Jon
Module AB12Z

PETITION FOR MODIFICATION OF SITE CERTIFICATION BIG BEND STATION UNIT 4 PA 79-12

RECEIVED
OCT 12 2012
DIVISION OF AIR
RESOURCE MANAGEMENT

GYPSUM CONVEYOR AND STORAGE AREA IMPROVEMENTS

Project 0570039-059-AC

Prepared for:

TECO
TAMPA ELECTRIC
Tampa, Florida

Prepared by:

ECT
Environmental Consulting & Technology, Inc.
6440 Southpoint Parkway
Jacksonville, Florida 32216

ECT No. 10-0754-0200

October 2012

TECO
TAMPA ELECTRIC

RECEIVED
OCT 12 2012
DIVISION OF AIR
RESOURCE MANAGEMENT

October 11, 2012

Ms. Cindy Mulkey, Program Administrator
Siting Coordination Office
Florida Department of Environmental Protection
3900 Commonwealth Boulevard, MS 48
Tallahassee, Florida 32399-3000

Via FedEx
Airbill No. 7991 7181 5255

Re: Tampa Electric Company (Tampa Electric)
Petition for Modification of Site CertificationNo. 79-12
Big Bend Station – New East 40 Gypsum Storage Area

Dear Ms. Mulkey:

Tampa Electric is pleased to file this Petition for Modification of the above Site Certification, accompanied by the plans for the Project and a filing fee check for ten thousand ($10,000) dollars. Copies of the Minor Source Air Construction (AC) Permit Application and the Environmental Resource Permit (ERP) Joint Application to cover minimal drainage and wetland alterations on the project site are included as appendices to this filing. A CD containing these documents, as well as all design drawings for the Project is enclosed.

This Petition covers the proposed addition of a new gypsum storage area in the northeastern portion of the Big Bend site. The first phase of the project will include a new lined storage area, paved haul roads, in-plant improvements to existing gypsum handling facilities and a zero discharge contact stormwater management system to return runoff to the existing recycle water system for use in plant processes. The second phase of the project would include a new conveyor and transloading equipment, as well as a product storage dome within the storage area.

Tampa Electric looks forward to working with you and the Department during this certification proceeding. If you have any questions regarding this Petition or the Project, please contact me at 813-228-4560.

Sincerely,

Randy Melton

B. Randall Melton, C.E.P.
Administrator, Environmental Planning
Environmental Health and Safety
Tampa Electric Company

BRM/rlm/BRM290

c/enc: Mr. Jonathan Holtom – FDEP
S. Curtis Kiser, Esq. - FPSC
David Jordan, Esq. - DEO
Martha Moore, Esq. - SWFWMD
Marva M. Taylor, Esquire

TAMPA ELECTRIC COMPANY
P. O. BOX 111 TAMPA, FL 33601-0111
(813) 228-4111

CUSTOMER SERVICE:
HILLSBOROUGH COUNTY (813) 223-0800
POLK COUNTY (863) 299-0800
ALL OTHER COUNTIES 1 (888) 223-0800

AN EQUAL OPPORTUNITY COMPANY
TAMPAELECTRIC.COM

TECO
TAMPA ELECTRIC

October 2012

ECT Environmental Consulting & Technology, Inc.

Gypsum Conveyor and Storage
Area Improvements
Petition for Modification of Site
Certification Big Bend Station Unit 4
PA 79-12
and
Design Plans

PETITION FOR MODIFICATION OF SITE CERTIFICATION BIG BEND STATION UNIT 4 PA 79-12

GYPSUM CONVEYOR AND STORAGE AREA IMPROVEMENTS

Prepared for:

TECO
TAMPA ELECTRIC
Tampa, Florida

Prepared by:

ECT
Environmental Consulting & Technology, Inc.
6440 Southpoint Parkway
Jacksonville, Florida 32216

ECT No. 10-0754-0200

October 2012

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued, Page 2 of 2)

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

1.1 OVERVIEW

Tampa Electric Company (Tampa Electric) is planning to install a new gypsum storage area (the "Project") at its Big Bend Station located in Hillsborough County, Apollo Beach, Florida (Figure 1-1). This Project will allow for the primary gypsum storage operations to be moved from their current location approximately 1 mile south of Big Bend Road to a new location on the east side of Wyandotte Road on Big Bend Station's property. According to the current schedule, construction for the Project will begin November 2013 and be completed by April 2014.

Tampa Electric's Big Bend Station Unit 4 was previously certified in August 1981 (PA 79-12) pursuant to the Florida Electrical Power Plant Siting Act (PPSA), Section 403.501 through 403.518, Florida Statutes (F.S.), and the Florida Department of Environmental Protection (FDEP) rules for electrical power plant siting (Chapter 62-17, Florida Administrative Code [F.A.C.]). The original conditions of certification (COCs) authorized the construction and operation of Big Bend Station Unit 4 and associated facilities, including the construction of fine mesh screens, organism return system, flue gas desulfurization systems, and a gypsum storage area for both Units 3 and 4. The COCs have been modified a number of times since 1981 to address changes to the site associated with the operations of Unit 4, the most recent change occurring in January 2009.

1.2 BACKGROUND AND PURPOSE

In accordance with the provisions of Consent Order File No. 00-1275 and the Big Bend Remedial Action Plan (RAP), has completed two of the three required major construction projects. The first one completed was the Slag Bins Conversion Project which eliminated the operation of the former unlined slag ponds and replaced them with two dewatering bins. These bins now collect and dewater the slag from Units 1 through 3, thus enabling the slag to be loaded directly into trucks for delivery to customers. The second project was the Settling Recycle System Improvements Project, which included the refurbishment and lining of the South Recycle Pond, construction of both the new lined North

Recycle Pond and the new lined Settling Pond, and construction of the new concrete Solids Settling Units (SSUs). This project was completed in 2010.

The third project is the Gypsum Storage Area and Conveyor Improvements. The preliminary engineering design for this project was submitted on March 29, 2012, in accordance with the approved RAP schedule.

FIGURE 1-1.
LOCATION OF BIG BEND POWER STATION

Sources: ESRI, 2012; ECT, 2012.

TECO
TAMPA ELECTRIC

2.0 PROJECT DESCRIPTION

The Big Bend Storage Area and Conveyor Project will be built in phases with the initial phase including a new lined storage area, paved roads, and stormwater management system, and a possible second phase involving the installation of a new conveyor system to move gypsum generated by the Big Bend Station units to the new storage area. A final decision as to whether to proceed with the second phase has not been made at this time. The new storage area will be located on property owned by Tampa Electric on the west side of the Wyandotte Road between the existing railroad loop to the north and agricultural property to the west (Figure 2-1).

2.1 PROJECT LOCATION AND EXISTING FACILITIES

The Project will be located within the Big Bend Station site on approximately 27 acres (Figure 2-1) which will be known as the *East 40*. Big Bend Station is located at 13031 Wyandotte Road, Apollo Beach, Hillsborough County, Florida, and occupies an area of 1,493 acres. The project location was chosen primarily for its proximity to the National Gypsum's wallboard production facility, which contractually is the ultimate destination for the majority of the gypsum produced by the Big Bend FGD systems. The new storage area will be over 2 miles less in round trip travel distance by road than the existing South 40 storage area and will be connected to the wallboard plant site by a direct haul road. This will eliminate much of the truck hauling to the wallboard plant on local public roads, and the shorter distance will proportionately reduce vehicle and fugitive emissions. Another significant advantage of the relocation is the increase in distance between the primary gypsum management operations and the Apollo Beach community by over a mile.

The Big Bend Station is a nominal 1,892 megawatt (MW) electric generation facility consisting of four solid fuel-fired steam boiler/steam turbine generator units (Units 1 through 4), two simple-cycle combustion turbines (SCCT 4A and SSCT 4B), solid fuel yard, solid fuel bunkers, combustion products handling and storage systems, limestone handling and storage, condenser cooling water intake and discharge systems, wastewater

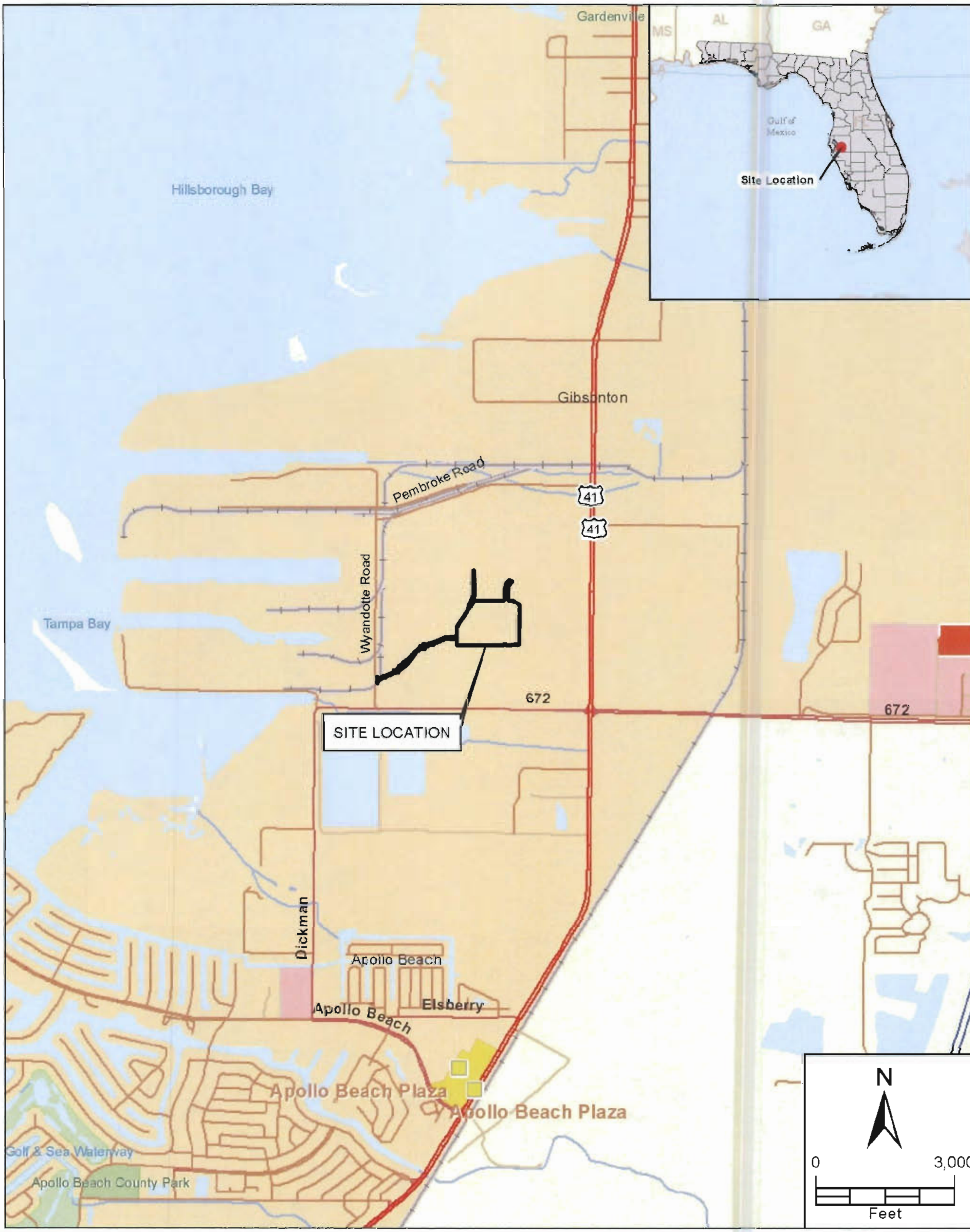


FIGURE 2-1.

SITE LOCATION

Source: Street Map, 2011; Sargent & Lundy, 2011; ECT, 2012.

TECO
TAMPA ELECTRIC

treatment system, lime silo, abrasive blasting, surface coating operations, coal combustion residue storage and transfer, and two diesel engine generators. Figure 2-2 depicts the layout of the existing facilities.

Solid fuels combusted in Units 1 through 4 include coal, petroleum coke (pet-coke), and coal combustion products generated at the Big Bend or Polk Power Stations. The simple-cycle combustion turbines are fired primarily with natural gas with ultra low sulfur diesel (ULSD) fuel oil serving as a secondary fuel.

2.2 PROJECT DESCRIPTION

The four coal-fired steam generators at Big Bend Station use wet flue gas desulfurization (FGD) control technology (i.e., wet scrubbers) to reduce emissions of sulfur oxides. Gypsum (hydrated calcium sulfate) is a by-product of the wet FGD control systems and is currently stored onsite at the Big Bend Station until it is sold for use in the production of wallboard or for agricultural application.

Since the existing onsite gypsum storage facility is near its storage capacity, the Project will involve the installation of a new gypsum handling and storage facilities. Additionally, as required by the Big Bend RAP, the new storage area will be lined to provide enhanced protection of groundwater resources at the site. Figure 2-3 depicts the layout of the proposed Project.

Phase I of the project will consist of a lined gypsum storage area, paved haul roads, and a stormwater management system. Initially, the Phase I operational scenario will involve the hauling of gypsum from the FGD area within the plant by truck to the new storage area, and hauling from this area either to customers or to other areas of the site transloading into either barges or railcars. Additionally, Phase I operations will allow for hauling gypsum from the plant directly to offsite customers. Phase II could eventually be constructed to include a conveyor system to transfer gypsum directly from the plant to the new gypsum storage facility and other transloading and management facilities such as a radial stacker and storage dome. In the phase II operational scenario, a full hood cover belt conveyor would transfer gypsum from the reclaim hopper in the plant to a diverter


Aero CT
BB Unit 4
Coal Conveyor
Rail Unloading
Facility
Coal Conveyor
Project
Site
Coal Field
Settling
Basin
North Recycle
Pond
South Recycle
Pond
Storm Water
Pond
Seperation
Basin
Economizer
Ash Pond
Bottom Ash
Ponds
Closed Economizer
Ash Pond
Approximate
Big Bend Boundary
Long Term
Fly Ash/
Reclaimed
Water Pond
Existing
Gypsum
Storage

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
NOT FOR CONSTRUCTION

NO.	DESCRIPTION	SIZE (APPROXIMATE)
01	CONVEYOR G-1 30"W, 300 TPH	150 FT. LONG
02	TRANSFER HOUSE GTH-1 (ENCLOSED)	20FT x 20FT x 40FT HIGH
03	12.5" DIA. PIPE CONVEYOR G-2, 42"W, 300 TPH	3200 FT. LONG
04	TRANSFER HOUSE GTH-2 (ROOF ONLY)	20FT x 30FT x 35 FT HIGH
05	EAST 40 RADIAL STACKER CONVEYOR G-3, 30"W, 300 TPH	125'LG @ 12 DEG.SLOPE
06	(4) GYPSUM STORAGE PILES	1000 TONS @ 60 PCF DENSITY EACH, TOTAL 4000 TONS
07	ABOVE GRADE RECEIVING AND RECLAIM HOPPER	20 TON NET CAPACITY
08	BELT FEEDER GBF-1 36"W, 75 TO 300 TPH	15 FT. LONG
09	CONVEYOR G-4, 30"W, 300 TPH	250 FT. LONG
10	GYPSUM STORAGE SILO WITH TRUCK LOAD OUT	14 FT. DIA. CAPACITY 100 TON
11	CONVEYOR G-5, 30"W, 300 TPH	225 FT. LONG
12	GYPSUM STORAGE DOME WITH TWO (2) OPENINGS IN THE WALL FOR TRUCKS AND FRONT END LOADERS ACCESS	200' DIA. x 90' HIGH 25,000 TONS STORAGE CAP. @ 70 PCF DENSITY
13	50FT x 45 FT FGD BYPRODUCT STORAGE AREA BUILDING	E.E. ROOM, BATTERY ROOM, BREAK ROOM, COMPRESSOR ROOM AND UTILITY ROOM
14	MOBILE EQUIPMENT WASHDOWN PAD	
15	THREE (3) STORM WATER COLLECTING SUMPS WITH 2x100% CAPACITY PUMPS IN EACH SUMP	
A	WASTE HANDLING BUILDING EXISTING	
B	REVERSIBLE CONVEYORS GA1 (A) AND GA2 (B) EXISTING	
16	FUTURE TRANSFER CONVEYOR G-6	
17	FUTURE GYPSUM STORAGE SILOS WITH TRUCK LOAD OUT	

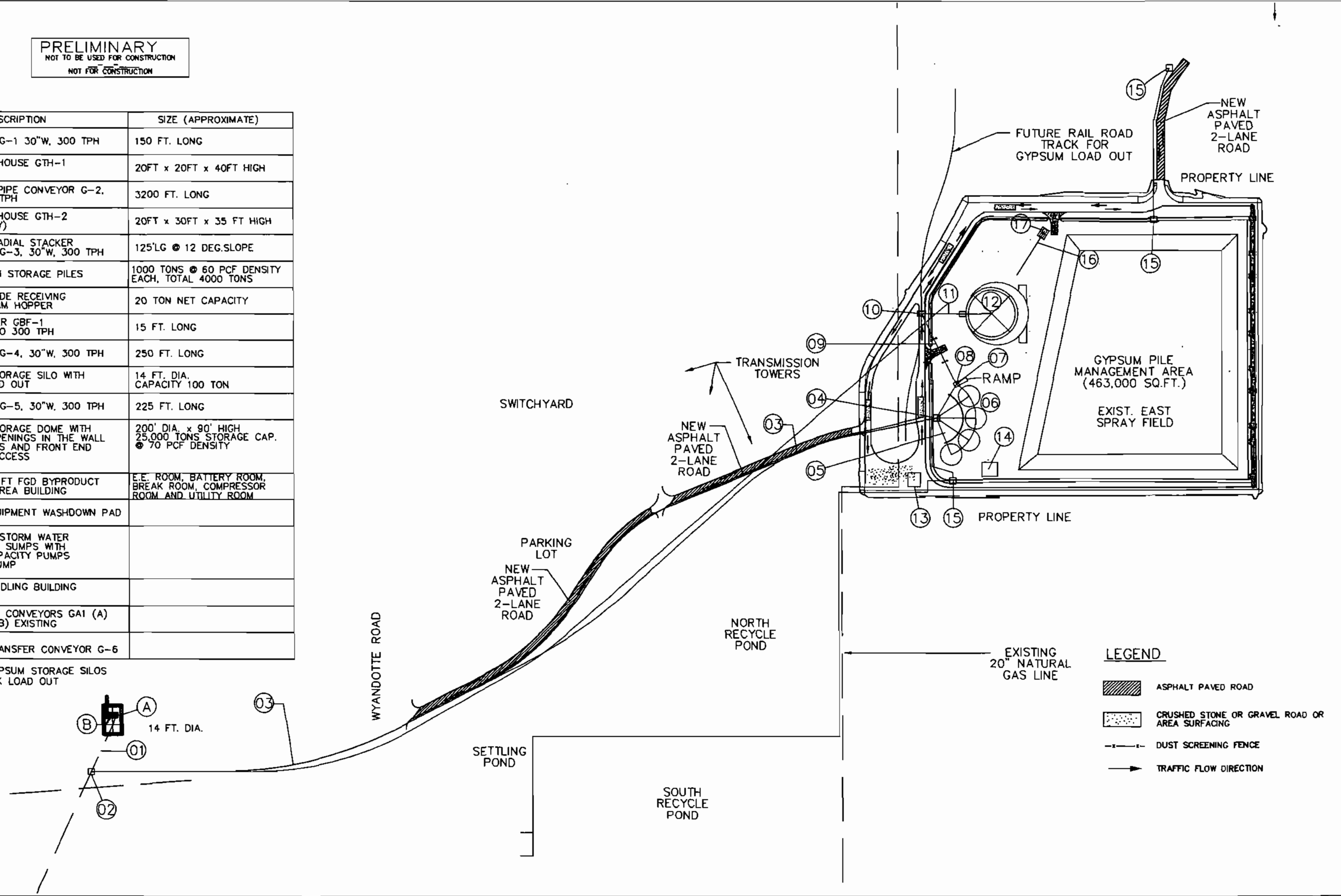


FIGURE 2-3.
LAYOUT OF THE PROJECT

Source: Sargent & Lundey, 2011;ECT, 2012.

TECO
TAMPA ELECTRIC

gate which would be used to transfer gypsum to either an in-plant truck/railcar loadout silo or onto a fully enclosed pipe conveyor for conveyance to the transfer house in the East 40 storage area. From the transfer house, gypsum would be moved either by a radial stacker/conveyor to stackout piles or transferred by full hood conveyor to a reclaim/ receiving hopper to be loaded either into trucks or onto another full hood conveyor for transfer into a storage dome. As previously mentioned, a final decision has not been made regarding the Phase II facilities at this time.

also plans to improve its existing onsite gypsum handling facilities to allow gypsum to be loaded either onto barges at the existing Big Bend Station dock or to be hauled to the existing South 40 storage area, which is already authorized under existing Certification No. 79-12. Following these improvements and the addition of the new gypsum handling and storage facility, gypsum will be transferred to the following alternative locations:

- From the FGD area (point of generation):
  - By truck to the new gypsum handling and storage facility.
  - By truck to a wallboard manufacturing facility or to other customers.
  - By truck to the existing South 40 storage area (after remediation and lining).
  - By truck to the barge loading area at the Big Bend Station dock.
  - By truck to a rail loadout station.

- From the new East 40 gypsum and handling storage facility:
  - By truck to the barge loading area at the Big Bend Station dock.
  - By truck to the wallboard facility or other customers.
  - By train to other customers.

The Project's major components include:

- Phase I
  - New East 40 gypsum handling and storage facility, including nominal 1.4 million ton capacity gypsum pile management area.
  - New backup conveyor in the North Stackout Yard within plant.
  - Paved access roads.
  - Stormwater management system.

    - Storage pad and receiving hopper at Big Bend Dock for barging.
- Phase II (possible future facilities)
    - Enclosed pipe conveyors, belt conveyors, and enclosed belt transfer stations to transfer gypsum from the existing Big Bend Station FGD gypsum processing area to East 40 Storage Area.
    - Radial stacker to stackout storage piles.
    - Gypsum Storage Dome.
    - Rail spur to existing Rail Loop.
    - Various transloading equipment within storage area, including transfer house, covered belt conveyor to reclaim/receiving hopper, and a covered belt conveyor to a gypsum storage dome within the storage area.

Initially, gypsum from the existing Big Bend Station processing area will be transferred by trucks to the gypsum storage area where it will be managed and loaded into trucks using mobile equipment (e.g., front end loaders).

If Phase II is implemented, gypsum from the existing Big Bend Station processing area will be transferred by covered and pipe belt conveyors to the radial stacker. The existing 150-foot (ft) covered conveyor will be modified to transfer gypsum from the existing gypsum transfer building to a new transfer station to tie in to a new pipe conveyor which will transfer gypsum to the stacker transfer house. In the pipe conveyor, the belt is wrapped into a cylindrical pipe form guided by six hexagonally arranged idlers along the conveyor route. This allows the conveyor to negotiate inclines of up to 30 degrees and to curve in both the vertical and the horizontal directions enabling the conveyor to negotiate obstacles that would obstruct a conventional straight conveyor. With the material being transferred completely enclosed within the belt pipe, fugitive dust emissions and spillage are eliminated along the conveyor run on both the pipe (outbound) and the belt (return) conveyors. Pipe conveyors also allow for relatively long conveying distances without the need for transfer towers. The continuous pipe conveyor will be approximately 3,200 ft (0.61 mile) in length.

From the transfer station, a fully covered radial stacker conveyor will transfer gypsum to the stackout piles. Gypsum will be reclaimed from the stackout piles using mobile equipment (e.g., front end loaders) and transferred to an above grade reclaim hopper, to the gypsum pile management area, or into trucks for transport. Mobile equipment will also be used to reclaim gypsum from the management area pile for transfer to the reclaim hopper. The radial stacker may also transfer gypsum directly to the reclaim hopper. From the reclaim hopper, a fully covered belt conveyor will transfer gypsum to a diverter gate which will be used to transfer gypsum via a covered conveyor to a truck/railcar loadout silo, a conical storage pile located inside the gypsum storage dome, or radial stacker, which will deposit gypsum into discreet stackout piles. A rotary plow will be used to transfer gypsum from the truck/railcar loadout silo to trucks/railcars which will then transfer the gypsum to offsite customers. Within the covered gypsum storage dome, gypsum will be transferred from the conical storage pile to trucks using mobile equipment for subsequent shipment to offsite customers. The reclaimed gypsum may also be transferred by truck to the Big Bend Station dock for loading onto barges.

The gypsum handling and storage facility area will encompass approximately 27 acres of land, consisting of 24.2 acres where the actual handling and storage operations will occur, and 2.8 acres of above-grade access roads to the west and north of the facility. The facility area will be lined with a geosynthetic clay and an 80-mil geomembrane liners, overlain by 2 ft of compacted gypsum. An 8-ft tall perimeter berm will surround the area to provide flood protection and contain the stormwater generated within the area. A chain link fence 10 ft in height will surround the exterior of the berm and provide security to the area.

There will be a total of 1,822 ft and 447 ft of access roads with a proposed width of approximately 30 ft to be constructed to the west and north of the new gypsum handling and storage facility, respectively (i.e., 1.77 acres and 0.64 acre, respectively). The width of road construction will increase at certain areas where expansion is required such as at the truck scale and at ditch crossings for culvert installations.

Modifications planned for the existing gypsum handling system include: (a) addition of emergency backup stack-out conveyor and storage pile to be located at the current FGD by-products storage pile to the west of the limestone storage building, and (b) equipment to transfer gypsum by truck to the Big Bend Station dock for barge loading. The new emergency stack-out conveyor will transfer gypsum from the existing gypsum product handling building to a new temporary storage pile (Figure 2-4). The backup stack-out belt conveyor will be 20 inches wide, have a length of 1,240 ft, and a gypsum transfer capacity of 200 tons per hour. The conical temporary gypsum storage pile will be 45 ft high with a storage capacity of 3,350 tons.

Equipment associated with the transfer of gypsum from truck to barge includes a front-end loader and a new receiving hopper located at the dock. Gypsum trucks will unload to an existing impervious storage pad at the dock. A front-end loader will then transfer gypsum from the temporary storage pile to the new receiving hopper. A clamshell located on the barge will then transfer gypsum from the receiving hopper to the barge.

2.2.1 AIR EMISSIONS AND CONTROLS

The only air pollutant associated with the new gypsum handling and storage facility stationary emission sources (i.e., truck loading/unloading, conveyor belt transfers, storage piles, storage pile reclaim, and truck/railcar and barge loadout) is particulate matter ($PM/PM_{10}/PM_{2.5}$). Particulate matter will be minor since the gypsum product will have a relatively high average moisture content of approximately 8 to 10 percent by weight. will implement reasonable best management practices to control fugitive and unconfined emissions of particulate matter. These will include paving of roads and use of water sprays on open storage piles and haul roads as necessary. As previously stated, a full hood cover, pipe conveyor belts, gypsum storage dome and other transloading facilities may be constructed if the decision is made to construct the future phase of the Project.

Particulate matter emission rates were estimated for the worst-case Phase I and Phase II scenarios. For Phase I, the worst-case gypsum handling scenario (i.e., the alternative that will result in the highest potential particulate matter emission rates) is the truck transfer

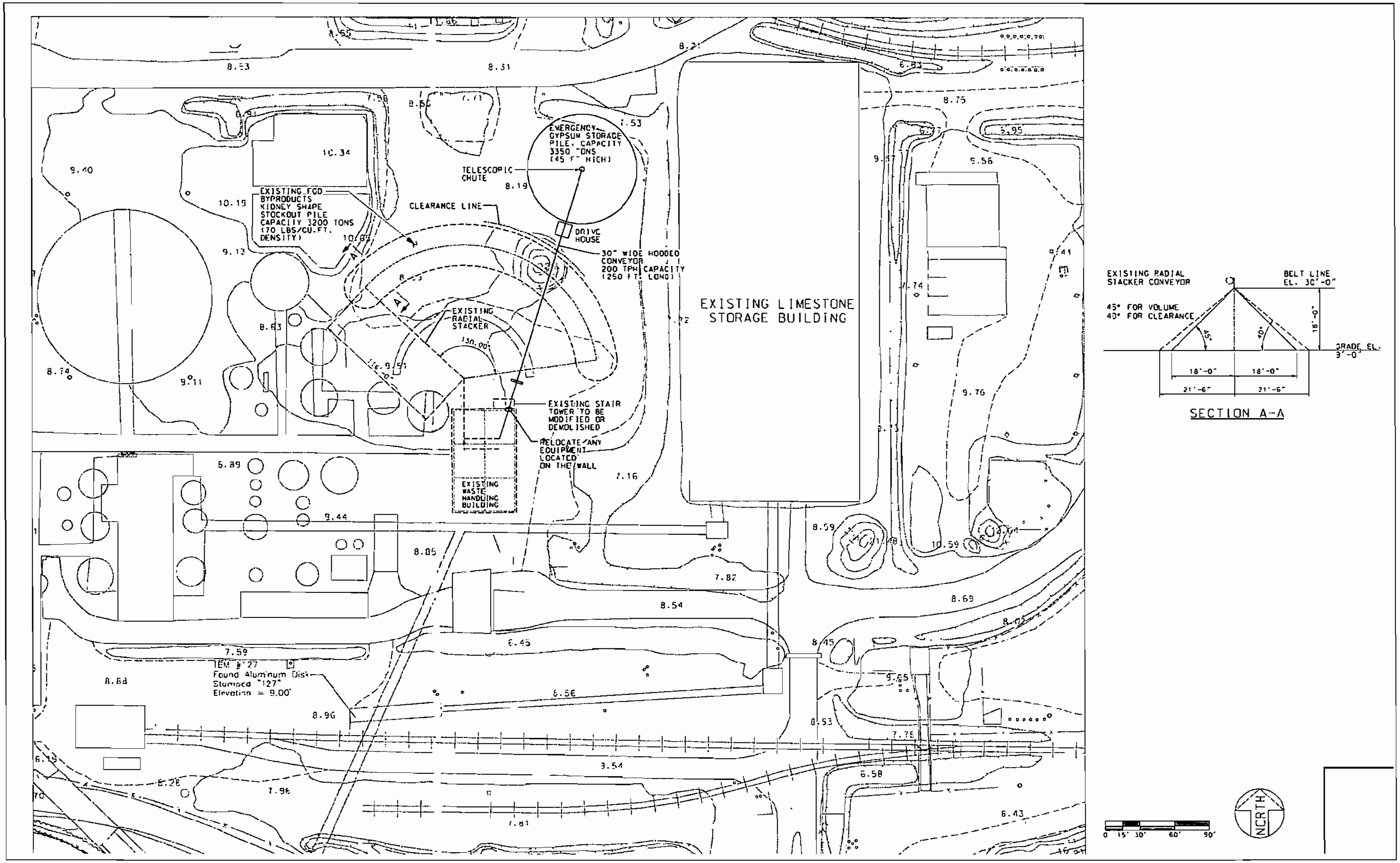


FIGURE 2-4.

LOCATION OF EMERGENCY PILE

Source: Sargent & Lundy, 2011; ECT, 2012.

TECO
TAMPA ELECTRIC

of gypsum from Big Bend Station to the East 40 storage piles, reclaim of gypsum from the new handling truck loading operations, transfer by truck from the new handling and storage facility to a temporary storage pile at the Big Bend Station dock, reclaim of gypsum from the temporary storage pile to a receiving hopper, and transfer of gypsum from the receiving hopper by clamshell to the barge. Particulate matter emission rates were estimated for both potential and actual particulate matter emissions for the worst-case scenarios for Phase I and II.

Potential and expected actual particulate matter emission rates for Phase I and II of the new gypsum handling and storage facility were estimated based on annual gypsum throughput rates of 850,000 tons per year. This rate was derived giving consideration to future regulatory requirements, such as the recently promulgated Mercury and Air Toxics Standard (MATS) otherwise known as the Utility MACT. Actual particulate matter emission rates were also developed for the existing gypsum handling and storage facility using 2007-2011 gypsum production data and the same current AP-42 emission estimation procedures. Table 2-1 summarizes these emission rates. Details of the emission rate calculations are included in Appendix A.

Table 2-1. PM/PM_{10}/$PM_{2.5}$ Emission Rate Estimates

Pollutant	Future Gypsum System Potential Emissions (ton/yr)	Existing Gypsum System Actual Emissions (ton/yr)	Net Change in Emissions (ton/yr)
PM	29.7	9.9	19.8
PM_{10}	7.0	2.5	4.5
$PM_{2.5}$	1.2	0.38	0.82

Sources: TEC, 2012; ECT, 2012.

2.2.2 WATER USE AND SUPPLY

Potable water will be required for a restroom and an eye wash station. A new connection to the existing potable water main at the Big Station will be installed once authorization from Hillsborough County utilities is obtained.

Service water from the plant system system will be used in small amounts for equipment washes.

2.2.3 INDUSTRIAL WASTEWATER AND SANITARY WASTES

The only wastewater generated by the Project will be equipment wash water. This wash water will be collected along with contact stormwater from within the bermed gypsum storage area by gravity drains and pumped to the main sump to the existing settling pond within the industrial wastewater management system for reuse. Sanitary wastes will be collected in a holding tank and pumped out monthly for disposal at the municipal wastewater treatment plant.

2.2.4 CONTACT STORMWATER

Stormwater generated within the new gypsum handling and storage facility will be handled as contact stormwater, This contact stormwater will be collected and piped to the existing settling pond within the industrial wastewater management system for reuse. The existing industrial wastewater system is currently authorized (DEP Permit No. FLA017047) to accept contact stormwater from the existing gypsum storage area. The quantity of contact stormwater generated from the new gypsum handling and storage during a 25 year, 24 hour event has been calculated to be 4.75 million gallons.

2.2.5 NON-CONTACT STORMWATER

The small amount of non-contact stormwater associated with the exterior side of the berm and access roads will routed to roadside swales which will be sized to capture the required treatment volume for the impervious areas. Appendix B provides details on the design basis, site soils and conditions for proposed construction activities and non-contact stormwater management and control.

2.2.6 SOLID AND HAZARDOUS WASTES

During the operation of the Project, nonhazardous solid wastes will generally be limited to small quantities of refuse. These wastes will be stored in onsite dumpsters for regular transport by a licensed hauler to an offsite, licensed landfill.

Maintenance activities associated with the transfer equipment will be conducted at the existing locations within the Big Bend Station already designated for those purposes. Spent lubricating oils and oily rags will be collected and transferred to the used oil storage shed within the Big Bend Station.

Minimal quantities of universal wastes such as heavy equipment batteries, lamps, etc. will be generated occasionally. These wastes will be collected and taken to the 90-day hazardous waste storage facility within Big Bend Station. It is anticipated that the Project will not generate hazardous wastes.

2.3 CONSTRUCTION ACTIVITIES, EQUIPMENT, AND MATERIALS

It is anticipated that construction of the Project will commence in November 2013 with the construction of Phase 1 and will be completed by April 2014. A construction schedule for Phase II is undetermined at this time. Construction of the Project will begin with site mobilization of construction equipment, site preparation, and site grading. These activities will be followed by foundation work and equipment installation.

Typical equipment to be used in construction will include industrial grade earth moving equipment and structural fabrication support equipment (back hoes, bull dozers, cranes, etc.). The primary laydown area will be approximately 3 acres directly west of the Big Bend Warehouse 21. This area was previously used for equipment laydown during the construction of the Rail Loop Project. (Figure 2-4).

To support the construction work at the site, temporary construction offices will include office trailers, equipment, and storage trailers will be placed at the new gypsum handling and storage facility area and at the laydown area.

Water and electric infrastructure exists at the site and will be used for the Project. Construction sanitary needs will include use of temporary portable facilities, which will be present from the mobilization of construction activity through commissioning and demobilization.

Temporary construction power will be installed or upgraded to support construction activities. Power distribution centers will be placed at strategic locations for construction usage.

The onsite laydown area as previously identified will be prepared such that construction materials and some equipment can be delivered and temporarily stored until they are needed. All parking for the Project personnel will be onsite at existing designated contractor and Tampa Electric staff parking areas.

Upon completion of all construction and commissioning activities, all temporary structures and services will be removed, and the areas occupied by them returned to preconstruction condition.

All necessary building permits and zoning approvals are being obtained in accordance with applicable Hillsborough County ordinances and site development rules.

Project access roads will be completed near the end of construction to avoid potential damage by heavy construction equipment and allow for the addition of the final wearing surface.

The construction workforce will ramp up and down throughout the construction period, with the peak number of contract employees being approximately 60 people. No additional Tampa Electric employees with be needed for operations.

3.0 ENVIRONMENTAL EFFECTS OF THE PROJECT

As required under the provisions of Section 62-17.21, F.A.C., the following text describes the anticipated potential effects of the proposed Project. The descriptions focus on the key areas of potential effects associated with the Project and changes to the existing Big Bend Station facilities and operations.

3.1 AIR QUALITY

The ambient air quality in an area can be characterized in relation to the National Ambient Air Quality Standards (NAAQS). The NAAQS have been established for six common air pollutants that have been selected because of their prevalence and importance to human health and welfare. These pollutants are carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone, particulate matter less than 10 and 2.5 microns in aerodynamic diameter (PM_{10} and $PM_{2.5}$, respectively), and lead. These are also commonly referred to as criteria pollutants, because the limits are largely based on health criteria. The primary NAAQS were established to protect human health, and the secondary NAAQS are designed to protect the environment and physical property.

Table 3-1 shows the primary and secondary NAAQS. The secondary standards are the same as the primary NAAQS for most pollutants. However, there are no secondary standards for CO or for the NO_x and SO_2 1-hour averaging times. Also, there is a 3-hour secondary standard for SO_2, but no primary standard associated with that averaging time. Except for establishing slightly lower SO_2 standards for the annual and 3-hour averaging periods, Florida has adopted the NAAQS.

With the exception of the lead standard, all areas of Florida have air quality designated as being better than the NAAQS. There is a localized area (less than 2 square kilometers) in Tampa surrounding an industrial facility that is nonattainment for the lead standard. This area is over 15 miles from the proposed project site and is not relevant to the evaluation of this project.

Table 3-1. National Ambient Air Quality Standards

Pollutant (units)	Averaging Periods	National Standards Primary	National Standards Secondary
SO_2 (μg/m^3)	1-hour*	196	
	3-hour†		1,300
	24-hour†	365	
	Annual‡	80	
PM_{10} (μg/m^3)	24-hour§	150	150
	Annual☼		
$PM_{2.5}$ (μg/m^3)	24-hour**	35	35
	Annual††	15	15
CO (μg/m^3)	1-hour†	40,000	
	8-hour†	10,000	
Ozone (ppmv)	1-hour‡‡		
	8-hour§§	0.075	0.075
NO_2 (μg/m^3)	Annual‡	100	100
	1-hour☼☼	188	188
Lead (μg/m^3)	Calendar quarter arithmetic mean	1.5	1.5
	Rolling quarterly average	0.15	0.15

Note: μg/m^3 = microgram per cubic meter.
ppmv = part per million by volume.

*Compliance shown with 3-year average of the 99th percentile of the annual distribution of the daily maximum 1-hour average concentrations.
†Not to be exceeded more than once per calendar year. Federal standard has been revoked (75 FR 35580) for 24-hour SO_2.
‡Arithmetic mean. Federal standard has been revoked (75 FR 35580) for SO_2.
§Standards are attained when expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3, as determined in accordance with 40 CFR 50, Appendix K, is equal to or less than 1.
☼Standards are attained when expected annual arithmetic mean concentration, as determined in accordance with 40 CFR 50, Appendix K, is less than or equal to 50 μg/m^3.
**98th percentile concentration, as determined in accordance with 40 CFR 50, Appendix N.
††Arithmetic mean concentration, as determined in accordance with 40 CFR 50, Appendix N.
‡‡Standard attained when the expected number of calendar days per calendar year with maximum hourly average concentrations above the standard is equal to or less than 1, as determined by 40 CFR 50, Appendix H. No longer applies to Maryland after January 15, 2005.
§§Standard attained when the average of the annual 4th highest daily maximum 8-hour average concentrations over a 3-year period are less than or equal to the standard, as determined by 40 CFR 50, Appendix P.
☼☼Compliance shown with 3-year average of the 98th percentile of the annual distribution of the daily maximum 1-hour average concentrations.

Sources: 40 CFR 50.
Section 62-204.800(1), F.A.C.

3.1.1 CONSTRUCTION PHASE IMPACTS

Three general activities will generate air emissions during construction of the Project. First, land clearing, site preparation, and vehicle movement will generate fugitive dust emissions. Second, internal combustion engines will release nitrogen oxides (NO_x), carbon dioxide (CO_2), and other combustion products. Third, construction worker travel to and from the site will result in vehicular emissions.

The quantity of any emissions released during the construction process will generally be low but will vary due to weather conditions and on an hourly and daily basis as construction progresses. Fugitive dust emissions will be greater during the land clearing and site preparation phases. Fugitive dust emissions will also be greater during the more active construction periods as a result of increased onsite vehicle traffic.

Increased emissions from internal combustion engines will occur during the site preparation and facility construction due to the amount of onsite construction equipment using engines for site excavation and grading, concrete placement, and structural steel and major equipment installation. Potential minor sources of volatile organic compounds (VOCs) include:

- Evaporative losses from onsite painting.
- Refueling of construction equipment.
- The application of adhesives and waterproofing chemicals.

During peak periods of construction activity, up to 60 workers may be involved. It is possible that some of these construction personnel will be drawn from outside Hillsborough County and will commute to the job site. It is likely that a greater portion of the workforce may commute from the Tampa-St. Petersburg Metropolitan Area. Construction workers from Hillsborough County, who currently commute to job sites outside the county, would travel fewer miles to the Project site. While not readily quantifiable, the temporary net changes in vehicle-miles traveled in the area would be insignificant, as would any temporary net changes in area wide vehicular emissions.

Fugitive dust emissions from the construction area will be minimized using appropriate dust suppression control methods. These standard control methods will include placement of gravel on roads, applying water to roads and other exposed surfaces, or other methods, as needed. Existing public roads leaving the Project site are currently paved. New access roads will be paved at the end of the construction period.

All construction-related fugitive dust emissions will be intermittent and temporary. The air quality impacts caused by construction activity will vary as a function of the level of activity, the specific nature of the activity, the weather conditions while the activity is occurring, and the emission controls applied to the activity. However, even under worst-case conditions, the maximum ambient impacts caused by construction emissions are expected to be small and limited to the specific area of the Project site under construction. Also, any potential emissions are expected to be well below any applicable ambient air quality standards (AAQS).

3.1.2 OPERATIONAL PHASE IMPACTS

As previously stated, the only air pollutant associated with the new gypsum handling and storage facility stationary emission sources (i.e., truck loading/unloading, conveyor belt transfers, storage piles, storage pile reclaim, and truck/railcar and barge loadout) is particulate matter ($PM/PM_{10}/PM_{2.5}$). Emissions of particulate matter will be minor since the gypsum handled and stored will have a relatively high average moisture content of approximately 8 to 10 percent by weight. Tampa Electric will take reasonable precautions to control fugitive and unconfined emissions of PM including enclosure of conveying systems, paving of roads, and use of water sprays on open storage piles as necessary.

The existing gypsum handling and storage facility is classified as an unregulated emission unit in the Big Bend Station Title V air operation permit. The replacement gypsum handling and storage facility and modifications to the existing Big Bend Station gypsum handling system also qualifies as an unregulated emission unit since none of the associated emission sources are subject to a numerical emission limit (i.e., none of the associated emission sources will emit an emissions-limited pollutant) or a unit-specific work practice standard.

A summary of the particulate matter emissions during the operations of Phase I is provided in Table 3-1.

Table 3-1. Phase I Summary of PM/PM10/PM2.5 Potential Emission Estimates

	Potential Annual Emission, tons per year				
Pollutant	Transfer Points	Truck Traffic Paved Roads	Front-End Loader Operations	Storage Pile Windblown Dust	Project Totals
PM	1.3	15.2	5.5	0.0014	22.0
PM_{10}	0.63	3.0	1.5	0.00068	5.1
$PM_{2.5}$	0.095	0.75	0.15	0.00010	1.0

Sources: ECT, 2012; S&L, 2012; Tampa Electric, 2012.

Details of the emission rate calculations, regulatory applicability, project drawings, and equipment profile drawings area provided in Appendix A.

3.2 SURFACE WATER

Historically, the Project site was used for agriculture prior to being used as a wastewater spray field for the Big Bend Station. Generally, the Project site and the immediate surroundings consist of open space, access roads, a rail track, man-made impoundments, natural and man-made drainages, wetlands and other industrial uses. The Project site is currently clear of trees for the most part, but overgrown with Brazilian pepper and other invasive species. Extensive ditching has altered the area's natural pre-existing condition. The subject property is bound on the south and east by manmade ditches that drain the agricultural areas adjacent to them. The Project site is bound to the west by the Big Bend Station rail loop and its associated drainage features. To the north, the property is bound by a natural waterway that has undergone major modifications due to agriculture over the years. This waterway separates the proposed gypsum storage area from the low lying areas to the north and the National Gypsum site.

The Project site is also bisected by a manmade ditch that drains the property from the east to west. The upstream end of this ditch is not hydraulically connected to any of the ditches surrounding the property. Therefore, this ditch only drains the area that will become the footprint of the new gypsum storage area and should not be considered a significant drainage feature to the area's existing condition.

The surrounding area has been previously modeled by Hillsborough County through their watershed management program. As noted previously, the project site is adjacent to a series of ditches. That ditching is reflected in the Hillsborough County modeling. The Project resides within the Wolf Branch portion of the Bull Frog Creek Watershed in a minor system called Jackson Branch. Jackson Branch is modeled within the Miscellaneous Coastal Streams Stormwater Management Model (SWMM) prepared by Hillsborough County and approved by Federal Emergency Management Agency (FEMA).

3.2.1 CONSTRUCTION PHASE IMPACTS

During the construction phase, various agricultural and roadway drainage ditches, an unnamed natural waterway, an isolated depression, and the Jackson Branch system will experience minor impacts. The project site is made up of two sections, the gypsum storage area and the facility's paved access roads. Within the gypsum storage area, the construction impacts will be limited to the filling of the internal swale and an isolated depression. The ditches that will be filled have no hydraulic connectivity to any offsite surface waters. The drainage basins associated with the isolated depression and ditches do not extend outside of the bermed project area. With the drainage basins being isolated to the project area, no offsite areas will be impacted by the construction of the gypsum storage area. The planned layout of paved access roads will cross the aforementioned agricultural and roadway drainage ditches, as well as the unnamed natural waterway. The impacts from construction in these areas will be limited to the installation of culverts at roadway crossings. During construction of the access roads, culverts will be placed across the drainage crossings to allow for adequate flow. These activities, along with the filling of the ditches and isolated depression within the gypsum storage facility, will disturb approximately 0.97 acre of jurisdictional areas. The construction of the entire project will only result in localized and minimal losses of aquatic macroinvertebrates due to sedimentation in the area. No long-term impacts to aquatic species are expected. A detailed discussion of the construction impacts is provided in Appendix B.

Appropriate sediment and erosion control procedures will be followed during construction to minimize temporary disturbances associated with the construction of the gypsum storage area and paved access roads. The construction will follow an approved sedimentation and erosion control plan, the Construction Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will ensure that minimal impacts to the water quality will occur during construction. Included in the plan will be silt fence barriers surrounding any area that will be altered during construction. Areas that will be protected by these barriers include the agricultural and roadway drainage ditches, along with the natural waterway. Silt fences will be installed between the project area and these features. Details of the mitigation measures to be implemented during the construction phase are provided in Appendix B.

3.2.2 OPERATIONAL PHASE IMPACTS

No operational impacts to surface water bodies are anticipated. No surface waters will be used as source water for process water or any other use required by the Project. Within the new gypsum handling and storage facility area, all contact stormwater runoff and equipment washes will be captured. No contact stormwater will be discharged from the project site. Along the paved access roads, culverts will be placed at each location where the roadway crosses a waterway. These culverts will be sized to provide adequate conveyance based on acceptable design standards.

As stated above, all contact stormwater runoff and intermittent equipment washes will be captured within the new gypsum handling and storage facility area. This runoff will be routed to Tampa Electric's onsite settling pond through a proposed forcemain which is part of the existing industrial wastewater management system. From this pond, the water will be reused in Tampa Electric's processes.

Sanitary wastes will be collected in a holding tank and pumped monthly for offsite disposal to a municipal wastewater treatment plant.

Since no contact stormwater runoff, intermittent equipment wash water, and sanitary wastes will be discharged to surface waters, no adverse impacts to surface water quality up or downstream of the Project will occur.

Potential impacts will be also mitigated for in the construction of the paved access roads. The paved access roads will also be constructed with a treatment swale system designed to capture any noncontact stormwater runoff and treat the runoff before allowing it to discharge to the drainage ditches or to discharge via infiltration into the groundwater system.

With these two best management practices in place, no adverse impacts to surface water bodies will occur during operation. Detailed drainage calculations for contact and non-contact stormwater are provided in Appendix B. In addition, Appendix B also includes an evaluation of the capacity of the existing industrial wastewater management system to accept and treatment the inflow of contact stormwater to be generated by the Project.

3.3 ECOLOGY AND WETLANDS

The following narrative provides a description of the ecology and wetlands on the proposed gypsum relocation project site. Uplands, wetlands and surface waters were classified using Level III of the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (Florida Department of Transportation, 1999). The most current FLUCFCS does not differentiate among the various types of linear water bodies (i.e., linear water bodies are classified as 510-Streams and Waterways). For the purposes of this project, natural and artificially created linear water bodies will be separately described and classified using a modified Level III FLUCFCS (i.e., FLUCFCS 511-Natural Streams and FLUCFCS 512-Upland Cut Ditches, respectively). Figure 3-1 is a land use/cover map of the proposed project facilities with wetlands/surface water features overlaid and an aerial photographic background provided.

Florida Land Use, Cover, Forms and Classification System (FDOT, 1999)		Size (Acres)
422/740	Brazilian Peppers/Disturbed Land	26.03
511	Natural Streams	0.06
512	Upland Cut Ditches	0.75
534	Reservoirs less than 10 acres	0.03
641/619	Freshwater Marsh/Exotic Wetland Hardwoods	0.16
Total		27.03

FIGURE 3-1.
JURISDICTIONAL/LAND USE AND COVER MAP

Source:SWFWMD Aerial Photo, 2011; Sargent & Lundy, 2011; ECT, 2012.

TECO
TAMPA ELECTRIC

The proposed 27.03-acre Big Bend gypsum disposal area consists of existing unpaved access roads/berms with roadside ditches and an abandoned wastewater spray field/agricultural upland area with associated man-made upland cut drainage ditches and a canal, a segment of an unnamed stream which has been channelized, a small, isolated depression, and a highly disturbed freshwater marsh. The greatest amount of project area consists of a mixture of disturbed uplands: open grassy fields and Brazilian peppers (i.e., FLUCFCS 740-Disturbed Lands and 422-Brazilian Pepper). Approximately 26.03 acres of the project site is covered by disturbed uplands dominated by the growth of dense exotic shrubs such as Brazilian peppers and scattered open areas dominated by invasive grasses such as cogon grass (*Imperata cylindrica*). The shrub cover also contains scattered young cabbage palms (*Sabal palmetto*). The open, grassy areas also support other grasses such as smutgrass (*Sporobolus indicus*) with occasional yerba de jicotea (*Ludwigia erecta*) and common wireweed (*Sida ulmifolia*).

Upland-cut ditches and canals are linear channels created by man to carry surface water, usually rainfall, off of and away from areas of human activity. Approximately 0.75 acre of these man-made drainages is within project limits. The majority of upland-cut ditches are located along roadsides/berms and are routinely maintained by mowing and/or cleanout efforts (i.e., designated by the following mapping codes: D1 and 2; S1, 2, 4-8, and 10-12; and V1, 3 and 4 on Figure 3-1). The man-made, upland cut drainage ditches located on the project site are oriented north to south or east to west and average approximately 10 ft wide and 3 ft deep. Most of the ditches are shaded by dense over hanging trees and shrubs including Brazilian pepper, cabbage palm, white lead tree (*Leucaena leucophyllum*), and occasionally live oak (*Quercus virginiana*), sugarberry (*Celtis laevigata*), and river sheoak. Wetland vegetation in these ditches is sparse and typically consists of scattered giant leather fern (*Acrostichum danaeifolium*). The man-made, upland cut ditches located to the southwest of the project site vary from 10- to 30-ft wide and 3- to 6-ft deep and are either oriented north to south or east to west. They vary from being open and dominated by Peruvian primrosewillow (*Ludwigia peruviana*), Southern cattail (*Typha domingensis*) and paragrass (*Urochloa mutica*) to being completely shaded by overhanging Brazilian pepper with little or no wetland vegetation, except for scattered giant leather fern.

The man-made, upland cut drainage canal (i.e., the term canal is meant to define the linear system that drains the majority of surface waters on the property) oriented north to south on the east side of the project site averages approximately 20 ft wide and 6 ft deep (i.e., S3). The drainage canal is largely shaded by overhanging Brazilian pepper and is devoid of wetland vegetation, except for scattered giant leather fern. The canal connects to a channelized unnamed stream (i.e., V2) at the northeast corner of the project site.

During a review of historic aerial photography (photo dates 1957 and 1968), it was determined that the drainage located at the northeastern corner of the project site was a natural stream prior to channelization. Approximately 0.06 acre of the channelized stream occurs within project limits. The stream is approximately 30 ft wide and averages over 6 ft deep. The channelized stream is densely shaded by Brazilian pepper with occasional white lead tree and river sheoak; scattered patches of coastalplain willow (*Salix caroliniana*), manyflower marshpennywort (*Hydrocotyle umbellata*), and giant leather fern also occur along the lower reaches.

None of the drainages on or in the vicinity of the project site appear to be tidally influenced. The majority of these systems convey surface runoff from surrounding industrial and agricultural areas to downstream reaches. The unnamed stream drains to the northwest and ultimately discharges into Tampa Bay. The highest spring tides and/or storm surges may result in tidal waters being flushed further inland on the Tampa Electric property through the unnamed stream channel. Giant leather fern is a euryhaline species (i.e., ability to tolerate a wide range of degrees of salinity) that can grow in saltwater, brackish water and freshwater. The presence of scattered giant leather ferns in the stream channel could suggest that the local hydrology ranges from fresh water under normal circumstances to an oligohaline condition (slightly brackish) during severe storm/high spring tide events.

Portions of the ditches located southwest of the project site are planned to be crossed by a paved road for access from Wyandotte Road to the project site. Culverts will be installed at each flow-through ditch crossing to maintain flow (six culvert crossings). A few of the ditches located within the footprint of the project site are also planned to be filled. However, these ditches are dead end systems and do not need to be relocated to maintain flow (i.e., S1, 2, and 11). An access road ditch crossing at S4 and another ditch crossing at S12 along the southern edge of the railroad track extension are also going to be filled without installation of a culvert because they are located at a dead end. Another dead end ditch (i.e., D2) is also located a little further north along the railroad track spur that will need to be filled. This small ditch is a junction of two upland-cut ditches that were probably dug to facilitate drainage through the remnant forest after clearing and preparation of farm fields. The ditch is heavily shaded and has sparse to no vegetation, except near the existing rail tracks where light can reach the ground. Near the railroad line, there is a colony of string-lilies (*Crinum americanum*) and a few giant leather ferns in the ditch. The abutting landscape is relict maritime hammock with considerable encroachment of Brazilian pepper trees.

Originally, the northern portion of the eastern canal and the channelized stream at the northeastern corner of the project site were going to be filled. However, the project configuration was redesigned to avoid these systems resulting in a 0.08-acre reduction in jurisdictional impacts. Currently, 0.04 acre of the 0.06-acre unnamed stream to the north of the project site is scheduled to be crossed by an access road and a culvert will be installed (i.e., the seventh culvert crossing). The access road will continue to the northeast to connect the project site to National Gypsum located offsite. At the National Gypsum site, another existing ditch (i.e., D1) will be crossed that already has an existing box culvert (i.e., the eighth culvert crossing). The ditch at the National Gypsum site is a deep and wide channel originally dug to control water when the surrounding land was used for the cultivation of row crops and/or nursery plants. Row crop fields and ditches are evident in aerial photographs taken in the 1930s, 1950s, and 1960s. These ditches are still in use to facilitate drainage for the industries that are now in place.

The ditch is over 20 ft wide at the bottom and 30+ ft wide at the top of bank. It is crossed by a wide box culvert bridge for access to a cell phone tower. It is wet to flowing most of the year and supports a community of southern cattail, Mexican primrosewillow (*Ludwigia octovalvis*), southern shield fern (*Thelyteris kunthii*), peppervine (*Ampelopsis* *arborea*), and bog hemp (*Boehmeria cylindrica*). The surrounding land is upland with mostly Brazilian pepper cover and many nuisance species like cogon grass, white lead tree, shrub verbena (*Lantana camara*), smutgrass, caesarweed (*Urena lobata*), and bahiagrass (*Paspalum notatum*). The upland cover is generally thick and overgrown with numerous vines.

A very small (i.e., 0.03 acre) depression will be filled along the southern portion of the project site (i.e., S9). This shallow depression was dry during the site investigations and appears to be hydrologically isolated area that may have been created from the removal of fill material for local access road improvements. It is dominated by the growth of Brazilian peppers. This depression may pond after storm events, but has no true functional wetland component and was identified as FLUCFCS 534-Reservoirs less than 10 acres.

Finally, a highly disturbed freshwater marsh, identified as FLUCFCS 641/619-Freshwater Marsh/Exotic Wetland Hardwoods, occurs along the existing railroad tracks in the vicinity of the project site to the northwest. The grassy marsh is dominated by knotgrass (*Paspalum distichum*) with a small area of open water and minor populations of string-lily, giant leather fern, and southern cattail. Historic aerial photographs indicate that the area once had a wetland shrub or tree component, but this part of the system has been taken over by Brazilian peppers to the exclusion of almost all other species. The altering of the land first for farming and currently for industry leaves this wetland and its abutting forest as relict habitats. Extending the railroad track on the property to include a connection to the project site will result in 0.16 acre of fill in the freshwater marsh. The existing culvert that provides drainage from the marsh to the west across the existing railroad tracks will be extended to accommodate the additional railroad track (i.e., the ninth culvert crossing).

Most of the land within the power plant facility consists of developed property and highly disturbed land dominated by exotic vegetation. As stated previously, the undeveloped project site is in a highly disturbed condition with the majority of the area dominated by exotic plant species such as Brazilian pepper and cogon grass. The project site provides some limited wildlife habitat, but mostly along the channelized stream and man-made drainage ditches and canal. Snowy egret (*Egretta thula*), Northern cardinal (*Cardinalis cardinalis*), Eastern mud turtle (*Kinosternon subrubrum*), black racer (*Coluber constrictor*), and mosquito fish (*Gambusia affinis*) were animal species observed along the drainages onsite. Snowy egret is a State listed Species of Special Concern. The snowy egret was the only listed species observed at the site. This is not unexpected, as very little habitat that most listed species require occurs within the project environs. Other wading birds would be expected to forage in the ditches and along the shallow edges of ponds near the Project. However, no nesting areas are available for wading birds along the proposed project area.

3.3.1 CONSTRUCTION PHASE IMPACTS

Portions of the ditches located southwest of the project site are planned to be crossed by an access road. Culverts will be installed at each flow-through ditch crossing to maintain flow (6 culvert crossings). A few of the ditches located within the footprint of the project site are also planned to be filled. However, these ditches are dead end systems and do not need to be relocated to maintain flow (i.e., S1, 2, and 11). An access road ditch crossing at S4 and another ditch crossing at S12 along the southern edge of the railroad track extension are also going to be filled without installation of a culvert because they are located at a dead end. Another dead end ditch (D2) is located farther north along the railroad track spur that will need to be filled. Originally, the northern portion of the eastern canal and the channelized stream at the northeastern corner of the project site were going to be filled. However, the project configuration was redesigned to avoid these systems resulting in a 0.08 acre reduction in jurisdictional impacts. Currently, 0.04 acre of the 0.06-acre unnamed stream to the north of the project site is scheduled to be crossed by an access road and a culvert will be installed (i.e., the seventh culvert crossing). The access road will continue to the northeast to connect the project site to National Gypsum located offsite. At the National Gypsum site, another existing ditch (i.e., D1) will be crossed that already has an existing box culvert (i.e., the eighth culvert crossing). Finally, the existing culvert that provides drainage from the marsh to the west across the existing railroad tracks will be extended to accommodate the additional railroad track (i.e., the ninth culvert crossing).

The total impact from filling in wetlands/surface waters on the project site is 0.97 acre. All of the surface water features identified are considered to be under the jurisdiction of the FDEP and U.S. Army Corps of Engineers (USACE).

Of the 0.97 acre of jurisdictional impacts, the Project will unavoidably result in permanent fill within a natural, but highly altered stream (0.04 acre), a highly disturbed freshwater marsh (0.16 acre), and man-made, upland cut ditches and a small depression (0.77 acre). Only the 0.04 acre of true natural watercourse and 0.16 acre of wetland impacts were considered for mitigation. The remaining impacts are associated with man-made, upland cut systems. Tampa Electric will purchase 0.07 credits from a permitted mitigation bank to ameliorate impacts associated with the proposed project. More details of construction-related impacts to jurisdictional areas and the proposed wetlands mitigation are described in the USACE/FDEP joint Environmental Resource Permit application (see Appendix B).

Site preparation and construction will also result in both air quality and noise impacts. Fugitive dust emissions during construction will most likely result from earthwork, movement of vehicles, and wind erosion of exposed soil. Equipment powered by diesel internal combustion engines will emit NO_x, SO_2, CO, and VOC. However, impacts from emissions from diesel engine-powered equipment during construction are not expected to adversely affect local or regional air quality (emissions will be concentrated within the confines of the plant). Impacts to adjacent vegetation from the deposition of fugitive dust should be considered insignificant. Noise levels during construction are expected to be below the existing background ambient sound level at the plant. These air quality and noise impacts will be of a high intensity, but of a relatively short duration. Therefore, no permanent, significant impacts to regional wildlife or plant species populations are anticipated. Finally, no adverse effects to threatened or endangered species are anticipated from project construction activities.

3.3.2 OPERATIONAL PHASE IMPACTS

Operational impacts on wildlife may include direct impacts (i.e., mortality) and indirect impacts (i.e., noise, human presence, and air emissions). Vehicular traffic on the plant site may result in some minor mortality such as road kills of less motile organisms such as reptiles, amphibians, or small mammals. These are expected to be minimal and not noticeably increased from those impacts already occurring from existing vehicular traffic on the plant site. Human presence and noise associated with operating a power plant are impacts already present. Current wildlife usage of the plant site reflects those species already accustomed to these activities. It is anticipated that the relatively minor increases (if any) in noise or human presence will not significantly affect wildlife usage of the plant site. The proposed gypsum storage area will represent the most noticeable new operational impact and will increase noise and human presence closer to undeveloped habitat occurring along the east side of the plant site. However, due to the highly disturbed condition of existing habitat in the area, the addition of the gypsum storage facility should not pose a significant new source of disturbance to regional species populations. The primary air pollutant associated with the new gypsum handling and storage facility stationary emission sources (i.e., truck loading/unloading, conveyor belt transfers, storage piles, storage pile reclaim, and truck/railcar and barge loadout) is particulate matter (i.e., $PM/PM_{10}/PM_{2.5}$). Particulate matter is expected to be minor based on reasonable precautions to control fugitive and unconfined emissions of particulate matter, including enclosure of conveying systems, paving of roads, and use of water sprays on open storage piles as necessary. Thus, no significant impacts to onsite, local, or regional populations of wildlife are expected from air emissions.

3.4 SOILS AND GROUNDWATER

3.4.1 SOILS AND LITHOLOGY

The area surrounding the Project site is located in the Alafia River Basin in the Gulf Coastal Lowlands physiographic province (Water Atlas of Florida, 1998). In vicinity of the subject property, the topography slopes gently westward. The contour lines shown on the Gibsonton, Florida, quadrangle topographic map indicate that land surface elevations to the east of the site are approximately 15 ft above mean sea level (msl) and slope to an elevation of 5 ft above msl in the immediate area of the site.

The site and surrounding region contain surficial layers of unconsolidated sand and clay, underlain by sand, clay, and limestone sequences. The unconsolidated soils underlying the property may be as much as 25 ft thick. These unconsolidated soils contain varying amounts of sand, silt, clay, and shell. Relict shorelines are evident in these soils and are responsible for variations in the thickness of the sands. Coastal transgression and recessions are the dominant geomorphic processes responsible for post-deposition reworking of these sediments. In addition, pedisols may be present as well as organic deposits from paleo-swamps that could affect groundwater quality locally.

Underlying these unconsolidated soils is a series of named formations. The uppermost formation is the Middle Miocene Age Hawthorn Group. The Hawthorn Group consists of (in descending order) the Peace River and Arcadia Formations. The Peace River Formation is comprised of clayey phosphatic sand beds (Scott, 1986). The Arcadia Formation consists of dolomite, sand, clay, and silty, phosphatic limestone. The thickness of the Hawthorn Group in this area ranges from 80 to 100 ft.

The Oligocene Age Suwannee Limestone underlies the Hawthorn Group in this area. The thickness of the Suwannee Limestone in this area averages over 100 ft. This limestone formation is the top of two highly productive units of the Upper Floridan aquifer.

The Eocene Age Ocala Limestone lies below the Suwannee Limestone. The surface and thickness of this formation are highly irregular due to dissolution of the limestone as secondary porosity developed.

The Avon Park Formation, also of Eocene Age, underlies the Ocala Limestone. This limestone formation is considered the bottom of the two highly productive units of the Upper Floridan aquifer.

Below the Avon Park Formation is the Oldsmar Formation, also of Eocene Age, followed by the Paleocene Age Cedar Keys Formation. The Oldsmar Formation forms the lower portion of the Floridan aquifer and the Cedar Keys Formation forms the base of the Floridan aquifer system.

The lithologic formations underlying the subject property and surrounding area are summarized here in descending order:

- Hawthorn Group—This group is a highly variable unit composed of interbedded sandy clays, limestone, and dolomite, which may be intermixed with phosphate grains of varying sizes. The Hawthorn Group consists of the Peace River and Arcadia Formations.
- Peace River Formation—It consists of interbedded sands, clays, and dolomite with varying phosphate content. The Bone Valley Member of the Peace River Formation consists of calcareous and noncalcareous fine grained clayey sands to sandy clays with abundant phosphorite nodules up to pebble size. The pebbles are white to gray in the upper part, and amber or black in the lower part. This member includes beds of clean phosphatic sands and gravels, and is the primary ore zone for phosphatic pebble mining.
- Arcadia Formation—It consists of marl, dolomite, and limestone. These are soft to chalky, fine-grained to sandy or pebbly, with abundant brown or black phosphorite grains and pebbles. The formation includes some minor thin-bedded sand and clay. The Tampa Member of this formation consists of massive or thick-bedded limestone. The limestone is hard, dense, fossiliferous, phosphatic, cherty, white to gray and brown, with some minor thin beds of sand and clay. The lower part of the Tampa limestone is characteristically sandy, white to tan, lime mud with low to moderate porosity.
- Suwannee Limestone Formation—This formation consists of fairly pure, granular limestone. The limestone is cream to white colored and is usually very fossiliferous with occasional clear quartz grains.
- Ocala Limestone Formation—The upper portion of this formation consists of white dolomitic limestone with calcite matrix. The lower part is cream to dark brown and gray with chert veins throughout, and is more dense that the upper portion.
- Avon Park Formation—This formation is primarily composed of fossiliferous limestone interbedded with vuggy dolomite. This formation occurs throughout the Florida peninsula and the eastern panhandle. The limestone contains intergranular

anhydrite and gypsum, and is white and cream grading to dark brown. Dolomite zones are common in the middle section. They are dense to finely crystalline, and yellow to grayish brown. The lower dolomite unit is dense to finely crystalline or sucrosic. Some areas are coarsely crystalline, pale yellow, and mottled brown and gray.

- Oldsmar Formation—This formation consists of limestone and dolomite with some intervals containing inclusions of evaporates (gypsum and anhydrite).
- Cedar Keys Formation—This formation generally consists of the same sediments as the Oldsmar Formation.

3.4.2 GROUNDWATER

Aquifers in the area of the Project site include (in descending order) the Surficial and Floridan aquifers. Thin layers of carbonates in the Hawthorn Group may contain sufficient water to act as a minor intermediate aquifer, but in this area, these do not provide a significant amount of water. The Surficial aquifer lies within the unconsolidated deposits and is widely used as a source of water for agricultural irrigation. However, the groundwater in the Surficial aquifer may contain elevated levels of iron, making the water undesirable for potable use. In addition, it is unlikely that the specific yield of the Surficial aquifer would yield a sufficient amount of water for potable use.

The clays and dolomites of the Hawthorn Group act as a low permeability or impermeable barrier separating the Surficial aquifer from the underlying Floridan aquifer. Clays present in the upper portion of the Tampa Member also comprise this low permeability barrier.

The Floridan aquifer is generally recognized as the primary source of potable groundwater. Water supply wells may be present in the area. The Floridan aquifer is comprised of the thick sequence of limestone formations identified above. The role these formations play in the aquifer system is described below:

- Suwannee Limestone Formation—Considered the upper permeable zone of the upper Floridan aquifer.

- Ocala Limestone Formation—It lies between the upper and lower permeable zones of the upper Floridan aquifer, and is of generally lower permeability.
- Avon Park Formation—Typically recognized as the lower permeable zone of the upper Floridan aquifer.
- Lower portion of the Avon Park Formation—It acts as a confining unit between the upper and lower portions of the Floridan aquifer.
- Floridan aquifer—It consists of the carbonates of the Oldsmar Formation.
- Cedar Keys Formation—It forms the base of the Floridan aquifer system.

3.4.3 CONSTRUCTION PHASE IMPACTS

Impacts to groundwater resources during construction of the Project will be minimal to negligible. There will be no direct discharges to groundwater as part of construction activities. During construction, recycled water will be used intermittently for dust control. It is not anticipated at this time that dewatering for construction of the project foundations, water/wastewater lines will be necessary since most of the foundations and structures will be above ground surface. If the water table rises and construction excavations are needed dewatering and groundwater discharge may be required; however, this scenario is not anticipated.

The potential temporary effects on existing groundwater quality of the Surficial aquifer due to earth-moving activities at the site during site preparation and construction are anticipated to be minimal due to low groundwater flow velocities in the area.

Construction contractors will be required to implement practices to minimize the potential for spills of fuels or chemicals. Maintenance will be performed only in designated areas. In the unlikely event that spills do occur, they will be managed in an approved manner, in accordance with local, state, and federal regulations. In conclusion, the proposed construction activities for the Project are not expected to adversely impact onsite or offsite groundwater resources. Any impacts should be minor and temporary.

3.4.4 OPERATIONAL PHASE IMPACTS

As previously stated, the new gypsum handling and storage facility area will encompass approximately 27 acres of land, consisting of 24.2 acres where the actual handling and storage operations will occur, and 2.8 acres of above-grade access roads to the west and north of the facility. The facility area will be lined with a geo-synthetic clay lining and geo-membrane, overlain by 2 ft of compacted gypsum. An 8-ft tall perimeter berm will surround the area to provide flood protection and contain the stormwater generated within the area. In accordance with the provisions of Consent Order File No. 00-1275 and the Big Bend RAP, details of the Preliminary Engineering Design for the Project were submitted to FDEP on March 19, 2012.

In light of this, it is anticipated that the impacts to soils and groundwater due to the operations of the Project will be minimal to negligible.

3.5 HUMAN POPULATION

3.5.1 SITE CHARACTERIZATION

To assess the potential impacts that a project may have, it is necessary to characterize the environment in which the Project will be located. This section provides the characterization for the project area, related improvements, and vicinity in the Big Bend area of Hillsborough County. The environmental descriptions in this section are based on a combination of information contained in the original site certification application (SCA) for the Big Bend Station and updated information to reflect current environmental conditions on the project site and its vicinity.

Where appropriate, the impacts from construction and operation are described. The construction workforce for the Project is estimated to peak at approximately 60 workers and average 42 workers for 12-month duration. Employment is expected to be highest during the July-December 2013 time frame. The majority of the construction workforce is expected to be drawn from Hillsborough County. It is estimated that most workers will commute from their current housing and that there will be few, if any temporarily relocation to areas within commuting distance of the project site. Any such workers could occupy available rental housing units or recreational vehicle park sites. The associated potential impacts on housing, schools, and other public facilities and services are expected to be minimal and temporary. Construction is expected to occur primarily during daylight hours, with the majority of the construction workers onsite between 7 a.m. and 7 p.m. The operational work force will be the same employees that are working at the existing gypsum storage area.

3.5.1.1 Adjacent Properties

The properties adjacent to and in the vicinity of the Big Bend Station currently consist of Tampa Bay to the west, undeveloped and industrially developed properties to the north and northeast, agricultural lands to the east, and undeveloped land and residentially developed properties to the south in the vicinity of Apollo Beach. Other residentially developed areas are located to the east, east of U.S. Highway 41.

3.5.1.2 Proposed Project Site Uses

The main areas that will be impacted by construction of the proposed improvements include existing Big Bend Station facilities where the conveyor belt and access roads will be located. These facilities include connection of the conveyor belt to the transfer house and the location of the conveyor belt and access road across an open storage area, across Wyandotte Road, across a parking lot, across a floodplain compensation area and then to the new gypsum handling and storage facility.

3.5.2 LAND USE PLANNING

According to the provision of Rule 62-17, F.A.C., an analysis of various land use baseline conditions and projected impacts in accordance with local government comprehensive plans and land development regulations. The various planning issues relevant to the Project fall within the following generalized categories: (1) comprehensive planning and land development code regulations, (2) land use, and (3) public services and utilities.

Based on the evaluation of existing conditions, consistency with the comprehensive plan and land development regulations and sufficient capacity of public facilities, the new gypsum storage area is compatible development and should result in no significant negative impacts to the socio-political environment in the surrounding area.

3.5.2.1 Governmental Jurisdiction

The Big Bend Station site lies within unincorporated Hillsborough County, north of the unincorporated area of Apollo Beach. The nearest incorporated municipality to the Site is Tampa, located approximately 10.5 miles to the north-northwest. Unincorporated Brandon is located about 11 miles to the northeast and incorporated Plant City is located over 22 miles to the northeast.

Moreover, the Big Bend Station site is also within the jurisdiction of the Tampa Bay Regional Planning Council (CFRPC) and Southwest Florida Water Management District (SWFWMD).

3.5.2.2 Comprehensive Planning and Zoning

The current land use plan designation and the zoning for the project site are described in the following subsections based on the applicable sections of the Hillsborough County Comprehensive Plan and the Hillsborough County Land Development Code.

Comprehensive Plan

The Local Government Comprehensive Planning and Land Development Regulation Act of 1985 (Chapter 163, F.S.) requires all counties and municipalities within the state to prepare comprehensive plans. The Site is located in the Heavy Industrial (HI) land use designation of the Hillsborough County Future Land Use Map (FLUM). According to the Future Land Use Element of the Comprehensive Plan, the purpose of the HI land use category is to provide areas for industrial development that have the potential to produce the most intense objectionable accompanying effects. The maximum floor area ratio (FAR) is 0.5. The FAR does not apply to processing, storage and other uses characterized by outdoor storage. Allowable uses include light and heavy industrial uses including the processing, manufacturing and assembly of materials with associated storage as well as existing electrical generation plants and expansions of such plants. All of the immediately surrounding area is also in the HI land use category. The closest non-HI land use category is a Community Mixed Use designation located in the northwestern quadrant of the inter-section of U.S. 41 and Big Bend Road. Figure 3–2 depicts the onsite and surrounding future land use designations.

A review of the FLUM indicates that the Site is also located within the Coastal High Hazard Area (CHHA) overlay. The CHHA is defined as the area below the elevation of the category 1 storm surge line as established by the Tampa Bay Regional Planning Council using the Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model. The Coastal Management Element of the Comprehensive Plan contains goals, objectives and policies addressing the coastal planning area. The Big Bend Station is identified as a water-dependent use. Objective 7 and Policies 7.1 through 7.11 address water-dependent and water-related uses. Policy 7.1 (in part) states "The County shall give priority to locating water-dependent and water-related uses within the coastal planning area designed for industrial development on the Future Land Use Map."

According to the Livable Communities Element of the Comprehensive Plan, the entire Big Bend Station site is located within the SouthShore Areawide community planning area. The community plan for the SouthShore area recommends strategies for growth and development in three main areas; transportation, environmental/natural, and cultural/historical. There are references to the Hillsborough County Corridor Preservation Plan map, to the Hillsborough County Greenways map and to the SouthShore Historical Resources Inventory map. A review of these maps indicates that the roadway improvements in the vicinity of the Site are the future 6-laning of U.S. 41 and the enhancement of Big Bend Road. There are no Greenways depicted in the vicinity of the Site. No designated historical landmarks or properties eligible for local landmark designation or listing on the National Register of Historic Places are depicted in the vicinity of the Site. The community vision and strategies do not change allowable uses, maximum densities or other changes in land use approvals.

