904) 336-0444 | TELEPHONE: ( ) |

DESCRIPTION OF LAND:

| COUNTY | SECTION | TOWNSHIP | RANGE |
|---|---|---|---|
| Polk | See Chapters | 1.0 and 2.0 | of the SCA |

PROJECT NAME *(INCLUDING PHASE)*: Polk Power Station

| TOTAL LAND AREA *(ACRES)*: | PROJECT SIZE *(ACRES)* IF DIFFERENT THAN TOTAL LAND AREA: |
|---|---|
| 4,348 | See Chapters 1.0 and 2.0 of the SCA |

BRIEF DESCRIPTION OF PROJECT: *(TYPE, LAND USE, ETC.)*

See Chapters 1.0, 2.0, 3.0 and Section 3.8 of the SCA

| HAVE YOU HAD A PRE-APPLICATION CONFERENCE WITH DISTRICT STAFF? | DATE OF CONFERENCE | WITH WHOM? |
|---|---|---|
| [X] YES [ ] NO | / / | |

FORM 46 10-003 (10/88)

## II. CONTENT OF APPLICATION - 40D-4.101

**INSTRUCTIONS: THE FOLLOWING INFORMATION IS NECESSARY TO PROPERLY EVALUATE YOUR PERMIT APPLICATION. THE APPLICANT SHOULD SUBMIT AS MUCH OF THE INFORMATION LISTED AS THE COMPLEXITY OF THE PROJECT AND SENSITIVITY OF THE AREA NECESSITATES. A CONCEPTUAL PERMIT DOES NOT GENERALLY REQUIRE THE SAME LEVEL OF DETAIL AS A CONSTRUCTION PERMIT. PROVIDING A GREATER LEVEL OF DETAIL MAY, HOWEVER, REDUCE THE NEED FOR ADDITIONAL INFORMATION BEING REQUIRED AT A LATER DATE.**

- Respond to each item leaving no blanks.
- If you feel that an item **DOES NOT** apply to your project, write "**NOT APPLICABLE**" or "**N/A**" in that space.
- Your response to each item must indicate where the requested information can be found in the accompanying plans, maps, reports, etc.
- Please be specific when identifying the plan sheet number(s), map(s), report(s), page(s), etc. that contain all supporting information.

### A SITE INFORMATION - 40D-4.101(2)(a)

| | | |
|---|---|---|
| 1 | 40D-4.101(2)(a) 1 | Provide a location sketch of sufficient detail to allow someone to locate the project for a site visit. |
| | | See Chapter 1.0 of the SCA |
| 2 | 40D-4.101(2)(a) 7 | Provide recent aerial photo map(s), legible for photo interpretation with a scale no smaller than 1" = 800'; with total land area, project area, and any on-site wetlands delineated. |
| | | See Sections 2.2.4, 2.3.5, and 2.3.6 of the SCA |
| 3 | 40D-4.101(2)(a) 3 | Provide a hydrologic features map of the overall area showing existing runoff patterns and size, location, topography, and land use of off-site areas which drain through, onto, and from the project. |
| | | See Sections 2.2.4, 2.3.3, 2.3.4.1, and 3.8 of the SCA |
| 4 | 40D-4.101(2)(a) 2 | Provide a detailed topographic map (with contours) of the site and adjacent hydrologically related areas, which shall include the location and description of bench marks (minimum of one per major water control structure). |
| | | See Sections 2.3.4.1 of the SCA |
| 5 | 40D-4.101(2)(a) 6 | Provide a description of vegetative cover. Location of wetland areas in and adjacent to the project area are to be identified. Quantify the acreage of existing on-site wetlands. If activities are proposed in wetlands, provide a description of wetland type and functions, and an analysis of impact alternatives that were considered. |
| | | See Sections 2.2.4, 2.3.5, 2.3.6, 4.3, 4.4.1, and Chapter 5.0 of the SCA |
| 6 | 40D-4.101(2)(a) 5 | If the project is in the known floodplain of a stream or other watercourse, the floodplain should be identified and approximate flooding elevations determined. The 100 year flood plain elevation and limits are to be identified. If no 100 year flood plain exists on site, please state below. |
| | | See Section 2.1 of the SCA |
| 7 | 40D-4.101(2)(a) 4 | Provide identification of wet season high water table elevations, including normal pool and seasonal high elevations in wetlands. |
| | | See Sectoni 2.3.2 of the SCA |
| 8 | 40D-4.101(2)(a) 9 | Provide soils information representative of actual conditions; including percolation tests, if effluent filtration, percolation or exfiltration systems are proposed. |
| | | See Section 2.3.1 of the SCA |

### B MASTER DRAINAGE PLAN 40D-4.101(2)(b)

| | | |
|---|---|---|
| 1 | 40D-4.101(2)(b) 1 | Provide the location of all water bodies with details of size, side slopes, elevations and depths used for water quantity, quality and environmental functions, including compensation plan details for wetland impacts and floodplain encroachment. |
| | | See Chapters 4.0, 5.0, 9.0, Section 3.8, and Appendix 11.16 of the SCA |
| 2 | 40D-4.101(2)(b) 2 | Provide the location and site details of all major water control structures, including design elevations of the discharge structures along with any seasonal water level fluctuation or drawdown schedules. |
| | | See Sections 4.2 and 4.3 of the SCA |
| 3 | 40D-4.101(2)(b) 4 | Provide the locations of roads and buildings along with their proposed elevations. |
| | | See Section 3.2 of the SCA |

| | | |
|---|---|---|
| 4 | 40D-4.101(2)(b) 3 | Provide drainage basin boundaries showing direction and path of flow, taking into account off-site runoff being routed through or around the project. |
| | | See Sections 2.3.4.1, 4.3, and 5.1 of the SCA |
| 5 | 40D-4.101(2)(B) 7 | Provide the location and description of any nearby existing off-site water resource facilities which might be affected by the proposed construction or development. The names and addresses of the owners of such facilities should also be submitted. |
| | | See Chapters 4.0, 5.0, and Appendix 11.16 of the SCA |
| **C** | | **DRAINAGE CALCULATIONS 40D-4.101(2)(C)** |
| 1 | 40D-4.101(2)(c) 1 | Provide the design storms used including depth, duration and distribution. |
| | | See Sections 2.3.4, 3.8.4, 4.2, and Appendix 11.8 of the SCA |
| 2 | 40D-4.101(2)(c) 2 | Provide the details of any off-site inflows. |
| | | See Sections 3.8, 4.2, and Appendix 11.8 of the SCA |
| 3 | 40D-4.101(2)(c) 4 | Provide the acreages and percentages of property proposed as: a. Impervious surfaces (excluding waterbodies); b. Pervious surfaces (green areas); c. Lakes, canals, retention areas, etc.; d. Wetlands; and, e. Total acreage of project. |
| | | See Section 4.4.1 and Appendix 11.8 of the SCA |
| 4 | 40D-4.101(2)(c) 3 | Provide the stage-storage computations for the project and stage-discharge computations for the outfall structure(s). |
| | | See Sections 3.8, 4.2, 4.4.1, 5.8, and Appendix 11.8.9 of the SCA |
| 5 | 40D-4.101(2)(c) 5 | Provide the runoff calculations signed and sealed by the design engineer showing pre-and post-development discharges, elevations, and volumes retained and/or detained during applicable storm events; including the hydrologic parameters and modeling input and output data. Mathematical computations may be required to demonstrate that the proposed development will not significantly alter net storage from the project area for events up to the required design storm nor cause adverse affects due to floodplain encroachment up to the 100 year event. |
| | | See Chapter 9.0, Section 3.8, and Appendices 11.8 and 11.16 of the SCA |
| 6 | 40D-4.101(2)(c) 6 | Provide the calculations required for determination of minimum building flood and road elevations. See Section 3.8 and Appendix 11.8 of the SCA |
| **D** | | **LEGAL AND INSTITUTIONAL INFORMATION 40D-4.101(2)(d)** |
| 1 | 40D-4.101(2)(d) 4 | Provide the identification of agencies and organizations contacted in connection with the project. Include meeting summaries and/or responses. Give the status of local approvals indicating if site plan and/or subdivision approval has been granted, final plats recorded and building or construction permits issued. |
| | | See Chapter 10.0 of the SCA |
| 2 | 40D-4.101(2)(d) 6 | Provide a copy of the boundary survey and/or a legal description and acreage of the total land area of contiguous property owned or controlled by the applicant adjacent to and including the project. Also provide a legal description and acreage of the project area required to construct, operate and maintain the system; if different from the total land area. Provide a copy of the deed or other evidence of ownership. |
| | | See Chapter 1.0 of the SCA |
| 3 | 40D-4.101(2)(d) 5 | Provide the present zoning classification and status of any DRI application or proposed zoning reclassification. |
| | | See Section 2.2 of the SCA |
| 4 | 40D-4.101(2)(d) 3 | Provide indication of how water and wastewater service will be supplied. Letters of intended commitment from off-site suppliers must be included. |
| | | N/A |
| 5 | 40D-4.101(2)(d) 7 | Provide documentation of legal and physical availability of the receiving water system to receive project discharge, if such is not evident. |
| | | N/A |

| | | |
|---|---|---|
| 6 | 40D-4.101(2)(d) 1 | Identify the entity to be responsible for operation and maintenance of the Surface Water Management System upon completion of construction. |
| | | Tampa Electric Company |
| 7 | 40D-4.101(2)(d) 2 | Provide a letter or other evidence of potential acceptance by the operation and maintenance entity, if the entity is to be a public body such as a city or drainage district. If the entity is a homeowners or other association, documents verifying either the present or imminent existence of such an organization and its ability to accept operation and maintenance responsibility are required. |
| | | See Chapter 1.0 of the SCA |
| **E** | | **OTHER INFORMATION** |
| 1 | 40D-4.321(1)(a) | Provide a Master Plan of the Surface Water Management System identifying the phases and sequence for development of the project. |
| | | See Section 3.8 of the SCA |
| 2 | 17-21.10(4) | If there are any existing wells located within the project site, please indicate how they will be utilized or properly abandoned by a licensed water well contractor in accordance with Rules 40D-3 and 17-21.10(4), F.A.C. |
| | | See Section 2.3.3 of the SCA |
| 3 | | Are there existing Consumptive Use Permits from Southwest Florida Water Management District within the total land area? If so, provide the permit number(s). |
| | | See Water Use Permit Application in Appendix 11.2.2 of the SCA |
| 4 | | Provide letter or other certification from the owner clearly identifying and authorizing the agent who is applying for the permit to sign for and bind the owner, if applicable. |
| | | See attached letter |
| 5 | 40D-4.101(3) | The application must be signed by the owner or his authorized agent, and submitted to the District with four copies of all information required in subsections 40D-4.101 (1) and (2). |
| | | See the following page. This application is submitted as part of Appendix 11.2 of the SCA to facilitate the review of the Southwest Florida Water Management District. |

COMMENTS:

## III APPLICATION CERTIFICATIONS

**• STATEMENT BY PROFESSIONAL ENGINEER REGISTERED IN FLORIDA •**

This is to certify that the engineering features of this Surface Water Management System, designed by me or under by responsible charge, are designed in my professional opinion in conformity with sound engineering principles and in accordance with all applicable rules and specifications of Chapters 40D-4 and 40D-40, Florida Administrative Code (F.A.C), including the "Basis of Review for Surface Water Management Permit Applications" referenced in Rule 40D-4.091, F.A.C.

| ENGINEER'S NAME *(TYPE OR PRINT)* | FL REGISTRATION NO. | • AFFIX SEAL • |
|---|---|---|
| Ivan B. Chou, P.E. | 30688 | |
| COMPANY NAME | | |
| Environmental Consulting & Technology, Inc. | | |
| ADDRESS | | |
| 5200 Newberry Road, Suite E-1 | | |
| CITY, STATE, ZIP | PHONE | |
| Gainesville, Florida 32607 | (904) 336-0444 | |
| ENGINEER'S SIGNATURE | DATE | |
| X | 7/29/92 | |

**• STATEMENTS BY APPLICANT •**

**A. I hereby acknowledge that:**

1. A Conceptual Permit does not authorize any construction.

2. Construction of any portion of this project prior to receiving a District Construction Permit is a violation of Section 373.413, Florida Statutes (F.S.), and Rules 40D-4.041, 40D-40.041 and 40D-40.042, Florida Administrative Code.

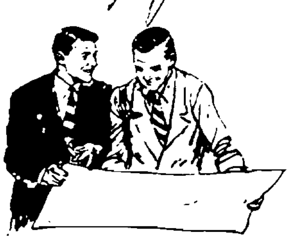
3. The District has the authority, pursuant to Chapter 373, F.S., to enter and inspect the property described in this application for the purpose of determining compliance with District rules.

**B.** By executing this application the applicant states that the property legally described in the survey drawing and/or legal description of the total land area is owned/controlled by the undersigned applicant and encompasses the project area referenced in the permit application.

**C.** I hereby certify that the information contained herein is true and accurate and that I have legal authority to execute this application to perform the proposed activities on the property identified herein.

| OWNER'S NAME *(PRINT)* | | NAME OF PERSON SIGNING APPLICATION *(PRINT)* |
|---|---|---|
| Tampa Electric Company | | Gregory M. Nelson, P.E. |
| SIGNATURE OF OWNER OR AUTHORIZED AGENT: | DATE | TITLE *(IF APPLICABLE)* |
| | 07 / 30 / 92 | Consulting Engineer |
| | | COMPANY NAME *(IF APPLICABLE)* |
| | | Tampa Electric Company |





**Southwest Florida Water Management District**

2379 BROAD STREET, BROOKSVILLE, FLORIDA 34609-6899

PHONE (904) 796-7211 OR 1-800-423-1476 SUNCOM 628-4097

TAMPA ELECTRIC
A TECO ENERGY COMPANY

To Whom It May Concern:

Please be advised that Gregory M. Nelson, Consulting Engineer of Environmental Planning, is the authorized representative of Tampa Electric Company concerning matters with which this permit application deals.

Sincerely,

Charles R. Black
Vice President
Project Management

/Permit2

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601-0111 (813) 228-4111

## 11.2.4 CONCEPTUAL FDOT DRIVEWAY CONNECTION REVIEW REQUEST

TAMPA ELECTRIC
A TECO ENERGY COMPANY

July 21, 1992

Mr. W.A. (Wes) Waddell
Assistant District Safety Engineer
Florida Department of Transportation
801 North Broadway
Bartow, Florida 33830

Re: Conceptual Review of Driveway Connections to State Road 37,
Tampa Electric Company Polk Power Station

Dear Mr. Waddell:

Tampa Electric Company is pleased to submit three copies of the Transportation Analysis and schematic geometry plans for the above referenced project. Please review these documents, and provide a Notice of Department Conceptual Review Findings at your earliest convenience.

Please contact me if you have general questions regarding the project, while specific questions about geometry and/or the transportation analysis should be directed to Mr. Steve Henry of Lincks & Associates, Inc., at (813) 289-0039.

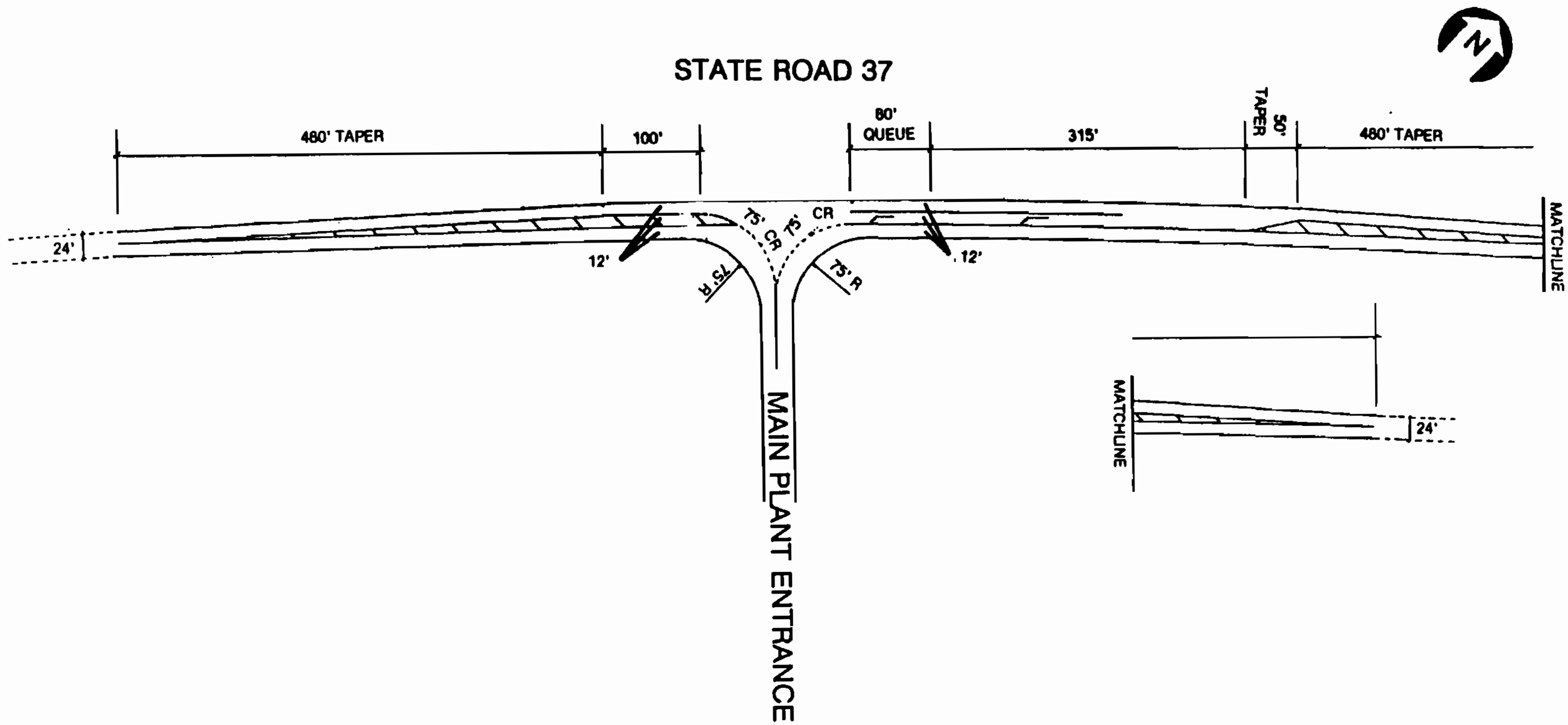
Thank you for your assistance in the conceptual review process.

Sincerely,

A. Spencer Autry
Director
Environmental

gt\SA005

Enclosures




NOTES:

1. TAPERS BASED ON 60 MPH DESIGN SPEED AND CENTERED WIDENING.
2. QUEUE LENGTH BASED ON OPERATIONAL PROJECT TRAFFIC.
3. THIS IS A CONCEPTUAL LAYOUT OF THE PROPOSED ROADWAY IMPROVEMENTS. THE ACTUAL DIMENSIONS ARE SUBJECT TO CHANGE BASED ON THE FINAL DESIGN AND FDOT APPROVAL.

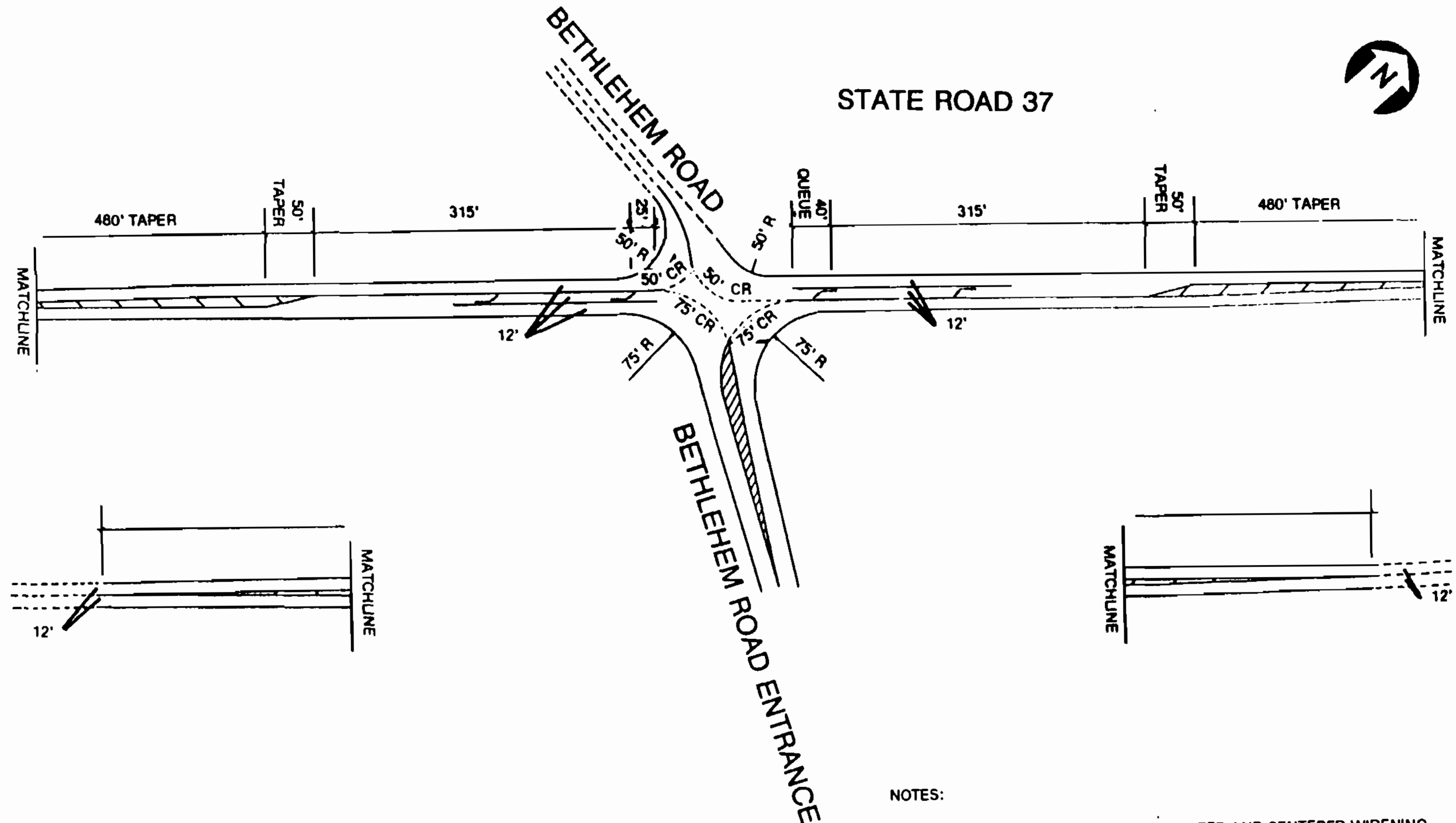
FIGURE 1.

SCHEMATIC DRIVEWAY IMPROVEMENTS, SR 37 AT POLK POWER STATION MAIN PLANT ENTRANCE

Sources: FDOT, 1992. Lincks and Associates, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION




NOTES:

1. TAPERS BASED ON 60 MPH DESIGN SPEED AND CENTERED WIDENING.
2. QUEUE LENGTH BASED ON OPERATIONAL PROJECT TRAFFIC.
3. THIS IS A CONCEPTUAL LAYOUT OF THE PROPOSED ROADWAY IMPROVEMENTS. THE ACTUAL DIMENSIONS ARE SUBJECT TO CHANGE BASED ON THE FINAL DESIGN AND FDOT APPROVAL.

FIGURE 2.

SCHEMATIC DRIVEWAY IMPROVEMENTS, SR 37 AT POLK POWER STATION BETHLEHEM ROAD ENTRANCE

Sources: FDOT, 1992. Lincks and Associates, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

# APPENDIX 11.3

## ZONING DESCRIPTIONS AND CONSISTENCY DETERMINATIONS

# 11.3.1 ZONING DISTRICT DESCRIPTIONS

5.2C RURAL CONSERVATION (RC) DISTRICT:

The RC District is established to provide suitable areas for low density residential development in rural locations, to allow agricultural uses to be conducted in a rural environment, and to create open space and recreation areas.

1. Permitted Uses:

   a. Class III Agricultural Uses

   b. Parks and Open Space

   c. Nature Preserves and Wildlife Refuges

   d. Single Family Detached Dwellings - conventionally constructed buildings and mobile homes

   e. Foster Homes

   f. Home Occupations in accordance with Article III, Section 3.12

   g. Class I and II Essential Services

   h. Off-Premises Signs in accordance with the Polk County Sign Code

   i. Uses similar to or customarily accessory to the uses listed above

2. Conditional Uses - Non-Agricultural:

   a. Private clubs, fraternal organizations, and similar facilities

   b. Airports and Heliports

   c. Aircraft Hangars

   d. Cemeteries

   e. Group Care Homes - Levels I and II

   f. Day-Care Centers

   g. Boarding Kennels

   h. Class III Essential Services, provided that all facilities are buffered from adjacent properties used for residential dwellings

3. <u>Conditional Uses - Agricultural</u>:

   a. Muck or Peat Removal

   b. Specialized forestry related facilities such as sawmills and mulching operations

   c. Specialized agricultural service establishments performing maintenance of grove equipment and farm machinery, fertilizer application, or grove installation and service

   d. Veterinary Services

   e. Agricultural bulk products collection, weighing, storage, and/or transfer facilities such as a citrus scalehouse

   f. Farm Employee Housing, provided the gross density requirements are met

   g. Other agriculture related uses similar to those listed previously which would not conflict with existing agricultural uses, are compatible, and are found necessary after consideration of alternative locations.

4. <u>Issues - Conditional Agricultural Uses</u>:

   The following issues shall be considered by the Board in issuing permits for Conditional Agricultural Uses in addition to the requirements in Article VI, Section 6.4.

   a. Size of the proposed use and its relationship to its service area

   b. Conflicts or compatibility of the proposed use with existing land uses

   c. Need for the proposed use to be located in an agricultural area

   d. Availability of alternative, feasible locations for the proposed use

   e. Demand for additional public services created by allowing the proposed use and the ability of local government to provide these services without unreasonable burdens

f. Effect of the proposed use on water, air, soil, and other natural resources

g. Productivity of the land involved

h. Other related considerations

5. <u>Density and Lot Size Requirements</u>:

a. Gross density shall not exceed one (1) dwelling unit per acre.

b. Minimum lot area shall be forty thousand (40,000) square feet for each dwelling unit exclusive of road right-of-ways.

6. <u>Minimum Setbacks, Principal Structure</u>:

a. Front, exterior side, and exterior rear setbacks shall be determined by the distance from the road right-of-way (R/W) or road centerline (C/L), whichever results in the greater distance from the property line, based on the following table:

| Highway/Road Classification | Minimum Setback Required From R/W | From C/L |
|---|---|---|
| Arterial | 65' | 125' |
| Collector, Major | 50' | 90' |
| Collector, Minor | 35' | 65' |
| Local, 60' R/W | 25' | 55' |
| Local, 50' or Less R/W | 25' | 50' |

b. Interior Side - Minimum of fifteen (15) feet

c. Interior Rear - Minimum of forty (40) feet

7. <u>Minimum Setbacks, Accessory Structure</u>:

a. No closer to an adjacent road than the principal structure

b. Minimum of fifteen (15) feet from any side lot line, and a minimum of ten (10) feet from the rear lot line

## SECTION 5.3 SINGLE FAMILY RESIDENTIAL DISTRICTS:

Single Family Residential Districts are established for single family dwellings in a variety of districts with a range of lot size and density standards, and for other uses which are generally compatible with residential uses.

### 5.3A SINGLE FAMILY (SF-1, SF-1M) DISTRICT:

SF-1, SF-1M Districts are established to provide suitable areas for development of single family residential uses at low densities on large lots and for compatible uses.

SF-1 indicates that dwellings shall be limited to conventionally constructed buildings. SF-1M indicates mixed building types for either mobile homes or conventionally constructed buildings.

1. Permitted Uses:

    a. Single Family Detached Dwellings

    b. Foster Homes

    c. Customary Accessory Structures

    d. Parks and Playgrounds

    e. Class I Agricultural Uses

    f. Class I and II Essential Services provided that all Class II facilities are buffered from adjacent properties used for residential dwellings

2. Conditional Uses:

    a. Cluster Development

    b. Zero Lot Line Development

    c. Class II Agricultural Uses

    d. Class III Essential Services, provided that all facilities are buffered from adjacent properties used for residential dwellings

    e. Group Care Homes - Level I

    f. Day-Care Centers

    g. Aircraft Hangars

    h. Home Occupations in accordance with Article III, Section 3.12

3. Minimum Lot Size (Area):

   a. Lot size shall not be less than fifteen thousand (15,000) square feet for each dwelling unit exclusive of road right-of-ways.

4. Minimum Setbacks, Principal Structure:

   a. Front, exterior side, and exterior rear setbacks shall be determined by the distance from the road right-of-way (R/W) or road centerline (C/L), whichever results in the greater distance from the property line, based on the following table:

| Highway/Road Classification | Minimum Setback Required From R/W | From C/L |
|---|---|---|
| Arterial | 65' | 125' |
| Collector, Major | 50' | 90' |
| Collector, Minor | 35' | 65' |
| Local, 60' R/W | 20' | 50' |
| Local, 50' or less R/W | 20' | 45' |

   b. Interior Side - Minimum of ten (10) feet on each side

   c. Interior Rear - Minimum of thirty (30) feet

5. Minimum Setbacks, Accessory Structure:

   a. No closer to an adjacent road than the principal structure

   b. Minimum of ten (10) feet from any property line

6. Off-Street Parking:

   a. A minimum of two (2) off-street parking spaces for each dwelling unit shall be provided.

5.6E COMMERCIAL (C-3) DISTRICT - REGIONAL COMMERCIAL:

C-3 Districts are established to provide areas for commercial trade and services oriented to serving a regional market, for general commercial enterprises, and for selected cultural, entertainment, and recreational uses.

1. Permitted Uses:

   a. All uses permitted in Commercial C-2 Districts with the addition of the following permitted uses

   b. Retail Establishments such as:

      Bars, Lounges, and Taverns
      Building Materials Dealers including Electrical Supply Stores, Heating and Plumbing Equipment Stores, and Lumber Suppliers
      Mobile Home and Recreational and Utility Trailer Dealers
      Monument Sales
      Motor Vehicle and Marine Craft Sales and Service including Auto Dealers, Auto Parts and Supply Stores, Car Washes, Marine Craft Dealers, and Motorcycle Dealers
      Service Stations

   c. Transient Lodging Places such as:

      Camps and Campgrounds
      Hotels and Motels
      Tourist Courts

   d. Restaurants with drive-in/carry-out services

   e. Business Services such as:

      Commercial Photography, Art, and Graphics
      Dwelling and Building Cleaning, Maintenance, and Exterminating Services
      Equipment Rental and Leasing
      Mailing, Duplicating, and Stenographic Services
      Motor Vehicle and Trailer Rental and Leasing
      Photofinishing Laboratories
      Printing, Reproduction, Binding and Lithograhy Services
      Research, Development, and Testing Laboratories

f. Repair Services such as:

   Household Appliance Repair
   Office Equipment Repair

g. Enclosed Storage and Warehousing

   Separate storage spaces of varying sizes leased or rented on an individual basis (commonly known as mini warehouses)
   Storage facilities used subordinate and ancillary to retail establishments

h. Health Service Establishments such as:

   Hospitals
   Medical, Dental, and Other Health Service Laboratories
   Nursing Homes and Personal Care Facilities
   Veterinary Hospitals and Animal Shelters

i. Amusement and Recreation Services and Facilities such as:

   Amusement Parks and Theme Parks
   Arcades
   Bowling Alleys
   Clubs
   Lodges and Fraternal Organizations
   Motion Picture Theaters

j. Cultural Activities such as:

   Arboreta, Botanical, and Zoological Gardens
   Libraries
   Museums, Art Galleries, and Planetariums

k. Radio and Television Stations

l. Kennels

m. Multiple Family Dwellings in accordance with Multiple Family MF-16 District standards

n. Off-Premises Sign(s) in accordance with the Polk County Sign Code

o. Uses similar to or customarily accessory to the uses listed previously, provided such uses do not appear as additional permitted uses in Commercial C-4 Districts

2. Conditional Uses:

   a. Class III Essential Services

   b. Class III Agricultural Uses

   c. Enclosed Automotive Repair, Armature Rewinding, or other Major Mechanical Repair

   d. Mobile Home Parks in accordance with Mobile Home Park MHP District standards

   e. Distribution Centers

   f. Heliports

3. Minimum Standards:

   a. Buffers: Development in C-3 Districts shall provide a perimeter visual buffer in accordance with Article III, Section 3.9, Minimum Standards for Buffers, along side and rear property lines adjoining other properties which are either used or zoned for residential dwellings.

   b. Enclosure: All service, repair, and storage activities--except gasoline sales--shall be conducted and maintained entirely within an enclosed building.

   c. General Regulations: Minimum Setbacks, Gasoline Pump Island Setbacks, Building Separations, Off-Street Parking and Loading, Driveways, Landscaping, Lighting, Refuse Storage, Land Coverage, Use of nonresidentially zoned property, and Projections from Buildings and Structures shall be in accordance with Section 5.6A, General Regulations-Commercial and Office Districts.

C. RESIDENCE (R-1) DISTRICT:

R-1 Districts are designed and intended to provide exclusive areas for conventionally constructed buildings on spacious lots wherein a property owner may invest in a substantial sized home with reasonable assurance of compatible development of a similar nature.

1. Permitted Uses:

   a. Single Family Detached Dwellings

   b. Foster Homes

   c. Customary Accessory Structures

   d. Public Parks and Playgrounds

   e. Class I and II Agricultural Uses

   f. Class I and II Essential Services, provided all Class II facilities are buffered from adjacent properties used for residential dwellings

2. Conditional Uses:

   a. Class III Agricultural Uses

   b. Class III Essential Services, provided that all facilities are buffered from adjacent properties used for residential dwellings

   c. Group Care Homes - Level I

   d. Day-Care Homes

   e. Aircraft Hangars

   f. Home Occupations in accordance with Article III, Section 3.12

3. Density and Lot Size:

   a. Gross density shall not exceed three (3) dwelling units per acre.

   b. Minimum lot area shall be no less than ten thousand (10,000) square feet exclusive of road right-of-ways.

4. Required Setbacks:

a. Front, exterior side, and exterior rear setbacks shall be determined by the distance from the road right-of-way (R/W) or road centerline (C/L), whichever results in the greater distance from the property line, based on the following table:

| Highway/Road Classification | Minimum Setback Required From R/W | From C/L |
|---|---|---|
| Arterial | 65' | 125' |
| Collector, Major | 50' | 90' |
| Collector, Minor | 35' | 65' |
| Local, 60' R/W | 15' | 45' |
| Local, 50' or less R/W | 15' | 40' |

b. Interior side yard setbacks in R-1 Districts shall not be less than seven and one half (7 1/2) feet on either side of the dwelling unit.

c. Interior rear yard setbacks in R-1 Districts shall not be less than thirty (30) feet.

d. Accessory building setbacks shall be not less than seven (7) feet from any property line.

## E. RESIDENCE (R-3) DISTRICT:

R-3 Districts are designed and intended to provide areas allowing a broad diversity of housing styles and uses for either conventionally constructed buildings or mobile homes and for the grouping of units in multiple family complexes on a single parcel of land.

1. Permitted Uses:

   a. Residential Dwellings of all building types not exceeding two (2) stories in height

   b. Foster Homes

   c. Customary Accessory Structures

   d. Parks and Playgrounds

   e. Class I and II Agricultural Uses

   f. Class I and Class II Essential Services, provided that all Class II facilities are buffered from adjacent properties used for residential dwellings

   g. Home Occupations in accordance with Article III, Section 3.12

2. Conditional Uses:

   a. Class III Agricultural Uses

   b. Class III Essential Services, provided that all facilities be buffered from adjacent properties used for residential dwellings

   c. Group Care Homes - Levels I and II

   d. Supervised Apartments

   e. Day-Care Centers

   f. Aircraft Hangars

   g. Multiple Building Complexes

3. Density and Lot Size

a. Gross density shall not exceed eight (8) dwelling units per acre.

b. Minimum lot area shall be not less than six thousand (6,000) square feet for Single Family Dwellings plus four hundred (400) square feet per dwelling unit for Duplex or Multiple Family Dwellings.

4. Required Setbacks:

a. Front, exterior side, and exterior rear setbacks shall be determined by the distance from the road right-of-way (R/W) or road centerline (C/L), whichever results in the greater distance from the property line, based on the following table:

| Highway/Road Classification | Minimum Setback Required From R/W | From C/L |
|---|---|---|
| Arterial | 65' | 125' |
| Collector, Major | 50' | 90' |
| Collector, Minor | 35' | 65' |
| Local, 60' R/W | 15' | 45' |
| Local, 50' or less R/W | 15' | 40' |

b. Interior side yard setbacks in R-3 District shall not be less than seven and one half (7 1/2) feet on either side of the dwelling unit.

c. Interior rear yard setbacks in R-3 Districts shall not be less than twenty (20) feet.

d. Accessory building setbacks shall not be less than five (5) feet from any property line.

# 11.3.2 CONDITIONAL USE PERMIT

IMPERIAL

POLK COUNTY

DEVELOPMENT SERVICES
PHIL McLEMORE, DIRECTOR

P.O. BOX 2096
BARTOW, FL. 33830
813-534-6792

June 18, 1992

Stacy Frank
Tampa Electric Company
Corporate Counsel, Legal Department
Post Office Box 111
Tampa, FL 33601-0111

Dear Ms. Frank:

Attached please find a final copy of Conditional Use Permit 92-05 for the proposed Certified Electrical Power Generating Facility in southwest Polk County as adopted by the Polk County Board of County Commissioners on June 2, 1992.

We appreciate the cooperation and professionalism exhibited by Tampa Electric staff in providing all the information necessary for analysis of the application. We look forward to working with you through the Site Certification Process.

Sincerely,

Phil McLemore

Phil McLemore
Director
Development Services

attachment

xc: BoCC
Mark Carpanini, County Attorney
Rob Anders, Planning Director
Tampa Electric Company, Vice President, Production
Tampa Electric Company, Vice President, Energy Resources

file: K:\...\DSM\certipp\cup92-05.flt

TAMPA ELECTRIC COMPANY
POLK POWER STATION
CONDITIONAL USE PERMIT

92-05

CONDITIONAL USE PERMIT 92-05 is approved this 2nd day of June, 1992, for TAMPA ELECTRIC COMPANY (TEC), a Florida corporation, by the BOARD OF COUNTY COMMISSIONERS OF POLK COUNTY (COUNTY), a political subdivision of the State of Florida, based on the following determinations and subject to the following conditions:

DETERMINATIONS

A. TEC wishes to develop (in accordance with development plans as may be revised from time to time) electric power generating facilities together with appurtenant and supportive facilities, all as more particularly described in TEC's Application for Conditional Use Permit and supporting documentation provided by TEC to the County (the Project). Said electric power generating facilities, comprising 1,150 megawatts of capacity, are to be located at a site situated and being in Polk County, Florida, and legally described on Exhibit "A" attached hereto and made part hereof.

B. The Polk County Comprehensive Plan and Zoning Ordinance permit this type of development as proposed by TEC, subject to Conditional Use Permit approval for the Project at the Polk County Site.

C. TEC's Project will be evaluated further during proceedings under the Florida Electrical Power Plant Siting Act (PPSA), Chapter

403, Part II, Florida Statutes, in which Polk County may participate fully as a party and may raise questions or objections to the proposed plan of development. Certification issued under the PPSA for TEC's Polk Power Station constitutes the necessary approval for construction and operation of the Project (Development Plan). The certification is subject to a determination that land use and zoning are appropriate for the Project through the land use hearing required under the PPSA.

D. Documents certifying proper authorization for TEC to represent the current owners of the Polk County Site are attached hereto and incorporated herein as Composite Exhibit "B".

E. CUP 92-05 is hereby granted for TEC's Project subject to the following conditions.

## CONDITIONS

I. EXISTING ACTIVITY

1. The current owners of the site of the Polk Power Station and their successors in interest may continue to conduct phosphate mining and related activities at the site without violating this CUP.

2. If TEC does not gain the necessary approval or permits required to commence construction of the Polk Power Station and/or TEC does not purchase the property on which to construct the Polk Power Station, then the conditions associated with and imposed by the CUP will be nullified and withdrawn and the property which is

the subject of this CUP will revert back to the zoning category and its associated conditions as existed before the approval of this CUP.

II. SITE AND DEVELOPMENT PLANS

CUP 92-05 shall be undertaken and carried out in accordance with the following:

1. Development of CUP 92-05 will be undertaken and carried out in accordance with the CUP Site Plan and the Development Plan as officially adopted and certified, respectively.

a. CUP 92-05 for the Polk Power Station is approved in accordance with the CUP Conceptual Site Plan, a reduced copy of which is attached hereto as Exhibit "D" and by reference made a part hereof.

b. The Site Certification Application to be filed by TEC under the PPSA for the Polk Power Station will constitute the formal application for Development Plan approval and shall be submitted to Polk County simultaneously with the Florida Department of Environmental Regulation (DER).

c. The remaining development of CUP 92-05 must be accomplished in accordance with any site certification order issued under the PPSA, which order will constitute Development Plan approval for CUP 92-05; provided that such Site Development Plan approval is generally consistent with the Conceptual Site Plan approval hereby granted by Polk County.

2. The Timetable of Development as officially adopted by the County and agreed to by TEC, as shown in Exhibit "E" attached hereto and made part hereof, shall be adhered to by TEC.

3. The Special Conditions adopted or imposed by the County in the process of the approval of CUP 92-05, which requirements are set forth in Exhibit "F" attached hereto, are made part hereof.

4. All permits and authorizations shall be granted under the PPSA in accordance with such laws, ordinances, and regulations as may be in effect at the time of approval. Impact fees shall be assessed at the time of building construction code compliance review.

III. <u>DESTRUCTION</u>

In the event that all or a portion of the Project should be destroyed by a storm, fire or other common disaster, TEC, its grantees, successors or assigns, shall have the right to rebuild and/or repair so long as there is compliance with the Site and Development Plans, as the same may be amended from time to time.

IV. <u>CHANGES AND ADDITIONS</u>

There shall at all times be a strict adherence to the provisions of this CUP and the Development Plans approved under the PPSA. All modifications of the Project shall be submitted to the County. Any modification of the Project that would require amendment of this CUP but not amendment of the Development Plans approved under the PPSA shall be reviewed pursuant to the applicable laws and ordinances of the County. Any modification of the Project that would require amendment of both this CUP and the Development Plans approved under the PPSA shall be reviewed pursuant to both the applicable laws and ordinances of the County and the PPSA. Any modification of the Project that would require amendment of the Development Plans approved under the PPSA but not amendment of this CUP shall be reviewed pursuant to the PPSA. The following possible future improvements shall require appropriate future county authorization pursuant to local ordinances:

> electrical transmission lines if other corridor routes are proposed other than those detailed in the CUP application, pursuant to Finding 21-1 of the staff report.

Any off-site future natural gas or fuel oil pipeline pursuant to Finding 21-2 of the staff report shall not be considered as part of this CUP approval.

V. <u>BREACH OF CUP 92-06</u>

1. In the event that TEC, its grantees, successors or assigns, has not presented its design plans for an initial building construction code compliance review within thirty-six (36) months

of the approval of the Development Plans under the PPSA, or has violated any of the terms of this CUP in any material respect, the Board of County Commissioners may serve notice to TEC in writing of the date and place of a public hearing on the CUP, at which time TEC will be given an opportunity to explain the reasons for the scheduling delays and/or violation of the terms of this CUP and to propose a method of fulfilling its obligations under this CUP. If it is determined that a breach has occurred, the County may, at its discretion, allow TEC, by amendment of this CUP, time to demonstrate its willingness to meet the County's conditions.

2. If at the end of a reasonable period of time, in this case no more than twelve (12) months from the date notice is served on TEC as described above, TEC is clearly unable or unwilling to abide by the conditions of this CUP, or if the conditions of this CUP have in some other manner been clearly violated, the Board of County Commissioners may initiate a modification of the CUP to eliminate the affected property from the CUP or impose additional conditions that would remedy the violation.

VI. JURISDICTION

Any and all suits or actions at law pertaining to this CUP shall initially be brought in the Tenth Judicial Circuit, Polk County, Florida, and no other venue.

VII. SUCCESSOR AND ASSIGNS

This CUP shall be binding upon the parties hereto, their successors in interest and assigns.

VIII. NOTICE

All notices given pursuant to the terms of CUP 92-05 or which any party may desire to give hereunder shall be in writing and delivered personally, telegraphed or sent registered or certified mail and shall be conclusively presumed to have been given by such delivery. All notices shall be given to each of the following:

| | |
|---|---|
| TEC: | Tampa Electric Company<br>Corporate Counsel, Legal Department<br>Post Office Box 111<br>Tampa, Florida 33601-0111 |
| | Tampa Electric Company<br>Vice President, Production<br>Post Office Box 111<br>Tampa, Florida 33601-0111 |
| | Tampa Electric Company<br>Vice President, Energy Resources Planning<br>Post Office Box 111<br>Tamps, Florida 33601-0111 |
| COUNTY: | Polk County Board of County Commissioners<br>Post Office Box 1969<br>Bartow, FL 33830 |
| With copies to: | Polk County Attorney<br>Post Office Box 60<br>330 W. Church Street<br>Bartow, FL 33830 |

Polk County Planning Division
Post Office Box 1969
Bartow, FL  33830

Table 3-1. Polk Power Station Legal Description of Lands

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LANDS FROM FREEPORT MACMORAN RESOURCE PARTNERS, LIMITED PARTNERSHIP

LANDS TO THE EAST OF STATE ROAD 37:

TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 1

That part of the West 330.00 feet of the East 1/2 of the West 1/2 of said Section 1, lying southwesterly of Fort Green Road, AND all that part of the West 1/4 of said Section 1 lying southwesterly of Fort Green Road.

SECTION 2

a. The West 848.00 feet of the NW 1/4 of the NW 1/4.
b. The South 3/4 LESS that part described as; Begin 400.00 feet West of the NE corner of said South 3/4, run thence West 3600.00 feet; thence South 150.00 feet; thence East 450.00 feet; thence South 200.00 feet; thence East 700.00 feet; thence North 200.00 feet; thence East 2450.00 feet; thence North 150.00 feet to the POINT OF BEGINNING.

SECTION 3

All lying East of State Road 37.

SECTION 4

All lying East of State Road 37.

SECTION 9

BEGIN at the NE corner of said Section 9 and proceed S.00°04'08"E. along the East line of said Section 9 for 2117.07 feet; thence N.88°05'57"W. for 323.11 feet; thence S.88°42'07"W. for 983.72 feet; thence N.89°51'23"W. for 1058.61 feet; thence S.39°38'56"W. for 454.20 feet; thence N.13°09'59"W. for 538.34 feet to the easterly right-of-way line of State Road No. 37 (being 80 feet at right angles from centerline); thence N.27°31'59"E. along said right-of-way line for 2184.60 feet to the North line of said Section 9; thence N.89°32'05"E. along said North line for 1765.11 feet to the POINT OF BEGINNING.

Table 3-1. Polk Power Station Legal Description of Lands (Continued, Page 2 of 4)

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SECTION 10

BEGIN at the NE corner of said Section 10 and proceed S.00°00'02"E. along the East line of said Section 10 for 1885.69 feet thence N.88°45'46"W. for 324.02 feet; thence S.01°25'49"W. for 1761.69 feet; thence N.89°56'27"W. for 3504.25 feet; thence N.02°46'52"W. for 454.48 feet; thence N.61°33'02"W. for 320.02 feet; thence N.00°22'41"W. for 641.25 feet; thence N.46°54'10"W. 372.71 feet; thence N.88°05'57"W. for 820.69 feet; to the West line of said Section 10; thence N.00°04'08"W. for 2117.07 feet to the NW corner of said Section 10; thence S.89°53'15"E. along the North line of said Section 10 for 5274.75 feet to the POINT OF BEGINNING.

SECTION 11

BEGIN at the NE corner of said Section 11 and proceed S.00°13'13"E. along the East line of said Section 11 for 731.09 feet; thence S.22°01'06"W. for 60.15 feet; thence S. 04°41'20"W. for 1038.35 feet; thence S.16°25'50"E. for 399.84 feet again to the East line of said Section 11; thence S.00°13'13"E. along said East line for 448.50 feet to the East Quarter Section Corner of said Section 11; thence S.00°19'20"W. along the East line of the SE 1/4 of said Section 11 for 277.57 feet; thence S.83°10'34"W. for 845.66 feet; thence N.80°44'17"W. for 775.80 feet; thence N.04°00'31"W. for 937.40 feet; thence N.88°45'46"W. for 3637.10 feet to the West line of said Section 11; thence N.00°00'02"W. for 1885.69 feet to the NW corner of said Section 11; thence N.89°55'04"E. for 5298.52 feet to the POINT OF BEGINNING.

SECTION 12

BEGIN at the NW corner of said Section 12 and proceed S.88°52'09"E. along the North line of the NW 1/4 of said Section 12 for 1649.70 feet to a concrete monument number 1943; thence S.00°19'05"W. for 75.98 feet; thence S.89°23'48"W. for 614.63 feet; thence S.10°48'34"W. for 155.81 feet; thence S.43°38'11"W. for 211.14 feet; thence S.82°21'29"W. for 355.22 feet; thence N.84°53'22"W. for 385.84 feet; thence S.22°01'06"W. for 320.75 feet to the West line of said Section 12; thence N.00°13'13"W. along said West line for 731.09 feet to the POINT OF BEGINNING.

Table 3-1. Polk Power Station Legal Description of Lands (Continued, Page 3 of 4)

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LANDS TO THE WEST OF STATE ROAD 37:

TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 3

The part of the South 1/2 of the NW 1/4 lying West of State Road No. 37. LESS existing county maintained right-of-way for Bethlehem Road.

SECTION 4

The SE 1/4 of the SW 1/4, LESS existing county maintained right-of-way for Albritton Road. The SE 1/4 of said Section 4 lying North and West of State Road No. 37, LESS existing county maintained right-of-way for Albritton Road, and subject to GAS PIPELINE EASEMENT in O.R. Book 219 on Page 341 of the Public Records of Polk County, Florida. That part of the South 1/2 of the NE 1/4 of said Section 4 lying North and West of State Road No. 37, LESS existing county maintained right-of-way for Bethlehem Road, and subject to GAS PIPELINE EASEMENT in O.R. Book 219 on Page 341 of the Public Records of Polk County, Florida.

TOWNSHIP 32, SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 7

The NE 1/4, LESS the NE 1/4 of the NE 1/4, AND LESS the North 416.00 feet of the East 209.00 feet of the NW 1/4 of the NE 1/4, AND LESS existing county maintained right-of-way for Albritton Road.
The SE 1/4, LESS right-of-way for State Road No. 674.
The SW 1/4, LESS right-of-way for State Road No. 674.
The NW 1/4, LESS the NE 1/4 of the NW 1/4, AND LESS existing county maintained right-of-way for Albritton Road. Said Section 7 being subject to existing Florida Gas Transmission Co. Pipeline Easement.

SECTION 8

The NE 1/4, LESS the West 1/2 of the NW 1/4 of the NE 1/4.
The SE 1/4 of Section 8, LESS right-of-way for State Road No. 674.
The SW 1/4 of Section 8, LESS right-of-way for State Road No. 674.
The South 1/2 of the NW 1/4.

Table 3-1. Polk Power Station Legal Description of Lands (Continued, Page 4 of 4)

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SECTION 9

ALL, lying West of State Road No. 37 LESS existing county maintained right-of-way for Albritton Road, AND LESS right-of-way for State Road No. 674.

LANDS FROM AMERICAN CYANAMID COMPANY

TOWNSHIP 31 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 34

All the part of the S-3/4 of E-3/4 of the section lying east of the right-of-way of State Road 37 and also lying south of the right-of-way of County Road 630 (formerly designated State Road 630).

SECTION 35

All the part of the S-3/4 of the section lying south of the right-of-way of County Road 630 (formerly designated State Road 630) and also lying west of the right-of-way of the Brewster-Fort Green Road.

TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 2

a. The N-1/2 of N-1/2, LESS the west 848 feet thereof, and SUBJECT TO existing right-of-way of the Brewster-Fort Green Road at the northeast corner thereof.

b. The part of the S-1/2 of N-1/2 (being part of U.S. Government Lot 1 in the NW-1/4 and of U.S. Government Lot 1 in the NE-1/4) described as: begin at a point on the north boundary of said S-1/2 of N-1/2 located 400 feet west of the northeast corner thereof (measured along said north boundary), thence west along said north boundary 3600 feet, thence south 150 feet, thence east 450 feet, thence south 200 feet, thence east 700 feet, thence north 200 feet, thence east 2450 feet, thence north 150 feet to the point of beginning. (The directions "north" and "south" meaning the bearing of the east boundary of Section 2, and the directions "east" and "west" meaning the bearing of the north boundary of said S-1/2 of N-1/2 of Section 2.)

---

Source: Andrew Edgemon & Associate, 1991.

EXHIBIT B

FREEPORT-MCMORAN RESOURCE PARTNERS

Freeport-McMoRan Resource Partners, Limited Partnership
1615 Poydras Street
New Orleans, LA 70112
P.O. Box 61520
New Orleans, LA 70161

Brainerd S. Montgomery
Senior Attorney
Telephone: 504-582-4377

January 23, 1992

Mr. Phil McLemore
Development Services Director
330 West Church Street
Bartow, Florida 33830

**Re: Tampa Electric Company's Conditional Use Permit Application**

Dear Mr. McLemore:

This letter is to advise you that Freeport-McMoRan Resource Partners, Limited Partnership, as owner of real property more particularly described in the application enclosed herewith, authorizes Tampa Electric Company to file the attached application seeking approval of a conditional use permit for the purpose of constructing, operating and maintaining electric generating power plant facilities.

Sincerely,

Brainerd Montgomery

/ag
Enclosure

February 17, 1992

Mr. Phil McLemore
Development Services
Director, Polk County
330 West Church Street
Bartow, FL 33830

**Re: Tampa Electric Company's Conditional Use Permit Application**
**Our File No.: 192-0127**

Dear Mr. McLemore:

American Cyanamid Company is the owner of the real property (the "Property") described on Exhibit "A" attached hereto, consisting of approximately 774 acres. Please be advised that as the owner of the Property, we hereby authorize Tampa Electric Company to file the attached Application seeking approval of a Conditional Use Permit for the purpose of constructing, operating or maintaining electric generating power plant facilities on the Property. We request that notices of any hearings before the Board of County Commissioners and or the Zoning Advisory Board be sent to us at the following address:

American Cyanamid Company
c/o FOWLER, WHITE, GILLEN, BOGGS,
VILLAREAL AND BANKER, P.A.
Post Office Box 1438
Tampa, FL 33601
Attn: F. Woodrow Coleman, Esq.

Sincerely,

AMERICAN CYANAMID COMPANY, a
Maine corporation

AMERICAN CYANAMID CO. LEGAL DEPT. APPROVED AS TO ... BY ... DATE ...

By: ______________________

FWC\132

EXHIBIT B

## DESCRIPTION TRACT "C"

TOWNSHIP 31 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 34

All THAT PART of said Section 34 lying East of State Road No. 37 (Project No. 5687) and South of County Road No. 630.

SECTION 35

ALL THAT PART of said Section 35 lying South of County Road No. 630 and West of Fort Green Road.

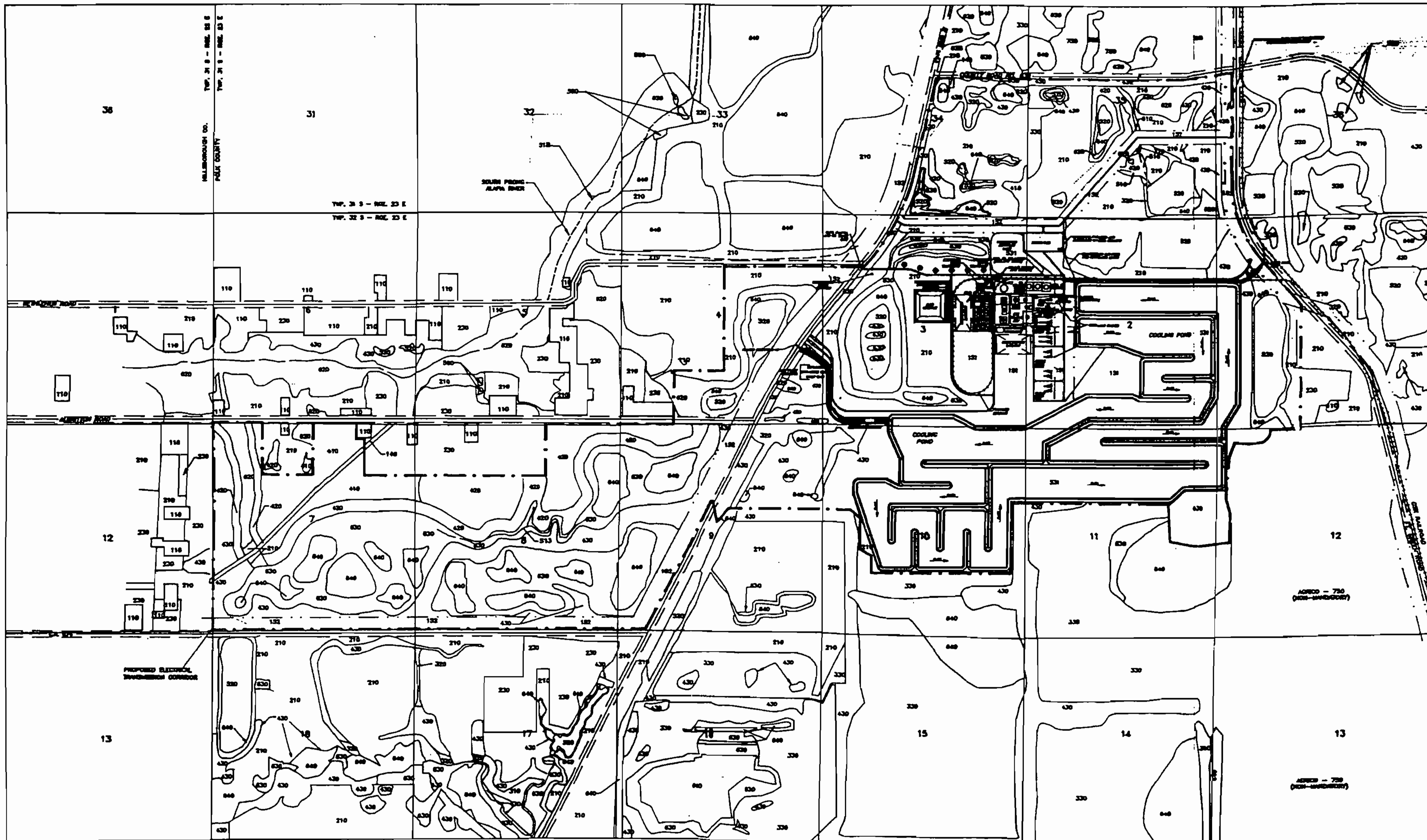
TOWNSHIP 32 SOUTH, RANGE 23 EAST, POLK COUNTY, FLORIDA

SECTION 2 (O.R. 1434 PG 312)

BEGIN at the Northeast corner of the South 3/4 of said Section 2 and run West along the North line of said South 3/4 for 400.00 feet; thence South 150.00 feet; thence West 2450.00 feet; thence South 200.00 feet; thence West 700.00 feet; thence North 200.00 feet; thence West 450.00 feet; thence North 150.00 feet to a point on the North line of said South 3/4, said point being 4000.00 feet West of the POINT OF BEGINNING; thence West 458.54 feet to a point 848.00 feet East of the West line of the NW 1/4 of said Section 2; thence North and parallel with said West line of Section 2 for 1282.90 feet to the North line of said Section 2; thence East along the North line of said Section 2 to the NE corner of said Section 2; thence South along the East line of the North 1/4 of said Section 2 to the POINT OF BEGINNING. LESS existing right-of-way for Fort Green Road.

EXHIBIT C

THIS EXHIBIT HAS BEEN ELIMINATED FROM CUP 92-05



| LAND USE LEGEND | NON–MANDATORY | MANDATORY | ACRES |
|---|---|---|---|
| 148 = GAS TRANSMISSION LINE EASEMENT ROW | 0.00 | 12.47 | 12.47 |
| 152 = OVERHEAD TRANSMISSION LINES | 0.00 | 226.08 | 226.08 |
| 210 = CROPLAND AND PASTURELAND | 254.40 | 493.54 | 747.94 |
| 310 = GRASSLAND | 4.38 | 0.00 | 4.38 |
| 320 = SHRUB AND BRUSHLAND | 1.89 | 53.06 | 54.95 |
| 330 = MIXED RANGELAND | 35.09 | 0.00 | 35.09 |
| 410 = CONIFEROUS FOREST | 0.00 | 129.70 | 129.70 |
| 420 = HARDWOOD FOREST | 56.37 | 264.98 | 497.66 |
| 430 = MIXED UPLAND FOREST | 24.17 | 246.61 | 270.78 |
| 520 = LAKES | 140.18 | 70.81 | 210.99 |
| 531 = RESEVIORS | 0.00 | 22.83 | 22.83 |
| 620 = WETLAND – HARDWOOD FOREST | 12.22 | 32.48 | 44.70 |
| 630 = WETLAND – MIXED FOREST | 0.00 | 412.24 | 419.85 |
| 640 = WETLAND – VEGETATED NON–FORESTED | 6.58 | 357.45 | 371.64 |
| POWER PLANT SITE AND SURROUNDING RESEVOIR AND GRASSLANDS | 0.00 | 1321.77 | 1321.77 |
| | | TOTAL SITE ACREAGE | 4347.98 |

N

0 750 1500 3000 6000

SCALE

(FEET)

DATE: 01/23/92

FIGURE 3-4.

CONCEPTUAL SITE AND POST-RECLAMATION PLAN

EXHIBIT D

Source: ECT, 1992.

TAMPA ELECTRIC

A TECO ENERGY COMPANY

EXHIBIT E
DEVELOPMENT TIMETABLE

Implementation of the Polk Power Plant as authorized by CUP 92-05 shall be defined as TEC's initial application to Polk County for building construction code compliance review. Implementation must occur no later than 36 months following Development Plan approval and shall satisfy the requirements of Section 6.6 of Article V of Polk County Ordinance 83-2 and shall apply to the entire phased-in buildout capacity of up to 1,150 megawatts at the Polk Power Station ("Development Schedule").

It is anticipated that the 1,150 megawastt phased-in build out capacity of the Polk Power Station will be completed by the year 2030. Failure to complete the phase-in build out capacity of up to 1,150 megawatts by the year 2030, however, shall not be deemed a variation from the approved development schedule and shall not constitute a modification of CUP 92-05 nor require TEC to re-apply for a CUP. The only time requirement that TEC shall be obligated to satisfy will be that implementation occur no latter than 36 months following Development Plan Approval, as set forth above.

EXHIBIT F
SPECIAL CONDITIONS OF APPROVAL

1. Permits - Copies of all federal permits and the PPSA certification order required for each phase of development of the Polk County Site facility shall be provided to the Polk County Planning Division prior to the commencement of building construction code compliance review.

2. Fuel - The project shall be restricted to the use of the following fuels: natural gas, coal, coal gas, petroleum coke, or oil unless a CUP modification is received.

3. Fire Protection Plan - Prior to obtaining a building permit, TEC shall submit an acceptable fire protection plan to Polk County outlining specific measures to be taken to meet all local fire codes and regulations. As part of these plans, TEC shall give consideration to foam systems for tank protection as discussed in NFPA 850(5-3.9.2) as part of the overall fire risk evaluation. The evaluation shall consider such factors as the specific type of tank to be utilized, exposure to other important structures, product value and resupply capability.

4. Emergency Management Plan - Following site certification, and prior to commercial operation, TEC shall submit an acceptable emergency management plan to Polk County (Office of Public Safety). This Plan will detail emergency management procedures for any project-related, off-site incident in Polk County so as to minimum response time and maximum effectiveness to protect the public's health, safety, and welfare.

5. Emergency Notice - TEC shall agree to immediately contact Polk County's Office of Public Safety when the applicant becomes aware of project related off-site incidents which have the potential for affecting the public's health, safety, and welfare.

6. Transportation:

a. In 1995, 1996, and 1997, TEC shall begin a traffic monitoring program at the intersection of SR 37 and CR 630 to monitor the need to install a traffic signal or to make geometric improvements. Intersection monitoring shall consist of conducting turning movement counts and a signal warrant analysis. The monitoring shall be conducted once in 1995, 1996 and 1997 during January, February, or March and reported to the Transportation Section of the Planning Division. Should the traffic monitoring program show the need for a new traffic signal as a result of traffic to the Polk Power Station, it shall be the responsibility of TEC to install such a signal.

b. In 1995, 1996, and 1997, TEC shall begin a traffic monitoring program at the intersections of CR 630 and Fort Green Road to monitor the need to install a traffic signal or to make geometric improvements. Intersection monitoring shall consist of conducting turning movement counts and a signal warrant analysis. The monitoring shall be conducted once in 1995, 1996 and 1997 during January, February, or March. Should the traffic monitoring program show the need for improvements as a result of traffic to the Polk Power Station, it shall be the responsibility of TEC to install a new traffic signal or to make geometric improvements.

7. Solid Waste Disposal -

   a. TEC shall be responsible for proper disposal of slag and/or ash byproducts produced in the power generation process at locations other than at County landfills.

   b. TEC shall monitor groundwater in relation to by-product and temporary storage areas and make available to the County all data produced from the groundwater monitoring system. Upon 24-hour notice TEC shall allow County staff members access to the site for purposes of examining the condition of the groundwater monitoring equipment.

8. Hazardous Materials - TEC shall report their storage and usage of hazardous materials annually to Polk County's Environmental Services Department and shall allow the County random inspection of the facility to determine their compliance with the reporting requirements. As part of the first report, TEC shall specifically address provision (a) through (g) of Comprehensive Plan Policy 2.310-A4.

9. Spill Prevention Containment and Control Plan (SPCC) - TEC shall be required to submit a preliminary Spill Prevention Containment and Control Plan (SPCC) to the Polk County Public Safety Department and the Polk County Planning Department as part of the building construction code compliance review. The final SPCC Plan shall be submitted within six months after the date the facility begins operations. SPCC Plan updates and amendments, due to a change in design, construction, operation, technology or maintenance, shall be submitted within six months of such change.

10. Stormwater Management - TEC shall submit, with its application for Development Plan approval (Site Certification Application), the stormwater management plan for on-site surface water management, which meets, at a minimum all level of service standards set forth in the Polk County Comprehensive Plan and all standards of Ordinance 88-04, the Polk County Flood Protection and Surface Water Management Code.

11. Flood Study - TEC shall submit a flood study within one year of release of reclamation of the site.

12. Stack Emissions Monitoring - TEC shall make available to the County all data produced from the emissions monitoring system for the exhaust stack when requested and shall allow designated County staff members access to the site for purposes of examining the condition of this equipment upon prior notice.

13. Compliance with Applicable Air Quality Regulations - TEC shall comply with applicable air quality regulations in effect at the time of filing of each site certification application or supplemental application for each phase of development of the Polk Power Station.

14. Compliance with District Regulations - The Development

Plan included in the application for Development Plan Approval (Site Certification Application) shall reflect all required setbacks, buffers and building separations as required by the standards set forth in the Polk County Zoning Ordinance, Article V, Section 5.7(B)(3).

15. Wildlife Management Plan - Within one year of release of reclamation of the site by DNR, TEC shall prepare a wildlife management plan in consultation with the Florida Game and Fresh Water Fish Commission, Polk County and other interested parties concerning that portion of TEC's site located west of State Road 37.

16. Water Use and Conservation Reporting - TEC shall supply water use quantities, methods of water conservation, and estimates of water conservation if available, on an annual basis to Polk County (Planning and Water Resource Divisions).

17. Ambient Air Quality Testing - The purpose of this condition is to assist Polk County in gathering air quality data. Therefore, to the extent not required as a condition of TEC's certification approval and provided for through the DER Title V funded statewide air quality monitoring network or other means, TEC shall provide up to two ambient air quality monitoring stations ("Monitors"). The parameters to be monitored, the location of the Monitors, and the operational date of the Monitors will be determined during TEC's certification process.

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# APPENDIX 11.4

## LAND USE PLAN DESCRIPTIONS

11.4.1 POLK COUNTY COMPREHENSIVE PLAN
11.4.2 CENTRAL FLORIDA COMPREHENSIVE REGIONAL POLICY PLAN
11.4.3 STATE COMPREHENSIVE PLAN

# 11.4.1 POLK COUNTY COMPREHENSIVE PLAN

## SELECTED AREAS

Another distinct planning technique incorporated within this Plan is the use of Selected-Area Studies (SAS) and Selected-Area Plans (SAP).

SASs are detailed studies of specifically delineated areas designated by the Board of County Commissioners when it is deemed necessary that such a study is necessary to evaluate area issues in the process of making prudent growth-management and land-use decisions. Such studies are not restricted with regards to size. The Plan specifies that several preselected SASs be performed after adoption of the Plan.

An SAP may result from an SAS. An SAP is a special, detailed land-use plan for a specific area. SAPs include a land-use map and accompanying objective and policies to provide special conditions, restrictions, or requirements for activities within the SAP. Two SAPS -- the I-4/NE Parkway SAP and the CR 540/Loughman SAP -- were developed and included with the initial adoption of this Plan (see Section 2.131).

## AGRICULTURE/RESIDENTIAL-RURAL CLASSIFICATION

The Plan's "Agriculture/Residential-Rural land-use classification provides for the protection of agriculture and rural areas through a base density of one dwelling unit per five acres (1 DU/5 AC), but allows for greater residential densities through a land reservation/residential-density locational system. This system is designed to maximize the benefits of available residential-support facilities and services through the use of a sliding-scale density system which allows residential development to occur at gross densities from one dwelling unit per two-and-one-half acres (1 DU/2.5 AC) up to one dwelling unit per one acre (1 DU/AC)with a mandatory 50% land reservation program. This system awards points, which are later converted to maximum residential densities, by evaluating parcels within the rural development area on the following criteria:

a. proximity to Rural-Cluster Centers, Business-Park Centers, Linear Commercial Corridors, Commercial Enclaves, and municipalities;

b. proximity to isolated sewer systems;

c. vehicular access to arterial, paved collector, and paved County-maintained local roads;

d. level of public-safety protection, to include: fire and emergency medical service (EMS); and

e. proximity to schools.

## SECTION 2.102 GENERAL

OBJECTIVE 2.102-A: Development within unincorporated Polk County shall occur in accordance with the policies stated within this Future Land Use Element and all other Goals, Objectives and Policies incorporated within the Polk County Comprehensive Plan.

POLICY 2.102-A1: COMPATIBILITY -- Land shall be developed so that adjacent uses are compatible with each other, pursuant to the requirements of other Policies in this Future Land Use Element, so that one or more of the following provisions are accomplished:

a. there have been provisions made which buffer incompatible uses from dissimilar uses;

b. incompatible uses are made to be more compatible to each other through limiting the intensity and scale of the more intense use;

c. uses are transitioned through a gradual scaling of different land-use activities through the use of innovative development techniques such as a Planned Unit Development.

POLICY 2.102-A2: DISTRIBUTION -- Development shall be distributed throughout the County consistently with this Future Land Use Element so that the public utility and transportation systems can be efficiently utilized; and high-intensity Activity Center development is located where urban services can be made available.

POLICY 2.102-A3: TIMING -- The development of land shall be timed and staged in conjunction with the cost-effective and efficient provision of supporting community services which, at a minimum, shall require compliance with the Plan's Level of Service requirements and the County's concurrency management system.

POLICY 2.102-A4: DEVELOPMENT POLICIES -- All development within unincorporated Polk County shall be subject to the goals, objectives and policies included within the Polk County Comprehensive Plan, including the following:

a. Future Land Use Element
b. Housing Element
c. Conservation Element
d. Economic Element
e. Infrastructure Element
f. Traffic Circulation Element
g. Mass Transit Element
h. Aviation and Related Facilities Element
i. Recreation and Open Space Element
j. Intergovernmental Coordination Element
k. Capital Improvements Element

POLICY 2.102-A5: DEVELOPMENT STANDARDS -- All development within unincorporated Polk County shall conform to all County land-development regulations, shall meet or exceed all applicable County construction standards, and shall comply with the level-of-service

OBJECTIVE 2.110-B: RURAL-CLUSTER CENTERS -- The Polk County Plan shall provide locations within the Rural Area for the placement of retail and service establishments to accommodate the daily-shopping needs of rural residents through:

a. the designation and mapping of Rural-Cluster Centers on the Future Land Use Map Series; and

b. the establishment of criteria applicable to the location and development of land within Rural-Cluster Centers.

POLICY 2.110-B1: CHARACTERISTICS -- A Rural-Cluster Center serves as a focus for the rural community and generally contains retail-commercial uses at a level to serve the surrounding population.

POLICY 2.110-B2: DESIGNATION AND MAPPING -- Rural-Cluster Centers shall be designated and mapped on the Future Land Use Map Series for those clusters of residential parcels located within the "Rural Area" of the County, which also have a concentration of non-residential uses located within the immediate area. These centers shall be shown on the Future Land Use Map Series as "Rural-Cluster Center" (RCC).

POLICY 2.110-B3: LOCATION CRITERIA -- The establishment of new RCCs shall be located at the intersections of arterial roads, or arterial and collector roads, and shall be guided by the criteria established within Section 2.110-K -- Activity Center Establishment.

POLICY 2.110-B4: DEVELOPMENT CRITERIA -- Development within Rural-Cluster Centers shall conform with the following standards:

a. Residential development within the Rural-Cluster Center shall be permitted at a density of up to two dwelling units per acre (2 DU/AC).

b. Non-residential development shall be permitted within a Rural Cluster as follows:

   1. Commercial uses shall be limited to an intensity and scale necessary to provide the immediate rural population with retail and personal services. Such determination should be based on the market-area radius and minimum population support criteria established for Convenience, Neighborhood, or Community Activity Centers. The maximum floor area ratio shall not exceed 0.20.

   2. Non-residential uses should be concentrated at the center of the cluster, with direct access to a collector or arterial intersection.

   3. Typical non-residential uses are grocery, pharmacy, medical offices, and personal services.

4. The amount of non-residential uses for any cluster shall be based on the location and minimum population support criteria established for the applicable Activity Center.

OBJECTIVE 2.110-C: CONVENIENCE CENTERS -- The Polk County Plan shall provide for the convenience-shopping needs of residents through:

a. the designation and mapping of Convenience Centers on the Future Land Use Map Series; and

b. the establishment of criteria applicable to the location and development of land within Convenience Centers.

POLICY 2.110-C1: CHARACTERISTICS -- Convenience Centers are intended to accommodate the convenience-shopping needs of residents living within the immediate surrounding area. General (approximate) characteristics of Convenience Centers are:

| | |
|---|---|
| Usable Area | 1 to 5 acres |
| Gross Leasable Area (GLA) | 3,000 to 20,000 square feet |
| Minimum Population Support | 2,500 to 5,000 people |
| Market-Area Radius | 1 mile |
| Typical Leading Tenant | Convenience Store |
| Other Typical Tenants | Laundry, Dry Cleaning, Barber, Restaurant, Gas Station |

POLICY 2.110-C2: DESIGNATION AND MAPPING -- Convenience Centers shall be located within UDAs, UGAs, SDAs, and UEAs as designated on the Future Land Use Map Series as "Convenience Center" (CC).

POLICY 2.110-C3: LOCATION CRITERIA -- Convenience Centers shall be located at the intersections of arterial and/or collector roads. There shall be the following traveling distance, on public roads, between the center of a Convenience Center and the center of any other Convenience Center, or other higher-level Activity Center, Linear Commercial Corridor, or Commercial Enclave providing for the same convenience-shopping needs:

a. One (1) mile within the UDA and UGA
b. Two (2) miles within the SDA and UEA

POLICY 2.110-C4: DEVELOPMENT CRITERIA -- Development within a Convenience Center shall conform to the following criteria:

a. Convenience Centers shall have frontage on, or direct access to, an arterial or collector roadway, or a frontage road or service drive which directly serves an arterial or collector roadway.

b. Different uses within a Convenience Center shall incorporate the use of frontage roads or shared ingress/egress facilities wherever practical.

g. industrial facilities should group together in planned industrial districts on sites capable of being expanded and developed in stages.

POLICY 2.113-A4: DEVELOPMENT CRITERIA -- Development within an Industrial area shall conform to the following criteria:

a. Retail commercial uses within an industrial area shall be sized for the purpose of serving just the employees of, and visitors to, the industrial area, and shall be limited to a scale appropriate for that purpose. The maximum floor area ratio for commercial uses within an industrial area shall not exceed 0.25.

b. Industrial sites shall be designed to provide for:

   1. adequate parking to meet the demands of the use; and

   2. buffering where the effects of lighting, noise, odors, and other such factors would adversely affect adjacent land uses. Parking lots, loading areas, dumpsters, utilities and air conditioning units, signage, etc., are examples of facilities which may require special buffering provisions.

c. The maximum floor area ratio for non-commercial uses within an Industrial area shall not exceed 0.75.

## SECTION 2.114 PHOSPHATE MINING

**OBJECTIVE 2.114-A: The Polk County Plan shall provide for the use and development of mining lands and non-reclaimed phosphate-mined areas within the County through:**

**a. the establishment of a "Phosphate Mining" land-use classification;**

**b. the designation of Phosphate Mining lands on the Future Land Use Map Series; and**

**c. through the establishment of development criteria applicable to the development and location of Phosphate Mining lands within the County.**

POLICY 2.114-A1: CHARACTERISTICS -- Phosphate Mining areas are generally characterized by existing or proposed phosphate-mining operations, phosphate-mining support facilities, and non-reclaimed phosphate-mined areas.

POLICY 2.114-A2: DESIGNATION AND MAPPING -- Phosphate Mining areas shall be designated and mapped on the Future Land Use Map Series as "Phosphate Mining" (PM), and shall include:

a. all existing phosphate-mining areas and support facilities for which a "Conceptual Mine Plan" has been accepted by the County,

b. and any non-reclaimed inactive mining areas for which foreseeable development is unlikely, as of the adoption date of the Comprehensive Plan.

POLICY 2.114-A3: PERMITTED ACTIVITES -- The following activities shall be permitted within the Phosphate Mining land-use category as mapped pursuant to Policy 2.114-A2.

a. Phosphate mining and allied industries;

b. Land reclamation;

c. Agriculture;

d. Construction, operation and maintenance of Electric-Power Generation Facilities and ancillary uses and facilities that are required to be certified pursuant to Sections 403.501 - 403.518, FS (1990); hereinafter referred to as "Certified Electric-Power Generating Facilities";

e. Construction, operation and maintenance of Electric-Power Generation Facilities and ancillary uses and facilities not required to be certified pursuant to Sections 403.501-403.518 (FL Stat. 1990); hereinafter referred to as "Non-certified Electric-Power Generating Facilities"; and

f. Commercial hazardous-waste treatment facilities; and

g. Other land uses with conditional approval which are compatible and related with the extraction and processing of phosphate.

SECTION 2.114-B PHOSPHATE MINING USES

POLICY 2.114-B1: DEVELOPMENT CRITERIA FOR PHOSPHATE MINING -- Development within these districts shall conform to the following criteria:

a. Mining extraction activities and the construction, operation and maintenance of Electric-Power Generating Facilities shall be conducted in a manner that will minimize adverse effects upon water quality, fish and wildlife and adjacent land uses.

b. All mining activities shall require approval through the County's development review procedures. This review will require the approval of a "Conceptual Mine Plan", which shall include, at a minimum:

   1. a "Mine-Area Map" to include, at a minimum, the locations of the mine boundaries, public rights-of-way,

existing structures, and environmental features (e.g. topography, watersheds, and any endangered wildlife habitats);

2. a "Mine-Area Layout" to include, at a minimum, planned locations for beneficiation operations, waste-storage areas, and any proposed permanent structures and/or roads;

3. a "Reclamation Plan" to include, at a minimum, all information required by applicable state regulations; and

4. an "Operations Plan" to include, at a minimum:

   i. phasing plans,

   ii. an Impact Mitigation Plan, and

   iii. a Traffic Circulation Plan showing major access routes to the mine site.

c. Once extraction activities are completed, the site shall be reclaimed (where reclamation is required by Chapter 16C-16, FAC) in accordance with the approved Reclamation Plan. Lands mined prior to reclamation requirements may be developed (reclaimed) without having to file a "reclamation plan".

<u>POLICY 2.114-B2: ADJACENT DEVELOPMENT</u> - New Mining activities shall be setback and/or buffered from existing subdivisions a minimum of 250 feet, and 500 feet from a residential structure ("Polk County Phosphate Mining Ordinance" -- Ordinance 88-19), or as otherwise required by applicable law. New residential development on property adjacent to areas designated "PM" on the Future Land Use Map Series shall be required to provide appropriate buffering, if applicable.

## SECTION 2.114-C CERTIFIED ELECTRIC-POWER GENERATION FACILITIES

<u>POLICY 2.114-C1: LOCATION CRITERIA FOR CERTIFIED ELECTRIC-POWER GENERATION FACILITIES</u> -- The construction, operation, and maintenance of Certified Electric-Power Generating facilities consistent with the requirements of the Polk County Comprehensive Plan and approved by the County via a conditional-use permit, shall occur within designated PM areas. The following factors shall be taken into consideration when determining the appropriateness of a location for a Certified Electric-Power Generating Facility within the Phosphate Mining area:

a. The location of Certified Electric-Power Generating Facilities shall comply with all federal, state, and local laws, rules, and regulations pertaining to the siting, certification, permitting, and environmental requirements attendant thereto.

b. The power block and fuel storage facilities that are part of an Certified Electric-Power Generating Facility shall be located:

   1. not less than one-quarter (1/4) mile from single-family residences,

   2. one (1) mile from existing and developed residential communities consisting of not less than one hundred (100) single-family residences, and

   3. three (3) miles from the outer boundaries of incorporated municipalities existing at the time of the initial application for the conditional-use permit.

c. Certified Electric-Power Generating Facilities shall be served by existing or new transportation systems comprised of collector or arterial roads of sufficient size so as to insure that no degradation to the level of service of the road network below the adopted standard will occur.

d. The power block and fuel-storage facilities that are part of a Certified Electric-Power Generating Facility shall not be located within 500 feet of the one-hundred year floodplain of the Peace river, the Alafia river or any "Outstanding Florida Waters" listed in Section 403.061(27) (a) and (b), FS (1990), as of the date of initial application for the conditional-use permit.

e. At least fifty percent (50%) of the entire site used for a Certified Electric-Power Generating Facility shall be comprised of lands previously disturbed by phosphate mining activities.

<u>POLICY 2.114-C2: ENVIRONMENTAL CRITERIA</u> -- Development of Certified Electric-Power Generating Facilities within Phosphate Mining Districts shall conform to the following environmental criteria:

a. Environmentally sensitive areas shall be specifically detailed on the "Conceptual Electric-Power Generating Facility Site Plan" submitted as part of the conditional-use permit process.

b. Certified Electric-Power Generating Facilities shall protect environmentally sensitive areas through buffering and/or other mitigating techniques imposed pursuant to Sections 403.501 - 403.518, FS.

c. The location of all Certified Electric-Power Generating Facilities shall comply with all applicable environmental, federal, state, and local laws, rules, and regulations pertaining to the site, certification, permitting, and operation and maintenance requirements.

POLICY 2.114-C3: DEVELOPMENT APPROVAL CRITERIA -- The following development approval criteria shall apply:

a. Polk County recognizes that the locational criteria are not exhaustive, therefore, Polk County shall require proposed Certified Electric-Power Generating Facilities to obtain approval as a Conditional Use Permit, or its functional equivalent, prior to the commencement of construction of the facility which approval shall demonstrate compliance with all applicable County ordinances and these policies. Additional review criteria shall include, but not be limited to, the following:

   1. that the delivery, and storage of the fuel source will not threaten the safety or health of residents;

   2. that height, bulk, and noise factors associated with the facility are compatible with other land uses in the area.

b. Notwithstanding the Condition Use Permitting process, Polk County shall, at its sole discretion, remain a party to the Electrical Power-Plant Siting Act certification process.

POLICY 2.114-C4: ADJACENT DEVELOPMENT -- Certified Electric-Power Generating Facilities shall be set back and/or buffered from existing adjacent residential areas. Subsequent residential development on property designated as "PM" on the Land Use Map Series shall be required to provide appropriate buffering, if applicable.

SECTION 2.114-D: HAZARDOUS-WASTE TREATMENT FACILITIES

**OBJECTIVE 2.114-D: In an effort to reduce illegal disposal of hazardous wastes in Polk County and to induce an improvement in the County's overall management of hazardous wastes, Polk County will carefully balance the need for commercial facilities to treat hazardous wastes regulated by the Resource Conservation and Recovery Act (RCRA) against the need to protect the health, safety and welfare of the citizens and the environment of the County by applying the following siting criteria policies when considering applications to construct Commercial Hazardous-Waste Treatment Facilities (Facilities) in the County.**

POLICY 2.114-D1: Disposal facilities, as defined by RCRA, shall be prohibited, and facilities which generate and/or store RCRA regulated wastes shall be subject to industrial/commercial requirements, as regulated by Section 2.310 of this Plan.

POLICY 2.114-D2: Polk County shall require a minimum parcel size of at least 200% of the size of the development envelope to permit setbacks, to avoid floodprone areas, and to allow proper stormwater management, building separation, internal buffers, and ingress/egress design.

POLICY 2.123-C1: CHARACTERISTICS -- Densities up to, and including, 15.00 DU/AC The Residential-High classification is characterized by multi-story, multi-family units.

POLICY 2.123-C2: DESIGNATION AND MAPPING -- Residential-High districts shall be located within UDAs, UGAs, and UEAs as designated on the Future Land Use Map Series as "RH".

POLICY 2.123-C3: LOCATION CRITERIA -- Residential-High areas shall be located only within UDAs, UGAs, and UEAs and may be located within Activity Centers. The placement of Residential-High shall be evaluated based on the general criteria listed in policy 2.122-A2.

POLICY 2.123-C4: DEVELOPMENT CRITERIA -- Residential development may contain single-family dwelling units, duplex units, multi-family units, and group-living facilities, and shall be permitted at a density of up to 15 DU/AC. Multi-family structures may contain non-residential uses to provide support retail and personal services for the residents.

## SECTION 2.124: RURAL RESIDENTIAL

## SECTION 2.124 A: AGRICULTURE/RESIDENTIAL-RURAL

**OBJECTIVE 2.124-A: Polk County recognizes the importance of the agriculture industry as a healthy and competitive force in the national and international marketplace and, therefore, shall encourage the continuation of productive agricultural uses and provide for the placement of low-density residential development within unincorporated rural areas through:**

**a. the establishment and mapping of Agriculture/Residential-Rural (A/RR), and**

**b. the establishment of policies to govern the development of land within the A/RR land-use category.**

POLICY 2.124-A1: DESIGNATION AND MAPPING -- Residential-Rural may located throughout Rural Areas of the County and is designated on the Future Land Use Map Series as "A/RR".

POLICY 2.124-A2: DEVELOPMENT CRITERIA -- Development within designated A/RR areas shall be limited to:

a. single-family homes at a density of one dwelling unit per five acres (1 DU/5 AC);

b. associated farm labor residential uses to allow for the provision of housing for farm workers in conformance with HRS rules and regulations, and upon approval of a special-use permit by the County;

c. utility structures for the storage of farm equipment and to conduct normal farm operations, to include on-site packing; and

d. the permitted uses of:

   1. Rural Residential Development (RRD), and
   2. Rural Mixed-Use Development (RMD).

POLICY:2.124-A3: RRD & RMD PERMITTED USES -- The permitted uses of RRD and RMD shall meet the development criteria and conditions of Sections 1.124-B and 1.124-C, and receive development approval as specified within the County's land-development regulations which shall include the following guidelines for consideration of such approval:

A. When approving an RRD or RMD permitted use consideration shall be given to all relevant facts and circumstances, including, but not limited to:

   1. the functional and proximate relationship between the proposed development and other development,

   2. the compatibility of the development with existing agricultural activities,

   3. the displacement of on-going economically viable agricultural activities,

   4. whether the development is premature, and

   5. consistency with the goals and objectives of this Comprehensive Plan.

B. The County shall encourage design standards for RRDs and RMDs which promote development consistent with the rural character of the area.

POLICY 2.124-A4: AGRICULTURE -- The following Agricultural policies shall apply within Polk County:

a. Agricultural uses shall be permitted within any future land-use category, and a future land-use designation shall not be grounds for denial of a "greenbelt" tax exemption claim if the property is used primarily for bona fide agricultural purposes in accordance with Section 193.461, FS.

b. Agricultural activities within an A/RR classification shall not be deemed inconsistent or incompatible with, or a nuisance to, development.

c. All development within an A/RR classification shall be designed in a manner compatible with adjacent agricultural activities, including the provision of adequate buffering.

d. Agricultural activities shall be given priority when making land-use decisions within A/RR areas.

e. Polk County shall not duplicate the regulation of those aspects of agricultural activities that are adequately regulated by other governmental agencies, as determined by the Board of County Commissioners.

f. Land within areas designated as A/RR may be used by family members of the property owner for use as a permanent residence at densities higher than that permitted by the A/RR land-use classification, upon approval by the Board of County Commissioners -- but not to exceed one dwelling unit per acre (1 DU/AC). This provision is intended to promote the perpetuation of the family farm by making it possible for family members to both work and reside on the property devoted to agricultural uses.

g. In furtherance of Policy 2.402-A4, and to address the agricultural land-use issues created by the devastating December 1989 freeze, the Polk County Planning Division, and the Economic Development Council, shall work with organizations representing the commercial agricultural industry in Polk County, including, but not limited to, Florida Citrus Mutual, Florida Cattlemen's Association (Polk County), and Florida Farm Bureau Federation (Polk County) in order to coordinate the future land-use needs of that industry.

## SECTION 2.124 B RURAL RESIDENTIAL DEVELOPMENT (RRD)

POLICY 2.124-B1: PERMITTED USE -- "Rural Residential Development" (RRD) is a permitted use allowed within the A/RR land-use classification upon approval by the Board of County Commissioners, and subject to the policies within this section.

POLICY 2.124-B2: DEVELOPMENT CRITERIA -- RRDs may contain single-family dwelling units at a sliding-scale gross density (on the entire site) of one dwelling unit per 2.5 acres (1 DU/2.5 AC) up to, and including, one dwelling unit per acre (1 DU/AC) (see "Rural-Residential-Development Density Conversion Schedule"), as determined by appropriate location criteria (see "Rural-Residential-Development Density Schedule"). Locational criteria include:

a. proximity to rural clusters, business parks, linear commercial corridors, commercial enclaves, and municipalities;

b. proximity to isolated sewer systems.

c. vehicular access to arterial, paved collector, and paved County-maintained local roads;

| Existing Land Use | Proposed Land Use | | | | | |
|---|---|---|---|---|---|---|
| | Ind. | Comm. | Office | Res. High | Res. Med. | Res. Low |
| | Permitted Mitigation Use | | | | | |
| Industrial | 0 | 0 | 0 | 1 | 1,2 | 1,3 |
| Commercial | 0 | 0 | 0 | 1 | 1,2 | 1,3 |
| Office | 0 | 0 | 0 | 0 | 2 | 3 |
| Residential-High | 1 | 1 | 0 | 0 | 0 | 3 |
| Residential-Med. | 1,2 | 1,2 | 2 | 0 | 0 | 0 |
| Residential-Low | 1,3 | 1,3 | 3 | 3 | 0 | 0 |

where: 0 = intensive-use not allowed
1 = office uses
2 = residential high
3 = residential medium

d. Development within an Intensive-Use Mitigation Area shall be appropriately buffered from the less-intensive use and shall meet, at a minimum, the development criteria applicable to the intensive-use area for which the mitigation area is serving.

## SECTION 2.125-D UTILITIES

POLICY 2.125-D1: UTILITIES PERMITTED USES -- The following utility facilities shall be permitted throughout the County in all land-use classifications, subject to County approval, to support existing and proposed development:

a. water and sewer transmission and treatment facilities, including, without limitation, collection and distribution mains, water and sewerage-treatment facilities, and pumping facilities;

b. electrical-transmission and distribution facilities including, without limitation, electrical transmission lines, substations, and related electrical-distribution facilities;

c. communications facilities, including, without limitation, radio towers and microwave transmission facilities, (subject to other restrictions within the Plan or the County's land-development regulations);

## SECTION 2.302 AIR QUALITY

OBJECTIVE 2.302-A: Air quality within Polk County shall continue to meet the minimum air quality levels established by the Environmental Protection Agency and the Department of Environmental Regulation.

POLICY 2.302-A1: During Polk County's review of proposed Developments of Regional Impact (DRI), the County shall review air quality impacts of the project and the air-quality mitigative measures for the project both to be provided by the applicant for the DRI.

POLICY 2.302-A2: Polk County shall, at least annually, review the existing placement of DER/EPA ambient air monitoring stations in the County and shall request that the Department of Environmental Regulation provide for placement of temporary or permanent stations to monitor air quality for specific areas determined by the County to be in need of such monitoring based on population and location of air pollutant emission sources.

POLICY 2.302-A3: By the date established in Section 163.3203(1), FS, Polk County shall provide for buffer areas between land uses where hazardous air emissions from one land use may adversely affect adjacent land uses.

POLICY 2.302-A4: At that time when the Florida Department of Community Affairs promulgates standards addressing radon gas Polk County shall initiate implementation of the standards within its development regulations.

OBJECTIVE 2.302-B: By the date established in Section 163.3202(1), FS, Polk County shall assist DER with enforcement of its asbestos control program.

POLICY 2.302-B1: Polk County shall, before issuing a County structure demolition permit, require verification that DER has been notified of intent to demolish or remodel buildings containing asbestos, except for those structures exempt from DER notification.

## SECTION 2.303 SOILS

OBJECTIVE 2.303-A: By the date established in Section 163.3202(1),FS, Polk County shall require all construction/development sites to implement best management practices .

POLICY 2.303-A1: Polk County's development regulations shall require all construction/development sites to implement best management practices based on DER's Florida Development Manual, Chapter Six.

POLICY 2.303-A2: Criteria for Polk County's inspection of development sites during construction activities shall include erosion-control standards.

OBJECTIVE 2.303-B: Polk County shall ensure adequate funding to the Polk Soil and Water Conservation District in order for the District to provide, upon request, technical assistance with the use of best management practices for development (including mining) and agriculture.

POLICY 2.303-B1: Polk County shall annually review the funding to the Polk Soil and Water Conservation District to ensure provision of sufficient monies to allow the District to provide consistent technical assistance and development review.

POLICY 2.303-B2: Polk County shall, through its Legislative Delegation Position Statement request that the State provide funding to the Polk Soil and Water Conservation District in at least an amount to match the funding provided by the County.

## SECTION 2.304 MINERAL RESOURCES

**OBJECTIVE 2.304-A: By September 1, 1992, Polk County shall promote the efficient utilization of mineral resources in a manner which will lend itself to reclamation and limit significant impact to the natural environment.**

POLICY 2.304-A1: Polk County shall require mining operations to submit permits from state and federal regulatory agencies prior to, or concurrent with, final development approval.

POLICY 2.304-A2: Polk County shall support research to determine uses of phosphate mining and processing waste products such as phosphogypsum and clay, and shall support the use of those materials if such use is determined by Federal and State agencies to not pose a hazard to human health.

POLICY 2.304-A3: Lands designated as Preservation on the Future Land Use Map Series, and/or through development regulations, shall not be disturbed by mining or mining support operations.

POLICY 2.304-A4: Polk County shall require that use of reclaimed land be consistent with Future Land Use Element policies and land-use designations.

POLICY 2.304-A5: Polk County's development regulations shall include minimum setbacks for all mining operations between the mine site and adjoining properties not owned by the mine operator.

POLICY 2.304-A6: Polk County shall protect the availability and mineability of its mineral resources by implementing a Mineral Resource Overlay District, as defined within the Future Land Use Element of this plan. The overlay will delineate areas intended for mining through the time frame of the Comprehensive Plan. (See

OBJECTIVE 2.306-B: By September 1, 1992, Polk County shall develop and institute a water conservation program for development and redevelopment in accordance with Water Management districts.

POLICY 2.306-B1: Polk County shall provide for enforcement of water use restrictions declared by applicable water management districts during district-declared water shortages.

POLICY 2.306-B2: The Board of County Commissioners shall establish a Water Conservation Technical Advisory Committee to develop, for consideration by the Board, a water conservation program.

POLICY 2.306-B3: Polk County's development regulations shall include landscaping requirements for residential, commercial and industrial development that stress water conservation techniques such as xeriscaping or use of drought-tolerant native vegetation.

## SECTION 2.307 FLOODPLAINS

OBJECTIVE 2.307-A: Polk County shall continue its floodplain protection measures.

POLICY 2.307-A1: The Polk County Engineering Division shall prioritize floodplains associated with watercourses, based on the floodplains' development potential, and shall routinely perform hydrologic studies of selected floodplains to determine floodplain and floodway limits. The results of these studies shall be submitted to FEMA for review and revision of existing FIRM and floodway maps.

POLICY 2.307-A2: Polk County shall continue to enforce floodplain regulations to ensure the protection of floodplains' natural functions.

POLICY 2.307-A3: Polk County shall require that new development in the form of structures and structural improvements be placed one foot or more above the 100-year flood elevation.

POLICY 2.307-A4: Polk County shall continue to request inclusion of County public lakes in SWFWMD's Lake Levels Project.

POLICY 2.307-A5: Development within floodplains shall be limited in accordance to the policies stated in the Future Land Use Element "Floodplain-Protection Areas" Section 2.120-B.

## SECTION 2.308 WETLANDS

OBJECTIVE 2.308-A: **Polk County shall continue its protection of natural wetlands.**

POLICY 2.308-A1: Polk County shall use a combination of the National Wetlands Inventory developed by the US Fish and Wildlife Service and the SCS Soils Inventory to develop a wetlands database and shall revise that database regularly as additional information becomes available.

POLICY 2.308-A2: Polk County shall, to the greatest extent that is financially feasible, enhance degraded wetland systems found on the site of any County public works project undertaken.

POLICY 2.308-A3: Polk County's development regulations shall encourage wetland species diversification and re-vegetation by natural or cultural means.

POLICY 2.308-A4: Polk County shall enforce its existing wetlands regulations.

POLICY 2.308-A5: Development within wetlands shall be limited in accordance to the policies stated in the Future Land Use Element "Wetland-Protection Areas" Section 2.120-C.

## SECTION 2.309 ECOLOGICAL COMMUNITIES

OBJECTIVE 2.309-A: **By the date established in Section 163.3202(1), FS, Polk County shall promote conservation of wildlife and native vegetative communities.**

POLICY 2.309-A1: Polk County's development regulations shall:

a. include design criteria and provide incentives to conserve native vegetative communities, as defined;

b. allow for an on-site density transfer to preserve native vegetative communities;

c. implement the policies of the Recreation and Open Space Element for protection of such communities; and,

d. require development to conserve or mitigate damage to endangered and threatened species through the development review process.

POLICY 2.309-A2: Polk County shall coordinate with applicable local governments to identify and protect unique environmental resources.

POLICY 2.309-A3: Polk County shall protect the natural functions of fisheries by maintaining and improving surface water quality as described in the policies of the Surface Water, Floodplains, and Wetlands Sections of this element.

POLICY 2.309-A4: Polk County shall coordinate with other governments or governmental agencies to preserve Green-Way Districts, as defined in the Future Land Use Element of this plan.

OBJECTIVE 2.309-B: Polk County shall coordinate with the Florida Game and Freshwater Fish Commission and the US Fish and Wildlife Service to prevent loss of endangered or threatened species.

POLICY 2.309-B1: By the date established in Section 163.3202(1), FS, Polk County shall establish and maintain an inventory of areas supporting endangered or threatened plants or wildlife species. The inventory shall be compiled using data available from State and Federal agencies. Development, excluding single-family dwelling units, that contains property identified in the inventory will be required to conserve or mitigate damage to areas supporting endangered or threatened plants or wildlife species in the development review process. This policy provision shall not apply to the mining of minerals, other than phosphate, provided the mining operation conforms with all applicable state and federal regulations applicable to reclamation.

POLICY 2.309-B2: Polk County shall, at least annually, prioritize those areas identified according to Policy 2.309-B1 and shall continue to submit those areas for inclusion in state acquisition programs.

POLICY 2.309-B3: Polk County shall coordinate with state and other governmental agencies in the conservation of endangered plant and wildlife species.

POLICY 2.309-B4: Polk County shall acquire a minimum of 500 acres in FY 1991-92 and 200 acres annually, thereafter, for protection of federally or state listed endangered or threatened plants or wildlife. In addition, development regulations shall provide for transfer of densities to protect endangered or threatened wildlife. These land purchases shall be coordinated with purchase of land for recreational, open space or other compatible uses. Funding shall be solicited from various state funds, including: CARL, SOR, Preservations 2000, Communities Trust, etc.

## SECTION 2.310 HAZARDOUS WASTE/MATERIALS

OBJECTIVE 2.310-A: By October 1, 1993, Polk County shall establish mechanisms to minimize the risks associated with hazardous materials.

POLICY 2.310-A1: By October 1, 1991, a hazardous-materials inventory shall be conducted and annually updated which shall identify locations where hazardous materials are used, processed, stored, or transported as required by EPA.

POLICY 2.310-A2: Polk County shall require all commercial and industrial operations that handle hazardous materials to report their storage and usage of such materials annually. The County shall randomly inspect facilities to determine their compliance with the reporting requirements. The information received from these reports shall be used to annually update the Hazardous Materials Plan prepared by the Polk County Civil Defense Division.

POLICY 2.310-A3: Polk County shall investigate the potential for implementing a County occupational license fee or other fees to be paid to the County by industrial and commercial organizations that are known to handle hazardous materials and for which the County would need to develop emergency procedures within the Hazardous Materials Plan. This fee would be in an amount to cover the cost of compiling the annual reports, the inspections required in Policy 2.310-A2,and any extraordinary measures the County would have to take to implement emergency procedures.

POLICY 2.310-A4: The County's development regulations shall include standards for the location and relocation of commercial and industrial facilities which use, handle, or store hazardous materials in excess of 1000 kilograms or as established by the Code of Federal Regulations, Chapter 40, Part 355, Appendix A, such as:

a. access from the site to major transportation routes for ease and safety of transporting hazardous materials;

b. access and response time to the site for properly-trained and equipped personnel to service potential hazardous materials accidents;

c. the nearness and degree of sensitivity of surrounding land uses;

d. the compatibility of the proposed use with respect to the nature of hazardous materials stored or used on adjacent sites;

e. the existence of surface water features, including drainage patterns and basin characteristics;

f. the location of potable water supplies, private wells, public well fields, sinkholes and other conduits for potential migration of contaminants; and

g. atmospheric conditions, including but not limited to, prevailing wind patterns.

**OBJECTIVE 2.310-B: By October 1, 1993, Polk County shall establish mechanisms to provide for the proper management of hazardous wastes produced within Polk County.**

POLICY 2.310-B1: A hazardous wastes inventory shall be conducted which identifies locations where hazardous wastes are produced, stored, or transported. Once the inventory is compiled a random sample of the identified locations will be inventoried regularly.

## SECTION 2.402 ECONOMIC BASE MAINTENANCE

OBJECTIVE 2.402-A: The County shall, through the Economic Development Council, maintain programs designed to expand and enhance the County's traditional economic base.

POLICY 2.402-A1: The Economic Development Council shall continue programs which assist existing companies in expansion efforts in order to create a minimum of 200 jobs annually.

POLICY 2.402-A2: The Economic Development Council shall continue programs which encourage and assist in the location of new companies that build on the traditional economic base in order to provide a minimum of 300 new jobs annually.

POLICY 2.402-A3: By December 31, 1992, the Economic Development Council shall develop a strategy for Polk County to provide financial, in-kind, or other incentives to assist in the expansion of existing industry.

POLICY 2.402-A4: By December 31, 1993, the Polk County Planning Division and the Economic Development Council shall work with organizations representing the commercial agricultural industry in Polk County, including but not limited to Florida Citrus Mutual, Florida Cattlemen's Association (Polk County), and Florida Farm Bureau Federation (Polk County), in order to coordinate the future economic and land-use needs of that industry.

POLICY 2.402-A5: The Economic Development Council shall continue a program of economic diversification to mitigate the impact of any significant economic downturns in the citrus or phosphate industries.

POLICY 2.402-A6: The Economic Development Council shall continue to market and recruit film production in the County through a strategic marketing plan.

POLICY 2.402-A7: The Economic Development Council shall continue an education strategy for the formation of training programs relating to targeted industrial and commercial sectors through local institutions.

POLICY 2.402-A8: The Economic Development Council shall continue programs which encourage and assist existing businesses in the expansion of their market through international trade.

POLICY 2.402-A9: The Economic Development Council shall continue to market for trade and reverse investment opportunities through the development of an international strategic marketing plan.

POLICY 2.402-A10: The Tourist Development Council shall continue to promote tourism in the County through a strategic marketing plan.

POLICY 2.404-A2: By December 31, 1993, the County Planning Division, in cooperation with the County Property Appraiser, shall develop a parcel level Geographic information System which can be used to analyze land for its potential to accommodate future industrial/commercial uses.

POLICY 2.404-A3: No later than the deadline established by Section 163.3202(1) Florida Statute, the County shall streamline the development review process through the use of computerized concurrency management and permit tracking to facilitate economic growth.

POLICY 2.404-A4: By December 31, 1993, the County shall work with the phosphate industry to study the feasibility of utilizing reclaimed and unreclaimed phosphate lands for uses that would enhance Polk County's economic base.

**OBJECTIVE 2.404-B: The County, in coordination with municipal governments, shall protect the integrity of existing infrastructure and promote the development of appropriate new infrastructure within designated growth areas of the County to facilitate economic development.**

POLICY 2.404-B1: The County shall, by December 31, 1992, establish cooperative agreements between affected municipal governments to provide public water and sewer facilities for areas where economic growth is appropriate as based on Future Land Use Elements and review those areas and agreements annually.

POLICY 2.404-B2: The County shall coordinate with the Metropolitan Planning Organization for the Lakeland/Winter Haven Urbanized Areas, the Florida Department of Transportation, and local governments to expand and enhance the overall transportation network by providing reasonable access to agricultural, commercial, industrial, and office locations throughout the County.

POLICY 2.404-B3: No later than the deadline established by Section 163.3202 (1) Florida Statute, the County shall adopt regulations to protect the capacity of and promote traffic flow efficiency on arterials and collectors by limiting road (driveway) cuts and encouraging use of frontage roads.

POLICY 2.404-B4: The County shall seek a working relationship with all active railroad companies to maintain active rail lines that could service existing and future commercial/industrial use areas as outlined in the Future Land Use Element.

**OBJECTIVE 2.404-C: The County shall enter into coordinating agreements with other governmental entities which affect economic development policy and planning efforts.**

POLICY 2.404-C1: The County shall continue the Economic Development Council's economic development efforts through regular meetings of the Economic Development Council.

POLICY 2.402-A11: The Tourist Development Council shall promote the upgrading and expansion of Polk County's tourism industry as measured by the industry's investment in the County, the taxes generated by tourists for the County, and the number of persons employed within the County's hospitality industry.

## SECTION 2.403 ECONOMIC BASE DIVERSIFICATION

**OBJECTIVE 2.403-A: The County, through the Economic Development Council, shall establish and maintain programs designed to promote the recruitment of non-traditional industries to facilitate the diversification of Polk County's economic base.**

POLICY 2.403-A1: By December 31, 1992, the Economic Development Council shall identify and target non-traditional industries which are sensitive to the County's environment and its natural resources.

POLICY 2.403-A2: By December 31, 1993, the Economic Development Council shall develop a strategic marketing plan to recruit targeted industries which will provide quality job opportunities for County residents, increase the County's per capita income, and reduce the County's unemployment rate and, beginning in 1994, annually report target industry starts including the number of new jobs created and available wage information.

POLICY 2.403-A3: By December 31, 1992, the Economic Development Council shall develop a strategy for Polk County to provide financial, in-kind, or other incentives required to assist in the recruitment of new industry.

## SECTION 2.404 ECONOMIC DEVELOPMENT INTEGRATED WITH PLANNING

**OBJECTIVE 2.404-A: The County shall ensure that land is allocated for future agricultural/commercial/industrial land uses to allow for a viable economy.**

POLICY 2.404-A1: The County Planning Division shall encourage the location and clustering of major commercial and industrial activities according to the following guidelines:

a. in close proximity to principal arterials;

b. with access to appropriate utilities (water, sewer, electricity, gas, telephone) or to allow for provision of these utilities;

c. with on-site rail facilities, if appropriate;

d. with access to mass transit routes where feasible; and

e. so as to minimize impacts to the natural environment and adjacent land uses.

## SECTION 3.102 SANITARY SEWER

OBJECTIVE 3.102-A: Polk County shall provide for safe and efficient sanitary sewer service (public or private) to the County's unincorporated area.

POLICY 3.102-A1: Installation, operation, and maintenance of sanitary sewer treatment and disposal facilities shall, at a minimum, meet the requirements of the Water Quality act of 1987, Chapter 17-6, FAC, Chapter 10D-6, FAC, Polk County Utility Code, Ordinance N 89-38.

POLICY 3.102-A2: Sanitary sewer facilities shall, at a minimum, meet the following level-of-service (LOS) standards:

a. Sanitary sewer treatment and disposal facilities shall be designed to provide:

   1. average daily-flow capacity of 270 gallons per equivalent residential connection (GPERC),

   2. maximum daily-flow capacity of two times the average daily-flow, and

   3. maximum hourly capacity of 4.0 times the average daily-flow;

b. Minimum capacity for a new private or public sanitary sewer treatment plants shall be 100,000 gallons per day. At the discretion of the County, smaller, interim plants, may be allowed for industrial and commercial uses within the Urban Development and Urban Growth Areas as designated in the Future Land Use Element and Map Series. These interim systems must be connected to the public regional or sub-regional system within a year of it becoming available. Isolated industrial sites in the suburban or rural areas may be allowed to use smaller plants as long as they satisfy the County's requirements as to effluent disposal capability and implement a groundwater monitoring program (GWMP) in accordance with FDER rules for wastewater treatment facilities with capacities of 100,000 gallons per day; and

c. Sites for the disposal of effluent shall be provided in an amount equivalent to, or greater than, treatment plant capacity. Design shall meet all requirements and shall be supported by hydrogeological evaluation; signed and sealed by a registered hydrologist and professional engineer.

POLICY 3.102-A3: *Discharge effluent from new sanitary sewer* treatment facilities shall, at a minimum, meet water quality standards established in Chapter 17-6 (FAC) and the Water Quality Act of 1987, as amended, such that effluent may be reused for non-drinking purposes.

OBJECTIVE 3.102-B: By October 1, 1996, Polk County shall correct existing public wastewater treatment and disposal facility deficiencies and plan extension or increase of facility capacity in order to maximize the use of existing facilities and discourage urban sprawl.

POLICY 3.102-B1: By the date established by Section 163.3202(1), FS, the County shall implement the Capital Improvement Program (CIP) to provide sanitary sewer service within the unincorporated urban development areas, as establish by the Future Land Use Element.

POLICY 3.102-B2: By October 1, 1991, the County shall update the Polk County Water and Wastewater Master Plan consistent with the policies of this Comprehensive Plan in order to maximize the use of existing facilities and provide for future needs. The update shall include a timetable to determine the feasibility of providing the service in the Urban Growth Areas, as defined in the Future Land Use Element, by or before FY 2000-2001. The Comprehensive Plan shall be amended, as necessary, to include the results of this master plan update.

POLICY 3.102-B3: All improvements of existing sanitary sewer, expansion, replacement, or increase in capacity shall meet or exceed established LOS standards.

POLICY 3.102-B4: Any new private sanitary sewer treatment and disposal system (e.g. package treatment plants), shall make the necessary provision, as approved by County's Utilities Division, for future incorporation into a public regional or sub-regional collection, treatment, and disposal system within 365 days of such system becoming available, as mandated by Section 381.272, FS, and Rule 10D-6.41(2), FAC.

POLICY 3.102-B5: The County shall continue to collect a user's fee to cover the operation and maintenance expenses and design a funding mechanism for capital improvement of sanitary sewer treatment and disposal facilities.

POLICY 3.102-B6: Where service-area agreements exist, the County shall continue coordination efforts with the municipalities to assure availability of service, to ascertain potential for revision in boundaries, and to ensure cooperation rather than competition.

POLICY 3.102-B7: Where service-area agreements do not exist, the County shall initiate coordination efforts, to set standards, define or modify service-area boundaries, and estimate capability of providing the service to unincorporated areas adjoining municipalities' or private utilities' service areas.

OBJECTIVE 3.102-C: Polk County shall prepare and implement, through the County's Health Department, a management program to ensure proper installation, use, and maintenance of on-site treatment and disposal systems (i.e. septic tanks.), as a part of the land-development regulations to be adopted and/or amended by the County in accordance with Section 163.3202(1), FS.

POLICY 3.102-C1: Private on-site disposal systems shall, at a minimum, meet the requirements set by the Department of Health and Rehabilitative Service (HRS) in Chapter 10D-6, FAC, as amended.

POLICY 3.102-C2: The County shall coordinate with HRS, DER, and other applicable agencies to develop and implement a program where the Polk County Health Department staff inspects, and identifies and takes action to correct the deficiencies found in on-site disposal systems (e.g. septic tanks) and private wastewater treatment and disposal facilities (e.g. package treatment plants) that are polluting ground or surface waters or otherwise creating health hazards as shown in the results of investigations by any County's Divisions, DER, water management district, or any other related agency, or by public complaint. Such inspection shall be financed by a fee which must not exceed the cost of the inspection. (Any cost incurred to correct any deficiencies found in private systems shall be paid by the owner(s) of such system.)

POLICY 3.102-C3: The Polk County Utilities Division, Water Resources Division, and Solid Waste Division shall coordinate with HRS, DER, EPA, and other concerned agencies, to establish a set of procedures, following the guidelines established by Chapters 17-640 and 17-7 Part IV, FAC, as amended, to ensure the proper disposal of sludge and septage, from treatment plants and on-site wastewater disposal systems.

POLICY 3.102-C4: Private on-site disposal systems (e.g. septic tanks) shall be designed and located in accordance to standards established by Chapter 10D-6, FAC, for the HRS, using USDA Soil Conservation Services' determinations as to the adequacy of each type of soil to support septic-tank use, and the depth of the wet-season water-table level.

POLICY 3.102-C5: Density and intensity of on-site treatment and disposal systems will be evaluated for impact on ground and surface water during development review process.

POLICY 3.102-C6: The County shall establish development regulations, in accordance with the Polk County Surface Water Protection Ordinance, Ordinance No. 89-47, which address set-back from surface water bodies, wetlands, and floodplain for new septic tanks and sewage treatment facilities which minimizes the potential for contamination of these natural features.

## SECTION 3.104 DRAINAGE

OBJECTIVE 3.104-A: With plan adoption, Polk County shall adopt the following minimum design criteria for stormwater management systems as the level-of-service (LOS) standards:

DRAINAGE LEVEL-OF-SERVICE STANDARDS

| | LOS I | LOS II | LOS III | LOS IV | LOS V |
|---|---|---|---|---|---|
| Drainage Structures | Ability to handle 100-year, 24 hr-storm event with 1-ft freeboard at allowed velocity | Ability to handle 50-year, 24 hr-storm event with 1-ft freeboard at allowed velocity 100-year, 24 hr-storm event with no freeboard at allowed velocity | Ability to handle 25-year, 24 hr-storm event with 1-ft freeboard at allowed velocity 50-year, 24 hr-storm event with no freeboard at allowed velocity | Ability to handle 10-year, 24 hr-storm event with 1-ft freeboard at allowed velocity 25-year, 24 hr-storm event with no freeboard at allowed velocity | Ability to handle 3-year, 24 hr-storm event with 1-ft freeboard at allowed velocity 10-year, 24 hr-storm event with no freeboard at allowed velocity |
| Stormwater Facilities | 100-year, 24 hr storm event at top of bank or berm | 50-year, 24 hr storm event at top of bank or berm | 25-year, 24 hr storm event at top of bank or berm | 10-year, 24 hr storm event at top of bank or berm | 3-year, 24 hr storm event at top of bank or berm |
| Storm sewer | Capacity to handle a 100-year storm event | Capacity to handle a 50-year storm event | Capacity to handle a 25-year storm event | Capacity to handle a 10-year storm event | Capacity to handle a 3 -year storm event |

POLICY 3.104-A1: All applicable federal, state, regional, and local regulations pertaining to flood control and water quality preservation shall continue to be met in public and private project design.

POLICY 3.104-A2: The following facilities shall meet Level-of-Service IV: Existing man-made stormwater facilities (i.e. canals, ditches, detention/retention ponds), and existing drainage structures (i.e. culverts and bridges).

POLICY 3.104-A3: Existing roads shall be maintained above the 10-year flood elevation; and new roads shall be constructed and maintained above the 100-year flood elevation.

POLICY 3.104-A4: New and reconstructed drainage structures (i.e. culverts and bridges) shall be designed and constructed to meet:

a. Level-of-Service II: those related to arterial and major collector roads, and

b. Level-of-Service IV: those related to minor collector and local roads.

POLICY 3.104-A5: New and reconstructed stormwater facilities (i.e. ditches, canals, detention/retention ponds) shall be designed and constructed to meet Level-of-Service III.

POLICY 3.104-A6: Existing storm-sewers (e.g. inlets) shall be maintained to meet Level-of-Service V. New systems shall be required to meet Level-of-Service III.

POLICY 3.104-A7: For all new development and redevelopment, post-development peak-discharge volumes and runoff-rates shall not exceed the corresponding pre-development volumes and rates.

POLICY 3.104-A8: Stormwater treatment for pollutants in post-development runoff (regardless of project size) shall be provided for a water-volume equivalent to 1/2 inch of depth over the entire site, or the runoff from the first inch of rainfall on the entire site, in accordance with Chapter 17-25, FAC in order to meet receiving water-quality standards in Section 17-302.500, FAC.

**OBJECTIVE 3.104-B: By January 1, 1994, Polk County shall complete the identification and evaluation of the drainage facilities network within the County, determine deficiencies and causes of deficiencies, develop programs for stormwater-management improvement and maintenance, and update both the Surface Water Management Plan (SWMP) and the Polk County Comprehensive Plan (PCCP) accordingly.**

POLICY 3.104-B1: The County shall continue a County-wide inventory to determine its Drainage Facility Network (DFN) to include:

a. drainage patterns in each sub-basin,

b. structures in place (culverts, etc.),

c. natural and man-made drainage features (watercourses, streams, rivers, canals, ditches, etc.),

d. connectivity,

e. disposition,

f. easements,

g. capacities,

h. other features that may influence stormwater quantity and quality characteristics in each sub-basin within, or affecting, the County, and

i. the EPA's NPDES application requirements.

POLICY 3.104-D8: The County shall develop and implement mechanisms to obtain consistency of regulations and all regulatory processes pertinent to stormwater management in the County.

**OBJECTIVE 3.104-E: By January 1, 1991, Polk County shall implement a plan to maintain and update the database in the SWMP.**

POLICY 3.104-E1: The County shall develop and implement a maintenance plan to keep the SWMP routinely updated and revised.

POLICY 3.104-E2: Polk County shall develop a priority program to detail and upgrade the studies performed in the SWMP. The detail and upgrade shall be based upon the future growth areas as delineated on the Future Land Use Map series of the adopted Plan. The results of these studies and updates will be submitted for incorporation into federal and state programs related to floodplain and stormwater management (e.g. FEMA).

POLICY 3.104-E3: The County shall update future-development flood scenarios, based on the Comprehensive Plan's projected growth patterns, to identify potential flood-problem areas.

## SECTION 3.105 POTABLE WATER

**OBJECTIVE 3.105-A: Polk County shall adopt level-of-service (LOS) standards to ensure the provision of safe and efficient potable water service (public or private) to the County's unincorporated area.**

POLICY 3.105-A1: Installation, operation, and maintenance of potable water supply systems shall, at a minimum, meet the requirements of the Safe Drinking Water Act (SDWA) of 1974, as amended, Chapters 17-4, 17-550, and 17-22 (FAC), Polk County Utility Code, Ordinance No 89-38.

POLICY 3.105-A2: Public and private potable water supply systems (15 or more connections or 25 people) shall meet or exceed design criteria to provide for:

a. average daily-flow capacity of 360 gallons per equivalent-residential connection (GPERC);

b. Maximum daily-flow capacity of 2.0 times the average daily flow;

c. Maximum hourly-flow capacity of 4.5 times the average daily-flow for systems serving less than 0.1 million gallon per day (mgd); 4.0 times the average daily-flow for systems serving 0.1 to 0.5 mgd; and 3.2 times the average daily-flow for systems serving more than 0.5 mgd.

d. storage capacity shall be provided to meet domestic demands, and where fire protection is provided, fire flow demands as established by the appropriate State Insurance

Agency Office (ISO). Minimum storage capacity for systems not providing fire protection shall be equal to the average daily consumption. This requirement may be reduced when the supply facilities have sufficient capacity with a stand-by power to supplement peak demand of the system.

e. capacity to support peaks caused by fire flow demands as established by the appropriate State ISO.

POLICY 3.105-A3: Sites for the location of water wells shall be evaluated as set forth in the Federal Clean Water Act, as amended, and Chapters 17-4 and 17-22 (FAC), in order to minimize the potential for contamination of the potable water supply.

POLICY 3.105-A4: The County shall review effectiveness of the County utilities ordinance, Ordinance No. 89-36 to enforce or implement the requirements of this Comprehensive Plan and make the necessary amendments.

**OBJECTIVE 3.105-B: By October 1, 1996, Polk County shall correct existing public potable water treatment and distribution facility deficiencies and plan extension or increase of facility capacity in order to maximize the use of existing facilities and discourage urban sprawl.**

POLICY 3.105-B1: By the date established by Section 163.3202(1), FS, the County shall implement the Capital Improvement Program (CIP) to provide potable water service within the unincorporated urban development areas, as establish by the Future Land Use Element.

POLICY 3.105-B2: By October 1, 1991, the County shall update the Polk County Water and Wastewater Master Plan consistent with the policies of this Comprehensive Plan in order to maximize the use of existing facilities and provide for future needs. The update shall include a timetable to determine the feasibility of providing the service in the Urban Growth Areas, as defined in the Future Land Use Element, by or before FY 2000-2001. The Comprehensive Plan shall be amended, as necessary, to include the results of this master plan update.

POLICY 3.105-B3: All improvements of existing potable water system, expansion, replacement, or increase in capacity shall meet or exceed established LOS standards.

POLICY 3.105-B4: Private development within the planned unincorporated urban development areas or urban growth areas, served by private potable water supply systems, shall make the necessary provision, as approved by the County's Utilities Division to allow incorporation into a public regional or sub-regional system within 365 days of such system becoming available.

POLICY 3.105-B5: The County shall coordinate with HRS, DER, SWFWMD, and other applicable agencies to develop and implement a program where the Polk County Health Department staff inspect, identify and take action to correct the deficiencies found in private residential, commercial, or industrial potable water systems that are suspected health hazards. Such inspection shall be financed by a fee which must not exceed the cost of the inspection, and any cost incurred in to correct any deficiency found in the private systems shall be paid by the owner(s) of such system.

POLICY 3.105-B6: The County shall evaluate on a regular basis the effectiveness of the Polk County Water and Wastewater Master Plan.

POLICY 3.105-B7: All improvements, expansions, replacements, or increases in capacity of existing potable water supply facilities shall meet or exceed established LOS standards.

POLICY 3.105-B8: Where service-area agreements exist, the County shall continue coordination efforts with the municipalities to assure availability of service, to ascertain potential for revision in boundaries, and to ensure cooperation rather than competition.

POLICY 3.105-B9: Where service-area agreements do not exist, the County shall initiate coordination efforts, to set standards, define or modify service-area boundaries, and estimate capability of providing the service to unincorporated areas adjoining municipal's or private utilities' service areas.

POLICY 3.105-B10: The County shall continue to collect a user's fee to cover the operation and maintenance expenses and design a funding mechanism for capital improvement of potable water facilities.

**OBJECTIVE 3.105-C: Polk County shall adopt regulations and implement design criteria, and construction and location standards consistent with the adopted LOS for potable water facility management, as a part of the land-development regulations to be adopted and/or amended by the County in accordance with Section 163.3202(1), FS.**

POLICY 3.105-C1: All applicable federal, state, regional, and local regulations pertaining to the potable water supply shall continue to be met in public and private project design, construction, and operation.

POLICY 3.105-C2: The County shall develop and implement mechanisms to assist in the coordination of permitting and monitoring processes between the County, and DER, HRS, water management districts, and CFRPC to ensure the proper operation and maintenance of the existing potable water supply facilities and installment of adequate future facilities.

POLICY 3.105-C3: The County shall revise the existing ordinance regulating franchised potable water facilities (Ordinances No 82-11 and 84-11), as part of the new development regulations to correct any deficiency and reflect the policies of this plan.

EXHIBIT 1.

STATEWIDE MINIMUM ACCEPTABLE OPERATING LEVEL OF SERVICE STANDARDS FOR THE STATE HIGHWAY SYSTEM

| | EXISTING URBANIZED AREAS | TRANSITIONING URBANIZED AREAS | RURAL AREAS |
|---|---|---|---|
| ROADWAY TYPE | | | |
| FREEWAYS | D | C | C |
| PRINCIPAL ARTERIAL | D | C | C |
| MINOR ARTERIAL | E | D | D |
| SPECIAL SITUATIONS | | | |
| | CONSTRAINED FACILITY | BACKLOGGED FACILITY | |
| ROADWAY TYPE | | | |
| FREEWAYS | MAINTAIN | MAINTAIN & IMPROVE | |
| PRINCIPAL ARTERIAL | MAINTAIN | MAINTAIN & IMPROVE | |
| MINOR ARTERIAL | MAINTAIN | MAINTAIN & IMPROVE | |

POLICY 3.204-A3: On an annual basis, Polk County shall update the County Traffic Circulation Analysis to determine the existing operating conditions on State and County road segments.

**OBJECTIVE 3.204-B: Polk County shall maintain an acceptable Level of Service (LOS) on all road segments shown to be operating at an acceptable LOS.**

POLICY 3.204-B1: Through technical assistance, Polk County shall encourage the implementation of Traffic Management Programs, e.g. ride-sharing, staggered work hours, and other techniques, tc accommodate travel demand while preserving the surplus capacity oi existing roads.

POLICY 3.204-B2: Polk County shall, through land development regulations, provide that all road segments shown to be operating at an acceptable LOS will not be permitted to deteriorate to an unacceptable LOS. (Refer to Objective 4.207-A and Policy 4.207-A3.)

**OBJECTIVE 3.204-C: Polk County shall seek to achieve an acceptable LOS on all road segments which are "Backlogged Facilities".**

POLICY 3.204-C1: With the exception of Rural Areas, Polk County shall implement 110% Maintain as the LOS for the purpose of issuing development permits for backlogged facilities. For Rural Areas, Polk County shall implement 105% Maintain as the LOS for backlogged facilities.

**OBJECTIVE 3.204-D: Polk County shall prevent the deterioration of all road segments shown to be operating at an unacceptable LOS and defined as "Constrained Facilities".**

POLICY 3.204-D1: With the exception of Rural Areas, Polk County shall implement 110% Maintain as the LOS for the purpose of issuing development permits for road segments which are constrained facilities. For Rural Areas, Polk County shall implement 105% Maintain as the LOS for constrained facilities.

**OBJECTIVE 3.204-E: Polk County shall coordinate access point, median opening, and street intersection locations associated with adjacent existing and future development to promote a safe and orderly pattern of access and preserve the capacity of arterial and collector roads.**

POLICY 3.204-E1: Polk County shall adopt land development regulations to control access from adjacent development onto arterial and collector roads. At a minimum, the regulations shall address the following:

a. spacing and design of median openings and curb cuts,

b. provision of frontage roads,

c. driveway access and spacing, and

d. access to out-parcels.

POLICY 3.204-E2: Through its site plan review, Polk County shall assure safe and convenient on-site traffic flow and the availability of adequate parking for motorized and non-motorized vehicles.

POLICY 3.204-E3: In its site plan review, Polk County shall coordinate with the FDOT to ensure efficient access from adjacent development onto the State road system.

POLICY 3.204-E4: Through the MPO, Polk County shall participate cooperatively in carrying out studies to streamline patterns of access control on State principal arterials.

a. Polk County staff shall cooperate with the FDOT District Office to identify the need for corridor studies and establish a ranked order for conducting these studies.

b. Corridor studies shall determine the necessary means for preserving through-capacity and relieving congestion through access control planning and implementation.

c. Affected property owners shall be given an opportunity to provide input to study recommendations.

POLICY 3.204-E5: Polk County land development regulations shall be reviewed and amended as necessary to ensure adequate off-street parking.

## SECTION 3.205 PROTECTION OF RIGHTS-OF-WAY

**OBJECTIVE 3.205-A: Polk County shall protect, reserve and acquire rights-of-way for identified transportation corridors in a timely manner so as to preclude encroachment by incompatible land uses.**

POLICY 3.205-A1: Polk County shall continue its current practice of preserving existing and future transportation rights-of-way by requiring appropriate minimum building setback lines and land dedication through the plat and site plan review and approval process.

POLICY 3.205-A2: By October 1, 1992, Polk County shall adopt a Rights-of-Way Needs Map based upon the transportation corridors identified in the MPO's adopted 2010 Transportation Needs Plan and minimum right-of-way standards, or typical cross-sections, by road facility type.

POLICY 3.205-A3: By October 1, 1993, Polk County shall develop a recommended program to protect and acquire transportation rights-of-way in advance of construction.

## SECTION 3.206 COORDINATION WITH FUTURE LAND USE ELEMENT AND OTHER APPROPRIATE PLANS AND PROGRAMS

**OBJECTIVE 3.206-A: Polk County shall coordinate its traffic circulation system with the Future Land Use Element of the Comprehensive Plan and with the plans of adjacent jurisdictions.**

POLICY 3.206-A1: The Traffic Circulation Element shall support the future land-use planning concepts and designations as contained in the Future Land Use Element.

# 11.4.2 CENTRAL FLORIDA COMPREHENSIVE REGIONAL POLICY PLAN

Regional Policies:

(1) The Governor's Energy Office or its successor shall assist local governments in implementing energy management procedures.

Measure (a): Assistance rendered to local governments.

(2) Schools and hospitals, in conjunction with the Governor's Energy Office or its successor, shall develop energy management plans through the Institutional Conservation Program.

Measure (a): Number of energy management plans developed by schools and hospitals.

Measure (b): Content of schools' and hospitals' energy management plans.

(3) The Governor's Energy Office or its successor shall assist Department of Environmental Regulations in implementing mandatory energy efficiency training for water/wastewater treatment plant operator certification.

Measure (a): Assistance rendered to DER.

(4) The Governor's Energy Office or its successor shall assist the Florida Public Service Commission in establishing incentives for energy-efficient electric generation by utilities and other producers.

Measure (a): Assistance rendered to PSC.

(5) The Governor's Energy Office or its successor shall assist the Department of Transportation in implementing traffic operation improvements to effect energy savings.

Measure (a): Assistance rendered to DOT.

(6) Department of Transportation and local governments shall ensure that highway traffic signals are synchronized on arterials and collectors transecting municipalities.

Measure (a): Number and location of unsynchronized traffic signals.

Regional Goal (c): By 1990, the energy efficiency of new and renovated residential and non-residential buildings shall be improved over 1986 levels.

Illinois.

8. U. S. Bureau of Mines. 1983. State of the Art of Phosphatic Clay Dewatering Technology and Disposal and Techniques. September, 1983, Tuscaloosa, Alabama.

9. Environmental Land Use Planning: Proceedings of A Seminar. 1977, Dallas, Texas.

10. Department of Natural Resources. 1980. Evaluation of Pre-July 1, 1975 Disturbed 1Phosphate Lands. August, 1980. Lakeland, Florida.

11. Florida Game and Fresh Water Fish Commission. 1985. Habitat Reclamation Guidelines. April 1985.

12. Florida Game and Fresh Water Fish Commission. 1986. Florida Freshwater Fish and Game Commission Agency Functional Plan. 1986. Tallahassee, Florida.

13. Florida Administrative Code Chapter 16C-16.

14. Florida Administrative Code Chapter 16C-17.

15. U. S. Environmental Protection Agency. 1978. Final Environmental Impact Statement for the Central Florida Phosphate Industry.

Involved Agencies: DNR, DER, DACS/DOF, RPCs, SCS, GFWFC, WMDs, DCA, Counties, FIPR, FPC

Regional Goal (a): All disturbed lands, including nonmandatory, shall be reclaimed or put to productive use, within a time frame established by statute, except those lands which have been successfully reclaimed by nature.

Regional Policies:

(1) The post-mining reclamation shall be determined and controlled by projected land use as determined by the region and local governments in accordance with applicable local, state, or federal regulations.

Measure (a): Number of mine reclamation plans in which the planned land use has determined and controlled the reclamation.

(2) Mining companies shall commit to post-mining land uses to be accomplished within a binding time frame including, but not limited to, a productive, tax generating land use for decommissioned waste clay ponds.

Measure (a): Number of mining companies committed to

Regionally Significant Resources/Facilities:

Regional Agencies: Central Florida Regional Planning Council, Southwest Florida Water Management District, South Florida Water Management District.

Local governments in the Central Florida Planning Region: County/City Elected and Appointed Officials, City/County Agencies and Departments, City/County Planning Commissions and Zoning Boards.

See Appendix (1) outlining federal, state, county, municipal, and private non-profit designated parks/natural habitat areas.

Regional Goal (a): By 1992, all local, regional, and state agencies shall balance the impacts of population growth with the public facilities and natural resource protection needs of the existing community, through the requirements for consistency within Florida's integrated planning and budgeting process.

Regional Policies:

(1) Urbanization and new land development shall be directed to areas most suitable because of natural capacity, accessibility, consistency with local capital improvement budgets, previous preparation for urban purposes, efficient use of previous infrastructure, and criteria directed toward preserving the region's natural environment. This shall be accomplished through 1) adoption and enforcement of local/regional/state land use and development plans, regulations, and approvals, 2) demonstrated consistency with local capital improvement budgets, and 3) promotion of state programs, investments, and development/redevelopment activities encouraging efficient use of infrastructure to serve new population and commerce.

Measure (a): Increase in the number/acreage of new urban land developments approved for suitable locations.

Measure (b): Decrease in the number/acreage of individual types of new urbanization and land developments approved for outlying locations having little or no infrastructure.

Measure (c): Number of land development permits denied because of unsuitable locations/lack of infrastructure/ inconsistency with local capital improvement budgets.

Measure (d): Number of local/regional/state land use and development plans, regulations, and approvals adopted and enforced with provisions to direct urbanization and new land development to suitable locations.

Measure (e): Number of local land use and development plans, regulations, and approvals demonstrated to be consistent with adopted capital improvement budgets.

Measure (f): Number of state programs and investments used in areas having the capacity to serve population growth.

Measure (g): Consistency of public plans and programs with the requirements of legislation and rules including the State Comprehensive Plan, the State and Regional Planning Act, the Local Government Comprehensive Planning and Land Development Regulation Act, and Chapter 9J-5, Florida Administrative Code.

(2) Land use and development regulations and approvals shall be demonstrated to be consistent with the adoption, implementation, and enforcement of local, regional, and state comprehensive plans which ensure a balance of compatible land uses, protection of the public interest, and property rights.

Measure (a): Number of local land use/development regulations and approvals based on demonstrated consistency with local, regional, and state comprehensive plans providing a balance of compatible land uses, protection of the public interest, and property rights.

Measure (b): Number of local land use/development regulations and approvals inconsistent with local, regional, and state comprehensive plans providing a balance of compatible land uses, protection of the public interest, and property rights.

(3) The livability and character of the region's urban areas shall be enhanced through comprehensive county/municipal review and adoption of policies providing an attractive, functional, and coordinated mix of living, working, shopping, and recreational/open space activities.

Measure (a): Number of comprehensive local reviews and plans leading to adoption of urban development policies.

Measure (b): Increase in the number of urban development/redevelopment plans and projects undergoing comprehensive review to provide a mix of urban and open space activities.

Both the public and private sectors in this region have recognized the value of rehabilitation and reuse of existing facilities, structures, and buildings, as evidenced by the success of various historic preservation, Main Street, and other efforts in the central Florida region. With continuing growth pressures, however, and with the elimination of certain federal investment tax credits and other federal funding sources, it may become more difficult to economically and efficiently rehabilitate existing buildings and facilities.

Infilling is one practice which can help maximize the use of existing public facilities, but this process should not take place at the expense of adequate open space, park facilities, and preservation areas.

References:

1. Central Florida Regional Planning Council, 1986.

2. Local Governments, 1986.

Corresponding Governor's Ofc/State Plan Policy Cluster Title: 59

Involved Agencies: Cities, Counties, DCA, RPCs, DOT, DNR, DGS

Significant Resources/Facilities:

Transportation Facilities, Public Buildings, Potable Water Facilities, Hazardous and Non-Hazardous Waste Treatment/Disposal Facilities, Public Health Facilities, Preservation Areas and Public Parks.

Regional Goal (a): By 1991, development shall proceed along the lines of in-place support services reducing the rate of urban sprawl from 1985 patterns.

Regional Policies:

(1) Development shall be allowed only where infrastructure is adequate, or where services adequate to support the proposal are in place or under construction.

Measure (a): Number of projects approved only in areas with adequate infrastructural support.

(2) Development shall be approved only where it has been identified as the proper land use in the Future Land Use Element of a local government comprehensive plan.

Measure (a): Number of developments approved only where the locale has been previously identified as the proper land use in the Future Land Use Element.

2. Central Florida Regional Planning Council. Transportation Corridor Maps.

3. Letter from Richard S. Glaze, Chief, Bureau of Policy Planning, Florida Department of Transportation, September 8, 1986.

Corresponding Governor's Ofc/State Plan Policy Cluster: 64

Involved Agencies: RPC, DOT, Counties and Cities, U.S. DOT

Regionally Significant Resources: State Highway System - Connecting Links -Hurricane Evacuation Routes, Roads off State Highway System which are of regionally significant mobility.

Regional Goal (1): Development shall only occur in a manner consistent with Florida Statutes requiring the concurrent provision of adequate transportation facilities.

Regional Policies:

(1) By 1989, regional policies shall be established to ensure public and private responsibilities for transportation improvements are determined equitably on a fair share basis.

Measure (a): Number and date policies established.

(2) Development shall only be allowed to occur in areas where the existing level of service (LOS) meet or exceeds the standards specified, as determined by Table 1. using the recommended methodologies of the Transportation Research Board, National Research Council.

# 11.4.3 STATE COMPREHENSIVE PLAN

acquisition to ensure the integrity and continued attractive image of coastal areas.

6. Encourage land and water uses which are compatible with the protection of sensitive coastal resources.

7. Protect and restore long-term productivity of marine fisheries habitat and other aquatic resources.

8. Avoid the exploration and development of mineral resources which threaten marine, aquatic, and estuarine resources.

9. Prohibit development and other activities which disturb coastal dune systems, and ensure and promote the restoration of coastal dune systems that are damaged.

10. Give priority in marine development to water-dependent uses over other uses.

(10) NATURAL SYSTEMS AND RECREATIONAL LANDS.—

(a) *Goal.*—Florida shall protect and acquire unique natural habitats and ecological systems, such as wetlands, tropical hardwood hammocks, palm hammocks, and virgin longleaf pine forests, and restore degraded natural systems to a functional condition.

(b) *Policies.*—

1. Conserve forests, wetlands, fish, marine life, and wildlife to maintain their environmental, economic, aesthetic, and recreational values.

2. Acquire, retain, manage, and inventory public lands to provide recreation, conservation, and related public benefits.

3. Prohibit the destruction of endangered species and protect their habitats.

4. Establish an integrated regulatory program to assure the survival of endangered and threatened species within the state.

5. Promote the use of agricultural practices which are compatible with the protection of wildlife and natural systems.

6. Encourage multiple use of forest resources, where appropriate, to provide for timber production, recreation, wildlife habitat, watershed protection, erosion control, and maintenance of water quality.

7. Protect and restore the ecological functions of wetlands systems to ensure their long-term environmental, economic, and recreational value.

8. Promote restoration of the Everglades system and of the hydrological and ecological functions of degraded or substantially disrupted surface waters.

9. Develop and implement a comprehensive planning, management, and acquisition program to ensure the integrity of Florida's river systems.

10. Emphasize the acquisition and maintenance of ecologically intact systems in all land and water planning, management, and regulation.

11. Expand state and local efforts to provide recreational opportunities to urban areas, including the development of activity-based parks.

12. Protect and expand park systems throughout the state.

13. Encourage the use of public and private financial and other resources for the development of recreational opportunities at the state and local levels.

(11) AIR QUALITY.—

(a) *Goal.*—Florida shall comply with all national air quality standards by 1987, and by 1992 meet standards which are more stringent than 1985 state standards.

(b) *Policies.*—

1. Improve air quality and maintain the improved level to safeguard human health and prevent damage to the natural environment.

2. Ensure that developments and transportation systems are consistent with the maintenance of optimum air quality.

3. Reduce sulfur dioxide and nitrogen oxide emissions and mitigate their effects on the natural and human environment.

4. Encourage the use of alternative energy resources that do not degrade air quality.

5. Ensure, at a minimum, that power plant fuel conversion does not result in higher levels of air pollution.

(12) ENERGY.—

(a) *Goal.*—Florida shall reduce its energy requirements through enhanced conservation and efficiency measures in all end-use sectors, while at the same time promoting an increased use of renewable energy resources.

(b) *Policies.*—

1. Continue to reduce per capita energy consumption.

2. Encourage and provide incentives for consumer and producer energy conservation and establish acceptable energy performance standards for buildings and energy consuming items.

3. Improve the efficiency of traffic flow on existing roads.

4. Ensure energy efficiency in transportation design and planning and increase the availability of more efficient modes of transportation.

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

6. Increase the efficient use of energy in design and operation of buildings, public utility systems, and other infrastructure and related equipment.

7. Promote the development and application of solar energy technologies and passive solar design techniques.

8. Provide information on energy conservation through active media campaigns.

9. Promote the use and development of renewable energy resources.

10. Develop and maintain energy preparedness plans that will be both practical and effective under circumstances of disrupted energy supplies or unexpected price surges.

(13) HAZARDOUS AND NONHAZARDOUS MATERIALS AND WASTE.—

(a) *Goal.*—All solid waste, including hazardous waste, wastewater, and all hazardous materials, shall be properly managed, and the use of landfills shall be eventually eliminated.

(b) *Policies.*—

1. By 1994, reduce all volume of solid waste requiring disposal by 30 percent.

2. By 1994, provide in all counties a countywide solid waste collection system to discourage littering and the illegal dumping of solid waste.

3. Initiate programs to develop or expand recyclable material markets, especially those involving plastics, metals, paper, and glass.

4. Encourage and expedite the development of environmentally safe hazardous waste treatment, storage, and disposal facilities.

5. Identify and clean up hazardous waste sites.

6. Enforce and strengthen regulation of the generation, storage, treatment, disposal, and transportation of hazardous waste.

7. Establish a system for identifying the location, type, and quantity of hazardous materials.

8. Require all hazardous waste generators to properly manage their own wastes.

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

10. Encourage coordination of intergovernmental and interstate waste management efforts.

11. Identify, develop, and encourage environmentally sound wastewater treatment and disposal methods.

12. Develop a permanent system for households, small business, and other low-volume generators of hazardous waste to safely dispose of these materials in a convenient manner.

13. Encourage strict enforcement of hazardous waste laws and swift prosecution of violators.

(14) MINING.—

(a) *Goal.*—Florida shall protect its air, land, and water resources from the adverse effects of resource extraction and ensure that the disturbed areas are reclaimed or restored to beneficial use as soon as reasonably possible.

(b) *Policies.*—

1. Develop a comprehensive approach to the regulation of resource extraction.

2. Require mining operations to provide evidence of financial responsibility to ensure the reclamation of mined lands.

3. Require that disturbed areas, except those selected to be reclaimed by nature, be reclaimed to productive and beneficial use within a period determined by the state to be reasonable and practical.

4. Require state reclamation standards to be simple and well-coordinated and to be consistent with the protection of the public interest and conservation of natural resources.

5. Prohibit resource extraction which will result in an adverse effect on environmentally sensitive areas of the state which cannot be restored.

6. Minimize the effects of resource extraction upon ground and surface waters.

7. Protect human health from radiological or other adverse impacts associated with resource extraction.

8. Reduce the adverse impacts of waste disposal associated with resource extraction.

9. Require that mining and reclamation regulation recognizes the geological constraints and inherent differences in the types and locations of resources to be mined.

(15) PROPERTY RIGHTS.—

(a) *Goal.*—Florida shall protect private property rights and recognize the existence of legitimate and often competing public and private interests in land use regulations and other government action.

(b) *Policies.*—

1. Provide compensation, or other appropriate relief as provided by law, to a landowner for any governmental action that is determined to be an unreasonable exercise of the state's police power so as to constitute a taking.

2. Determine compensation or other relief by judicial proceeding rather than by administrative proceeding.

3. Encourage acquisition of lands by state or local government in cases where regulation will severely limit practical use of real property.

(16) LAND USE.—

(a) *Goal.*—In recognition of the importance of preserving the natural resources and enhancing the quality of life of the state, development shall be directed to those areas which have in place, or have agreements to provide, the land and water resources, fiscal abilities, and service capacity to accommodate growth in an environmentally acceptable manner.

(b) *Policies.*—

1. Promote state programs, investments, and development and redevelopment activities which encourage efficient development and occur in areas which will have the capacity to service new population and commerce.

2. Develop a system of incentives and disincentives which encourages a separation of urban and rural land uses while protecting water supplies, resource development, and fish and wildlife habitats.

3. Enhance the livability and character of urban areas through the encouragement of an attractive and functional mix of living, working, shopping, and recreational activities.

4. Develop a system of intergovernmental negotiation for siting locally unpopular public and private land uses which considers the area of population served, the impact on land development patterns or important natural resources, and the cost-effectiveness of service delivery.

5. Encourage and assist local governments in establishing comprehensive impact-review procedures to evaluate the effects of significant development activities in their jurisdictions.

6. Consider, in land use planning and regulation, the impact of land use on water quality and quantity; the availability of land, water, and other natural resources to meet demands; and the potential for flooding.

7. Provide educational programs and research to meet state, regional, and local planning and growth-management needs.

(17) DOWNTOWN REVITALIZATION.—

(a) *Goal.*—In recognition of the importance of Florida's developing and redeveloping downtowns to the state's ability to use existing infrastructure and to accommodate growth in an orderly, efficient, and environmentally acceptable manner, Florida shall encourage the centralization of commercial, governmental, retail, residential, and cultural activities within downtown areas.

(b) *Policies.*—

1. Provide incentives to encourage private sector investment in the preservation and enhancement of downtown areas.

2. Assist local governments in the planning, financing, and implementation of development efforts aimed at revitalizing distressed downtown areas.

3. Promote state programs and investments which encourage redevelopment of downtown areas.

(18) PUBLIC FACILITIES.—

(a) *Goal.*—Florida shall protect the substantial investments in public facilities that already exist and shall plan for and finance new facilities to serve residents in a timely, orderly, and efficient manner.

(b) *Policies.*—

1. Provide incentives for developing land in a way that maximizes the uses of existing public facilities.

2. Promote rehabilitation and reuse of existing facilities, structures, and buildings as an alternative to new construction.

3. Allocate the costs of new public facilities on the basis of the benefits received by existing and future residents.

4. Create a partnership among state government, local governments, and the private sector which would identify and build needed public facilities and allocate the costs of such facilities among the partners in proportion to the benefits accruing to each of them.

5. Encourage local government financial self-sufficiency in providing public facilities.

6. Identify and implement innovative but fiscally sound and cost-effective techniques for financing public facilities.

7. Encourage the development, use, and coordination of capital improvement plans by all levels of government.

8. Take into consideration, in the assessed value of property, increased property values directly related to infrastructure expenditures by government.

9. Identify and use stable revenue sources which are also responsive to growth for financing public facilities.

10. Encourage development of graywater systems to extend existing sewerage capacity.

(19) CULTURAL AND HISTORICAL RESOURCES.—

(a) *Goal.*—By 1995, Florida shall increase access to its historical and cultural resources and programs and encourage the development of cultural programs of national excellence.

(b) *Policies.*—

1. Promote and provide access throughout the state to performing arts, visual arts, and historic preservation and appreciation programs at a level commensurate with the state's economic development.

2. Develop a strategy for the construction of arts facilities based on an assessment which ranks regional and statewide capabilities and needs.

3. Ensure the identification, evaluation, and protection of archaeological folk heritage and historic resources properties of the state's diverse ethnic population.

4. Stimulate increased private-sector participation and support for historical and cultural programs.

5. Encourage the rehabilitation and sensitive, adaptive use of historic properties through technical assistance and economic incentive programs.

6. Ensure that historic resources are taken into consideration in the planning of all capital programs and projects at all levels of government and that such programs and projects are carried out in a manner which recognizes the preservation of historic resources.

(20) TRANSPORTATION.—

(a) *Goal.*—Florida shall direct future transportation improvements to aid in the management of growth and shall have a state transportation system that integrates highway, air, mass transit, and other transportation modes.

(b) *Policies.*—

1. By 1995, establish a high-speed rail system that links the Tampa Bay area, Orlando, and Miami.

2. Coordinate transportation investments in major travel corridors to enhance system efficiency and minimize adverse environmental impacts.

3. Promote a comprehensive transportation planning process which coordinates state, regional, and local transportation plans.

4. Allow flexibility in state and local participation in funding of public transit projects and encourage construction and use of toll facilities in order to meet transportation needs.

5. Ensure that existing port facilities and airports are being used to the maximum extent possible before encouraging the expansion or development of new port facilities and airports to support economic growth.

6. Promote timely resurfacing and repair of roads and bridges to minimize costly reconstruction and to enhance safety.

7. Develop a revenue base for transportation which is consistent with the goals and policies of this plan.

8. Encourage the construction and utilization of a public transit system, including, but not limited to, a high-speed rail system, in lieu of the expansion of the highway system, where appropriate.

9. Ensure that the transportation system provides Florida's citizens and visitors with timely and efficient access to services, jobs, markets, and attractions.

10. Promote ride sharing by public and private sector employees.

11. Emphasize state transportation investments in major travel corridors and direct state transportation investments to contribute to efficient urban development.

12. Avoid transportation improvements which encourage or subsidize increased development in coastal high-hazard areas or in identified environmentally sensitive areas such as wetlands, floodways, or productive marine areas.

13. Coordinate transportation improvements with state, local, and regional plans.

# APPENDIX 11.5

## CULTURAL RESOURCE SURVEY AND FLORIDA DIVISION OF HISTORIC RESOURCES OPINION LETTER

## 11.5.1 FLORIDA DIVISION OF HISTORIC RESOURCES OPINION LETTER

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State

DIVISION OF HISTORICAL RESOURCES
R.A. Gray Building
500 South Bronough
Tallahassee, Florida 32399-0250
Director's Office (904) 488-1480
Telecopier Number (FAX) (904) 488-3353

February 27, 1992

Mr. Charles Fuhrmeister
Piper Archaeology/Janus Research
P.O. Box 919
St. Petersburg, Florida 33731

In Reply Refer To:
Susan Hammersten
Historic Sites
Specialist
(904) 487-2333
Project File No. 920360

Re: Cultural Resource Assessment Review Request
*Cultural Resource Assessment Survey of the Proposed TEC Polk Power Station Siting Area, Polk County, Florida.*

Dear Mr. Fuhrmeister:

In accordance with this agency's responsibilities under Chapter 403, Florida Statutes, we have reviewed the information in the above referenced report, and find it to be complete and sufficient. We note that no previously unrecorded, historic or prehistoric sites were encountered during the survey.

Therefore, on the basis of the negative findings, it is the opinion of this agency that the proposed TEC Polk Power Station project is unlikely to affect any sites listed, or eligible for listing, in the National Register. The project may proceed without further involvement with this agency.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's archaeological and historic resources is appreciated.

Sincerely,

Suzanne P. Walker

for George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/Hsh

## 11.5.2 CULTURAL RESOURCE ASSESSMENT REQUEST

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State
DIVISION OF HISTORICAL RESOURCES
R.A. Gray Building
500 South Bronough
Tallahassee, Florida 32399-0250
Director's Office (904) 488-1480
Telecopier Number (FAX) (904) 488-3353

January 10, 1991

Brian Kiraly
Environmental Consulting &
Technology, Inc.
P. O. Box 20866
Tampa, Florida 33622-0866

In Reply Refer To:
Susan M. Herring
Historic Sites Specialist
(904) 487-2333
Project File No. 910020

RE: Cultural Resource Assessment Request
Proposed 1500 Acre Coal Fired Power Plant
Polk County, Florida

Dear Mr. Kiraly:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the above referenced project(s) for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the National Register of Historic Places. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

A review of the Florida Master Site File indicates that a portion of the proposed project area has already been surveyed to locate and evaluate any cultural resources present. One archaeological site, 8PO1508, was identified within the project area, but this site was determined not to be significant. In addition, the U.S.G.S. topographic maps indicate that several sections within the proposed project area have already been disturbed by phosphate mining activities. However, it is the opinion of this agency that significant archaeological and historic sites may be present within a portion of the project area which, according to our records, has not been subjected to mining practices nor has it been assessed for cultural resources.

Since potentially significant archaeological and historic sites may be present, it is our recommendation that, prior to initiating any project related land clearing or ground disturbing activities within Section 4, Township 32S-Range 23E, this portion of the proposed project area should be subjected to a systematic, professional archaeological and historical survey (see attachment). The purpose of this survey will be to locate and assess the significance of cultural resources present. The resultant survey report must be forwarded to this agency in order to complete the process of reviewing the impact of this project on significant archaeological and historic resources. However, project activities in all other sections may proceed without further involvement with this agency.

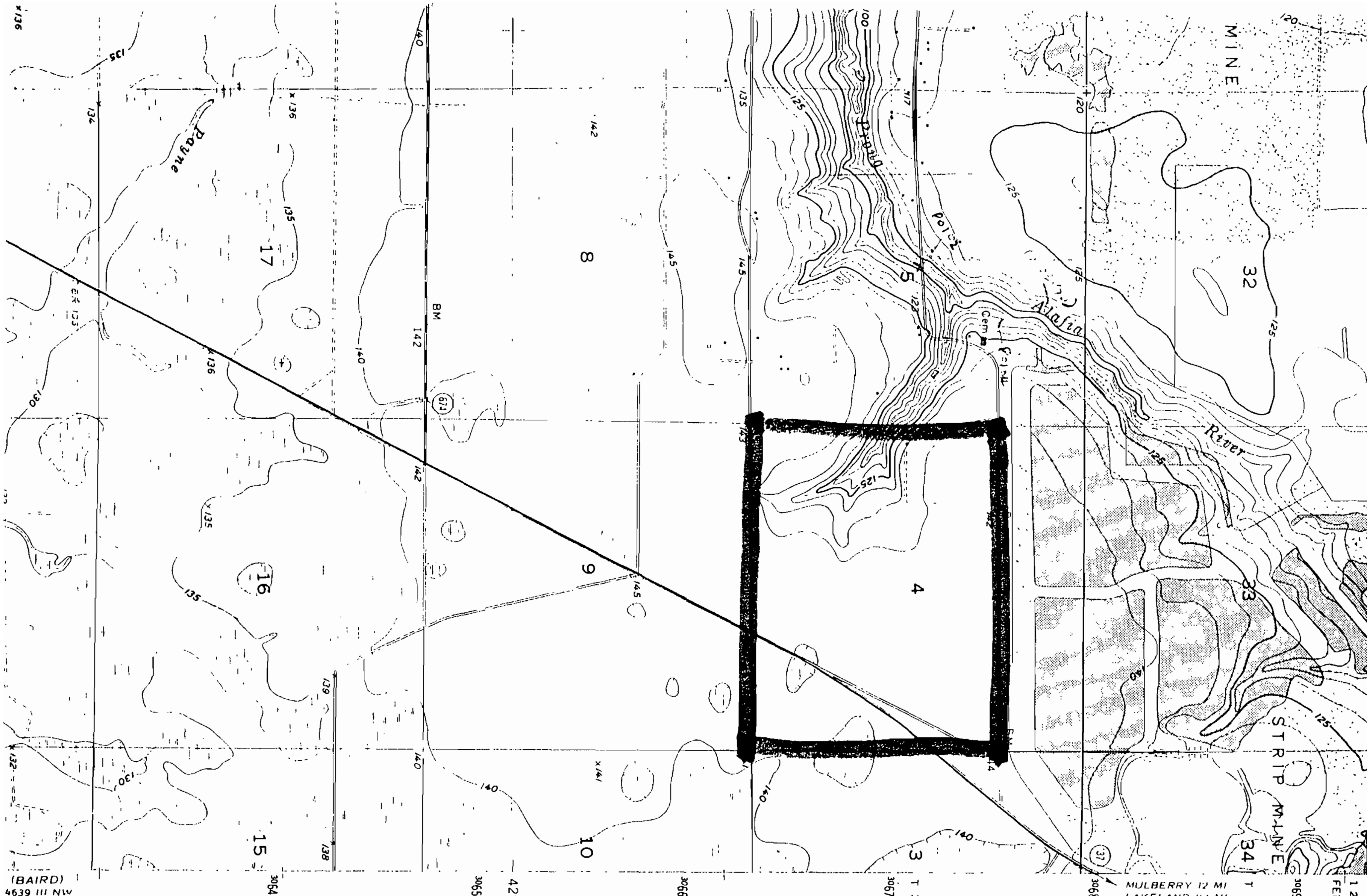
If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's archaeological and historic resources is appreciated.

Sincerely,

Louis R. Tesar

George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/smh
Enclosure (1)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FEET



272

Page 1
x original
___ update

# ARCHAEOLOGICAL SITE FORM
# FLORIDA MASTER SITE FILE

Version 1.1: 11/88

Site #8 Po1508
Recorder # 2010
Field Date 7-25-89

SITE NAME(S) Agrico #6
PROJECT NAME Agrico COE Permits DHR# 2010
OWNERSHIP x private-profit _priv-nonprof _priv-indiv _priv-unsp _city _county _state _federal
USGS MAP NAME Duette NE CITY
UTM: ZONE 16 / 17 EASTING /3/9/6/4/6/0/ NORTHING /3/0/6/5/4/2/0/
COUNTY Polk TWP 32S RANGE 23E SECTION 7 ¼ SW ¼-¼ NE ¼-¼-¼ NW
(Optional) LATITUDE d ___ m ___ s ___ LONGITUDE d ___ m ___ s ___
ADDRESS/VICINITY OF/ROUTE TO

TYPE OF SITE (All that apply) x prehist unspecified _hist aboriginal _hist nonaboriginal _hist unspecified

| SETTING | STRUCTURES OR FEATURES | | | FUNCTION | DENSITY |
|---|---|---|---|---|---|
| x land site | _aboriginal boat | _fort | _road segment | X none specified | _unknown |
| ___ | _agric/farm bldg | _midden | _shell midden | _campsite | x single artifact |
| _wetland fresh | _burial mound | _mill unspecified | _shell mound | _extractive site | _diffuse scatter |
| _wetland salt/tidal | _building remains | _mission | _shipwreck | _habitatn/homestead | _dense scatter>2/$m^2$ |
| ___ | _cemetery/grave | _mound unspecif | _subsurface features | _farmstead | _variable density |
| _underwater | _dump/refuse | _plantation | _well | _village/town | ___ |
| ___ | _earthworks | _platform mound | _wharf/dock | _quarry | ___ |

OTHER

HISTORIC CONTEXTS (All that apply) X unknown culture _aboriginal unspecif _hist unspecified

| ABORIGINAL: | | | | | |
|---|---|---|---|---|---|
| _Alachua | _Early Archaic | _Glades IIb | _Manasota | _St. Johns unspecif | _Swift Creek |
| _Archaic unspec. | _Early Swft Creek | _Glades IIc | _Middle Archaic | _St. Johns I | _Transitional |
| _Belle Glade | _Englewood | _Glades III | _Mount Taylor | _St. Johns Ia | _Weeden Island |
| _Belle Glade I | _Fort Walton | _Glades IIIa | _Norwood | _St. Johns Ib | _Weeden Island I |
| _Belle Glade II | _Glades unspecif | _Glades IIIb | _Orange | _St. Johns II | _Weeden Island II |
| _Belle Glade III | _Glades I | _Glades IIIc | _Paleo-Indian | _St. Johns IIa | ___ |
| _Belle Glade IV | _Glades Ia | _Hickory Pond | _Pensacola | _St. Johns IIb | ___ |
| _Cades Pond | _Glades Ib | _Late Archaic | _Perico Island | _St. Johns IIc | ___ |
| _Deptford | _Glades II | _Late Swift Creek | _Safety Harbor | _Santa Rosa | _prehistc-aceramic |
| | _Glades IIa | _Leon-Jefferson | _St. Augustine | _Seminole | _prehistc-ceramic |

| NONABORIGINAL: | | | | | |
|---|---|---|---|---|---|
| | _1st Spn 1700-63 | _Amer Terr 1821-44 | _Postrecn 1880-97 | _Depress 1930-40 | _American 1821- |
| _1st Spanish unsp | _Brit 1763-1783 | _Statehood 1845-60 | _SpWar 1898-1916 | _WW II 1941-49 | _American 1821-99 |
| _1st Spn 1513-99 | _2dSpn 1783-1821 | _Civil War 1861-65 | _WW I 1917-1920 | _Modern 1950- | _American 1900- |
| _1st Spn 1600-99 | ___ | _Reconstr 1866-79 | _Boom 1921-1929 | ___ | _Afro-American |

OTHER

RECORDER'S EVALUATION OF SITE

| | | | | |
|---|---|---|---|---|
| Eligible for National Register? | _yes | X no | _likely, need information | _insufficient information |
| Significant as part of district? | _yes | X no | _likely, need information | _insufficient information |
| Significant at the local level? | _yes | X no | _likely, need information | _insufficient information |

SIGNIFICANCE STATEMENT FOR COMPUTER FILES (Limit to 3 lines here; attach full justification)

DHR USE ONLY ------------------------------------------------ DHR USE ONLY

DATE LISTED ON NAT REG. ___/___/___
KEEPER DETERMINATION OF ELIGIBILITY: Yes _ No _ Date ___
SHPO EVALUATION OF ELIGIBILITY: Yes _ No _ Date ___
LOCAL DETERMINATION OF ELIGIBILITY: Yes _ No _ Date ___
Local Office ___

# ARCHAEOLOGICAL SITE FORM

Division of Historical Resources, Florida Department of State

Site #8 Po1508

### METHODS FOR SITE DETECTION

_no field check _exposed ground X screened shovel
_literature search _posthole digger
_informant report _auger--size:____
_remote sensing _unscreend shovel

### METHODS FOR SITE BOUNDARIES

_bounds unknown _remote sensing _unscreened shovel
_none by recorder _insp exposed ground xxscreened shovel
_literature search _posthole digger _block excavns
_informant report _auger--size:____ _guess

Other/Remarks (#, size, depth, pattern of units; screen size) 50 cm dia test pits, 1/4" screen

### COLLECTION STRATEGY

_unknown _unselective (all artifacts)
_selective (some artifacts)
_uncollected Xgeneral (not by subarea)
_controlled (by subarea)

### ARTIFACT CATEGORIES

_unknown _daub _nonlocal-exotic _bone-unspec
Xlithics _brick/bldg matl _metal _unworked shell
_ceramic-aborig _glass _bone-human _worked shell
_ceramic-nonabo _prec metal/coin _bone-animal _subsurf fents

Other (Strategy, Categories)

**SITE EXTENT** Size ($m^2$) ____ Depth/Stratigraphy of Cultural Deposit Depth - 45cm

Perpendicular Dimensions ____m ________ direction by ____m ________ direction

**SPACE COLLECTED** Surface: #units___, total area ____$m^2$. Excavation: #units___, total vol ____$m^3$

**TOTAL ARTIFACTS** Count or Estimate? Surface # 0 Subsurface # 1.

**DIAGNOSTICS (TYPE OR MODE & FREQUENCY)**

1 Flake N= 1
2 N=
3 N=
4 N=
5 N=
6 N=
7 N=

Remarks

**TEMPORAL INTERPRETATION** Components: _single _prob single _prob multiple _multiple X uncertain

Describe each occupation spatially. For each, estimate begin, end dates BP; basis; if absolute dates, give method, lab, id, date, range, etc.

**ENVIRONMENT** Nearest Fresh Water South Prong Alafia River Distance (m) ca. 30 m

Natural Community

Local Vegetation improved pasture

Topographic Setting

Present Land Use pasture

SCS Soil Series Soil Association

**SITE INTEGRITY** Overall Disturbance: _none seen X minor _substantial _major _redeposited

Nature of Disturbances/Threats planned for phosphate mining

**INFORMANT(S)** Contact Information

**REPOSITORY** Field Notes, Artifacts Agrico Chemical Company Mulberry, FL

Photographs (negative nos)

**MANUSCRIPTS OR PUBLICATIONS ON THE SITE**

**RECORDER(S):** Name Bill Johnson Date of Form 7-25-89

Affiliation/Address/Phone Piper Archaeology, St. Petersburg, FL 813-821-7600

**RECOMMENDATIONS FOR SITE** No further work recommended

**NARRATIVE DESCRIPTION:** Attach information on site discovery, history, current integrity, apparent threats, environment, and your temporal and functional interpretations.

**DISCUSSION OF SIGNIFICANCE:** Attach justification for recorder's evaluation (Page 1).

**REQUIRED: USGS MAP OR COPY WITH SITE LOCATION MARKED**

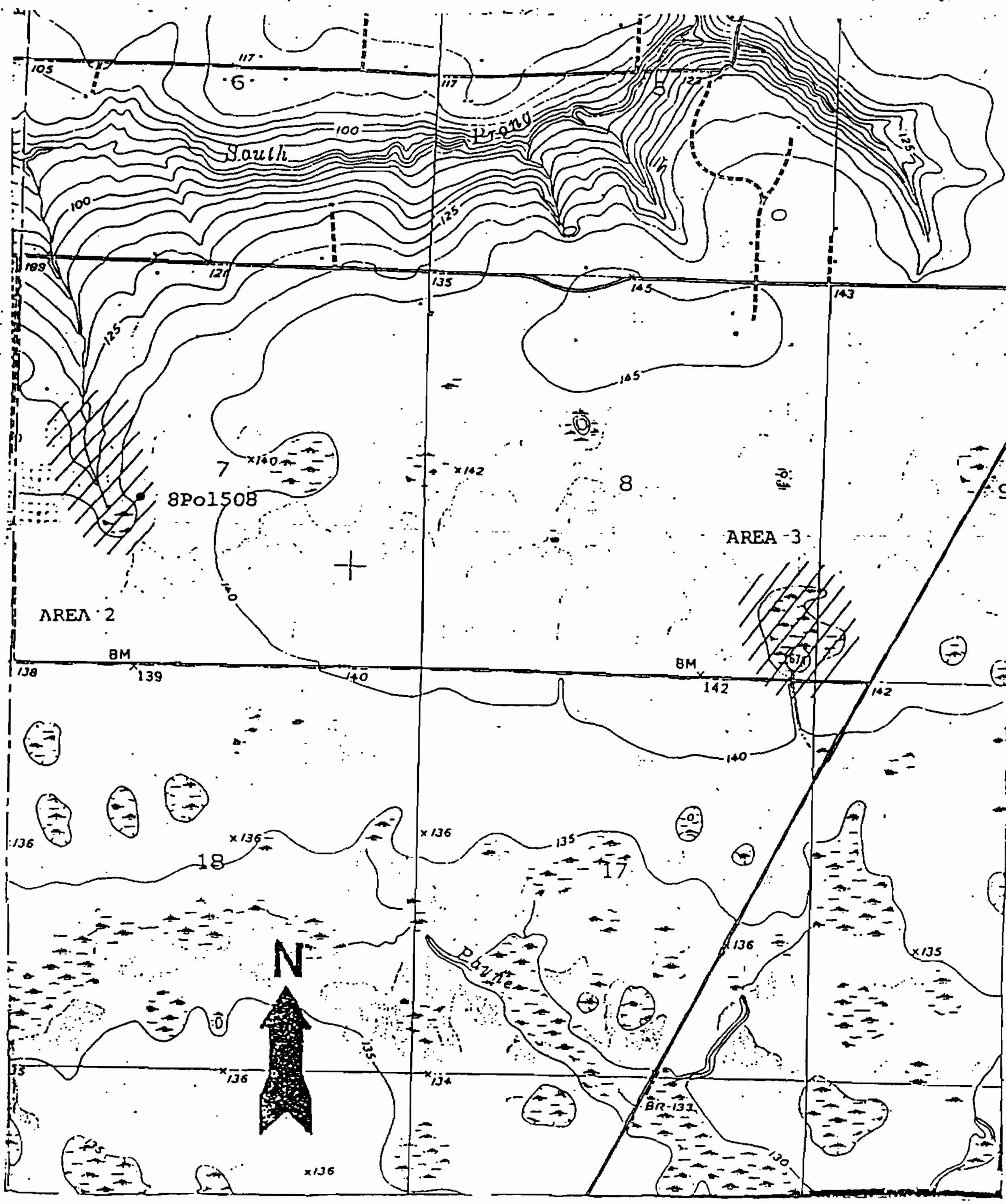


Figure 2: Map showing Agrico COE permit areas 2 and 3 and archaeological sites discovered during survey

PIPER ARCHAEOLOGY

St. Petersburg, FL

# 11.5.3 CULTURAL RESOURCE ASSESSMENT SURVEY

# CULTURAL RESOURCE ASSESSMENT SURVEY OF THE PROPOSED TEC POLK POWER STATION SITING AREA, POLK COUNTY, FLORIDA

Conducted for

**Environmental Consulting and Technology**

Tampa, Florida

by

Charles Fuhrmeister and Kenneth W. Hardin

**PIPER ARCHAEOLOGICAL RESEARCH, INC.**

St. Petersburg, Florida

July 1991

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## LIST OF FIGURES

## INTRODUCTION

An archaeological and historical survey of the proposed TEC Polk Power Station Siting Area in southwestern Polk County was conducted for Environmental Consulting & Technology, Inc. (ECT) to satisfy the requirements of a Site Certification Application (SCA). The purpose of the survey was to locate any archaeological and/or historic sites within the project area and to assess their potential eligibility for nomination to the National Register of Historic Places.

The TEC Polk Power Station site (Figure 1) encompasses slightly more than 4000 acres and is located in all or portions of Sections 1, 2, 3, 4, 7, 8, 9, 10, 11, and 12, of Township 32 South, Range 23 East and Sections 35 and 36 of Township 31 South, Range 23 East, Polk County, Florida. The west edge of the property is along the Hillsborough-Polk County line, the southern portion abuts SR 674 and the north and east borders are SR 630 and Seaboard System Railroad, respectively. State Road 37 runs southwest - northeast through the project area, and the South Prong of the Alafia River is near the northern border of the west half of the property.

In a letter dated January 10, 1991, George Percy, Director of the Florida Division of Historical Resources (DHR), notified Brian Kiraly of ECT that one prehistoric archaeological site (Florida Master Site File number 8Po1508) had been previously recorded in the project area. Site 8Po1508, evidenced by a single artifact, was evaluated as not eligible for National Register nomination, nor was it considered significant on the regional or local levels. No other prehistoric or historic sites were recorded on the FMSF for the SCA study area. As a result of a previous study undertaken by Piper Archaeological Research, Inc., portions of the power plant area have already been assessed. The DHR, therefore recommended that only Section 4 of Township 32 South, Range 23 East be systematically surveyed. The research design for this project was created to comply with Section 403.51, F.S.; Section 403.5063, F.S.; and Chapter 267.061 F.S.; and the minimum field methods, data analysis, and reporting standards embodied in Florida Division of Historical Resources' (FDHR) "Historical Preservation Compliance Review Program" (November 1990, Final Draft Version).

Prior to entering the field, a project-specific, environmentally based cultural resource site predictive model was developed by Piper Archaeological Research, Inc. (PAR). The PAR model was used to identify three areas within the TEC Polk Power Station siting area which were considered likely to contain archaeological or historic resources (cf. Hardin 1991). These areas of higher archaeological site probability are shown in Figure 1. These areas were subjected to an intensive pedestrian and subsurface survey.

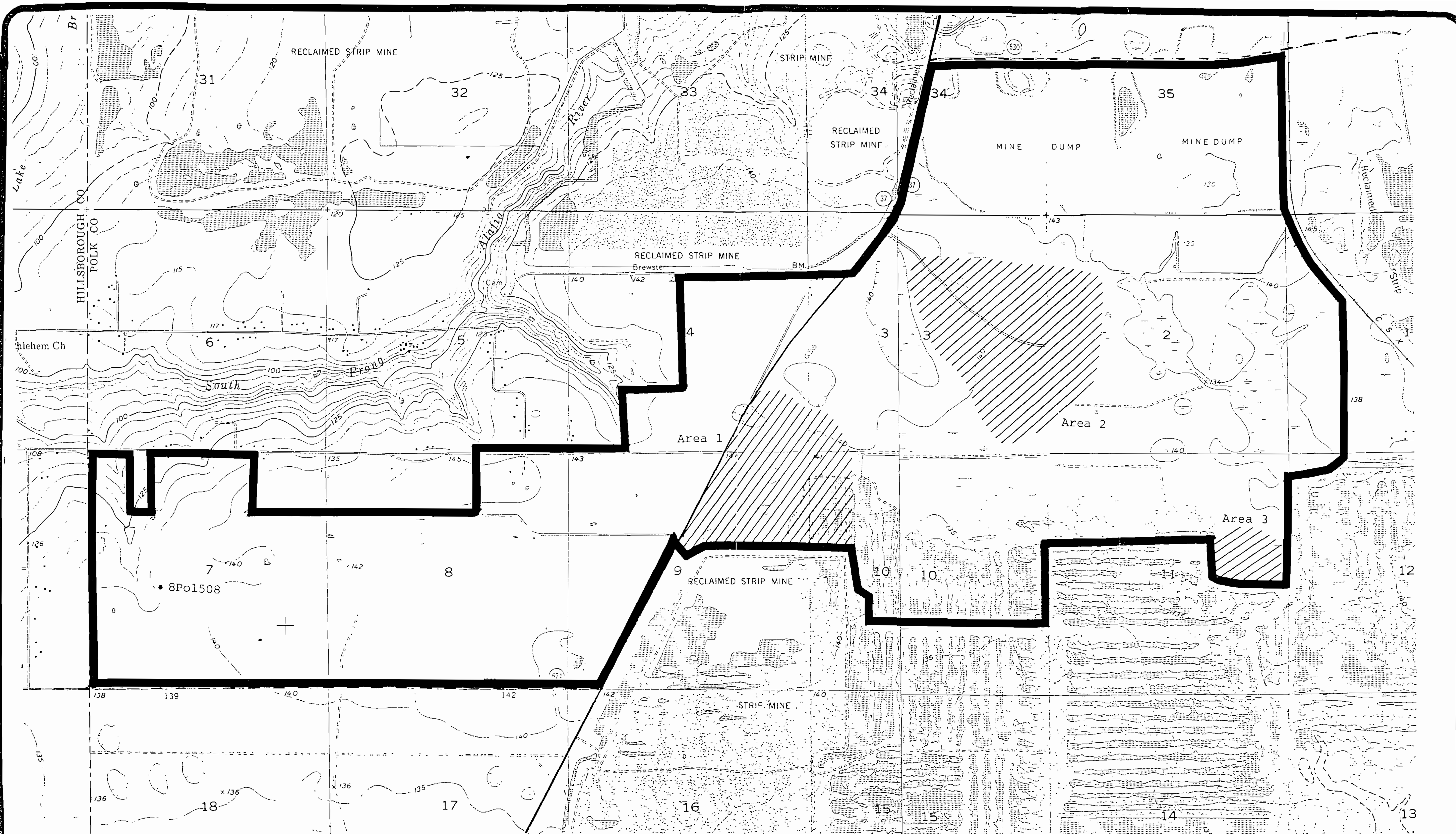


Figure 1: Map of the TEC Polk Power Plant siting area with the three areas of investigation and site 8Po1508 indicated.

PIPER ARCHAEOLOGY St. Petersburg, FL

# ENVIRONMENTAL SETTING

Environmental and ecological factors through time had a direct influence on the choice of sites for occupation by prehistoric populations and early historic settlers. Thus, geologic, hydrologic, and meteorologic processes that may have affected the survey area and its biotic resources are important elements in the formulation of a settlement/subsistence model for prehistoric and early historic peoples. Present day environmental variables are used to reconstruct past conditions that influenced early human occupation of the TEC Polk Power Station area and so are included in this study.

The study area is located in southeastern Polk County near the southern terminus of the Polk Uplands physiographic region (White 1970). These broad marine terraces are prominent features of the topography and were formed during interglacial periods by the advances and retreats of the Pleistocene seas. Subsequent exposure to erosion has helped shape the surface topography of these relict terraces. The nature of the sediments and the relative elevation of a particular terrace affect the occurrence and movement of groundwater which may be the only source of fresh water during some periods of the year (Healy 1975).

The surface lithology of western Polk County is composed primarily of undifferentiated deposits of sand and clay of Pleistocene and Recent age which are underlain by the Bone Valley Formation (Knapp 1980). The nearest major exposures of silicified limestone, also called chert, are found around the shore of Tampa Bay and along the central and lower portions of the Hillsborough and Alafia Rivers (Upchurch et al. 1982). Chert was an important resource that was exploited by prehistoric peoples as a raw material for stone tool manufacture. While no major outcrops are known in the area, chert outcroppings too small to have been mapped for geological purposes have been reported by archaeologists to be present around the mouths of small sinkholes (e.g. Milanich et al. 1975:4).

The TEC PPS lies within two major river basins, the Alafia River and Peace River, and three sub-basins, the South Prong Alafia River, Payne Creek, and Little Payne Creek.

Although much of the area has been relieved of its natural topography and environments, the natural vegetation can be determined using historic documents, maps and soils information. Most of the project area originally consisted of pine/palmetto flatwoods with longleaf pine, slash pine, saw palmetto and wire grass the dominate species. Sand pines, live oak, bluejack oak, and turkey oak occupied areas of higher elevation and better drained soils. Some relict areas of these vegetation communities are still present within the TEC Polk Power Station project area. Hardwood hammock vegetation (xeric, mesic, and hydric) is still observable along the larger drainages. The existing freshwater bottomland environments contain pond and bald cypress, bay, gum, elm, water oak, and various aquatic plants (Leighty et al. 1958).

The property was originally typified by flat terrain that slopes slightly from west to east and toward natural drainages. The present natural land contours range from about 145 feet (43.5 meters) to about 135 feet (40.5 meters) above mean sea level, near Little Payne Creek. The natural topographic relief was provided by the downcutting action of creeks and streams. The numerous marshes and wet depressions that originally dotted the surrounding landscape hold water perched above a semi-permeable hardpan seasonally. Because of the presence of this hardpan layer, vertical drainage is limited, and standing water is often encountered in the flatlands during the rainy season. Before the mining, numerous canals had been dug to aid in drainage and make the land more conducive for use as pasture.

Three generalized soil classifications as designated by the US Soil Conservation Service (SCS) have been identified within the study areas associated with the TEC Polk Power Station. These soil types include the following: Zolfo - Tavares; Pomona - Myakka - Smyrna; and Arents - Hydroquents - Neilhurst (SCS 1990). These soil associations have the following characteristics:

Zolfo - Tavares
: Generally sloping, somewhat poorly drained and maderately well drained, sandy throughout;

Pomona - Myakka - Smyrna
: nearly level, poorly drained, sandy soils with some loamy underlain material; and

Arents - Hydroquents - Neilhurst
: soils that have been strip-mined for phosphate or silica sand.

Specific soils identified in 1989 by the SCS inthe study areas of the TEC Polk Power Station include the following:

Pomona fine sand;
Arents - Water complex;
Samsula muck;
Smyrna and Myakka fine sands;
Ona fine sand;
Bassinger mucky fine sand, depressional;
Arents, 0-5% slopes;
Felda fine sand, depressional; and
Bassinger fine sand.

Much of the project area had been cleared for pasture and agriculture during the first half of the 20th century. Pine and cypress trees were timbered out during the late 19th and early 20th centuries. In the 1970s and 1980s, the natural stratigraphy of the soils has been completely disrupted by phosphate mining. Despite these activities, natural vegetation is still present in some areas, or can be inferred from the available soils data. On the low sand ridges which tend to be better drained, vegetation consists primarily of scrub oak, palmetto and pine. In the intervening flatlands, the dominant vegetation is palmetto prairie or pine/palmetto flatwoods.

The floral community of the study area was probably stable during prehistoric times after the last major environmental change about 3000 years ago (Long 1974; Watts 1971:687; Watts and Hansen 1988). Many of these plants would have been used as a food or shelter resource by prehistoric inhabitants.

The range of habitat diversity of the land in and around the project area was probably limited in comparison to other, more ecologically diverse areas of southern Florida. Prior to modern drainage practices, the land was probably much wetter than it appears today, particularly during the summer and fall months. Animal resources, while certainly more abundant than today, were probably not plentiful (cf. Larson 1980). Wading birds, turtles, snakes and small game such as squirrels, raccoons and opossums would have composed the bulk of the animal population. Deer were probably seen along the ecotonal breaks between the pine flatlands and the swamp or marsh margins. In general, however, the area is considered to have been relatively inhospitable for early human populations. This is reflected in the fact that few prehistoric sites have been found in the area, and those that have are characterized by small size and low artifact density, indicating that the area was peripheral to the primary habitation areas to the east, west and south.

## CULTURAL PREHISTORY

The following review of the region's prehistory will serve as a framework for understanding the prehistoric sites located during this survey.

The project area is located within the Central Gulf Coast archaeological area as defined by Goggin (1947). This area has recently been divided into two closely related cultural regions by Milanich and Fairbanks (1980:24-26): the North Peninsula Gulf Coast region, stretching from Apalachee Bay to Pasco County, and the Central Gulf Coast region, which extends from Pasco County to Charlotte Harbor (Figure 2). The dividing line in mid-Pasco County is somewhat arbitrary but present evidence suggests that the majority of post-A.D. 100 aboriginal pottery to the north of this line consists of limestone-tempered Pasco ware while the majority to the south is tempered with varying amounts of sand (Milanich and Fairbanks 1980:113).

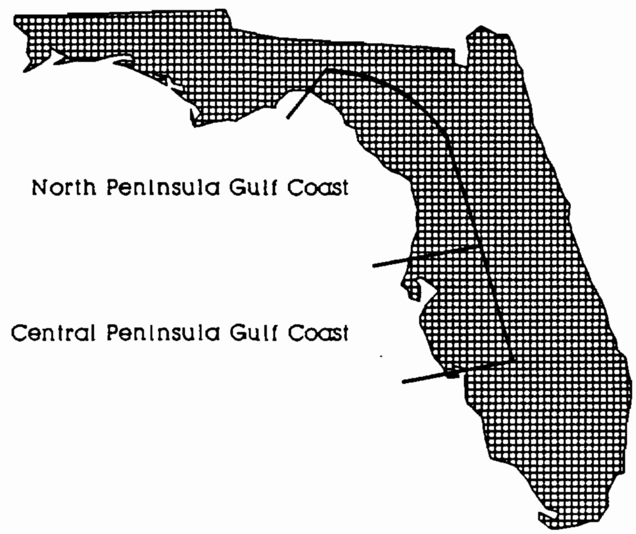


Figure 2: North and Central Peninsula Gulf Coast archaeological Regions (after Milanich and Fairbanks 1980:22).

The project area is located near the southeastern terminus of the Central Peninsular Gulf Coast region, near the interface of three adjacent archaeological areas: the Circum-Glades, the Okeechobee Basin and the East-Central (Milanich and Fairbanks 1980:113). The interior boundaries of all four of these archaeological areas is poorly defined, and as expected, there is some overlap of cultural traits exhibited by prehistoric sites located in this part of the state.

### Paleo-Indian Stage

The earliest documented evidence for human occupation in the region comes from the Warm Mineral and Little Salt Springs sites in Sarasota County where radio-carbon dates of 10,000 B.C. have been obtained (Cockrell and Murphy 1978; Clausen et al. 1979). The evidence for Paleo-Indian occupation in the Gulf Coast region is at present limited to research conducted at these sites and to surface finds of distinctive lanceolate-shaped projectile points; however, recent excavations at the Harney Flats site in Hillsborough

County (Daniel and Wisenbaker 1987; Daniel et al. 1986) have yielded important new data on this little known period.

The climate of the region during the late Pleistocene was cooler and drier than at present, and the level of the sea was as much as 35 meters lower (Milanich and Fairbanks 1980:37). Rising sea levels are assumed to have inundated many coastal sites (Ruppe 1980; Goodyear and Warren 1972) of the period so that the dependence of Paleo-Indian groups on estuarine and littoral resources is unknown.

The prevailing view of Paleo-Indian existence, based on the uniformity of the known tool kit and the small size of most of the known sites, is that of a nomadic existence based on hunting and gathering, including hunting of the now extinct Pleistocene megafauna. Recent excavations in Hillsborough County, however, have contributed to the development of increasingly sophisticated models of early hunter-gatherer settlement (e.g. Daniel 1985; Chance 1983) which take into account the adaptive responses of human populations to both short and long term environmental change. These models suggest that some Paleo-Indian groups may have practiced a more sedentary lifestyle than had previously been believed (Daniel 1985:264).

**Archaic Stage**

The Archaic stage of cultural development was characterized by a shift in adaptive strategies stimulated by the onset of drier environmental conditions and the concomitant floral and faunal changes which resulted. It is generally believed to have begun in Florida around 6500 B.C. (Milanich and Fairbanks 1980:48). This stage is further characterized by an efficient, seasonal exploitation of a variety of food resources including deer and other small game, hardwood nuts, and mollusks, and a larger but less carefully worked tool assemblage.

Archaic groups are thought to have used a more restricted territorial range than their Paleo-Indian predecessors, with some groups leading a sedentary or semi-sedentary existence at permanent habitation sites. These large habitation sites, such as the one at Pinellas Point (Goodyear 1968), were generally located on the coast or in a marsh-riverine environment. Other types of sites, both coastal and inland, include quarries, hunting camps, butchering sites, and cemeteries.

Only a few Archaic sites in this region have been thoroughly excavated and analyzed. The Crystal Beach site (Wolf 1975), 8-Hi-450D (Daniel and Wisenbaker 1981), the Tampa Palms site (Austin and Ste. Claire 1982), and the Ranch House site (Estabrook and Newman 1984) have provided information on lithic technology. The Little Salt Springs site (Clausen et al. 1979) has yielded preserved wooden artifacts and information concerning burial customs. Recent cultural resource surveys have recorded many Archaic sites and professional excavation of sites along the I-75 corridor in Hillsborough County has yielded important new data on Archaic activities (Gagel 1981; Daniel and Wisenbaker 1981; Chance 1982; Daniel 1982; Wharton 1983).

Orange Phase

The introduction of crude fiber-tempered pottery into the artifact assemblage of the Archaic aboriginals marks the beginning of the Orange phase at approximately 2000 B.C. The basic hunting and foraging subsistence pattern of the Archaic continued relatively unchanged. Orange phase sites in the Central Peninsula Gulf Coast region include Maximo Point (Sears 1958) and the Canton Street site (Bullen et al. 1978) in Pinellas County and the Republic Groves site (Wharton and Williams 1980) in Hardee County.

## Formative Stage

During the late Orange phase, described by Bullen (1959, 1971) as the Florida Transitional period (ca. 1200-500 B.C.), changes in technology and lifestyles occurred in Florida which mark the beginning of the Formative stage. Fiber-tempered wares began to be replaced by sand-tempered and limestone-tempered ceramics. Three different projectile point styles - basally notched, corner-notched and stemmed - all occur in relatively contemporaneous deposits. This profusion of ceramic and tool traditions is suggestive of population movement and social interaction between culture areas. A more sedentary way of life became possible as prehistoric peoples refined their subsistence strategies to more efficiently exploit the estuarine resources of the Gulf Coast. Other changes include the possible utilization of cultigens (Milanich and Fairbanks 1980:155).

By the end of the Transitional period, ceramic traditions were not so greatly mixed, indicating increased regional differentiation. In the Tampa Bay area and to the south, sand-tempered plain became the dominant ceramic type while to the north in Pasco, Hernando and Citrus counties limestone-tempered wares dominated.

Manasota Phase

The first of the post-Transitional cultures to appear in the Central Peninsula Gulf Coast region was the Manasota culture which dates from about 500 B.C. to A.D. 800. Manasota peoples were primarily coastal dwelling and their material culture is characterized by a dominance of sand-tempered plain ceramics as well as shell and bone tools (Luer and Almy 1982). Only a few interior sites have been found (Hardin and Piper 1984).

Manasota peoples interred their dead in midden debris located near the living areas. Later burials are found in sand mounds, reflecting the influence of Weeden Island cultures to the north. Early burials are generally primary flexed while later interments are usually secondary bundles indicating that they were cremated. These later burials are often accompanied by grave goods of exotic Weeden Island ceramics.

Weeden Island-Related Phase

During its later stages, the Manasota culture was influenced by the extensive Weeden Island socio-political complex which is best known in northern Florida, southern Georgia, and Alabama - the recognized "heartland" of Weeden Island cultures. The Central Peninsula Gulf Coast culture is classified as "Weeden Island-related" (Milanich and Fairbanks 1980:96).

Present evidence suggests a date of ca. A.D. 200 (Brose and Percy 1974; Milanich and Fairbanks 1980:112; Milanich et al. 1984:11) for the beginning of the Weeden Island period. The subsistence pattern was based on hunting and gathering of terrestrial, marine, and riverine swamp resources. Larger populations infer an increasing dependence on horticulture, although archaeological evidence for this is still lacking in the Peninsula Gulf Coast area. Mound burial customs, artifactual evidence of an extensive trade network, and settlement pattern data suggest a complex socio-religious organization, while technologically and stylistically Weeden Island ceramic types are considered outstanding examples of aboriginal pottery.

The Weeden Island site, from which this phase is named, located in St. Petersburg and excavated by Fewkes (1924) and Sears (1971); the Bay Pines site (Gagel 1976); Cockroach Key (Willey 1949; Bullen 1952); and the Thomas Mound (Bullen 1952) are examples of coastal Weeden Island sites. Inland sites, particularly low sand mounds, have also been located in the Gulf Coast area (Piper and Piper 1981; Deming 1975; Willey 1949).

## Mississippian Stage

### Safety Harbor Phase

The final prehistoric cultural manifestation along the central peninsula Gulf Coast is the Safety Harbor culture which was centered geographically around Tampa Bay. This period, beginning about A.D. 1000, is typified by ceremonial centers with truncated temple mounds and open village plazas surrounded by middens (Milanich and Fairbanks 1980:204-205), traits which are characteristic of Mississippian cultures to the north. Ethnohistorical reconstruction, as well as archaeological data (Goodyear 1972; Bullen 1978; Willey 1949) indicate a more complex political/ceremonial structure than the preceding Weeden Island culture. These studies have identified the Safety Harbor peoples as Tocobago Indians, a subdivision of the Timucuan tribe. Hunting and gathering, especially of marine resources, continued as the primary subsistence base. Swidden agriculture, associated with most Mississippian cultures, does not appear to have been practiced in the Tampa Bay region (Grange et al. 1979:17; Milanich and Fairbanks 1980:210).

Safety Harbor sites are primarily found on the coast and include the Safety Harbor site (Griffen and Bullen 1950) and Tierra Verde (Sears 1967) in Pinellas County. Buck Island (Bullen 1952) and the Picnic Mound (Willey 1949) in Hillsborough County represent sizable inland manifestations of the Safety Harbor culture.

The Indians native to the Central Gulf Coast during this period are believed to have been decimated and dispersed by repeated conflicts with the Europeans as well as exposure to European diseases. Remnants of the tribe may have joined the Cuban-Spanish fishermen who were active in the Tampa Bay area in the first half of the 18th century (Neill 1968).

By the early 18th century, groups of Creek Indians who came to be known as Seminoles moved into Florida to escape the political and population pressures of the expanding American frontier. A Seminole band under the leadership of Chief Billy Bowlegs settled on Lake Thonotosassa in Hillsborough County (Historic Tampa/Hillsborough County Preservation Board n.d.:34). Other towns are reported to have been in the general vicinity of Tampa Bay, but their exact locations are not known (Fairbanks 1978:185; Mahon 1967:5). The remains of Seminole men, women, and children were excavated from part of the original cemetery (ca. 1824-1846) of Fort Brooke, a Second Seminole War fort underlying present-day downtown Tampa (Piper and Piper 1982).

## HISTORICAL REVIEW

In the first half of the 16th century European exploration of Florida began when Spain, England, France and Portugal focused their attention on North and South America. Although the historical record indicates that earlier explorers sailed along the coast of Florida, official credit for discovery goes to Juan Ponce de Leon. His voyage in 1513 took him along the Atlantic Coast from St. Augustine south to the Florida Keys, and then northwestward up the Gulf Coast to Charlotte Harbor. He and his men came ashore at various locales where they encountered Native American groups. This expedition did not attempt settlement in Florida. In 1521 Ponce de Leon returned with supplies and settlers and put ashore near Charlotte Harbor. This attempt at establishing a Spanish colony met with failure, for the Calusa Indians attacked the party and wounded many, including Ponce de Leon. The expedition retreated and sailed for Cuba where the leader eventually died from his wounds (Tebeau 1971; McCarthy and Dame 1983).

Panfilo de Narvaez followed Juan Ponce De Leon in 1528, landing at Tampa Bay and travelling northward through the interior of Florida to Apalachee. He and his men encountered difficult conditions and hostile native groups along their route which resulted in the loss of many lives, including that of Narvaez, and the eventual failure of the expedition.

Ten years later another major attempt to settle Florida was undertaken, this time by Hernando de Soto. He sailed from Spain in 1538 and landed at Tampa Bay in May 1539. Here the group divided with one marching inland and the other travelling along the coast. The second group was successful in reaching northwest Florida where they discovered Pensacola Bay, but the Spaniards on the inland march encountered much the same problems as their predecessors. Undaunted, de Soto pushed on, and rather than reconnoitering with the second expedition in northwest Florida as planned, he travelled north into the Mississippi Valley. From there he moved west and managed to reach Oklahoma before the expedition turned back.

The failure of these missions resulted in Spain's closing the area to further exploration in 1561 (Smith and Gottlob 1978:7). But this policy was quickly reversed when in 1562 news reached Spain that France was attempting to colonize Florida. Pedro Menendez de Aviles was dispatched to challenge French encroachment and build a permanent settlement. Menendez met with greater success than did his compatriots and in 1565 St. Augustine was founded. A settlement at St. Augustine provided Spain the opportunity to extend its sphere of influence to other parts of Florida.

Spain constructed missions in Florida as a means of effecting the religious conversion of the native population and as a line of defense against other European powers. The mission effort was more successful in the northern areas of Florida than in the south. According to Milanich (1978:68), the failure of the Spanish missions among south Florida natives was due partially to the tribes' aboriginal subsistence pattern which required seasonal movement for maximum resource exploitation. In north-central Florida, a tradition of horticulture existed at least one thousand years before the historic period and with the introduction of better techniques and tools by the priests, mission villages in those areas were occupied year round (Milanich 1978:68). After several attempts at placing priests among the southern groups proved futile, the Spanish virtually ignored the area and concentrated their efforts elsewhere.

For the most part, the southern portion of Florida remained uninhabited by Europeans during the next two centuries. Spanish fishermen from Cuba built fish camps (ranchos) along the coast, otherwise very few ventured into the region. Changes in politics and government had little or no effect on the area until the beginning of the 19th century when the Seminole Indians migrated south.

The Seminoles, originally members of the Creek nation, moved into Florida from south Georgia during the early 18th century. Their presence in Florida was unchallenged, as the aboriginal population had dwindled to very small numbers as a result of warfare and disease. The British and Spanish traded with the Seminoles and did not attempt to oust them from the province. A change of policy was instituted, however, when Florida became a U.S. Territory in 1821. Anglo-American settlers, many of whom anticipated that the United States would acquire Florida, had begun claiming land in north Florida at the beginning of the 19th century. Soon, they were in conflict with the Seminoles over land and as soon as the United States controlled the area they demanded that the Native Americans be removed.

During the period 1824-1835 three treaties were written by the United States. The end result called for the removal of the Seminoles from Florida and relocation in the western territories. Understandably, these treaties were unpopular with the Seminoles and they served to foster resentment and outbreaks of hostility which finally culminated in the Second Seminole War in 1835.

Seminoles lived in what is now Hardee County at this time, but there were no battles fought in the region. Fort Brooke, a major military installation, was located at Tampa Bay and outside of a few outposts, there were no other forts south of Tampa until Ft. Myers (Map 1839).

By war's end in 1842 only a few hundred Seminoles remained in the swamps of south Florida. Not wishing to fight a war of attrition, the U.S. Government decided to leave the Seminoles there and drew up a new reservation plan for the remaining Indians. The new reservation boundary ran south of the Peace River to Cape Sable. The eastern boundary ran through the middle of Lake Okeechobee and followed the dividing line between the Everglades and Big Cypress Swamp (Mahon 1967:rear fold-out map). The reservation was located southeast of the project area.

The Second Seminole War had an adverse effect on settlement as people were afraid to attempt homesteading in an area where the safety of the citizens could not be guaranteed. Many who were already living in Florida at the start of the war were forced to leave their homes and seek safety in nearby forts. In 1842 the Armed Occupation Act was passed to encourage settlers to build homes and cultivate the land (Tebeau 1971:149). This Act did help manage to boost settlement in the areas south and east of Tampa Bay.

The apportionment of land gave rise to government surveys of the wilderness. Men were contracted to survey vast amounts of land in Florida for the sum of four dollars a mile (Martin 1944:176). The first survey of this area was made in 1843 by Henry Washington. He surveyed the west boundary of what is now Hardee County. Sam Reid surveyed part of the region in the same year, and a good idea of the landscape at that time can be derived from his field notes. "It was impossible to chain correctly from nature of ground;", he wrote, "thick, broken hammocks, full of deep ponds, and in the pine woods, high grass and deep water." (Reid 1843). John Jackson also surveyed the Four Corners area in 1854. Only a few homestead settlements are shown on his survey maps, and none were located within the project's boundaries. The Green and Alderman families lived near where the town of Fort Green Springs now exists. The Greens lived just west of the town site, and the Aldermans just northeast of the intersection of State Road 62 and the Seaboard Coast Line railroad tracks (Plowden 1929:34).

No homesteads or cultivated fields are indicated in the entire project area on these early maps. However, that does not preclude their existence at the time of survey, for sometimes they were omitted from the surveyors' maps and notes. Overall, these historic maps and notes are good indicators of the presence or absence of physical features as well as good sources of information about the pre-urban environment.

In the late 1840s, two early settlers from Fort Brooke, Kennedy and Darling, erected a small trading post on the banks of the Charlo-popka-hatchee Creek (later Payne's Creek). The store was run by Dempsy Whidden. On the night of July 17, 1849, the store was attacked by Seminoles and burned. Whidden and a visitor, Captain George Payne, were killed. This incident prompted the army to build a small blockhouse fort near the site of the store. It was named Fort Chockanikla, a Seminole word for "burnt store" (Plowden 1929:9; Devane 1979:85).

Fort Chockanikla was one of several fortified military outposts in a network of forts that stretched from Fort Hamer on the Manatee River to Fort Meade. Established on October 26, 1849, the fort was the first in this chain to be constructed. It was garrisoned on April 30, 1850 by Companies W and M of the Fourth U.S. Artillery. The fort was abandoned on July 18, 1850 and was evidently never reoccupied (Plowden 1929:7). The site of the fort was known as Utica in the 1880s, and later became the town of Bowling Green (Devane 1979:85).

Fort Myakka, or Myacca, was established to the southeast of Fort Chockanikla on November 16, 1849. It was located just below the confluence of the east and west forks of Horse Creek, on the creek's east bank, at the present site of the New Zion Church. A military road linked the fort to Fort Crawford on the upper Manatee River, and to Fort Chockanikla and Fort Meade to the northeast. The road, which ran from Ft. Hamer to Ft. Capron (Ft. Pierce) was built by Col. David Twiggs, and was the first cross state road built in central or south Florida. It remained in use for many years following the Seminole Wars (Devane 1978:15).

Fort Green was built along a pioneer road by settler James Green in 1854. He built a small log fort near his house to protect his family and neighbors from Seminole raids. The fort is first recorded on a survey map of 1856. Green homesteaded this land in the 1840s and planted orange groves there. After the Civil War, the town Ft. Green Springs was established immediately to the east of the fort (Plowden 1929:7).

The increased number of settlers along the Manatee River and Gulf Coast led to the creation of Manatee County from the existing Hillsborough County on January 9, 1855. This had little effect on stimulating inland settlement, however. The outbreak of the Third Seminole War in 1855 caused a reactivation of military forts in the area, and the creation of several new ones like Fort Hartstuff (now Wauchula; Plowden 1929:11).

Although a member of the Confederacy, Florida saw very limited military activity during the Civil War. Egmont Key, at the mouth of Tampa Bay, was a minor Union Navy base during the war, and its personnel engaged in minor skirmishes and raids on homesteads along the coast. The interior of central and south Florida remained unaffected by hostilities.

In 1881, a serious threat to the steady settlement of rural Florida by pioneer homesteaders occurred when the state agreed to sell four million acres of its lands to Hamilton Disston, a Philadelphia industrialist, who organized the Florida Land and Improvement Company. British capital obtained through Sir Edward James Reed financed this speculative venture.

The Florida Land and Improvement Company was a holding company for Hamilton Disston and his associates. Disston, son of a wealthy Philadelphia Industrialist, contracted with the State of Florida in two large land deals - the Disston Drainage Contract and the Disston Land Purchase. The Disston Land Purchase involves much of the land within the project region. The Land Purchase was an agreement between Disston and the State in which Disston agreed to purchase Internal Improvement Fund lands at twenty-five cents an acre to satisfy the indebtedness of the fund. A contract was signed on 1 June 1881 for the sale of 4,000,000 acres for a sum of 1,000,000 dollars, which was the estimated debt owed by the Improvement Fund. Disston was allowed to select tracts of land in lots of 10,000 acres, up to 3,500,000 acres; the remainder was selected in tracts of 640 acres (Davis 1938:206-207). Before he could fulfill the obligation, Disston sold half of this contract to a british concern, the British Florida Land and Mortgage Company, headed by Sir Edward Reed (Tischendorf 1954:123). Two years lapsed between the signing of Disston's original contract and the title transfers (3 February 1883) to allow squatters to acquire the land on which they had settled for $1.25 per acre (Tebeau 1971). Many people in west central Florida obtained title to lands during this two year period.

The Disston Drainage Contract was an agreement between Disston and the State in which Disston and his associates agreed to drain and reclaim all overflow lands south of Township 23 (later changed to Township 24) and east of the Peace river in exchange for one-half the acreage that could be reclaimed and made fit for cultivation. A contract was signed on March 10th, 1881. Disston and his associates formed a company called the Atlantic and Gulf Coast Canal and Okeechobee Land Company (Davis 1938:205).

In 1881, Captain J. Francis LeBaron found phosphate pebbles in the Peace River south of Ft. Meade. This area, known as the Bone Valley region of Florida, soon became the phosphate center of the nation. LeBaron's find, along with the discovery of hard rock phosphate near Hawthorne in north central Florida, set off a phosphate rush similar to the famous California gold rush of the mid-1880s. In the 20 years following these discoveries, nearly 200 mining companies sprang up to search for Florida's phosphate. Mining began with picks and shovels then graduated to steam shovels during the first quarter of the 20th century. In 1926 the first steam powered drag lines were used (Blakey 1973).

The early years of phosphate mining brought a large increase in population to Polk and Hardee Counties. It also brought the railroads. The Charlotte Harbor and Northern Railway, a subsidiary of American Agricultural and Chemical Company, began a rail line between Boca Grande and Plant City in 1906. This line passed through Wauchula, Bradley and Mulberry to the east of the project area (Prince 1969:154-156).

In the first quarter of the 20th century, the forest industry began operations in south Florida. Florida slash pine, which predominated in the region, was a good resource for pulpwood and turpentine.

Based on the historical documentary review it was determined that the TEC Polk Power Station Siting Area exhibited a low probability for containing historical sites from the Spanish and British Periods. During the early territorial period and the Second Seminole War, settlement focused elsewhere and there was little military activity in the area. Forts associated with the Third Seminole War era 1849-1858 are located well outside the project area. Control of this land by the Florida Land and Mortgage Company discouraged any settlement until the 20th century. After 1900, the forest industry and cattle ranching dominated land use in this part of the county. Cultural remains associated with these two industries were considered most likely to be found within the project area.

## SITE FILE SEARCH AND LITERATURE REVIEW

Predictions of archaeological or historical site location are often based on the location of all known sites in the area. A consideration of these sites within the context of the larger, regional settlement system is essential. A first approximation of settlement variability through time was first obtained by reviewing information regarding the known sites. A search of the pertinent literature and records of the surrounding region was conducted including archaeological and historical assessments of other tracts of land in close proximity to the TEC Polk Power Station Siting Area.

It is well known from many published sources (e.g. Stearns 1872; Vogeles 1879; Walker 1880; Shepard 1886; Moore 1900; Fewkes 1924; Hall 1928; Stirling 1930; Willey 1949; Bullen 1952, 1955; McCall 1974:200) that the central gulf coast region was intensively occupied during prehistoric times. Most of these early researchers were concerned with coastal shell middens and large mound sites near the shore. Much of what is known about these sites comes from the information collected by these early investigators before the sites were destroyed.

This coastal research emphasis continues today with studies conducted along the shores of the northern half of Tampa Bay (e.g. Warren et al. 1967; Karklins 1968, 1970; Neill 1968; Goodyear 1968; Sears 1971) and in urban downtown Tampa. Work in the latter area has shown that undisturbed portions of aboriginal middens (Fisher 1979; Ste. Claire and Ballo 1984), as well as various non-midden sites (Ellis 1977; Fisher 1979; Piper et al. 1981; Piper and Piper 1982; Hardin and Thomsen 1984) are still in existence beneath present-day Tampa. Diagnostic bifaces from these sites indicate Archaic period components, while the pottery indicates occupation as late as A.D. 1100 and possibly to about A.D. 1650. In addition to prehistoric cultural deposits, major structural and artifactual remains from the earliest days of historic Fort Brooke (1824) and Tampa (ca. 1840) have been recently excavated (Piper and Piper 1980, 1982; Hardin et al. 1983; Hardin and Thomsen 1984).

Numerous cultural resources management surveys have been performed in north-central Hillsborough County within the Hillsborough River drainage northwest of the project area (e.g. McCullough and Fisher 1978; Grange et al. 1979; Jones 1979; McCullough 1979; Rom 1979; Wharton 1981; Piper et al. 1979; Piper et al. 1982; Williams et al. 1983; Austin et al. 1986; Williams and Estabrook 1987). These surveys recorded numerous archaeological and historic sites. Many of these Phase I surveys resulted in Phase II and III archaeological investigations. Most, if not all of these studies, focus on some aspect of lithic technology within the Hillsborough River Basin.

A Phase I reconnaissance survey was conducted for the Interstate 75 By-pass Project was conducted in 1978 by Calvin Jones (Jones 1979) of the Division of Archaeological Resources. This survey located 31 sites, 13 of which were judged eligible for listing on the National Register of Historic Places. As a result of this survey, Phase II mitigative excavations were conducted at several sites including the Wetherington Island site (Chance 1981, 1982), the Deerstand site (Gagel 1981; Daniel 1982), the Fletcher Avenue site (Daniel and Wisenbaker 1981), the Fowler Avenue Bridge site (Palmer et al. 1981), and the Landfill site (Hardin 1983).

Numerous archaeological and historical surveys were performed in the Four Corners area prior to the excavation or expansion of phosphate mines (Hemmings 1974; Padgett 1974; Browning 1975; Deming 1975; Martin 1976; Wood 1976). These surveys were conducted during the mid-1970s, and most incorporated little or no subsurface testing. Although these investigations were able to locate the larger and more obvious archaeological resources, small, low-density sites may have gone unrecorded.

Hemmings (1974) surveyed the Brewster Phosphate mining tract which is situated in southeastern Hillsborough County. Sixteen archaeological and historic sites were recorded, the majority identified as surface scatters of flint (chert) flakes, but some also containing aboriginal ceramics (Hemmings 1974:2-4). Hemming was also able to relocate the site of the Picnic Mound. The Picnic Mound was a Safety Harbor period burial mound excavated by WPA crews in 1937 (Willey 1949). No trace of the mound remained in 1974 (Hemmings 1974:2).

A survey of the Big Four Mine Properties was conducted by John D. Martin of the University of South Florida in 1976. This 5300 acre tract lies west of the study area in the southeast corner of Hillsborough County. Eight archaeological sites were located and assessed; four were recommended for further testing. Again, the majority of these sites were discovered as surface exposures of chert flakes (Martin 1976).

An archaeological and historical survey of the IMC Kingsford Plant tract was conducted by William Browning in 1975. This 6700 acre assessment located six previously unrecorded aboriginal sites. All six sites are best described as surface scatters of stone tool flaking debris (Browning 1975:11-18).

An archaeological and historical survey of the Fishhawk Creek Development site was conducted by PAR in 1988. This 5000 acre assessment located ten previously unrecorded aboriginal sites and one previously unrecorded historic resource. Eight of the sites are best described as surface scatters of stone tool flaking debris; one site contained flaking debris and aboriginal ceramics (Austin and Ballo 1988:31-46). The remains of a late 19th or early 20th century homestead were also discovered.

Cultural resource assessments conducted in the vicinity of the TEC Polk Power Station Siting Area include the assessment of the Agrico Chemical Company's holdings (Milanich and Willis 1976a; Piper et al. 1981; Austin 1989; Austin et al. 1989), the Hooker's Prairie tracts (Miller 1976; Swindell et al. 1980), the Fort Green Mine survey (Milanich and Willis 1976b), the Carlton Ranch, Limestone, and Olliff properties (Milanich et al. 1975), the Carlton Ranch property (Milanich and Martinez 1975; Milanich and Willis 1975), the C.F. Industries property (Wood 1976; Deming and Williams 1976; Wharton and Williams 1980), the Little Payne Mining tract (Batcho 1978), the Brewster Mine expansion tract (Grange and Williams 1978), the Beker Phosphate Corporation property (Deming 1975), portions of the AMAX property (Piper and Piper

1981), the Dolime Minerals property (Williams 1977), the Estech General Chemicals Corporation's Duette mine (Williams and Grange 1979), and the Farmland Industries property (Willis and Milanich 1977).

Archaeological excavations at inland sites in the Four Corners area are limited. Salvage excavations at several sites were conducted in the late 1970s and early 1980s. The Orchard-Fenceline site (8Hr11) was tested by the University of South Florida under the direction of Barry Wharton in 1977 (Wharton 1977). This site is described as a multi-component, limited occupation hunting site dating to the late Formative or Acculturative stages, roughly A.D. 700 to A.D. 1539. The Payne Creek site (8Hi10) consisted of a single Glades period component (ca. A.D. 500 - A.D. 800) containing the remains of one prehistoric structure and three activity areas (Ellis 1977). Excavations at the South Prong 1 site (8-Hi-418) and the Cates site (8-Hi-425) were conducted in 1981; both sites have been identified as faunal procurement or hunting camps (Welch 1983:268).

Limited archaeological excavations were conducted at 8Hr5, a small prehistoric midden discovered by Milanich and Martinez in 1975 (Piper et al. 1982). Testing of the occupation zone recorded 14 firepits and numerous postmolds. These data suggested a minimum of two site occupations, one during the Manasota phase and one during Mississippian times (Piper et al. 1982:41).

Perhaps the most interesting site investigated near the project area is the unnamed site complex examined by Calvin Jones (Jones 1984) of the Bureau of Archaeological Research. This complex consists of four areas of concentrated cultural material dating to the Middle Archaic cultural phase. The site is located within a wetland in the northern portion of Hookers Prairie, northeast of the project area. Because of its inundation in a wetland, this site has exceptional preservation of food remains from this little understood period of cultural development.

One archaeological site is located within the survey tract. The Agrico #6 site (8Po1508) is described on the Florida Master Site File as a single lithic artifact found in a test pit at a depth of 45 centimeters. The site is located in Township 32 South, Range 23 East, Section 7 (SW/NE/NW). It was discovered about 30 meters east of a small tributary to the South Prong of the Alafia River. Limited testing at this location failed to recover any additional artifacts or occupational features. This site was not considered of sufficient importance to warrant further testing, as listed in the evaluation on the site file.

Due to the existence of archaeological sites on and in the near vicinity of the project area, it is considered possible that some additional evidence of prehistoric activity would be present on the TEC Polk Power Station Siting Area. The most likely type of prehistoric site was expected to be a small, limited activity campsite evidenced by a sparse to moderate amount of lithic and/or ceramic artifacts. Sand mounds, which may have been used for interment of the dead or as domiciliary mounds for a structure, were also considered likely. Less likely but still possible were small habitation sites and middens indicative of semi-permanent occupation during one or more seasons of the year. Historic sites that could be expected on the property included artifact scatters related to early homesteads, lumbering or turpentining, and cattle ranching.

## RESEARCH CONSIDERATIONS AND PREDICTIVE MODEL

The background and literature review, in conjunction with pertinent environmental variables, contributed to the formulation of project specific methods designed to identify areas of high site potential within the TEC Polk Power Station Siting Area. The designation of probability zones was based on previous research conducted within the Central Peninsula Gulf Coast region.

### Subsistence-Settlement Models for the Interior Central Gulf Coast

Several authors have proposed models for the subsistence-settlement patterns of the inland portions of the central Gulf Coast. Padgett (1976) proposed a set of ideas that came to be called the "hinterland hypothesis." This model organized the extent of the southern central Gulf Coast archaeological area into three environmental zones: coastal, riverine, and hinterland (inland). Different socio-economic activities were proposed for each zone. Padgett proposed that the hinterland was exploited primarily as a hunting area only during the Late Archaic and Safety Harbor periods. Use during the intervening cultural periods was thought to be lacking (Padgett 1976:30-31). The projected site type for the hinterland zone was the small, limited-use extractive site. More permanent village sites were thought to have been in the better-drained riverine or coastal zones. Other researchers (e.g., Willis and Milanich 1976) broadened Padgett's model to include all prehistoric culture periods.

The antithesis to the hinterland model was offered by Wharton and Williams (1980). They proposed that the advent of agriculture in the Peace River drainage resulted in the eclipse of the Gulf Coastal religious and political centers by new ones in the interior. At present, the available settlement data appears to support their hypothesis. Recent surveys and excavations have documented the presence of habitation sites, burial mounds, and at least one temple mound in this interior zone (e.g., Deming 1975, Wood 1976, Wharton 1977, Ellis 1977, Wharton and Williams 1980; Piper and Piper 1981; Piper et al. 1982), suggesting that the area functioned as more than just a procurement area for coastal dwelling groups.

Luer and Almy (1981:149), taking this hypothesis one step further, state that the Gulf coast and Peace River basin represent two "similar but distinct" cultural areas. They have identified the prehistoric culture group occupying the Gulf coast as the Manasota culture. As they define it (Luer and Almy 1979, 1982), the Manasota culture was principally a coastal adaptation which first appeared about 500 B.C. and continued until roughly A.D. 800 (Luer and Almy 1982:37).

According to Luer and Almy (1982:39-44), the Manasota/Weeden Island-related settlement pattern was one of permanent residence on the coast for most of the year with occasional, probably seasonal forays into the interior to obtain game, plants, or other resources. The catchment or procurement area of these groups is thought to be 77 kilometers (48 miles). They use the term "inland from the shore" to differentiate this area from interior regions such as the Peace River basin (Luer and Almy 1982:51). The proposed TEC Polk Power Station Siting Area is within this "inland from the shore" catchment area.

Hardin and Piper (1984) have questioned the validity of the criteria used to define these boundaries, and in the process have raised questions about the entire Manasota settlement model. Citing data from several interior sites located within the Peace River drainage, they suggest that aboriginal groups possessing a Manasota material culture may have inhabited these interior areas on at least a temporary basis. As they observe, one of the problems with the Manasota concept is that the culture has been defined on the basis of patterned traits observed primarily at coastal sites. Little is known about how non-coastal sites articulated with the primary population centers on the Gulf. Because of their generally small size, it has been assumed that these sites represent short term, special-use campsites (e.g., Milanich and Fairbanks 1980:207; Luer and Almy 1982:43). However, as noted above, other researchers (e.g., Wharton and Williams 1980; Hardin and Piper 1984) have suggested that some of the larger, non-coastal sites may represent permanent or semi-permanent (seasonal) habitation sites.

Hardin and Piper (1984) also make a distinction between cultures and polities and suggest that two different political entities, one occupying the coast and the other the interior drainage of the Peace River, could share a similar material culture. The debate remains unresolved in part because of the lack of detailed studies of interior sites, particularly with regard to season of occupation, as well as the difficulty in identifying cultural differences in the plain ceramic wares that dominate the archaeological assemblages of southwest Florida sites.

## Site Location Model

### Previous Research

Considerable discussion about the validity of site predictive models and the various environmental variables that can be used to develop them is abundant in the archaeological literature (ie., Grange et al. 1979; Grange and Williams 1978; Deming 1980; Almy 1981; Piper et al. 1982; de Montmollin 1983). A brief synthesis of these works will be presented here. The reader is directed to any or all of these works for an extended background discussion on the variables employed in this study.

Four environmental factors are employed in predicting site potential: soil type (or soil association), distance to fresh (potable) water, distance to hardwood hammocks, and relative elevation. Soil type and relative elevation deal with the land slope and water drainage pattern found in a particular area. Soils with an organic pan, with underlying marl or clays, and with slow to moderate internal drainage tend to retain water or be inundated. Areas with a low elevation relative to perched water systems tend to be wet or inundated. Although wet areas can contain abundant wildlife and plant resources, they make poorer habitation areas when better drained locations are available.

Freshwater is an important resource for prehistoric people, as the need for water is universal. All areas of the Proposed TEC Polk Power Station Siting Area are within 2,000 feet (615 meters) distance to fresh water. This variable would have been of greater importance during the Paleo-Indian and Early and Middle Archaic Periods (14,000 to 4,000 B.C.), when the perched water system was much more restricted. Access to water during these early periods would have been from sinkholes and aquifer-fed rivers.

Hardwood hammocks (hydric, mesic, or xeric) provide a variety of faunal and floral resources which would have been exploited by the aboriginal inhabitants of Florida.

Data from recent cultural resource assessment surveys in Polk and adjacent counties have repeatedly demonstrated the validity of using environmental variables as predictors of prehistoric site location (eg., Grange et al. 1979; Grange and Williams 1978; Piper et al. 1980; Piper et al. 1982). These have shown that prehistoric habitation sites are frequently located on well-drained soils on upland slopes adjacent to freshwater swamps with a source of potable water nearby. However, a significant percentage of sites are also associated with somewhat poorly to poorly drained soils. Grange et al. (1977) have developed the concept of the "micro-hinterland" in an effort to understand the aboriginal utilization of marginal environments. The "microhinterland" is an environmental zone characterized by flat relief and poor drainage that is located peripheral to environmental locations more conducive to permanent settlements. When sites are found in such environments, it has been assumed that the availability of food or other resources was the determining factor that influenced site location (Grange et al. 1977; Deming 1980; Piper et al. 1981). This implies that these areas were used primarily for extracting locally available resources. The types of sites found in these environments, usually small, limited activity campsites, tends to confirm this.

There is one type of archaeological site that is occasionally found in wetland/swamp environments. Human burial interments from the Archaic stage (8500 to 4000 years B.P.) have been discovered in Florida wetland environments. The Bay West site (Beriault et al. 1981) in Collier County, the Little Salt Springs site in Sarasota County (Clausen et al. 1979), the Republic Groves site in Hardee County (Wharton et al. 1981), and the Windover site in Brevard County (Doran and Dickel 1988), are noted examples of Archaic wetland burials; the Polk County complex reported by Jones (Jones 1984) is very likely to also have associated wetland burials. Beriault et al. (1981) have suggested that Archaic burials are more likely to occur within wetlands adjacent to large, upland Archaic village sites.