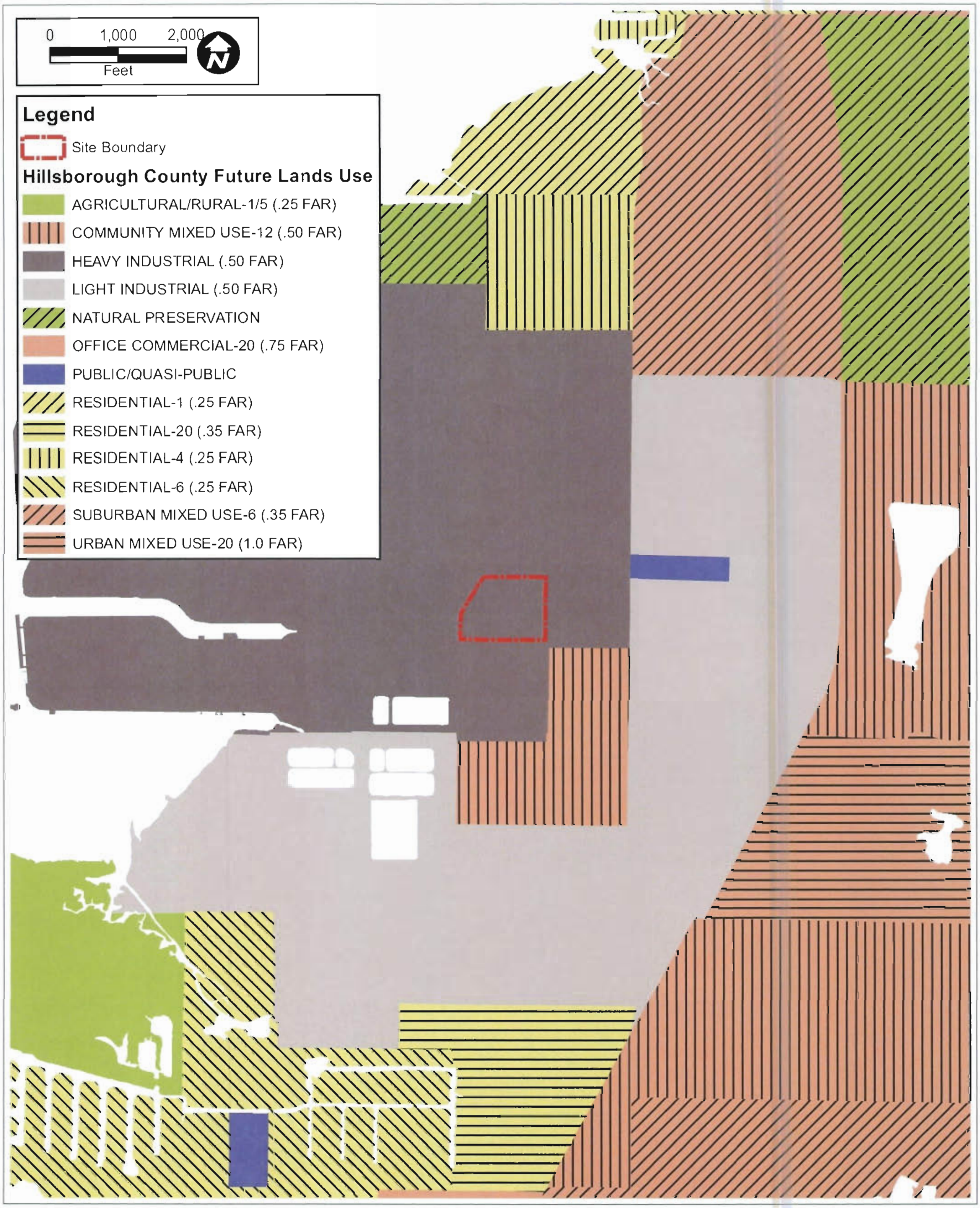


FIGURE 3-2.
ONSITE AND FUTURE LAND USE DESIGNATIONS

Sources: Hillborough County, 2010; ECT, 2012.

TECO
TAMPA ELECTRIC

Zoning

As shown in Figure 3-3, the project site is zoned Agricultural Industrial (AI). The purpose of this district is to allow agricultural and related uses within areas designated for industrial uses by the Comprehensive Plan on parcels of at least one acre. Neither power plants nor power generation facilities are allowed in this zoning district. Due to the project site location within the CHHA, Policy 10.4 of the Coastal Management Element of the Comprehensive Plan requires any rezoning for all new buildings, structures, uses, and substantial expansions of existing uses for commercial or industrial development on more than five acres of land to be approved through a planned development (PD) process. Tampa Electric has submitted an application for rezoning from AI to PD. The PD will allow the proposed use of the project site.

The area to the west of the western boundary of the Gypsum Storage Area is zoned Manufacturing (M). The purpose of this district is to provide areas for manufacturing, processing or assembling uses, intensive commercial uses and other industrial uses in appropriate areas of Hillsborough County. Electrical power generation is allowed as a conditional use in the M zoning district.

3.5.2.3 Land Use

Existing Land Use

Existing land use and land cover characteristics, using the Level II categories of the FLUCFCSwithin the Big Bend Station and the surrounding area within a 5-mile radius, are shown at a scale of 1 inch equals 2,000 ft (1:24,000 proportion scale) on Figure 3-1.

Existing land uses found adjacent to the Site boundaries associated Big Bend Station facilities (rail loop and stormwater ponds) to the northwest, west and southwest, undeveloped land and the National Gypsum Company wallboard manufacturing facility to the north, and row crops to the east, southeast and south. The closest residential land uses are located over 4,000 ft to the east and southeast. The Caribbean Isles Mobile Home Park and Apollo Beach are located over a mile to the south and southwest.

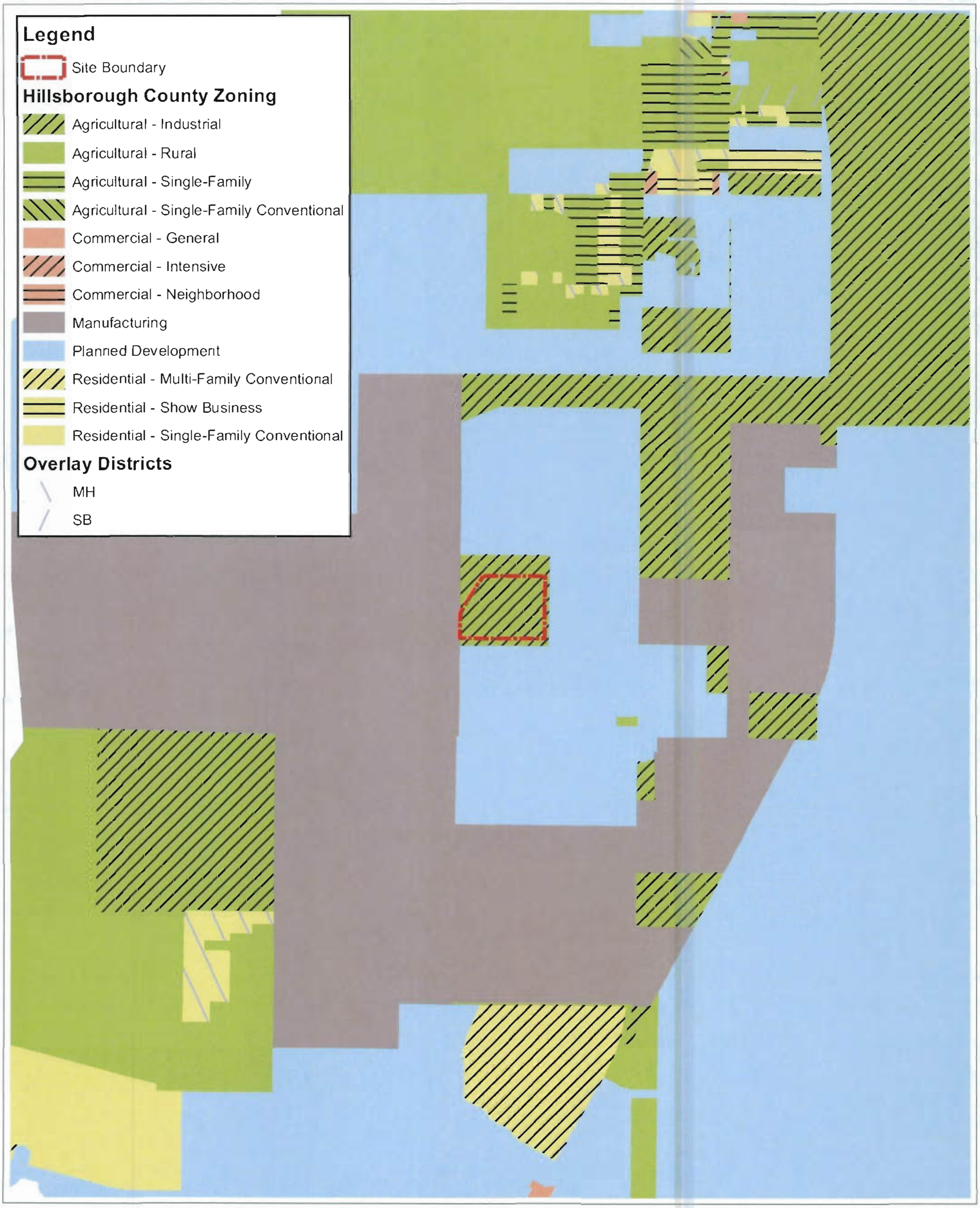


FIGURE 3-3.
ZONING MAP

Sources: Hillborough County, 2011; ECT, 2012.

TECO
TAMPA ELECTRIC

Land Use Impacts

Projected construction impacts on land use on and in the vicinity of the project site are expected to be insignificant. There is no current use of the project site. The rezoning of the project site to a PD district to accommodate the electrical power plant affiliated use from the current AI standard zoning district is more compatible with the surrounding zoning of M (Big Bend Station to the northwest, west and southwest) and PD-Industrial (north, east and south). The properties to the west are part of the existing Big Bend Station. The property to the north is developed with a wallboard manufacturing facility that uses gypsum as a raw material. The properties to the east and south are in agricultural use and approved through a PD-Industrial zoning district for warehousing, service center and light industrial uses.

When compared to the existing gypsum handling and storage facility, the distance to the nearest single-family residence to the new gypsum handling and storage facility site increases the distance from approximately 1,000 to over 4,000 ft. The closest residences are located east of U.S. 41, north (Kings Lake Apartments and Tuscany Bay) and south of Big Bend Road (Covington Park). The new gypsum handling and storage facility will be bermed, providing a visual buffer from the eastern and southern adjacent properties and from U.S. 41.

Housing Impacts

For the year 2009, there were a total of 29,524 construction workers in Hillsborough County (Bureau of Economic and Business Research, 2010). Based on this available construction workforce and as previously discussed, the majority of construction workers is expected to be drawn from within commuting distance to the project site and will not permanently relocate to the area. It is, therefore, expected that the majority of these construction workers will commute daily to and from the project site. Unlike the case of power plant construction, specialized workers from out of the state or the region are not required.

3.5.2.4 Transportation

Transportation facilities that will service the project site include roadways and rail. No public or private airport facilities are located within a 5-mile radius of the Big Bend Station. Figure 3-2 shows the regional transportation facilities.

Major roadways within a 5-mile radius of the Site include U.S. 41, Big Bend Road, Interstate (I) 75 and U.S. 301. U.S. 41, I-75 and U.S. 301 are identified as state principal arterials on the Hillsborough County 2005 Federal Functional Classification Map. Big Bend Road is identified as a local minor arterial. The project site is accessed from Wyandotte Road to the west, which terminates to the south at Big Bend Road and at Pembroke Road to the north. Both Big Bend Road and Pembroke Road access U.S. 41 to the east.

The project site is provided with direct rail access by a loop that intersects the Site in the northeastern portion. The rail loop connects to an east-west CSX Railroad located north of Pembroke Road. This rail line connects to an existing north-south rail line located east of U.S. 41. The north-south line connects to both the Port of Tampa to the north and Port Manatee to the south.

As previously stated, no public or private aviation facilities are located within a 5-mile radius of the Site. The closest airport to the Site is MacDill Air Force Base, approximately 6.2 miles to the northwest. Peter O. Knight airport is located approximately 8.5 miles to the north-northwest. The Wimauma Air Park Airport (private airport) is located approximately 8.7 miles to the southeast. Tampa International Airport is approximately 14 miles to the northwest.

Construction Phase Impacts

During construction of the gypsum storage area and the related facilities, construction labor force and delivery traffic will use the existing roadway system in the vicinity of the Site, primarily I-75, U.S. 41, Big Bend Road, Pembroke Road and Wyandotte Road. The delivery traffic will primarily use the existing I-75 or U.S. 41 to Big Bend Road to Wyandotte Road route to the Site. Construction worker traffic can access the Project site from U.S. 41/Big Bend Road/Wyandotte Road route, U.S. 41/Pembroke Road/Wyandotte

Road route, or I-75/Big Bend Road/Wyandotte route. These routes and intersections were used by construction traffic during development of Big Bend Station and are expected to be adequate for the project construction traffic. Access to the project site will be controlled for security purposes. It is not anticipated that there will be any required short-term closures of any roadways other than Wyandotte Road. Any such closures will be scheduled for low traffic periods to minimize traffic disruptions and delays.

The access to the Site is from Wyandotte Road to the west. Wyandotte Road terminates to the north at Pembroke Road and to the south at Big Bend Road. Both Pembroke and Big Bend Roads access U.S. 41 to the east. Big Bend Road, between U.S. 41 and I-75 currently functions at level of service (LOS) B, based on a LOS report (March 2011) prepared by Hillsborough County. U.S. 41 operates at LOS C from Gibsonton Road south to Big Bend Road and at LOS B from Big Bend Road south to Apollo Beach Boulevard. U.S. 41 operates at or better than LOS D from State Road (SR) 60 south to the Manatee County Line. I-75 operates at or better than LOS D from SR 60 south to SR 674. The county minimum LOS standard for arterial roads is LOS D.

Some temporary construction-related transportation impacts are expected as a result of the movement of construction workers, machines, and equipment to and from the project site. For the purposes of a transportation analysis, the following assumptions apply:

- Construction-related trip generation of 2.0.
- Vehicle occupancy rate of 1.2.
- 25 percent southbound trips (U.S. 41 to Pembroke Road to Wyandotte Road).
- 25 percent northbound trips (U.S. 41 to Big Bend Road to Wyandotte Road).
- 50 percent westbound trips (I-75 to Big Bend Road to Wyandotte Road).
- Nearly all deliveries will be via Big Bend Road.

There will only be one access to the project site during construction. Most project workers will park to the west, offsite and will walk or be bused to the Site. Access to the project site will be controlled.

Using the assumptions above, a total of 114 daily trips will be generated during the expected 4-month peak construction employment period with as many as an additional 15 daily trips for deliveries. The average construction workforce of 42 employees will generate a total of 70 daily trips with approximately 10 additional delivery trips Table 3-2 identifies the anticipated distribution for both peak and average employment periods.

Table 3-2. Anticipated Distribution of Vehicle Trips during Construction

Roadway	Direction	Trips
Peak Period		
U.S. 41/Pembroke/ Wyandotte	Southbound	29
U.S. 41/Pembroke/ Wyandotte	Northbound	29
I-75/Big Bend/Wyandotte	Westbound	71
Average Period		
U.S. 41/Pembroke/Wyandotte	Southbound	10
U.S. 41/Pembroke/Wyandotte	Northbound	10
I-75/Big Bend/Wyandotte	Westbound	32

Sources: Tampa Electric, 2012; ECT, 2012.

The original Big Bend Unit 4's SCA transportation analysis found that all roadway links and intersections within the traffic impact area would operate at acceptable levels of service with the existing geometry. No additional roadway improvements were recommended and none were required after construction of the plant entrances.

Table 3-3 compares the AADT reported in 2010 by Hillsborough County and the peak projection construction traffic for the Project with the daily capacity of the roadways.

Table 3-3. Anticipated Distribution of Vehicle Trips during Construction

Roadway	2010 AADT	Peak Construction	Daily Capacity
U.S. 41(North of Pembroke Road)	26,500	26,529	36,700
U.S. 41 (South of Big Bend Road)	27,000	27,020	36,700
Big Bend Road	23,500	23,571	28,825

Sources: Tampa Electric, 2012; ECT, 2012.

Even at the peak of construction activities, the surrounding roadway network is expected to operate at acceptable levels of service. Furthermore, Tampa Electric will encourage transportation demand management techniques to reduce the number of temporary construction-related vehicle trips on the road networks. These techniques will include placing a bulletin board onsite which may be used by construction contractors to place carpooling advertisements. All construction contractors will be requested to inform their employees that this service is available.

During the peak construction activities, construction vehicles (e.g., graders, bulldozers, dump trucks) will also access the Site. However, the majority of these heavy construction vehicles are anticipated to remain onsite for the duration of the initial construction activities, entering at initiation and exiting at completion. Since the majority of these vehicles are not expected to make daily trips to and from the Site, the potential traffic impacts from these vehicles are expected to be minimal to the regional road network.

Operational Phase Impacts

Operation of the Project will not create any additional employment. With the closure of the existing gypsum storage area, the four full time employees will be transferred to the operations of the Project. There will be an estimated 80 daily truck trips for receiving and or loading gypsum. The number of trips actually on public roads will depend on whether or not the loads are being received or loaded on the destination of the outbound trips. For a worst case scenario, all of the trips were assumed to be on public roads. The maximum number of daily trips is less than that during construction. Therefore, there will be no degradation of the existing LOS.

3.5.2.5 Public Facilities

Medical Facilities

The nearest hospital to the project site is South Bay Hospital located in Sun City Center, approximately 6 miles to the south-southeast (approximately 10.2 miles by ambulance) Tampa General Hospital is located approximately 10.4 miles to the north-northeast (approximately 16 miles by ambulance). Both hospitals are equipped with emergency rooms and Tampa General Hospital is equipped with a trauma center.

Hillsborough County had 4,199 general hospital beds at a ratio of 341 general hospital beds per 100,000 population.

Fire Protection and Emergency Rescue Service

The nearest fire station to the Project site is Fire Station 29 located at 626 Golf to Sea Boulevard in Apollo Beach, approximately 2.4 miles to the southwest. Fire and Rescue Station 3 (Summerfield) located at 10817 Big Bend Road, is approximately 4 miles to the east, Fire and Rescue Station 12 (Gibsonton), at 8612 Gibsonton Drive, is located approximately 4.3 miles to the northeast and Fire and Rescue Station 28 (Sun City Center), at 4551 Sun City Center Boulevard, is located approximately 6.5 miles to the southeast. There is a fire engine located at Station 29 and fire trucks and rescue vehicles assigned to the other nearby stations.

Police Protection

The project site are located unincorporated Hillsborough County and receive police services from the Hillsborough County Sheriff's Department. The area is located in District IV. The district office is located in Ruskin, approximately 9.5 miles to the south.

Approximately 15 to 20 officers per two 12-hour shift work out of the District IV office. Responses are prioritized according to urgency, with an estimated response time of less than 10 minutes for a routine response, with a considerably shorter time expected for high-priority emergencies. Because the project site lies in unincorporated Hillsborough County and is more than 10 miles from the nearest municipality, responses by city police departments under most all circumstances are not expected (Polk County Sheriff's Department, 2012).

Potable Water, Sanitary Sewer, and Solid Waste

The project site is located in the Urban Service Area of Hillsborough County, an area provided with public potable water supply and sanitary sewerage service. Although sanitary sewerage service is available in the general area, the minimal amount of domestic waste to be generated during operation will be handled onsite by utilization of a holding tank to be periodically emptied and the contents transported to the South County wastewater treatment plant.

There is no potable water service supplied to the project site; however, the Big Bend Station has potable water supplied by the Lithia Water Treatment Plant (WTP) located 5402 Lithia-Pinecrest Road. The closest potable water line is a 12-inch diameter pipe located in the right-of-way of Wyandotte Road, approximately 1,500 ft from the western boundary of the project site. Tampa Electric will request an additional connection in order to provide potable water to the Project. The Lithia WTP has a permitted capacity of 140 million gallons per day (MGD) and is currently operating at about 23 to 25 MGD.

The South County landfill, located north of County Road (CR) 672 Highway 540 between CR 39 and Balm-Boyette Road, is currently the only operating landfill in Hillsborough County. The 179-acre facility, opened in 1984, was built over the clay residue from a prior phosphate mining operation. Solid waste that cannot be processed through the resource recovery facility, ash from the resource recovery facility and the city of Tampa waste to energy facility, shredded tires and solid waste diverted from the resource recovery facility and from transfer stations is received at the South County landfill. For solid waste generated during construction and operation of the Project, domestic, construction, and certain industrial solid waste disposal services will be provided by contracted services with an approved, licensed contractor serving the region. According to a spokesperson with the Hillsborough County Solid Waste Department, there is approximately 44 years of estimated capacity based on projected landfilling rates.

Construction and Operational Phase Impacts

Operation of the Project will not negatively affect essential services or facilities. While it will rely on local police and fire protection, the existing Big Bend Station is already equipped with its own fire protection and other safety-related systems, and the project site will be secured with controlled, fenced access. The medical facilities in the surrounding area are sufficient to handle most emergencies involving either the larger construction workforce or the relatively few additional permanent employees for operations.

There will be no connection to the Hillsborough County sanitary sewer system and, therefore no impact to distribution lines or treatment capacities during construction and operation. Portable facilities will be made available during construction.

Bottled water will be made available to construction workers as there will be no connection to the Hillsborough County potable water distribution and water treatment system until near the end of construction. The permanent workforce of four employees will have potable water provided by the County. A new connection will be made at Wyandotte Road. There is sufficient capacity at the Lithia WTP to accommodate the new connection.

Solid waste generated during construction activities will be disposed in accordance with applicable rules and regulations. Disposal of solid waste (i.e., typical municipal solid waste) will be in appropriate waste collection containers located around the construction areas, and the waste will be transported offsite for disposal at an approved solid waste landfill (South County). Construction debris, such as scrap wood, concrete, and metal, will first be transported to a specified salvage storage area on the Site where they will be separated and stockpiled for potential salvage and recycling. Construction debris that is not salvaged and recycled will be transported to the South County landfill.

Used oil from construction vehicles and equipment will be collected in appropriate containers and transported offsite for recycling or disposal at an approved facility. The approved disposal facility will be an existing facility that has been permitted for commercial recycling or disposal of used oils.

Individual contractors will be responsible for handling any hazardous materials required to perform their tasks and any resulting hazardous wastes. This responsibility includes the proper recordkeeping, transportation, storage, handling, and offsite disposal of such wastes in accordance with federal and state hazardous waste regulations.

3.6 LEASES, EASEMENT, TITLES, AND AGENCY WORKS

The Project will be constructed on property owned by Tampa Electric. No additional easements or rights-of-way will be required.

3.7 LANDMARKS AND SENSITIVE AREAS

There are no onsite regionally significant scenic, cultural, or natural landmarks. The aesthetic character of lands within the boundaries of and adjacent to the project site are largely influenced by the presence of Big Bend Station. With the exception of Tampa Bay to the west, there are no areas of aesthetic or visual importance and significance in the vicinity of the Site. The Tampa Bay Regional Planning Council Strategic Regional Policy Plan does not identify any regionally significant natural resources in proximity to the project site.

The following areas are *not* found within a 5-mile radius of the Project site:

- National parks.
- National forests.
- National seashores.
- Military lands.
- National wild and scenic rivers.
- Scenic and wild rivers.
- Roadless area review and evaluation areas.
- State parks.
- State forests.
- National memorials or monuments.
- Areas of critical state concern.
- National marine and estuarine sanctuaries.
- Indian reservations.

No federal, state, regional, or local scenic, cultural, or natural landmarks are located within the 5-mile study area surrounding the Site. Therefore, the construction of the Project will have no impact upon such resources.

3.8 ARCHAEOLOGICAL AND HISTORIC SITES

Correspondence from the Florida Division of Historical Resources (FDHR) stated that no archaeological or historic site had previously been recorded in the area of the Site. The closest such resources are two historic structures located approximately 1,500 ft to the southwest and three archaeological sites located approximately 3,800 ft to the west-northwest, 2,700 ft to the west, and 3,200 ft to the southwest. Due to the distances from the identified resources, no adverse impacts to significant cultural resources are expected.

According to a review of the Florida Master Site File, there are no historic or archaeological resources located closer than 1,500 ft of the project site. Project construction is not expected to disturb any archaeological or historical features. Therefore, no mitigation to such impacts will be required. In the unexpected event that such a feature is encountered during construction, activities will be halted until a certified archaeologist evaluates the find and determines its significance. If the find is significant, Tampa Electric will take the appropriate measures to preserve or mitigate the impact to the find in coordination with FDHR.

4.0 REFERENCES

Bureau of Economic and Business Research. 2011. 2010 Statistical Florida Abstract. College of Business Administration, University of Florida, University Press of Florida. Gainesville, FL.

Personal communication. Dawn Ramos, Hillsborough County Public Works Department. March 13, 2012

Personal communication. Mel Parrish, Lithia Water Treatment Plant. March 12, 2012.

Personal communication. Larry Ruis, South County Landfill. March 5, 2012.

www.hillsborough county.org/firerescue (fire and rescue stations)

www.hcso.tampa.fl.us/ (Sheriff's office)

http://hcma.net/Hospitals.html (medical facilities)

www.planningcommission.org/hillsborough (Hillsborough County Comprehensive Plan and Southshore Community Plan)

http://library.municode.com/index.aspx?clientId=12399 (Hillsborough County Land Development Code)

www.hillsboroughmpo.org/traffic-counts/

Tampa Bay Regional Planning Council. Strategic Regional Policy Plan. 2005.

APPENDIX A

MINOR CONSTRUCTION

AIR PERMIT APPLICATION

BIG BEND STATION

GYPSUM HANDLING AND STORAGE AREA MODIFICATIONS

MINOR AIR CONSTRUCTION PERMIT APPLICATION

Prepared for:

TECO
TAMPA ELECTRIC

Tampa, Florida

Prepared by:

ECT

Environmental Consulting & Technology, Inc.
3701 Northwest 98th Street
Gainesville, Florida 32606

ECT No. 100754-0200

October 2012

1.0 INTRODUCTION

The Tampa Electric Company (Tampa Electric) Big Bend Station located in North Ruskin, Hillsborough County, Florida is a nominal 1,892 megawatt (MW) electric generation facility. Regulated emission units at the Big Bend Station include four solid fuel-fired steam boiler/steam turbine generator units (Units 1 through 4), two simple-cycle combustion turbines (SCCT 4A and SSCT 4B), solid fuel yard, coal bunkers, flyash and limestone handling and storage, wastewater treatment plant lime silo, abrasive blasting, surface coating operations, coal residue storage and transfer, and two diesel engine generators. Solid fuels combusted in Units 1 through 4 include coal, petroleum coke (petcoke), and coal combustion products generated at the Tampa Electric Big Bend or Polk Power Stations. The simple-cycle combustion turbines are fired primarily with natural gas with ultra low sulfur diesel fuel oil serving as a secondary fuel.

The Big Bend Station also includes several unregulated emission units and activities including slag, bottom ash, and gypsum handling and storage, No. 2 fuel oil storage tanks, vehicle refueling operations, and regulated and insignificant emergency diesel engines.

Operation of the Big Bend Station is currently authorized by Title V Air Operation Permit No. 0570039-054-AV issued with a revision effective date of September 18, 2012 and an expiration date of December 31, 2014.

Since the existing onsite gypsum storage facility (i.e., the *South 40*), is near its storage capacity, Tampa Electric plans to install a new gypsum handling and storage facility (i.e., the *East 40*) in phases. The East 40 will be located northeast of the Big Bend Station south of the existing National Gypsum wallboard facility. In Phase 1, gypsum will be transferred from the Big Bend Station to the East 40 by truck. The Phase 1 East 40 will consist of a gypsum storage area. If the decision is made to construct Phase II, a conveyor system will be utilized to transfer gypsum from the Big Bend Station to the East 40 instead of trucks. A radial stacker and storage dome would also be installed in Phase II. For both Phases I and II, gypsum will be reclaimed from the East 40 and transferred to trucks and railcars for offsite shipment.

Tampa Electric also plans to modify its existing Big Bend Station gypsum handling facilities to facilitate truck transfer to the East 40 and to allow gypsum to be loaded onto barges at the existing Big Bend Station dock. Following these modifications and the addition of the new East 40 gypsum storage and handling facility, gypsum initially stacked at the Big Bend Station north stackout yard will be transferred directly to trucks for delivery by truck to the following alternative locations:

(1) By truck to the East 40 (Phase I).

(2) By truck to the South 40.

(3) By truck to reuse customers.

(4) By truck to barge loading at the Big Bend Station dock.

(5) By truck for off-site landfill disposal.

Reclaimed gypsum from the East 40 and South 40 storage areas will be transferred to the following alternative locations:

(1) By truck or railcar to reuse customers (East 40).

(2) By truck to barge loading at the Big Bend Station dock.

(3) By truck for off-site landfill disposal.

Under the provisions of the Big Bend Station Remedial Action Plan (RAP), gypsum currently stored in the South 40 will be transferred to the East 40—this transfer of gypsum will be completed by December 2014. Following the transfer of gypsum and after the addition of a storage area liner by January 2015, the existing South 40 will be used as an alternative gypsum storage area in the event the East 40 is unavailable. In this event, gypsum will be transferred by truck from the Big Bend Station to the South 40 since the existing conveyor system will no longer be used. Gypsum reclaimed from the South 40 will be transferred to the same alternative locations described above for the East 40 storage area.

The new and modified gypsum handling and storage systems will be a source of particulate matter ($PM/PM_{10}/PM_{2.5}$) emissions due to the transfer of gypsum (i.e., truck unloading/loading and other transfer points), truck traffic on paved facility roads, front-end loader storage pile operations, and storage pile windblown dust. PM emissions due to the handling and storage of gypsum are relatively minor due to the high moisture content of gypsum, which is approximately 10 percent by weight.

As noted previously, the existing gypsum handling and storage facility is classified as an unregulated emission unit in the Big Bend Station Title V air operation permit. The new and modified gypsum handling and storage emission sources also qualify as an unregulated emission unit since none of the associated emission sources are subject to a numerical emission limit (i.e., none of the associated emission sources will emit an emissions-limited pollutant) or a unit-specific work practice standard. Construction of the Phase I East 40 new gypsum handling and storage facility and the existing gypsum handling modifications is planned to commence in November 2013 and to be completed by May 2014. Construction of the Phase II East 40 new gypsum handling and storage facility is uncertain at this time.

FDEP air permitting requirements are codified in Chapter 62-210, F.A.C., *Stationary Sources – General Requirements*. As required by Rule 62-210.300(1)(a), F.A.C., an air construction permit is required for any new and modified facility prior to the beginning of construction unless otherwise exempt from permitting. The new and modified gypsum handling and storage emission sources represent physical modifications and a change in operation that has the potential to increase emissions. Accordingly, this minor modification air construction permit application has been prepared to satisfy the requirements of Chapter 62-210.300(1), F.A.C.

A description of the new East 40 gypsum handling and storage facility and changes to the existing gypsum handling system are provided in Section 2.0. Emission rate estimates and a regulatory applicability analysis are provided in Sections 3.0 and 4.0, respectively. The FDEP's *Application for Air Permit –Long Form No. 62-210.900(1) Effective*

03/11/2010 is provided in Attachment A. Plan view drawings are included in Attachment B. Detailed emission rate calculations are provided in Attachment C.

2.0 PROJECT DESCRIPTION

Tampa Electric plans to install a new East 40 gypsum handling and storage facility and modify the existing gypsum handling and storage system. As noted in the Introduction, the East 40 will be constructed in phases. The Phase 1 East 40 will consist of a gypsum storage area. If constructed, Phase II will include additional improvements to the East 40 new gypsum handling and storage facility. A final decision regarding construction of the second phase of improvements has not yet been made. However, if the decision is made to construct Phase II, information regarding the design and schedule will be provided to the appropriate regulatory agencies for review and approval. The following section provides a discussion of the East 40 Phase I project and the changes planned to the existing gypsum handling system.

East 40 Phase I

Major components of the Phase I East 40 new gypsum handling and storage facility include:

(1) Truck transfer of gypsum from Big Bend Station to the East 40.

(2) Lined gypsum storage area.

(3) Mobile equipment to transfer gypsum from the storage area directly to trucks or railcars.

Gypsum from the existing Big Bend Station processing area will be transferred by trucks to the gypsum storage area. Gypsum will be reclaimed using mobile equipment (e.g., front end loaders). The reclaimed gypsum will then be transferred by truck to off-site locations (i.e., National Gypsum or other reuse customers, landfill, agricultural use, etc.) or to the Big Bend Station dock for loading into barges. The reclaimed gypsum may also be transferred to railcars for off-site shipment using mobile equipment or portable conveyors.

Modifications to Existing Gypsum Handling System

Modifications planned for the existing gypsum handling system include: (a) addition of a backup stackout conveyor to be located at the current flue gas desulfurization (FGD) by-products storage pile to the west of the limestone storage building, and (b) equipment to transfer gypsum from truck to barge at the Big Bend Station dock.

The backup stackout conveyor will transfer gypsum from the existing gypsum product handling building to the storage pile. The backup stackout belt conveyor will be 20 inches wide, have a length of 1,240 feet, and a gypsum transfer capacity of 300 tons per hour. The conical gypsum storage pile will be on an impervious pad with containment walls and will be 45 feet high with a storage capacity of 3,350 tons. Gypsum will be loaded from the storage pile into trucks by payloader for delivery either direct to reuse customers or transfer to the East 40 and South 40 storage areas.

Equipment associated with the transfer of gypsum from truck to barge includes a storage pile on an existing impervious pad with containment walls, a front-end loader, and a new receiving hopper located at the dock. Gypsum trucks will unload onto a storage pad at the dock. A front-end loader will then transfer gypsum from the storage pile to the new receiving hopper. A clamshell located on the dock will then transfer gypsum from the receiving hopper to the barge.

3.0 EMISSION RATE ESTIMATES

The only air pollutant associated with the new and modified gypsum handling and storage stationary emission sources (i.e., gypsum transfer points, truck travel and loading/unloading, storage piles, storage pile reclaim, and railcar and barge loading) is particulate matter ($PM/PM_{10}/PM_{2.5}$). Emissions of particulate matter will be minor since the gypsum handled and stored will have a relatively high moisture content; i.e., an average moisture content of approximately 10 percent by weight. Tampa Electric will take reasonable precautions to control fugitive and unconfined emissions of PM including the paving of roads and use of water sprays on open storage piles as necessary.

PM emission rates were estimated for the future post-modification East 40 and South 40 gypsum storage areas and handling system. PM emission rates were also estimated for the existing South 40 gypsum handling facilities using 2007 through 2011 gypsum transfer rates. These emission estimates were used to develop the net change in PM emissions resulting from the Big Bend Station gypsum handling and storage system modifications.

Particulate matter emission rates were estimated using the most current procedures obtained from Section 13 (Miscellaneous Sources) of EPA's AP-42 Compilation of Air Pollutant Emission Factors, Fifth Edition. Procedures from Section 13.2.4 (Aggregate Handling and Storage Piles) were used to estimate particulate emissions from the gypsum truck loading/unloading and transfer points. Section 13.2.1 (Paved Roads) procedures were used to estimate particulate emissions due to gypsum truck traffic on paved facility roads. Particulate matter emissions due to front-end loader operations at the gypsum storage piles were estimated using Section 13.2.2 (Unpaved Roads) procedures. Windblown dust emissions from open gypsum storage piles were estimated using Section 13.2.5 (Industrial Wind Erosion) procedures.

Potential PM emission rates for the future gypsum storage and handling system were estimated based on an annual gypsum throughput rate of 750,000. This gypsum throughput rate was developed with consideration given to future regulatory requirements; e.g., the recently promulgated Mercury and Air Toxics Standard (MATS) otherwise known as the

Utility MACT. As requested by the Department, actual particulate matter emission rates were also developed for the existing gypsum handling and storage facility using 2007-2011 gypsum production data and the same current AP-42 emission estimation procedures.

The following table provides a summary of the annual $PM/PM_{10}/PM_{2.5}$ emission rate estimates for the future and existing Big Bend Station gypsum storage and handling systems.

Pollutant	Future Gypsum System Potential Emissions (ton/yr)	Existing Gypsum System Actual Emissions (ton/yr)	Net Change in Emissions (ton/yr)
PM	29.7	9.9	19.8
PM_{10}	7.0	2.5	4.5
$PM_{2.5}$	1.2	0.38	0.82

As indicated in the above table, the net changes in PM, PM_{10}, and $PM_{2.5}$ emissions are below the PSD significant emission rate (SER) thresholds of 25, 15, and 10 tons per year, respectively. Detailed particulate matter emission rate calculations are provided in Attachment C.

4.0 REGULATORY APPLICABILITY ANALYSIS

Federal, State, and Hillsborough County regulations that apply or that are potentially applicable to the new and modified gypsum handling and storage emission sources are discussed in the following sections.

4.1 FEDERAL EMISSION STANDARDS

4.1.1 New Source Performance Standards

There are no New Source Performance Standards (NSPS) that are applicable to the new and modified gypsum handling and storage emission sources. The project will not include any new diesel engines and therefore NSPS Subparts IIII and JJJJ are not applicable.

4.1.1 National Emission Standards for Hazardous Air Pollutants

There are no National Emission Standards for Hazardous Air Pollutants (NESHAPS) that are applicable to the new and modified gypsum handling and storage emission sources. The project will not include any new diesel engines and therefore NESHAPS Subpart ZZZZ is not applicable.

4.2 STATE PERMITTING REQUIREMENTS

Florida Department of Environmental Protection (FDEP) air construction permitting requirements are codified in Chapter 62-210, F.A.C., *Stationary Sources – General Requirements*, and Chapter 62-212, *Stationary Sources – Preconstruction Review.*

Rule 62-210.300(1)(a) of Chapter 62-210, F.A.C., requires the owner or operator of any proposed new, reconstructed, or modified facility or emissions unit, or any new pollution control equipment to obtain an air construction permit prior to the beginning of construction unless otherwise exempt from permitting. This permitting requirement is also stated by Rule 62-212.300(1)(a) of Chapter 62-212.

Section 62-212.400, Prevention of Significant Deterioration (PSD), applies to new and modified emission units that exceed the emission rate thresholds specified in the FDEP

Section 62-210.200 definitions for new major stationary sources and major modifications. The net emission rate increases associated with the new and modified gypsum handling and storage emission sources are below the major modification significant emission rate thresholds and therefore the project is not subject to PSD review.

As is currently the case for the existing gypsum handling and storage system, the new and modified gypsum handling and storage emission sources also qualify as an "unregulated emission unit". Unregulated emission units are defined by Rule 62-210.900, F.A.C. and DEP Form No. 62-210.900(1) – Instructions as follows:

> An emissions unit which emits no "emissions-limited pollutant" and which is subject to no unit-specific work practice standard, though it may be subject to regulations applied on a facility-wide basis (e.g., unconfined emissions, odor, general opacity) or to regulations that require only that it be able to prove exemption from otherwise applicable unit-specific emissions or work practice standards (e.g., recordkeeping requirements for small storage tanks under 40 CFR 60, Subpart Kb). All fugitive emissions not subject to unit-specific work practice standards may be included in the application as one or more separate unregulated emissions units.

An "emissions-limited pollutant" is defined by Rule 62-210.900, F.A.C. and DEP Form No. 62-210.900(1) – Instructions as follows:

> An emissions-limited pollutant, for purposes of this portion of the application form, is any pollutant which is subject to a numerical emissions limiting standard for the emissions unit addressed in this section of the application, either individually or in combination with other emissions units at the facility (e.g., a "bubble" or "cap"). The term also includes any emissions limitation that would be assumed by the applicant, or any limitation on potential-to-emit created by a limitation on process rate or hours of operation assumed by the applicant. It does not include

pollutants regulated only by a work practice standard or visible emissions standard.

Emission sources associated with the new and modified gypsum handling and storage emission sources will not be subject to any pollutant numerical emissions limiting standard and will only be subject to general visible emission standards and requirements to use reasonable precautions to prevent emissions of unconfined particulate matter.

4.3 STATE EMISSION STANDARDS

FDEP emission standards for stationary sources are contained in Chapter 62-296, F.A.C., Stationary Sources—Emission Standards. General pollutant emission limit standards are included in Section 62-296.320, F.A.C. Sections 62-296.401 through 62-296.418, F.A.C., specify emission standards for 15 categories of sources. Section 62-296.470 addresses CAIR requirements. Sections 62-296.500 through 62-296.570, F.A.C., establish reasonably available control technology (RACT) requirements for VOC and NO_x emitting facilities. RACT requirements for lead and PM are found in Sections 62-296.600 through 62-296.605 and 62-296.700 through 62-296.712, F.A.C., respectively. FDEP emission standards applicable to the new and modified gypsum handling and storage emission sources are discussed in the following sections.

4.3.1 Section 62-296.320—General Pollutant Emission Limiting Standards

General Rule 62-296.320(2), F.A.C. (Objectionable Odor Prohibited), will apply to all of the new and modified gypsum handling and storage emission sources and activities. General Rule 62-296.320(4)(c), F.A.C. (Unconfined Emissions of Particulate Matter) will apply to emissions from unenclosed operations such as the gypsum storage piles.

Emissions from the new and modified gypsum handling and storage emission sources will comply with the FDEP general pollutant emission standards discussed above. None of the remaining emission standards specified in Sections 62-296.401 through 62-296.417, F.A.C., are applicable to the project. CAIR, the VOC, NO_x, lead, and PM RACT requirements of Sections 62-296.500 through 62-296.570, F.A.C., Sections 62-296.600 through 62-296.605, and 62-296.700 through 62-296.712 are also not applicable to the new and modified gypsum handling and storage emission sources.

4.4 ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY EMISSION STANDARDS

The Environmental Protection Commission (EPC) of Hillsborough County is a FDEP approved local program that has been delegated the primary responsibility for air source permitting in Hillsborough County.

EPC regulatory requirements for stationary air pollution sources are codified in Chapter 1-3 of the Rules of the Environmental Protection Commission of Hillsborough County. Chapter 1-3, Part 2, 1-3.21 (Permits Required) adopts a number of FDEP rules by reference including 62-4 (Permits), 62-210 (Stationary Sources – General Requirements), 62-212 (Stationary Sources – Preconstruction Review), 62-213 (Operation Permits for Major Sources of Air Pollution), and 62-214 (Requirements for Sources Subject to the Federal Acid Rain Program). General prohibitions are addressed in Chapter 1-3, Part 2, 1-3.22. These general prohibitions include provisions pertaining to compliance with ambient air quality standards, applicable emission standards, and objectionable odor.

Similarly, Chapter 1-3, Part 5, 1-3.50 (Emission Limiting and Performance Standards) adopts FDEP Chapter 62-204 (Air Pollution Control – General Provisions) and 62-296 (Stationary Sources – Emission Standards) by reference. General visible emission standards are contained in Chapter 1-3, Part 5, 1-3.52. A general opacity standard of 20 percent applies to all stationary sources while a general 5 percent opacity standard applies to a broad subset of stationary sources including the loading or unloading of materials to and from containers such as railcars, trucks, ships, storage structures and stockpiles, permanent conveyor systems, storage of materials in structures such as silos or enclosed bins, which have a storage capacity of fifty cubic yards or more, crushing, grinding, sizing and screening operations, and static drop transfer points. The general 5 percent opacity standard does not apply to emissions of particulate matter from open stockpiles of materials, vehicular traffic and other emissions from roads and plant grounds.

ATTACHMENT A

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION APPLICATION FOR AIR PERMIT – LONG FORM

Jon

Department of Environmental Protection

RECEIVED

OCT 12 2012

DIVISION OF AIR RESOURCE MANAGEMENT

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit:

- For any required purpose at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air operation permit;
- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment new source review, or maximum achievable control technology (MACT);
- To assume a restriction on the potential emissions of one or more pollutants to escape a requirement such as PSD review, nonattainment new source review, MACT, or Title V; or
- To establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial, revised, or renewal Title V air operation permit.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **Tampa Electric Company**	
2. Site Name: **Big Bend Station**	
3. Facility Identification Number: **0570039**	
4. Facility Location... Street Address or Other Locator: **13031 Wyandotte Road** City: **Apollo Beach** County: **Hillsborough** Zip Code: **33572**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **Robert A. Velasco, Senior Environmental Engineer**
2. Application Contact Mailing Address Organization/Firm: **Tampa Electric Company** Street Address: **P.O. Box 111** City: **Tampa** State: **Florida** Zip Code: **33601-0111**
3. Application Contact Telephone Numbers... Telephone: **(813) 228-4232** ext. Fax: **(813) 228-1308**
4. Application Contact Email Address: **RAVelasco@tecoenergy.com**

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 10-12-12	3. PSD Number (if applicable):
2. Project Number(s): 0570039-059-AC	4. Siting Number (if applicable):

APPLICATION INFORMATION

Purpose of Application

This application for air permit is being submitted to obtain: (Check one)

Air Construction Permit

☒ Air construction permit.

☐ Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).

☐ Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

Air Operation Permit

☐ Initial Title V air operation permit.

☐ Title V air operation permit revision.

☐ Title V air operation permit renewal.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.

☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

☐ Air construction permit and Title V permit revision, incorporating the proposed project.

☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

Air construction permit application for modifications to the Big Bend Station existing gypsum handling and storage facilities and for the addition of a new gypsum handling and storage facility ("East 40") to be constructed in phases. In Phase 1, gypsum will be transferred from the Big Bend Station to the East 40 storage area by truck. If constructed, Phase II will include additional improvements to the East 40 gypsum handling and storage facility. A final decision regarding construction of the second phase of improvements has not yet been made. However, if the decision is made to construct Phase II, information regarding the design and schedule will be provided to the appropriate regulatory agencies for review and approval. A detailed description of the Project is provided in Section 2.0.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Processing Fee
-036	Gypsum Handling and Storage Sources	N/A	N/A

Application Processing Fee

Check one: ☐ Attached - Amount: $______________ ☒ Not Applicable

Note: The Tampa Electric Big Bend Station has been issued FINAL Title V Permit 0570039-054-AV. An application processing fee is not required pursuant to Rule 62-213.205(4), F.A.C.

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name: **Byron T. Burrows, Manager – Air Programs**	
2. Owner/Authorized Representative Mailing Address Organization/Firm: **Tampa Electric Company** Street Address: **P.O. Box 111** City: **Tampa** State: **Florida** Zip Code: **33601-0111**	
3. Owner/Authorized Representative Telephone Numbers Telephone: Telephone: **(813) 228-1282** ext. Fax: **(813) 228-1308**	
4. Owner/Authorized Representative Email Address: **BTburrows@tecoenergy.com**	
5. Owner/Authorized Representative Statement: *I, the undersigned, am the owner or authorized representative of the corporation, partnership, or other legal entity submitting this air permit application. To the best of my knowledge, the statements made in this application are true, accurate and complete, and any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department.* Signature	10/9/12 Date

APPLICATION INFORMATION

Application Responsible Official Certification NOT APPLICABLE

Complete if applying for an initial, revised, or renewal Title V air operation permit or concurrent processing of an air construction permit and revised or renewal Title V air operation permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):
   - ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
   - ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
   - ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
   - ☐ The designated representative at an Acid Rain source or CAIR source.

3. Application Responsible Official Mailing Address...
   Organization/Firm:
   Street Address:
   City: State: Zip Code:

4. Application Responsible Official Telephone Numbers...
   Telephone: ( ) - ext. Fax: ( ) -

5. Application Responsible Official E-mail Address:

6. Application Responsible Official Certification:

   I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.

   ______________________________ ____________________
   Signature Date

Professional Engineer Certification

1.	Professional Engineer Name: **Thomas W. Davis** Registration Number: **36777**
2.	Professional Engineer Mailing Address... Organization/Firm: **Environmental Consulting & Technology, Inc.** Street Address: **3701 Northwest 98th Street** City: **Gainesville** State: **Florida** Zip Code: **32606-5004**
3.	Professional Engineer Telephone Numbers... Telephone:**(352) 332 – 0444** ext. Fax: **(352) 332 - 6722**
4.	Professional Engineer Email Address: **tdavis@ectinc.com**
5.	Professional Engineer Statement: *I, the undersigned, hereby certify, except as particularly noted herein*, that:* *(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and* *(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.* *(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.* *(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.* *(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.* Signature ______ Date 10/9/12 (seal)

* Attach any exception to certification statement.

STATE OF FLORIDA PROFESSIONAL ENGINEER No. 36777 THOMAS W. DAVIS

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **361.9** North (km) **3,075.0**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s): **4911**
7. Facility Comment :			

Facility Contact

1. Facility Contact Name: **Karen O. Zwolak, Senior Environmental Consultant**
2. Facility Contact Mailing Address... Organization/Firm: **Tampa Electric Company** Street Address: **13031 Wyandotte Road** City: **Apollo Beach** State: **FL** Zip Code: **33572**
3. Facility Contact Telephone Numbers: Telephone: **(813) 228 - 4111** ext. Fax: **(813) 641 - 5081**
4. Facility Contact E-mail Address: **KOzwolak@tecoenergy.com**

Facility Primary Responsible Official **NOT APPLICABLE**

Complete if an "application responsible official" is identified in Section I that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official E-mail Address:

FACILITY INFORMATION

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☒ Title V Source	
4. ☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☒ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☒ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☒ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment: **Applicable State and Federal emission standards are discussed in Section 4.0 for the gypsum storage and handling project.**	

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
NOX	**A**	**N**
SO2	**A**	**Y**
CO	**A**	**N**
PM10	**A**	**Y**
PM	**A**	**Y**
SAM (Sulfuric Acid Mist)	**A**	**N**
VOC	**A**	**N**
PB	**B**	**N**
H106 (Hydrogen Chloride)	**A**	**N**
H107 (Hydrogen Fluoride)	**A**	**N**
H133 (Nickel Compounds)	**A**	**N**
HAPS (Total HAPs)	**A**	**N**

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps NOT APPLICABLE

1. Pollutant Subject to Emissions Cap	2. Facility-Wide Cap [Y or N]? (all units)	3. Emissions Unit ID's Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1.	Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **Attachment B** ☐ Previously Submitted, Date:____
2.	Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **Section 2.0** ☐ Previously Submitted, Date:_______
3.	Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **Section 2.0** ☐ Previously Submitted, Date:_______

Additional Requirements for Air Construction Permit Applications

1.	Area Map Showing Facility Location: ☐ Attached, Document ID: ☒ Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): ☒ Attached, Document ID: **Section 2.0**
3.	Rule Applicability Analysis: ☒ Attached, Document ID: **Section 4.0**
4.	List of Exempt Emissions Units (Rule 62-210.300(3), F.A.C.): ☐ Attached, Document ID: ☒ Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: ☒ Attached, Document ID: **Section 2.0** ☐ Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): ☐ Attached, Document ID: ☒ Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): ☐ Attached, Document ID: ☒ Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): ☐ Attached, Document ID: ☒ Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): ☐ Attached, Document ID: ☒ Not Applicable
10.	Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID:___________ ☒ Not Applicable

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

NOT APPLICABLE

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units: ☐ Attached, Document ID:__________ ☐ Not Applicable (no exempt units at facility)	

NOT APPLICABLE

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities: (Required for initial/renewal applications only) ☐ Attached, Document ID: __________ ☐ Not Applicable (revision application)	
2. Identification of Applicable Requirements: (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought) ☐ Attached, Document ID:____________ ☐ Not Applicable (revision application with no change in applicable requirements)	
3. Compliance Report and Plan: (Required for all initial/revision/renewal applications) ☐ Attached, Document ID:____________ Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.	
4. List of Equipment/Activities Regulated under Title VI: (If applicable, required for initial/renewal applications only) ☐ Attached, Document ID:__________ ☐ Equipment/Activities Onsite but Not Required to be Individually Listed ☐ Not Applicable	
5. Verification of Risk Management Plan Submission to EPA: (If applicable, required for initial/renewal applications only) ☐ Attached, Document ID:__________ ☐ Not Applicable	
6. Requested Changes to Current Title V Air Operation Permit: ☐ Attached, Document ID:__________ ☐ Not Applicable	

C. FACILITY ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Facilities Subject to Acid Rain, CAIR, or Hg Budget Program

1.	Acid Rain Program Forms: Acid Rain Part Application (DEP Form No. 62-210.900(1)(a)): ☐ Attached, Document ID:__________ ☒ Previously Submitted, Date: **June 5, 2008** ☐ Not Applicable (not an Acid Rain source) Phase II NO_X Averaging Plan (DEP Form No. 62-210.900(1)(a)1.): ☐ Attached, Document ID:__________ ☒ Previously Submitted, Date: **June 5, 2008** ☐ Not Applicable New Unit Exemption (DEP Form No. 62-210.900(1)(a)2.): ☐ Attached, Document ID:__________ ☐ Previously Submitted, Date:__________ ☒ Not Applicable
2.	CAIR Part (DEP Form No. 62-210.900(1)(b)): ☐ Attached, Document ID:__________ ☒ Previously Submitted, Date: **June 5, 2008** ☐ Not Applicable (not a CAIR source)

Additional Requirements Comment

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

   ☐ The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

   ☒ The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

Emissions Unit Description and Status

1. Type of Emissions Unit Addressed in this Section: (Check one)

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

   ☐ This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

   ☒ This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:

   Gypsum handling and storage sources.

3. Emissions Unit Identification Number: **-036**

4. Emissions Unit Status Code: A/C	5. Commence Construction Date: N/A	6. Initial Startup Date: N/A	7. Emissions Unit Major Group SIC Code: 49

8. Federal Program Applicability: (Check all that apply)

   ☐ Acid Rain Unit

   ☐ CAIR Unit

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

Project includes modifications to the existing Big Bend Station gypsum handling and storage system and the addition of a new gypsum storage area ("East 40").

Emissions Unit Control Equipment/Method: Control **1** of **1**

1. Control Equipment/Method Description: **Fugitive Dust Control – Water Sprays**
2. Control Device or Method Code: **153**

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

Emissions Unit Control Equipment/Method: Control __ of __

1. Control Equipment/Method Description:
2. Control Device or Method Code:

B. EMISSIONS UNIT CAPACITY INFORMATION
(Optional for unregulated emissions units.)

NOT APPLICABLE – UNREGULATED

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate:	
2. Maximum Production Rate:	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: hours/day weeks/year	days/week hours/year
6. Operating Capacity/Schedule Comment:	

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

NOT APPLICABLE - UNREGULATED

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram:	2. Emission Point Type Code:
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:	
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:	

5. Discharge Type Code:	6. Stack Height: feet	7. Exit Diameter: feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment:	

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment **1** of **1**

1. Segment Description (Process/Fuel Type): **Gypsum conveying**		
2. Source Classification Code (SCC): **3-05-015-05**	3. SCC Units: **Tons**	
4. Maximum Hourly Rate: ***300***	5. Maximum Annual Rate: **750,000**	6. Estimated Annual Activity Factor: **N/A**
7. Maximum % Sulfur: **N/A**	8. Maximum % Ash: **N/A**	9. Million Btu per SCC Unit: **N/A**
10. Segment Comment:		

Segment Description and Rate: Segment __ of __

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):	3. SCC Units:	
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	**N/A**	**N/A**	**NS**
PM10	**N/A**	**N/A**	**NS**
PM2.5	**N/A**	**N/A**	**NS**
See Appendix C for emission rate calculations.			

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS
(Optional for unregulated emissions units.)

NOT APPLICABLE - UNREGULATED

Complete a Subsection F1 for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V operation permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.

Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions

1. Pollutant Emitted:	2. Total Percent Efficiency of Control:
3. Potential Emissions: lb/hour tons/year	4. Synthetically Limited? ☐ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code:
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Potential, Fugitive, and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

NOT APPLICABLE – UNREGULATED

Complete Subsection F2 if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions __ of __

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

G. VISIBLE EMISSIONS INFORMATION

Complete Subsection G if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

NOT APPLICABLE

Visible Emissions Limitation: Visible Emissions Limitation __ of ___

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation __ of ___

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

H. CONTINUOUS MONITOR INFORMATION

Complete Subsection H if this emissions unit is or would be subject to continuous monitoring.

NOT APPLICABLE

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

Continuous Monitoring System: Continuous Monitor ___ of ___

1. Parameter Code:	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☐ Other
4. Monitor Information... Manufacturer: Model Number:	Serial Number:
5. Installation Date:	6. Performance Specification Test Date:
7. Continuous Monitor Comment:	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **Section 2.0** ☐ Previously Submitted, Date:__________

2. Fuel Analysis or Specification: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _________ ☒ Not Applicable

3. Detailed Description of Control Equipment: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **Section 2.0** ☐ Not Applicable

4. Procedures for Startup and Shutdown: (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: ☐ Previously Submitted, Date:__________
   ☒ Not Applicable (construction application)

5. Operation and Maintenance Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: _________ ☐ Previously Submitted, Date __________
   ☒ Not Applicable

6. Compliance Demonstration Reports/Records:
   ☐ Attached, Document ID: _________
   Test Date(s)/Pollutant(s) Tested: ____________________

   ☐ Previously Submitted, Date: _______
   Test Date(s)/Pollutant(s) Tested: ____________________

   ☐ To be Submitted, Date (if known):__________
   Test Date(s)/Pollutant(s) Tested: ____________________

   ☒ Not Applicable

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.

7. Other Information Required by Rule or Statute:
   ☐ Attached, Document ID: _________ ☒ Not Applicable

I. EMISSIONS UNIT ADDITIONAL INFORMATION (CONTINUED)

Additional Requirements for Air Construction Permit Applications

NOT APPLICABLE

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)): ☐ Attached, Document ID: ________ ☐ Not Applicable	
2. Good Engineering Practice Stack Height Analysis (Rules 62-212.400(4)(d) and 62-212.500(4)(f), F.A.C.): ☐ Attached, Document ID: ________ ☐ Not Applicable	
3. Description of Stack Sampling Facilities: (Required for proposed new stack sampling facilities only) ☐ Attached, Document ID: ________ ☐ Not Applicable	

Additional Requirements for Title V Air Operation Permit Applications

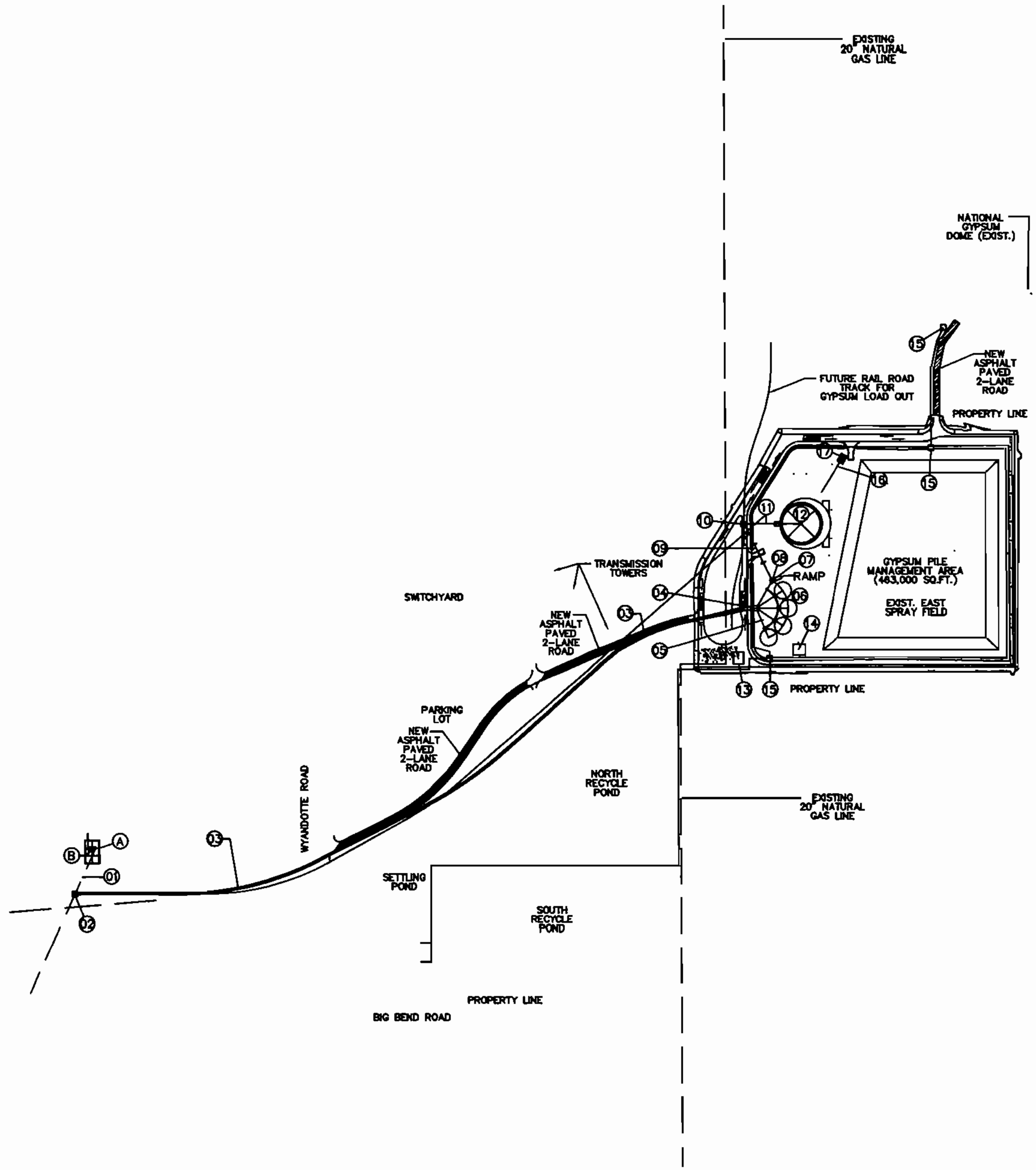
NOT APPLICABLE

1. Identification of Applicable Requirements: ☐ Attached, Document ID:	
2. Compliance Assurance Monitoring: ☐ Attached, Document ID: ________ ☐ Not Applicable	
3. Alternative Methods of Operation: ☐ Attached, Document ID: ________ ☐ Not Applicable	
4. Alternative Modes of Operation (Emissions Trading): ☐ Attached, Document ID: ________ ☐ Not Applicable	

Additional Requirements Comment

ATTACHMENT B

PLAN VIEW DRAWINGS



02	(ENCLOSED)	20FT x 20FT
03	12.5" DIA. PIPE [illegible]VEYOR G-2, 42"W, 300 TP[illegible]	3200 FT. LON
04	TRANSFER HO[illegible]-2 (ROOF ONLY)	20FT x 30FT
05	EAST 40 RADIAL STACKER CONVEYOR G-3, 30"W, 300 TPH	125'LG @ 12
06	(4) GYPSUM STORAGE PILES	1000 TONS @ EACH, TOTAL
07	ABOVE GRADE RECEIVING AND RECLAIM HOPPER	20 TON NET
08	BELT FEEDER GBF-1 36"W, 75 TO 300 TPH	15 FT. LONG
09	CONVEYOR G-4, 30"W, 300 TPH	250 FT. LON
10	GYPSUM STORAGE SILO WITH TRUCK LOAD OUT	14 FT. DIA. CAPACITY 10
11	CONVEYOR G-5, 30"W, 300 TPH	225 FT. LON
12	GYPSUM STORAGE DOME WITH TWO (2) OPENINGS IN THE WALL FOR TRUCKS AND FRONT END LOADERS ACCESS	200' DIA. x 25,000 TONS @ 70 PCF DE
13	50FT x 45 FT FGD BYPRODUCT STORAGE AREA BUILDING	E.E. ROOM, BA BREAK ROOM, ROOM AND UT
14	MOBILE EQUIPMENT WASHDOWN PAD	
15	THREE (3) STORM WATER COLLECTING SUMPS WITH 2x100% CAPACITY PUMPS IN EACH SUMP	
A	WASTE HANDLING BUILDING EXISTING	
B	REVERSIBLE CONVEYORS GA1 (A) AND GA2 (B) EXISTING	

16 FUTURE TRANSFER CONVEYOR G-6

17 FUTURE GYPSUM STORAGE SILOS WITH TRUCK LOAD OUT 14 FT. DIA.

PRELIMI
NOT TO BE USED
NOT FOR C

NOTES

LEGEND

ASPHALT PAVED RO

CRUSHED STONE OR AREA SURFACING

DUST SCREENING FE

TRAFFIC FLOW DIREC

REFERENCE DRA

NORTH

0 100' 200' 400' 600'

TECO
TAMPA ELECTRIC

CONTRACTOR INSTALLER SHALL T[illegible] PRECAUTION[illegible] THE [illegible] LOCATED [illegible] CONTRACTOR [illegible] THE WORK

FILE ID BIG-GHS-62.DGN

SCALE 1"=200'

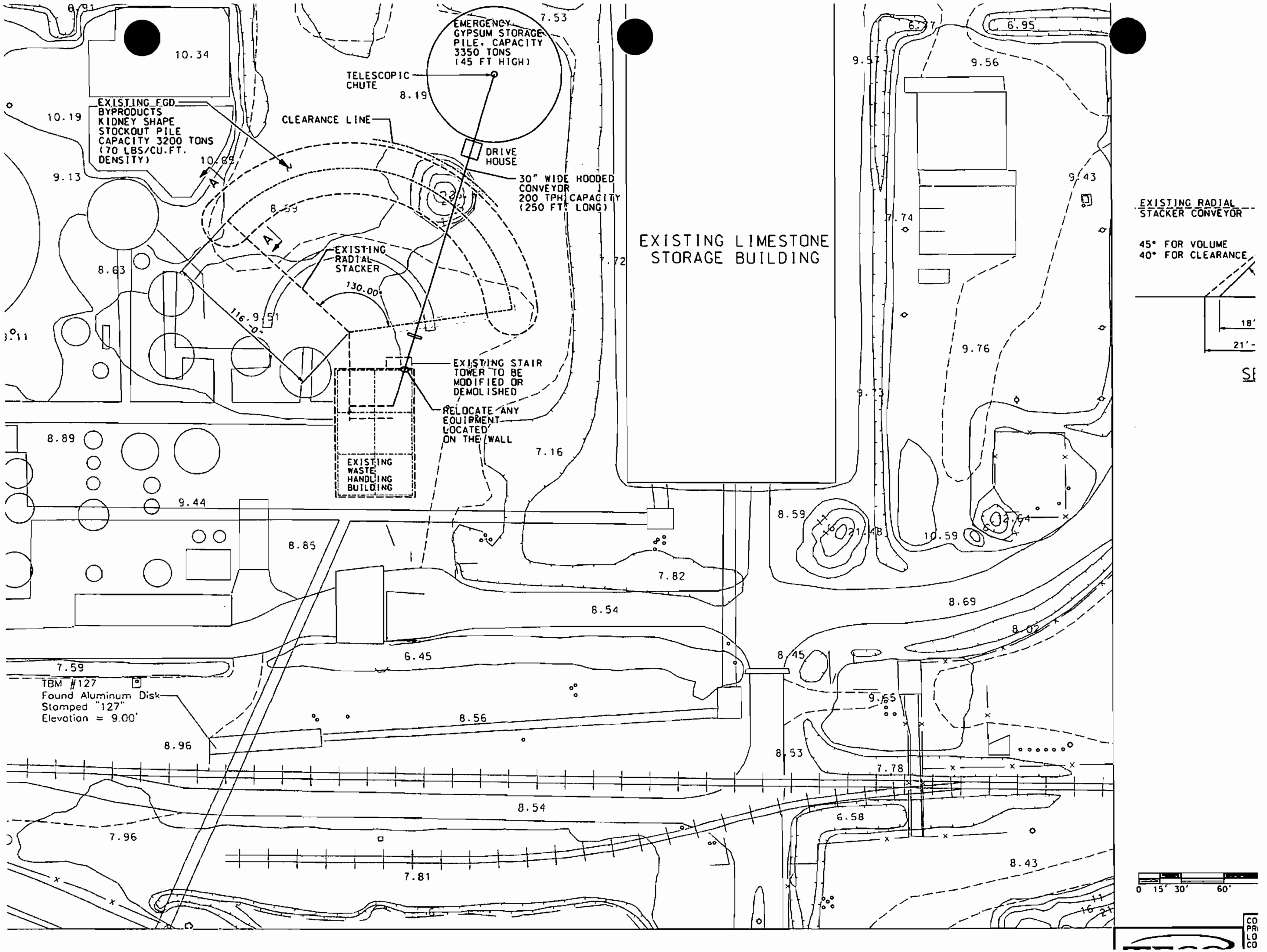
PROJECT

DRAWING RELEASE RECORD

REL'D	PREPARED	REVIEWED	APPROVED	PURPOSE

DRAWING RELEASE RECORD

REV	DATE REL'D	PREPARED	REVIEWED	APPROVED	PURPOSE
A	05-20-2011	D.AMIN	B.SHAH	-	DELETED FUTURE GYPSUM TRUCK LOADING SILO & CONVEYORS, REV. 1&2 REPLACED


EMERGENCY GYPSUM STORAGE PILE, CAPACITY 3350 TONS (45 FT HIGH)
TELESCOPIC CHUTE
EXISTING FGD BYPRODUCTS KIDNEY SHAPE STOCKOUT PILE CAPACITY 3200 TONS (70 LBS/CU.FT. DENSITY)
CLEARANCE LINE
DRIVE HOUSE
30" WIDE HOODED CONVEYOR 200 TPH CAPACITY (250 FT. LONG)
EXISTING RADIAL STACKER
130.00°
116'-0"
EXISTING STAIR TOWER TO BE MODIFIED OR DEMOLISHED
RELOCATE ANY EQUIPMENT LOCATED ON THE WALL
EXISTING WASTE HANDLING BUILDING
EXISTING LIMESTONE STORAGE BUILDING
EXISTING RADIAL STACKER CONVEYOR
45° FOR VOLUME
40° FOR CLEARANCE
TBM #127
Found Aluminum Disk Stamped "127"
Elevation = 9.00'
10.34
10.19
9.13
8.63
8.59
9.51
8.19
7.53
7.72
7.16
8.89
9.44
8.85
7.59
8.96
6.45
8.56
8.54
7.82
8.54
7.96
7.81
6.95
9.57
9.56
9.43
7.74
9.76
9.73
8.59
21.48
10.59
8.69
8.02
8.45
9.65
8.53
7.78
6.58
8.43
0 15' 30' 60'

ATTACHMENT C

EMISSION RATE CALCULATIONS

FUTURE EAST 40 AND SOUTH 40
GYSPUM STORAGE AND HANDLING

POTENTIAL EMISSIONS

Table C1. Tampa Electric Company Big Bend Station - Future East and South Gypsum Storage Areas and Handling Summary of $PM/PM_{10}/PM_{2.5}$ Potential Emission Estimates

Pollutant	Potential Annual Emissions (ton/yr)				
	Transfer Points	Truck Traffic Paved Roads	Front-End Loader Operations	Storage Pile Windblown Dust	Project Totals
PM	1.3	17.4	11.0	0.0157	**29.7**
PM_{10}	0.63	3.5	2.9	0.0078	**7.0**
$PM_{2.5}$	0.095	0.85	0.29	0.0012	**1.2**

Sources: ECT, 2012.
S&L, 2012.
TEC, 2012.

Table C2. Tampa Electric Company Big Bend Station - Future East and South Gypsum Storage Areas and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Potential Emission Estimates Gypsum Transfer Points

A. Emission Estimate Methodology

Reference - AP-42, Section 13.2.4, Aggregate Handling and Storage Piles - Equation (1), EPA November 2006.

$$E_1 = [k \times 0.0032] \times [(U / 5)^{1.3} / (M / 2)^{1.4}] \times [1 - (CE / 100)] \times T_1$$
$$E_2 = [k \times 0.0032] \times [(U / 5)^{1.3} / (M / 2)^{1.4}] \times [1 - (CE / 100)] \times T_2 \times (1 \text{ ton} / 2{,}000 \text{ lb})$$

where:
E_1 = hourly emission rate (lb/hr)
E_2 = annual emission rate (ton/yr)
k = particle size multiplier (dimensionless)
U = mean wind speed (miles per hour)
M = gypsum moisture content (weight %)
CE = control efficiency (%)
T_1 = hourly gypsum transfer rate (tons/hr)
T_2 = annual gypsum transfer rate (tons/yr)

B. Input Data

Parameter	Units	Value
Particle size multiplier (k), particle size <30 μm	N/A	0.74
Particle size multiplier (k), particle size <10 μm	N/A	0.35
Particle size multiplier (k), particle size <2.5 μm	N/A	0.053
Mean Wind Speed	mph	8.6
Gypsum Moisture Content (minimum)	weight %	10.0

C. Calculations

Transfer Point	EU ID	Maximum Gypsum Transfer Rates		Controls	Control Efficiency	Potential PM Emission Estimates					
						PM		PM_{10}		$PM_{2.5}$	
		(tons/hr)	(tons/yr)		(%)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
New Conveyor to Emergency Storage Pile at Big Bend Station	GYP-1	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Front-End Loader Transfer to Trucks at Big Bend Station	GYP-2	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Truck Unloading at East 40 Storage Area	GYP-3A	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
or											
Truck Unloading at South 40 Storage Area	GYP-3B	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Front-End Loader Transfer to Trucks at East 40 Area	GYP-4A	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
or											
Front-End Loader Transfer to Trucks at South 40 Area	GYP-4B	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Truck Unloading at Big Bend Station Barge Dock	GYP-5	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Front-End Loader Transfer to Open Bunker	GYP-6	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Clam Shell Barge Loader to Barge	GYP-7	300	750,000	None	0	0.15	0.19	0.071	0.089	0.011	0.014
Totals						**1.1**	**1.3**	**0.50**	**0.63**	**0.076**	**0.095**

Sources: ECT, 2012.
S&L, 2012.
TEC, 2012.

Table C3. Tampa Electric Company Big Bend Station - Future East and South Gypsum Storage Areas and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Potential Emission Estimates Truck Travel on Paved Facility Roadways

A. Emission Estimate Methodology

Reference - AP-42, Section 13.2.1, Paved Roads - Equation (2), EPA January 2011.

$$E_1 = [k \times (sL)^{0.91} \times (W^{1.02})] \times (1 - (P / 4N) \times [1 - (CE / 100)] \times VMT_1$$
$$E_2 = [k \times (sL)^{0.91} \times (W^{1.02})] \times (1 - (P / 4N) \times [1 - (CE / 100)] \times VMT_2 \times (1 \text{ ton} / 2{,}000 \text{ lb})$$

where:
E_1 = hourly emission rate (lb/hr)
E_2 = annual emission rate (ton/yr)
k = particle size multiplier (lb/VMT)
sL = road surface silt loading (g/m²)
W = average weight of vehicles (tons)
P = number of "wet" days/yr with 0.01 inches of precipitation
N = number of days in averaging period
CE = control efficiency (%)
VMT_1 = vehicle miles traveled (veh-mi/hr) = round-trip distance x number of trucks/hr
VMT_2 = vehicle miles traveled (veh-mi/yr) = round-trip distance x number of trucks/yr

B. Input Data

Parameter	Units	Value
Particle size multiplier (k), particle size <30 µm	lb/VMT	0.011
Particle size multiplier (k), particle size <10 µm	lb/VMT	0.0022
Particle size multiplier (k), particle size <2.5 µm	lb/VMT	0.00054
Road Surface Silt Loading (sL), Table 13.2.1-3	g/m²	9.7
Gypsum Truck Weight, Full	tons	41
Gypsum Truck Weight, Empty	tons	15
Average Gypsum Truck Weight[1]	tons	28
Number of "Wet" Days Per Year (P), Figure 13.2.1-2	-	120
Number of Days in Averaging Period (N)	-	365
Control Efficiency (CE) - Sweeping and/or watering, as necessary	%	90
Gypsum Truck Travel Distance from Big Bend Station Gypsum Area to East 40, Round-Trip	mi	1.21
Gypsum Truck Travel Distance from Big Bend Station Gypsum Area to South 40, Round-Trip	mi	1.52
Gypsum Truck Travel Distance from East 40 to Big Bend Station Dock, Round-Trip	mi	3.21
Gypsum Truck Travel Distance from South 40 to Big Bend Station Dock, Round-Trip	mi	3.52

[1] Truck weight is average of empty and full weights.

C. Calculations

Truck Travel Paths	EU ID	Maximum Number of Trucks		PM Emission Estimates					
				PM		PM_{10}		$PM_{2.5}$	
		(trucks/hr)	(trucks/yr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Gypsum Trucks - Big Bend Station Gypsum Area to East 40, Round-Trip	GYP-8A	12	28,846	3.3	4.2	0.67	0.84	0.16	0.21
or									
Gypsum Trucks - Big Bend Station Gypsum Area to South 40, Round-Trip	GYP-8B	12	28,846	4.2	5.2	0.84	1.0	0.21	0.26
Gypsum Trucks - East 40 to Big Bend Station Dock, Round-Trip	GYP-9A	12	28,846	8.9	11.1	1.8	2.2	0.43	0.54
or									
Gypsum Trucks - South 40 to Big Bend Station Dock, Round-Trip	GYP-9B	12	28,846	9.7	12.1	1.9	2.4	0.48	0.60
Totals				13.9	17.4	2.8	3.5	0.68	0.85

Sources: ECT, 2012.
S&L, 2012.
TEC, 2012.

Table C4. Tampa Electric Company Big Bend Station - Future East and South Gypsum Storage Areas and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Potential Emission Estimates Front-End Loader Operations on Gypsum Stockout Piles and Management Area

A. Emission Estimate Methodology

Reference - *AP-42, Section 13.2.2, Unpaved Roads - Equation (1a), EPA November 2006.*

$E_1 = k \times (s / 12)^a \times (W / 3)^b \times [1 - (CE / 100)] \times ((365 - \text{"Wet" Days})/365) \times VMT_1$

$E_2 = k \times (s / 12)^a \times (W / 3)^b \times [1 - (CE / 100)] \times ((365 - \text{"Wet" Days})/365) \times VMT_2 \times (1 \text{ ton} / 2{,}000 \text{ lb})$

where:
E_1 = hourly emission rate (lb/hr)
E_2 = annual emission rate (ton/yr)
k = particle size multiplier (lb/VMT)
s = surface material silt content (%)
a = empirical constant, particle size specific
W = average weight of vehicles (tons)
b = empirical constant, particle size specific
CE = control efficiency (%)
"Wet" Days = 100 (from AP-42, Section 13.2.2, Figure 13.2.2-1)
VMT_1 = vehicle miles traveled (veh-mi/hr) = number of front-end loaders x average speed (mi/hr)
VMT1 = vehicle miles traveled (veh-mi/yr) = number of front-end loaders x average speed (mi/hr) x hours/yr

B. Input Data

Parameter	Units	Value
Particle size multiplier (k), particle size <30 μm	lb/VMT	4.9
Particle size multiplier (k), particle size <10 μm	lb/VMT	1.5
Particle size multiplier (k), particle size <2.5 μm	lb/VMT	0.15
Surface Material Silt Content (s), Table 13.2.2-1	%	6.0
Empirical Constant (a), particle size <30 μm	-	0.7
Empirical Constant (a), particle size <10 μm	-	0.9
Empirical Constant (a), particle size <2.5 μm	-	0.9
Front-End Loader Weight (W)	tons	48
Empirical Constant (b), particle size <30 μm	-	0.45
Empirical Constant (b), particle size <10 μm	-	0.45
Empirical Constant (b), particle size <2.5 μm	-	0.45
Control Efficiency (CE), Moist material and watering, as necessary	%	85
Number of "Wet" Days	-	120
Number of Front-End Loaders (Big Bend Gypsum Area)	-	2
Number of Front-End Loaders (North 40 Gypsum Stockout Piles)	-	2
Number of Front-End Loaders (North 40 Gypsum Management Area)	-	2
Number of Front-End Loaders (South 40 Gypsum Area)	-	2
Front-End Loader Operating Hours	hrs/day	4
Front-End Loader Operating Hours	days/wk	5
Front-End Loader Operating Hours	wks/yr	52
Front-End Loader Operating Hours	hrs/yr	1,040
Front-End Loader Average Speed	mi/hr	2.5

C. Calculations

	EU ID	Vehicle Miles Traveled (VMT)		PM Emission Estimates					
				PM		PM_{10}		$PM_{2.5}$	
		(VMT/hr)	(VMT/yr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Front-End Loader Operations at Big Bend Gypsum Area	GYP-10	5.0	5,200	5.3	2.7	1.4	0.73	0.14	0.073
Front-End Loader Operations at North 40 Stockout Piles	GYP-11	5.0	5,200	5.3	2.7	1.4	0.73	0.14	0.073
Front-End Loader Operations at North 40 Gypsum Management Area	GYP-12	5.0	5,200	5.3	2.7	1.4	0.73	0.14	0.073
Front-End Loader Operations at South 40 Gypsum Area	GYP-13	5.0	5,200	5.3	2.7	1.4	0.73	0.14	0.073
Totals		**20.0**	**20,800**	**21.2**	**11.0**	**5.6**	**2.9**	**0.56**	**0.29**

Sources: ECT, 2012.
S&L, 2012.
TEC, 2012.

Table C5. Tampa Electric Company Big Bend Station - Future East and South Gypsum Storage Areas and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Potential Emission Estimates Gypsum Stockout Piles and Management Area Windblown Dust

A. Emission Estimation Methodology

Reference - EPA AP-42, Section 13.2.5, Industrial Wind Erosion - Equation (2), November 2006.

$$EF = k \times Sum(P_i), \text{ sum is from i to N (Equation 2)}$$

where:

EF = emission factor ($g/m^2/yr$)
k = particle size multiplier (unitless)
N = number of disturbances per year
P_i = erosion potential function based on fastest mile between disturbances (g/m^2)
$P = 58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)$ (Equation 3)
$P = 0$ for $u^* < u_t^*$
u^* is the friction velocity (= 0.053 times the fastest mile (m/s))
u_t^* = threshold friction velocity (m/s) = 1.02 m/s for overburden from AP-42 Table 13.2.5-2
The fastest mile is defined as the fastest observed one mile of wind from Tampa, FL for the years 1951 - 1980.

B. Input Data

Parameter	Units	Value
Threshold friction velocity (u_t^*)	m/s	1.02
Frequency of disturbance, N	dy/yr	365
Frequency of wind events resulting in wind erosion	dy/mo	2
	dy/yr	24
Particle size multiplier (k), particle size <30 µm	-	1
Particle size multiplier (k), particle size <10 µm	-	0.5
Particle size multiplier (k), particle size <2.5 µm	-	0.075
Control Efficiency (CE), storage of moist material and watering as necessary	%	50

C. Calculations

Erosion Potential Emission Factors

Month	Fastest Mile (mph)	Fastest Mile (m/s)	u^* (m/s)	$(u^*-u_t^*)$	$(u^*-u_t^*)^2$	P_{PM} (g/m^2)	P_{PM10} (g/m^2)	$P_{PM2.5}$ (g/m^2)
Jan	35	15.65	0.83	-0.19	0.036	0.00	0.00	0.00
Feb	50	22.35	1.18	0.16	0.027	5.69	2.84	0.43
Mar	43	19.22	1.02	0.00	0.000	0.00	0.00	0.00
Apr	37	16.54	0.88	-0.14	0.021	0.00	0.00	0.00
May	46	20.56	1.09	0.07	0.005	2.03	1.02	0.15
Jun	67	29.95	1.59	0.57	0.322	32.86	16.43	2.46
Jul	58	25.93	1.37	0.35	0.125	16.13	8.07	1.21
Aug	38	16.99	0.90	-0.12	0.014	0.00	0.00	0.00
Sep	56	25.03	1.33	0.31	0.094	13.13	6.57	0.98
Oct	38	16.99	0.90	-0.12	0.014	0.00	0.00	0.00
Nov	40	17.88	0.95	-0.07	0.005	0.00	0.00	0.00
Dec	45	20.12	1.07	0.05	0.0021	1.28	0.64	0.10
Annualized Emission Factor (g/m^2-yr)						**4.68**	**2.34**	**0.35**

Wind Erosion Emissions

Emission Source	EU ID	Surface Area (m^2)	Disturbed Area (%)	Total (m^2)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Big Bend Station Emergency Storage Pile	GYP-14	1,711	5	86	0.000221	0.000110	0.0000165
East 40 Stockout Piles	GYP-15	2,552	5	128	0.00033	0.000164	0.0000247
Management Area	GYP-16	45,481	5	2,274	0.0059	0.0029	0.00044
South 40 Storage Area	GYP-17	72,025	5	3,601	0.0093	0.0046	0.00070
Totals					**0.0157**	**0.0078**	**0.00118**

Sources: ECT, 2012.
S&L, 2012.
TEC, 2012.

EXISTING SOUTH 40
GYPSUM STORAGE AND HANDLING

ACTUAL EMISSIONS

Table C6. Tampa Electric Company Big Bend Station - Existing South 40 Gypsum Storage Area and Handling Summary of $PM/PM_{10}/PM_{2.5}$ Actual Emission Estimates (2007-2011 Average)

Pollutant	2007-2011 Average Actual Emissions (ton/yr)				
	Transfer Points	Truck Traffic Paved Roads	Dozer Operations	Storage Pile Windblown Dust	Project Totals
PM	0.71	3.7	5.5	0.0097	**9.9**
PM_{10}	0.33	0.7	1.5	0.0048	**2.5**
$PM_{2.5}$	0.051	0.18	0.15	0.00073	**0.38**

Sources: ECT, 2012.
TEC, 2012.

Table C7. Tampa Electric Company Big Bend Station - Existing South 40 Gypsum Storage Area and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Actual Emission Estimates - Gypsum Transfer Points

A. Emission Estimate Methodology

Reference - AP-42, Section 13.2.4, Aggregate Handling and Storage Piles - Equation (1), EPA November 2006.

$$E_1 = [k \times 0.0032] \times [(U / 5)^{1.3} / (M / 2)^{1.4}] \times [1 - (CE / 100)] \times T_1$$
$$E_2 = [k \times 0.0032] \times [(U / 5)^{1.3} / (M / 2)^{1.4}] \times [1 - (CE / 100)] \times T_2 \times (1 \text{ ton} / 2{,}000 \text{ lb})$$

where:
E_1 = hourly emission rate (lb/hr)
E_2 = annual emission rate (ton/yr)
k = particle size multiplier (dimensionless)
U = mean wind speed (miles per hour)
M = gypsum moisture content (weight %)
CE = control efficiency (%)
T_1 = hourly gypsum transfer rate (tons/hr)
T_2 = annual gypsum transfer rate (tons/yr)

B. Input Data

Parameter	Units	Value
Particle size multiplier (k), particle size <30 μm	N/A	0.74
Particle size multiplier (k), particle size <10 μm	N/A	0.35
Particle size multiplier (k), particle size <2.5 μm	N/A	0.053
Mean Wind Speed	mph	8.6
Average Big Bend Units 1-4 Operating Hours - 2007 - 2011	hrs/yr	6,833
Average Gypsum Throughput Rates - 2007-2011	ton/hr	120
	ton/yr	630,226
Gypsum Moisture Content (minimum)	weight %	10.0

C. Calculations

Transfer Point	EU ID	Gypsum Transfer Rates		Controls	Control Efficiency	PM Emission Estimates					
						PM		PM_{10}		$PM_{2.5}$	
		(tons/hr)	(tons/yr)		(%)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Stacker Conveyor to North Stackout Pile	GH-001	120	630,226	None	0	0.060	0.16	0.029	0.075	0.0043	0.011
Dozer Transfer from North Stockout Pile to Trucks	GH-004	120	630,226	None	0	0.060	0.16	0.029	0.075	0.0043	0.011
Conveyor GD to Conveyor GE	GH-007	120	630,226	Enclosure	85	0.0091	0.024	0.0043	0.011	0.00065	0.0017
Conveyor GE to Conveyor GF	GH-008	120	630,226	Enclosure	85	0.0091	0.024	0.0043	0.011	0.00065	0.0017
Conveyor GF to Radial Stacker	GH-009	120	630,226	Enclosure	85	0.0091	0.024	0.0043	0.011	0.00065	0.0017
Radial Stacker to South Stackout Pile	GH-010	120	630,226	None	0	0.060	0.16	0.029	0.075	0.0043	0.011
Dozer Transfer from Long Term Storage to Trucks	GH-015	120	630,226	None	0	0.060	0.16	0.029	0.075	0.0043	0.011
Totals						**0.27**	**0.71**	**0.13**	**0.33**	**0.019**	**0.051**

Sources: ECT, 2012.
TEC, 2012.

Table C8. Tampa Electric Company Big Bend Station - Existing South 40 Gypsum Storage Area and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Actual Emission Estimates - Truck Travel on Paved Facility Roadways

A. Emission Estimate Methodology

Reference - AP-42, Section 13.2.1, Paved Roads - Equation (2), EPA January 2011.

$$E_1 = [k \times (sL)^{0.91} \times (W^{1.02})] \times (1 - (P / 4N) \times [1 - (CE / 100)] \times VMT_1$$
$$E_2 = [k \times (sL)^{0.91} \times (W^{1.02})] \times (1 - (P / 4N) \times [1 - (CE / 100)] \times VMT_2 \times (1 \text{ ton} / 2{,}000 \text{ lb})$$

where:
E_1 = hourly emission rate (lb/hr)
E_2 = annual emission rate (ton/yr)
k = particle size multiplier (lb/VMT)
sL = road surface silt loading (g/m^2)
W = average weight of vehicles (tons)
P = number of "wet" days/yr with 0.01 inches of precipitation
N = number of days in averaging period
CE = control efficiency (%)
VMT_1 = vehicle miles traveled (veh-mi/hr) = one-way distance x number of trucks/hr

B. Input Data

Parameter	Units	Value
Particle size multiplier (k), particle size <30 μm	lb/VMT	0.011
Particle size multiplier (k), particle size <10 μm	lb/VMT	0.0022
Particle size multiplier (k), particle size <2.5 μm	lb/VMT	0.00054
Road Surface Silt Loading (sL), Table 13.2.1-3	g/m^2	9.7
Gypsum Throughput Rates - (2007-2011 average)	ton/hr	120
	ton/yr	630,226
Gypsum Truck Weight, Full	tons	41
Gypsum Truck Weight, Empty	tons	15
Number of "Wet" Days Per Year (P), Figure 13.2.1-2	-	120
Number of Days in Averaging Period (N)	-	365
Control Efficiency (CE) - Watering, as necessary	%	90
One-Way Distance - Gypsum Trucks from North Stockout Pile	mi	0.49
One-Way Distance - Gypsum Trucks from Long Term Storage Pile	mi	0.63

C. Calculations

	EU ID	Maximum Number of Trucks		PM Emission Estimates					
				PM		PM_{10}		$PM_{2.5}$	
		(trucks/hr)	(trucks/yr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Gypsum Trucks from North Stockout Pile to Offsite, Full	GH-005	5	24,239	0.80	2.1	0.16	0.42	0.039	0.10
Gypsum Trucks from North Stockout Pile to Offsite, Empty	GH-006	5	24,239	0.29	0.75	0.057	0.15	0.014	0.037
or									
Gypsum Trucks from Long Term Storage Pile to Offsite, Full	GH-016	5	24,239	1.02	2.7	0.20	0.54	0.050	0.13
Gypsum Trucks from Long Term Storage Pile to Offsite, Empty	GH-017	5	24,239	0.37	0.97	0.074	0.19	0.018	0.047
Totals				**1.4**	**3.7**	**0.28**	**0.73**	**0.068**	**0.18**

Sources: ECT, 2012.
TEC, 2012.

Table C[illegible] Tampa Electric Company Big Bend Station - Existing South 40 Gypsum Storage Area and Handling Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Actual Emission Estimates Dozer Operations on Gypsum Storage Piles and Unpaved Roads

A. Emission Estimate Methodology

Reference - AP-42, Section 13.2.2, Unpaved Roads - Equation (1a), EPA November 2006.

$$E_1 = k \times (s / 12)^a \times (W / 3)^b \times [1 - (CE / 100)] \times ((365 - \text{"Wet" Days})/365) \times VMT_1$$
$$E_2 = k \times (s / 12)^a \times (W / 3)^b \times [1 - (CE / 100)] \times ((365 - \text{"Wet" Days})/365) \times VMT_2 \times (1 \text{ ton} / 2{,}000 \text{ lb})$$

where:
E_1 = hourly emission rate (lb/hr)
E_2 = annual emission rate (ton/yr)
k = particle size multiplier (lb/VMT)
s = surface material silt content (%)
a = empirical constant, particle size specific
W = average weight of vehicles (tons)
b = empirical constant, particle size specific
CE = control efficiency (%)
"Wet" Days = 100 (from AP-42, Section 13.2.2, Figure 13.2.2-1)
VMT_1 = vehicle miles traveled (veh-mi/hr) = number of front-end loaders x average speed (mi/hr)
VMT1 = vehicle miles traveled (veh-mi/yr) = number of front-end loaders x average speed (mi/hr) x hours/yr

B. Input Data

Parameter	Units	Value
Particle size multiplier (k), particle size <30 µm	lb/VMT	4.9
Particle size multiplier (k), particle size <10 µm	lb/VMT	1.5
Particle size multiplier (k), particle size <2.5 µm	lb/VMT	0.15
Surface Material Silt Content (s), Table 13.2.2-1	%	6.0
Empirical Constant (a), particle size <30 µm	-	0.7
Empirical Constant (a), particle size <10 µm	-	0.9
Empirical Constant (a), particle size <2.5 µm	-	0.9
Front-End Loader Weight (W)	tons	48
Empirical Constant (b), particle size <30 µm	-	0.45
Empirical Constant (b), particle size <10 µm	-	0.45
Empirical Constant (b), particle size <2.5 µm	-	0.45
Control Efficiency (CE), Moist material and watering, as necessary	%	85
Number of "Wet" Days	-	120
Front-End Loader Operating Hours	hrs/day	4
Front-End Loader Operating Hours	days/wk	5
Front-End Loader Operating Hours	wks/yr	52
Front-End Loader Operating Hours	hrs/yr	1,040
Front-End Loader Average Speed	mi/hr	2.5

C. Calculations

	EU ID	Vehicle Miles Traveled (VMT)		PM Emission Estimates					
				PM		PM_{10}		$PM_{2.5}$	
		(VMT/hr)	(VMT/yr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Dozer Operations on North Stockout Pile (1 Dozer)	GH-003	2.5	2,600	2.6	1.4	0.70	0.37	0.070	0.037
Dozer Operations on South Stockout Pile (1 Dozer)	GH-012	2.5	2,600	2.6	1.4	0.70	0.37	0.070	0.037
Dozer Operations on Long Term Storage Pile (2 Dozers)	GH-013	2.5	5,200	2.6	2.7	0.70	0.73	0.070	0.073
Totals				**7.9**	**5.5**	**2.1**	**1.5**	**0.21**	**0.15**

Sources: ECT, 2012.
TEC, 2012.

Table C10. Tampa Electric Company Big Bend Station - Existing South 40 Gypsum Storage Area Fugitive Emission Source PM/PM_{10}/$PM_{2.5}$ Actual Emission Estimates Gypsum Storage Piles Windblown Dust

A. Emission Estimation Methodology

Reference - EPA AP-42, Section 13.2.5, Industrial Wind Erosion - Equation (2), November 2006.

EF = k x Sum(P_i), sum is from i to N (Equation 2) x [1 - (CE / 100)]

where:

EF = emission factor ($g/m^2/yr$)
k = particle size multiplier (unitless)
N = number of disturbances per year
P_i = erosion potential function based on fastest mile between disturbances (g/m^2)
$P = 58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)$ (equation 3)
$P = 0$ for $u^* < u_t^*$
u^* is the friction velocity (= 0.053 times the fastest mile (m/s))
u_t^* = threshold friction velocity (m/s) = 1.02 m/s for overburden from AP-42 Table 13.2.5-2
The fastest mile is defined as the fastest observed one mile of wind from Tampa, FL for the years 1951 - 1980.

B. Input Data

Parameter	Units	Value
Threshold friction velocity (u_t^*)	m/s	1.02
Frequency of disturbance, N	dy/yr	365
Frequency of wind events resulting in wind erosion	dy/mo	2
	dy/yr	24
Particle size multiplier (k), particle size <30 μm	-	1
Particle size multiplier (k), particle size <10 μm	-	0.5
Particle size multiplier (k), particle size <2.5 μm	-	0.075
Control Efficiency (CE), Storage of moist material and watering as necessary	%	50

C. Calculations

Erosion Potential Emission Factors

Month	Fastest Mile (mph)	Fastest Mile (m/s)	u^* (m/s)	$(u^*-u_t^*)$	$(u^*-u_t^*)^2$	P_{PM} (g/m^2)	P_{PM10} (g/m^2)	$P_{PM2.5}$ (g/m^2)
Jan	35	15.65	0.83	-0.19	0.036	0.00	0.00	0.00
Feb	50	22.35	1.18	0.16	0.027	5.69	2.84	0.43
Mar	43	19.22	1.02	0.00	0.000	0.00	0.00	0.00
Apr	37	16.54	0.88	-0.14	0.021	0.00	0.00	0.00
May	46	20.56	1.09	0.07	0.005	2.03	1.02	0.15
Jun	67	29.95	1.59	0.57	0.322	32.86	16.43	2.46
Jul	58	25.93	1.37	0.35	0.125	16.13	8.07	1.21
Aug	38	16.99	0.90	-0.12	0.014	0.00	0.00	0.00
Sep	56	25.03	1.33	0.31	0.094	13.13	6.57	0.98
Oct	38	16.99	0.90	-0.12	0.014	0.00	0.00	0.00
Nov	40	17.88	0.95	-0.07	0.005	0.00	0.00	0.00
Dec	45	20.12	1.07	0.05	0.0021	1.28	0.64	0.10
Annualized Emission Factor (gm/m^2-yr)						**4.68**	**2.34**	**0.35**

Wind Erosion Emissions

Emission Source	EU ID	Surface Area (m^2)	Disturbed Area (%)	Total (m^2)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
North Stockout Pile	GH-002	1,581	5	79	0.000204	0.000102	0.0000153
South Stockout Pile	GH-011	1,518	5	76	0.000196	0.000098	0.0000147
Long Term Storage Pile	GH-014	72,025	5	3,601	0.009282	0.004641	0.0006962
Totals					**0.0097**	**0.0048**	**0.00073**

Sources: ECT, 2012.
TEC, 2012.

APPENDIX B
ENVIRONMENTAL RESOURCE PERMIT APPLICATION

TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
JOINT ENVIRONMENTAL RESOURCE PERMIT APPLICATION

PREPARED FOR:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Siting Coordination Office
3900 Commonwealth Boulevard, Rd M.S. 48
Tallahassee, Florida 32399-3000

PREPARED BY:

TECO
TAMPA ELECTRIC
P.O. Box 111
Tampa, Florida 33601

AND

ECT
Environmental Consulting & Technology, Inc.
1408 North Westshore Boulevard, Suite 115
Tampa, Florida 33607

100754-0300-1200
October 2012

TABLE OF CONTENTS

LIST OF FIGURES

1.0 INTRODUCTION

The Tampa Electric Company Big Bend Station consists of four coal-fired steam generators which use wet flue gas desulfurization (FGD) control technology (i.e., wet scrubbers) to reduce emissions of sulfur oxides. Gypsum (hydrated calcium sulfate) produced as a by-product of the wet FGD control systems is currently sold for use in the production of wallboard, or stored onsite at the Big Bend Station.

Since the existing onsite gypsum storage facility is near its storage capacity, Tampa Electric is planning the installation of a new gypsum handling and storage facility which will provide the ability to handle and store gypsum (the Project). Construction of the new gypsum handling and storage facility will be accomplished in two phases. Phase I of the project will consist of a stackout pile, gypsum management area, paved haul roads and a stormwater management system. Gypsum will be hauled from the FGD area within the plant by truck to the new storage area for the time being. Phase II could eventually be constructed to include a conveyor system to transfer gypsum directly from the plant to the new gypsum storage facility and other transloading and management facilities such as a radial stacker and storage dome. In the Phase II operational scenario, a full hood cover belt conveyor would transfer gypsum from the reclaim hopper in the plant to a diverter gate which would be used to transfer gypsum to either a truck/railcar loadout silo or to a stackout area for transfer to the gypsum management pile. A rotary plow will be used to transfer gypsum from the management pile or truck/railcar loadout silo to trucks/railcars which will then transfer the gypsum to offsite customers. The reclaimed gypsum may also be transferred by truck to the Big Bend Station dock for loading onto barges. This product gypsum will be barged to agricultural customers in South America.

The Project's major components include:

- Phase I
    - Truck transfer of gypsum to the new gypsum handling and storage facility.
    - Nominal 1.4 million ton capacity gypsum pile management area.
    - Mobile equipment to transfer gypsum from the stock out pile to the gypsum pile management area, reclaim hopper, or directly to truck.

    - Two access roads.
    - Stormwater management system.
- Phase II
    - Enclosed pipe conveyors, belt conveyors, and enclosed belt transfer stations to transfer gypsum from the existing Big Bend Station FGD gypsum processing area to a radial stacker.
    - Covered belt conveyors to transfer gypsum from the reclaim hopper to either the truck loadout silo or to the gypsum storage dome.
    - Nominal 100 ton capacity truck/railcar loadout silo.

Gypsum from the existing Big Bend Station FGD system will be conveyed into the adjacent North Stackout Area and stacked onto an impervious pad with secondary containment walls. It will then be loaded into trucks to be hauled to the East 40 storage area. Gypsum will be reclaimed from the storage pile using mobile equipment (e.g., front end loaders) and loaded into trucks or railcars for hauling to customers or to the waterfront dock for loading onto barges and shipment to offshore customers.

A final decision as to whether to build Phase II has not been reached by Tampa Electric at this time. However, if Phase II is implemented, gypsum from the existing Big Bend Station processing area will be transferred by covered belt and pipe belt conveyors to the radial stacker. The existing 150-foot (ft) covered conveyor would be modified to transfer gypsum from the existing gypsum transfer building in the plant to a new transfer station in the new East 40 storage area by means of a new pipe conveyor. The gypsum would then be distributed either into stockout piles for pickup by front end loader and transport to the main gypsum management pile or to a receiving hopper for loadout into trucks or transferred via a covered conveyor to a gypsum storage dome. In a pipe conveyor, the belt is wrapped into a cylindrical pipe form guided by six hexagonally arranged idlers along the conveyor route. This allows the conveyor to negotiate inclines of up to 30 degrees and to curve in both the vertical and the horizontal directions enabling the conveyor to negotiate obstacles that would obstruct a conventional straight conveyor. With the material being transferred completely enclosed within the belt pipe, fugitive dust emissions and spillage are eliminated along the conveyor run on both the pipe (outbound) and the belt (return) conveyors. Pipe conveyors also allow for relatively long conveying distances without the need for transfer towers. The continuous pipe conveyor would be approximately 3,200 ft (0.61 mile) in length.

As mentioned previously, from the transfer station, a fully covered radial stacker conveyor would transfer gypsum to the stackout piles. Gypsum would be reclaimed from the stackout piles using mobile equipment (e.g., front end loaders) and either transferred to an above-grade reclaim hopper in the gypsum pile management area or loaded into trucks for transport. Mobile equipment will be also used to reclaim gypsum from the management area pile for transfer to the reclaim hopper or loadout directly into trucks. The radial stacker may also transfer gypsum directly to the reclaim hopper. From the reclaim hopper, a fully covered belt conveyor will transfer gypsum to a diverter gate which will be used to transfer gypsum via a covered conveyor to a truck/railcar loadout silo, a conical storage pile located inside the gypsum storage dome or the radial stacker, which will deposit gypsum into discrete stackout piles. A rotary plow will be used to transfer gypsum from the truck/railcar loadout silo to trucks/railcars which will then transfer the gypsum to offsite customers. Within the covered gypsum storage dome, gypsum will be transferred from the conical storage pile to trucks using mobile equipment for subsequent shipment to offsite customers. The reclaimed gypsum may also be transferred by truck to the Big Bend Station dock for loading onto barges.

Modifications planned for the existing gypsum handling system include: (a) addition of an backup stack-out conveyor and an impervious storage pad with containment walls to be located at the current FGD by-products storage pile to the west of the limestone storage building, The new backup stackout conveyor will transfer gypsum from the existing gypsum product handling building to the new storage pad. The backup stack-out belt conveyor will be 20 inches wide, have a length of 1,240 ft, and a gypsum transfer capacity of 200 tons per hour. The conical gypsum storage pile will be 45 ft high with a storage capacity of 3,350 tons.

Equipment associated with the transfer of gypsum from truck to barge includes a front-end loader and a new receiving hopper located at the dock. Gypsum trucks will unload to an existing impervious storage pad with containment walls located at the dock. A front-end loader will then transfer gypsum from the storage pad to the new receiving hopper. A clamshell located on the barge will then transfer gypsum from the receiving hopper to the barge.

The Project will result in the permanent filling of approximately 0.97 acres of highly disturbed natural or man-made surface water features (i.e., 0.04 acre of altered natural stream channel, 0.16 acre of freshwater marsh, 0.74 acre of upland-cut ditches, and 0.03 acre of an upland excavated depression). Project construction is currently scheduled to commence no later than November 2013 and will be completed by April 2014.

The Project site was formerly operated as an industrial wastewater sprayfield by Tampa Electric. This operation was terminated in 1999 when modifications to the plant Recycle Water System enabled Tampa Electric to recycle all of its industrial wastewater. Since the project area was not formerly licensed as a gypsum management area, development of the Project will require a modification to the SCA under Florida Department of Environmental Protection (FDEP) siting rules (Section 62-17.211, Florida Administrative Code [F.A.C.]). This Environmental Resource Permit (ERP) application is being submitted to the FDEP Siting Coordination Office in Tallahassee as an appendix to the Petition for Modification of the Big Bend Unit 4 Site Certification for the construction and operation of the proposed gypsum storage area and, if constructed in the future, the Phase II conveyor and storage area improvements. This ERP application is being submitted to the FDEP Siting Coordination Office in Tallahassee in order to: (1) Provide sufficient information for a complete petition for modification, (2) Receive confirmation that the proposed surface water impacts will not violate State 401 Surface Water Quality standards. A separate copy of this ERP application (i.e., Appendix B) is also being submitted to the U.S. Army Corps of Engineers (USACE) office in Tampa, Florida in order to receive a permit for impacts to waters of the United States.

Tampa Electric contracted with Environmental Consulting & Technology, Inc. (ECT), George F. Young, Inc., and Sargent & Lundy LLC to provide environmental consulting (including drainage engineering), surveying, and design engineering services for the project, respectively. ECT is the designated Consultant for the Project.

1.1 PROJECT OBJECTIVE

The objective for submittal of this Joint Federal/State ERP Application package is to describe and obtain approvals for ditch crossings, as well as *de minimis* filling of some low quality wetlands in the vicinity of the Project. In addition to a completed permit application (Section 2.0), the package contains supplemental data that will serve as additional detail in response to information requested in the Joint Federal/State ERP application form (Sections 3.0 to 8.0). The placement of the proposed project was carefully considered in order to avoid/minimize potential impacts to wetlands and surface waters.

1.2 WETLAND IMPACT AVOIDANCE/MINIMIZATION

The project site was chosen by Tampa Electric after an extensive alternatives analysis utilizing environmental and operational criteria. The existing gypsum storage and conveyor facilities, located near the southern boundary of the site, are required to be either upgraded or replaced to achieve the goals of the Big Bend Remedial Action Plan (RAP) under the provisions of Consent Order 00-1275 entered into by Tampa Electric and FDEP in April 2001. In accordance with the RAP, the design of the new facilities will provide enhanced protection of groundwater, surface water, and air resources in the vicinity of the power station. Additionally, the new location for the gypsum facilities, in the northeast portion of the site, is adjacent to the property of Tampa Electric's largest customer for the product gypsum (i.e., National Gypsum). This will allow for direct transport of gypsum by truck between the Tampa Electric facility and the customer's storage area without the need to use public thoroughfares, greatly reducing related impacts on local transportation infrastructure. Furthermore, the project will be constructed in a former agricultural/spray field area, where no sensitive wetland or upland habitats are located. The footprints of temporary access and haul roads associated with this project have been reduced to the greatest extent practical and these facilities will be constructed of pervious material where feasible in order to minimize effects on local hydrologic functions and drainage.

The proposed permanent asphalt access road to the west of the project site was realigned early on in the project design to avoid the adjacent rail loop floodplain compensation area and to follow the proposed conveyor path if Phase II of the Project is constructed. The channelized stream and a portion of the north-south canal at the northeast corner of the project site were avoided in a re-design of the project footprint which resulted in a 0.08-acre reduction in jurisdictional impacts. Finally, 0.20 acre of permanent fill impacts to an altered natural drainage from an access road crossing (i.e., 0.04 acre) and a freshwater marsh from the addition of a railroad track to connect to the project site (i.e., 0.16 acre) will be ameliorated through the purchase of 0.07 mitigation credits within the service area of a permitted mitigation bank site and any potential alterations to existing drainage patterns associated with access road crossings of drainages at the project site will be eliminated through the installation of properly sized culverts. For all of the above reasons, the selected location and design features of this project incorporate an appropriate level of consideration for avoidance and minimization of environmental impacts.

Thus, due to the above-referenced design criteria and the implementation of best management practices (BMPs) before, during and after construction (e.g., use of hay bales/silt screens along the edges of surface waters), construction of the Project will avoid or minimize impacts to jurisdictional surface water features to the greatest extent practicable. Based upon the above-referenced project designs and conditions, Tampa Electric has adequately demonstrated avoidance and minimization of wetland impacts.

2.0 COMPLETED APPLICATION FORM

SECTION A

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

PART 1:

Are any of the activities described in this application proposed to occur in, on, or over wetlands or other surface waters? ☒ yes ☐ no

Is this application being filed by or on behalf of a government entity or drainage district? ☐yes ☒no

PART 2:

A. Type of Environmental Resource Permit Requested (check at least one). See Attachment 2 for thresholds and descriptions.). Requesting an FDEP compliance verification with the Conditions of Certification of the SCA modification.

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

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

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

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

D. For activities in, on, or over wetlands or other surface waters, check type of federal dredge and fill permit requested:
☒Individual ☐Programmatic General ☐General
☐Nationwide ☐Not Applicable

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

PART 3: **A. OWNER(S) OF LAND**	**B. ENTITY TO RECEIVE PERMIT (IF OTHER THAN OWNER)**
Name Mr. Randy Melton	Name
Title and Company Administrator, Environmental Planning Environmental Health and Safety Tampa Electric Company	Title and Company
Address	Address
City, State, Zip	City, State, Zip
Telephone and Fax Phone: (813) 228-4560 Fax: (813) 228-1308	Telephone and Fax
C. AGENT AUTHORIZED TO SECURE PERMIT	**D. CONSULTANT (IF DIFFERENT FROM AGENT)**
Name	Name
Title and Company	Title and Company
Address	Address
City, State, Zip	City, State, Zip
Telephone and Fax	Telephone and Fax

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

A. Name of Project, including phase if applicable: **Big Bend Power Station Gypsum Storage Area/Conveyor Improvements Project**

B. Is this application for part of a multi-phase project?
☐yes ☒no

C. Total applicant-owned area contiguous to the project?
1,523.39 ac.; **616.49** ha.

D. Total area served by the system: **27.03** ac.; **10.94** ha.

E. Impervious area for which a permit is sought: **0.65** ac.; **0.26** ha. (FDEP)
0.65 ac.; **0.26** ha. (USACE)

F. Volume of water that the system is capable of impounding:
_____ ac. ft.; _____ cu. m.

G. What is the total area of work in, on, or over wetlands or other surface waters?
0.97 ac.; **0,39** ha.; **42,253.2** sq. ft.; **3,925.45** sq. m. (FDEP)
0.97 ac.; **0.39** ha. ; **42,253.2** sq. ft.; **3,925.45** sq. m. (USACE)

H. Total volume of material to be dredged: **0** cu., yd; **0** cu. m.

I. Number of new boat slips proposed:_____ wet slips; _____ dry slips

PART 5:

Project location (use additional sheets if needed):
County(ies) **Hillsborough**

Section(s) **10**	Township **31 South**	Range **19 East**
Section(s)	Township	Range
Section(s)	Township	Range

Land Grant name, if applicable:

Tax Parcel Identification Number: **see Appendix A**

Street Address Road or other location: **Wyandotte Road**

City, Zip Code, if applicable: **N/A**

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

The Tampa Electric Company (Tampa Electric) Big Bend Station consists of four (4) coal-fired steam generators which use wet flue gas desulfurization (FGD) control technology (i.e., wet scrubbers) to reduce emissions of sulfur oxides. Gypsum (hydrated calcium sulfate) produced as a by-product of the wet FGD control systems is currently sold for use in the production of wallboard, or stored onsite at the Big Bend Station.

Since the existing onsite gypsum storage facility is near its storage capacity, Tampa Electric is planning the installation of a new gypsum handling and storage facility which will provide the ability to handle and store gypsum (the Project). Construction of the new gypsum handling and storage facility will be accomplished in two phases. Phase I of the project will consist of a stackout pile, gypsum management area, paved haul roads and a stormwater management system. Gypsum will be hauled from the FGD area within the plant by truck to the new storage area for the time being. Phase II could eventually be constructed to include a conveyor system to transfer gypsum directly from the plant to the new gypsum storage facility and other transloading and management facilities such as a radial stacker and storage dome. In the Phase II operational scenario, a full hood cover belt conveyor would transfer gypsum from the reclaim hopper in the plant to a diverter gate which would be used to transfer gypsum to either a truck/railcar loadout silo or to a stackout area for transfer to the gypsum management pile. A rotary plow will be used to transfer gypsum from the management pile or truck/railcar loadout silo to trucks/railcars which will then transfer the gypsum to offsite customers. The reclaimed gypsum may also be transferred by truck to the Big Bend Station dock for loading onto barges. This product gypsum will be barged to agricultural customers in South America.

The Project's major components include:

- Phase I
  - Truck transfer of gypsum to the new gypsum handling and storage facility.
  - Nominal 1.4 million ton capacity gypsum pile management area.
  - Mobile equipment to transfer gypsum from the stock out pile to the gypsum pile management area, reclaim hopper, or directly to truck.
  - Two access roads.
  - Stormwater management system.
- Phase II
  - Enclosed pipe conveyors, belt conveyors, and enclosed belt transfer stations to transfer gypsum from the existing Big Bend Station FGD gypsum processing area to a radial stacker.
  - Covered belt conveyors to transfer gypsum from the reclaim hopper to either the truck loadout silo or to the gypsum storage dome.
  - Nominal 100 ton capacity truck/railcar loadout silo.

Gypsum from the existing Big Bend Station FGD system will be conveyed into the adjacent North Stackout Area and stacked onto an impervious pad with secondary containment walls. It will then be loaded into trucks to be hauled to the East 40 storage area. Gypsum will be reclaimed from the storage pile using mobile equipment (e.g., front end loaders) and loaded into trucks or railcars for hauling to customers or to the waterfront dock for loading onto barges and shipment to offshore customers.

A final decision as to whether to build Phase II has not been reached by Tampa Electric at this time. However, if Phase II is implemented, gypsum from the existing Big Bend Station processing area will be transferred by covered belt and pipe belt conveyors to the radial stacker. The existing 150-foot covered conveyor would be modified to transfer gypsum from the existing gypsum transfer building in the plant to a new transfer station in the new East 40 storage area by means of a new pipe conveyor. The gypsum would then be distributed either into stockout piles for pickup by front end loader and transport to the main gypsum management pile or to a receiving hopper for loadout into trucks or transfer via a coverd conveyor to a gypsum storage dome. In a pipe conveyor, the belt is wrapped into a cylindrical pipe form guided by six hexagonally arranged idlers along the conveyor route. This allows the conveyor to negotiate inclines of up to 30 degrees and to curve in both the vertical and the horizontal directions enabling the conveyor to negotiate obstacles that would obstruct a conventional straight conveyor. With the material being transferred completely enclosed within the belt pipe, fugitive dust emissions and spillage are eliminated along the conveyor run on both the pipe (outbound) and the belt (return) conveyors. Pipe conveyors also allow for relatively long conveying distances without the need for transfer towers. The continuous pipe conveyor would be approximately 3,200 ft (0.61 mile) in length.

As mentioned above, from the transfer station, a fully covered radial stacker conveyor would transfer gypsum to the stackout piles. Gypsum would be reclaimed from the stackout piles using mobile equipment (e.g., front end loaders) and transferred to an above grade reclaim hopper either to the gypsum pile management area or into trucks for transport. Mobile equipment will be also used to reclaim gypsum from the management area pile for transfer to the reclaim hopper or loadout directly into trucks. The radial stacker may also transfer gypsum directly to the reclaim hopper. From the reclaim hopper, a fully covered belt conveyor will transfer gypsum to a diverter gate which will be used to transfer gypsum via a covered conveyor to either a truck/railcar loadout silo, to to a conical storage pile located inside the gypsum storage dome or to the radial stacker, which will deposit gypsum into discrete stackout piles. A rotary plow will be used to transfer gypsum from the truck/railcar loadout silo to trucks/railcars which will then transfer the gypsum to offsite customers. Within the covered gypsum storage dome, gypsum will be transferred from the conical storage pile to trucks using mobile equipment for subsequent shipment to offsite customers. The reclaimed gypsum may also be transferred by truck to the Big Bend Station dock for loading onto barges.

Modifications planned for the existing gypsum handling system include: (a) addition of an backup stack-out conveyor and an impervious storage pad with containment walls to be located at the current FGD by-products storage pile to the west of the limestone storage building, The new backup stack-out conveyor will transfer gypsum from the existing gypsum product handling building to the new storage pad (Figure 2-7). The backup stack-out belt conveyor will be 20 inches wide, have a length of 1,240 ft, and a gypsum transfer capacity of 200 tons per hour. The conical gypsum storage pile will be 45 ft high with a storage capacity of 3,350 tons.

Equipment associated with the transfer of gypsum from truck to barge include a front-end loader and a new receiving hopper located at the dock. Gypsum trucks will unload to an existing impervious storage pad with containment walls located at the dock. A front-end loader will then transfer gypsum from the storage pad to the new receiving hopper. A clamshell located on the barge will then transfer gypsum from the receiving hopper to the barge.

The Project will result in the permanent filling of approximately 0.97 acres of highly disturbed natural or man-made surface water features (i.e., 0.04 acre of altered natural stream channel, 0.16 acre of freshwater marsh, 0.74 acre of upland-cut ditches, and 0.03 acre of an upland excavated depression). Project construction is currently scheduled to commence no later than November 2013 and will be completed by April 2014.

The Project site was formerly operated as an industrial wastewater sprayfield by Tampa Electric. This operation was terminated in 1999 when modifications to the plant Recycle Water System enabled Tampa Electric to recycle all of its industrial wastewater. Since the project area was not formerly licensed as a gypsum management area, development of the Project will require a modification to the SCA under Florida Department of Environmental Protection (FDEP) siting rules (Section 62-17.211, Florida Administrative Code [F.A.C.]). This Environmental Resource Permit (ERP) application is being submitted to the FDEP Siting Coordination Office in Tallahassee as an appendix to the Petition for Modification of the Big Bend Unit 4 Site Certification for the construction and operation of the proposed gypsum storage area and, if constructed in the future, the Phase II conveyor and storage area improvements. This ERP application is being submitted to the FDEP Siting Coordination Office in Tallahassee in order to: 1) Provide sufficient information for a complete petition for modification, 2) Receive confirmation that the proposed surface water impacts will not violate State 401 Surface Water Quality standards. Appendix B will also serve as the application for the U.S. Army Corps of Engineers (USACE) federal dredge and fill permit application in order to receive a permit for impacts to waters of the United States. A separate copy of this ERP application is being submitted to the USACE office in Tampa, Florida.

Tampa Electric contracted with Environmental Consulting & Technology, Inc. (ECT), George F. Young, Inc., and Sargent & Lundy LLC to provide environmental consulting (including drainage engineering), surveying, and design engineering services for the project, respectively. ECT is the designated Consultant for the Project.

PART 7:

A. If there have been any pre-application meetings, including onsite meetings, with regulatory staff, please list the date(s), location(s), and names of key staff and project representatives.
On November 16, 2011, 13 staff members of the Industrial Wastewater, Solid Waste, Siting, and ERP Divisions of FDEP and 7 members of the Project Team, which included Tampa Electric and ECT, met at the Tampa FDEP office to discuss the project at a pre-application meeting.
On February 1, 2012, Mark Langford with FDEP met with Adriano "Nate" Alcoz and Randy Melton with Tampa Electric and Tony Arcuri with ECT in the field at the project site to review the jurisdictional lines/ UMAM analyses.
On February 6, 2012, Darlene Dannels with USACE met with Adriano "Nate" Alcoz with Tampa Electric in the USACE office at a pre-application meeting.

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

Agency	Date	No.\Type of Application	Action Taken
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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

1. 2.

See Appendix A.

3. 4.

5. 6.

7. 8.

PART 8:

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

Mr. Stanley M. Kroh
Typed/Printed Name of Applicant (If no Agent is used) or Agent (If one is so authorized below)

Stanley M. Kroh — October 9, 2012
Signature of Applicant/Agent — Date

Manager, Land & Water Programs, Tampa Electric Company
(Corporate Title if applicable)

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

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

Typed/Printed Name of Applicant	Signature of Applicant	Date

(Corporate Title if applicable)

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

PERSON AUTHORIZING ACCESS TO THE PROPERTY MUST COMPLETE THE FOLLOWING:

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

Mr. Stanley M. Kroh	Stanley M. Kroh	October 9, 2012
Typed/Printed Name of Applicant	Signature of Applicant	Date

Manager, Land & Water Programs, Tampa Electric Company
(Corporate Title if applicable)

SECTION C

Environmental Resource Permit Notice of Receipt of Application

Note: this form does not need to be submitted for noticed general permits.
This information is required in addition to that required in other sections of the application. Please submit five copies of this notice of receipt of application and all attachments with the other required information. Please submit all information on 8 1/2" x 11" paper.

Project Name	**Big Bend Power Station Gypsum Storage Area/Conveyor Improvements Project**
County	**Hillsborough**
Owner	**Tampa Electric Company**
Applicant:	**Same**
Applicant's Address:	**P.O. Box 111, Tampa, Florida 33601**

1. Indicate the project boundaries on a USGS quadrangle map. Attach a location map showing the boundary of the proposed activity. The map should also contain a north arrow and a graphic scale; show Section(s), Township(s), and Range(s); and must be of sufficient detail to allow a person unfamiliar with the site to find it. **See Figures 1 and 2.**

2. Provide the names of all wetlands, or other surface waters that would be dredged, filled, impounded, diverted, drained, or would receive discharge (either directly or indirectly), or would otherwise be impacted by the proposed activity, and specify if they are in an Outstanding Florida Water or Aquatic Preserve: **The existing gypsum pile will be relocated to the proposed location at the Tampa Electric Company Big Bend Power Station facility. Thus, no named wetlands or surface water features will directly or indirectly affected by the proposed action. There are no Outstanding Florida Waters or Aquatic Preserves in the immediate area.**

3. Attach a depiction (plan and section views), which clearly shows the works or other facilities proposed to be constructed. Use multiple sheets, if necessary. Use a scale sufficient to show the location and type of works. **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

4. Briefly describe the proposed project (such as "construct dock with boat shelter", "replace two existing culverts", "construct surface water management system to serve 150 acre residential development"): **Tampa Electric Company proposes to construct a gypsum storage facility, conveyor, access roads, and a railroad track at the existing Big Bend Power Station in Apollo Beach, Florida.**

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

filled **0.97** ac.; **0** excavated ac.;

other impacts **0** ac.

6. Provide a brief statement describing any proposed mitigation for impacts to wetlands and other surface waters (attach additional sheets if necessary): **Approximately 0.20 acre of an altered unnamed stream and a highly disturbed freshwater marsh will be filled to accommodate a culvert for an access road crossing and the addition of a railroad track, respectively. To mitigate for this 0.20 acre of fill, Tampa Electric will purchase 0.07 mitigation credits from the Tampa Bay Mitigation Bank.**

FOR AGENCY USE ONLY

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

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

SECTION E

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

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

I. Site Information

A. Provide a map(s) of the project area and vicinity delineating USDA/SCS soil types. **See Figure 3.**

B. Provide recent aerials, legible for photo interpretation with a scale of 1" = 400 ft, or more detailed, with project boundaries delineated on the aerial. **See Figure 6.**

C. Identify the seasonal high water or mean high tide elevation and normal pool or mean low tide elevation for each on site wetland or surface water, including receiving waters into which runoff will be discharged. Include dates, datum, and methods used to determine these elevations. **Tampa Electric estimated the seasonal high water level for the project site by averaging the elevations established at three stations (i.e., 1.82, 1.88 and 1.93 ft NAVD88) located within the unnamed stream system (i.e., 1.88 ft NAVD88). The SHWL stations were established along the bank slope of the channel using the growth limits of wetlands vegetation.**

D. Identify the wet season high water tables at the locations representative of the entire project site. Include dates, datum, and methods used to determine these elevations.

The soil types shown on Figure 3 are reported by the Natural Resource Conservation Service to have the following high water table depths in relation to the land surface:

Soil Map Code	Soil Type	Depth in Feet
5	Basinger, Holopaw and Samsula soils, depressional	+2-1.0
57	Wabasso fine sand	0-1.0
58	Wabasso-Urban Land	0-1.0

II. Environmental Considerations

A. Provide results of any wildlife surveys that have been conducted on the site, and provide any comments pertaining to the project from the Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service. **On September 8, 9, 12, and 15 and December 13, 2011, wildlife surveys were conducted along the proposed facilities by two ecologists with ECT. Snowy egret (*Egretta thula*), is a State listed Special of Special Concern. The snowy egret was the only listed species observed at the site. This is not unexpected, as very little habitat that most listed species require occurs within the project environs. Most of the land within the power plant facility consists of developed property and highly disturbed land dominated by exotic vegetation. Other wading birds would be expected to forage in the ditches and along the shallow edges of ponds near the project. However, no nesting areas are available for wading birds along**

the proposed project area. No adverse effects to threatened or endangered species are anticipated from the proposed action. See Section 3.0.

B. Provide a description of how water quantity, quality, hydroperiod, and habitat will be maintained in onsite wetlands and other surface waters that will be preserved or will remain undisturbed. **See Sections 4.0 to 6.0.**

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

D. Describe how boundaries of wetlands or other surface waters were determined. If there has ever been a jurisdictional declaratory statement, a formal wetland determination, a formal determination, a validated informal determination, or a revalidated jurisdictional determination, provide the identifying number. **See Section 3.0-In addition, on 2/1/12 the FDEP reviewed the jurisdictional lines for the project site and access road crossings in the field and informally verified the limits to be accurately delineated. However, the jurisdictional lines for the railroad track addition were not reviewed in the field by FDEP.**

E. Impact Summary Tables:

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

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

3. For shoreline stabilization projects, provide the information requested in Table 5. **N/A**

III. Plans

Provide clear, detailed plans for the system including specifications, plan (overhead) views, cross sections (with the locations of the cross sections shown on the corresponding plan view), and profile (longitudinal) views of the proposed project. The plans must be signed and sealed by an appropriate registered professional as required by law. Plans must include a scale and a north arrow. These plans should show the following: **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

A. Project area boundary and total land area, including distances and orientation from roads or other land marks; **See Figure 7.**

B. Existing land use and land cover (acreage and percentages), and onsite natural communities, including wetlands and other surface waters, aquatic communities, and uplands. Use the Florida Land Use Cover & Classification System (FLUCCS)(Level 3) for projects proposed in the South Florida Water Management District, the St. Johns River Water Management District, and the Suwannee River Water Management District and use the National Wetlands Inventory (NWI) for projects proposed in the Southwest Florida Water Management District. Also identify each community with a unique identification number which must be consistent in all exhibits. **The proposed facilities are to be located on undeveloped industrial land that** mostly consists of abandoned wastewater spray field/agricultural uplands with associated man-made upland cut drainage ditches and a canal, a segment of an unnamed stream which has been channelized, a small, isolated depression, and a highly disturbed freshwater marsh. **The land uses/covers were identified using the Florida Land Use, Cover and Forms Classification System (FLUCFCS)-Level III (FDOT, 1999). The FLUCFCS map is on Figure 7. The National Wetlands Inventory mapping for the project site is depicted on Figure 5. The acreages and percentages of the existing land use and cover types for the project site and access roads are provided below:**

FLUCFCS CODE AND DESCRIPTION	ACREAGE	PERCENTAGE
422/740-Brazilian Peppers/Disturbed Lands	26.03	96.30
511-Natural Streams	0.06	0.22
512-Upland Cut Ditches	0.75	2.78
534-Reservoirs less than 10 acres	0.03	0.11
641/619-Freshwater Marsh/Exotic Wetland Hardwoods	0.16	0.59
TOTAL	27.03	100.0

C. The existing topography extending at least 100 ft off the project area, and including adjacent wetlands and other surface waters. All topography shall include the location and a description of known benchmarks, referenced to NGVD. For systems waterward of the mean high water (MHW) or seasonal high water lines, show water depths, referenced to mean low water (MLW) in tidal areas or seasonal low water in non-tidal areas, and list the range between MHW and MLW. For docking facilities, indicate the distance to, location of, and depths of the nearest navigational channel and access routes to the channel. **See Figure 2 and Sheets 5, and 5-1 through 5-9.**

D. If the project is in the known flood plain of a stream or other water course, identify the following: 1) the flood plain boundary and approximate flooding elevations; and 2) the 100-year flood elevation and floodplain boundary of any lake, stream or other watercourse located on or adjacent to the site; **The project is not located within the flood plain of a lake, stream or other non-tidal water course; however, the site is situated within Flood Zone AE (See Figure 4). Flood Zone AE is subject to flooding by the base or 1 percent chance flood and considered to be a high risk area for flooding. However, the flood zone area is coastal and not riverine. The coastal flood area is landward of the shoreline, but may be associated with tidal inundation during storms. Floodplain compensation is based upon riverine flooding events only. In addition, according to the modeling, the flood stages in the 100-year event do not inundate the area. Thus, floodplain compensation is not required for this project.**

E. The boundaries of wetlands and other surface waters within the project area. Distinguish those wetlands and other surface waters that have been delineated by any binding jurisdictional determination; **See Figure 7.**

F. Proposed land use, land cover and natural communities (acreage and percentages), including wetlands and other surface waters, undisturbed uplands, aquatic communities, impervious surfaces, and water management areas. Use the same classification system and community identification number used in III (B) above. **See Figure 7.**

G. Proposed impacts to wetlands and other surface waters, and any proposed connections/outfalls to other surface waters or wetlands; **See Section 3.0 and Table 1.**

H. Proposed buffer zones; **N/A**

I. Pre- and post-development drainage patterns and basin boundaries showing the direction of flows, including any off-site runoff being routed through or around the system; and connections between wetlands and other surface waters; **N/A.**

J. Location of all water management areas with details of size, side slopes, and designed water depths; **See the drainage report in Appendix B-Figures 1 and 2.**

K. Location and details of all water control structures, control elevations, any seasonal water level regulation schedules; and the location and description of benchmarks (minimum of one benchmark per structure); **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

L. Location, dimensions and elevations of all proposed structures, including docks, seawalls, utility lines, roads, and buildings; **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

M. Location, size, and design capacity of the internal water management facilities; **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

N. Rights-of-way and easements for the system, including all onsite and off-site areas to be reserved for water management purposes, and rights-of-way and easements for the existing drainage system, if any; **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

O. Receiving waters or surface water management systems into which runoff from the developed site will be discharged; **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

P. Location and details of the erosion, sediment and turbidity control measures to be implemented during each phase of construction and all permanent control measures to be implemented in post-development conditions; **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

Q. Location, grading, design water levels, and planting details of all mitigation areas; **N/A**

R. Site grading details, including perimeter site grading; **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

S. Disposal site for any excavated material, including temporary and permanent disposal sites; **N/A**

T. Dewatering plan details; **N/A**

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

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

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

IV. Construction Schedule and Techniques

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

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

B. Schedule of implementation of temporary or permanent erosion and turbidity control measures; **See Section 6.0**

C. For projects that involve dredging or excavation in wetlands or other surface waters, describe the method of excavation, and the type of material to be excavated; **N/A.**

D. For projects that involve fill in wetlands or other surface waters, describe the source and type of fill material to be used. For shoreline stabilization projects that involve the installation of riprap, state how these materials are to be placed, (i.e., individually or with heavy equipment) and whether the rocks will be underlain with filter cloth; **See Sections 4.0 to 6.0.**

E. If dewatering is required, detail the dewatering proposal including the methods that are proposed to contain the discharge, methods of isolating dewatering areas, and indicate the period dewatering structures will be in place (Note: a consumptive use or water use permit may by required); At this time, dewatering should not be required. If dewatering is determined to be required, Tampa Electric will submit the necessary information to FDEP for a permit prior to any dewatering activities.

F. Methods for transporting equipment and materials to and from the work site. If barges are required for access, provide the low water depths and draft of the fully loaded barge; **Equipment and materials will be transported to the project site from Wyandotte Road. On Tampa Electric property, the equipment and materials will be transported along a series of interior access roads.**

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

H. Identify the schedule and party responsible for completing monitoring, record drawings, and as-built certifications for the project when completed. **Tampa Electric is the party responsible.**

V. Drainage Information

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

1. Runoff characteristics, including area, runoff curve number or runoff coefficient, and time of concentration for each drainage basin; **See Appendices B and C of Appendix B.**

2. Water table elevations (normal and seasonal high) including aerial extent and magnitude of any proposed water table draw down; **The SHW level was established for the immediate area of the project site at 1.88 ft NAVD. No water table draw downs are proposed.**

3. Receiving water elevations (normal, wet season, design storm); **N/A**

4. Design storms used including rainfall depth, duration, frequency, and distribution; **See Section 3.0 of Appendix B.**

5. Runoff hydrograph(s) for each drainage basin, for all required design storm event(s); **See Appendices B and C of Appendix B.**

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

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

8. Flood routings through onsite conveyance and storage areas; **See *.smx files in Appendix B of Appendix B.**

9. Water surface profiles in the primary drainage system for each required design storm event(s); **See Appendices B and C of Appendix B.**

10. Runoff peak rates and volumes discharged from the system for each required design storm event(s); **See Appendices B and C of Appendix B.**

11. Tail water history and justification (time and elevation); **See Appendices B and C of Appendix B.**

and

12. Pump specifications and operating curves for range of possible operating conditions (if used in system view). **See Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14.**

B. Provide the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions; **N/A**

C. Provide the acreage, and percentages of the total project, of the following:

1. Impervious surfaces, excluding wetlands; **pre-development (0 acres or 0 percent); post-development (25.07 acres or 92.75 percent and an additional 0.65 acre or 2.41 percent in surface waters).**

2. Pervious surfaces (green areas, not including wetlands); **pre-development (26.03 acres or 96.30 percent); post-development (0.96 acre or 3.55 percent, an additional 0.16 acre or 0.59 percent in surface waters, and 0.16 acre or 0.59 percent in wetlands).**

3. Lakes, canals, retention areas, other open water areas; **pre-development (0.84 acre or 3.11 percent); post-development (0.03 acre or 0.11 percent)** and

4. Wetlands; **pre-development (0.16 acre and 0.59 percent); post-development (0 acre and 0 percent).**

D. Provide an engineering analysis of floodplain storage and conveyance (if applicable), including:

1. Hydraulic calculations for all proposed traversing works; **See Appendix E of Appendix B.**

2. Backwater water surface profiles showing upstream impact of traversing works; **N/A**

3. Location and volume of encroachment within regulated floodplain(s); **N/A** and

4. Plan for compensating floodplain storage, if necessary, and calculations required for determining minimum building and road flood elevations. **N/A**

E. Provide an analysis of the water quality treatment system including: **N/A**

1. A description of the proposed stormwater treatment methodology that addresses the type of treatment, pollution abatement volumes, and recovery analysis; and

2. Construction plans and calculations that address stage-storage and design elevations, which demonstrate compliance with the appropriate water quality treatment criteria.

F. Provide a description of the engineering methodology, assumptions and references for the parameters listed above, and a copy of all such computations, engineering plans, and specifications used to analyze the system. If a computer program is used for the analysis, provide the name of the program, a description of the program, input and output data, two diskette copies, if available, and justification for model selection. **See Appendix B.**

VI. *Operation and Maintenance and Legal Documentation*

A. Describe the overall maintenance and operation schedule for the proposed system. **See Section 2.4 of Appendix B.**

B. Identify the entity that will be responsible for operating and maintaining the system in perpetuity if different than the permittee, a draft document enumerating the enforceable affirmative obligations on the entity to properly operate and maintain the system for its expected life, and documentation of the entity's financial responsibility for long-term maintenance. If the proposed operation and maintenance entity is not a property owner's association, provide proof of the existence of an entity, or the future acceptance of the system by an entity which will operate and maintain the system. If a property owner's association is the proposed operation and maintenance entity, provide copies of the articles of incorporation for the association and copies of the declaration, restrictive covenants, deed restrictions, or other operational documents that assign responsibility for the operation and maintenance of the system. Provide information ensuring the continued adequate access to the system for maintenance purposes. Before transfer of the system to the operating entity will be approved, the permittee must document that the transferee will be bound by all terms and conditions of the permit. **Tampa Electric is the entity responsible for operating and maintaining the system in perpetuity.**

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

D. Provide indication of how water and wastewater service will be supplied. Letters of commitment from off-site suppliers must be included. Portable toilets will be utilized during construction. Tampa Electric will construct a permanent restroom at the proposed project facility which will be hooked up to a County potable water line and utilize the onsite Tampa Electric PPS wastewater treatment system through the installation and use of a holding tank.

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

VII. Water Use N/A

A. Will the surface water system be used for water supply, including landscape irrigation, or recreation.

B. If a Consumptive Use or Water Use permit has been issued for the project, state the permit number.

C. If no Consumptive Use or Water Use permit has been issued for the project, indicate if such a permit will be required and when the application for a permit will be submitted.

D. Indicate how any existing wells located within the project site will be utilized or abandoned.

TABLE 1
Project Impact Summary (FDEP/USACE)

WL & SW ID*	WL & SW TYPE	WL & SW SIZE (ac.) ON SITE	WL & SW ACRES NOT IMPACTED	PERMANENT IMPACTS TO WL & SW		TEMPORARY IMPACTS TO WL & SW		MITIGATION ID
				IMPACT SIZE (acres)	IMPACT CODE	IMPACT SIZE (acres)	IMPACT CODE	
V2	511	0.054	0.018	0.036	F			TBMB**
D1	512	0.010	0.009	0.001	F	N/A	N/A	N/A***
D2	512	0.014	0	0.014	F	N/A	N/A	N/A***
S1	512	0.124	0	0.124	F			N/A***
S2	512	0.020	0	0.020	F	N/A	N/A	N/A***
S4	512	0.037	0	0.037	F	N/A	N/A	N/A***
S5	512	0.003	0	0.003	F	N/A	N/A	N/A***
S6	512	0.190	0	0.190	F	N/A	N/A	N/A***
S11	512	0.260	0	0.260	F	N/A	N/A	N/A***
S12	512	0.002	0	0.002	F	N/A	N/A	N/A***
V3	512	0.018	0	0.018	F	N/A	N/A	N/A***
V4	512	0.071	0	0.071	F	N/A	N/A	N/A***
S9	534	0.029	0	0.029	F	N/A	N/A	N/A***
W!	641/619	0.162	0	0.162	F	N/A	N/A	TBMB**
		0.994	0.027	0.967				

WL = Wetland; **SW** = Surface water; **ID** = Identification number, letter, etc.
Wetland Type: Use an established wetland classification system and, in the comments section below, indicate which classification system is being used.
Impact Code (Type): D = dredge; F = fill; H = change hydrology; S = shading; C = clearing; O = other. Indicate the final impact if more than one impact type is proposed in a given area. For example, show F only for an area that will first be de-mucked and then backfilled.

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

Comments:
*V2 is a FLUCFCS-511-Natural Streams; D1 and D2: S1, 2, 4, 5, 6, 11, and 12; and V3 and V4 are FLUCFCS 512-Upland Cut Ditches, S9 is a FLUCFCS 534-Reservoirs Less Than 10 Acres, and W1 is a FLUCFCS 641/619-Freshwater Marsh/Exotic Wetland Hardwoods.
**The impacts to the natural stream and freshwater marsh will be mitigated through the installation of properly sized culverts and purchase of mitigation credits from the Tampa Bay Mitigation Bank.-See Table 3.
*** Mitigation is not proposed for the impacts to the man-made, upland-cut ditches and hydrologically-isolated depression. Drainage patterns/flows will be maintained using properly sized culverts for flow through conveyances and Best Management Practices will be employed during construction.

TABLE 2
ONSITE MITIGATION SUMMARY **N/A**

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

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

COMMENTS:

TABLE 3
OFF-SITE MITIGATION SUMMARY

MITIGATION ID	CREATION		RESTORATION		ENHANCEMENT		WETLAND PRESERVE		UPLAND PRESERVE		OTHER-MITIGATION BANK*	
	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE	AREA	TARGET TYPE
V2											0.04/0.01	Brackish
W1											0.16/0.06	Fresh
PROJECT TOTALS:											0.20/0.07	

CODES (multiple entries per cell not allowed):

Target Type=target or existing habitat type from an established wetland classification system or land use classification for non-wetland mitigation

* Purchase 0.07 oligohaline/freshwater wetland mitigation credits from Tampa Bay Mitigation Bank for 0.20 acre of FDEP/USACE wetland impacts.

TABLE 4
DOCKING FACILITY SUMMARY N/A

Type of Structure*	Type of Work**	Number of Identical Docks	Length (ft)	Width (ft)	Height (ft)	Total square feet over water	Number of slips

	TOTALS:	Existing	Proposed
*Dock, Pier, Finger Pier, or other structure (please specify what type)	Number of Slips		
**New, Replaced, Existing (unaltered), Removed, or Altered/Modified	Square Feet over the water		

Use of Structure:

Will the docking facility provide:

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

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

Pilings
Decking
Proposed Dock-Plank Spacing (if applicable)

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

TABLE 5: SHORELINE STABILIZATION **N/A**
IF YOU ARE CONSTRUCTING A SHORELINE STABILIZATION PROJECT, PLEASE PROVIDE THE FOLLOWING:

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

Size of the Rip Rap: _____

Type of Rip Rap:_____

COMMENTS:

3.0 SITE/CORRIDOR INFORMATION

3.1 PROJECT LOCATION AND DESCRIPTION

As previously described, Tampa Electric proposes to relocate a gypsum pile and construct access roads at the existing Big Bend Power Station in Apollo Beach, Florida (i.e., Township 31 South, Range 19 East, and Section 10, Hillsborough County, Florida). The main project site is wholly located on Tampa Electric-owned property 0.45 mile south of Pembroke Road, 0.30 mile east of Wyandotte Road, 0.25-mile north of Big Bend Road (State Road 672) and 0.25-mile west of South Tamiami Trail (U.S. Highway 41). The site is bordered by agricultural land on the east and south, vacant land on the north and industrial facilities associated with the power plant to the west. All of the proposed surface water crossings occur within the existing Big Bend Power Station. The project area mostly consists of open, upland grassy fields, man-made ditches, remnant forest, an altered natural stream, monocultures of exotic shrubs and trees such as Brazilian pepper (*Schinus terebinthifolius)* and river sheoak (*Casuarina cunninghamiana)*, abandoned wastewater spray fields, abandoned buildings, railroad tracks, access roads, electrical facilities, small ponds, highly disturbed wetlands, and other ruderal areas.

The Florida Natural Areas Inventory (FNAI) Species Tracking List provided information on animal and plant species listed as endangered, threatened, or species of special concern by the Florida Fish and Wildlife Conservation Commission (FFWCC), Florida Department of Agriculture and Consumer Services and/or U.S. Fish and Wildlife Service (USFWS) that have been recorded as present in Hillsborough County, Florida. Additionally, the FFWCC website was searched for known bald eagle (*Haliaeetus leucocephalus*) nests and wading bird rookeries for the Sections of land on which the proposed facilities are to be located, as well as all adjacent Sections.

The FNAI identified 14 listed plants and 36 listed animals (1 amphibian, 11 reptiles, 21 birds, and 3 mammals) as occurring within Hillsborough County, Florida. According to the FFWCC Eagle Nest Locator, the closest documented active eagle nest is about 1.2 miles east of the project activities (i.e., Eagle Locator identification code HL041; Last Active 2007; located in T31S, R19E, and S11). The closest wading bird colonies were recorded approximately 3 miles to the northwest of the project site on Sunken Island key (i.e., Wading Bird Locator identification code 615007; >3,000 nests; Last Active in 1990's and Wading Bird Locator identification code 615336; 250-500 nests; Last Active in 1990's). Thus, no eagle's nests or wading bird rookeries were recorded on or within one mile of the project site.

Out of the 50 listed plant and animal species recorded for Hillsborough County, Florida, no listed plants and only 10 listed animal species (1 reptile, 8 birds, and 1 mammal) were considered to have a potential likelihood for occurrence based upon the availability of habitat. The American alligator (*Alligator mississippiensis*), a state-listed species of special concern, could be present within the ditches onsite. Wading birds such as little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), and white ibis (*Eudocimus albus*) are all state-listed as species of special concern that could also potentially be found along the ditches onsite. Wood stork (*Mycteria americana*), a state/federally-listed endangered species, might also be found feeding in the ditches onsite. The Southeastern American kestrel (*Falco sparverius paulus*), a state-listed threatened species, could potentially nest in available wooded habitat located just outside the project site limits to the north. The Florida burrowing owl (*Athene cunicularia floridana*), a state-listed species of special concern, could potentially nest in upland grassy areas. The sandhill crane (*Grus canadensis pratensis*), a state-listed threatened species, might also feed along the open wet grassy areas. Finally, Sherman's fox squirrel (*Sciurus niger shermani*), a state-listed species of special concern, could also utilize the wooded habitats located just outside of the project limits.

During the wetland jurisdictional delineations, two Environmental Consulting & Technology, Inc. (ECT), ecologists conducted wildlife surveys of the project area. During the surveys, snowy egrets were seen in the ditches. In addition to wading birds, other birds were observed directly or indirectly through signs thereof, including Northern cardinal, American crow, black vulture, and turkey vulture. Leopard frogs, a mud turtle, and a black racer were present in the ditches. Finally, signs of armadillo, raccoon, Eastern cottontail, and white-tailed deer were observed.

The snowy egret was the only listed species observed at the site. This is not unexpected, as very little habitat that most listed species require occurs within the project environs. Most of the land within the power plant facility consists of developed property and highly disturbed land dominated by exotic vegetation. Other wading birds would be expected to forage in the ditches and along the shallow edges of ponds near the project. However, no nesting areas are available for wading birds along the proposed project area. No adverse effects to threatened or endangered species are anticipated from the proposed action.

Finally, as previously referenced, Tampa Electric owns the Big Bend Power Station site. The property owners adjacent to the Big Bend Power Station, together with folio numbers and mailing addresses, are listed in Appendix A. The applicant-owned property information is also provided in Appendix A.

3.2 JURISDICTIONAL WETLANDS AND SURFACE WATERS

On September 8, 9, 12, and 15; December 13; and August 20, 2012, ECT wetland ecologists conducted wetland/surface water jurisdictional determinations along the area of the proposed gypsum relocation site and access roads. Wetlands and surface waters were delineated in the field using accepted, standard state and federal wetland delineation methodologies (e.g., the FDEP regulations, Section 62-301 and 62-340 and the Routine Onsite Determination Methods as described in the *USACE 1987 Wetlands Delineation Manual,* the most current regional supplements, and the most current vegetative index, respectively).

Standard USACE Routine Wetland Delineation Forms were not completed for this project because all jurisdictional boundaries occurred along the edges of the tops of banks of adjacent berms. Pink surveyor's flags labeled with the words "wetlands delineation" were tied at strategic locations along the identified jurisdictional boundaries on existing vegetation. No true wetlands were found onsite (i.e., only surface waters). Each flag was labeled with a code to identify the surface water. After the wetland ecologist flagged the surface waters, a certified land surveyor surveyed each flag's location. The surveyed jurisdictional lines were overlaid on a site plan and are provided on an 8 ½ by 11-inch drawing in this permit application (see Figure 7). Ground photographs of representative surface waters associated with the project are also provided in Appendix C.

As stated previously, there are no true wetlands located within the project area. All jurisdictional areas identified within the project area consist of man-made drainage ditches and a canal, a channelized natural stream, and a hydrologically isolated depression. Although the term “wetland” is being used to identify the jurisdictional areas, none of the surface water features appear to exhibit natural wetland conditions (i.e., all are highly altered/disturbed or artificial/man-made). Completed USACE-approved Jurisdictional Determination Forms have also been provided for the USACE jurisdictional surface waters on the site (see Appendix D).

The following narrative provides a description of the ecology on the project. Uplands and surface waters were classified using Level III of the Florida Land Use, Cover and Forms Classification System (FLUCFCS) (FDOT, 1999). The most current FLUCFCS does not differentiate among the various types of linear water bodies (i.e., linear water bodies are classified as 510-Streams and Waterways). For the purposes of this project, natural and artificially created linear water bodies will be separately described and classified using a modified Level III FLUCFCS (i.e., FLUCFCS 511-Natural Streams and FLUCFCS 512-Upland Cut Ditches, respectively). Figure 7 is a land use/cover map of the proposed project facilities with surface water features overlaid and an aerial photographic background provided.

The proposed 27.03-acre Project area consists of existing unpaved access roads/berms with roadside ditches and an abandoned wastewater spray field/agricultural upland area with associated man-made upland cut drainage ditches and a canal, a segment of an unnamed stream which has been channelized, a small, isolated depression, and a highly disturbed freshwater marsh. The greatest amount of project area consists of a mixture of disturbed uplands: open grassy fields and Brazilian peppers (i.e., FLUCFCS 740-Disturbed Lands and 422-Brazilian Pepper). Approximately 26.03 acres of the project site is covered by disturbed uplands dominated by the growth of dense exotic shrubs such as Brazilian peppers and scattered open areas dominated by invasive grasses such as cogon grass (*Imperata cylindrica*). The shrub cover also contains scattered young cabbage palms (*Sabal palmetto*). The open, grassy areas also support other grasses such as smutgrass (*Sporobolus indicus*) with occasional yerba de jicotea (*Ludwigia erecta*) and common wireweed (*Sida ulmifolia*).

Upland-cut ditches and canals are linear channels created by man to carry surface water, usually rainfall, off of and away from areas of human activity. Approximately 0.75 acre of these man-made drainages is within project limits. The majority of upland-cut ditches are located along roadsides/berms and are routinely maintained by mowing and/or cleanout efforts (i.e., designated by the following mapping codes: D1 and 2; S1, 2, 4-8, and 10-12; and V1, 3, and 4 on Figure 7). The man-made, upland cut drainage ditches located on the project site are oriented north to south or east to west and average approximately 10-ft wide and 3-ft deep. Most of the ditches are shaded by dense over hanging trees and shrubs including Brazilian pepper, cabbage palm, white lead tree (*Leucaena leucophyllum*), and occasionally live oak (*Quercus virginiana*), sugarberry (*Celtis laevigata*), and river sheoak. Wetland vegetation in these ditches is sparse and typically consists of scattered giant leather fern (*Acrostichum danaeifolium*). The man-made, upland cut ditches located to the southwest of the project site vary from 10- to 30- ft wide and 3- to 6-ft deep and are either oriented north to south or east to west. They vary from being open and dominated by Peruvian primrosewillow (*Ludwigia peruviana*), Southern cattail (*Typha domingensis*) and paragrass (*Urochloa mutica*) to being completely shaded by overhanging Brazilian pepper with little or no wetland vegetation, except for scattered giant leather fern.

The man-made, upland cut drainage canal (i.e., the term canal is meant to define the linear system that drains the majority of surface waters on the property) oriented north to south on the east side of the project site averages approximately 20-ft wide and 6-ft deep (i.e., S3). The drainage canal is largely shaded by overhanging Brazilian pepper and is devoid of wetland vegetation, except for scattered giant leather fern. The canal connects to a channelized unnamed stream (i.e., V2) at the northeast corner of the project site.

During a review of historic aerial photography (photo dates 1957 and 1968), it was determined that the drainage located at the northeastern corner of the project site was a natural stream prior to channelization. Approximately 0.06 acre of the channelized stream occurs within project limits. The stream is approximately 30-ft wide and averages over 6-ft deep. The channelized stream is densely shaded by Brazilian pepper with occasional white lead tree and river sheoak; scattered patches of coastalplain willow (*Salix caroliniana*), manyflower marshpennywort (*Hydrocotyle umbellata*), and giant leather fern also occur along the lower reaches.

None of the drainages on or in the vicinity of the project site appear to be tidally influenced. The majority of these systems convey surface runoff from surrounding industrial and agricultural areas to downstream reaches. The unnamed stream drains to the northwest and ultimately discharges into Tampa Bay. The highest spring tides and/or storm surges may result in tidal waters being flushed further inland on the Tampa Electric property through the unnamed stream channel. Giant leather fern is a euryhaline species (i.e., ability to tolerate a wide range of degrees of salinity) that can grow in saltwater, brackish water and freshwater. The presence of scattered giant leather ferns in the stream channel could suggest that the local hydrology ranges from fresh water under normal circumstances to an oligohaline condition (slightly brackish) during severe storm/high spring tide events.

Portions of the ditches located southwest of the project site are planned to be crossed by a paved road for access from Wyandotte Road to the project site. Culverts will be installed at each flow-through ditch crossing to maintain flow (6 culvert crossings). A few of the ditches located within the footprint of the project site are also planned to be filled. However, these ditches are dead end systems and do not need to be relocated to maintain flow (i.e., S1, 2, and 11). An access road ditch crossing at S4 and another ditch crossing at S12 along the southern edge of the railroad track extension are also going to be filled without installation of a culvert because they are located at a dead end. Another deadend ditch (i.e., D2) is also located a little further north along the railroad track spur that will need to be filled. This small ditch that is a junction of two upland-cut ditches that were probably dug to facilitate drainage through the remnant forest after clearing and preparation of farm fields. The ditch is heavily shaded and has sparse to no vegetation, except near the existing rail tracks where light can reach the ground. Near the railroad line, there is a colony of string-lilies (*Crinum americanum*) and a few giant leather ferns in the ditch. The abutting landscape is relict maritime hammock with considerable encroachment of Brazilian pepper trees.

Originally, the northern portion of the eastern canal and the channelized stream at the northeastern corner of the project site were going to be filled. However, the project configuration was redesigned to avoid these systems resulting in a 0.08-acre reduction in jurisdictional impacts. Currently, 0.04 acre of the 0.06-acre unnamed stream to the north of the project site is scheduled to be crossed by an access road and a culvert will be installed (i.e., the seventh culvert crossing). The access road will continue to the northeast to connect the project site to National Gypsum located offsite. At the National Gypsum site, another existing ditch (i.e., D1) will be crossed that already has an existing box culvert (i.e., the eighth culvert crossing). The ditch at the National Gypsum site is a deep and wide channel originally dug to control water when the surrounding land was used for the cultivation of row crops and/or nursery plants. Row crop fields and ditches are evident in aerial photographs taken in the 1930s, 1950s, and 1960s. These ditches are still in use to facilitate drainage for the industries that are now in place.