Site Location Model

The environmental factors pertinent to the project area may be summarized as follows:

a) by far, the majority of the property has been heavily disturbed to depths of tens of feet by phosphate mining operations, the only parts of the property that may still have original integrity are portions of Sections 2, 3, 4, 9, and 11 of Township 32 South, Range 23 East; this area totals less than 1000 acres;

b) most of the soils in these portions of the project area are classified as poorly or very poorly drained;

c) somewhat poorly-drained areas adjacent to grassy ponds, marshes, and sloughs would have provided natural resources suitable for exploitation including turtle, water birds and small mammals.

The areas of the property that have been mined are considered to no longer contain intact archaeological remains, as any cultural materials that may be found no longer have any orientation or association with other artifacts deposited with them.

Undisturbed areas of better drained soils, such as small knolls and wetlands are also considered to have higher potential for containing prehistoric sites. Small, limited activity sites associated with the prehistoric exploitation of locally available resources are the most probable kind of site to be found in these areas.

Areas of low elevation relative to the surrounding terrain were considered less likely to contain evidence of prehistoric occupation. Those areas which are poorly-drained, very poorly-drained, or inundated are considered generally unsuitable for either habitation or cultivation within aboriginal or early historic technological limitations.

The three areas outlined in Figure 1 meet these environmental factors in whole or in part, and were therefore considered the only portions of the TEC Polk Power Plant siting area with some potential to contain archaeological and/or historic sites.

## FIELD METHODS

Prior to entering the field, three areas considered to be of higher prehistoric and early historic site potential were identified on the USGS Baird and Duette NE 7.5' Quadrangle maps and 1" = 1000' aerial photographs using the variables discussed above. All the identified areas were traversed on foot and shovel tests were systematically and judgmentally excavated in areas that appeared to have potential for containing an archaeological site. Figure 1 shows the three areas that were identified and tested.

Additionally, to compensate for the unpredictable location of such sites as burial mounds and cemeteries, shovel tests were placed judgmentally in areas of poorer drained soils along wetland margins. Shovel tests averaged 40 centimeters in diameter and extended to at least one meter below the ground surface unless prevented by ground water seepage or impenetrable soil conditions (i.e., organic or mineralized hardpan, or clayey marl). Surface exposures such as cleared areas, old agricultural fields, spoil piles, dirt roads, upturned trees, and animal burrows were visually examined for the presence of artifacts. All excavated soil was screened through 1/4" mesh hardware cloth suspended in portable wooden frames.

## RESULTS and RECOMMENDATIONS

The archaeological reconnaissance survey of the TEC Polk Power Station Siting Area located no prehistoric archaeological sites or evidence of prehistoric activity. In addition, no historic structures or historic archaeological sites were located within the project area by the field survey. The negative findings of the field survey are consistent with the expectations outlined in the Research Considerations section. As the project tract has poorly drained soils, very few shovel tests could be dug below 80 centimeters without excessive pit slumping and loss of vertical and horizontal control due to water seepage.

Although prehistoric and early historic activity may have occurred within the survey area, it was of such short duration that no identifiable archaeological site was deposited. The only evidence of historic activities found was a scatter of clay "Herty cups" used by the naval stores industry for collecting pine tar and pitch. This find is not surprising or unique, considering that the naval stores industry was strong in the inland areas of central Florida, therefore this scatter of galvanized and earthenware cups is in no way significant.

Since no archaeological or historic sites and no historic structures were discovered or recorded during the survey, it is concluded that no cultural resources eligible for nomination to the National Register of Historic Places will be impacted by development of the TEC Polk Power Station and its related devices.

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SURVEY NO.*______

# SURVEY LOG SHEET
# FLORIDA MASTER SITE FILE

Plotted?* Y_ N_

Version 1.3: 10/89

TITLE C R Survey of the Proposed TEC Polk Power Station Siting Area, Polk County, Florida.

AUTHOR(S) Fuhrmeister, Hardin

ARCHAEOLOGIST/HISTORIAN Hardin, Hansen

AFFILIATION Piper Archaeological Research, Inc.

PUB. DATE June 1991 TOTAL NUMBER OF PAGES IN REPORT 34

PUBLICATION INFO

KEY WORDS/PHRASES DESCRIBING SURVEY (max of 30 columns each)
SE Polk County

CORPORATION, GOVERNMENT UNIT, OR PERSON SPONSORING SURVEY
NAME Environmental Consulting & Technology (ECT)
ADDRESS 5405 Cypress Center Drive, Suite 200, Tampa, Florida, 33609

DESCRIPTION OF SURVEY: NUMBER OF DISTINCT AREAS SURVEYED 3
MONTH/YEAR DATES FOR FIELD WORK: START June / 1991 THRU ___/___
TOTAL AREA ______ha/ac IF CORRIDOR: WIDTH ___m/ft LENGTH ____km/mi
TYPE OF SURVEY (Use as many as apply): X archaeological
__architectural __underwater
OTHER TYPE(S):

METHODS EMPLOYED (Use as many as apply): _unknown _archival
Xpedestrian Xshovel test _test excav. _posthole
_extensive excav. _auger survey _coring _local informt
_remote sensing _windshield _surf.exposrs _probing
OTHER METHODS
SCOPE/INTENSITY/PROCEDURES Three areas chosen because of their overall integrity compared to the rest of the project area, which had been strip-mined.

SITES Significance discussed? Y x N_ Circle NR-elig/signif site nos:
PREVIOUSLY RECORDED SITES : COUNT 1 LIST 8Po1508

NEWLY RECORDED SITES : COUNT Ø LIST

COUNTIES: Polk

USGS MAP(S) Baird, Duette NE

TOWNSHIP/RANGE (list all township/range combinations eg, 04S/29E)
32S/23E 31S/23E

REMARKS (Use reverse if needed):

## OUTLINE OR HIGHLIGHT SURVEY AREA ON FDOT COUNTY HWY. MAP. ATTACH OR PHOTOCOPY ONTO BACK OF FORM.

* For use of Fla. Master Site File only: Div of Historical Resources/R A Gray Bldg/500 S. Bronough St/Tallahassee, FL 32399-0250

# APPENDIX 11.6

# TRANSPORTATION ANALYSIS: POLK POWER STATION

# TRANSPORTATION ANALYSIS

## POLK POWER STATION

PREPARED FOR

TAMPA ELECTRIC
A TECO ENERGY COMPANY

PREPARED BY

LINCKS & ASSOCIATES, INC.
Engineers — Planners
Tampa, Florida

# TRANSPORTATION ANALYSIS

# POLK POWER STATION

Prepared For

TAMPA ELECTRIC COMPANY

Prepared By

LINCKS & ASSOCIATES, INC.
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## EXECUTIVE SUMMARY

The Transportation Analysis was conducted for both the operational and construction phase of the proposed Polk Power Station. The analysis was performed in accordance with the draft Polk County Traffic Impact Study Methodology and Procedures dated October 18, 1991, the Traffic Methodology Statement for the project prepared by Lincks & Associates, Inc. and the pre-application conference held with Polk County on April 3, 1992.

Based upon the agreed methodology, all existing roadway links and intersections within the Traffic Impact Area should operate at an acceptable level of service with the existing traffic plus the traffic associated with the Florida Power Corporation Power Station. Therefore, no additional roadway improvements should be required due to the addition of the Polk Power Station.

# INTRODUCTION

The purpose of this report is to provide a Transportation Analysis for the proposed Polk Power Station (PPS) as requested by Polk County in conjunction with the Conditional Use Permit (CUP) approval process. Tampa Electric Company proposes to construct and operate a nominal 1,150 - MW power plant facility on approximately 4,348 acres in southwest Polk County. The property that is controlled by Tampa Electric Company is located both east and west of SR 37, north of SR 674, south of CR 630, and west of Fort Green Road, as shown in Figure 1.

This report will determine the impacts of the proposed power station for the operational phase of the facility. In addition, this report will also determine if there are any additional impacts to the roadway system due to the traffic associated with the construction of the facility.

This analysis will be conducted in accordance with the draft Polk County Traffic Impact Study Methodology and Procedures dated October 18, 1991, the Traffic Methodology Statement for the project dated March, 1992 prepared by Lincks & Associates, Inc. and the pre-application conference held on April 3, 1992 with Polk County.

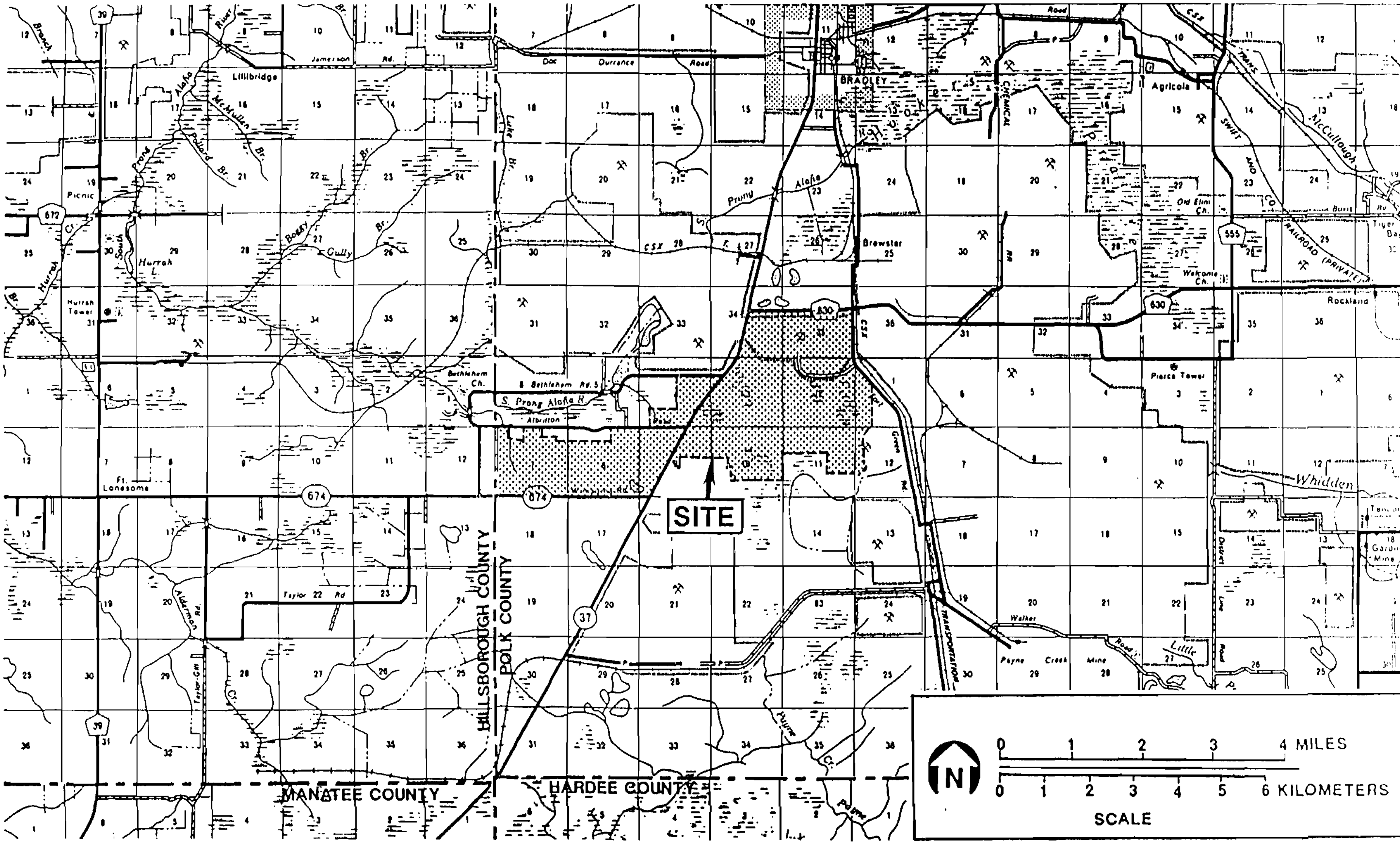


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FIGURE 1
LOCATION MAP

## PROJECT DESCRIPTION AND PHASING SCHEDULE

As stated previously, the Polk Power Station (PPS) is proposed to be located in southwest Polk County on approximately 4,348 acres. The property was previously a part of a phosphate mining operation and that portion of the acreage that was mined will be reclaimed as a part of this project. The actual power plant facility and all activities associated with the power plant will be isolated to the property on the east side of SR 37. The property on the west side of SR 37 will be reclaimed and maintained in its natural state by Tampa Electric Company.

The proposed power plant is a state of the art facility which will include an Integrated Coal Gasification Combined Cycle (IGCC) component. This process will reduce the number of employees required to operate the plant by more than 30 percent as compared to a typical coal fired power plant. Therefore, the impact of this project on the transportation system should be reduced from a typical power plant.

The PPS is proposed to be constructed in phases with the initial construction to begin in 1994 and buildout of the facility anticipated to be in 2010.

The initial construction phase of the project is projected to be completed within 27 months of initiation of construction. This initial phase will include the construction of the coal gasification facilities, the ancillary facilities, and the overall site reclamation. During this 27 month period, the average work force is projected to be 400 construction workers with a peak of 600 construction workers for a 9 month period. After the initial construction phase, the employment due to construction will be significantly reduced to an average of 15 to 40 construction workers with a peak of 60 construction workers. Table 1 summarizes the construction employment schedule for the project. This information was provided by Tampa Electric Company and is based on a conservative estimate of the numbers of construction workers required for construction of a facility of this type.

The operational work force is anticipated to include 50 persons in 1995 at the initial operation of the plant and increase to a total of 210 at project buildout in 2010. Table 2 illustrates the projected operational work force for each year from 1995 to 2010. The operational work force is proposed to work in three shifts with approximately seventy-two percent of the operational work force working in the first shift (7:00 AM to 3:00 PM). Sixteen percent is proposed to work in the second shift (3:00 PM to 11:00 PM), and the remaining twelve percent in the third shift (11:00 PM to 7:00 AM). The number of employees and work schedule was provided by

TABLE 1 - CONSTRUCTION EMPLOYMENT

| Year | Unit Additions | Total Nominal Station Capacity (MW) | Construction Personnel Average | Construction Personnel Peak | Comments |
|---|---|---|---|---|---|
| 1994 | None | 0 | 400 | 400 | Construction of CT and IGCC starts January 1994. |
| 1995 | One 150-MW CT | 150 | 400 | 600 | Peak personnel, January through September 1995. |
| 1996 | CG conversion of one 150-MW CT | 260 | 400 | 400 | Construction ends July 1996. |
| 1998 | None | 260 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 1998. |
| 1999 | One 75-MW CT | 335 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 1999. |
| 2000 | One 75-MW CT | 410 | 15 | 20 | Construction of CC plant starts in April; peak personnel, July through September 2000. |
| 2001 | CC conversion of two 75-MW CTs | 480 | 40 | 60 | Construction of next 75-MW CT and 220-MW CC units starts in April 2001; peak at December. |
| 2002 | One 75-MW CT | 555 | 40 | 60 | Peak personnel, January through May 2002. |
| 2003 | One 220-MW CC | 775 | 40 | 40 | Construction ends January 2003. |
| 2005 | None | 775 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 2005. |
| 2006 | One 75-MW CT | 850 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 2006. |
| 2007 | One 75-MW CT | 925 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 2007. |
| 2008 | One 75-MW CT | 1,000 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 2008. |
| 2009 | One 75-MW CT | 1,075 | 15 | 20 | Construction of next 75-MW unit starts in April; peak personnel, July through September 2009. |
| 2010 | One 75-MW CT | 1,150 | 15 | 20 | Construction ends January 2010. |

TABLE 2 - OPERATIONAL EMPLOYMENT

| Year | Unit Additions | Total Nominal Station Capacity (MW) | Personnel Requirement Addition This Year | Personnel Requirement Cumulative Total |
|---|---|---|---|---|
| 1995 | One 150-MW CT | 150 | 50 | 50 |
| 1996 | CG conversion of one 150-MW CT | 260 | 80 | 130 |
| 1999 | One 75-MW CT | 335 | 10 | 140 |
| 2000 | One 75-MW CT | 410 | 7 | 147 |
| 2001 | CC conversion of two 75-MW CTs | 480 | 15 | 162 |
| 2002 | One 75-MW CT | 555 | 5 | 167 |
| 2003 | One 220-MW CC | 775 | 15 | 182 |
| 2006 | One 75-MW CT | 850 | 5 | 187 |
| 2007 | One 75-MW CT | 925 | 5 | 192 |
| 2008 | One 75-MW CT | 1,000 | 5 | 197 |
| 2009 | One 75-MW CT | 1,075 | 5 | 202 |
| 2010 | One 75-MW CT | 1,150 | 8 | 210 |

* The personnel requirements include plant operators, maintenance personnel, and supervisory and administrative staff.

Tampa Electric Company and is based on an estimate of the number of employees required to operate the facility.

In addition to the operational work force employed by Tampa Electric Company, there are also projected to be contract maintenance personnel associated with the power plant. These projections are shown in Table 3. The projected number of employees range from 6 in 1997 to a maximum of 100 in 2010. The number of contract maintenance personnel to maintain the facility was provided by Tampa Electric Company.

Table 4 summarizes the total employment for the PPS including construction, operational, and maintenance personnel. As shown in Table 4, the maximum employment will be 530 people in 1996; this includes 400 construction workers and 130 operational personnel. The actual time the construction workers and operational personnel will be at the facility together should be approximately three to five months. After the initial construction phase, the highest employment year is projected to be 2010 with 325 employees.

Access to the PPS facility will be via two full access driveways onto SR 37. The spacing of these driveways will be approximately one-half mile each. The two entrances on SR 37 will be as follows:

TABLE 3 - ANNUAL CONTRACT MAINTENANCE PERSONNEL REQUIREMENTS

| Unit | Special Contract Maintenance Personnel in Year | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| 150-MW CT* | | | 6 | 6 | | 10 | | 6 | 6 | 11 | | 6 | 6 | | 10 | |
| IGCC+ | | | | 60 | | 60 | | 60 | | 60 | | 60 | | 60 | | 60 |
| 75-MW CT** | | | | | | 5 | | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 |
| 75-MW CT** | | | | | | | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 | 5 | 7 |
| CC conversion | Included in preceding CT units | | | | | | | | | | | | | | | |
| 75-MW CT** | | | | | | | | | 5 | | 7 | | 5 | | 7 | |
| 220-MW CC** | | | | | | | | | | 10 | | 14 | | 10 | | 14 |
| 75-MW CT** | | | | | | | | | | | | | 5 | | 7 | |
| 75-MW CT** | | | | | | | | | | | | | | 5 | | 7 |
| 75-MW CT** | | | | | | | | | | | | | | | 5 | |
| 75-MW CT** | | | | | | | | | | | | | | | | 5 |
| Total Annual | | | 6 | 66 | 0 | 75 | 5 | 80 | 21 | 95 | 17 | 94 | 26 | 89 | 39 | 100 |

Note: The maintenance of the units could be staggered or combined based on plant operation requirements. Annual load factor for CT is 35 percent, and 65 percent for CC.

* Maintenance requirements for combustion liners at 8,000-hour, hot gas path at 24,000-hour, and major overhaul at 48,000-hour operation interval.

\+ Major maintenance at 24-month interval.

** Maintenance requirements for combustors at 6,000-hour, hot gas path at 12,000-hour, and major at 24,000-hour operation interval.

TABLE 4 - TOTAL EMPLOYMENT

| Year | Construction(1) | Operation | Maintenance | Total |
|---|---|---|---|---|
| 1994 | 400 | 0 | 0 | 400 |
| 1995 | 400 | 50 | 0 | 450 |
| 1996 | 400 | 130 | 0 | 530 |
| 1997 | 0 | 130 | 6 | 136 |
| 1998 | 15 | 130 | 66 | 211 |
| 1999 | 15 | 140 | 0 | 155 |
| 2000 | 15 | 147 | 75 | 237 |
| 2001 | 40 | 162 | 5 | 207 |
| 2002 | 40 | 167 | 80 | 287 |
| 2003 | 40 | 182 | 21 | 243 |
| 2004 | 0 | 182 | 95 | 277 |
| 2005 | 15 | 182 | 17 | 214 |
| 2006 | 15 | 187 | 94 | 296 |
| 2007 | 15 | 192 | 26 | 233 |
| 2008 | 15 | 197 | 89 | 301 |
| 2009 | 15 | 202 | 39 | 256 |
| 2010 | 15 | 210 | 100 | 325 |

(1) Based on average number of construction employees.

- Bethlehem Entrance (Project Drive A) - This entrance is proposed to align with Bethlehem Road and will serve as the union contractors and delivery entrance.

- Main Entrance (Project Drive B) - This entrance is proposed to be approximately 1/2 mile south of Bethlehem Road and will serve as the employee and visitor entrance.

In addition to the access on SR 37, an access on Fort Green Road is proposed (Project Drive C). This access will serve as a non-union contractors and delivery entrance.

## TRAFFIC IMPACT AREA

The Traffic Impact Area (TIA) is defined in the draft Polk County Traffic Impact Study Methodology and Procedures dated October 18, 1991 as any roadway segment on the Concurrency Determination Network on which the project traffic consumes 5% or more of the peak hour Level of Service 'C' FDOT generalized planning capacity.

The determination of the TIA was based on the trip ends attracted to the site during the AM peak hour for the operational phase of the project. This time period was utilized to determine the TIA for the following reasons:

- The operational phase was selected rather than the construction phase due to the fact that the operational phase of the project represents the long term impacts of the project versus the construction phase which represents the short term impacts and is anticipated to be substantially completed in 1996.

- The AM peak hour of the operational phase was selected rather than the PM peak hour because significantly more trip ends are attracted to the site in the AM peak hour than the PM peak hour.

Table 5 summarizes the calculations of the study impact area and indicates the following roadway links will be included in the TIA for additional link analysis:

- SR 37 from SR 674 to Project Drive B
- SR 37 from Project Drive B to Project Drive A
- SR 37 from Project Drive A to CR 630
- SR 37 from CR 630 to CR 640
- SR 37 from CR 640 to Cameron Street
- CR 630 from SR 37 to Fort Green Road
- CR 630 from Fort Green Road to CR 555
- CR 630 from CR 555 to US 98

## TABLE 5 - STUDY IMPACT AREA DETERMINATION

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Level of Service 'C' Directional Peak Hour Capacity (2) | Project Traffic (3) | % Service Capacity Consumed by Project | Study Network |
|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | |
| Manatee Co. Line to SR 674 | NB | 2U | MA | M | 420 | 10 | 2.38% | NO |
| | SB | 2U | MA | M | 540 | 2 | 0.37% | NO |
| SR 674 - Project Dr. B | NB | 2U | MA | M | 420 | 29 | 6.90% | YES |
| | SB | 2U | MA | M | 540 | 6 | 1.11% | NO |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | 420 | 33 | 7.86% | YES |
| | SB | 2U | MA | M | 540 | 109 | 20.19% | YES |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | 420 | 33 | 7.86% | YES |
| | SB | 2U | MA | M | 540 | 150 | 27.78% | YES |
| CR 630 to CR 640 | NB | 2U | MA | M | 420 | 18 | 4.29% | NO |
| | SB | 2U | MA | M | 540 | 86 | 15.93% | YES |
| CR 640 TO Cameron Street | NB | 2U | MA | M | 420 | 10 | 2.38% | NO |
| | SB | 2U | MA | M | 540 | 48 | 8.89% | YES |
| Cameron Street to SR 60 | NB | 4D | MA | B | 1,290 | 10 | 0.78% | NO |
| | SB | 4D | MA | B | 1,680 | 48 | 2.86% | NO |
| SR 60 to Shepherd Road | NB | 4D | MA | A | 1,380 | 4 | 0.29% | NO |
| | SB | 4D | MA | A | 1,790 | 19 | 1.06% | NO |
| SR 674 | | | | | | | | |
| Hills. Co. Line to SR 37 | EB | 2U | MA | M | 420 | 19 | 4.52% | NO |
| | WB | 2U | MA | M | 540 | 4 | 0.74% | NO |
| CR 630 | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | 420 | 25 | 5.95% | YES |
| | WB | 2U | (4) | M | 540 | 74 | 13.70% | YES |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | 420 | 12 | 2.86% | NO |
| | WB | 2U | (4) | M | 540 | 57 | 10.56% | YES |
| CR 555 to US 98 | EB | 2U | (4) | M | 420 | 8 | 1.90% | NO |
| | WB | 2U | (4) | M | 540 | 38 | 7.04% | YES |

TABLE 5 - STUDY IMPACT AREA DETERMINATION
(CONTINUED)

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Level of Service 'C' Directional Peak Hour Capacity (2) | Project Traffic (3) | % Service Capacity Consumed by Project | Study Network |
|---|---|---|---|---|---|---|---|---|
| **Fort Green Road** | | | | | | | | |
| Hardee Co. Line to Proj. Drive C | NB | 2U | (4) | M | 420 | 10 | 2.38% | NO |
| | SB | 2U | (4) | M | 540 | 2 | 0.37% | NO |
| Proj. Drive C - CR 630 | NB | 2U | (4) | M | 420 | 14 | 3.33% | NO |
| | SB | 2U | (4) | M | 540 | 17 | 3.15% | NO |
| **CR 555** | | | | | | | | |
| CR 630 to SR 60 | NB | 2U | (4) | M | 420 | 4 | 0.95% | NO |
| | SB | 2U | (4) | M | 540 | 19 | 3.52% | NO |
| **CR 640** | | | | | | | | |
| Hills. Co. Line to SR 37 | EB | 2U | (4) | M | 420 | 19 | 4.52% | NO |
| | WB | 2U | (4) | M | 540 | 4 | 0.74% | NO |
| SR 37 to CR 559 | EB | 2U | (4) | M | 540 | 4 | 0.74% | NO |
| | WB | 2U | (4) | M | 420 | 19 | 4.52% | NO |
| **SR 60** | | | | | | | | |
| Coronet Road to SR 37 | EB | 4D | PA | M | 2,280 | 19 | 0.83% | NO |
| | WB | 4D | PA | M | 1,760 | 4 | 0.23% | NO |
| SR 37 to 12th Avenue | EB | 4D | PA | B | 1,680 | 2 | 0.12% | NO |
| | WB | 4D | PA | B | 1,290 | 10 | 0.78% | NO |
| **US 98** | | | | | | | | |
| Edgewood Drive to US 17 | EB | 2D | PA | B | 790 | 4 | 0.51% | NO |
| | WB | 2D | PA | B | 600 | 19 | 3.17% | NO |
| **US 17** | | | | | | | | |
| S. 9th Street to US 98 | NB | 4D | PA | D | 840 | 2 | 0.24% | NO |
| | SB | 4D | PA | D | 1,090 | 1 | 0.09% | NO |
| US 98 to N. 9th Street | NB | 4D | PA | A | 1,380 | 4 | 0.29% | NO |
| | SB | 4D | PA | A | 1,790 | 17 | 0.95% | NO |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction Level of Service 'C' capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction Level of Service 'C' capacity obtained from the FDOT Generalized Capacity Tables.

(3) Project Traffic = AM peak hour operational project traffic.

(4) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

In addition, Fort Green Road from Project Drive C to CR 630 will be included in the link analysis.

The trip generation, distribution, and assignment of the project traffic associated with the facility is discussed in the following section of this report.

The traffic impact area is shown graphically in Figure 2.

In addition to the link analysis, the draft Polk County Traffic Study Methodology and Procedures requires that intersection analysis be conducted on each major intersection within the TIA where the total traffic consumes 80 percent or more of the generalized planning Level of Service 'C' peak hour capacity of the approach link. Table 6 summarizes these calculations which indicates that the only approach link that the total traffic consumes 80 percent of the Level of Service 'C' capacity is SR 37 from CR 640 to Cameron Street. Therefore, the intersection of SR 37 and CR 640 will be analyzed as a part of the study.

In addition, the intersections of SR 37 and CR 630 and CR 630 and Fort Green Road will be analyzed since they are adjacent to the site and also the majority of the project traffic is from the north and east.

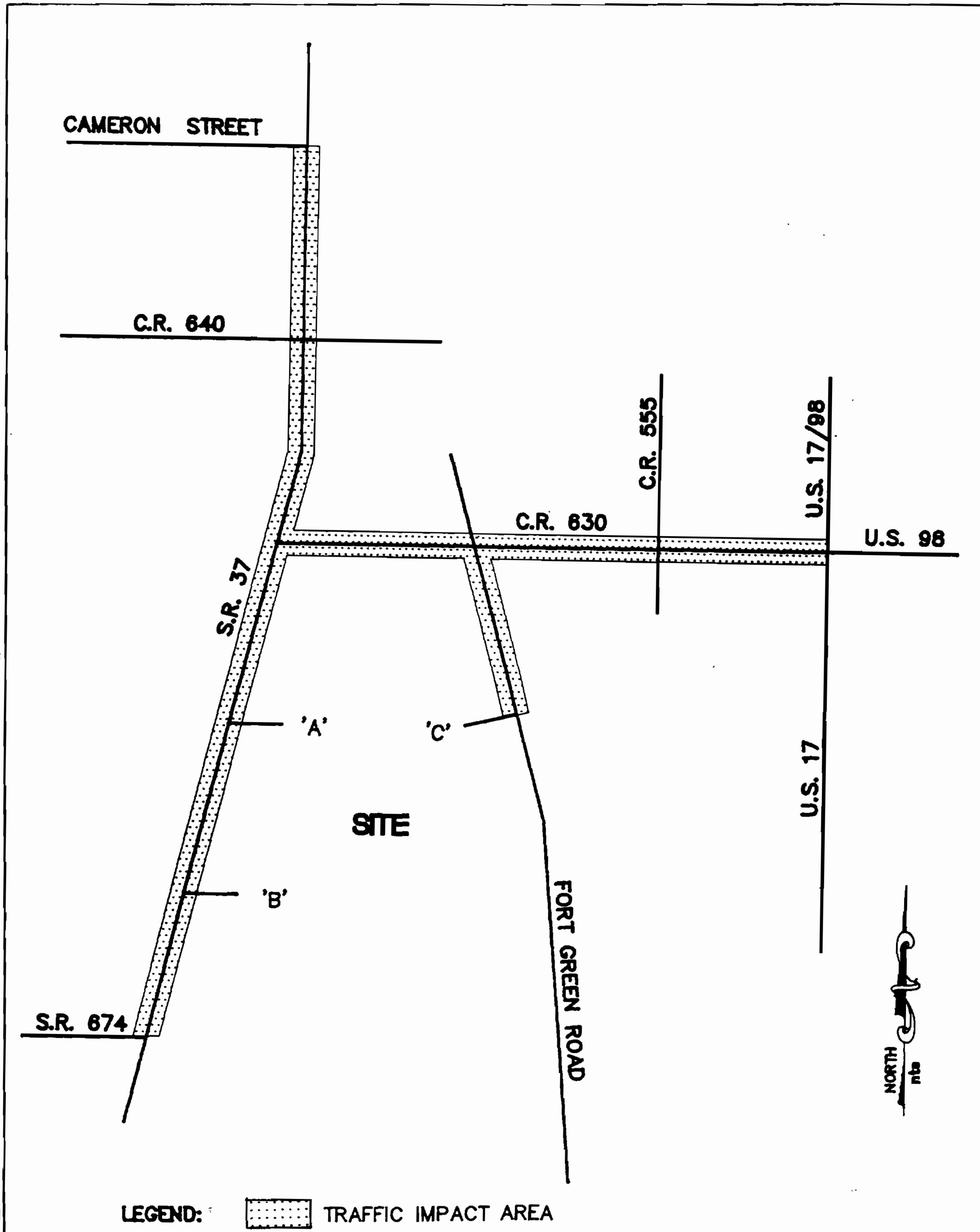


FIGURE 2
TRAFFIC IMPACT AREA

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## TABLE 6 - 80 PERCENT THRESHOLD DETERMINATION

| Roadway Segment | Dir | AM Peak Hour: LOS 'C' Dir. Peak Hour Capacity (1) | AM Peak Hour: Total Traffic (2) | AM Peak Hour: % of LOS C Capacity Consumed | AM Peak Hour: Intersection Analysis | PM Peak Hour: LOS 'C' Dir. Peak Hour Capacity (1) | PM Peak Hour: Total Traffic (3) | PM Peak Hour: % of LOS C Capacity Consumed | PM Peak Hour: Intersection Analysis |
|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 420 | 183 | 43.57% | NO | 540 | 188 | 34.81% | NO |
| | SB | 540 | 189 | 35.00% | NO | 420 | 167 | 39.76% | NO |
| Proj. Drive B to Proj. Drive A | NB | 420 | 187 | 44.52% | NO | 540 | 244 | 45.19% | NO |
| | SB | 540 | 292 | 54.07% | NO | 420 | 171 | 40.71% | NO |
| Proj. Drive A to CR 630 | NB | 420 | 187 | 44.52% | NO | 540 | 268 | 49.63% | NO |
| | SB | 540 | 333 | 61.67% | NO | 420 | 173 | 41.19% | NO |
| CR 630 to CR 640 | NB | 420 | 167 | 39.76% | NO | 540 | 229 | 42.41% | NO |
| | SB | 540 | 268 | 49.63% | NO | 420 | 160 | 38.10% | NO |
| CR 640 to Cameron Street | NB | 420 | 335 | 79.76% | NO | 540 | 430 | 79.63% | NO |
| | SB | 540 | 464 | 85.93% | YES | 420 | 335 | 79.76% | NO |
| CR 630 | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 420 | 143 | 34.05% | NO | 540 | 181 | 33.52% | NO |
| | WB | 540 | 213 | 39.44% | NO | 420 | 130 | 30.95% | NO |
| Fort Green Road to CR 555 | EB | 420 | 133 | 31.67% | NO | 540 | 173 | 32.04% | NO |
| | WB | 540 | 197 | 36.48% | NO | 420 | 125 | 29.76% | NO |
| CR 555 to US 98 | EB | 420 | 133 | 31.67% | NO | 540 | 198 | 36.67% | NO |
| | WB | 540 | 245 | 45.37% | NO | 420 | 135 | 32.14% | NO |
| Fort Green Road | | | | | | | | | |
| Project Dr. C to CR 630 | NB | 660 | 44 | 6.67% | NO | 870 | 41 | 4.71% | NO |
| | SB | 870 | 50 | 5.75% | NO | 660 | 35 | 5.30% | NO |

(1) Peak hour peak direction Level of Service 'C' capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction Level of Service 'C' capacity obtained from the FDOT Generalized Capacity Tables.

(2) Total Traffic = AM peak hour background traffic + AM peak hour operational traffic.

(3) Total Traffic = PM peak hour background traffic + PM peak hour operational traffic.

The determination of the total traffic contained in Table 6 will be discussed in the following section of the report.

## BACKGROUND CONDITIONS

The background traffic utilized in the link analysis for this report was calculated using the following methodology:

(1) The peak hour/peak direction/peak season volume was extracted from the Polk County Roadway Inventory - March, 1992 for each roadway segment within the TIA (see Appendix). The peak direction for each roadway segment was determined based on actual AM and PM peak hour traffic counts for each of the individual roadway segments. The counts were obtained from the Florida Power Corporation traffic study prepared by Kimley-Horn & Associates, Inc. and augmented by Lincks & Associates, Inc. where required.

(2) The peak hour/off-peak direction/peak season volume was calculated by applying a .102 peak-to-daily ratio to the existing AADT contained in the Polk County Road Inventory dated March, 1992 and then subtracting the two-way volume from the peak direction volume in number 1 above. The methodology to determine the peak hour off-peak volumes was agreed upon in

the pre-application conference in Polk County on April 3, 1992.

(3) The AM and PM peak hour trip ends associated with the 2008 operational phase of the Florida Power Corporation (FPC) traffic study were added to each roadway segments within the TIA. These volumes were extracted from the Kimley-Horn & Associates, Inc. traffic study prepared for the FPC facility.

Figure 3 illustrates the background traffic (link volumes) within the TIA for both the AM and PM peak hour.

The background traffic utilized in the intersection analysis for this report was calculated using the following methodology:

(1) The AM and PM peak hour/peak season turning movements for the intersection of SR 37 and CR 640 were obtained from the Kimley-Horn report for the FPC facility.

(2) AM and PM peak hour turning movement counts were conducted by Lincks & Associates, Inc. personnel for the intersections of SR 37 and CR 630 and CR 630 and Fort Green Road. These turning movement volumes were then factored to peak season based on FDOT seasonal adjustment factors (see Appendix).

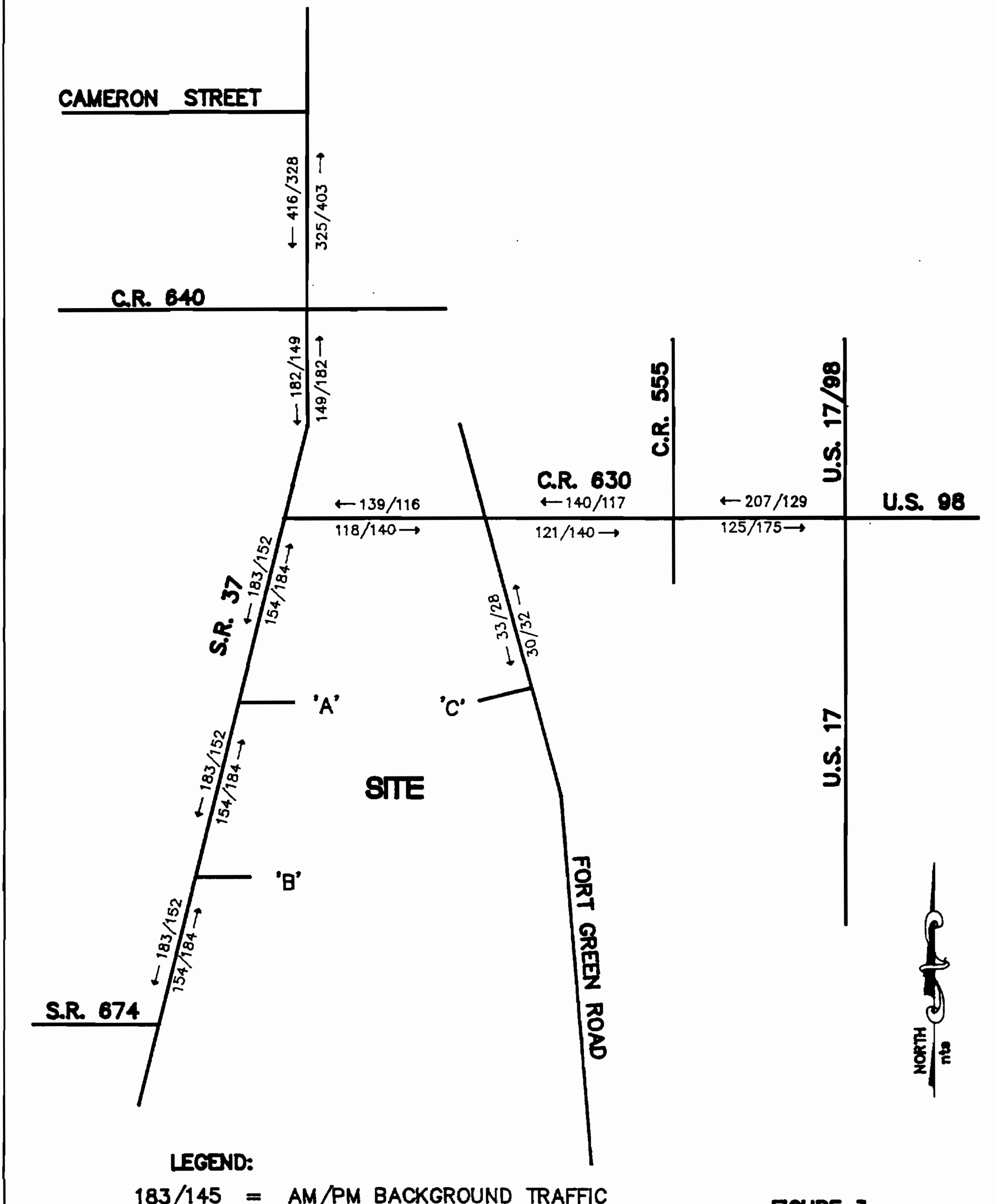



**FIGURE 3**
BACKGROUND TRAFFIC
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.

(3) The AM and PM peak hour trip ends associated with the 2008 operational phase of the FPC facility were added to the adjusted intersection turning movement volumes.

Figure 4 illustrates the background turning movement volumes at each of the intersections to be analyzed in this report.

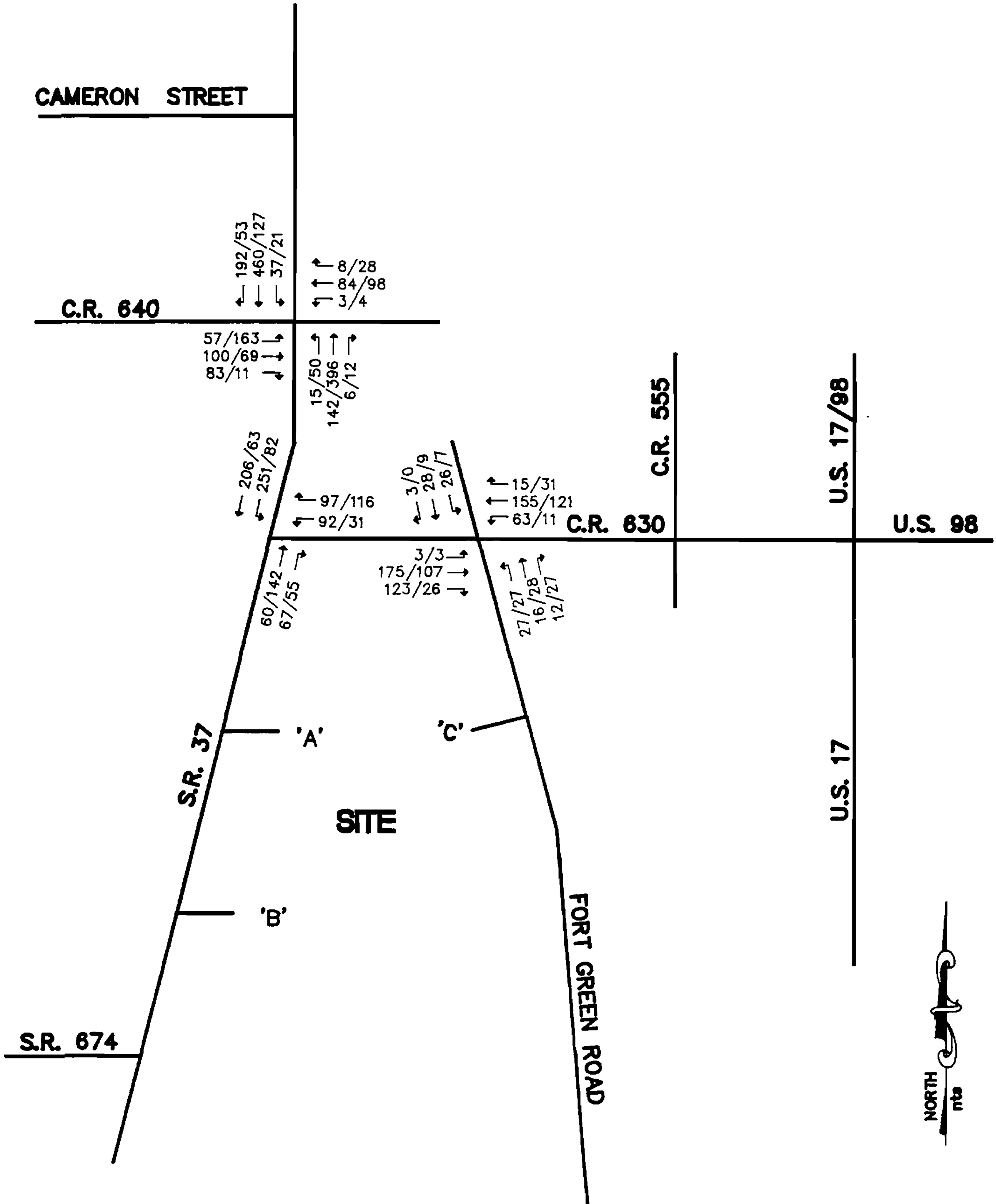
## Link Analysis

Tables 7 and 8 show the existing peak hour/peak and off-peak direction/peak season volumes and the FPC project traffic for each roadway link within the TIA for the AM and PM peak hour, respectively. As shown in these tables with the background traffic, all the roadway links within the TIA operate at an acceptable level of service.

## Intersection Capacity Analysis

Capacity calculations were conducted for the AM and PM peak hours with the background traffic for the following intersections:

- SR 37 and CR 640
- SR 37 and CR 630
- CR 630 and Fort Green Road




LEGEND:
18/45 = AM/PM PEAK HOUR VOLUMES

**FIGURE 4**
BACKGROUND TRAFFIC
(INTERSECTION VOLUMES)

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TABLE 7 - LINK ANALYSIS BACKGROUND CONDITION - AM PEAK HOUR

| Roadway Segment | Dir | Exist. Lane Type(1) | Functional Classification (1) | Group (1) | Perf. Std.(1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Exist. Traffic(3) | FPC Traffic(4) | Bckgrd. Traffic(5) | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 to Proj. Drive B | NB | 2U | MA | M | D | 660 | 149 | 5 | 154 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 1 | 183 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 660 | 149 | 5 | 154 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 1 | 183 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 660 | 149 | 5 | 154 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 1 | 183 | B |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 660 | 149 | 0 | 149 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 0 | 182 | B |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 660 | 319 | 6 | 325 | C |
| | SB | 2U | MA | M | D | 870 | 388 | 28 | 416 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (6) | M | D | 660 | 113 | 5 | 118 | A |
| | WB | 2U | (6) | M | D | 870 | 138 | 1 | 139 | A |
| Fort Green Road to CR 555 | EB | 2U | (6) | M | D | 660 | 113 | 8 | 121 | A |
| | WB | 2U | (6) | M | D | 870 | 138 | 2 | 140 | A |
| CR 555 to US 98 | EB | 2U | (6) | M | D | 660 | 113 | 12 | 125 | A |
| | WB | 2U | (6) | M | D | 870 | 138 | 69 | 207 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (6) | M | D | 660 | 27 | 3 | 30 | A |
| | SB | 2U | (6) | M | D | 870 | 32 | 1 | 33 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction level of service capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction obtained from the FDOT generalized capacity tables.

(3) Peak directional volume was obtained from the Polk County Roadway Inventory dated March, 1992 (see Appendix). Off-peak directional volume was calculated utilizing the peak-to-daily ratio of .102 and the subtracting the peak directional volume from the two way volume.

(4) FPC traffic obtained from the Kimley-Horn Traffic Analysis for 2008 operations.

(5) Background traffic = existing traffic + FPC traffic.

(6) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

TABLE 8 - LINK ANALYSIS BACKGROUND CONDITION - PM PEAK HOUR

| Roadway Segment | Dir | Exist. Lane Type(1) | Functional Classification (1) | Group (1) | Perf. Std.(1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Exist. Traffic(3) | FPC Traffic(4) | Bckgrd. Traffic(5) | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 to Proj. Drive B | NB | 2U | MA | M | D | 870 | 182 | 2 | 184 | B |
| | SB | 2U | MA | M | D | 660 | 149 | 3 | 152 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 870 | 182 | 2 | 184 | B |
| | SB | 2U | MA | M | D | 660 | 149 | 3 | 152 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 870 | 182 | 2 | 184 | B |
| | SB | 2U | MA | M | D | 660 | 149 | 3 | 152 | B |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 870 | 182 | 0 | 182 | B |
| | SB | 2U | MA | M | D | 660 | 149 | 0 | 149 | B |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 870 | 388 | 15 | 403 | C |
| | SB | 2U | MA | M | D | 660 | 319 | 9 | 328 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (6) | M | D | 870 | 138 | 2 | 140 | A |
| | WB | 2U | (6) | M | D | 660 | 113 | 3 | 116 | A |
| Fort Green Road to CR 555 | EB | 2U | (6) | M | D | 870 | 138 | 2 | 140 | A |
| | WB | 2U | (6) | M | D | 660 | 113 | 4 | 117 | A |
| CR 555 to US 98 | EB | 2U | (6) | M | D | 870 | 138 | 37 | 175 | B |
| | WB | 2U | (6) | M | D | 660 | 113 | 16 | 129 | A |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (6) | M | D | 870 | 32 | 0 | 32 | A |
| | SB | 2U | (6) | M | D | 660 | 27 | 1 | 28 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction level of service capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction obtained from the FDOT generalized capacity tables.

(3) Peak directional volume was obtained from the Polk County Roadway Inventory dated March, 1992 (see Appendix). Off-peak directional volume was calculated utilizing the peak-to-daily ratio of .102 and then subtracting the peak directional volume from the two way volume.

(4) FPC traffic obtained from the Kimley-Horn Traffic Analysis for 2008 operations.

(5) Background traffic = existing traffic + FPC traffic.

(6) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

These calculations were performed utilizing the methods outlined in Chapter 9, Signalized Intersections, of the Transportation Research Board (TRB) Special Report 209 the Highway Capacity Manual. The use of the signalized intersection analysis for unsignalized intersections does not indicate the need for a signal nor that the intersection meets signal warrants. The purpose of this methodology was to determine the overall intersection level of service. As shown in Table 9, all the studied intersections should operate at an acceptable level of service with the existing geometry.

## OPERATIONAL PHASE

The construction of the IGCC and ancillary facilities is anticipated to be completed in 1996 with operations of the facility beginning at that time. The operational work force will begin with 50 employees in 1995. This work force will continue to grow to a maximum of 325 employees in 2010 which will include operational employees of Tampa Electric Company, contract maintenance personnel, and also a small number of construction personnel. The analysis of the operational phase of the project will be based on the highest anticipated employment year which will be 2010 with 325 employees.

TABLE 9 - SIGNALIZED INTERSECTION ANALYSIS
BACKGROUND CONDITIONS

| Intersection | Analysis Period | Background Traffic Existing Geometry | | |
|---|---|---|---|---|
| | | V/C (1) | LOS | Delay |
| SR 37 and CR 640 | AM | 0.481 | B | 9.3 |
| | PM | 0.475 | B | 9.9 |
| SR 37 and CR 630 | AM | 0.554 | B | 5.5 |
| | PM | 0.307 | A | 4.9 |
| CR 630 and Fort Green Road | AM | 0.287 | B | 8.0 |
| | PM | 0.192 | B | 7.7 |

(1) Volume/Capacity

Estimated Project Average Daily Traffic

The Institute of Transportation Engineers' (ITE) Trip Generation, 5th Edition, does not contain trip generation rates for a IGCC power plant. Therefore, the trip generation rates determined by Kimley-Horn & Associates, Inc. for the Florida Power and Light Company's Coal Gasification facility in Martin County, Florida were utilized in the report. The Florida Power and Light plant is a 1,600 MW facility located along SR 710 in rural Martin County and is considered comparable to the proposed Polk Power Station based on its location to urbanized coastal areas in Martin County (approximately 22 miles east) and the West Palm Beach area (approximately 56 miles southeast). The trip generation rate contained in the Kimley-Horn & Associates, Inc. report for the operational phase of the facility was 2.35 trip ends per employee.

Typically for inland power plant facilities coal is delivered by rail. However, for this proposed facility the option of coal delivery by truck will be considered. Since it is not evident in the Kimley-Horn report for the Martin County facility that coal was delivered by truck, the trip ends associated with the coal delivery will be added to the trip generation rate in the Kimley-Horn report for this facility. It should be noted that the trucks delivering the coal to this facility may also back haul the slag by-product from this facility or phosphate from the local area. The hauling of the slag by-product for this facility would be required whether the coal for the facility were delivered by rail or by truck. Therefore, the actual number of new trucks to this facility due to the coal delivery should be minimal. However, for the purpose of this analysis it will be assumed that all the trucks associated with the coal delivery are new trips.

The trucks will originate at a facility in Hillsborough County and will operate in shifts which will coincide with the operational shifts of this facility; 1st shift 7:00 AM - 3:00 PM, 2nd shift 3:00 PM - 11:00 PM, and 3rd shift 11:00 PM - 7:00 AM. Therefore, the trucks associated with the coal delivery should not impact the adjacent roadway system during the AM or PM street peak hour.

It is estimated the coal delivery will require 80 trucks per day.

Table 10 summarizes the daily trip ends associated with the operational phase of the power plant in 2010 including the coal delivery.

Estimated Peak Hour Traffic

Again, there are no trip generation rates for Power Plant facilities in the ITE Trip Generation, 5th Edition, therefore, the trip generation rates for the AM and PM peak hour contained in the

TABLE 10 - ESTIMATED DAILY TRIP ENDS

| Land Use | Size | Trip Rate | Daily Trip Ends |
|---|---|---|---|
| Power Plant | 325 Employees (1) | 2.35/employee (2) | 764 |
| | 80 Trucks (3) | 2/truck | 160 |
| | Total | | 924 |

(1) Total operational employees projected for 2010 operations.

(2) Trip Generation rate based on Kimley-Horn Report for FPL in Martin County, FL.

(3) Estimated number of coal deliveries.

Kimley-Horn & Associates, Inc. traffic analysis for the FPL facility were utilized. Table 11 summarizes the trip ends attracted to the facility for both the AM and PM peak hours.

Peak Hour Traffic Distribution and Assignment

The distribution of the operational work force is based on information provided by Tampa Electric Company on existing employees and also from where they anticipate pulling their additional work force. This distribution is as follows:

- Polk County - 60%
- Hillsborough County - 25%
- Hardee County - 5%
- Manatee County - 5%
- Outside Region/State - 5%

The PPS will be located in the rural area of Polk County which has a limited roadway network. The primary roadways that will serve the project are SR 37, Fort Green Road, SR 674, and CR 630. Figure 5 illustrates the percentage of the operational trip ends assigned to each roadway.

TABLE 11 - ESTIMATED PEAK HOUR TRIP ENDS

| Land Use | Size | Analysis Period | Trip Generation Rate (1) In | Trip Generation Rate (1) Out | Trip Generation Rate (1) Total | Trip Ends In | Trip Ends Out | Trip Ends Total |
|---|---|---|---|---|---|---|---|---|
| Power Plant | 325 Employees | AM Peak Hour | 0.59 | 0.12 | 0.71 | 191 | 40 | 231 |
| | | PM Peak Hour | 0.08 | 0.32 | 0.40 | 25 | 105 | 130 |

(1) Trip generation rates obtained from Kimley-Horn & Associates, Inc. traffic analysis prepard for FPL facility in Martin County, Florida.

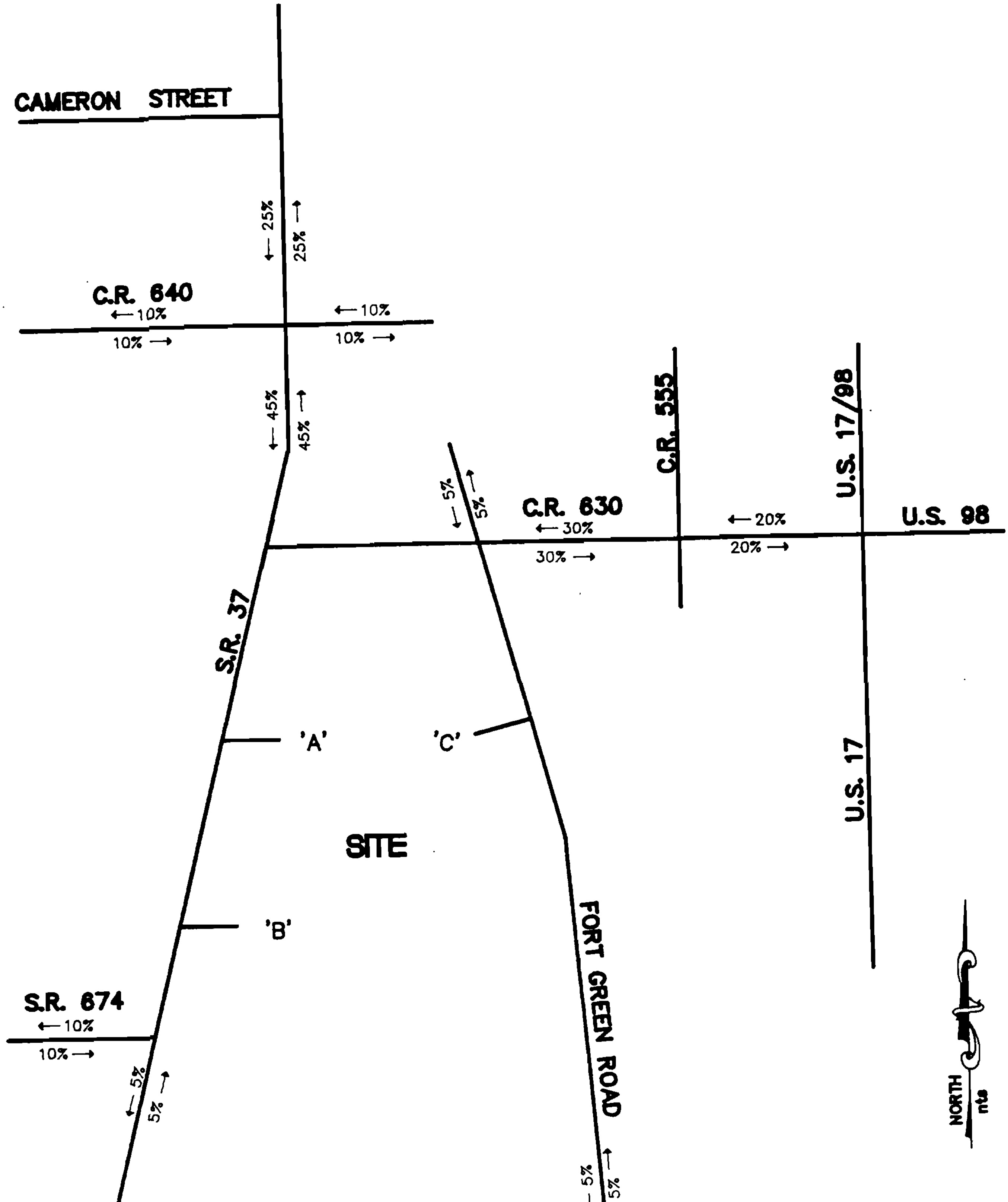



FIGURE 5
OPERATION DISTRIBUTION

LINCKS & ASSOCIATES, INC.

## Site Access

As stated previously, there are three accesses proposed for the facility, two on SR 37 and one on Fort Green Road. The utilization of the union and non-union access drives will be dictated by the percentage of union versus non-union employees for the contract maintenance and the construction personnel. Based on existing Tampa Electric facilities, it is assumed for the purpose of the analysis that 75% of the contract maintenance and construction employees will be union and the remaining 25% will be non-union. Therefore, the distribution of project traffic to the project driveway will be as follows:

Project Drive A - 75% of the contract maintenance and construction employees.

Project Drive B - 100% of the Tampa Electric operational employees.

Project Drive C - 25% of the contract maintenance and construction employees.

Figure 6 illustrates the AM and PM peak hour project traffic on the roadway links within the TIA. Figure 7 illustrates the AM and PM

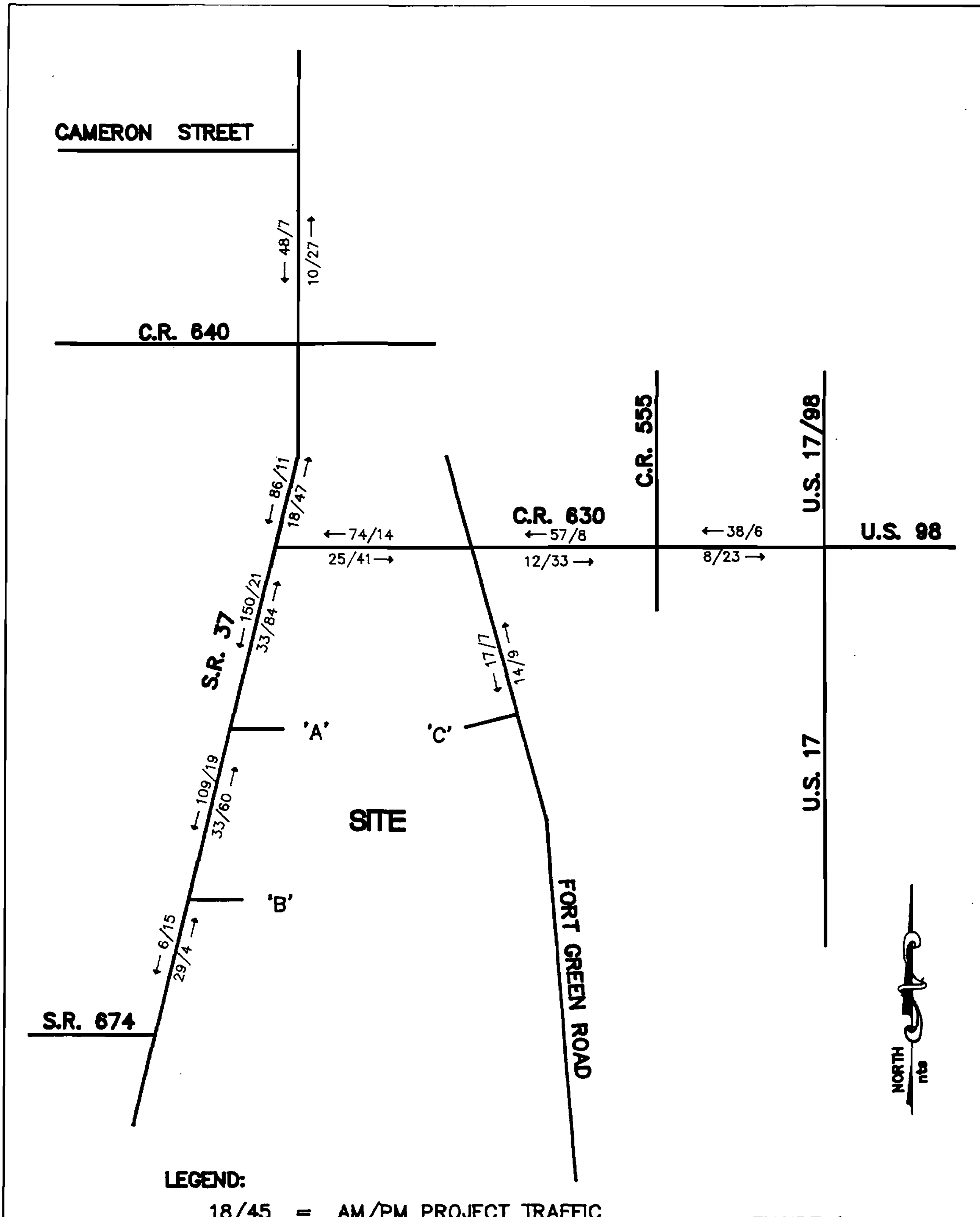
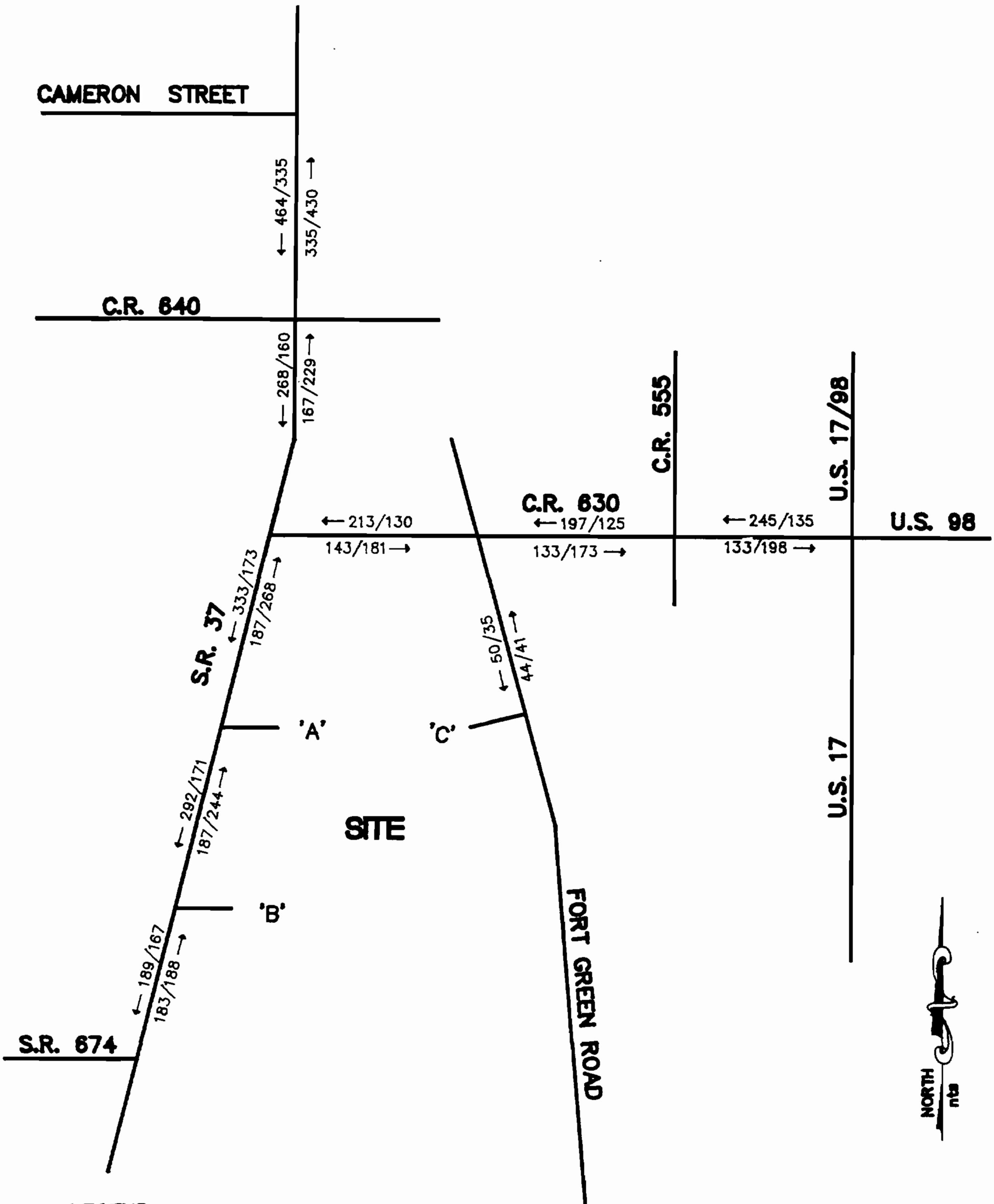



**FIGURE 6**
PROJECT TRAFFIC
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.




LEGEND:
18/45 = AM/PM PEAK HOUR VOLUMES

FIGURE 7
BACKGROUND + PROJECT TRAFFIC
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.

peak hour background plus project traffic on each of the roadway links within the TIA.

Figures 8 and 9 show the AM and PM peak hour project traffic and background plus project traffic at each of the project driveways and intersections to be analyzed, respectively.

## Link Analysis

Link analysis was conducted for both the AM and PM peak hour with the background plus project traffic on all the roadway segments within the TIA. Tables 12 and 13 summarize the link analysis for the AM and PM peak hour, respectively. As shown in the tables, all the roadway segments should operate at an acceptable level of service.

## Intersection Analysis

The intersection analysis was performed utilizing the methodology described in Chapter 9, Signalized Intersections, of the TRB Special Report 209, the Highway Capacity Manual. Table 14 summarizes the intersection analysis which indicates that all the intersections should operate at an acceptable level of service with the addition of the traffic associated with the operation of the facility and the existing geometry.

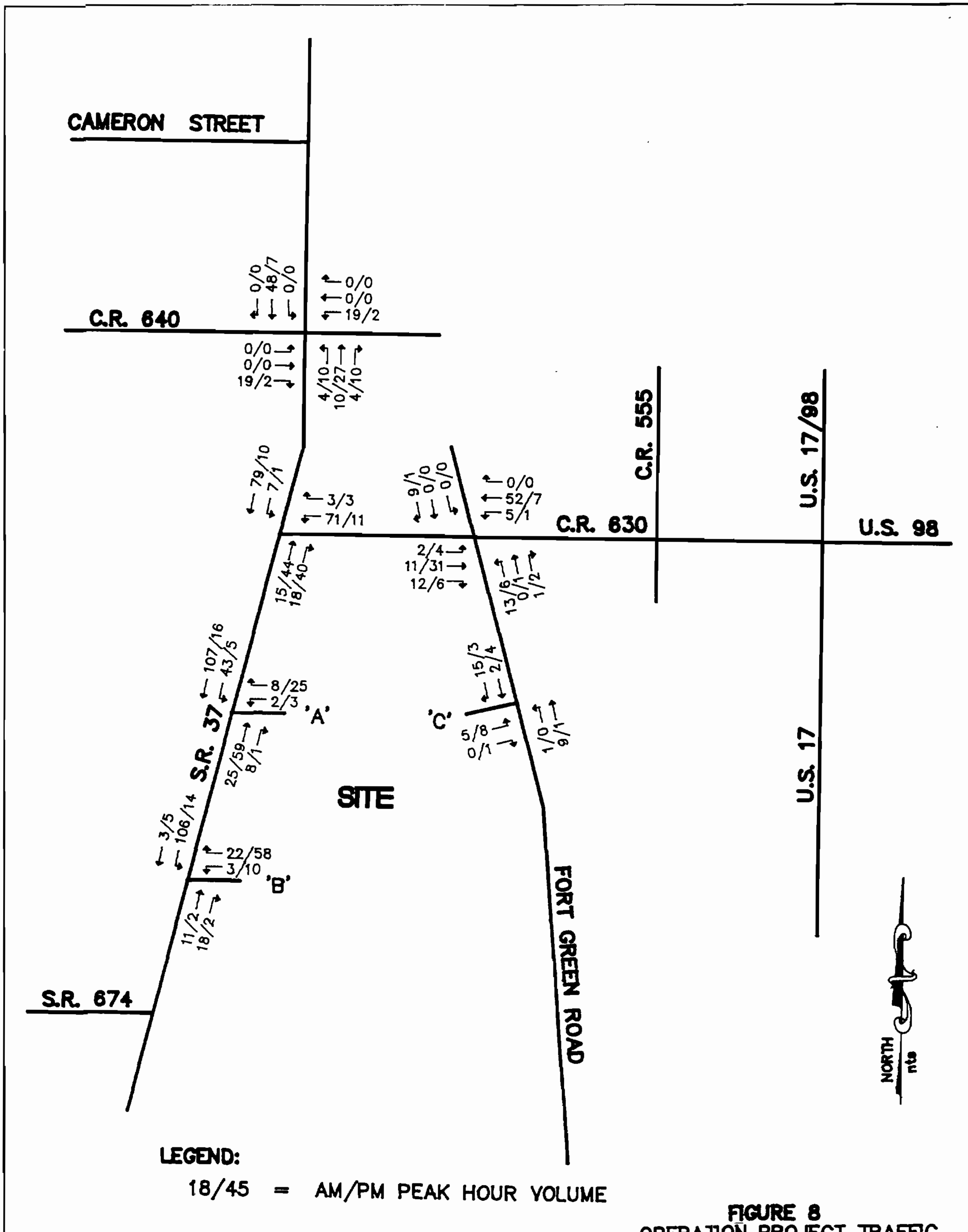



FIGURE 8
OPERATION PROJECT TRAFFIC
(INTERSECTION VOLUMES)

LINCKS & ASSOCIATES, INC.

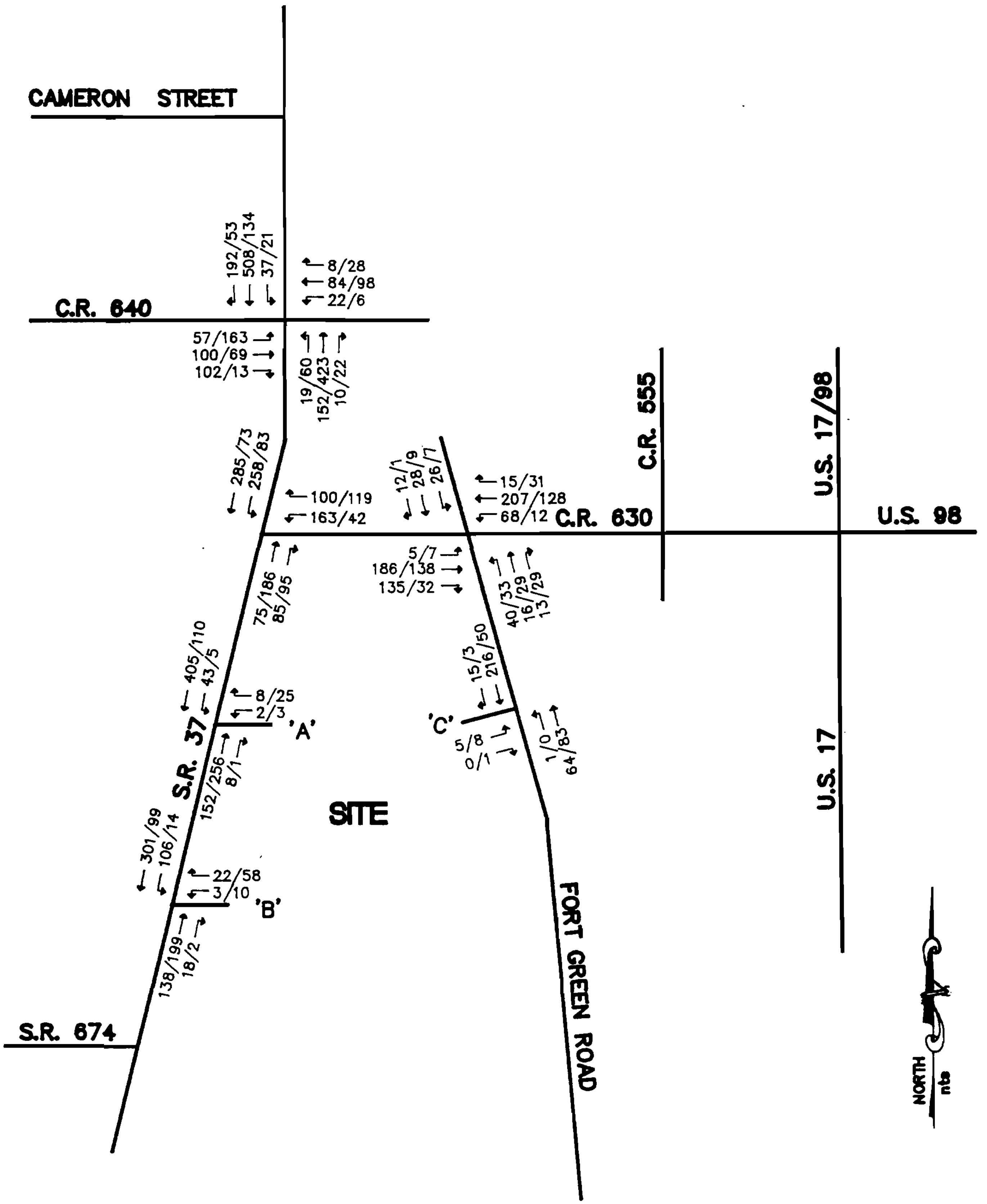



**FIGURE 9**
BACKGROUND + OPERATION
PROJECT TRAFFIC
(INTERSECTION VOLUMES)

LINCKS & ASSOCIATES, INC.

## TABLE 12 - LINK ANALYSIS - AM PEAK HOUR
## BACKGROUND PLUS OPERATION PROJECT CONDITIONS

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Perf. Std. (1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Background Traffic (3) | Project Traffic | Bckrd. + Project Traffic | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 2U | MA | M | D | 660 | 154 | 29 | 183 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 6 | 189 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 660 | 154 | 33 | 187 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 109 | 292 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 660 | 154 | 33 | 187 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 150 | 333 | C |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 660 | 149 | 18 | 167 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 86 | 268 | B |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 660 | 325 | 10 | 335 | C |
| | SB | 2U | MA | M | D | 870 | 416 | 48 | 464 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | D | 660 | 118 | 25 | 143 | B |
| | WB | 2U | (4) | M | D | 870 | 139 | 74 | 213 | B |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | D | 660 | 121 | 12 | 133 | B |
| | WB | 2U | (4) | M | D | 870 | 140 | 57 | 197 | B |
| CR 555 to US 98 | EB | 2U | (4) | M | D | 660 | 125 | 8 | 133 | B |
| | WB | 2U | (4) | M | D | 870 | 207 | 38 | 245 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (4) | M | D | 660 | 30 | 14 | 44 | A |
| | SB | 2U | (4) | M | D | 870 | 33 | 17 | 50 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction Level of Service capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction Level of Service capacity obtained from the FDOT Generalized Capacity Tables.

(3) Background Traffic = existing traffic + FPC AM peak hour operation project traffic. See Table 7.

(4) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

**TABLE 13 - LINK ANALYSIS - PM PEAK HOUR**
**BACKGROUND PLUS OPERATION PROJECT CONDITIONS**

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Perf. Std. (1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Background Traffic (3) | Project Traffic | Bckrd. + Project Traffic | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 2U | MA | M | D | 870 | 184 | 4 | 188 | B |
| | SB | 2U | MA | M | D | 660 | 152 | 15 | 167 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 870 | 184 | 60 | 244 | B |
| | SB | 2U | MA | M | D | 660 | 152 | 19 | 171 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 870 | 184 | 84 | 268 | B |
| | SB | 2U | MA | M | D | 660 | 152 | 21 | 173 | B |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 870 | 182 | 47 | 229 | B |
| | SB | 2U | MA | M | D | 660 | 149 | 11 | 160 | B |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 870 | 403 | 27 | 430 | C |
| | SB | 2U | MA | M | D | 660 | 328 | 7 | 335 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | D | 870 | 140 | 41 | 181 | B |
| | WB | 2U | (4) | M | D | 660 | 116 | 14 | 130 | B |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | D | 870 | 140 | 33 | 173 | B |
| | WB | 2U | (4) | M | D | 660 | 117 | 8 | 125 | B |
| CR 555 to US 98 | EB | 2U | (4) | M | D | 870 | 175 | 23 | 198 | B |
| | WB | 2U | (4) | M | D | 660 | 129 | 6 | 135 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (4) | M | D | 870 | 32 | 9 | 41 | A |
| | SB | 2U | (4) | M | D | 660 | 28 | 7 | 35 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour direction Level of Service capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction Level of Service capacity obtained from the FDOT Generalized Capacity Tables.

(3) Background Traffic = existing traffic + FPC PM peak hour operation project traffic. See Table 8.

(4) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

**TABLE 14 - SIGNALIZED INTERSECTION ANALYSIS**
**BACKGROUND PLUS OPERATION PROJECT CONDITIONS**

| Intersection | Analysis Period | Background + Operation Project Traffic Existing Geometry V/C | LOS | Delay |
|---|---|---|---|---|
| SR 37 and CR 640 | AM | 0.530 | B | 9.7 |
| | PM | 0.505 | B | 10.1 |
| SR 37 and CR 630 | AM | 0.695 | B | 6.4 |
| | PM | 0.393 | A | 5.0 |
| CR 630 and Fort Green Road | AM | 0.323 | B | 8.3 |
| | PM | 0.210 | B | 7.7 |

Again, the use of the methodology does not indicate the need for signalization nor that a signal warrant analysis was conducted, but rather to provide the overall level of service for each intersection.

## CONSTRUCTION PHASE

As stated previously in the report, there are two distinct phases for this project. The operational phase which was discussed in the previous section has the long term impacts. The initial construction phase which is projected to last approximately 27 months will have some short term impacts on the transportation system. This section of the report will evaluate the impacts of the temporary construction phase on the roadway network within the TIA identified in the previous section. This analysis will be based on the largest employment year during the construction phase.

As shown in Table 4, the peak employment during the construction phase of the project is projected to be in 1996 with 530 employees. This includes 400 construction employees and 130 operational employees. The time period that the construction employees and the operational employees are on the site at the same time should be approximately three to five months.

## Estimated Project Average Daily Traffic

The Institute of Transportation Engineers, Trip Generation, 5th Edition does not contain trip generation rates for the construction of power plant facilities. Therefore, the trip generation rates for the construction phase contained in the Kimley-Horn & Associates, Inc. traffic analysis for the FPL facility in Martin County were utilized. The trip generation rate contained in the Kimley-Horn & Associates, Inc. report for the construction employees was 2 trip ends per employee with a vehicle occupancy of 1.33 employees per vehicles.

In addition to the construction employees, there are projected to be 130 operational employees in 1996. Therefore, the daily trip generation for the operational employees discussed previously in this report was utilized to determine the trip generation potential for these employees.

Finally, for a worst case condition, it was assumed that the coal delivery would be at the 80 trucks per day. Table 15 summarizes the trip ends associated with the construction of the power plant facility.

TABLE 15 - ESTIMATED PROJECT AVERAGE DAILY TRAFFIC

| Land Use | Size | Vehicle Occupancy | Trip Generation Rate | Trip Ends |
|---|---|---|---|---|
| Power Plant | 400 Construction Employees | 1.33 employees vehicle | 2 trip ends/ employee | 602 |
| Power Plant | 130 Operational Employees | N/A | 2.35 trip ends/ employee | 306 |
| | 80 Coal Deliveries | N/A | 2 trip ends/ truck | 160 |
| | | | | 1,068 |

## Estimated Peak Hour Traffic

The trip generation rates contained in the Kimley-Horn & Associates, Inc. traffic analysis for the FPL Martin County facility were utilized for both the construction and operational employees to determine the trip ends attracted to the proposed facility during both the AM and PM peak hours. Tables 16 and 17 summarize the trip ends attracted to the proposed facility for both the AM and PM peak hours, respectively.

## Peak Hour Traffic Distribution and Assignment

The distribution of the project trip ends during the construction phase is based largely on who is selected to do the construction and where they may pull their work force. To estimate what the distribution of the work force may be, the distribution of the work force for TECO Power Services Hardee Power Station was utilized. The Hardee Power Station is currently under construction and, therefore, should give a reasonable estimate of the distribution of the work force during the construction phase of this project. This distribution is as follows:

- Polk County - 60%
- Hillsborough County - 30%

TABLE 16 - ESTIMATED AM PEAK HOUR TRIP ENDS

| | | | Trip Generation Rate | | | Trip Ends | | |
|---|---|---|---|---|---|---|---|---|
| Land Use | Size | Vehicle Occupancy | In | Out | Total | In | Out | Total |
| Power Plant | 400 Construction Employees | 1.33 Employees/ Vehicles | 1.0 | 0 | 1.0 | 301 | 0 | 301 |
| Power Plant | 130 Operational Employees | N/A | .59 | .12 | .71 | 76 | 16 | 92 |
| Total | 530 Employees | | | | | 377 | 16 | 393 |

TABLE 17 - ESTIMATED PM PEAK HOUR TRIP ENDS

| Land Use | Size | Vehicle Occupancy | Trip Generation Rate In | Out | Total | Trip Ends In | Out | Total |
|---|---|---|---|---|---|---|---|---|
| Power Plant | 400 Construction Employees | 1.33 Employees/ Vehicles | 0 | 1.0 | 1.0 | 0 | 301 | 301 |
| Power Plant | 130 Operational Employees | N/A | .08 | .32 | .40 | 10 | 42 | 52 |
| Total | 530 Employees | | | | | 10 | 343 | 353 |

- Manatee and Hardee County - 5%
- Outside Region/State - 5%

Figure 10 illustrates these percentages on the adjacent roadway system.

## Site Access

The three access driveways for the project previously mentioned in this report are also proposed to be utilized during the construction phase of the project. Again, the utilization of the union and non-union access drives will be dictated by the percentage of union versus non-union construction employees. This percentage will be based entirely on who is selected to do the construction of the facility. At this point in time, no contractors have been selected, therefore, the distribution of project traffic to the project driveways will be based on the following two scenarios:

- I - 75% union construction employees
  25% non-union construction employees
- II - 25% union construction employees
  75% non-union construction employees

The distribution of employees to the project driveways under Scenario I will be as follows:

- Project Driveway A - 75% construction employees

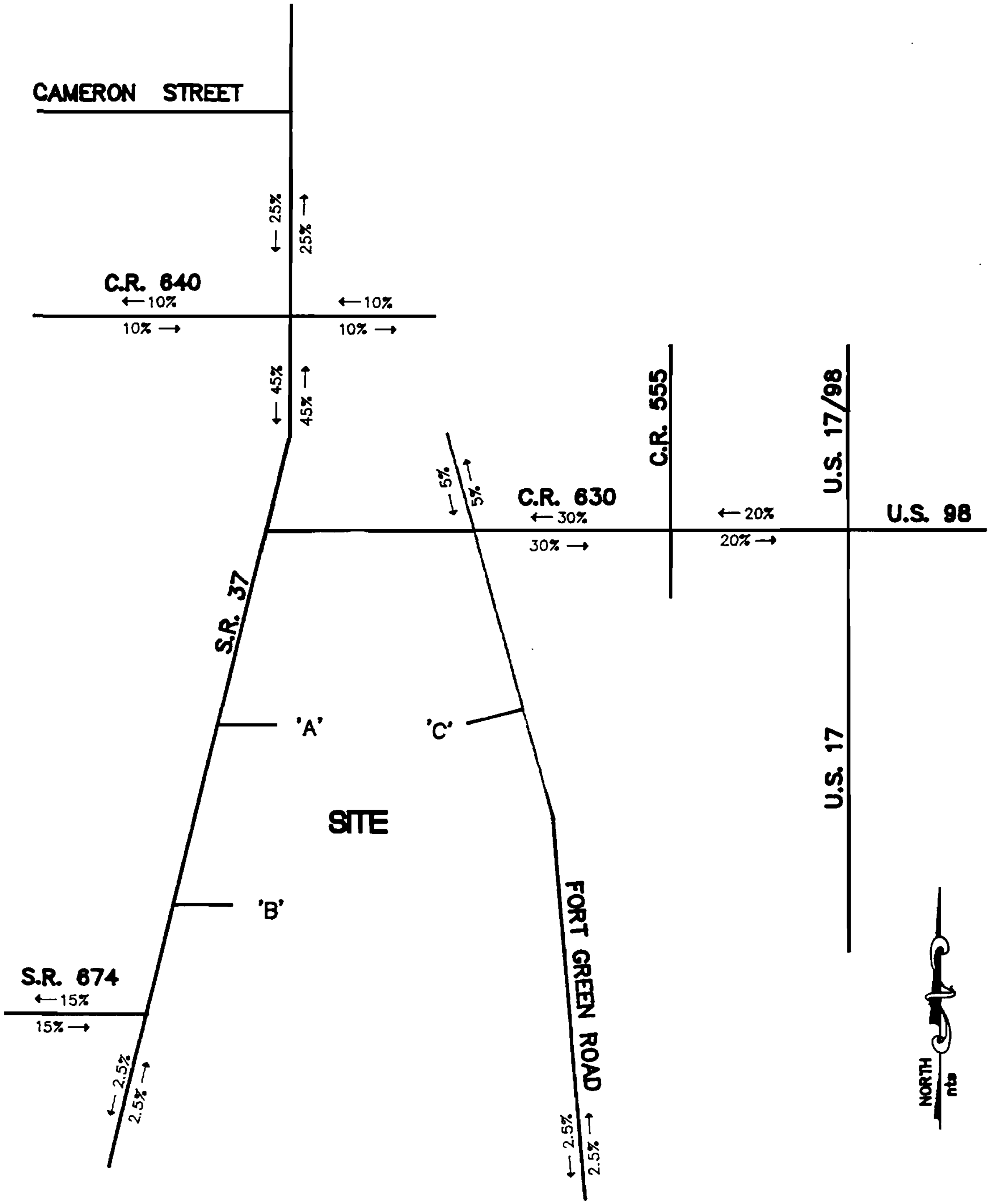



**FIGURE 10**
CONSTRUCTION DISTRIBUTION

LINCKS & ASSOCIATES, INC.

- Project Driveway B - 100% of the Tampa Electric operational employees.

- Project Driveway C - 25% of the construction employees.

Figure 11 illustrates the link volumes and Figure 12 illustrates the intersection volumes for the construction project traffic under Scenario I.

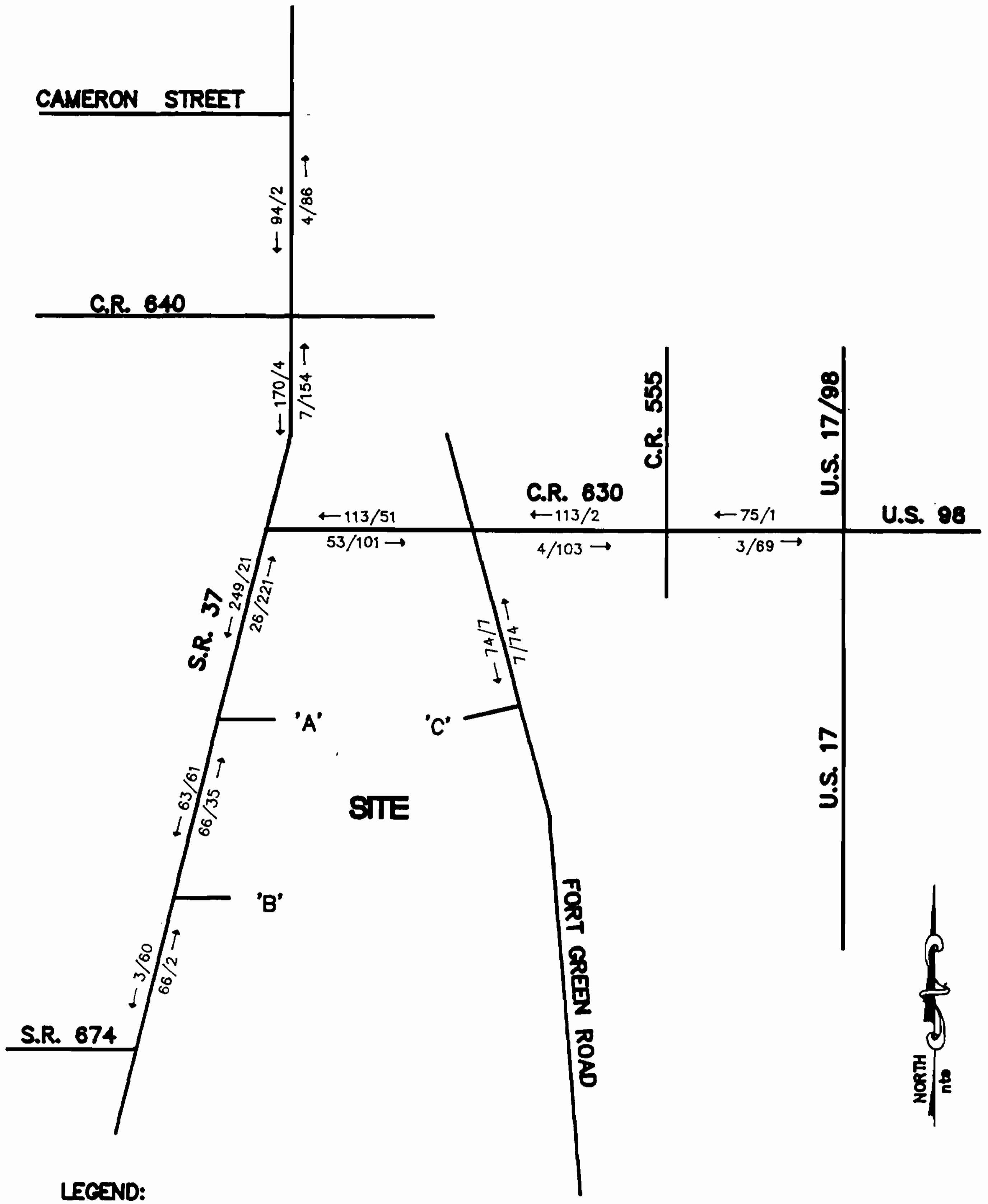
The distribution of the employees to the project driveways for Scenario II will be as follows:

- Project Driveway A - 25% construction employees

- Project Driveway B - 100% of the Tampa Electric operational employees.

- Project Driveway C - 75% of the construction employees.

Figure 13 illustrates the link volumes and Figure 14 illustrates the intersection volumes for the construction project traffic under Scenario II.




LEGEND:
183/145 = AM/PM PEAK HOUR VOLUMES

**FIGURE 11**
CONSTRUCTION PROJECT TRAFFIC
SCENARIO I
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.

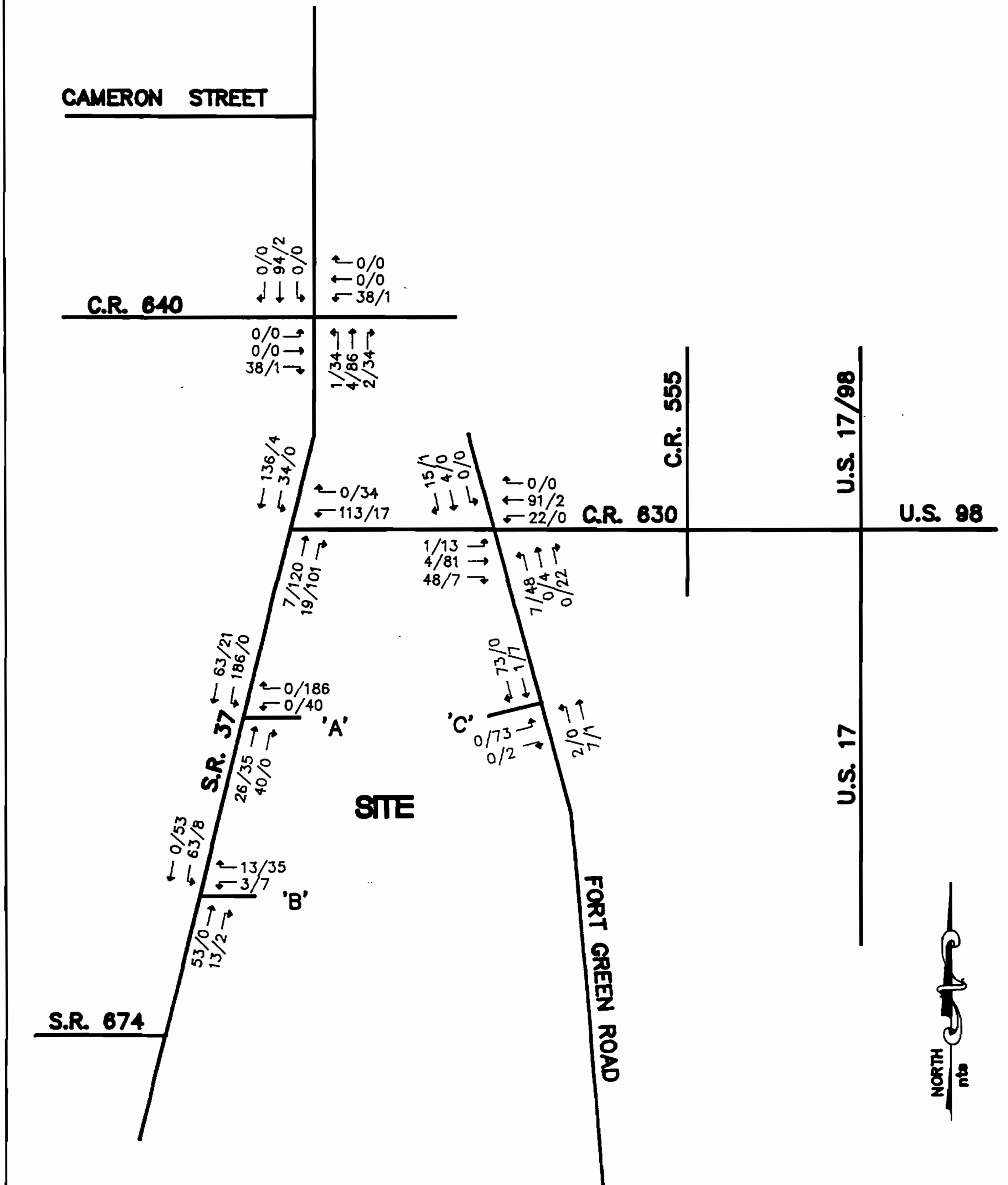



**FIGURE 12**
CONSTRUCTION PROJECT TRAFFIC
SCENARIO I
(INTERSECTION VOLUMES)

LINCKS & ASSOCIATES, INC.

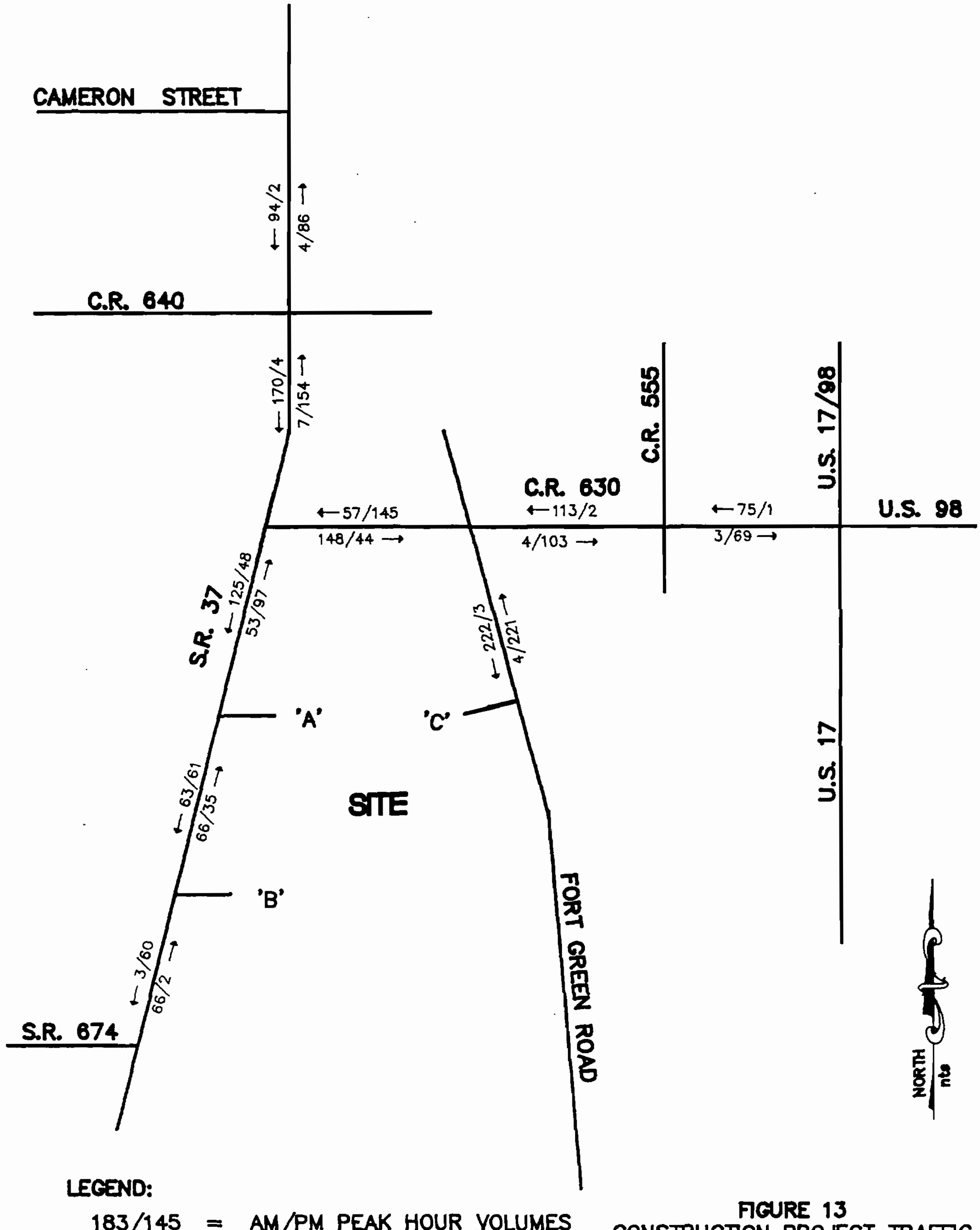



FIGURE 13
CONSTRUCTION PROJECT TRAFFIC
SCENARIO II
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.

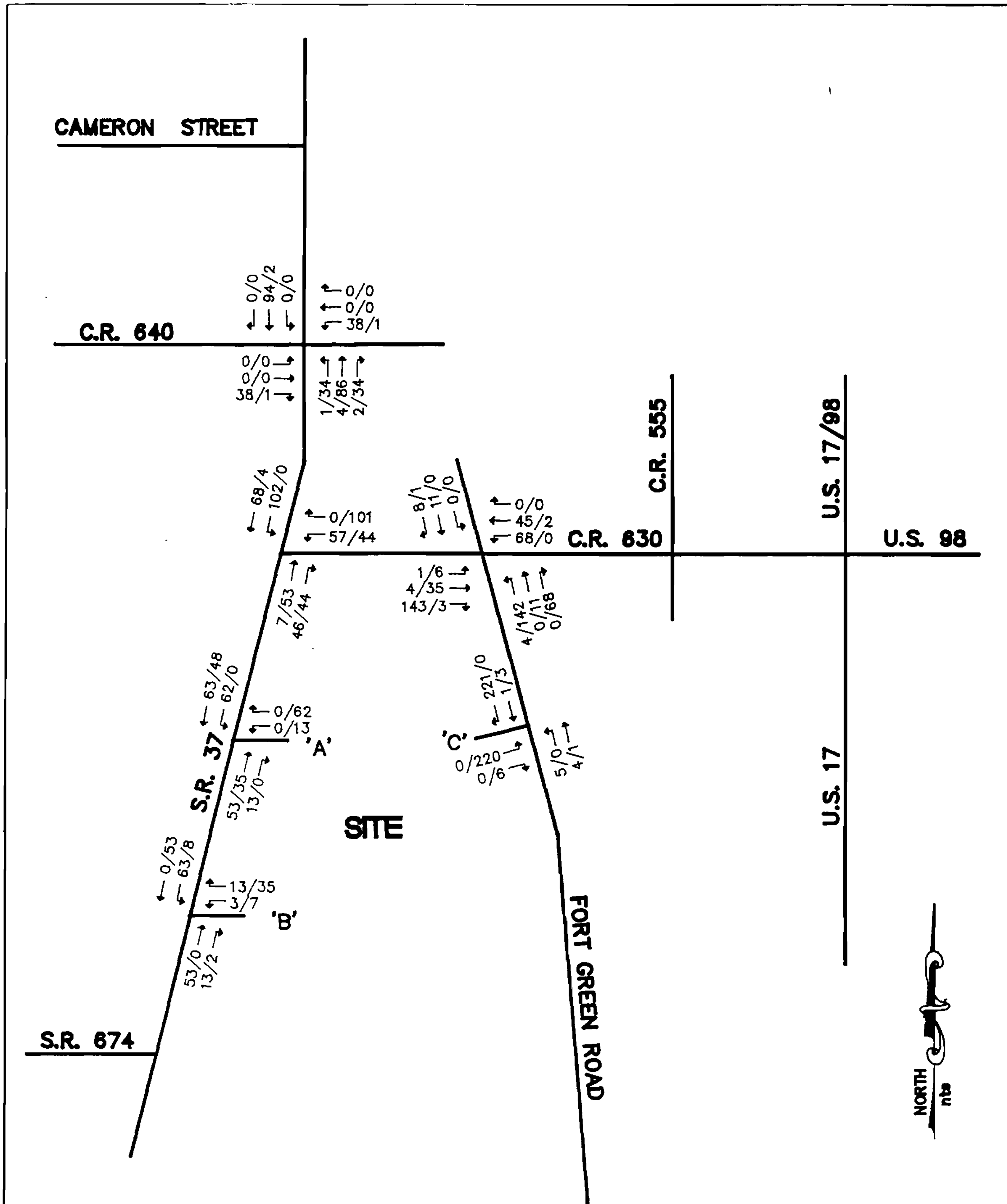



**FIGURE 14**
CONSTRUCTION PROJECT TRAFFIC
SCENARIO II
(INTERSECTION VOLUMES)

LINCKS & ASSOCIATES, INC.

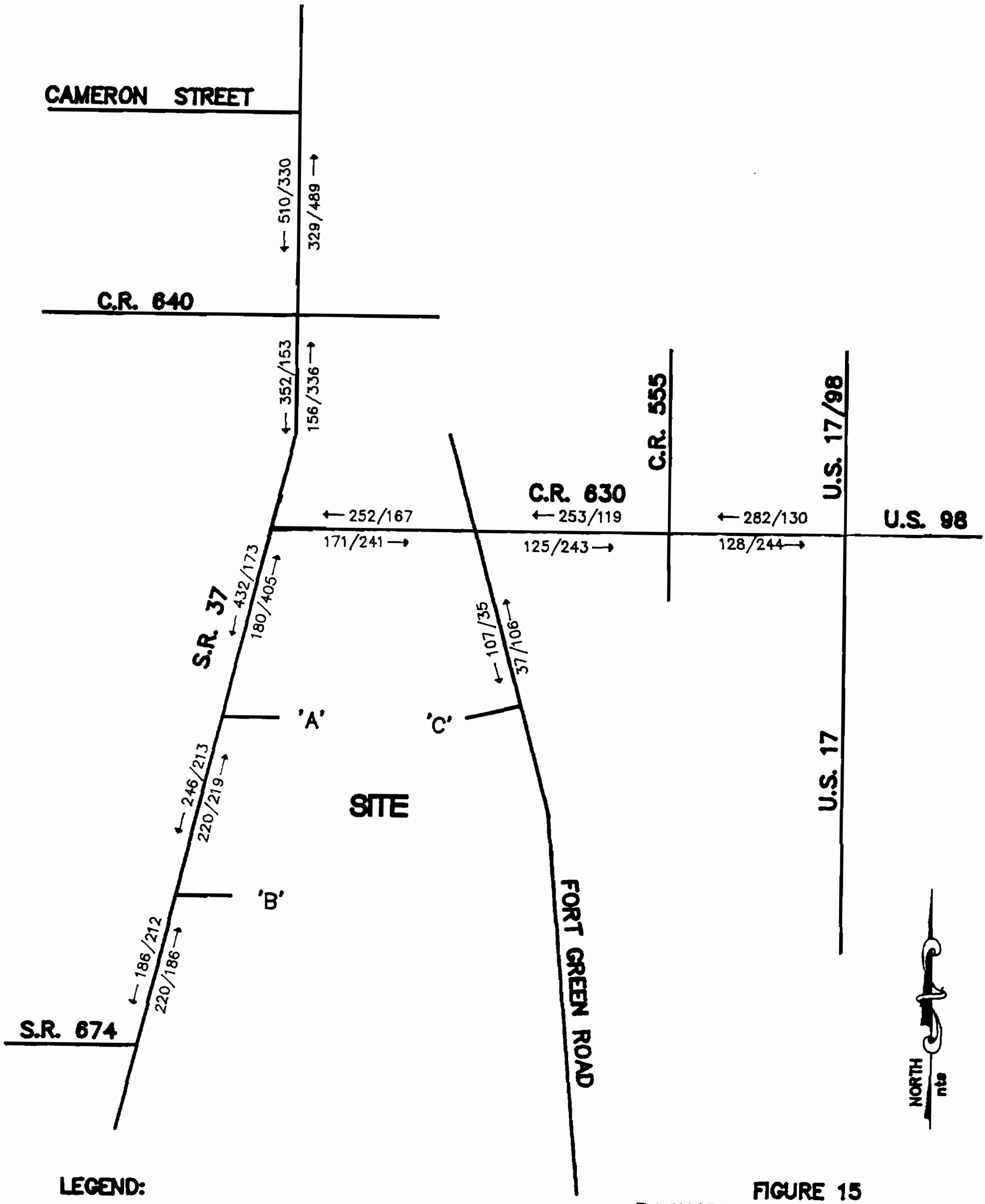
## Background Traffic

The same background traffic was utilized for the construction phase analysis as for the operational phase analysis for the following reasons:

1. The existing peak hour/peak and off-peak direction/peak season volumes would be the same under both the operational and construction analyses.

2. The trip ends associated with the FPC in the operational portion of this report was based on 470 employees at the FPC facility. In 1996, FPC projects only 83 construction employees. Therefore, the trip ends associated with the FPC in the operation portion of this report would be considerably higher than what is projected to be present in 1996, therefore, this would present a worst case condition.

Figures 15 and 16 illustrate the link volumes for the background plus construction project traffic for Scenarios I and II, respectively. Figures 17 and 18 illustrate the intersection volume with the background plus construction project traffic for Scenarios I and II, respectively.

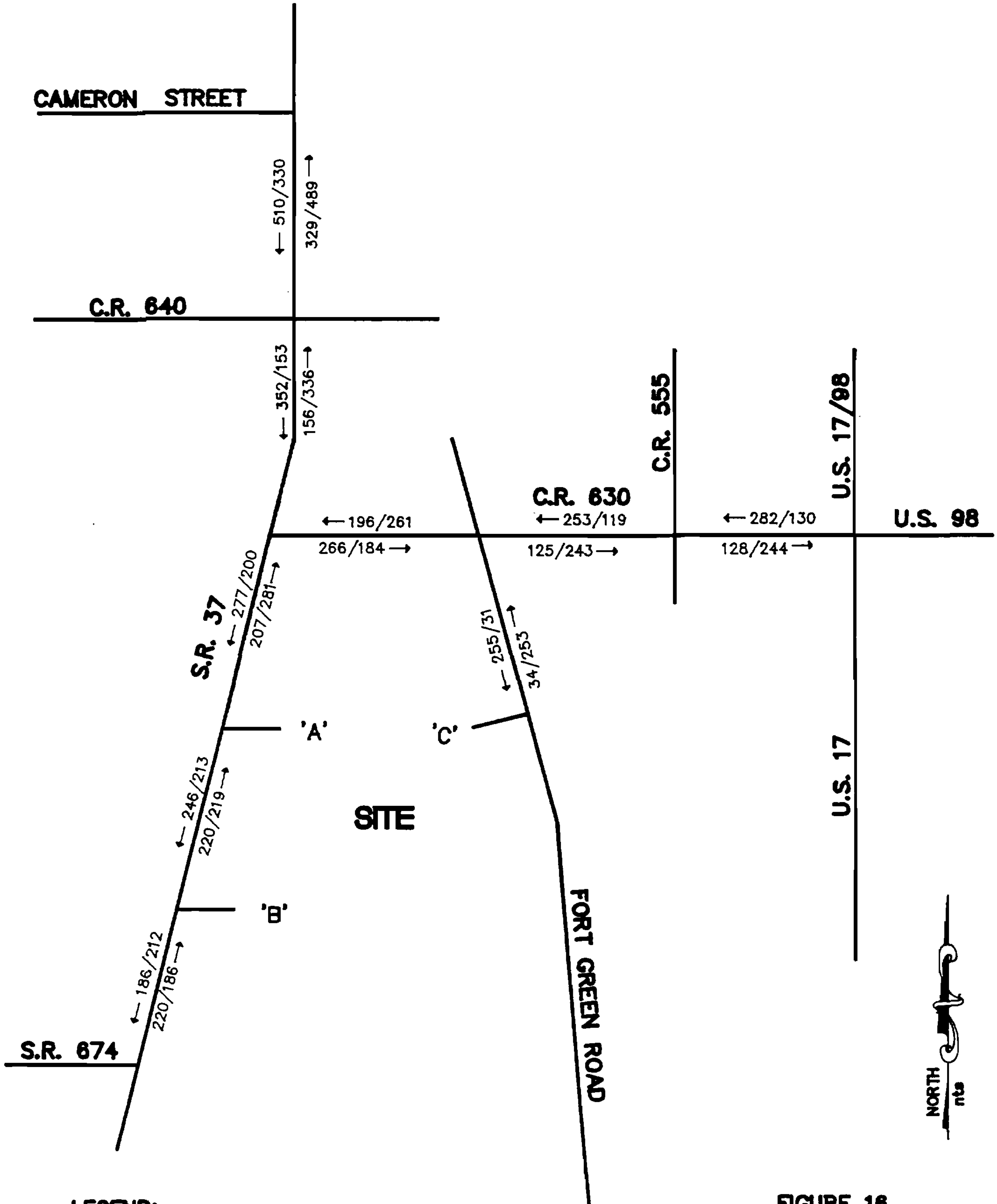



**LEGEND:**

183/145 = AM/PM PEAK HOUR VOLUMES

**FIGURE 15**
BACKGROUND + CONSTRUCTION
PROJECT TRAFFIC
SCENARIO I
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.




LEGEND:
183/145 = AM/PM PEAK HOUR VOLUMES

FIGURE 16
BACKGROUND + CONSTRUCTION
PROJECT TRAFFIC
SCENARIO II
(LINK VOLUMES)

LINCKS & ASSOCIATES, INC.

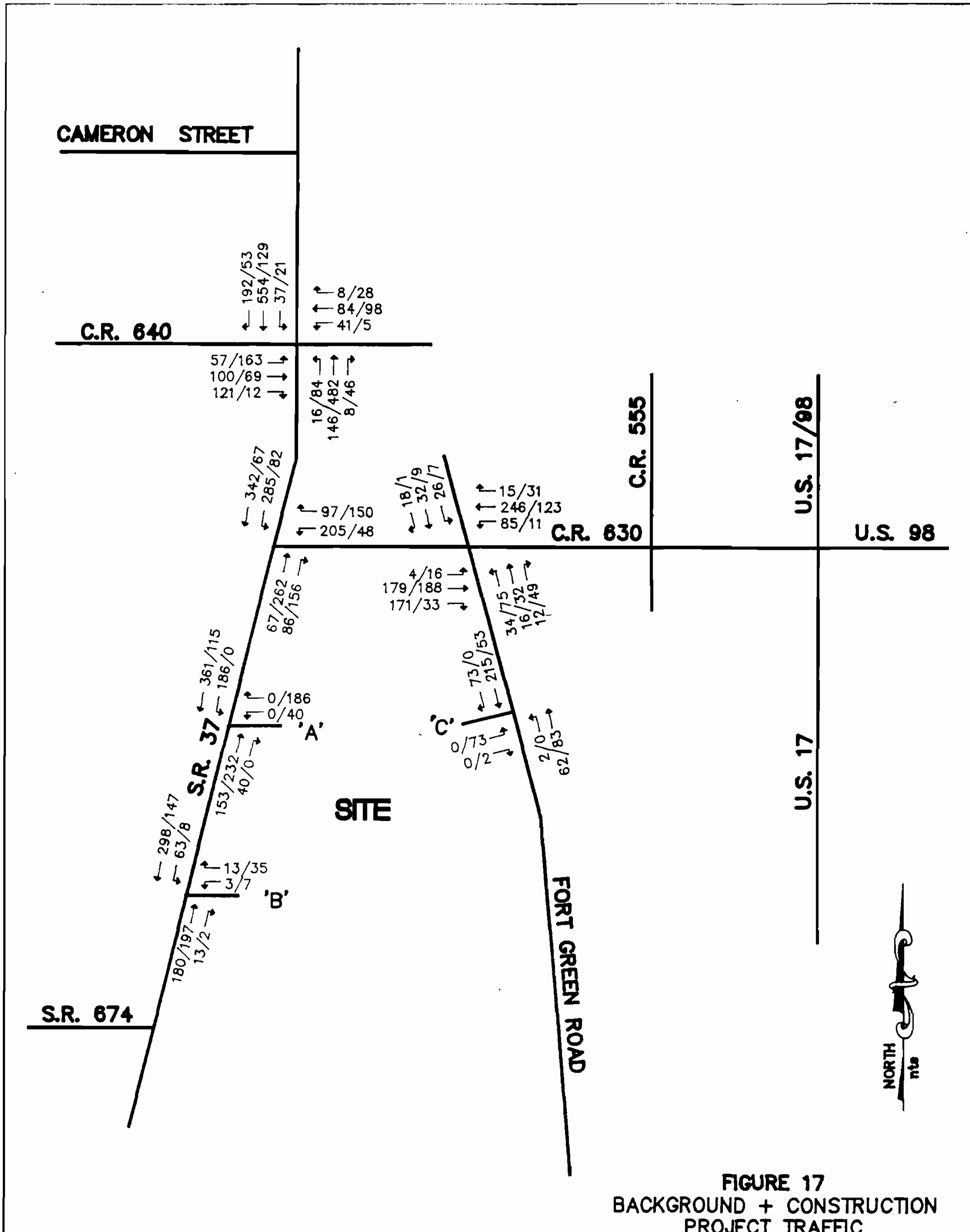



FIGURE 17
BACKGROUND + CONSTRUCTION
PROJECT TRAFFIC
SCENARIO I
(INTERSECTION VOLUMES)

LINCKS & ASSOCIATES, INC.

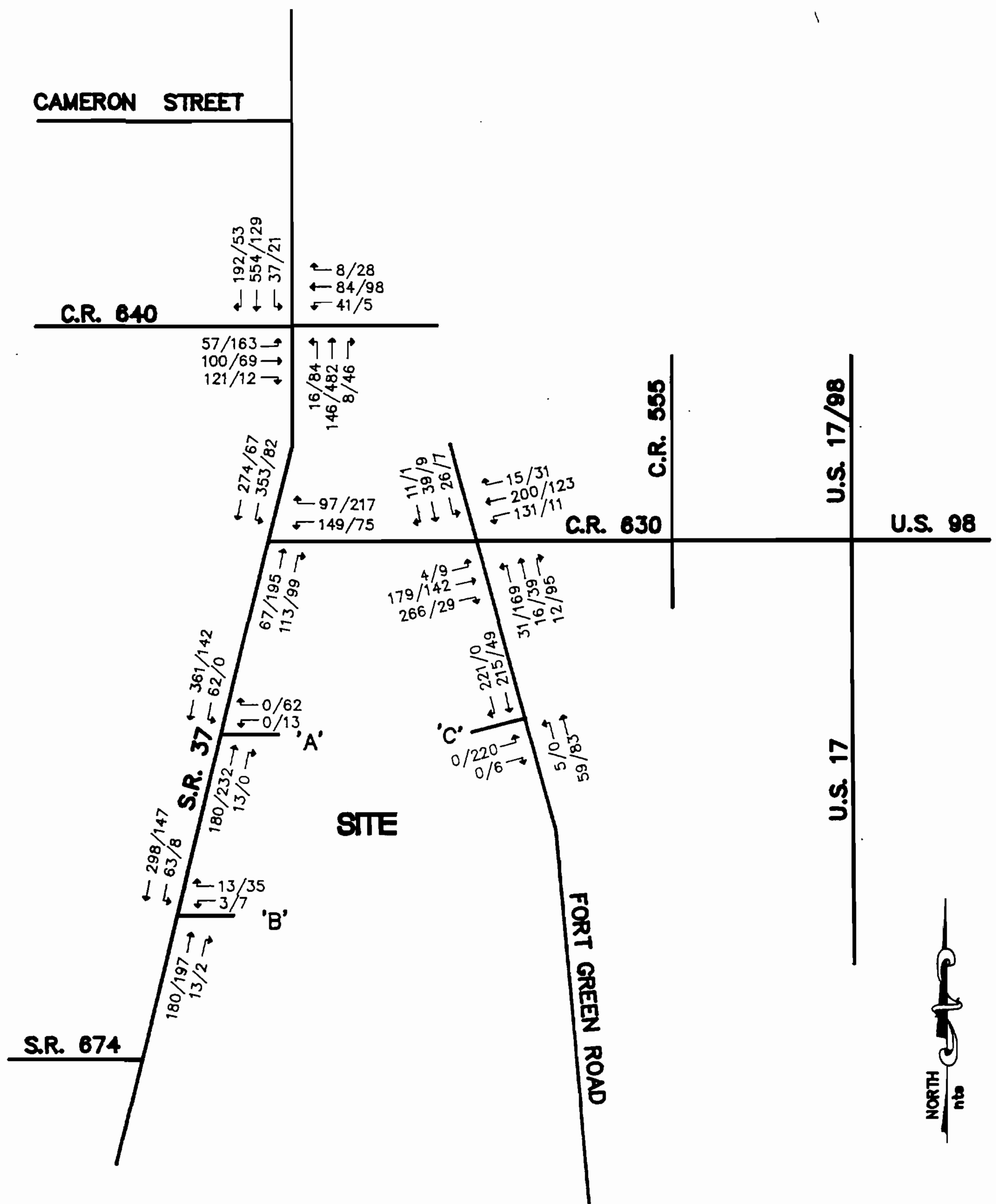



**FIGURE 18**
BACKGROUND + CONSTRUCTION
PROJECT TRAFFIC
SCENARIO II
(INTERSECTION VOLUMES)

LINCKS & ASSOCIATES, INC.

## Link Analysis

The link analysis for the construction phase was performed for both scenarios.

Scenario I

Tables 18 and 19 summarize the link analysis for the background plus construction project traffic for the AM and PM peak hours, respectively. As shown in the tables, all roadway links should operate at an acceptable level of service.

Scenario II

Tables 20 and 21 summarize the link analysis for the background plus construction project traffic for the AM and PM peak hours, respectively. As shown in the tables, all roadway links should operate at an acceptable level of service.

## Intersection Analysis

An intersection analysis was conducted for each of the intersections that were identified to be studied previously in this report. The analysis was conducted with the background plus construction project traffic for both scenarios.

## TABLE 18 - LINK ANALYSIS - AM PEAK HOUR
## BACKGROUND PLUS CONSTRUCTION PROJECT CONDITIONS - SCENARIO I

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Perf. Std. (1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Background Traffic (3) | Project Traffic | Bckrd. + Project Traffic | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 2U | MA | M | D | 870 | 154 | 66 | 220 | B |
| | SB | 2U | MA | M | D | 660 | 183 | 3 | 186 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 660 | 154 | 66 | 220 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 63 | 246 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 660 | 154 | 26 | 180 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 249 | 432 | C |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 660 | 149 | 7 | 156 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 170 | 352 | C |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 660 | 325 | 4 | 329 | C |
| | SB | 2U | MA | M | D | 870 | 416 | 94 | 510 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | D | 660 | 118 | 53 | 171 | B |
| | WB | 2U | (4) | M | D | 870 | 139 | 113 | 252 | B |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | D | 660 | 121 | 4 | 125 | A |
| | WB | 2U | (4) | M | D | 870 | 140 | 113 | 253 | B |
| CR 555 to US 98 | EB | 2U | (4) | M | D | 660 | 125 | 3 | 128 | A |
| | WB | 2U | (4) | M | D | 870 | 207 | 75 | 282 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (4) | M | D | 660 | 30 | 7 | 37 | A |
| | SB | 2U | (4) | M | D | 870 | 33 | 74 | 107 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction level of service capacity obtained from Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction obtained from the FDOT Generalized Capacity Tables.

(3) Background Traffic = existing traffic + FPC AM peak hour operation project traffic. See Table 7.

(4) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

**TABLE 19 - LINK ANALYSIS - PM PEAK HOUR**
**BACKGROUND PLUS CONSTRUCTION PROJECT CONDITIONS - SCENARIO I**

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Perf. Std. (1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Background Traffic (3) | Project Traffic | Bckrd. + Project Traffic | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 2U | MA | M | D | 660 | 184 | 2 | 186 | B |
| | SB | 2U | MA | M | D | 870 | 152 | 60 | 212 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 870 | 184 | 35 | 219 | B |
| | SB | 2U | MA | M | D | 660 | 152 | 61 | 213 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 870 | 184 | 221 | 405 | C |
| | SB | 2U | MA | M | D | 660 | 152 | 21 | 173 | B |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 870 | 182 | 154 | 336 | C |
| | SB | 2U | MA | M | D | 660 | 149 | 4 | 153 | B |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 870 | 403 | 86 | 489 | C |
| | SB | 2U | MA | M | D | 660 | 328 | 2 | 330 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | D | 870 | 140 | 101 | 241 | B |
| | WB | 2U | (4) | M | D | 660 | 116 | 51 | 167 | B |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | D | 870 | 140 | 103 | 243 | B |
| | WB | 2U | (4) | M | D | 660 | 117 | 2 | 119 | A |
| CR 555 to US 98 | EB | 2U | (4) | M | D | 870 | 175 | 69 | 244 | B |
| | WB | 2U | (4) | M | D | 660 | 129 | 1 | 130 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (4) | M | D | 870 | 32 | 74 | 106 | A |
| | SB | 2U | (4) | M | D | 660 | 28 | 7 | 35 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction level of service capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction obtained from the FDOT Generalized Capacity Tables.

(3) Background Traffic = existing traffic + FPC PM peak hour operation project traffic. See Table 8.

4) No functional classification provided in Polk County Roadway Inventory dated March, 1992.

**TABLE 20 - LINK ANALYSIS - AM PEAK HOUR**
**BACKGROUND PLUS CONSTRUCTION PROJECT CONDITIONS - SCENARIO II**

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Perf. Std. (1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Background Traffic (3) | Project Traffic | Bckrd. + Project Traffic | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 2U | MA | M | D | 870 | 154 | 66 | 220 | B |
| | SB | 2U | MA | M | D | 660 | 183 | 3 | 186 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 660 | 154 | 66 | 220 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 63 | 246 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 660 | 154 | 53 | 207 | B |
| | SB | 2U | MA | M | D | 870 | 183 | 125 | 277 | B |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 660 | 149 | 7 | 156 | B |
| | SB | 2U | MA | M | D | 870 | 182 | 170 | 352 | C |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 660 | 325 | 4 | 329 | C |
| | SB | 2U | MA | M | D | 870 | 416 | 94 | 510 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | D | 870 | 118 | 148 | 266 | B |
| | WB | 2U | (4) | M | D | 660 | 139 | 57 | 196 | B |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | D | 660 | 121 | 4 | 125 | A |
| | WB | 2U | (4) | M | D | 870 | 140 | 113 | 253 | B |
| CR 555 to US 98 | EB | 2U | (4) | M | D | 660 | 125 | 3 | 128 | A |
| | WB | 2U | (4) | M | D | 870 | 207 | 75 | 282 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (4) | M | D | 660 | 30 | 4 | 34 | A |
| | SB | 2U | (4) | M | D | 870 | 33 | 222 | 255 | B |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction level of service obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction obtained from the FDOT Generalized Capacity Tables.

(3) Background Traffic = existing traffic + FPC AM peak hour operation project traffic. See Table 7.

(4) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.



LINCKS & ASSOCIATES, INC.

**TABLE 21 - LINK ANALYSIS - PM PEAK HOUR**
**BACKGROUND PLUS CONSTRUCTION PROJECT CONDITIONS - SCENARIO II**

| Roadway Segment | Dir | Existing Lane Type (1) | Functional Classification (1) | Group (1) | Perf. Std. (1) | LOS Perf. Std. Dir. Peak Hr. Capacity (2) | Background Traffic (3) | Project Traffic | Bckrd. + Project Traffic | LOS |
|---|---|---|---|---|---|---|---|---|---|---|
| SR 37 | | | | | | | | | | |
| SR 674 - Project Dr. B | NB | 2U | MA | M | D | 660 | 184 | 2 | 186 | B |
| | SB | 2U | MA | M | D | 870 | 152 | 60 | 212 | B |
| Proj. Drive B to Proj. Drive A | NB | 2U | MA | M | D | 870 | 184 | 35 | 219 | B |
| | SB | 2U | MA | M | D | 660 | 152 | 61 | 213 | B |
| Proj. Drive A to CR 630 | NB | 2U | MA | M | D | 870 | 184 | 97 | 281 | B |
| | SB | 2U | MA | M | D | 660 | 152 | 48 | 200 | B |
| CR 630 to CR 640 | NB | 2U | MA | M | D | 870 | 182 | 154 | 336 | C |
| | SB | 2U | MA | M | D | 660 | 149 | 4 | 153 | B |
| CR 640 to Cameron Street | NB | 2U | MA | M | D | 870 | 403 | 86 | 489 | C |
| | SB | 2U | MA | M | D | 660 | 328 | 2 | 330 | C |
| CR 630 | | | | | | | | | | |
| SR 37 to Fort Green Road | EB | 2U | (4) | M | D | 660 | 140 | 44 | 184 | B |
| | WB | 2U | (4) | M | D | 870 | 116 | 145 | 261 | B |
| Fort Green Road to CR 555 | EB | 2U | (4) | M | D | 870 | 140 | 103 | 243 | B |
| | WB | 2U | (4) | M | D | 660 | 117 | 2 | 119 | A |
| CR 555 to US 98 | EB | 2U | (4) | M | D | 870 | 175 | 69 | 244 | B |
| | WB | 2U | (4) | M | D | 660 | 129 | 1 | 130 | B |
| Fort Green Road | | | | | | | | | | |
| Proj. Drive C to CR 630 | NB | 2U | (4) | M | D | 870 | 32 | 221 | 253 | B |
| | SB | 2U | (4) | M | D | 660 | 28 | 3 | 31 | A |

(1) Obtained from the Polk County Roadway Inventory dated March, 1992.

(2) Peak hour peak direction level of service capacity obtained from the Polk County Roadway Inventory dated March, 1992. Peak hour off-peak direction obtained from the FDOT Generalized Capacity Tables.

(3) Background Traffic = existing traffic + FPC PM peak hour operation project traffic. See Table 8.

(4) No functional classification provided in the Polk County Roadway Inventory dated March, 1992.

Scenario I

Table 22 summarizes the results of the intersection analysis which indicates that all the intersections should operate at an acceptable level of service.

Scenario II

Table 23 summarizes the results of the intersection analysis which indicates that all the intersections should operate at an acceptable level of service.

## TRANSPORTATION SYSTEM MANAGEMENT

Transportation System Management (TSM) utilizes several different methods, either separately or in conjunction with each other to reduce the traffic on the roadways during the peak hours. Some of these methods include car pooling, ride sharing, staggered hours, etc. Tampa Electric Company is committed to assisting the employees with those TSM measures to the reasonable extent possible.

Currently, Tampa Electric Company offers car pooling/ride sharing through a company bulletin board at each location and also through the company newsletter (see Appendix). Tampa Electric Company is

TABLE 22 - SIGNALIZED INTERSECTION ANALYSIS
BACKGROUND PLUS CONSTRUCTION PROJECT TRAFFIC - SCENARIO I

| Intersection | Analysis Period | Background Traffic Existing Geometry V/C | LOS | Delay |
|---|---|---|---|---|
| SR 37 and CR 640 | AM | 0.576 | B | 10.2 |
| | PM | 0.572 | B | 10.6 |
| SR 37 and CR 630 | AM | 0.795 | B | 7.3 |
| | PM | 0.545 | B | 5.5 |
| CR 630 and Fort Green Road | AM | 0.387 | B | 8.8 |
| | PM | 0.311 | B | 8.5 |

TABLE 23 - SIGNALIZED INTERSECTION ANALYSIS
BACKGROUND PLUS CONSTRUCTION PROJECT TRAFFIC - SCENARIO II

| Intersection | Analysis Period | Background Traffic Existing Geometry V/C | LOS | Delay |
|---|---|---|---|---|
| SR 37 and CR 640 | AM | 0.576 | B | 10.2 |
| | PM | 0.572 | B | 10.6 |
| SR 37 and CR 630 | AM | 0.771 | B | 7.2 |
| | PM | 0.532 | B | 6.6 |
| CR 630 and Fort Green Road | AM | 0.475 | B | 10.3 |
| | PM | 0.392 | B | 11.2 |

committed to offering the same type of TSM measures at the PPS during both the construction phase and also the operational phase.

According to Ed Mierzejewski of the Center for Urban Transportation Research, there are no specific programs available at this time to assist any further in other TSM measures. However, if such programs are made available in the future, Tampa Electric Company is committed to reviewing the program to determine the feasibility of implementation at the facility.

## CONCLUSION

Based upon the agreed methodology, all existing roadway links and intersections within the Traffic Impact Area should operate at an acceptable level of service with the existing traffic plus the traffic associated with the Florida Power Corporation Power Station. With the addition of the project traffic associated with the operation and also the construction of the Tampa Electric Company's Polk Power Station, all roadway links and intersections should continue to operate at an acceptable level of service with the existing geometry. Therefore, no additional roadway improvements should be required due to the addition of the Polk Power Station.

APPENDIX

# POLK COUNTY ROADWAY INVENTORY

Polk County
March 1992

| Link# | Link | From | To | Lane Type | Functional Classification | Group (see chart) | Length | Existing AADT | Daily Capacity | Existing P/D/S* | P/D/S* Capacity | Ex. Daily LOS | Perf. Standard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 | US 17 | HARDEE CO/L | NORTH OF RAILROAD | 2U | PA | A | 2.9 | 6,052 | 15,600 | 339 | 840 | A | C |
| 1001 | US 17 | NORTH OF RAILROAD | SAND MOUTAIN RD | 2U | PA | M | 2.7 | 6,260 | 9,400 | 350 | 540 | C | C |
| 1002 | US 17 | SAND MOUNTAIN RD | S. 9th ST | 4D | PA | M | 1.2 | 6,260 | 30,900 | 350 | 2,280 | A | C |
| 1003 | US 17 | S. 9TH ST | US 98 (Ft. Meade) | 4D | PA | D | .8 | 11,582 | 20,100 | 589 | 1,090 | C | C |
| 1004 | US 17 | US 98 | N. 9TH STREET | 4D | PA | A | .7 | 14,960 | 33,000 | 761 | 1,790 | A | C |
| 1005 | US 17 / US 98 | N. 9TH ST (FT MEADE) | MANN RD (BARTOW) | 4D | PA | M | 8.1 | 11,684 | 30,900 | 654 | 2,280 | A | C |
| 1006 | US 17 / US 98 | MANN RD | BUS. SR 60 | 4D | PA | C | 1.6 | 17,563 | 29,500 | 893 | 1,600 | B | C |
| 1007 | US 17 / US 98 | BUS. SR 60 | SR 60A CONNECTOR | 2U | PA | C | .5 | 15,631 | 12,857 | 795 | 730 | F | C |
| 1008 | US 17 | SR 60A CONNECTOR | CRYSTAL BEACH RD | 4D | PA | A | 6.5 | 15,430 | 34,900 | 785 | 1,890 | A | D |
| 1009 | US 17 EAGLE LAKE RD | CRYSTAL BEACH RD | SR 655 (LK. SHIPP DR) | 6D | PA | B | 2.0 | 13,841 | 48,900 | 704 | 2,650 | A | D |
| 1010 | US 17 EAGLE LAKE RD | SR 544 (LK SHIPP DR) | SR 540 (CYP GDNS) | 2U | PA | B | .8 | 22,177 | 15,300 | 1,128 | 830 | F | D |
| 1011 | US 17 THIRD STREET | SR 540 (CYPRESS GDNS) | SR 542 (CENTRAL AVE) | 4D | PA | F | 1.4 | 13,747 | 22,800 | 699 | 1,230 | D | D |
| 1012 | US 17 SIXTH STREET | SR 542 (CENTRAL AVE) | SR 544 (HAVENDALE BLVD) | 4D | PA | F | 1.5 | 19,654 | 22,800 | 999 | 1,230 | D | D |
| 1013 | US 17 | SR 544 (HAVENDALE BLVD) | US 92 | 4D | PA | B | 2.2 | 16,111 | 32,500 | 819 | 1,760 | A | D |
| 1014 | US17/US92 LK SHORE WAY | US 92 | COLUMBIA ST (LK ALFRED) | 4D | PA | A | .9 | 18,296 | 34,900 | 930 | 1,890 | A | D |
| 1015 | US17/US92 LK SHORE WAY | COLUMBIA ST | SR 557 (HAINES BLVD) | 2U | PA | D | .3 | 15,776 | 13,048 | 802 | 740 | F | D |
| 1016 | US17/US92 ALFRED ST | SR 557 (HAINES BLVD) | N. ROCHELL AVE | 2D | PA | A | .4 | 14,020 | 17,325 | 713 | 935 | A | D |
| 1017 | US17/US92 ALFRED ST | N.ROCHELLE AVE | EXPERIMENT STATION RD | 4D | PA | A | .9 | 13,515 | 34,900 | 687 | 1,890 | A | D |
| 1018 | US 17 / US 92 | EXPERIMENT STATION RD | DYSON RD | 4D | PA | M | 3.5 | 11,501 | 30,900 | 643 | 2,280 | A | C |
| 1019 | US 17 / US 92 | DYSON ROAD | US 27 | 4D | PA | A | .8 | 15,824 | 33,000 | 805 | 1,790 | A | C |
| 1020 | US17/US92 HINSON AVE | US 27 | 10TH STREET | 4D | PA | C | 1.3 | 15,751 | 29,500 | 801 | 1,600 | B | C |
| 1021 | US17/US92 HINSON AVE | SR 17 (10TH STREET) | 17TH ST | 2U | PA | D | .4 | 15,096 | 8,762 | 768 | 500 | F | C |
| 1022 | US17/US92 17TH ST | HINSON AVE | BAKER DAIRY RD | 2U | PA | C | 1.0 | 8,836 | 12,857 | 449 | 730 | B | C |
| 1023 | US 17 / US 92 | BAKER DAIRY RD | CR 547 (BAY ST) | 2U | PA | M | 2.8 | 7,042 | 9,400 | 394 | 540 | C | C |
| 1024 | US 17 / US 92 | CR 547 (BAY ST) | OSCEOLA CO/L | 2U | PA | M | 7.0 | 4,493 | 9,400 | 251 | 540 | B | C |
| 1025 | | | | | | | | 0 | 0 | 0 | 0 | F | |
| 1100 | US 27 / US 98 | HIGHLANDS CO/L | ALT. US 27 | 4D | PA | M | 2.5 | 15,290 | 30,900 | 855 | 2,280 | A | C |
| 1101 | US 27 / US 98 | ALT. US 27 | US 98 | 4D | PA | M | 4.4 | 15,052 | 30,900 | 842 | 2,280 | A | C |
| 1102 | US 27 | US 98 | RAY MARTIN RD (LK WALES) | 4D | PA | M | 10.7 | 15,379 | 30,900 | 860 | 2,280 | A | C |
| 1103 | US 27 | RAY MARTIN RD | SR 60 (LK WALES) | 4D | PA | A | 1.3 | 21,415 | 33,000 | 1,089 | 1,790 | A | C |
| 1104 | US 27 | SR 60 (LK WALES) | MT. LAKE CUTOFF | 4D | PA | A | 1.9 | 21,105 | 33,000 | 1,073 | 1,790 | A | C |
| 1105 | US 27 | MT. LAKE CUTOFF | SR 540 (CYPRESS GARDENS) | 4D | PA | D | 4.1 | 22,545 | 26,400 | 1,261 | 1,520 | C | C |
| 1106 | US 27 | SR 540 (CYPRESS GDNS) | SR 542 (DUNDEE RD) | 4D | PA | D | 2.7 | 20,872 | 26,400 | 1,167 | 1,520 | C | C |
| 1107 | US 27 | SR 542 (DUNDEE RD) | SR 544 (SCENIC HWY) | 4D | PA | D | 4.6 | 21,468 | 26,400 | 1.201 | 1,520 | C | C |
| 1108 | US 27 | SR 544 (SCENIC HWY) | US 17/US 92 | 4D | PA | A | 1.8 | 29,161 | 33,000 | 1,483 | 1,790 | A | C |
| 1109 | US 27 | US 17/US 92 | POLK CITY RD | 4D | PA | B | 1.1 | 32,034 | 31.000 | 1,629 | 1,680 | D | C |
| 1110 | US 27 | POLK CITY ROAD | I-4 | 4D | PA | D | 7.8 | 25,126 | 26,400 | 1,405 | 1,520 | C | C |
| 1111 | US 27 | I-4 | US 192 (LAKE CO/L) | 4D | PA | M | 8.0 | 10,295 | 30,900 | 576 | 2,280 | A | C |
| 1200 | ALT. US 27 | US 27 | CR 630A (FROSTPROOF) | 2U | PA | M | 4.2 | 2,232 | 9,400 | 125 | 540 | A | C |
| 1201 | ALT. US 27 | CR 630A | CR 630 | 2U | PA | M | 1.8 | 5,931 | 9,400 | 332 | 540 | C | C |
| 1202 | ALT. US 27 | CR 630 (FROSTPROOF) | ROSS AVENUE | 2U | PA | M | 5.2 | 2,874 | 9,400 | 161 | 540 | A | C |
| 1203 | ALT. US 27 | ROSS AVE | RAY MARTIN (LK. WALES) | 2U | PA | M | 6.3 | 4,473 | 9,400 | 250 | 540 | B | C |
| 1204 | ALT. US 27 (FIFTH ST) | RAY MARTIN | NORTH AVE | 2U | PA | B | 2.9 | 5,805 | 14,500 | 295 | 790 | A | C |
| 1205 | ALT. US 27 | NORTH AVE | MOUNTAIN LK. CUTOFF | 2D | PA | A | .8 | 6,633 | 16,380 | 337 | 882 | A | C |
| 1206 | ALT. US 27 | MOUNTAIN LK. CUTOFF | SR 540 | 2U | PA | M | 3.9 | 3,782 | 9,400 | 212 | 540 | B | C |
| 1207 | ALT. US 27 | SR 540 | SR 542 (MAIN ST) | 2U | PA | M | 4.0 | 5,467 | 9,400 | 306 | 540 | B | C |
| 1208 | ALT. US 27 | SR 542 (MAIN ST) | SR 544 (SCENIC HWY) | 2U | PA | M | 4.3 | 4,804 | 9,400 | 269 | 540 | B | C |
| 1209 | ALT. US 27 (TENTH ST) | SR 544 (SCENIC HWY) | US 17/US 92 (HINSON) | 2U | PA | A | 1.6 | 9,191 | 15,600 | 467 | 840 | A | C |
| 1300 | US 92 (NEW TAMPA HWY) | HILLSBOROUGH CO/L | SR 572 (AIRPORT RD) | 2D | PA | A | 2.3 | 7,694 | 17,325 | 391 | 935 | A | D |
| 1301 | US 92 (NEW TAMPA HWY) | SR 572 (AIRPORT RD) | WABASH AVE | 2D | PA | A | 1.8 | 16,764 | 17,325 | 852 | 935 | D | D |
| 1302 | US 92 (WABASH AVE) | BUS. US 92 (MAIN ST) | SR 546 (MEMORIAL BLVD) | 4D | PA | B | .9 | 17,263 | 32,500 | 878 | 1,760 | A | D |
| 1303 | US 92 (MEMORIAL BLVD) | WABASH AVE | SR 539 (KATHLEEN RD) | 4D | PA | B | 3.0 | 27.657 | 32,500 | 1,406 | 1,760 | B | D |
| 1304 | US 92 (MEMORIAL BLVD) | SR 539 (KATHLEEN RD) | LINCOLN AVE | 4D | PA | D | .3 | 28,210 | 30,200 | 1,434 | 1,640 | D | D |
| 1305 | US 92 (MEMORIAL BLVD) | LINCOLN AVE | SR 563 (M.L.KING AVE) | 6D | PA | F | .2 | 28,210 | 34,900 | 1,434 | 1,890 | D | D |
| 1306 | US 92 (MEMORIAL BLVD) | SR 563 (M.L. KING AVE) | US 98 (FLORIDA AVE) | 6D | PA | F | .2 | 39,509 | 34,900 | 2,009 | 1,890 | E | D |
| 1307 | US 92 / US 98 | US 98 (FLORIDA AVE) | SR 33 (MASS.) | 6D | PA | D | .3 | 39,816 | 46,300 | 2,025 | 2,510 | D | D |
| 1308 | US 92 / US 98 | SR 33 (MASS.) | US 98 (LK. PARKER AVE) | 4D | PA | E | .3 | 33.268 | 26,300 | 1,692 | 1,430 | F | D |
| 1309 | US 92 | US 98 (LK. PARKER AVE) | BUS. US 92 (GARY RD) | 4D | PA | B | 1.2 | 26.072 | 32,500 | 1,326 | 1,760 | B | D |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1310 | US 92 | BUS. US 92 (GARY RD) | SR 655 (RECKER HWY) | 4D | PA | B | 7.0 | 27,129 | 32,500 | 1,380 | 1,760 | B | D |
| 1311 | US 92 | SR 655 (RECKER HWY) | SR 559 (BARTOW AVE) | 6D | PA | A | 1.6 | 23,365 | 52,400 | 1,188 | 2,840 | A | D |
| 1312 | US 92 (MAGNOLIA AVE) | SR 559 (BARTOW AVE) | SR 544 (HAVENDALE BLVD) | 6D | PA | F | .3 | 27,345 | 34,900 | 1,390 | 1,890 | D | D |
| 1313 | US 92 | SR 544 (HAVENDALE BLVD) | US 17 | 4D | PA | A | 3.3 | 16,259 | 34,900 | 827 | 1,890 | A | D |
| 1314 | BUS. US 92 | SR 517 (WABASH AVE) | MAIN/LEMON ST | 4D | PA | C | 1.5 | 13,160 | 31,700 | 669 | 1,720 | B | D |
| 1315 | BUS. US 92 | MAIN STREET | SR 563 (SIKES BLVD) | 20 | PA | G | .5 | 6,041 | 15,600 | 307 | 1,680 | C | D |
| 1316 | BUS. US 92 | SR 563 (SIKES BLVD) | SR 37 (FLORIDA AVE) | 30 | PA | G | .1 | 7,065 | 23,900 | 359 | 2,590 | C | D |
| 1317 | BUS. US 92 | SR 37 (FLORIDA AVE) | MASSACHUSETTS AVE | 30 | PA | G | .2 | 7,646 | 23,900 | 389 | 2,590 | C | D |
| 1318 | BUS. US 92 | MASSACHUSETTS AVE | MAIN ST | 20 | PA | J | .3 | 6,465 | 16,900 | 329 | 1,830 | B | D |
| 1319 | BUS. US 92 | MAIN/LEMON ST. | SR 37 (FLORIDA AVE) | 20 | PA | G | .2 | 7,967 | 15,600 | 405 | 1,680 | C | D |
| 1320 | BUS. US 92 | SR 37 (FLORIDA AVE) | SR 563 (LAKE WIRE DR) | 20 | PA | G | .2 | 6,485 | 15,600 | 330 | 1,680 | C | D |
| 1321 | BUS. US 92 | SR 563 (SIKES BLVD) | LAKE BEULAH DR | 20 | PA | J | .5 | 6,485 | 16,900 | 330 | 1,830 | B | D |
| 1322 | BUS. US 92 | MAIN/LEMON ST. | SR 35 (BARTOW RD) | 4D | PA | D | .3 | 16,119 | 30,200 | 820 | 1,640 | C | D |
| 1323 | BUS. US 92 | SR 35 (BARTOW RD) | US 98 (LK PARKER AVE) | 4D | PA | F | .3 | 8,078 | 22,800 | 411 | 1,230 | D | D |
| 1324 | BUS. US 92 | US 98 (LK. PARKER AVE) | GARY ROAD | 4D | PA | A | .1 | 11,530 | 34,900 | 586 | 1,890 | A | D |
| 1325 | BUS. US 92 | MAIN STREET | US 92 (MEMORIAL) | 4D | PA | A | 1.2 | 6,053 | 34,900 | 308 | 1,890 | A | D |
| 1400 | US 98 | US 27 | EDGEWOOD DRIVE (FT. MEADE | 2U | PA | M | 14.1 | 3,176 | 9,400 | 178 | 540 | B | C |
| 1401 | US 98 | EDGEWOOD DR. | US 17 (FT. MEADE) | 2D | PA | B | 1.0 | 6,020 | 15,225 | 306 | 830 | A | C |
| 1402 | US 98 | BUS. SR 60 | SR 60A (BARTOW) | 4D | PA | E | .5 | 18,634 | 26,300 | 948 | 1,430 | D | C |
| 1403 | US 98 | SR 60A | OLD LAKELAND RD | 6D | PA | D | .6 | 29,243 | 30,700 | 1,487 | 1,660 | C | C |
| 1404 | US 98 | OLD LAKELAND RD | SR 540 (WINTER-LAKE RD) | 4D | PA | A | 6.7 | 23,014 | 34,900 | 1,170 | 1,890 | A | D |
| 1405 | US 98 | SR 540 (WINTER LK RD) | LAKE PARKER AVE | 4D | PA | C | 3.9 | 30,360 | 31,700 | 1,544 | 1,720 | D | D |
| 1406 | US 98 | SR 35 (BARTOW RD) | BUS. US 92 (MAIN ST) | 4D | PA | F | .4 | 19,462 | 22,800 | 990 | 1,230 | D | D |
| 1407 | US 98 | BUS. US 92 (MAIN ST) | US 92 (MEMORIAL BLVD) | 4D | PA | E | .7 | 13,503 | 26,300 | 687 | 1,430 | D | D |
| 1408 | US 98 | US 92 (MEMORIAL BLVD) | SR 563 (10TH ST) | 4D | PA | C | .6 | 24,238 | 31,700 | 1,233 | 1,720 | C | D |
| 1409 | US 98 | SR 563 (10TH STREET) | I-4 | 4D | PA | C | 1.9 | 21,217 | 31,700 | 1,079 | 1,720 | B | D |
| 1410 | US 98 | I-4 | LAKELAND MALL | 4D | PA | F | .4 | 35,438 | 22,800 | 1,802 | 1,230 | F | D |
| 1411 | US 98 | LAKELAND MALL | SOCRUM LOOP RD | 4D | PA | A | 5.0 | 20,298 | 34,900 | 1,032 | 1,890 | A | D |
| 1412 | US 98 | SOCRUM LOOP RD | SR 471 | 2U | PA | M | 7.7 | 9,905 | 9,400 | 472 | 540 | D | C |
| 1413 | US 98 | SR 471 | PASCO CO/L | 2U | PA | M | 1.5 | 9,905 | 9,400 | 472 | 540 | D | C |
| 1500 | I-4 | HILLS. CO/L | POLK CO PKWY (FUTURE) | 4F | PA | H | 1.0 | 60,792 | 56,900 | 2,920 | 3,530 | E | D |
| 1501 | I-4 | POLK CO PKWY (FUTURE) | MEMORIAL | 4F | PA | H | 1.5 | 60,792 | 56,900 | 2,920 | 3,530 | E | D |
| 1502 | I-4 | SR 546 (MEMORIAL) | SR 539 (KATHLEEN) | 4F | PA | H | 2.7 | 46,464 | 56,900 | 2,231 | 3,530 | C | D |
| 1503 | I-4 | SR 539 (KATHLEEN) | US 98 | 4F | PA | H | 1.2 | 43,816 | 56,900 | 2,104 | 3,530 | C | D |
| 1504 | I-4 | US 98 | SOCRUM LOOP ROAD | 4F | PA | H | 1.5 | 49,106 | 56,900 | 2,358 | 3,530 | D | D |
| 1505 | I-4 | SOCRUM LOOP ROAD | SR 33 | 4F | PA | H | 4.4 | 44,734 | 56,900 | 2,148 | 3,530 | C | D |
| 1506 | I-4 | SR 33 | SR 559 | 4F | PA | I | 6.1 | 47,265 | 37,600 | 2,270 | 2,780 | E | C |
| 1507 | I-4 | SR 559 | SR 557 | 4F | PA | I | 3.9 | 47,907 | 37,600 | 2,301 | 2,780 | E | C |
| 1508 | I-4 | SR 557 | US 27 | 4F | PA | I | 6.8 | 36,759 | 37,600 | 1,765 | 2,780 | C | C |
| 1509 | I-4 | US 27 | OSCEOLA CO/L | 4F | PA | I | 2.9 | 61,232 | 37,600 | 2,941 | 2,780 | F | C |
| 1600 | SR 33 (MASS. AVE) | BUS. US 92 (MAIN ST) | US 92 (MEMORIAL BLVD) | 4D | MA | F | .8 | 14,989 | 22,800 | 762 | 1,230 | D | D |
| 1601 | SR 33(LKLD HILLS BLVD) | US 92 (MEMORIAL BLVD) | ROBSON ST | 4D | MA | C | 2.0 | 22,186 | 31,700 | 1,128 | 1,720 | B | D |
| 1602 | SR 33(LKLD HILLS BLVD) | ROBSON STREET | I-4 @ SOCRUM LOOP | 2D | MA | C | 1.2 | 22,854 | 15,700 | 1,162 | 893 | F | E |
| 1603 | SR 33(LKLD HILLS BLVD) | I-4 @ SOCRUM LOOP | I-4 | 2D | MA | A | 4.4 | 7,199 | 18,270 | 366 | 987 | A | E |
| 1604 | SR 33 | I-4 | SR 559 (POLK CITY) | 2U | MA | O | 6.1 | 6,934 | 11,300 | 388 | 650 | C | D |
| 1605 | SR 33 | SR 559 (POLK CITY) | LAKE CO/L | 2U | MA | M | 12.7 | 3,505 | 15,000 | 196 | 870 | B | D |
| 1700 | SR 35 (BARTOW RD) | BUS. SR 60 | SR 60A | 4D | PA | F | .5 | 15,924 | 22,800 | 810 | 1,230 | D | D |
| 1701 | SR 35 (BARTOW RD) | US 98 (LK PARKER) | BUS. US 92 (MAIN ST) | 4D | PA | F | .5 | 12,629 | 22,800 | 642 | 1,230 | D | D |
| 1702 | SR 35 (N. FLA AVE) | BUS. US 92 (MAIN ST) | US 92/98 (MEMORIAL BLVD) | 2U | PA | F | .7 | 17,873 | 9,810 | 909 | 560 | F | D |
| 1800 | SR 37 | MANATEE CO/L | SR 674 (WIMAUMA RD) | 2U | MA | M | 3.5 | 3,309 | 15,000 | 185 | 870 | B | D |
| 1801 | SR 37 | SR 674 (WIMAUMA RD) | CR 640 (PINECREST) | 2U | MA | M | 10.7 | 3,247 | 15,000 | 182 | 870 | B | D |
| 1802 | SR 37 | CR 640 (PINECREST) | CAMERON ST (MULBERRY) | 2U | MA | M | 2.3 | 6,931 | 15,000 | 388 | 870 | C | D |
| 1803 | SR 37 | CAMERON ST | SR 60 (MULBERRY) | 4D | MA | B | .7 | 12,422 | 34,000 | 632 | 1,850 | A | E |
| 1804 | SR 37 | SR 60 | SHEPHERD RD | 4D | MA | A | 3.0 | 16,360 | 36,700 | 832 | 1,990 | A | E |
| 1805 | SR 37 | SHEPHERD ROAD | PIPKIN ROAD | 4D | MA | B | 2.7 | 26,340 | 34,000 | 1,339 | 1,850 | B | E |
| 1806 | SR 37 (S. FLA AVE) | PIPKIN RD | SR 572 (DRANE FIELD) | 6D | MA | D | 1.5 | 37,507 | 50,200 | 1,907 | 2,720 | D | E |
| 1807 | SR 37 (S. FLA AVE) | SR 572 (DRANE FIELD) | ARIANA STREET | 4D | MA | E | 2.1 | 32,410 | 32,100 | 1,648 | 1,740 | F | E |
| 1808 | SR 37 (S. FLA AVE) | ARIANA STREET | BUS. US 92 (MAIN STREET) | 4D | MA | F | 1.2 | 28,033 | 32,100 | 1,425 | 1,740 | E | E |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1900 | SR 60 | HILLSBOROUGH CO/L | CORONET RD | 4D | | PA | M | 1.0 | 16,146 | 30,900 | 903 | 2,280 | B | C |
| 1901 | SR 60 | CORONET RD | SR 37 | 4D | | PA | M | 4.8 | 21,935 | 30,900 | 1,227 | 2,280 | B | C |
| 1902 | SR 60 | SR 37 | 12TH AVE (MULBERRY) | 4D | | PA | B | .7 | 23,693 | 32,500 | 1,205 | 1,760 | B | D |
| 1903 | SR 60 | 12TH AVE (MULBERRY) | BUS. SR 60 (BARTOW) | 4D | | PA | M | 9.0 | 16,129 | 30,900 | 902 | 2,280 | B | C |
| 1904 | SR 60 | BUS. SR 60 | US 27 (LK WALES) | 4D | | PA | M | 14.0 | 18,696 | 30,900 | 1,046 | 2,280 | B | C |
| 1905 | SR 60 | US 27 | ALT. US 27 | 4D | | PA | C | 1.1 | 18,157 | 29,500 | 923 | 1,600 | B | C |
| 1906 | SR 60 | ALT. US 27 | 11TH STREET | 4D | | PA | B | 1.0 | 20,789 | 31,000 | 1,057 | 1,680 | B | C |
| 1907 | SR 60 | 11TH STREET | CAPPS ROAD | 4D | | PA | A | 1.8 | 18,099 | 33,000 | 920 | 1,790 | A | C |
| 1908 | SR 60 | CAPPS RD | LK WALK-IN-WATER RD | 4D | | PA | M | 5.5 | 8,582 | 30,900 | 480 | 2,280 | A | C |
| 1909 | SR 60 | LK WALK-IN-WATER RD | FEDHAVEN | 4D | | PA | M | 1.8 | 8,767 | 30,900 | 490 | 2,280 | A | C |
| 1910 | SR 60 | FEDHAVEN | CR 630 (INDIAN LAKES) | 2U | | PA | M | 8.2 | 6,938 | 9,400 | 388 | 540 | C | C |
| 1911 | SR 60 | CR 630 (INDIAN LAKES) | OSCEOLA CO/L | 2U | | PA | M | 7.0 | 5,267 | 9,400 | 295 | 540 | B | C |
| 1912 | BUS. SR 60 (MAIN ST) | SR 60A | SR 35 (BROADWAY) | 2U | | PA | B | .7 | 7,064 | 14,500 | 359 | 790 | A | C |
| 1913 | BUS. SR 60 (MAIN ST) | SR 35 (BROADWAY) | US 17 (BARTOW) | 2U | | PA | D | .9 | 9,545 | 8,762 | 485 | 500 | D | C |
| 1914 | BUS. SR 60(FLAMINGO DR) | US 17 | SR 60 | 2U | | PA | A | .7 | 6,142 | 15,600 | 312 | 840 | A | C |
| 2000 | SR 60A (VAN FLEET DR) | BUS. SR 60 | US 98 (BARTOW) | 2D | | PA | B | .8 | 13,981 | 15,225 | 711 | 830 | B | C |
| 2001 | SR 60A (VAN FLEET DR) | US 98 | SR 60A CONNECTOR | 4D | | PA | B | .7 | 25,112 | 31,000 | 1,277 | 1,680 | B | C |
| 2002 | SR 60A (VAN FLEET DR) | SR 60A CONNECTOR | BUS. SR 60 | 2D | | PA | B | .9 | 15,769 | 15,225 | 802 | 830 | D | C |
| 2003 | SR 60A | SR 60A CONNECTOR | US 17 (BARTOW) | 2U | | PA | A | .3 | 15,425 | 15,600 | 784 | 840 | C | C |
| 2100 | SR 471 | US 98 | SUMTER CO/L | 2U | | MA | M | 4.4 | 1,845 | 9.400 | 103 | 540 | A | C |
| 2200 | SR 539 (KATHLEEN RD) | SR 563 (LK WIRE DR) | SR 546 (MEMORIAL BLVD) | 4D | | MA | A | .8 | 10.655 | 36,700 | 542 | 1,990 | A | E |
| 2201 | SR 539 (KATHLEEN RD) | SR 546 (MEMORIAL BLVD) | I-4 | 4D | | MA | B | 1.7 | 13,221 | 34,000 | 672 | 1,850 | A | E |
| 2300 | SR 540(WINTER-LAKE RD) | US 98 | PCC/USF ENTRANCE | 2D | | MA | C | .6 | 13.579 | 15,700 | 690 | 893 | D | E |
| 2301 | SR 540(WINTER-LAKE RD) | PCC/USF ENTRANCE | THORNHILL RD | 2U | | MA | M | 4.6 | 10,043 | 15,000 | 562 | 870 | D | D |
| 2302 | SR 540(WINTER-LAKE RD) | THORNHILL RD | SPIRIT LAKE RD | 2D | | MA | A | 2.6 | 7,556 | 18,270 | 384 | 987 | A | E |
| 2303 | SR 540(WINTER-LAKE RD) | SPIRIT LAKE RD | SR 655 (RECKER HWY) | 2D | | MA | A | 1.7 | 10,728 | 18,270 | 546 | 987 | A | E |
| 2304 | SR 540 (CYP GDNS BLVD) | US 17 | 9TH STREET (WINTER HAVEN) | 4D | | MA | F | 1.0 | 24,244 | 32,100 | 1,233 | 1,740 | E | E |
| 2305 | SR 540 (CYP GDNS BLVD) | 9TH ST | CR 550 (OVERLOOK DR) | 2U | | MA | A | 1.5 | 29.844 | 17,400 | 1,437 | 940 | F | E |
| 2306 | SR 540 | CR 550 (OVERLOOK DR) | CR 540 (CYPRESS GDNS RD) | 4D | | MA | A | 2.9 | 12,016 | 36.700 | 611 | 1,990 | A | E |
| 2307 | SR 540 | CR 540 (CYPRESS GARDENS R | US 27 | 4D | | MA | A | 1.8 | 9,659 | 34.900 | 491 | 1,890 | A | D |
| 2308 | SR 540 | US 27 | ALT. US 27 | 2U | | MA | M | 2.3 | 2,073 | 15,000 | 116 | 870 | A | D |
| 2400 | SR 542 (CENTRAL AVE) | US 17 | CARL FLOYD RD | 2U | | MA | B | 3.5 | 12,389 | 16.100 | 630 | 870 | B | E |
| 2401 | SR 542 | CARL FLOYD RD | US 27 | 2U | | MA | M | 2.8 | 11,746 | 15,000 | 657 | 870 | D | D |
| 2500 | SR 544(HAVENDALE BLVD) | US 92 | US 17 | 6D | | MA | C | 7.2 | 23,370 | 50,700 | 1,189 | 2,730 | E | E |
| 2501 | SR 544 (AVE "T" NW) | US 17 | 1ST STREET, N.W. | 4D | | MA | D | .5 | 22,953 | 33,400 | 1,167 | 1,810 | C | E |
| 2502 | SR 544 (LUCERNE PK RD) | 1ST STREET N.W. | US 27 | 2D | | MA | A | 6.1 | 10,961 | 18,270 | 557 | 987 | A | E |
| 2503 | SR 544 (SCENIC HWY) | US 27 | MYRTLE (HAINES CITY) | 2D | | MA | A | 1.3 | 6,612 | 17,325 | 336 | 935 | A | D |
| 2504 | SR 544 (LUCERNE PK RD) | MYRTLE | ALT. US 27 | 2U | | MA | C | .5 | 6,522 | 14,095 | 332 | 800 | B | D |
| 2600 | SR 546 (MEMORIAL BLVD) | I-4 | US 92 (WABASH AVE) | 4D | | MA | B | 1.3 | 19,912 | 34,000 | 1,013 | 1,850 | A | E |
| 2700 | SR 557 (BUENA VISTA) | US 92 / US 17 | I-4 | 2U | | MA | M | 5.4 | 4,918 | 15,000 | 275 | 870 | B | D |
| 2800 | SR 559 (BARTOW AVE) | US 92 (AUBURNDALE) | LAKE VAN RD | 2D | | MA | A | 4.0 | 4,586 | 18,270 | 233 | 987 | A | E |
| 2801 | SR 559 | LAKE VAN RD | I-4 | 2U | | MA | M | 3.7 | 3,660 | 15.000 | 205 | 870 | B | D |
| 2802 | SR 559 | I-4 | SR 33 (POLK CITY) | 2U | | MA | M | 2.3 | 2,402 | 15,000 | 134 | 870 | A | D |
| 2900 | SR 563 (M.L.K. BLVD) | LIME ST (SIKES BLVD) | SR 539 (KATHLEEN RD) | 4D | | MA | F | .4 | 14,714 | 32,100 | 748 | 1,740 | D | E |
| 2901 | SR 563 (M.L.K. BLVD) | SR 539 (KATHLEEN RD) | US 92 (MEMORIAL BLVD) | 4D | | MA | B | .7 | 7,292 | 34,000 | 371 | 1,850 | A | E |
| 2902 | SR 563 (M.L.K. BLVD) | US 92 (MEMORIAL BLVD) | US 98 (FLORIDA AVE) | 4D | | MA | E | .7 | 7,144 | 32,100 | 363 | 1,740 | D | E |
| 3000 | SR 572 (AIRPORT RD) | US 92 (NEW TPA HWY) | RICE/DRANE FIELD RD | 2D | | MA | A | 2.3 | 5,602 | 18,270 | 285 | 987 | A | E |
| 3001 | SR 572 (DRANEFIELD RD) | AIRPORT ROAD | SR 37 | 2U | | MA | B | 3.7 | 11,343 | 16,100 | 577 | 870 | B | E |
| 3100 | SR 655 (RECKER HWY) | US 17 | SR 540 (LK. HANCOCK) | 2D | | MA | B | 1.1 | 17,311 | 16,905 | 880 | 914 | F | E |
| 3101 | SR 655 (RECKER HWY) | SR 540 (LK HANCOCK) | CR 542 (AVENUE "G") | 2D | | MA | B | 2.7 | 13,010 | 16,905 | 662 | 914 | B | E |
| 3102 | SR 655 (RECKER HWY) | CR 542 (AVENUE "G") | US 92 | 2D | | MA | A | 3.3 | 11,967 | 18,270 | 609 | 987 | A | E |
| 3200 | SR 674 (WIMAUMA RD) | HILLSBOROUGH CO/L | SR 37 | 2U | | MA | M | 2.1 | 1,418 | 15,000 | 79 | 870 | A | D |
| 3300 | SR 569 (COMBEE RD) | US 98 | US 92 | 2U | | MA | C | 2.3 | 21,582 | 14.952 | 1,097 | 850 | F | E |
| 3301 | SR 569 (COMBEE RD) | US 92 | SR 33 | 2U | | MA | A | 5.0 | 14,732 | 17,400 | 749 | 940 | B | E |
| 4000 | 10TH ST(W) | CR 542A | SR 539 | 2U | CN2/UCOL | | L | 1.9 | 5,211 | 11,048 | 265 | 630 | C | D |
| 4001 | 12TH ST | STUART AVE | US 17/92 | 2U | | | L | 1.1 | 2,683 | 11,048 | 136 | 630 | C | D |
| 4002 | 21ST ST NW | SR 544 | US 92 | 2U | CM1/UCOL | | L | 1.7 | 2,158 | 11,048 | 110 | 630 | C | D |
| 4003 | 23RD ST NW/26TH ST NW | CR 542 (AVE "G" NW) | SR 544 | 2U | CN2/UCOL | | L | 1.1 | 1,234 | 11,048 | 63 | 630 | C | D |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4004 | 34TH ST NW | CR 542 (AVE "G" NW) | SR 544 | 2U | CN2/UCOL | L | 1.4 | 6,205 | 11,048 | 316 | 630 | C | D |
| 4005 | 3RD ST SE/6TH ST SE | SR 540 | SR 540 | 2U | CN2/UCOL | L | .7 | 519 | 11,048 | 26 | 630 | C | D |
| 4006 | 3RD ST/AVE "K" SW | CRYSTAL BEACH RD | US 17 | 2U | CN2/UCOL | S | 3.5 | 3,729 | 14,600 | 190 | 790 | A | D |
| 4007 | 42ND ST NW/DAIRY RD | SR 655 | STADIUM RD | 2U | CM1/UCOL | T | 4.0 | 7,452 | 13.500 | 379 | 730 | B | D |
| 4008 | 9TH ST SE/LK SUMMIT DR(W) | SR 540 | SR 540 | 2U | CN2/UCOL | L | 2.0 | 2,979 | 11,048 | 151 | 630 | C | D |
| 4009 | AGRICOLA MN RD | OLD HWY 37 | CR 555 | 2U | CN2/RMCOL | M | 6.1 | 1,387 | 15,000 | 78 | 870 | A | D |
| 4010 | ALTRS-BBSN PK CTF | CR 559 (80 FT RD) | US 27 | 2U | CM1/RMCOL | M | 12.2 | 829 | 15,000 | 46 | 870 | A | D |
| 4011 | AMRCN SUPERIOR BLVD/SHELL | CR 655 (RIFLE RANGE RD) | AVE "Z" SE | 2U | CN2/UCOL | L | 1.6 | 1,093 | 11,048 | 56 | 630 | C | D |
| 4012 | ARIANA ST | WABASH AVE (S) | SR 563 | 2U | CN2/UCOL | L | 1.0 | 4,307 | 11,048 | 219 | 630 | C | D |
| 4013 | AVE "T" NE/COUNTRY CLUB R | SR 544 | LAKE HAMILTON DR (W) | 2U | CN2/UCOL | L | 2.1 | 2,343 | 11,048 | 119 | 630 | C | D |
| 4014 | A-Z PK RD | US 98 (BARTOW HWY) | SR 659 | 2U | CM1/UCOL | L | .6 | 4,641 | 11,048 | 236 | 630 | C | D |
| 4015 | BEREAH ROAD(W) | HARDEE CNTY LINE | AVON PK CTF | 2U | CN2/RMCOL | M | 2.4 | 224 | 15,000 | 13 | 870 | A | D |
| 4016 | BOLENDER ST# | SR 559 | LK ALFRED RD | 2U | CN2/UCOL | L | 1.6 | 709 | 11,048 | 36 | 630 | C | D |
| 4017 | BOMBER RD | US 17 | CR 655 | 2U | CM1/UCOL | Q | 3.4 | 4,420 | 9,500 | 247 | 550 | C | D |
| 4018 | BRIDGERS AVE | US 92 | US 92 | 2U | CN2/UCOL | S | 2.1 | 2,499 | 14,600 | 127 | 790 | A | D |
| 4019 | BROOKE RD/CR 655A | SR 700/US 98 | SR 60 | 2U | CM1/RMACL | M | 12.0 | 2,425 | 15,000 | 136 | 870 | A | D |
| 4020 | BUCKEYE LP RD | SR 542 | AVE "T" NE | 2U | CN2/UCOL | L | 1.5 | 5,185 | 11,048 | 264 | 630 | C | D |
| 4021 | BUCKEYE RD | 11th ST NE | BUCKEYE LP RD | 2U | CN2/UCOL | L | 1.2 | 922 | 11,048 | 47 | 630 | C | D |
| 4022 | CANAL AVE/MORGAN-COMBEE R | CR 542 (E MAIN ST) | FISH HATCHERY RD | 2U | CN2/UCOL | L | 2.4 | 6,510 | 11,048 | 331 | 630 | C | D |
| 4023 | CHESTNUT RD(N) | US 92 | 10TH ST (W) | 2U | CN2/UCOL | L | 1.5 | 4,057 | 11,048 | 206 | 630 | C | D |
| 4024 | COLEMAN RD/AVE "C" SW | SPIRIT LAKE RD | 21ST ST SW | 2U | CN2/UCOL | L | 1.0 | 5,196 | 11,048 | 264 | 630 | C | D |
| 4025 | CORONET RD | SR60 | HILLSB CNTY LN | 2U | CN2/UCOL | Q | 2.0 | 3,114 | 9,500 | 174 | 550 | C | D |
| 4026 | COUNTRY CLUB RD(S) | SR 542 | LK HAMILTON DR (W) | 2U | CN2/UCOL | L | 4.4 | 1,997 | 11,048 | 102 | 630 | C | D |
| 4027 | COUNTY LINE RD | SR 60 | DRANE FIELD RD | 2U | CN2/- | M | 4.8 | 4,962 | 15,000 | 278 | 870 | B | D |
| 4028 | COUNTY LINE RD | DRANE FIELD RD | I-4 | 2U | CN2/- | M | 2.7 | 9,576 | 15,000 | 487 | 870 | D | D |
| 4029 | CR 17 | CR 557 | US 27 | 2U | | M | 7.8 | 2,926 | 15,000 | 164 | 870 | B | D |
| 4030 | CR 17A | MAMMOTH GROVE RD | US 27 | 2U | CM1/RMACL | M | 7.6 | 3,117 | 15,000 | 174 | 870 | B | D |
| 4031 | CR 17A | US 27A | MAMMOTH GROVE RD | 2U | CM1/UCOL | L | 3.4 | 5,786 | 11,048 | 314 | 630 | C | D |
| 4032 | CR 17B | US 27 | SR 60 | 2U | | M | 3.3 | 2,639 | 15,000 | 160 | 870 | A | D |
| 4033 | CR 17B(BUCK MOORE RD) | SR 60 | CR 17A | 2U | CM1/UCOL | L | 1.4 | 3,062 | 11,048 | 166 | 630 | C | D |
| 4034 | CR 35A | CR 35A (KATHLEEN RD) | US 98 | 2U | CM1/UCOL | L | 3.2 | 1,486 | 11,048 | 81 | 630 | C | D |
| 4035 | CR 35A | I-4 | DUFF RD | 2U | CM1/UCOL | S | 4.2 | 9,292 | 14,600 | 504 | 790 | A | D |
| 4036 | CR 35A | DUFF RD | CR 35A | 2U | CM1/UCOL | Q | 3.3 | 3,443 | 9.500 | 208 | 550 | C | D |
| 4037 | CR 37A | CR 540A | HALLAM DR | 2U | CM1/UCOL | S | 2.0 | 3,707 | 14,600 | 472 | 790 | A | D |
| 4038 | CR 37B | CR 540A | EDGEWOOD DR (E) | 2U | CM1/UCOL | S | 4.0 | 9,780 | 14,600 | 530 | 790 | B | D |
| 4039 | CR 54 | US 27 | US 17/92 | 2U | CM1/RMACL | M | 5.4 | 1,019 | 15,000 | 62 | 870 | A | D |
| 4040 | CR 540 | CR 37B | US 98 | 2U | CM1/UCOL | L | 2.7 | 7,326 | 11,048 | 373 | 630 | C | D |
| 4041 | CR 540A | SR 37 | US 98 | 2U | CM1/UCOL | S | 5.9 | 11,249 | 14,600 | 572 | 790 | B | D |
| 4042 | CR 542 | US 27A | LK HATCHINEHA | 2U | | M | 9.8 | 1,922 | 15,000 | 108 | 870 | A | D |
| 4043 | CR 542 | SR 569 | SR 655 | 2U | CM1/RMACL | M | 3.2 | 8.091 | 15.000 | 453 | 870 | C | D |
| 4044 | CR 542 | US 92 BUS (GARY RD N) | SR 569 | 2U | CM1/UCOL | S | 1.8 | 12,022 | 14,600 | 611 | 790 | B | D |
| 4045 | CR 542A | US 92 | CR 35A | 2U | | L | 5.0 | 8,990 | 11,048 | 457 | 630 | D | D |
| 4046 | CR 542(AVE "G" NW) | LK HOWARD DR NW | SR 655 | 2U | | L | 1.7 | 10,320 | 11,048 | 525 | 630 | D | D |
| 4047 | CR 542(OLD TAMPA HWY) | US 92 | WABASH AVE (S) | 2U | | M | 4.3 | 3,197 | 15,000 | 179 | 870 | B | D |
| 4048 | CR 544A | SR 655 | SR 544 | 2U | | S | 2.1 | 4.390 | 14,600 | 223 | 790 | A | D |
| 4049 | CR 544/JIM EDWARDS RD | US 27A | CR 542 | 2U | | M | 7.0 | 2.856 | 15.000 | 160 | 870 | A | D |
| 4050 | CR 546 | SR 659 | LK ARIANA BLVD | 2U | | M | 6.0 | 5.056 | 15,000 | 283 | 870 | B | D |
| 4051 | CR 546 | US 27A | CR 544 | 2U | | M | 5.4 | 2,856 | 15,000 | 160 | 870 | A | D |
| 4052 | CR 547 | US 17/92 | CR 54 | 2U | | M | 6.4 | 1,537 | 15,000 | 86 | 870 | A | D |
| 4053 | CR 547 | US 27 | US 17/92 | 2U | | M | 2.4 | 4,483 | 15,000 | 251 | 870 | B | D |
| 4054 | CR 550 | SR 540 | SR 542 | 2U | | L | 3.0 | 3,140 | 11,048 | 160 | 630 | C | D |
| 4055 | CR 555 | US 92 | CR 557 | 2U | | L | 1.1 | 5,484 | 11,048 | 279 | 630 | C | D |
| 4056 | CR 555 | CR 630 | SR 60 | 2U | | M | 11.0 | 2,882 | 15,000 | 161 | 870 | A | D |
| 4057 | CR 557A | SR 559 | CR 557 | 2U | | M | 5.8 | 1,420 | 15,000 | 79 | 870 | A | D |
| 4058 | CR 559A | CR 655 | SR 559 | 2U | | Q | 2.0 | 767 | 9,500 | 43 | 550 | C | D |
| 4059 | CR 580/CYPRESS PKWY | US 92 | OSCEOLA CNTY LN | 2U | | M | 10.2 | 2,836 | 15,000 | 159 | 870 | A | D |
| 4060 | CR 582 | SR 33 | OLD POLK CITY RD | 2U | | S | 2.2 | 15,713 | 14,600 | 976 | 790 | F | D |
| 4061 | CR 582 | HILLSB CNTY LINE | CR 582 | 2U | | S | 6.4 | 8,084 | 14.600 | 411 | 790 | A | D |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4062 | CR 582(N FLA AVE) | CR 582 (GRIFFIN RD) | SR 33 | 2U | L | 1.2 | 4,183 | 11,048 | 213 | 630 | C | D |
| 4063 | CR 630 | SR37 | US 17/98 | 2U | M | 12.3 | 2,462 | 15,000 | 138 | 870 | A | D |
| 4064 | CR 630 | US 98 | SR 60 | 2U | M | 17.6 | 2,955 | 15,000 | 165 | 870 | B | D |
| 4065 | CR 630A | CR 630 | US 27A | 2U | M | 3.0 | 2,804 | 15,000 | 157 | 870 | A | D |
| 4066 | CR 630A | US 27 | CR 630 | 2U | Q | 1.5 | 2,670 | 9,500 | 149 | 550 | C | D |
| 4067 | CR 64 | HIGHLANDS CNTY LINE | ARBUCKLE CR | 2U | M | 2.0 | 2,069 | 15,000 | 116 | 870 | A | D |
| 4068 | CR 640 | US 27 | US 27A | 2U | Q | 1.0 | 2,585 | 9,500 | 145 | 550 | C | D |
| 4069 | CR 640 | HILLSBOROUGH COUNTY LINE | CR 559 | 2U | M | 18.9 | 2,817 | 15,000 | 158 | 870 | A | D |
| 4070 | CR 653/MTN LK CTF | US 27A | CR 540A | 2U | M | 7.8 | 644 | 15,000 | 0 | 870 | A | D |
| 4071 | CR 655 | SR 33 | DENTON RD | 2U | M | 6.6 | 8,025 | 15,000 | 449 | 870 | C | D |
| 4072 | CR 655 | DENTON RD | US 92 | 2U | L | 1.8 | 7,717 | 11,048 | 392 | 630 | D | D |
| 4073 | CR 655A | CR 559/CR 655A | SR 60 | 2U | M | 5.0 | 1,099 | 15,000 | 61 | 870 | A | D |
| 4074 | CR 655(RIFLE RANGE RD) | SR 60 | US 17 | 2U | S | 5.7 | 12,677 | 14,600 | 645 | 790 | B | D |
| 4075 | CR 676 | HILLSB CNTY LINE | SR 60 | 2U | M | 4.0 | 2,684 | 15,000 | 150 | 870 | A | D |
| 4076 | CREWS RD/W LK WALES RD | ALTRS-BBSN PK CTF | OLD BTW-LK WLS RD | 2U | M | 5.3 | 368 | 15,000 | 21 | 870 | A | D |
| 4077 | CRSTL BCH RD/THRNHLL RD | OLD BARTOW/EAGLE LAKE RD | SR 655 | 2U | M | 7.0 | 2,548 | 15,000 | 143 | 870 | A | D |
| 4078 | CRUMP RD | COUNTRY CLUB RD (S) | US 27 | 2U | Q | 1.9 | 1,513 | 9,500 | 85 | 550 | C | D |
| 4079 | CRUTCHFIELD RD | SR 546 (MEM BLVD) | WABASH AVE (N) | 2U | L | 1.4 | 1,528 | 11,048 | 79 | 630 | C | D |
| 4080 | CRYSTAL LK DR(N) | US 98 (BARTOW HWY) | SR 659 | 2U | L | 1.0 | 2,857 | 11,048 | 145 | 630 | C | D |
| 4081 | CRYSTAL LK DR(S) | US 98 (BARTOW HWY) | SR 659 | 2U | L | 1.1 | 6,397 | 11,048 | 325 | 630 | C | D |
| 4082 | CYPRESS GRDNS RD | SR 540 | LK NED RD | 2U | L | .9 | 10,440 | 11,048 | 531 | 630 | D | D |
| 4083 | DEEN STILL RD(E) | SR 33 | US 27 | 2U | M | 10.6 | 240 | 15,000 | 13 | 870 | A | D |
| 4084 | DENTON AVE | CR 655 | LK ARIANA BLVD | 2U | L | .4 | 1,668 | 11,048 | 86 | 630 | C | D |
| 4085 | DISHONG RD/KELLER RD | MOUNT PISGAH RD | US 98 | 2U | M | 4.3 | 255 | 15,000 | 14 | 870 | A | D |
| 4086 | DOHERTY DR | LEISURE LANE | SR 60 | 2U | M | 5.6 | 1,755 | 15,000 | 98 | 870 | A | D |
| 4087 | DRANE FIELD RD | CNTY LN RD | SR 572 | 2U | S | 2.3 | 4,460 | 14,600 | 249 | 790 | A | D |
| 4088 | DUFF RD | CR 35A (KATHLEEN RD) | US 98 | 2U | L | 3.0 | 5,872 | 11,048 | 299 | 630 | C | D |
| 4089 | EAGLE LK LP RD | 3RD STREET | CR 655 | 2U | L | 2.2 | 4,328 | 11,048 | 220 | 630 | C | D |
| 4090 | EDGEWOOD DR | US 98 | CR 37B | 2U | T | .7 | 25,546 | 13,500 | 1,299 | 730 | F | D |
| 4091 | EGL LK LP RD/CPRSS GDNS R | CR 655 | LK NED RD | 2U | L | 7.2 | 4,885 | 11,048 | 248 | 630 | C | D |
| 4092 | FISH HATCHERY RD | CR 542 (E MAIN ST) | CR 546 | 2U | L | 2.0 | 2,212 | 11,048 | 112 | 630 | C | D |
| 4093 | FT GREEN RD | HARDEE COUNTY LINE | CR 630 | 2U | M | 7.4 | 577 | 15,000 | 32 | 870 | A | D |
| 4094 | GRAPE HAMMOCK RD | SR 60 | KISSIMMEE RVR | 2U | Q | 1.3 | 260 | 9,500 | 15 | 550 | C | D |
| 4095 | HELENA RD | CR 540A | SR 540 | 2U | L | 2.2 | 3,041 | 11,048 | 155 | 630 | C | D |
| 4096 | HIGHLAND ST(W) | CR 542 | SR 563 | 2U | L | 1.3 | 3,810 | 11,048 | 194 | 630 | C | D |
| 4097 | HOPSON RD/LK RDY BLVD(S) | CR 630A | LK ARBUCKLE RD | 2U | M | 5.2 | 466 | 15,000 | 26 | 870 | A | D |
| 4098 | LAKE ALFRED RD | SR 559 | STADIUM RD | 2U | L | .5 | 5,553 | 11,048 | 282 | 630 | C | D |
| 4099 | LAKE MIRIAM DR | SR 37 | CR 37B | 2U | L | 2.3 | 12,344 | 11,048 | 628 | 630 | F | D |
| 4100 | LK ARIANA BLVD(W) | OLD DIXIE HIGHWAY | SR 559 | 2U | S | 2.1 | 3,522 | 14,600 | 197 | 790 | A | D |
| 4101 | LK BFFM RD(S)/AVN PK CTF | LAKE HENDRY ROAD | US 27 | 2U | M | 17.2 | 539 | 15,000 | 30 | 870 | A | D |
| 4102 | LK BFFM RD(W)/LK BFFM RD | LK BUFFUM RD (S) | ALTRS-BSN PK CTF | 2U | M | 5.0 | 795 | 15,000 | 44 | 870 | A | D |
| 4103 | LK HAMILTON DR(W) | COUNTRY CLUB RD (S) | SR 544 | 2U | L | 2.8 | 827 | 11,048 | 42 | 630 | C | D |
| 4104 | LK HENDRY RD/LK BFFM RD(S | US 98 | LK BUFFUM RD W | 2U | M | 3.5 | 868 | 15,000 | 49 | 870 | A | D |
| 4105 | LK LOWERY RD | OLD HAINES CITY-LAKE ALFR | CR 17 | 2U | M | 6.0 | 622 | 15,000 | 35 | 870 | A | D |
| 4106 | LK NED/LK DAISY RD | CYPRESS GARDENS RD | CR 550 | 2U | L | 2.1 | 2,846 | 11,048 | 145 | 630 | C | D |
| 4107 | LK RDY BLVD(N)/LK ARBCKL | CR 630 | LAKE ARBUCKLE | 2U | M | 3.0 | 607 | 15,000 | 34 | 870 | A | D |
| 4108 | LONGFELLOW BLVD | CRYSTAL LAKE DR (N) | CR 542 (E MAIN ST) | 2U | L | 1.6 | 6,097 | 11,048 | 310 | 630 | C | D |
| 4109 | LYLE PKWY/E F GRFFN RD | US 98 TO US 98 | US 98 | 2U | M | 2.0 | 1,197 | 15,000 | 67 | 870 | A | D |
| 4110 | MAINE AVE | SR 659 (COMBEE RD) TO REY | REYNOLDS RD | 2U | L | 1.0 | 6,411 | 11,048 | 326 | 630 | C | D |
| 4111 | MARCUM RD | OLD POLK CITY RD TO US 98 | US 98 | 2U | L | 1.7 | 11,893 | 11,048 | 565 | 630 | E | D |
| 4112 | McKEAN STREET/CR655A* | SR 655 TO BRIDGERS AVE | BRIDGERS AVE | 2U | L | .9 | 2,600 | 11,048 | 132 | 630 | C | D |
| 4113 | McLEOD ST | CR 555 TO GORDON AVE | GORDON AVE | 2U | L | .7 | 835 | 11,048 | 42 | 630 | C | D |
| 4114 | McNICHOLS AVE/KEYSTONE RD | SR 559 TO LK ALFRED RD | LK ALFRED RD | 2U | L | 1.2 | 1,076 | 11,048 | 55 | 630 | C | D |
| 4115 | MEDULLA RD | CNTY LN RD | PIPKIN RD (S) | 2U | M | 4.7 | 4,680 | 15,000 | 262 | 870 | B | D |
| 4116 | MINEOLA DR | SR 659 (COMBEE RD) | FISH HATCHERY RD | 2U | L | .8 | 711 | 11,048 | 36 | 630 | C | D |
| 4117 | MMTH GRVE RD | SR 60 | CAMP MACK RD | 2U | Q | 1.9 | 1,728 | 9,500 | 97 | 550 | C | D |
| 4118 | MMTH GRVE RD/CMP MCK RD | CR 17A | KISSIMMEE RIVER | 2U | M | 12.4 | 1,554 | 15,000 | 87 | 870 | A | D |
| 4119 | MT PISGAH RD | HARDEE CNTY LINE | US 98 | 2U | M | 7.4 | 650 | 15,000 | 36 | 870 | A | D |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4120 | NCHLS MN RD/OLD NCHLS RD | NICHOLS PLANT | CR 676 | 2U | Q | .5 | 890 | 9,500 | 50 | 550 | C | D |
| 4121 | NINTEY-ONE MN RD | SR 60 | US 17 | 2U | M | 2.5 | 2,196 | 15,000 | 123 | 870 | A | D |
| 4122 | NORTHSIDE FRONTAGE RD | HILLSB CNTY LINE | CR 542A | 2U | L | 2.8 | 678 | 11,048 | 34 | 630 | C | D |
| 4123 | OAKDALE RD | LAKE LOWERY RD | WINDING LANE | 2U | M | .5 | 929 | 15,000 | 52 | 870 | A | D |
| 4124 | OLD BRTW RD | SR 60 | OLD BARTOW-LK WALES RD | 2U | M | 2.7 | 1,236 | 15,000 | 69 | 870 | A | D |
| 4125 | OLD BTW-EGL LK RD/CRSTL B | US 98 | US 17 | 2U | M | 7.2 | 665 | 15,000 | 37 | 870 | A | D |
| 4126 | OLD DADE CITY RD | CR 35A (SOCRUM LOOP RD (W | US 98 | 2U | M | 8.3 | 356 | 15,000 | 20 | 870 | A | D |
| 4127 | OLD HWY 37 | SHEPHERD RD | PIPKIN RD (W) | 2U | L | 2.6 | 4,565 | 11,048 | 232 | 630 | C | D |
| 4128 | OLD HWY 37 | CR 630 | CR 640 | 2U | M | 9.3 | 1,964 | 15,000 | 110 | 870 | A | D |
| 4129 | OLD NINE FOOT RD | 3RD ST (EAGLE LAKE)** | SR 540 | 2U | L | 1.4 | 2,476 | 11,048 | 126 | 630 | C | D |
| 4130 | OLD POLK CITY RD | WALT WILLIAMS RD | SR 33 | 2U | M | 4.2 | 4,511 | 15,000 | 252 | 870 | B | D |
| 4131 | OLD POLK CITY RD | CR 582 | WALT WILLMS-RD | 2U | L | 2.5 | 9,117 | 11,048 | 464 | 630 | D | D |
| 4132 | PARK BYRD RD | DUFF RD | CR 35A | 2U | L | 2.0 | 1,091 | 11,048 | 55 | 630 | C | D |
| 4133 | PERCH LK RD/CNTRL AVE | ALTURAS-BABSON PARK CUTOF | CR 655A | 2U | Q | 2.0 | 489 | 9,500 | 27 | 550 | C | D |
| 4134 | PINELLAS ST/ROBIN RD | SR 37 | CR 37A | 2U | L | .5 | 3,129 | 11,048 | 159 | 630 | C | D |
| 4135 | PIPKIN RD(W) | PIPKIN ROAD (S) | SR 37 | 2U | L | 2.0 | 9,165 | 11,048 | 466 | 630 | D | D |
| 4136 | POLK DR/ALACHUA DR | SR 540 | SUWANNEE RD | 2U | L | .7 | 1,142 | 11,048 | 58 | 630 | C | D |
| 4137 | PTTSBRG RD/OLD AVN PK RD | US 27 | T S WILSON RD | 2U | M | 7.0 | 790 | 15,000 | 44 | 870 | A | D |
| 4138 | RCK RDGE RD/GREEN PND RD | OLD DADE CITY RD | SR 33 | 2U | M | 17.4 | 2,593 | 15,000 | 145 | 870 | A | D |
| 4139 | REYNOLDS RD | SR 540 | US 92 | 2U | T | 3.5 | 8,084 | 13,500 | 411 | 730 | B | D |
| 4140 | RIVER RANCH BLVD | LONG HAMMOCK DR | SR 60 | 2U | M | 3.4 | 847 | 15,000 | 47 | 870 | A | D |
| 4141 | ROBSON ST | US 98 | CR 582 | 2U | L | .7 | 3,223 | 11,048 | 164 | 630 | C | D |
| 4142 | SENATE ST | ADAMS ST | DAIRY RD | 2U | L | .2 | 485 | 11,048 | 25 | 630 | C | D |
| 4143 | SHADY OAKS DR | GRAPE HAMMOCK RD | KSSMEE RVR | 2U | Q | 1.2 | 415 | 9,500 | 23 | 550 | C | D |
| 4144 | SHEPHERD RD | BAILEY RD | SR 37 | 2U | T | 2.0 | 10,819 | 13,500 | 550 | 730 | B | D |
| 4145 | SHEPHERD RD | CNTY LN RD | BAILEY RD | 2U | M | 3.0 | 4,414 | 15,000 | 0 | 870 | B | D |
| 4146 | SKYVIEW DR | SR 659 (COMBEE RD) | REYNOLDS RD | 2U | L | 1.0 | 5,274 | 11,048 | 268 | 630 | C | D |
| 4147 | SOC LP RD(N)/SOC LP RD(W) | MARCUM RD | US 98 | 2U | L | 2.7 | 2,033 | 11,048 | 103 | 630 | C | D |
| 4148 | SOUTHSIDE FRONTAGE RD | HILLSB CNTY LINE | CR 542A | 2U | L | 2.7 | 1,054 | 11,048 | 54 | 630 | C | D |
| 4149 | SPIRIT LAKE RD | US 17 | SR 655 | 2U | S | 5.0 | 10,748 | 14,600 | 547 | 790 | B | D |
| 4150 | STADIUM RD/PIERCE ST | SR 559 | CR 555 | 2U | S | 4.1 | 1,934 | 14,600 | 98 | 790 | A | D |
| 4151 | SUNSET DR | LAKE SHORE BLVD (N) | CR 17B | 2U | L | .4 | 1,284 | 11,048 | 65 | 630 | C | D |
| 4152 | SUWANNEE RD/WAKULLA DR SE | SR 540 | CR 550 | 2U | L | .9 | 1,391 | 11,048 | 71 | 630 | C | D |
| 4153 | SWINDELL RD | CR 542A | SR 546 | 2U | L | 1.2 | 3,170 | 11,048 | 161 | 630 | C | D |
| 4154 | TIMBERLANE RD/WATKINS RD | CR 17A | CR 542 | 2U | M | 7.0 | 977 | 15,000 | 55 | 870 | A | D |
| 4155 | WABASH AVE(N) | SR 546 (MEM BLVD) | 10TH ST | 2U | L | .5 | 5,002 | 11,048 | 254 | 630 | C | D |
| 4156 | WABASH AVE(S) | ARIANA ST | US 92 | 2U | L | 1.1 | 6,440 | 11,048 | 327 | 630 | C | D |
| 4157 | WALK-IN-WATER RD | CR 630 | SR 60 | 2U | M | 9.0 | 1,086 | 15,000 | 61 | 870 | A | D |
| 4158 | WASHINGTON AVE | US 27 | "S" STREET | 2U | L | .6 | 3,619 | 11,048 | 184 | 630 | C | D |
| 4159 | YTS-TLGHMN RD/OLD BWLNG G | HARDEE CNTY LINE | US 17 | 2U | M | 7.3 | 687 | 15,000 | 38 | 870 | A | D |

**EXISTING ROAD (COLUMN E)**

U - Undivided

D - Divided

F - Freeway

O - One-Way

**GROUP (COLUMN F)**

A - Urban/Urbanized Two-Way Arterial, 0.0 to 0.75 signals/mile

B - Urban/Urbanized Two-Way Arterial, 0.76 to 1.50 signals/mile

C - Urban/Urbanized Two-Way Arterial, 1.60 to 2.50 signals/mile

D - Urban/Urbanized Two-Way Arterial, 2.60 to 3.50 signals/mile

E - Urban/Urbanized Two-Way Arterial, 3.60 to 4.50 signals/mile

F - Urban/Urbanized Two-Way Arterial, More Than 4.50 signals/mile

H - Freeway w/in Urbanized Area

I - Freeway w/in Non-Urbanized Area

J - One-Way Arterial, Less Than 3.60 signals/mile

K - One-Way Arterial, 3.60 to 4.50 signals/mile

G - One-Way Arterial, More Than 4.50 signals/mile

L - Urban Two-Way Collector

M - Rural Highways (For 2-Lane: 55 MPH Posted Speed)

N - Two-Lane Rural Highway, 45 MPH Posted Speed

O - Rural Two-Way Arterial, 0.25 to 0.75 signals/mile

P - Rural Two-Way Arterial, 0.76 to 1.50 signals/mile

R - Rural Two-Way Arterial, More Than 1.60 signals/mile

Q - Rural Collector

S - Urban/Urbanized Two-Way Minor Arterial, 0.0 to 0.75 signals/mile

T - Urban/Urbanized Two-Way Minor Arterial, 0.76 to 1.50 signals/mile

U - Urban/Urbanized Two-Way Minor Arterial, 1.60 to 2.50 signals/mile

V - Urban/Urbanized Two-Way Minor Arterial, 2.60 to 3.50 signals/mile

W - Urban/Urbanized Two-Way Minor Arterial, 3.60 to 4.50 signals/mile

X - Urban/Urbanized Two-Way Minor Arterial, More Than 4.50 signals/mile

FDOT ADJUSTMENT FACTORS

WEEKDAY FACTORS
FOR CALENDER YEAR 1991

| CO | WEEK | DATES | CAT | FACT | CAT | FACT | CAT | FACT | CAT | FACT |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 01 | 12-31 TO 01-04 | 00 | 1.10 | | | | | | |
| | 02 | 01-07 TO 01-11 | 00 | 1.11 | | | | | | |
| | 03 | 01-14 TO 01-18 | 00 | 1.13 | | | | | | |
| | 04 | 01-21 TO 01-25 | 00 | 1.14 | | | | | | |
| | 05 | 01-28 TO 02-01 | 00 | 1.16 | | | | | | |
| | 06 | 02-04 TO 02-08 | 00 | 1.17 | | | | | | |
| | 07 | 02-11 TO 02-15 | 00 | 1.19 | | | | | | |
| | 08 | 02-18 TO 02-22 | 00 | 1.20 | | | | | | |
| | 09 | 02-25 TO 03-01 | 00 | 1.20 | | | | | | |
| | 10 | 03-04 TO 03-08 | 00 | 1.21 | | | | | | |
| | 11 | 03-11 TO 03-15 | 00 | 1.22 | | | | | | |
| | 12 | 03-18 TO 03-22 | 00 | 1.19 | | | | | | |
| | 13 | 03-25 TO 03-29 | 00 | 1.16 | | | | | | |
| | 14 | 04-01 TO 04-05 | 00 | 1.12 | | | | | | |
| | 15 | 04-08 TO 04-12 | 00 | 1.09 | | | | | | |
| | 16 | 04-15 TO 04-19 | 00 | 1.08 | | | | | | |
| | 17 | 04-22 TO 04-26 | 00 | 1.06 | | | | | | |
| | 18 | 04-29 TO 05-03 | 00 | 1.05 | | | | | | |
| | 19 | 05-06 TO 05-10 | 00 | 1.03 | | | | | | |
| | 20 | 05-13 TO 05-17 | 00 | 1.02 | | | | | | |
| | 21 | 05-20 TO 05-24 | 00 | 1.01 | | | | | | |
| | 22 | 05-27 TO 05-31 | 00 | 1.00 | | | | | | |
| | 23 | 06-03 TO 06-07 | 00 | 0.99 | | | | | | |
| | 24 | 06-10 TO 06-14 | 00 | 0.98 | | | | | | |
| | 25 | 06-17 TO 06-21 | 00 | 0.98 | | | | | | |
| | 26 | 06-24 TO 06-28 | 00 | 0.97 | | | | | | |
| | 27 | 07-01 TO 07-05 | 00 | 0.97 | | | | | | |
| | 28 | 07-08 TO 07-12 | 00 | 0.96 | | | | | | |
| | 29 | 07-15 TO 07-19 | 00 | 0.95 | | | | | | |
| | 30 | 07-22 TO 07-26 | 00 | 0.95 | | | | | | |
| | 31 | 07-29 TO 08-02 | 00 | 0.94 | | | | | | |
| | 32 | 08-05 TO 08-09 | 00 | 0.94 | | | | | | |
| | 33 | 08-12 TO 08-16 | 00 | 0.93 | | | | | | |
| | 34 | 08-19 TO 08-23 | 00 | 0.93 | | | | | | |
| | 35 | 08-26 TO 08-30 | 00 | 0.93 | | | | | | |
| | 36 | 09-02 TO 09-06 | 00 | 0.92 | | | | | | |
| | 37 | 09-09 TO 09-13 | 00 | 0.92 | | | | | | |
| | 38 | 09-16 TO 09-20 | 00 | 0.93 | | | | | | |
| | 39 | 09-23 TO 09-27 | 00 | 0.93 | | | | | | |
| | 40 | 09-30 TO 10-04 | 00 | 0.94 | | | | | | |
| | 41 | 10-07 TO 10-11 | 00 | 0.94 | | | | | | |
| | 42 | 10-14 TO 10-18 | 00 | 0.96 | | | | | | |
| | 43 | 10-21 TO 10-25 | 00 | 0.97 | | | | | | |
| | 44 | 10-28 TO 11-01 | 00 | 0.99 | | | | | | |
| | 45 | 11-04 TO 11-08 | 00 | 1.00 | | | | | | |
| | 46 | 11-11 TO 11-15 | 00 | 1.02 | | | | | | |
| | 47 | 11-18 TO 11-22 | 00 | 1.03 | | | | | | |
| | 48 | 11-25 TO 11-29 | 00 | 1.03 | | | | | | |
| | 49 | 12-02 TO 12-06 | 00 | 1.04 | | | | | | |
| | 50 | 12-09 TO 12-13 | 00 | 1.05 | | | | | | |
| | 51 | 12-16 TO 12-20 | 00 | 1.06 | | | | | | |
| | 52 | 12-23 TO 12-31 | 00 | 1.07 | | | | | | |

TAMPA ELECTRIC COMPANY LETTER

TAMPA ELECTRIC
A TECO ENERGY COMPANY

RECEIVED

APR - 9 1992

LINCKS & ASSOC.,INC.

April 7, 1992

SH
TBC

Mr. Steve Henry
Lincks & Associates, Inc.
5100 West Kennedy Boulevard, Suite 595
Tampa, Florida 33609

Re: Tampa Electric Company
Transportation Management

Dear Mr. Henry:

Tampa Electric Company (TEC) currently has two methods of addressing the issue of transportation management. One, TEC has bulletin boards, available at each office, that are specifically reserved for employee use. Employees interested in car pooling may place ads on these boards. The second method is through the biweekly TEC newsletter that is distributed to all employees. There is a section in each newsletter dedicated to employee ads, including car pool requests.

During construction of the Polk Power Station, TEC will install a bulletin board at the site that may be used by the construction personnel for placing car pooling ads. TEC will inform all on-site contractors that this service is available and will request that these contractors inform their employees of this service.

Should you have any further questions, please do not hesitate to contact me.

Sincerely,

Gregory M. Nelson

Gregory M. Nelson
Consulting Engineer
Environmental Planning

gt\LL603

cc: Mr. Brian Kiraly, ECT

TAMPA ELECTRIC COMPANY
P.O. Box 111 Tampa, Florida 33601-0111 (813) 228-4111
P.O. Box 271 Winter Haven, Florida 33882-0271 (813) 294-4171
P.O. Drawer N Plant City, Florida 33564-9009 (813) 752-1115
P.O. Box 588 Dade City, Florida 33526-0588 (904) 567-5101
P.O. Box 907 Ruskin, Florida 33570-0907 (813) 645-6461
(Ruskin Engineering & All Other Inquiries (813) 641-1411)
137 S. Parsons Av. Brandon, Florida 33511-5224 (813) 681-4451
P.O. Box 215 Mulberry, Florida 33860-0215 (813) 425-4988

HCM COMPUTER PRINTOUT

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

*************************************************************************

INTERSECTION..CR 640/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND TRAFFIC - EXISTING GEOMETRY

## VOLUMES : GEOMETRY

| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 57 | 3 | 15 | 37 | : | L | 12.0 | L | 12.0 | LT | 12.0 | LT | 12.0 |
| TH | 100 | 84 | 142 | 460 | : | TR | 12.0 | TR | 12.0 | R | 12.0 | R | 12.0 |
| RT | 83 | 8 | 6 | 192 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

## ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| NB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| SB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |

## SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 30.0 | 0.0 | 0.0 | 0.0 | GREEN | | 48.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

## LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | L | 0.129 | 0.367 | 14.4 | B | 13.7 | B |
| | TR | 0.341 | 0.367 | 13.4 | B | | |
| WB | L | 0.008 | 0.367 | 13.8 | B | 12.4 | B |
| | TR | 0.162 | 0.367 | 12.4 | B | | |
| NB | LT | 0.265 | 0.567 | 6.5 | B | 6.4 | B |
| | R | 0.008 | 0.567 | 5.5 | B | | |
| SB | LT | 0.571 | 0.567 | 8.6 | B | 8.0 | B |
| | R | 0.259 | 0.567 | 6.4 | B | | |

INTERSECTION: Delay = 9.3 (sec/veh) V/C = 0.481 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

*************************************************************************

INTERSECTION..CR 640/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
| LT | 163 | 4 | 50 | 21 | : | L | 12.0 | L | 12.0 | LT | 12.0 | LT | 12.0 |
| TH | 69 | 98 | 396 | 127 | : | TR | 12.0 | TR | 12.0 | R | 12.0 | R | 12.0 |
| RT | 11 | 28 | 12 | 53 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |
| NB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |
| SB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 30.0 | 0.0 | 0.0 | 0.0 | GREEN | | 48.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | L | 0.393 | 0.367 | 16.3 | C | 15.0 | C |
| | TR | 0.142 | 0.367 | 12.3 | B | | |
| WB | L | 0.009 | 0.367 | 13.8 | B | 12.6 | B |
| | TR | 0.226 | 0.367 | 12.7 | B | | |
| NB | LT | 0.528 | 0.567 | 8.2 | B | 8.1 | B |
| | R | 0.016 | 0.567 | 5.5 | B | | |
| SB | LT | 0.211 | 0.567 | 6.2 | B | 6.1 | B |
| | R | 0.071 | 0.567 | 5.7 | B | | |

INTERSECTION: Delay = 9.9 (sec/veh) V/C = 0.475 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****************************************************************************
INTERSECTION..CR 640/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + OPERATION PROJECT TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
| LT | 57 | 22 | 19 | 37 | : | L | 12.0 | L | 12.0 | LT | 12.0 | LT | 12.0 |
| TH | 100 | 84 | 152 | 508 | : | TR | 12.0 | TR | 12.0 | R | 12.0 | R | 12.0 |
| RT | 102 | 8 | 10 | 192 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| NB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| SB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 30.0 | 0.0 | 0.0 | 0.0 | GREEN | | 48.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | L | 0.129 | 0.367 | 14.4 | B | 13.9 | B |
| | TR | 0.379 | 0.367 | 13.7 | B | | |
| WB | L | 0.062 | 0.367 | 14.0 | B | 12.7 | B |
| | TR | 0.162 | 0.367 | 12.4 | B | | |
| NB | LT | 0.336 | 0.567 | 6.9 | B | 6.8 | B |
| | R | 0.013 | 0.567 | 5.5 | B | | |
| SB | LT | 0.627 | 0.567 | 9.3 | B | 8.5 | B |
| | R | 0.259 | 0.567 | 6.4 | B | | |

INTERSECTION: Delay = 9.7 (sec/veh) V/C = 0.530 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****************************************************************************
INTERSECTION..CR 640/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + OPERATION PROJECT TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
| LT | 163 | 6 | 60 | 21 | : | L | 12.0 | L | 12.0 | LT | 12.0 | LT | 12.0 |
| TH | 69 | 98 | 423 | 134 | : | TR | 12.0 | TR | 12.0 | R | 12.0 | R | 12.0 |
| RT | 13 | 28 | 22 | 53 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. Y/N | BUT. min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |
| NB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |
| SB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 19.8 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 30.0 | 0.0 | 0.0 | 0.0 | GREEN | | 48.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | L | 0.393 | 0.367 | 16.3 | C | 15.0 | B |
| | TR | 0.146 | 0.367 | 12.3 | B | | |
| WB | L | 0.013 | 0.367 | 13.8 | B | 12.8 | B |
| | TR | 0.226 | 0.367 | 12.7 | B | | |
| NB | LT | 0.578 | 0.567 | 8.7 | B | 8.6 | B |
| | R | 0.030 | 0.567 | 5.6 | B | | |
| SB | LT | 0.231 | 0.567 | 6.3 | B | 6.1 | B |
| | R | 0.071 | 0.567 | 5.7 | B | | |

INTERSECTION: Delay = 10.1 (sec/veh) V/C = 0.505 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

************************************************************************

INTERSECTION..CR 640/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (I) - EXISTING GEOMETRY

| VOLUMES | EB | WB | NB | SB | GEOMETRY EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 57 | 41 | 16 | 37 | L | 12.0 | L | 12.0 | LT | 12.0 | LT | 12.0 |
| TH | 100 | 84 | 146 | 554 | TR | 12.0 | TR | 12.0 | R | 12.0 | R | 12.0 |
| RT | 121 | 8 | 8 | 192 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| NB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| SB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |

SIGNAL SETTINGS    CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 30.0 | 0.0 | 0.0 | 0.0 | GREEN | | 48.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | L | 0.129 | 0.367 | 14.4 | B | 14.1 | B |
| | TR | 0.418 | 0.367 | 14.0 | B | | |
| WB | L | 0.121 | 0.367 | 14.4 | B | 13.0 | B |
| | TR | 0.162 | 0.367 | 12.4 | B | | |
| NB | LT | 0.334 | 0.567 | 6.9 | B | 6.8 | B |
| | R | 0.011 | 0.567 | 5.5 | B | | |
| SB | LT | 0.678 | 0.567 | 10.0 | B | 9.1 | B |
| | R | 0.259 | 0.567 | 6.4 | B | | |

INTERSECTION: Delay = 10.2 (sec/veh) V/C = 0.576 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

**************************************************************************

INTERSECTION..CR 640/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (I) - EXISTING GEOMETRY

| VOLUMES | EB | WB | NB | SB | : | GEOMETRY EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 163 | 5 | 84 | 21 | : | L | 12.0 | L | 12.0 | LT | 12.0 | LT | 12.0 |
| TH | 69 | 98 | 482 | 129 | : | TR | 12.0 | TR | 12.0 | R | 12.0 | R | 12.0 |
| RT | 12 | 28 | 46 | 53 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| NB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |
| SB | 0.00 | 10.00 | N | 0 | 0 | 0.90 | 0 | N | 14.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 30.0 | 0.0 | 0.0 | 0.0 | GREEN | | 48.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | L | 0.393 | 0.367 | 16.3 | C | 15.0 | B |
| | TR | 0.144 | 0.367 | 12.3 | B | | |
| WB | L | 0.011 | 0.367 | 13.8 | B | 12.8 | B |
| | TR | 0.226 | 0.367 | 12.7 | B | | |
| NB | LT | 0.687 | 0.567 | 10.2 | B | 9.9 | B |
| | R | 0.062 | 0.567 | 5.7 | B | | |
| SB | LT | 0.265 | 0.567 | 6.5 | B | 6.3 | B |
| | R | 0.071 | 0.567 | 5.7 | B | | |

INTERSECTION: Delay = 10.6 (sec/veh) V/C = 0.572 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
************************************************************************************

INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | EB | | WB | | NB | | SB | |
| LT | 0 | 92 | 0 | 251 | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 | |
| TH | 0 | 0 | 60 | 206 | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RT | 0 | 97 | 67 | 0 | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RR | 0 | 0 | 0 | 0 | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ Y/N | PKG Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 16.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.353 | 0.489 | 9.3 | B | 9.3 | B |
| NB | TR | 0.148 | 0.689 | 3.1 | A | 3.1 | A |
| SB | LT | 0.500 | 0.689 | 4.6 | A | 4.6 | A |

INTERSECTION: Delay = 5.5 (sec/veh) V/C = 0.354 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****************************************************************************
INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND TRAFFIC - EXISTING GEOMETRY

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| | VOLUMES | | | | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | EB | | WB | | NB | | SB | |
| LT | 0 | 31 | 0 | 82 | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 | |
| TH | 0 | 0 | 142 | 63 | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RT | 0 | 116 | 55 | 0 | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RR | 0 | 0 | 0 | 0 | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |

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ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | ADJ PKG Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 15.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 11.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

---

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

---

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.277 | 0.489 | 8.8 | B | 8.8 | B |
| NB | TR | 0.220 | 0.689 | 3.3 | A | 3.3 | A |
| SB | LT | 0.173 | 0.689 | 3.2 | A | 3.2 | A |

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INTERSECTION: Delay = 4.9 (sec/veh) V/C = 0.227 LOS = A

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
****************************************************************************
INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + OPERATIONAL PROJECT TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
| LT | 0 | 163 | 0 | 258 | : | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 | |
| TH | 0 | 0 | 75 | 285 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RT | 0 | 100 | 85 | 0 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RR | 0 | 0 | 0 | 0 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | : | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | : | 12.0 | | 12.0 | | 12.0 | | 12.0 | |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 16.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.492 | 0.489 | 10.5 | B | 10.5 | B |
| NB | TR | 0.187 | 0.689 | 3.2 | A | 3.2 | A |
| SB | LT | 0.593 | 0.689 | 5.3 | B | 5.3 | B |

INTERSECTION: Delay = 6.4 (sec/veh) V/C = 0.575 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

************************************************************************

INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + OPERATIONAL PROJECT TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | EB | | WB | | NB | | SB | |
| LT | 0 | 42 | 0 | 83 | | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 |
| TH | 0 | 0 | 186 | 73 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 0 | 119 | 95 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 15.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 11.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.303 | 0.489 | 9.0 | B | 9.0 | B |
| NB | TR | 0.317 | 0.689 | 3.7 | A | 3.7 | A |
| SB | LT | 0.198 | 0.689 | 3.3 | A | 3.3 | A |

INTERSECTION: Delay = 5.0 (sec/veh) V/C = 0.393 LOS = A

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
*************************************************************************************

INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (I) - EXISTING GEO
METRY

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| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
| LT | 0 | 205 | 0 | 285 | : | | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 |
| TH | 0 | 0 | 67 | 342 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 0 | 97 | 86 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

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ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ Y/N | PKG Nm | BUSES Nb | PHF | PEDS | PED. Y/N | BUT. min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 16.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

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SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

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LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.565 | 0.489 | 11.3 | B | 11.3 | B |
| NB | TR | 0.180 | 0.689 | 3.2 | A | 3.2 | A |
| SB | LT | 0.676 | 0.689 | 6.3 | B | 6.3 | B |

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INTERSECTION: Delay = 7.3 (sec/veh) V/C = 0.795 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
**********************************************************************

INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (I) - EXISTING GEOMETRY

| | VOLUMES EB | WB | NB | SB | : | GEOMETRY EB | | WB | | NB | | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 0 | 48 | 0 | 82 | : | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 |
| TH | 0 | 0 | 262 | 67 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 0 | 150 | 156 | 0 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 15.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 11.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.373 | 0.489 | 9.4 | B | 9.4 | B |
| NB | TR | 0.474 | 0.689 | 4.4 | A | 4.4 | A |
| SB | LT | 0.222 | 0.689 | 3.3 | A | 3.3 | A |

INTERSECTION: Delay = 5.5 (sec/veh) V/C = 0.545 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

*************************************************************************

INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (II) - EXISTING GE
OMETRY

| | VOLUMES | | | | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | EB | | WB | | NB | | SB | |
| LT | 0 | 149 | 0 | 353 | | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 |
| TH | 0 | 0 | 67 | 274 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 0 | 97 | 113 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 16.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.460 | 0.489 | 10.1 | B | 10.1 | B |
| NB | TR | 0.214 | 0.689 | 3.3 | A | 3.3 | A |
| SB | LT | 0.719 | 0.689 | 7.1 | B | 7.1 | B |

INTERSECTION: Delay = 7.2 (sec/veh) V/C = 0.771 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
*******************************************************************************
INTERSECTION..CR 630/SR 37
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (II) - EXISTING GEOMETRY

| | VOLUMES EB | WB | NB | SB | : | GEOMETRY EB | | WB | | NB | | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 0 | 75 | 0 | 82 | : | 12.0 | LR | 12.0 | TR | 12.0 | LT | 12.0 |
| TH | 0 | 0 | 195 | 67 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 0 | 217 | 99 | 0 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 0.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 6.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 15.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |
| SB | 0.00 | 11.00 | N | 0 | 0 | 0.90 | 0 | N | 5.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | | | | | NB | LT | | | | |
| | TH | | | | | | TH | X | | | |
| | RT | | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 19.0 | 0.0 | 0.0 | 0.0 | GREEN | | 59.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| WB | LR | 0.549 | 0.489 | 11.1 | B | 11.1 | B |
| NB | TR | 0.331 | 0.689 | 3.7 | A | 3.7 | A |
| SB | LT | 0.193 | 0.689 | 3.3 | A | 3.3 | A |

INTERSECTION: Delay = 6.6 (sec/veh) V/C = 0.532 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
***********************************************************************
INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND TRAFFIC - EXISTING GEOMETRY

| VOLUMES | EB | WB | NB | SB | GEOMETRY | EB | | WB | | NB | | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 3 | 63 | 27 | 26 | | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR 12.0 |
| TH | 175 | 155 | 16 | 28 | | | 12.0 | | 12.0 | | 12.0 | 12.0 |
| RT | 123 | 15 | 12 | 3 | | | 12.0 | | 12.0 | | 12.0 | 12.0 |
| RR | 0 | 0 | 0 | 0 | | | 12.0 | | 12.0 | | 12.0 | 12.0 |
| | | | | | | | 12.0 | | 12.0 | | 12.0 | 12.0 |
| | | | | | | | 12.0 | | 12.0 | | 12.0 | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.398 | 0.567 | 7.2 | B | 7.2 | B |
| WB | LTR | 0.353 | 0.567 | 6.9 | B | 6.9 | B |
| NB | LTR | 0.116 | 0.367 | 12.2 | B | 12.2 | B |
| SB | LTR | 0.116 | 0.367 | 12.2 | B | 12.2 | B |

INTERSECTION: Delay = 8.0 (sec/veh) V/C = 0.297 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND TRAFFIC - EXISTING GEOMETRY

| VOLUMES | EB | WB | NB | SB | GEOMETRY | EB | | WB | | NB | | SB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 3 | 11 | 27 | 7 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 |
| TH | 107 | 121 | 28 | 9 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 26 | 31 | 27 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.174 | 0.567 | 6.1 | B | 6.1 | B |
| WB | LTR | 0.208 | 0.567 | 6.2 | B | 6.2 | B |
| NB | LTR | 0.167 | 0.367 | 12.4 | B | 12.4 | B |
| SB | LTR | 0.030 | 0.367 | 11.8 | B | 11.8 | B |

INTERSECTION: Delay = 7.7 (sec/veh) V/C = 0.192 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

*************************************************************************

INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + OPERATION PROJECT TRAFFIC - EXISTING GEOMETRY

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| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | | EB | | WB | | NB | | SB |
| LT | 5 | 68 | 40 | 26 | : | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 |
| TH | 186 | 207 | 16 | 28 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 135 | 15 | 13 | 12 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

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ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

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SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

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LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.431 | 0.567 | 7.4 | B | 7.4 | B |
| WB | LTR | 0.436 | 0.567 | 7.5 | B | 7.5 | B |
| NB | LTR | 0.149 | 0.367 | 12.3 | B | 12.3 | B |
| SB | LTR | 0.135 | 0.367 | 12.3 | B | 12.3 | B |

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INTERSECTION: Delay = 8.3 (sec/veh) V/C = 0.323 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT
*********************************************************************************
INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + OPERATION PROJECT TRAFFIC - EXISTING GEOMETRY

| | VOLUMES | | | | : | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | : | EB | | WB | | NB | | SB | |
| LT | 7 | 12 | 33 | 7 | : | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 |
| TH | 138 | 128 | 29 | 9 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 32 | 31 | 29 | 1 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | : | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.226 | 0.567 | 6.3 | B | 6.3 | B |
| WB | LTR | 0.218 | 0.567 | 6.2 | B | 6.2 | B |
| NB | LTR | 0.186 | 0.367 | 12.5 | B | 12.5 | B |
| SB | LTR | 0.035 | 0.367 | 11.8 | B | 11.8 | B |

INTERSECTION: Delay = 7.7 (sec/veh) V/C = 0.210 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

***********************************************************************

INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (I) - EXISTING GEOMETRY

| | VOLUMES | | | | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | | EB | | WB | | NB | | SB |
| LT | 4 | 85 | 34 | 26 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 |
| TH | 179 | 246 | 16 | 32 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 171 | 15 | 12 | 18 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.474 | 0.567 | 7.7 | B | 7.7 | B |
| WB | LTR | 0.538 | 0.567 | 8.4 | B | 8.4 | B |
| NB | LTR | 0.134 | 0.367 | 12.3 | B | 12.3 | B |
| SB | LTR | 0.155 | 0.367 | 12.4 | B | 12.4 | B |

INTERSECTION: Delay = 8.8 (sec/veh) V/C = 0.387 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

**************************************************************************

INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (I) - EXISTING GEOMETRY

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| | VOLUMES | | | | | GEOMETRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EB | WB | NB | SB | | EB | | WB | | NB | | SB | |
| LT | 16 | 11 | 75 | 7 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | |
| TH | 188 | 123 | 32 | 9 | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RT | 33 | 31 | 49 | 1 | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 | |

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ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ Y/N | PKG Nm | BUSES Nb | PHF | PEDS | PED. Y/N | BUT. min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

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SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

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LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.300 | 0.567 | 6.6 | B | 6.6 | B |
| WB | LTR | 0.213 | 0.567 | 6.2 | B | 6.2 | B |
| NB | LTR | 0.326 | 0.367 | 13.4 | B | 13.4 | B |
| SB | LTR | 0.036 | 0.367 | 11.8 | B | 11.8 | B |