The ditch is over 20-ft wide at the bottom and 30+ ft wide at the top of bank. It is crossed by a wide box culvert bridge for access to a cell phone tower. It is wet to flowing most of the year and supports a community of southern cattail, Mexican primrosewillow (*Ludwigia octovalvis*), southern shield fern (*Thelyteris kunthii*), peppervine (*Ampelopsis arborea*), and bog hemp (*Boehmeria cylindrica*). The surrounding land is upland with mostly Brazilian pepper cover and many nuisance species like cogon grass, white lead tree, shrub verbena (*Lantana camara*), smutgrass, caesarweed (*Urena lobata*), and bahiagrass (*Paspalum notatum*). The upland cover is generally thick and overgrown with numerous vines.

A very small (i.e., 0.03 acre) depression will be filled along the southern portion of the project site (i.e., S9). This shallow depression was dry during the site investigations and appears to be hydrologically isolated area that may have been created from the removal of fill material for local access road improvements. It is dominated by the growth of Brazilian peppers. This depression may pond after storm events, but has no true functional wetland component and was identified as FLUCFCS 534-Reservoirs less than 10 acres.

Finally, a highly disturbed freshwater marsh, identified as FLUCFCS 641/619-Freshwater Marsh/Exotic Wetland Hardwoods, occurs along the existing railroad tracks in the vicinity of the project site to the northwest. The grassy marsh is dominated by knotgrass (*Paspalum distichum*) with a small area of open water and minor populations of string-lily, giant leather fern, and southern cattail. Historic aerial photographs indicate that the area once had a wetland shrub or tree component, but this part of the system has been taken over by Brazilian peppers to the exclusion of almost all other species. The altering of the land first for farming and currently for industry leaves this wetland and its abutting forest as relict habitats. Extending the railroad track on the property to include a connection to the project site will result in 0.16 acre of fill in the freshwater marsh. The existing culvert that provides drainage from the marsh to the west across the existing railroad tracks will be extended to accommodate the additional railroad track (i.e., the ninth culvert crossing).

The total impact from filling in wetlands/surface waters on the project site is 0.97 acre. All of the surface water features identified are considered to be under the jurisdiction of the FDEP and USACE.

4.0 CONSTRUCTION PLANS, SCHEDULE AND TECHNIQUES

The limits of construction for the proposed project will encompass 27.03 acres of land, based on a 24.2-acre project site, 2.4 acres of above-grade access roads to the west and north of the facility, and 0.43 acre of railroad track to be added to the existing loop to connect to the project site. The project site will be a new-lined storage facility utilized to manage the gypsum piles. The storage area will have a lining system consisting of a geo-synthetic clay lining and a geo-membrane, overlain by 2 ft of compacted gypsum. Once the outdoor "off spec" gypsum piles meet the specifications required by the wallboard plant, it will either be loaded into trucks using the front end loaders for delivery to the wallboard plant, or loaded into an above grade reclaim hopper using a front end loader and sent to the gypsum load out silo or the 25,000-ton storage dome.

There will be a total of 1,822 ft and 447 ft of access road with a proposed width of approximately 30 ft to be constructed to the west and north of the proposed relocated gypsum facility, respectively (i.e., 1.77 acres and 0.635 acre, respectively). The width of road construction will increase at certain areas where expansion is required such as at the truck scale and at ditch crossings for culvert installations (i.e., 70 to 110 ft). A width of approximately 24 ft of the aboveground access roads will be constructed of pavement over compacted aggregate and an aggregate base over compacted fill material. A railroad track will be extended from the existing rail loop system on the property to connect rail to the new gypsum handling and storage facility. The track will be extended approximately 25 ft to east of the existing tracks. A total of 25.72 acres of the land will be covered with an impervious surface, while an additional 0.54 acre will be back filled and 0.34 acre will be left intact. Out of the 27.03-acre project area, approximately 0.65 acre of jurisdictional area will be filled with an impervious surface and an additional 0.32 acre of jurisdictional area will be backfilled (i.e., a total of 0.97 acre of fill in jurisdictional areas). The following narrative provides the construction plans and techniques to be utilized for the gypsum relocation project over the November 2013 to April 2014 construction schedule.

4.1 ADMINISTRATIVE

A Pre-Construction Conference will be held at the site. Participants will include necessary personnel from the Contractor, Construction Management, and Tampa Electric. An agenda for topics of discussion will be established by Construction Management prior to issuing a Notice to Proceed (NTP) to the Contractor. Existing utilities in the vicinity of work will be located and marked prior to the Contractor receiving the NTP.

After the NTP is issued, establishment of silt fencing, temporary sediment ponds, and other erosion control devices will commence. Jurisdictional areas will be delineated in the field and buffer zones established to define construction limits.

4.2 CLEARING, GRUBBING, AND TOPSOIL REMOVAL

Trees will be cleared within the limits of the project site and along road access corridors and disposed of per Tampa Electric's direction. After clearing, grubbing will occur to remove stumps and other larger materials. Topsoil will then be stripped and stockpiled within the project limits for later use.

4.3 EARTHWORK

Earthwork will be performed using scrapers, dozers, backhoes, and other earthmoving equipment. Embankment material will be obtained from excavation areas of the site as appropriate. Prior to placement of embankment, the excavated materials will be tested for suitability as fill material use. Earth-moving operations will progress from excavation areas to embankment areas, and offsite fill materials will be imported if required. Temporary stockpiles may be established to store excess, segregated or specialized materials.

4.4 DRAINAGE

Perimeter berms will provide flood protection for the new gypsum storage facility. Stormwater will be collected and sent to recycle pond for treatment. Operation of this gypsum storage facility requires the construction of paved roads to access the project site from Wyandotte Road and to connect the site to the National Gypsum property northeast of the project area. The cross section for this access road will be designed to route runoff to a roadside swale (i.e., V-ditch) that will be sized to capture the required treatment volume for the impervious area. The swale will be designed with ditch blocks that will hold the volume in the swale so that treatment will occur. Attenuation is not proposed for these roadway drainage systems due to the over attenuation that will be a result of the reuse of the captured rainfall within the proposed gypsum storage area berms. Drainage at access road crossings of existing ditches will be via culverts where flow paths are directed beneath the access roads. Culverts will be constructed with reinforced concrete pipe (RCP). Bedding and backfill material will be delivered by truck to the site and placed using backhoes and hand-operated compaction equipment. All drainages will be routed to the surrounding canals that drain west to Tampa Bay. Culvert design was based on the capacity of the existing ditch/canal system located throughout the site. All of the drainage canals drain through a 6-ft by 8-ft concrete box culvert that crosses Wyandotte Road. Survey maps of the site indicate that the existing ditches/canals have several corrugated metal pipe (CMP) culverts in place. These existing culverts limit the flow capacity within the existing canal banks and were analyzed to determine peak flow capacity, based on a no tail water condition.

It was determined that the proposed access road crossings would impact flow through conveyances at seven different locations throughout the project site. Conveyance would need to be maintained in these drainages following the completion of construction by the installation of 24-inch or 36-inch culverts. The new culverts were sized to provide hydraulic capacity equivalent or greater than the hydraulic capacity of the existing culverts. Thus, the development of the gypsum relocation project site and improvements and additions to access will not change existing drainage patterns or reduce the drainage capacity to Tampa Bay. The culverts to be installed should not require dredging. However, some minor dredging could potentially occur along the length of the culvert only as necessary to place the sections level across the channel cross-section.

The locations for the proposed culvert crossings are depicted on Sheets 5-1 through 5-9. The detail sheets for the proposed seven culvert locations are provided on Figures 8 through 14.

Finally, please be aware the Tampa Electric will be submitting a Notice Of Intent (NOI) to the FDEP for using the *Generic Permit for Stormwater Discharge from Large and Small Construction Activities* (Chapter 62-621.300[4][a], F.A.C.). Any construction activity that disturbs greater than or equal to 1 acre and discharges storm waters to waters of the State requires the preparation of a stormwater pollution prevention plan (SWPPP). The SWPPP will be developed before submittal of the NOI and in effect 48 hours after submittal of the NOI. The SWPPP will be updated and amended as needed and kept at the Big Bend Power Station for review upon request.

5.0 OPERATION AND MAINTENANCE

5.1 DRAINAGE FACILITIES

Ditches will be checked as required for erosion, scour, sediment deposits, and other impediments to ensure proper drainage. If ditches require cleaning, this will be performed with small equipment such as bobcats and pickups. Culverts will also be cleaned of sediment as needed. This will be accomplished by vacuum or water-jet trucks.

5.2 TEMPORARY EROSION CONTROL FACILITIES

Silt fencing will be inspected after rainfalls greater than 0.5 inch, or at a minimum frequency of once per week during the construction phase. Ditch checks will be inspected at the same frequency as silt fencing. Sediment deposits greater than 4-inches deep will be removed. Broken ditch checks or torn silt fencing will be replaced as needed until final surface stabilization is achieved for the site. Sediment tracking prevention devices such as rock-surfaced construction entrances will be inspected daily for sediment depth, and replaced if needed to prevent sediment from leaving the site. Sediment deposits greater than 4-inch deep will be removed from temporary sediment ponds.

6.0 ACTIVITIES PROPOSED IN SURFACE WATERS AND FLOODPLAINS

6.1 SURFACE WATERS

All jurisdictional areas identified within the project area consist of man-made drainage ditches and a canal, a channelized natural stream, and a hydrologically isolated depression, except for a highly disturbed freshwater marsh. The previously referenced surface water impacts are considered to be the minimum required to assure safe and efficient construction and operation of the proposed gypsum pile and access roads. In some cases, a small amount of fill may need to be excavated in order to allow for the placement of suitable materials at crossing locations. Should such activity be required, all materials will be disposed of offsite. Permanent fill will be associated with the construction of the gypsum storage facility and access roads within other surface waters. Construction of culverts across surface waters will utilize control measures to prevent erosion during construction. There are no impacts to local drainage patterns anticipated as a result of the proposed action. Representative plan view and cross-sections of the proposed facilities identifying the invert elevations, existing and proposed grades, and jurisdictional limits are provided in Sheets 4, 5, and 5-1 through 5-9 and Figures 8 through 14. Approximately 0.97 acre of manmade upland cut ditches, a very small, hydrologically isolated depression, a highly disturbed natural stream, and a portion of a highly disturbed freshwater marsh will be filled as indicated on the plan view drawings. Along access road crossings of flow-through conveyances, 24-inch or 36-inch RCP culverts will be installed.

Where proposed activities are adjacent to jurisdictional areas, appropriate sediment control methods will be used as required. Sediment controls may include the installation of staked silt fences with hay bales along uplands and shallow wetland edges. Silt and/or turbidity screens will also be placed downstream of construction areas, as required.

During periods of high water levels, temporary mats may be used in jurisdictional areas to provide access for construction. Upon completion of construction activity, matting will be removed and impacted areas restored to their original condition.

6.2 FLOODPLAINS

Based on the results of the modified Hillsborough County – Miscellaneous Coastal Streams model (see Appendix D of Appendix B to this application), floodplain compensation will not be required for this project. According to the model results, at junction 824120 (i.e., the confluence of the drainages at the northeast corner of the project area) the 100-year flood stage reaches an elevation of 2.04-ft NAVD88. This stage elevation is adequately contained within the banks of the streams surrounding the project area. All existing elevations within the project area are above the flood stage elevation thus no adverse impacts to the floodplain are created by the proposed project.

In addition, the project site is not located within a 100-year riverine floodplain. Typically, development within the 100-year riverine floodplain must be compensated by creation of storage for an equal or greater volume elsewhere within the riverine 100-year floodplain. Areas solely within a tidally-produced 100-year floodplain or the riverine 100-year floodplain immediately adjacent to a tidally-produced 100-year floodplain shall not be subject to this level of service performance standard. The project is not located within the flood plain of a lake, stream or other non-tidal water course. The project site is situated within Flood Zone AE, a 100-year flood zone designated by the Federal Emergency Management Agency (FEMA). Flood Zone AE is subject to flooding by the base or 1 percent chance flood and considered to be a high risk area for flooding. However, the flood zone area is coastal and not riverine. The coastal flood area is landward of the shore line, but is typically associated with tidal inundation during storm events.

7.0 MITIGATION PLAN

As stated previously, Tampa Electric proposes to relocate a gypsum storage facility and improve associated access roads across the highly disturbed drainages located at the Big Bend Power Station property (i.e., a 0.97-acre surface water fill impact). Tampa Electric will also need to remove trees and woody under story vegetation. It was determined that only 0.20 acre of the 0.97 acre of jurisdictional surface waters consist of a native, albeit highly disturbed, stream and a highly disturbed freshwater marsh. The remaining 0.77 acre consists of upland cut, man-made surface water runoff ditches and a small depression. Thus, there were 0.04 acre of native stream impacts, 0.74 acre of man-made, upland cut surface water impacts, 0.03 acre of small depression impacts, and 0.16 acre of highly disturbed freshwater marsh impacts. Only the 0.20 acre of true natural watercourse and freshwater marsh impacts was considered for mitigation. A wetland impact summary is provided in Table 1 of Section 2 of this ERP application.

Section 373.4135, Florida Statutes (FS) states that adverse wetland impacts may be offset by the creation, maintenance, and use of mitigation banks. Currently, there are permitted mitigation banks in Florida providing freshwater and/or saltwater impact mitigation. These banks provide replacement functions and values, expressed as credits, for permitted wetland impacts within each bank's service area. The mitigation bank service area generally reflects the drainage or watershed basin where the bank is located. If a project site is located within the service area of a permitted mitigation bank, bank credits may be purchased from the bank to compensate for wetland impacts. ECT determined that there is currently only one permitted mitigation bank with a service area that includes the project site: Tampa Bay Mitigation Bank (TBMB). The TBMB is located in Ruskin, Florida. The old Caloosa Shell pits at the mitigation bank site will be converted to freshwater marsh and mangrove swamp connected by a creek to Cockroach Bay. Currently, oligohaline and freshwater wetland and palustrine open water and emergent wetland mitigation credits are now available from the TBMB for the FDEP and USACE, respectively.

The Uniform Mitigation Assessment Method (UMAM) was developed by various Florida state regulatory agencies, with input from local government and the USACE, Jacksonville District. On February 2, 2004, UMAM went into effect at the state level, and those Florida state and local governments responsible for environmental regulation were required to begin utilizing the methodology (Chapter 62-345, F.A.C.). Prior to its implementation at the federal level, the USACE conducted a study of the method and recommended UMAM be used for federal wetland regulatory purposes starting August 1, 2005. Implementation of UMAM by the USACE included a few changes from the state rule. Specifically, the USACE continues to use the Temporal Lag Table - USACE 3 percent discount rate, rather than the state's time lag table, based on a 7 percent rate. Also, the USACE has more restrictions compared to the state in the amount of wetland and upland preservation credit given. The method is a standardized procedure for assessing the functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, the amount of mitigation necessary to offset that loss, and to also award and deduct mitigation bank credits.

However, to calculate how many credits are needed from the TBMB, the applicant must multiply the acres of wetland impact by the impact Estuarine Wetland Rapid Assessment Procedure (E-WRAP) analysis score (i.e., e.g., 2 acres of wetland impact with a WRAP score of 0.6 = 2 x 0.6 = 1.2 credits needed). Thus, in this case, the E-WRAP analyses will replace the use of the UMAM to determine the amount of mitigation required to offset adverse impacts to wetlands and other surface waters.

The E-WRAP is a matrix developed by the Mitigation Bank Review Team to assist in the regulatory evaluation of estuarine mitigation bank sites that are created, enhanced, preserved, or restored in order to increase wetland functional lift to mitigate for future wetland losses authorized through the state and federal permit process in Florida. This standardized matrix can also be used to provide an accurate and consistent evaluation of wetland sites. The E-WRAP was developed from the Modified Wetland Rapid Assessment Procedure (M-WRAP), which assesses freshwater functions specifically for use on mitigation bank projects. The rating index can be used to evaluate the current wetland condition. The E-WRAP is a numerical ranking system that can be used to rank individual ecological and anthropogenic factors or variables. The E-WRAP assesses six variables which can be assigned a number between 0 and 3.0. A score of 3.0 is considered to be the best a system can function, while a score of 0 is a highly disturbed system exhibiting negligible attributes. The six scores are then totaled and divided by the sum of the total maximum score for all variables. The final E-WRAP score is expressed as a number between 0 and 1.0.

The completed UMAM and E-WRAP forms for the jurisdictional impact are provided in Appendix E. The calculation is provided below:

JURISDICTIONAL ID	FLUCFCS	IMPACT ACREAGES		E-WRAP SCORES*		MITIGATION CREDITS
V2	511	0.04	x	0.33	=	0.01
W!	641/619	0.16	x	0.36	=	0.06
TOTAL		0.20				0.07

*E-WRAP and UMAM impact scores match (see Appendix E).

The calculation assumes a complete loss of wetland function through fill activities however the hydrology of the stream channel will be maintained through the installation of a culvert. Even though the hydrological function of the system is not being lost, Tampa Electric has assumed a worst case impact scenario for the mitigation determination. Therefore, based upon the analyses provided, Tampa Electric will assume that purchasing 0.07 of oligohaline or freshwater wetland mitigation credits for FDEP and palustrine open water or emergent wetland credits for USACE from the TBMB will be more than sufficient to ameliorate impacts associated with the proposed project construction (see Table 3 of Section 2 of this ERP application). The credits will be purchased from the TBMB by Tampa Electric after Tampa Electric receives approval from the FDEP and a permit application from the USACE. The mitigation credits will be debited based upon the schedules established for the TBMB.

8.0 SUMMARY

The Project is in the public interest in that it will ultimately provide more efficient electric service and reliability to the public. The Project will unavoidably result in 0.97 acre of permanent fill in a natural, but highly altered stream (i.e., 0.04 acre), a highly disturbed freshwater marsh (i.e., 0.16 acre), and man-made, upland cut ditches and a small depression (i.e., 0.77 acre). The natural stream and wetland impacts are proposed to be mitigated through purchase of mitigation credits from a permitted mitigation bank. In addition, it is not anticipated that any threatened or endangered species will be affected by project construction activities.

FIGURES

Q:\projects\TECO\100754\0300\Revised092012\Location_Map.mxd By: jstebnisky Date: 9/21/2012

FIGURE 1.
LOCATION MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: ESRI Street Map Data, 2011; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Q:\projects\TECO\100754\0300\Revised092012\Quad_Map.mxd By: jstebnisky Date: 9/21/2012

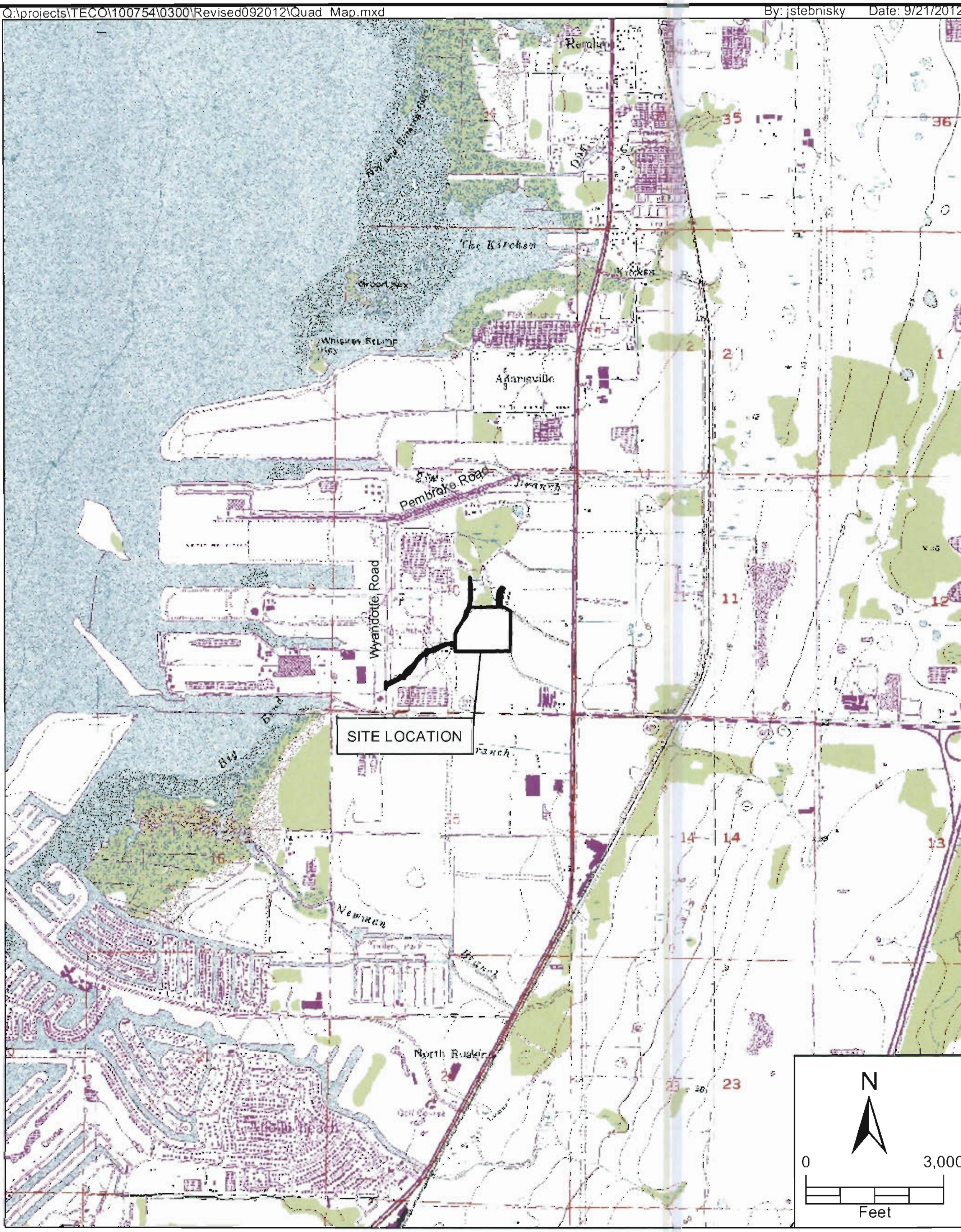
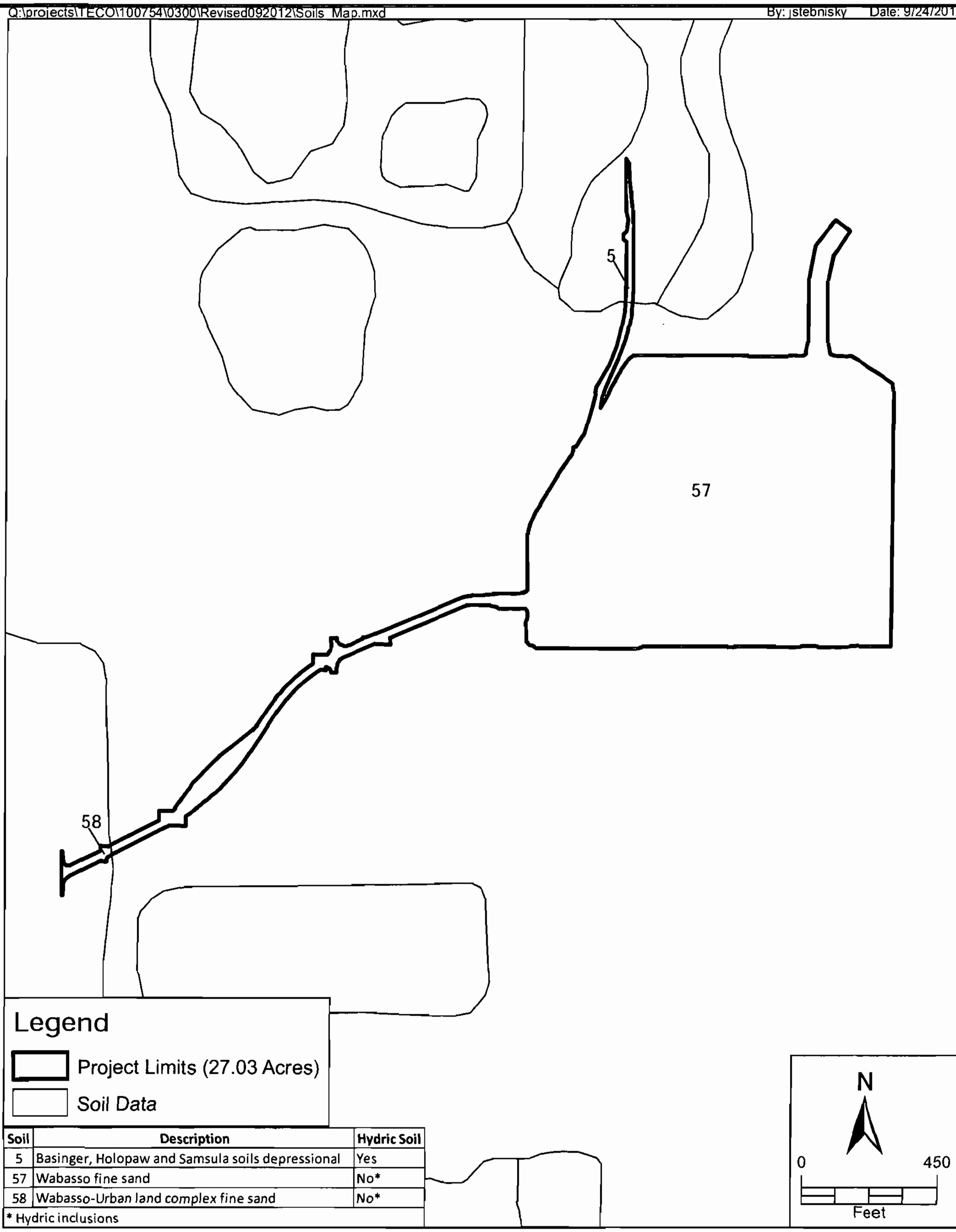


FIGURE 2.
USGS TOPOGRAPHIC QUADRANGLE MAP (T31S, R19E, S10)
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Labins.org Quadrangle Map of Gibsonton, FL., 1987; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Q:\projects\TECO\100754\0300\Revised092012\Soils_Map.mxd By: jstebnisky Date: 9/24/2012



Soil	Description	Hydric Soil
5	Basinger, Holopaw and Samsula soils depressional	Yes
57	Wabasso fine sand	No*
58	Wabasso-Urban land complex fine sand	No*

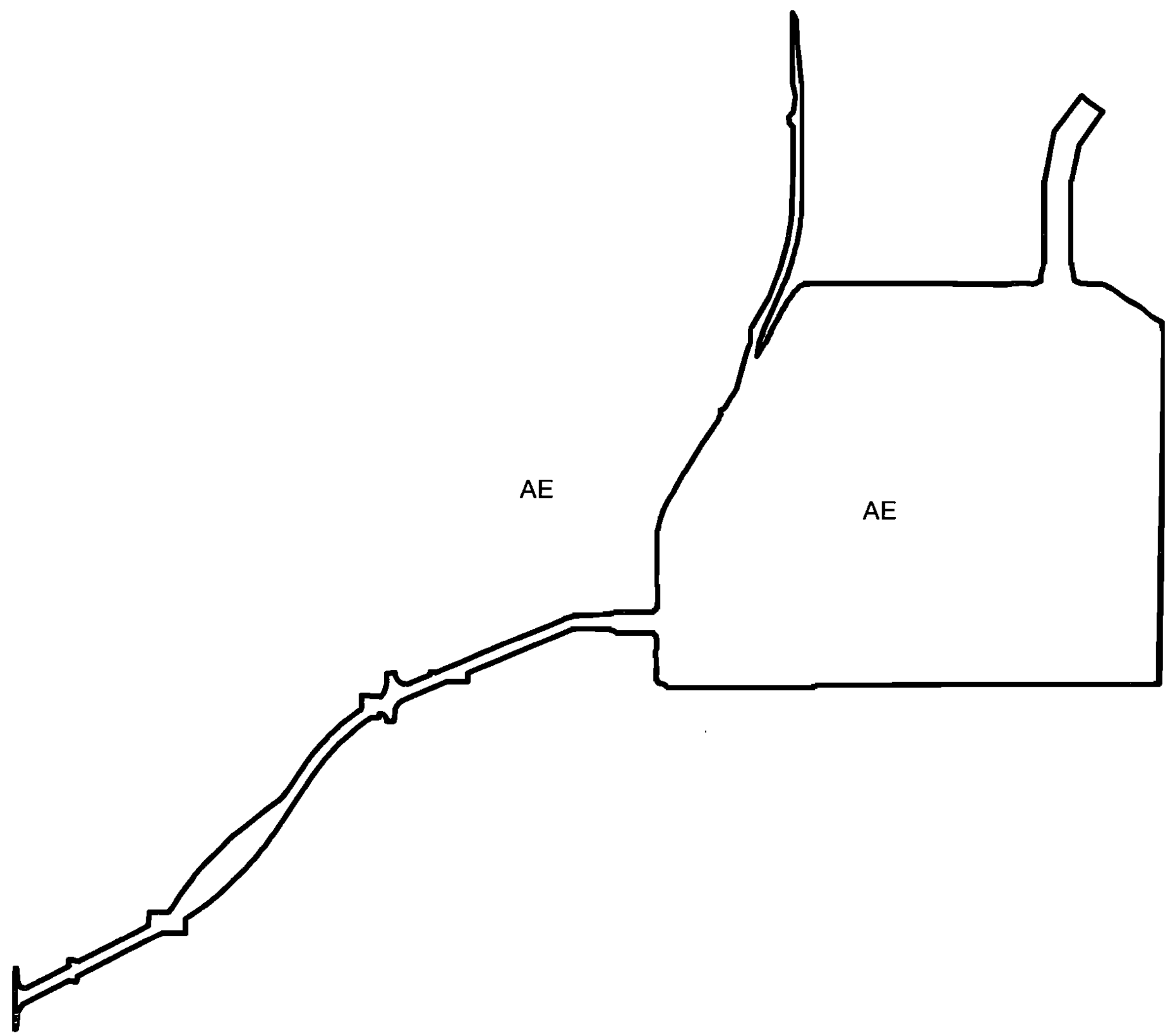
* Hydric inclusions

FIGURE 3.
SOILS MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Hydric Soils of Florida, 2000; Soil Survey Geographic Database (SSURGO), 2002; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Path: Q:\projects\TECO\100754\0300\Revised092012\FLPL_Map.mxd User: jstebnisky Date: 9/21/2012



Legend

Project Limits (27.03 Acres)

Flood Zone

AE - An area inundated by 100-year flooding, for which BFEs have been determined (FEMA Storm Surge Flood Elevation=11.0 ft NGVD).

N

0 450

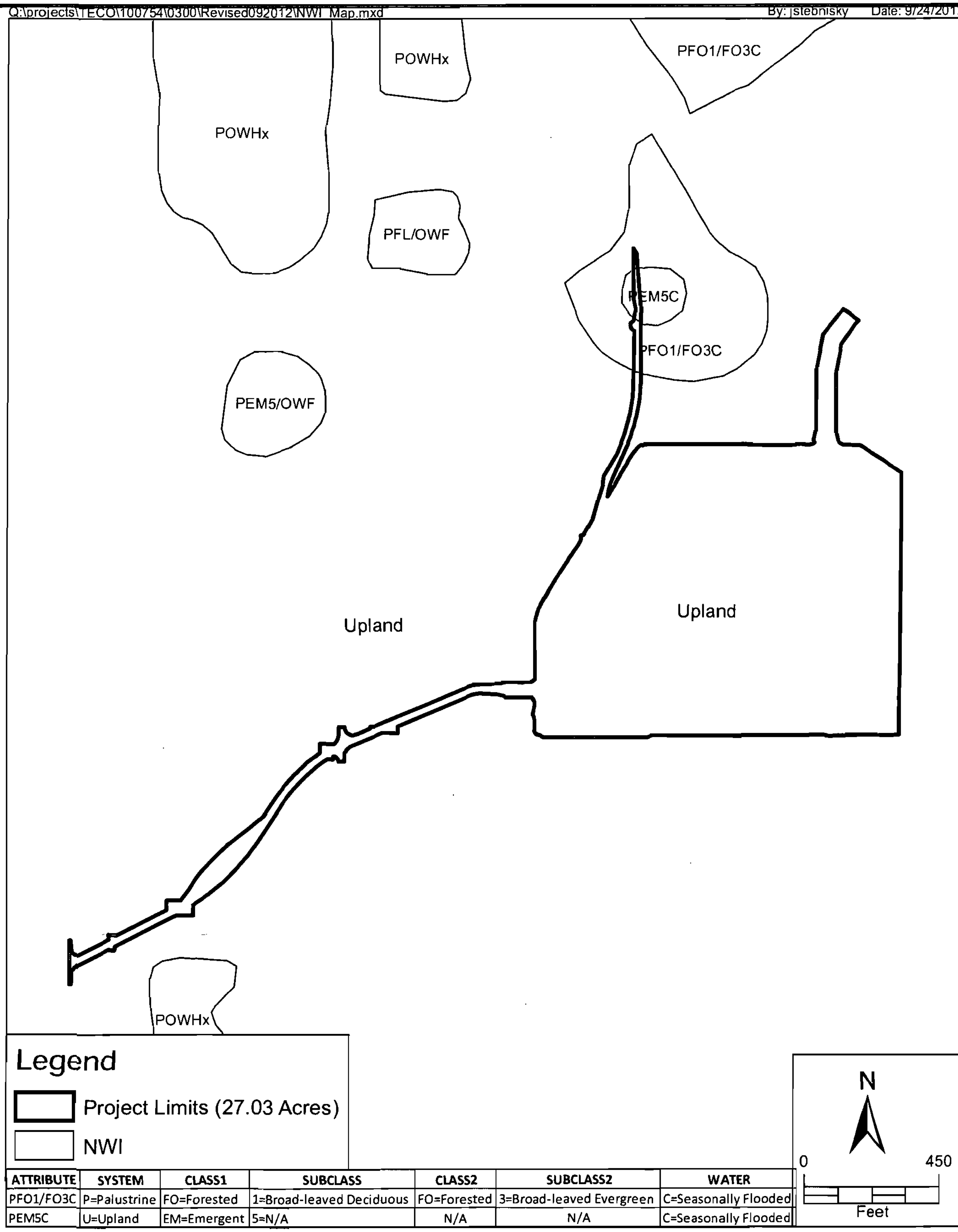
Feet

FIGURE 4.
FLOODPLAIN MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Hillsborough County FEMA, 2008; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Q:\projects\TECO\100754\0300\Revised092012\NWI_Map.mxd By: jstebnisky Date: 9/24/2012



ATTRIBUTE	SYSTEM	CLASS1	SUBCLASS	CLASS2	SUBCLASS2	WATER
PFO1/FO3C	P=Palustrine	FO=Forested	1=Broad-leaved Deciduous	FO=Forested	3=Broad-leaved Evergreen	C=Seasonally Flooded
PEM5C	U=Upland	EM=Emergent	5=N/A	N/A	N/A	C=Seasonally Flooded

FIGURE 5.
NATIONAL WETLANDS INVENTORY MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: U.S. Fish & Wildlife Services, 2006; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Path: Q:\projects\TECO\100754\0300\Revised092012\Aerial.mxd User: jstebnisky Date: 9/21/2012

FIGURE 6.
AERIAL PHOTOGRAPH MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: SWFWMD Aerial Photograph, 2011; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Q:\projects\TECO\100754\0300\Revised092012\fig3-1_Land_Use.mxd

By: jstebnisky Date: 9/27/2012

Florida Land Use, Cover, Forms and Classification System (FDOT, 1999)		Size (Acres)
422/740	Brazilian Peppers/Disturbed Land	26.03
511	Natural Streams	0.06
512	Upland Cut Ditches	0.75
534	Reservoirs less than 10 acres	0.03
641/619	Freshwater Marsh/Exotic Wetland Hardwoods	0.16
Total		27.03

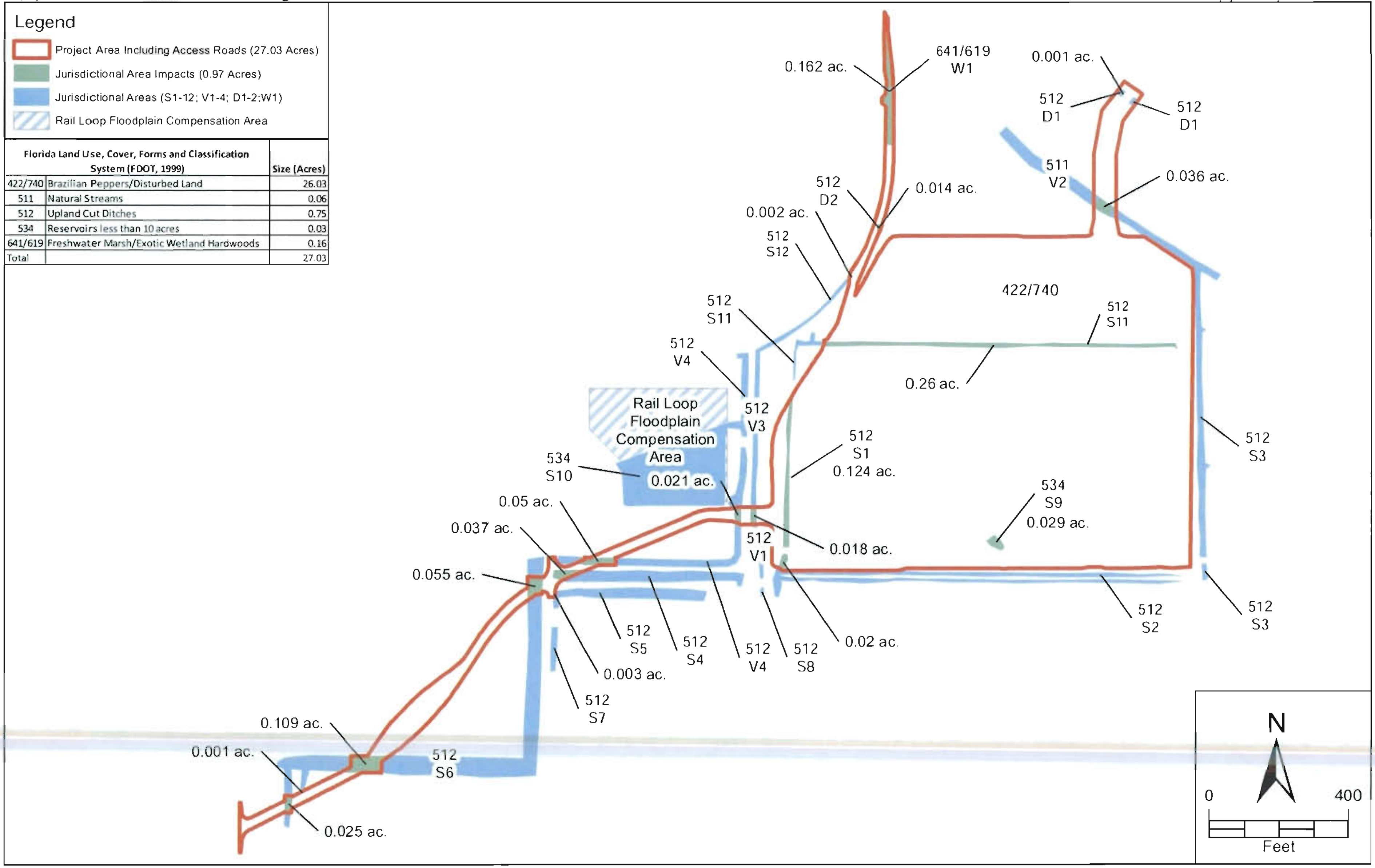
FIGURE 7.
JURISDICTIONAL/LAND USE AND COVER MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: SWFWMD Aerial Photograph, 2011; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

Q:\projects\TECO\100754\0300\Revised092012\Land_Use.mxd

By: jstebnisky Date: 9/25/2012

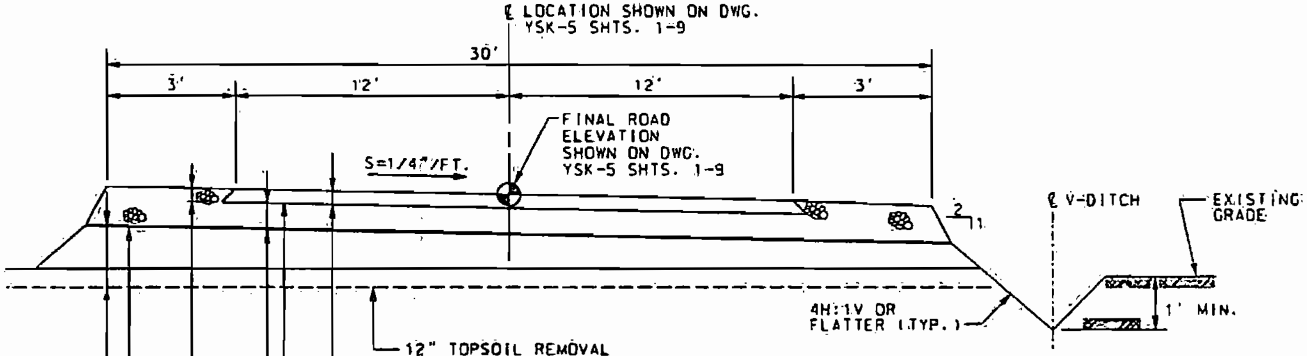


Florida Land Use, Cover, Forms and Classification System (FDOT, 1999)		Size (Acres)
422/740	Brazilian Peppers/Disturbed Land	26.03
511	Natural Streams	0.06
512	Upland Cut Ditches	0.75
534	Reservoirs less than 10 acres	0.03
641/619	Freshwater Marsh/Exotic Wetland Hardwoods	0.16
Total		27.03

FIGURE 7.
JURISDICTIONAL/LAND USE AND COVER MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC



12" TOPSOIL REMOVAL

3" THICK SUPERPAVE TYPE SP-12.5 PER FDOT SECTION 334. TO BE CONSTRUCTED IN 2 - 1½" THICK LIFTS.

PRIME COAT FOR AGGREGATE BASE - 0.25 TO 0.50 GAL/SQ.YD., MC-70, RT-1 OR RT-2

18" THICK - AGGREGATE BASE COURSE - GRADED AGGREGATE BASE PER FDOT SECTION 204 REQUIREMENTS.

AGGREGATE SHOULDER COURSE - SAME MATERIAL AS AGGREGATE BASE COURSE. PLACE IN 6" LIFTS AND COMPACT TO 95% PER ASTM D1557 REQUIREMENTS.

8 OZ/SY GEOTEXTILE NON-WOVEN SOIL SEPARATOR.

SUBGRADE PREPARATION - IN FILL AREAS COMPACT FILL TO 95% ASTM D1557. IN CUT OR PARTIAL FILL AREAS, INSITU SOILS NOT MEETING THE REQUIRED DENSITY SHALL BE COMPACTED TO THE REQUIRED DENSITY EITHER BY COMPACTING FROM THE SURFACE OR BY SCARIFYING AND RECOMPACTING AS REQUIRED.

TYPICAL SECTION
HAUL ROAD

SECTION YSK-4-01

N.T.S.

ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12677-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: B2741-YSK-4.DGN
PREPARED BY: C. CHOW/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

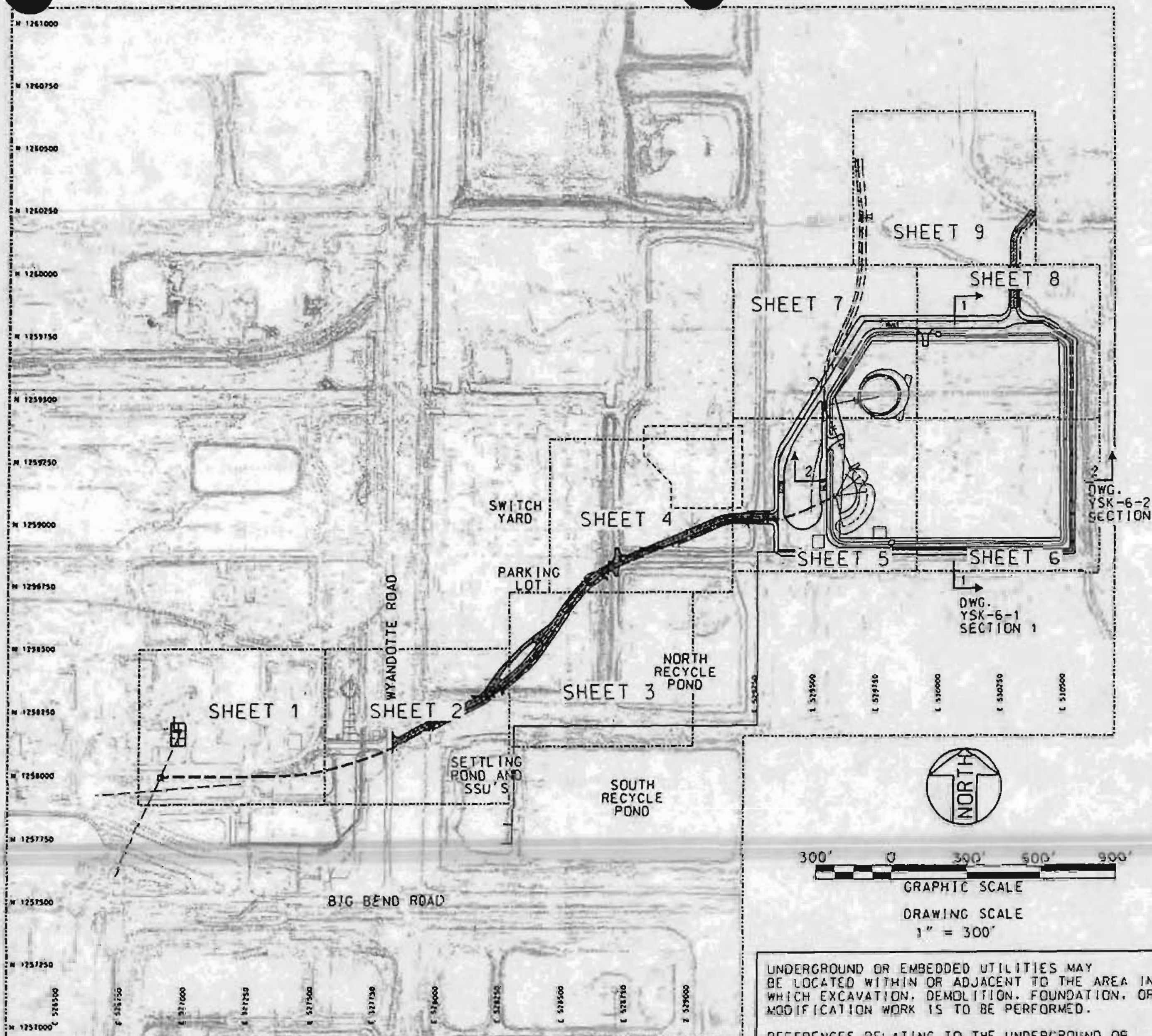
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
HAUL ROAD SECTIONS AND DETAILS

DRAWING NUMBER	REVISION
B2741-YSK-4	A

SHEET 1 OF 1



UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

ISSUED FOR AGENCY REVIEW

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12877-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL:
THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006939

CAD FILE NAME: B2741-YSK-5.DGN
PREPARED BY: C. SVENSON/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

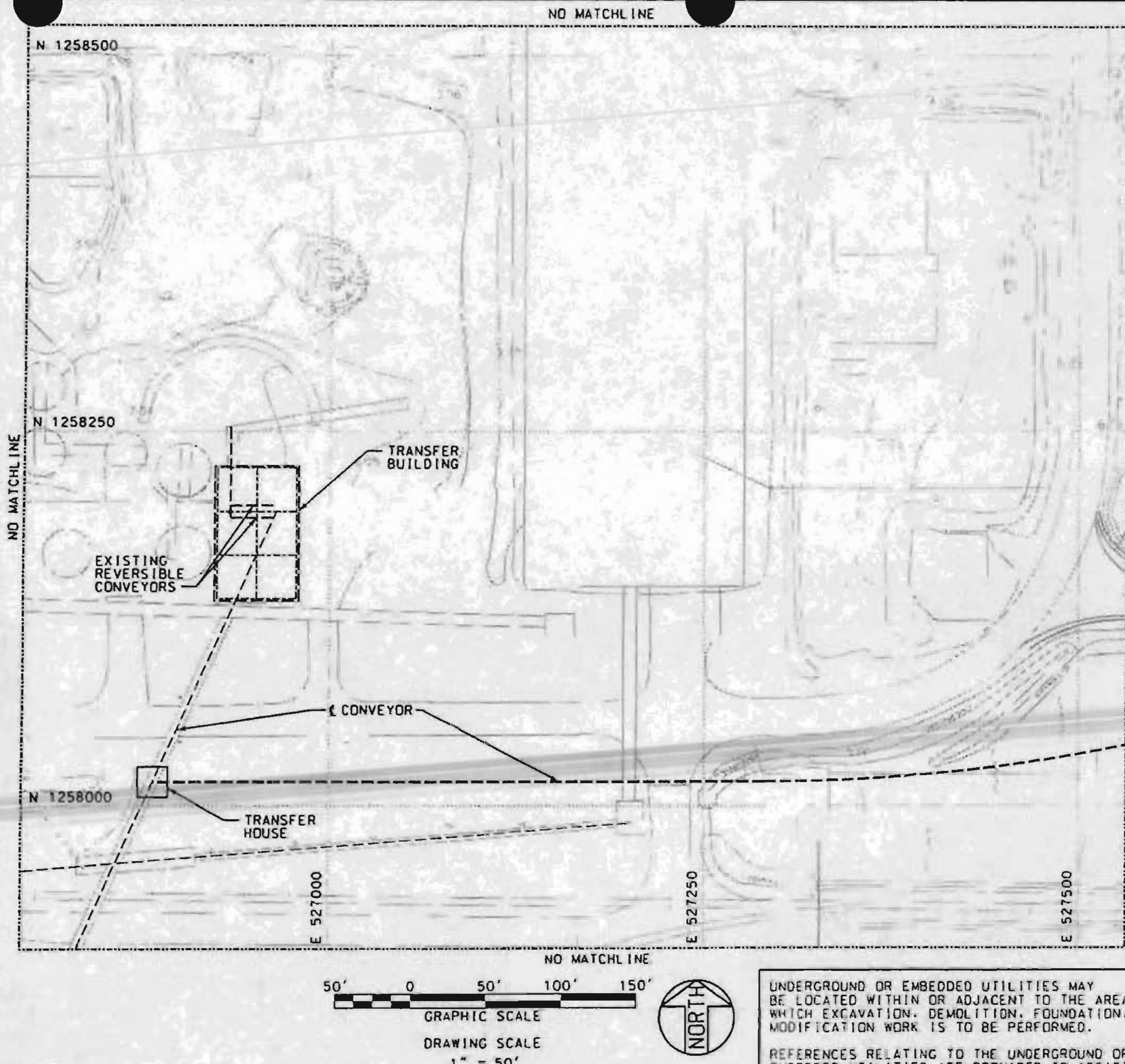
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-5	A

SHEET 1 OF 1



ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION. DEMOLITION. FOUNDATION. OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMA[TION]

NO.	DESCRIPT[ION]

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE. INCLUDING CONTRACTOR'S/ INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW

SPECIFICATION: NONE

PROJECT NO.: 12877-03[illegible]

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: B2741-YSK-5-1.DGN

PREPARED BY: C. SVENSON/A. SLACH

REVIEWED BY: J. PERRY

APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY. IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO. ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

PROJECT

GYPSUM HANDLING SYSTEM
UNITS 1. 2. 3 & 4

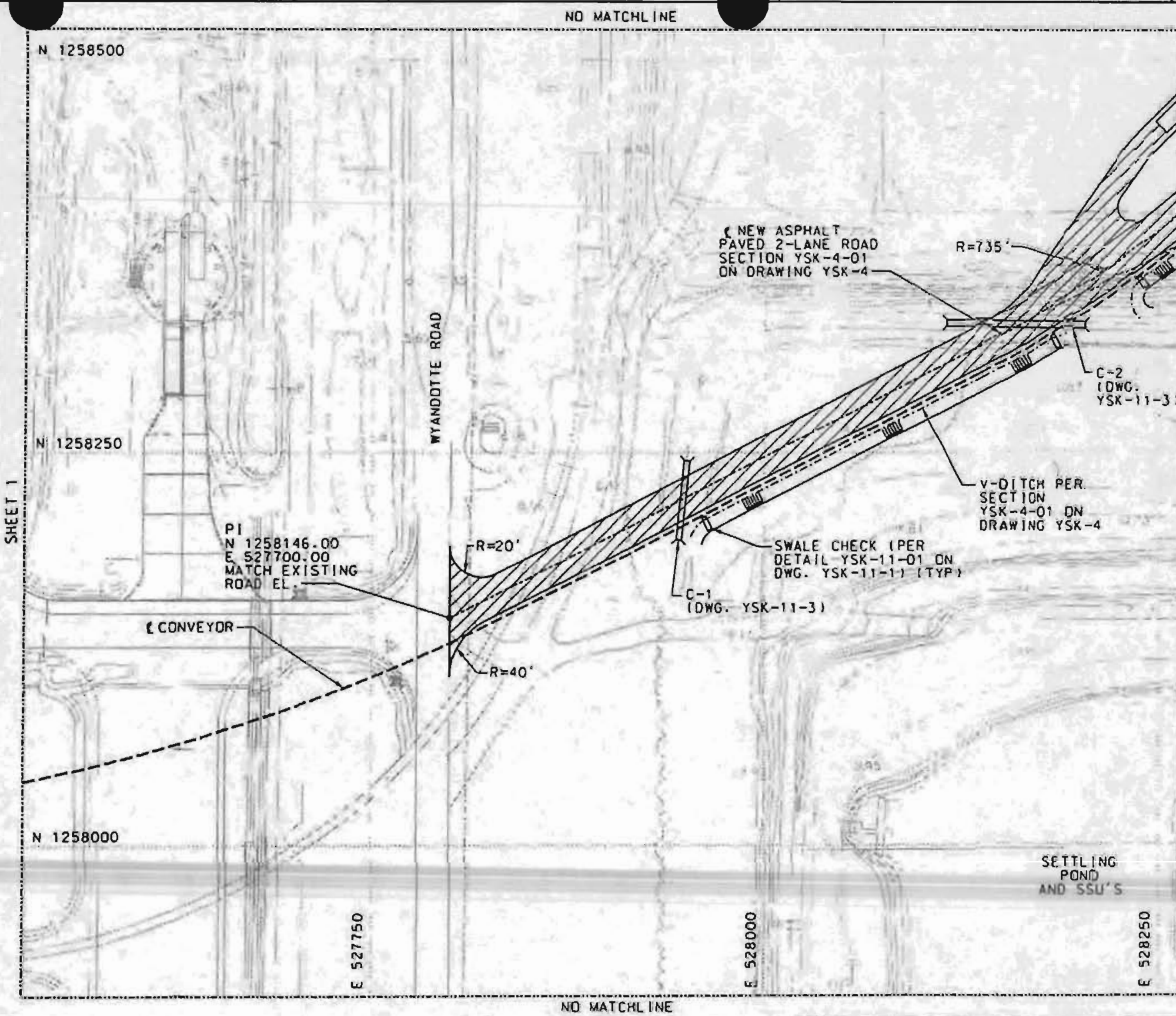
BIG BEND POWER STATION
TAMPA ELECTRIC CO

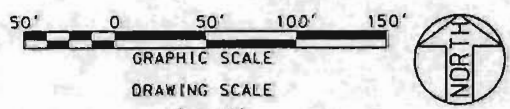
DRAWING TITLE

FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-5-1	A

SHEET 1 OF 9





DRAWING SCALE
1" = 50'

ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12077-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: B2741-YSK-5-2.DGN
PREPARED BY: C. SVENSON/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy
SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

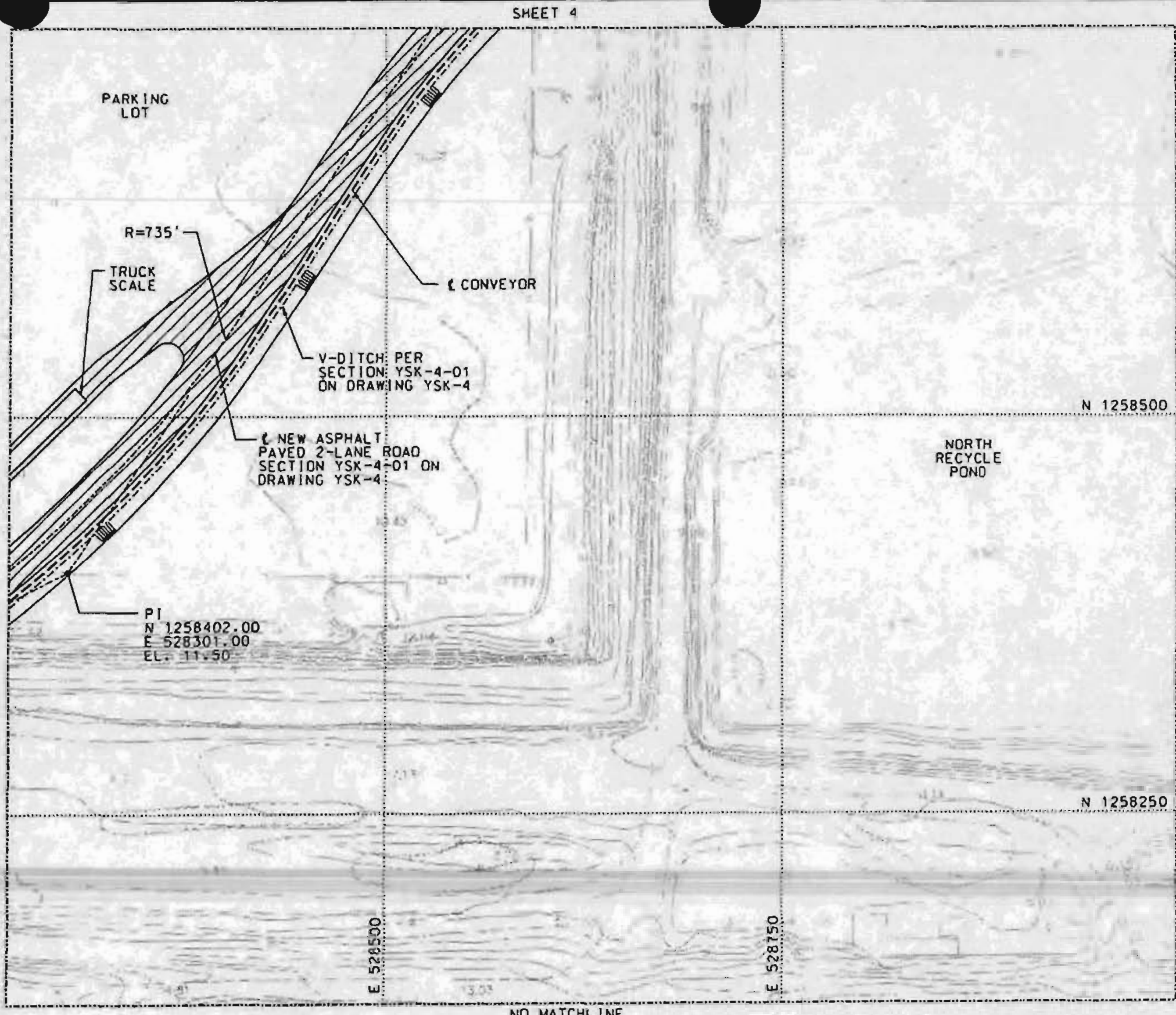
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-5-2	A

SHEET 2 OF 9



50' 0 50' 100' 150'

GRAPHIC SCALE

DRAWING SCALE
1" = 50'

NORTH

ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12877-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL:
THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: B2741-YSK-5-3.DGN
PREPARED BY: C. SVENSON/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY LLC
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

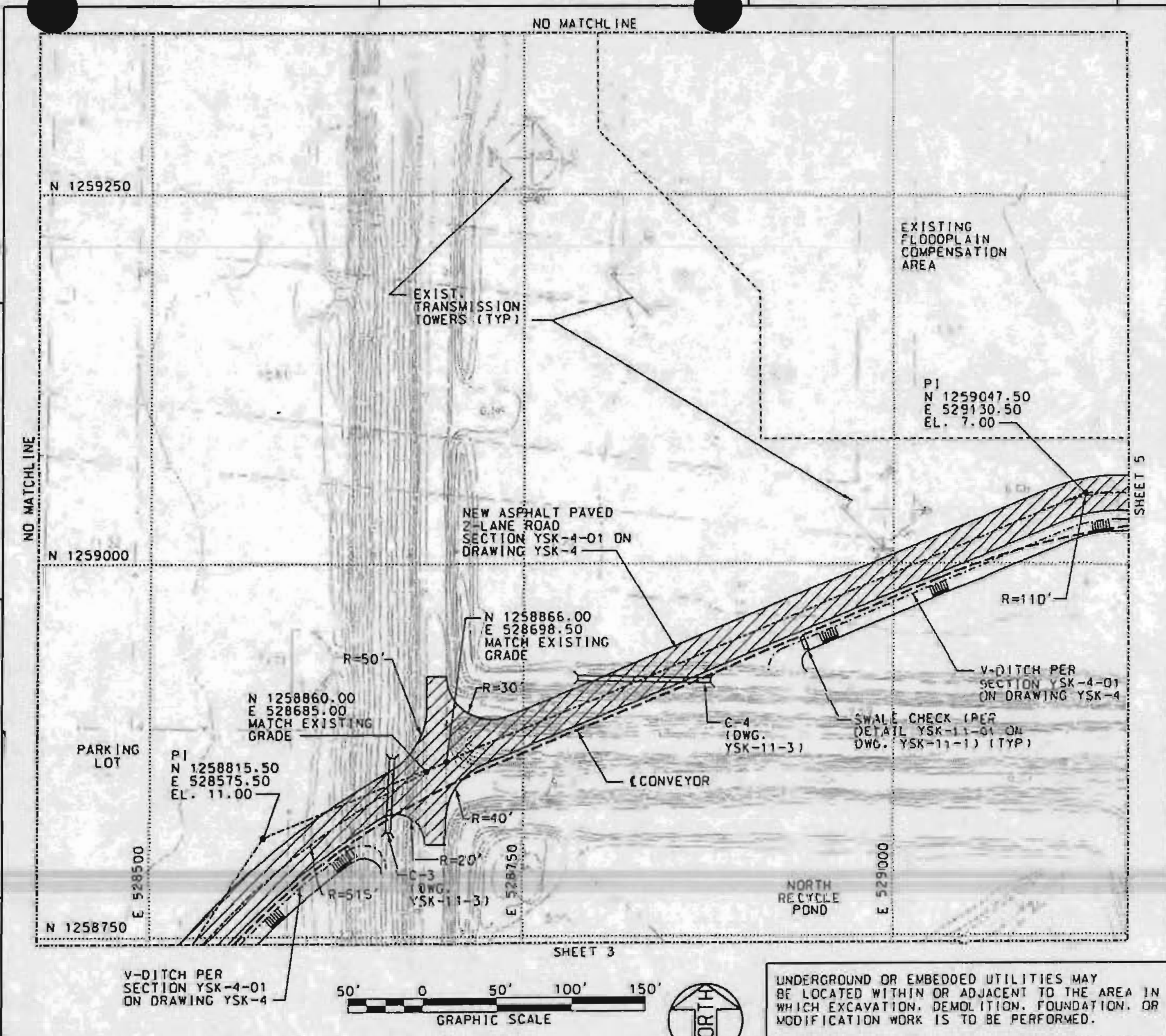
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-5-3	A

SHEET 3 OF 9



ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION	
NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK

RELEASE INFORMATION		
REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12877-031

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

CJ Nelson 3/29/2012
CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: 82741-YSK-5-4.DGN
PREPARED BY: C. SVENSON/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy
SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

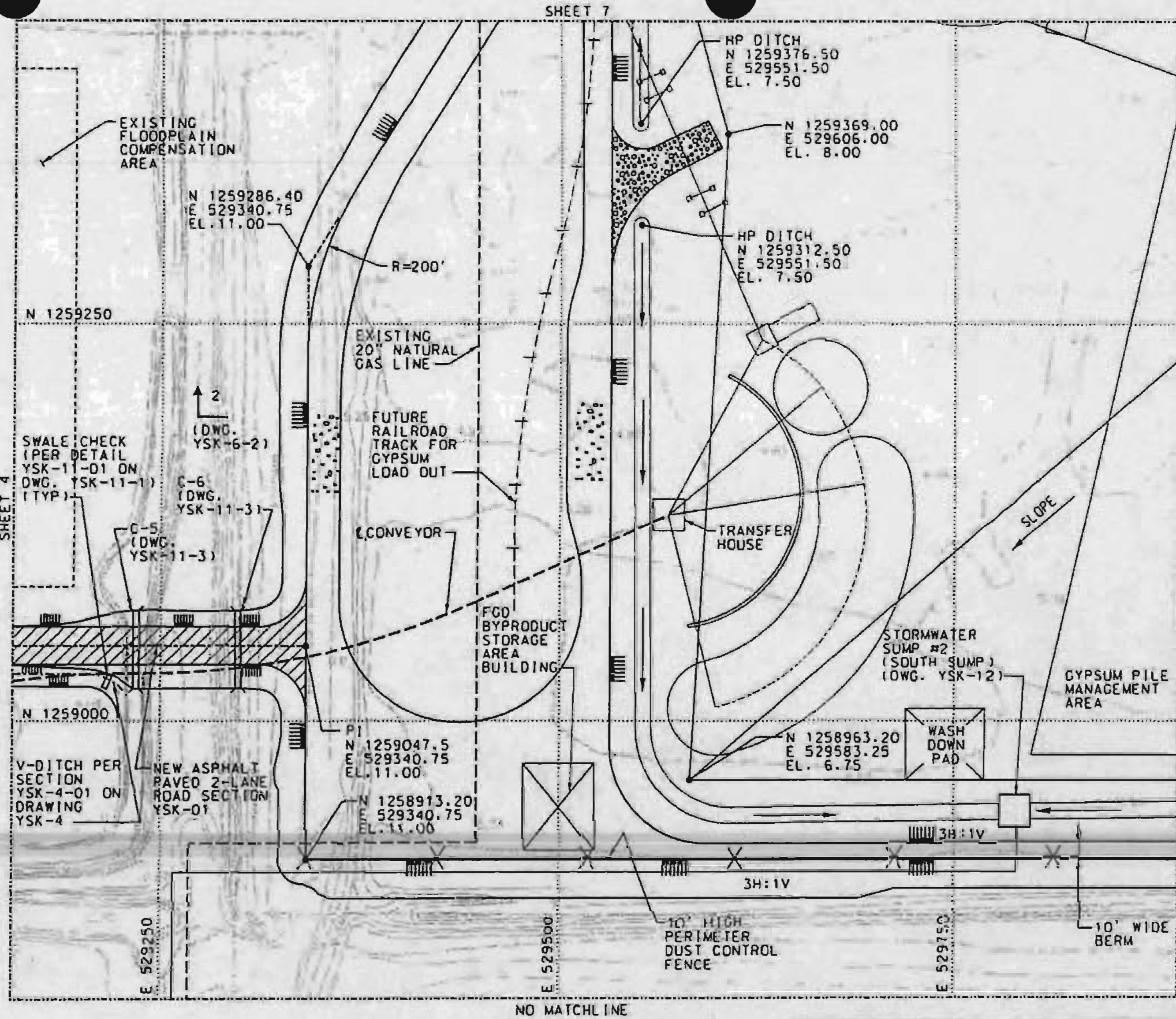
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-5-4	A

SHEET 4 OF 9



50' 0 50' 100' 150'

GRAPHIC SCALE

DRAWING SCALE

1" = 50'

NORTH

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

ISSUED FOR AGENCY REVIEW

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW

SPECIFICATION: NONE

PROJECT NO.: 12871-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

CJ Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: 82741-YSK-5-5.DGN

PREPARED BY: C. SVENSON/A. SLACH

REVIEWED BY: J. PERRY

APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

PROJECT

GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

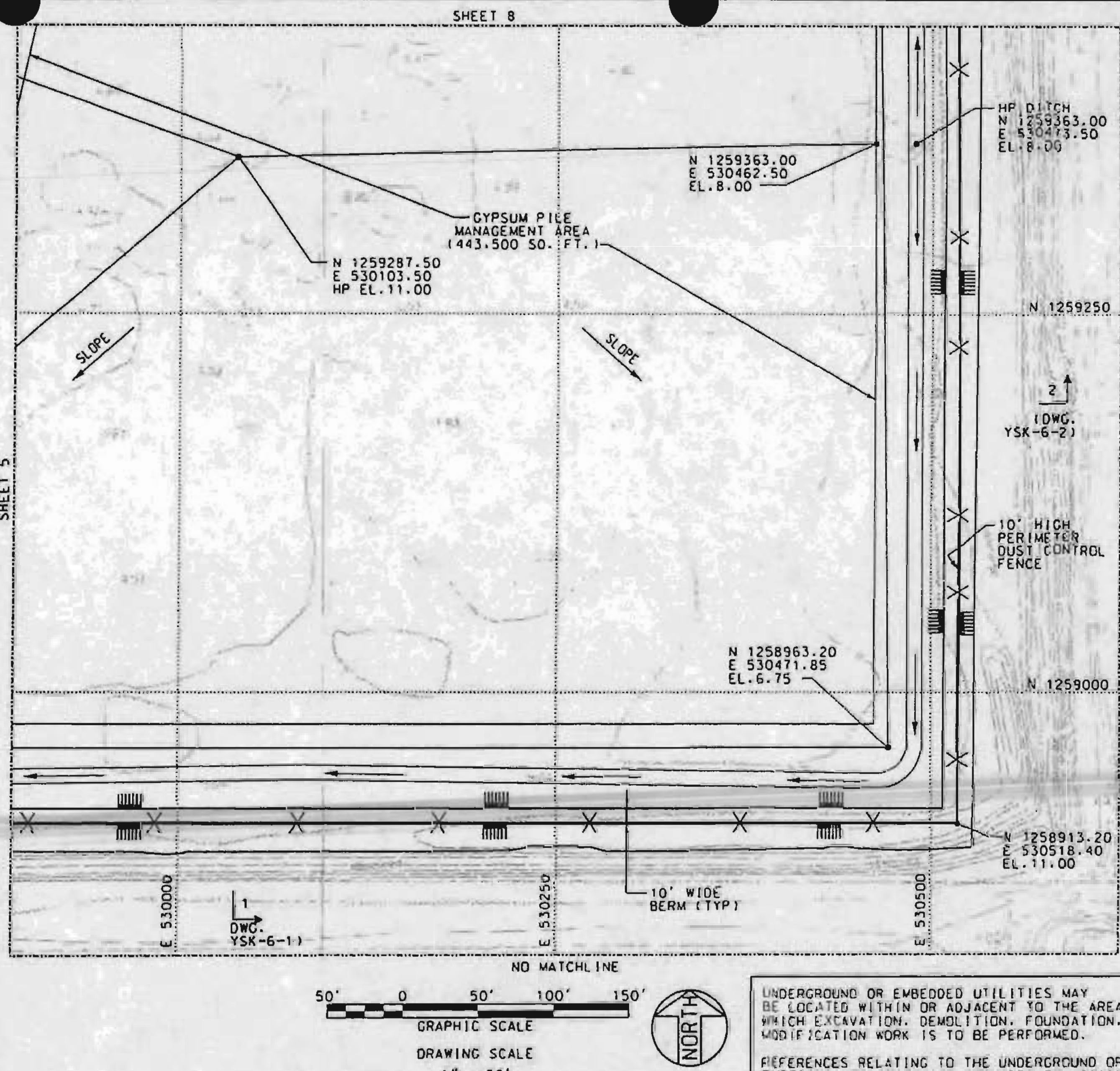
BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE

FINAL SITE PLAN AND DETAIL SHEETS

DRAWING NUMBER	REVISION
82741-YSK-5-5	A

SHEET 5 OF 9



ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12857-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006935

CAD FILE NAME: 82741-YSK-5-6.DGN
PREPARED BY: C. SVENSON/A.SLACK
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

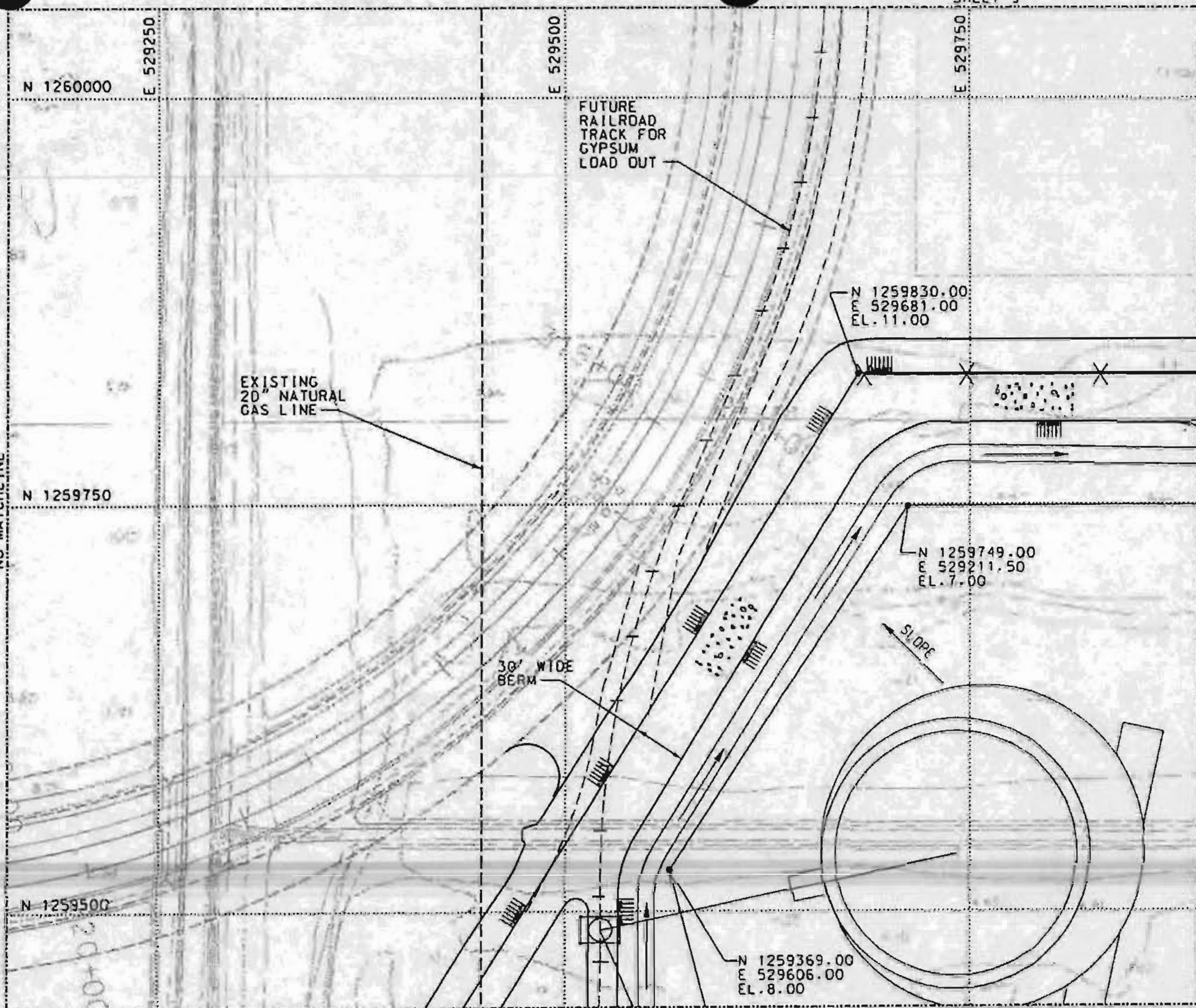
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
82741-YSK-5-6	A

SHEET 6 OF 9



50' 0 50' 100' 150'

GRAPHIC SCALE

DRAWING SCALE

1" = 50'

NORTH

ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORM

NO.	DESCRIP

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/ INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12877-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: B2741-YSK-5-7.DGN
PREPARED BY: C. SVENSON/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

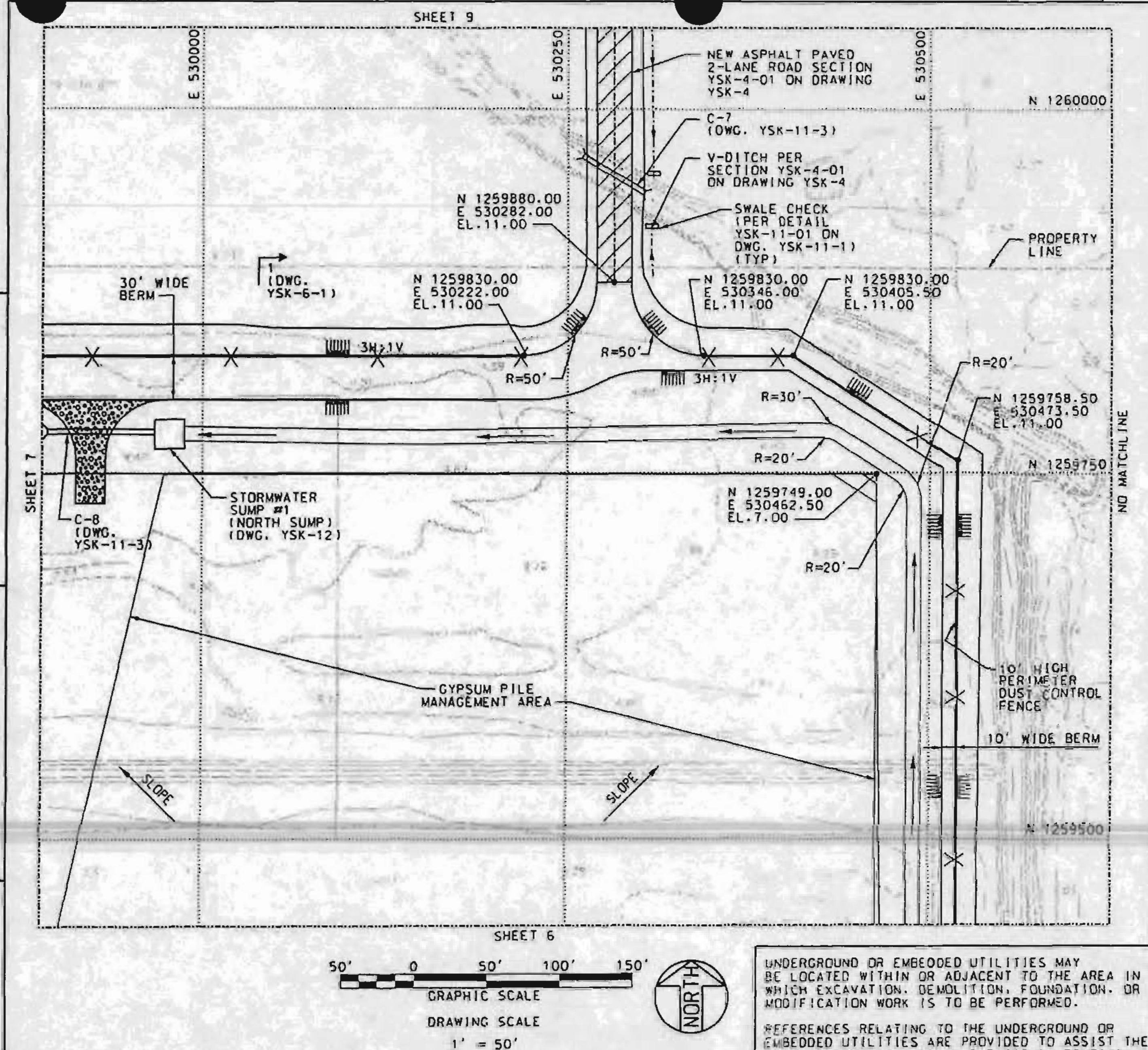
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-5-7	A

SHEET 7 OF 9



ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12741-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012
CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL: THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: B2741-YSK-S-8.DGN
PREPARED BY: C. SVENSON/A. SLACH AS
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON CJN

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

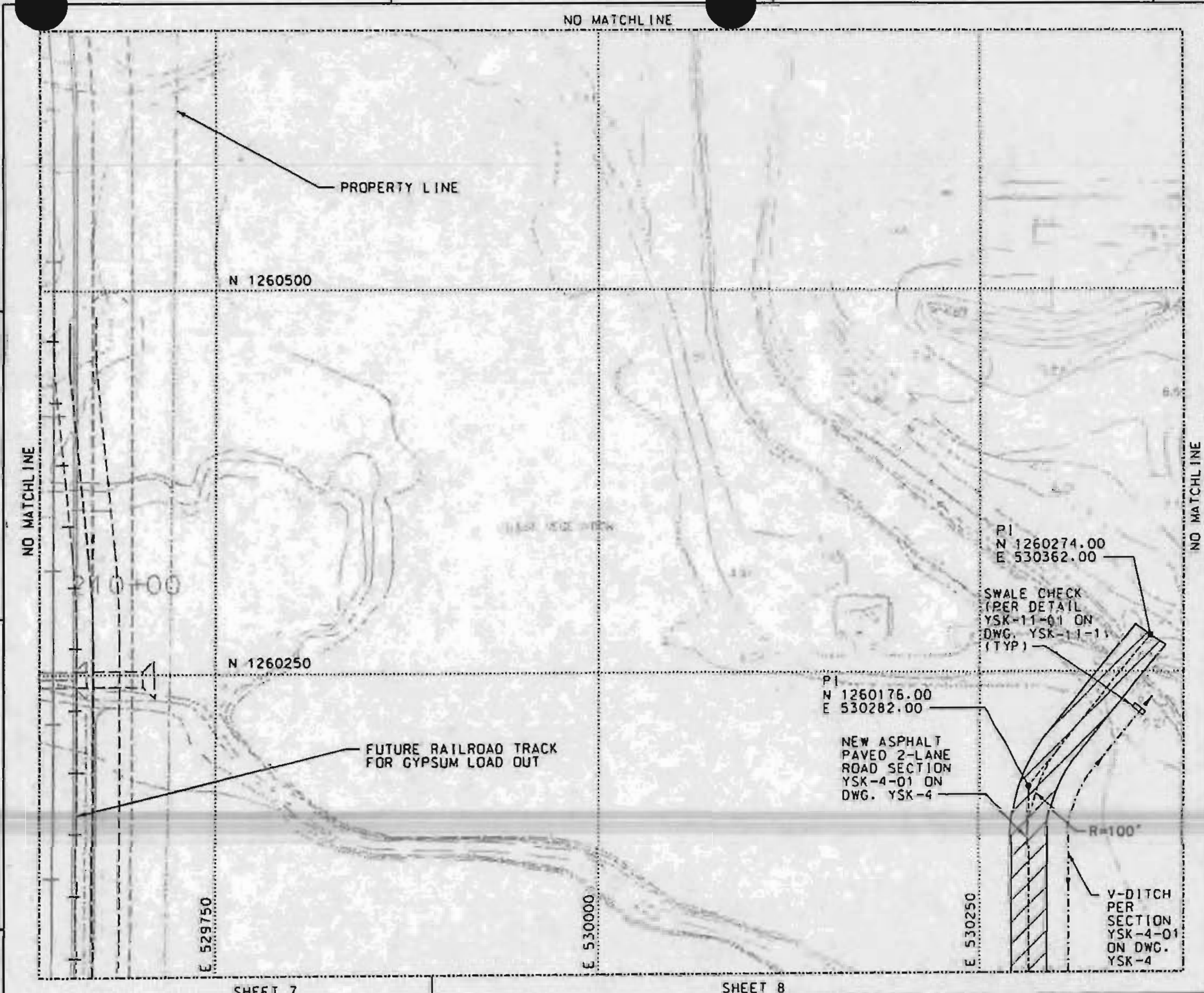
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

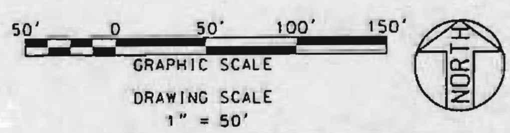
BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
B2741-YSK-S-8	A

SHEET 8 OF 9





ISSUED FOR AGENCY REVIEW

UNDERGROUND OR EMBEDDED UTILITIES MAY BE LOCATED WITHIN OR ADJACENT TO THE AREA IN WHICH EXCAVATION, DEMOLITION, FOUNDATION, OR MODIFICATION WORK IS TO BE PERFORMED.