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INTERSECTION: Delay = 9.5 (sec/veh) V/C = 0.311 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

************************************************************************

INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........AM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (II) - EXTSTING GEOMETRY

| | VOLUMES EB | WB | NB | SB | GEOMETRY EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 4 | 131 | 31 | 26 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 |
| TH | 179 | 200 | 16 | 39 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 266 | 15 | 12 | 11 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

SIGNAL SETTINGS CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.612 | 0.567 | 9.2 | B | 9.2 | B |
| WB | LTR | 0.684 | 0.567 | 10.9 | B | 10.9 | B |
| NB | LTR | 0.127 | 0.367 | 12.2 | B | 12.2 | B |
| SB | LTR | 0.153 | 0.367 | 12.4 | B | 12.4 | B |

INTERSECTION: Delay = 10.3 (sec/veh) V/C = 0.475 LOS = B

1985 HCM: SIGNALIZED INTERSECTIONS
SUMMARY REPORT

**************************************************************************

INTERSECTION..CR 630/FORT GREEN ROAD
AREA TYPE.....OTHER
ANALYST.......LINCKS & ASSOC.
DATE..........04-7-1992
TIME..........PM PEAK HOUR
COMMENT.......BACKGROUND + CONSTRUCTION PROJECT TRAFFIC (II) - EXTSTING GEOMETRY

| | VOLUMES EB | VOLUMES WB | VOLUMES NB | VOLUMES SB | GEOMETRY EB | | GEOMETRY WB | | GEOMETRY NB | | GEOMETRY SB | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LT | 9 | 11 | 169 | 7 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 | LTR | 12.0 |
| TH | 142 | 123 | 39 | 9 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RT | 29 | 31 | 95 | 1 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| RR | 0 | 0 | 0 | 0 | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |
| | | | | | | 12.0 | | 12.0 | | 12.0 | | 12.0 |

ADJUSTMENT FACTORS

| | GRADE (%) | HV (%) | ADJ PKG Y/N | Nm | BUSES Nb | PHF | PEDS | PED. BUT. Y/N | min T | ARR. TYPE |
|---|---|---|---|---|---|---|---|---|---|---|
| EB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| WB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| NB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |
| SB | 0.00 | 5.00 | N | 0 | 0 | 0.90 | 0 | N | 8.5 | 3 |

SIGNAL SETTINGS — CYCLE LENGTH = 90.0

| | | PH-1 | PH-2 | PH-3 | PH-4 | | | PH-1 | PH-2 | PH-3 | PH-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EB | LT | X | | | | NB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| WB | LT | X | | | | SB | LT | X | | | |
| | TH | X | | | | | TH | X | | | |
| | RT | X | | | | | RT | X | | | |
| | PD | | | | | | PD | | | | |
| GREEN | | 48.0 | 0.0 | 0.0 | 0.0 | GREEN | | 30.0 | 0.0 | 0.0 | 0.0 |
| YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 | YELLOW | | 6.0 | 0.0 | 0.0 | 0.0 |

LEVEL OF SERVICE

| | LANE GRP. | V/C | G/C | DELAY | LOS | APP. DELAY | APP. LOS |
|---|---|---|---|---|---|---|---|
| EB | LTR | 0.227 | 0.567 | 6.3 | B | 6.3 | B |
| WB | LTR | 0.211 | 0.567 | 6.2 | B | 6.2 | B |
| NB | LTR | 0.643 | 0.367 | 16.9 | C | 16.9 | C |
| SB | LTR | 0.040 | 0.367 | 11.8 | B | 11.8 | B |

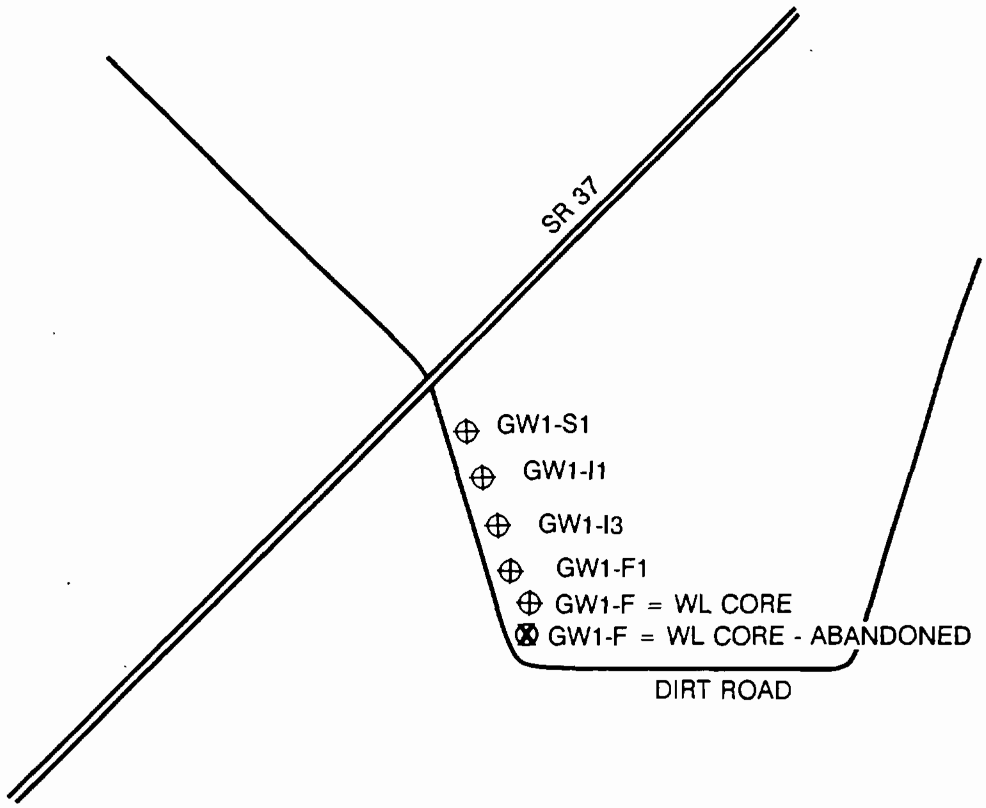
INTERSECTION: Delay = 11.2 (sec/veh) V/C = 0.392 LOS = B

# APPENDIX 11.7

## GEOLOGY/GEOHYDROLOGY MONITORING PROGRAM AND SUPPORTING INFORMATION

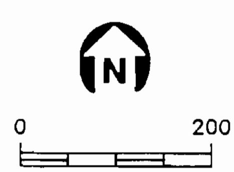
# 11.7.1 BORING LOGS AND WELL CONSTRUCTION DETAILS

## SITE GW-1




TO C (ELEVATIONS IN FEET, ABOVE MEAN SEA LEVEL)

S1 - 145.70'
I1 - 145.00'
I3 - 145.45'
F1 - 146.03'




APPROXIMATE SCALE IN FEET

GROUNDWATER STATION GW-1
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

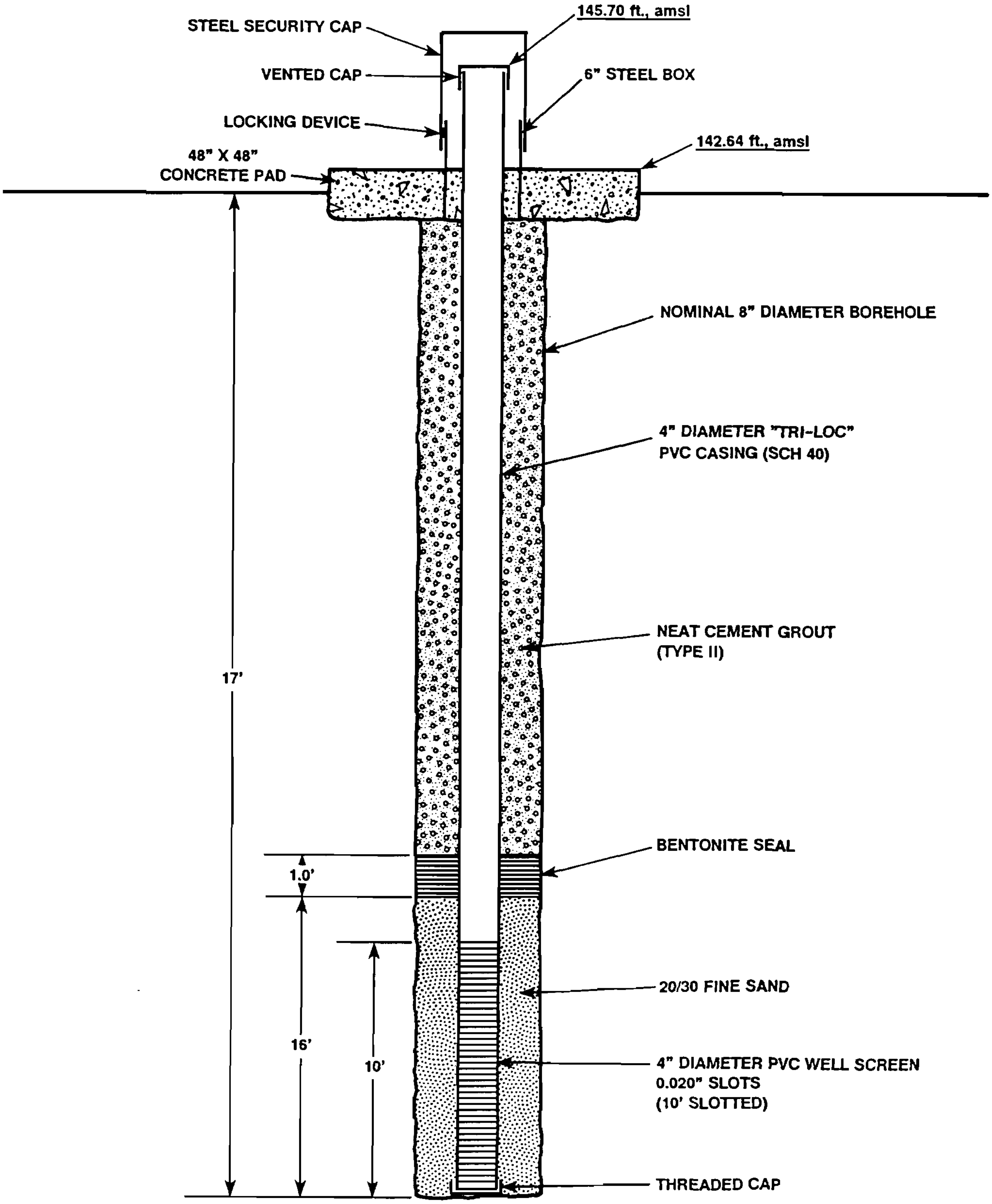
## GEOLOGIC LOG

PROPERTY: Polk Power Station    CLIENT: TEC
HOLE No.: GW 1 - S1    DATE: 04/03/91
GEOLOGIST: Kay L. Winslow    DRILLER: Burnett Drilling
LOCATION: NE 1/4 of NW 1/4 of Section 16, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary    Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | FOOTAGE TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 10.0 | Dark brown, fine grained, silty sand with roots (water table @ ~8.5 ft bls) |
| | 10.0 | 17.0 | Tan to light brown, fine grained, silty sand |
| | TOTAL DEPTH | 17' | |

Remarks: 4/03/91: Drilled from 0 to 17 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-1
MONITOR WELL GW1-S1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

## GEOLOGIC LOG

| | | | |
|---|---|---|---|
| PROPERTY: | Polk Power Station | CLIENT: | TEC |
| HOLE No.: | GW 1 - I1 | DATE: | 03/26/91 - 03/27/91 |
| GEOLOGIST: | Richard Steele, P.G. | DRILLER: | Burnett Drilling |

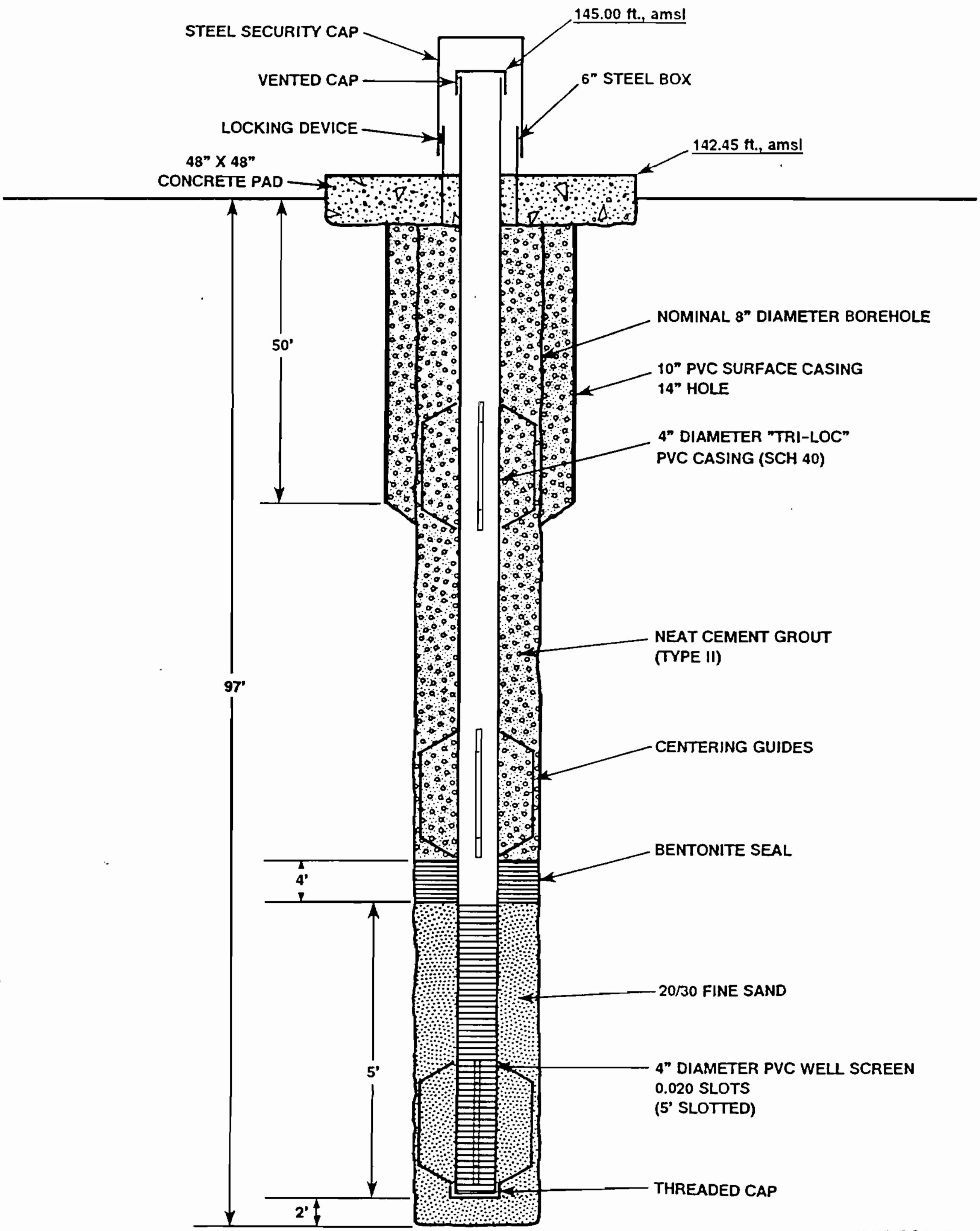
LOCATION: NE 1/4 of NW 1/4 of Section 16, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary     Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | FOOTAGE TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 10.0 | Dark brown, fine grained, silty sand with roots (water table @ ~8.5 ft bls) |
| | 10.0 | 20.0 | Tan to light brown, fine grained, silty sand |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 20.0 | 37.0 | Tan to greyish green, fine - medium grained, medium dense, phosphatic, silty sand interbedded with greenish sandy clay lenses |
| | | | (Surficial Aquifer) |
| • • • • | | | |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 37.0 | 39.0 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| | 39.0 | 50.0 | Light brown to tan, soft to medium hard, slightly phosphatic, sandy, calcareous mudstone with traces of fossils |
| | 50.0 | 63.0 | Dark grey, dense, phosphatic, slightly calcareous, clayey, fine grained sand |
| - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 63.0 | 70.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some dark grey sandy clay |
| | | | (Intermediate Aquifer) |
| | 70.0 | 97.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with dark grey sandy clay |

**TOTAL DEPTH 97'**

Remarks: 3/26/91: Drilled from 0 to 50 ft bls, set surface casing
3/27/91: Drilled from 50 to 97 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-1
MONITOR WELL GW1-I1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1992.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

## GEOLOGIC LOG

PROPERTY: Polk Power Station    CLIENT: TEC
HOLE No.: GW 1 - I3    DATE: 03/19/91 - 03/25/91
GEOLOGIST: Richard Steele, P.G.    DRILLER: Burnett Drilling
LOCATION: NE 1/4 of NW 1/4 of Section 16, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary    Page: 1 of 3

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 10.0 | Dark brown, fine grained, silty sand with roots (water table @ ~8.5 ft bls) |
| | 10.0 | 20.0 | Tan to light brown, fine grained, silty sand |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 20.0 | 40.0 | Tan to greyish green, fine - medium grained, medium dense, phosphatic, silty sand interbedded with greenish sandy clay lenses (Surficial Aquifer) |
| • • • • | | | |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 40.0 | 50.0 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| | 50.0 | 54.0 | Light brown to tan, soft to medium hard, slightly phosphatic, sandy, calcareous mudstone with traces of fossils and solution features |
| | 54.0 | 60.0 | Dark grey, dense, phosphatic, slightly calcareous, clayey, fine grained sand |
| - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 60.0 | 65.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with dark grey sandy clay (Intermediate Aquifer) |
| | 65.0 | 75.0 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone, trace fossils and dark grey phosphatic clay |
| | 75.0 | 100.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with dark grey sandy clay |

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Arcadia Formation undifferentiated, continued | 100.0 | 145.0 | Light brown to grey, moderately hard - hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown sandy clay and dark grey chert; interbedded with strata of greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft to medium hard mudstone |
| | 145.0 | 157.0 | Greyish brown, moderately hard - hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown, phosphatic, slightly sandy clay |
| | 157.0 | 165.0 | Light brownish grey, medium hard, phosphatic, slightly sandy, dolomitic mudstone interbedded with strata dark greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft, calcareous mudstone |
| | 165.0 | 175.0 | Light to dark greyish brown, very dense, phosphatic, calcareous, fine grained, clayey fine sand; to medium hard, slightly phosphatic, slightly sandy, dolomitic mudstone |
| | 175.0 | 188.0 | Light brown to greyish brown, soft to moderately hard, phosphatic, sandy, dolomitic limestone interbedded with strata dark greyish brown, phosphatic, calcareous, sandy clay/mudstone; dark grey, slightly phosphatic, slightly calcareous clay; and dark grey chert |
| | 188.0 | 190.0 | Tan to light brown, soft to hard, phosphatic, slightly sandy, dolomitic mudstone with trace fossils and dark grey, slightly phosphatic clay |
| Miocene Hawthorn Group, Arcadia Formation, Tampa Member | 190.0 | 205.0 | Grey, moderately hard to hard, phosphatic, sandy, dolomitic limestone with fractures and interclasts; interbedded with strata dark greyish, dense, phosphatic, slightly calcareous, clayey fine sand **{Complete drilling fluid loss @ ~205′, estimate approximately > 750 gallons lost}** |

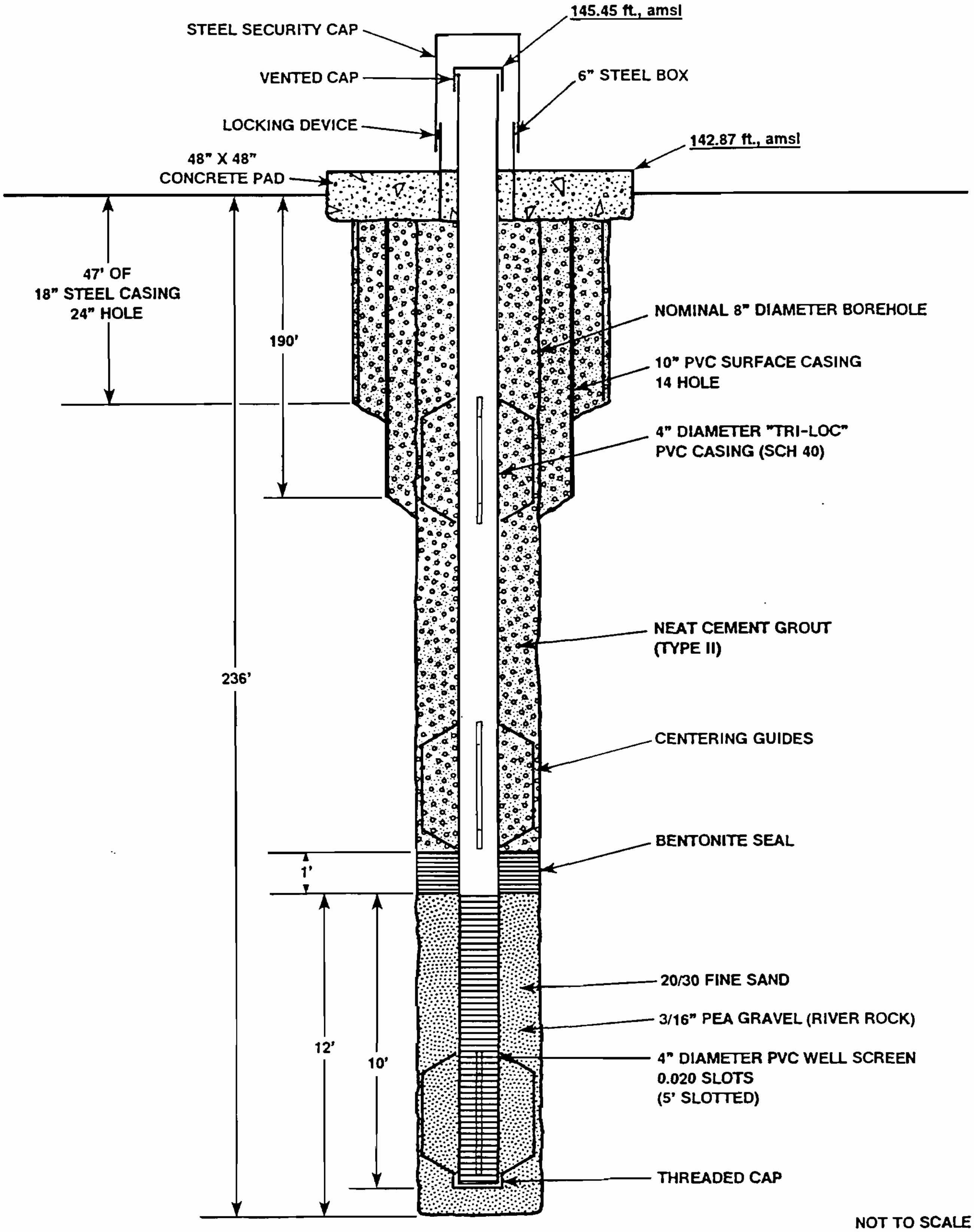
## GEOLOGIC LOG

### GW 1 - I3, continued

Page: 3 of 3

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Miocene Hawthorn Group, Arcadia Formation, Tampa Member, continued | 205.0 | 211.0 | Grey, hard to very hard, phosphatic, sandy, fossiliferous, dolomitic limestone with greyish brown clay |
| | 211.0 | 215.0 | Grey, hard to very hard, phosphatic, sandy, fossiliferous, dolomitic limestone; very vuggy with some small voids |
| | 215.0 | 217.0 | Brown, soft to moderately hard, sandy limestone with trace fossils and laminations of clay, mudstone and chert |
| | **TOTAL DEPTH 217'** | | |

Remarks:
3/19/91: Drilled from 0 to 47 ft bls, set surface casing
3/20/91: Drilled from 47 to 120 ft bls
3/21/91: Drilled from 120 to 180 ft bls
3/22/91: Drilled from 180 to 190 ft bls, set second surface casing
3/25/91: Drilled from 190 to 217 ft bls
3/26/91: Set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-1
MONITOR WELL GW1-I3
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

## GEOLOGIC LOG

| | | | |
|---|---|---|---|
| PROPERTY: | Polk Power Station | CLIENT: | TEC |
| HOLE No.: | GW 1 - F1 | DATE: | 03/05/91 - 03/13/91 |
| GEOLOGIST: | Richard Steele, P.G. | DRILLER: | Burnett Drilling |

LOCATION: NE 1/4 of NW 1/4 of Section 16, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary     Page: 1 of 3

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 10.0 | Dark brown, fine grained, silty sand with roots (water table @ ~8.5 ft bls) |
| | 10.0 | 20.0 | Tan to light brown, fine grained, silty sand |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 20.0 | 40.0 | Tan to greyish green, fine - medium grained, medium dense, phosphatic, silty sand interbedded with greenish sandy clay lenses |
| | | | (Surficial Aquifer) |
| • • • • | | | |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 40.0 | 50.0 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| | 49.0 | 54.0 | Light brown to tan, soft to medium hard, slightly phosphatic, sandy, calcareous mudstone with traces of fossils and solution features |
| | 54.0 | 60.0 | Dark grey, dense, phosphatic, slightly calcareous, clayey, fine grained sand |
| - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 60.0 | 65.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone (Intermediate Aquifer) |
| | 65.0 | 75.0 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone, trace fossils and dark grey phosphatic clay |
| | 75.0 | 100.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with dark grey sandy clay |

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Arcadia Formation undifferentiated, continued | 100.0 | 145.0 | Light brown to grey, moderately hard - hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown sandy clay and dark grey chert; interbedded with strata of greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft to medium hard mudstone |
| | 145.0 | 157.0 | Greyish brown, moderately hard - hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown, phosphatic, slightly sandy clay |
| | 157.0 | 165.0 | Light brownish grey, medium hard, phosphatic, slightly sandy, dolomitic mudstone interbedded with strata dark greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft, calcareous mudstone |
| | 165.0 | 175.0 | Light to dark greyish brown, very dense, phosphatic, calcareous, fine grained, clayey fine sand; to medium hard, slightly phosphatic, slightly sandy, dolomitic mudstone |
| | 175.0 | 188.0 | Light brown to greyish brown, soft to moderately hard, phosphatic, sandy, dolomitic limestone interbedded with strata dark greyish brown, phosphatic, calcareous, sandy clay/mudstone; dark grey, slightly phosphatic, slightly calcareous clay; and dark grey chert |
| | 188.0 | 190.0 | Tan to light brown, soft to hard, phosphatic, slightly sandy, dolomitic mudstone with trace fossils and dark grey, slightly phosphatic clay |
| Miocene Hawthorn Group, Arcadia Formation, Tampa Member | 190.0 | 196.0 | Light grey, hard, sandy, dolomitic mudstone interbedded with strata of greyish brown, calcareous, slightly sandy clay |
| | 196.0 | 205.0 | Grey, moderately hard to hard, phosphatic, sandy, dolomitic limestone with interclasts; interbedded with strata dark greyish, dense, phosphatic, slightly calcareous, clayey fine sand **{Complete drilling fluid loss @ ~205', estimate approximately 1,000 gallons lost}** |

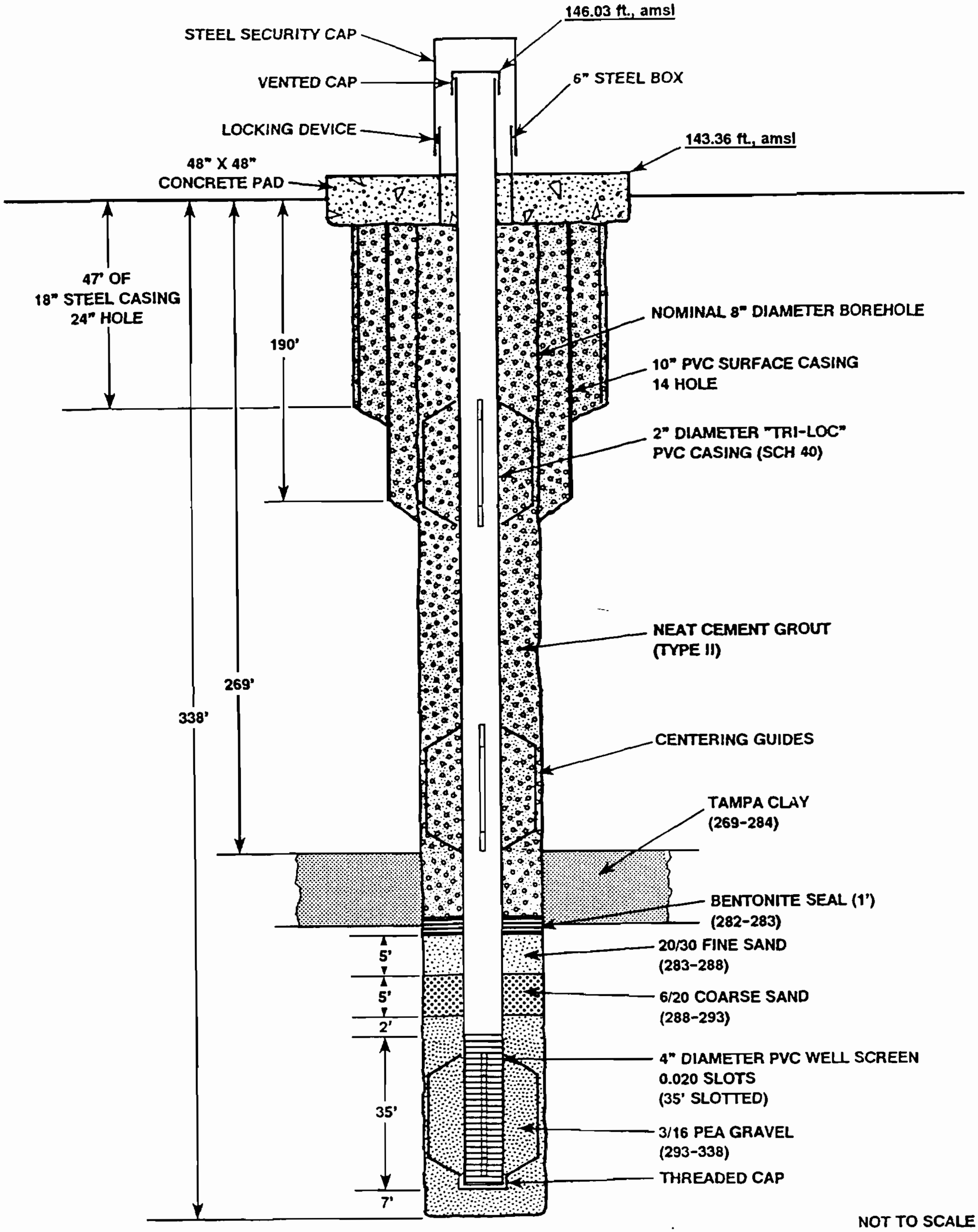
## GEOLOGIC LOG

### GW 1 - F1, continued



| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Miocene Hawthorn Group, Arcadia Formation, Tampa Member, continued | 205.0 | 212.0 | Grey, hard to very hard, phosphatic, sandy, fossiliferous, dolomitic limestone with dark grey brown clay |
| | 212.0 | 220.0 | Brown, soft to moderately hard, sandy limestone with trace fossils and laminations of clay, mudstone and chert |
| | 220.0 | 240.0 | Brown, hard to very hard, slightly sandy, fossiliferous limestone with trace phosphate |
| | 240.0 | 250.0 | Brown, soft to moderately hard, sandy, slightly fossiliferous limestone interbedded with strata of dark grey chert |
| | 250.0 | 270.0 | White to tan, medium to moderately hard, sandy, slightly fossiliferous limestone interbedded with strata of dark grey chert |
| Miocene Hawthorn Group, Arcadia Formation, Nocatee Member | 270.0 | 285.0 | Interbedded strata of bluish grey, hard clay to very soft, calcareous claystone, light gray, soft to medium, calcareous mudstone with trace fossils, and brown, soft, sandy limestone |
| Oligocene Suwannee Limestone | 285.0 | 335.0 | Brown, soft to hard, slightly fossiliferous becoming fossiliferous with depth, limestone with interbedded strata of dark grey chert (Floridan Aquifer) |
| | TOTAL DEPTH 335' | | |

Remarks:
3/05/91: Drilled from 0 to 47 ft bls, set surface casing
3/06/91: Drilled from 47 to 145 ft bls
3/07/91: Drilled from 145 to 190 ft bls
3/08/91: Set second surface casing
3/10/91: Drilled from 190 to 250 ft bls
3/12/91: Drilled from 250 to 269 ft bls, (using air rotary to completion)
3/13/91: Drilled from 269 to 335 ft bls
3/14/91: Drilled from 335 to 338 ft bls
3/15/91: Complete monitor well
See monitor well construction details for a record of well completion

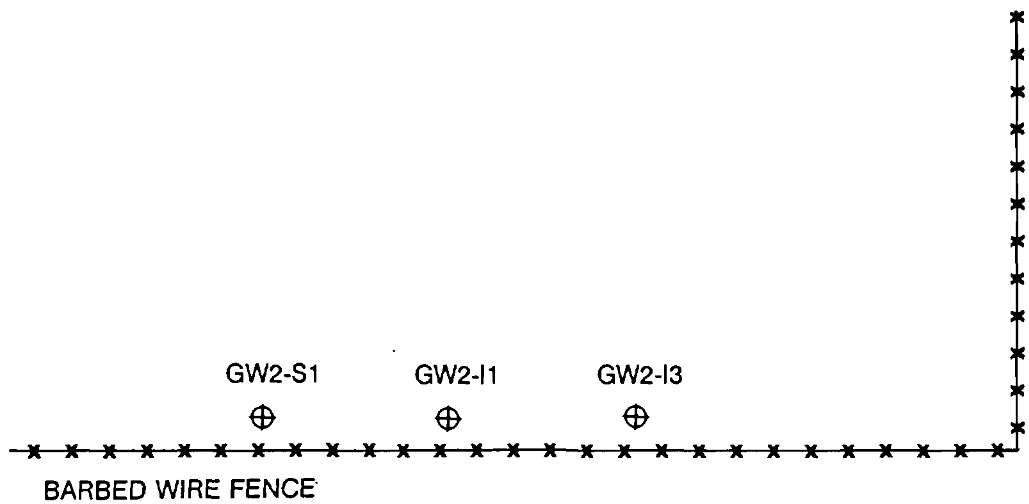



GROUNDWATER STATION GW-1
MONITOR WELL GW1-F1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

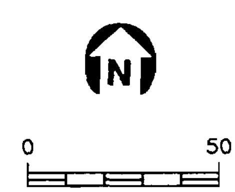
**POLK POWER STATION**

## SITE GW-2




TO C (ELEVATIONS IN FEET, ABOVE MEAN SEA LEVEL)

S1 - 138.79'
I1 - 138.83'
I3 - 139.29'




APPROXIMATE SCALE IN FEET

GROUNDWATER STATION GW-2
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

## GEOLOGIC LOG

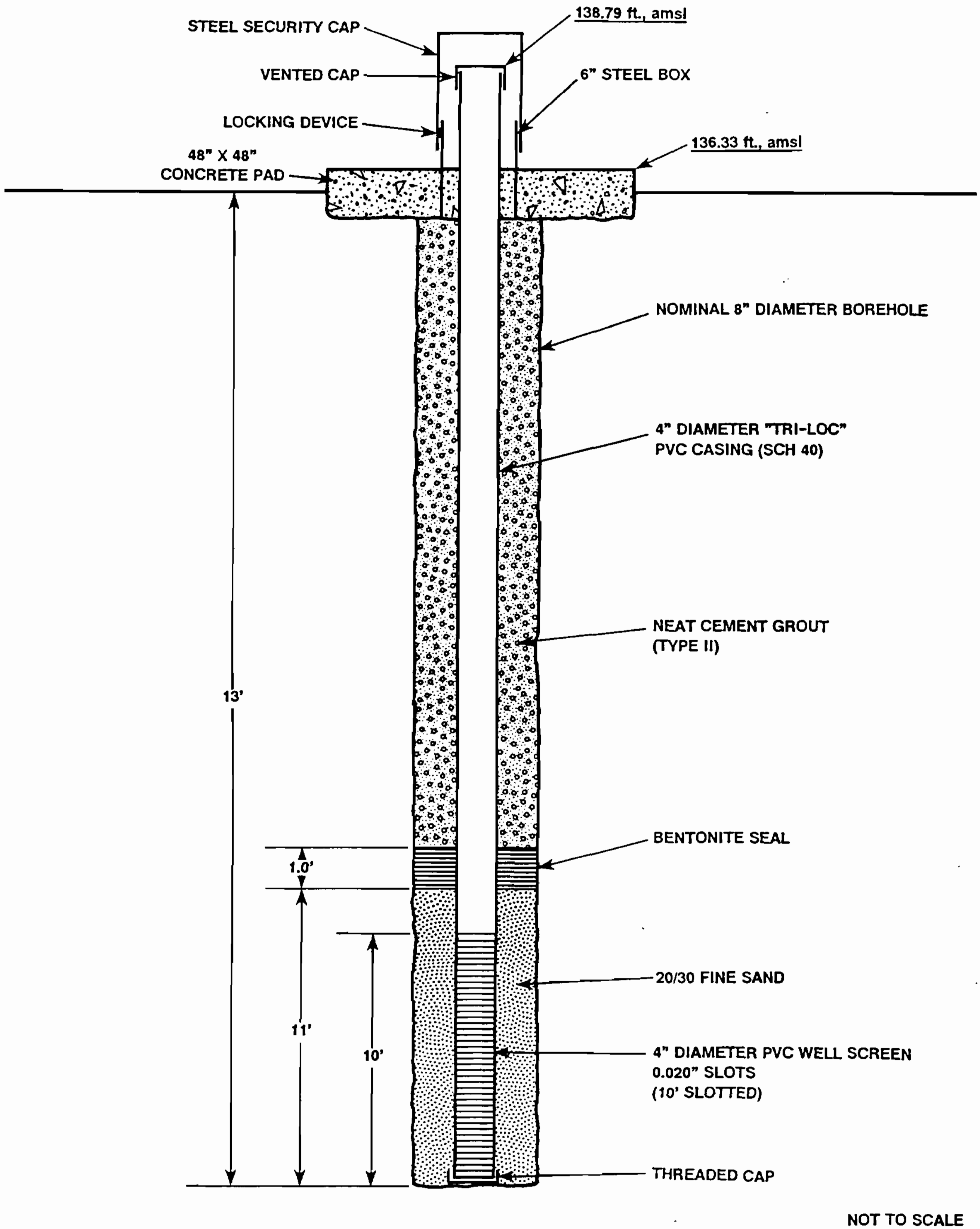
| | | | |
|---|---|---|---|
| PROPERTY: | Polk Power Station | CLIENT: | TEC |
| HOLE No.: | GW 2 - S1 | DATE: | 04/04/91 |
| GEOLOGIST: | Kay L. Winslow | DRILLER: | Burnett Drilling |

LOCATION: NE 1/4 of SE 1/4 of Section 11, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary     Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 5.0 | Light brown to grey, fine - medium grained, silty silty sand with some organics and phosphate, subrounded, minor sorting (CAST OVERBURDEN; water table @ ~4.5 ft bls) |
| | 5.0 | 13.0 | Light brown to grey, fine - medium grained, silty sand with some phosphate, subrounded, minor sorting |
| | TOTAL DEPTH | 13' | |

Remarks: 4/04/91: Drilled from 0 to 13 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-2
MONITOR WELL GW2-S1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

# GEOLOGIC LOG

PROPERTY: Polk Power Station    CLIENT: TEC

HOLE No.: GW 2 - I1    DATE: 03/25/91 - 03/26/91

GEOLOGIST: Richard Steele, P.G.    DRILLER: Burnett Drilling

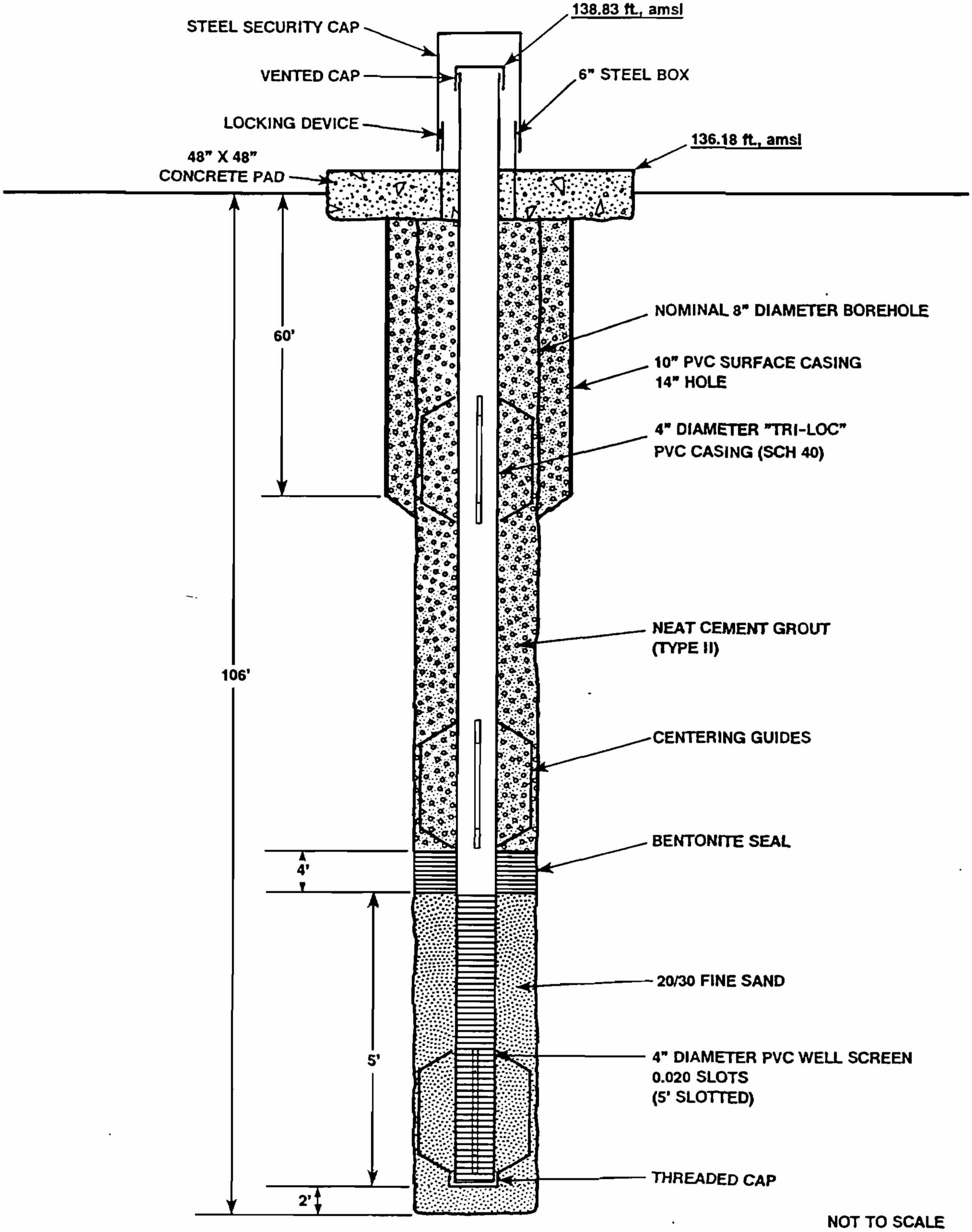
LOCATION: NE 1/4 of SE 1/4 of Section 11, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary    Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 5.0 | Light brown to grey, fine - medium grained, silty silty sand with some organics and phosphate, subrounded, minor sorting (CAST OVERBURDEN; water table @ ~4.5 ft bls) |
| | 5.0 | 15.0 | Light brown to grey, fine - medium grained, silty sand with some phosphate, subrounded, minor sorting |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 15.0 | 41.5 | Tan to greyish green, medium grained, medium dense, phosphatic (increasing with depth), silty sand interbedded with occasional cemented sand lenses (Surficial Aquifer) |
| • • • • | | | |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 41.5 | 49.5 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| | 49.5 | 60.0 | Dark grey, dense, phosphatic, slightly calcareous, clayey, fine grained sand |
| - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 60.0 | 73.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some sandy clay (Intermediate Aquifer) |
| | 75.0 | 95.0 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone, trace fossils and dark grey phosphatic clay |
| | 95.0 | 106.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with some dark grey sandy clay |

**TOTAL DEPTH 106'**

Remarks: 3/25/91: Drilled from 0 to 60 ft bls, set surface casing
3/26/91: Drilled from 60 to 106 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-2
MONITOR WELL GW2-I1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
*Source:* ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

GEOLOGIC LOG

PROPERTY: Polk Power Station | CLIENT: TEC

HOLE No.: GW 2 - I3 | DATE: 03/12/91 - 03/20/91

GEOLOGIST: Bradley S. Pekas, E.I.T. | DRILLER: Burnett Drilling

LOCATION: NE 1/4 of SE 1/4 of Section 11, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary     Page: 1 of 2

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 5.0 | Light brown to grey, fine - medium grained, silty silty sand with some organics and phosphate, subrounded, minor sorting (CAST OVERBURDEN; water table @ ~4.5 ft bls) |
| | 5.0 | 15.0 | Light brown to grey, fine - medium grained, silty sand with some phosphate, subrounded, minor sorting |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 15.0 | 41.5 | Tan to greyish green, medium grained, medium dense, phosphatic (increasing with depth), silty sand interbedded with occasional cemented sand lenses |
| | | | (Surficial Aquifer) |
| • • • • | | | |
| - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 41.5 | 49.5 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| | 49.5 | 60.0 | Dark grey, dense, phosphatic, slightly calcareous, clayey, fine grained sand |
| - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 60.0 | 75.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some sandy clay (Intermediate Aquifer) |
| | 75.0 | 97.5 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone, trace fossils and dark grey phosphatic clay |
| | 97.5 | 100.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with some solution features and dark grey sandy clay |

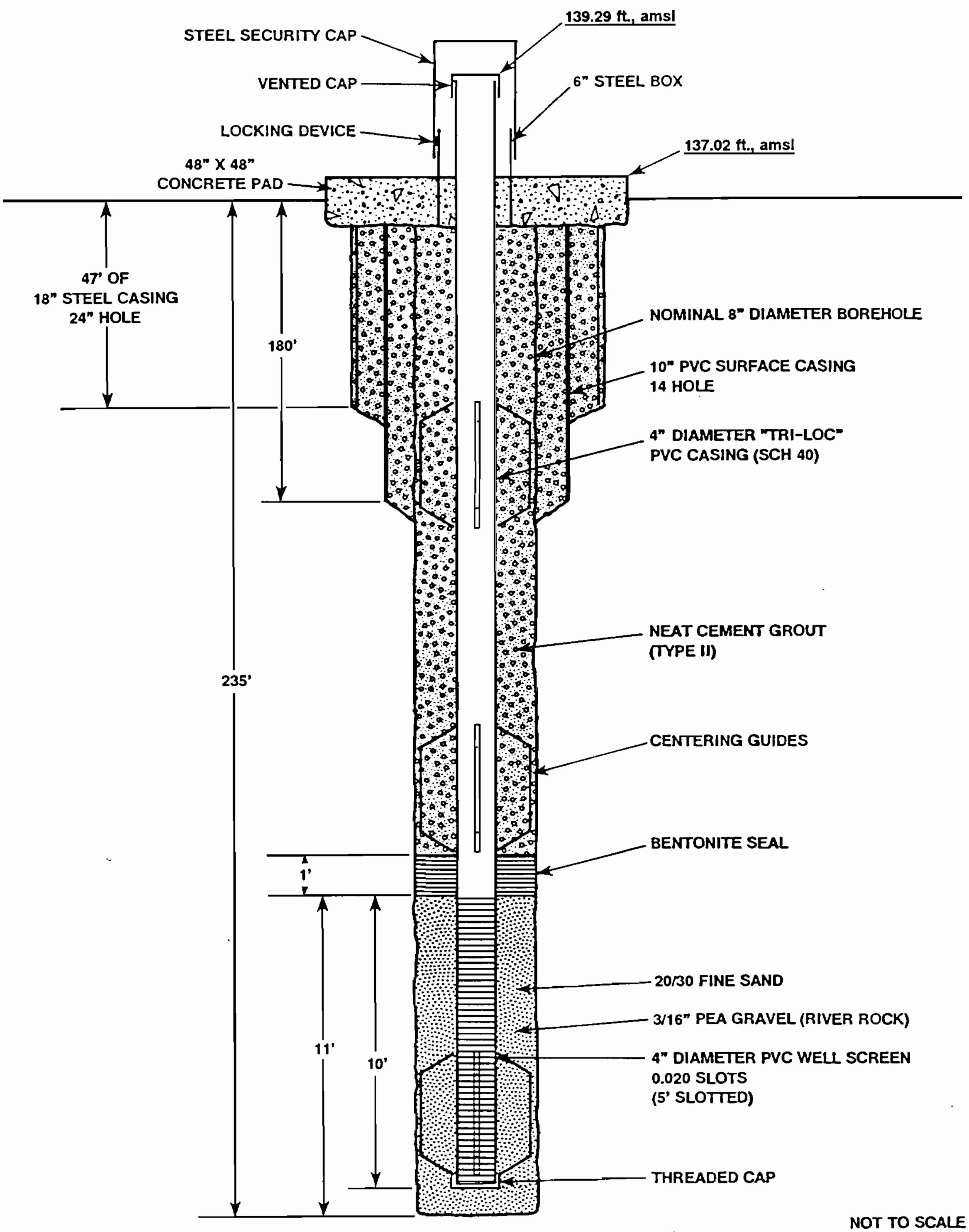
## GEOLOGIC LOG

## GW 2 - I3, continued



| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Arcadia Formation undifferentiated, continued | 100.0 | 136.5 | Light green to grey, soft - moderately hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown sandy clay and dark grey chert; interbedded with strata of greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft to medium hard mudstone |
| | 136.5 | 155.0 | Greyish brown, moderately hard - hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown, phosphatic, slightly sandy clay |
| | 155.0 | 184.0 | Light brownish grey, medium hard, phosphatic, slightly sandy, dolomitic mudstone interbedded with strata dark greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft, calcareous mudstone |
| | 184.0 | 192.0 | Tan to light brown, soft to moderately hard, phosphatic, slightly sandy, dolomitic mudstone with trace fossils and dark grey, slightly phosphatic clay |
| Miocene Hawthorn Group, Arcadia Formation, Tampa Member | 192.0 | 210.0 | Grey, moderately hard to hard, phosphatic, sandy, dolomitic limestone with interclasts; interbedded with strata dark greyish, dense, phosphatic, slightly calcareous, clayey fine sand |
| | 210.0 | 226.0 | Grey, hard to very hard, phosphatic, sandy, fossiliferous, dolomitic limestone with greyish brown clay |
| | 226.0 | 235.0 | Light brown to brown, moderately hard to hard, phosphatic, sandy, fossiliferous, dolomitic limestone with greyish brown clay; very vuggy below 230 ft, {Partial drilling fluid loss @ ~233', estimate approximately > 500 gallons lost} |
| | TOTAL DEPTH 235' | | |

Remarks:
3/12/91: Drilled from 0 to 47 ft bls, set surface casing
3/13/91: Drilled from 47 to 97.5 ft bls
3/14/91: Drilled from 97.5 to 175 ft bls
3/15/91: Drilled from 175 to 180 ft bls, set second surface casing
3/20/91: Drilled from 180 to 234 ft bls, set monitor well
See monitor well construction details for a record of well completion

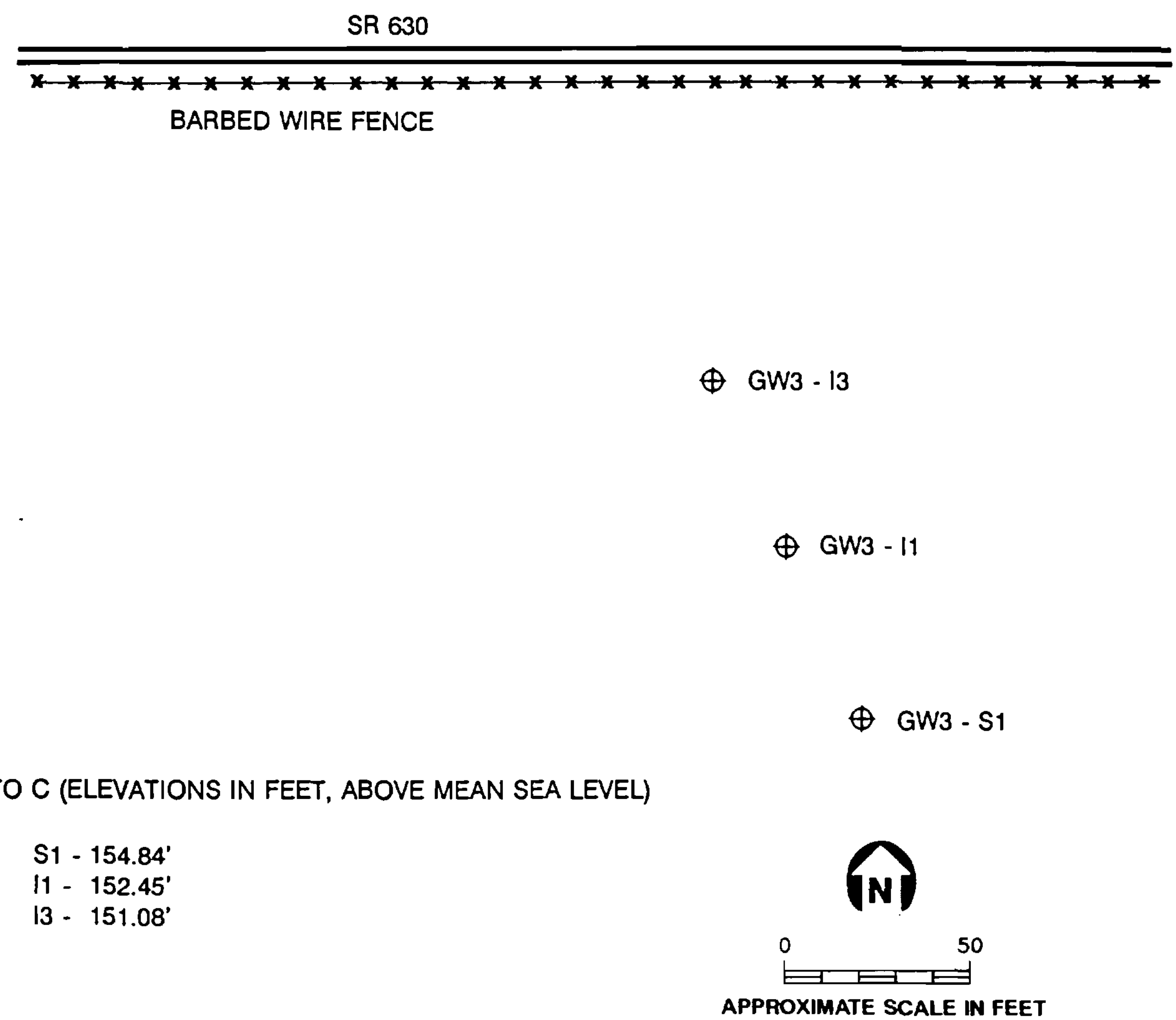



GROUNDWATER STATION GW-2
MONITOR WELL GW2-I3
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

## SITE GW-3




TO C (ELEVATIONS IN FEET, ABOVE MEAN SEA LEVEL)

S1 - 154.84'
I1 - 152.45'
I3 - 151.08'

GROUNDWATER STATION GW-3
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: *ECT, 1991.*

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

## GEOLOGIC LOG

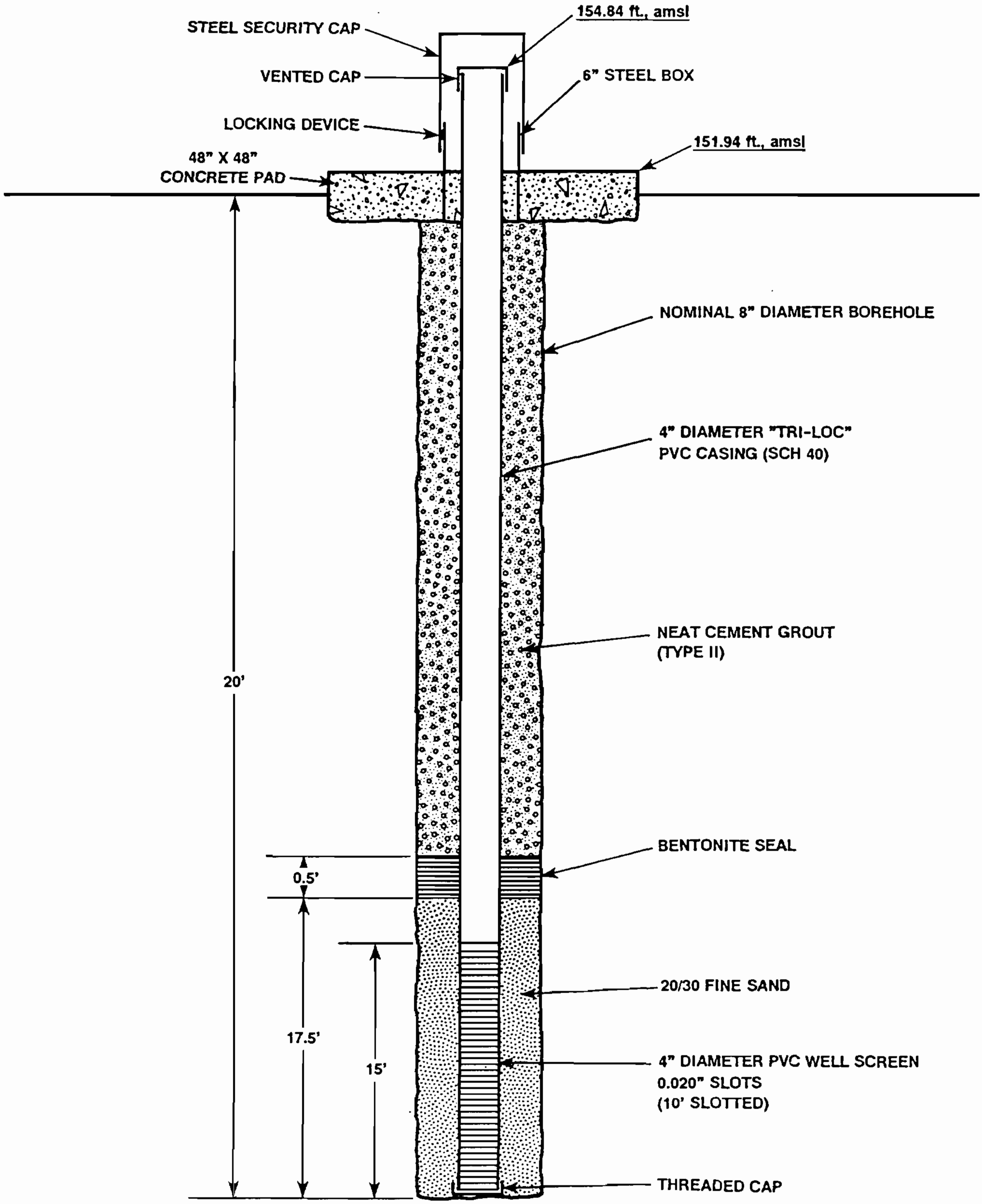
| | | | |
|---|---|---|---|
| PROPERTY: | Polk Power Station | CLIENT: | TEC |
| HOLE No.: | GW 3 - S1 | DATE: | 04/04/91 |
| GEOLOGIST: | Kay L. Winslow | DRILLER: | Burnett Drilling |
| LOCATION: | SE 1/4 of NW 1/4 of Section 35, Township 31 S., Range 23 E. | | |

- - - - Stratigraphic Contact • • • • Aquifer Boundary      Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 20.0 | Light grey to tan, medium grained, silty sand well sorted, with some phosphate, subrounded, (TAILINGS SAND; water table @ ~12 ft bls) |

**TOTAL DEPTH 20'**

Remarks: 4/04/91: Drilled from 0 to 20 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-3
MONITOR WELL GW3-S1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

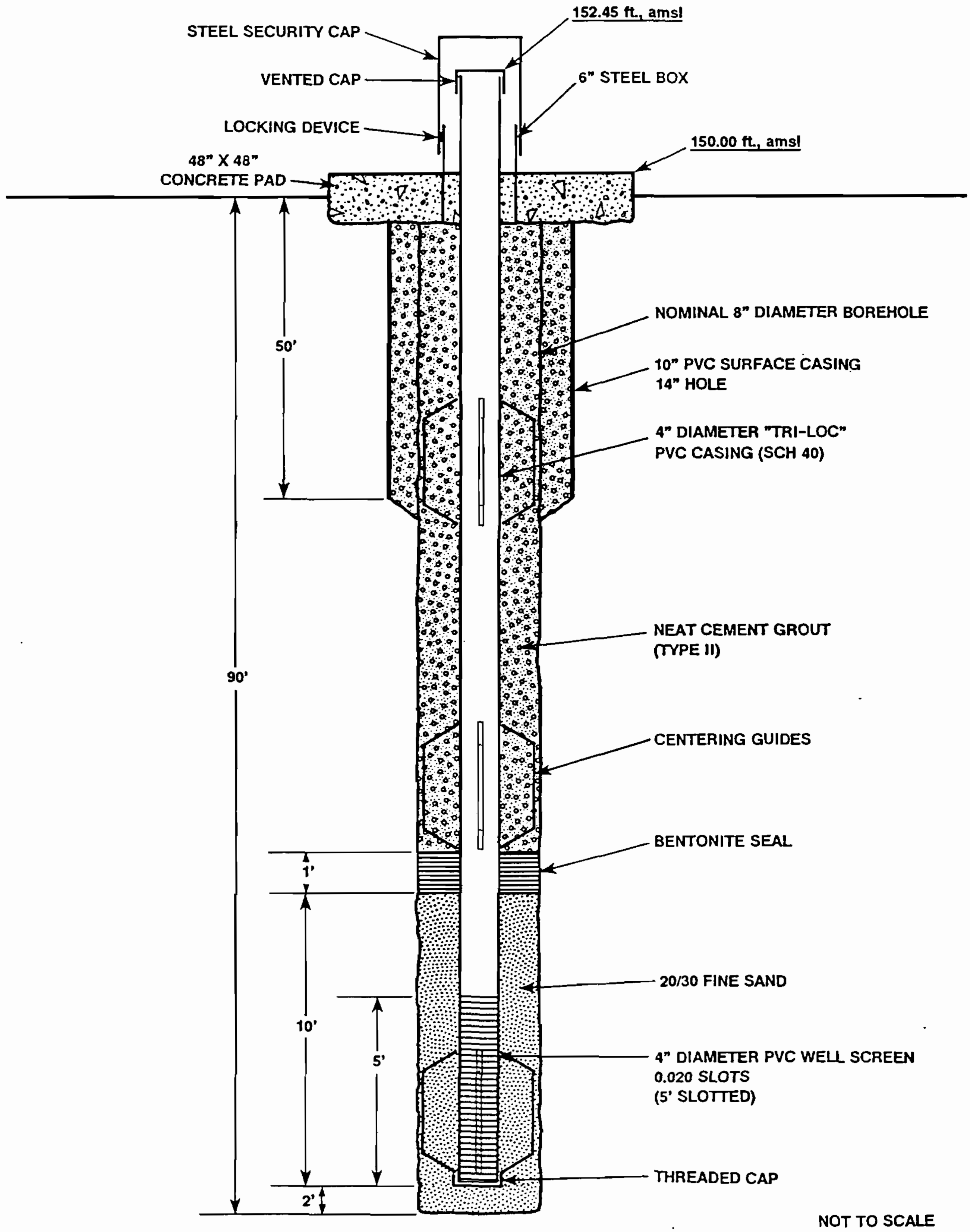
## GEOLOGIC LOG

PROPERTY: Polk Power Station  CLIENT: TEC
HOLE No.: GW 3 - I1  DATE: 04/01/91 - 04/02/91
GEOLOGIST: Kay L. Winslow  DRILLER: Burnett Drilling
LOCATION: SE 1/4 of NW 1/4 of Section 35, Township 31 S., Range 23 E.
- - - - Stratigraphic Contact • • • • Aquifer Boundary  Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 35.0 | Light grey to tan, medium grained, silty sand well sorted, with some phosphate, subrounded, (TAILINGS SAND; water table @ ~12 ft bls) |
| - - - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 35.0 | 44.0 | Tan to greyish green, medium grained, medium dense, phosphatic (increasing with depth), silty to clayey sand<br>(Surficial Aquifer) |
| • • • • • • | | | |
| - - - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 44.0 | 50.0 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| - - - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 50.0 | 72.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some sandy clay<br>(Intermediate Aquifer) |
| | 72.0 | 90.0 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone; trace fossils and dark grey phosphatic clay; interbedded with chert lenses |

**TOTAL DEPTH 90′**

Remarks: 4/01/91: Drilled from 0 to 50 ft bls, set surface casing
4/02/91: Drilled from 50 to 90 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-3
MONITOR WELL GW3-I1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

# GEOLOGIC LOG

**PROPERTY:** Polk Power Station  **CLIENT:** TEC

**HOLE No.:** GW 3 - I3  **DATE:** 03/26/91 - 04/05/91

**GEOLOGIST:** Bradley S. Pekas, E.I.T.  **DRILLER:** Burnett Drilling

**LOCATION:** SE 1/4 of NW 1/4 of Section 35, Township 31 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary  Page: 1 of 2

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | FOOTAGE TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 33.0 | Light grey to tan, medium grained, silty sand well sorted, with some phosphate, subrounded, (TAILINGS SAND; water table @ ~12 ft bls) |
| - - - - - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 33.0 | 42.5 | Tan to greyish green, medium grained, medium dense, phosphatic (increasing with depth), silty to clayey sand (Surficial Aquifer) |
| • • • • • • • • | | | |
| - - - - - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 42.5 | 47.5 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| - - - - - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 47.5 | 72.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some sandy clay (Intermediate Aquifer) |
| | 72.0 | 88.0 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone; trace fossils and dark grey phosphatic clay; interbedded with chert lenses |
| | 88.0 | 120.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with some solution features and dark grey sandy clay; interbedded with chert lenses |
| | 120.0 | 152.5 | Light green to grey, soft - moderately hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with dark greyish brown sandy clay and dark grey chert; interbedded with strata of greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft to medium hard mudstone |
| | 152.5 | 167.0 | Light green to grey, medium hard, phosphatic, sandy, clay; interbedded with chert lenses |

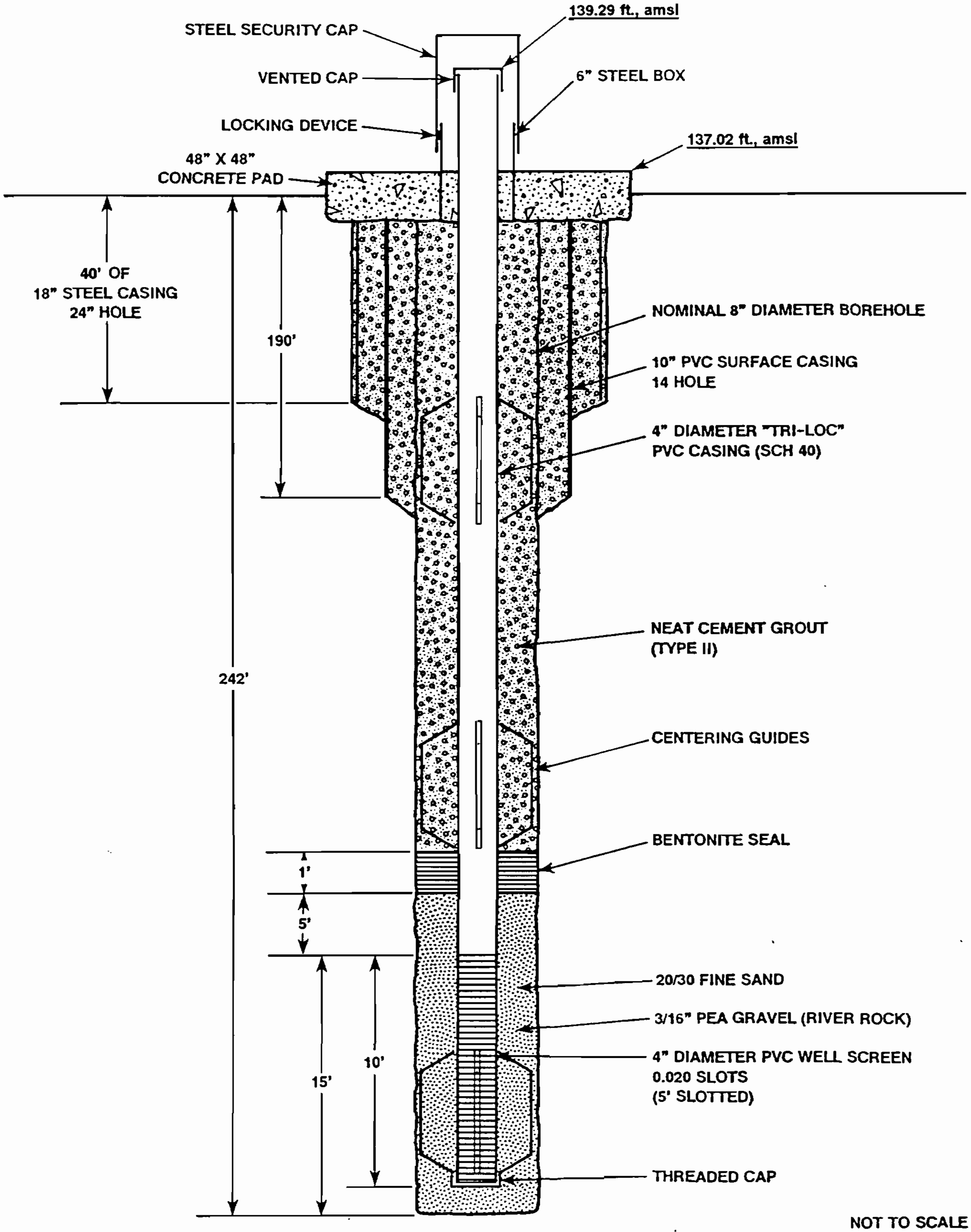
## GEOLOGIC LOG

## GW 3 - I3, continued



| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Arcadia Formation undifferentiated, continued | 167.0 | 175.0 | Light green to grey, soft - moderately hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone interbedded with dark greyish brown sandy clay and dark grey chert |
| | 175.0 | 210.0 | Light brownish grey, medium hard, phosphatic, slightly sandy, dolomitic mudstone interbedded with strata dark greyish brown, phosphatic, calcareous, slightly sandy to sandy clay, very soft, calcareous mudstone |
| | 184.0 | 192.0 | Tan to light brown, soft to moderately hard, phosphatic, slightly sandy, dolomitic mudstone with trace fossils and dark grey, slightly phosphatic clay |
| Miocene Hawthorn Group, Arcadia Formation, Tampa Member | 210.0 | 226.0 | Grey, soft to moderately hard, phosphatic, sandy, dolomitic limestone with interclasts; interbedded with strata dark greyish, dense, phosphatic, slightly calcareous, clayey fine sand |
| | 226.0 | 238.5 | Grey, soft to hard, phosphatic, sandy, fossiliferous, dolomitic mudstone interbedded with soft greenish grey clay |
| | 238.5 | 240.0 | Light brown to brown, medium grained, subrounded, slightly to moderately cemented sand. |
| | **TOTAL DEPTH 240'** | | |

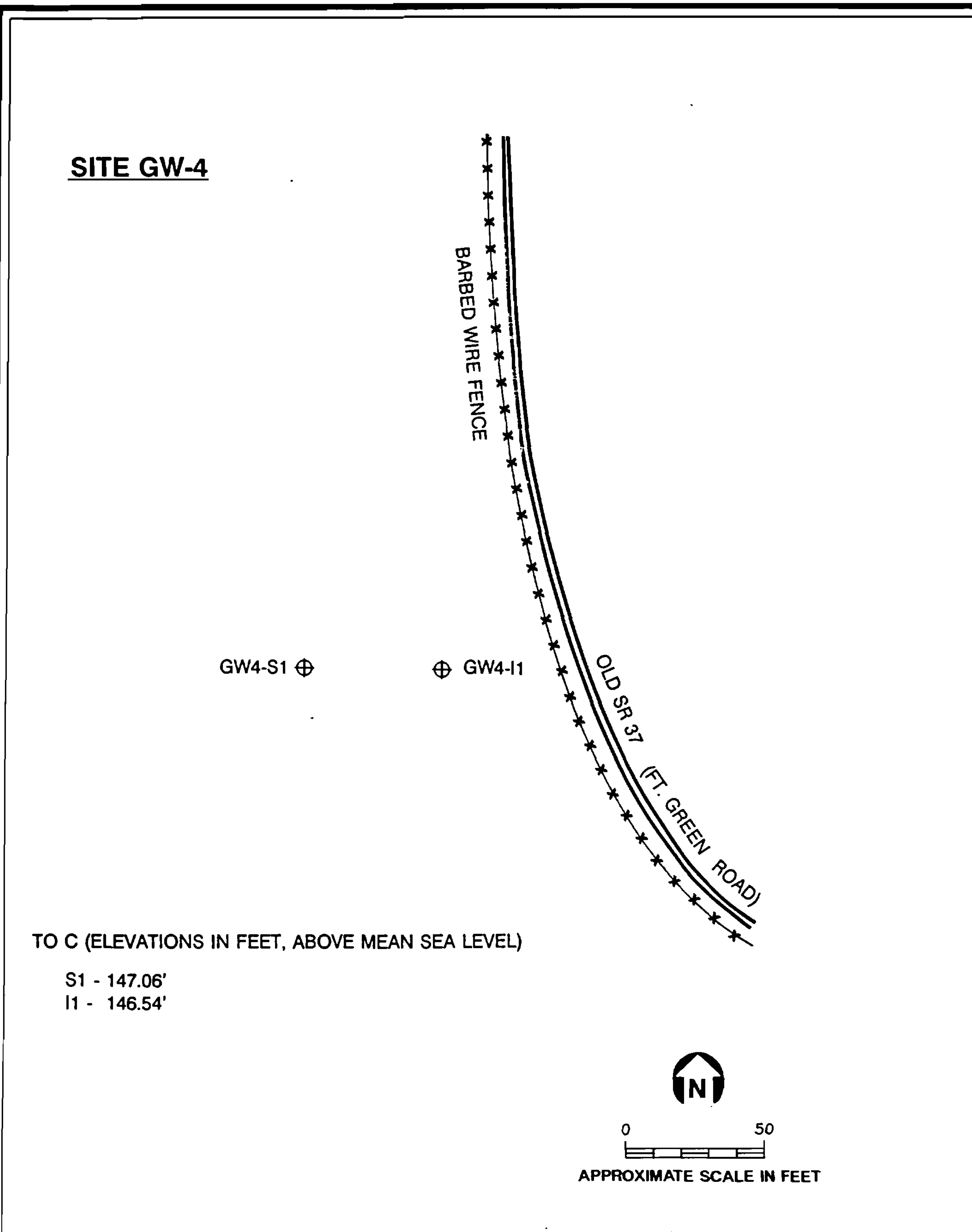
Remarks: 3/26/91: Drilled from 0 to 46 ft bls, set surface casing
3/27/91: Drilled from 46 to 140 ft bls
3/28/91: Drilled from 140 to 190 ft bls, set second surface casing
4/01/91 to 4/03/91: PVC cap/rock fragment has trapped drill bit in hole
4/04/91: Free drill bit trapped in hole, drilled from 190 ft to 225 ft bls
4/05/91: Drilled from 225 to 235 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-3
MONITOR WELL GW3-I3
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**




GROUNDWATER STATION GW-4
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

**GEOLOGIC LOG**

PROPERTY: Polk Power Station CLIENT: TEC

HOLE No.: GW 4 - S1 DATE: 04/04/91

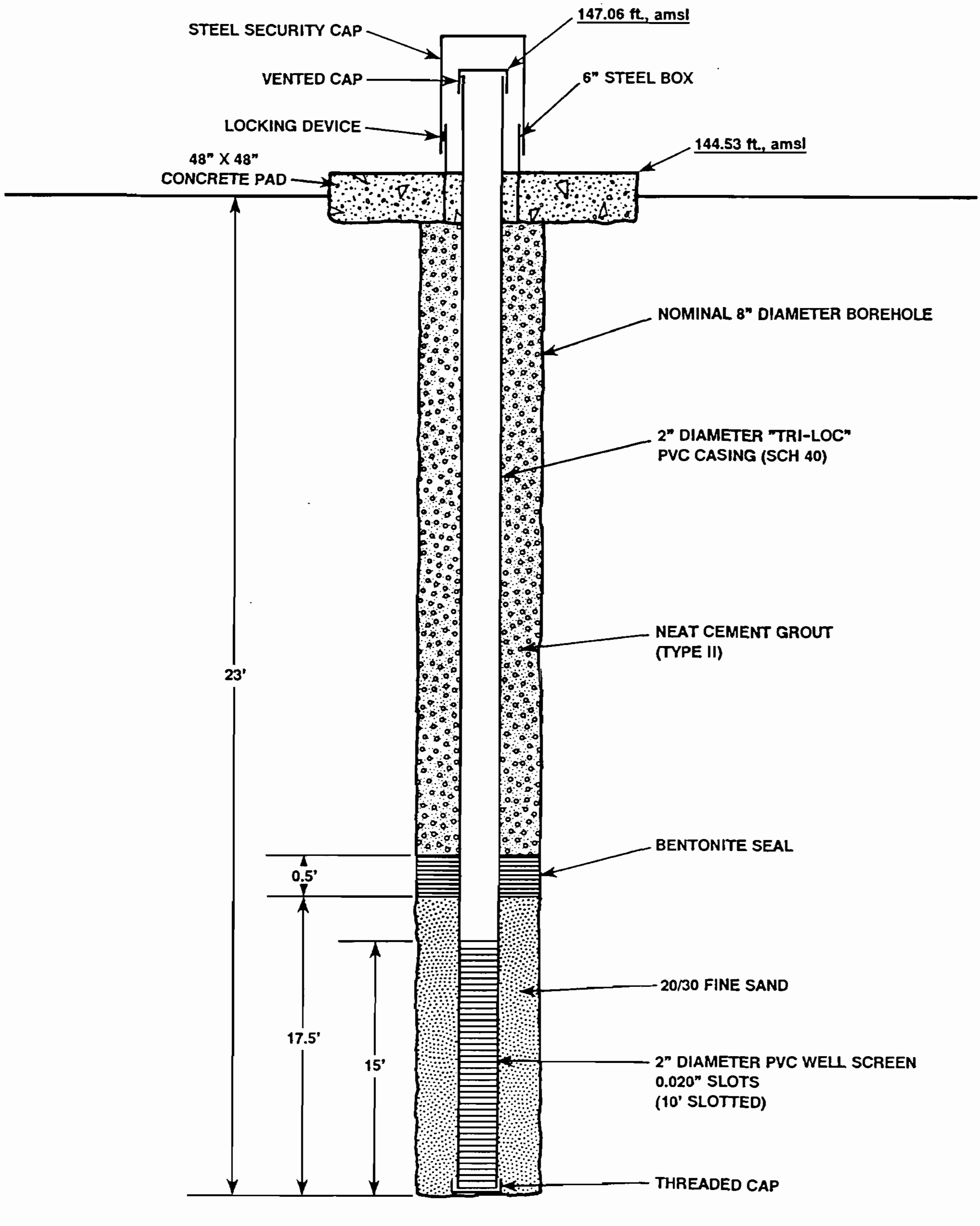
GEOLOGIST: Richard Steele, P.G. DRILLER: Burnett Drilling

LOCATION: SE 1/4 of SE 1/4 of Section 35, Township 31 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 23.0 | Light grey to tan, medium grained, slightly silty, well sorted, subrounded, sands with minor phosphate, (TAILINGS SAND; water table @ ~6 to 7 ft bls) |
| | **TOTAL DEPTH** | **23'** | |

Remarks: 4/04/91: Drilled from 0 to 23 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-4
PIEZOMETER GW4-S1
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

## GEOLOGIC LOG

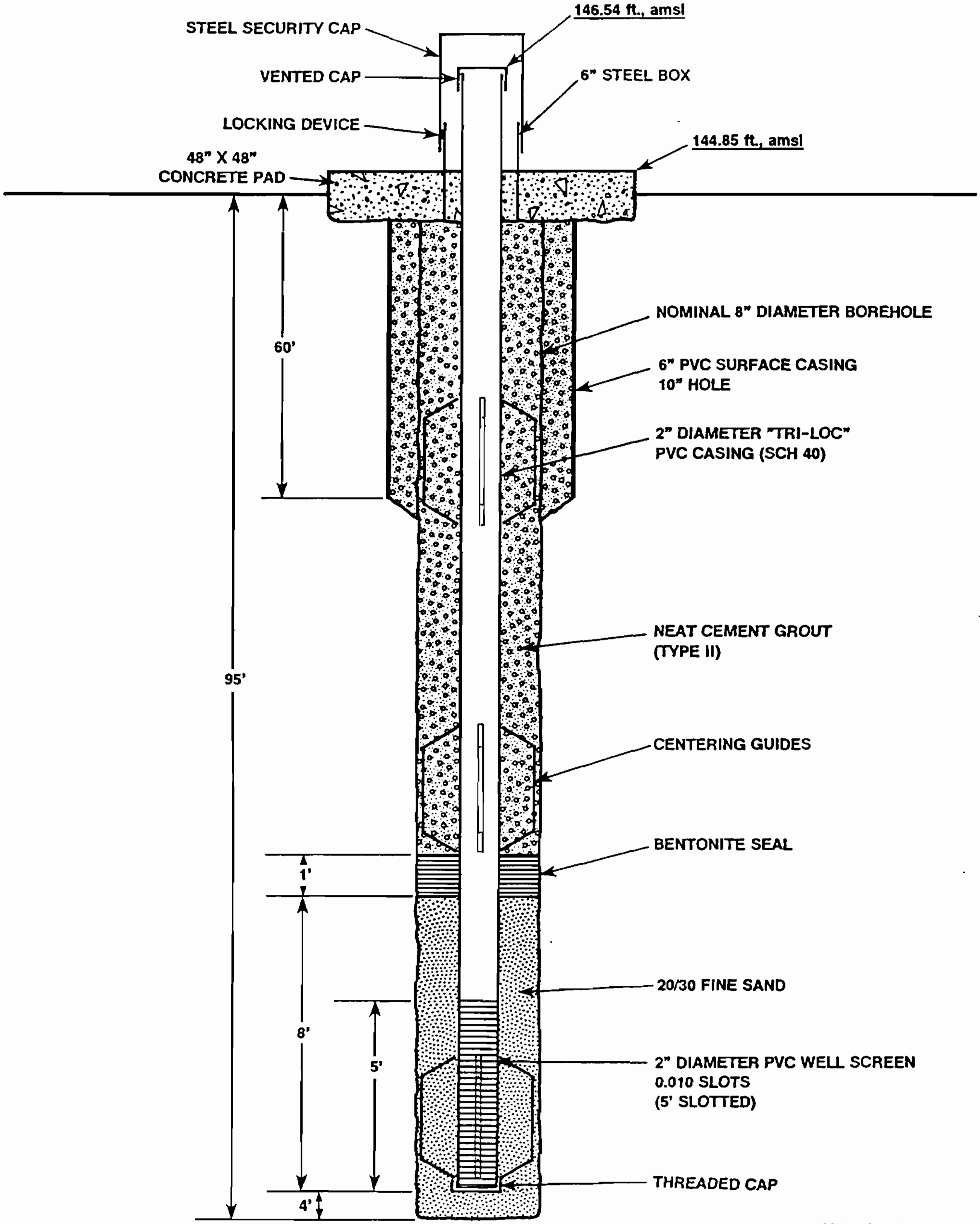
| | | | |
|---|---|---|---|
| PROPERTY: | Polk Power Station | CLIENT: | TEC |
| HOLE No.: | GW 4 - I1 | DATE: | 03/27/91 - 04/02/91 |
| GEOLOGIST: | Richard Steele, P.G. | DRILLER: | Burnett Drilling |

LOCATION: SE 1/4 of SE 1/4 of Section 35, Township 31 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary      Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 36.0 | Light grey to tan, medium grained, slightly silty, well sorted, subrounded, sands with minor phosphate, (TAILINGS SAND; water table @ ~6 to 7 ft bls) (Surficial Aquifer) |
| • • • • • • • • • • | | | • • • • • • • • • • |
| | 36.0 | 40.5 | Light grey to brown, soft, sandy clay (phosphate slimes) |
| - - - - - - - - - - | | | - - - - - - - - - - |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 40.5 | 51.0 | Tan to greyish green, medium grained, medium dense, phosphatic (increasing with depth), silty sand to sandy clay |
| - - - - - - - - - - | | | - - - - - - - - - - |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 51.0 | 65.0 | Greenish grey, moderate hard - hard, phosphatic, sandy dolomitic mudstone; interbedded with grey clay |
| - - - - - - - - - - | | | - - - - - - - - - - |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 65.0 | 85.0 | Light green to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some sandy clay (Intermediate Aquifer) |
| | 85.0 | 95.0 | Greenish grey, soft - medium hard, phosphatic, sandy dolomitic mudstone; trace fossils and dark grey phosphatic clay |
| | TOTAL DEPTH | 95′ | |

Remarks: 3/27/91: Drilled from 0 to 60 ft bls, set surface casing
4/02/91: Drilled from 60 to 95 ft bls, set monitor well
See monitor well construction details for a record of well completion

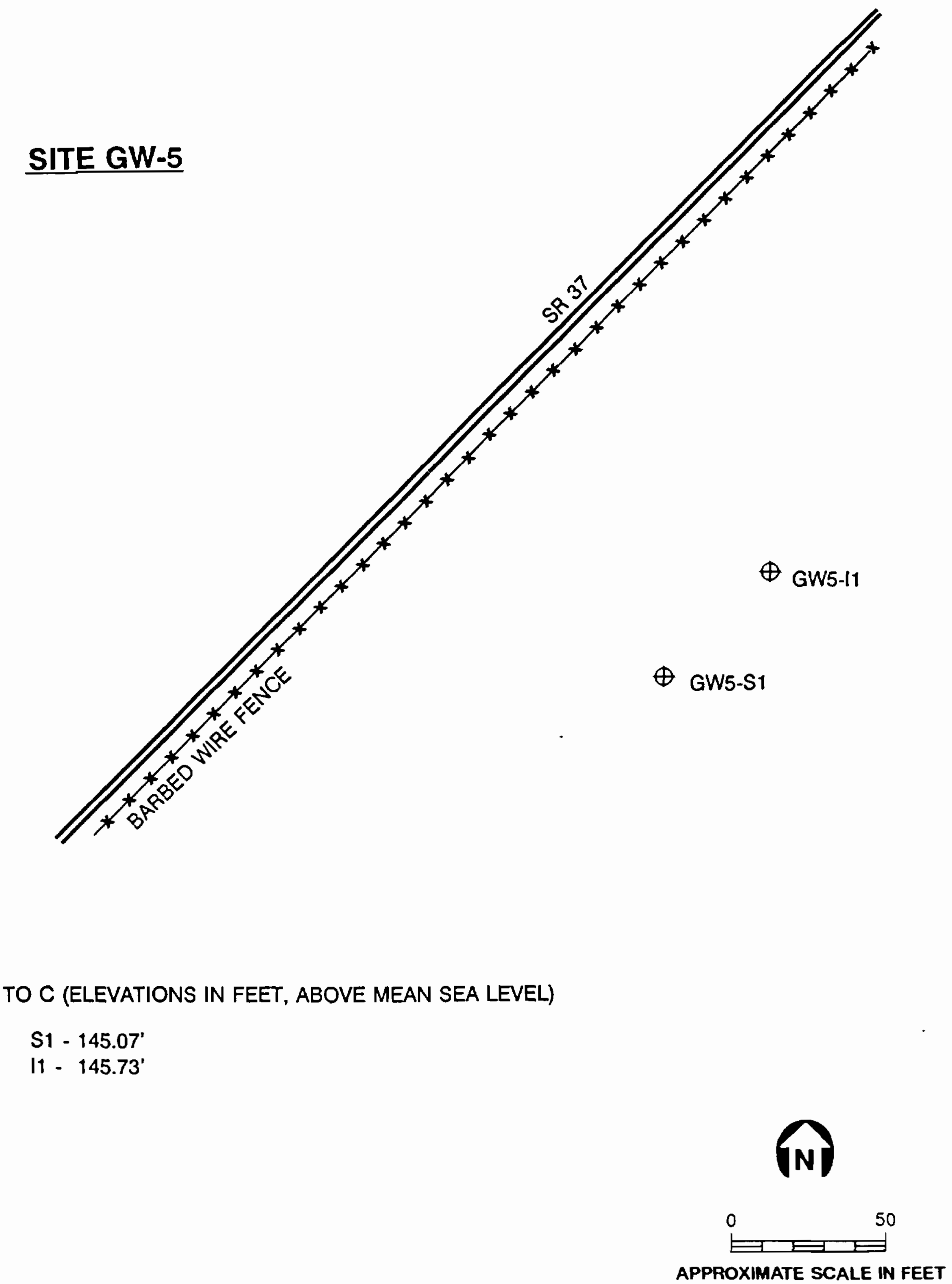



NOT TO SCALE

GROUNDWATER STATION GW-4
PIEZOMETER GW4-I1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**




TO C (ELEVATIONS IN FEET, ABOVE MEAN SEA LEVEL)

S1 - 145.07'
I1 - 145.73'

GROUNDWATER STATION GW-5
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

## GEOLOGIC LOG

PROPERTY: Polk Power Station  CLIENT: TEC

HOLE No.: GW 5 - S1  DATE: 04/04/91

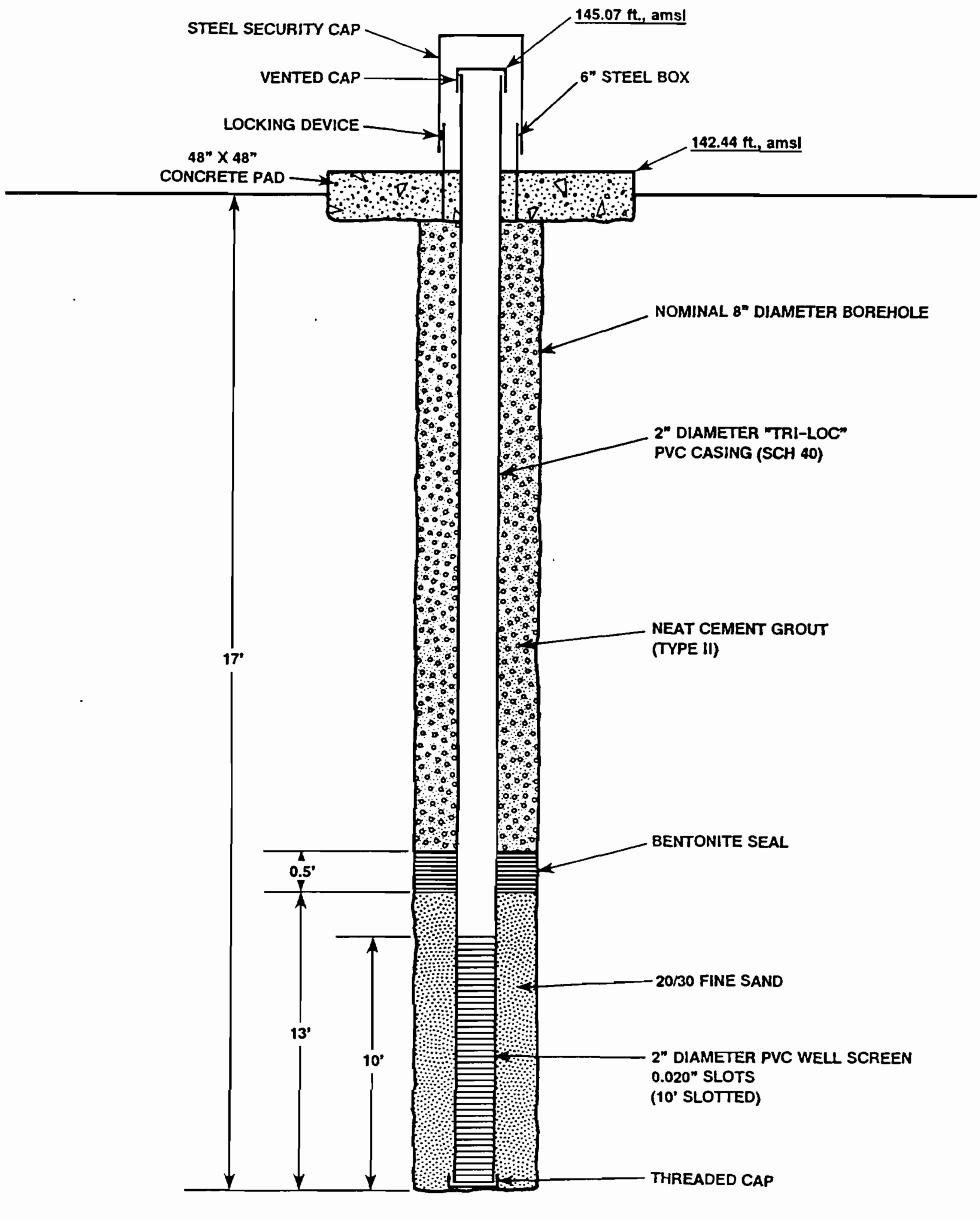
GEOLOGIST: Kay L. Winslow  DRILLER: Burnett Drilling

LOCATION: SW 1/4 of NW 1/4 of Section 3, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary  Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 2.0 | Dark brown, fine grained, silty sand with roots |
| | 2.0 | 17.0 | Light brown, fine to medium grained, moderately dense, subrounded, silty to clayey sand (water table @ ~9.0 ft bls) |
| | **TOTAL DEPTH** | **17'** | |

Remarks: 4/04/91: Drilled from 0 to 17 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-5
PIEZOMETER GW5-S1
TAMPA ELECTRIC COMPANY
POLK POWER STATION

Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

**POLK POWER STATION**

## GEOLOGIC LOG

PROPERTY: Polk Power Station — CLIENT: TEC

HOLE No.: GW 5 - I1 — DATE: 03/29/91 - 04/01/91

GEOLOGIST: Richard Steele, P.G. — DRILLER: Burnett Drilling

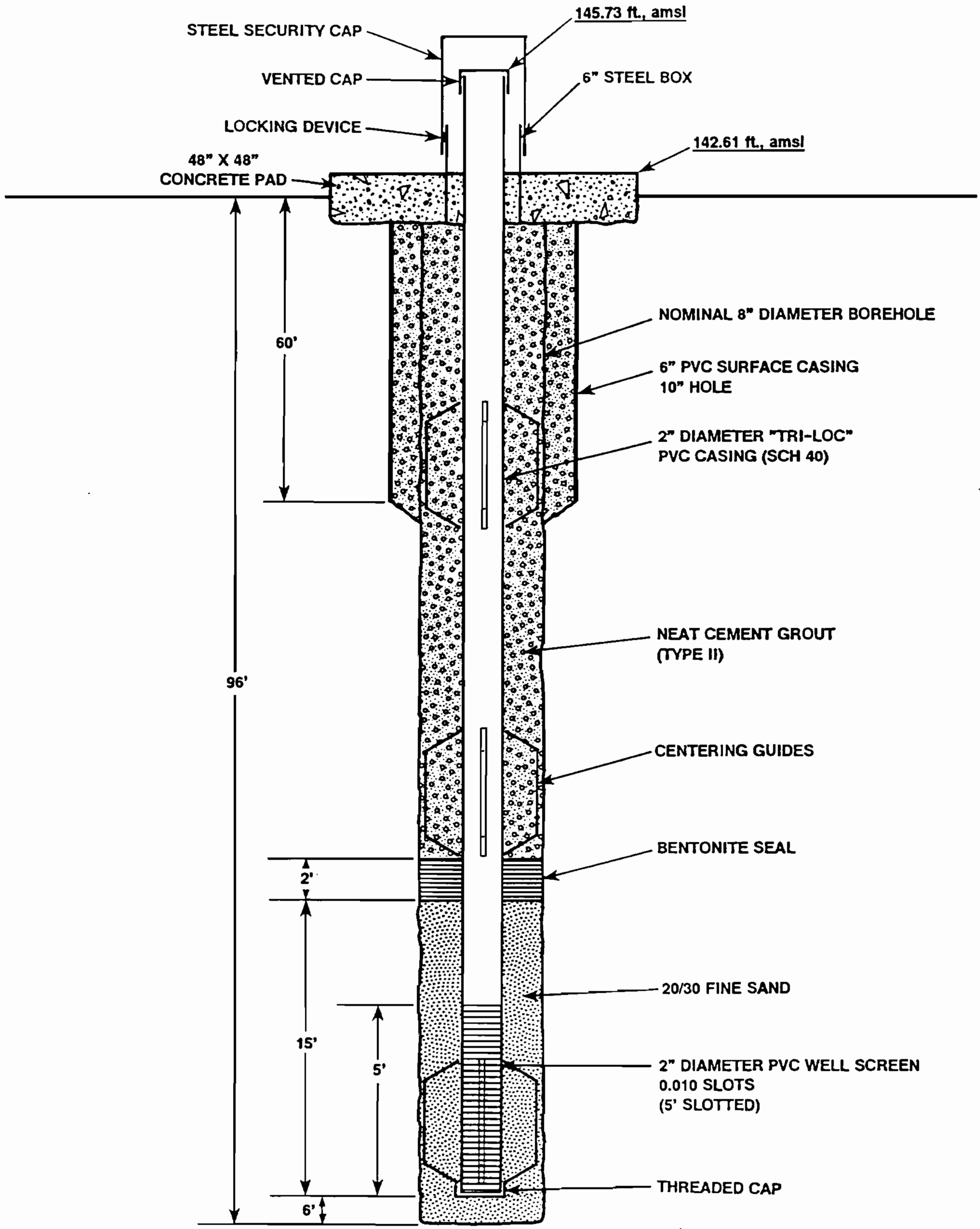
LOCATION: SW 1/4 of NW 1/4 of Section 3, Township 32 S., Range 23 E.

- - - - Stratigraphic Contact • • • • Aquifer Boundary      Page: 1 of 1

| STRATIGRAPHIC INTERVAL | FOOTAGE FROM | FOOTAGE TO | DESCRIPTION |
|---|---|---|---|
| Undifferentiated Surficial Deposits | 0.0 | 2.0 | Dark brown, fine grained, silty sand with roots |
| | 2.0 | 18.0 | Light brown, fine to medium grained, moderately dense, subrounded, silty to clayey sand (water table @ ~9.0 ft bls) |
| | 18.0 | 27.5 | Tan to gray, fine - medium grained, subrounded, silty sand, occasional poorly cemented lense |
| - - - - - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Bone Valley Member | 20.0 | 37.0 | Tan to greyish green, fine - medium grained, medium dense, phosphatic, silty sand interbedded with greenish sandy clay lenses (Surficial Aquifer) |
| • • • • • • • • | | | |
| - - - - - - - - | | | |
| Miocene Hawthorn Group, Peace River Formation, Undifferentiated Deposits | 37.0 | 39.0 | Light bluish grey, stiff to very stiff, phosphatic, sandy clay with phosphate pebbles |
| | 39.0 | 50.0 | Light brown to tan, soft to medium hard, slightly phosphatic, sandy, calcareous mudstone with traces of fossils |
| | 50.0 | 63.0 | Dark grey, dense, phosphatic, slightly calcareous, clayey, fine grained sand |
| - - - - - - - - | | | |
| Miocene Hawthorn Group, Arcadia Formation, Undifferentiated Deposits | 63.0 | 70.0 | Light brown to grey, phosphatic, fossiliferous, sandy, dolomitic limestone with some dark grey sandy clay (Intermediate Aquifer) |
| | 70.0 | 96.0 | Light brown to light grey, soft - moderately hard, slightly sandy, phosphatic, fossiliferous, dolomitic limestone with dark grey sandy clay |

**TOTAL DEPTH 96'**

Remarks: 3/29/91: Drilled from 0 to 60 ft bls, set surface casing
4/01/91: Drilled from 60 to 96 ft bls, set monitor well
See monitor well construction details for a record of well completion




GROUNDWATER STATION GW-5
PIEZOMETER GW5-I1
TAMPA ELECTRIC COMPANY
POLK POWER STATION
Source: ECT, 1991.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

POLK POWER STATION

REC'D JUL 02 1992

# LETTER OF TRANSMITTAL

**ARDAMAN & ASSOCIATES, INC.**
P.O. BOX 593003
ORLANDO, FLORIDA 32859-3003
**(407) 855-3860**

| | |
|---|---|
| DATE 7-1-92 | JOB NO. 91-9045 |
| ATTENTION Mr. Brad Pekas | |
| RE TECO Power Plant | |

TO Brad Pekas
Environmental Consulting and Technology, Inc.
5405 Cypress Center Drive, Suite 200
Tampa, Florida 33609
813-289-9338

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via ______ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ ______

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 3/4-13/91 | 1 | Ardaman & Associates, Inc. Boring Log for TECO Power Plant |
| | | | Boring No.: GW-1; Total Depth 350.00 feet; |
| | | | Sheets 1-9 and notes. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit ______ copies for approval

☒ For your use ☐ Approved as noted ☐ Submit ______ copies for distrubition

☒ As requested ☐ Returned for corrections ☐ Return ______ corrected prints

☐ For review and comment ☐ ______

☐ FOR BIDS DUE ______ 19 ______ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Please find enclosed one copy of the Boring Log for GW-1 as requested per our phone conversation 6-30-92. The elevation used was from U.S.G.S. topographic map, Duette NE Quad., 5 ft. contour interval, since no survey elevation or coordinates were available. I trust that this will satisfy your needs. If you have any questions or if we can be of any further assistance, please feel free to call.

COPY TO Mr. Tom Leto 40

SIGNED: Diane Bloomberg

*If enclosures are not as noted, kindly notify us at once.*

A0152 (12/91)

# BORING LOG

## ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.
SHEET 1 OF 9

PROJECT TECO Power Plant
FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc.
ELEVATION 140.0' (MSL) ±
BORING LOCATION
BORING TYPE SPT / NQ wire-line core
COUNTY Polk
STATE Florida
CASING TYPE 50' / 3" steel
DATE STARTED 03/04/91
COMPLETED 03/13/91
DRILLER/RIG E. Parker / CME 55
WATER TABLE: 1st depth 8.25'
DATE 03/04/91
TIME --
WATER TABLE: 2nd depth --
DATE --
TIME --
REMARKS Geologist: D. Bloomberg; (See Sheet 9 of 9)

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-3 5-6 | 8 | 1 | | | | | | **PLIO-PLEISTOCENE UNDIFFERENTIATED SURFICIAL DEPOSITS** Dark brown, loose, slightly silty fine sand with roots |
| | | 4-1 7-8 | 8 | 2 | | | | | | Brown, loose, silty fine sand |
| 135 | 5 | 6-4 5-4 | 9 | 3 | | | | | | |
| | | 3-3 3-3 | 6 | 4 | | | | | | Light brown, loose to medium dense, silty fine sand |
| 130 | 10 | 4-5 6-7 | 11 | 5 | | | | | | |
| 125 | 15 | 4-5 4-4 | 9 | 6 | | | | | | |
| 120 | 20 | 5-11 12-11 | 23 | 7 | | | | | | **MIOCENE HAWTHORN GROUP** **Peace River Formation - Bone Valley Member** Grayish brown, medium dense, phosphatic, slightly clayey fine to medium sand |
| 115 | 25 | 3-5 7-6 | 12 | 8 | | | | | | Bluish gray and greenish brown, medium dense, phosphatic, clayey fine to medium sand |
| 110 | 30 | 8-10 10-12 | 20 | 9 | | | | | | |
| 105 | 35 | 4-5 6-6 | 11 | 10 | | | | | | |
| 100 | 40 | | | | | | | | | |

# BORING LOG

## ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.


PROJECT TECO Power Plant
CLIENT Environmental Consulting & Technology, Inc.
BORING LOCATION

FILE NO. 91-9045
ELEVATION 140.0' (MSL) ±
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 5-6 7-8 | 13 | 11 | | | | | | **Peace River Formation - Undifferentiated** |
| | | | | | | | | | | Light bluish gray, stiff to very stiff, phosphatic, calcareous, slightly sandy clay |
| 95 | 45 | 30-16 11-14 | 27 | | | | | | | |
| 90 | 50 | 50/4" | 50/4" | 12 | | | | | | Light yellowish brown, soft to medium hard, slightly phosphatic, sandy, calcareous mudstone with trace fossils and burrows/solution features infilled with greenish brown and bluish gray, phosphatic, slightly sandy clay |
| | | 98% Recov. | | CR-1 | | | | | | |
| 85 | 55 | | | | | | | | | Dark gray, v dense, phos, sl calcareous, clayey fine sand |
| | | | | | | | | | | **Arcadia Formation - Undifferentiated** |
| | | 90% Recov. | | CR-2 | | | | | | Lt brown, hard, phos, sandy, fossil, dolomitic limestone |
| | | | | | | | | | | Dk gray, v dense, phos, sl calcareous, clayey fine sand |
| 80 | 60 | | | | | | | | | Light brown to light grayish brown, hard, phosphatic, sandy, fossiliferous, dolomitic limestone with burrows/solution features infilled with dark gray, phosphatic, clayey fine sand and gray, slightly sandy clay |
| | | 80% Recov. | | CR-3 | | | | | | |
| 75 | 65 | | | | | | | | | Dark grayish brown, very dense, phosphatic, slightly calcareous, clayey fine sand |
| | | 100% Recov. | | CR-4 | | | | | | |
| 70 | 70 | | | | | | | | | Greenish gray, soft to medium hard, slightly phosphatic to phosphatic, slightly sandy to sandy, dolomitic mudstone with trace fossils and trace burrows/solution features infilled with dark gray, phosphatic, slightly sandy clay |
| | | 100% Recov. | | CR-5 | | | | | | |
| 65 | 75 | | | | | | | | | Light brown to light grayish brown, moderately hard, phos, slightly sandy, slightly fossiliferous, dolomitic limestone with burrows/solution features infilled with dark gray, phos, sl sandy clay and interbedded with strata of dark grayish brown, very dense, phosphatic, sl calcareous, clayey fine sand and grayish brown, phosphatic, calcareous, sl sandy clay |
| | | 40% Recov. | | CR-6 | | | | | | |
| 60 | 80 | | | | | | | | | |

# BORING LOG

## ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.
SHEET 3 OF 9

PROJECT TECO Power Plant
FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc.
ELEVATION 140.0' (MSL) ±
BORING LOCATION
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 55 | 85 | 60% Recov. | | CR-7 | | | | | | Light brown to light grayish brown, moderately hard, phos, slightly sandy, slightly fossiliferous, dolomitic limestone with burrows/solution features infilled with dark gray, phos, sl sandy clay and interbedded with strata of dark grayish brown, very dense, phosphatic, sl calcareous, clayey fine sand and grayish brown, phosphatic, calcareous, sl sandy clay |
| 50 | 90 | 30% Recov. | | CR-8 | | | | | | Light brown to light grayish brown, soft to medium hard, phos, sl sandy, slightly fossiliferous, dolomitic limestone with burrows/solution features infilled with dark gray, phos, sl sandy clay and interbedded with strata of dark grayish brown, very dense, phosphatic, sl calcareous, clayey fine sand and grayish brown, phosphatic, calcareous, sl sandy clay (According to driller's notes and core cuttings) |
| 45 | 95 | 0% Recov. | | CR-9 | | | | | | |
| 40 | 100 | 80% Recov. | | CR-10 | | | | | | Brownish gray, hard, phosphatic, sandy, fossiliferous, dolomitic limestone |
| 35 | 105 | 60% Recov. | | CR-11 | | | | | | Light brown and light gray, moderately hard to hard, phosphatic, slightly sandy, slightly fossiliferous to fossiliferous, dolomitic limestone with burrows/ solution features infilled with dark grayish brown, slightly phosphatic, slightly calcareous, slightly sandy clay and dark gray chert and interbedded with strata of grayish brown, slightly phosphatic, calcareous, slightly sandy clay to very soft to medium hard mudstone |
| 30 | 110 | 20% Recov. | | CR-12 | | | | | | |
| 25 | 115 | 80% Recov. | | CR-13 | | | | | | |
| 20 | 120 | 80% Recov. | | CR-14 | | | | | | |

# BORING LOG
## ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.


PROJECT TECO Power Plant
FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc.
ELEVATION 140.0' (MSL) ±
BORING LOCATION
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 125 | 20% Recov. | | CR-15 | | | | | | |
| 10 | 130 | 60% Recov. | | CR-16 | | | | | | |
| 5 | 135 | 30% Recov. | | CR-17 | | | | | | Light brownish gray, medium to moderately hard, phosphatic, slightly sandy, dolomitic limestone with trace fossils; burrows/solution features infilled with grayish brown, phosphatic, slightly sandy clay and dark gray chert; and interbedded with strata of dark grayish brown, phosphatic, slightly calcareous, clayey fine sand and grayish brown, phosphatic, calcareous, slightly sandy clay to very soft to soft mudstone |
| 0 | 140 | 100% Recov. | | CR-18 | | | | | | |
| -5 | 145 | 100% Recov. | | CR-19 | | | | | | |
| -10 | 150 | 80% Recov. | | CR-20 | | | | | | Grayish brown, moderately hard to hard, phosphatic, slightly sandy, fossiliferous, dolomitic limestone with burrows/solution features infilled with grayish brown, phosphatic, slightly sandy clay |
| -15 | 155 | 100% Recov. | | CR-21 | | | | | | Light brownish gray, medium hard, phosphatic, slightly sandy, dolomitic mudstone with trace fossils; trace burrows/solution features infilled with gray, phosphatic, slightly sandy clay; and interbedded with strata of dark grayish brown, phosphatic, calcareous, clayey fine sand |
| -20 | 160 | 100% Recov. | | CR-22 | | | | | | Dark grayish brown, very dense, phosphatic, calcareous, clayey fine sand<br>Lt brownish gray, medium hard, phos, sl sandy, dolomitic mudstone interbedded with dk grayish brown, phos, calc, sl sandy clay to grayish brown, v soft, sl sandy, calc mudstone |

# BORING LOG

ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.
SHEET 5 OF 9

PROJECT TECO Power Plant
FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc.
ELEVATION 140.0' (MSL) ±
BORING LOCATION
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) |
|---|---|---|---|---|---|---|---|---|---|
| -25 | 165 | 82% Recov. | | CR-23 | | | | | |
| -30 | 170 | 28% Recov. | | CR-24 | | | | | |
| -35 | 175 | 68% Recov. | | CR-25 | | | | | |
| -40 | 180 | 100% Recov. | | CR-26 | | | | | |
| -45 | 185 | 100% Recov. | | CR-27 | | | | | |
| -50 | 190 | 50% Recov. | | CR-28 | | | | | |
| -55 | 195 | 100% Recov. | | CR-29 | | | | | |
| -60 | 200 | 100% Recov. | | CR-30 | | | | | |

**Soils Description and Remarks**

Light brownish gray, medium hard, phosphatic, slightly sandy, dolomitic mudstone interbedded with strata of dark grayish brown, phosphatic, calcareous, slightly sandy clay to grayish brown, very soft, slightly sandy, calcareous mudstone

Dark grayish brown, very dense, phosphatic, calcareous, clayey fine sand

Light grayish brown, medium hard, slightly phosphatic, slightly sandy, dolomitic mudstone

Dark grayish brown, very dense, phosphatic, calcareous, clayey fine sand

Grayish brown, very soft to medium hard, phosphatic, sandy, dolomitic mudstone

Light brown, medium to moderately hard, phosphatic, sandy, dolomitic limestone interbedded with strata of dark grayish brown, phosphatic, calcareous, sandy clay; dark gray, slightly phosphatic, slightly calcareous clay; and dark gray chert

Light brown, soft to hard, phosphatic, slightly sandy, dolomitic mudstone with trace fossils and trace burrows/ solution features infilled with dk gray, sl phos clay

**Arcadia Formation - Tampa Member**

Light gray, hard, sandy, dolomitic mudstone interbedded with strata of grayish brown, calcareous, slightly sandy clay

Gray, moderately hard to hard, phosphatic, sandy, dolomitic limestone with intraclasts and interbedded with strata of dark gray, very dense, phosphatic, slightly calcareous, clayey fine sand

# BORING LOG

ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.