REFERENCES RELATING TO THE UNDERGROUND OR EMBEDDED UTILITIES ARE PROVIDED TO ASSIST THE CONTRACTOR/INSTALLER IN THE FIELD LOCATING THOSE UTILITIES AND OTHER POSSIBLE UNDERGROUND OR EMBEDDED INTERFERENCES WITH THE WORK.

THE CONTRACTOR/INSTALLER SHALL EXERCISE DUE CAUTION DURING ALL EXCAVATION/FOUNDATION/DEMOLITION WORK.

HOLD INFORMATION

NO.	DESCRIPTION

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUB-CONTRACTOR(S)) PERFORMING THE WORK.

RELEASE INFORMATION

REV.	DATE	DESCRIPTION
A	03-29-2012	ISSUED FOR AGENCY REVIEW

ISSUE PURPOSE: REVIEW
SPECIFICATION: NONE
PROJECT NO.: 12871-001

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF FLORIDA.

C J Nelson 3/29/2012

CHARLES J. NELSON
03-29-2012

MY LICENSE RENEWAL DATE IS: 02-28-2013
PAGES OR SHEETS COVERED BY THIS SEAL:
THIS DOCUMENT ONLY.

CERTIFICATE OF AUTHORIZATION 00006938

CAD FILE NAME: 82741-YSK-5-9.DGN
PREPARED BY: C. SVENSON/A. SLACH
REVIEWED BY: J. PERRY
APPROVED BY: C. NELSON

ANY MODIFICATION OR ADDITION TO THIS DRAWING BY AN ORGANIZATION OTHER THAN SARGENT & LUNDY, IS NOT THE RESPONSIBILITY OF SARGENT & LUNDY.

Sargent & Lundy

SARGENT & LUNDY LLC
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603-5780

TECO
TAMPA ELECTRIC

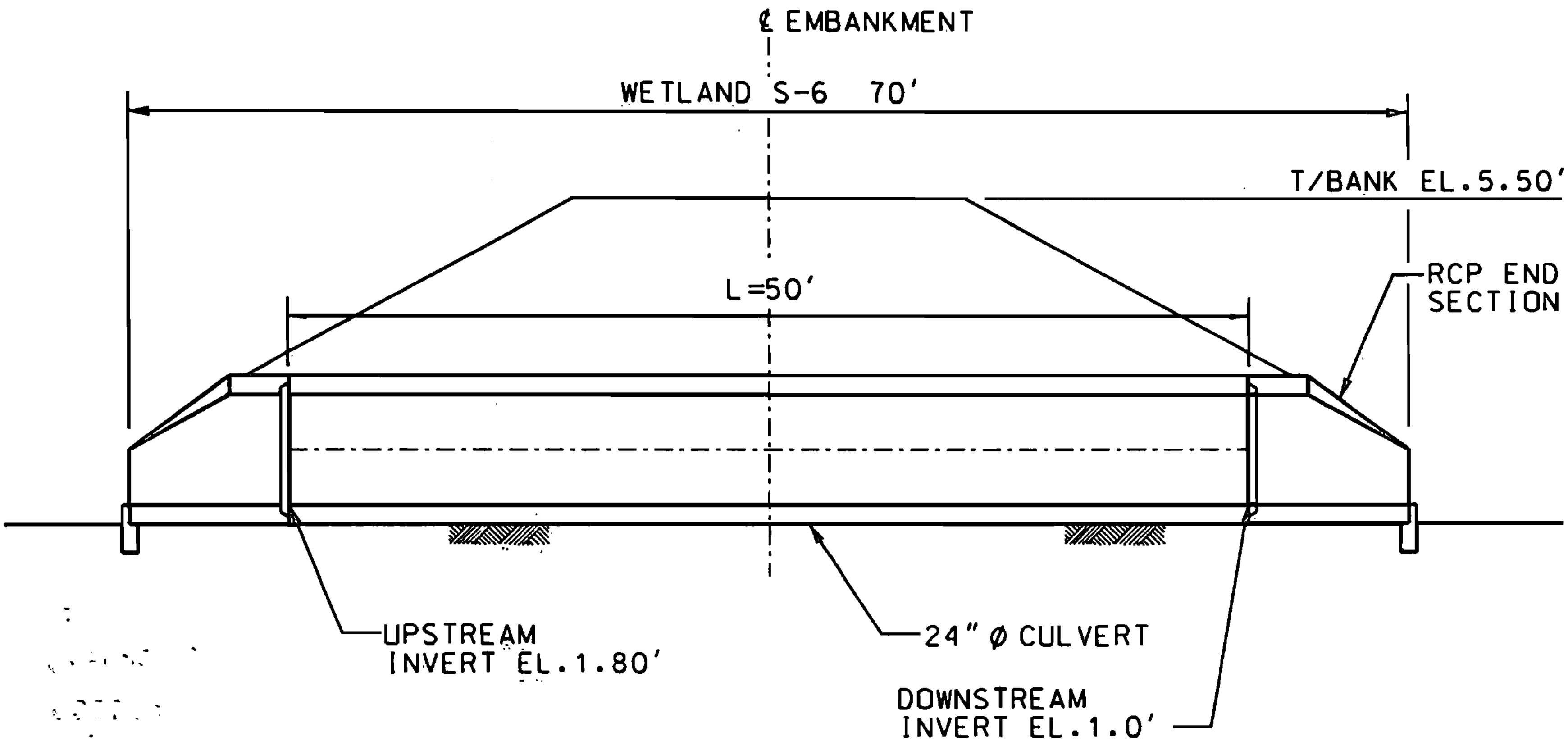
PROJECT
GYPSUM HANDLING SYSTEM
UNITS 1, 2, 3 & 4

BIG BEND POWER STATION
TAMPA ELECTRIC CO

DRAWING TITLE
FINAL SITE PLAN
AND DETAIL SHEETS

DRAWING NUMBER	REVISION
82741-YSK-5-9	A

SHEET 9 OF 9



SEASONAL HIGH WATER TABLE EL.1.90'

C-1 LOOKING WEST

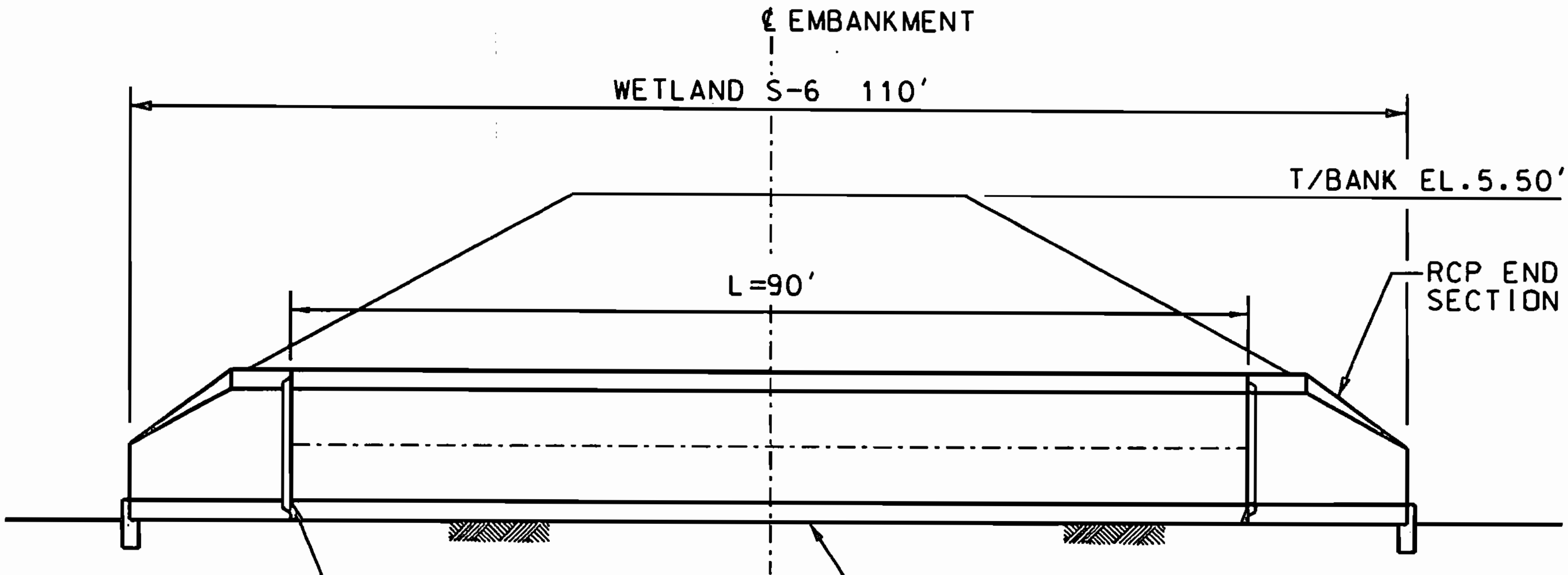
N.T.S.
ELEVATIONS IN NAVD 88

CJ Nelson
3/29/2012

FIGURE 8
CULVERT DESIGN C-1
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TECO
TAMPA ELECTRIC



C-2 LOOKING NORTH

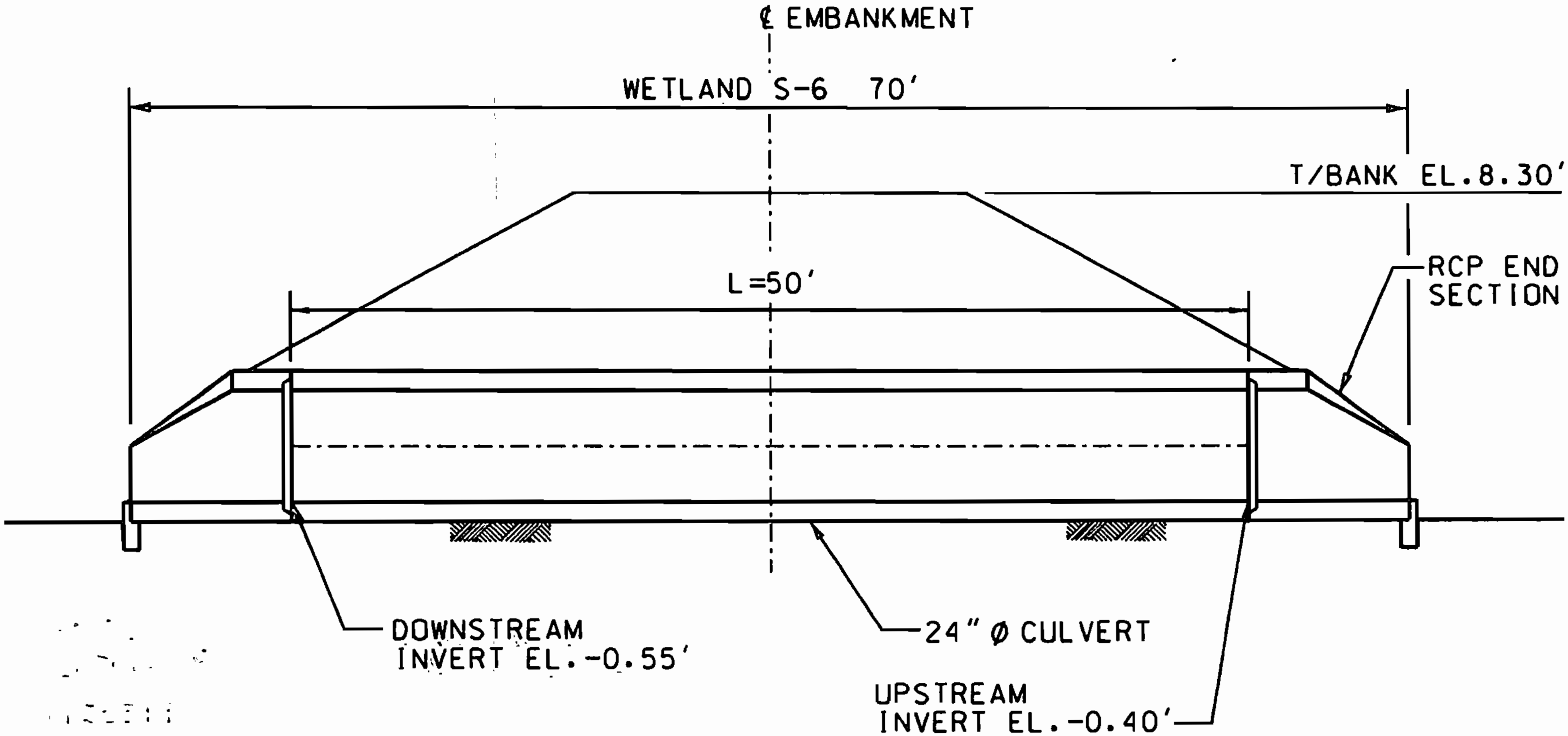
N.T.S.
ELEVATIONS IN NAVD 88

CJ Nelson
3/29/2012

FIGURE 9
CULVERT DESIGN C-2
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TAMPA ELECTRIC



SEASONAL HIGH WATER TABLE EL.1.90'

C-3 LOOKING EAST

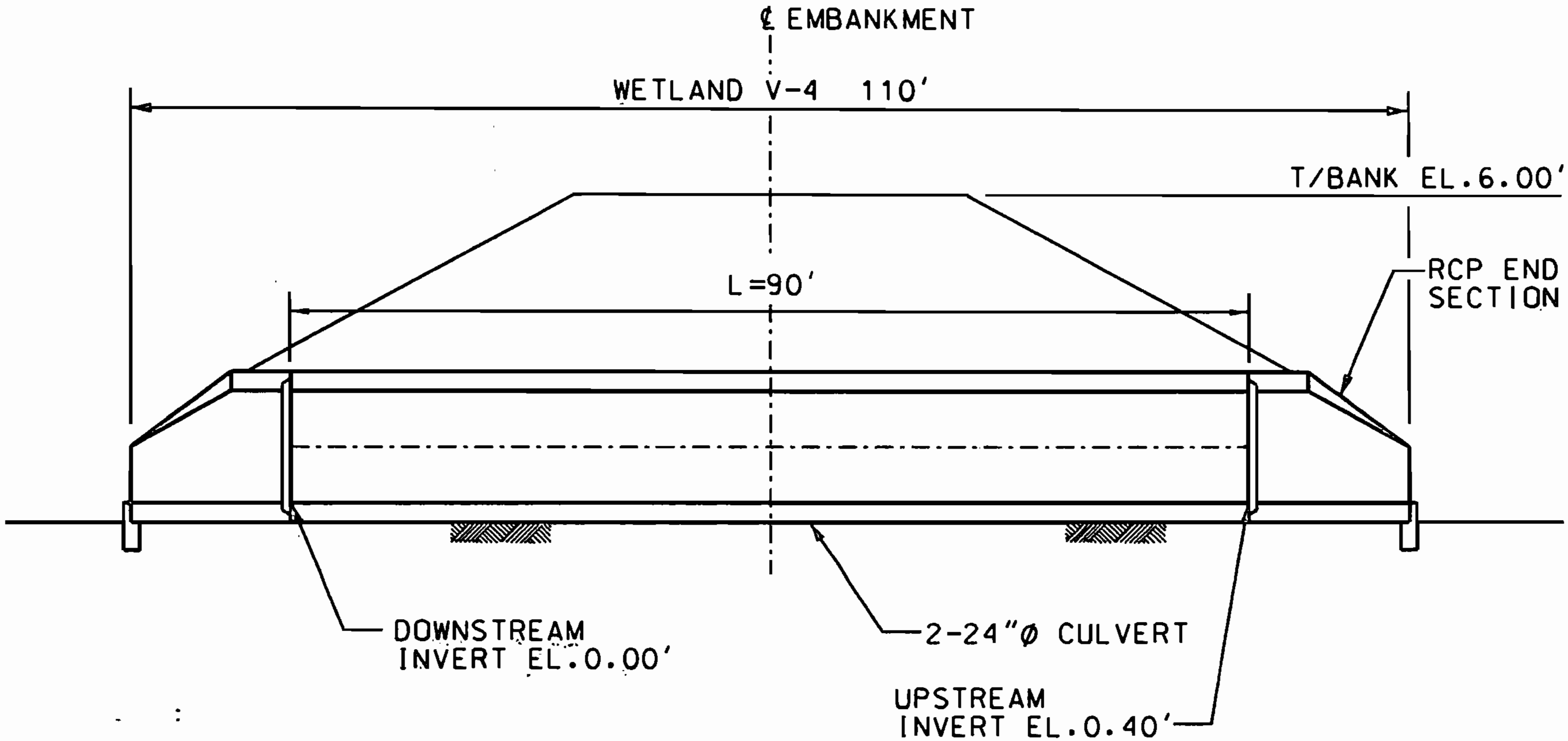
N.T.S.
ELEVATIONS IN NAVD 88

C J Nelson
3/29/2012

FIGURE 10
CULVERT DESIGN C-3
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TECO
TAMPA ELECTRIC



C-4 LOOKING NORTH

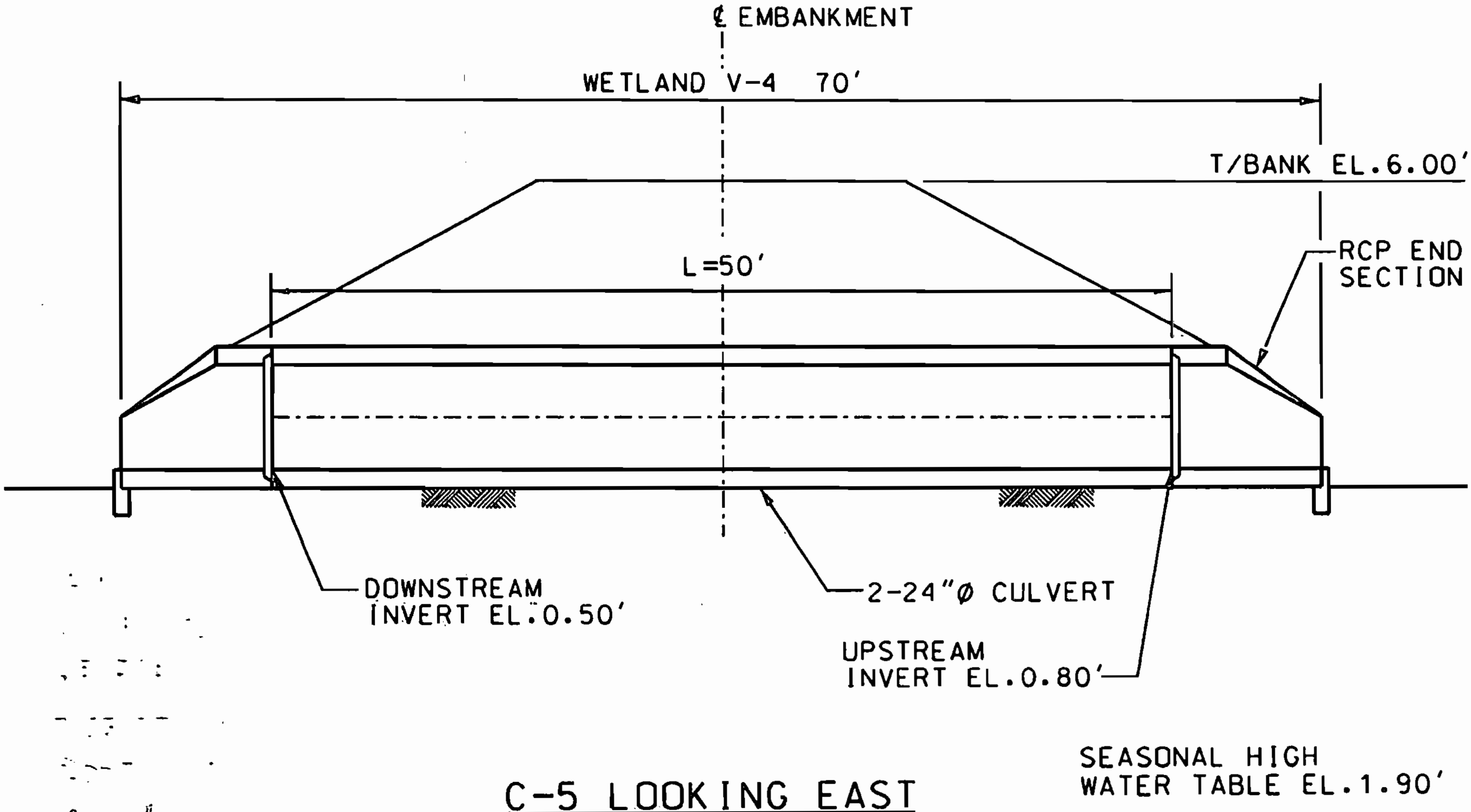
N.T.S.
ELEVATIONS IN NAVD 88

CJ Nelson
3/29/2012

FIGURE 11
CULVERT DESIGN C-4
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TECO
TAMPA ELECTRIC



C-5 LOOKING EAST

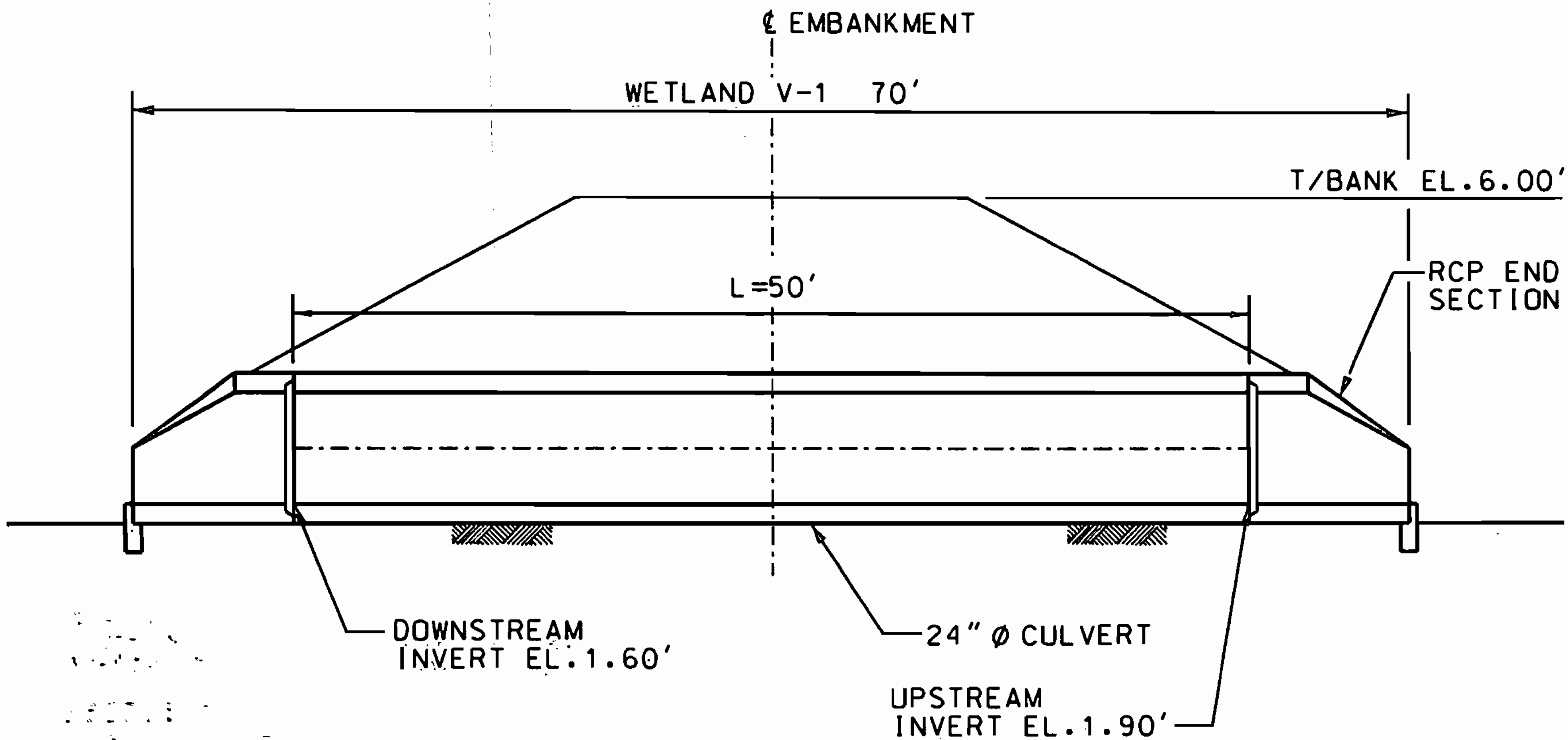
N.T.S.
ELEVATIONS IN NAVD 88

C J Nelson
3/29/2012

FIGURE 12
CULVERT DESIGN C-5
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TECO
TAMPA ELECTRIC



SEASONAL HIGH WATER TABLE EL.1.90'

C-6 LOOKING EAST

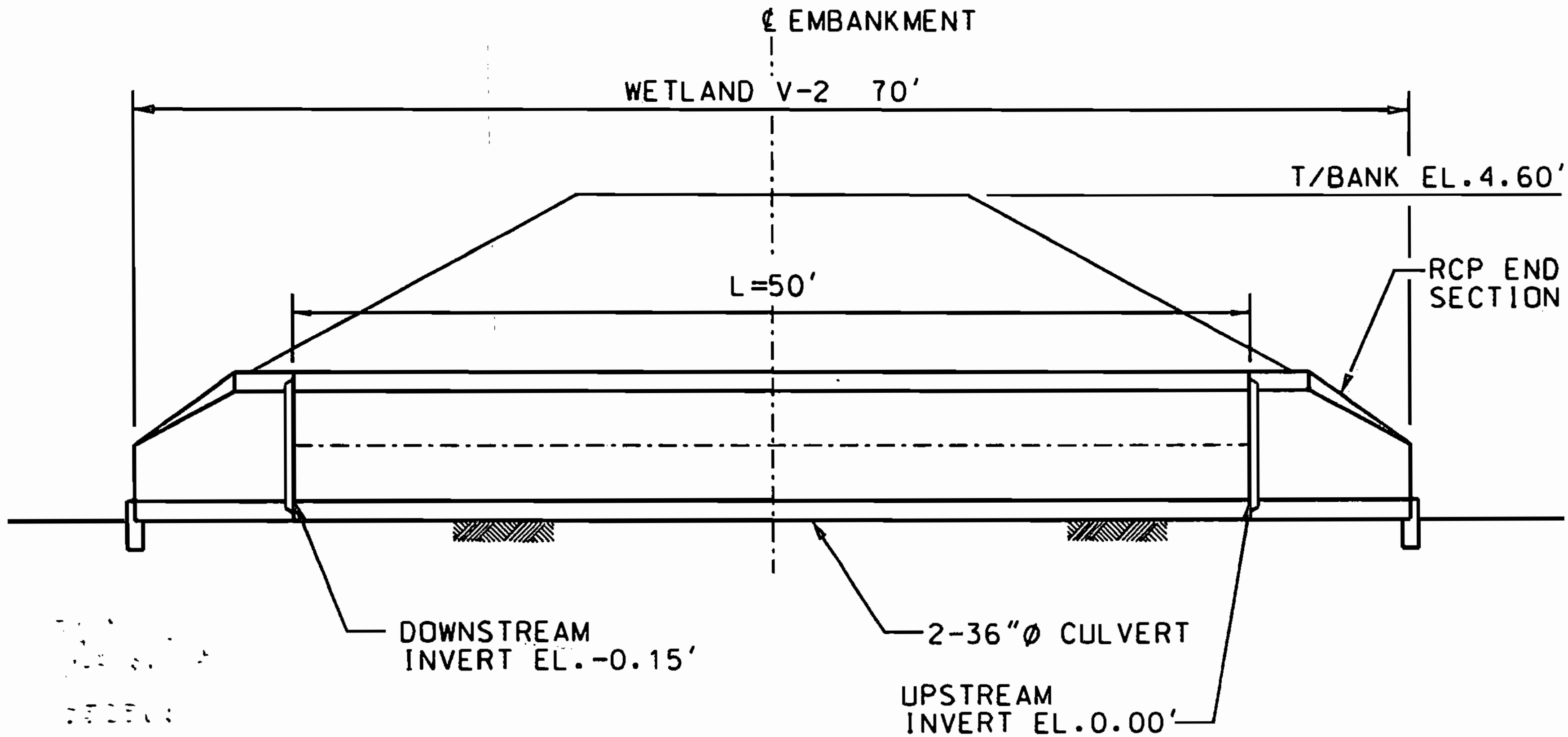
N.T.S.
ELEVATIONS IN NAVD 88

CJ Nelson
3/29/2012

FIGURE 13
CULVERT DESIGN C-6
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TECO
TAMPA ELECTRIC



SEASONAL HIGH WATER TABLE EL.1.90'

C J Nelson
3/25/2012

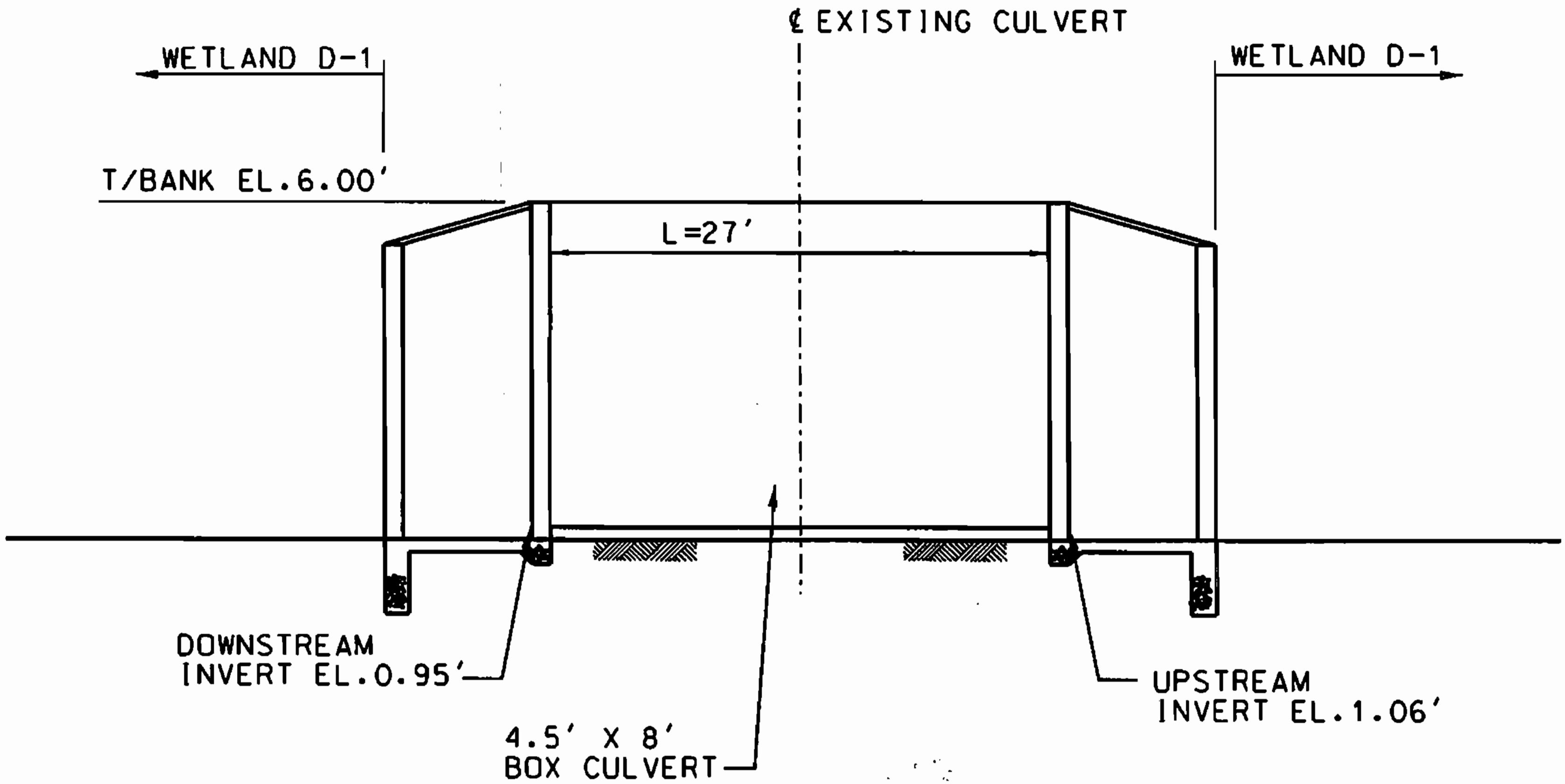
C-7 LOOKING NORTH

N.T.S.
ELEVATIONS IN NAVD 88

FIGURE 14
CULVERT DESIGN C-7
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

CHARLES J. NELSON
#52508

TECO
TAMPA ELECTRIC



NOTE:
SEASONAL HIGH
WATER TABLE
EL.1.90'

C-8 LOOKING NORTHEAST

N.T.S.
ELEVATIONS IN NAVD 88

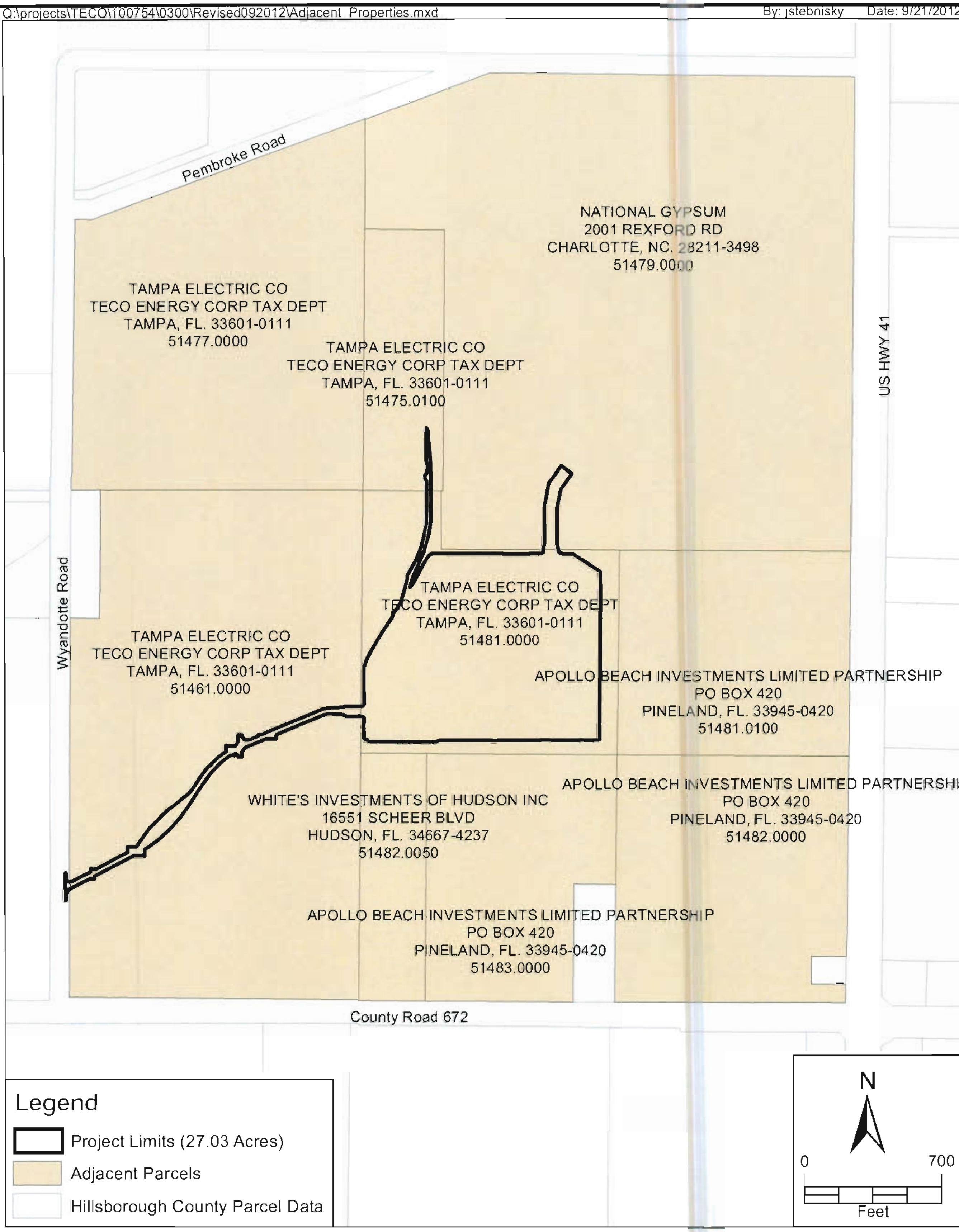
FIGURE 15
CULVERT DESIGN C-8
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM RELOCATION PROJECT
SOURCE: SARGENT & LUNDY,LLC,2012;ECT,2012

C J Nelson 10/5/2012
CHARLES J. NELSON
#52508

APPENDIX A

ADJACENT PROPERTY OWNERSHIP MAP

Q:\projects\TECO\100754\0300\Revised092012\Adjacent_Properties.mxd By: jstebnisky Date: 9/21/2012



APPENDIX A.
ADJACENT PROPERTY OWNERSHIP MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Hillsborough County Property Appraiser, 2011; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

APPENDIX B

DRAINAGE REPORT

TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION
GYPSUM STORAGE AREA/
CONVEYOR IMPROVEMENTS PROJECT
DRAINAGE REPORT

Prepared for:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Southwest District Office
Division of Environmental Resources
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

Prepared by:

ECT

Environmental Consulting & Technology, Inc.

1408 North Westshore Boulevard
Suite 115
Tampa, Florida 33607

Certificate of Authorization #5520

Ryan P. Martin, P.E.
FL. REG. No.: 63867

100754-0400-1200
October 2012

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

Tampa Electric Company (TEC) proposes to construct a new gypsum storage and handling facility (the Project). The existing gypsum storage and handling facility, located near the southern boundary of TEC's property, is required to be either upgraded or replaced to achieve the goals of the Big Bend Remedial Action Plan (RAP). In accordance with the RAP, the design of the new facilities will provide enhanced protection of groundwater, surface water, and air resources in the vicinity of the power station. The project site was chosen by TEC after an extensive alternatives analysis utilizing environmental and operational criteria. Additionally, the new location for the gypsum facility, in the northeast portion of the site, is adjacent to the property of TEC's largest customer for the product gypsum. This will allow for direct transport of gypsum by truck between the TEC facility and the customer's storage area without the need to use public thoroughfares, greatly reducing related impacts on local transportation infrastructure. Furthermore, the project will be constructed in a former spray field area, where no sensitive wetland or upland habitats are located. Finally, the footprints of access and haul roads associated with this project have been reduced to the greatest extent practical and these facilities will be constructed of pervious material, where feasible, in order to minimize effects on local hydrologic functions and drainage. For all of the above reasons, the selected location and design features of this project incorporate an appropriate level of consideration for avoidance and minimization of environmental impacts.

The entire Project area will be lined. The lining system will consist of a geo-synthetic clay lining and an 80 mil geo-membrane, overlain by 2 feet (ft) of compacted gypsum. Perimeter berms will provide flood protection. Rainfall that occurs within the 8-ft berms that protect the property will be captured and routed to TEC's industrial wastewater treatment system. This system is already in use to provide process water to the power plant. All runoff caused by rainfall within the berm of the gypsum storage area will be classified as industrial wastewater due to the nature of the project. Therefore, the runoff will be subject to the industrial wastewater treatment standards and not subject to the Environmental Resource Permit's (ERP's) stormwater treatment criteria. Treatment will be provided for runoff captured from the access roads in roadside swales. The Project site will be cleared and development will proceed after site preparation. Along with the storage site, a key component to this project will be the conveyor that will deliver gypsum from the power plant to the site, and the access road that will travel along the conveyor's path. The conveyor and access road will be contained within TEC property.

The proposed access road alignment includes portions that cross various ditches formerly used for agricultural and roadway drainage. The surface water management plan will ensure that the conveyance capacity of the ditches will be maintained. Under the proposed plan, the existing drainage patterns will be maintained through the use of culverted sections in the locations where ditches are proposed to be crossed. As mentioned above, water quality treatment for runoff from the bermed gypsum storage area is not required under the ERP. Treatment will be provided for runoff captured from the access roads in roadside swales. All runoff will be classified as industrial wastewater and will be captured and routed to the Big Bend Power Station's industrial wastewater system.

The Project site resides within the Wolf Branch portion of the Bull Frog Creek Watershed, in a minor system called Jackson Branch.

The Hillsborough River Combined Storm Water Management Model (SWMM) prepared by Hillsborough County and approved by the Federal Emergency Management Agency (FEMA) was used to analyze the existing and proposed site improvements (i.e., HCSWMM431b). Hillsborough County's geographic information services (GIS) coverage shows the proposed site is not located within a *Peak Sensitive* or *Volume Sensitive* area and therefore is limited to the 25-year pre-development versus 25-year post development criteria for areas that are non-tidal in Hillsborough County.

It is the intent of this report to produce a quality surface water management plan for the TEC Big Bend Power Station Gypsum Storage Area/Conveyor Improvements Project. This surface water management plan is being provided to satisfy the requirements of the owner/applicant (i.e. TEC) and the Florida Department of Environmental Protection

(FDEP). This drainage report was prepared by Environmental Consulting & Technology, Inc. (ECT).

2 GENERAL INFORMATION

2.1 LOCATION

The approximately 27-acre project site is located east of Wyandotte Road, south of Pembroke Road, north of Big Bend Road (SR 672), and west of U.S. Highway 41 in Section 10, Township 31 South, Range 19 East, in Hillsborough County, Florida. Approximately 24.2 acres of the 27-acre Project site includes the actual bermed area that will serve as the storage area.

2.2 ZONING, DRI, AND OTHER PERMITS

1. Zoning is compatible with the proposed land use.
2. Development of Regional Impact (DRI) – No development order is required for this project.
3. No other permits are pending.

2.3 MAINTENANCE OF THE STORMWATER SYSTEM

All onsite conveyance structures will be owned and maintained by the applicant. A Property Owners Association will not be required.

2.4 OPERATION AND MAINTENANCE INSTRUCTIONS

2.4.1 OPERATION

The project's surface water management system is gravity operated and requires no operator action.

2.4.2 MAINTENANCE

Pipes and structures will be cleaned, maintained, and inspected regularly, and will be free of debris, and/or sediment. Other structures will be maintained as directed by the providing vendor.

3 BASIS OF ANALYSIS

3.1 MODEL

The area has been previously modeled by Hillsborough County through their watershed management program. The location of the TEC Big Bend Power Station Gypsum Storage Area/Conveyor Improvements Project is included in the Bullfrog Creek watershed and, therefore, modeled in the SWMM model (HCSWMM431b). This model utilizes the U.S. Soil Conservation Service (SCS) method to complete runoff calculations and routing and stage analysis of the waterways. See Figure 1 for the Existing Model's Link Node Diagram/Basin Delineation and Figure 2 for the Proposed Model's Link Node Diagram/Basin Delineation.

3.2 RUNOFF CURVE NUMBERS

Runoff curve numbers were previously calculated during the initial modeling effort by Hillsborough County. These curve numbers were not altered for this project. The proposed changes that will be in effect in the post-development condition will not alter the hydrology of the watershed. No additional runoff will be created based on the proposed design. All rainfall that occurs within the bermed area will be captured and routed to TEC's process water facilities. Please see Appendix A for composite curve number calculations.

3.3 SOILS

The hydrologic soil groupings used for calculating the curve numbers for the initial Hillsborough County modeling effort were not altered for this project. The proposed changes that will be in effect in the post-development condition will not alter the hydrology of the watershed. No additional runoff will be created based on the proposed design. All rainfall that occurs within the bermed area will be captured and routed to TEC's process water facilities. Southwest Florida Water Management District (SWFWMD) GIS data includes a soil coverage containing polygons for each soil type. The GIS coverage provides descriptions of these soil types and their corresponding hydrologic soil grouping. The site is completely located in type "B/D" soils-Wabasso fine sands (Soil survey identification number 57). See Figure 3 for a soils map of the project area.

3.4 RAINFALL DEPTHS AND DISTRIBUTION

Hillsborough County's modeling effort approximated rainfall depths from isohyetal maps in the SWFWMD Environmental Resource Permitting Information Manual (ERPM). The depths approximated for the 25-year and 100-year storm events are 8.0 and 11.0 inches, respectively. The SCS Florida Modified Type II rainfall distribution was used. This distribution was also taken from the ERPM. See Figures 4 and 5 for the SWFWMD 25- and 100-year isohyetal rainfall maps.

3.5 TIME OF CONCENTRATION

The times of concentration used for the initial Hillsborough County modeling effort were not altered for this project. The proposed changes that will be in effect in the post-development condition will not alter the times of concentration of the basins that will be impacted. For the basin that will be impacted, the drainage path taken from the most hydraulically distant point of the basin to the discharge point of the basin is still intact.

3.6 GROUNDWATER CONDITIONS

The groundwater conditions used in the initial Hillsborough County modeling effort were not altered for this project. The proposed changes that will be in effect in the post-development condition will not alter the groundwater hydraulics of the watershed. The seasonal high water (SHW) level for the project site was determined by averaging the elevations established at three stations located within the unnamed stream channel adjacent to the northeast corner of the project site that collects runoff from the project site in the existing condition. The SHW level stations were established along the bank slope of the channel using the growth limits of wetlands vegetation. The value for the SHW was set at 1.88 feet (ft) North American Vertical Datum of 1988 (NAVD88). The proximity of this site to the coast and the location of the SHW level elevation determination within the project area mean that this estimate is conservative. The fact that the SHW level estimate was made along the eastern edge of the project site, while all flows are moving in a direction away from that location and to the coast, along with the topography of the site (predominately flat with man-made drainage ditches throughout), lead to the determination that this estimate of the SHW level elevation is conservative and can be applied throughout the project area.

3.7 DESIGN CRITERIA

The post-development conditions have been designed to show no adverse impacts versus the pre-developed conditions for the 25-year (yr)/24-hour (hr) and 100-yr/24-hr storm events stages. The post-developed conditions will retain the existing drainage patterns by maintaining any conveyance ways through culverted sections. No water quality treatment is provided for the bermed project area as all runoff will be classified as industrial wastewater and will be captured and routed to TEC's offsite recycle pond to be used in power generating processes. Water quality treatment will be provided for runoff captured from the access roads in roadside swales. No attenuation is proposed for this site as there is no generation of additional runoff volume attributed to the design changes.

ECT used Hillsborough County's Regional SWMM model study for the Wolf Branch (of Bullfrog Creek) watershed to acquire 100-yr/24-hr and 25-yr/24-hr stage data for the proposed project site. The proposed stormwater modeling and permit application considers the site to be filled and prepared for development. The plans (prepared by others) depict the site work.

3.8 CULVERTED SECTION ANALYSIS

Based on survey information and wetland delineation, it was determined that the construction of the Project would impact flow through conveyance ditches in nine different locations throughout the project site. Conveyance would need to be maintained in these ditches following the completion of construction. Figure 6 shows the location of nine impacted ditch sections. These sections will need to be treated to ensure that conveyance on the property is maintained. Figure 7 shows the location of existing culverted sections and their maximum conveyance as well as the proposed crossings and their maximum conveyance.

4 DESCRIPTION OF ANALYSIS

4.1 PRE-DEVELOPMENT CONDITIONS

The property in its pre-development condition occurs in a historically agricultural area. The Project area consists of open space, wetland, and industrial use in combination. The Project site is currently clear of trees, for the most part, but overgrown with Brazilian pepper and other invasive species. The area has been previously modeled by Hillsborough County through their watershed management program, as mentioned in Section 3.1. The Project site is adjacent to a modeled unnamed natural drainage. The unnamed natural drainage junction adjacent to the project site is junction 824120. At the proposed project site location, the existing channel bottom is at an elevation of approximately 0.0 ft NAVD88. Additional junctions representing the Project site area of the Bullfrog Creek watershed exist at junction number 824100 (1285-ft downstream of junction 824120) and junction number 824130 (1490-ft upstream of the proposed crossing). These junctions are linked via trapezoidal channels with a total length of 2775 ft and numbered 9824120 and 9824130. These junctions and channel fall within sub-basin 824080. Appendix B contains existing model input and output files. These files include the existing site hydraulics (*.s4d file) and the existing site hydrology (*.wpx files) for the 25- and 100-year events. The existing model stage results are also included within the 25- and 100-year *.smx files. Further hydrologic and hydraulic information pertaining to the existing model can be found in Appendix G. Appendix H contains a compact disc (CD) containing the complete existing conditions model input and output files for the mean annual, 5, 10, 25, 50, and 100-year events.

4.2 POST-DEVELOPMENT CONDITIONS

In the post-development condition, the Project area was accounted for in the model by removing the total acreage of the Project area from the existing basin in which it is located. The Project proposes to capture all rainfall that falls within the Project area and route the runoff produced through a pipe system to Big Bend Station's existing industrial wastewater treatment system. By reducing the total acreage of sub-basin 824080, the proposed model replicates the effect that the proposed gypsum storage area will have on the local hydrology. As mentioned in Section 3.0 of this report, the Basis of Analysis, the curve number for sub-basin 824080 was not changed as the Project site has similar overall drainage characteristics as the rest of the sub-basin. The time of concentration also was not changed in the proposed model as the proposed project will not alter the flow path from the most hydraulically distant point within sub-basin 824080 to the discharge point.

Appendix C contains the proposed model input and output files. These files include the proposed site hydraulics (*.s4d file) and the site hydrology (*.wpx files) for the 25- and 100-year events. The proposed model stage results are also included within the 25- and 100-year *.smx files. Appendix D contains the model results comparison tables for all existing and proposed SWMM model runs. Further hydrologic and hydraulic information pertaining to these junctions in the proposed model can be found in Appendix H, an attached CD containing the complete proposed conditions model input and output files for the 2.33 (mean annual), 5-, 10-, 25-, 50-, and 100-year events.

4.3 CULVERTED SECTION ANALYSIS

The conveyance through onsite ditches to be crossed for the construction of this project and operation of this facility will need to be maintained. Conveyance is proposed to be maintained through the use of culverted sections in the impacted locations. As previously mentioned, Figure 6 shows the location of the nine impacted ditch crossings. Through survey and field verification, the design for the proposed culverted sections can be determined through the use of Manning's Equation. For four of the nine ditch sections that will be crossed, an existing culvert is in place within the same ditch in a location up or downstream of the proposed crossing. This allows for proposed culverts to be sized. For the two crossings at the northeast corner of the project area, the channel is modeled in the SWMM model and the flow can be taken out of the model files to ensure that culverts are designed with the capability of conveying adequate flow. Two crossings exist within the project area over a ditch that does not seem to have culverts within the ditch currently. This ditch appears to function as a storage area. There is little slope throughout the length of the ditch. In order to continue to provide a conveyance for the flow that does occur, a representative trapezoidal channel was determined with a slope and flow using Manning's Equation to determine the size of an adequate culvert. For the crossing at the

National Gypsum ditch, the maximum potential existing flow is calculated. The proposed culvert will provide the same conveyance as the existing condition. For the crossing at the rail spur, the existing culvert will be extended to an adequate length and maintain the same conveyance characteristics. A variety of sources were used to determine sufficient information about the existing ditches and culverts to calculate their maximum conveyance with the Manning's Equation. These sources include site specific survey, wetland delineation, construction plans, as-built drawings and historical model information. The culverted section calculations are located in Appendix E.

4.4 PROJECT AREA RUNOFF

Runoff from the bermed gypsum storage area portion of this project will be captured and routed Big Bend Station industrial wastewater treatment system, which consists primarily of treatment/recycling ponds. Calculations to determine the volume captured and required to be accounted for in these ponds are included in Appendix F.

4.5 ROADWAY DRAINAGE

Operation of this gypsum storage facility requires the construction of paved roads to access the project site from Wyandotte Road and to connect the site to the National Gypsum property northeast of the project area. The cross section for this access road will be designed to route runoff to a roadside swale that will be sized to capture the required treatment volume for the impervious area. The swale will be designed with ditch blocks that will hold the volume in the swale so that treatment will occur. Attenuation is not proposed for these roadway drainage systems due to the over attenuation that will be a result of the reuse of the captured rainfall within the proposed gypsum storage area berms. Since none of that rainfall will reach the unnamed natural drainage, additional runoff from the proposed impervious surfaces of the access roads won't lead to a net stage increase upstream of the project area. Calculations for the sizing of this swale are included in Appendix G.

4.6 INTERNAL DITCH DRAINAGE

Several ditches exist within the proximity of the proposed gypsum storage area. Two of these ditches are major hydraulic features within the project area. These major hydraulic features will not be impacted by the construction of the gypsum storage area. The berms for the gypsum storage area are constructed outside the top of bank of these existing ditches, leaving the flow through these ditches unimpacted. These ditches are identified as Non-Impacted Ditches #1 and #2 in Figure 7 of this report.

The construction of the gypsum storage area does impact two ditches that are onsite. These ditches were identified as jurisdictional/wetland areas (see Section 3.2 of ERP application). These ditches will be eliminated during the process of construction. The elimination of these interior ditches will not impact the overall hydraulics or hydrology of the Project area. These ditches are identified as Impacted Ditches #1 and #2 in Figure 7 of this report. Based on the overall sight specific survey for this project, the drainage basins for these ditches are limited by the non-impacted flow through ditches that will remain.

Impacted Ditch #1 is isolated to the area inside the proposed berms. All of the drainage basin that historically contributed to this ditch is going to be removed, along with the ditch, with the proposed construction. Also, based on the survey, Impacted Ditch #1, which runs east and west, does not connect hydraulically with the non-impacted ditch that runs south to north. According to Hillsborough County's modeling effort, junction 824120, which approximates the location of the confluence of the ditches in the northeast corner of the project area, reaches an elevation of 2.04-ft NAVD88 during the 100-year rainfall event. This flood elevation remains below the top of bank elevation of both ditches; therefore, Impacted Ditch #1 is not hydraulically connected to the remaining overall site hydraulics. Thus, the elimination of Impacted Ditch #1 will not cause adverse impacts upstream of its location during any rainfall event.

Impacted Ditch #2 is also isolated to the area inside the proposed berms. The entire drainage basin of this ditch will be altered by the construction of the Project. With the entire drainage basin to Impacted Ditch #2 to be contained within the berms of the Project area, the removal of the ditch will not cause adverse impacts upstream of its location during any rainfall event. In conclusion, the modification to the ditches within the proposed project area will not alter the hydraulics or hydrology of the surrounding area.

5 MODELING RESULTS

5.1 HYDROLOGIC AND HYDRAULIC MODELING

In addition to the required 25-year and 100-year design events, the model was run for the 2.33-year, 5-year, 10-year, and 50-year events. Running the additional events allowed for a check for no adverse impacts during low flow events. Table 1 lists these events with their rainfall depths, durations and distributions.

Table 1. Design Storms

Frequency (years)	Depth (inches)	Duration (hours)	Distribution
2.33 (Mean Annual)	4.5	24	Type II Florida-Modified
5	5.5	24	Type II Florida-Modified
10	7.0	24	Type II Florida-Modified
*25	8.0	24	Type II Florida-Modified
50	10.0	24	Type II Florida-Modified
*100	11.0	24	Type II Florida-Modified

**See Figures 3 and 4 for SWFWMD 25- and 100-year isohyetal rainfall maps, respectively.*

In order to simulate potential upstream impacts caused by the proposed changes, the original Hillsborough County-Wolf Branch Basin – Miscellaneous Coastal Streams Model (HCSWMM431b) was modified for our application.

As previously mentioned, Appendix D includes the Model Result Comparison tables for each event. The tables are summarized in Table 2 for the 25-year and 100-year design events. As shown in Table 2, there are 17 junctions within the Jackson Branch system. None of these junctions exhibit a stage increase during the 25 and 100-year events. This is to be expected. The resultant change in hydrology to the Jackson Branch system is a result of the gypsum storage facility design intent to capture all rain that historically fell within the project area. There is no increase of impervious area to the drainage basin and there is no additional discharge. Three junctions, 824080, 824085, and 824100 are downstream of the project site and exhibit slight stage decreases. This is to be expected since the project area is no longer contributing to the hydrology of the drainage basin.

Table 2. Jackson Branch Junctions – Change in Stage

Summary of Junctions Proposed - Existing Model		
Junction Locale	**25-Year Event (ft)**	**100-Year Event (ft)**
82400	0	0
824000	0	0
824080	-0.03	-0.09
824085	-0.02	-0.08
824100	0	-0.02
824110	0	0
824120	0	0
824130	0	0
824140	0	0
824200	0	0
824300	0	0
824400	0	0
824490	0	0
824500	0	0
824590	0	0
824600	0	0
824650	0	0

5.2 FLOODPLAIN COMPENSATION

Based on the results of the modified Hillsborough County – Miscellaneous Coastal Streams model (attached in Appendix D), floodplain compensation will not be required for this project. According to the model results at junction 824120, the confluence of the streams at the northeast corner of the project area, the 100-year flood stage reaches an elevation of 2.04-ft NAVD88. This stage elevation is adequately contained within the banks of the streams surrounding the Project area. All existing elevations within the project area are above the flood stage elevation therefore, no adverse impacts to the floodplain are created by the Project.

6 CULVERTED SECTION RESULTS

The construction of the Project would impact flow through conveyance ditches in nine different locations throughout the project site. Table 3 below shows the results of calculations completed to ensure that conveyance on site is maintained post construction. As previously mentioned, the calculations are included in Appendix E.

Table 3. Existing/Proposed Summary of Conveyances

Existing Conveyance Location Description	Existing Flow Through Section (CFS)	Proposed Conveyance Location Description	Proposed Design Capacity (CFS)	Proposed Minimum Culvert Size (inches)	Proposed Minimum Culvert Slope (ft/ft)	Proposed Culvert Slope Direction
E1	10.5	P1	31.7	24	0.016	To North
E1	10.5	P2	11.6	24	0.002	To East
E1	10.5	P3	13.5	24	0.003	To North
Existing Ditch Section #1 @ P4	21.7	P4	31.0	24 (2)	0.004	To West
Existing Ditch Section #1 @ P5	32.6	P5	38.0	24 (2)	0.006	To North
E2	13.5	P6	19.0	24	0.006	To North
Existing Ditch Section #3 @ P7	44.1	P7	71.3	36 (2)	0.0024	To Northwest
E3	499.9	P8	499.9	54 x 96	0.0046	To Northwest
E4	141.2	P9	141.2	36 x 60 (2)	0.00095	To West

Notes: CFS = Cubic feet per second
ft/ft = Foot per foot

7 CONCLUSION

The impacts identified through the modeling efforts are considered to be insignificant. Based on existing and proposed modeling, the proposed relocated gypsum storage facility design will not result in any significantly adverse impacts upstream or downstream of the modified section. The proposed design will provide function as well as allow existing flow regimes to remain intact.

FIGURES

Path: Q:\projects\TECO\100754\0400\Existing Link Node Diagram.mxd User: jstebnisky Date: 5/15/2012

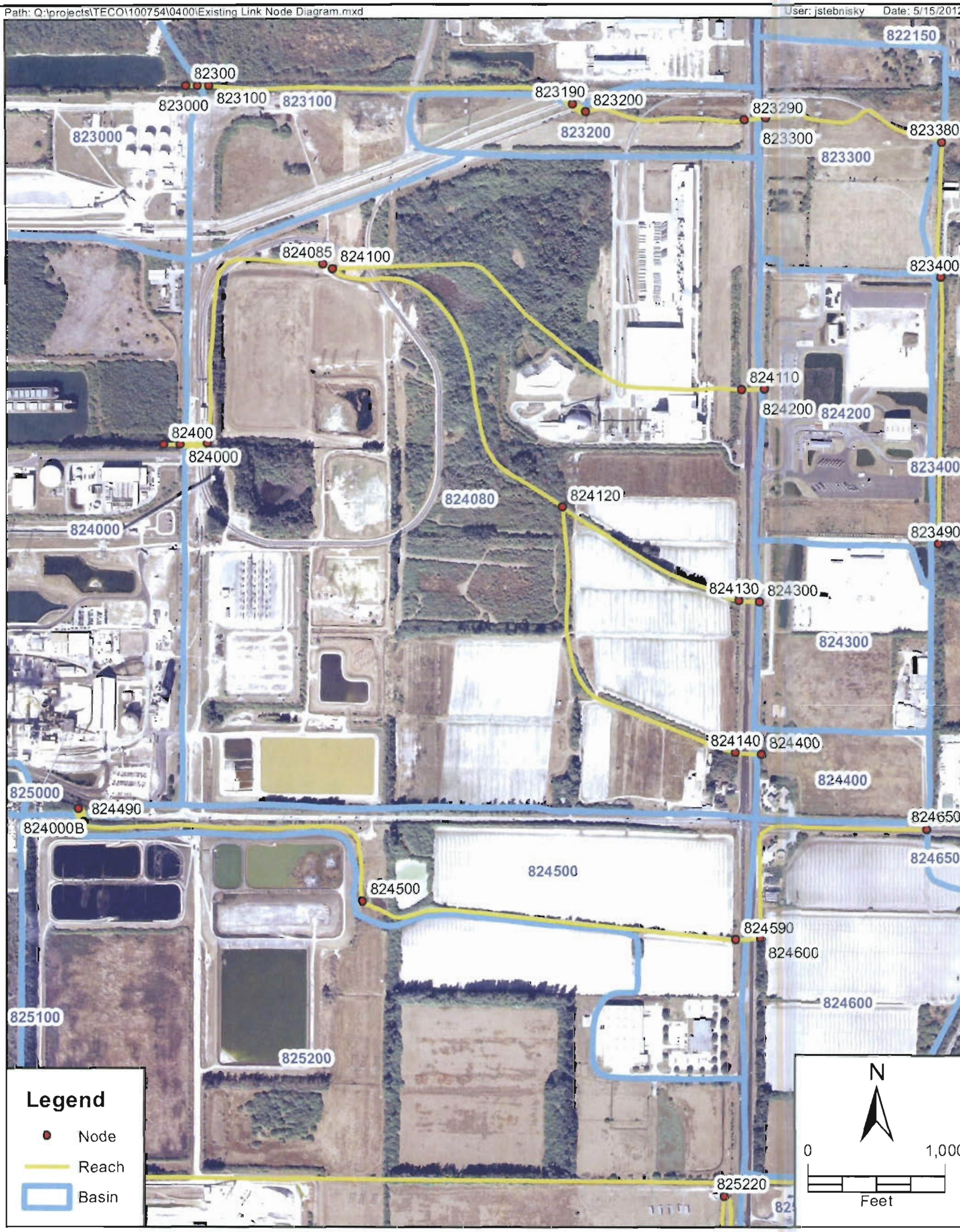


FIGURE 1.
EXISTING LINK NODE DIAGRAM/BASIN DELINEATION
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: SWFWMD Aerial Photography. 2012; ECT, 2012.

TECO
TAMPA ELECTRIC

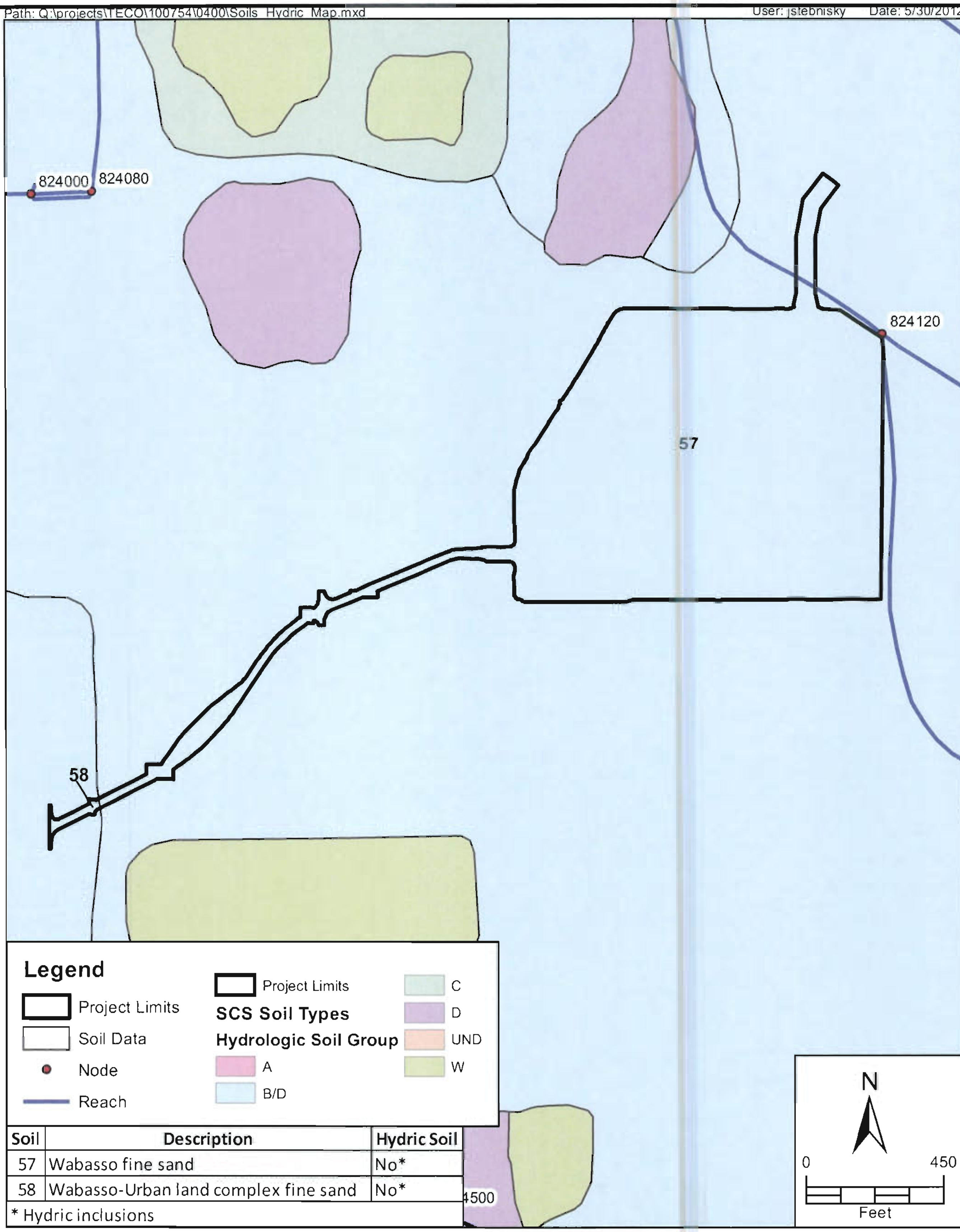
Path: Q:\projects\TECO\100754\0400\Proposed_LinkNodeDiagram.mxd User: jstebnisky Date: 5/30/2012

FIGURE 2.
PROPOSED LINK NODE DIAGRAM/BASIN DELINEATION
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: SWFWMD Aerial Photography, 2011; ECT, 2012.