PROJECT TECO Power Plant
CLIENT Environmental Consulting & Technology, Inc.
BORING LOCATION
FILE NO. 91-9045
ELEVATION 140.0' (MSL) ±
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| -65 | 205 | 100% Recov. | | CR-31 | | | | | | Gray, moderately hard to hard, phosphatic, sandy, dolomitic limestone with intraclasts and interbedded with strata of dark gray, very dense, phosphatic, slightly calcareous, clayey fine sand |
| -70 | 210 | 100% Recov. | | CR-32 | | | | | | Gray, hard to very hard, phosphatic, sandy, slightly fossiliferous to fossiliferous, dolomitic limestone with burrows/solution features infilled with grayish brown clay<br>**Piezometric water level - 03/10/91 - 82.0'. Borehole cased to 50.0' and open hole to 209.0'. Complete drilling fluid circulation loss from 209.0' to 240.0'.** |
| -75 | 215 | 68% Recov. | | CR-33 | | | | | | Brown, soft to moderately hard, sandy limestone with trace fossils and laminations of clay, mudstone and chert |
| -80 | 220 | 100% Recov. | | CR-34 | | | | | | |
| -85 | 225 | 100% Recov. | | CR-35 | | | | | | Brown, moderately hard to very hard, slightly sandy, fossiliferous limestone with trace phosphate |
| -90 | 230 | 100% Recov. | | CR-36 | | | | | | |
| -95 | 235 | 100% Recov. | | CR-37 | | | | | | |
| -100 | 240 | 100% Recov. | | CR-38 | | | | | | Brown, moderately hard to hard, slightly sandy limestone with trace phosphate, trace fossils and laminations of mudstone and chert |

# BORING LOG

**ARDAMAN & ASSOCIATES, INC.**

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.
SHEET 7 OF 9

PROJECT TECO Power Plant
FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc.
ELEVATION 140.0' (MSL) ±
BORING LOCATION
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| -105 | 245 | 100% Recov. | | CR-39 | | | | | | **Partial drilling fluid circulation loss from 240.0' to 285.0'.** |
| -110 | 250 | 80% Recov. | | CR-40 | | | | | | |
| -115 | 255 | 100% Recov. | | CR-41 | | | | | | Brown, soft to moderately hard, sandy, sl fossiliferous limestone with laminations of mudstone and chert |
| -120 | 260 | 100% Recov. | | CR-42 | | | | | | **Piezometric water level - 03/07/91 - 19.1'. Borehole cased to 50.0' and open hole to 260.0'.** |
| -125 | 265 | 80% Recov. | | CR-43 | | | | | | White to very light brown, medium to moderately hard, sandy, slightly fossiliferous limestone interbedded with strata of dark gray chert |
| -130 | 270 | 100% Recov. | | CR-44 | | | | | | **Arcadia Formation - Nocatee Member** Reworked transitional layer of brown, soft, sandy limestone and light bluish gray, hard clay |
| -135 | 275 | 100% Recov. | | CR-45 | | | | | | Bluish gray, hard clay to very soft claystone with laminations of brown, soft, sandy limestone; Interbedded strata of bluish gray, hard clay to very soft claystone and light gray, soft to medium hard, calcareous mudstone with trace fossils |
| -140 | 280 | 100% Recov. | | CR-46 | | | | | | Bluish gray, hard clay to medium hard claystone with interbedded strata of light gray, very soft to soft, calcareous claystone |

# BORING LOG

## ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.
SHEET 8 OF 9

PROJECT TECO Power Plant
FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc.
ELEVATION 140.0' (MSL) ±
BORING LOCATION
BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| -145 | 285 | 100% Recov. | | CR-47 | | | | | | Bluish gray, hard clay to medium hard claystone with interbedded strata of light gray, very soft to soft, calcareous claystone |
| -150 | 290 | 100% Recov. | | CR-48 | | | | | | **OLIGOCENE "SUWANNEE" LIMESTONE** <br> **Complete drilling fluid circulation loss from 285.0' to 350.0'.** |
| -155 | 295 | 50% Recov. | | CR-49 | | | | | | |
| -160 | 300 | 50% Recov. | | CR-50 | | | | | | |
| -165 | 305 | 0% Recov. | | CR-51 | | | | | | Brown, soft to hard, slightly fossiliferous becoming fossiliferous with depth, limestone (with interbedded strata of dark gray chert between 285.0' and 295.0') |
| -170 | 310 | 0% Recov. | | CR-52 | | | | | | |
| -175 | 315 | 0% Recov. | | CR-53 | | | | | | |
| -180 | 320 | 10% Recov. | | CR-54 | | | | | | |

# BORING LOG

ARDAMAN & ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 350.0ft.
SHEET 9 OF 9

PROJECT TECO Power Plant — FILE NO. 91-9045
CLIENT Environmental Consulting & Technology, Inc. — ELEVATION 140.0' (MSL) ±
BORING LOCATION — BORING TYPE SPT / NQ wire-line core

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| -185 | 325 | 40% Recov. | | CR-55 | | | | | | |
| -190 | 330 | 40% Recov. | | CR-56 | | | | | | |
| -195 | 335 | 40% Recov. | | CR-57 | | | | | | Brown, soft to hard, slightly fossiliferous becoming fossiliferous with depth, limestone |
| -200 | 340 | 40% Recov. | | CR-58 | | | | | | |
| -205 | 345 | 40% Recov. | | CR-59 | | | | | | |
| -210 | 350 | 20% Recov. | | CR-60 | | | | | | |
| -215 | 355 | | | | | | | | | Total depth 350.0 feet<br>**Remarks:** 03/08/91 - Borehole abandoned at a depth of 260.0' and grouted. 03/09/91 - New borehole moved 5.0' NW of initial location. Coring continued from a depth of 260.0' to a total depth of 350.0'. 03/14/91 - Borehole grouted upon completion of drilling. |
| -220 | 360 | | | | | | | | | |

# NOTES

1. WHILE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL AND ROCK TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

2. GROUNDWATER LEVELS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE AND PIEZOMETRIC WATER LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.

3. STANDARD PENETRATION RESISTANCE "N" VALUES SHOWN ON THE BORING LOGS REPRESENT THE NUMBER OF BLOWS REQUIRED TO PENETRATE THE SECOND AND THIRD 6-INCH INTERVALS OF THE SPLIT-BARREL SAMPLER. THE SAMPLER WAS OFTEN DRIVEN AN ADDITIONAL 6-INCHES (i.e., THE FULL 24-INCH LENGTH OF THE SAMPLER) DURING CONTINUOUS SAMPLING OF THE BORINGS.

4. DESCRIPTIONS OF THE RELATIVE DENSITY OF COHESIONLESS SOILS ARE BASED UPON THE FOLLOWING CORRELATION WITH STANDARD PENETRATION RESISTANCE (TERZAGHI AND PECK, 1967):

| "N" VALUE (BLOWS/FOOT) | DESCRIPTION |
|---|---|
| 0 TO 4 | VERY LOOSE |
| 4 TO 10 | LOOSE |
| 10 TO 30 | MEDIUM DENSE |
| 30 TO 50 | DENSE |
| >50 | VERY DENSE |

5. DESCRIPTIONS OF THE CONSISTENCY OF COHESIVE SOILS ARE BASED UPON THE FOLLOWING CORRELATION WITH STANDARD PENETRATION RESISTANCE (TERZAGHI AND PECK, 1967):

| "N" VALUE (BLOWS/FOOT) | DESCRIPTION | UNCONFINED COMPRESSIVE STRENGTH, TONS/FT$^2$ |
|---|---|---|
| 0 TO 2 | VERY SOFT | <1/4 |
| 2 TO 4 | SOFT | 1/4 TO 1/2 |
| 4 TO 8 | MEDIUM STIFF | 1/2 TO 1 |
| 8 TO 15 | STIFF | 1 TO 2 |
| 15 TO 30 | VERY STIFF | 2 TO 4 |
| >30 | HARD | >4 |

6. DESCRIPTIONS OF THE HARDNESS OF ROCK ARE BASED UPON THE FOLLOWING CRITERIA (ASCE, 1976):

| HARDNESS CLASSIFICATION | DESCRIPTION |
|---|---|
| VERY HARD | CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF GEOLOGIST'S PICK. |
| HARD | CAN BE SCRATCHED WITH KNIFE OR PICK ONLY WITH DIFFICULTY. HARD BLOW OF HAMMER REQUIRED TO DETACH HAND SPECIMEN. |
| MODERATELY HARD | CAN BE SCRATCHED WITH KNIFE OR PICK. GOUGES OR GROOVES TO 1/4 INCH DEEP CAN BE EXCAVATED BY HARD BLOW OF POINT OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOW. |
| MEDIUM | CAN BE GROOVED OR GOUGED 1/16 INCH DEEP BY FIRM PRESSURE ON KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES ABOUT 1-INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. |
| SOFT | CAN BE GOUGED OR GROOVED READILY WITH KNIFE OR PICK POINT. CAN BE EXCAVATED IN CHIPS TO PIECES SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. |
| VERY SOFT | CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1-INCH OR MORE IN THICKNESS CAN BE BROKEN WITH FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. |

7. DESCRIPTIONS OF ROCK, WHICH WERE GENERALLY SELECTED FOR MATERIALS WITH A STANDARD PENETRATION RESISTANCE OF GREATER THAN 50 BLOWS/FOOT, ARE BASED UPON THE FOLLOWING TEXTURAL CLASSIFICATION MODIFIED FROM DUNHAM (1962):

| ROCK CLASSIFICATION | CHARACTERISTICS |
|---|---|
| LIMESTONE | A CARBONATE ROCK COMPRISED OF GRAINS (i.e., FOSSILS,PELLETS, INTRACLASTS, etc.) IN A FINE-GRAINED MATRIX OF SILT- AND CLAY- SIZE CARBONATE. ROCKS CLASSIFIED AS LIMESTONE WERE GENERALLY FOSSILIFEROUS, AND MEDIUM HARD TO HARD. |
| MUDSTONE | A TYPE OF LIMESTONE COMPRISED LARGELY OF FINE-GRAINED (i.e., SILT- AND CLAY- SIZE) CARBONATE AND CLAY MINERALS WITH FEW GRAINS. ROCKS CLASSIFIED AS MUDSTONE WERE GENERALLY VERY SOFT TO MEDIUM HARD. |

REC'D MAY 05 1991

**Ardaman & Associates, Inc.**
105 North Faulkenburg, Suite D
P.O. Box 1506
Tampa, Florida 34299-1506

(813) 654-2336

# LETTER OF TRANSMITTAL

DATE: May 6 '91
JOB NO.: 91 - 9045
ATTENTION: Rick Steele
RE: TECO Power Plant SR 37 & CR 630

TO: Environmental Consulting & Tech.

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via ______ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☑ Boring Logs, Cone Penet. Logs

| COPIES | DATE | NO. | DESCRIPTION |
|---|---|---|---|
| | | | CPT-1, CPT-2 & CP3 |
| | | | SPT-1N, SPT-2M, SPT-3SD, SPT-4ND |
| | | | SPT-5S, GW-1, GW-4, GW-5 |

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit ____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit ____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints

☐ For review and comment ☐ ______

☐ FOR BIDS DUE ______ 19____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Dusan Jovanovic

COPY TO ______ SIGNED: [signature]

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-1N
TOTAL DEPTH: 60ft.
SHEET 1 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/02/91
COMPLETED 4/02/91
DRILLER/RIG Alderman/CME45
WATER TABLE: 1st depth 8.0''
date 4/02/91
time
WATER TABLE: 2nd depth –
date –
time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-3 4-5 | 7 | 1 | | | | | | Dark reddish-brown sand with silt and roots (sp-sm) | | |
| | | 7-8 7-5 | 15 | 2 | | | | | | Light reddish-brown sand (sp) | | |
| -5 | 5 | 3-4 3-7 | 7 | 3 | | | | | | | | |
| | | 9-10 10-9 | 20 | 4 | | | | | | Light brown sand (sp) | | |
| -10 | 10 | 7-7 9-8 | 16 | 5 | | | | | | | | |
| | | | | | | | | | | Brownish-gray clayey sand (sc) | | |
| -15 | 15 | 4-4 4-6 | 8 | 6 | | | | | | | | |
| | | | | US-1 | 19 | 17 | | | 110.9 | Gray clayey sand with phosphate (sc) | | |
| -20 | 20 | 7-7 7-8 | 14 | 7 | | | | | | | | |
| -25 | 25 | 7-7 11-9 | 18 | 8 | | | | | | | | |
| -30 | 30 | 6-8 9-10 | 17 | 9 | | | | | | | | |
| -35 | 35 | 7-9 10-14 | 19 | 10 | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-1N
TOTAL DEPTH: 60ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/ 6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 13-22 32-38 | 54 | 11 | | | | | | Gray sand with clay to clayey sand with phosphate (sp-sc to sc) | | |
| -42 | 42 | | | | | | | | | | | |
| | | 12-18 25-25 | 43 | 12 | | | | | | | | |
| -47 | 47 | | | | | | | | | | | |
| | | 2-3 4-6 | 7 | 13 | | | | | | Gray clayey sand with phosphate (sc) with lenses of greenish-brown clayey silt (mh) | | |
| -52 | 52 | | | | | | | | | | | |
| | | 46-50/4 | 50/4" | 14 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -57 | 57 | | | | | | | | | | | |
| | | 20-18 19-35 | 32 | 15-16 | | | | | | | | |
| | | | | | | | | | | Total depth 60.0 feet | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-4ND
TOTAL DEPTH: 40ft.
SHEET 1 OF 2

PROJECT Teco Power Plant — FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. — ELEVATION
BORING LOCATION As Per Plan — BORING TYPE SPT
COUNTY Polk — STATE Florida — CASING TYPE None
DATE STARTED 4/04/91 — COMPLETED 4/04/91 — DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 3.58'' — date 4/04/91 — time
WATER TABLE: 2nd depth – — date – — time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-2 2-4 | 4 | 1 | | | | | | Light brown to brown sand (sp) | | |
| | | 4-4 5-8 | 9 | 2 | | | | | | | | |
| -5 | 5 | 8-12 10-15 | 22 | 3 | | | | | | Brown sand with clay (sp-sc) | | |
| | | 7-14 7-21 | 31 | 4 | | | | | | | | |
| -10 | 10 | 13-13 16-15 | 29 | 5 | | | | | | | | |
| | | | | US-1 | 18 35.3 | 73 | | | 100.2 | | | |
| -15 | 15 | 3-3 3-4 | 6 | 6 | | | | | | Brownish-gray clayey sand (sc) | | |
| -20 | 20 | 3-4 9-11 | 13 | 7 | | | | | | Brownish-gray sand with silt to silty sand with phosphate (sp-sm to sm) | | |
| -25 | 25 | 4-5 6-11 | 11 | 8 | | | | | | | | |
| -30 | 30 | 4-6 7-10 | 13 | 9 | | | | | | | | |
| | | | | | | | | | | Grayish-green clayey sand (sc) | | |
| -35 | 35 | 13-5 6-7 | 11 | 10-11-12 | | | | | | Brownish-gray clayey sand with phosphate (sc) | | |
| | | | | US-2 | 44.8 | 23 | 89 | 47 | 74.9 | | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-4ND
TOTAL DEPTH: 40ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan
FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | US-2 | 44.8 | 23 | 89 | 47 | 74.9 | Brownish-gray clayey sand with phosphate (sc) | | |
| | | 7-9 15-50/4 | 24 | 13-14 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| | | | | | | | | | | Greenish-brown silty sand with clay and phosphate (sm) | | |
| | | | | | | | | | | Total depth 40.0 feet | | |
| -42 | 42 | | | | | | | | | | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-2M
TOTAL DEPTH: 41ft.
SHEET 1 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/02/91
COMPLETED 4/02/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 6.0''
date 4/02/91
time
WATER TABLE: 2nd depth –
date –
time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3-4 5-6 | 9 | 1/2 | | | | | | Dark reddish-brown sand with silt an roots (sp-sm) | | |
| | | | | | | | | | | Light brown to brown sand (sp) | | |
| | | 8-7 8-7 | 15 | 3 | | | | | | Yellowish-brown to light brown sand (sp) | | |
| -5 | 5 | 4-2 2-2 | 4 | 4 | | | | | | | | |
| | | 2-1 1-4 | 2 | 5 | | | | | | Brown sand with clay (sp-sc) | | |
| -10 | 10 | 6-7 8-10 | 15 | 6 | | | | | | Brownish-gray sand with silt and cemented sand nodules (sp-sm) | | |
| -15 | 15 | 15-10 5-5 | 15 | 7 | | | | | | Brownish-gray clayey sand (sc) | | |
| -20 | 20 | | | US-1 | 16.8 | 13 | 24 | 10 | 105.4 | | | |
| -25 | 25 | 9-11 11-13 | 22 | 8 | | | | | | Gray sand with clay to clayey sand with phosphate (sp-sc to sc) | | |
| -30 | 30 | 6-9 8-9 | 17 | 9 | | | | | | | | |
| -35 | 35 | 4-9 50/2" | 50/2" | 10 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-2M
TOTAL DEPTH: 41ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan

FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7-14 20-21 | 34 | 11 | | | | | | greenish-brown silty sand with clay and phosphate (sm-sc) | | |
| -42 | 42 | | | | | | | | | Total depth 41.0 feet | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-3SD
TOTAL DEPTH: 44ft.
SHEET 1 OF 2

PROJECT Teco Power Plant — FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. — ELEVATION
BORING LOCATION As Per Plan — BORING TYPE SPT
COUNTY Polk — STATE Florida — CASING TYPE None
DATE STARTED 4/03/91 — COMPLETED 4/03/91 — DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 4.0' — date 4/03/91 — time
WATER TABLE: 2nd depth – — date – — time –
REMARKS

| Elevation | Depth (ft) | Blows/ 6 in | N Value | Sample Number | NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-1 2-3 | 3 | 1 | | | | | | Light brown to brown sand (sp) | | |
| | | 4-2 2-2 | 4 | 2 | | | | | | Dark reddish-brown sand with silt an roots (sp-sm) | | |
| -5 | 5 | 3-3 3-3 | 6 | 3 | | | | | | | | |
| | | 1-1 1-2 | 2 | 4 | | | | | | Light reddish-brown sand (sp) | | |
| -10 | 10 | 4-4 5-6 | 9 | 5 | | | | | | | | |
| -15 | 15 | 9-14 18-24 | 32 | 6-7 | | | | | | Brownish-gray clayey sand (sc) | | |
| | | | | | | | | | | Grayish-brown sand with silt to silty SAND (sp-sm to sm) | | |
| | | | | US-1 | 18.9 | 11 | | | 104.8 | | | |
| -20 | 20 | 23-27 25-30 | 52 | 8 | | | | | | Gray sand with clay to clayey sand with phosphate (sp-sc to sc) | | |
| -25 | 25 | 5-6 8-8 | 14 | 9 | | | | | | | | |
| | | | | US-2 | 18.8 | 16 | 26 | 10 | 108.9 | | | |
| -30 | 30 | 2-7 8-15 | 15 | 10 | | | | | | Gray clayey sand with phosphate with lenses of greenish-brown clayey silt (mh) | | |
| -35 | 35 | 8-6 8-8 | 14 | 11 | | | | | | | | |

# BORING LOG
## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-3SD
TOTAL DEPTH: 44ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan
FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 28-13 14-11 | 27 | 12 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -42 | 42 | | | | | | | | | | | |
| | | 50/0" | 50/0" | | | | | | | No recovery | | |
| | | | | | | | | | | Total depth 44.0 feet | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG
## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-5S
TOTAL DEPTH: 40ft.
SHEET 1 OF 2

PROJECT Teco Power Plant | FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. | ELEVATION
BORING LOCATION As Per Plan | BORING TYPE SPT
COUNTY Polk | STATE Florida | CASING TYPE None
DATE STARTED 4/04/91 | COMPLETED 4/05/91 | DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth None' | date | time
WATER TABLE: 2nd depth — | date — | time —
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-2 5-9 | 7 | 1 | | | | | | Dark reddish-brown sand with silt and roots (sp-sm) | | |
| | | 18-22 12-10 | 32 | 2 | | | | | | | | |
| -5 | 5 | 11-12 14-14 | 36 | 3 | | | | | | Brownish-gray clayey sand (sc) | | |
| | | 12-12 11-11 | 23 | 4 | | | | | | | | |
| -10 | 10 | 9-9 10-12 | 19 | 5-6 | | | | | | Grayish-brown sand (sp) | | |
| | | | | | | | | | | Brownish-gray clayey sand (sc) | | |
| -15 | 15 | 2-3 4-6 | 7 | 7 | | | | | | Grayish-brown sand (sp) | | |
| | | | | US-1 | 20 | 7 | | | 103.3 | | | |
| -20 | 20 | 1-2 5-6 | 7 | 8 | | | | | | | | |
| -25 | 25 | 1-3 3-4 | 6 | 9 | | | | | | Brownish-gray clayey sand (sc) | | |
| -30 | 30 | 6-7 15-11 | 22 | 10 | | | | | | Gray sand with clay to clayey sand with phosphate (sc) | | |
| | | | | | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -35 | 35 | 3-7 6-9 | 13 | 11-12 | | | | | | Greenish-brown silty sand with clay and phosphate (sm-sc) | | |
| | | | | | | | | | | Light gray clayey sand with phosphate (sc) | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-5S
TOTAL DEPTH: 40ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | US-2 | 38.4 | | 97 | 63 | 86.4 | Light gray clayey sand with phosphate (sc) | | |
| | | 10-50/4 | 50/4" | | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| | | | | | | | | | | Total depth 40.0 feet | | |
| -42 | 42 | | | | | | | | | | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG
## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-5
TOTAL DEPTH: 50ft.
SHEET 1 OF 2

PROJECT Teco Power Plant — FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. — ELEVATION
BORING LOCATION As per Plan — BORING TYPE SPT
COUNTY Polk — STATE Florida — CASING TYPE None
DATE STARTED 4/01/91 — COMPLETED 4/01/91 — DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 9.0' — date 4/01/91 — time
WATER TABLE: 2nd depth – — date – — time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3-4-4 | 8 | 1 | | | | | | Dark reddish-brown sand with silt and roots (sp-sm) | | |
| | | 7-9-15 | 24 | 2 | | | | | | Light brown to dark brown silty sand (sm) | | |
| | | 26-28-23 | 51 | 3 | | | | | | | | |
| -5 | 5 | 18-18-18 | 36 | 4 | | | | | | | | |
| | | 12-14-15 | 29 | 5 | | | | | | Brown sand with clay (sp-sc) | | |
| | | 17-17-15 | 32 | 6 | | | | | | Brownish-gray clayey sand (sc) | | |
| -10 | 10 | 8-8-8 | 16 | 7 | | | | | | | | |
| | | 7-13-15 | 28 | 8 | | | | | | | | |
| | | 14-14-14 | 28 | 9 | | | | | | Grayish-brown sand (sp) | | |
| -15 | 15 | | | | | | | | | | | |
| | | | | US-1 | 27 | 12 | | | 90.9 | Brownish-gray silty sand with cemented sand nodules (sm) | | |
| -20 | 20 | 2-1 1-2 | 2 | 10 | | | | | | | | |
| -25 | 25 | 4-6 8-12 | 14 | 11 | | | | | | Gray sand with clay to clayey sand with phosphate (sc) | | |
| -30 | 30 | 7-7 6-12 | 13 | 12 | | | | | | | | |
| -35 | 35 | 6-8 12-14 | 20 | 13 | | | | | | Greenish-gray sand with clay and phosphate (sp-sc) | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-5
TOTAL DEPTH: 50ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As per Plan
FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11-20 17-12 | 32 | 14 | | | | | | Gray sand with clay to clayey sand with phosphate (sc) with lenses of greenish-brown clayey silt (mh) | | |
| -42 | 42 | | | | | | | | | | | |
| | | 12-15 15-15 | 30 | 15 | | | | | | Brownish-gray sand with silt and cemented sand nodules (sp-sm) | | |
| -47 | 47 | | | | | | | | | | | |
| | | 19-24 24-24 | 48 | 16 | | | | | | Greenish-brown silty sand with clay and phosphate (sm) | | |
| | | | | | | | | | | Total depth 50.0 feet | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 12ft.
SHEET 1 OF 1

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/04/91
COMPLETED 4/04/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth None'
date 4/04/91
time
WATER TABLE: 2nd depth –
date –
time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -5 | 5 | | | | | | | | | Wash | | |
| -10 | 10 | | | US-1 | 16.9<br>20.3 | | | | 108.3 | Light greenish-brown sandy clay (ch-sc)<br>Light gray sand (sp) | | |
| | | | | | | | | | | Total depth 12.0 feet | | |
| -15 | 15 | | | | | | | | | | | |
| -20 | 20 | | | | | | | | | | | |
| -25 | 25 | | | | | | | | | | | |
| -30 | 30 | | | | | | | | | | | |
| -35 | 35 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-4
TOTAL DEPTH: 51ft.
SHEET 1 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/05/91
COMPLETED 4/05/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 4.0'
date 4/05/91
time
WATER TABLE: 2nd depth --
date --
time --
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-1 2-3 | 3 | 1 | | | | | | Light brown sand (sp) - fill | | |
| | | 3-3 2-3 | 5 | 2 | | | | | | | | |
| -5 | 5 | 3-1 1-1 | 2 | 3 | | | | | | Light brown sand with light gray clayey sand lenses (sp with sc) - fill | | |
| | | WOH | 0 | 4 | | | | | | | | |
| -10 | 10 | WOH | 0 | 5 | | | | | | | | |
| | | 1/24" | 0 | 6 | | | | | | | | |
| | | | | US-1 | 19.7 | | | | 122.1 | | | |
| -15 | 15 | WOH | 0 | 7 | | | | | | | | |
| -20 | 20 | | | | | | | | | | | |
| -25 | 25 | 1-1 2-2 | 3 | 8 | | | | | | | | |
| -30 | 30 | | | | | | | | | | | |
| -35 | 35 | 1-1 2-3 | 3 | 9 | | | | | | | | |

# BORING LOG

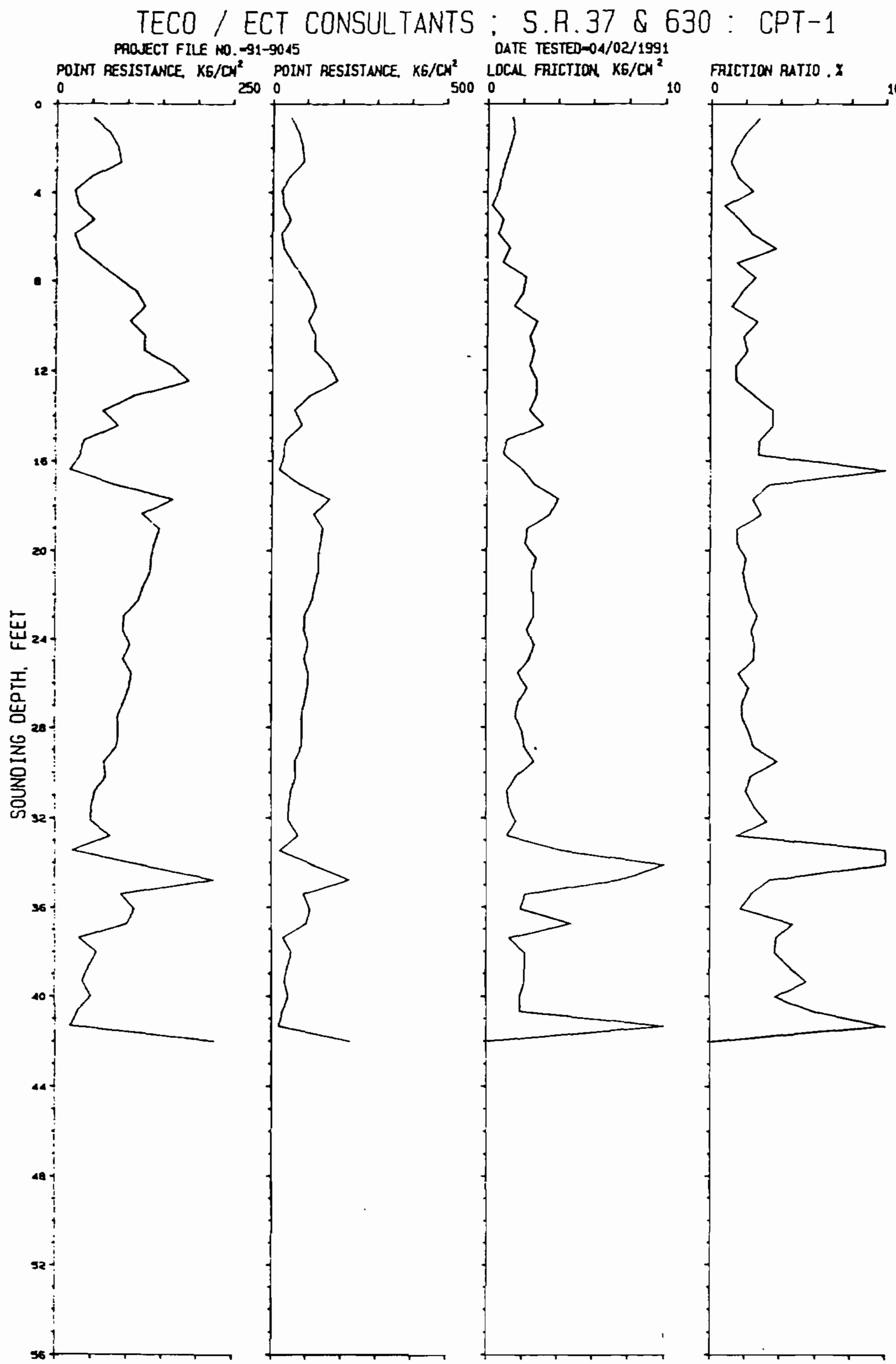
## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-4
TOTAL DEPTH: 51ft.
SHEET 2 OF 2

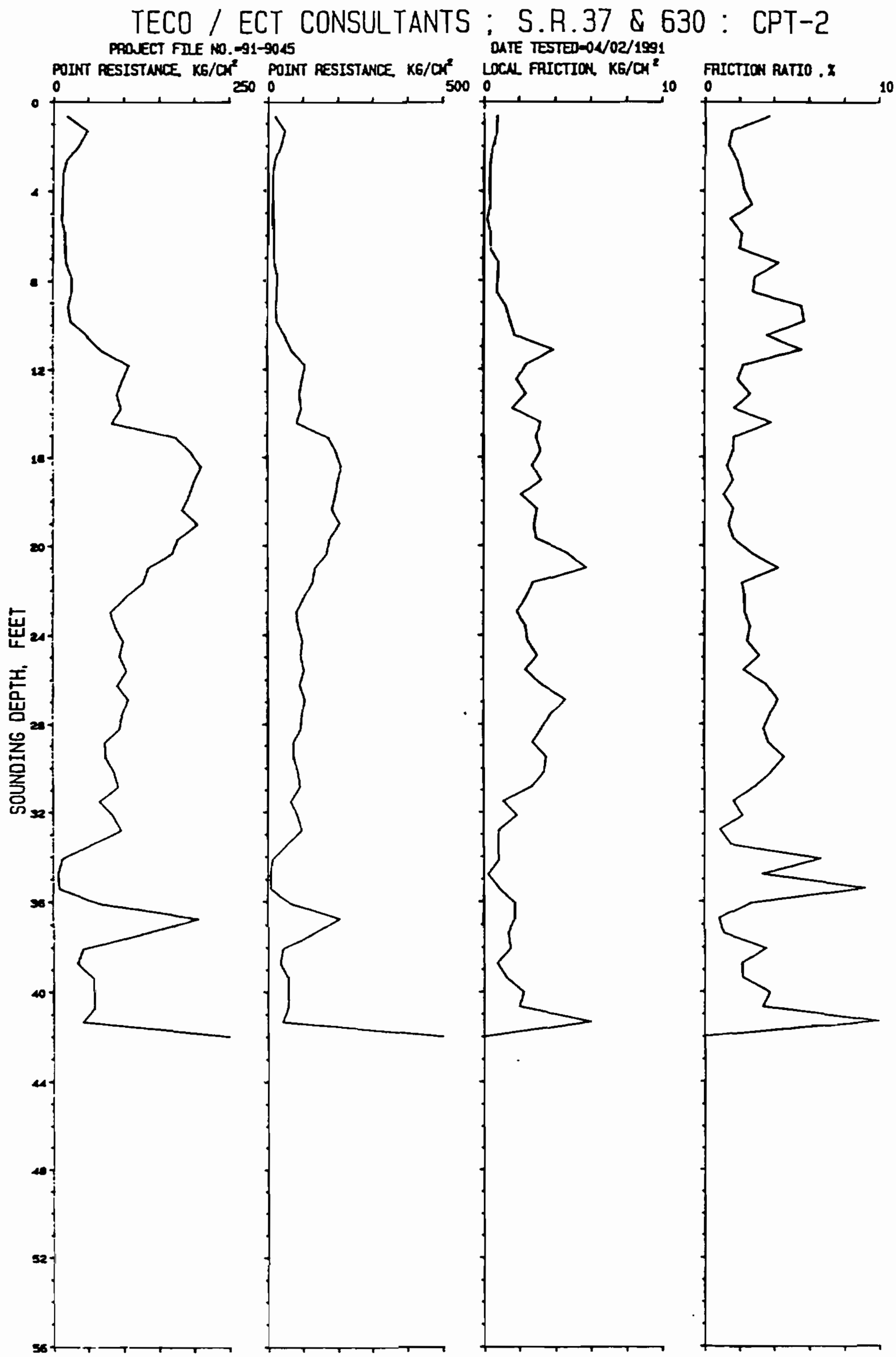
PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan

FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

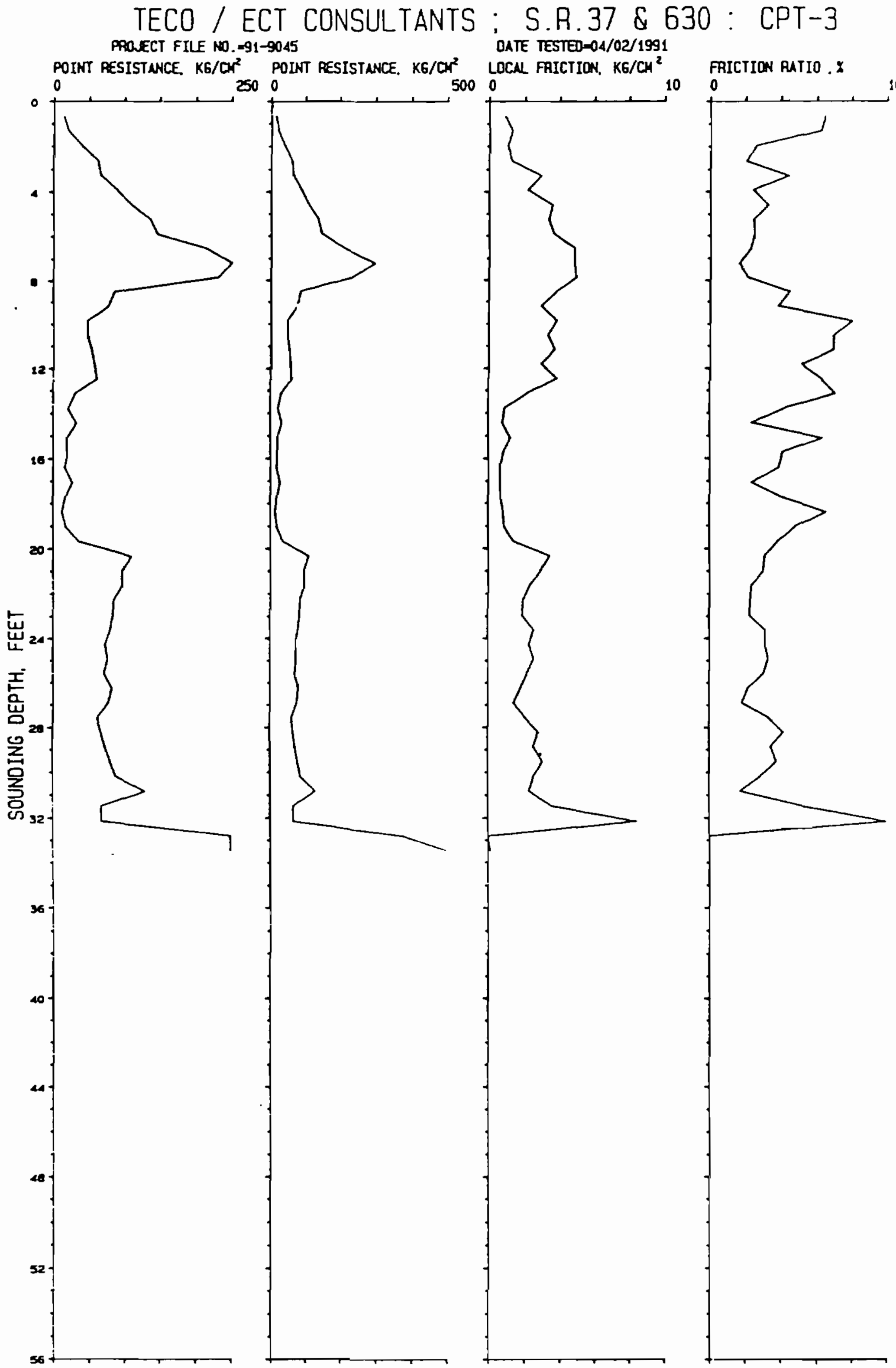
| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/ 6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3-6 7-10 | 13 | 19 | | | | | | Light brown sand with light gray clayey sand lenses (sp with sc) - fill | | |
| -42 | 42 | | | | | | | | | Phosphatic waste clay (slime) (ch) - fill | | |
| | | 4-2 2-3 | 4 | 11-12 | | | | | | | | |
| -47 | 47 | | | | | | | | | Light brown to brown sand (sp) | | |
| | | | | | | | | | | Gray clayey sand with phosphate with lenses of greenish-brown clayey silt (mh) | | |
| | | 8-18 23-25 | 41 | 13 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -52 | 52 | | | | | | | | | Total depth 51.0 feet | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |




| Ardaman & Associates, Inc. Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing | PROPOSED TECO POWER PLANT | DRAWN BY: J.W. | CHECKED BY: | DATE: 4-19-91 |
|---|---|---|---|---|
| | POLK COUNTY, FLORIDA | FILE NO. 91-9045 | APPROVED BY: | |




| Ardaman & Associates, Inc. Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing | PROPOSED TECO POWER PLANT POLK COUNTY, FLORIDA | DRAWN BY: J.W. | CHECKED BY: | DATE: 4-19-91 |
|---|---|---|---|---|
| | | FILE NO. 91-9045 | APPROVED BY: | |




| Ardaman & Associates, Inc. Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing | PROPOSED TECO POWER PLANT POLK COUNTY, FLORIDA | DRAWN BY: J.W. | CHECKED BY: | DATE: 4-19-91 |
|---|---|---|---|---|
| | | FILE NO. 91-9045 | APPROVED BY: | |

## 11.7.2 LABORATORY SOIL TESTING RESULTS

Ardaman & Associates, Inc.

Consultants in Soils, Hydrogeology,
Foundations and Materials Testing

Revised June 5, 1991
May 15, 1991
File Number 91-9045

Environmental Consulting &
Technology, Inc.
Post Office Box 20866
Tampa, Florida 33622-0866

Attn: Rick Steele

Subject: Report of Soil Laboratory Test Results, Proposed TECO Power Plant, State Road 630 and State Road 37, Polk County, Florida

Gentlemen:

As authorized, we have performed soil testing according to the program determined by Mr. Rick Steele, of ECT, Inc. The laboratory test results performed are presented on Table 1.

Furthermore, grain size distribution curves, based on the grain size analysis performed on selected soil samples, are presented in Figures 1 through 7.

It has been a pleasure assisting you with this phase of your project. If there are any questions, or when we may be of further assistance, please contact the undersigned at 813/654-2336.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

Dusan Jovanovic
Project Engineer

Thomas J. Leto

Thomas J. Leto, P.E.
Principal
Florida Registration No. 12458

DJ/TJL:paw Enclosures
sse21/91-9045.slt

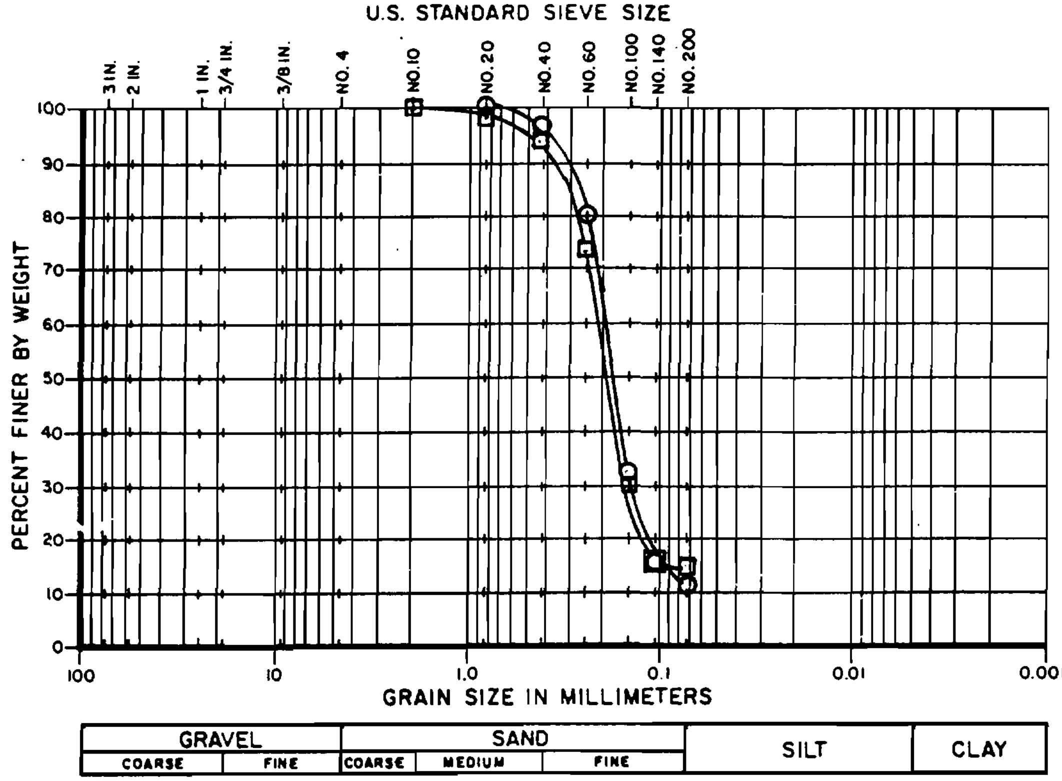
**ENVIRONMENTAL CONSULTING**
**& TECHNOLOGY, INC.**
**PROPOSED TECO POWER PLANT**
**SOIL LABORATORY TEST RESULTS**

| Boring No. | Sample No. | Depth Sampled [feet] | Natural Moisture [%] | Percent Fines [%] | LL | PI | k [cm/sec] | Dry Density [pcf] | Porosity [%] | CEC** [meg Ba/ 100g Soil] |
|---|---|---|---|---|---|---|---|---|---|---|
| SPT-1N | U.S. #1 | 16'-18' | 19.0 | 17.0 | | | $3.8x10^{-5}$ | 110.7 | 33.7 | |
| GW-1 | U.S. #1 | 10'-12' | 22.5 | 4.0 | | | $5.1x10^{-3}$ | 114.4 | 40.3 | |
| SPT-2M | U.S. #1 | 18.5'-20.5' | 16.8 | 13.0 | 24 | 10 | $2.3x10^{-5}$ | 105.4 | 28.4 | |
| SPT-3SD | U.S. #1 | 17'-18.5' | 18.9 | 11.0 | | | $2.8x10^{-5}$ | 104.8 | 31.7 | |
| SPT-3SD | U.S. #2 | 27'-29' | 18.8 | 16.0 | 26 | 10 | $6.3x10^{-6}$ | 108.9 | 32.8 | |
| SPT-4ND | U.S. #2 | 36'-38' | 44.8 | 23.0 | 89 | 47 | $1.1x10^{-5}$ | 74.9 | 53.8 | |
| SPT-4ND | U.S. #1 | 12'-14' | 26.7 | 73.0 | | | $3.2x10^{-8}$ | 100.2 | 42.9 | |
| SPT-5S | U.S. #2 | 36'-38' | 33.4 | 25.0 | 97 | 63 | $6.2x10^{-7}$ | 86.4 | 46.2 | |
| SPT-5S | U.S. #1 | 16'-18' | 20.1 | 7.0 | | | $3.3x10^{-4}$ | 103.3 | 33.3 | |
| GW-1 | * | Approx. 270' | 18.6 | 38.0 | | | $3.0x10^{-7}$ | 108.3 | 32.3 | 0.27 |
| GW-5 | U.S. #1 | 16.5'-18.5' | 27.0 | 12.0 | | | $4.3x10^{-7}$ | 90.9 | 39.3 | |
| GW-4 | U.S. #1 | 12'-14' | 19.7 | 7.0 | | | $2.4x10^{-5}$ | 102.0 | 32.2 | |
| GW-4 | MT-1 | 38'-40' | 52.3 | | | | | 69.3 | 58.1 | 7.11 |
| PPS-GW2 | | | | | | | | | | |
| I-1 | U.S. #1 | 80'-81' | 30.6 | | | | | 96.0 | 47.1 | |
| GW-3 | U.S. PI1 | 49'-51' | 20.4 | | | | | 110.0 | 36.0 | |
| GW-3 | U.S. #1 | 12'-14' | 25.8 | 5.0 | | | $1.2x10^{-3}$ | 99.4 | 41.1 | |
| GW-1 | U.S. #MT-1 | 36'-38' | 27.1 | 73.0 | | | $6.4x10^{-7}$ | 99.1 | 43.0 | 3.04 |

*Mineral Barrel Sample
**Cation Exchange Capacity

TABLE 1

# FIGURES




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 33D | US 1 | 17.0 - 18.5' | ○ | DARK BROWN SILTY SAND | SM |
| 33D | US 2 | 27.0 - 29.0' | □ | BLUISH - GRAY CLAYEY SAND | SC |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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|---|---|---|
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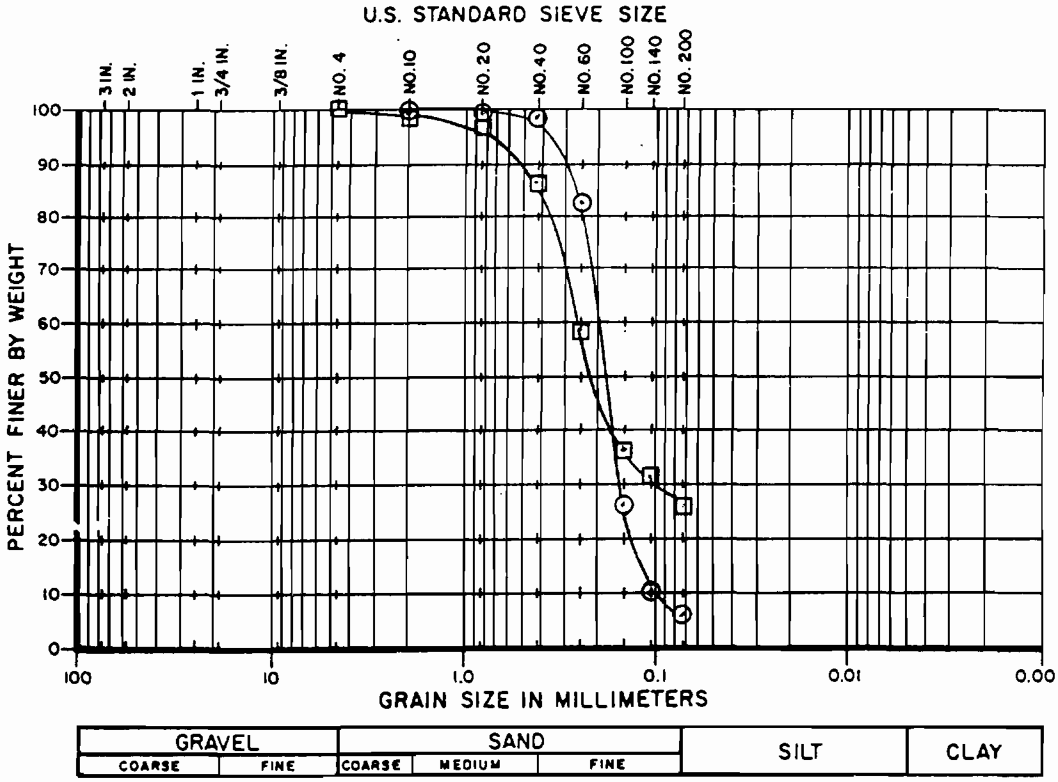
FORM NO. 1509 7/80

FIGURE 1




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 55 | US1 | 16.0' - 18.0' | O | GRAYISH-BROWN SAND | SP |
| 55 | US2 | 36.0' - 38.0' | □ | GREENISH-GRAY CLAYEY SAND | SC |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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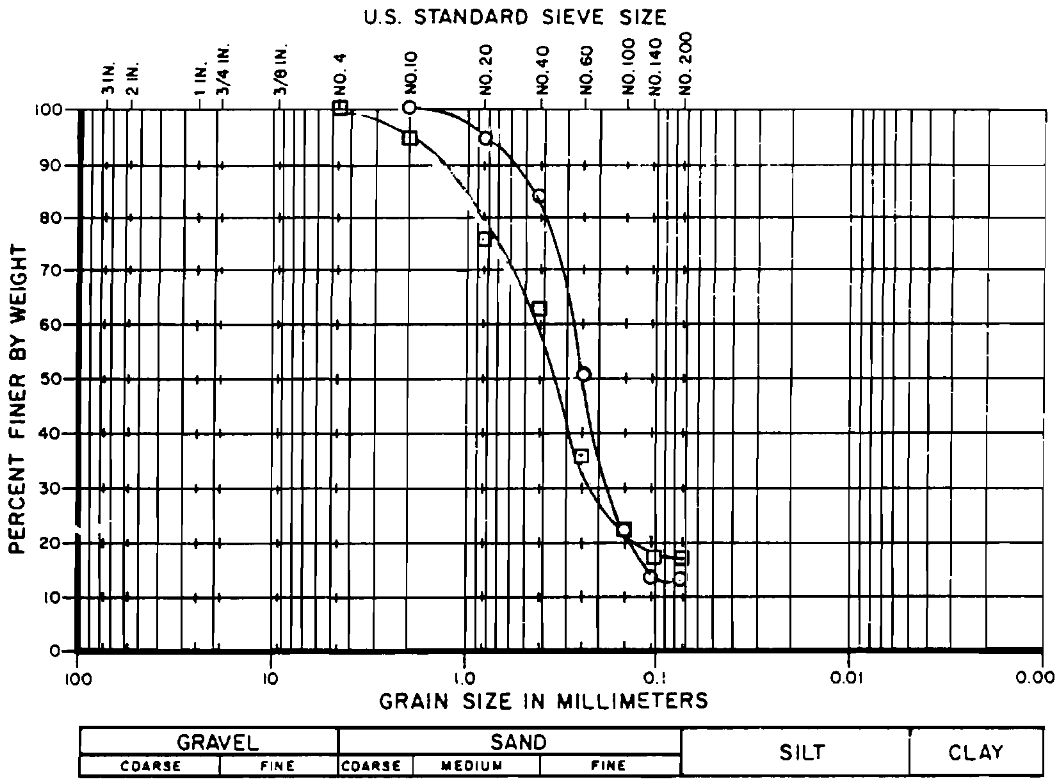
FIGURE 2




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 1N | US1 | 16.0' - 18.0' | o | LT. GRAY CLAYEY SAND | SC |
| 2M | US1 | 18.5' - 20.5' | □ | BROWNISH-GRAY CLAYEY SAND | SC |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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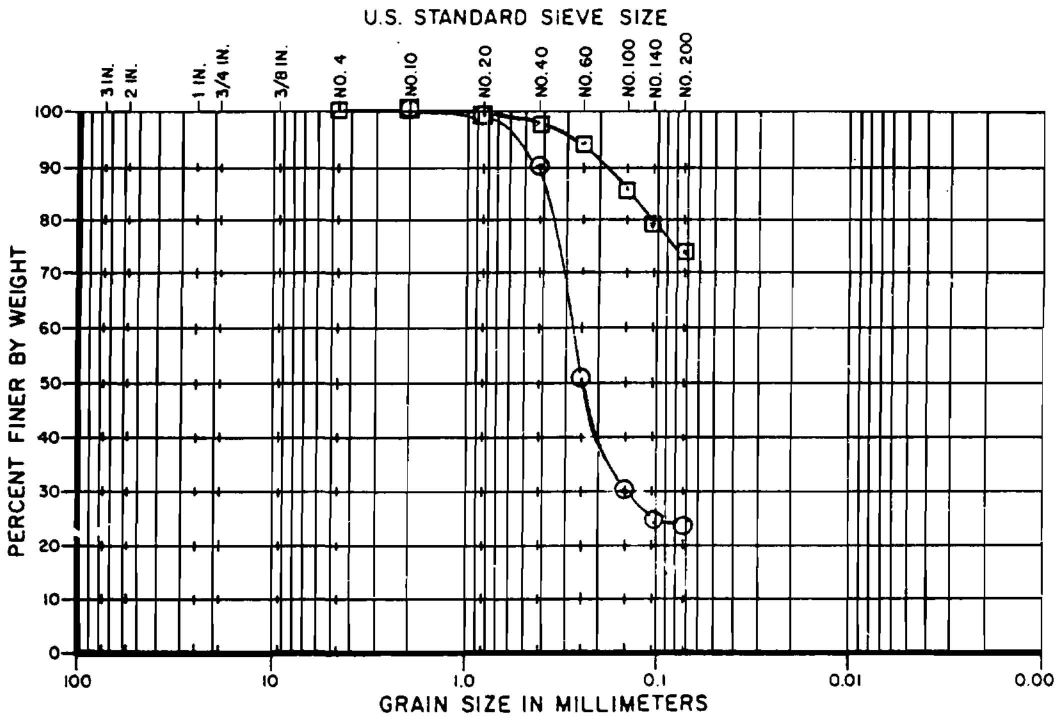
**FIGURE 3**




| GRAVEL | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | | |

| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 4ND | US1 | 12.0-14.0' | □ | GREENISH-GRAY CLAY W POCKETS OF SAND | CH-SP |
| 4ND | US2 | 36.0-38.0' | ○ | GREEN CLAYEY SAND W/POCKETS OF SAND | SC |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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|---|---|---|
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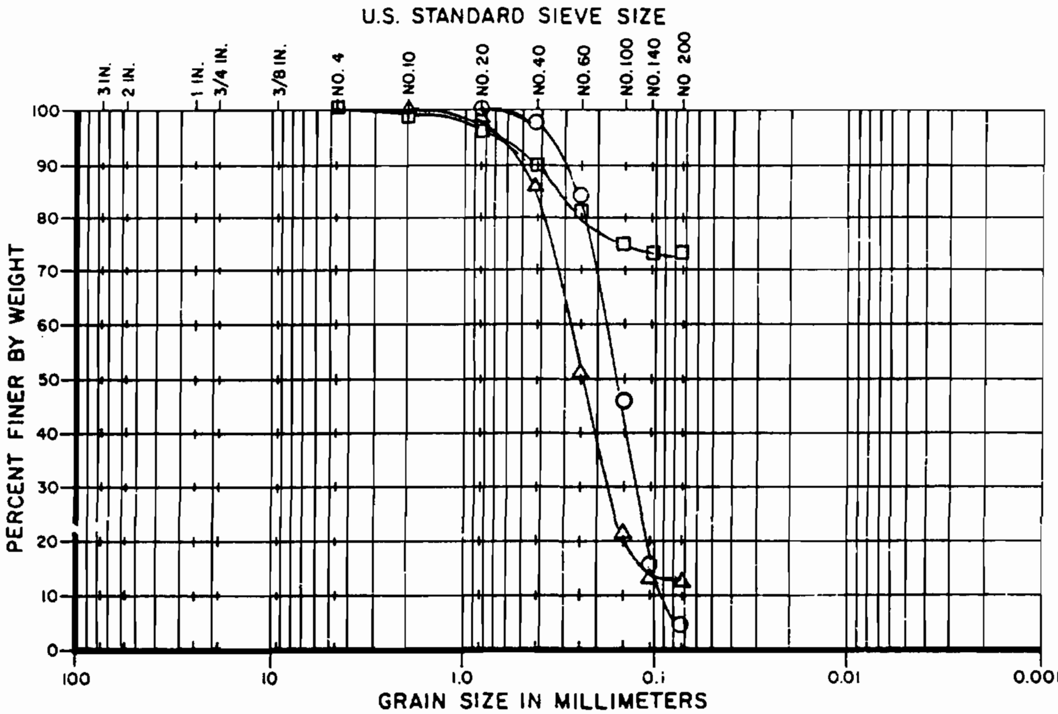
**FIGURE 4**




| GRAVEL | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | | |

| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| GW1 | US1 | 10.0 - 12.0' | ○ | LT. GRAY SAND | SP |
| GW1 | MT1 | 36.0 - 38.0' | □ | GRAY CLAYEY SILT W/ PHOSPHATE | MH |
| GW5 | US1 | 16.5 - 18.5' | Δ | GRAY SILTY SAND | SM |
| | | | | | |
| | | | | | |
| | | | | | |

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|---|---|---|
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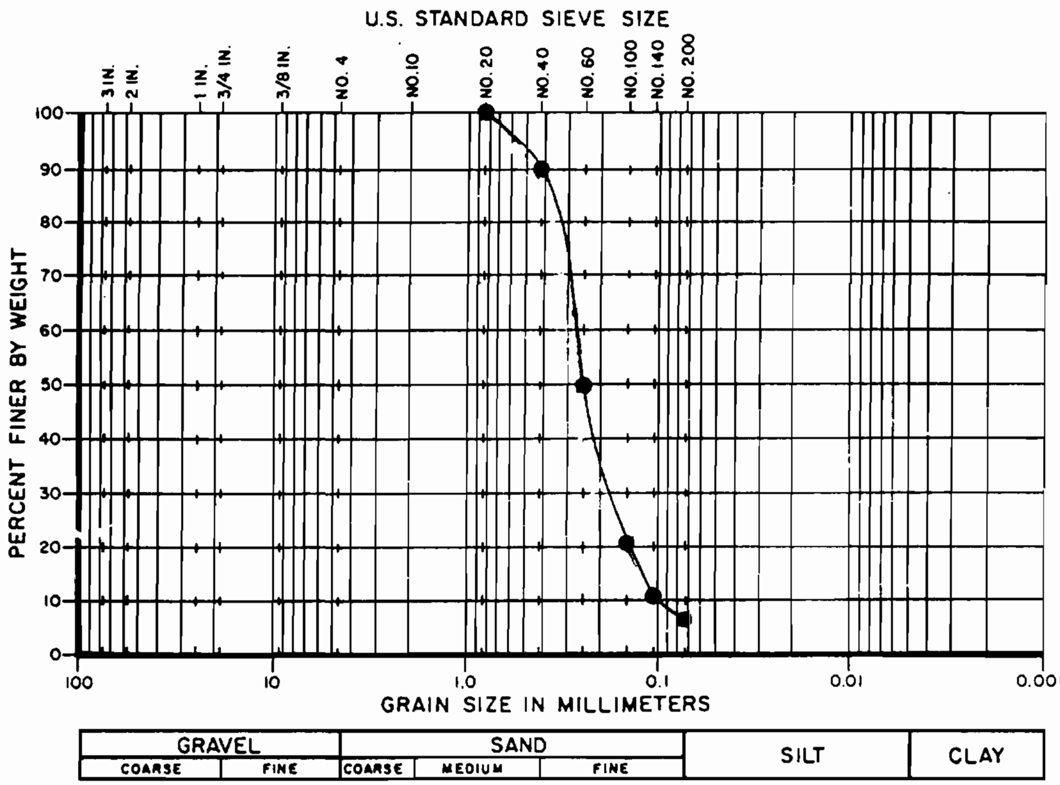
FIGURE 5




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| OW-4 | US#1 | 12.0'-14.0' | ● | LIGHT GRAY CLAYEY SAND | SC |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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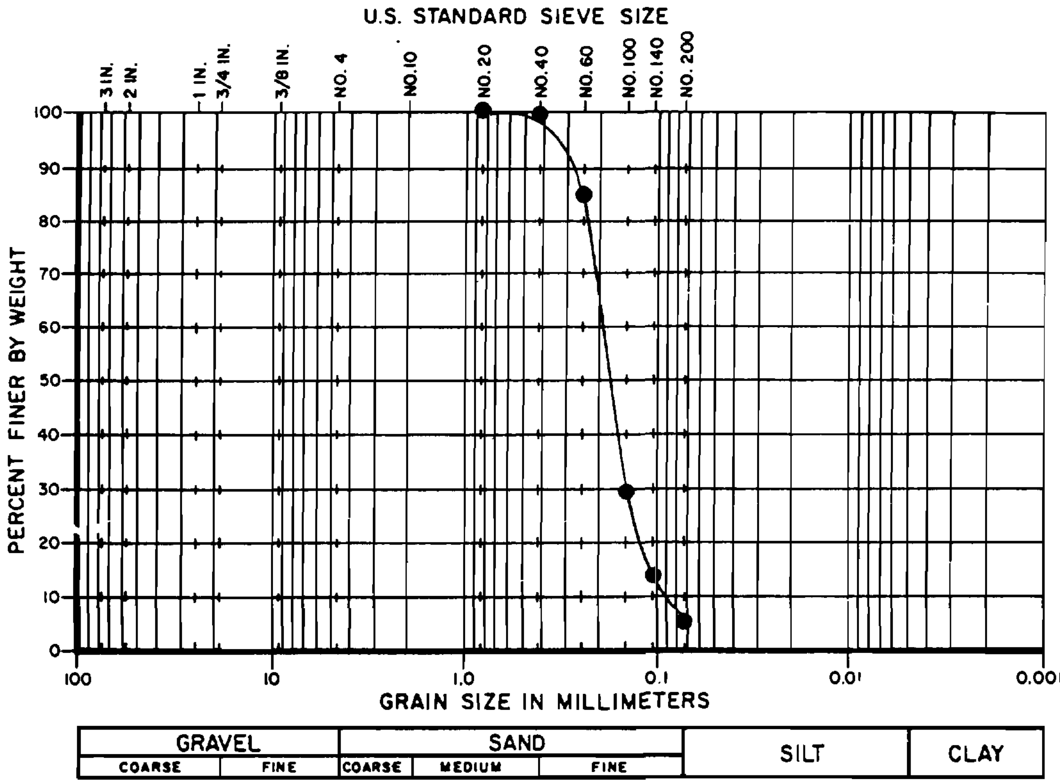
**POLK COUNTY, FLORIDA**

DRAWN BY: JW | CHECKED BY: | DATE: 6/5/91
FILE NO. 91-9045 | APPROVED BY:

FORM NO. 1509 7/80

**FIGURE 6**




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| GW-3 | US#1 | 12.0' - 14.0' | ● | LIGHT GRAY SAND W/PHOSPHATE TAILINGS | SP |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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| DRAWN BY: J.W. | CHECKED BY: | DATE: 6/5/91 |
|---|---|---|
| FILE NO. 91-9045 | APPROVED BY: | |

FORM NO. 1509 7/80

**FIGURE 7**

# 11.7.3 LABORATORY RESULTS FOR GROUNDWATER SAMPLING--MAY 1991

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REC'D JUL 23 1991

# REPORT OF LABORATORY ANALYSIS

July 19, 1991

Mr. Brad Pekas
Environmental Consulting & Technology
5405 Cypress Center Drive
Suite 200
Tampa, Florida 33609

Re: PACE Project N. 210516.508
902630301 TECO

Dear Mr. Pekas:

Enclosed is the report of laboratory analyses for samples received May 21 - 24, 1991.

Please note sample numbers 90 0077246, 90 0078170 and 90 0078188 (sampled on 5/22/91) were analyzed (5/28/91) out-of-hold for ortho-phosphorus. The samples were analyzed on 5/23/91 via Ion Chromotography 300 methodology and results obtained for ortho-phosphorus are in agreement with the results obtained 5/28/91. The equipment blank had 0.09 mg/L of NH3-N detected and a travel blank was not available for analysis.

The following symbols are utilized in the draft analytical report:

- Are utilized as place holders for report formatting

ND Analyte not detected at or above stated Method Detection limit.

Total Cations are the meq/L summation of sodium, calcium, magnesium, maganese and iron.

Total Anions are the meq/L summation of chloride, nitrate, nitrite, ortho-phosphorus, sulfate and carbonate alkalinity.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan R. Anderson
Quality Assurance Officer
Florida Region

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

5460 Beaumont Center Blvd.
Tampa, FL 33634
TEL: 813-884-8268
FAX: 813-888-6382

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# REPORT OF LABORATORY ANALYSIS

Environmental Consulting & Technology
5405 Cypress Center Drive
Suite 200
Tampa, FL 33609

July 19, 1991
PACE Project Number: 210516508

Attn: Mr. Brad Pekas

902630301 TECO

| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
| SUBCONTRACT ANALYSIS | | | | | |
| RADIONUCLIDES | | | | | |
| Radium 226 | pCi/L | 0.6 | ND | - | - |
| Radium 228 | pCi/L | 1 | ND | - | - |
| Gross Alpha | pCi/L | 2 | ND | - | - |
| INORGANIC ANALYSIS | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| Antimony | mg/L | 0.2 | ND | - | - |
| Thallium | mg/L | 0.2 | ND | - | - |
| CLASSICAL | | | | | |
| Alkalinity, as CaCO3 | mg/L | 1 | ND | - | - |
| Acidity, Total | mg/L | 1 | ND | - | - |
| Alkalinity, Bicarbonate | mg/L | 1 | ND | - | - |
| Alkalinity, Carbonate | mg/L | 1 | ND | - | - |
| Hardness, Total (CACO3) | mg/L | 1 | ND | - | - |
| Color, Platinum-Cobalt Units | | 5 | ND | - | - |
| Solids, Total Dissolved | mg/L | 5 | ND | - | - |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | ND | - | - |
| Turbidity | NTU | 1.0 | ND | - | - |
| Cyanide, Total EPA 335.2 | mg/L | 0.02 | ND | - | - |
| Ammonia (un-ionized) | mg/L | 0.02 | 0.09* | - | - |
| Selenium EPA 270.2 | ug/L | 10 | ND | - | - |
| Chloride | mg/L | 1.0 | ND | - | - |
| Fluoride, soluble | mg/L | 0.1 | ND | - | - |

MDL Method Detection Limit
ND Not detected at or above the MDL.
* This value is reported as total NH3-N

Lab Certification: Florida Environmental. HRS #E84003: Florida SDWA: HRS #84125

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 2

July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| | | | | | |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
| INORGANIC ANALYSIS | | | | | |
| CLASSICAL | | | | | |
| Sulfate | mg/L | 5.0 | ND | - | - |
| Sodium | mg/L | 1 | ND | - | - |
| Calcium | mg/L | 0.2 | ND | - | - |
| Magnesium | mg/L | 0.02 | ND | - | - |
| Arsenic EPA 206.2 | ug/L | 10 | ND | - | - |
| Nitrogen, Nitrate | mg/L | 1.0 | ND | - | - |
| Nitrogen, Nitrite | mg/L | 0.01 | ND | - | - |
| Nitrogen, Total Organic | mg/L | 0.3 | ND | - | - |
| Nitrogen, Kjeldahl EPA 351.3 | mg/L | 0.3 | ND | - | - |
| Phosphorus, Ortho | mg/L | 0.05 | ND | - | - |
| Phosphorus, Total EPA 365.2 | mg/L | 0.05 | ND | - | - |
| Phenol | mg/L | 0.05 | ND | - | - |
| Chemical Oxygen Demand | mg/L | 10 | ND | - | - |
| Surfactants | mg/L | 0.02 | 0.03 | - | - |
| METALS | | | | | |
| Barium | mg/L | 0.3 | ND | - | - |
| Beryllium | ug/L | 10 | ND | - | - |
| Cadmium | ug/L | 0.8 | ND | - | - |
| Chromium | mg/L | 0.05 | ND | - | - |
| Chromium, Hexavalent | mg/L | 0.04 | ND | - | - |
| Copper | mg/L | 0.03 | ND | - | - |
| Iron | mg/L | 0.3 | ND | - | - |
| Lead EPA 239.2 | ug/L | 5 | ND | - | - |
| Manganese | mg/L | 0.05 | ND | - | - |
| Mercury EPA 245.1 | ug/L | 0.2 | ND | - | - |
| Nickel | mg/L | 0.2 | ND | - | - |
| Silver | ug/L | 0.07 | ND | - | - |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

# REPORT OF LABORATORY ANALYSIS

PACE INCORPORATED
THE ASSURANCE OF QUALITY

Mr. Brad Pekas
Page 3

July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
| INORGANIC ANALYSIS | | | | | |
| METALS | | | | | |
| Zinc | mg/L | 0.03 | ND | - | - |
| ORGANIC ANALYSIS | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| 1,2-Dibromoethane | ug/L | 0.02 | ND | ND | - |
| Acrolein | ug/L | 5.0 | ND | - | - |
| Acrylonitrile | ug/L | 5.0 | ND | - | - |
| Methoxychlor | ug/L | 100 | ND | - | ND |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| Benzene | ug/L | 5.0 | ND | - | - |
| Bromodichloromethane | ug/L | 5.0 | ND | - | - |
| Bromoform | ug/L | 5.0 | ND | - | - |
| Bromomethane | ug/L | 10 | ND | - | - |
| Carbon Tetrachloride | ug/L | 5.0 | ND | - | - |
| Chlorobenzene | ug/L | 5.0 | ND | - | - |
| Chloroethane | ug/L | 10 | ND | - | - |
| 2-Chloroethylvinyl ether | ug/L | 10 | ND | - | - |
| Chloroform | ug/L | 5.0 | ND | - | - |
| Chloromethane | ug/L | 10 | ND | - | - |
| Dibromochloromethane | ug/L | 5.0 | ND | - | - |
| 1,1-Dichloroethane | ug/L | 5.0 | ND | - | - |
| 1,2-Dichloroethane | ug/L | 5.0 | ND | - | - |
| 1,1-Dichloroethylene | ug/L | 5.0 | ND | - | - |
| trans-1,2-Dichloroethylene | ug/L | 5.0 | ND | - | - |
| 1,2-Dichloropropane | ug/L | 5.0 | ND | - | - |
| cis-1,3-Dichloropropene | ug/L | 5.0 | ND | - | - |
| trans-1,3-Dichloropropene | ug/L | 5.0 | ND | - | - |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 4

July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
| ORGANIC ANALYSIS | | | | | |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| Ethyl benzene | ug/L | 5.0 | ND | - | - |
| Methylene Chloride | ug/L | 5.0 | ND | - | - |
| 1,1,2,2-Tetrachloroethane | ug/L | 5.0 | ND | - | - |
| Tetrachloroethylene | ug/L | 5.0 | ND | - | - |
| Toluene | ug/L | 5.0 | ND | - | - |
| 1,1,1-Trichloroethane | ug/L | 5.0 | ND | - | - |
| 1,1,2-Trichloroethane | ug/L | 5.0 | ND | - | - |
| Trichloroethylene | ug/L | 5.0 | ND | - | - |
| Trichlorofluoromethane | ug/L | 10 | ND | - | - |
| Vinyl Chloride | ug/L | 10 | ND | - | - |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| a-BHC | ug/L | 0.05 | ND | ND | ND |
| b-BHC | ug/L | 0.05 | ND | ND | ND |
| g-BHC | ug/L | 0.05 | ND | ND | ND |
| d-BHC | ug/L | 0.05 | ND | ND | ND |
| Heptachlor | ug/L | 0.05 | ND | ND | ND |
| Aldrin | ug/L | 0.05 | ND | ND | ND |
| Heptachlor epoxide | ug/L | 0.07 | ND | ND | ND |
| Endosulfan I | ug/L | 0.14 | ND | ND | ND |
| Dieldrin | ug/L | 0.10 | ND | ND | ND |
| Endrin | ug/L | 0.08 | ND | ND | ND |
| 4,4-DDD | ug/L | 0.3 | ND | ND | ND |
| Endosulfan II | ug/L | 0.20 | ND | ND | ND |
| 4,4-DDT | ug/L | 0.30 | ND | ND | ND |
| 4,4-DDE | ug/L | 0.10 | ND | ND | ND |
| Endrin aldehyde | ug/L | 1.0 | ND | ND | ND |
| Endosulfan sulfate | ug/L | 1.0 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 5

July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| ORGANIC ANALYSIS | | | | | |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| Chlordane | ug/L | 1.0 | ND | ND | ND |
| Toxaphene | ug/L | 3.0 | ND | ND | ND |
| PCB-1016 | ug/L | 0.5 | ND | ND | ND |
| PCB-1221 | ug/L | 0.5 | ND | ND | ND |
| PCB-1232 | ug/L | 0.5 | ND | ND | ND |
| PCB-1242 | ug/L | 0.1 | ND | ND | ND |
| PCB-1248 | ug/L | 0.1 | ND | ND | ND |
| PCB-1254 | ug/L | 0.5 | ND | ND | ND |
| PCB-1260 | ug/L | 0.5 | ND | ND | ND |
| CHLOROPHENOXYS EPA 515 | | | | | |
| 2,4-D | ug/L | 10 | - | - | ND |
| Silvex | ug/L | 1 | - | - | ND |
| TOTAL TRIHALOMETHANE | | | | | |
| Chloroform | ug/L | 0.4 | ND | - | ND |
| Bromodichloromethane | ug/L | 0.6 | ND | - | ND |
| Dibromochloromethane | ug/L | 1.0 | ND | - | ND |
| Bromoform | ug/L | 2.0 | ND | - | ND |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2-Trichloroethylene | ug/L | 0.9 | ND | - | ND |
| Benzene | ug/L | 0.6 | ND | - | ND |
| Vinyl Chloride | ug/L | 0.8 | ND | - | ND |
| Carbon Tetrachloride | ug/L | 0.5 | ND | - | ND |
| 1,1,1-Trichloroethane | ug/L | 0.8 | ND | - | ND |
| 1,2-Dichloroethane | ug/L | 1.0 | ND | - | ND |
| 1,1-Dichloroethylene | ug/L | 0.5 | ND | - | ND |
| 1,4-Dichlorobenzene | ug/L | 1.0 | ND | - | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

REPORT OF LABORATORY ANALYSIS

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| | | | | | |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
| ORGANIC ANALYSIS | | | | | |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2,2-Tetrachloroethylene | ug/L | 0.9 | ND | - | ND |
| CLASSICAL | | | | | |
| Total Recoverable Oil & Grease EPA413.2 | mg/L | 1 | ND | - | - |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Acenaphthene | ug/L | 10 | ND | - | - |
| Acenaphthylene | ug/L | 10 | ND | - | - |
| Anthracene | ug/L | 10 | ND | - | - |
| Benzoic Acid | ug/L | 10 | ND | - | - |
| Benzo(a)anthracene | ug/L | 10 | ND | - | - |
| Benzo(a)pyrene | ug/L | 10 | ND | - | - |
| Benzo(b)fluoranthene | ug/L | 10 | ND | - | - |
| Benzo(k)fluoranthene | ug/L | 10 | ND | - | - |
| Benzo(g,h,i)perylene | ug/L | 10 | ND | - | - |
| Benzyl Alcohol | ug/L | 10 | ND | - | - |
| 4-Bromophenyl phenyl ether | ug/L | 10 | ND | - | - |
| Butyl benzyl phthalate | ug/L | 10 | ND | - | - |
| Bis(2-ethyl hexyl)phthalate | ug/L | 10 | ND | - | - |
| Bis(2-chloroethoxy)methane | ug/L | 10 | ND | - | - |
| Bis(2-chloroethyl)ether | ug/L | 10 | ND | - | - |
| Bis(2-chloroisopropyl)ether | ug/L | 10 | ND | - | - |
| 2-Chloronaphthalene | ug/L | 10 | ND | - | - |
| 4-Chloroaniline | ug/L | 10 | ND | - | - |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | ND | - | - |
| Chrysene | ug/L | 10 | ND | - | - |
| Dibenzo(a,h)anthracene | ug/L | 10 | ND | - | - |
| 1,2-Dichlorobenzene | ug/L | 10 | ND | - | - |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| Parameter | Units | MDL | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| **ORGANIC ANALYSIS** | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,3-Dichlorobenzene | ug/L | 10 | ND | - | - |
| 1,4-Dichlorobenzene | ug/L | 10 | ND | - | - |
| 3,3-Dichlorobenzidine | ug/L | 10 | ND | - | - |
| Dibenzofuran | ug/L | 10 | ND | - | - |
| Diethyl phthalate | ug/L | 10 | ND | - | - |
| Di-n-butyl phthalate | ug/L | 10 | ND | - | - |
| 2,4-Dinitrotoluene | ug/L | 10 | ND | - | - |
| 2,6-Dinitrotoluene | ug/L | 10 | ND | - | - |
| Di-n-octyl phthalate | ug/L | 10 | ND | - | - |
| Fluoranthene | ug/L | 10 | ND | - | - |
| Fluorene | ug/L | 10 | ND | - | - |
| Hexachlorocyclopentadiene | ug/L | 10 | ND | - | - |
| Hexachlorobenzene | ug/L | 10 | ND | - | - |
| Hexachlorobutadiene | ug/L | 10 | ND | - | - |
| Hexachloroethane | ug/L | 10 | ND | - | - |
| Indeno(1,2,3-c,d)pyrene | ug/L | 10 | ND | - | - |
| Isophorone | ug/L | 10 | ND | - | - |
| 2-Methylnaphthalene | ug/L | 10 | ND | - | - |
| Naphthalene | ug/L | 10 | ND | - | - |
| 2-Nitroaniline | ug/L | 10 | ND | - | - |
| 3-Nitroaniline | ug/L | 10 | ND | - | - |
| 4-Nitroaniline | ug/L | 10 | ND | - | - |
| Nitrobenzene | ug/L | 10 | ND | - | - |
| N-Nitrosodi-n-propylamine | ug/L | 10 | ND | - | - |
| N-Nitrosodiphenylamine | ug/L | 10 | ND | - | - |
| Phenanthrene | ug/L | 10 | ND | - | - |
| Pyrene | ug/L | 10 | ND | - | - |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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# REPORT OF LABORATORY ANALYSIS

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| Parameter | Units | MDL | 90 0076584 | 90 0076592 | 90 0077254 |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0076584 | 90 0076592 | 90 0077254 |
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/21/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/22/91 |
| | | | Equipment Blank | Travel Blank 5-20-91 | Travel Blank 5-21-91 |
| **ORGANIC ANALYSIS** | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,2,4-Trichlorobenzene | ug/L | 10 | ND | - | - |
| 2-Chlorophenol | ug/L | 10 | ND | - | - |
| 2-Methylphenol | ug/L | 10 | ND | - | - |
| 4-Chloro-3-methylphenol | ug/L | 10 | ND | - | - |
| 4-Methylphenol | ug/L | 10 | ND | - | - |
| 2,4-Dichlorophenol | ug/L | 10 | ND | - | - |
| 2,4-Dimethylphenol | ug/L | 10 | ND | - | - |
| 2,4-Dinitrophenol | ug/L | 10 | ND | - | - |
| 2-Methyl-4,6-Dinitrophenol | ug/L | 10 | ND | - | - |
| 2-Nitrophenol | ug/L | 10 | ND | - | - |
| 4-Nitrophenol | ug/L | 10 | ND | - | - |
| Pentachlorophenol | ug/L | 10 | ND | - | - |
| Phenol | ug/L | 10 | ND | - | - |
| 2,4,5-Trichlorophenol | ug/L | 10 | ND | - | - |
| 2,4,6-Trichlorophenol | ug/L | 10 | ND | - | - |
| Phenol-d6 - Surrogate | % | | 32 | - | - |
| 2-Fluorophenol - Surrogate | % | | 37 | - | - |
| Nitrobenzene-d5 - Surrogate | % | | 66 | - | - |
| 2-Fluorobiphenyl - Surrogate | % | | 63 | - | - |
| 2,4,6-Tribromophenol - Surrogate | % | | 42 | - | - |
| Terphenyl-d14 - Surrogate | % | | 72 | - | - |
| EPA 413.2 | | | | | |
| Total Recoverable Oil & Grease EPA413.2 | mg/L | 1 | - | - | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

PACE Sample Number: 90 0078196
Date Collected: 05/22/91
Date Received: 05/23/91

| Parameter | Units | MDL | Travel Blank 5-22-91 |
|---|---|---|---|
| **ORGANIC ANALYSIS** | | | |
| INDIVIDUAL PARAMETERS | | | |
| 1,2-Dibromoethane | ug/L | 0.02 | ND |
| CHLOROPHENOXYS EPA 515 | | | |
| 2,4-D | ug/L | 10 | ND |
| Silvex | ug/L | 1 | ND |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | |
| 1,1,2-Trichloroethylene | ug/L | 0.9 | ND |
| Benzene | ug/L | 0.6 | ND |
| Vinyl Chloride | ug/L | 0.8 | ND |
| Carbon Tetrachloride | ug/L | 0.5 | ND |
| 1,1,1-Trichloroethane | ug/L | 0.8 | ND |
| 1,2-Dichloroethane | ug/L | 1.0 | ND |
| 1,1-Dichloroethylene | ug/L | 0.5 | ND |
| 1,4-Dichlorobenzene | ug/L | 1.0 | ND |
| 1,1,2,2-Tetrachloroethylene | ug/L | 0.9 | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| SUBCONTRACT ANALYSIS | | | | | |
| RADIONUCLIDES | | | | | |
| Radium 226 | pCi/L | 0.6 | 1.2+/-0.4 | ND | 8.5+/-1.0 |
| Radium 228 | pCi/L | 1 | ND | ND | 1.3+/-1.1 |
| Gross Alpha | pCi/L | 2 | ND | ND | 16.6+/-6.4 |
| INORGANIC ANALYSIS | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| Antimony | mg/L | 0.2 | ND | ND | ND |
| Thallium | mg/L | 0.2 | ND | ND | ND |
| CLASSICAL | | | | | |
| Alkalinity, as CaCO3 | mg/L | 1 | 190 | 170 | 30 |
| Acidity, Total | mg/L | 1 | ND | ND | 9.2 |
| Alkalinity, Bicarbonate | mg/L | 1 | 150 | 160 | 30 |
| Alkalinity, Carbonate | mg/L | 1 | 39 | 6.3 | ND |
| Hardness, Total (CACO3) | mg/L | 1 | 90 | 140 | 54 |
| Color, Platinum-Cobalt Units | | 5 | 10 | 15 | 75 |
| Solids, Total Dissolved | mg/L | 5 | 230 | 240 | 86 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 69 | 55 | 290 |
| Turbidity | NTU | 1.0 | 8.5 | 20 | 190 |
| Cyanide, Total EPA 335.2 | mg/L | 0.02 | ND | ND | ND |
| Ammonia (un-ionized) | mg/L | 0.02 | ND | ND | ND |
| Selenium EPA 270.2 | ug/L | 10 | ND | ND | ND |
| Chloride | mg/L | 1.0 | 11 | 14 | 3.2 |
| Fluoride, soluble | mg/L | 0.1 | 1.7 | 1.0 | 1.6 |
| Sulfate | mg/L | 5.0 | 5.5 | 7.8 | 27 |
| Sodium | mg/L | 1 | 22 | 20 | 3 |
| Calcium | mg/L | 0.2 | 27 | 56 | 36 |
| Magnesium | mg/L | 0.02 | 15 | 19 | 4.4 |
| Arsenic EPA 206.2 | ug/L | 10 | ND | 21 | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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902630301 TECO

| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| **INORGANIC ANALYSIS** | | | | | |
| CLASSICAL | | | | | |
| Total Anions (Calculated) | meq/L | | 1.2 | 0.68 | 2.4 |
| Total Cations (Calculated) | meq/L | | 3.5 | 5.2 | 2.4 |
| Nitrogen, Nitrate | mg/L | 1.0 | ND | ND | ND |
| Nitrogen, Nitrite | mg/L | 0.01 | ND | ND | ND |
| Nitrogen, Total Organic | mg/L | 0.3 | ND | ND | 0.58 |
| Nitrogen, Kjeldahl EPA 351.3 | mg/L | 0.3 | 0.3 | 0.3 | 0.6 |
| Phosphorus, Ortho | mg/L | 0.05 | ND | ND | 43 |
| Phosphorus, Total EPA 365.2 | mg/L | 0.05 | 0.16 | 0.20 | 12 |
| Phenol | mg/L | 0.05 | ND | ND | ND |
| Chemical Oxygen Demand | mg/L | 10 | ND | ND | ND |
| Surfactants | mg/L | 0.02 | 0.06 | 0.10 | ND |
| METALS | | | | | |
| Barium | mg/L | 0.3 | ND | ND | ND |
| Beryllium | ug/L | 10 | ND | ND | ND |
| Cadmium | ug/L | 0.8 | ND | ND | 3.8 |
| Chromium | mg/L | 0.05 | ND | ND | ND |
| Chromium, Hexavalent | mg/L | 0.04 | ND | ND | ND |
| Copper | mg/L | 0.03 | ND | ND | ND |
| Iron | mg/L | 0.3 | ND | ND | 2.3 |
| Lead EPA 239.2 | ug/L | 5 | ND | ND | 14 |
| Manganese | mg/L | 0.05 | ND | ND | ND |
| Mercury EPA 245.1 | ug/L | 0.2 | ND | ND | ND |
| Nickel | mg/L | 0.2 | ND | ND | ND |
| Silver | ug/L | 0.07 | ND | ND | ND |
| Zinc | mg/L | 0.03 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| **ORGANIC ANALYSIS** | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| 1,2-Dibromoethane | ug/L | 0.02 | ND | ND | ND |
| Acrolein | ug/L | 5.0 | ND | ND | ND |
| Acrylonitrile | ug/L | 5.0 | ND | ND | ND |
| Methoxychlor | ug/L | 100 | ND | ND | ND |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| Benzene | ug/L | 5.0 | ND | ND | ND |
| Bromodichloromethane | ug/L | 5.0 | ND | ND | ND |
| Bromoform | ug/L | 5.0 | ND | ND | ND |
| Bromomethane | ug/L | 10 | ND | ND | ND |
| Carbon Tetrachloride | ug/L | 5.0 | ND | ND | ND |
| Chlorobenzene | ug/L | 5.0 | ND | ND | ND |
| Chloroethane | ug/L | 10 | ND | ND | ND |
| 2-Chloroethylvinyl ether | ug/L | 10 | ND | ND | ND |
| Chloroform | ug/L | 5.0 | ND | ND | ND |
| Chloromethane | ug/L | 10 | ND | ND | ND |
| Dibromochloromethane | ug/L | 5.0 | ND | ND | ND |
| 1,1-Dichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,2-Dichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,1-Dichloroethylene | ug/L | 5.0 | ND | ND | ND |
| trans-1,2-Dichloroethylene | ug/L | 5.0 | ND | ND | ND |
| 1,2-Dichloropropane | ug/L | 5.0 | ND | ND | ND |
| cis-1,3-Dichloropropene | ug/L | 5.0 | ND | ND | ND |
| trans-1,3-Dichloropropene | ug/L | 5.0 | ND | ND | ND |
| Ethyl benzene | ug/L | 5.0 | ND | ND | ND |
| Methylene Chloride | ug/L | 5.0 | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | ug/L | 5.0 | ND | ND | ND |
| Tetrachloroethylene | ug/L | 5.0 | ND | ND | ND |
| Toluene | ug/L | 5.0 | ND | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 5.0 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2-Trichloroethane | ug/L | 5.0 | ND | ND | ND |
| Trichloroethylene | ug/L | 5.0 | ND | ND | ND |
| Trichlorofluoromethane | ug/L | 10 | ND | ND | ND |
| Vinyl Chloride | ug/L | 10 | ND | ND | ND |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| a-BHC | ug/L | 0.05 | ND | ND | ND |
| b-BHC | ug/L | 0.05 | ND | ND | ND |
| g-BHC | ug/L | 0.05 | ND | ND | ND |
| d-BHC | ug/L | 0.05 | ND | ND | ND |
| Heptachlor | ug/L | 0.05 | ND | ND | ND |
| Aldrin | ug/L | 0.05 | ND | ND | ND |
| Heptachlor epoxide | ug/L | 0.07 | ND | ND | ND |
| Endosulfan I | ug/L | 0.14 | ND | ND | ND |
| Dieldrin | ug/L | 0.10 | ND | ND | ND |
| Endrin | ug/L | 0.08 | ND | ND | ND |
| 4,4-DDD | ug/L | 0.3 | ND | ND | ND |
| Endosulfan II | ug/L | 0.20 | ND | ND | ND |
| 4,4-DDT | ug/L | 0.30 | ND | ND | ND |
| 4,4-DDE | ug/L | 0.10 | ND | ND | ND |
| Endrin aldehyde | ug/L | 1.0 | ND | ND | ND |
| Endosulfan sulfate | ug/L | 1.0 | ND | ND | ND |
| Chlordane | ug/L | 1.0 | ND | ND | ND |
| Toxaphene | ug/L | 3.0 | ND | ND | ND |
| PCB-1016 | ug/L | 0.5 | ND | ND | ND |
| PCB-1221 | ug/L | 0.5 | ND | ND | ND |
| PCB-1232 | ug/L | 0.5 | ND | ND | ND |
| PCB-1242 | ug/L | 0.1 | ND | ND | ND |
| PCB-1248 | ug/L | 0.1 | ND | ND | ND |
| PCB-1254 | ug/L | 0.5 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| PCB-1260 | ug/L | 0.5 | ND | ND | ND |
| CHLOROPHENOXYS EPA 515 | | | | | |
| 2,4-D | ug/L | 10 | ND | ND | ND |
| Silvex | ug/L | 1 | ND | ND | ND |
| TOTAL TRIHALOMETHANE | | | | | |
| Chloroform | ug/L | 0.4 | ND | ND | ND |
| Bromodichloromethane | ug/L | 0.6 | ND | ND | ND |
| Dibromochloromethane | ug/L | 1.0 | ND | ND | ND |
| Bromoform | ug/L | 2.0 | ND | ND | ND |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2-Trichloroethylene | ug/L | 0.9 | ND | ND | ND |
| Benzene | ug/L | 0.6 | ND | ND | ND |
| Vinyl Chloride | ug/L | 0.8 | ND | ND | ND |
| Carbon Tetrachloride | ug/L | 0.5 | ND | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 0.8 | ND | ND | ND |
| 1,2-Dichloroethane | ug/L | 1.0 | ND | ND | ND |
| 1,1-Dichloroethylene | ug/L | 0.5 | ND | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 1.0 | ND | ND | ND |
| 1,1,2,2-Tetrachloroethylene | ug/L | 0.9 | ND | ND | ND |
| CLASSICAL | | | | | |
| Total Recoverable Oil & Grease EPA413.2 | mg/L | 1 | 13 | 4.4 | ND |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Acenaphthene | ug/L | 10 | ND | ND | ND |
| Acenaphthylene | ug/L | 10 | ND | ND | ND |
| Anthracene | ug/L | 10 | ND | ND | ND |
| Benzoic Acid | ug/L | 10 | ND | ND | ND |
| Benzo(a)anthracene | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number:<br>Date Collected:<br>Date Received:<br>Parameter | Units | MDL | 90 0076550<br>05/20/91<br>05/21/91<br>GW-3 I-3 | 90 0076568<br>05/20/91<br>05/21/91<br>GW-3 I-1 | 90 0076576<br>05/20/91<br>05/21/91<br>GW-3 S-1 |
|---|---|---|---|---|---|
| ORGANIC ANALYSIS | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Benzo(a)pyrene | ug/L | 10 | ND | ND | ND |
| Benzo(b)fluoranthene | ug/L | 10 | ND | ND | ND |
| Benzo(k)fluoranthene | ug/L | 10 | ND | ND | ND |
| Benzo(g,h,i)perylene | ug/L | 10 | ND | ND | ND |
| Benzyl Alcohol | ug/L | 10 | ND | ND | ND |
| 4-Bromophenyl phenyl ether | ug/L | 10 | ND | ND | ND |
| Butyl benzyl phthalate | ug/L | 10 | ND | ND | ND |
| Bis(2-ethyl hexyl)phthalate | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroethoxy)methane | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroethyl)ether | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroisopropyl)ether | ug/L | 10 | ND | ND | ND |
| 2-Chloronaphthalene | ug/L | 10 | ND | ND | ND |
| 4-Chloroaniline | ug/L | 10 | ND | ND | ND |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | ND | ND | ND |
| Chrysene | ug/L | 10 | ND | ND | ND |
| Dibenzo(a,h)anthracene | ug/L | 10 | ND | ND | ND |
| 1,2-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 1,3-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 3,3-Dichlorobenzidine | ug/L | 10 | ND | ND | ND |
| Dibenzofuran | ug/L | 10 | ND | ND | ND |
| Diethyl phthalate | ug/L | 10 | ND | ND | ND |
| Di-n-butyl phthalate | ug/L | 10 | ND | ND | ND |
| 2,4-Dinitrotoluene | ug/L | 10 | ND | ND | ND |
| 2,6-Dinitrotoluene | ug/L | 10 | ND | ND | ND |
| Di-n-octyl phthalate | ug/L | 10 | ND | ND | ND |
| Fluoranthene | ug/L | 10 | ND | ND | ND |
| Fluorene | ug/L | 10 | ND | ND | ND |
| Hexachlorocyclopentadiene | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Hexachlorobenzene | ug/L | 10 | ND | ND | ND |
| Hexachlorobutadiene | ug/L | 10 | ND | ND | ND |
| Hexachloroethane | ug/L | 10 | ND | ND | ND |
| Indeno(1,2,3-c,d)pyrene | ug/L | 10 | ND | ND | ND |
| Isophorone | ug/L | 10 | ND | ND | ND |
| 2-Methylnaphthalene | ug/L | 10 | ND | ND | ND |
| Naphthalene | ug/L | 10 | ND | ND | ND |
| 2-Nitroaniline | ug/L | 10 | ND | ND | ND |
| 3-Nitroaniline | ug/L | 10 | ND | ND | ND |
| 4-Nitroaniline | ug/L | 10 | ND | ND | ND |
| Nitrobenzene | ug/L | 10 | ND | ND | ND |
| N-Nitrosodi-n-propylamine | ug/L | 10 | ND | ND | ND |
| N-Nitrosodiphenylamine | ug/L | 10 | ND | ND | ND |
| Phenanthrene | ug/L | 10 | ND | ND | ND |
| Pyrene | ug/L | 10 | ND | ND | ND |
| 1,2,4-Trichlorobenzene | ug/L | 10 | ND | ND | ND |
| 2-Chlorophenol | ug/L | 10 | ND | ND | ND |
| 2-Methylphenol | ug/L | 10 | ND | ND | ND |
| 4-Chloro-3-methylphenol | ug/L | 10 | ND | ND | ND |
| 4-Methylphenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dichlorophenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dimethylphenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dinitrophenol | ug/L | 10 | ND | ND | ND |
| 2-Methyl-4,6-Dinitrophenol | ug/L | 10 | ND | ND | ND |
| 2-Nitrophenol | ug/L | 10 | ND | ND | ND |
| 4-Nitrophenol | ug/L | 10 | ND | ND | ND |
| Pentachlorophenol | ug/L | 10 | ND | ND | ND |
| Phenol | ug/L | 10 | ND | ND | ND |
| 2,4,5-Trichlorophenol | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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| PACE Sample Number: | | | 90 0076550 | 90 0076568 | 90 0076576 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/20/91 | 05/20/91 | 05/20/91 |
| Date Received: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Parameter | Units | MDL | GW-3 I-3 | GW-3 I-1 | GW-3 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| 2,4,6-Trichlorophenol | ug/L | 10 | ND | ND | ND |
| Phenol-d6 - Surrogate | % | | 29 | 20 | 25 |
| 2-Fluorophenol - Surrogate | % | | 42 | 25 | 30 |
| Nitrobenzene-d5 - Surrogate | % | | 72 | 48 | 72 |
| 2-Fluorobiphenyl - Surrogate | % | | 69 | 49 | 68 |
| 2,4,6-Tribromophenol - Surrogate | % | | 68 | 48 | 44 |
| Terphenyl-d14 - Surrogate | % | | 119 | 69 | 82 |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| **SUBCONTRACT ANALYSIS** | | | | | |
| RADIONUCLIDES | | | | | |
| Radium 226 | pCi/L | 0.6 | 2.2+/-0.5 | 6.2+/-0.9 | 0.7+/-0.3 |
| Radium 228 | pCi/L | 1 | 1.4+/-1.2 | 1.4+/-3.0 | 3.4+/-3.2 |
| Gross Alpha | pCi/L | 2 | 13.5+/-6.8 | 4.8+/-6.9 | ND |
| **INORGANIC ANALYSIS** | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| Antimony | mg/L | 0.2 | ND | ND | ND |
| Thallium | mg/L | 0.2 | ND | ND | ND |
| CLASSICAL | | | | | |
| Alkalinity, as CaCO3 | mg/L | 1 | 45 | 270 | 130 |
| Acidity, Total | mg/L | 1 | 29 | 8.7 | ND |
| Alkalinity, Bicarbonate | mg/L | 1 | 45 | 270 | 130 |
| Alkalinity, Carbonate | mg/L | 1 | ND | ND | ND |
| Hardness, Total (CACO3) | mg/L | 1 | 40 | 210 | 89 |
| Color, Platinum-Cobalt Units | | 5 | 5 | 15 | 15 |
| Solids, Total Dissolved | mg/L | 5 | 70 | 320 | 280 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 24 | 42 | 16 |
| Turbidity | NTU | 1.0 | 110 | 7.4 | 49 |
| Cyanide, Total EPA 335.2 | mg/L | 0.02 | ND | ND | ND |
| Ammonia (un-ionized) | mg/L | 0.02 | ND | 0.09 | 0.04 |
| Selenium EPA 270.2 | ug/L | 10 | ND | ND | ND |
| Chloride | mg/L | 1.0 | 11 | 5.7 | 18 |
| Fluoride, soluble | mg/L | 0.1 | 0.10 | 0.53 | 1.0 |
| Sulfate | mg/L | 5.0 | ND | 5.2 | 45 |
| Sodium | mg/L | 1 | 10 | 22 | 22 |
| Calcium | mg/L | 0.2 | 19 | 55 | 14 |
| Magnesium | mg/L | 0.02 | 0.54 | 28 | 15 |
| Arsenic EPA 206.2 | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| **INORGANIC ANALYSIS** | | | | | |
| CLASSICAL | | | | | |
| Total Anions (Calculated) | meq/L | | 0.31 | 0.27 | 1.4 |
| Total Cations (Calculated) | meq/L | | 1.4 | 6.0 | 2.9 |
| Nitrogen, Nitrate | mg/L | 1.0 | ND | ND | ND |
| Nitrogen, Nitrite | mg/L | 0.01 | ND | ND | ND |
| Nitrogen, Total Organic | mg/L | 0.3 | ND | ND | ND |
| Nitrogen, Kjeldahl EPA 351.3 | mg/L | 0.3 | ND | 0.8 | 0.4 |
| Phosphorus, Ortho | mg/L | 0.05 | 0.35 | 0.05 | ND |
| Phosphorus, Total EPA 365.2 | mg/L | 0.05 | 3.9 | 0.09 | 0.33 |
| Phenol | mg/L | 0.05 | ND | ND | ND |
| Chemical Oxygen Demand | mg/L | 10 | ND | ND | 280 |
| Surfactants | mg/L | 0.020 | 0.038 | 0.063 | 0.043 |
| METALS | | | | | |
| Barium | mg/L | 0.3 | ND | ND | ND |
| Beryllium | ug/L | 10 | ND | ND | ND |
| Cadmium | ug/L | 0.8 | 1.6 | ND | 1.3 |
| Chromium | mg/L | 0.05 | ND | ND | ND |
| Chromium, Hexavalent | mg/L | 0.04 | ND | ND | ND |
| Copper | mg/L | 0.03 | ND | ND | ND |
| Iron | mg/L | 0.3 | 0.9 | ND | ND |
| Lead EPA 239.2 | ug/L | 5 | 19 | ND | 9 |
| Manganese | mg/L | 0.05 | ND | ND | ND |
| Mercury EPA 245.1 | ug/L | 0.2 | ND | ND | ND |
| Nickel | mg/L | 0.2 | ND | ND | ND |
| Silver | ug/L | 0.07 | ND | ND | ND |
| Zinc | mg/L | 0.03 | ND | ND | 0.03 |

MDL Method Detection Limit
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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| **ORGANIC ANALYSIS** | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| 1,2-Dibromoethane | ug/L | 0.02 | ND | ND | ND |
| Acrolein | ug/L | 5.0 | ND | ND | ND |
| Acrylonitrile | ug/L | 5.0 | ND | ND | ND |
| Methoxychlor | ug/L | 100 | ND | ND | ND |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| Benzene | ug/L | 5.0 | ND | ND | ND |
| Bromodichloromethane | ug/L | 5.0 | ND | ND | ND |
| Bromoform | ug/L | 5.0 | ND | ND | ND |
| Bromomethane | ug/L | 10 | ND | ND | ND |
| Carbon Tetrachloride | ug/L | 5.0 | ND | ND | ND |
| Chlorobenzene | ug/L | 5.0 | ND | ND | ND |
| Chloroethane | ug/L | 10 | ND | ND | ND |
| 2-Chloroethylvinyl ether | ug/L | 10 | ND | ND | ND |
| Chloroform | ug/L | 5.0 | ND | ND | ND |
| Chloromethane | ug/L | 10 | ND | ND | ND |
| Dibromochloromethane | ug/L | 5.0 | ND | ND | ND |
| 1,1-Dichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,2-Dichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,1-Dichloroethylene | ug/L | 5.0 | ND | ND | ND |
| trans-1,2-Dichloroethylene | ug/L | 5.0 | ND | ND | ND |
| 1,2-Dichloropropane | ug/L | 5.0 | ND | ND | ND |
| cis-1,3-Dichloropropene | ug/L | 5.0 | ND | ND | ND |
| trans-1,3-Dichloropropene | ug/L | 5.0 | ND | ND | ND |
| Ethyl benzene | ug/L | 5.0 | ND | ND | ND |
| Methylene Chloride | ug/L | 5.0 | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | ug/L | 5.0 | ND | ND | ND |
| Tetrachloroethylene | ug/L | 5.0 | ND | ND | ND |
| Toluene | ug/L | 5.0 | ND | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 5.0 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| **ORGANIC ANALYSIS** | | | | | |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2-Trichloroethane | ug/L | 5.0 | ND | ND | ND |
| Trichloroethylene | ug/L | 5.0 | ND | ND | ND |
| Trichlorofluoromethane | ug/L | 10 | ND | ND | ND |
| Vinyl Chloride | ug/L | 10 | ND | ND | ND |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| a-BHC | ug/L | 0.05 | ND | ND | ND |
| b-BHC | ug/L | 0.05 | ND | ND | ND |
| g-BHC | ug/L | 0.05 | ND | ND | ND |
| d-BHC | ug/L | 0.05 | ND | ND | ND |
| Heptachlor | ug/L | 0.05 | ND | ND | ND |
| Aldrin | ug/L | 0.05 | ND | ND | ND |
| Heptachlor epoxide | ug/L | 0.07 | ND | ND | ND |
| Endosulfan I | ug/L | 0.14 | ND | ND | ND |
| Dieldrin | ug/L | 0.10 | ND | ND | ND |
| Endrin | ug/L | 0.08 | ND | ND | ND |
| 4,4-DDD | ug/L | 0.3 | ND | ND | ND |
| Endosulfan II | ug/L | 0.20 | ND | ND | ND |
| 4,4-DDT | ug/L | 0.30 | ND | ND | ND |
| 4,4-DDE | ug/L | 0.10 | ND | ND | ND |
| Endrin aldehyde | ug/L | 1.0 | ND | ND | ND |
| Endosulfan sulfate | ug/L | 1.0 | ND | ND | ND |
| Chlordane | ug/L | 1.0 | ND | ND | ND |
| Toxaphene | ug/L | 3.0 | ND | ND | ND |
| PCB-1016 | ug/L | 0.5 | ND | ND | ND |
| PCB-1221 | ug/L | 0.5 | ND | ND | ND |
| PCB-1232 | ug/L | 0.5 | ND | ND | ND |
| PCB-1242 | ug/L | 0.1 | ND | ND | ND |
| PCB-1248 | ug/L | 0.1 | ND | ND | ND |
| PCB-1254 | ug/L | 0.5 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| ORGANIC ANALYSIS | | | | | |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| PCB-1260 | ug/L | 0.5 | ND | ND | ND |
| CHLOROPHENOXYS EPA 515 | | | | | |
| 2,4-D | ug/L | 10 | ND | ND | ND |
| Silvex | ug/L | 1 | ND | ND | ND |
| TOTAL TRIHALOMETHANE | | | | | |
| Chloroform | ug/L | 0.4 | ND | ND | ND |
| Bromodichloromethane | ug/L | 0.6 | ND | ND | ND |
| Dibromochloromethane | ug/L | 1.0 | ND | ND | ND |
| Bromoform | ug/L | 2.0 | ND | ND | ND |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2-Trichloroethylene | ug/L | 0.9 | ND | ND | ND |
| Benzene | ug/L | 0.6 | ND | ND | ND |
| Vinyl Chloride | ug/L | 0.8 | ND | ND | ND |
| Carbon Tetrachloride | ug/L | 0.5 | ND | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 0.8 | ND | ND | ND |
| 1,2-Dichloroethane | ug/L | 1.0 | ND | ND | ND |
| 1,1-Dichloroethylene | ug/L | 0.5 | ND | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 1.0 | ND | ND | ND |
| 1,1,2,2-Tetrachloroethylene | ug/L | 0.9 | ND | ND | ND |
| CLASSICAL | | | | | |
| Total Recoverable Oil & Grease EPA413.2 | mg/L | 1 | ND | 1 | 8.1 |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Acenaphthene | ug/L | 10 | ND | ND | ND |
| Acenaphthylene | ug/L | 10 | ND | ND | ND |
| Anthracene | ug/L | 10 | ND | ND | ND |
| Benzoic Acid | ug/L | 10 | ND | ND | ND |
| Benzo(a)anthracene | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| ORGANIC ANALYSIS | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Benzo(a)pyrene | ug/L | 10 | ND | ND | ND |
| Benzo(b)fluoranthene | ug/L | 10 | ND | ND | ND |
| Benzo(k)fluoranthene | ug/L | 10 | ND | ND | ND |
| Benzo(g,h,i)perylene | ug/L | 10 | ND | ND | ND |
| Benzyl Alcohol | ug/L | 10 | ND | ND | ND |
| 4-Bromophenyl phenyl ether | ug/L | 10 | ND | ND | ND |
| Butyl benzyl phthalate | ug/L | 10 | ND | ND | ND |
| Bis(2-ethyl hexyl)phthalate | ug/L | 10 | ND | ND | 25 |
| Bis(2-chloroethoxy)methane | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroethyl)ether | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroisopropyl)ether | ug/L | 10 | ND | ND | ND |
| 2-Chloronaphthalene | ug/L | 10 | ND | ND | ND |
| 4-Chloroaniline | ug/L | 10 | ND | ND | ND |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | ND | ND | ND |
| Chrysene | ug/L | 10 | ND | ND | ND |
| Dibenzo(a,h)anthracene | ug/L | 10 | ND | ND | ND |
| 1,2-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 1,3-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 3,3-Dichlorobenzidine | ug/L | 10 | ND | ND | ND |
| Dibenzofuran | ug/L | 10 | ND | ND | ND |
| Diethyl phthalate | ug/L | 10 | ND | ND | ND |
| Di-n-butyl phthalate | ug/L | 10 | ND | ND | ND |
| 2,4-Dinitrotoluene | ug/L | 10 | ND | ND | ND |
| 2,6-Dinitrotoluene | ug/L | 10 | ND | ND | ND |
| Di-n-octyl phthalate | ug/L | 10 | ND | ND | ND |
| Fluoranthene | ug/L | 10 | ND | ND | ND |
| Fluorene | ug/L | 10 | ND | ND | ND |
| Hexachlorocyclopentadiene | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| **ORGANIC ANALYSIS** | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Hexachlorobenzene | ug/L | 10 | ND | ND | ND |
| Hexachlorobutadiene | ug/L | 10 | ND | ND | ND |
| Hexachloroethane | ug/L | 10 | ND | ND | ND |
| Indeno(1,2,3-c,d)pyrene | ug/L | 10 | ND | ND | ND |
| Isophorone | ug/L | 10 | ND | ND | ND |
| 2-Methylnaphthalene | ug/L | 10 | ND | ND | ND |
| Naphthalene | ug/L | 10 | ND | ND | ND |
| 2-Nitroaniline | ug/L | 10 | ND | ND | ND |
| 3-Nitroaniline | ug/L | 10 | ND | ND | ND |
| 4-Nitroaniline | ug/L | 10 | ND | ND | ND |
| Nitrobenzene | ug/L | 10 | ND | ND | ND |
| N-Nitrosodi-n-propylamine | ug/L | 10 | ND | ND | ND |
| N-Nitrosodiphenylamine | ug/L | 10 | ND | ND | ND |
| Phenanthrene | ug/L | 10 | ND | ND | ND |
| Pyrene | ug/L | 10 | ND | ND | ND |
| 1,2,4-Trichlorobenzene | ug/L | 10 | ND | ND | ND |
| 2-Chlorophenol | ug/L | 10 | ND | ND | ND |
| 2-Methylphenol | ug/L | 10 | ND | ND | ND |
| 4-Chloro-3-methylphenol | ug/L | 10 | ND | ND | ND |
| 4-Methylphenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dichlorophenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dimethylphenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dinitrophenol | ug/L | 10 | ND | ND | ND |
| 2-Methyl-4,6-Dinitrophenol | ug/L | 10 | ND | ND | ND |
| 2-Nitrophenol | ug/L | 10 | ND | ND | ND |
| 4-Nitrophenol | ug/L | 10 | ND | ND | ND |
| Pentachlorophenol | ug/L | 10 | ND | ND | ND |
| Phenol | ug/L | 10 | ND | ND | ND |
| 2,4,5-Trichlorophenol | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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| PACE Sample Number: | | | 90 0077211 | 90 0077220 | 90 0077238 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/21/91 | 05/21/91 |
| Date Received: | | | 05/22/91 | 05/22/91 | 05/22/91 |
| Parameter | Units | MDL | GW-1 S-1 | GW-1 I-1 | GW-1 I-3 |
| ORGANIC ANALYSIS | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| 2,4,6-Trichlorophenol | ug/L | 10 | ND | ND | ND |
| Phenol-d6 - Surrogate | % | | 39 | 31 | 17 |
| 2-Fluorophenol - Surrogate | % | | 78 | 34 | 17 |
| Nitrobenzene-d5 - Surrogate | % | | 85 | 64 | 65 |
| 2-Fluorobiphenyl - Surrogate | % | | 82 | 53 | 64 |
| 2,4,6-Tribromophenol - Surrogate | % | | 79 | 66 | 21 |
| Terphenyl-d14 - Surrogate | % | | 100 | 82 | 128 |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| **SUBCONTRACT ANALYSIS** | | | | | |
| RADIONUCLIDES | | | | | |
| Radium 226 | pCi/L | 0.6 | 2.5+/-0.6 | 1.0+/-0.4 | 8.9+/-1.0 |
| Radium 228 | pCi/L | 1 | ND | ND | ND |
| Gross Alpha | pCi/L | 2 | 23.1+/-8.0 | ND | 44.0+/-6.6 |
| **INORGANIC ANALYSIS** | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| Antimony | mg/L | 0.2 | ND | ND | ND |
| Thallium | mg/L | 0.2 | ND | ND | ND |
| CLASSICAL | | | | | |
| Alkalinity, as CaCO3 | mg/L | 1 | 52 | 110 | 56 |
| Acidity, Total | mg/L | 1 | 31 | ND | 270 |
| Alkalinity, Bicarbonate | mg/L | 1 | 52 | 71 | 56 |
| Alkalinity, Carbonate | mg/L | 1 | ND | 39 | ND |
| Hardness, Total (CACO3) | mg/L | 1 | 42 | 65 | 160 |
| Color, Platinum-Cobalt Units | | 5 | 5 | 20 | 500 |
| Solids, Total Dissolved | mg/L | 5 | 87 | 220 | 200 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 47 | 33 | 64 |
| Turbidity | NTU | 1.0 | 190 | 20 | 510 |
| Cyanide, Total EPA 335.2 | mg/L | 0.02 | ND | ND | ND |
| Ammonia (un-ionized) | mg/L | 0.02 | ND | ND | ND |
| Selenium EPA 270.2 | ug/L | 10 | ND | ND | ND |
| Chloride | mg/L | 1.0 | 10 | 11 | 17 |
| Fluoride, soluble | mg/L | 0.1 | 0.1 | 0.5 | 0.3 |
| Sulfate | mg/L | 5.0 | ND | 34 | ND |
| Sodium | mg/L | 1 | 9 | 15 | 12 |
| Calcium | mg/L | 0.2 | 18 | 32 | 10 |
| Magnesium | mg/L | 0.02 | 0.52 | 13 | 15 |
| Arsenic EPA 206.2 | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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902630301 TECO

| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| INORGANIC ANALYSIS | | | | | |
| CLASSICAL | | | | | |
| Total Anions (Calculated) | meq/L | | 0.29 | 1.8 | 0.55 |
| Total Cations (Calculated) | meq/L | | 2.0 | 4.9 | 1.7 |
| Nitrogen, Nitrate | mg/L | 1.0 | ND | ND | ND |
| Nitrogen, Nitrite | mg/L | 0.01 | ND | ND | ND |
| Nitrogen, Total Organic | mg/L | 0.3 | ND | ND | 6.0 |
| Nitrogen, Kjeldahl EPA 351.3 | mg/L | 0.3 | ND | ND | 11 |
| Phosphorus, Ortho | mg/L | 0.05 | 0.15 | ND * | 1.7 * |
| Phosphorus, Total EPA 365.2 | mg/L | 0.05 | 3.8 | 0.13 | 4.6 |
| Phenol | mg/L | 0.05 | ND | ND SP | ND |
| Chemical Oxygen Demand | mg/L | 10 | ND | 390 | 120 |
| Surfactants | mg/L | 0.02 | 0.04 | 0.06 | ND |
| METALS | | | | | |
| Barium | mg/L | 0.3 | ND | ND | ND |
| Beryllium | ug/L | 10 | ND | ND | ND |
| Cadmium | ug/L | 0.8 | 1.6 | ND | ND |
| Chromium | mg/L | 0.05 | ND | ND | ND |
| Chromium, Hexavalent | mg/L | 0.04 | ND | ND | ND |
| Copper | mg/L | 0.03 | ND | ND | ND |
| Iron | mg/L | 0.3 | 0.9 | ND | 7.4 |
| Lead EPA 239.2 | ug/L | 5 | ND | ND | ND |
| Manganese | mg/L | 0.05 | ND | ND | ND |
| Mercury EPA 245.1 | ug/L | 0.2 | ND | ND | ND |
| Nickel | mg/L | 0.2 | ND | ND | ND |
| Silver | ug/L | 0.07 | ND | ND | ND |
| Zinc | mg/L | 0.03 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| ORGANIC ANALYSIS | | | | | |
| INDIVIDUAL PARAMETERS | | | | | |
| 1,2-Dibromoethane | ug/L | 0.02 | ND | ND | ND |
| Acrolein | ug/L | 5.0 | ND | ND | ND |
| Acrylonitrile | ug/L | 5.0 | ND | ND | ND |
| Methoxychlor | ug/L | 100 | ND | ND | ND |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| Benzene | ug/L | 5.0 | ND | ND | ND |
| Bromodichloromethane | ug/L | 5.0 | ND | ND | ND |
| Bromoform | ug/L | 5.0 | ND | ND | ND |
| Bromomethane | ug/L | 10 | ND | - | - |
| Bromomethane | ug/L | 10.0 | - | ND | ND |
| Carbon Tetrachloride | ug/L | 5.0 | ND | ND | ND |
| Chlorobenzene | ug/L | 5.0 | ND | ND | ND |
| Chloroethane | ug/L | 10 | ND | - | - |
| Chloroethane | ug/L | 10.0 | - | ND | ND |
| 2-Chloroethylvinyl ether | ug/L | 10 | ND | - | - |
| 2-Chloroethylvinyl ether | ug/L | 10.0 | - | ND | ND |
| Chloroform | ug/L | 5.0 | ND | ND | ND |
| Chloromethane | ug/L | 10 | ND | - | - |
| Chloromethane | ug/L | 10.0 | - | ND | ND |
| Dibromochloromethane | ug/L | 5.0 | ND | ND | ND |
| 1,1-Dichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,2-Dichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,1-Dichloroethylene | ug/L | 5.0 | ND | ND | ND |
| trans-1,2-Dichloroethylene | ug/L | 5.0 | ND | ND | ND |
| 1,2-Dichloropropane | ug/L | 5.0 | ND | ND | ND |
| cis-1,3-Dichloropropene | ug/L | 5.0 | ND | ND | ND |
| trans-1,3-Dichloropropene | ug/L | 5.0 | ND | ND | ND |
| Ethyl benzene | ug/L | 5.0 | ND | ND | ND |
| Methylene Chloride | ug/L | 5.0 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2,2-Tetrachloroethane | ug/L | 5.0 | ND | ND | ND |
| Tetrachloroethylene | ug/L | 5.0 | ND | ND | ND |
| Toluene | ug/L | 5.0 | ND | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 5.0 | ND | ND | ND |
| 1,1,2-Trichloroethane | ug/L | 5.0 | ND | ND | ND |
| Trichloroethylene | ug/L | 5.0 | ND | ND | ND |
| Trichlorofluoromethane | ug/L | 10 | ND | - | - |
| Trichlorofluoromethane | ug/L | 10.0 | - | ND | ND |
| Vinyl Chloride | ug/L | 10 | ND | - | - |
| Vinyl Chloride | ug/L | 10.0 | - | ND | ND |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| a-BHC | ug/L | 0.05 | ND | ND | ND |
| b-BHC | ug/L | 0.05 | ND | ND | ND |
| g-BHC | ug/L | 0.05 | ND | ND | ND |
| d-BHC | ug/L | 0.05 | ND | ND | ND |
| Heptachlor | ug/L | 0.05 | ND | ND | ND |
| Aldrin | ug/L | 0.05 | ND | ND | ND |
| Heptachlor epoxide | ug/L | 0.07 | ND | ND | ND |
| Endosulfan I | ug/L | 0.14 | ND | ND | ND |
| Dieldrin | ug/L | 0.10 | ND | ND | ND |
| Endrin | ug/L | 0.08 | ND | ND | ND |
| 4,4-DDD | ug/L | 0.3 | ND | ND | ND |
| Endosulfan II | ug/L | 0.20 | ND | ND | ND |
| 4,4-DDT | ug/L | 0.30 | ND | ND | ND |
| 4,4-DDE | ug/L | 0.10 | ND | ND | ND |
| Endrin aldehyde | ug/L | 1.0 | ND | ND | ND |
| Endosulfan sulfate | ug/L | 1.0 | ND | ND | ND |
| Chlordane | ug/L | 1.0 | ND | ND | ND |
| Toxaphene | ug/L | 3.0 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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July 19, 1991
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902630301 TECO

| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | | |
| PCB-1016 | ug/L | 0.5 | ND | ND | ND |
| PCB-1221 | ug/L | 0.5 | ND | ND | ND |
| PCB-1232 | ug/L | 0.5 | ND | ND | ND |
| PCB-1242 | ug/L | 0.1 | ND | ND | ND |
| PCB-1248 | ug/L | 0.1 | ND | ND | ND |
| PCB-1254 | ug/L | 0.5 | ND | ND | ND |
| PCB-1260 | ug/L | 0.5 | ND | ND | ND |
| CHLOROPHENOXYS EPA 515 | | | | | |
| 2,4-D | ug/L | 10 | ND | ND | ND |
| Silvex | ug/L | 1 | ND | ND | ND |
| TOTAL TRIHALOMETHANE | | | | | |
| Chloroform | ug/L | 0.4 | ND | ND | - |
| Chloroform | ug/L | 0.80 | - | - | ND |
| Bromodichloromethane | ug/L | 0.6 | ND | ND | - |
| Bromodichloromethane | ug/L | 1.2 | - | - | ND |
| Dibromochloromethane | ug/L | 1.0 | ND | ND | - |
| Dibromochloromethane | ug/L | 2.0 | - | - | ND |
| Bromoform | ug/L | 2.0 | ND | ND | - |
| Bromoform | ug/L | 4.0 | - | - | ND |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | | |
| 1,1,2-Trichloroethylene | ug/L | 0.9 | ND | ND | - |
| 1,1,2-Trichloroethylene | ug/L | 1.8 | - | - | ND |
| Benzene | ug/L | 0.6 | ND | ND | - |
| Benzene | ug/L | 1.2 | - | - | ND |
| Vinyl Chloride | ug/L | 0.8 | ND | ND | - |
| Vinyl Chloride | ug/L | 1.6 | - | - | ND |
| Carbon Tetrachloride | ug/L | 0.5 | ND | ND | - |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| ORGANIC ANALYSIS | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Bis(2-chloroethyl)ether | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroisopropyl)ether | ug/L | 10 | ND | ND | ND |
| 2-Chloronaphthalene | ug/L | 10 | ND | ND | ND |
| 4-Chloroaniline | ug/L | 10 | ND | ND | ND |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | ND | ND | ND |
| Chrysene | ug/L | 10 | ND | ND | ND |
| Dibenzo(a,h)anthracene | ug/L | 10 | ND | ND | ND |
| 1,2-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 1,3-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 10 | ND | ND | ND |
| 3,3-Dichlorobenzidine | ug/L | 10 | ND | ND | ND |
| Dibenzofuran | ug/L | 10 | ND | ND | ND |
| Diethyl phthalate | ug/L | 10 | ND | ND | ND |
| Di-n-butyl phthalate | ug/L | 10 | ND | ND | ND |
| 2,4-Dinitrotoluene | ug/L | 10 | ND | ND | ND |
| 2,6-Dinitrotoluene | ug/L | 10 | ND | ND | ND |
| Di-n-octyl phthalate | ug/L | 10 | ND | ND | ND |
| Fluoranthene | ug/L | 10 | ND | ND | ND |
| Fluorene | ug/L | 10 | ND | ND | ND |
| Hexachlorocyclopentadiene | ug/L | 10 | ND | ND | ND |
| Hexachlorobenzene | ug/L | 10 | ND | ND | ND |
| Hexachlorobutadiene | ug/L | 10 | ND | ND | ND |
| Hexachloroethane | ug/L | 10 | ND | ND | ND |
| Indeno(1,2,3-c,d)pyrene | ug/L | 10 | ND | ND | ND |
| Isophorone | ug/L | 10 | ND | ND | ND |
| 2-Methylnaphthalene | ug/L | 10 | ND | ND | ND |
| Naphthalene | ug/L | 10 | ND | ND | ND |
| 2-Nitroaniline | ug/L | 10 | ND | ND | ND |
| 3-Nitroaniline | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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# REPORT OF LABORATORY ANALYSIS

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| **ORGANIC ANALYSIS** | | | | | |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | | |
| Carbon Tetrachloride | ug/L | 1.0 | - | - | ND |
| 1,1,1-Trichloroethane | ug/L | 0.8 | ND | ND | - |
| 1,1,1-Trichloroethane | ug/L | 1.6 | - | - | ND |
| 1,2-Dichloroethane | ug/L | 1.0 | ND | ND | - |
| 1,2-Dichloroethane | ug/L | 2.0 | - | - | ND |
| 1,1-Dichloroethylene | ug/L | 0.5 | ND | ND | - |
| 1,1-Dichloroethylene | ug/L | 1.0 | - | - | ND |
| 1,4-Dichlorobenzene | ug/L | 1.0 | ND | ND | - |
| 1,4-Dichlorobenzene | ug/L | 2.0 | - | - | ND |
| 1,1,2,2-Tetrachloroethylene | ug/L | 0.9 | ND | ND | - |
| 1,1,2,2-Tetrachloroethylene | ug/L | 1.8 | - | - | ND |
| CLASSICAL | | | | | |
| Total Recoverable Oil & Grease EPA413.2 | mg/L | 1 | ND | 12 | ND |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| Acenaphthene | ug/L | 10 | ND | ND | ND |
| Acenaphthylene | ug/L | 10 | ND | ND | ND |
| Anthracene | ug/L | 10 | ND | ND | ND |
| Benzoic Acid | ug/L | 10 | ND | ND | ND |
| Benzo(a)anthracene | ug/L | 10 | ND | ND | ND |
| Benzo(a)pyrene | ug/L | 10 | ND | ND | ND |
| Benzo(b)fluoranthene | ug/L | 10 | ND | ND | ND |
| Benzo(k)fluoranthene | ug/L | 10 | ND | ND | ND |
| Benzo(g,h,i)perylene | ug/L | 10 | ND | ND | ND |
| Benzyl Alcohol | ug/L | 10 | ND | ND | ND |
| 4-Bromophenyl phenyl ether | ug/L | 10 | ND | ND | ND |
| Butyl benzyl phthalate | ug/L | 10 | ND | ND | ND |
| Bis(2-ethyl hexyl)phthalate | ug/L | 10 | ND | ND | ND |
| Bis(2-chloroethoxy)methane | ug/L | 10 | ND | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003: Florida SDWA: HRS #84125

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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| Parameter | Units | MDL | 90 0077246 | 90 0078161 | 90 0078170 |
|---|---|---|---|---|---|
| PACE Sample Number: | | | 90 0077246 | 90 0078161 | 90 0078170 |
| Date Collected: | | | 05/21/91 | 05/22/91 | 05/22/91 |
| Date Received: | | | 05/22/91 | 05/23/91 | 05/23/91 |
| Parameter | Units | MDL | Duplicate | GW-1 F-1 | GW-2 S-1 |
| **ORGANIC ANALYSIS** | | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | | |
| 4-Nitroaniline | ug/L | 10 | ND | ND | ND |
| Nitrobenzene | ug/L | 10 | ND | ND | ND |
| N-Nitrosodi-n-propylamine | ug/L | 10 | ND | ND | ND |
| N-Nitrosodiphenylamine | ug/L | 10 | ND | ND | ND |
| Phenanthrene | ug/L | 10 | ND | ND | ND |
| Pyrene | ug/L | 10 | ND | ND | ND |
| 1,2,4-Trichlorobenzene | ug/L | 10 | ND | ND | ND |
| 2-Chlorophenol | ug/L | 10 | ND | ND | ND |
| 2-Methylphenol | ug/L | 10 | ND | ND | ND |
| 4-Chloro-3-methylphenol | ug/L | 10 | ND | ND | ND |
| 4-Methylphenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dichlorophenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dimethylphenol | ug/L | 10 | ND | ND | ND |
| 2,4-Dinitrophenol | ug/L | 10 | ND | ND | ND |
| 2-Methyl-4,6-Dinitrophenol | ug/L | 10 | ND | ND | ND |
| 2-Nitrophenol | ug/L | 10 | ND | ND | ND |
| 4-Nitrophenol | ug/L | 10 | ND | ND | ND |
| Pentachlorophenol | ug/L | 10 | ND | ND | ND |
| Phenol | ug/L | 10 | ND | ND | ND |
| 2,4,5-Trichlorophenol | ug/L | 10 | ND | ND | ND |
| 2,4,6-Trichlorophenol | ug/L | 10 | ND | ND | ND |
| Phenol-d6 - Surrogate | % | | 36 | 26 | 14 |
| 2-Fluorophenol - Surrogate | % | | 46 | 32 | 45 |
| Nitrobenzene-d5 - Surrogate | % | | 69 | 60 | 87 |
| 2-Fluorobiphenyl - Surrogate | % | | 64 | 65 | 83 |
| 2,4,6-Tribromophenol - Surrogate | % | | 68 | 34 | 38 |
| Terphenyl-d14 - Surrogate | % | | 92 | 55 | 104 |

MDL Method Detection Limit
ND Not detected at or above the MDL.

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PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
|---|---|---|---|---|
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
| SUBCONTRACT ANALYSIS | | | | |
| RADIONUCLIDES | | | | |
| Radium 226 | pCi/L | 0.6 | 0.6+/-0.3 | 1.2+/-0.4 |
| Radium 228 | pCi/L | 1 | ND | ND |
| Gross Alpha | pCi/L | 2 | ND | ND |
| INORGANIC ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Antimony | mg/L | 0.2 | ND | ND |
| Thallium | mg/L | 0.2 | ND | ND |
| CLASSICAL | | | | |
| Alkalinity, as CaCO3 | mg/L | 1 | 150 | 690 |
| Acidity, Total | mg/L | 1 | ND | ND |
| Alkalinity, Bicarbonate | mg/L | 1 | 150 | ND |
| Alkalinity, Carbonate | mg/L | 1 | ND | 480 |
| Hardness, Total (CACO3) | mg/L | 1 | 140 | 93 |
| Color, Platinum-Cobalt Units | | 5 | 20 | 10 |
| Solids, Total Dissolved | mg/L | 5 | 270 | 600 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | ND | 40 |
| Turbidity | NTU | 1.0 | ND | 15 |
| Cyanide, Total EPA 335.2 | mg/L | 0.02 | ND | ND |
| Ammonia (un-ionized) | mg/L | 0.02 | 0.02 | ND |
| Selenium EPA 270.2 | ug/L | 10 | ND | ND |
| Chloride | mg/L | 1.0 | 16 | 23 |
| Fluoride, soluble | mg/L | 0.1 | 1.0 | 0.81 |
| Sulfate | mg/L | 5.0 | 38 | 54 |
| Sodium | mg/L | 1 | 30 | 58 |
| Calcium | mg/L | 0.2 | 30 | 10 |
| Magnesium | mg/L | 0.02 | 15 | 3.1 |
| Arsenic EPA 206.2 | ug/L | 10 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

# REPORT OF LABORATORY ANALYSIS

pace INCORPORATED
THE ASSURANCE OF QUALITY



July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
|---|---|---|---|---|
| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| **ORGANIC ANALYSIS** | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| 1,2-Dibromoethane | ug/L | 0.02 | ND | ND |
| Acrolein | ug/L | 5.0 | ND | ND |
| Acrylonitrile | ug/L | 5.0 | ND | ND |
| Methoxychlor | ug/L | 100 | ND | ND |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | |
| Benzene | ug/L | 5.0 | ND | ND |
| Bromodichloromethane | ug/L | 5.0 | ND | ND |
| Bromoform | ug/L | 5.0 | ND | ND |
| Bromomethane | ug/L | 10.0 | ND | ND |
| Carbon Tetrachloride | ug/L | 5.0 | ND | ND |
| Chlorobenzene | ug/L | 5.0 | ND | ND |
| Chloroethane | ug/L | 10.0 | ND | ND |
| 2-Chloroethylvinyl ether | ug/L | 10.0 | ND | ND |
| Chloroform | ug/L | 5.0 | ND | ND |
| Chloromethane | ug/L | 10.0 | ND | ND |
| Dibromochloromethane | ug/L | 5.0 | ND | ND |
| 1,1-Dichloroethane | ug/L | 5.0 | ND | ND |
| 1,2-Dichloroethane | ug/L | 5.0 | ND | ND |
| 1,1-Dichloroethylene | ug/L | 5.0 | ND | ND |
| trans-1,2-Dichloroethylene | ug/L | 5.0 | ND | ND |
| 1,2-Dichloropropane | ug/L | 5.0 | ND | ND |
| cis-1,3-Dichloropropene | ug/L | 5.0 | ND | ND |
| trans-1,3-Dichloropropene | ug/L | 5.0 | ND | ND |
| Ethyl benzene | ug/L | 5.0 | ND | ND |
| Methylene Chloride | ug/L | 5.0 | ND | ND |
| 1,1,2,2-Tetrachloroethane | ug/L | 5.0 | ND | ND |
| Tetrachloroethylene | ug/L | 5.0 | ND | ND |
| Toluene | ug/L | 5.0 | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 5.0 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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Mr. Brad Pekas
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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
|---|---|---|---|---|
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
| ORGANIC ANALYSIS | | | | |
| 624 - VOLATILE ORGANIC COMPOUNDS | | | | |
| 1,1,2-Trichloroethane | ug/L | 5.0 | ND | ND |
| Trichloroethylene | ug/L | 5.0 | ND | ND |
| Trichlorofluoromethane | ug/L | 10.0 | ND | ND |
| Vinyl Chloride | ug/L | 10.0 | ND | ND |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | |
| a-BHC | ug/L | 0.05 | ND | ND |
| b-BHC | ug/L | 0.05 | ND | ND |
| g-BHC | ug/L | 0.05 | ND | ND |
| d-BHC | ug/L | 0.05 | ND | ND |
| Heptachlor | ug/L | 0.05 | ND | ND |
| Aldrin | ug/L | 0.05 | ND | ND |
| Heptachlor epoxide | ug/L | 0.07 | ND | ND |
| Endosulfan I | ug/L | 0.14 | ND | ND |
| Dieldrin | ug/L | 0.10 | ND | ND |
| Endrin | ug/L | 0.08 | ND | ND |
| 4,4-DDD | ug/L | 0.3 | ND | ND |
| Endosulfan II | ug/L | 0.20 | ND | ND |
| 4,4-DDT | ug/L | 0.30 | ND | ND |
| 4,4-DDE | ug/L | 0.10 | ND | ND |
| Endrin aldehyde | ug/L | 1.0 | ND | ND |
| Endosulfan sulfate | ug/L | 1.0 | ND | ND |
| Chlordane | ug/L | 1.0 | ND | ND |
| Toxaphene | ug/L | 3.0 | ND | ND |
| PCB-1016 | ug/L | 0.5 | ND | ND |
| PCB-1221 | ug/L | 0.5 | ND | ND |
| PCB-1232 | ug/L | 0.5 | ND | ND |
| PCB-1242 | ug/L | 0.1 | ND | ND |
| PCB-1248 | ug/L | 0.1 | ND | ND |
| PCB-1254 | ug/L | 0.5 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
|---|---|---|---|---|
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
| ORGANIC ANALYSIS | | | | |
| 608 - ORGANOCHLORINE PESTICIDES AND PCBS | | | | |
| PCB-1260 | ug/L | 0.5 | ND | ND |
| CHLOROPHENOXYS EPA 515 | | | | |
| 2,4-D | ug/L | 10 | ND | ND |
| Silvex | ug/L | 1 | ND | ND |
| TOTAL TRIHALOMETHANE | | | | |
| Chloroform | ug/L | 0.4 | ND | ND |
| Bromodichloromethane | ug/L | 0.6 | ND | ND |
| Dibromochloromethane | ug/L | 1.0 | ND | ND |
| Bromoform | ug/L | 2.0 | ND | ND |
| LOW LEVEL VOLATILE ORGANIC COMPOUNDS | | | | |
| 1,1,2-Trichloroethylene | ug/L | 0.9 | ND | ND |
| Benzene | ug/L | 0.6 | ND | ND |
| Vinyl Chloride | ug/L | 0.8 | ND | ND |
| Carbon Tetrachloride | ug/L | 0.5 | ND | ND |
| 1,1,1-Trichloroethane | ug/L | 0.8 | ND | ND |
| 1,2-Dichloroethane | ug/L | 1.0 | ND | ND |
| 1,1-Dichloroethylene | ug/L | 0.5 | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 1.0 | ND | ND |
| 1,1,2,2-Tetrachloroethylene | ug/L | 0.9 | ND | ND |
| CLASSICAL | | | | |
| Total Recoverable Oil & Grease EPA413.2 | mg/L | 1 | ND | 1.5 |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | |
| Acenaphthene | ug/L | 10 | ND | ND |
| Acenaphthylene | ug/L | 10 | ND | ND |
| Anthracene | ug/L | 10 | ND | ND |
| Benzoic Acid | ug/L | 10 | ND | ND |
| Benzo(a)anthracene | ug/L | 10 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 39

July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
|---|---|---|---|---|
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
| **ORGANIC ANALYSIS** | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | |
| Benzo(a)pyrene | ug/L | 10 | ND | ND |
| Benzo(b)fluoranthene | ug/L | 10 | ND | ND |
| Benzo(k)fluoranthene | ug/L | 10 | ND | ND |
| Benzo(g,h,i)perylene | ug/L | 10 | ND | ND |
| Benzyl Alcohol | ug/L | 10 | ND | ND |
| 4-Bromophenyl phenyl ether | ug/L | 10 | ND | ND |
| Butyl benzyl phthalate | ug/L | 10 | ND | ND |
| Bis(2-ethyl hexyl)phthalate | ug/L | 10 | ND | ND |
| Bis(2-chloroethoxy)methane | ug/L | 10 | ND | ND |
| Bis(2-chloroethyl)ether | ug/L | 10 | ND | ND |
| Bis(2-chloroisopropyl)ether | ug/L | 10 | ND | ND |
| 2-Chloronaphthalene | ug/L | 10 | ND | ND |
| 4-Chloroaniline | ug/L | 10 | ND | ND |
| 4-Chlorophenyl phenyl ether | ug/L | 10 | ND | ND |
| Chrysene | ug/L | 10 | ND | ND |
| Dibenzo(a,h)anthracene | ug/L | 10 | ND | ND |
| 1,2-Dichlorobenzene | ug/L | 10 | ND | ND |
| 1,3-Dichlorobenzene | ug/L | 10 | ND | ND |
| 1,4-Dichlorobenzene | ug/L | 10 | ND | ND |
| 3,3-Dichlorobenzidine | ug/L | 10 | ND | ND |
| Dibenzofuran | ug/L | 10 | ND | ND |
| Diethyl phthalate | ug/L | 10 | ND | ND |
| Di-n-butyl phthalate | ug/L | 10 | ND | ND |
| 2,4-Dinitrotoluene | ug/L | 10 | ND | ND |
| 2,6-Dinitrotoluene | ug/L | 10 | ND | ND |
| Di-n-octyl phthalate | ug/L | 10 | ND | ND |
| Fluoranthene | ug/L | 10 | ND | ND |
| Fluorene | ug/L | 10 | ND | ND |
| Hexachlorocyclopentadiene | ug/L | 10 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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# REPORT OF LABORATORY ANALYSIS

pace INCORPORATED
THE ASSURANCE OF QUALITY

Mr. Brad Pekas
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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
|---|---|---|---|---|
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
| INORGANIC ANALYSIS | | | | |
| CLASSICAL | | | | |
| Total Anions (Calculated) | meq/L | | 1.3 | 1.8 |
| Total Cations (Calculated) | meq/L | | 4.0 | 3.3 |
| Nitrogen, Nitrate | mg/L | 1.0 | ND | ND |
| Nitrogen, Nitrite | mg/L | 0.01 | ND | 0.02 |
| Nitrogen, Total Organic | mg/L | 0.3 | 0.47 | ND |
| Nitrogen, Kjeldahl EPA 351.3 | mg/L | 0.3 | 0.7 | ND |
| Phosphorus, Ortho | mg/L | 0.05 | 0.15 * | ND |
| Phosphorus, Total EPA 365.2 | mg/L | 0.05 | 0.17 | 0.53 |
| Phenol | mg/L | 0.05 | 0.08 SP | ND |
| Chemical Oxygen Demand | mg/L | 10 | 16 | 57 |
| Surfactants | mg/L | 0.02 | 0.02 | 0.04 |
| METALS | | | | |
| Barium | mg/L | 0.3 | ND | ND |
| Beryllium | ug/L | 10 | ND | ND |
| Cadmium | ug/L | 0.8 | ND | ND |
| Chromium | mg/L | 0.05 | ND | ND |
| Chromium, Hexavalent | mg/L | 0.04 | ND | ND |
| Copper | mg/L | 0.03 | ND | ND |
| Iron | mg/L | 0.3 | ND | ND |
| Lead EPA 239.2 | ug/L | 5 | ND | ND |
| Manganese | mg/L | 0.05 | ND | ND |
| Mercury EPA 245.1 | ug/L | 0.2 | ND | ND |
| Nickel | mg/L | 0.2 | ND | ND |
| Silver | ug/L | 0.07 | ND | ND |
| Zinc | mg/L | 0.03 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Mr. Brad Pekas
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July 19, 1991
PACE Project Number: 210516508

902630301 TECO

| PACE Sample Number: | | | 90 0078188 | 90 0079273 |
|---|---|---|---|---|
| Date Collected: | | | 05/22/91 | 05/23/91 |
| Date Received: | | | 05/23/91 | 05/24/91 |
| Parameter | Units | MDL | GW-2 I-1 | GW-2 I-3 |
| **ORGANIC ANALYSIS** | | | | |
| 8270 SEMIVOLATILE ORGANIC COMPOUNDS | | | | |
| Hexachlorobenzene | ug/L | 10 | ND | ND |
| Hexachlorobutadiene | ug/L | 10 | ND | ND |
| Hexachloroethane | ug/L | 10 | ND | ND |
| Indeno(1,2,3-c,d)pyrene | ug/L | 10 | ND | ND |
| Isophorone | ug/L | 10 | ND | ND |
| 2-Methylnaphthalene | ug/L | 10 | ND | ND |
| Naphthalene | ug/L | 10 | ND | ND |
| 2-Nitroaniline | ug/L | 10 | ND | ND |
| 3-Nitroaniline | ug/L | 10 | ND | ND |
| 4-Nitroaniline | ug/L | 10 | ND | ND |
| Nitrobenzene | ug/L | 10 | ND | ND |
| N-Nitrosodi-n-propylamine | ug/L | 10 | ND | ND |
| N-Nitrosodiphenylamine | ug/L | 10 | ND | ND |
| Phenanthrene | ug/L | 10 | ND | ND |
| Pyrene | ug/L | 10 | ND | ND |
| 1,2,4-Trichlorobenzene | ug/L | 10 | ND | ND |
| 2-Chlorophenol | ug/L | 10 | ND | ND |
| 2-Methylphenol | ug/L | 10 | ND | ND |
| 4-Chloro-3-methylphenol | ug/L | 10 | ND | ND |
| 4-Methylphenol | ug/L | 10 | ND | ND |
| 2,4-Dichlorophenol | ug/L | 10 | ND | ND |
| 2,4-Dimethylphenol | ug/L | 10 | ND | ND |
| 2,4-Dinitrophenol | ug/L | 10 | ND | ND |
| 2-Methyl-4,6-Dinitrophenol | ug/L | 10 | ND | ND |
| 2-Nitrophenol | ug/L | 10 | ND | ND |
| 4-Nitrophenol | ug/L | 10 | ND | ND |
| Pentachlorophenol | ug/L | 10 | ND | ND |
| Phenol | ug/L | 10 | ND | ND |
| 2,4,5-Trichlorophenol | ug/L | 10 | ND | ND |

MDL Method Detection Limit
ND Not detected at or above the MDL.

# 11.7.4 LABORATORY RESULTS FOR WATER/ GROUNDWATER SAMPLING--MARCH 1992

pace INCORPORATED
THE ASSURANCE OF QUALITY

REC'D JUN 05 1992

# REPORT OF LABORATORY ANALYSIS

May 06, 1992

Mr. Brad Pekas
Environmental Consulting & Technology
5405 Cypress Center Drive
Suite 200
Tampa, FL 33609

RE: PACE Project No. 220316.501
Client Reference: Filter Test

Dear Mr. Pekas:

Enclosed is the report of laboratory analyses for samples received March 10, 1992.

Bottles were received containing Mine Pond Water (16 Liters), Mine Cut (4 containers) and Aquifer Material (6 containers). The following procedure was performed.

A 1:4 mixture of Mine Cut to Pond Water was mixed and stirred for 18 hours. Then the following occurred:

Sample 1 - Mine Pond Water

A sample of the unfiltered pond water was analyzed for total solids, total suspended solids, gross alpha, radium 226 and radium 228.

Sample 2 - Elutrate (Pond Water and Mine Cut after Agitation)

Aliquot taken unfiltered and was analyzed for total solids, total suspended solids, gross alpha, radium 226 and radium 228.

Sample 3 - Filtered Elutrate (Pond Water and Mine Cut after Agitation)

Filtered through a 0.45 micron filter then analyzed for total solids, total suspended solids, gross alpha, radium 226 and radium 228.

Mr. Brad Pekas
Environmental Consulting & Technology

Sample 4 - Extraction Leachate (Elutrate Filtered through the Aquifer Material)

Sample was unfiltered and analyzed for total solids, total suspended solids, gross alpha, radium 226 and radium 228.

Sample 5 - Filtered Extraction Leachate (Sample 5 Filtered through a 0.45 Micron Filter)

Analyzed for total solids, total suspended solids, gross alpha, radium 226 and radium 228.

Sample 6 - Control Leachate (DI Water Passed through the Aquifer Material)

Unfiltered aliquot was analyzed for total solids, total suspended solids, gross alpha, radium 226 and radium 228.

A sample duplicate was not run on the extraction lechate. A filtered control was not taken.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Michael F. Valder
Project Manager

Enclosures

pace INCORPORATED THE ASSURANCE OF QUALITY

# REPORT OF LABORATORY ANALYSIS

Environmental Consulting & Technology
5405 Cypress Center Drive
Suite 200
Tampa, FL 33609

May 08, 1992
PACE Project Number: 220316501

Attn: Mr. Brad Pekas

Client Reference: Filter Test

PACE Sample Number: 90 0035160
Date Collected: 03/03/92
Date Received: 03/04/92
Client Sample ID: Sample #1

| Parameter | Units | MDL | | DATE ANALYZED |
|---|---|---|---|---|
| SUBCONTRACT ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Gross Alpha | pCi/L | 0.1 | 3.5+/-2.6 | 04/08/92 |
| Radium 226 | pCi/L | 0.3 | 0.8+/-1.3 | 04/08/92 |
| Radium 228 | pCi/L | 0.3 | ND+/-1.1 | 04/07/92 |
| INORGANIC ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Solids, Total | mg/L | 5 | 360 | 03/17/92 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 12 | 03/18/92 |

MDL Method Detection Limit

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 2

May 08, 1992
PACE Project Number: 220316501

Client Reference: Filter Test

| | | | | |
|---|---|---|---|---|
| PACE Sample Number: | | | 90 0035179 | |
| Date Collected: | | | 03/03/92 | |
| Date Received: | | | 03/04/92 | |
| Client Sample ID: | | | Sample #2 | |
| Parameter | Units | MDL | | DATE ANALYZED |
| SUBCONTRACT ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Gross Alpha | pCi/L | 0.1 | 2990+/-517 | 04/08/92 |
| Radium 226 | pCi/L | 0.3 | 15.4+/-3.4 | 04/08/92 |
| Radium 228 | pCi/L | 0.3 | 0.3+/-1 | 04/07/92 |
| INORGANIC ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Solids, Total | mg/L | 5 | 49000 | 03/17/92 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 70000 | 03/18/92 |

MDL Method Detection Limit

**pace** INCORPORATED THE ASSURANCE OF QUALITY

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 3

May 08, 1992
PACE Project Number: 220316501

Client Reference: Filter Test

| | | | | |
|---|---|---|---|---|
| PACE Sample Number: | | | 90 0035187 | |
| Date Collected: | | | 03/03/92 | |
| Date Received: | | | 03/04/92 | |
| Client Sample ID: | | | Sample #3 | |
| Parameter | Units | MDL | | DATE ANALYZED |
| SUBCONTRACT ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Gross Alpha | pCi/L | 0.1 | 2.1+/-3.1 | 04/08/92 |
| Radium 226 | pCi/L | 0.3 | 1.4+/-1.4 | 04/08/92 |
| Radium 228 | pCi/L | 0.3 | ND+/-1 | 04/07/92 |
| INORGANIC ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Solids, Total | mg/L | 5 | 330 | 03/17/92 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | ND | 03/18/92 |

MDL Method Detection Limit
ND Not detected at or above the MDL.

Lab Certification: Florida Environmental: HRS #E84003; Florida SDWA: HRS #84125

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FAX: 813-888-6382

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
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May 08, 1992
PACE Project Number: 220316501

Client Reference: Filter Test

| | | | | |
|---|---|---|---|---|
| PACE Sample Number: | | | 90 0035195 | |
| Date Collected: | | | 03/03/92 | |
| Date Received: | | | 03/04/92 | |
| Client Sample ID: | | | Sample #4 | |
| Parameter | Units | MDL | | DATE ANALYZED |
| SUBCONTRACT ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Gross Alpha | pCi/L | 0.1 | 450+/-125 | 04/08/92 |
| Radium 226 | pCi/L | 0.3 | 23.6+/-4 | 04/08/92 |
| Radium 228 | pCi/L | 0.3 | 6.4+/-1.2 | 04/07/92 |
| INORGANIC ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Solids, Total | mg/L | 5 | 14000 | 03/17/92 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 6200 | 03/18/92 |

MDL Method Detection Limit

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 5

May 08, 1992
PACE Project Number: 220316501

Client Reference: Filter Test

| Parameter | Units | MDL | | DATE ANALYZED |
|---|---|---|---|---|
| PACE Sample Number: | | | 90 0035209 | |
| Date Collected: | | | 03/03/92 | |
| Date Received: | | | 03/04/92 | |
| Client Sample ID: | | | Sample #5 | |
| **SUBCONTRACT ANALYSIS** | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Gross Alpha | pCi/L | 0.1 | 1.1+/-2.4 | 04/08/92 |
| Radium 226 | pCi/L | 0.3 | 2.2+/-1.8 | 04/08/92 |
| Radium 228 | pCi/L | 0.3 | ND+/-1 | 04/07/92 |
| **INORGANIC ANALYSIS** | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Solids, Total | mg/L | 5 | 300 | 03/17/92 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | ND | 03/18/92 |

MDL Method Detection Limit
ND Not detected at or above the MDL.

**pace** INCORPORATED
THE ASSURANCE OF QUALITY

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas
Page 6

May 08, 1992
PACE Project Number: 220316501

Client Reference: Filter Test

| | | | | |
|---|---|---|---|---|
| PACE Sample Number: | | | 90 0035217 | |
| Date Collected: | | | 03/03/92 | |
| Date Received: | | | 03/04/92 | |
| Client Sample ID: | | | Control | |
| Parameter | Units | MDL | | DATE ANALYZED |
| SUBCONTRACT ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Gross Alpha | pCi/L | 0.1 | 191+/-37.6 | 04/08/92 |
| Radium 226 | pCi/L | 0.3 | 12.7+/-3.4 | 04/08/92 |
| Radium 228 | pCi/L | 0.3 | 0.8+/-1.1 | 04/07/92 |
| INORGANIC ANALYSIS | | | | |
| INDIVIDUAL PARAMETERS | | | | |
| Solids, Total | mg/L | 5 | 2800 | 03/17/92 |
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 1800 | 03/18/92 |

MDL Method Detection Limit

These data have been reviewed and are approved for release.

Michael F. Valder

Michael F. Valder
Manager, Inorganic Chemistry

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas QUALITY CONTROL DATA May 08, 1992
Page 7 PACE Project Number: 220316501

Client Reference: Filter Test

Solids, Total
Batch: 90 24351
Samples: 90 0035160, 90 0035179, 90 0035187, 90 0035195, 90 0035209
90 0035217

METHOD BLANK AND SAMPLE DUPLICATE:

| Parameter | Units | MDL | Method Blank | 90 0035160 Sample #1 | Duplicate of 90 0035160 | RPD |
|---|---|---|---|---|---|---|
| Solids, Total | mg/L | 5 | ND | 360 | 360 | 0% |

LABORATORY CONTROL SAMPLE:

| Parameter | Units | MDL | Reference Value | Recv |
|---|---|---|---|---|
| Solids, Total | mg/L | 5 | 569 | 102% |

MDL Method Detection Limit
RPD Relative Percent Difference



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Tampa, FL 33634
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FAX: 813-888-6382

# REPORT OF LABORATORY ANALYSIS

Mr. Brad Pekas QUALITY CONTROL DATA May 08, 1992
Page 8 PACE Project Number: 220316501

Client Reference: Filter Test

Solids, Total Suspended EPA 160.2
Batch: 90 24411
Samples: 90 0035160, 90 0035179, 90 0035187, 90 0035195, 90 0035209
90 0035217

METHOD BLANK AND SAMPLE DUPLICATE:

| Parameter | Units | MDL | Method Blank | 90 0035160 Sample #1 | Duplicate of 90 0035160 | RPD |
|---|---|---|---|---|---|---|
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | ND | 12 | 9 | 29% |

LABORATORY CONTROL SAMPLE:

| Parameter | Units | MDL | Reference Value | Recv |
|---|---|---|---|---|
| Solids, Total Suspended EPA 160.2 | mg/L | 5 | 278 | 88% |

MDL Method Detection Limit
RPD Relative Percent Difference



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## 11.7.5 SINKHOLE EVALUATION REPORT

APPENDIX 11.7.5

# SINKHOLE EVALUATION REPORT
# TAMPA ELECTRIC COMPANY
# POLK POWER STATION

Prepared for:

TAMPA ELECTRIC

A TECO ENERGY COMPANY

Tampa, Florida

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

Tampa, Florida

and

William Sinclair

Consulting Hydrogeologist

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SINKHOLE EVALUATION REPORT
TAMPA ELECTRIC COMPANY
POLK POWER STATION

## 1.0 INTRODUCTION

The Tampa Electric Company Polk Power Station site occupies an area of largely mined-out land in the extreme southwest corner of Polk County, Florida (Figure 1-1). The purpose of this report is to evaluate the potential for sinkhole occurrence at the site.

Although the development of solution features in limestone and the subsidence and collapse of land surface that results may appear to occur in a chaotic manner, the process is closely controlled by the geologic and hydrologic setting. Unfortunately, the structural and lithological features that control solution development in the limestone are complex, not fully developed, and difficult to evaluate, particularly in this area where the limestone is deeply buried beneath unconsolidated sand and clay deposits.

Several methods were used in this study to assess the potential for sinkhole development:

1. Existing sinkholes in the area were studied, as well as the effect of historic land use on recent sinkhole development. Existing sinkholes were defined by use of topographic and soils maps, aerial photograph interpretation, site visits, and test borings.
2. The geologic and hydrologic history of the area has had an important effect on the development of solution cavities in the carbonate rocks, and this aspect of the situation was also studied.
3. Surface features, such as the alignment of sinkholes, stream segments, or ridges, were studied to determine whether they might reflect the occurrence of faults or fractures in the limestone that represent zones of accelerated groundwater flow where cavities might be developing toward the point of collapse.

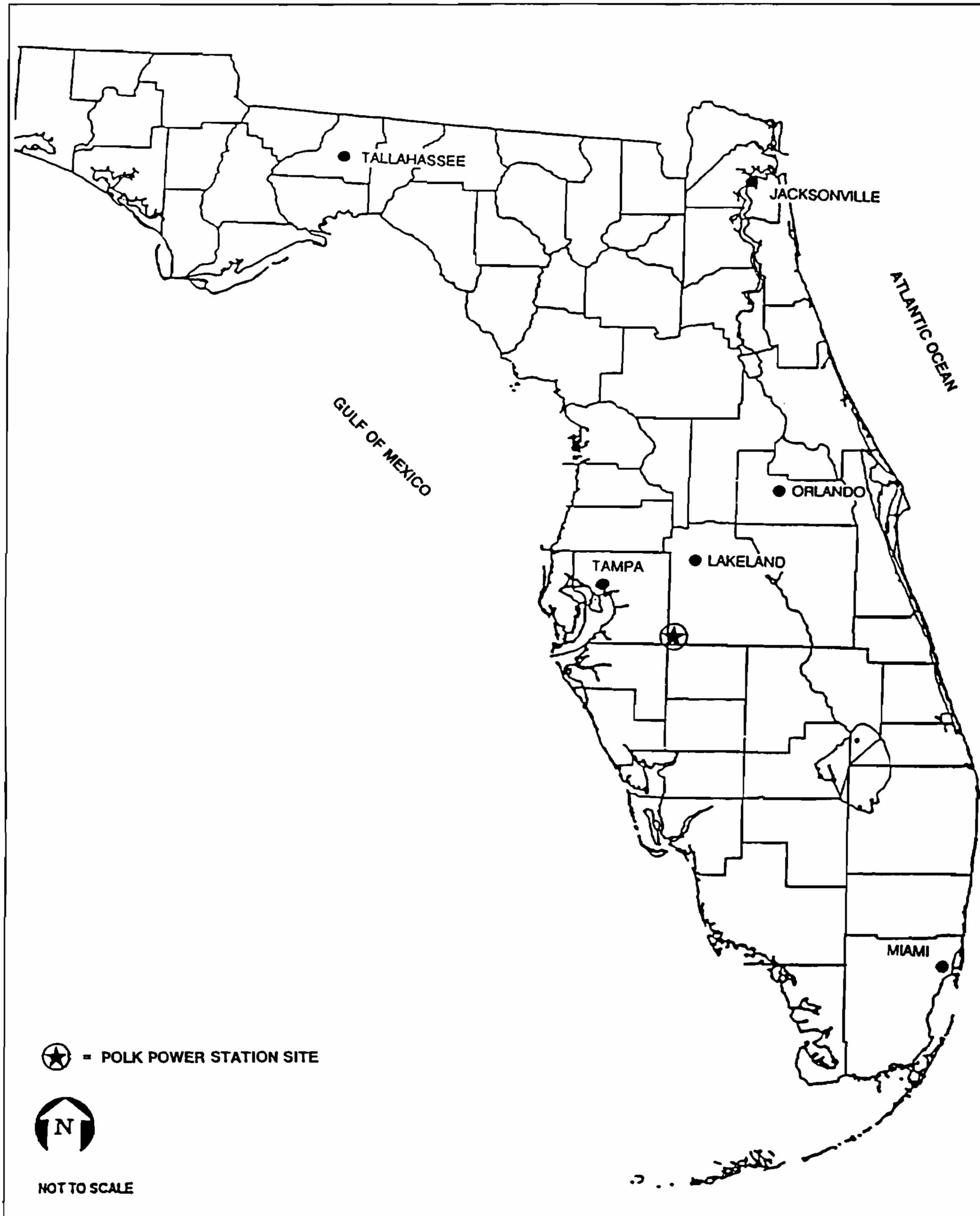


FIGURE 1-1.

LOCATION OF THE POLK POWER STATION WITHIN THE STATE OF FLORIDA

Source: ECT, 1992.

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POLK POWER STATION

4. The rate of recharge to limestone aquifers has a direct effect on the rate of limestone solution. Closely spaced stream tributaries represent areas of relatively high surface runoff, as opposed to areas where streams are sparse or non-existent and infiltration is the principal flow path. The relation of the surface and shallow water-table to water levels in the deeper aquifers also indicates the rate of recharge, and is a controlling factor in the type of sinkhole that may occur in an area. Therefore, the relation of surface to shallow and deep groundwater were also evaluated.
5. Thickness and cohesiveness of the surficial material overlying the bedrock affects whether collapse or subsidence may readily occur into an underlying cavity and may control the size and abruptness of sinkhole development. Therefore, test borings to determine the lithology beneath the site and the bearing strength of the material at depth were also made in an attempt at more specific understanding of the potential for sinkhole development at this site.

## 2.0 GEOGRAPHIC SETTING

The Tampa Electric Company Polk Power Station site lies in the south-central part of the Polk Upland (White, 1970), an undulating to gently rolling plain generally 130 to 150 feet above mean sea level (ft-msl). The site occupies an interfluve between two drainage basins (Figure 2-1). Surface runoff from the site flows northerly to westward-flowing tributaries of the Alafia River, and southward and easterly to the Peace River Basin via Little Payne Creek and Payne Creek (Figure 2-1).

### 2.1 TOPOGRAPHY

Topographic maps [U.S. Geological Survey (USGS) Baird and Duette NE] show several closed surface depressions within the proposed plant property boundaries and the cooling water reservoir area (Figure 2-2). Land surface altitude in undisturbed areas ranges from about 130 to 150 ft-msl. Channels of the South Prong Alafia River and Payne Creek are incised to altitudes of 85 ft-msl and below in the vicinity of the Polk Power Station. Much of the area surrounding the proposed site has undergone phosphate mining throughout the 1900s. Some of the mined acreage has also undergone reclamation. The mining and reclamation activities have caused irregular landscapes with numerous tailings mounds, settling ponds, plus drainage ditches and ponds.

A 1929 Soils Conservation Service map (Figure 2-3) was reviewed and also compared to aerial photographs from the early 1940s and 1950s (Figures 2-4 and 2-5). The soil map and older photographs pre-date much of the mining activity that has disturbed part of the site area; the older data illustrate pre-mining conditions. Several closed depressions were identified on the soils and aerial photographs. Most correspond with depressions shown on the topographic maps. The surface depressions were also confirmed during the site investigation. The closed depressions are sinkholes of undetermined age. Their relatively subdued topographic aspect and vegetative assemblages suggest that they are not actively subsiding.

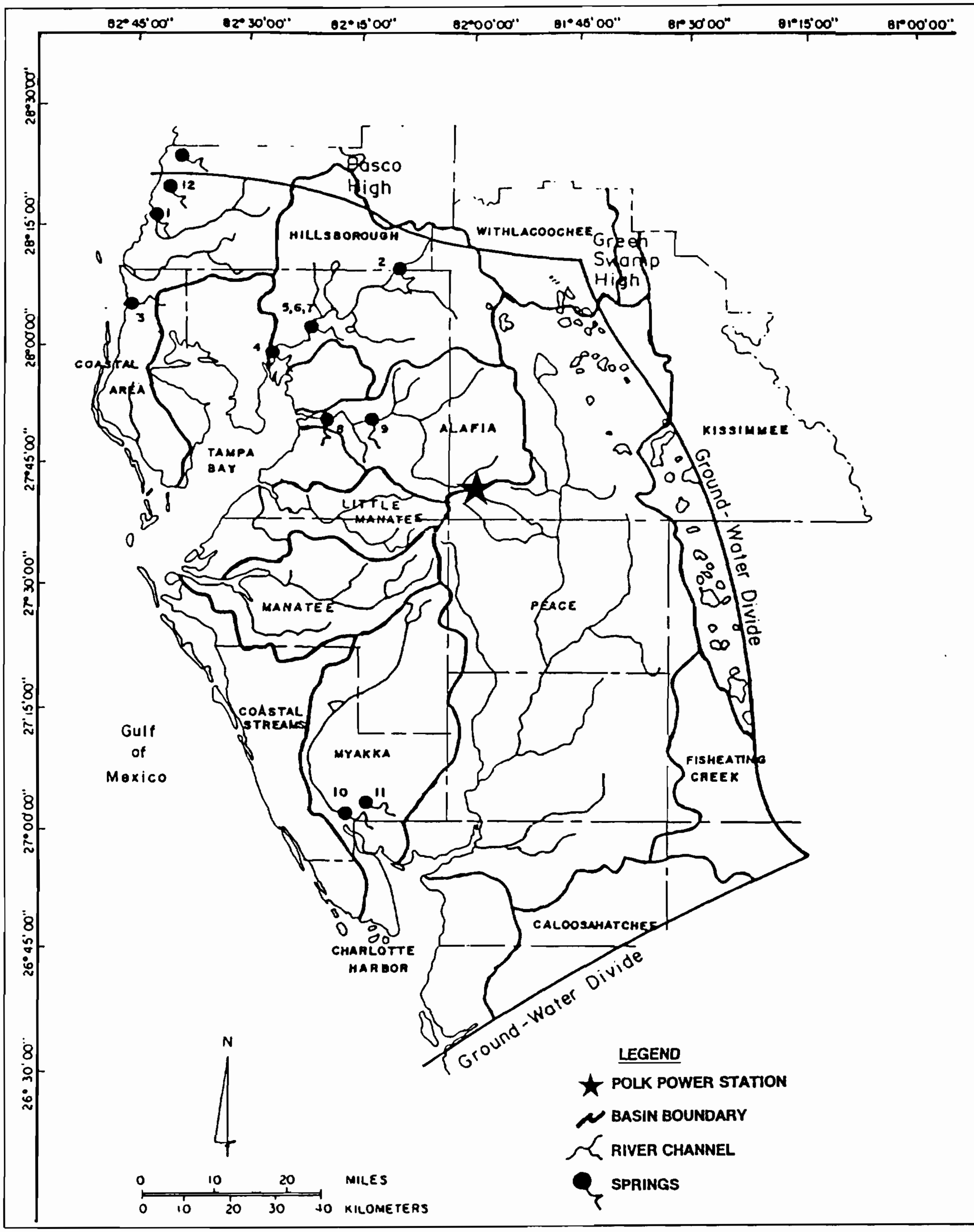


FIGURE 2-1.

MAJOR SURFACE WATER DRAINAGE BASINS

**Source: White, 1970.**

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**POLK POWER STATION**

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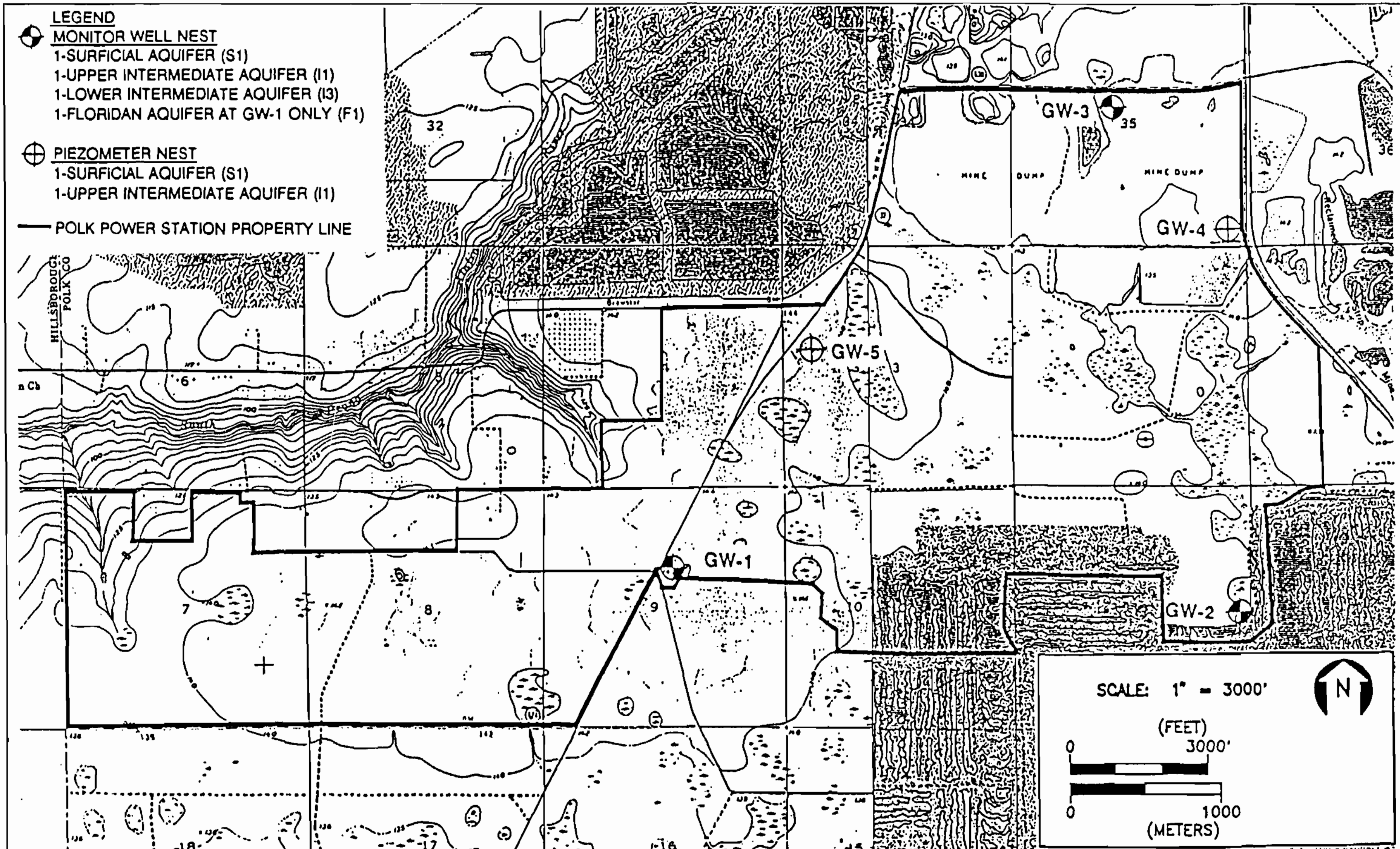


FIGURE 2-2.

USGS TOPOGRAPHIC MAP FOR POLK POWER STATION

Source: USGS, Duette NE, FL, 1972; Baird, FL, 1987; ECT, 1992.

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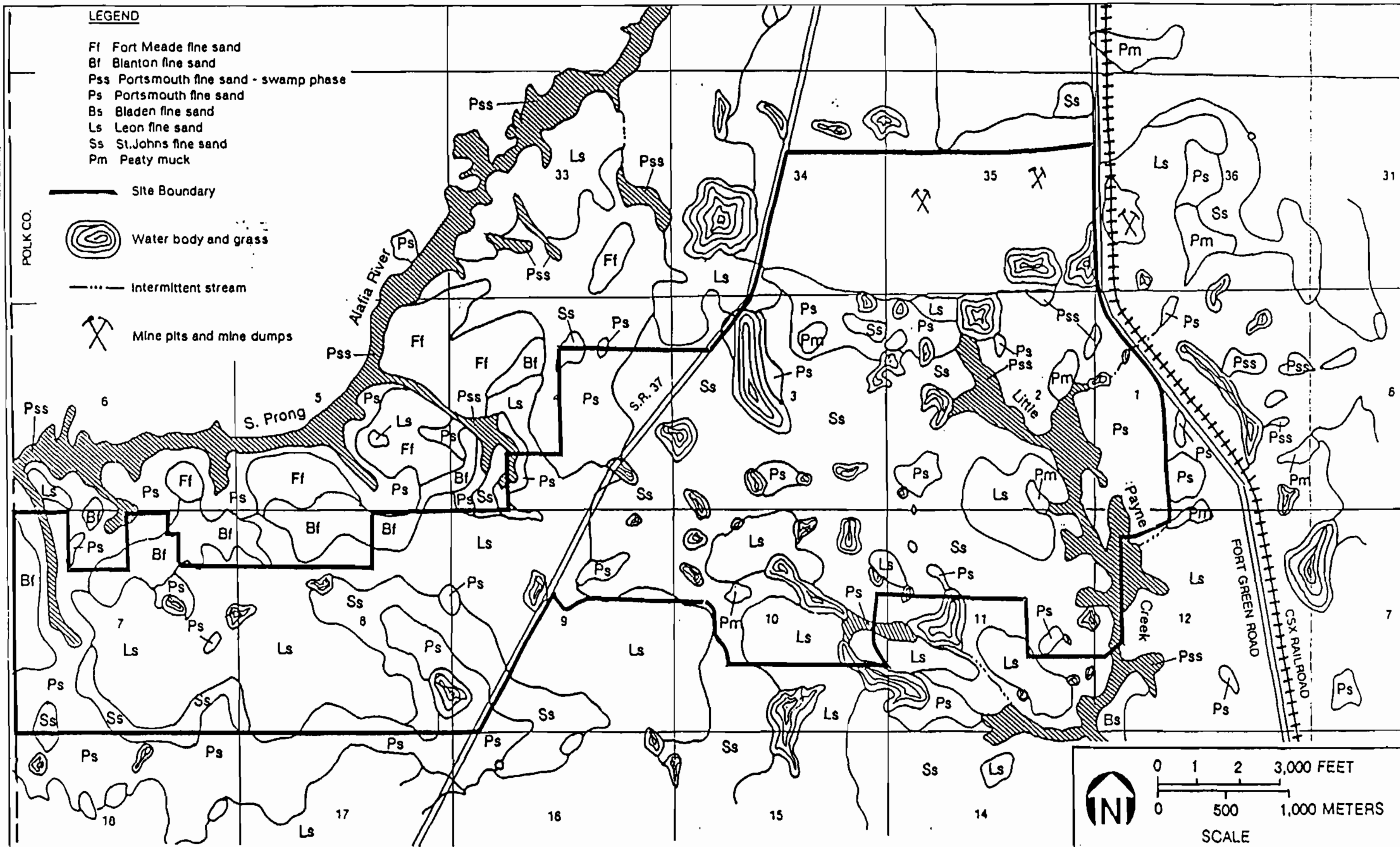


FIGURE 2-3.

1929 SOIL IDENTIFICATION MAP

Sources: Bureau of Chemistry and Soils; Soil Survey of Polk County, FL, 1927; ECT, 1992.

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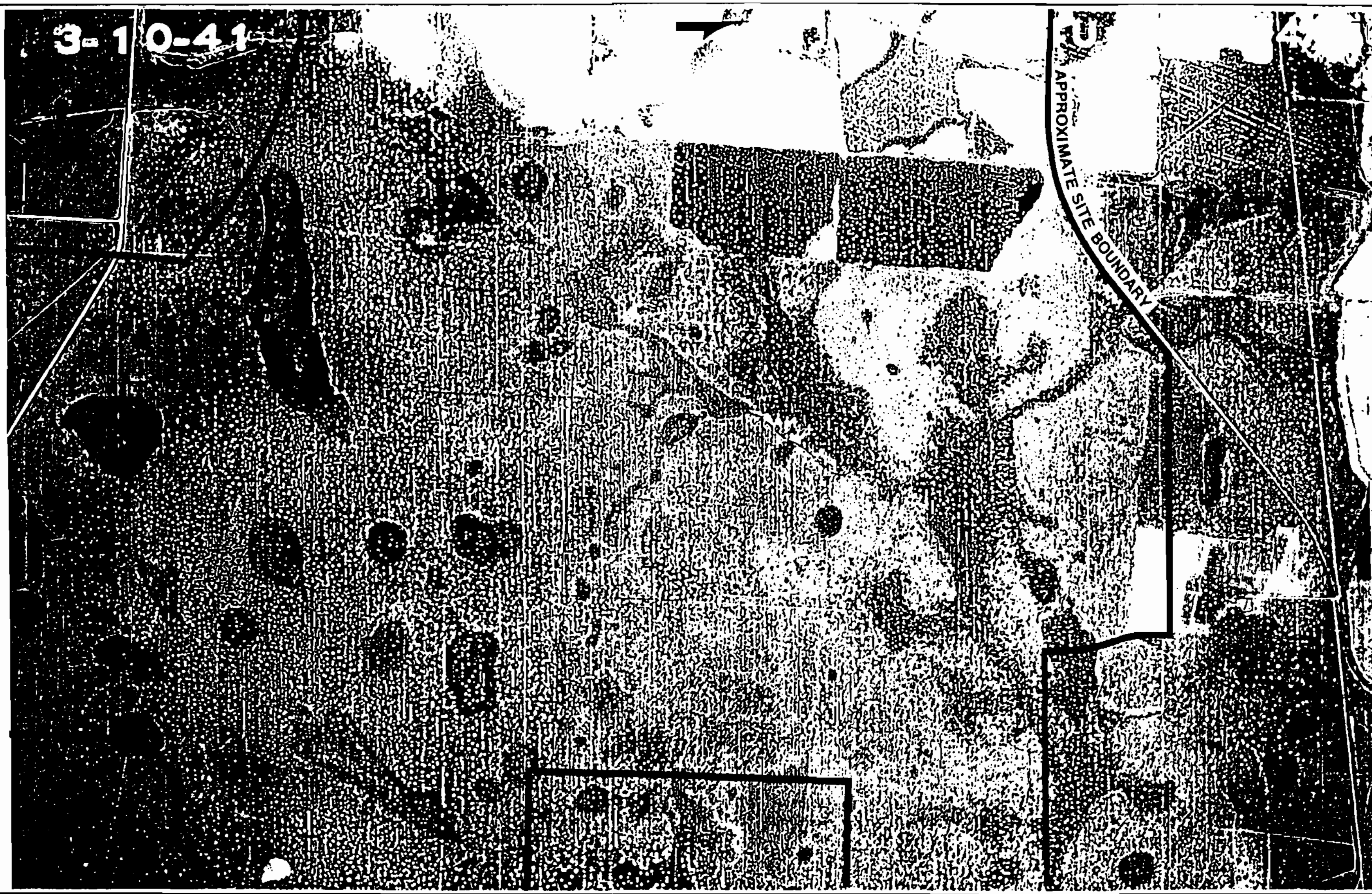


FIGURE 2-4.

1941 AERIAL PHOTOGRAPH OF POLK POWER STATION

Source: ECT, 1992.

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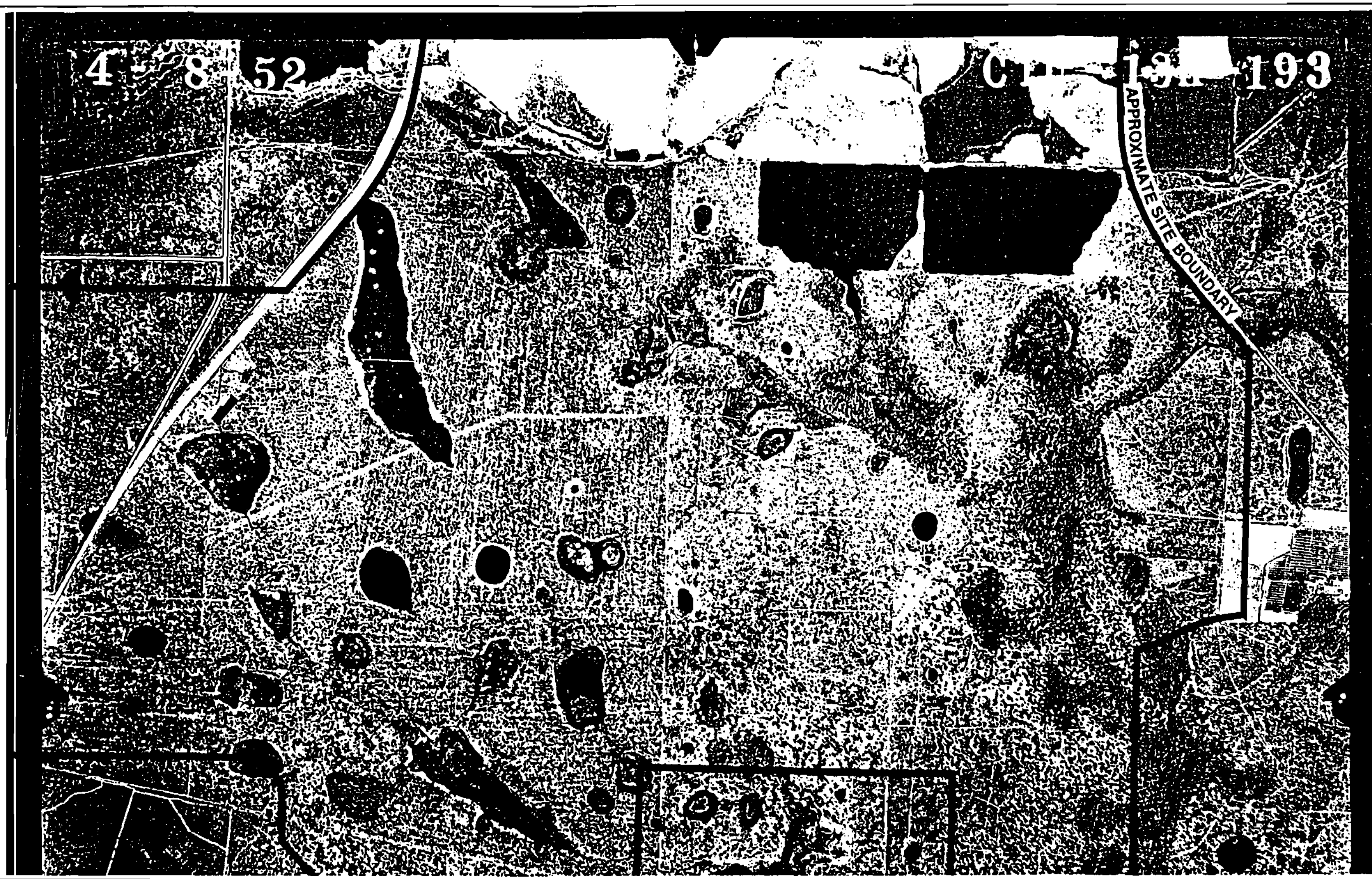


FIGURE 2-5.

1952 AERIAL PHOTOGRAPH OF POLK POWER STATION

Source: ECT, 1992.

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## 2.2 DRAINAGE

As illustrated on Figure 2-3, most of the surficial soils are sandy in nature and would promote infiltration when not actually saturated. The balance between infiltration and surface runoff is controlled by the amount and intensity of rainfall, slope of the land surface, and type of vegetation.

The closely-spaced, integrated system of tributary streams in the site area indicate that surface runoff is a more significant factor in the hydrologic system than is infiltration. Thus, the dissolution of the underlying carbonate rocks, prerequisite to sinkhole formation, is not well advanced in this area as in parts of the State where streams are more widely spaced, or non-existent, and water infiltrates more freely to react with the carbonate rocks and form cavities.

## 2.3 SINKHOLES

Sinkholes are a natural and common geologic feature of areas underlain by carbonate rocks, such as limestone and dolomite, and other rock types that are soluble in natural water. The term sinkhole is used for closed depressions in the land surface that are formed by solution or by subsidence or collapse of surficial materials owing to the solution of near-surface carbonate or other soluble rocks.

The thick sequence of carbonate rocks that comprise the Floridan aquifer dip southward and, in the latitude of south Polk County, are overlain by several hundred feet of non-soluble clastic sediments, sand, and clay, interbedded with strata of dolomite (Figures 2-6 and 2-7). The relatively permeable dolomite strata comprise the intermediate aquifer system. Solution cavities in the dolomite sections within the clastic sediments would be the most likely cause of the small sinkhole features seen in the Polk Power Station area.

The potential for sinkhole development is readily apparent in the number and size of sinkholes presently existing in a given area. Areas of different sinkhole types are shown on Figure 2-8 (Sinclair *et al.*, 1985). The Polk Power Station site is located

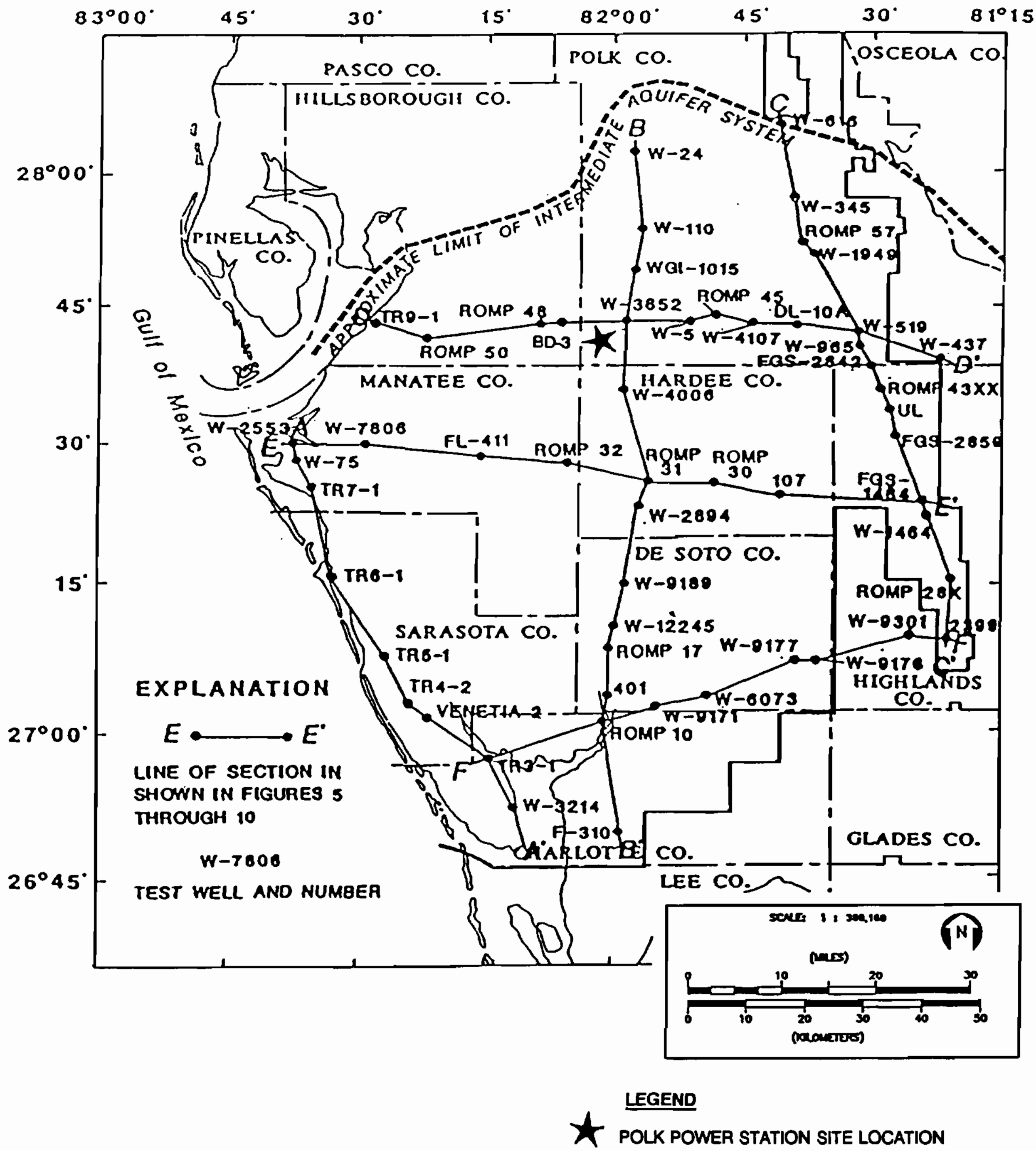


FIGURE 2-6.

LOCATIONS OF HYDROGEOLOGICAL CROSS-SECTIONS

Source: Modified from Duerr, 1988 (Fig. 6); ECT, 1992.

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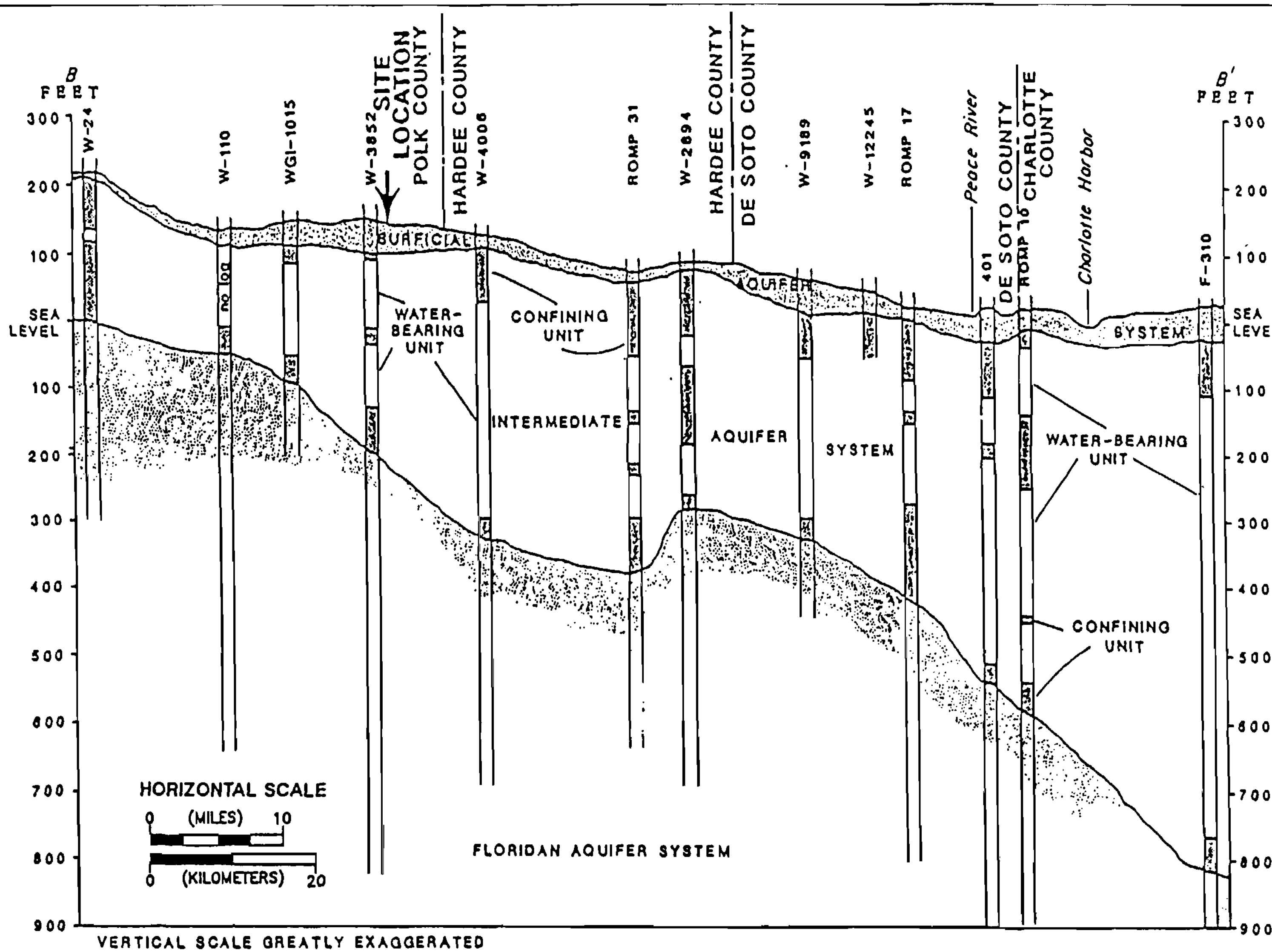


FIGURE 2-7.

GENERALIZED HYDROGEOLOGIC CROSS-SECTION B-B'

Source: Modified from Duerr, 1988 (Fig. 6); ECT, 1992.

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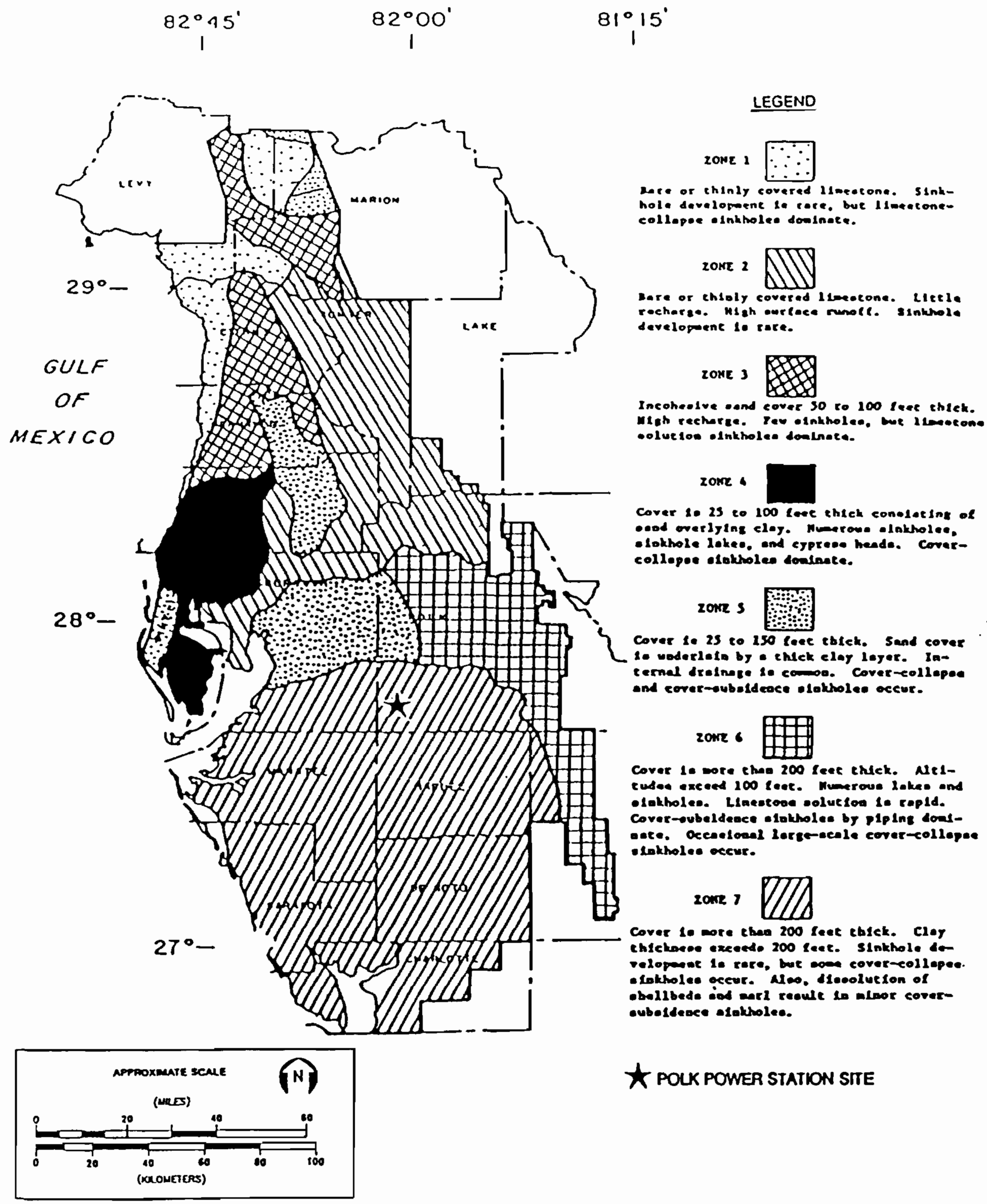


FIGURE 2-8.

ZONES OF DIFFERENT SINKHOLE TYPES

Source: USGS Duette NE & Baird Quads; ECT, 1992.

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in an area where the clastic cover exceeds 200 feet (ft), and sinkhole occurrence, though possible, is unlikely. Figure 2-9 illustrates the location of sinkholes reported from 1956 to 1982 (Ardaman & Associates, 1987). No sinkholes are shown in the vicinity of the Polk Power Station site.

Data from the Florida Sinkhole Research Institute indicate that no sinkholes of notable size have formed in the recent past near the site. Based on the available data, only four sinkholes were reported within a 10-mile radius of the site within the past 33 years (Figure 2-10). The distances to these four sinkholes and their location from the Polk Power Station are illustrated in Figure 2-11. Details regarding the size and shape of the sinkholes is summarized in Table 2-1.

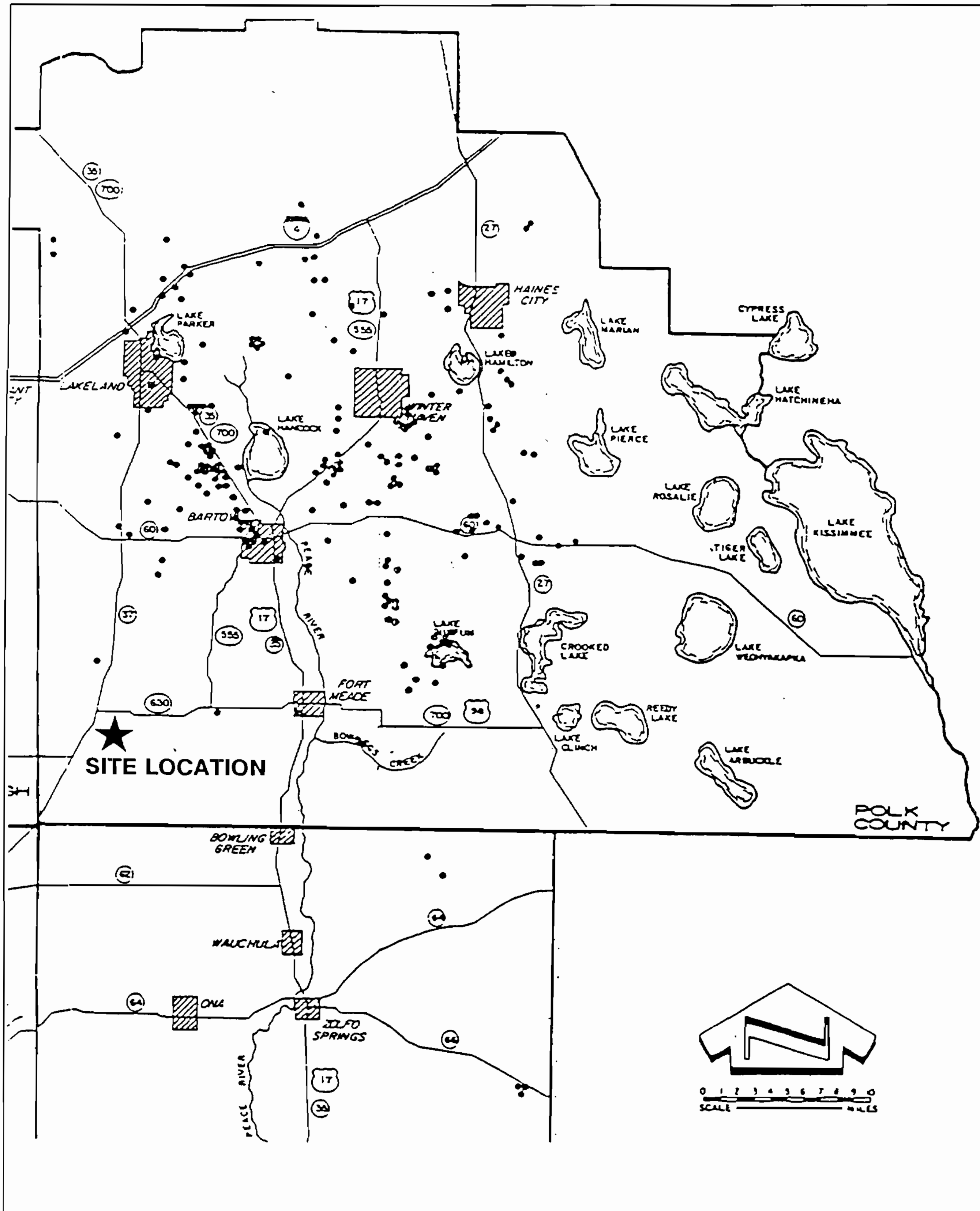


FIGURE 2-9.

1956 TO 1982 SINKHOLE OCCURRENCE MAP

Source: Ardaman & Associates.

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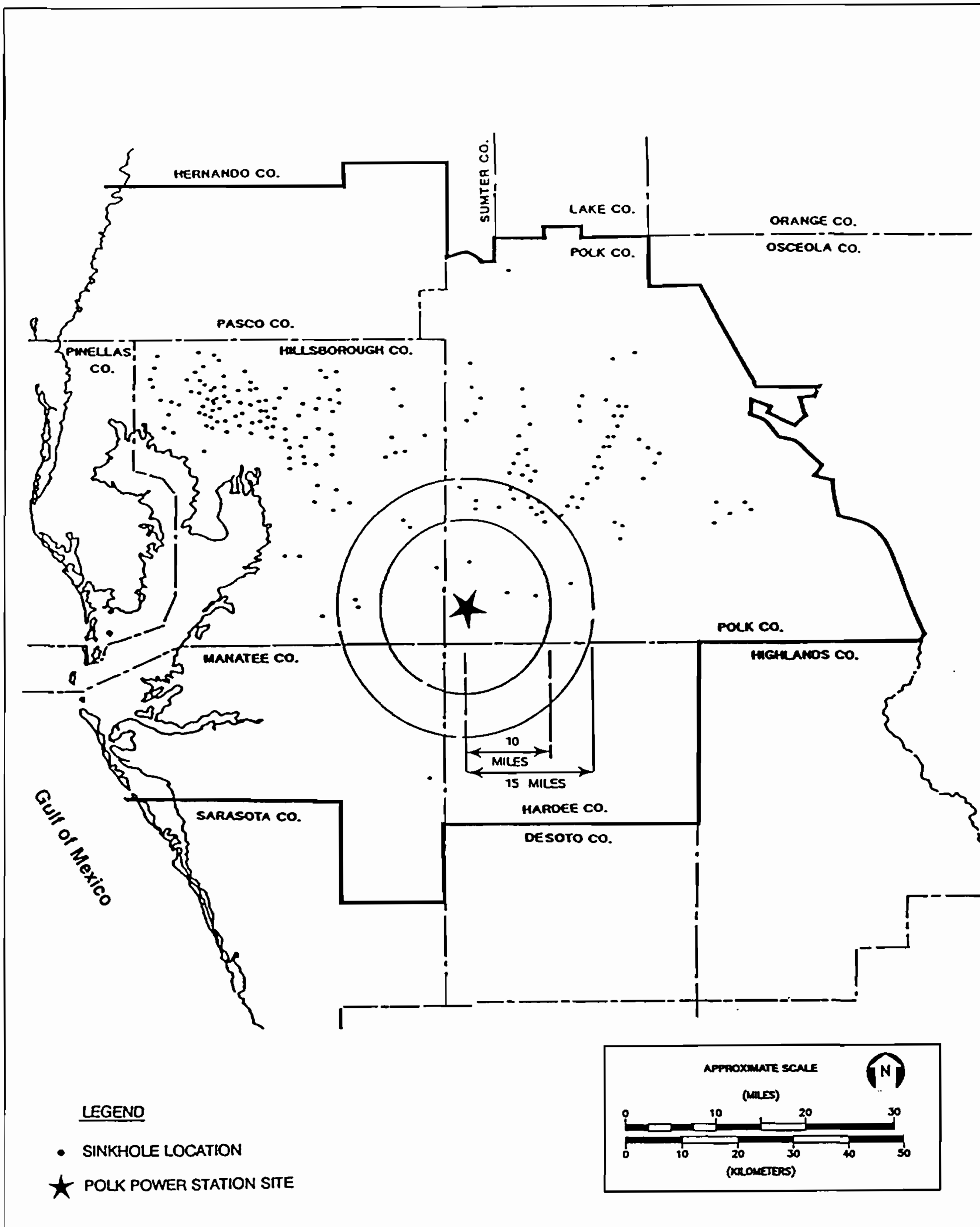


FIGURE 2-10.

DISTRIBUTION OF REPORTED SINKHOLES IN THE VICINITY OF POLK POWER STATION SITE

Source: Ardaman & Associates.

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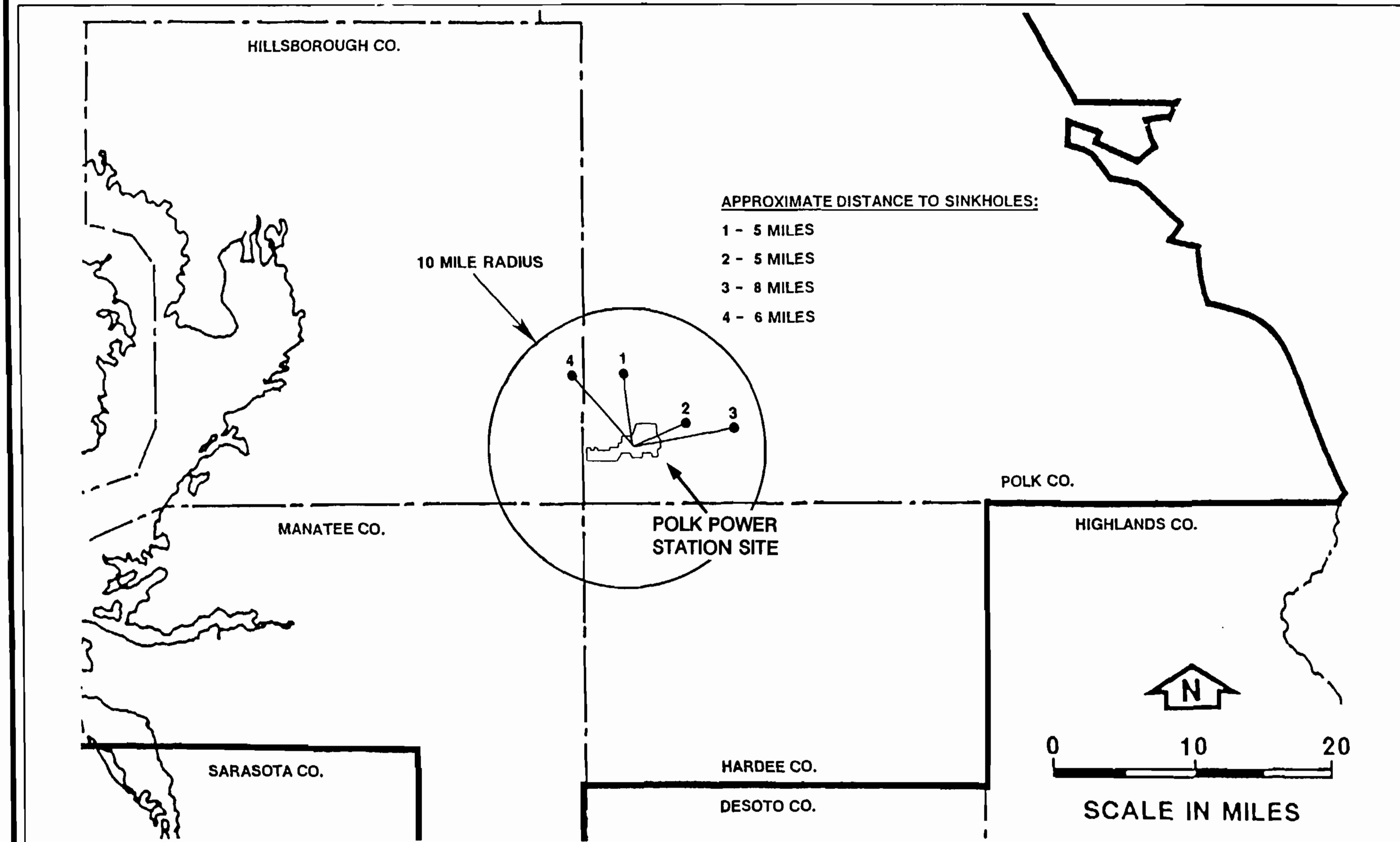


FIGURE 2-11.

SINKHOLE IDENTIFICATION MAP FOR TAMPA ELECTRIC COMPANY POLK POWER STATION

Sources: FSRI; ECT, 1992.

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Table 2-1. Available Information on Sinkholes within 10 Miles of the Polk Power Station Site

| Sinkhole Number | FSRI Code Number | Year of Occurrence | Location | | | | | County | Dimensions (ft) | | | Elevation (ft-msl) | | | | Rainfall over 90 days before sinkhole developed (inches) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Longitude | Latitude | Range | Township | Section | | Length | Width | Depth | Land Surface | Limestone | Water Table | Potentiometric Surface | |
| 1 | 16-703 | NA | -- | -- | -- | -- | -- | Polk | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | 16-704 | NA | -- | -- | -- | -- | -- | Polk | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | 16-017 | 1968 | 81 50 05 | 27 44 35 | 25E | 31S | 32 | Polk | 200 | 200 | 45 | 125 | -285 | NA | 55 | NA |
| 4 | 10-648 | 1989 | 82 03 24 | 27 46 16 | 22E | 31S | 24 | Hillsborough | 100 | 100 | 15 | 122 | -130 | NA | 95 | 8.75 |

NA = Specific information not available for these sinkholes from FSRI database.

Sources: FSRI, 1989; confirmed through verbal communication with Barry Beck, Ph.D., January 20, 1992.

## 3.0 GEOLOGY

Throughout most of the Tertiary Period, the Florida Peninsula was isolated from the North American Continent, much as the Bahamas Islands are today. During this period, the only rock-forming materials available for deposition were the carbonate minerals precipitated from sea water by coral and other shell-forming creatures. Several thousand feet of carbonate rocks, limestone, and dolomite were deposited.

At the end of the Oligocene Period following deposition of the Suwannee Limestone, clastic sediments, derived from the Appalachian Mountains and Piedmont areas, were carried by coastal currents onto the peninsula,. The sequence of sedimentation and erosion is illustrated by the stratigraphic chart in Table 3-1. From Miocene time until the present, the Florida Peninsula has kept pace with its subsidence by deposition of silica sand and clay, alternating or combined with periods of additional carbonate sedimentation.

### 3.1 HORIZONTAL ZONES OF CARBONATE DISSOLUTION

Fluctuations in sea level, relative to the land, resulted in periods of exposure and erosion, followed by periods of re-submergence and renewed deposition of additional carbonate material. The periods of erosion could, more properly be called periods of corrosion because of the soluble nature of the carbonate rocks. While the surface of the rock was sculpted by the forces of erosion, the shallow sub-surface was penetrated by slightly-acidic natural water that dissolved the rock forming cavities and conduits. Both the surface unconformities and the solution features have exerted a significant influence on the circulation of groundwater under subsequent hydrologic conditions, including the present ones.

As noted previously, sea-level has often been much higher than present, in relation to the Florida Peninsula. During the Pleistocene Epoch, or Ice Age, sea level declined more than 400 ft below present because frozen rivers in the glaciated areas were not returning water to the sea during the glacial maxima. During interglacial stages, the climate was warmer than present, and the sea rose to approximately 100 ft

Table 3-1. Hydrogeological Framework of West-Central Florida

| System | Series | Stratigraphic Unit | General Lithology | Major Lithologic Unit | Hydrogeological Unit | |
|---|---|---|---|---|---|---|
| Quaternary | Holocene and Pliestocene | Undifferentiated Surficial Deposits | Predominantly fine quartz sand; shell interbedded clay, marl, peat, dolostone, sandstone, and phosphorite. | Sand | Surficial Aquifer System | |
| | | Fort Thompson Formation | Shelly quartz sand, unfossiliferous quartz sand, and thin limestone beds. | | | |
| | | Caloosahatchee Formation | Shelly quartz sand. Thin, shelly limestone beds, and marl. | | | |
| Tertiary | Pliocene | Tamiami Formation | Sandy limestone, clayey and pebbly sand; clay, marl, shell, phosphatic. | Clastic | Confining Unit | INTERMEDIATE AQUIFER SYSTEM |
| | Miocene | HAWTHORN GROUP: Peace River Formation[1] | Clayey, phosphatic, sandy beds; silty and sandy phosphatic clay beds, and clayey phosphatic quartz sand. | Carbonate and Clastic | Aquifer | |
| | | HAWTHORN GROUP: Arcadia Formation[2] | Dolomite and, clay, and limestone, silty, phosphatic. | | Confining Unit | |
| | Oligocene | Suwannee Limestone | Limestone, sandy limestone, fossiliferous | Carbonate | Floridan Aquifer System | |
| | Eocene | Ocala Group | Limestone, chalky, foraminiferal, dolomitic, near bottom. | | | |
| | | Avon Park Formation | Limestone and hard brown dolomite; intergranular evaporite in lower part in some areas. | | Upper Floridan Aquifer; Middle Confining Unit | |
| | | Oldsmar Formation | Dolomite and limestone, with intergranular gypsum in most areas. | | Lower Floridan Aquifer | |
| | Paleocene | Cedar Keys Formation | Dolomite and limestone with beds of anhydrite. | Carbonate with evaporites | Sub-Floridan Confining Unit | |

1 Peace River Formation includes Bone Valley Member and undifferentiated deposits.
2 Arcadia Formation includes undifferentiated deposits, Tampa Member, and Nocatee Member.

Sources: Modified from Ryder, 1985 (Table 1) and Johnson, 1989.

above its present level as the Greenland Ice Cap melted. Inasmuch as the oceans are the base level that controls the flow of both rivers and groundwater, these various stands of the sea had a strong effect on stream and groundwater flow in Florida. The effect on the water table is particularly significant because corrosion of the carbonate rocks is accelerated where groundwater flow is concentrated. The various ancient stands of sea level and associated water tables created discrete zones controlling carbonate dissolution along with other horizontal features, such as the inter-formational erosion surfaces previously mentioned, as well as bedding planes and lithologic changes within the formation. The shoreline elevations for the various sea levels include the Okefenokee (150 ft-msl), Wicomico (100 ft-msl), Pamlico (30 ft-msl), and the Silver Bluff (8 ft-msl) Shorelines.

## 3.2 VERTICAL ZONES OF CARBONATE DISSOLUTION

Linear features commonly apparent on aerial photographs and satellite images are often related to faults or fractures in the underlying bedrock. The visual effect may be due to alignments of the vegetation; lakes, ponds, and depressions or other topographic features; straight stream segments; springs; or any combination of these.

Bedrock fractures provide access for rapid infiltration of water from land surface to the aquifer and for accelerated circulation within the aquifer. Therefore, they commonly concentrate dissolution of the rock within relatively narrow vertical zones. Vertical fractures, or joints, commonly are best developed at the intersection of a set of fractures or the intersection of a vertical fracture with some horizontal control as described previously.

Previous studies described in the literature were reviewed for identification of linear features in southwest Polk County. Copies of five maps showing linear features are included as Figures 3-1 to 3-5, and are discussed in the following paragraphs.

None of the major lineaments identified intersect near or pass beneath the Polk Power Station site. Several of the less prominent lineaments, illustrated in

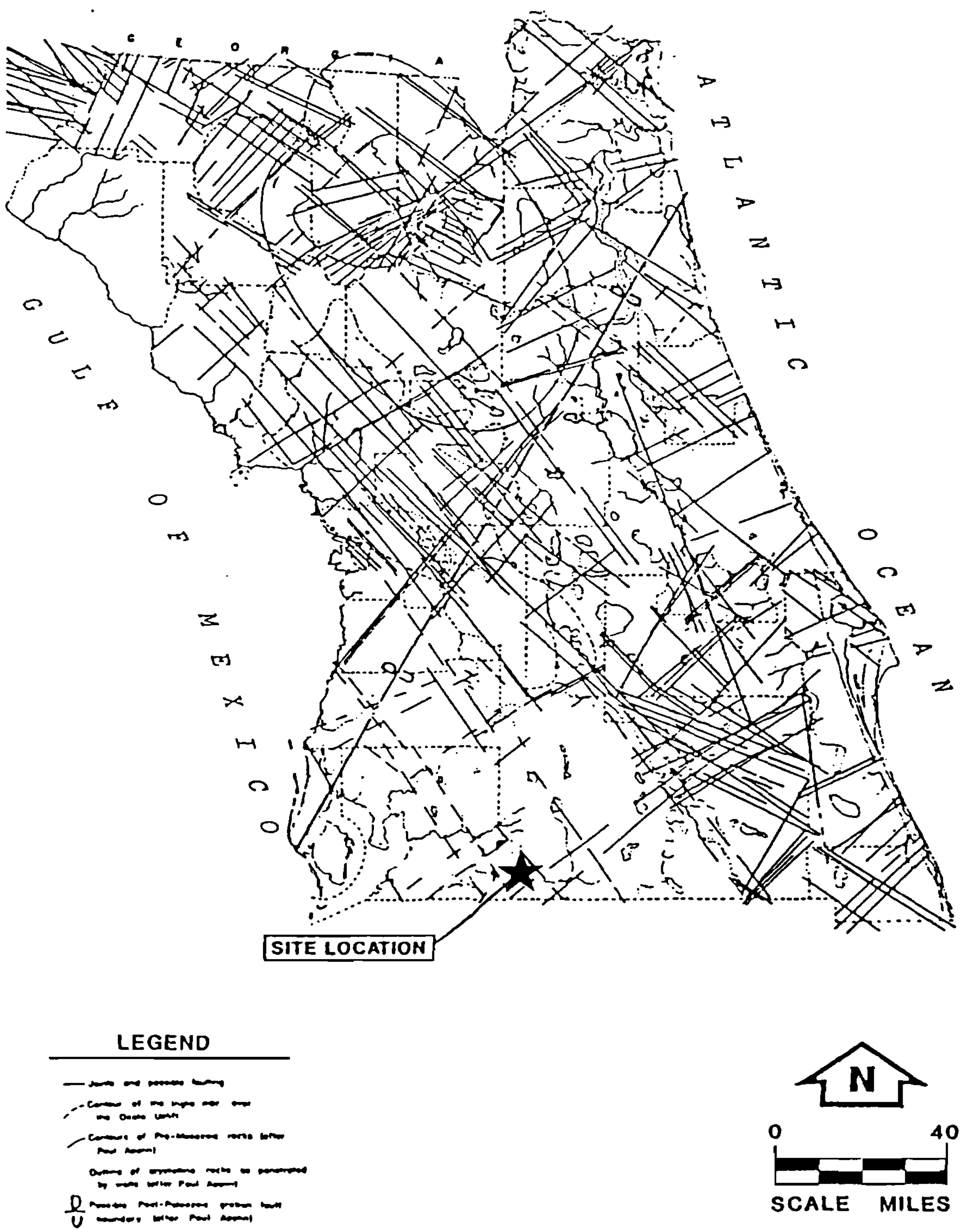


FIGURE 3-1.

LINEAMENT MAP #1

Source: Vernon, 1951.

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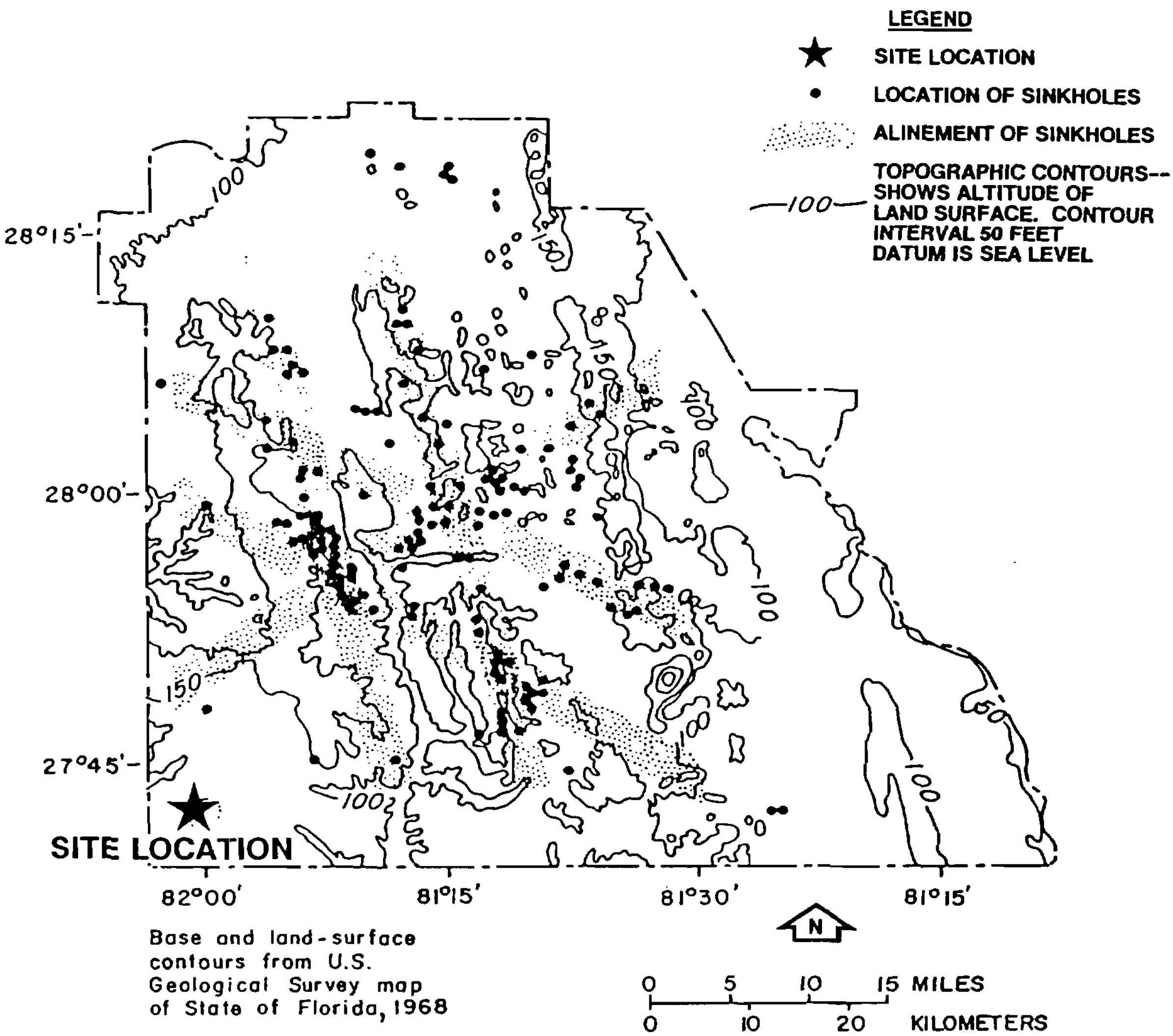


Base and land-surface contours from U.S. Geological Survey map of State of Florida, 1968

FIGURE 3-2.