TECO
TAMPA ELECTRIC

Path: Q:\projects\TECO\100754\0400\Soils_Hydric_Map.mxd User: jstebnisky Date: 5/30/2012



Soil	Description	Hydric Soil
57	Wabasso fine sand	No*
58	Wabasso-Urban land complex fine sand	No*

* Hydric inclusions

FIGURE 3.
SOILS MAP
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Hydric Soils of Florida, 2000; Soil Survey Geographic Database (SSURGO), 2002; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

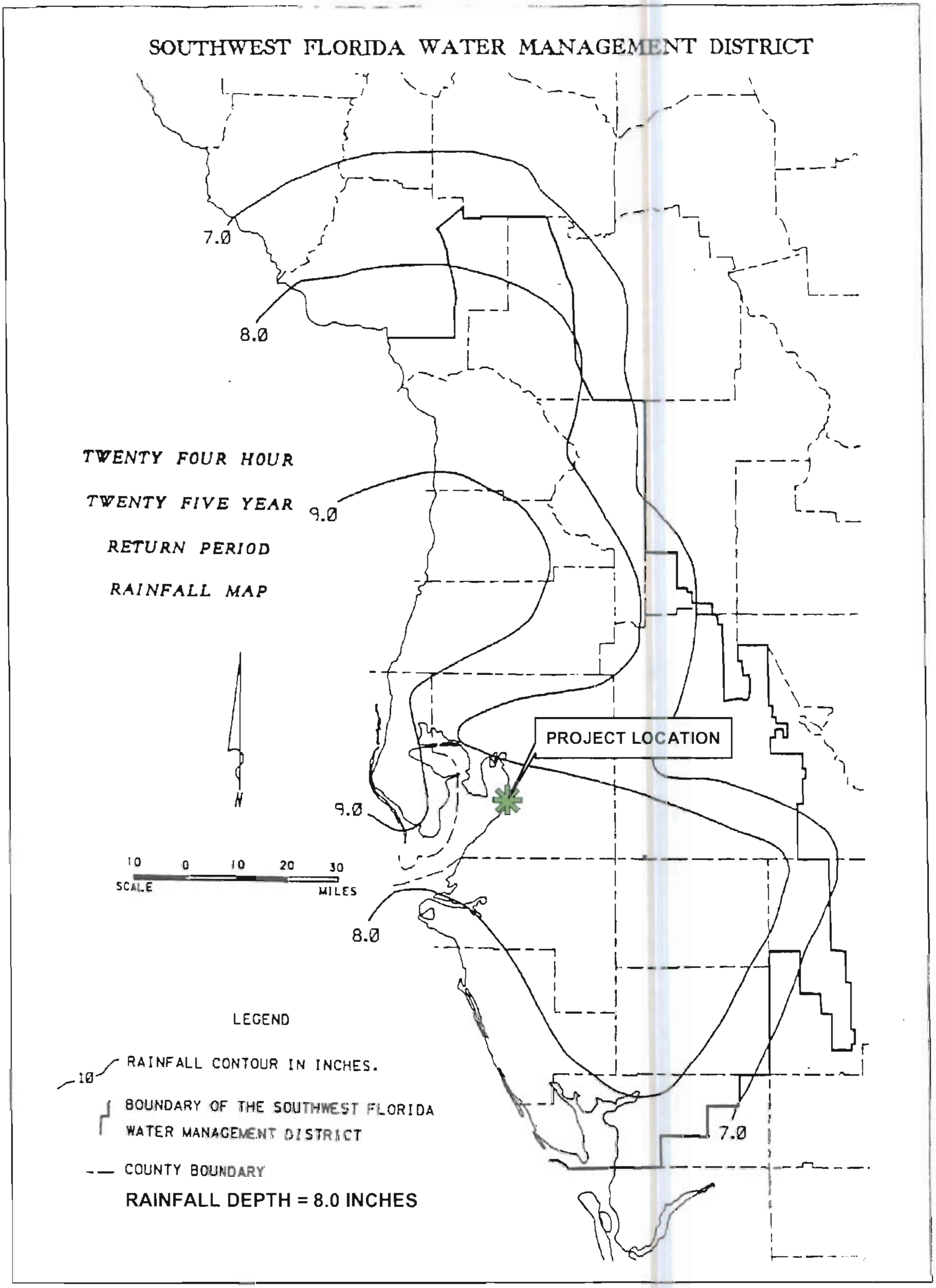


FIGURE 4.
25 YEAR/24 HOUR RAINFALL DEPTH
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Source: ECT, 2012

TECO
TAMPA ELECTRIC

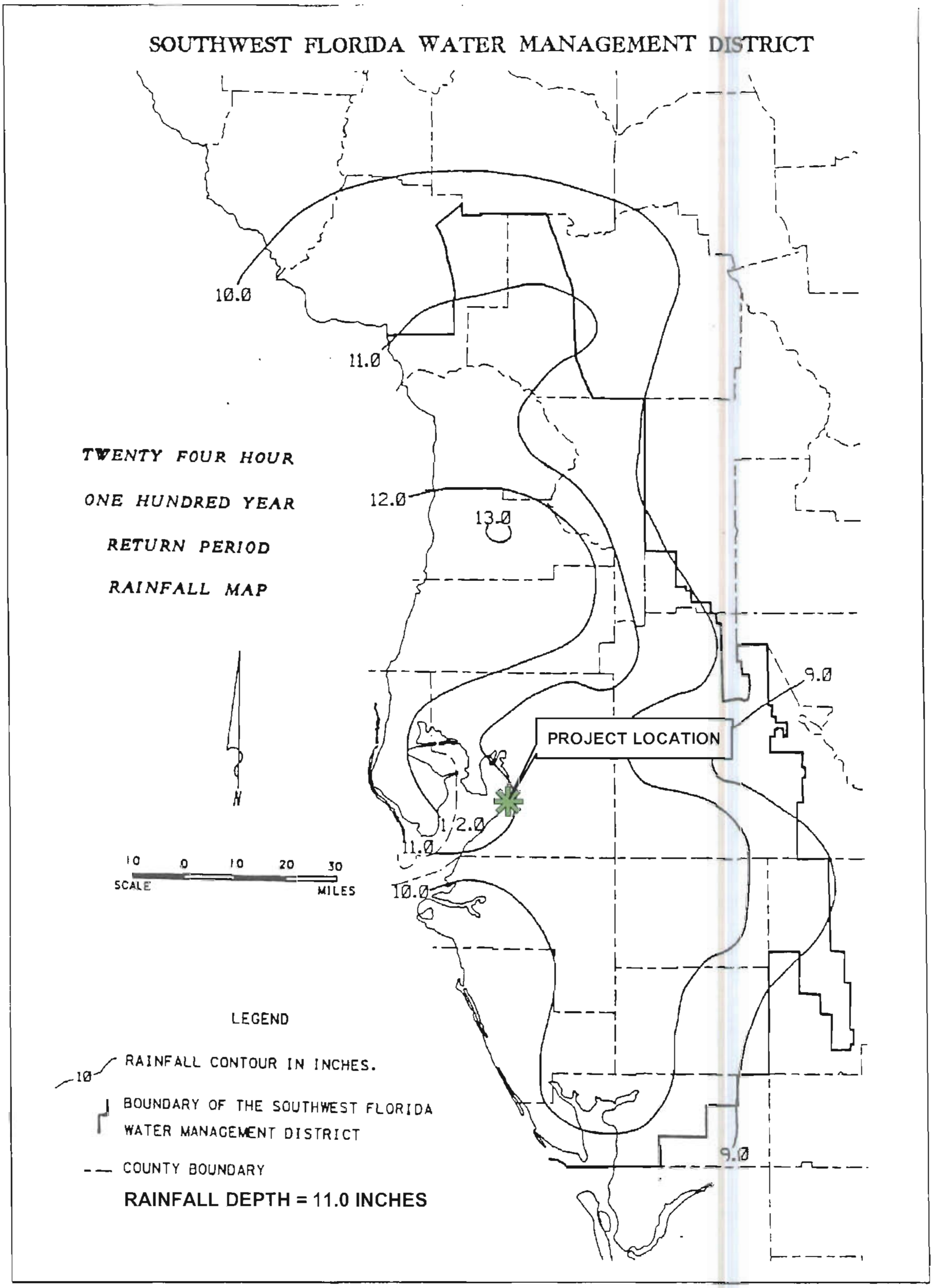


FIGURE 5.
100 YEAR/24 HOUR RAINFALL DEPTH
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Source: ECT, 2012

TECO
TAMPA ELECTRIC

Q:\projects\TECO\100754\0400\ditch_crossing11x8.mxd

By: jstebnisky Date: 5/30/2012

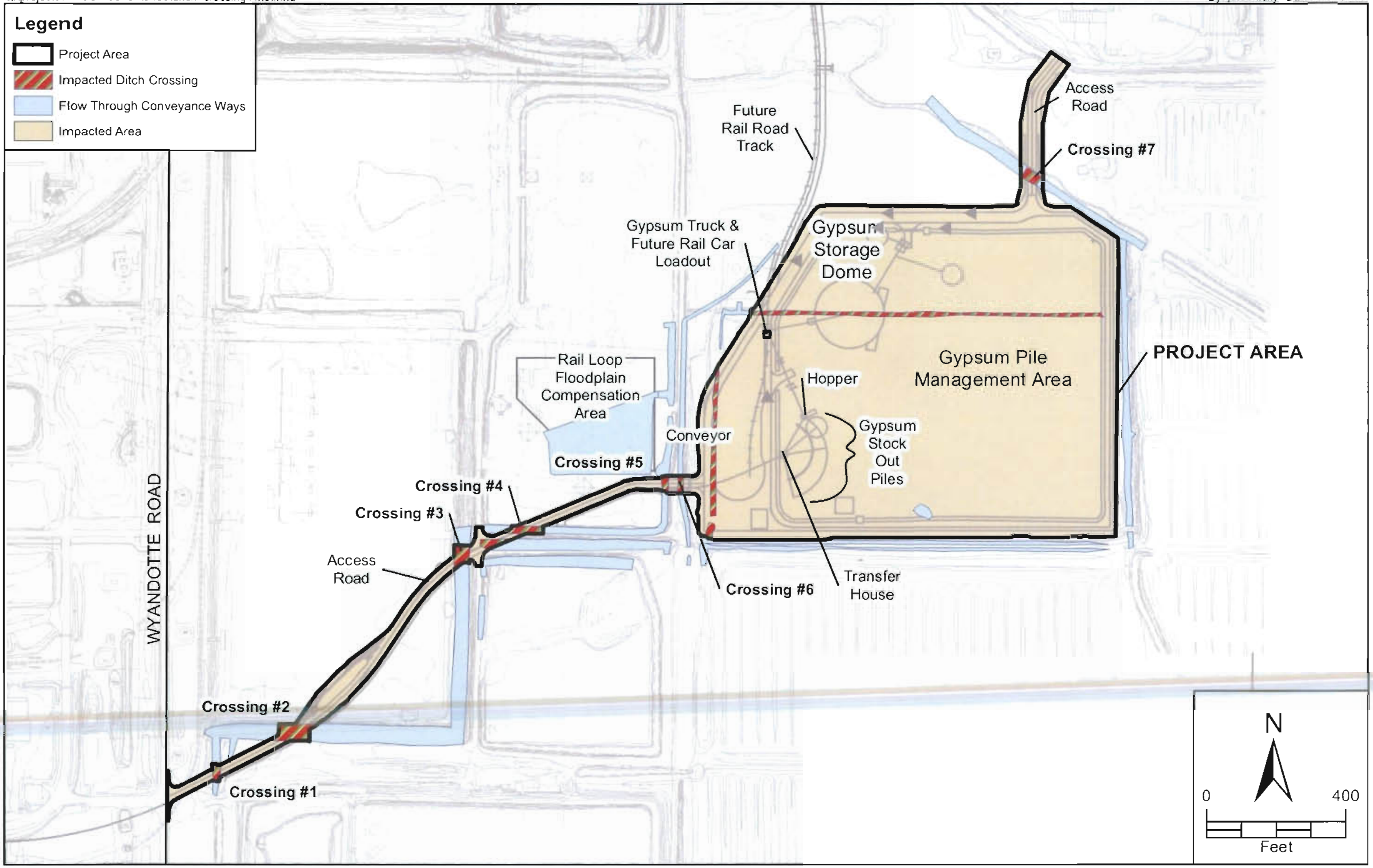


FIGURE 6.
IMPACTED DITCH CROSSINGS
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: ESRI Street Map Data, 2011; Sargent & Lundy, 2011; ECT, 2012

TECO
TAMPA ELECTRIC

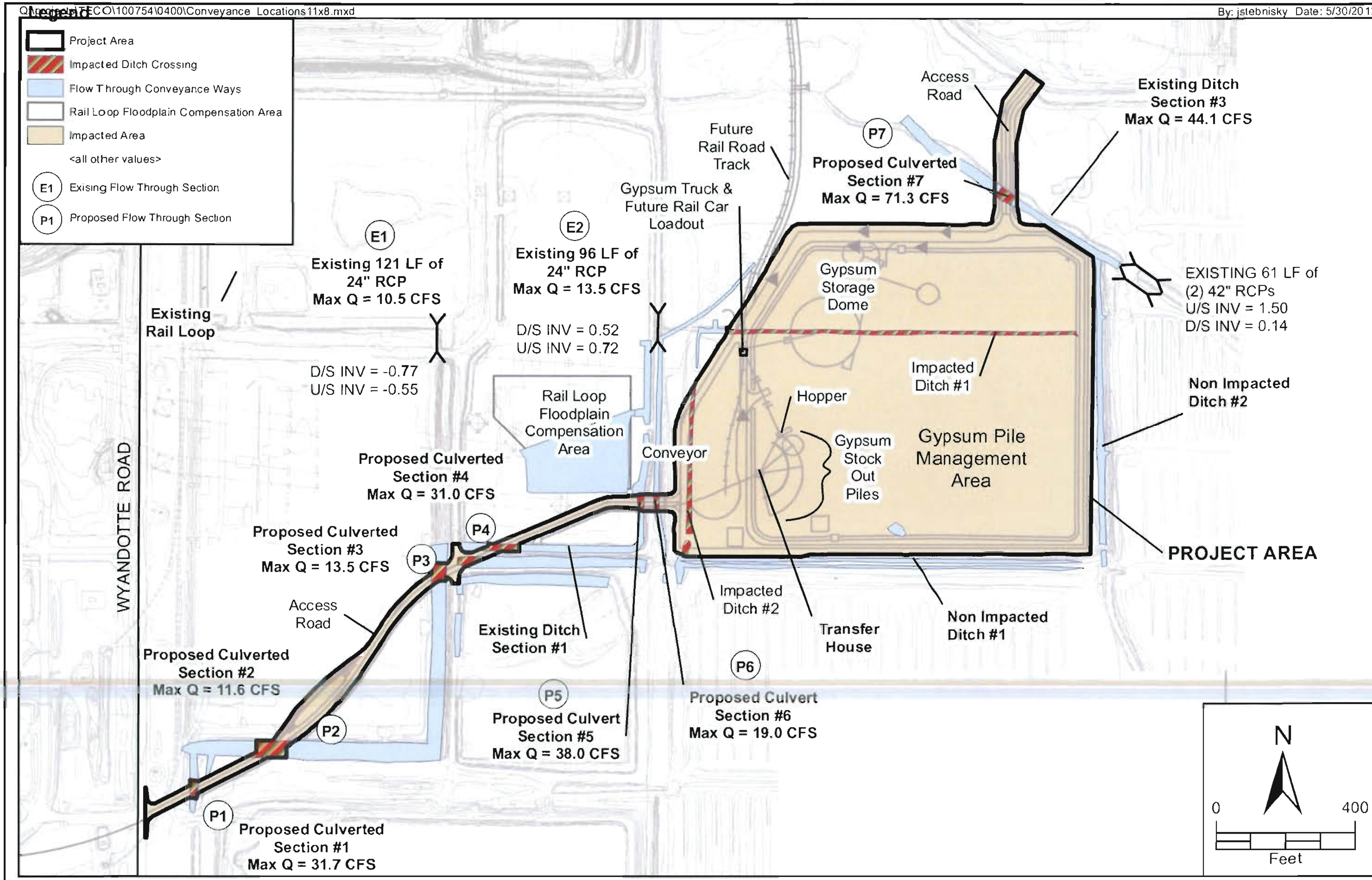


FIGURE 7.
EXISTING/PROPOSED CONVEYANCE SECTION LOCATIONS/INFORMATION
TAMPA ELECTRIC COMPANY
BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: ESRI Street Map Data, 2011; Sargent & Lundy, 2011; ECT, 2012

TECO TAMPA ELECTRIC

APPENDIX A

COMPOSITE CURVE NUMBER CALCULATIONS

ECT

Environmental Consulting & Technology, Inc.

PROJECT: TEC Gypsum CN Calcs
PROJECT NO. 100754-0400
SHEET NO. 1 OF 1
CALCULATED BY: RPM DATE: 1/4/2012
CHECKED BY: ______ DATE: ______

From the existing Hillsborough County - Miscellaneous Coastal Streams model, Basin 824080 has a CN of 86 and an acreage of 410.24 Ac

An estimated curve number for the project area is equal to 79 for "Woods Grass combination" in Good Condition on Table 2-2c in TR-55. If the project area were to be used for a composite CN calc, the CN would be calculated as shown.

$$\begin{array}{r} 410.24 \\ -\ 28.25 \\ \hline 381.99 \text{ Ac} \end{array}$$

– remaining acreage @ a CN of 86 not counting project area.

$(381.99 \times 86) + (28.25 \times 79) =$ 35082.89

$$\text{Composite CN} = \frac{35082.89}{410.24} = 85.5 \approx \underline{86}$$

∴ Existing composite CN for basin is same as CN used in existing model. Therefore CN should not change in proposed condition when project area is removed from basin.

APPENDIX B

EXISTING CONDITIONS MODEL INPUT AND OUTPUT FILES

1. MC-25_EX112010.S4D
2. WB-25.WPX
3. WB-100.WPX
4. MC-25_EX112010.SMX
5. MC-100_EX112010.SMX

```
*   NBLOCKS   INBLK1  OUTBLK1   INBLK2  OUTBLK
SW    2          8       12       12      14
* NITCH NSCRATCH(1)NSCRATCH(2)NSCRATCH(3)NSCRATCH(4)NSCRATCN(5)NSCRATCH(NTH)
MM    6   10   11   13   14   15   16
* ========================================================================
@     8   'WB-25.WPX'
@    11   'MC-25_ex112010.HOT'
@    12   'MC-25_ex112010.INT'
@    15   'MC-25_ex112010.SMX'
@    16   'MC-25_ex112010.PLT'
* ========================================================================
$COMBINE
A1  11
B1  '  GENERATE HYDROGRAPH FROM INTERNAL SCS METHOD'
B1  '  MAKE SWMM INTERFACE FILE           '
* ========================================================================
$EXTRAN
A1 'WOLF BRANCH BASIN - MISCELLANEOUS COASTAL STREAMS  7/25/00 FINAL'
A1 'EXISTING CONDITIONS 25 YEAR, 24 HOUR EVENT '
*************************************************************************
** 7/10/00  Editted roadway overflow elevation for 825420 from 12.5 to 12.8 *
**       Added interbasin overland connection from 825430 to 825630      *
** 7/20/00  Added floodplain definition (From Type 6 to Type 8) for channels*
**       9823170, 9823290, 9823490, 9826640, 9826665                    *
** 7/25/00  Edited 9825600 to 6825600 to model earthen berm obstruction     *
**     Dropped 825640 and made 825615 linear storage for better model  *
*************************************************************************
*        ISOL     KSUPER   LOSSES
B0         2        0        1
*         JELEV    JDOWN
BB          1        0
*======================*
*======================*                        1 hour    5 min
*       NTCYC     DELT      TZERO   NSTART    INTER     JNTER     JREDO  IDATZ(opt)
B1      57600     2.0        0.0      1       1800      150        0
*     32 HOUR SIMULATION
*       METRIC   NEQUAL   AMEN     ITMAX     SURTOL
B2        0        0      10.0      120     0.0015
*     H-prnt  Q-prnt H-plot Q-plot    NJSW
B3      0       0       142      223      0      0     0
B6         82100   82200   82300   82400   82510   82615   82620   82645   82900   82900
           82930   82940  821000  821100  821190  821200  821290  821300  821390  821400
          821490  821500  822000  822050  822100  822110  822190  822150  822200  822250
          822290  822300  822350  822390  822400  822410  822420  822490  822500  823000
          823100  823170  823180  823190  823200  823290  823300  823380  823390  823400
          823490  824000  824080  824085  824100  824110  824120  824130  824140  824200
          824300  824400  824490  824500  824590  824600  824650  825100  825200  825220
          825230  825300  825390  825400  825410  825420  825430  825500  825600  825610
          825615  825620  825630  825630  825650  825653  825655  825700  825800  825900
          826150  826190  826200  826245  826250  826290  826295  826300  826305  826310
          826315  826320  826325  826350  826400  826450  826500  826550  826560  826570
          826600  826640  826650  826665  826685  826700  826750  826780  826790  826800
          826850  826855  826860  826865  826900  826970  826980  826990  829000  829100
          829190  829200  829300  829400  829410  829450  829500  829510  829600  826940
          826950  825429
B7        9821000 9821100 9821190 1821200 9821290 1821300 2821300 3821300 9821390 1821400
          2821400 3821400 9821490 1821500 2821500 9822000 1822050 2822050 1822100 2822100
          3822100 9822150 9822190 1822200 9822110 1822250 9822290 1822300 2822300 3822300
          9822350 9822390 1822400 2822400 9822410 1822420 2822420 9822490 1822500 2822500
          9823000 1823100 9823170 1823180 1823190 2823190 3823190 1823200 2823200 9823290
          1823300 9823380 9823390 1823400 9823490 9824000 1824080 2824080 9824085 1824100
          9824120 9824140 1824400 9824130 1824300 9824110 1824200 1824490 2824490 9824500
          9824590 1824600 9824650 9825100 1825200 9825610 9825610 1825650 9825650 9825653
          1825655 9825615 9825616 1825700 1825700 9825620 1825630 2825630 1825800 2825800
          9825900 9825220 9825410 1825420 9825430 1825500 9825230 1825230 1825300 9825390
          1825400 9826150 9826190 9826200 9826245 1826250 9826290 1826295 1826400 2826400
          1826300 9826305 1826310 9826315 1826320 9826325 1826350 9826450 9826500 1826550
          9826560 1826570 2826570 3826570 9826600 9826640 1826650 2826650 3826650 9826665
          9826685 1826700 1826750 2826750 9826790 1826800 2826800 9826780 1826850 2826850
          9826855 1826860 9826865 1826900 2826900 9826970 9826980 1826990 9829000 9829100
          9829190 1829200 2829200 9829400 9829410 1829450 9829500 9829300 9829501 9829510
          1829600 7821200 7821300 7821400 7821500 7822050 7822100 7822200 7822250 7822300
          7822400 7822420 7822500 7823100 7823180 7823190 7823200 7823300 7823400 7824080
          7824100 7824200 7824300 7824400 7824490 7824600 7825200 7825300 7825400 7825420
          7825500 7825630 7825655 7825700 7825800 7826250 7826295 7826300 7826310 7826320
          7826350 7826400 7826500 7826550 7826570 7826650 7826700 7826750 7826800 7826850
          7826860 7826900 7826990 7826990 7829100 7829200 7829600 1826950 2826950 9826940
          6825430 9825429 6825600
*==============================
** Conduit Data
*==============================
*  NCOND   NJUNC(1)NJUNC(2)  Q0    NKLASS APULL     DEEP    WIDE     LEN    ZP(1)    ZP(2)  ROUGH   STHETA  SPHI        KENT  KEXIT KMIN  STRE *NOTES
**************************
*****  DUG CREEK  *******
**************************
C1  9821000  821000   82100   0      6        0.000   5    100        500   -2.00    -2.00   0.02    7.0           7.0        0      0      0  1  * BOUNDARY
C1  9821100  821100  821000   0      9        0.000   0    0          144   -1.10    -2.00   0.035 9821100     0.00635      0      0      0  1  * S#W-1
C1  9821190  821190  821100   0      8        0.000   0    0         1615   -4.50    -1.10   0.035 9821190 0.002205263     0      0      0  1  * S#W-1
COPY
** US 41
C1  1821200  821200  821190   0      2       80.000   8    10         135   -4.50    -4.50   0.015      0              0  0.1      1      0  1  * FDOT
C1  9821290  821290  821200   0      8        0.000   0    0         1890    0.87    -4.50   0.035 9821290  0.00294127      0      0      0  1  * S#W-2
** CSX R.R.
C1  1821300  821300  821290   0      1       15.904  4.5   4.5        120    0.87     0.87   0.015      0              0  0.1      1      0  1  * FDOT
C1  2821300  821300  821290   0      1       15.904  4.5   4.5        120    0.87     0.87   0.015      0              0  0.1      1      0  1  * FDOT
C1  3821300  821300  821290   0      1       15.904  4.5   4.5        120    0.87     0.87   0.015      0              0  0.1      1      0  1  * FDOT
C1  9821390  821390  821300   0      6        0.000   11   15        2790    8.00     0.87   0.035    3.33         3.33      0      0      0  1  * E,F
** NORTH ST.
C1  1821400  821400  821390   0      3       16.116  3.6   5.7         80    9.00     8.00   0.015      0              0  0.1      1      0  4  * E,F
C1  2821400  821400  821390   0      3       16.116  3.6   5.7         80    9.00     8.00   0.015      0              0  0.1      1      0  4  * E,F
C1  3821400  821400  821390   0      3       16.116  3.6   5.7         80    9.00     8.00   0.015      0              0  0.1      1      0  4  * E,F
C1  9821490  821490  821400   0      6        0.000   8    15        4690   19.00     9.00   0.035   2.083        2.083      0      0      0  1  * E,F
** MESSLER RD.
C1  1821500  821500  821490   0      1        3.142   2    2           80   21.50    20.00   0.026      0              0  0.5      1      0  4  * E,F
C1  2821500  821500  821490   D      1        7.069   3    3           80   20.50    19.00   0.015      0              0  0.1      1      0  4  * E,F
********************************
*****  KITCHEN BRANCH  *********
********************************
C1  9822000  822000   82200   0      6        0.000   5    300        500   -2.10    -2.50   0.02       3              3      0      0      0  1  * BOUNDARY
** US 41
```

```
C1  1822100  822100  822000   0     2    50.000   5     10      113   -2.00   -2.00   0.015      0               0   0.1    1     0  1  * FDOT
C1  2822100  822100  822000   0     2    45.000   5     9       150   -2.10   -2.10   0.015      0               0   0.1    1     0  1  * FDOT
C1  3822100  822100  822000   0     2    45.000   5     9       150   -2.10   -2.10   0.015      0               0   0.1    1     0  1  * FDOT
**********************
*** KRACKER AVE TRIB **
**********************
C1  9822150  822150  822100   0     6     0.000   8     4       965   -2.00   -2.00   0.035      6               6    0     0     0  1  * EM
C1  9822190  822190  822150   0     6     0.000   8     4       890   -2.00   -2.00   0.035      6               6    0     0     0  1  * E,F&M
** CORNER OF KRACKER AND PHILLIPS
C1  1822200  822200  822190   0     1    15.904  4.5   4.5       80   -1.00   -2.00   0.015      0               0   0.1    1     0  4  * E,F
********************************
*****  KITCHEN BRANCH CONT'D) **
********************************
C1  9822110  822110  822100   0     8     0.000   0     0       785   -1.10   -2.00   0.035 9822110 0.001246497    0     0     0  1  * E,F &M
** PHILLIPS LANE
C1  1822250  822250  822110   0     2   142.500  4.75  30        80   -1.10   -1.10   0.015      0               0   0.1    1     0  4  * E,F ,
S#W-3
C1  9822290  822290  822250   0     8     0.000   0     0      1460   -0.65   -1.10   0.035 9822290 0.000408219    0     0     0  1  * S#W-3
** CSX R.R.
C1  1822300  822300  822290   0     1    12.566   4     4       105   -0.65   -0.65   0.015      0               0   0.1    1     0  1  * FDOT
C1  2822300  822300  822290   0     1    12.566   4     4       105   -0.65   -0.65   0.015      0               0   0.1    1     0  1  * FDOT
C1  3822300  822300  822290   0     1    12.566   4     4       105   -0.65   -0.65   0.015      0               0   0.1    1     0  1  * FDOT
C1  9822350  822350  822290   0     6     0.000   8     20     1870    0.00   -0.65   0.035      4               4    0     0     0  1  * EM (DBL
DITCH)
C1  9822390  822390  822350   0     6     0.000   8     20     2265    1.00    0.00   0.035      4               4    0     0     0  1  * EM (DBL
DITCH)
**   SIDE DITCH CROSSINGS OF CSX R.R. 4300 FEET SOUTH OF MAIN CSX-KITCHEN CROSSING
C1  1822400  822400  822390   0     1    12.566   4     4       100    1.50    1.00   0.015      0               0   0.1    1     0  1  * E,F
C1  2822400  822400  822390   0     1    12.566   4     4       100    1.50    1.00   0.015      0               0   0.1    1     0  1  * E,F
C1  9822410  822410  822400   0     6     0.000   12    20     1240    2.80    1.50   0.035     2.2             2.2   0     0     0  1  * E,F
(DBL DITCH)
** SIDE DITCH CROSSINGS OF CSX R.R. 1.05 MILES SOUTH OF MAIN CSX-KITCHEN CROSSING
C1  1822420  822420  822410   0     1     3.142   2     2        65    3.00    2.80   0.015      0               0   0.1    1     0  4  * FDOT
C1  2822420  822420  822410   0     3    11.310   3     4.8      65    3.00    2.80   0.026      0               0   0.5    1     0  4  * FDOT
C1  9822490  822490  822420   0     6     0.000   12    20     4100    4.00    3.00   0.035     2.2             2.2   0     0     0  1  * E,F,
S#W-8
** CR 672/BIG BEND ROAD @ CSX RR
C1  1822500  822500  822490   0     3    12.566  3.2    5       115    5.00    4.00   0.015      0               0   0.1    1     0  1  * E,F,
S#W-8
C1  2822500  822500  822490   0     1     4.909  2.5   2.5      115    5.00    4.00   0.015      0               0   0.1    1     0  1  * E,F,
S#W-8
****************************
*** KRACKER AVE OUTFALL******
****************************
** KRACKER AVE.
C1  1822050  822050  822000   0     1     3.142   2     2        80    0.50   -0.50   0.015      0               0   0.1    1     0  4  * E,F
C1  2822050  822050  822000   0     3     5.027   2     3.2      80    0.50   -0.50   0.015      0               0   0.1    1     0  4  * E,F
**********************************
******  SIMS BRANCH  **************
**********************************
C1  9823000  823000   82300   0     6     0.000   5     300     500   -2.00   -2.50   0.02       3               3    0     0     0  1  * BOUNDARY
** N OF CSX R.R. AT BIG BEND INDUSTRIAL PARK - OUTFALL
C1  1823100  823100  823000   0     1    19.635   5     5       140   -2.00   -2.00   0.015      0               0   0.1    1     0  1  * E,F
*C1  9823170  823170  823100   0     6     0.000   10    6      2515   -0.50   -2.00   0.035     1.75            1.75   0     0     0  1  * E,F
C1  9823170  823170  823100   0     8     0.000  0.0   0.0     2515   -0.50   -2.00   0.035  9823170     0.000596   0     0     0  1  * E,F
** CSX R.R. AT BIG BEND INDUSTRIAL PARK
C1  1823180  823180  823170   0     2    50.000   5     10       80    1.26    1.92   0.015      0               0   0.1    1     0  4  * F,
S#W-4
** CSX R.R. AT BIG BEND INDUSTRIAL PARK
C1  1823190  823190  823180   0     1    12.566   4     4        80    0.09    1.17   0.026      0               0   0.5    1     0  4  * F,
S#W-4
C1  2823190  823190  823180   0     1    12.566   4     4        80    0.09    1.17   0.026      0               0   0.5    1     0  4  * F,
S#W-4
C1  3823190  823190  823180   0     1    12.566   4     4        80    0.09    1.17   0.026      0               0   0.5    1     0  4  * F,
S#W-4
** CSX R.R. AT BIG BEND INDUSTRIAL PARK
C1  1823200  823200  823190   0     1    12.566   4     4        80    0.22    1.18   0.015      0               0   0.1    1     0  4  * F,
S#W-4
C1  2823200  823200  823190   0     1    12.566   4     4        80    0.22    1.18   0.015      0               0   0.1    1     0  4  * F,
S#W-4
*C1  9823290  823290  823200   0     6     0.000   10    3      1160    1.40    0.22   0.035    0.875           0.875   0     0     0  1  * E,F
C1  9823290  823290  823200   0     8     0.000  0.0   0.0     1160    1.40    0.22   0.035 9823290      0.001017   0     0     0  1  * E,F
** US 41
C1  1823300  823300  823290   0     2    40.000   4     10      115    3.00    1.40   0.015      0               0   0.1    1     0  2  * FDOT
C1  9823380  823380  823300   0     8     0.000   0     0      1360    3.20    3.00   0.035 9823380 0.000247059    0     0     0  1  * S#W-6
COPY
C1  9823390  823390  823380   0     8     0.000   0     0       900    3.30    3.20   0.035 9823390 0.000211111    0     0     0  1  * S#W-6
** POWELL RD.
C1  1823400  823400  823390   0     4    21.614  4.3   6.4       95    3.60    3.30   0.026      0               0   0.5    1     0  4  * E,F
*C1  9823490  823490  823400   0     6     0.000   7     4      2000    5.00    3.60   0.035      1               1    0     0     0  1  * E,F
C1  9823490  823490  823400   0     8     0.000  0.0   0.0     2000    5.00    3.60   0.035 9823490 0.000700       0     0     0  1  * E,F
**********************************
*****  JACKSON BRANCH *************
**********************************
C1  9824000  824000   82400   0     6     0.000   5     300     500   -2.54   -2.60   0.02       3               3    0     0     0  1  * BOUNDARY
**********************************
*** BIG BEND INDUSTRIAL DRAINAGE**
**********************************
** WYANDOTTE ROAD
C1  1824080  824080  824000   0     2    56.000   7     8       175   -1.01   -2.54   0.015      0               0   0.1    1     0  1  * S#W-10
C1  2824080  824080  924000   0     2    56.000   7     8       175   -1.01   -2.54   0.015      0               0   0.1    1     0  1  * S#W-10
C1  9824085  824085  824080   0     6     0.000   7     20     2125    0.30   -1.01   0.035     1.25            1.25   0     0     0  1  * E,F
** TECO GRAVEL RD - WETLAND OUTFALL
C1  1824100  824100  824085   0     1    23.758  5.5   5.5      100    0.30    0.30   0.026      0               0   0.5    1     0  1  * E, F,
S#W-9
C1  9824110  824110  824100   0     6     0.000   7     10     1800    3.40    1.60   0.035      1               1    0     0     0  1  * EM
** US 41 - 3150 FEET NORTH OF 672
C1  1824200  824200  824110   0     1     7.069   3     3       122    3.60    3.40   0.015      0               0   0.1    1     0  1  * FDOT
*********************
*** TRIB 1 TO WETLAND *
*********************
C1  9824120  824120  824100   0     6     0.000   7     10     1285    1.50    1.00   0.035      1               1    0     0     0  1  * EM
C1  9824130  824130  824120   0     6     0.000   7     10     1490    3.70    1.50   0.035      1               1    0     0     0  1  * EM
** US 41 - 1530 FEET NORTH OF CR 672
C1  1824300  824300  824130   0     1     7.069   3     3        66    3.90    3.70   0.015      0               0   0.1    1     0  4  * FDOT
*********************
*** TRIB 2 TO WETLAND *
*********************
C1  9824140  824140  824120   0     6     0.000,  7     10     2615    5.00    1.50   0.035      1               1    0     0     0  1  * EM
** US 41 - 470 FEET NORTH OF CR 672
```

```
C1  1824400  824400  824140   0    1     7.069  3    3       138   5.20   5.00  0.015      0          0  0.1   1    0  1  * FDOT
******************************
***** JACKSON BRANCH MAIN ****
******************************
** BIG BEND/CR 672 OUTFALL @ BEACH RD.
C1  1824490  824490  824000   0    1     4.909  2.5  2.5     100   1.15   1.59  0.015      0          0  0.1   1    0  1  * SWW-11
C1  2824490  824490  824000   0    1     4.909  2.5  2.5     100   1.15   1.59  0.015      0          0  0.1   1    0  1  * SWW-11
C1  9824500  824500  824490   0    6     0.000  5    4      2550   2.00   1.15  0.035      2          2    0   0    0  1  *
E,F,SWW-11
C1  9824590  824590  824500   0    6     0.000  5    4      2780   3.00   2.00  0.035      2          2    0   0    0  1  * E,F
** US 41 - 910 FEET SOUTH OF CR 672
C1  1824600  824600  824590   0    2    40.000  4    10      110   3.50   3.00  0.015      0          0  0.1   1    0  1  * E,F
C1  9824650  824650  824600   0    6     0.000  7    15     2250   5.00   3.50  0.035      1          1    0   0    0  1  * EM
****************************************
*****  NEWMAN BRANCH MAIN  ***********
****************************************
C1  9825100  825100   82510   0    6     0.000  12   200     500  -4.00  -4.00   0.02      5          5    0   0    0  1  *
BOUNDARY
** DICKMAN DR.
C1  1825200  825200  825100   0    2   480.000  12   40      125  -4.00  -4.00  0.015      0          0  0.1   1    0  1  * E,F
BRIDGE
*C1  9825600  825600  825200   0    8     0.000  0    0     1000  -4.00  -4.00  0.035 9825600     0.0001    0    0    0  1  * SWW-13
COPY
C1  9825610  825610  825600   0    8     0.000  0    0      2550  -3.60  -4.00  0.035 9825610 0.000256863  0    0    0  1  * SWW-13
******************************************
*****  NEWMAN BRANCH SOUTHERN OUTFALL ***
******************************************
** DICKMAN DRIVE
C1  1825650  825650  826190   0    8     0.000  0    0       475  -4.00  -4.00  0.015 1825650     0.0001    0    0    0  1  * SWW-16
BR: LowCh=9.29, Rd=11.55
C1  9825650  825650  825600   0    8     0.000  0    0       825  -4.00  -4.00  0.035 9825650     0.0001    0    0    0  1  * SWW-13
COPY
C1  9825653  825653  825650   0    8     0.000  0    0      2050  -1.05  -4.00  0.035 9825653 0.001539024  0    0    0  1  * SWW-13
COPY
** PIERRES WAY
C1  1825655  825655  825653   0    3     5.498  2    3.5      50  -1.29  -1.05  0.026      0          0  0.5   1    0  4  * SWW-14
C1  9825615  825615  825655   0    8     0.000  0    0       650  -1.00  -1.29  0.035 9825615 0.000546154  0    0    0  1  * SWW-13
COPY
C1  9825616  825615  825610   0    8     0.000  0    0       235  -3.00  -3.60  0.035 9825616 0.002653191  0    0    0  1  * SWW-13
COPY
** changed 825615 to storage 700 ft x 70 ft 7/25/00
** ELLSBERRY RD.
C1  1825700  825700  825615   0    1     3.142  2    2       150   3.00   1.50  0.026      0          0  0.5   1    0  1  * E,F
**************************************
*****  NEWMAN BRANCH MAIN (CONT'D)****
**************************************
C1  9825620  825620  825615   0    6     0.000  12   25     1580   1.20  -3.00  0.035   0.313      0.313    0    0    0  1  * E,F
** US 41
C1  1825630  825630  825620   0    2    96.000  8    12      121   1.20   1.20  0.015      0          0  0.1   1    0  1  * FDOT
C1  2825630  825630  825620   0    2    96.000  8    12      121   1.20   1.20  0.015      0          0  0.1   1    0  1  * FDOT
** CSX R.R.
C1  1825800  825800  825630   0    2    96.000  6    16       80   3.63   3.58  0.015      0          0  0.1   1    0  4  * FDOT
C1  2825800  825800  825630   0    2    96.000  6    16       80   3.63   3.58  0.015      0          0  0.1   1    0  4  * FDOT
C1  9825900  825900  825800   0    6     0.000  12   15      680   4.00   3.63  0.035      3          3    0   0    0  1  * EM
******************************************
*****  NEWMAN BRANCH TECO DITCH OUTFALL**
******************************************
** TECO SOUTH DITCH TO DICKMAN ROAD
C1  9825220  825220  825200   0    6     0.000  10   30     5910   4.00  -4.00  0.035      5          5    0   0    0  1  * E,F
C1  9825410  825410  825220   0    6     0.000  10   25      810   6.10   4.00  0.035     10         10    0   0    0  1  * EM
** US 41
C1  1825420  825420  825410   0    1     7.069  3    3       129   6.30   6.10  0.015      0          0  0.1   1    0  1  * FDOT
C1  9825430  825430  825420   0    6     0.000  10   10     1170   6.50   6.30  0.035      1          1    0   0    0  1  * EM
*****************
***** EXISTING INTERBASIN CONNECTION
C1  9825429  825429  825630   0    6     0.000  10   10     1700    8.0   3.50  0.035      2          2    0   0    0  1  * EM
** CSX R.R. UNDER POWER LINES
C1  1825500  825500  825430   0    1     4.909  2.5  2.5     125   9.41   8.82  0.015      0          0  0.1   1    0  1  * FDOT
** TECO NORTH DITCH TO DICKMAN ROAD
C1  9825230  825230  825200   0    6     0.000  16   20     5900   4.00  -4.00  0.035      4          4    0   0    0  1  * E,F
C1  1825230  825230  825220   0    1    15.904  4.5  4.5      85   4.00   4.00  0.026      0          0  0.5   1    0  4  * E,F
** US 41
C1  1825300  825300  825230   0    2    40.000  5    8       110   4.00   4.00  0.015      0          0  0.1   1    0  1  * FDOT
C1  9825390  825390  825300   0    6     0.000  16   20      845   4.00   4.00  0.035      4          4    0   0    0  1  * E,F
** CSX R.R.
C1  1825400  825400  825390   0    1     7.069  3    3       135   5.50   4.00  0.015      0          0  0.1   1    0  1  * E,F
**************************************************
**********  APOLLO BEACH *********************
**************************************************
C1  9826150  826150   82615   0    6     0.000  7    200     500  -4.00  -4.00  0.025    3            3    0    0    0  1  *
BOUNDARY
C1  9826190  826190  826150   0    8     0.000  0    0      1450  -4.00  -4.00  0.035 9826190     0.0001    0    0    0  1  * SWW-17
copy
C1  9826200  826200   82620   0    6     0.000  7    200     500  -3.50  -3.50  0.025    3            3    0    0    0  1  *
BOUNDARY
C1  9826245  826245  826200   0    8     0.000  0    0      7150  -3.20  -3.50  0.035 9826245 0.000141958  0    0    0  1  * SWW-17
copy
** FAIRWAY BLVD.
C1  1826250  826250  826245   0    2   216.000  12   18       60  -3.17  -3.20  0.015      0          0  0.1   1    0  4  * F ,
SWW-17
C1  9826290  826290  826250   0    8     0.000  0    0      5140   0.00  -3.17  0.035 9826290 0.000716732  0    0    0  1  * SWW-17
copy
** US 41
C1  1826295  826295  826290   0    1    15.904  4.5  4.5     180   6.00   3.00  0.026      0          0  0.5   1    0  1  * E,F
** CSX R.R.
C1  1826400  826400  826295   0    1     4.909  2.5  2.5     120   8.38   7.58  0.015      0          0  0.1   1    0  1  * FDOT
C1  2826400  826400  826295   0    1     9.621  3.5  3.5     120   8.14   7.68  0.015      0          0  0.1   1    0  1  * FDOT
***************
*** TRIB 1 ****
***************
** US 41 DRIVEWAY CULVERT
C1  1826300  826300  826290   0    1    38.485  7    7        80   1.00   0.00  0.026      0          0  0.5   1    0  4  * E;F
C1  9826305  826305  826300   0    6     0.000  10   6       485   1.40   1.00  0.035   1.183      1.183    0   0    0  1  * E,F
** US 41 DRIVEWAY CULVERT
C1  1826310  826310  826305   0    1    28.274  6    6       120   1.50   1.40  0.015      0          0  0.1   1    0  1  * E,F
C1  9826315  826315  826310   0    6     0.000  10   6       595   2.00   1.50  0.035      2          2    0   0    0  1  * E,F
** US 41 DRIVEWAY CULVERT
C1  1826320  826320  826315   0    1    19.635  5    5       340   2.50   2.20  0.015      0          0  0.1   1    0  1  * E,F
C1  9826325  826325  826320   0    6     0.000  10   6       260   6.00   2.50  0.035      2          2    0   0    0  1  * E,F
** CSX R.R. & US 41
```

```
C1  1826350  826350  826325   0     1       7.069   3    3          300    8.12     6.88   0.015       0          0   0.1    1     0  1  * FDOT
*********************************************
*********  WILDCAT CREEK  *******************
*********************************************
C1  9826450  826450   82645   0     6       0.000   6.5  200        500   -3.50    -3.50   0.025       3          3    0     0     0  1  *
BOUNDARY
C1  9826500  826500  826450   0     8       0.000   0    0         2950   -3.50    -3.50   0.035 9826500    0.0001    0     0     0  1  * SWW-17
copy
** GOLF COURSE PATH
C1  1826550  826550  826500   0     6       0.000   10   20         195   -2.00    -3.50   0.035       6          6    0     0     0  1  * EM-Golf
Cart path not modeled
C1  9826560  826560  826500   0     8       0.000   0    0         4950   -2.53    -3.50   0.035 9826560 0.00029596    0     0     0  1  * SWW-17
COPY
** GOLF & SEA BLVD. @ MILLER MAC RD.
C1  1826570  826570  826560   0     1      28.274   6    6          100   -2.02    -2.53   0.015       0          0   0.1    1     0  1  * F,
SWW-18
C1  2826570  826570  826560   0     1      28.274   6    6          100   -2.62    -1.99   0.015       0          0   0.1    1     0  1  * F,
SWW-18
C1  3826570  826570  826560   0     1      28.274   6    6          100   -2.55    -2.07   0.015       0          0   0.1    1     0  1  * F,
SWW-18
C1  9826600  826600  826570   0     6       0.000   9    20        1210   -1.00    -2.62   0.035   0.833      0.833    0     0     0  1  * E,F
*C1  9826640  826640  826600   0     6       0.000   8    20        4055    2.20    -1.00   0.035       1          1    0     0     0  1  * E,F
C1  9826640  826640  826600   0     8       0.000   0.0  0.0       4055    2.20    -1.00   0.035  9826640  0.000789    0     0     0  1  * E,F
** US 41
C1  1826650  826650  826640   0     2      96.000   8    12         116    2.20     2.20   0.015       0          0   0.1    1     0  1  * FDOT
C1  2826650  826650  826640   0     2      96.000   8    12         116    2.20     2.20   0.015       0          0   0.1    1     0  1  * FDOT
C1  3826650  826650  826640   0     2      96.000   8    12         116    2.20     2.20   0.015       0          0   0.1    1     0  1  * FDOT
*C1  9826665  826665  826650   0     6       0.000   10   12         715    2.64     2.20   0.035     1.5        1.5    0     0     0  1  * E,F
C1  9826665  826665  826650   0     8       0.000   0.0  0.0        715    2.64     2.20   0.035  9826665  0.000615    0     0     0  1  * E,F
***************
*** TRIB 1 *****
***************
C1  9826685  826685  826665   0     6       0.000   8    4          650    8.98     4.00   0.035     4.5        4.5    0     0     0  1  * EM
** CSX R.R AT RUSKIN VEGETABLE CORP.
C1  1826700  826700  826685   0     1       4.909   2.5  2.5        380    9.28     8.98   0.015       0          0   0.1    1     0  1  * FDOT
*********************************************
*********  WILDCAT CREEK (CONT'D) ************
*********************************************
** CSX R.R
C1  1826750  826750  826665   0     2     128.000   8    16          85    2.64     2.64   0.015       0          0   0.1    1     0  4  * FDOT
C1  2826750  826750  826665   0     2     128.000   8    16          85    2.64     2.64   0.015       0          0   0.1    1     0  4  * FDOT
C1  9826780  826780  826750   0     6       0.000   10   12        1460    8.03     2.64   0.035     1.5        1.5    0     0     0  1  * E,F
** SAND FIELD DRIVE
C1  1826850  826850  826780   0     1      12.566   4    4          100    8.27     8.68   0.026       0          0   0.5    1     0  1  * F,
SWW-19
C1  2826850  826850  826780   0     1      12.566   4    4          100    8.31     8.03   0.026       0          0   0.5    1     0  1  * F,
SWW-19
C1  9826855  826855  826850   0     6       0.000   10   8         2120   17.50     8.27   0.035   1.375      1.375    0     0     0  1  * E,F
** UNNAMED DIRT ROAD (SECTION 27)
C1  1826860  826860  826855   0     4      15.268   3.6  5.4        100   18.00    17.50   0.026       0          0   0.5    1     0  1  * E,F
C1  9826865  826865  826860   0     6       0.000   10   6         2080   29.00    18.00   0.035     0.9        0.9    0     0     0  1  * E,F
** TECO POWER LINE ACCESS ROAD
C1  1826900  826900  826865   0     1      12.566   4    4           60   29.50    29.00   0.026       0          0   0.5    1     0  4  * E,F
C1  2826900  826900  826865   0     1      12.566   4    4           60   29.50    29.00   0.026       0          0   0.5    1     0  4  * E,F
C1  9826940  826940  826900   0     6       0.000   15   6         1900   41.00    29.50   0.035      10         10    0     0     0  1  * EM
** I-75
C1  1826950  826950  826940   0     2      24.000   4    6          304   41.10    41.00   0.015       0          0   0.1    1     0  1  * FDOT
C1  2826950  826950  826940   0     2      24.000   4    6          304   41.10    41.00   0.015       0          0   0.1    1     0  1  * FDOT
***************
*** TRIB 2 *****
***************
C1  9826790  826790  826750   0     6       0.000   10   5         4810   27.50     2.64   0.035     3.2        3.2    0     0     0  1  * EM
** TECO POWER LINES ACCESS ROAD
C1  1826800  826800  826790   0     1      12.566   4    4          140   28.00    27.50   0.026       0          0   0.5    1     0  1  * assumed
same as 1826900/2826900
C1  2826800  826800  826790   0     1      12.566   4    4          140   28.00    27.50   0.026       0          0   0.5    1     0  1  * assumed
same as 1826900/2826900
****************
*** TRIB 3 *****
***************
C1  9826970  826970  826850   0     6       0.000   10   8         1170    8.50     8.27   0.035   1.375      1.375    0     0     0  1  * E,F
C1  9826980  826980  826970   0     6       0.000   10   6         1525   10.00     8.50   0.035    0.75       0.75    0     0     0  1  * E,F
** UNNAMED DIRT ROAD
C1  1826990  826990  826980   0     1      15.904   4.5  4.5         85   10.50    10.00   0.026       0          0   0.5    1     0  4  * E,F
*****************************************************
***** MISCELLANEOUS SOUTHERN COASTAL BASINS *********
*****************************************************
C1  9829000  829000   82900   0     6       0.000   4    200        500   -1.00    -1.00   0.025       3          3    0     0     0  1  *
BOUNDARY
C1  9829100  829100  829000   0     8       0.000   0    0          450    1.70    -1.00   0.035 9829100    0.0061     0     0     0  1  * SWW-43
C1  9829190  829190  829000   0     8       0.000   0    0         1600   -1.00    -1.00   0.035 9829190    0.0001     0     0     0  1  * SWW-40
COPY
** 19TH AVE. NW & 14TH ST. NW
C1  1829200  829200  829190   0     3       7.163   2.4  3.8        100    0.00    -1.00   0.015       0          0   0.1    1     0  1  * E,F
C1  2829200  829200  829190   0     1       3.142   2    2          100    0.00    -1.00   0.015       0          0   0.1    1     0  1  * E,F
C1  9829400  829400   82940   0     6       0.000   7    100        500   -4.00    -4.00   0.02     7.00       7.00    0     0     0  1  * BOUNDARY
C1  9829410  829410  829400   0     6       0.000   10   30        1100   -3.90    -4.00   0.025    3.75       3.75    0     0     0  1  * F,
SWW-41 COPY
** 32ND ST NW & SEAGRAPE DR.
C1  1829450  829450  829410   0     2     253.000   11   23          50   -3.81    -3.90   0.015       0          0   0.1    1     0  4  * SWW-41
BR: LowCH=6.92, Rd=9.44
C1  9829500  829500  829450   0     8       0.000   0    0         1350   -3.50    -3.81   0.035 9829500 0.00032963    0     0     0  1  * F,
SWW-41
C1  9829300  829300   82930   0     6       0.000   4    200        500   -1.50    -1.50   0.025       3          3    0     0     0  1  *
BOUNDARY
C1  9829501  829500  829300   0     8       0.000   0    0         1400   -1.10    -1.50   0.035 9829501 0.000385714   0     0     0  1  * SWW-40
copy
C1  9829510  829510  829500   0     6       0.000   10   20        1750   -1.00    -1.10   0.035       2          2    0     0     0  1  * EM
** SHELL POINT ROAD @ CEDAR DRIVE
C1  1829600  829600  829510   0     1       4.909   2.5  2.5         65   -0.50    -1.00   0.015       0          0   0.1    1     0  4  * E,F
*==========================================
*  IRREGULAR CHANNEL CROSS-SECTIONS
*==========================================
**NC     XNL      XNR      XNCH
**X1     SECNO    NUMSTA   STCHL    STCHR    XLOBL    XLOBR    LEN      PXSECR   PSXECE
**GR     EL1      STA1     EL2      STA2     EL3      STA3     EL4      STA4     EL5      STA5
***
* DUG CREEK
***          SURVEY W-1  F.P. ADDED (SWFWMD MAPS)
NC          0.10     0.10     0.025
```

```
X1    9821100    11     0     82     0     0   144     0     0
GR    5.8  -200     5     0     4.7     11     1.6     20     0.8     28
GR    -1.1     47     0.4     51     1.9     69     5     74     5.1     82
GR    5.8     1600
***          SURVEY W-1  F.P. ADDED (SWFWMD MAPS)
NC       0.10    0.10    0.03
X1    9821190    11     0     82     0     0  1615     0     0
GR    7.0  -800     5     0     4.7     11     1.6     20     0.8     28
GR    -4.5     47     0.4     51     1.9     69     5     74     5.1     82
GR    6.5     1500
***          SURVEY W-2  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.035
X1    9821290    8     0     49     0     0    1890     0     0
GR    12.5  -400    10.7     0    10.4     10    0.87     20     1.2     29
GR    6.4   39     7.1     49    12.5     750
****
* KITCHEN BRANCH
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW
NC       0.16    0.16    0.04
X1    9822110    8     0     70     0     0     785     0     0
GR    5.0  -480    3.0  -130    1.0     0    -1.1    20    -1.1    50
GR    1.0   70     3.0   100     5.0   420
***          SURVEY W-3  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.04
X1    9822290    9     0    112     0     0    1460     0     0
GR    10  -500     3.1   0     3.4    33     0.8     41    -0.65     56
GR    1     74     5.5   85    5.1    112    10      820
****
* SIMS BRANCH
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC       0.16    0.16    0.04
X1    9823170    11     0     21.6    0     0    2515     0     0
GR    7.0   -25.0    6.0   -20     5.0    -10     4.0     0    -0.5     7.8
GR    -0.5    13.8    4.0    21.6    5.0    31.6    5.0    622    6.0    662
GR    7.0    665
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC       0.16    0.16    0.04
X1    9823290    13     0     10.0    0     0    1160     0     0
GR    8.0   -250     7.0   -220    6.5   -200    6.5    -100    6.0   -10.0
GR    5.5    0.0    1.4    3.5    1.4    6.5    5.5    10.0    6.0    20.0
GR    7.0    90     7.0    160    8.0    170.0
***          SURVEY W-6  COPY  Rt.Bank ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.04
X1    9823380    10     0     81     0     0    1360     0     0
GR    9.0   -1100    8.9     0    8.7     41     4.6     50     3.2     58
GR    3.6     66     8.7    69    8.8     76     8.9     81     9.1    681
***          SURVEY W-6  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.04
X1    9823390    10     0     81     0     0    900     0     0
GR    9.8   -1200    8.9     0    8.7     41     4.6     50     3.3     58
GR    3.6     66     8.7    69    9.9     76     10     81     10.1    1481
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC       0.16    0.16    0.04
X1    9823490    11     0     10.0    0     0    2000     0     0
GR    12.5   -20     10.5  -15.0   10.0  -10     8.0     0     5.0     3
GR    5.0     7     8.0    10.0    9.0    20.0    10    210    10.5    610
GR    12.5   620
***
* NEWMAN BRANCH
***          SURVEY W-13 COPY  R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
******* obstructed by earthen berm at elev 4.81!!
*NC       0.16    0.16    0.025
*XI    9825600    8     0     131     0   0     1000     0     0
*GR    7.5  -100    4.19     0    -1.8     1    -4.0     51     1.6     101
*GR    5.0   106    5.1    131     5.2     631
***          SURVEY W-13  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    9825610    8     0     131     0   0    2550     0     0
GR    7.5  -300    4.19     0    -1.8     1    -3.6     51     1.6     101
GR    5.8   106    5.7    131     5.9     431
***          SURVEY W-16 BRIDGE  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    1825650    9     0    160     0   0    475     0     0
GR    7.7  -450    7.66     0    6.56    25   -1.24    33.6   -4.0     61
GR    0.84  106    6.66    112    6.76    160    6.8  360
***          SURVEY W-13  COPY  R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    9825650    8     0     131     0   0    825     0     0
GR    10.0 -500    4.19     0    -1.8     1    -4.0     51     1.6     101
GR    5.8   106    5.7    131     7.0     731
***          SURVEY W-13  COPY (+2.55') F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    9825653    8     0     131     0   0    2050     0     0
GR    7.0  -450    4.19     0    0.75     1    -1.05     51     4.15     101
GR    5.8   106    5.7    131     7.0     331
***          SURVEY W-13  COPY (+2.55') F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    9825615    8     0     131     0   0    650     0     0
GR    7.0  -450    4.19     0    0.75     1    -1.00     51     4.15     101
GR    5.8   106    5.7    131     7.0     331
***          SURVEY W-13  COPY  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    9825616    8     0     131     0   0    235     0     0
GR    7.5  -300    4.19     0    -1.8     1    -3.0     51     1.6     101
GR    5.8   106    5.7    131     5.9     431
****         SURVEY W-13  COPY (+2' TO 5.1') F.P. ADDED (SWFWMD MAPS)
*NC       0.16    0.16    0.025
*X1    9825640    8     0     131     0   0    310     0     0
*GR    9.4  -300    9.29     0    3.3     1    1.5     51     6.7     101
*GR    7.8   106    7.7    131     9.2     431
***
* APOLLO BEACH/WILDCAT CREEK
***
***          SURVEY W-17  COPY  R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
X1    9826190    10     0     191     0     0    1450     0     0
GR    6  -450     5.0   -350    4.1     0   -1.07     2   -4.00     83
GR    1.33 164    4.81 166     4.63  191    5.0    300     5.5    350
***          SURVEY W-17  COPY  F.P. ADDED (SWFWMD MAPS)
NC       0.16    0.16    0.025
```

```
X1    9826245     8        0      191       0        0    7150        0        0
GR    7.0   -400    4.1        0   -1.07        2   -3.20       83     1.33      164
GR    6.81     166      6.63    191       7.0     400
***              SURVEY W-17  COPY  (+3')R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1    9826290     8        0      191       0        0    5140        0        0
GR    8.0   -100    7.1    0      2.07        2   0.0       83     4.33      164
GR    6.81     166      7.63    191       8.0     300
***              SURVEY W-17  COPY  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1    9826500     8        0      191       0        0    2950        0        0
GR    7.0   -100    4.1        0   -1.07        2   -3.50       83     1.33      164
GR    6.81     166      6.63    191       7.0     300
***              SURVEY W-17  COPY (+0.5')R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1    9826560     8        0      191       0        0    4950        0        0
GR    7.0   -100    4.6        0   -0.57        2   -2.53       83     1.83      164
GR    6.81     166      6.83    191       7.0     300
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC          0.16    0.16    0.04
X1    9826640      9      0      30     0       0      4055       0        0
GR    11    -310    9.5   -300     7.2   0     2.2     5.0      2.2      25
GR    7.2    30     9.0   280     10.0   430    11     450
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC          0.16    0.16    0.04
X1    9826665      12      0       30     0       0      715        0        0
GR    12.0 -510      10.0  -500      9.0   -100     9.0    -20      8.64       0
GR    2.64    9      2.64    21     8.64    30     8.0     80       9.0      130
GR    10.0   230     12      250
***
* COASTAL BASINS
***
***              SURVEY W-43  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.03
X1   9829100     9         0       62        0        0   450        0        0
GR   6.7     -200    3.5        0     3.7       25     2.1      27     1.7       31
GR   2.5     36      2.6       37     3.1       62      6.7    762
***              SURVEY W-40 COPY  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.03
X1  9829190     9         0       80        0        0   1600        0        0
GR    5    -150     1.56     0    1.36       10    0.16       16   -1.00       30
GR    -0.34   44       5.96    55     5.96       80       6    230
***              SURVEY W-41 COPY  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.03
X1  9829500     7        0       75       0        0   1350        0        0
GR      7.59        0    6.45     26.4   -0.41    26.5   -3.50       41   -0.21       57
GR      6.99       64    7.59       75
***              SURVEY W-40 COPY  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.03
X1  9829501     9         0       80        0        0   1400        0        0
GR    6    -100     1.56     0    1.36       10    0.16       16   -1.10       30
GR    -0.34   44       5.96    55     5.96       80       5    2000
*==============================
** Junction Data     TW=2
*==============================
*   (INPUT)  (opt. 200)       (INPUT)HBC Model
*     JUN     GRELEV     Z      QINST      YO              TOB    Yo or Rd Top
**   DUG CREEK
D1     82100        5       -2    0        2         *     3.5     BOUNDARY
D1     821000       7       -2    0        2         *     5
D1     821100      15     -1.1    0        2         *     5
D1     821190    17.6     -4.5    0        2         *     7.6
D1     821200    17.7     -4.5    0        2         *     7.7      7.5
D1     821290      20     0.87    0        2         *     10
D1     821300      20     0.87    0        2         *     10       10.6
D1     821390      25        8    0        8         *     15
D1     821400      25        9    0        9         *     15       14.9
D1     821490      36       19    0       19         *     26
D1     821500      37     20.5    0     20.5         *     27       26.2
** KITCHEN BRANCH
D1     82200        5     -2.5    0        2         *     3.5      BOUNDARY
D1     822000       7     -2.1    0        2         *     4
D1     822050      10      0.5    0        2         *     5        4.5
D1     822100      15     -2.1    0        2         *     5        6.5
D1     822110      15     -1.1    0        2         *     5
D1     822150      15       -2    0        2         *     5
D1     822190      15       -2    0        2         *     5
D1     822200      15       -1    0        2         *     5        6.5
D1     822250      16     -1.1    0        2         *     6        6.08
D1     822290      15    -0.65    0        2         *     5
D1     822300      16    -0.65    0        2         *     6        12
D1     822350      17        0    0        2         *     7
D1     822390      20        1    0        2         *     10
D1     822400      20      1.5    0        2         *     10       12.5
D1     822410      20      2.8    0      2.8         *     10
D1     822420      20        3    0        3         *     10       12.5
D1     822490      20        4    0        4         *     10
D1     822500      20        5    0        5         *     10       15.4
** SIMS BRANCH
D1     82300        5     -2.5    0        2         *     3.5      BOUNDARY
D1     823000       7       -2    0        2         *     6
D1     823100      17       -2    0        2         *     7        6.5
D1     823170      17     -0.5    0        2         *     7
D1     823180      17     1.17    0        2         *     7        6
D1     823190      16     0.09    0        2         *     6        6
D1     823200      16     0.22    0        2         *     6        6
D1     823290      19      1.4    0        2         *     9
D1     823300      19        3    0        3         *     9        9
D1     823380      18      3.2    0      3.2         *     8
D1     823390      20      3.3    0      3.3         *     10
D1     823400      20      3.6    0      3.6         *     10       9.8
D1     823490    20.5        5    0        5         *     10.5
** JACKSON BRANCH
D1     82400        5     -2.6    0        2         *     3.5      BOUNDARY
D1     824000       7    -2.54    0        2         *     7
D1 .   824080    16.5    -1.01    0        2         *     6.5      6.5
D1     824085      16      0.3    0        2         *     6
D1     824100      16      0.3    0        2         *     6        Yo=3, 5.5
D1     824110    16.5      3.4    0      3.4         *     6.5
D1     824120      16      1.5    0        2         *     6
```

```
D1   824130     18     3.7   0    3.7     *    8
D1   824140     18       5   0    5       *    8
D1   824200     17     3.6   0    3.6     *    7          9.3
D1   824300     18     3.9   0    3.9     *    8          10
D1   824400     21     5.2   0    5.2     *    11         11
D1   824490     17.5   1.15  0    2       *    7.5        7.5
D1   824500     16       2   0    2       *   .6
D1   824590     18       3   0    3       *    8
D1   824600     20     3.5   0    3.5     *    10         12.5
D1   824650     20       5   0    5       *    10         Yo=8
** NEWMAN BRANCH
D1   82510       9      -4   0    2       *    BOUNDARY
D1   825100      9      -4   0    2       *    4
D1   825200     15      -4   0    2       *    5          5
D1   825220     20       4   0    4       *    10
D1   825230     20       4   0    4       *    10
D1   825300     22       4   0    4       *    12         12
D1   825390     20       4   0    4       *    10
D1   825400     22     5.5   0    5.5     *    12         15
D1   825410     22     6.1   0    6.1     *    12
D1   825420     22     6.3   0    6.3     *    12         12.8
D1   825429     22.5   8.0   0    8.0     *    12.4
D1   825430     22.5   6.5   0    6.5     *    12.5
D1   825500     23     9.41  0    9.41    *    13         13
D1   825600     11      -4   0    2       *    7
D1   825610     11    -3.6   0    2       *    7
D1   825615     11      -3   0    2       *    7
D1   825620     15     1.2   0    2       *    9
D1   825630     23     1.2   0    2       *    13         13.5
*D1   825640     17     1.5   0    2       *    7
D1   825650     11      -4   0    2       *    5
D1   825653     11   -1.05   0    2       *    6
D1   825655     11   -1.29   0    2       *    6
D1   825700     19       3   0    3       *    9          9.2
D1   825800     23     3.63  0    3.63    *    13         13.5
D1   825900     20       4   0    4       *    10
** APOLLO BEACH/WILDCAT CREEK
D1    82615      5      -4   0    2       *    3.5        BOUNDARY
D1    82620      5    -3.5   0    2       *    3.5        BOUNDARY
D1    82645      5    -3.5   0    2       *    3.5        BOUNDARY
D1   826150      9      -4   0    2       *    8
D1   826190     14.5    -4   0    2       *    4.5
D1   826200      9    -3.5   0    2       *    6
D1   826245     16    -3.2   0    2       *    6
D1   826250     16   -3.17   0    2       *    6          10
D1   826290     20       0   0    2       *    10
D1   826295     23       6   0    6       *    13         14
D1   826300     22       1   0    2       *    12         10
D1   826305     20     1.4   0    2       *    10
D1   826310     20     1.5   0    2       *    10         10
D1   826315     20       2   0    2       *    10
D1   826320     20     2.5   0    2.5     *    10         10.2
D1   826325     20       6   0    6       *    10
D1   826350     21.5   8.12  0    8.12    *    11.5       13
D1   826400     22     8.14  0    8.14    *    12         14
D1   826450      9    -3.5   0    2       *    7
D1   826500     15    -3.5   0    2       *    5          6
D1   826550     14      -2   0    2       *    4          4
D1   826560     14   -2.53   0    2       *    4
D1   826570     16   -2.62   0    2       *    6          5
D1   826600     15      -1   0    2       *    5
D1   826640     18     2.2   0    2.2     *    8
D1   826650     21     2.2   0    2.2     *    11         11
D1   826665     19     2.64  0    2.64    *    9
D1   826685     22     8.98  0    8.98    *    12
D1   826700     25     9.28  0    9.28    *    15         14
D1   826750     22     2.64  0    2.64    *    12         12
D1   826780     20     8.03  0    8.03    *    10
D1   826790     45    27.5   0    27.5    *    35
D1   826800     44      28   0    28      *    34         34
D1   826850     24     8.27  0    8.27    *    14         14.7
D1   826855     34    17.5   0    17.5    *    24
D1   826860     34      18   0    18      *    24         24
D1   826865     46      29   0    29      *    36
D1   826900     46    29.5   0    29.5    *    36         36
D1   826940     57      41   0    41      *    47
D1   826950     57    41.1   0    41.1    *    47
D1   826970     25     8.5   0    8.5     *    15         15
D1   826980     28      10   0    10      *    18
D1   826990     28    10.5   0    10.5    *    18         18.5
** COASTAL BASINS
D1    82900      5      -1   0    2       *    3.5        BOUNDARY
D1    82930      5    -1.5   0    2       *    3.5        BOUNDARY
D1    82940      5      -4   0    2       *    3.5        BOUNDARY
D1   829000      7      -1   0    2       *    1
D1   829100     12     1.7   0    2       *    2          2
D1   829190     14      -1   0    2       *    4
D1   829200     15       0   0    2       *    5          5
D1   829300      7    -1.5   0    2       *    5
D1   829400      7      -4   0    2       *    1.5
D1   829410     11.5  -3.9   0    2       *    1.5
D1   829450     14   -3.81   0    2       *    4          BR: LC=6.92, RD=9.44
D1   829500     13    -3.5   0    2       *    3
D1   829510     14      -1   0    2       *    4
D1   829600     15    -0.5   0    2       *    5          5
*==========================================
* STORAGE NODES - ROAD OVERTOPPING
* (allows non-overlapping pipe connect.s & weirs)
*==========================================
** DUG CREEK
E1 821190  18    5000  0
E1 821200  18    -1    4
E2 0.007    -4.5
    2.0      5.0
    21       7.0
    21      17.0
E1 821290  20    5000    0
E1 821390  25    5000    0
E1 821400  25    -1    3
E2  0.005    9.0
```

```
    26.5    14.5
    26.5    24.5
E1 821490  36   5000    0
E1 821500  37   5000    0
** KITCHEN BRANCH
E1 822050  15   5000    0
E1 822000  15   100000  0
E1 822200  15   5000    0
E1 822190  15   5000    0
E1 822250  16   5000    0
E1 822110  15   5000    0
E1 822290  15   5000    0
E1 822400  22   -1    3
E2  0.005   1.5
    17.0    12.0
    17.0    22.0
E1 822390  20   5000    0
E1 822420  22   -1    3
E2  0.005   3.0
    24.0    12.0
    24.0    22.0
E1 822410  20   5000    0
E1 822500  25   -1    3
E2  0.005   5.0
    30.0    14.9
    17.0    24.9
E1 822490  20   5000    0
** SIMS BRANCH
E1 823000  17   5000    0
E1 823100  17   5000    0
E1 823170  17   5000    0
E1 823180  17   -1    3
E2  0.005  1.17
    5.0    5.50
    5.0    15.5
E1 823190  17   -1    3
E2  0.005  0.09
    2.0    5.50
    2.0    15.5
E1 823200  17   5000    0
** storage accounted for in type 8 floodplain
*E1 823200  17   -1    3
*E2  0.005  0.22
*    5.5    5.50
*    5.5    15.5
E1 823290  20   5000    0
E1 823300  20   -1    3
E2  0.005   3.0
    30      8.50
    30      18.5
E1 823380  20   5000    0
E1 823390  20   5000    0
E1 823400  20   5000    0
** storage accounted for in type 8 floodplain
*E1 823400  20   -1    3
*E2  0.005   3.6
*    3.0     9.3
*    3.0     19.3
E1 823490  20   5000    0
** JACKSON BRANCH
E1 824000  16   5000    0
E1 824085  16   5000    0
E1 824080  16   -1    3
E2  0.005  -1.01
    8.0     5.0
    8.0     15.0
E1 824110  16   5000    0
E1 824130  18   5000    0
E1 824140  18   5000    0
E1 824200  19   -1    3
E2  0.005   3.6
    52.0    8.8
    52.0    18.8
E1 824300  20   -1    3
E2  0.005   3.9
    24.0    9.5
    24.0    19.5
E1 824400  21   5000    0
E1 824490  18   5000    0
E1 824590  18   5000    0
E1 824600  22   -1    3
E2  0.005   3.5
    83.0    12.0
    83.0    22.0
** NEWMAN BRANCH
E1 825100  20   1000000 0
E1 825230  20   5000    0
E1 825300  22   -1    3
E2  0.005   4.0
    3.0     11.5
    3.0     21.5
E1 825390  20   5000    0
E1 825400  25   -1    3
E2  0.005   5.5
    27.0    14.5
    27.0    24.5
E1 825410  20   5000    0
E1 825420  20   5000    0
E1 825429  20   5000    0
E1 825430  20   5000    0
E1 825500  23   -1    4
E2  0.005   9.41
    3.2     10.0
    18.0    13.0
    18.0    23.0
E1 825620  15   5000    0
E1 825630  23   -1    3
E2  0.005   1.2
    2.0     13.0
    2.0     23.0
```

```
E1 825653  11    5000    0
E1 825655  11    5000    0
E1 825615  11    52500   0
E1 825700  20     -1   3
E2  0.005   3.0
    21.0    8.7
    21.0    18.7
E1 825800  23    -1    4
E2  0.005   3.63
    6.5     10.0
    21.0    13.0
    21.0    23.0
** APOLLO BEACH/WILDCAT CREEK
E1 826245  21    5000    0
E1 826250  21    5000    0
E1 826290  22    5000    0
E1 826300  22     -1   3
E2  0.005   1.0
    1.10    9.5
    1.10    19.5
E1 826305  20    5000    0
E1 826310  20    5000    0
E1 826315  20    5000    0
E1 826320  20    5000    0
E1 826325  21.5 5000    0
E1 826350  22.5   -1    3
E2  0.005   8.12
    29.0   12.5
    29.0   22.5
E1 826295  22.0 5000    0
E1 826400  24.0   -1    3
E2  0.005   8.14
    23.0   13.5
    23.0   23.5
E1 826450  15.0 5000    0
E1 826500  16.0   -1    3
E2  0.005   -3.5
    37.0    5.5
    37.0   15.5
E1 826550  14.0   -1    3
E2  0.005   -2.0
    39.0    3.5
    39.0   13.5
E1 826560  16    5000    0
E1 826570  16     -1    3
E2  0.005   -2.62
    0.21    4.5
    0.21   14.5
E1 826640  21    5000    0
E1 826665  22     -1    4
E2  0.005  2.64
    0.55   7.9
    2.5    8.0
    2.5   18.0
E1 826685  25 5000    0
E1 826700  25   -1    3
E2  0.005  9.28
    20.0   13.5
    20.0   23.5
E1 826650  21.0 5000    0
E1 826750  22.0   -1    3
E2  0.005  2.64
    16.4   11.5
    16.4   21.5
E1 826790  44 5000    0
E1 826800  44   -1    3
E2  0.005  28.0
    0.23   33.5
    0.23   43.5
E1 826780  24    5000    0
E1 826850  24.2   -1    3
E2  0.005  8.27
    5.2    14.2
    5.2    24.2
E1 826855  34    5000    0
E1 826860  34    5000    0
E1 826865  46    5000    0
E1 826900  46    5000    0
E1 826970  25     -1    3
E2  0.005  8.5
    13.7   14.5
    13.7   24.5
E1 826980  28    5000    0
E1 826990  28     -1    3
E2  0.005  10.5
    5.2    18.0
    5.2    28.0
** COASTAL BASINS
E1 829000  12    5000    0
E1 829190  15    5000    0
E1 829200  15     -1    3
E2  0.005  0.0
    33.0    4.5
    33.0   14.5
E1 829510  15    5000    0
E1 829600  15     -1    3
E2  0.005  -0.5
    21.0    4.5
    21.0   14.5
*==================================================
* STORAGE DATA (SIGNIFICANT LAKES/WETLANDS)
*==================================================
** DUG CREEK
E1 821300 20  -1 4
E2  0.005   0.87
    2.5     5.0
    49.0    10.0
    49.0    20.0
** KITCHEN BRANCH
E1 822100  15   1000000  0
```

```
E1 822150  15    313000  0
E1 822300  17    -1   5
E2  0.005   -0.65
    0.5     5.0
    28.0    10.0
    119.0   12.0
    119.0   17.0
** JACKSON BRANCH
E1 824100  17    -1   6
E2  0.005  0.30
    0.005   2.9
    10.5    3.0
    40      5.0
    78      6.0
   100     11.0
E1 824650  20    -1   6
E2  0.005   5.0
    0.005   7.9
    0.75    8.0
    3.0     10.0
    8.8     11.5
    50      16.5
** NEWMAN BRANCH
E1 825200  15    -1   3
E2  0.005   -4.0
    20.0     4.5
    50.0    14.0
** COASTAL BASINS
E1 829100  15  1129250  0
E1 829500  15  3681250  0
*=====================
** Weir Data
*=====================
* ==============================
*  FLOOD FLOW OVERTOP ROAD PATHS
* ==============================
*        IDWEIR   NJUNC(1) NJUNC(2)  KWEIR   EL.CREST  EL.TOP   WLEN    COEFF
** DUG CREEK
G1       7821200   821200   821190     1       7.50    17.7     100     2.63
G1       7821300   821300   821290     1      10.60     20      100     2.63
G1       7821400   821400   821390     1      14.90     25      100     2.63
G1       7821500   821500   821490     1      26.20     37      100     2.63
** KITCHEN BRANCH
G1       7822050   822050   822000     1       4.50     15      100     2.63
G1       7822100   822100   822000     1       6.50     15      400     2.63
G1       7822200   822200   822190     1       6.50     15      100     2.63
G1       7822250   822250   822110     1       6.08     16      100     2.63
G1       7822300   822300   822290     1      12.00     16      100     2.63
G1       7822400   822400   822390     1      12.50     20      100     2.63
G1       7822420   822420   822410     1      12.50     20      100     2.63
G1       7822500   822500   822490     1      15.40     20      100     2.63
** SIMS BRANCH
G1       7823100   823100   823000     1       6.50     17      100     2.63
G1       7823180   823180   823170     1       6.00     17      100     2.63
G1       7823190   823190   823180     1       6.00     16      100     2.63
G1       7823200   823200   823190     1       6.00     16      100     2.63
G1       7823300   823300   823290     1       9.00     19      100     2.63
G1       7823400   823400   823390     1       9.80     20      100     2.63
** JACKSON BRANCH
G1       7824080   824080   824000     1       6.50    16.5     100     2.63
G1       7824100   824100   824085     1       5.50     16      100     2.63
G1       7824200   824200   824110     1       9.30     17      100     2.63
G1       7824300   824300   824130     1      10.00     18      100     2.63
G1       7824400   824400   824140     1      11.00     21      100     2.63
G1       7824490   824490   824000     1       7.50    17.5     100     2.63
G1       7824600   824600   824590     1      12.50     20      100     2.63
** NEWMAN BRANCH
G1       7825200   825200   825100     1      10.00     15      100     2.63
G1       7825300   825300   825230     1      12.00     22      100     2.63
G1       7825400   825400   825390     1      15.00     22      100     2.63
G1       7825420   825420   825410     1      12.80     22      100     2.63
********* INTERBASIN TRANSFER TO FDOT DITCH  7/10/00
G1       6825430   825430   825429     1      12.40     22      20      2.63
***********
G1       7825500   825500   825430     1      13.00     23      100     2.63
***** 7/25 MODIFICATION earthen berm obstructs flow
G1       6825600   825600   825200     1       4.80     10      100     2.63
*********************
G1       7825630   825630   825620     1      13.50     17      100     2.63
G1       7825655   825655   825653     1       6.80     11      100     2.63
G1       7825700   825700   825615     1       9.20     19      100     2.63
G1       7825800   825800   825630     1      13.50     23      100     2.63
** APOLLO BEACH/WILDCAT CREEK
G1       7826250   826250   826245     1      10.00     16      100     2.63
G1       7826295   826295   826290     1      14.00     23      100     2.63
G1       7826300   826300   826290     1      10.00     22      50      2.63
G1       7826310   826310   826305     1      10.00     20      50      2.63
G1       7826320   826320   826315     1      10.20     20      50      2.63
G1       7826350   826350   826325     1      13.00    21.5     100     2.63
G1       7826400   826400   826295     1      14.00     22      100     2.63
G1       7826500   826500   826450     1       6.00     15      100     2.63
G1       7826550   826550   826500     1       4.00     14      100     2.63
G1       7826570   826570   826560     1       5.00     16      100     2.63
G1       7826650   826650   826640     1      11.00     21      100     2.63
G1       7826700   826700   826685     1      14.00     25      100     2.63
G1       7826750   826750   826665     1      12.00     22      100     2.63
G1       7826800   826800   826790     1      34.00     44      100     2.63
G1       7826850   826850   826780     1      14.70     24      100     2.63
G1       7826860   826860   826855     1      24.00     34      100     2.63
G1       7826900   826900   826865     1      36.00     46      100     2.63
G1       7826990   826990   826980     1      18.50     28      100     2.63
** COASTAL BASINS
G1       7829100   829100   829000     1       2.00     12      100     2.63
G1       7829200   829200   829190     1       5.00     15      100     2.63
G1       7829600   829600   829510     1       5.00     15      100     2.63
********* Outfall Data ****************************************************
* Tidal (CONSTANT)
*
I1    82100  1
I1    82200  1
```

```
I1     82300  1
I1     82400  1
I1     82510  1
I1     82615  1
I1     82620  1
I1     82645  1
I1     82900  1
I1     82930  1
I1     82940  1
J1  2
J2  2.0
$ENDPROGRAM
```

```
* ==========================================================================
*                        BULLFROG CREEK/WOLF BRANCH
* ==========================================================================
*
ID                    WOLF BRANCH 25-YEAR STORM
ID         Dames & Moore for Hillsborough County BOCC--Dept of Stormwater Management
*
*
*   This is a standard HEC-1 file.  RDHEC copies the ID, *, IT, IO, JR,
*       PG, IN, PC, and PR records from this file.  It ignores other records.
*
*FREE
*DIAGRAM
*      ----------------------
*       25-YEAR 24 HOUR STORM
*      ----------------------
*
*   NMIN  DATE     ITIME      NQ  NDDATE   NDTIME
IT    15 26SEP97    0000     250 27SEP97    0000
*
*NOLIST
*   IPRT    IPLT
*   0,1,2          All
*       3          Input Data and Intermediate and Master Summaries
*       4          Input Data and Master Summary
*       5          Job specification and Master Summary Only
*
*            0,1  No Printer Plots--Can be overriden on KO record
*              2  Plot All
*
IO     3       0
*
* ######################################################
JR  PREC    8.0
* ######################################################
*     SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION (30-MIN INCREMENTS)
*     SOURCE: SWFWMD ERP INFORMATION MANUAL TABLE C-1
* GAGE      UDEPTH
PGSCSFLM     1.0
*
*  TSTEP IDATE       ITIME
IN     30 26SEP97       0
PC  .000     .006     .012     .019     .025     .032     .039     .047     .054     .062
PC  .071     .080     .089     .099     .110     .122     .134     .148     .164     .181
PC  .201     .226     .258     .308     .607     .719     .757     .785     .807     .826
PC  .842     .857     .870     .882     .893     .904     .913     .923     .931     .940
PC  .948     .955     .962     .969     .976     .983     .989     .995    1.000    1.000
*
* ================================================================================
*     SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION
PRSCSFLM
* ==========================================================================
ZZ
*                                             AMC II
* BASINID NJUNC    TC  ACRE     CN  IACOEFF K KPRINT
WP  821000  821000  105 214.86   95   0.2 256 0
WP  821100  821100  176 72.13    90   0.2 256 0
WP  821200  821200  168 120.9    84   0.2 256 0
WP  821300  821300  170 189.1    81   0.2 256 0
WP  821400  821400  268 352.13   82   0.2 256 0
WP  821500  821500  173 110.84   81   0.2 256 0
WP  822000  822000  127 235.71   82   0.2 256 0
WP  822050  822050  233 97.92    79   0.2 256 0
WP  822100  822100  190 42.06    90   0.2 256 0
WP  822150  822150  338 107.69   80   0.2 256 0
WP  822200  822200  263 77.31    77   0.2 256 0
WP  822250  822250  110 64.71    80   0.2 256 0
```