SINKHOLE ALIGNMENT/LINEAMENT MAP #2

Source: Sinclair, etal, 1985.

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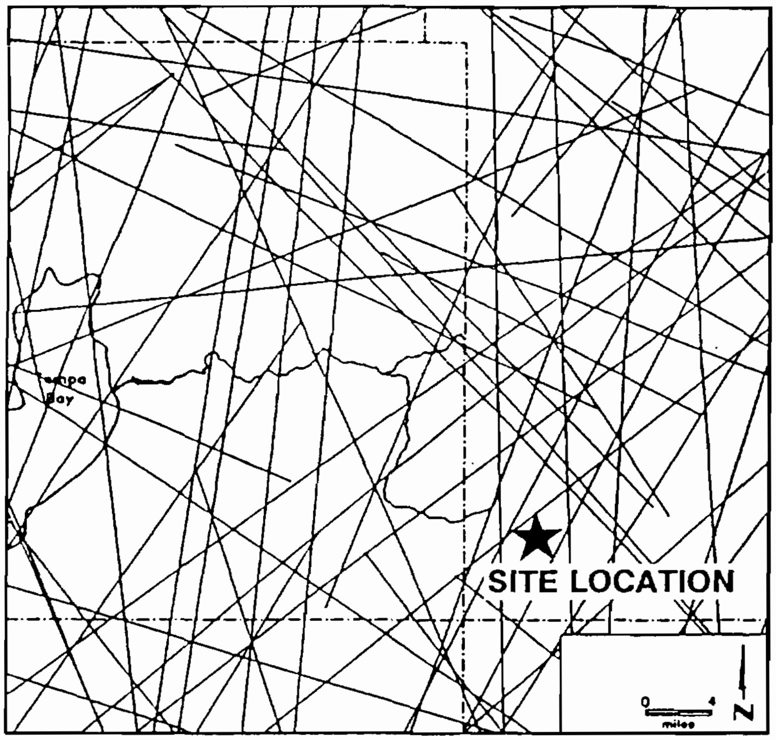


LINEAMENT MAP

——— LINEAMENT FROM SATELLITE IMAGERY

FIGURE 3-3.

LINEAMENT MAP #3

Source: Griepentrog, 1975.

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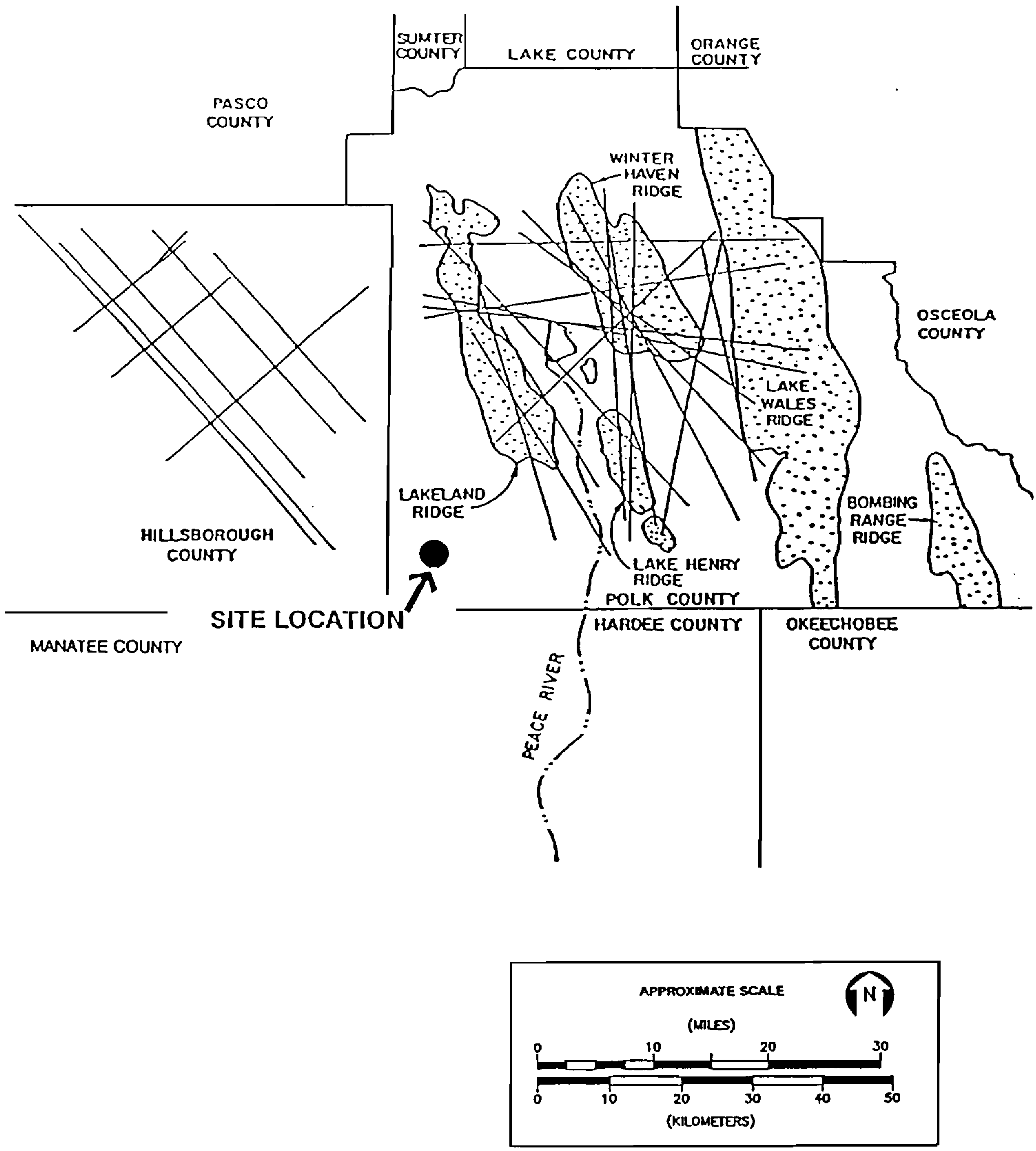


FIGURE 3-4.

LINEAMENT MAP #4

Source: Ardaman & Associates, 1987.

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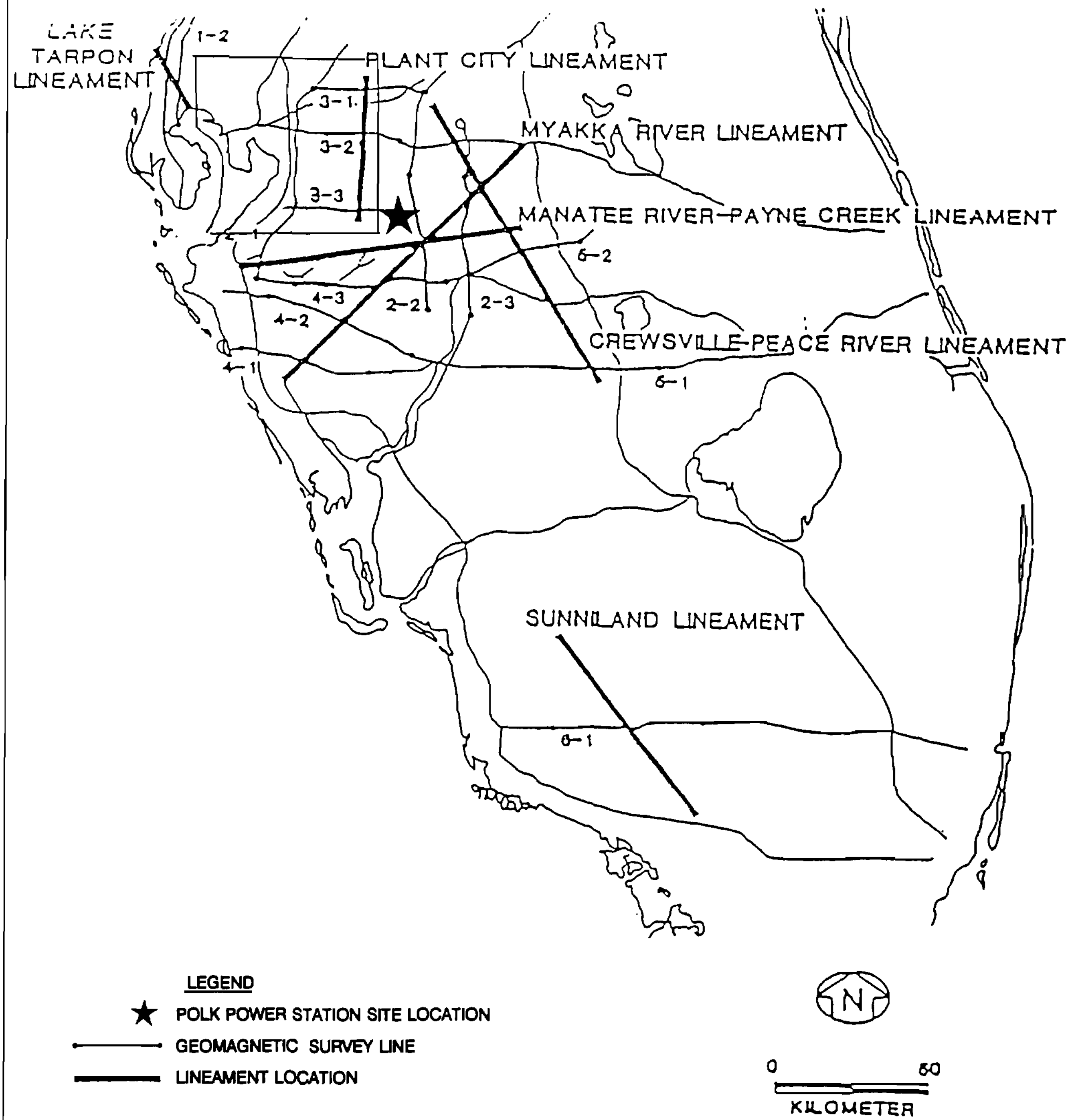


FIGURE 3-5.

LINEAMENT MAP #5

Source: Culbreath, 1988.

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Figures 3-1 and 3-2, pass beneath the site, but the intersections occur at or near the property boundaries. Figures 3-3 through 3-5 depict prominent lineaments identified through various techniques by various studies. In Polk County, the prominent lineations appear to align with the northwest-southeast trend of the Ocala Uplift and the topographic ridges with a series of less prominent lineaments at approximate right angles. The topographic ridges and the gaps between them are thought to be the surface expression of underlying structural features (Sinclair *et al.*, 1985).

It would seem apparent from the lineament studies that the Polk Power Station site lies in an area relatively free of joints and fracture zones. This conclusion is complicated by the fact that the entire sequence of formations dips steeply southward, from about the latitude of Tampa Bay, so that the mass of carbonate bedrock is buried beneath an increasing thickness of unconsolidated and poorly consolidated surficial material. At the Polk Power Station site, the top of the Floridan aquifer lies at depths of approximately 300 feet below land surface (ft bls) or approximately 150 ft below msl. This mantle of unconsolidated material would tend to bury surface expressions of any bedrock features. Whether fracture zones are absent or whether they are too deeply buried to be observed, the net effect is that the potential for sinkhole occurrence is greatly diminished by the thick section of unconsolidated cover material.

## 4.0 HYDROGEOLOGY

Three groundwater aquifers occur in the area of the Polk Power Station site. They are the surficial, intermediate, and Floridan aquifer systems. Groundwater levels obtained for each of the aquifers from a site-specific monitoring program conducted during this study are summarized in Table 4-1.

Rainfall at the site averages approximately 53 inches per year. Rainfall input is balanced by output via evapotranspiration, surface runoff, or groundwater recharge. Evapotranspiration and runoff may account for more than 90 percent of the rainfall received.

### 4.1 GROUNDWATER LEVELS AND RECHARGE RATES

The surficial aquifer is composed of the undifferentiated sands and clays, plus the upper sandy section of the Bone Valley Member of the Peace River Formation. Based on the site-specific monitoring program, groundwater level across the site ranged from approximately 130 to 144 feet-National Geodetic Vertical Datum (ft-NGVD). The water table fluctuation has been approximately 5 ft from the end of the dry season to the end of the wet season. A hydrograph of the surficial aquifer water levels at well nest site GW-1 is provided on Figure 4-1. The surficial aquifer is typically in hydraulic communication with the streams and lakes within southwestern Polk County. Recharge from precipitation and surface water bodies causes the water level of the surficial aquifer to fluctuate routinely.

The intermediate aquifer system consists of portions of the Peace River and Arcadia Formations of the Hawthorn Group. At the Polk Power Station, this aquifer has two producing zones which are separated by confining units (Figure 2-7). During the monitoring program, the potentiometric surface of the upper intermediate aquifer across the site ranged from approximately 126 to 135 ft-NGVD. The potentiometric surface fluctuated approximately 1 to 7 ft from the end of the dry season to the end of the wet season. The potentiometric surface of the lower intermediate aquifer ranged from approximately 48 to 68 ft-NGVD across the site. The potentiometric

Table 4-1. Tampa Electric Company Polk Power Station Summary of Groundwater Levels

| Aquifer | Station | Well Nest | Reference Elevation (ft-NGVD) | Groundwater Elevations (ft-NGVD) 11-Apr-91 | 20-May-91 | 10-Jul-91 | 31-Oct-91 | 19-Nov-91 | 31-Dec-91 |
|---|---|---|---|---|---|---|---|---|---|
| Surficial | GW1 | S1 | 145.70 | 137.60 | 135.90 | 140.39 | 136.50 | 135.96 | 135.38 |
| | GW2 | S1 | 138.79 | 134.00 | 133.01 | 133.96 | 133.81 | 133.85 | 134.01 |
| | GW3 | S1 | 154.84 | 141.69 | 141.47 | 143.84 | 142.68 | 142.50 | 142.00 |
| | GW4 | S1 | 147.06 | 139.28 | 139.22 | 141.76 | 139.50 | 139.26 | 138.86 |
| | GW5 | S1 | 145.07 | 131.92 | 132.53 | 137.68 | 133.23 | 132.77 | 132.17 |
| Upper Intermediate | GW1 | I1 | 145.00 | 126.50 | 126.72 | 127.92 | 128.10 | 127.56 | 126.32 |
| | GW2 | I1 | 138.83 | 134.41 | 134.08 | 134.80 | 133.97 | 134.87 | 135.03 |
| | GW3 | I1 | 152.45 | 133.13 | 133.07 | 134.27 | 134.11 | 133.43 | 130.75 |
| | GW4 | I1 | 146.06 | 130.76 | 130.68 | 131.64 | 132.76 | 132.46 | 131.90 |
| | GW5 | I1 | 145.73 | 126.18 | 126.79 | 128.46 | 129.59 | 129.23 | 129.03 |
| Lower Intermediate | GW1 | I3 | 145.45 | 49.25 | 48.21 | 58.57 | 62.19 | 57.89 | 53.11 |
| | GW2 | I3 | 139.29 | 49.61 | 49.70 | 58.79 | 62.71 | 58.41 | 53.35 |
| | GW3 | I3 | 151.08 | 54.36 | 57.12 | 61.73 | 68.04 | 65.34 | 60.66 |
| Floridan | GW1 | F1 | 146.03 | 41.93 | 40.58 | 51.79 | 53.13 | 49.03 | 44.81 |

| Aquifer | Station | Well Nest | Reference Elevation (ft-NGVD) | Groundwater Elevations (ft-NGVD) 14-Jan-92 | 26-Feb-92 | 26-Mar-92 | 28-Apr-92 |
|---|---|---|---|---|---|---|---|
| Surficial | GW1 | S1 | 145.70 | 135.21 | 136.38 | 136.50 | 137.20 |
| | GW2 | S1 | 138.79 | 134.19 | 134.79 | 134.37 | Not Taken |
| | GW3 | S1 | 154.84 | 141.83 | 141.34 | 141.28 | 141.16 |
| | GW4 | S1 | 147.06 | 138.74 | 138.52 | 138.76 | 139.28 |
| | GW5 | S1 | 145.07 | 132.15 | 132.05 | 132.05 | 133.15 |
| Upper Intermediate | GW1 | I1 | 145.00 | 126.07 | 124.98 | 124.64 | 124.00 |
| | GW2 | I1 | 138.83 | 135.18 | 136.01 | 136.05 | Not Taken |
| | GW3 | I1 | 152.45 | 130.42 | 129.65 | 130.89 | 131.29 |
| | GW4 | I1 | 146.06 | 131.86 | 131.66 | 131.58 | 131.44 |
| | GW5 | I1 | 145.73 | 128.99 | 128.25 | 128.25 | 128.39 |
| Lower Intermediate | GW1 | I3 | 145.45 | 51.41 | 51.77 | 52.33 | 55.11 |
| | GW2 | I3 | 139.29 | 51.91 | 52.23 | 52.87 | Not Taken |
| | GW3 | I3 | 151.08 | 60.37 | 59.42 | 59.84 | 60.66 |
| Floridan | GW1 | F1 | 146.03 | 42.99 | 43.99 | 44.35 | 46.91 |

Source: ECT, 1992.

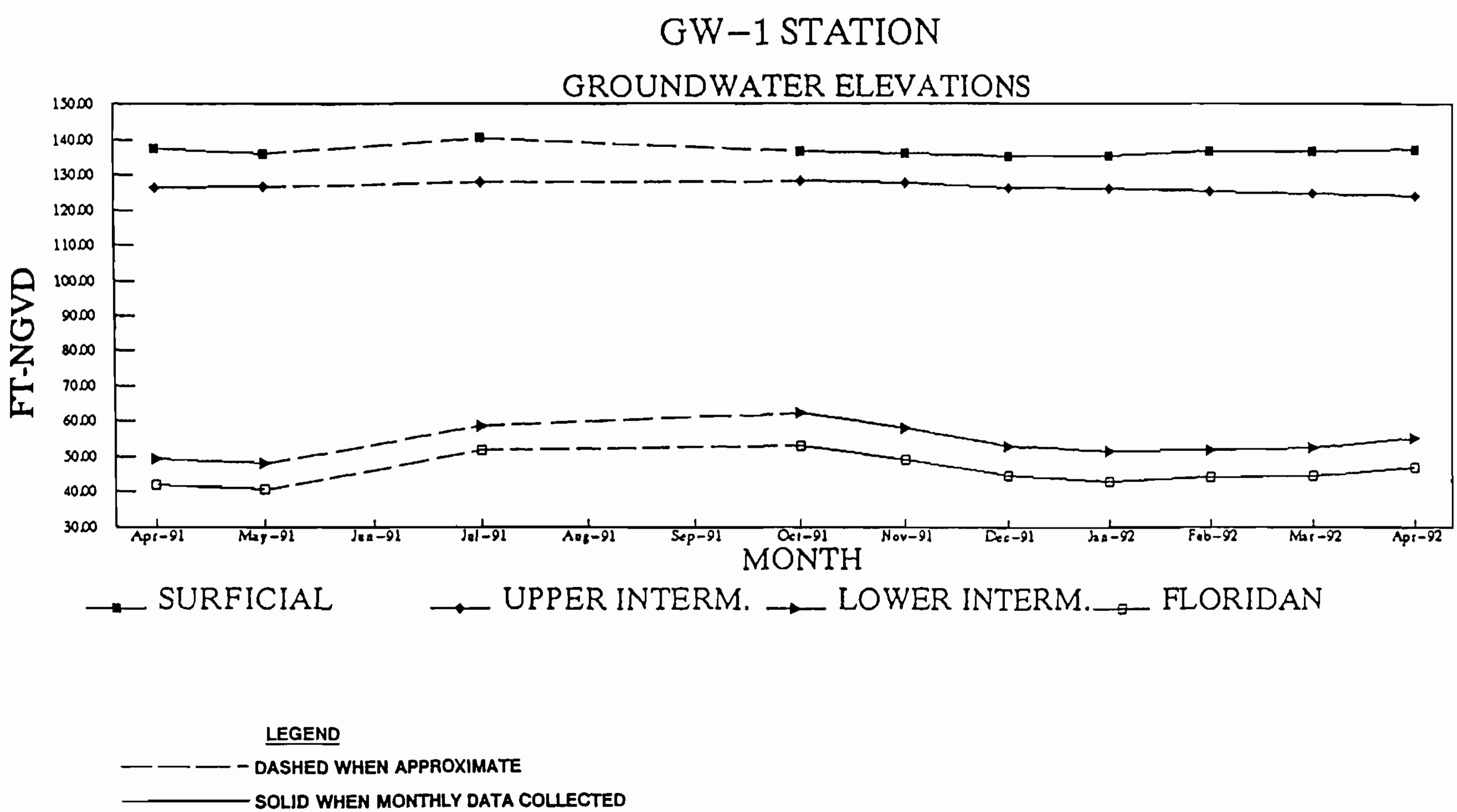


FIGURE 4-1.

HYDROGRAPH FOR GROUNDWATER MONITOR STATION GW-1

Source: ECT, 1992.

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A TECO ENERGY COMPANY

POLK POWER STATION

surface has fluctuated approximately 10 to 14 ft from the end of the dry season to the end of the wet season. Hydrographs of the potentiometric surface levels for the upper and lower intermediate aquifer at well nest site GW-1 are provided on Figure 4-1. The recharge from the surficial aquifer into the intermediate aquifer system as determined from regional pump tests and modeling efforts is approximately 2 inches per year (Figure 4-2). This indicates a relatively low recharge rate.

The Floridan aquifer system may consist of portions of the Hawthorn Group, the Suwannee Limestone, and underlying carbonate sequence. The potentiometric surface of the Floridan aquifer at the southwest corner of the plant site varied from approximately 40 to 53 ft-NGVD. The potentiometric surface fluctuated approximately 13 ft from the end of the dry season to the end of the wet season. A hydrograph of the Floridan aquifer potentiometric surface levels at well nest site GW-1 is provided on Figure 4-1. The recharge from the intermediate aquifer into the Floridan aquifer system as determined from regional pump tests and modeling efforts is approximately 2 to 5 inches per year (Figure 4-3). This indicates a relatively low to moderate recharge rate.

The groundwater elevation data are summarized in Table 4-1 and Figure 4-1 of this report. The potentiometric head difference between the surficial aquifer and other aquifer systems are:

- Surficial aquifer to upper intermediate aquifer--5 to 10 ft,
- Surficial aquifer to lower intermediate aquifer--70 to 80 ft, and
- Surficial aquifer to Floridan aquifer--80 to 90 ft.

Due to the potentiometric head difference between the aquifers, groundwater from the surficial aquifer has and will continue to recharge vertically through the intermediate aquifer system toward the Floridan aquifer. The differences in the potentiometric surfaces indicate poor hydraulic connection between the surficial and the lower intermediate or Floridan aquifer systems. The confining units of the

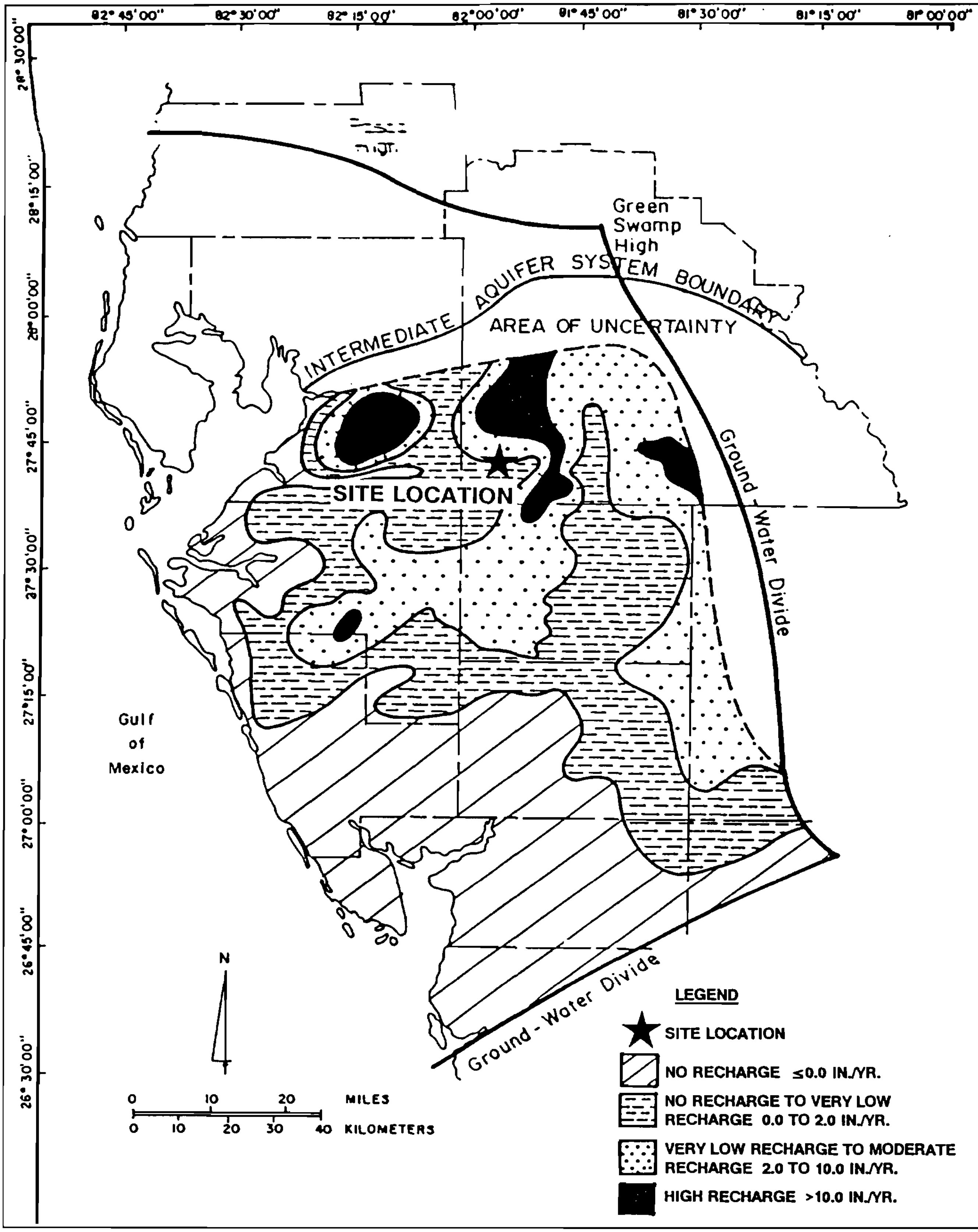


FIGURE 4-2.

RECHARGE RATES TO THE INTERMEDIATE AQUIFER SYSTEM (MAY 1987)

Source: ECT, 1992.

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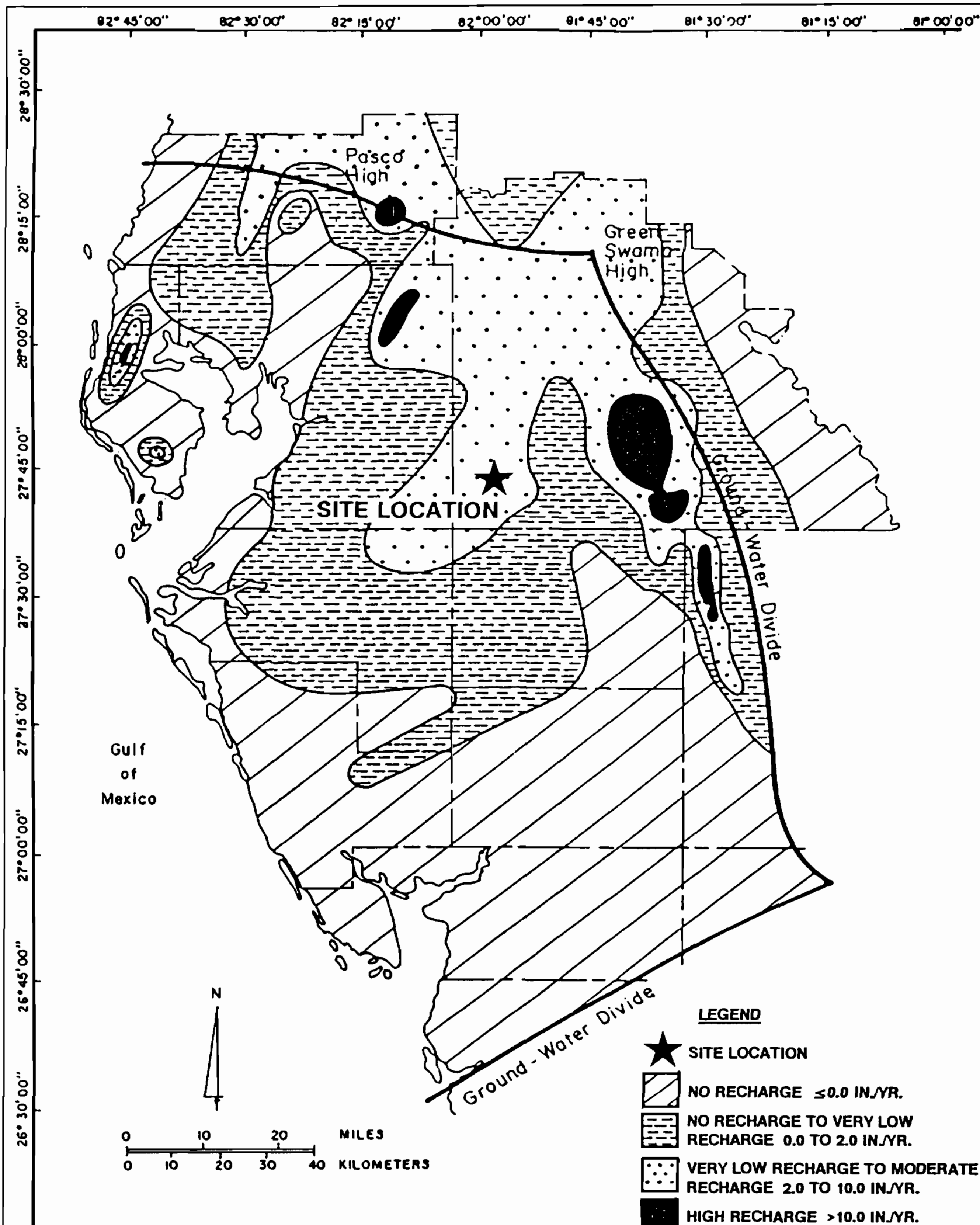


FIGURE 4-3.

RECHARGE RATES TO THE UPPER FLORIDAN AQUIFER SYSTEM (MAY 1987)
Source: ECT, 1992.

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Hawthorn Group are relatively impervious, thick consolidated strata, which are resistant to erosion, solution, and inhibit water migration.

## 4.2 GROUNDWATER CHEMISTRY

As rainfall infiltrates the soil zone, it becomes a weak carbonic acid that readily reacts with carbonate rocks as it moves downward. The reaction between water and rock is controlled by the rate of circulation of the water and this, in turn, is controlled by the rate of recharge and by the rate of groundwater flow. Solution is most intensive where the corrosive water first contacts the limestone surface and in areas where groundwater circulation is accelerated.

Water in the surficial aquifer is relatively low in dissolved ion concentration, and pH typically indicates slightly acidic conditions. In a study of the surficial and intermediate aquifers in the upper Alafia and Peace River Basins, Hutchinson (1977, Table 5) tabulates chemical analyses from both aquifers. Values of pH ranged from 4.3 to 6.6 in six samples of water from the surficial aquifer. The seventh had a pH of 7.8. Thirteen samples of water from the intermediate aquifer had pH ranging from 7.0 to 7.8. The high pH values from the carbonate intermediate aquifer relate closely to concentrations of calcium, magnesium, and bicarbonate dissolved from the rock.

Water in the Floridan aquifer is generally saturated with respect to calcite and dolomite (Hanshaw *et al.*, 1971), so that further dissolution of the carbonate rock is unlikely under present conditions (Figure 4-4).

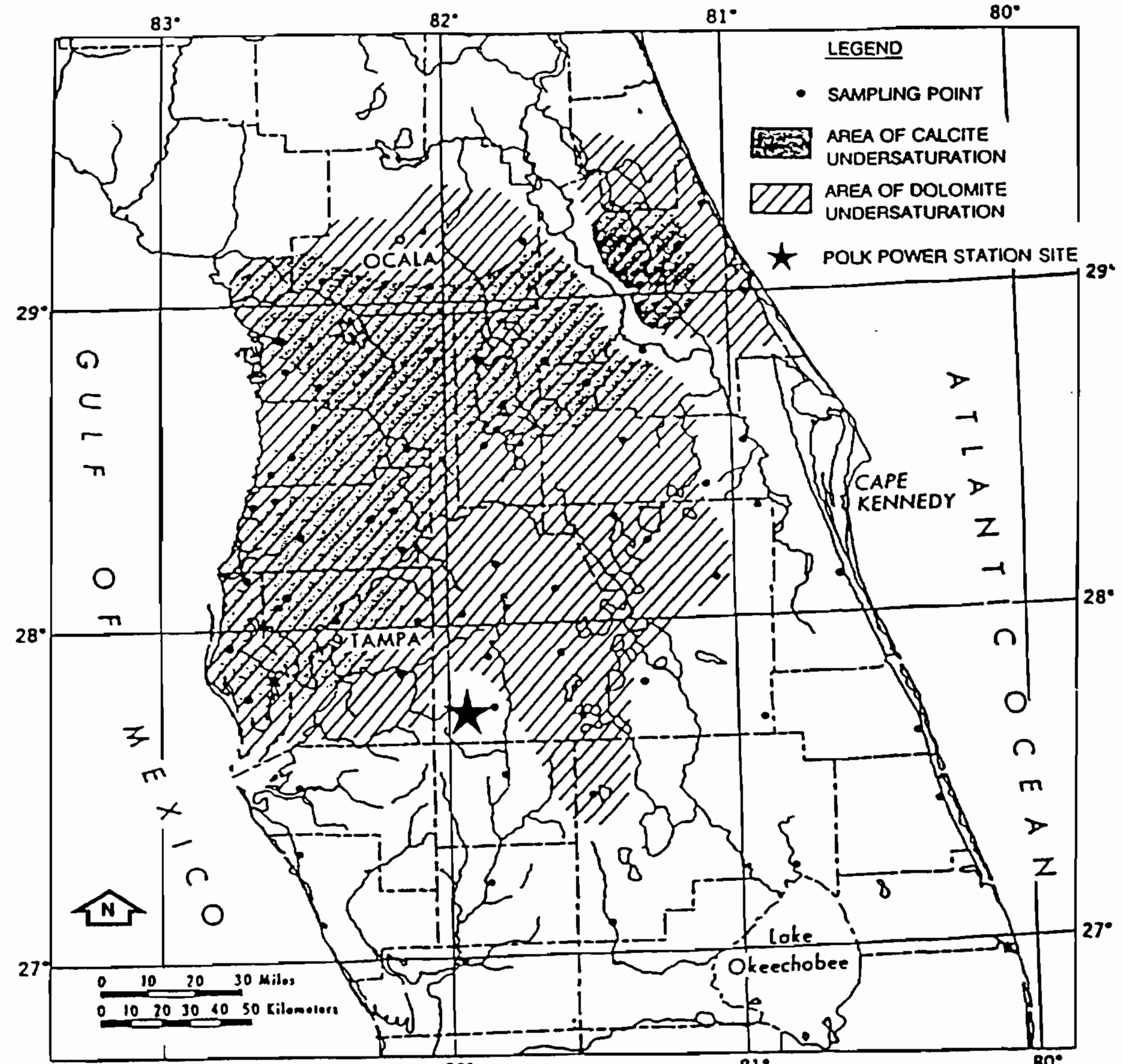


FIGURE 4-4.

AREA OF UNDERSATURATION OF CALCITE AND DOLOMITE

Source: Hanshaw, 1971.

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## 5.0 SUBSURFACE SOIL CONDITIONS

A site-specific drilling program along the western boundary of the plant site was conducted to evaluate two accessible surface depressions and obtain data regarding the soil stratification and strength. The drilling program consisted of a series of standard penetration tests (SPTs) and cone penetration tests (CPTs). The SPT and CPT borings were placed within and adjacent to two surface depressions to determine whether they had any significance relative to sinkhole potential (Figure 5-1). The depths were selected such that we could compare "n" values, soils, and geotechnical information from the borings. Geotechnicial testing data for the boring program including boring logs, CPT logs, and soil laboratory test results are provided in Appendices A, B, and C, respectively.

Results of the site-specific drilling program and review of the available literature indicate variations of the lithologies within the surficial soil beneath the site. In general, a silty to clayey sand with varying amounts of phosphate occurred from land surface to approximately 40 to 50 ft bls. Figure 5-2 illustrates a soil profile along the western boundary of the plant site. A profile of the "n" values for the borings is provided as Figure 5-3.

Three primary soil units are identified from Figure 5-2. The uppermost unit is sand (sp) with varying amounts of silt and clay present. This unit ranges from 5 to 20 ft in thickness. The SPT "n" values ranged from 2 to 51. The next unit is a relatively clean, fine- to medium-grained sand (sc) containing several clayey sand lenses. This unit ranges from 7 to 40 ft in thickness. The SPT "n" values for this unit ranged from 2 to 30. The silty, clayey sands (sp and sm) to silty, sandy clays (mh and ml) are the next underlying strata which also overlies the bedrock. The SPT "n" values for this unit ranged from 10 to 50.

Review of the data indicates that the surficial depressions have no correlation to the underlying stratigraphy. Thus, it is unlikely that the investigated depressions represent active karst conditions, but are probably paleokarst features.

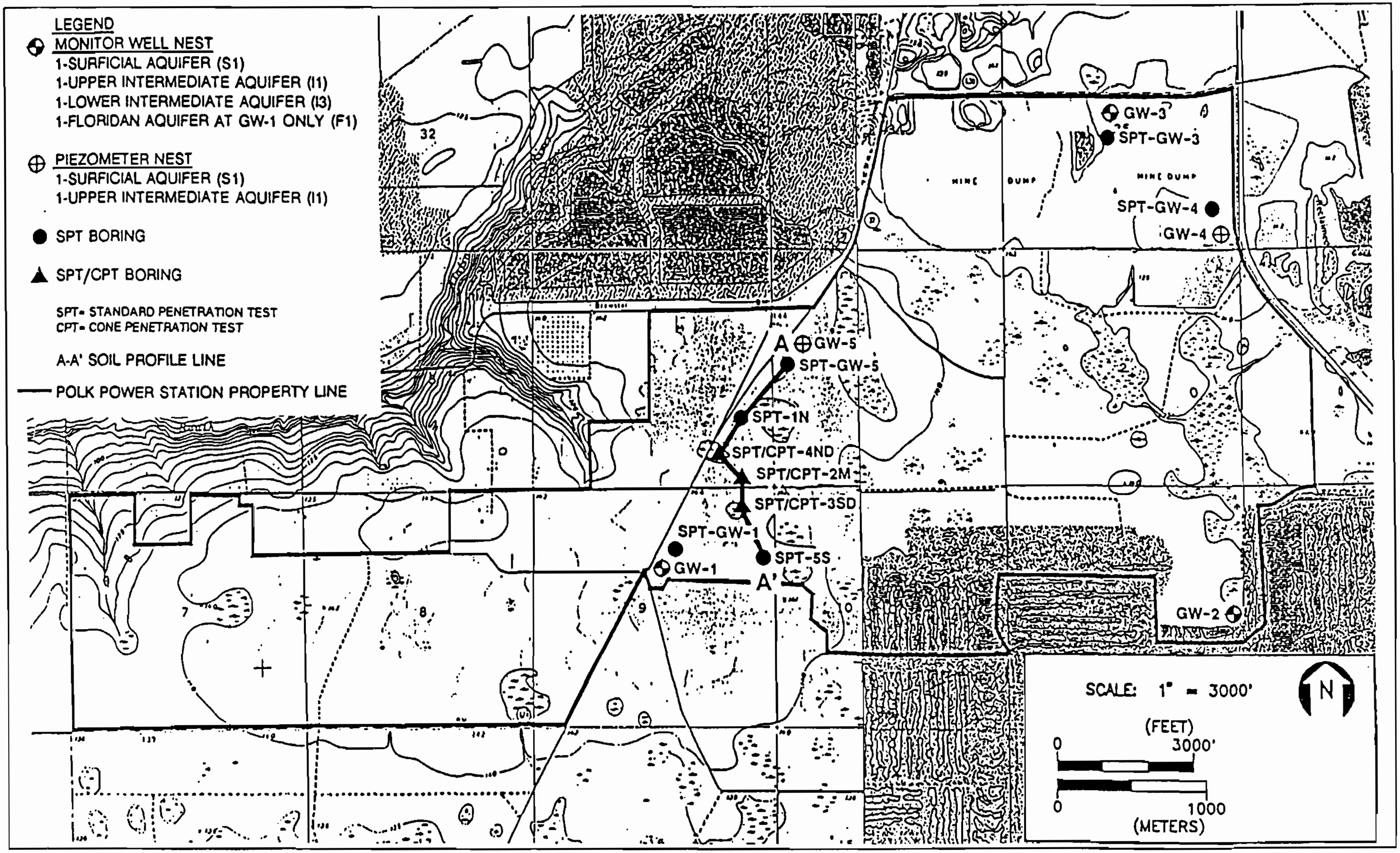


**FIGURE 5-1.**

**STANDARD AND CONE PENETRATION TEST BORINGS**

**Sources:** USGS, Duette NE, FL, 1972. Baird, FL, 1987. ECT, 1992.

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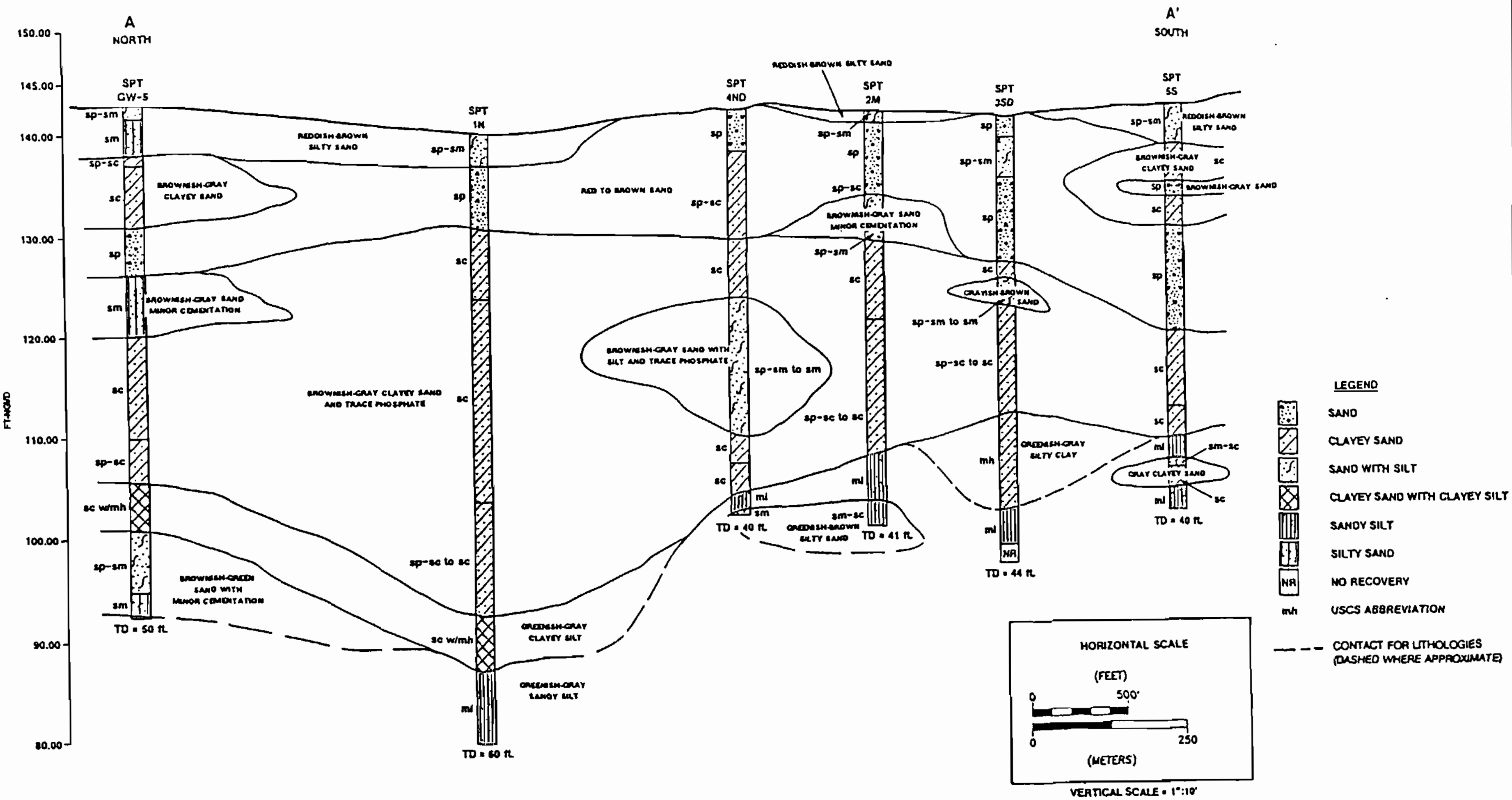


NOTE: EXCEPT AT WELL LOCATIONS, GROUND SURFACE AND STRATIGRAPHY ARE INFERRED.

FIGURE 5-2.

SOIL PROFILE A-A'

Source: ECT, 1992.

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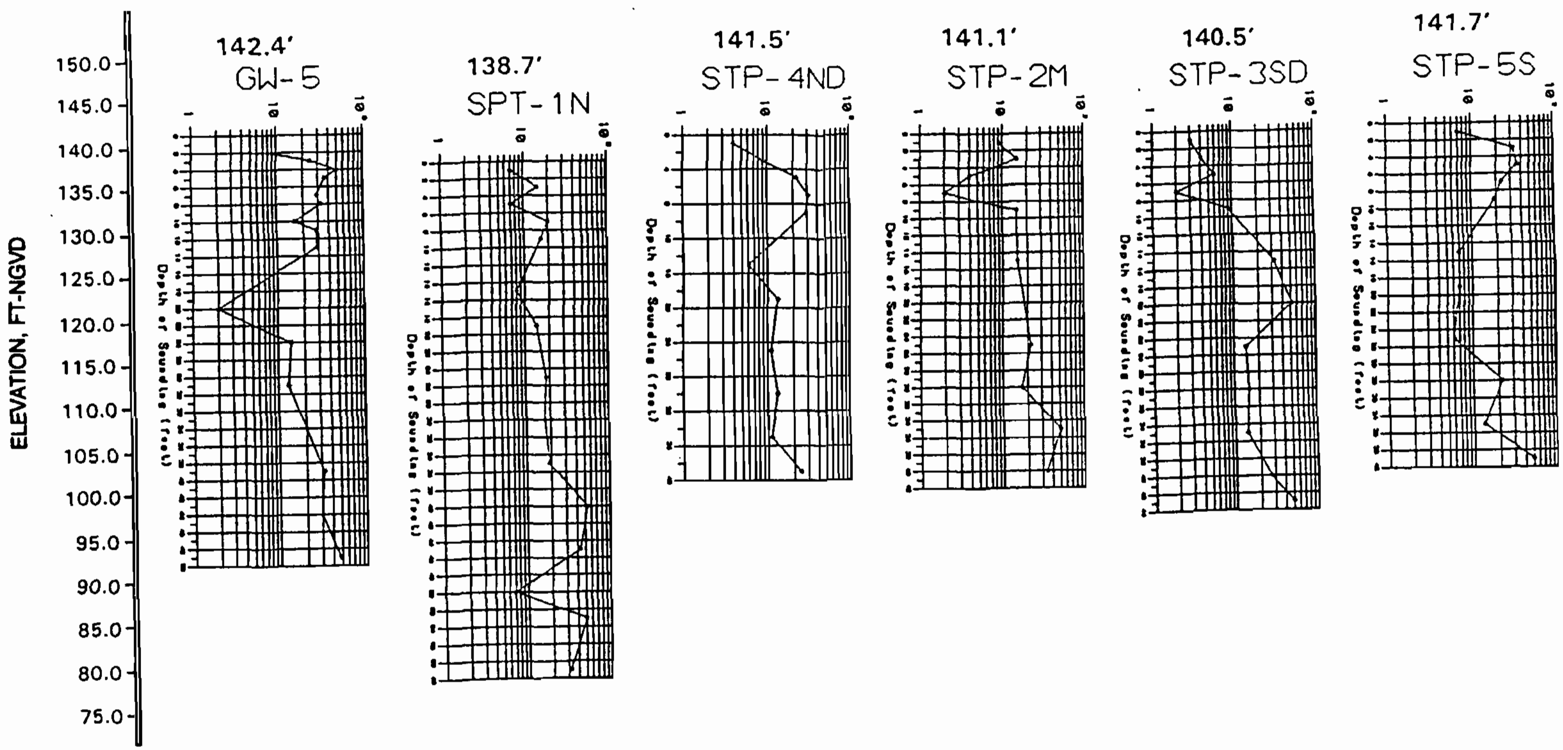
90263 0401 06/92




NOTES: HORIZONTAL AXIS REPRESENTS "N" VALUE
VERTICAL AXIS REPRESENTS DEPTH OF SAMPLE
142.4'- ELEVATION OF BORING LOCATION

**FIGURE 5-3.**

**STANDARD PENETRATION TEST "N VALUE" PROFILE FOR SOIL PROFILE A-A'**

Source: ECT, 1992.

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**POLK POWER STATION**

## 6.0 INFLUENCE/EFFECT OF PROPOSED CONSTRUCTIONS

Sinkhole formation can be triggered by various industrial construction or operation activities. Key construction/operation aspects associated with increased potential for sinkhole formation are discussed in the following sections.

### 6.1 COOLING RESERVOIR

According to the proposed plant layout, the Polk Power Station will have an 860-acre cooling water reservoir, including the surrounding earthen berm. The design elevations for the top of the berm, water surface, and reservoir bottom are 145, 136, and 120 ft-NGVD, respectively. Construction of the cooling reservoir will take advantage of the existing mine cuts. This will minimize the need to dig the mine cuts deeper and limit the major excavation activities to removal of overburden spoil piles present in the mine cuts. The reservoir design is intended to be in close relationship (hydraulic connection) to the surficial aquifer. The anticipated net makeup of approximately 1.9 million gallons per day (MGD) (5.0 MGD makeup and 3.1 MGD blowdown) of groundwater from the Floridan aquifer to the reservoir will cause some local mounding. However, the results of the model which was used to simulate operational range of the cooling water reservoir indicate that its levels are within the range of typical seasonal fluctuation of the surficial aquifer. Thus, the hydraulic loading from the reservoir is not expected to be significantly increased. Additionally, the loading caused by the cooling reservoir should be less than that caused by numerous clay settling ponds in the site vicinity.

### 6.2 CONSTRUCTION DEWATERING

Based on the plant and reservoir construction design and layout, only shallow dewatering activities (less than 40 ft bls) are required. These activities will be conducted in small units/cells and the water will be discharged into adjacent mine cuts. Therefore, the dewatering impacts will be limited both in their vertical and areal extent.

## 6.3 WATER SUPPLY

Two 10-inch inside diameter and two 24-inch outside diameter water supply wells are planned to withdraw the required 6.6 MGD annual average from the Floridan aquifer for the Polk Power Station cooling reservoir makeup and process water needs. Upon full build-out, the pumping will be distributed between two 24-inch wells with the two 10-inch wells as a backup. These wells are proposed for the west central portion of the plant site. These locations are not immediately adjacent to the cooling reservoir or property boundaries. By using two production wells, the drawdown impacts will be minimized and the smaller impact distributed over a larger area. The pumpage rates of the supply wells will be adjusted to minimize pump cycling and related groundwater levels fluctuations. By using adequate well placement, construction, and operation techniques, the potential withdrawal impacts in the Floridan aquifer are not expected to be significant.

## 6.4 STORMWATER MANAGEMENT SYSTEM

The proposed stormwater management plan for the Polk Power Station indicates that stormwater runoff from the site will be directed to the cooling reservoir after appropriate treatment or to the three drainage systems which existed on the site prior to mining. The cooling reservoir will be designed so that upon full build-out, discharge from the reservoir will occur at an average rate of 3.1 MGD to Little Payne Creek. Because the reservoir will be in hydraulic connection with the surficial aquifer, the potential impacts of collecting and routing the stormwater runoff to the reservoir are expected to be insignificant.

## 6.5 RAILROAD SYSTEM

Railroad access to the Tampa Electric Company Polk Power Station site, will be constructed from the existing CSX Railroad adjacent to Fort Green Road along the eastern boundary of the site. The railroad system will lie on the north side of the cooling reservoir and loop around the coal storage area within the main plant site area. The railroad access will serve for coal and heavy equipment deliveries to the facility. Loading caused by operation of the railroad will not be significantly different than that from existing railroad systems in the mining district. No reported sinkhole damage attributed to railroad operation were encountered in the site area during this investigation.

## 7.0 CONCLUSIONS

Many small surface depressions dot the uplands between the stream systems that drain the Polk Power Station site area. Inasmuch as this upland has not been inundated by the sea since pre-Pleistocene time, more than one million years, the scarcity and small size of the depressions suggest that sinkhole activity has been relatively minor in the area.

Although solution cavities probably exist in the carbonate rocks of the Floridan aquifer and are probably large, the aquifer is buried beneath approximately 300 ft of unconsolidated clastic and poorly consolidated carbonate rock material. Though possible, it seems highly unlikely that collapse within the deeply-buried Floridan aquifer will have any effect at the land surface.

Carbonate rocks of the intermediate aquifer occur within the surficial clastic sediments at depths of 30 to 50 ft. These are the first carbonate rocks that water percolating through the surficial aquifer makes contact with. Solution cavities, particularly in the upper part of the intermediate aquifer, are probably responsible for the small land-surface depressions.

Surface lineations, related to fracture zones in the bedrock, are relatively scarce in the Polk Power Station area, suggesting either that groundwater circulation has not been adequate to develop large solution cavities along fractures, or that the bedrock is too deeply buried for these features to affect the land surface. Recharge to the intermediate aquifer and below is relatively slight. The potential for dissolution of carbonate rocks is, likewise, limited.

The thick section of relatively cohesive sandy clay and clay that overlie the carbonate rocks appears to have sufficient bearing strength to bridge cavities of small to moderate size. When the bearing strength is exceeded, however, collapse at land surface will quickly result. It seems unlikely that sinkholes any larger than the existing small depressions will occur in the Polk Power Station site area.

## 8.0 REFERENCES


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# APPENDIX A--SOIL BORING LOGS

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-1N
TOTAL DEPTH: 60ft.
SHEET 1 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/02/91
COMPLETED 4/02/91
DRILLER/RIG Alderman/CME45
WATER TABLE: 1st depth 8.0''
date 4/02/91
time
WATER TABLE: 2nd depth –
date –
time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-3 4-5 | 7 | 1 | | | | | | Dark reddish-brown sand with silt and roots (sp-sm) | | |
| | | 7-8 7-5 | 15 | 2 | | | | | | Light reddish-brown sand (sp) | | |
| -5 | 5 | 3-4 3-7 | 7 | 3 | | | | | | | | |
| | | 9-10 10-9 | 20 | 4 | | | | | | Light brown sand (sp) | | |
| -10 | 10 | 7-7 9-8 | 16 | 5 | | | | | | | | |
| | | | | | | | | | | Brownish-gray clayey sand (sc) | | |
| -15 | 15 | 4-4 4-6 | 8 | 6 | | | | | | | | |
| | | | | US-1 | 19 | 17 | | | 110.9 | Gray clayey sand with phosphate (sc) | | |
| -20 | 20 | 7-7 7-8 | 14 | 7 | | | | | | | | |
| -25 | 25 | 7-7 11-9 | 18 | 8 | | | | | | | | |
| -30 | 30 | 6-8 9-10 | 17 | 9 | | | | | | | | |
| -35 | 35 | 7-9 10-14 | 19 | 10 | | | | | | | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-1N
TOTAL DEPTH: 60ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan

FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 13-22 32-38 | 54 | 11 | | | | | | Gray sand with clay to clayey sand with phosphate (sp-sc to sc) | | |
| -42 | 42 | | | | | | | | | | | |
| | | 12-18 25-25 | 43 | 12 | | | | | | | | |
| -47 | 47 | | | | | | | | | | | |
| | | 2-3 4-6 | 7 | 13 | | | | | | Gray clayey sand with phosphate (sc) with lenses of greenish-brown clayey silt (mh) | | |
| -52 | 52 | | | | | | | | | | | |
| | | 46-50/4 | 50/4" | 14 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -57 | 57 | | | | | | | | | | | |
| | | 20-18 19-35 | 32 | 15-16 | | | | | | | | |
| | | | | | | | | | | Total depth 60.0 feet | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG
## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-4ND
TOTAL DEPTH: 40ft.
SHEET 1 OF 2

PROJECT Teco Power Plant | FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. | ELEVATION
BORING LOCATION As Per Plan | BORING TYPE SPT
COUNTY Polk | STATE Florida | CASING TYPE None
DATE STARTED 4/04/91 | COMPLETED 4/04/91 | DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 3.58'' | date 4/04/91 | time
WATER TABLE: 2nd depth — | date — | time —
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-2 2-4 | 4 | 1 | | | | | | Light brown to brown sand (sp) | | |
| | | 4-4 5-8 | 9 | 2 | | | | | | | | |
| -5 | 5 | 8-12 10-15 | 22 | 3 | | | | | | | | |
| | | 7-14 7-21 | 31 | 4 | | | | | | Brown sand with clay (sp-sc) | | |
| -10 | 10 | 13-13 16-15 | 29 | 5 | | | | | | | | |
| | | | | US-1 | 18 35.3 | 73 | | | 100.2 | | | |
| -15 | 15 | 3-3 3-4 | 6 | 6 | | | | | | Brownish-gray clayey sand (sc) | | |
| -20 | 20 | 3-4 9-11 | 13 | 7 | | | | | | | | |
| -25 | 25 | 4-5 6-11 | 11 | 8 | | | | | | Brownish-gray sand with silt to silty sand with phosphate (sp-sm to sm) | | |
| -30 | 30 | 4-6 7-10 | 13 | 9 | | | | | | | | |
| | | | | | | | | | | Grayish-green clayey sand (sc) | | |
| -35 | 35 | 13-5 6-7 | 11 | 10-11-12 | | | | | | Brownish-gray clayey sand with phosphate (sc) | | |
| | | | | US-2 | 44.8 | 23 | 89 | 47 | 74.9 | | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-4ND
TOTAL DEPTH: 40ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | US-2 | 44.8 | 23 | 89 | 47 | 74.9 | Brownish-gray clayey sand with phosphate (sc) | | |
| | | 7-9 15-50/4 | 24 | 13-14 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| | | | | | | | | | | Greenish-brown silty sand with clay and phosphate (sm) | | |
| | | | | | | | | | | Total depth 40.0 feet | | |
| -42 | 42 | | | | | | | | | | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-2M
TOTAL DEPTH: 41ft.
SHEET 1 OF 2

PROJECT Teco Power Plant — FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. — ELEVATION
BORING LOCATION As Per Plan — BORING TYPE SPT
COUNTY Polk — STATE Florida — CASING TYPE None
DATE STARTED 4/02/91 — COMPLETED 4/02/91 — DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 6.0'' — date 4/02/91 — time
WATER TABLE: 2nd depth – — date – — time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3-4<br>5-6 | 9 | 1/2 | | | | | | Dark reddish-brown sand with silt an roots (sp-sm)<br>Light brown to brown sand (sp) | | |
| | | 8-7<br>8-7 | 15 | 3 | | | | | | Yellowish-brown to light brown sand (sp) | | |
| -5 | 5 | 4-2<br>2-2 | 4 | 4 | | | | | | | | |
| | | 2-1<br>1-4 | 2 | 5 | | | | | | Brown sand with clay (sp-sc) | | |
| -10 | 10 | 6-7<br>8-10 | 15 | 6 | | | | | | Brownish-gray sand with silt and cemented sand nodules (sp-sm) | | |
| -15 | 15 | 15-10<br>5-5 | 15 | 7 | | | | | | Brownish-gray clayey sand (sc) | | |
| -20 | 20 | | | US-1 | 16.8 | 13 | 24 | 10 | 105.4 | | | |
| -25 | 25 | 9-11<br>11-13 | 22 | 8 | | | | | | Gray sand with clay to clayey sand with phosphate (sp-sc to sc) | | |
| -30 | 30 | 6-9<br>8-9 | 17 | 9 | | | | | | | | |
| -35 | 35 | 4-9<br>50/2" | 50/2" | 10 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-2M
TOTAL DEPTH: 41ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan
FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7-14 20-21 | 34 | 11 | | | | | | greenish-brown silty sand with clay and phosphate (sm-sc) | | |
| -42 | 42 | | | | | | | | | Total depth 41.0 feet | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-3SD
TOTAL DEPTH: 44ft.
SHEET 1 OF 2

PROJECT Teco Power Plant — FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc. — ELEVATION
BORING LOCATION As Per Plan — BORING TYPE SPT
COUNTY Polk — STATE Florida — CASING TYPE None
DATE STARTED 4/03/91 — COMPLETED 4/03/91 — DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 4.0' — date 4/03/91 — time
WATER TABLE: 2nd depth – — date – — time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1-1 2-3 | 3 | 1 | | | | | | Light brown to brown sand (sp) | | |
| | | 4-2 2-2 | 4 | 2 | | | | | | Dark reddish-brown sand with silt an roots (sp-sm) | | |
| -5 | 5 | 3-3 3-3 | 6 | 3 | | | | | | | | |
| | | 1-1 1-2 | 2 | 4 | | | | | | Light reddish-brown sand (sp) | | |
| -10 | 10 | 4-4 5-6 | 9 | 5 | | | | | | | | |
| -15 | 15 | 9-14 18-24 | 32 | 6-7 | | | | | | Brownish-gray clayey sand (sc) | | |
| | | | | US-1 | 18.9 | 11 | | | 104.8 | Grayish-brown sand with silt to silty SAND (sp-sm to sm) | | |
| -20 | 20 | 23-27 25-30 | 52 | 8 | | | | | | Gray sand with clay to clayey sand with phosphate (sp-sc to sc) | | |
| -25 | 25 | 5-6 8-8 | 14 | 9 | | | | | | | | |
| | | | | US-2 | 18.8 | 16 | 26 | 10 | 108.9 | | | |
| -30 | 30 | 2-7 8-15 | 15 | 10 | | | | | | Gray clayey sand with phosphate with lenses of greenish-brown clayey silt (mh) | | |
| -35 | 35 | 8-6 8-8 | 14 | 11 | | | | | | | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-3SO
TOTAL DEPTH: 44ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan
FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 28-13 14-11 | 27 | 12 | | | | | | Light greenish-gray sandy silt - occasionally cemented [ml] | | |
| -42 | 42 | | | | | | | | | | | |
| | | 50/0" | 50/0" | | | | | | | No recovery | | |
| | | | | | | | | | | Total depth 44.0 feet | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-5S
TOTAL DEPTH: 40ft.
SHEET 1 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/04/91
COMPLETED 4/05/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth None*
date
time
WATER TABLE: 2nd depth —
date —
time —
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-2<br>5-9 | 7 | 1 | | | | | | Dark reddish-broww sand with silt and roots (sp-sm) | | |
| | | 18-22<br>12-10 | 32 | 2 | | | | | | | | |
| -5 | 5 | 11-12<br>14-14 | 36 | 3 | | | | | | Brownish-gray clayey sand (sc) | | |
| | | 12-12<br>11-11 | 23 | 4 | | | | | | | | |
| -10 | 10 | 9-9<br>10-12 | 19 | 5-6 | | | | | | Grayish-brown sand (sp) | | |
| | | | | | | | | | | Brownish-gray clayey sand (sc) | | |
| -15 | 15 | 2-3<br>4-6 | 7 | 7 | | | | | | Grayish-brown sand (sp) | | |
| | | | | US-1 | 20 | 7 | | | 103.3 | | | |
| -20 | 20 | 1-2<br>5-6 | 7 | 8 | | | | | | | | |
| -25 | 25 | 1-3<br>3-4 | 6 | 9 | | | | | | Brownish-gray clayey sand (sc) | | |
| -30 | 30 | 6-7<br>15-11 | 22 | 10 | | | | | | Gray sand with clay to clayey sand with phosphate (sc) | | |
| | | | | | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -35 | 35 | 3-7<br>6-9 | 13 | 11-12 | | | | | | Greenish-brown silty sand with clay and phosphate (sm-sc) | | |
| | | | | | | | | | | Light gray clayey sand with phosphate (sc) | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: SPT-5S
TOTAL DEPTH: 40ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As Per Plan
FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | US-2 | 38.4 | | 97 | 63 | 86.4 | Light gray clayey sand with phosphate (sc) | | |
| | | 10-50/4 | 50/4" | | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| | | | | | | | | | | Total depth 40.0 feet | | |
| -42 | 42 | | | | | | | | | | | |
| -47 | 47 | | | | | | | | | | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-5
TOTAL DEPTH: 50ft.
SHEET 1 OF 2

PROJECT Ieco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/01/91
COMPLETED 4/01/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 9.0'
date 4/01/91
time
WATER TABLE: 2nd depth –
date –
time –
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/ 6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3-4-4 | 8 | 1 | | | | | | Dark reddish-brown sand with silt and roots (sp-sm) | | |
| | | 7-9-15 | 24 | 2 | | | | | | | | |
| | | 26-28-23 | 51 | 3 | | | | | | Light brown to dark brown silty sand (sm) | | |
| -5 | 5 | 18-18-18 | 36 | 4 | | | | | | | | |
| | | | | | | | | | | Brown sand with clay (sp-sc) | | |
| | | 12-14-15 | 29 | 5 | | | | | | | | |
| | | 17-17-15 | 32 | 6 | | | | | | Brownish-gray clayey sand (sc) | | |
| -10 | 10 | 8-8-8 | 16 | 7 | | | | | | | | |
| | | 7-13-15 | 28 | 8 | | | | | | | | |
| | | 14-14-14 | 28 | 9 | | | | | | | | |
| -15 | 15 | | | | | | | | | Grayish-brown sand (sp) | | |
| | | | | US-1 | 27 | 12 | | | 90.9 | | | |
| -20 | 20 | 2-1 1-2 | 2 | 10 | | | | | | Brownish-gray silty sand with cemented sand nodules (sm) | | |
| -25 | 25 | 4-6 8-12 | 14 | 11 | | | | | | | | |
| | | | | | | | | | | Gray sand with clay to clayey sand with phosphate (sc) | | |
| -30 | 30 | 7-7 6-12 | 13 | 12 | | | | | | | | |
| -35 | 35 | 6-8 12-14 | 20 | 13 | | | | | | Greenish-gray sand with clay and phosphate (sp-sc) | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-5
TOTAL DEPTH: 50ft.
SHEET 2 OF 2

PROJECT Teco Power Plant
CLIENT Environmental Consult.& Technology, Inc.
BORING LOCATION As per Plan

FILE NO. 91-9045
ELEVATION
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 11-20<br>17-12 | 32 | 14 | | | | | | Gray sand with clay to clayey sand with phosphate (sc) with lenses of greenish-brown clayey silt (mh) | | |
| -42 | 42 | | | | | | | | | | | |
| | | 12-15<br>15-15 | 30 | 15 | | | | | | Brownish-gray sand with silt and cemented sand nodules (sp-sm) | | |
| -47 | 47 | | | | | | | | | | | |
| | | 19-24<br>24-24 | 48 | 16 | | | | | | Greenish-brown silty sand with clay and phosphate (sm) | | |
| | | | | | | | | | | Total depth 50.0 feet | | |
| -52 | 52 | | | | | | | | | | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# BORING LOG

## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-1
TOTAL DEPTH: 12ft.
SHEET 1 OF 1

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk STATE Florida
CASING TYPE None
DATE STARTED 4/04/91 COMPLETED 4/04/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth None' date 4/04/91 time
WATER TABLE: 2nd depth — date — time —
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586 Blows/6 in | N Value | Sample Number | Lab Data NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -5 | 5 | | | | | | | | | Wash | | |
| -10 | 10 | | | US-1 | 16.9<br>20.3 | | | | 108.3 | Light greenish-brown sandy clay (ch-sc)<br>Light gray sand (sp) | | |
| | | | | | | | | | | Total depth 12.0 feet | | |
| -15 | 15 | | | | | | | | | | | |
| -20 | 20 | | | | | | | | | | | |
| -25 | 25 | | | | | | | | | | | |
| -30 | 30 | | | | | | | | | | | |
| -35 | 35 | | | | | | | | | | | |

# BORING LOG
## ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-4
TOTAL DEPTH: 51ft.
SHEET 1 OF 2

PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT
COUNTY Polk
STATE Florida
CASING TYPE None
DATE STARTED 4/05/91
COMPLETED 4/05/91
DRILLER/RIG Alderman/CME 45
WATER TABLE: 1st depth 4.0'
date 4/05/91
time
WATER TABLE: 2nd depth --
date --
time --
REMARKS

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2-1 2-3 | 3 | 1 | | | | | | Light brown sand (sp) - fill | | |
| | | 3-3 2-3 | 5 | 2 | | | | | | | | |
| -5 | 5 | 3-1 1-1 | 2 | 3 | | | | | | | | |
| | | WOH | 0 | 4 | | | | | | Light brown sand with light gray clayey sand lenses (sp with sc) - fill | | |
| -10 | 10 | WOH | 0 | 5 | | | | | | | | |
| | | 1/24" | 0 | 6 | | | | | | | | |
| | | | | US-1 | 19.7 | | | | 122.1 | | | |
| -15 | 15 | WOH | 0 | 7 | | | | | | | | |
| -20 | 20 | | | | | | | | | | | |
| -25 | 25 | 1-1 2-2 | 3 | 8 | | | | | | | | |
| -30 | 30 | | | | | | | | | | | |
| -35 | 35 | 1-1 2-3 | 3 | 9 | | | | | | | | |

# BORING LOG

ARDAMAN AND ASSOCIATES, INC.

BORING NO: GW-4
TOTAL DEPTH: 51ft.
SHEET 2 OF 2

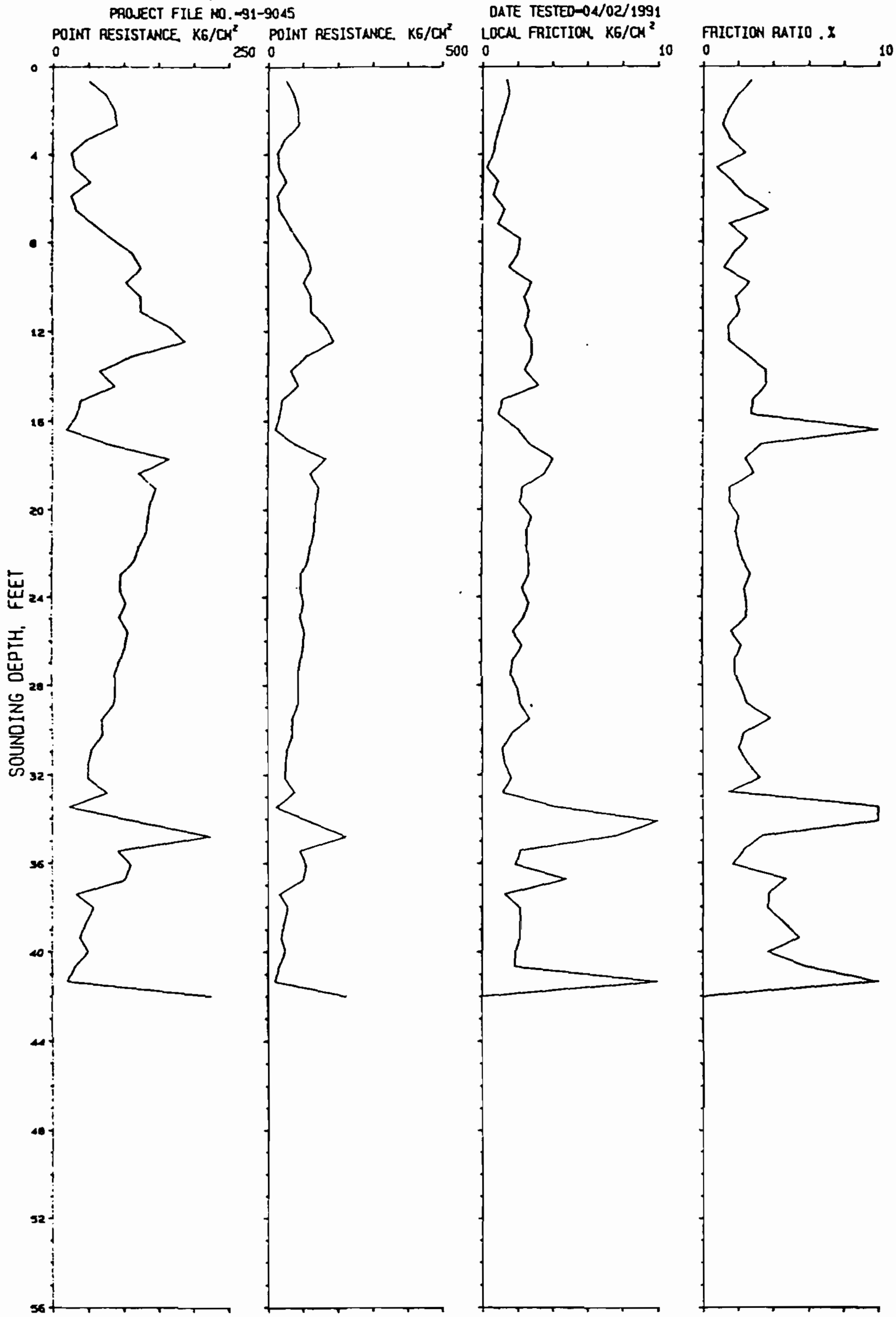
PROJECT Teco Power Plant
FILE NO. 91-9045
CLIENT Environmental Consult.& Technology, Inc.
ELEVATION
BORING LOCATION As Per Plan
BORING TYPE SPT

| Elevation | Depth (ft) | Standard Pen. Test ASTM D-1586: Blows/6 in | N Value | Sample Number | Lab Data: NM (%) | -200 (%) | LL (%) | PI (%) | Dry Den (pcf) | Soils Description and Remarks | U.S.C.S. | Graphic Log |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 3-6 7-10 | 13 | 19 | | | | | | Light brown sand with light gray clayey sand lenses (sp with sc) - fill | | |
| -42 | 42 | | | | | | | | | Phosphatic waste clay (slime) (ch) - fill | | |
| | | 4-2 2-3 | 4 | 11-12 | | | | | | | | |
| | | | | | | | | | | Light brown to brown sand (sp) | | |
| -47 | 47 | | | | | | | | | Gray clayey sand with phosphate with lenses of greenish-brown clayey silt (mh) | | |
| | | 8-18 23-25 | 41 | 13 | | | | | | Light greenish-gray sandy silt - occasionally cemented (ml) | | |
| -52 | 52 | | | | | | | | | Total depth 51.0 feet | | |
| -57 | 57 | | | | | | | | | | | |
| -62 | 62 | | | | | | | | | | | |
| -67 | 67 | | | | | | | | | | | |
| -72 | 72 | | | | | | | | | | | |

# APPENDIX B--CONE PENETRATION TESTS

# TECO / ECT CONSULTANTS : S.R.37 & 630 : CPT-1

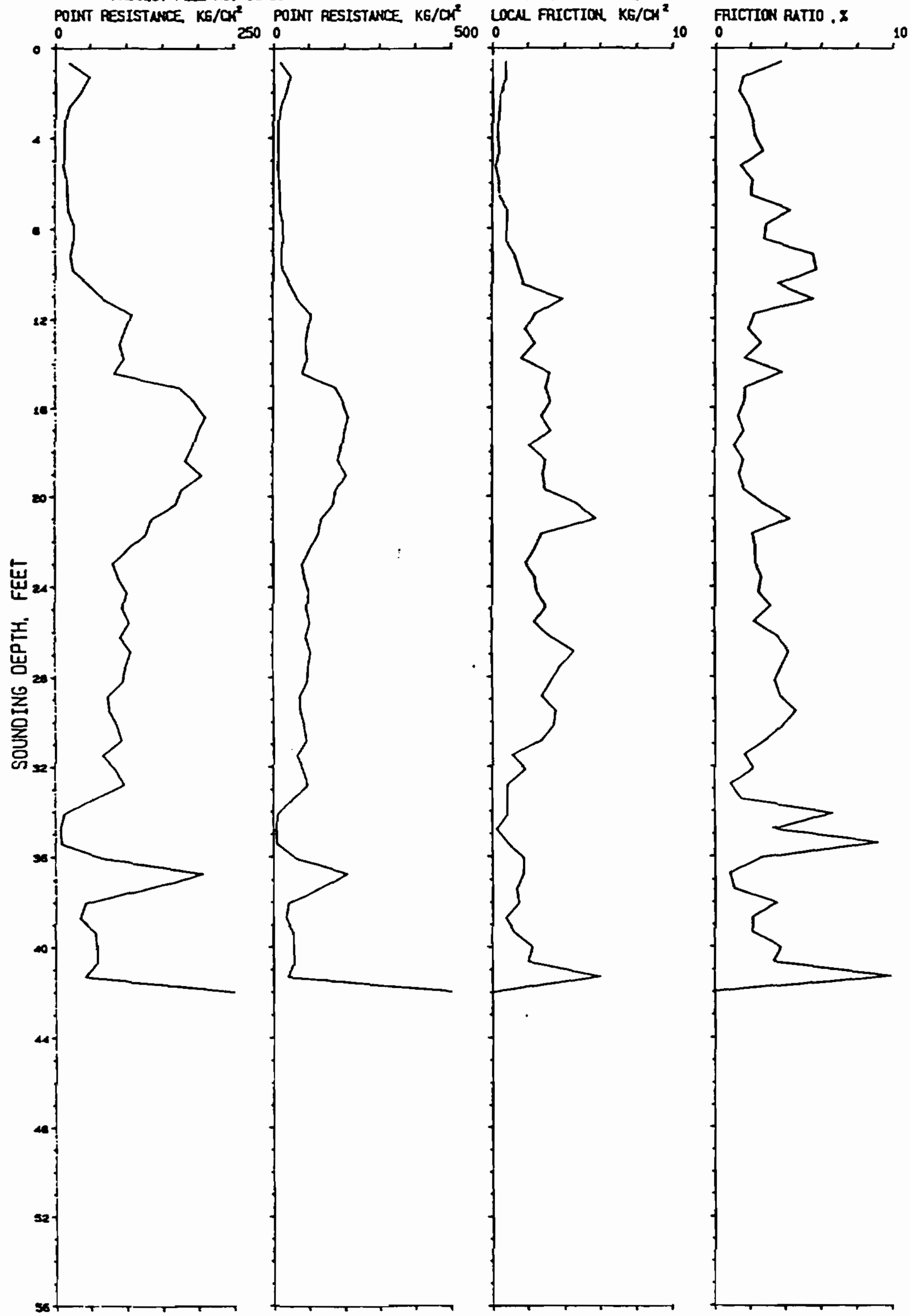
PROJECT FILE NO.-91-9045 DATE TESTED-04/02/1991



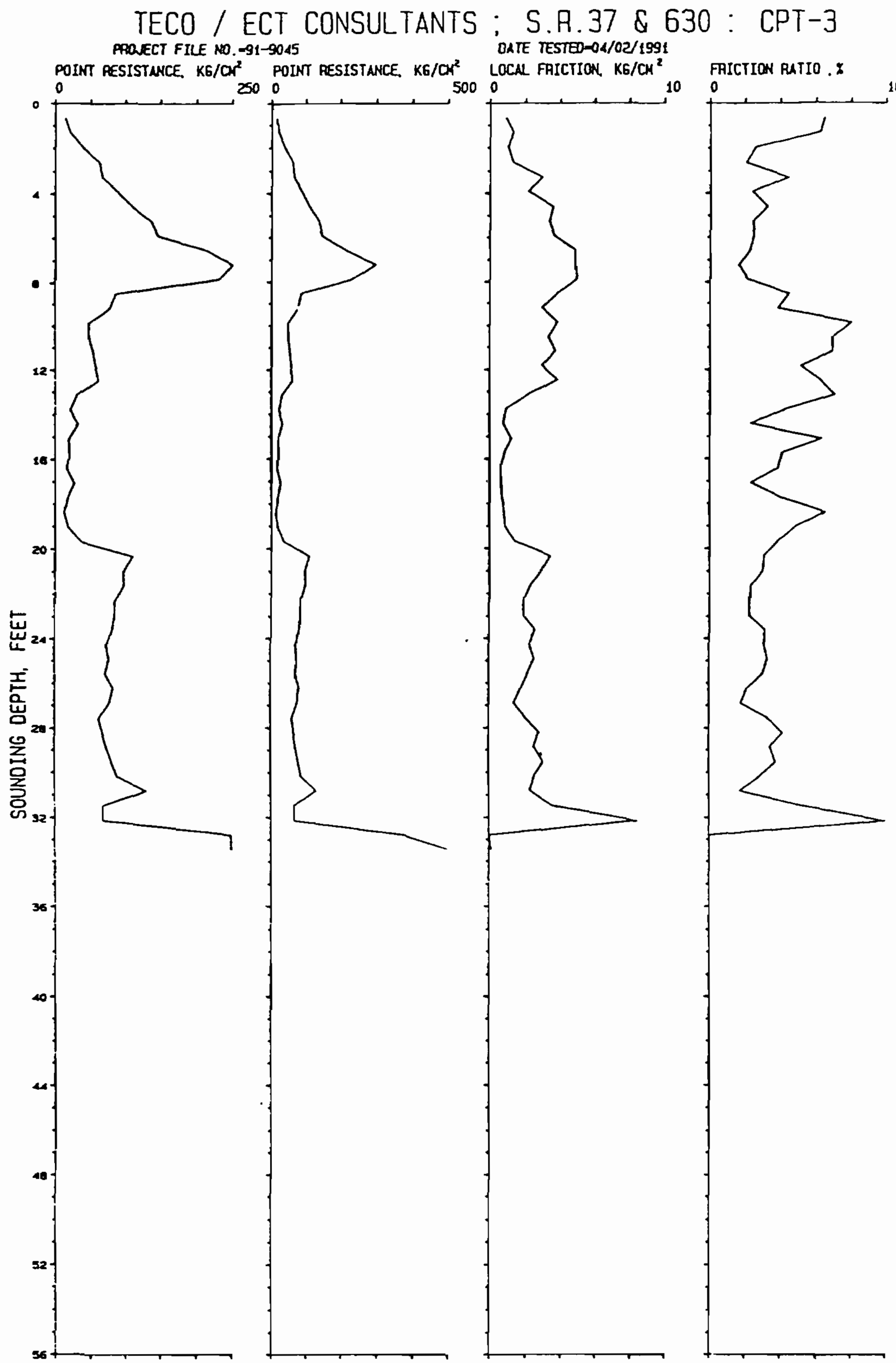

| | | | |
|---|---|---|---|
| **Ardaman & Associates, Inc.** Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing | PROPOSED TECO POWER PLANT<br>POLK COUNTY, FLORIDA | DRAWN BY: J.W.<br>FILE NO. 91-9045 | CHECKED BY: DATE: 4-19-91<br>APPROVED BY: |

# TECO / ECT CONSULTANTS ; S.R.37 & 630 : CPT-2

PROJECT FILE NO.=91-9045 DATE TESTED=04/02/1991




| | | | |
|---|---|---|---|
| Ardaman & Associates, Inc. Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing | PROPOSED TECO POWER PLANT POLK COUNTY, FLORIDA | DRAWN BY: J.W. FILE NO. 91-9045 | CHECKED BY: APPROVED BY: | DATE: 4-19-91 |




| | | | |
|---|---|---|---|
| Ardaman & Associates, Inc. Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing | PROPOSED TECO POWER PLANT<br>POLK COUNTY, FLORIDA | DRAWN BY: J.W.<br>FILE NO. 91-9045 | CHECKED BY:<br>APPROVED BY: | DATE: 4-19-91 |

# APPENDIX C--GEOTECHNICAL LABORATORY TEST REPORTS

REC'D JUN 1?

Ardaman & Associates, Inc.

Consultants in Soils, Hydrogeology,
Foundations and Materials Testing

Revised June 5, 1991
May 15, 1991
File Number 91-9045

Environmental Consulting &
Technology, Inc.
Post Office Box 20866
Tampa, Florida 33622-0866

Attn: Rick Steele

Subject: Report of Soil Laboratory Test Results, Proposed TECO Power Plant, State Road 630 and State Road 37, Polk County, Florida

Gentlemen:

As authorized, we have performed soil testing according to the program determined by Mr. Rick Steele, of ECT, Inc. The laboratory test results performed are presented on Table 1.

Furthermore, grain size distribution curves, based on the grain size analysis performed on selected soil samples, are presented in Figures 1 through 7.

It has been a pleasure assisting you with this phase of your project. If there are any questions, or when we may be of further assistance, please contact the undersigned at 813/654-2336.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

Dusan Jovanovic
Project Engineer

Thomas J. Leto

Thomas J. Leto, P.E.
Principal
Florida Registration No. 12458

DJ/TJL:paw Enclosures
sse21/91-9045.slt

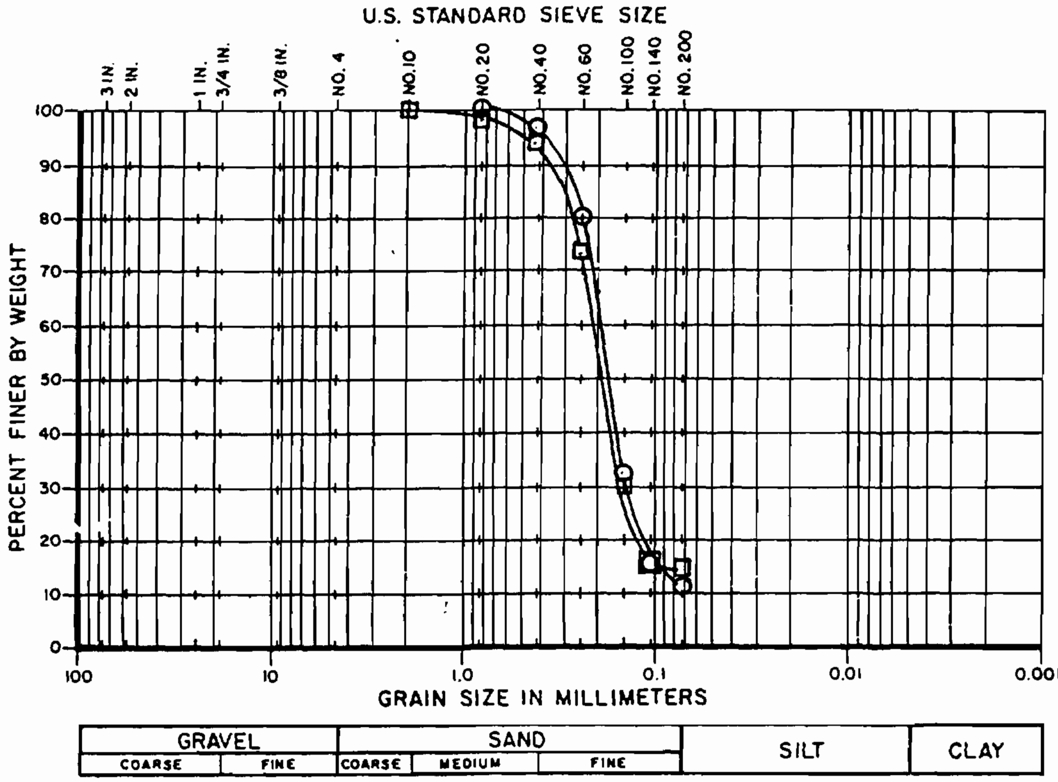
ENVIRONMENTAL CONSULTING
& TECHNOLOGY, INC.
PROPOSED TECO POWER PLANT
SOIL LABORATORY TEST RESULTS

| Boring No. | Sample No. | Depth Sampled [feet] | Natural Moisture [%] | Percent Fines [%] | LL | PI | k [cm/sec] | Dry Density [pcf] | Porosity [%] | CEC** [meg Ba/ 100g Soil] |
|---|---|---|---|---|---|---|---|---|---|---|
| SPT-1N | U.S. #1 | 16'-18' | 19.0 | 17.0 | | | $3.8\times10^{-5}$ | 110.7 | 33.7 | |
| GW-1 | U.S. #1 | 10'-12' | 22.5 | 4.0 | | | $5.1\times10^{-3}$ | 114.4 | 40.3 | |
| SPT-2M | U.S. #1 | 18.5'-20.5' | 16.8 | 13.0 | 24 | 10 | $2.3\times10^{-5}$ | 105.4 | 28.4 | |
| SPT-3SD | U.S. #1 | 17'-18.5' | 18.9 | 11.0 | | | $2.8\times10^{-5}$ | 104.8 | 31.7 | |
| SPT-3SD | U.S. #2 | 27'-29' | 18.8 | 16.0 | 26 | 10 | $6.3\times10^{-6}$ | 108.9 | 32.8 | |
| SPT-4ND | U.S. #2 | 36'-38' | 44.8 | 23.0 | 89 | 47 | $1.1\times10^{-5}$ | 74.9 | 53.8 | |
| SPT-4ND | U.S. #1 | 12'-14' | 26.7 | 73.0 | | | $3.2\times10^{-8}$ | 100.2 | 42.9 | |
| SPT-5S | U.S. #2 | 36'-38' | 33.4 | 25.0 | 97 | 63 | $6.2\times10^{-7}$ | 86.4 | 46.2 | |
| SPT-5S | U.S. #1 | 16'-18' | 20.1 | 7.0 | | | $3.3\times10^{-4}$ | 103.3 | 33.3 | |
| GW-1 | * | Approx. 270' | 18.6 | 38.0 | | | $3.0\times10^{-7}$ | 108.3 | 32.3 | 0.27 |
| GW-5 | U.S. #1 | 16.5'-18.5' | 27.0 | 12.0 | | | $4.3\times10^{-7}$ | 90.9 | 39.3 | |
| GW-4 | U.S. #1 | 12'-14' | 19.7 | 7.0 | | | $2.4\times10^{-5}$ | 102.0 | 32.2 | |
| GW-4 | MT-1 | 38'-40' | 52.3 | | | | | 69.3 | 58.1 | 7.11 |
| PPS-GW2 | | | | | | | | | | |
| I-1 | U.S. #1 | 80'-81' | 30.6 | | | | | 96.0 | 47.1 | |
| GW-3 | U.S. PI1 | 49'-51' | 20.4 | | | | | 110.0 | 36.0 | |
| GW-3 | U.S. #1 | 12'-14' | 25.8 | 5.0 | | | $1.2\times10^{-3}$ | 99.4 | 41.1 | |
| GW-1 | U.S. #MT-1 | 36'-38' | 27.1 | 73.0 | | | $6.4\times10^{-7}$ | 99.1 | 43.0 | 3.04 |

*Mineral Barrel Sample
**Cation Exchange Capacity

TABLE 1

FIGURES




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 33D | US 1 | 17.0 - 18.5' | O | DARK BROWN SILTY SAND | SM |
| 33D | US 2 | 27.0 - 29.0' | □ | BLUISH-GRAY CLAYEY SAND | SC |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

**GRAIN SIZE DISTRIBUTION**

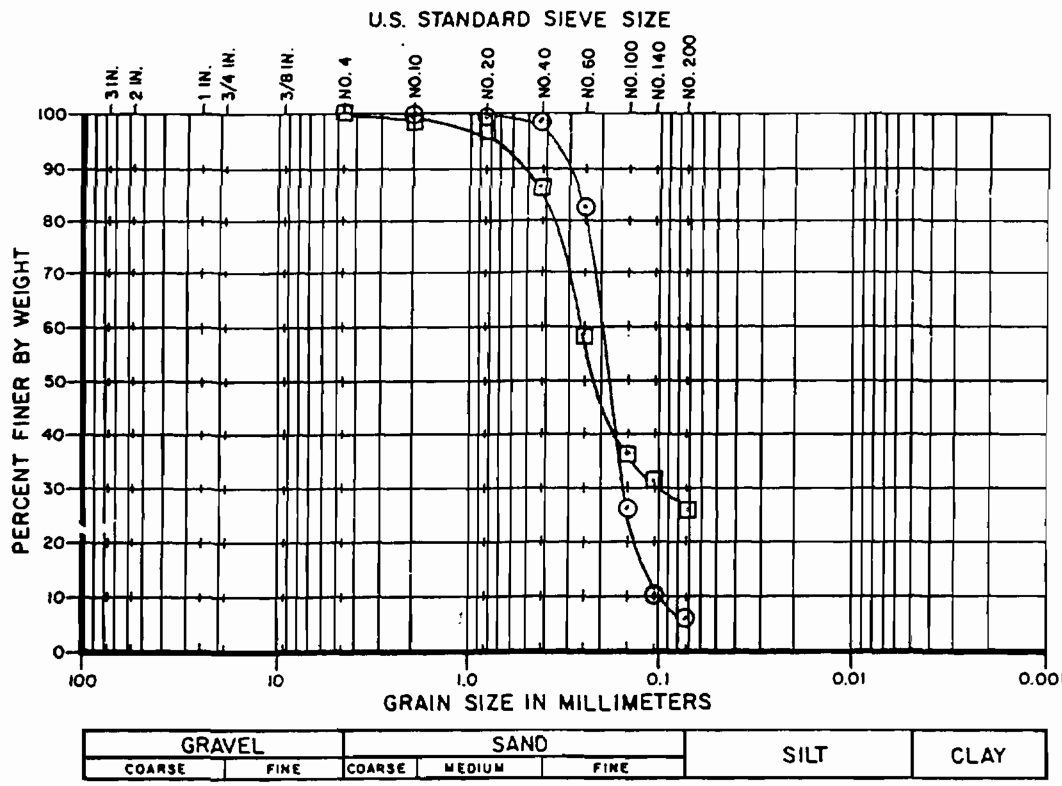
**Ardaman & Associates, Inc.**
Consulting Engineers in Soil Mechanics, Foundations, and Material Testing

PROPOSED TECO POWER PLANT
S.R. 630 & S.R. 37 POLK CO. FLORIDA

DRAWN BY: J.W. | CHECKED BY: | DATE: 5/20/91
FILE NO. 91-9045 | APPROVED BY:

FORM NO. 1509 7/80

FIGURE 1




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 55 | US1 | 16.0'-18.0' | O | GRAYISH-BROWN SAND | SP |
| 55 | US2 | 36.0'-38.0' | □ | GREENISH-GRAY CLAYEY SAND | SC |
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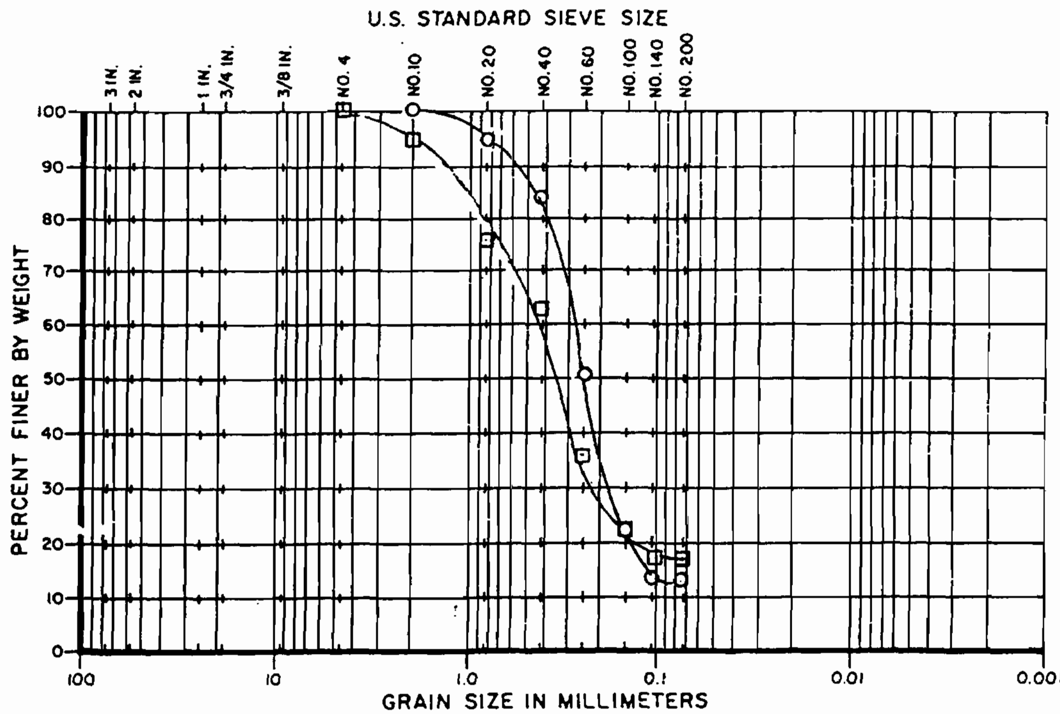
**FIGURE 2**




| GRAVEL | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | | |

| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 1N | US1 | 16.0'-18.0' | o | LT. GRAY CLAYEY SAND | SC |
| 2M | US1 | 18.5'-20.5' | □ | BROWNISH-GRAY CLAYEY SAND | SC |
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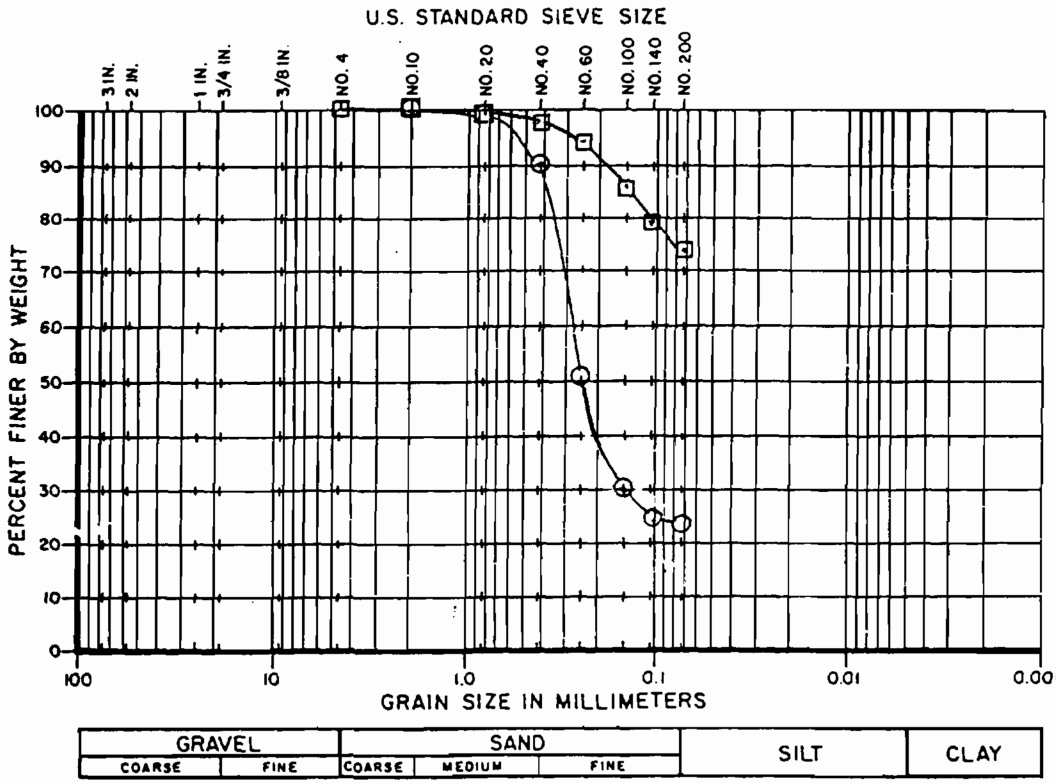
FIGURE 3




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| 4ND | US1 | 12.0-14.0' | □ | GREENISH-GRAY CLAY W POCKETS OF SAND | CH-SP |
| 4ND | US2 | 36.0-38.0' | O | GREEN CLAYEY SAND W/POCKETS OF SAND | SC |
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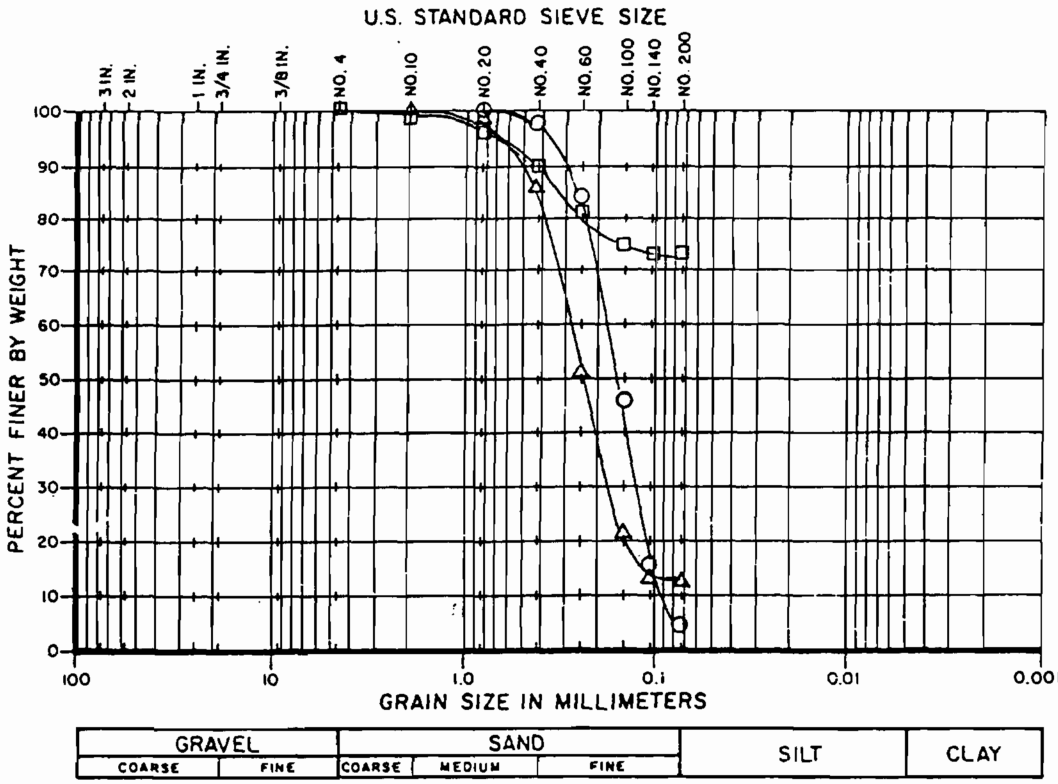
**FIGURE 4**




| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| GW1 | US1 | 10.0 - 12.0' | ○ | LT. GRAY SAND | SP |
| GW1 | MT1 | 36.0 - 38.0' | □ | GRAY CLAYEY SILT W/ PHOSPHATE | MH |
| GW5 | US1 | 16.5 - 18.5' | △ | GRAY SILTY SAND | SM |
| | | | | | |
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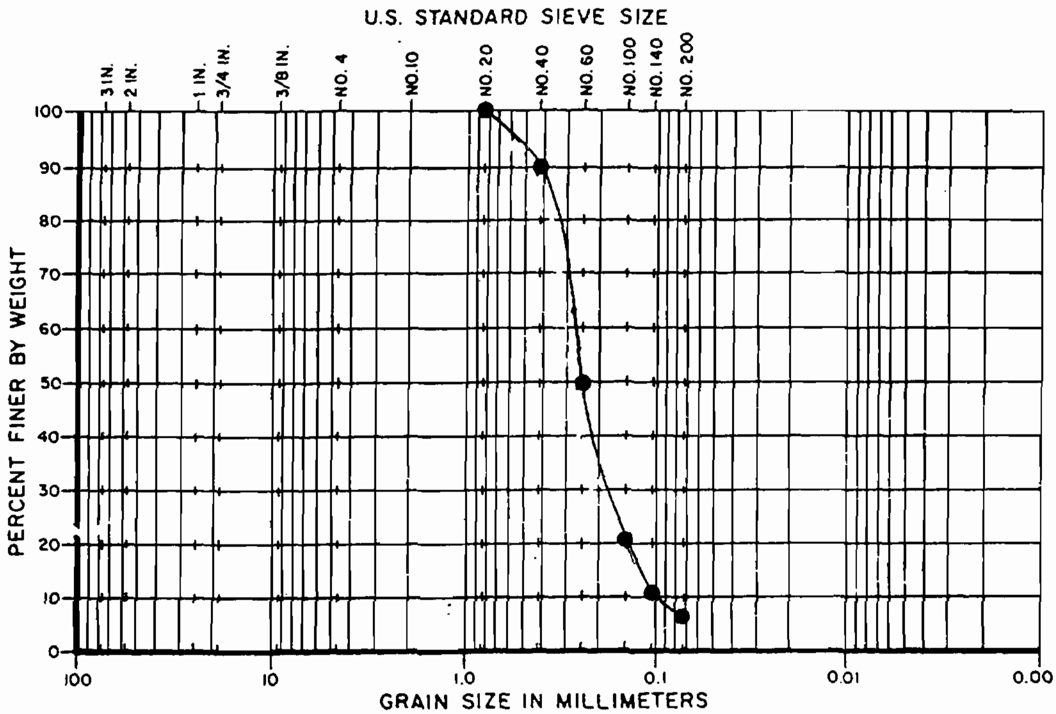
FIGURE 5




| GRAVEL | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|
| COARSE | FINE | COARSE | MEDIUM | FINE | | |

| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| GW-4 | US#1 | 12.0'-14.0' | ● | LIGHT GRAY CLAYEY SAND | SC |
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**FIGURE 6**

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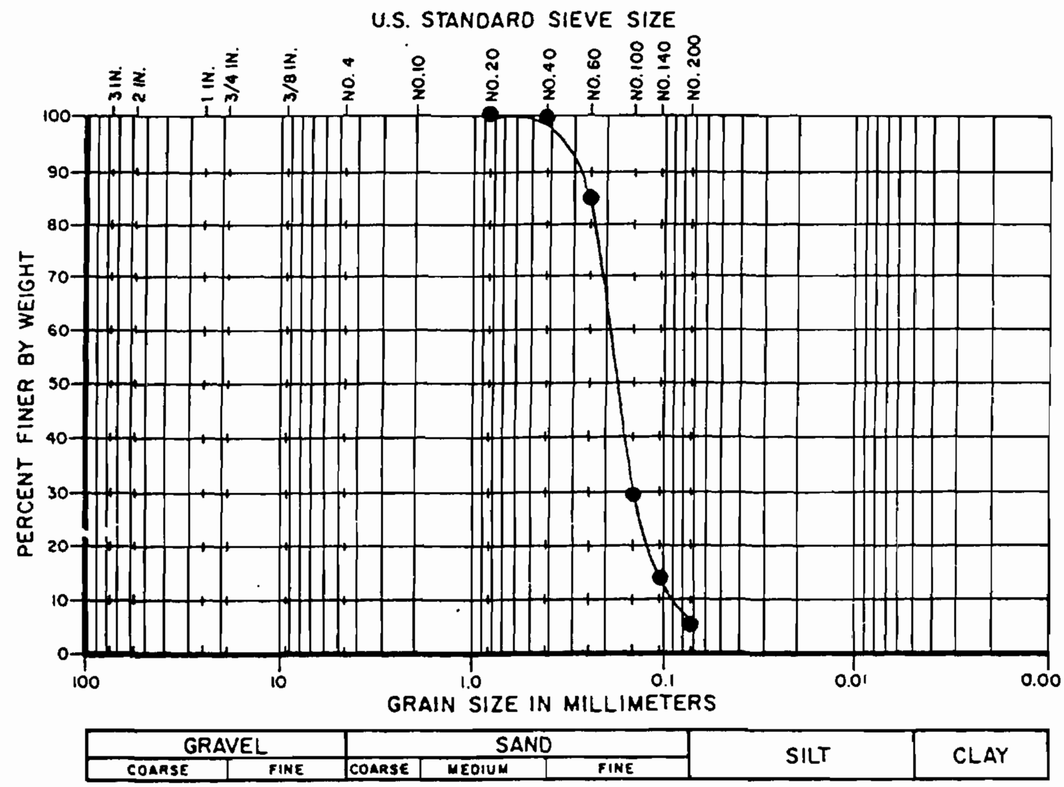


| TEST HOLE NO. | SAMPLE NO. | DEPTH | SYMBOL | SAMPLE DESCRIPTION | UNIFIED CLASS. |
|---|---|---|---|---|---|
| GW-3 | US#1 | 12.0' - 14.0' | ● | LIGHT GRAY SAND W/ PHOSPHATE TAILINGS | SP |
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**FIGURE 7**