WP	822300	822300	349	487	84	0.2	256	0
WP	822350	822350	84	347.15	83	0.2	256	0
WP	822400	822400	238	565.29	84	0.2	256	0
WP	822500	822500	237	386.38	81	0.2	256	0
WP	823000	823000	96	215.07	88	0.2	256	0
WP	823100	823100	377	167.38	84	0.2	256	0
WP	823200	823200	143	26.86	92	0.2	256	0
WP	823300	823300	143	49.07	84	0.2	256	0
WP	823400	823400	163	179.51	81	0.2	256	0
WP	824650	824650	77	8.84	83	0.2	256	0
WP	824000	824000	63	439.81	93	0.2	256	0
WP	824080	824080	265	438.49	86	0.2	256	0
WP	824200	824200	154	58.21	83	0.2	256	0
WP	824300	824300	126	38.92	83	0.2	256	0
WP	824400	824400	131	19.1	82	0.2	256	0
WP	824500	824500	343	88.29	86	0.2	256	0
WP	824600	824600	186	82.87	82	0.2	256	0
WP	825000	825000	1	221.84	99	0.2	256	0
WP	825050	825050	52	44.19	94	0.2	256	0
WP	825100	825100	227	296.6	92	0.2	256	0
WP	825200	825200	428	475.42	86	0.2	256	0
WP	825300	825300	98	23.17	90	0.2	256	0
WP	825400	825400	189	263.51	81	0.2	256	0
WP	825500	825500	188	152.33	83	0.2	256	0
WP	825600	825600	87	210.83	87	0.2	256	0
WP	825700	825700	143	52.88	88	0.2	256	0
WP	825800	825800	321	252.66	83	0.2	256	0
WP	825900	825900	147	55.42	83	0.2	256	0
WP	826000	826000	51	111.8	76	0.2	256	0
WP	826050	826050	61	100.8	91	0.2	256	0
WP	826100	826100	56	218.02	84	0.2	256	0
WP	826150	826150	63	272.26	94	0.2	256	0
WP	826200	826200	19	370.65	93	0.2	256	0
WP	826250	826250	165	296.12	88	0.2	256	0
WP	826300	826300	155	13.16	91	0.2	256	0
WP	826350	826350	31	60.75	82	0.2	256	0
WP	826400	826400	358	559.84	80	0.2	256	0
WP	826450	826450	16	276.05	89	0.2	256	0
WP	826500	826500	17	89.04	89	0.2	256	0
WP	826550	826550	39	173.15	82	0.2	256	0
WP	826600	826600	195	216.14	87	0.2	256	0
WP	826650	826650	189	37.3	95	0.2	256	0
WP	826700	826700	275	140.75	80	0.2	256	0
WP	826750	826750	253	198.16	82	0.2	256	0
WP	826800	826800	217	157.27	83	0.2	256	0
WP	826850	826850	96	111.13	82	0.2	256	0
WP	826900	826900	180	125.24	86	0.2	256	0
WP	826950	826950	296	361.32	84	0.2	256	0
WP	826970	826970	194	57.1	80	0.2	256	0
WP	826990	826990	282	295.16	83	0.2	256	0
WP	827000	827000	65	306.51	98	0.2	256	0
WP	827100	827100	37	190.21	84	0.2	256	0
WP	827150	827150	187	287.47	84	0.2	256	0
WP	827200	827200	109	101.22	87	0.2	256	0
WP	827250	827250	255	220.92	83	0.2	256	0
WP	827300	827300	312	107.04	85	0.2	256	0
WP	827350	827350	205	115.19	85	0.2	256	0
WP	827400	827400	104	208.79	86	0.2	256	0
WP	827450	827450	78	104.1	86	0.2	256	0
WP	827500	827500	145	309.99	83	0.2	256	0
WP	827550	827550	228	97.17	83	0.2	256	0
WP	827600	827600	79	112.76	83	0.2	256	0
WP	827650	827650	274	165.14	83	0.2	256	0
WP	827700	827700	137	89.33	82	0.2	256	0
WP	827750	827750	179	84.22	82	0.2	256	0
WP	827800	827800	103	138.01	85	0.2	256	0
WP	827850	827850	127	178.05	83	0.2	256	0

WP	827890	827890	116	239.72	87	0.2	256	0
WP	828000	828000	38	255.18	86	0.2	256	0
WP	828050	828050	133	38.83	85	0.2	256	0
WP	828100	828100	171	239.83	87	0.2	256	0
WP	828150	828150	183	169.74	85	0.2	256	0
WP	828200	828200	228	109.78	86	0.2	256	0
WP	828250	828250	133	133.56	81	0.2	256	0
WP	828300	828300	299	260.67	82	0.2	256	0
WP	828350	828350	196	294.38	81	0.2	256	0
WP	828400	828400	230	52.12	86	0.2	256	0
WP	828450	828450	92	39.85	88	0.2	256	0
WP	828500	828500	188	283.47	89	0.2	256	0
WP	828550	828550	132	92.73	84	0.2	256	0
WP	829000	829000	90	806.77	98	0.2	256	0
WP	829100	829100	148	179.34	89	0.2	256	0
WP	829200	829200	191	187.95	89	0.2	256	0
WP	829700	829700	247	100.41	93	0.2	256	0
WP	829400	829400	116	158.83	91	0.2	256	0
WP	829600	829600	178	26.9	81	0.2	256	0
WP	829500	829500	357	476.57	89	0.2	256	0
WP	829300	829300	22	439.75	92	0.2	256	0
WP	829800	829800	157	311.6	94	0.2	256	0

```
* ============================================================================
*                        BULLFROG CREEK/WOLF BRANCH
* ============================================================================
*
ID                  WOLF BRANCH 100-YEAR STORM
ID         Dames & Moore for Hillsborough County BOCC--Dept of Stormwater Management
*
*
*    This is a standard HEC-1 file.  RDHEC copies the ID, *, IT, IO, JR,
*        PG, IN, PC, and PR records from this file.  It ignores other records.
*
*FREE
*DIAGRAM
*      ----------------------
*      100-YEAR 24 HOUR STORM
*      ----------------------
*
*    NMIN  DATE     ITIME      NQ  NDDATE   NDTIME
IT     15 26SEP97    0000     250 27SEP97    0000
*
*NOLIST
*    IPRT    IPLT
*    0,1,2         All
*        3         Input Data and Intermediate and Master Summaries
*        4         Input Data and Master Summary
*        5         Job specification and Master Summary Only
*
*            0,1   No Printer Plots--Can be overriden on KO record
*              2   Plot All
*
IO     3       0
*
* ##################################################
JR  PREC    11.0
* ##################################################
*     SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION (30-MIN INCREMENTS)
*     SOURCE: SWFWMD ERP INFORMATION MANUAL TABLE C-1
* GAGE      UDEPTH
PGSCSFLM     1.0
*
*  TSTEP IDATE       ITIME
IN     30 26SEP97       0
PC   .000     .006     .012     .019     .025     .032     .039     .047     .054     .062
PC   .071     .080     .089     .099     .110     .122     .134     .148     .164     .181
PC   .201     .226     .258     .308     .607     .719     .757     .785     .807     .826
PC   .842     .857     .870     .882     .893     .904     .913     .923     .931     .940
PC   .948     .955     .962     .969     .976     .983     .989     .995    1.000    1.000
*
* ============================================================================
*     SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION
PRSCSFLM
* ============================================================================
ZZ
*                                         AMC II
* BASINID NJUNC   TC  ACRE     CN IACOEFF  K KPRINT
WP  821000  821000  93  214.86  95  0.2 256 0
WP  821100  821100  155 72.13   90  0.2 256 0
WP  821200  821200  149 120.9   84  0.2 256 0
WP  821300  821300  150 189.1   81  0.2 256 0
WP  821400  821400  236 352.13  82  0.2 256 0
WP  821500  821500  153 110.84  81  0.2 256 0
WP  822000  822000  112 235.71  82  0.2 256 0
WP  822050  822050  206 97.92   79  0.2 256 0
WP  822100  822100  167 42.06   90  0.2 256 0
WP  822150  822150  298 107.69  80  0.2 256 0
WP  822200  822200  232 77.31   77  0.2 256 0
WP  822250  822250  97  64.71   80  0.2 256 0
```

WP	822300	822300	308	487	84	0.2	256	0
WP	822350	822350	74	347.15	83	0.2	256	0
WP	822400	822400	220	565.29	84	0.2	256	0
WP	822500	822500	217	386.38	81	0.2	256	0
WP	823000	823000	61	215.07	88	0.2	256	0
WP	823100	823100	340	167.38	84	0.2	256	0
WP	823200	823200	126	26.86	92	0.2	256	0
WP	823300	823300	126	49.07	84	0.2	256	0
WP	823400	823400	143	179.51	81	0.2	256	0
WP	824650	824650	68	8.84	83	0.2	256	0
WP	824000	824000	56	439.81	93	0.2	256	0
WP	824080	824080	234	438.49	86	0.2	256	0
WP	824200	824200	136	58.21	83	0.2	256	0
WP	824300	824300	111	38.92	83	0.2	256	0
WP	824400	824400	116	19.1	82	0.2	256	0
WP	824500	824500	322	88.29	86	0.2	256	0
WP	824600	824600	164	82.87	82	0.2	256	0
WP	825000	825000	1	221.84	99	0.2	256	0
WP	825050	825050	46	44.19	94	0.2	256	0
WP	825100	825100	200	296.6	92	0.2	256	0
WP	825200	825200	378	475.42	86	0.2	256	0
WP	825300	825300	87	23.17	90	0.2	256	0
WP	825400	825400	167	263.51	81	0.2	256	0
WP	825500	825500	170	152.33	83	0.2	256	0
WP	825600	825600	76	210.83	87	0.2	256	0
WP	825700	825700	126	52.88	88	0.2	256	0
WP	825800	825800	288	252.66	83	0.2	256	0
WP	825900	825900	135	55.42	83	0.2	256	0
WP	826000	826000	45	111.8	76	0.2	256	0
WP	826050	826050	54	100.8	91	0.2	256	0
WP	826100	826100	33	218.02	84	0.2	256	0
WP	826150	826150	35	272.26	94	0.2	256	0
WP	826200	826200	17	370.65	93	0.2	256	0
WP	826250	826250	145	296.12	88	0.2	256	0
WP	826300	826300	154	13.16	91	0.2	256	0
WP	826350	826350	27	60.75	82	0.2	256	0
WP	826400	826400	326	559.84	80	0.2	256	0
WP	826450	826450	14	276.05	89	0.2	256	0
WP	826500	826500	15	89.04	89	0.2	256	0
WP	826550	826550	34	173.15	82	0.2	256	0
WP	826600	826600	188	216.14	87	0.2	256	0
WP	826650	826650	166	37.3	95	0.2	256	0
WP	826700	826700	252	140.75	80	0.2	256	0
WP	826750	826750	223	198.16	82	0.2	256	0
WP	826800	826800	191	157.27	83	0.2	256	0
WP	826850	826850	85	111.13	82	0.2	256	0
WP	826900	826900	159	125.24	86	0.2	256	0
WP	826950	826950	236	361.32	84	0.2	256	0
WP	826970	826970	171	57.1	80	0.2	256	0
WP	826990	826990	261	295.16	83	0.2	256	0
WP	827000	827000	63	306.51	98	0.2	256	0
WP	827100	827100	33	190.21	84	0.2	256	0
WP	827150	827150	165	287.47	84	0.2	256	0
WP	827200	827200	96	101.22	87	0.2	256	0
WP	827250	827250	225	220.92	83	0.2	256	0
WP	827300	827300	289	107.04	85	0.2	256	0
WP	827350	827350	223	115.19	85	0.2	256	0
WP	827400	827400	92	208.79	86	0.2	256	0
WP	827450	827450	69	104.1	86	0.2	256	0
WP	827500	827500	128	309.99	83	0.2	256	0
WP	827550	827550	202	97.17	83	0.2	256	0
WP	827600	827600	70	112.76	83	0.2	256	0
WP	827650	827650	248	165.14	83	0.2	256	0
WP	827700	827700	121	89.33	82	0.2	256	0
WP	827750	827750	158	84.22	82	0.2	256	0
WP	827800	827800	91	138.01	85	0.2	256	0
WP	827850	827850	116	178.05	83	0.2	256	0

WP	827890	827890	102	239.72	87	0.2	256	0
WP	828000	828000	34	255.18	86	0.2	256	0
WP	828050	828050	121	38.83	85	0.2	256	0
WP	828100	828100	161	239.83	87	0.2	256	0
WP	828150	828150	162	169.74	85	0.2	256	0
WP	828200	828200	210	109.78	86	0.2	256	0
WP	828250	828250	117	133.56	81	0.2	256	0
WP	828300	828300	282	260.67	82	0.2	256	0
WP	828350	828350	188	294.38	81	0.2	256	0
WP	828400	828400	203	52.12	86	0.2	256	0
WP	828450	828450	81	39.85	88	0.2	256	0
WP	828500	828500	166	283.47	89	0.2	256	0
WP	828550	828550	116	92.73	84	0.2	256	0
WP	829000	829000	79	806.77	98	0.2	256	0
WP	829100	829100	145	179.34	89	0.2	256	0
WP	829200	829200	168	187.95	89	0.2	256	0
WP	829700	829700	230	100.41	93	0.2	256	0
WP	829400	829400	102	158.83	91	0.2	256	0
WP	829600	829600	177	26.9	81	0.2	256	0
WP	829500	829500	315	476.57	89	0.2	256	0
WP	829300	829300	20	439.75	92	0.2	256	0
WP	829800	829800	74	311.6	94	0.2	256	0

	JUNC_ID	INVT	Z_MAX	T_MAX
ZMAX	82100	-2.00	2.00	0.00
ZMAX	821000	-2.00	2.16	12.47
ZMAX	821100	-1.10	2.33	12.65
ZMAX	821190	-4.50	4.73	18.75
ZMAX	821200	-4.50	5.15	18.72
ZMAX	821290	0.87	5.66	18.93
ZMAX	821300	0.87	6.90	18.82
ZMAX	821390	8.00	10.96	17.28
ZMAX	821400	9.00	11.49	17.22
ZMAX	821490	19.00	20.78	14.97
ZMAX	821500	20.50	25.87	14.50
ZMAX	82200	-2.50	2.00	0.00
ZMAX	822000	-2.10	2.01	16.27
ZMAX	822050	0.50	3.62	15.57
ZMAX	822100	-2.10	2.95	17.03
ZMAX	822110	-1.10	3.31	16.60
ZMAX	822150	-2.00	2.98	17.12
ZMAX	822190	-2.00	2.99	17.12
ZMAX	822200	-1.00	3.09	17.07
ZMAX	822250	-1.10	3.76	16.30
ZMAX	822290	-0.65	5.44	15.72
ZMAX	822300	-0.65	6.31	17.07
ZMAX	822350	0.00	5.99	15.17
ZMAX	822390	1.00	6.13	15.57
ZMAX	822400	1.50	9.31	20.55
ZMAX	822410	2.80	9.32	20.57
ZMAX	822420	3.00	10.25	24.60
ZMAX	822490	4.00	10.30	24.52
ZMAX	822500	5.00	11.36	22.80
ZMAX	82300	-2.50	2.00	0.00
ZMAX	823000	-2.00	2.00	8.03
ZMAX	823100	-2.00	4.10	22.82
ZMAX	823170	-0.50	4.21	22.70
ZMAX	823180	1.17	4.58	22.42
ZMAX	823190	0.09	4.90	22.15
ZMAX	823200	0.22	5.27	21.92
ZMAX	823290	1.40	6.50	21.08
ZMAX	823300	3.00	6.59	21.12
ZMAX	823380	3.20	7.23	19.48
ZMAX	823390	3.30	7.53	18.93
ZMAX	823400	3.60	9.46	17.80
ZMAX	823490	5.00	9.46	17.80
ZMAX	82400	-2.60	2.00	0.00
ZMAX	824000	-2.54	2.01	6.77
ZMAX	824080	-1.01	2.28	16.03
ZMAX	824085	0.30	2.38	16.60
ZMAX	824100	0.30	3.10	19.63
ZMAX	824110	3.40	4.33	20.63
ZMAX	824120	1.50	3.58	16.78
ZMAX	824130	3.70	4.74	18.15
ZMAX	824140	5.00	6.10	14.48
ZMAX	824200	3.60	5.54	20.33
ZMAX	824300	3.90	6.00	17.90
ZMAX	824400	5.20	7.51	13.93
ZMAX	824490	1.15	4.83	21.13
ZMAX	824500	2.00	5.73	20.90
ZMAX	824590	3.00	5.91	21.82
ZMAX	824600	3.50	5.91	21.83
ZMAX	824650	5.00	5.91	21.85
ZMAX	82510	-4.00	2.00	0.00
ZMAX	825100	-4.00	2.00	10.32
ZMAX	825200	-4.00	2.03	20.08
ZMAX	825220	4.00	4.99	20.58
ZMAX	825230	4.00	5.60	16.90
ZMAX	825300	4.00	6.71	16.62
ZMAX	825390	4.00	6.85	20.73
ZMAX	825400	5.50	11.51	20.85
ZMAX	825410	6.10	6.89	19.92
ZMAX	825420	6.30	12.92	19.80
ZMAX	825429	8.00	9.31	19.98
ZMAX	825430	6.50	12.94	19.80
ZMAX	825500	9.41	13.32	19.78
ZMAX	825600	-4.00	2.23	13.23
ZMAX	825610	-3.60	2.25	13.25
ZMAX	825615	-3.00	2.25	13.27
ZMAX	825620	1.20	3.19	16.28
ZMAX	825630	1.20	3.59	16.25
ZMAX	825650	-4.00	2.19	13.17
ZMAX	825653	-1.05	2.20	13.13
ZMAX	825655	-1.29	2.26	13.28
ZMAX	825700	3.00	6.00	19.70
ZMAX	825800	3.63	5.45	16.12
ZMAX	825900	4.00	5.80	15.25
ZMAX	82615	-4.00	2.00	0.00
ZMAX	82620	-3.50	2.00	0.00
ZMAX	82645	-3.50	2.00	0.00
ZMAX	826150	-4.00	2.09	12.58
ZMAX	826190	-4.00	2.13	13.05
ZMAX	826200	-3.50	2.03	12.50
ZMAX	826245	-3.20	2.13	15.78
ZMAX	826250	-3.17	2.42	15.85
ZMAX	826290	0.00	2.45	16.25
ZMAX	826295	6.00	13.88	25.15
ZMAX	826300	1.00	3.04	14.97
ZMAX	826305	1.40	3.43	15.07

ZMAX	826310	1.50	3.74	15.07
ZMAX	826315	2.00	4.02	15.02
ZMAX	826320	2.50	4.80	14.72
ZMAX	826325	6.00	6.87	14.62
ZMAX	826350	8.12	10.35	14.58
ZMAX	826400	8.14	14.50	25.13
ZMAX	826450	-3.50	2.03	12.50
ZMAX	826500	-3.50	2.20	21.32
ZMAX	826550	-2.00	2.21	13.10
ZMAX	826560	-2.53	2.48	21.13
ZMAX	826570	-2.62	4.39	21.03
ZMAX	826600	-1.00	5.63	21.00
ZMAX	826640	2.20	8.74	20.23
ZMAX	826650	2.20	8.84	20.15
ZMAX	826665	2.64	9.66	19.82
ZMAX	826685	8.98	9.80	27.27
ZMAX	826700	9.28	13.73	27.15
ZMAX	826750	2.64	9.74	19.75
ZMAX	826780	8.03	12.44	18.65
ZMAX	826790	27.50	29.75	15.50
ZMAX	826800	28.00	31.84	15.27
ZMAX	826850	8.27	15.63	18.62
ZMAX	826855	17.50	21.53	16.13
ZMAX	826860	18.00	24.82	16.08
ZMAX	826865	29.00	33.73	16.05
ZMAX	826900	29.50	36.43	16.02
ZMAX	826940	41.00	43.02	16.28
ZMAX	826950	41.10	44.68	16.25
ZMAX	826970	8.50	15.79	18.97
ZMAX	826980	10.00	16.37	18.88
ZMAX	826990	10.50	18.72	18.82
ZMAX	82900	-1.00	2.00	0.00
ZMAX	82930	-1.50	2.00	0.00
ZMAX	82940	-4.00	2.00	0.00
ZMAX	829000	-1.00	2.14	13.75
ZMAX	829100	1.70	2.66	15.68
ZMAX	829190	-1.00	2.18	14.78
ZMAX	829200	0.00	3.93	20.37
ZMAX	829300	-1.50	2.10	12.75
ZMAX	829400	-4.00	2.13	16.45
ZMAX	829410	-3.90	2.12	16.42
ZMAX	829450	-3.81	2.14	16.40
ZMAX	829500	-3.50	2.20	18.28
ZMAX	829510	-1.00	2.21	18.33
ZMAX	829600	-0.50	2.39	19.00

	PIPE_ID	FROM	TO	SIZE(INCH)	LENGTH	INV_U	ZMAXU	INV_D	ZMAXD	QMAX	VMAX	TMAX
QMAX	9821000	821000	82100	60.	500.	-2.00	2.16	-2.00	2.00	592.87	1.15	15.40
QMAX	9821100	821100	821000	83.	144.	-1.10	2.33	-2.00	2.16	430.17	4.37	17.95
QMAX	9821190	821100	821190	138.	1615.	-1.10	2.33	-4.50	4.73	-388.71	-2.70	18.72
QMAX	1821200	821200	821190	96.	135.	-4.50	5.15	-4.50	4.73	388.80	4.49	18.62
QMAX	9821290	821290	821200	140.	1890.	0.87	5.66	-4.50	5.15	330.93	0.85	18.93
QMAX	1821300	821300	821290	54.	120.	0.87	6.90	0.87	5.66	110.36	6.83	18.75
QMAX	2821300	821300	821290	54.	120.	0.87	6.90	0.87	5.66	110.36	6.83	18.75
QMAX	3821300	821300	821290	54.	120.	0.87	6.90	0.87	5.66	110.36	6.83	18.75
QMAX	9821390	821390	821300	132.	2790.	8.00	10.96	0.87	6.90	255.98	1.94	17.28
QMAX	1821400	821400	821390	43.	320.	9.00	11.49	8.00	10.96	85.34	6.55	17.18
QMAX	2821400	821400	821390	43.	320.	9.00	11.49	8.00	10.96	85.34	6.55	17.18
QMAX	3821400	821400	821390	43.	320.	9.00	11.49	8.00	10.96	85.34	6.55	17.18
QMAX	9821490	821490	821400	96.	4690.	19.00	20.78	9.00	11.49	83.30	2.32	14.97
QMAX	1821500	821500	821490	24.	320.	21.50	25.87	20.00	20.78	21.78	7.10	14.50
QMAX	2821500	821500	821490	36.	320.	20.50	25.87	19.00	20.78	62.12	10.84	14.77
QMAX	9822000	822000	82200	60.	500.	-2.10	2.01	-2.50	2.00	971.70	0.72	16.28
QMAX	1822100	822100	822000	60.	113.	-2.00	2.95	-2.00	2.01	275.11	6.15	17.03
QMAX	2822100	822100	822000	60.	150.	-2.10	2.95	-2.10	2.01	243.52	5.91	17.03
QMAX	3822100	822100	822000	60.	150.	-2.10	2.95	-2.10	2.01	243.52	5.91	17.03
QMAX	9822150	822150	822100	96.	965.	-2.00	2.98	-2.00	2.95	89.42	0.55	18.10
QMAX	9822190	822190	822150	96.	890.	-2.00	2.99	-2.00	2.98	37.26	0.23	17.17
QMAX	1822200	822200	822190	54.	320.	-1.00	3.09	-2.00	2.99	37.96	2.43	16.02
QMAX	9822110	822110	822100	73.	785.	-1.10	3.31	-2.00	2.95	688.13	1.35	15.75
QMAX	1822250	822250	822110	57.	320.	-1.10	3.76	-1.10	3.31	693.25	5.11	15.68
QMAX	9822290	822290	822250	128.	1460.	-0.65	5.44	-1.10	3.76	649.32	1.94	15.67
QMAX	1822300	822300	822290	48.	105.	-0.65	6.31	-0.65	5.44	76.43	6.06	17.78
QMAX	2822300	822300	822290	48.	105.	-0.65	6.31	-0.65	5.44	76.43	6.06	17.78
QMAX	3822300	822300	822290	48.	105.	-0.65	6.31	-0.65	5.44	76.43	6.06	17.78
QMAX	9822350	822350	822290	96.	1870.	0.00	5.99	-0.65	5.44	492.01	1.89	14.78
QMAX	9822390	822390	822350	96.	2265.	1.00	6.13	0.00	5.99	285.41	1.36	21.27
QMAX	1822400	822400	822390	48.	100.	1.50	9.31	1.00	6.13	142.38	11.20	21.13
QMAX	2822400	822400	822390	48.	100.	1.50	9.31	1.00	6.13	142.38	11.20	21.13
QMAX	9822410	822410	822400	144.	1240.	2.80	9.32	1.50	9.31	131.43	1.25	30.37
QMAX	1822420	822420	822410	24.	260.	3.00	10.25	2.80	9.32	30.81	9.72	30.23
QMAX	2822420	822420	822410	36.	260.	3.00	10.25	2.80	9.32	98.65	8.50	30.42
QMAX	9822490	822490	822420	144.	4100.	4.00	10.30	3.00	10.25	106.85	1.18	20.22
QMAX	1822500	822500	822490	38.	115.	5.00	11.36	4.00	10.30	86.12	6.78	15.75
QMAX	2822500	822500	822490	30.	115.	5.00	11.36	4.00	10.30	29.13	-10.00	19.22
QMAX	1822050	822050	822000	24.	320.	0.50	3.62	-0.50	2.01	20.62	6.55	15.57
QMAX	2822050	822050	822000	24.	320.	0.50	3.62	-0.50	2.01	35.24	7.00	15.57
QMAX	9823000	823000	82300	60.	500.	-2.00	2.00	-2.50	2.00	327.11	0.25	14.00
QMAX	1823100	823100	823000	60.	140.	-2.00	4.10	-2.00	2.00	155.59	8.42	22.82
QMAX	9823170	823170	823100	90.	2515.	-0.50	4.21	-2.00	4.10	96.68	1.06	22.30
QMAX	1823180	823170	823180	60.	320.	1.92	4.21	1.26	4.58	-96.89	-3.49	22.23
QMAX	1823190	823180	823190	48.	320.	1.17	4.58	0.09	4.90	-32.62	-2.68	21.75
QMAX	2823190	823180	823190	48.	320.	1.17	4.58	0.09	4.90	-32.62	-2.68	21.75
QMAX	3823190	823180	823190	48.	320.	1.17	4.58	0.09	4.90	-32.62	-2.68	21.75
QMAX	1823200	823190	823200	48.	320.	1.18	4.90	0.22	5.27	-49.23	-3.98	21.52
QMAX	2823200	823190	823200	48.	320.	1.18	4.90	0.22	5.27	-49.23	-3.98	21.52
QMAX	9823290	823290	823200	79.	1160.	1.40	6.50	0.22	5.27	94.90	1.91	21.42

QMAX	1823300	823300	823290	48.	230.	3.00	6.59	1.40	6.50	94.69	3.17	21.23
QMAX	9823380	823380	823300	71.	1360.	3.20	7.23	3.00	6.59	98.13	2.04	16.90
QMAX	9823390	823390	823380	82.	900.	3.30	7.53	3.20	7.23	98.78	2.24	16.83
QMAX	1823400	823400	823390	52.	380.	3.60	9.46	3.30	7.53	99.02	6.80	16.75
QMAX	9823490	823490	823400	90.	2000.	5.00	9.46	3.60	9.46	-12.91	-0.55	14.23
QMAX	9824000	824000	82400	60.	500.	-2.54	2.01	-2.60	2.00	915.13	0.64	13.50
QMAX	1824080	824080	824000	84.	175.	-1.01	2.28	-2.54	2.01	146.11	4.66	16.00
QMAX	2824080	824080	824000	84.	175.	-1.01	2.28	-2.54	2.01	146.11	4.66	16.00
QMAX	9824085	824085	824080	84.	2125.	0.30	2.38	-1.01	2.28	35.60	0.58	19.88
QMAX	1824100	824100	824085	66.	100.	0.30	3.10	0.30	2.38	35.35	3.52	19.82
QMAX	9824110	824110	824100	84.	1800.	3.40	4.33	1.00	3.10	13.54	0.83	20.63
QMAX	1824200	824200	824110	36.	122.	3.60	5.54	3.40	4.33	13.55	4.06	20.43
QMAX	9824120	824120	824100	84.	1285.	1.50	3.58	1.00	3.10	29.58	1.21	16.47
QMAX	9824130	824130	824120	84.	1490.	3.70	4.74	1.50	3.58	17.20	0.96	18.15
QMAX	1824300	824300	824130	36.	264.	3.90	6.00	3.70	4.74	17.21	4.62	18.00
QMAX	9824140	824140	824120	84.	2615.	5.00	6.10	1.50	3.58	17.98	1.20	14.48
QMAX	1824400	824400	824140	36.	138.	5.20	7.51	5.00	6.10	18.18	4.48	14.20
QMAX	1824490	824000	824490	30.	100.	1.59	2.01	1.15	4.83	-27.33	-5.79	21.13
QMAX	2824490	824000	824490	30.	100.	1.59	2.01	1.15	4.83	-27.33	-5.79	21.13
QMAX	9824500	824500	824490	60.	2550.	2.00	5.73	1.15	4.83	54.72	1.33	20.78
QMAX	9824590	824590	824500	60.	2780.	3.00	5.91	2.00	5.73	22.54	0.89	28.08
QMAX	1824600	824600	824590	48.	110.	3.50	5.91	3.00	5.91	22.04	-1.00	27.87
QMAX	9824650	824650	824600	84.	2250.	5.00	5.91	3.50	5.91	11.41	1.00	13.78
QMAX	9825100	825100	82510	144.	500.	-4.00	2.00	-4.00	2.00	495.09	0.36	16.62
QMAX	1825200	825200	825100	144.	125.	-4.00	2.03	-4.00	2.00	309.94	1.29	20.30
QMAX	9825610	825610	825600	133.	2550.	-3.60	2.25	-4.00	2.23	173.26	0.42	16.32
QMAX	1825650	825650	826190	140.	475.	-4.00	2.19	-4.00	2.13	494.99	1.65	13.38
QMAX	9825650	825650	825600	168.	825.	-4.00	2.19	-4.00	2.23	-459.99	-1.10	13.40
QMAX	9825653	825653	825650	97.	2050.	-1.05	2.20	-4.00	2.19	-53.28	-0.16	13.08
QMAX	1825655	825653	825655	24.	200.	-1.05	2.20	-1.29	2.26	-9.18	-1.67	13.28
QMAX	9825615	825615	825655	96.	650.	-1.00	2.25	-1.29	2.26	16.15	0.09	13.27
QMAX	9825616	825615	825610	126.	235.	-3.00	2.25	-3.60	2.25	171.99	0.44	16.30
QMAX	1825700	825700	825615	24.	150.	3.00	6.00	1.50	2.25	13.98	4.69	19.70
QMAX	9825620	825620	825615	144.	1580.	1.20	3.19	-3.00	2.25	162.57	1.75	16.28
QMAX	1825630	825630	825620	96.	121.	1.20	3.59	1.20	3.19	81.30	3.09	16.22
QMAX	2825630	825630	825620	96.	121.	1.20	3.59	1.20	3.19	81.30	3.09	16.22
QMAX	1825800	825800	825630	72.	320.	3.63	5.45	3.58	3.59	81.38	3.70	16.12
QMAX	2825800	825800	825630	72.	320.	3.63	5.45	3.58	3.59	81.38	3.70	16.12
QMAX	9825900	825900	825800	144.	680.	4.00	5.80	3.63	5.45	49.02	1.48	14.30
QMAX	9825220	825220	825200	120.	5910.	4.00	4.99	-4.00	2.03	48.81	0.25	20.58
QMAX	9825410	825410	825220	120.	810.	6.10	6.89	4.00	4.99	41.61	1.43	19.90
QMAX	1825420	825420	825410	36.	129.	6.30	12.92	6.10	6.89	30.60	7.11	19.90
QMAX	9825430	825430	825420	120.	1170.	6.50	12.94	6.30	12.92	41.62	0.98	19.82
QMAX	9825429	825429	825630	120.	1700.	8.00	9.31	3.50	3.59	20.64	1.93	19.98
QMAX	1825500	825500	825430	30.	125.	9.41	13.32	8.82	12.94	30.95	6.43	16.27
QMAX	9825230	825230	825200	192.	5900.	4.00	5.60	-4.00	2.03	77.74	0.50	16.90
QMAX	1825230	825230	825220	54.	340.	4.00	5.60	4.00	4.99	9.08	2.55	20.78
QMAX	1825300	825300	825230	60.	110.	4.00	6.71	4.00	5.60	86.26	5.01	16.65
QMAX	9825390	825390	825300	192.	845.	4.00	6.85	4.00	6.71	81.31	-0.95	20.97
QMAX	1825400	825400	825390	36.	135.	5.50	11.51	4.00	6.85	81.30	11.58	20.85
QMAX	9826150	826150	82615	84.	500.	-4.00	2.09	-4.00	2.00	1003.02	0.77	13.23
QMAX	9826190	826190	826150	120.	1450.	-4.00	2.13	-4.00	2.09	497.65	0.77	13.33
QMAX	9826200	826200	82620	84.	500.	-3.50	2.03	-3.50	2.00	1350.38	1.13	12.72
QMAX	9826245	826245	826200	122.	7150.	-3.20	2.13	-3.50	2.03	362.83	0.59	15.98
QMAX	1826250	826250	826245	144.	240.	-3.17	2.42	-3.20	2.13	362.59	3.69	15.90
QMAX	9826290	826290	826250	96.	5140.	0.00	2.45	-3.17	2.42	172.77	0.46	25.07
QMAX	1826295	826295	826290	54.	180.	6.00	13.88	3.00	2.45	156.34	10.14	25.15
QMAX	1826400	826400	826295	30.	120.	8.38	14.50	7.59	13.88	39.72	8.05	20.85
QMAX	2826400	826400	826295	42.	120.	8.14	14.50	7.68	13.88	89.45	9.31	21.20
QMAX	1826300	826300	826290	84.	320.	1.00	3.04	0.00	2.45	38.08	3.62	14.97
QMAX	9826305	826305	826300	120.	485.	1.40	3.43	1.00	3.04	25.73	1.51	15.17
QMAX	1826310	826310	826305	72.	120.	1.50	3.74	1.40	3.43	25.72	2.85	15.07
QMAX	9826315	826315	826310	120.	595.	2.00	4.02	1.50	3.74	25.74	1.19	14.90
QMAX	1826320	826320	826315	60.	340.	2.50	4.80	2.20	4.02	25.79	3.88	14.72
QMAX	9826325	826325	826320	120.	260.	6.00	6.87	2.50	4.80	25.80	-1.66	14.62
QMAX	1826350	826350	826325	36.	300.	8.12	10.35	6.88	6.87	25.80	5.37	14.58
QMAX	9826450	826450	82645	78.	500.	-3.50	2.03	-3.50	2.00	1444.01	1.21	12.75
QMAX	9826500	826500	826450	126.	2950.	-3.50	2.20	-3.50	2.03	699.58	1.14	21.40
QMAX	1826550	826550	826500	120.	195.	-2.00	2.21	-3.50	2.20	355.93	1.43	13.27
QMAX	9826560	826560	826500	114.	4950.	-2.53	2.48	-3.50	2.20	669.74	1.09	21.15
QMAX	1826570	826570	826560	72.	100.	-2.02	4.39	-2.53	2.48	239.73	8.81	21.02
QMAX	2826570	826560	826570	72.	100.	-1.99	2.48	-2.62	4.39	-212.99	-8.16	21.03
QMAX	3826570	826560	826570	72.	100.	-2.07	2.48	-2.55	4.39	-217.20	-8.25	21.03
QMAX	9826600	826600	826570	108.	1210.	-1.00	5.63	-2.62	4.39	669.95	3.82	20.98
QMAX	9826640	826640	826600	106.	4055.	2.20	8.74	-1.00	5.63	604.35	2.59	20.23
QMAX	1826650	826650	826640	96.	116.	2.20	8.84	2.20	8.74	204.67	2.64	19.32
QMAX	2826650	826650	826640	96.	116.	2.20	8.84	2.20	8.74	204.67	2.64	19.32
QMAX	3826650	826650	826640	96.	116.	2.20	8.84	2.20	8.74	204.67	2.64	19.32
QMAX	9826665	826665	826650	112.	715.	2.64	9.66	2.20	8.84	599.27	2.91	18.95
QMAX	9826685	826685	826665	96.	650.	8.98	9.80	4.00	9.66	15.84	-2.74	27.27
QMAX	1826700	826700	826685	30.	380.	9.28	13.73	8.98	9.80	15.84	4.99	27.20
QMAX	1826750	826750	826665	96.	340.	2.64	9.74	2.64	9.66	297.48	2.66	18.73
QMAX	2826750	826750	826665	96.	340.	2.64	9.74	2.64	9.66	297.48	2.66	18.73
QMAX	9826780	826780	826750	120.	1460.	8.03	12.44	2.64	9.74	434.68	3.74	18.65
QMAX	1826850	826780	826850	48.	100.	8.68	12.44	8.27	15.63	-99.96	-8.21	17.18
QMAX	2826850	826850	826780	48.	100.	8.31	15.63	8.03	12.44	105.33	8.61	16.25
QMAX	9826855	826855	826850	120.	2120.	17.50	21.53	8.27	15.63	282.64	3.39	16.13
QMAX	1826860	826860	826855	43.	100.	18.00	24.82	17.50	21.53	91.11	9.15	14.53
QMAX	9826865	826865	826860	120.	2080.	29.00	33.73	18.00	24.82	282.71	4.30	16.05
QMAX	1826900	826900	826865	48.	240.	29.50	36.43	29.00	33.73	108.60	8.52	15.12
QMAX	2826900	826900	826865	48.	240.	29.50	36.43	29.00	33.73	108.60	8.52	15.12
QMAX	9826940	826940	826900	180.	1900.	41.00	43.02	29.50	36.43	189.68	1.09	16.28
QMAX	1826950	826950	826940	48.	304.	41.10	44.68	41.00	43.02	94.88	5.65	16.25
QMAX	2826950	826950	826940	48.	304.	41.10	44.68	41.00	43.02	94.88	5.65	16.25
QMAX	9826790	826790	826750	120.	4810.	27.50	29.75	2.64	9.74	103.35	1.88	15.50
QMAX	1826800	826800	826790	48.	140.	28.00	31.84	27.50	29.75	51.79	5.27	15.30

QMAX	2826800	826800	826790	48.	140.	28.00	31.84	27.50	29.75	51.79	5.27	15.30
QMAX	9826970	826970	826850	120.	1170.	8.50	15.79	8.27	15.63	172.14	-1.51	19.58
QMAX	9826980	826980	826970	120.	1525.	10.00	16.37	8.50	15.79	142.36	1.87	18.87
QMAX	1826990	826990	826980	54.	340.	10.50	18.72	10.00	16.37	117.52	7.36	21.85
QMAX	9829000	829000	82900	48.	500.	-1.00	2.14	-1.00	2.00	1264.48	1.97	13.77
QMAX	9829100	829100	829000	60.	450.	1.70	2.66	-1.00	2.14	13.97	0.06	15.68
QMAX	9829190	829190	829000	84.	1600.	-1.00	2.18	-1.00	2.14	72.85	0.73	20.48
QMAX	1829200	829200	829190	29.	100.	0.00	3.93	-1.00	2.18	52.60	7.33	20.38
QMAX	2829200	829200	829190	24.	100.	0.00	3.93	-1.00	2.18	20.23	6.41	20.38
QMAX	9829400	829400	82940	84.	500.	-4.00	2.13	-4.00	2.00	511.88	0.60	16.47
QMAX	9829410	829410	829400	120.	1100.	-3.90	2.12	-4.00	2.13	154.78	0.49	16.43
QMAX	1829450	829450	829410	132.	200.	-3.81	2.14	-3.90	2.12	146.73	1.08	18.95
QMAX	9829500	829500	829450	133.	1350.	-3.50	2.20	-3.81	2.14	141.18	1.08	19.03
QMAX	9829300	829300	82930	48.	500.	-1.50	2.10	-1.50	2.00	1337.16	1.79	12.75
QMAX	9829501	829500	829300	85.	1400.	-1.10	2.20	-1.50	2.10	103.96	0.93	18.37
QMAX	9829510	829510	829500	120.	1750.	-1.00	2.21	-1.10	2.20	12.24	0.14	19.58
QMAX	1829600	829600	829510	30.	260.	-0.50	2.39	-1.00	2.21	12.16	2.42	19.48

	WEIR_ID	FROM	TO	ZCREST	ZU	ZD	ZMAXU	QMAX	ZMAXD	TMAX
QWEIR	7821200	821200	821190	7.50	-4.50	-4.50	5.15	0.00	4.73	0.0
QWEIR	7821300	821300	821290	10.60	0.87	0.87	6.90	0.00	5.66	0.0
QWEIR	7821400	821400	821390	14.90	9.00	8.00	11.49	0.00	10.96	0.0
QWEIR	7821500	821500	821490	26.20	20.50	19.00	25.87	0.00	20.78	0.0
QWEIR	7822050	822050	822000	4.50	0.50	-2.10	3.62	0.00	2.01	0.0
QWEIR	7822100	822100	822000	6.50	-2.10	-2.10	2.95	0.00	2.01	0.0
QWEIR	7822200	822200	822190	6.50	-1.00	-2.00	3.09	0.00	2.99	0.0
QWEIR	7822250	822250	822110	6.08	-1.10	-1.10	3.76	0.00	3.31	0.0
QWEIR	7822300	822300	822290	12.00	-0.65	-0.65	6.31	0.00	5.44	0.0
QWEIR	7822400	822400	822390	12.50	1.50	1.00	9.31	0.00	6.13	0.0
QWEIR	7822420	822420	822410	12.50	3.00	2.80	10.25	0.00	9.32	0.0
QWEIR	7822500	822500	822490	15.40	5.00	4.00	11.36	0.00	10.30	0.0
QWEIR	7823100	823100	823000	6.50	-2.00	-2.00	4.10	0.00	2.00	0.0
QWEIR	7823180	823180	823170	6.00	1.17	-0.50	4.58	0.00	4.21	0.0
QWEIR	7823190	823190	823180	6.00	0.09	1.17	4.90	0.00	4.58	0.0
QWEIR	7823200	823200	823190	6.00	0.22	0.09	5.27	0.00	4.90	0.0
QWEIR	7823300	823300	823290	9.00	3.00	1.40	6.59	0.00	6.50	0.0
QWEIR	7823400	823400	823390	9.80	3.60	3.30	9.46	0.00	7.53	0.0
QWEIR	7824080	824080	824000	6.50	-1.01	-2.54	2.28	0.00	2.01	0.0
QWEIR	7824100	824100	824085	5.50	0.30	0.30	3.10	0.00	2.38	0.0
QWEIR	7824200	824200	824110	9.30	3.60	3.40	5.54	0.00	4.33	0.0
QWEIR	7824300	824300	824130	10.00	3.90	3.70	6.00	0.00	4.74	0.0
QWEIR	7824400	824400	824140	11.00	5.20	5.00	7.51	0.00	6.10	0.0
QWEIR	7824490	824490	824000	7.50	1.15	-2.54	4.83	0.00	2.01	0.0
QWEIR	7824600	824600	824590	12.50	3.50	3.00	5.91	0.00	5.91	0.0
QWEIR	7825200	825200	825100	10.00	-4.00	-4.00	2.03	0.00	2.00	0.0
QWEIR	7825300	825300	825230	12.00	4.00	4.00	6.71	0.00	5.60	0.0
QWEIR	7825400	825400	825390	15.00	5.50	4.00	11.51	0.00	6.85	0.0
QWEIR	7825420	825420	825410	12.80	6.30	6.10	12.92	11.04	6.89	19.8
QWEIR	6825430	825430	825429	12.40	6.50	8.00	12.94	20.69	9.31	19.8
QWEIR	7825500	825500	825430	13.00	9.41	6.50	13.32	47.27	12.94	19.8
QWEIR	6825600	825600	825200	4.80	-4.00	-4.00	2.23	0.00	2.03	0.0
QWEIR	7825630	825630	825620	13.50	1.20	1.20	3.59	0.00	3.19	0.0
QWEIR	7825655	825655	825653	6.80	-1.29	-1.05	2.26	0.00	2.20	0.0
QWEIR	7825700	825700	825615	9.20	3.00	-3.00	6.00	0.00	2.25	0.0
QWEIR	7825800	825800	825630	13.50	3.63	1.20	5.45	0.00	3.59	0.0
QWEIR	7826250	826250	826245	10.00	-3.17	-3.20	2.42	0.00	2.13	0.0
QWEIR	7826295	826295	826290	14.00	6.00	0.00	13.88	0.00	2.45	0.0
QWEIR	7826300	826300	826290	10.00	1.00	0.00	3.04	0.00	2.45	0.0
QWEIR	7826310	826310	826305	10.00	1.50	1.40	3.74	0.00	3.43	0.0
QWEIR	7826320	826320	826315	10.20	2.50	2.00	4.80	0.00	4.02	0.0
QWEIR	7826350	826350	826325	13.00	8.12	6.00	10.35	0.00	6.87	0.0
QWEIR	7826400	826400	826295	14.00	8.14	6.00	14.50	93.81	13.88	25.1
QWEIR	7826500	826500	826450	6.00	-3.50	-3.50	2.20	0.00	2.03	0.0
QWEIR	7826550	826550	826500	4.00	-2.00	-3.50	2.21	0.00	2.20	0.0
QWEIR	7826570	826570	826560	5.00	-2.62	-2.53	4.39	0.00	2.48	0.0
QWEIR	7826650	826650	826640	11.00	2.20	2.20	8.84	0.00	8.74	0.0
QWEIR	7826700	826700	826685	14.00	9.28	8.98	13.73	0.00	9.80	0.0
QWEIR	7826750	826750	826665	12.00	2.64	2.64	9.74	0.00	9.66	0.0
QWEIR	7826800	826800	826790	34.00	28.00	27.50	31.84	0.00	29.75	0.0
QWEIR	7826850	826850	826780	14.70	8.27	8.03	15.63	235.09	12.44	18.6
QWEIR	7826860	826860	826855	24.00	18.00	17.50	24.82	196.82	21.53	16.1
QWEIR	7826900	826900	826865	36.00	29.50	29.00	36.43	72.88	33.73	16.0
QWEIR	7826990	826990	826980	18.50	10.50	10.00	18.72	27.75	16.37	18.8
QWEIR	7829100	829100	829000	2.00	1.70	-1.00	2.66	141.21	2.14	15.7
QWEIR	7829200	829200	829190	5.00	0.00	-1.00	3.93	0.00	2.18	0.0
QWEIR	7829600	829600	829510	5.00	-0.50	-1.00	2.39	0.00	2.21	0.0
QWEIR	90221	82100	0	-2.00	-2.00	0.00	2.00	592.87	0.00	15.4
QWEIR	90222	82200	0	-2.50	-2.50	0.00	2.00	971.70	0.00	16.3
QWEIR	90223	82300	0	-2.50	-2.50	0.00	2.00	327.11	0.00	14.0
QWEIR	90224	82400	0	-2.60	-2.60	0.00	2.00	915.13	0.00	13.5
QWEIR	90225	82510	0	-4.00	-4.00	0.00	2.00	495.09	0.00	16.6
QWEIR	90226	82615	0	-4.00	-4.00	0.00	2.00	1003.02	0.00	13.2
QWEIR	90227	82620	0	-3.50	-3.50	0.00	2.00	1350.38	0.00	12.7
QWEIR	90228	82645	0	-3.50	-3.50	0.00	2.00	1444.01	0.00	12.8
QWEIR	90229	82900	0	-1.00	-1.00	0.00	2.00	1264.48	0.00	13.8
QWEIR	90230	82930	0	-1.50	-1.50	0.00	2.00	1337.16	0.00	12.8
QWEIR	90231	82940	0	-4.00	-4.00	0.00	2.00	511.88	0.00	16.5

	JUNC_ID	INVT	Z_MAX	T_MAX
ZMAX	82100	-2.00	2.00	0.00
ZMAX	821000	-2.00	2.26	13.13
ZMAX	821100	-1.10	2.44	12.53
ZMAX	821190	-4.50	5.28	18.28
ZMAX	821200	-4.50	6.07	18.20
ZMAX	821290	0.87	6.35	19.85
ZMAX	821300	0.87	8.46	19.73
ZMAX	821390	8.00	11.56	17.95
ZMAX	821400	9.00	12.96	17.92
ZMAX	821490	19.00	21.36	14.57
ZMAX	821500	20.50	26.44	14.25
ZMAX	82200	-2.50	2.00	0.00
ZMAX	822000	-2.10	2.01	15.72
ZMAX	822050	0.50	4.69	15.00
ZMAX	822100	-2.10	3.86	16.75
ZMAX	822110	-1.10	4.15	16.43
ZMAX	822150	-2.00	3.91	16.82
ZMAX	822190	-2.00	3.91	16.82
ZMAX	822200	-1.00	4.29	16.63
ZMAX	822250	-1.10	4.86	15.72
ZMAX	822290	-0.65	6.19	15.25
ZMAX	822300	-0.65	8.14	18.50
ZMAX	822350	0.00	6.92	14.58
ZMAX	822390	1.00	7.02	14.82
ZMAX	822400	1.50	11.68	20.78
ZMAX	822410	2.80	11.68	20.82
ZMAX	822420	3.00	12.51	25.32
ZMAX	822490	4.00	12.53	25.28
ZMAX	822500	5.00	13.96	22.90
ZMAX	82300	-2.50	2.00	0.00
ZMAX	823000	-2.00	2.06	25.52
ZMAX	823100	-2.00	5.14	24.78
ZMAX	823170	-0.50	5.22	24.83
ZMAX	823180	1.17	5.45	24.08
ZMAX	823190	0.09	5.96	22.42
ZMAX	823200	0.22	6.28	21.58
ZMAX	823290	1.40	6.96	19.57
ZMAX	823300	3.00	7.25	19.42
ZMAX	823380	3.20	8.06	17.60
ZMAX	823390	3.30	8.46	17.35
ZMAX	823400	3.60	10.20	17.05
ZMAX	823490	5.00	10.20	17.05
ZMAX	82400	-2.60	2.00	0.00
ZMAX	824000	-2.54	2.01	13.00
ZMAX	824080	-1.01	2.75	15.80
ZMAX	824085	0.30	2.82	16.15
ZMAX	824100	0.30	3.51	20.40
ZMAX	824110	3.40	4.57	19.75
ZMAX	824120	1.50	4.01	16.47
ZMAX	824130	3.70	4.99	17.87
ZMAX	824140	5.00	6.41	14.25
ZMAX	824200	3.60	5.97	19.48
ZMAX	824300	3.90	6.48	17.67
ZMAX	824400	5.20	8.28	13.85
ZMAX	824490	1.15	5.95	20.95
ZMAX	824500	2.00	6.54	20.78
ZMAX	824590	3.00	6.63	21.48
ZMAX	824600	3.50	6.63	21.53
ZMAX	824650	5.00	6.63	21.55
ZMAX	82510	-4.00	2.00	0.00
ZMAX	825100	-4.00	2.00	16.75
ZMAX	825200	-4.00	2.09	17.75
ZMAX	825220	4.00	5.52	18.00
ZMAX	825230	4.00	5.80	15.88
ZMAX	825300	4.00	7.06	15.63
ZMAX	825390	4.00	7.16	15.92
ZMAX	825400	5.50	13.67	20.65
ZMAX	825410	6.10	7.35	17.47
ZMAX	825420	6.30	13.14	17.40
ZMAX	825429	8.00	9.66	18.57
ZMAX	825430	6.50	13.22	17.37
ZMAX	825500	9.41	13.60	17.37
ZMAX	825600	-4.00	2.23	13.68
ZMAX	825610	-3.60	2.26	14.00
ZMAX	825615	-3.00	2.26	14.00
ZMAX	825620	1.20	4.05	16.65
ZMAX	825630	1.20	4.52	16.63
ZMAX	825650	-4.00	2.16	13.68
ZMAX	825653	-1.05	2.17	13.58
ZMAX	825655	-1.29	2.26	13.98
ZMAX	825700	3.00	6.79	19.48
ZMAX	825800	3.63	5.97	15.77
ZMAX	825900	4.00	6.30	15.27
ZMAX	82615	-4.00	2.00	0.00
ZMAX	82620	-3.50	2.00	0.00
ZMAX	82645	-3.50	2.00	0.00
ZMAX	826150	-4.00	2.05	11.55
ZMAX	826190	-4.00	2.10	26.63
ZMAX	826200	-3.50	2.05	12.50
ZMAX	826245	-3.20	2.27	15.42
ZMAX	826250	-3.17	2.85	15.38
ZMAX	826290	0.00	2.96	19.42
ZMAX	826295	6.00	14.76	19.93
ZMAX	826300	1.00	3.44	15.13
ZMAX	826305	1.40	3.81	15.15

* 100 yr Existing Stage =
4.01 NGVD
-1.97
2.04 NAVD

ZMAX	826310	1.50	4.10	15.13
ZMAX	826315	2.00	4.37	15.07
ZMAX	826320	2.50	5.13	14.65
ZMAX	826325	6.00	7.02	14.57
ZMAX	826350	8.12	10.89	14.53
ZMAX	826400	8.14	15.13	19.93
ZMAX	826450	-3.50	2.06	12.50
ZMAX	826500	-3.50	2.49	20.67
ZMAX	826550	-2.00	2.49	20.68
ZMAX	826560	-2.53	3.06	20.35
ZMAX	826570	-2.62	5.89	20.05
ZMAX	826600	-1.00	7.56	20.02
ZMAX	826640	2.20	9.92	18.85
ZMAX	826650	2.20	10.21	18.65
ZMAX	826665	2.64	10.86	18.20
ZMAX	826685	8.98	11.03	18.25
ZMAX	826700	9.28	14.28	22.32
ZMAX	826750	2.64	11.16	17.98
ZMAX	826780	8.03	14.16	16.62
ZMAX	826790	27.50	30.32	15.00
ZMAX	826800	28.00	34.08	14.75
ZMAX	826850	8.27	16.53	16.58
ZMAX	826855	17.50	22.82	15.37
ZMAX	826860	18.00	25.36	15.33
ZMAX	826865	29.00	35.27	15.32
ZMAX	826900	29.50	37.14	15.28
ZMAX	826940	41.00	43.56	15.37
ZMAX	826950	41.10	47.34	15.25
ZMAX	826970	8.50	16.82	16.92
ZMAX	826980	10.00	17.74	16.75
ZMAX	826990	10.50	19.20	16.48
ZMAX	82900	-1.00	2.00	0.00
ZMAX	82930	-1.50	2.00	0.00
ZMAX	82940	-4.00	2.00	0.00
ZMAX	829000	-1.00	2.29	13.50
ZMAX	829100	1.70	2.86	15.38
ZMAX	829190	-1.00	2.34	13.83
ZMAX	829200	0.00	4.90	20.10
ZMAX	829300	-1.50	2.19	12.75
ZMAX	829400	-4.00	2.02	30.00
ZMAX	829410	-3.90	2.03	18.30
ZMAX	829450	-3.81	2.07	18.57
ZMAX	829500	-3.50	2.35	18.57
ZMAX	829510	-1.00	2.36	18.63
ZMAX	829600	-0.50	2.65	19.53

	PIPE_ID	FROM	TO	SIZE(INCH)	LENGTH	INV_U	ZMAXU	INV_D	ZMAXD	QMAX	VMAX	TMAX
QMAX	9821000	821000	82100	60.	500.	-2.00	2.26	-2.00	2.00	835.15	1.62	14.60
QMAX	9821100	821100	821000	83.	144.	-1.10	2.44	-2.00	2.26	569.14	5.48	17.38
QMAX	9821190	821100	821190	138.	1615.	-1.10	2.44	-4.50	5.28	-507.64	-2.72	18.20
QMAX	1821200	821200	821190	96.	135.	-4.50	6.07	-4.50	5.28	507.79	6.20	18.15
QMAX	9821290	821290	821200	140.	1890.	0.87	6.35	-4.50	6.07	429.86	0.85	19.85
QMAX	1821300	821300	821290	54.	120.	0.87	8.46	0.87	6.35	143.36	8.87	19.60
QMAX	2821300	821300	821290	54.	120.	0.87	8.46	0.87	6.35	143.36	8.87	19.60
QMAX	3821300	821300	821290	54.	120.	0.87	8.46	0.87	6.35	143.36	8.87	19.60
QMAX	9821390	821390	821300	132.	2790.	8.00	11.56	0.87	8.46	368.94	2.10	17.95
QMAX	1821400	821400	821390	43.	320.	9.00	12.96	8.00	11.56	122.99	7.49	17.87
QMAX	2821400	821400	821390	43.	320.	9.00	12.96	8.00	11.56	122.99	7.49	17.87
QMAX	3821400	821400	821390	43.	320.	9.00	12.96	8.00	11.56	122.99	7.49	17.87
QMAX	9821490	821490	821400	96.	4690.	19.00	21.36	9.00	12.96	136.58	2.76	14.57
QMAX	1821500	821500	821490	24.	320.	21.50	26.44	20.00	21.36	23.34	7.56	14.25
QMAX	2821500	821500	821490	36.	320.	20.50	26.44	19.00	21.36	83.70	12.82	14.55
QMAX	9822000	822000	82200	60.	500.	-2.10	2.01	-2.50	2.00	1392.54	1.03	15.92
QMAX	1822100	822100	822000	60.	113.	-2.00	3.86	-2.00	2.01	382.51	8.08	16.77
QMAX	2822100	822100	822000	60.	150.	-2.10	3.86	-2.10	2.01	341.56	7.98	16.77
QMAX	3822100	822100	822000	60.	150.	-2.10	3.86	-2.10	2.01	341.56	7.98	16.77
QMAX	9822150	822150	822100	96.	965.	-2.00	3.91	-2.00	3.86	146.03	0.64	17.58
QMAX	9822190	822190	822150	96.	890.	-2.00	3.91	-2.00	3.91	62.48	0.29	16.53
QMAX	1822200	822200	822190	54.	320.	-1.00	4.29	-2.00	3.91	64.74	3.97	15.52
QMAX	9822110	822110	822100	73.	785.	-1.10	4.15	-2.00	3.86	983.31	1.53	15.05
QMAX	1822250	822250	822110	57.	320.	-1.10	4.86	-1.10	4.15	1002.12	6.80	15.00
QMAX	9822290	822290	822250	128.	1460.	-0.65	6.19	-1.10	4.86	926.12	1.95	15.05
QMAX	1822300	822300	822290	48.	105.	-0.65	8.14	-0.65	6.19	114.70	9.08	18.98
QMAX	2822300	822300	822290	48.	105.	-0.65	8.14	-0.65	6.19	114.70	9.08	18.98
QMAX	3822300	822300	822290	48.	105.	-0.65	8.14	-0.65	6.19	114.70	9.08	18.98
QMAX	9822350	822350	822290	96.	1870.	0.00	6.92	-0.65	6.19	759.83	2.41	14.08
QMAX	9822390	822390	822350	96.	2265.	1.00	7.02	0.00	6.92	347.20	1.52	21.13
QMAX	1822400	822400	822390	48.	100.	1.50	11.68	1.00	7.02	173.21	13.70	21.00
QMAX	2822400	822400	822390	48.	100.	1.50	11.68	1.00	7.02	173.21	13.70	21.00
QMAX	9822410	822410	822400	144.	1240.	2.80	11.68	1.50	11.68	156.41	1.10	31.98
QMAX	1822420	822420	822410	24.	260.	3.00	12.51	2.80	11.68	37.70	11.83	32.00
QMAX	2822420	822420	822410	36.	260.	3.00	12.51	2.80	11.68	115.93	10.20	32.00
QMAX	9822490	822490	822420	144.	4100.	4.00	12.53	3.00	12.51	123.47	1.16	21.08
QMAX	1822500	822500	822490	38.	115.	5.00	13.96	4.00	12.53	106.33	8.43	16.88
QMAX	2822500	822500	822490	30.	115.	5.00	13.96	4.00	12.53	36.24	-10.00	16.88
QMAX	1822050	822050	822000	24.	320.	0.50	4.69	-0.50	2.01	26.56	8.42	15.00
QMAX	2822050	822050	822000	24.	320.	0.50	4.69	-0.50	2.01	45.38	9.00	15.00
QMAX	9823000	823000	82300	60.	500.	-2.00	2.06	-2.50	2.00	592.12	0.45	13.25
QMAX	1823100	823100	823000	60.	140.	-2.00	5.14	-2.00	2.06	190.67	10.42	25.08
QMAX	9823170	823170	823100	90.	2515.	-0.50	5.22	-2.00	5.14	121.62	0.76	26.45
QMAX	1823180	823170	823180	60.	320.	1.92	5.22	1.26	5.45	-131.24	-3.78	20.60
QMAX	1823190	823180	823190	48.	320.	1.17	5.45	0.09	5.96	-45.82	-3.62	20.28
QMAX	2823190	823180	823190	48.	320.	1.17	5.45	0.09	5.96	-45.82	-3.62	20.28
QMAX	3823190	823180	823190	48.	320.	1.17	5.45	0.09	5.96	-45.82	-3.62	20.28
QMAX	1823200	823190	823200	48.	320.	1.18	5.96	0.22	6.28	-64.37	-5.04	18.20
QMAX	2823200	823190	823200	48.	320.	1.18	5.96	0.22	6.28	-64.37	-5.04	18.20
QMAX	9823290	823290	823200	79.	1160.	1.40	6.96	0.22	6.28	137.46	1.70	19.57

QMAX	2826800	826800	826790	48.	140.	28.00	34.08	27.50	30.32	82.17	7.45	14.90
QMAX	9826970	826970	826850	120.	1170.	8.50	16.82	8.27	16.53	305.04	-2.08	17.52
QMAX	9826980	826980	826970	120.	1525.	10.00	17.74	8.50	16.82	245.45	2.56	16.43
QMAX	1826990	826990	826980	54.	340.	10.50	19.20	10.00	17.74	117.75	7.38	24.13
QMAX	9829000	829000	82900	48.	500.	-1.00	2.29	-1.00	2.00	1885.89	2.86	13.53
QMAX	9829100	829100	829000	60.	450.	1.70	2.86	-1.00	2.29	21.76	0.09	15.38
QMAX	9829190	829190	829000	84.	1600.	-1.00	2.34	-1.00	2.29	89.45	0.87	20.23
QMAX	1829200	829200	829190	29.	100.	0.00	4.90	-1.00	2.34	64.57	8.99	20.13
QMAX	2829200	829200	829190	24.	100.	0.00	4.90	-1.00	2.34	24.84	7.86	20.13
QMAX	9829400	829400	82940	84.	500.	-4.00	2.02	-4.00	2.00	402.23	0.47	13.95
QMAX	9829410	829410	829400	120.	1100.	-3.90	2.03	-4.00	2.02	222.84	0.71	18.63
QMAX	1829450	829450	829410	132.	200.	-3.81	2.07	-3.90	2.03	222.82	1.64	18.65
QMAX	9829500	829500	829450	133.	1350.	-3.50	2.35	-3.81	2.07	222.80	1.67	18.67
QMAX	9829300	829300	82930	48.	500.	-1.50	2.19	-1.50	2.00	1920.73	2.54	12.75
QMAX	9829501	829500	829300	85.	1400.	-1.10	2.35	-1.50	2.19	143.92	1.24	18.60
QMAX	9829510	829510	829500	120.	1750.	-1.00	2.36	-1.10	2.35	15.96	0.18	20.67
QMAX	1829600	829600	829510	30.	260.	-0.50	2.65	-1.00	2.36	15.74	3.20	20.38

	WEIR_ID	FROM	TO	ZCREST	ZU	ZD	ZMAXU	QMAX	ZMAXD	TMAX
QWEIR	7821200	821200	821190	7.50	-4.50	-4.50	6.07	0.00	5.28	0.0
QWEIR	7821300	821300	821290	10.60	0.87	0.87	8.46	0.00	6.35	0.0
QWEIR	7821400	821400	821390	14.90	9.00	8.00	12.96	0.00	11.56	0.0
QWEIR	7821500	821500	821490	26.20	20.50	19.00	26.44	30.65	21.36	14.2
QWEIR	7822050	822050	822000	4.50	0.50	-2.10	4.69	21.74	2.01	15.0
QWEIR	7822100	822100	822000	6.50	-2.10	-2.10	3.86	0.00	2.01	0.0
QWEIR	7822200	822200	822190	6.50	-1.00	-2.00	4.29	0.00	3.91	0.0
QWEIR	7822250	822250	822110	6.08	-1.10	-1.10	4.86	0.00	4.15	0.0
QWEIR	7822300	822300	822290	12.00	-0.65	-0.65	8.14	0.00	6.19	0.0
QWEIR	7822400	822400	822390	12.50	1.50	1.00	11.68	0.00	7.02	0.0
QWEIR	7822420	822420	822410	12.50	3.00	2.80	12.51	0.47	11.68	25.3
QWEIR	7822500	822500	822490	15.40	5.00	4.00	13.96	0.00	12.53	0.0
QWEIR	7823100	823100	823000	6.50	-2.00	-2.00	5.14	0.00	2.06	0.0
QWEIR	7823180	823180	823170	6.00	1.17	-0.50	5.45	0.00	5.22	0.0
QWEIR	7823190	823190	823180	6.00	0.09	1.17	5.96	0.00	5.45	0.0
QWEIR	7823200	823200	823190	6.00	0.22	0.09	6.28	39.81	5.96	21.6
QWEIR	7823300	823300	823290	9.00	3.00	1.40	7.25	0.00	6.96	0.0
QWEIR	7823400	823400	823390	9.80	3.60	3.30	10.20	66.22	8.46	17.0
QWEIR	7824080	824080	824000	6.50	-1.01	-2.54	2.75	0.00	2.01	0.0
QWEIR	7824100	824100	824085	5.50	0.30	0.30	3.51	0.00	2.82	0.0
QWEIR	7824200	824200	824110	9.30	3.60	3.40	5.97	0.00	4.57	0.0
QWEIR	7824300	824300	824130	10.00	3.90	3.70	6.48	0.00	4.99	0.0
QWEIR	7824400	824400	824140	11.00	5.20	5.00	8.28	0.00	6.41	0.0
QWEIR	7824490	824490	824000	7.50	1.15	-2.54	5.95	0.00	2.01	0.0
QWEIR	7824600	824600	824590	12.50	3.50	3.00	6.63	0.00	6.63	0.0
QWEIR	7825200	825200	825100	10.00	-4.00	-4.00	2.09	0.00	2.00	0.0
QWEIR	7825300	825300	825230	12.00	4.00	4.00	7.06	0.00	5.80	0.0
QWEIR	7825400	825400	825390	15.00	5.50	4.00	13.67	0.00	7.16	0.0
QWEIR	7825420	825420	825410	12.80	6.30	6.10	13.14	52.63	7.35	17.4
QWEIR	6825430	825430	825429	12.40	6.50	8.00	13.22	38.91	9.66	17.4
QWEIR	7825500	825500	825430	13.00	9.41	6.50	13.60	120.56	13.22	17.4
QWEIR	6825600	825600	825200	4.80	-4.00	-4.00	2.23	0.00	2.09	0.0
QWEIR	7825630	825630	825620	13.50	1.20	1.20	4.52	0.00	4.05	0.0
QWEIR	7825655	825655	825653	6.80	-1.29	-1.05	2.26	0.00	2.17	0.0
QWEIR	7825700	825700	825615	9.20	3.00	-3.00	6.79	0.00	2.26	0.0
QWEIR	7825800	825800	825630	13.50	3.63	1.20	5.97	0.00	4.52	0.0
QWEIR	7826250	826250	826245	10.00	-3.17	-3.20	2.85	0.00	2.27	0.0
QWEIR	7826295	826295	826290	14.00	6.00	0.00	14.76	173.26	2.96	19.9
QWEIR	7826300	826300	826290	10.00	1.00	0.00	3.44	0.00	2.96	0.0
QWEIR	7826310	826310	826305	10.00	1.50	1.40	4.10	0.00	3.81	0.0
QWEIR	7826320	826320	826315	10.20	2.50	2.00	5.13	0.00	4.37	0.0
QWEIR	7826350	826350	826325	13.00	8.12	6.00	10.89	0.00	7.02	0.0
QWEIR	7826400	826400	826295	14.00	8.14	6.00	15.13	291.22	14.76	19.9
QWEIR	7826500	826500	826450	6.00	-3.50	-3.50	2.49	0.00	2.06	0.0
QWEIR	7826550	826550	826500	4.00	-2.00	-3.50	2.49	0.00	2.49	0.0
QWEIR	7826570	826570	826560	5.00	-2.62	-2.53	5.89	220.37	3.06	20.0
QWEIR	7826650	826650	826640	11.00	2.20	2.20	10.21	0.00	9.92	0.0
QWEIR	7826700	826700	826685	14.00	9.28	8.98	14.28	39.32	11.03	22.3
QWEIR	7826750	826750	826665	12.00	2.64	2.64	11.16	0.00	10.86	0.0
QWEIR	7826800	826800	826790	34.00	28.00	27.50	34.08	5.68	30.32	14.8
QWEIR	7826850	826850	826780	14.70	8.27	8.03	16.53	651.13	14.16	16.6
QWEIR	7826860	826860	826855	24.00	18.00	17.50	25.36	416.01	22.82	15.3
QWEIR	7826900	826900	826865	36.00	29.50	29.00	37.14	319.25	35.27	15.3
QWEIR	7826990	826990	826980	18.50	10.50	10.00	19.20	155.08	17.74	16.5
QWEIR	7829100	829100	829000	2.00	1.70	-1.00	2.86	209.14	2.29	15.4
QWEIR	7829200	829200	829190	5.00	0.00	-1.00	4.90	0.00	2.34	0.0
QWEIR	7829600	829600	829510	5.00	-0.50	-1.00	2.65	0.00	2.36	0.0
QWEIR	90221	82100	0	-2.00	-2.00	0.00	2.00	835.15	0.00	14.6
QWEIR	90222	82200	0	-2.50	-2.50	0.00	2.00	1392.54	0.00	15.9
QWEIR	90223	82300	0	-2.50	-2.50	0.00	2.00	592.12	0.00	13.2
QWEIR	90224	82400	0	-2.60	-2.60	0.00	2.00	1406.58	0.00	13.2
QWEIR	90225	82510	0	-4.00	-4.00	0.00	2.00	785.83	0.00	17.1
QWEIR	90226	82615	0	-4.00	-4.00	0.00	2.00	1425.24	0.00	13.1
QWEIR	90227	82620	0	-3.50	-3.50	0.00	2.00	1990.05	0.00	12.5
QWEIR	90228	82645	0	-3.50	-3.50	0.00	2.00	2061.35	0.00	12.7
QWEIR	90229	82900	0	-1.00	-1.00	0.00	2.00	1885.89	0.00	13.5
QWEIR	90230	82930	0	-1.50	-1.50	0.00	2.00	1920.73	0.00	12.8
QWEIR	90231	82940	0	-4.00	-4.00	0.00	2.00	402.23	0.00	13.9

APPENDIX C

PROPOSED CONDITIONS MODEL INPUT AND OUTPUT FILES

1. MC-25_PROFGD122011.S4D
2. WB-25_PROFGD122011.WPX
3. WB-100_PROFGD122011.WPX
4. MC-25_PROFGD122011.SMX
5. MC-100PROFGD122011.SMX

```
*   NBLOCKS   INBLK1  OUTBLK1   INBLK2  OUTBLK
SW    2         8        12       12       14
* NITCH NSCRATCH(1)NSCRATCH(2)NSCRATCH(3)NSCRATCH(4)NSCRATCH(5)NSCRATCH(NTH)
MM    6   10   11   13   14   15   16
* ======================================================================
@     8   'WB-100_proFGD122011.WPX'
@    11   'MC-100_proFGD122011.HOT'
@    12   'MC-100_proFGD122011.INT'
@    15   'MC-100_proFGD122011.SMX'
@    16   'MC-100_proFGD122011.PLT'
* ======================================================================
$COMBINE
A1  11
B1  '  GENERATE HYDROGRAPH FROM INTERNAL SCS METHOD'
B1  '  MAKE SWMM INTERFACE FILE                '
* ======================================================================
$EXTRAN
A1 'WOLF BRANCH BASIN - MISCELLANEOUS COASTAL STREAMS  7/25/00 FINAL'
A1 'EXISTING CONDITIONS 100 YEAR, 24 HOUR EVENT '
************************************************************************
** 7/10/00  Editted roadway overflow elevation for 825420 from 12.5 to 12.8 *
**       Added interbasin overland connection from 825430 to 825630      *
** 7/20/00  Added floodplain definition (From Type 6 to Type 8) for channels*
**       9823170, 9823290, 9823490, 9826640, 9826665                     *
** 7/25/00  Edited 9825600 to 6825600 to model earthen berm obstruction     *
**     Dropped 825640 and made 825615 linear storage for better model  *
************************************************************************
*          ISOL      KSUPER   LOSSES
B0           2         0        1
*           JELEV     JDOWN
B8            1         0
*====================*
*====================*                        I hour    5 min
*       NTCYC     DELT      TZERO    NSTART    1NTER     JNTER     JREDO  IDATZ(opt)
B1      57600     2.0        0.0       1       1800      150        0
*     32 HOUR SIMULATION
*       METRIC    NEQUAL    AMEN     ITMAX     SURTOL
B2        0         0       10.0      120      0.0015
*      H-prnt  Q-prnt H-plot Q-plot   NJSW
B3      0        0       142      223      0       0      0
B6             82100    82200    82300    82400    82510    82615    82620   ·82645    82900    82900
               82930    82940   821000   821100   821190   821200   821290   821300   821390   821400
              821490   821500   822000   822050   822100   822110   822190   822150   822200   822250
              822290   822300   822350   822390   822400   822410   822420   822490   822500   823000
              823100   823170   823180   823190   823200   823290   823300   823380   823390   823400
              823490   824000   824080   824085   824100   824110   824120   824130   824140   824200
              824300   824400   824490   824500   824590   824600   824650   825100   825200   825220
              825230   825300   825390   825400   825410   825420   825430   825500   825600   825610
              825615   825620   825630   825630   825650   825653   825655   825700   825800   825900
              826150   826190   826200   826245   826250   826290   826295   826300   826305   826310
              826315   826320   826325   826350   826400   826450   826500   826550   826560   826570
              826600   826640   826650   826665   826685   826700   826750   826780   826790   826800
              826850   826855   826860   826865   826900   826970   826980   826990   829000   829100
              829190   829200   829300   829400   829410   829450   829500   829510   829600   826940
              826950   825429
B7           9821000 9821100 9821190 1821200 9821290 1821300 2821300 3821300 9821390 1821400
             2821400 3821400 9821490 1821500 2821500 9822000 1822050 2822050 1822100 2822100
             3822100 9822150 9822190 1822200 9822110 1822250 9822290 1822300 2822300 3822300
             9822350 9822390 1822400 2822400 9822410 1822420 2822420 9822490 1822500 2822500
             9823000 1823100 9823170 1823180 1823190 2823190 3823190 1823200 2823200 9823290
             1823300 9823380 9823390 1823400 9823490 9824000 1824080 2824080 9824085 1824100
             9824120 9824140 1824400 9824130 1824300 9824110 1824200 1824490 2824490 9824500
             9824590 1824600 9824650 9825100 1825200 9825610 9825610 1825650 9825650 9825653
             1825655 9825615 9825616 1825700 1825700 9825620 1825630 2825630 1825800 2825800
             9825900 9825220 9825410 1825420 9825430 1825500 9825230 1825230 1825300 9825390
             1825400 9826150 9826190 9826200 9826245 1826250 9826290 1826295 1826400 2826400
             1826300 9826305 1826310 9826315 1826320 9826325 1826350 9826450 9826500 1826550
             9826560 1826570 2826570 3826570 9826600 9826640 1826650 2826650 3826650 9826665
             9826685 1826700 1826750 2826750 9826790 1826800 2826800 9826780 1826850 2826850
             9826855 1826860 9826865 1826900 2826900 9826970 9826980 1826990 9829000 9829100
             9829190 1829200 2829200 9829400 9829410 1829450 9829500 9829300 9829501 9829510
             1829600 7821200 7821300 7821400 7821500 7822050 7822100 7822200 7822250 7822300
             7822400 7822420 7822500 7823100 7823180 7823190 7823200 7823300 7823400 7824080
             7824100 7824200 7824300 7824400 7824490 7824600 7825200 7825300 7825400 7825420
             7825500 7825630 7825655 7825700 7825800 7826250 7826295 7826300 7826310 7826320
             7826350 7826400 7826500 7826550 7826570 7826650 7826700 7826750 7826800 7826850
             7826860 7826900 7826990 7826990 7829100 7829200 7829600 1826950 2826950 9826940
             6825430 9825429 6825600
*==============================
** Conduit Data
*==============================
*  NCOND    NJUNC(1)NJUNC(2)  Q0     NKLASS AFULL     DEEP    WIDE     LEN     ZP(1)   ZP(2)  ROUGH    STHETA  SPHI         KENT  KEXIT KMIN  STRE *NOTES
*************************
*****  DUG CREEK  *******
*************************
C1  9821000  821000    82100   0       6       0.000   5   100        500   -2.00   -2.00   0.02    7.0            7.0     0      0      0  1  * BOUNDARY
C1  9821100  821100   821000   0       8       0.000   0   0          144   -1.10   -2.00   0.035 9821100     0.00635     0      0      0  1  * S#W-1
C1  9821190  821190   821100   0       8       0.000   0   0         1615   -4.50   -1.10   0.035 9821190 0.002205263     0      0      0  1  * S#W-1
COPY
** US 41
C1  1821200  821200   821190   0       2      80.000   8   10         135   -4.50   -4.50   0.015       0            0   0.1     1      0  1  * FDOT
C1  9821290  821290   821200   0       8       0.000   0   0         1890    0.87   -4.50   0.035 9821290  0.00294127     0      0      0  1  * S#W-2
** CSX R.R.
C1  1821300  821300   821290   0       1      15.904 4.5   4.5        120    0.87    0.87   0.015       0            0   0.1     1      0  1  * FDOT
C1  2821300  821300   821290   0       1      15.904 4.5   4.5        120    0.87    0.87   0.015       0            0   0.1     1      0  1  * FDOT
C1  3821300  821300   821290   0       1      15.904 4.5   4.5        120    0.87    0.87   0.015       0            0   0.1     1      0  1  * FDOT
C1  9821390  821390   821300   0       6       0.000  11   15        2790    8.00    0.87   0.035    3.33         3.33     0      0      0  1  * E,F
** NORTH ST.
C1  1821400  821400   821390   0       3      16.116 3.6   5.7         80    9.00    8.00   0.015       0            0   0.1     1      0  4  * E,F
C1  2821400  821400   821390   0       3      16.116 3.6   5.7         80    9.00    8.00   0.015       0            0   0.1     1      0  4  * E,F
C1  3821400  821400   821390   0       3      16.116 3.6   5.7         80    9.00    8.00   0.015       0            0   0.1     1      0  4  * E,F
C1  9821490  821490   821400   0       6       0.000   8   15        4690   19.00    9.00   0.035   2.083        2.083     0      0      0  1  * E,F
** MESSLER RD.
C1  1821500  821500   821490   0       1       3.142   2   2           80   21.50   20.00   0.026       0            0   0.5     1      0  4  * E,F
C1  2821500  821500   821490   0       1       7.069   3   3           80   20.50   19.00   0.015       0            0   0.1     1      0  4  * E,F
*********************************
*****  KITCHEN BRANCH  *********
*********************************
C1  9822000  822000    82200   0       6       0.000   5   300        500   -2.10   -2.50   0.02        3            3     0      0      0  1  * BOUNDARY
** US 41
```

```
C1  1822100  822100  822000   0    2     50.000  5    10        113   -2.00   -2.00   0.015        0              0   0.1    1     0  1  * FDOT
C1  2822100  822100  822000   0    2     45.000  5    9         150   -2.10   -2.10   0.015        0              0   0.1    1     0  1  * FDOT
C1  3822100  822100  822000   0    2     45.000  5    9         150   -2.10   -2.10   0.015        0              0   0.1    1     0  1  * FDOT
**********************
*** KRACKER AVE TRIB **
**********************
C1  9822150  822150  822100   0    6      0.000  8    4         965   -2.00   -2.00   0.035        6              6   0      0     0  1  * EM
C1  9822190  822190  822150   0    6      0.000  8    4         890   -2.00   -2.00   0.035        6              6   0      0     0  1  * E,F&M
** CORNER OF KRACKER AND PHILLIPS
C1  1822200  822200  822190   0    1     15.904  4.5  4.5        60   -1.00   -2.00   0.015        0              0   0.1    1     0  4  * E,F
******************************
***** KITCHEN BRANCH CONT'D) **
******************************
C1  9822110  822110  822200   0    8      0.000  0    0         785   -1.10   -2.00   0.035 9822110 0.001246497    0      0     0  1  * E,F &M
** PHILLIPS LANE
C1  1822250  822250  822110   0    2    142.500  4.75 30         80   -1.10   -1.10   0.015        0              0   0.1    1     0  4  * E,F ,
S#W-3
C1  9822290  822290  822250   0    8      0.000  0    0        1460   -0.65   -1.10   0.035 9822290 0.000408219    0      0     0  1  * S#W-3
** CSX R.R.
C1  1822300  822300  822290   0    1     12.566  4    4         105   -0.65   -0.65   0.015        0              0   0.1    1     0  1  * FDOT
C1  2822300  822300  822290   0    1     12.566  4    4         105   -0.65   -0.65   0.015        0              0   0.1    1     0  1  * FDOT
C1  3822300  822300  822290   0    1     12.566  4    4         105   -0.65   -0.65   0.015        0              0   0.1    1     0  1  * FDOT
C1  9822350  822350  822290   0    6      0.000  8    20       1870    0.00   -0.65   0.035        4              4   0      0     0  1  * EM (DBL
DITCH)
C1  9822390  822390  822350   0    6      0.000  8    20       2265    1.00    0.00   0.035        4              4   0      0     0  1  * EM (DBL
DITCH)
**  SIDE DITCH CROSSINGS OF CSX R.R. 4300 FEET SOUTH OF MAIN CSX-KITCHEN CROSSING
C1  1822400  822400  822390   0    1     12.566  4    4         100    1.50    1.00   0.015        0              0   0.1    1     0  1  * E,F
C1  2822400  822400  822390   0    1     12.566  4    4         100    1.50    1.00   0.015        0              0   0.1    1     0  1  * E,F
C1  9822410  822410  822400   0    6      0.000  12   20       1240    2.80    1.50   0.035      2.2            2.2   0      0     0  1  * E,F
(DBL DITCH)
** SIDE DITCH CROSSINGS OF CSX R.R. 1.05 MILES SOUTH OF MAIN CSX-KITCHEN CROSSING
C1  1822420  822420  822410   0    1      3.142  2    2          65    3.00    2.80   0.015        0              0   0.1    1     0  4  * FDOT
C1  2822420  822420  822410   0    3     11.310  3    4.8        65    3.00    2.80   0.026        0              0   0.5    1     0  4  * FDOT
C1  9822490  822490  822420   0    6      0.000  12   20       4100    4.00    3.00   0.035      2.2            2.2   0      0     0  1  * E,F,
S#W-8
** CR 672/BIG BEND ROAD @ CSX RR
C1  1822500  822500  822490   0    3     12.566  3.2  5         115    5.00    4.00   0.015        0              0   0.1    1     0  1  * E,F,
S#W-8
C1  2822500  822500  822490   0    1      4.909  2.5  2.5       115    5.00    4.00   0.015        0              0   0.1    1     0  1  * E,F,
S#W-8
*****************************
*** KRACKER AVE OUTFALL******
*****************************
** KRACKER AVE.
C1  1822050  822050  822000   0    1      3.142  2    2          80    0.50   -0.50   0.015        0              0   0.1    1     0  4  * E,F
C1  2822050  822050  822000   0    3      5.027  2    3.2        80    0.50   -0.50   0.015        0              0   0.1    1     0  4  * E,F
**********************************
******  SIMS BRANCH  *************
**********************************
C1  9823000  823000   82300   0    6      0.000  5    300       500   -2.00   -2.50   0.02         3              3   0      0     0  1  * BOUNDARY
** N OF CSX R.R. AT BIG BEND INDUSTRIAL PARK - OUTFALL
C1  1823100  823100  823000   0    1     19.635  5    5         140   -2.00   -2.00   0.015        0              0   0.1    1     0  1  * E,F
*C1  9823170  823170  823100   0    6      0.000  10   6        2515   -0.50   -2.00   0.035     1.75           1.75   0      0     0  1  * E,F
C1  9823170  823170  823100   0    8      0.000  0.0  0.0      2515   -0.50   -2.00   0.035  9823170      0.000596   0      0     0  1  * E,F
** CSX R.R. AT BIG BEND INDUSTRIAL PARK
C1  1823180  823180  823170   0    2     50.000  5    10         80    1.26    1.92   0.015        0              0   0.1    1     0  4  * F,
S#W-4
** CSX R.R. AT BIG BEND INDUSTRIAL PARK
C1  1823190  823190  823180   0    1     12.566  4    4          80    0.09    1.17   0.026        0              0   0.5    1     0  4  * F,
S#W-4
C1  2823190  823190  823180   0    1     12.566  4    4          80    0.09    1.17   0.026        0              0   0.5    1     0  4  * F,
S#W-4
C1  3823190  823190  823180   0    1     12.566  4    4          80    0.09    1.17   0.026        0              0   0.5    1     0  4  * F,
S#W-4
** CSX R.R. AT BIG BEND INDUSTRIAL PARK
C1  1823200  823200  823190   0    1     12.566  4    4          80    0.22    1.18   0.015        0              0   0.1    1     0  4  * F,
S#W-4
C1  2823200  823200  823190   0    1     12.566  4    4          80    0.22    1.18   0.015        0              0   0.1    1     0  4  * F,
S#W-4
*C1  9823290  823290  823200   0    6      0.000  10   3        1160    1.40    0.22   0.035    0.875          0.875   0      0     0  1  * E,F
C1  9823290  823290  823200   0    8      0.000  0.0  0.0      1160    1.40    0.22   0.035 9823290       0.001017   0      0     0  1  * E,F
** US 41
C1  1823300  823300  823290   0    2     40.000  4    10        115    3.00    1.40   0.015        0              0   0.1    1     0  2  * FDOT
C1  9823380  823380  823300   0    8      0.000  0    0        1360    3.20    3.00   0.035 9823380 0.000247059    0      0     0  1  * S#W-6
COPY
C1  9823390  823390  823380   0    8      0.000  0    0         900    3.30    3.20   0.035 9823390 0.000211111    0      0     0  1  * S#W-6
** POWELL RD.
C1  1823400  823400  823390   0    4     21.614  4.3  6.4        95    3.60    3.30   0.026        0              0   0.5    1     0  4  * E,F
*C1  9823490  823490  823400   0    6      0.000  7    4        2000    5.00    3.60   0.035        1              1   0      0     0  1  * E,F
C1  9823490  823490  823400   0    8      0.000  0.0  0.0      2000    5.00    3.60   0.035 9823490 0.000700      0      0     0  1  * E,F
**********************************
*****  JACKSON BRANCH ************
**********************************
C1  9824000  824000   82400   0    6      0.000  5    300       500   -2.54   -2.60   0.02         3              3   0      0     0  1  * BOUNDARY
*********************************
*** BIG BEND INDUSTRIAL DRAINAGE**
*********************************
** WYANDOTTE ROAD
C1  1824080  824080  824000   0    2     56.000  7    8         175   -1.01   -2.54   0.015        0              0   0.1    1     0  1  * S#W-10
C1  2824080  824080  824000   0    2     56.000  7    8         175   -1.01   -2.54   0.015        0              0   0.1    1     0  1  * S#W-10
C1  9824085  824085  824080   0    6      0.000  7    20       2125    0.30   -1.01   0.035     1.25           1.25   0      0     0  1  * E,F
** TECO GRAVEL RD - WETLAND OUTFALL
C1  1824100  824100  824085   0    1     23.758  5.5  5.5       100    0.30    0.30   0.026        0              0   0.5    1     0  1  * E, F,
S#W-9
C1  9824110  824110  824100   0    6      0.000  7    10       1800    3.40    1.00   0.035        1              1   0      0     0  1  * EM
** US 41 - 3150 FEET NORTH OF 672
C1  1824200  824200  824110   0    1      7.069  3    3         122    3.60    3.40   0.015        0              0   0.1    1     0  1  * FDOT
*********************
*** TRIB 1 TO WETLAND *
*********************
C1  9824120  824120  824100   0    6      0.000  7    10       1285    1.50    1.00   0.035        1              1   0      0     0  1  * EM
C1  9824130  824130  824120   0    6      0.000  7    10       1490    3.70    1.50   0.035        1              1   0      0     0  1  * EM
** US 41 - 1530 FEET NORTH OF CR 672
C1  1824300  824300  824130   0    1      7.069  3    3          66    3.90    3.70   0.015        0              0   0.1    1     0  4  * FDOT
*********************
*** TRIB 2 TO WETLAND *
*********************
C1  9824140  824140  824120   0    6      0.000  7    10       2615    5.00    1.50   0.035        1              1   0      0     0  1  * EM
** US 41 - 470 FEET NORTH OF CR 672
```

```
C1  1824400  824400  824140   0      1       7.069   3    3        138   5.20    5.00   0.015        0          0  0.1     1     0  1  * FDOT
******************************
***** JACKSON BRANCH MAIN ****
******************************
** BIG BEND/CR 672 OUTFALL @ BEACH RD.
C1  1824490  824490  824000   0      1       4.909  2.5  2.5       100   1.15    1.59   0.015        0          0  0.1     1     0  1  * S#W-11
C1  2824490  824490  824000   0      1       4.909  2.5  2.5       100   1.15    1.59   0.015        0          0  0.1     1     0  1  * S#W-11
C1  9824500  824500  824490   0      6       0.000   5    4       2550   2.00    1.15   0.035        2          2    0     0     0  1  *
E,F,S#W-11
C1  9824590  824590  824500   0      6       0.000   5    4       2780   3.00    2.00   0.035        2          2    0     0     0  1  * E,F
** US 41 - 910 FEET SOUTH OF CR 672
C1  1824600  824600  824590   0      2      40.000   4   10        110   3.50    3.00   0.015        0          0  0.1     1     0  1  * E,F
C1  9824650  824650  824600   0      6       0.000   7   15       2250   5.00    3.50   0.035        1          1    0     0     0  1  * EM
****************************************
*****  NEWMAN BRANCH MAIN  ***********
****************************************
C1  9825100  825100   82510   0      6       0.000  12  200        500  -4.00   -4.00   0.02         5          5    0     0     0  1  *
BOUNDARY
** DICKMAN DR.
C1  1825200  825200  825100   0      2     480.000  12   40        125  -4.00   -4.00   0.015        0          0  0.1     1     0  1  * E,F
BRIDGE
*C1  9825600  825600  825200   0      8       0.000   0    0       1000  -4.00   -4.00   0.035 9825600    0.0001    0     0     0  1  * S#W-13
COPY
C1  9825610  825610  825600   0      8       0.000   0    0       2550  -3.60   -4.00   0.035 9825610 0.000256863  0     0     0  1  * S#W-13
*******************************************
*****  NEWMAN BRANCH SOUTHERN OUTFALL ***
*******************************************
** DICKMAN DRIVE
C1  1825650  825650  826190   0      8       0.000   0    0        475  -4.00   -4.00   0.015 1825650    0.0001    0     0     0  1  * S#W-16
BR: LowCh=9.29, Rd=11.55
C1  9825650  825650  825600   0      8       0.000   0    0        825  -4.00   -4.00   0.035 9825650    0.0001    0     0     0  1  * S#W-13
COPY
C1  9825653  825653  825650   0      8       0.000   0    0       2050  -1.05   -4.00   0.035 9825653 0.001539024  0     0     0  1  * S#W-13
COPY
** PIERRES WAY
C1  1825655  825655  825653   0      3       5.498   2  3.5         50  -1.29   -1.05   0.026        0          0  0.5     1     0  4  * S#W-14
C1  9825615  825615  825655   0      8       0.000   0    0        650  -1.00   -1.29   0.035 9825615 0.000546154  0     0     0  1  * S#W-13
COPY
C1  9825616  825615  825610   0      8       0.000   0    0        235  -3.00   -3.60   0.035 9825616 0.002653191  0     0     0  1  * S#W-13
COPY
** changed 825615 to storage 700 ft x 70 ft 7/25/00
** ELLSBERRY RD.
C1  1825700  825700  825615   0      1       3.142   2    2        150   3.00    1.50   0.026        0          0  0.5     1     0  1  * E,F
****************************************
*****  NEWMAN BRANCH MAIN (CONT'D)****
****************************************
C1  9825620  825620  825615   0      6       0.000  12   25       1580   1.20   -3.00   0.035    0.313      0.313    0     0     0  1  * E,F
** US 41
C1  1825630  825630  825620   0      2      96.000   8   12        121   1.20    1.20   0.015        0          0  0.1     1     0  1  * FDOT
C1  2825630  825630  825620   0      2      96.000   8   12        121   1.20    1.20   0.015        0          0  0.1     1     0  1  * FDOT
** CSX R.R.
C1  1825800  825800  825630   0      2      96.000   6   16         80   3.63    3.58   0.015        0          0  0.1     1     0  4  * FDOT
C1  2825800  825800  825630   0      2      96.000   6   16         80   3.63    3.58   0.015        0          0  0.1     1     0  4  * FDOT
C1  9825900  825900  825800   0      6       0.000  12   15        680   4.00    3.63   0.035        3          3    0     0     0  1  * EM
*******************************************
*****  NEWMAN BRANCH TECO DITCH OUTFALL**
*******************************************
** TECO SOUTH DITCH TO DICKMAN ROAD
C1  9825220  825220  825200   0      6       0.000  10   30       5910   4.00   -4.00   0.035        5          5    0     0     0  1  * E,F
C1  9825410  825410  825220   0      6       0.000  10   25        810   6.10    4.00   0.035       10         10    0     0     0  1  * EM
** US 41
C1  1825420  825420  825410   0      1       7.069   3    3        129   6.30    6.10   0.015        0          0  0.1     1     0  1  * FDOT
C1  9825430  825430  825420   0      6       0.000  10   10       1170   6.50    6.30   0.035        1          1    0     0     0  1  * EM
****************
***** EXISTING INTERBASIN CONNECTION
C1  9825429  825429  825630   0      6       0.000  10   10       1700    8.0    3.50   0.035        2          2    0     0     0  1  * EM
** CSX R.R. UNDER POWER LINES
C1  1825500  825500  825430   0      1       4.909  2.5  2.5       125   9.41    8.82   0.015        0          0  0.1     1     0  1  * FDOT
** TECO NORTH DITCH TO DICKMAN ROAD
C1  9825230  825230  825200   0      6       0.000  16   20       5900   4.00   -4.00   0.035        4          4    0     0     0  1  * E,F
C1  1825230  825230  825220   0      1      15.904  4.5  4.5        85   4.00    4.00   0.026        0          0  0.5     1     0  4  * E,F
** US 41
C1  1825300  825300  825230   0      2      40.000   5    8        110   4.00    4.00   0.015        0          0  0.1     1     0  1  * FDOT
C1  9825390  825390  825300   0      6       0.000  16   20        845   4.00    4.00   0.035        4          4    0     0     0  1  * E,F
** CSX R.R.
C1  1825400  825400  825390   0      1       7.069   3    3        135   5.50    4.00   0.015        0          0  0.1     1     0  1  * E,F
**********************************************
**********  APOLLO BEACH ********************
**********************************************
C1  9826150  826150   82615   0      6       0.000   7  200        500  -4.00   -4.00   0.025    3            3    0     0     0  1  *
BOUNDARY
C1  9826190  826190  826150   0      8       0.000   0    0       1450  -4.00   -4.00   0.035 9826190    0.0001    0     0     0  1  * S#W-17
copy
C1  9826200  826200   82620   0      6       0.000   7  200        500  -3.50   -3.50   0.025    3            3    0     0     0  1  *
BOUNDARY
C1  9826245  826245  826200   0      8       0.000   0    0       7150  -3.20   -3.50   0.035 9826245 0.000141958  0     0     0  1  * S#W-17
copy
** FAIRWAY BLVD.
C1  1826250  826250  826245   0      2     216.000  12   18         60  -3.17   -3.20   0.015        0          0  0.1     1     0  4  * F ,
S#W-17
C1  9826290  826290  826250   0      8       0.000   0    0       5140   0.00   -3.17   0.035 9826290 0.000716732  0     0     0  1  * S#W-17
copy
** US 41
C1  1826295  826295  826290   0      1      15.904  4.5  4.5       180   6.00    3.00   0.026        0          0  0.5     1     0  1  * E,F
** CSX R.R.
C1  1826400  826400  826295   0      1       4.909  2.5  2.5       120   8.38    7.59   0.015        0          0  0.1     1     0  1  * FDOT
C1  2826400  826400  826295   0      1       9.621  3.5  3.5       120   8.14    7.68   0.015        0          0  0.1     1     0  1  * FDOT
***************
*** TRIB 1 ****
***************
** US 41 DRIVEWAY CULVERT
C1  1826300  826300  826290   0      1      38.485   7    7         80   1.00    0.00   0.026        0          0  0.5     1     0  4  * E,F
C1  9826305  826305  826300   0      6       0.000  10    6        485   1.40    1.00   0.035    1.183      1.183    0     0     0  1  * E,F
** US 41 DRIVEWAY CULVERT
C1  1826310  826310  826305   0      1      28.274   6    6        120   1.50    1.40   0.015        0          0  0.1     1     0  1  * E,F
C1  9826315  826315  826310   0      6       0.000  10    6        595   2.00    1.50   0.035        2          2    0     0     0  1  * E,F
** US 41 DRIVEWAY CULVERT
C1  1826320  826320  826315   0      1      19.635   5    5        340   2.50    2.20   0.015        0          0  0.1     1     0  1  * E,F
C1  9826325  826325  826320   0      6       0.000  10    6        260   6.00    2.50   0.035        2          2    0     0     0  1  * E,F
** CSX R.R. & US 41
```

```
C1  1826350  826350  826325   0      1       7.069   3    3          300    8.12    6.88   0.015        0            0.  0.1      1      0  1  * FDOT
**********************************************
**********  WILDCAT CREEK ********************
**********************************************
C1  9826450  826450   82645   0      6       0.000   6.5  200        500   -3.50   -3.50   0.025        3            3    0       0      0  1  *
BOUNDARY
C1  9826500  826500  826450   0      8       0.000   0    0         2950   -3.50   -3.50   0.035 9826500      0.0001    0       0      0  1  * S#W-17
copy
** GOLF COURSE PATH
C1  1826550  826550  826500   0      6       0.000   10   20         195   -2.00   -3.50   0.035        6            6    0       0      0  1  * EM-Golf
Cart path not modeled
C1  9826560  826560  826500   0      8       0.000   0    0         4950   -2.53   -3.50   0.035 9826560  0.00029596    0       0      0  1  * S#W-17
COPY
** GOLF & SEA BLVD. @ MILLER MAC RD.
C1  1826570  826570  826560   0      1      28.274   6    6          100   -2.02   -2.53   0.015        0            0  0.1      1      0  1  * F,
S#W-18
C1  2826570  826570  826560   0      1      28.274   6    6          100   -2.62   -1.99   0.015        0            0  0.1      1      0  1  * F,
S#W-18
C1  3826570  826570  826560   0      1      28.274   6    6          100   -2.55   -2.07   0.015        0            0  0.1      1      0  1  * F,
S#W-18
C1  9826600  826600  826570   0      6       0.000   9    20        1210  -1.00   -2.62   0.035   0.833        0.833    0       0      0  1  * E,F
*C1  9826640  826640  826600   0      6       0.000   8    20        4055   2.20   -1.00   0.035       1            1    0       0      0  1  * E,F
C1  9826640  826640  826600   0      8       0.000   0.0  0.0       4055   2.20   -1.00   0.035  9826640  0.000789    0       0      0  1  * E,F
** US 41
C1  1826650  826650  826640   0      2      96.000   8    12         116    2.20    2.20   0.015        0            0  0.1      1      0  1  * FDOT
C1  2826650  826650  826640   0      2      96.000   8    12         116    2.20    2.20   0.015        0            0  0.1      1      0  1  * FDOT
C1  3826650  826650  826640   0      2      96.000   8    12         116    2.20    2.20   0.015        0            0  0.1      1      0  1  * FDOT
*C1  9826665  826665  826650   0      6       0.000   10   12         715   2.64    2.20   0.035      1.5          1.5    0       0      0  1  * E,F
C1  9826665  826665  826650   0      8       0.000   0.0  0.0        715   2.64    2.20   0.035  9826665  0.000615    0       0      0  1  * E,F
****************
*** TRIB 1 *****
****************
C1  9826685  826685  826665   0      6       0.000   8    4          650    8.98    4.00   0.035      4.5          4.5    0       0.     0  1  * EM
** CSX R.R AT RUSKIN VEGETABLE CORP.
C1  1826700  826700  826685   0      1       4.909  2.5   2.5        380    9.28    8.98   0.015        0            0  0.1      1      0  1  * FDOT
**********************************************
**********  WILDCAT CREEK (CONT'D)************
**********************************************
** CSX R.R
C1  1826750  826750  826665   0      2     128.000   8    16          85    2.64    2.64   0.015        0            0  0.1      1      0  4  * FDOT
C1  2826750  826750  826665   0      2     128.000   8    16          85    2.64    2.64   0.015        0            0  0.1      1      0  4  * FDOT
C1  9826780  826780  826750   0      6       0.000   10   12        1460    8.03    2.64   0.035      1.5          1.5    0       0      0  1  * E,F
** SAND FIELD DRIVE
C1  1826850  826850  826780   0      1      12.566   4    4          100    8.27    8.68   0.026        0            0  0.5      1      0  1  * F,
S#W-19
C1  2826850  826850  826780   0      1      12.566   4    4          100    8.31    8.03   0.026        0            0  0.5      1      0  1  * F,
S#W-19
C1  9826855  826855  826850   0      6       0.000   10   8         2120   17.50    8.27   0.035    1.375        1.375    0       0      0  1  * E,F
** UNNAMED DIRT ROAD (SECTION 27)
C1  1826860  826860  826855   0      4      15.268  3.6   5.4        100   18.00   17.50   0.026        0            0  0.5      1      0  1  * E,F
C1  9826865  826865  826860   0      6       0.000   10   6         2080   29.00   18.00   0.035      0.9          0.9    0       0      0  1  * E,F
** TECO POWER LINE ACCESS ROAD
C1  1826900  826900  826865   0      1      12.566   4    4           60   29.50   29.00   0.026        0            0  0.5      1      0  4  * E,F
C1  2826900  826900  826865   0      1      12.566   4    4           60   29.50   29.00   0.026        0            0  0.5      1      0  4  * E,F
C1  9826940  826940  826900   0      6       0.000   15   6         1900   41.00   29.50   0.035       10           10    0       0      0  1  * EM
** I-75
C1  1826950  826950  826940   0      2      24.000   4    6          304   41.10   41.00   0.015        0            0  0.1      1      0  1  * FDOT
C1  2826950  826950  826940   0      2      24.000   4    6          304   41.10   41.00   0.015        0            0  0.1      1      0  1  * FDOT
****************
*** TRIB 2 *****
****************
C1  9826790  826790  826750   0      6       0.000   10   .5        4810   27.50    2.64   0.035      3.2          3.2    0       0      0  1  * EM
** TECO POWER LINES ACCESS ROAD
C1  1826800  826800  826790   0      1      12.566   4    4          140   28.00   27.50   0.026        0            0  0.5      1      0  1  * assumed
same as 1826900/2826900
C1  2826800  826800  826790   0      1      12.566   4    4          140   28.00   27.50   0.026        0            0  0.5      1      0  1  * assumed
same as 1826900/2826900
****************
*** TRIB 3 *****
****************
C1  9826970  826970  826850   0      6       0.000   10   8         1170    8.50    8.27   0.035    1.375        1.375   .0       0      0  1  * E,F
C1  9826980  826980  826970   0      6       0.000   10   6         1525   10.00    8.50   0.035     0.75         0.75    0       0      0  1  * E,F
** UNNAMED DIRT ROAD
C1  1826990  826990  826980   0      1      15.904  4.5   4.5         85   10.50   10.00   0.026        0            0  0.5      1      0  4  * E,F
*************************************************************
***** MISCELLANEOUS SOUTHERN COASTAL BASINS *********
*************************************************************
C1  9829000  829000   82900   0      6       0.000   4    200        500   -1.00   -1.00   0.025        3            3    0       0      0  1  *
BOUNDARY
C1  9829100  829100  829000   0      8       0.000   0    0          450    1.70   -1.00   0.035 9829100      0.0061    0       0      0  1  * S#W-43
C1  9829190  829190  829000   0      8       0.000   0    0         1600   -1.00   -1.00   0.035 9829190      0.0001    0       0      0  1  * S#W-40
COPY
** 19TH AVE. NW & 14TH ST. NW
C1  1829200  829200  829190   0      3       7.163  2.4   3.8        100    0.00   -1.00   0.015        0            0  0.1      1      0  1  * E,F
C1  2829200  829200  829190   0      1       3.142   2    2          100    0.00   -1.00   0.015        0            0  0.1      1      0  1  * E,F
C1  9829400  829400   82940   0      6       0.000   7    100        500   -4.00   -4.00   0.02      7.00         7.00    0       0.    0  1  * BOUNDARY
C1  9829410  829410  829400   0      6       0.000   10   30        1100   -3.90   -4.00   0.025     3.75         3.75    0       0      0  1  * F,
S#W-41 COPY
** 32ND ST NW & SEAGRAPE DR.
C1  1829450  829450  829410   0      2     253.000   11   23          50   -3.81   -3.90   0.015        0            0  0.1      1      0  4  * S#W-41
BR: LowCH=6.92, Rd=9.44
C1  9829500  829500  829450   0      8       0.000   0    0         1350   -3.50   -3.81   0.035 9829500  0.00032963    0       0      0  1  * F,
S#W-41
C1  9829300  829300   82930   0      6       0.000   4    200        500   -1.50   -1.50   0.025        3            3    0       0      0  1  *
BOUNDARY
C1  9829501  829500  829300   0      8       0.000   0    0         1400   -1.10   -1.50   0.035 9829501 0.000385714    0       0      0  1  * S#W-40
copy
C1  9829510  829510  829500   0      6       0.000   10   20        1750   -1.00   -1.10   0.035        2            2    0       0      0  1  * EM
** SHELL POINT ROAD @ CEDAR DRIVE
C1  1829600  829600  829510   0      1       4.909  2.5   2.5         65   -0.50   -1.00   0.015        0            0  0.1      1      0  4  * E,F
*====================================
*  IRREGULAR CHANNEL CROSS-SECTIONS
*====================================
**NC    XNL     XNR     XNCH
**X1    SECNO   NUMSTA  STCHL   STCHR   XLOBL   XLOBR   LEN     PXSECR  PSXECE
**GR    EL1     STA1    EL2     STA2    EL3     STA3    EL4     STA4    EL5     STA5
***
* DUG CREEK
***            SURVEY W-1  F.P. ADDED (SWFWMD MAPS)
NC          0.10    0.10    0.025
```

```
X1     9821100     11      0     82      0      0   144     0      0
GR      5.8  -200     5      0    4.7     11    1.6    20    0.8     28
GR     -1.1      47     0.4     51    1.9     69      5    74    5.1     82
GR      5.8      1600
***             SURVEY W-1  F.P. ADDED (SWFWMD MAPS)
NC          0.10    0.10    0.03
X1     9821190     11      0     82      0      0  1615     0      0
GR      7.0  -800     5      0    4.7     11    1.6    20    0.8     28
GR     -4.5      47     0.4     51    1.9     69      5    74    5.1     82
GR      6.5     1500
***             SURVEY W-2  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.035
X1     9821290    8       0     49      0      0    1890     0      0
GR     12.5  -400    10.7      0   10.4     10   0.87    20    1.2     29
GR     6.4   39      7.1     49   12.5     750
****
* KITCHEN BRANCH
***       CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW
NC          0.16    0.16    0.04
X1     9822110    8       0     70     0      0    785      0      0
GR      5.0  -480   3.0  -130   1.0    0   -1.1   20   -1.1   50
GR      1.0   70    3.0   100    5.0   420
***             SURVEY W-3  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.04
X1     9822290     9       0    112      0      0   1460    0      0
GR      10  -500      3.1   0      3.4    33    0.8     41   -0.65    56
GR      1     74      5.5   85     5.1   112    10     820
****
* SIMS BRANCH
***       CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC          0.16    0.16    0.04
X1     9823170     11      0    21.6    0      0    2515      0      0
GR     7.0   -25.0   6.0   -20    5.0   -10    4.0      0    -0.5   7.8
GR     -0.5    13.8   4.0   21.6   5.0   31.6   5.0    622    6.0   662
GR     7.0    665
***       CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC          0.16    0.16    0.04
X1     9823290     13      0    10.0    0      0    1160      0      0
GR     8.0   -250     7.0   -220    6.5   -200    6.5    -100    6.0   -10.0
GR     5.5     0.0    1.4    3.5    1.4     6.5    5.5    10.0   6.0    20.0
GR     7.0    90      7.0    160    8.0    170.0
***             SURVEY W-6  COPY  Rt.Bank ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.04
X1     9823380    10       0     81     0      0    1360      0      0
GR     9.0   -1100    8.9     0     8.7     41    4.6     50     3.2     58
GR     3.6      66    8.7    69     8.8     76    8.9     81     9.1   681
***             SURVEY W-6  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.04
X1     9823390    10       0     81     0      0    900    0      0
GR     9.8   -1200    8.9     0     8.7     41    4.6     50     3.3     58
GR     3.6      66    8.7    69    9.9     76    10     81     10.1   1481
***       CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC          0.16    0.16    0.04
X1     9823490     11      0    10.0    0      0    2000      0      0
GR     12.5   -20     10.5  -15.0   10.0  -10     8.0     0     5.0     3
GR      5.0     7     8.0   10.0    9.0   20.0   10     210    10.5   610
GR     12.5   620
***
* NEWMAN BRANCH
***             SURVEY W-13 COPY  R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
******* obstructed by earthen berm at elev 4.8!!!
*NC          0.16    0.16    0.025
*X1     9825600    8       0    131      0   0    1000     0      0
*GR     7.5  -100   4.19    0   -1.8     1   -4.0     51    1.6    101
*GR     5.0   106    5.1    131     5.2    631
***             SURVEY W-13  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     9825610    8       0    131      0   0   2550    0      0
GR     7.5  -300   4.19    0   -1.8     1   -3.6     51    1.6    101
GR     5.8   106    5.7    131     5.9    431
***             SURVEY W-16 BRIDGE  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     1825650     9      0    160      0   0    475     0      0
GR     7.7  -450   7.66     0    6.56     25   -1.24   33.6   -4.0    61
GR     0.84  106   6.66    112   6.76    160      6.8  360
***             SURVEY W-13  COPY  R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     9825650    8       0    131      0   0    825     0      0
GR     10.0 -500   4.19    0   -1.8     1   -4.0     51    1.6    101
GR     5.8   106    5.7    131     7.0    731
***             SURVEY W-13  COPY (+2.55') F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     9825653    8       0    131      0   0   2050     0      0
GR     7.0  -450   4.19    0    0.75     1   -1.05     51    4.15   101
GR     5.8   106    5.7    131     7.0    331
***             SURVEY W-13  COPY (+2.55') F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     9825615    8       0    131      0   0    650     0      0
GR     7.0  -450   4.19    0    0.75     1   -1.00     51    4.15   101
GR     5.8   106    5.7    131     7.0    331
***             SURVEY W-13  COPY  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     9825616    8       0    131      0   0    235     0      0
GR     7.5  -300   4.19    0   -1.8     1   -3.0     51    1.6    101
GR     5.8   106    5.7    131     5.9    431
****            SURVEY W-13  COPY (+2' TO 5.1') F.P. ADDED (SWFWMD MAPS)
*NC          0.16    0.16    0.025
*X1     9825640    8       0    131      0   0    310     0      0
*GR     9.4  -300   9.29    0    3.3      1    1.5     51    6.7    101
*GR     7.8   106    7.7    131     8.2    431
***
* APOLLO BEACH/WILDCAT CREEK
***
***             SURVEY W-17  COPY  R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
X1     9826190    10      0    191      0      0   1450      0      0
GR     6  -450    5.0   -350   4.1      0   -1.07      2   -4.00     83
GR     1.33 164   4.81 166    4.63  191    5.0     300     5.5   350
***             SURVEY W-17  COPY  F.P. ADDED (SWFWMD MAPS)
NC          0.16    0.16    0.025
```

```
X1    9826245     8       0     191      0      0    7150      0      0
GR    7.0   -400    4.1      0   -1.07      2   -3.20      83    1.33     164
GR    6.81    166     6.63   191       7.0     400
***         SURVEY W-17  COPY  (+3')R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.025
X1    9826290     8       0     191      0      0    5140      0      0
GR    8.0   -100    7.1    0      2.07      2    0.0      83    4.33     164
GR    6.81    166     7.63   191       8.0     300
***         SURVEY W-17  COPY  F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.025
X1    9826500     8       0     191      0      0    2950      0      0
GR    7.0   -100    4.1      0   -1.07      2   -3.50      83    1.33     164
GR    6.81    166     6.63   191       7.0     300
***         SURVEY W-17  COPY (+0.5')R.B. ADJUSTED & F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.025
X1    9826560     8       0     191      0      0    4950      0      0
GR    7.0   -100    4.6      0   -0.57      2   -2.53      83    1.83     164
GR    6.81    166     6.83   191       7.0     300
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC        0.16    0.16    0.04
X1    9826640     9      0      30     0      0    4055      0      0
GR    11    -310    9.5   -300    7.2   0     2.2    5.0     2.2      25
GR    7.2    30     9.0   280     10.0   430    11    450
***      CROSS-SECTION TAKEN FROM SWFWMD MAPPING AND FIELD REVIEW 7/20/00
NC        0.16    0.16    0.04
X1    9826665     12      0      30     0      0     715      0      0
GR    12.0 -510     10.0  -500     9.0   -100    9.0    -20     8.64     0
GR    2.64    9     2.64    21    8.64    30     8.0     80     9.0     130
GR    10.0   230    12     250
***
* COASTAL BASINS
***
***         SURVEY W-43  F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.03
X1   9829100     9       0      62      0      0   450      0      0
GR   6.7    -200    3.5      0     3.7     25     2.1      27     1.7      31
GR   2.5    36     2.6     37     3.1     62     6.7    762
***         SURVEY W-40 COPY  F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.03
X1  9829190     9       0     80      0      0   1600      0      0
GR    5    -150    1.56    0    1.36     10    0.16     16   -1.00      30
GR   -0.34   44     5.96    55     5.96     80      6    230
***         SURVEY W-41 COPY  F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.03
X1  9829500     7       0     75      0      0   1350      0      0
GR      7.59      0    6.45   26.4   -0.41    26.5   -3.50      41   -0.21       57
GR      6.99      64    7.59     75
***         SURVEY W-40 COPY  F.P. ADDED (SWFWMD MAPS)
NC        0.16    0.16    0.03
X1  9829501     9       0     80      0      0   1400      0      0
GR    6    -100    1.56    0    1.36     10    0.16     16   -1.10      30
GR   -0.34   44     5.96    55     5.96     80      5    2000
*=================================
** Junction Data      TW=2
*=================================
*  (INPUT) (opt. 200)        (INPUT)HBC Model
*    JUN    GRELEV    Z       QINST    YO            TOB   Yo or Rd Top
**  DUG CREEK
D1    82100        5     -2    0      2      *    3.5     BOUNDARY
D1    821000       7     -2    0      2      *    5
D1    821100      15    -1.1   0      2      *    5
D1    821190    17.6    -4.5   0      2      *    7.6
D1    821200    17.7    -4.5   0      2      *    7.7     7.5
D1    821290      20    0.87   0      2      *    10
D1    821300      20    0.87   0      2      *    10      10.6
D1    821390      25       8   0      8      *    15
D1    821400      25       9   0      9      *    15      14.9
D1    821490      36      19   0     19      *    26
D1    821500      37    20.5   0    20.5     *    27      26.2
** KITCHEN BRANCH
D1    82200        5    -2.5   0      2      *    3.5     BOUNDARY
D1    822000       7    -2.1   0      2      *    4
D1    822050      10     0.5   0      2      *    5       4.5
D1    822100      15    -2.1   0      2      *    5       6.5
D1    822110      15    -1.1   0      2      *    5
D1    822150      15      -2   0      2      *    5
D1    822190      15      -2   0      2      *    5
D1    822200      15      -1   0      2      *    5       6.5
D1    822250      16    -1.1   0      2      *    6       6.08
D1    822290      15   -0.65   0      2      *    5
D1    822300      16   -0.65   0      2      *    6       12
D1    822350      17       0   0      2      *    7
D1    822390      20       1   0      2      *    10
D1    822400      20     1.5   0      2      *    10      12.5
D1    822410      20     2.8   0    2.8      *    10
D1    822420      20       3   0      3      *    10      12.5
D1    822490      20       4   0      4      *    10
D1    822500      20       5   0      5      *    10      15.4
** SIMS BRANCH
D1    82300        5    -2.5   0      2      *    3.5     BOUNDARY
D1    823000       7      -2   0      2      *    6
D1    823100      17      -2   0      2      *    7       6.5
D1    823170      17    -0.5   0      2      *    7
D1    823180      17    1.17   0      2      *    7       6
D1    823190      16    0.09   0      2      *    6       6
D1    823200      16    0.22   0      2      *    6       6
D1    823290      19     1.4   0      2      *    9
D1    823300      19       3   0      3      *    9       9
D1    823380      18     3.2   0    3.2      *    8
D1    823390      20     3.3   0    3.3      *    10
D1    823400      20     3.6   0    3.6      *    10      9.8
D1    823490    20.5       5   0      5      *    10.5
** JACKSON BRANCH
D1    82400        5    -2.6   0      2      *    3.5     BOUNDARY
D1    824000       7   -2.54   0      2      *    7
D1    824080    16.5   -1.01   0      2      *    6.5     6.5
D1    824085      16     0.3   0      2      *    6
D1    824100      16     0.3   0      2      *    6       Yo=3, 5.5
D1    824110    16.5     3.4   0    3.4      *    6.5
D1    824120      16     1.5   0      2      *    6
```

```
D1   824130     18     3.7   0    3.7    *    8
D1   824140     18       5   0    5      *    8
D1   824200     17     3.6   0    3.6    *    7      9.3
D1   824300     18     3.9   0    3.9    *    8      10
D1   824400     21     5.2   0    5.2    *    11     11
D1   824490   17.5    1.15   0    2      *    7.5    7.5
D1   824500     16       2   0    2      *    6
D1   824590     18       3   0    3      *    8
D1   824600     20     3.5   0    3.5    *    10     12.5
D1   824650     20       5   0    5      *    10     Yo=8
** NEWMAN BRANCH
D1   82510       9      -4   0    2      *    BOUNDARY
D1   825100      9      -4   0    2      *    4
D1   825200     15      -4   0    2      *    5      5
D1   825220     20       4   0    4      *    10
D1   825230     20       4   0    4      *    10
D1   825300     22       4   0    4      *    12     12
D1   825390     20       4   0    4      *    10
D1   825400     22     5.5   0    5.5    *    12     15
D1   825410     22     6.1   0    6.1    *    12
D1   825420     22     6.3   0    6.3    *    12     12.8
D1   825429   22.5     8.0   0    8.0    *    12.4
D1   825430   22.5     6.5   0    6.5    *    12.5
D1   825500     23    9.41   0    9.41   *    13     13
D1   825600     11      -4   0    2      *    7
D1   825610     11    -3.6   0    2      *    7
D1   825615     11      -3   0    2      *    7
D1   825620     15     1.2   0    2      *    9
D1   825630     23     1.2   0    2      *    13     13.5
*D1  825640     17     1.5   0    2      *    7
D1   825650     11      -4   0    2      *    5
D1   825653     11   -1.05   0    2      *    6
D1   825655     11   -1.29   0    2      *    6
D1   825700     19       3   0    3      *    9      9.2
D1   825800     23    3.63   0    3.63   *    13     13.5
D1   825900     20       4   0    4      *    10
** APOLLO BEACH/WILDCAT CREEK
D1   82615       5      -4   0    2      *    3.5    BOUNDARY
D1   82620       5    -3.5   0    2      *    3.5    BOUNDARY
D1   82645       5    -3.5   0    2      *    3.5    BOUNDARY
D1   826150      9      -4   0    2      *    8
D1   826190   14.5      -4   0    2      *    4.5
D1   826200      9    -3.5   0    2      *    6
D1   826245     16    -3.2   0    2      *    6
D1   826250     16   -3.17   0    2      *    6      10
D1   826290     20       0   0    2      *    10
D1   826295     23       6   0    6      *    13     14
D1   826300     22       1   0    2      *    12     10
D1   826305     20     1.4   0    2      *    10
D1   826310     20     1.5   0    2      *    10     10
D1   826315     20       2   0    2      *    10
D1   826320     20     2.5   0    2.5    *    10     10.2
D1   826325     20       6   0    6      *    10
D1   826350   21.5    8.12   0    8.12   *    11.5   13
D1   826400     22    8.14   0    8.14   *    12     14
D1   826450      9    -3.5   0    2      *    7
D1   826500     15    -3.5   0    2      *    5      6
D1   826550     14      -2   0    2      *    4      4
D1   826560     14   -2.53   0    2      *    4
D1   826570     16   -2.62   0    2      *    6      5
D1   826600     15      -1   0    2      *    5
D1   826640     18     2.2   0    2.2    *    8
D1   826650     21     2.2   0    2.2    *    11     11
D1   826665     19    2.64   0    2.64   *    9
D1   826685     22    8.98   0    8.98   *    12
D1   826700     25    9.28   0    9.28   *    15     14
D1   826750     22    2.64   0    2.64   *    12     12
D1   826780     20    8.03   0    8.03   *    10
D1   826790     45    27.5   0    27.5   *    35
D1   826800     44      28   0    28     *    34     34
D1   826850     24    8.27   0    8.27   *    14     14.7
D1   826855     34    17.5   0    17.5   *    24
D1   826860     34      18   0    18     *    24     24
D1   826865     46      29   0    29     *    36
D1   826900     46    29.5   0    29.5   *    36     36
D1   826940     57      41   0    41     *    47
D1   826950     57    41.1   0    41.1   *    47
D1   826970     25     8.5   0    8.5    *    15     15
D1   826980     28      10   0    10     *    18
D1   826990     28    10.5   0    10.5   *    18     18.5
** COASTAL BASINS
D1   82900       5      -1   0    2      *    3.5    BOUNDARY
D1   82930       5    -1.5   0    2      *    3.5    BOUNDARY
D1   82940       5      -4   0    2      *    3.5    BOUNDARY
D1   829000      7      -1   0    2      *    1
D1   829100     12     1.7   0    2      *    2      2
D1   829190     14      -1   0    2      *    4
D1   829200     15       0   0    2      *    5      5
D1   829300      7    -1.5   0    2      *    5
D1   829400      7      -4   0    2      *    1.5
D1   829410   11.5    -3.9   0    2      *    1.5
D1   829450     14   -3.81   0    2      *    4      BR: LC=6.92, RD=9.44
D1   829500     13    -3.5   0    2      *    3
D1   829510     14      -1   0    2      *    4
D1   829600     15    -0.5   0    2      *    5      5
*==================================
* STORAGE NODES - ROAD OVERTOPPING
* (allows non-overlapping pipe connect.s & weirs)
*==================================
** DUG CREEK
E1 821190  18    5000  0
E1 821200  18    -1     4
E2 0.007   -4.5
   2.0      5.0
   21       7.0
   21      17.0
E1 821290  20    5000    0
E1 821390  25    5000    0
E1 821400  25    -1     3
E2  0.005   9.0
```

```
    26.5     14.5
    26.5     24.5
E1 821490  36    5000     0
E1 821500  37    5000     0
** KITCHEN BRANCH
E1 822050  15    5000     0
E1 822000  15    100000  0
E1 822200  15    5000     0
E1 822190  15    5000     0
E1 822250  16    5000     0
E1 822110  15    5000     0
E1 822290  15    5000     0
E1 822400  22    -1    3
E2  0.005   1.5
    17.0     12.0
    17.0     22.0
E1 822390  20    5000     0
E1 822420  22    -1    3
E2  0.005   3.0
    24.0     12.0
    24.0     22.0
E1 822410  20    5000     0
E1 822500  25    -1    3
E2  0.005   5.0
    30.0     14.9
    17.0     24.9
E1 822490  20    5000     0
** SIMS BRANCH
E1 823000  17    5000     0
E1 823100  17    5000     0
E1 823170  17    5000     0
E1 823180  17    -1    3
E2  0.005  1.17
    5.0    5.50
    5.0    15.5
E1 823190  17    -1    3
E2  0.005  0.09
    2.0    5.50
    2.0    15.5
E1 823200  17    5000     0
** storage accounted for in type 8 floodplain
*E1 823200  17    -1    3
*E2  0.005  0.22
*    5.5     5.50
*    5.5     15.5
E1 823290  20    5000     0
E1 823300  20    -1    3
E2  0.005   3.0
    30     8.50
    30     18.5
E1 823380  20    5000     0
E1 823390  20    5000     0
E1 823400  20    5000     0
** storage accounted for in type 8 floodplain
*E1 823400  20    -1    3
*E2  0.005   3.6
*    3.0     9.3
*    3.0     19.3
E1 823490  20    5000     0
** JACKSON BRANCH
E1 824000  16    5000     0
E1 824085  16    5000     0
E1 824080  16    -1    3
E2  0.005  -1.01
    8.0     5.0
    8.0     15.0
E1 824110  16    5000     0
E1 824130  18    5000     0
E1 824140  18    5000     0
E1 824200  19    -1    3
E2  0.005   3.6
    52.0    8.8
    52.0    18.8
E1 824300  20    -1    3
E2  0.005   3.9
    24.0    9.5
    24.0    19.5
E1 824400  21    5000     0
E1 824490  18    5000     0
E1 824590  18    5000     0
E1 824600  22    -1    3
E2  0.005   3.5
    83.0    12.0
    83.0    22.0
** NEWMAN BRANCH
E1 825100  20    1000000 0
E1 825230  20    5000     0
E1 825300  22    -1    3
E2  0.005   4.0
    3.0     11.5
    3.0     21.5
E1 825390  20    5000     0
E1 825400  25    -1    3
E2  0.005   5.5
    27.0    14.5
    27.0    24.5
E1 825410  20    5000     0
E1 825420  20    5000     0
E1 825429  20    5000     0
E1 825430  20    5000     0
E1 825500  23    -1    4
E2  0.005   9.41
    3.2     10.0
    18.0    13.0
    18.0    23.0
E1 825620  15    5000     0
E1 825630  23    -1    3
E2  0.005   1.2
    2.0    13.0
    2.0    23.0
```

```
E1 825653  11    5000    0
E1 825655  11    5000    0
E1 825615  11    52500   0
E1 825700  20     -1   3
E2  0.005   3.0
     21.0   8.7
     21.0   18.7
E1 825800  23     -1   4
E2  0.005   3.63
     6.5    10.0
     21.0   13.0
     21.0   23.0
** APOLLO BEACH/WILDCAT CREEK
E1 826245  21   5000    0
E1 826250  21   5000    0
E1 826290  22   5000    0
E1 826300  22    -1   3
E2  0.005   1.0
    1.10    9.5
    1.10    19.5
E1 826305  20   5000    0
E1 826310  20   5000    0
E1 826315  20   5000    0
E1 826320  20   5000    0
E1 826325  21.5 5000    0
E1 826350  22.5   -1    3
E2  0.005   8.12
    29.0   12.5
    29.0   22.5
E1 826295  22.0 5000    0
E1 826400  24.0   -1    3
E2  0.005   8.14
    23.0   13.5
    23.0   23.5
E1 826450  15.0 5000    0
E1 826500  16.0   -1    3
E2  0.005   -3.5
    37.0    5.5
    37.0   15.5
E1 826550  14.0   -1    3
E2  0.005   -2.0
    39.0    3.5
    39.0   13.5
E1 826560  16    5000    0
E1 826570  16     -1    3
E2  0.005   -2.62
    0.21    4.5
    0.21   14.5
E1 826640  21    5000    0
E1 826665  22     -1    4
E2  0.005  2.64
    0.55   7.9
    2.5    8.0
    2.5   18.0
E1 826685  25 5000    0
E1 826700  25   -1    3
E2  0.005  9.28
    20.0   13.5
    20.0   23.5
E1 826650  21.0 5000    0
E1 826750  22.0   -1    3
E2  0.005  2.64
    16.4   11.5
    16.4   21.5
E1 826790  44 5000    0
E1 826800  44   -1    3
E2  0.005  28.0
    0.23   33.5
    0.23   43.5
E1 826780  24    5000    0
E1 826850  24.2   -1    3
E2  0.005  8.27
    5.2    14.2
    5.2    24.2
E1 826855  34    5000    0
E1 826860  34    5000    0
E1 826865  46    5000    0
E1 826900  46    5000    0
E1 826970  25     -1    3
E2  0.005  9.5
    13.7   14.5
    13.7   24.5
E1 826980  28    5000    0
E1 826990  28     -1    3
E2  0.005  10.5
     5.2   18.0
     5.2   28.0
** COASTAL BASINS
E1 829000  12    5000    0
E1 829190  15    5000    0
E1 829200  15     -1    3
E2  0.005  0.0
    33.0    4.5
    33.0   14.5
E1 829510  15    5000    0
E1 829600  15     -1    3
E2  0.005  -0.5
    21.0    4.5
    21.0   14.5
*==============================================
* STORAGE DATA (SIGNIFICANT LAKES/WETLANDS)
*==============================================
** DUG CREEK
E1 821300 20  -1 4
E2  0.005   0.87
    2.5     5.0
    49.0    10.0
    49.0    20.0
** KITCHEN BRANCH
E1 822100  15   1000000  0
```

```
E1 822150  15    313000  0
E1 822300  17    -1    5
E2  0.005   -0.65
     0.5    5.0
     28.0    10.0
     119.0   12.0
     119.0   17.0
** JACKSON BRANCH
E1 824100  17    -1    6
E2  0.005  0.30
     0.005   2.9
     10.5    3.0
     40      5.0
     78      6.0
    100     11.0
E1 824650  20    -1    6
E2  0.005   5.0
     0.005   7.9
     0.75    8.0
     3.0    10.0
     8.8    11.5
     50     16.5
** NEWMAN BRANCH
E1 825200  15    -1    3
E2  0.005   -4.0
     20.0    4.5
     50.0   14.0
** COASTAL BASINS
E1 829100  15  1129250  0
E1 829500  15  3681250  0
*======================
** Weir Data
*======================
* ================================
*  FLOOD FLOW OVERTOP ROAD PATHS
* ================================
*          IDWEIR   NJUNC(1) NJUNC(2)  KWEIR   EL.CREST  EL.TOP   WLEN    COEFF
** DUG CREEK
G1       7821200    821200    821190      1       7.50     17.7     100     2.63
G1       7821300    821300    821290      1      10.60      20      100     2.63
G1       7821400    821400    821390      1      14.90      25      100     2.63
G1       7821500    821500    821490      1      26.20      37      100     2.63
** KITCHEN BRANCH
G1       7822050    822050    822000      1       4.50      15      100     2.63
G1       7822100    822100    822000      1       6.50      15      400     2.63
G1       7822200    822200    822190      1       6.50      15      100     2.63
G1       7822250    822250    822110      1       6.08      16      100     2.63
G1       7822300    822300    822290      1      12.00      16      100     2.63
G1       7822400    822400    822390      1      12.50      20      100     2.63
G1       7822420    822420    822410      1      12.50      20      100     2.63
G1       7822500    822500    822490      1      15.40      20      100     2.63
** SIMS BRANCH
G1       7823100    823100    823000      1       6.50      17      100     2.63
G1       7823180    823180    823170      1       6.00      17      100     2.63
G1       7823190    823190    823180      1       6.00      16      100     2.63
G1       7823200    823200    823190      1       6.00      16      100     2.63
G1       7823300    823300    823290      1       9.00      19      100     2.63
G1       7823400    823400    823390      1       9.80      20      100     2.63
** JACKSON BRANCH
G1       7824080    824080    824000      1       6.50     16.5     100     2.63
G1       7824100    824100    824085      1       5.50      16      100     2.63
G1       7824200    824200    824110      1       9.30      17      100     2.63
G1       7824300    824300    824130      1      10.00      18      100     2.63
G1       7824400    824400    824140      1      11.00      21      100     2.63
G1       7824490    824490    824000      1       7.50     17.5     100     2.63
G1       7824600    824600    824590      1      12.50      20      100     2.63
** NEWMAN BRANCH
G1       7825200    825200    825100      1      10.00      15      100     2.63
G1       7825300    825300    825230      1      12.00      22      100     2.63
G1       7825400    825400    825390      1      15.00      22      100     2.63
G1       7825420    825420    825410      1      12.80      22      100     2.63
********* INTERBASIN TRANSFER TO FDOT DITCH  7/10/00
G1       6825430    825430    825429      1      12.40      22       20     2.63
***********
G1       7825500    825500    825430      1      13.00      23      100     2.63
***** 7/25 MODIFICATION earthen berm obstructs flow
G1       6825600    825600    825200      1       4.80      10      100     2.63
********************
G1       7825630    825630    825620      1      13.50      17      100     2.63
G1       7825655    925655    825653      1       6.80      11      100     2.63
G1       7825700    825700    825615      1       9.20      19      100     2.63
G1       7825800    825800    825630      1      13.50      23      100     2.63
** APOLLO BEACH/WILDCAT CREEK
G1       7826250    826250    826245      1      10.00      16      100     2.63
G1       7826295    826295    826290      1      14.00      23      100     2.63
G1       7826300    826300    826290      1      10.00      22       50     2.63
G1       7826310    826310    826305      1      10.00      20       50     2.63
G1       7826320    826320    826315      1      10.20      20       50     2.63
G1       7826350    826350    826325      1      13.00     21.5     100     2.63
G1       7826400    826400    826295      1      14.00      22      100     2.63
G1       7826500    826500    826450      1       6.00      15      100     2.63
G1       7826550    826550    826500      1       4.00      14      100     2.63
G1       7826570    826570    826560      1       5.00      16      100     2.63
G1       7826650    826650    826640      1      11.00      21      100     2.63
G1       7826700    826700    826685      1      14.00      25      100     2.63
G1       7826750    826750    826665      1      12.00      22      100     2.63
G1       7826800    826800    826790      1      34.00      44      100     2.63
G1       7826850    826850    826780      1      14.70      24      100     2.63
G1       7826860    826860    826855      1      24.00      34      100     2.63
G1       7826900    826900    826865      1      36.00      46      100     2.63
G1       7826990    826990    826980      1      18.50      28      100     2.63
** COASTAL BASINS
G1       7829100    829100    829000      1       2.00      12      100     2.63
G1       7829200    829200    829190      1       5.00      15      100     2.63
G1       7829600    829600    829510      1       5.00      15      100     2.63
********* Outfall Data *****************************************************
* Tidal (CONSTANT)
*
I1    82100  1
I1    82200  1
```

```
I1     82300  1
I1     82400  1
I1     82510  1
I1     82615  1
I1     82620  1
I1     82645  1
I1     82900  1
I1     82930  1
I1     82940  1
J1  2
J2  2.0
$ENDPROGRAM
```

```
* ============================================================================
*                    BULLFROG CREEK/WOLF BRANCH
* ============================================================================
*
ID                WOLF BRANCH 25-YEAR STORM
ID        Dames & Moore for Hillsborough County BOCC--Dept of Stormwater Management
*
*
*   This is a standard HEC-1 file.  RDHEC copies the ID, *, IT, IO, JR,
*       PG, IN, PC, and PR records from this file.  It ignores other records.
*
*FREE
*DIAGRAM
*     ----------------------
*      25-YEAR 24 HOUR STORM
*     ----------------------
*
*   NMIN  DATE      ITIME      NQ  NDDATE   NDTIME
IT     15 26SEP97    0000     250 27SEP97    0000
*
*NOLIST
*   IPRT    IPLT
*   0,1,2         All
*       3         Input Data and Intermediate and Master Summaries
*       4         Input Data and Master Summary
*       5         Job specification and Master Summary Only
*
*           0,1  No Printer Plots--Can be overriden on KO record
*             2  Plot All
*
IO     3      0
*
* #####################################################
JR  PREC    8.0
* #####################################################
*    SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION (30-MIN INCREMENTS)
*    SOURCE: SWFWMD ERP INFORMATION MANUAL TABLE C-1
* GAGE     UDEPTH
PGSCSFLM    1.0
*
*  TSTEP IDATE      ITIME
IN    30 26SEP97      0
PC  .000    .006    .012    .019    .025    .032    .039    .047    .054    .062
PC  .071    .080    .089    .099    .110    .122    .134    .148    .164    .181
PC  .201    .226    .258    .308    .607    .719    .757    .785    .807    .826
PC  .842    .857    .870    .882    .893    .904    .913    .923    .931    .940
PC  .948    .955    .962    .969    .976    .983    .989    .995   1.000   1.000
*
* ================================================================================
*    SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION
PRSCSFLM
* ============================================================================
ZZ
*                                         AMC II
* BASINID NJUNC   TC  ACRE    CN  IACOEFF K KPRINT
WP  821000  821000  105 214.86  95  0.2 256 0
WP  821100  821100  176 72.13   90  0.2 256 0
WP  821200  821200  168 120.9   84  0.2 256 0
WP  821300  821300  170 189.1   81  0.2 256 0
WP  821400  821400  268 352.13  82  0.2 256 0
WP  821500  821500  173 110.84  81  0.2 256 0
WP  822000  822000  127 235.71  82  0.2 256 0
WP  822050  822050  233 97.92   79  0.2 256 0
WP  822100  822100  190 42.06   90  0.2 256 0
WP  822150  822150  338 107.69  80  0.2 256 0
WP  822200  822200  263 77.31   77  0.2 256 0
WP  822250  822250  110 64.71   80  0.2 256 0
```

WP	822300	822300	349	487	84	0.2	256	0
WP	822350	822350	84	347.15	83	0.2	256	0
WP	822400	822400	238	565.29	84	0.2	256	0
WP	822500	822500	237	386.38	81	0.2	256	0
WP	823000	823000	96	215.07	88	0.2	256	0
WP	823100	823100	377	167.38	84	0.2	256	0
WP	823200	823200	143	26.86	92	0.2	256	0
WP	823300	823300	143	49.07	84	0.2	256	0
WP	823400	823400	163	179.51	81	0.2	256	0
WP	824650	824650	77	8.84	83	0.2	256	0
WP	824000	824000	63	439.81	93	0.2	256	0
WP	824080	824080	265	410.24	86	0.2	256	0
WP	824200	824200	154	58.21	83	0.2	256	0
WP	824300	824300	126	38.92	83	0.2	256	0
WP	824400	824400	131	19.1	82	0.2	256	0
WP	824500	824500	343	88.29	86	0.2	256	0
WP	824600	824600	186	82.87	82	0.2	256	0
WP	825000	825000	1	221.84	99	0.2	256	0
WP	825050	825050	52	44.19	94	0.2	256	0
WP	825100	825100	227	296.6	92	0.2	256	0
WP	825200	825200	428	475.42	86	0.2	256	0
WP	825300	825300	98	23.17	90	0.2	256	0
WP	825400	825400	189	263.51	81	0.2	256	0
WP	825500	825500	188	152.33	83	0.2	256	0
WP	825600	825600	87	210.83	87	0.2	256	0
WP	825700	825700	143	52.88	88	0.2	256	0
WP	825800	825800	321	252.66	83	0.2	256	0
WP	825900	825900	147	55.42	83	0.2	256	0
WP	826000	826000	51	111.8	76	0.2	256	0
WP	826050	826050	61	100.8	91	0.2	256	0
WP	826100	826100	56	218.02	84	0.2	256	0
WP	826150	826150	63	272.26	94	0.2	256	0
WP	826200	826200	19	370.65	93	0.2	256	0
WP	826250	826250	165	296.12	88	0.2	256	0
WP	826300	826300	155	13.16	91	0.2	256	0
WP	826350	826350	31	60.75	82	0.2	256	0
WP	826400	826400	358	559.84	80	0.2	256	0
WP	826450	826450	16	276.05	89	0.2	256	0
WP	826500	826500	17	89.04	89	0.2	256	0
WP	826550	826550	39	173.15	82	0.2	256	0
WP	826600	826600	195	216.14	87	0.2	256	0
WP	826650	826650	189	37.3	95	0.2	256	0
WP	826700	826700	275	140.75	80	0.2	256	0
WP	826750	826750	253	198.16	82	0.2	256	0
WP	826800	826800	217	157.27	83	0.2	256	0
WP	826850	826850	96	111.13	82	0.2	256	0
WP	826900	826900	180	125.24	86	0.2	256	0
WP	826950	826950	296	361.32	84	0.2	256	0
WP	826970	826970	194	57.1	80	0.2	256	0
WP	826990	826990	282	295.16	83	0.2	256	0
WP	827000	827000	65	306.51	98	0.2	256	0
WP	827100	827100	37	190.21	84	0.2	256	0
WP	827150	827150	187	287.47	84	0.2	256	0
WP	827200	827200	109	101.22	87	0.2	256	0
WP	827250	827250	255	220.92	83	0.2	256	0
WP	827300	827300	312	107.04	85	0.2	256	0
WP	827350	827350	205	115.19	85	0.2	256	0
WP	827400	827400	104	208.79	86	0.2	256	0
WP	827450	827450	78	104.1	86	0.2	256	0
WP	827500	827500	145	309.99	83	0.2	256	0
WP	827550	827550	228	97.17	83	0.2	256	0
WP	827600	827600	79	112.76	83	0.2	256	0
WP	827650	827650	274	165.14	83	0.2	256	0
WP	827700	827700	137	89.33	82	0.2	256	0
WP	827750	827750	179	84.22	82	0.2	256	0
WP	827800	827800	103	138.01	85	0.2	256	0
WP	827850	827850	127	178.05	83	0.2	256	0

WP	827890	827890	116	239.72	87	0.2	256	0
WP	828000	828000	38	255.18	86	0.2	256	0
WP	828050	828050	133	38.83	85	0.2	256	0
WP	828100	828100	171	239.83	87	0.2	256	0
WP	828150	828150	183	169.74	85	0.2	256	0
WP	828200	828200	228	109.78	86	0.2	256	0
WP	828250	828250	133	133.56	81	0.2	256	0
WP	828300	828300	299	260.67	82	0.2	256	0
WP	828350	828350	196	294.38	81	0.2	256	0
WP	828400	828400	230	52.12	86	0.2	256	0
WP	828450	828450	92	39.85	88	0.2	256	0
WP	828500	828500	188	283.47	89	0.2	256	0
WP	828550	828550	132	92.73	84	0.2	256	0
WP	829000	829000	90	806.77	98	0.2	256	0
WP	829100	829100	148	179.34	89	0.2	256	0
WP	829200	829200	191	187.95	89	0.2	256	0
WP	829700	829700	247	100.41	93	0.2	256	0
WP	829400	829400	116	158.83	91	0.2	256	0
WP	829600	829600	178	26.9	81	0.2	256	0
WP	829500	829500	357	476.57	89	0.2	256	0
WP	829300	829300	22	439.75	92	0.2	256	0
WP	829800	829800	157	311.6	94	0.2	256	0

```
* ==========================================================================
*                        BULLFROG CREEK/WOLF BRANCH
* ==========================================================================
*
ID                   WOLF BRANCH 100-YEAR STORM
ID          Dames & Moore for Hillsborough County BOCC--Dept of Stormwater Management
*
*
*    This is a standard HEC-1 file.  RDHEC copies the ID, *, IT, IO, JR,
*        PG, IN, PC, and PR records from this file.  It ignores other records.
*
*FREE
*DIAGRAM
*      ----------------------
*      100-YEAR 24 HOUR STORM
*      ----------------------
*
*   NMIN  DATE     ITIME      NQ  NDDATE   NDTIME
IT    15 26SEP97    0000     250 27SEP97    0000
*
*NOLIST
*   IPRT    IPLT
*   0,1,2         All
*       3         Input Data and Intermediate and Master Summaries
*       4         Input Data and Master Summary
*       5         Job specification and Master Summary Only
*
*            0,1  No Printer Plots--Can be overriden on KO record
*              2  Plot All
*
IO     3       0
*
* #####################################################
JR  PREC   11.0
* #####################################################
*    SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION (30-MIN INCREMENTS)
*    SOURCE: SWFWMD ERP INFORMATION MANUAL TABLE C-1
* GAGE     UDEPTH
PGSCSFLM    1.0
*
*  TSTEP IDATE      ITIME
IN     30 26SEP97      0
PC  .000     .006     .012     .019     .025     .032     .039     .047     .054     .062
PC  .071     .080     .089     .099     .110     .122     .134     .148     .164     .181
PC  .201     .226     .258     .308     .607     .719     .757     .785     .807     .826
PC  .842     .857     .870     .882     .893     .904     .913     .923     .931     .940
PC  .948     .955     .962     .969     .976     .983     .989     .995    1.000    1.000
*
* ================================================================================
*    SCS 24-HR, TYPE II FLORIDA-MODIFIED DISTRIBUTION
PRSCSFLM
* =============================================================================
ZZ
*                                          AMC II
* BASINID NJUNC    TC  ACRE    CN IACOEFF  K KPRINT
WP .821000  821000  93  214.86  95  0.2 256 0
WP  821100  821100  155 72.13   90  0.2 256 0
WP  821200  821200  149 120.9   84  0.2 256 0
WP  821300  821300  150 189.1   81  0.2 256 0
WP  821400  821400  236 352.13  82  0.2 256 0
WP  821500  821500  153 110.84  81  0.2 256 0
WP  822000  822000  112 235.71  82  0.2 256 0
WP  822050  822050  206 97.92   79  0.2 256 0
WP  822100  822100  167 42.06   90  0.2 256 0
WP  822150  822150  298 107.69  80  0.2 256 0
WP  822200  822200  232 77.31   77  0.2 256 0
WP  822250  822250  97  64.71   80  0.2 256 0
```

WP	822300	822300	308	487	84	0.2	256	0
WP	822350	822350	74	347.15	83	0.2	256	0
WP	822400	822400	220	565.29	84	0.2	256	0
WP	822500	822500	217	386.38	81	0.2	256	0
WP	823000	823000	61	215.07	88	0.2	256	0
WP	823100	823100	340	167.38	84	0.2	256	0
WP	823200	823200	126	26.86	92	0.2	256	0
WP	823300	823300	126	49.07	84	0.2	256	0
WP	823400	823400	143	179.51	81	0.2	256	0
WP	824650	824650	68	8.84	83	0.2	256	0
WP	824000	824000	56	439.81	93	0.2	256	0
WP	824080	824080	234	410.24	86	0.2	256	0
WP	824200	824200	136	58.21	83	0.2	256	0
WP	824300	824300	111	38.92	83	0.2	256	0
WP	824400	824400	116	19.1	82	0.2	256	0
WP	824500	824500	322	88.29	86	0.2	256	0
WP	824600	824600	164	82.87	82	0.2	256	0
WP	825000	825000	1	221.84	99	0.2	256	0
WP	825050	825050	46	44.19	94	0.2	256	0
WP	825100	825100	200	296.6	92	0.2	256	0
WP	825200	825200	378	475.42	86	0.2	256	0
WP	825300	825300	87	23.17	90	0.2	256	0
WP	825400	825400	167	263.51	81	0.2	256	0
WP	825500	825500	170	152.33	83	0.2	256	0
WP	825600	825600	76	210.83	87	0.2	256	0
WP	825700	825700	126	52.88	88	0.2	256	0
WP	825800	825800	288	252.66	83	0.2	256	0
WP	825900	825900	135	55.42	83	0.2	256	0
WP	826000	826000	45	111.8	76	0.2	256	0
WP	826050	826050	54	100.8	91	0.2	256	0
WP	826100	826100	33	218.02	84	0.2	256	0
WP	826150	826150	35	272.26	94	0.2	256	0
WP	826200	826200	17	370.65	93	0.2	256	0
WP	826250	826250	145	296.12	88	0.2	256	0
WP	826300	826300	154	13.16	91	0.2	256	0
WP	826350	826350	27	60.75	82	0.2	256	0
WP	826400	826400	326	559.84	80	0.2	256	0
WP	826450	826450	14	276.05	89	0.2	256	0
WP	826500	826500	15	89.04	89	0.2	256	0
WP	826550	826550	34	173.15	82	0.2	256	0
WP	826600	826600	188	216.14	87	0.2	256	0
WP	826650	826650	166	37.3	95	0.2	256	0
WP	826700	826700	252	140.75	80	0.2	256	0
WP	826750	826750	223	198.16	82	0.2	256	0
WP	826800	826800	191	157.27	83	0.2	256	0
WP	826850	826850	85	111.13	82	0.2	256	0
WP	826900	826900	159	125.24	86	0.2	256	0
WP	826950	826950	236	361.32	84	0.2	256	0
WP	826970	826970	171	57.1	80	0.2	256	0
WP	826990	826990	261	295.16	83	0.2	256	0
WP	827000	827000	63	306.51	98	0.2	256	0
WP	827100	827100	33	190.21	84	0.2	256	0
WP	827150	827150	165	287.47	84	0.2	256	0
WP	827200	827200	96	101.22	87	0.2	256	0
WP	827250	827250	225	220.92	83	0.2	256	0
WP	827300	827300	289	107.04	85	0.2	256	0
WP	827350	827350	223	115.19	85	0.2	256	0
WP	827400	827400	92	208.79	86	0.2	256	0
WP	827450	827450	69	104.1	86	0.2	256	0
WP	827500	827500	128	309.99	83	0.2	256	0
WP	827550	827550	202	97.17	83	0.2	256	0
WP	827600	827600	70	112.76	83	0.2	256	0
WP	827650	827650	248	165.14	83	0.2	256	0
WP	827700	827700	121	89.33	82	0.2	256	0
WP	827750	827750	158	84.22	82	0.2	256	0
WP	827800	827800	91	138.01	85	0.2	256	0
WP	827850	827850	116	178.05	83	0.2	256	0

WP	827890	827890	102	239.72	87	0.2	256	0
WP	828000	828000	34	255.18	86	0.2	256	0
WP	828050	828050	121	38.83	85	0.2	256	0
WP	828100	828100	161	239.83	87	0.2	256	0
WP	828150	828150	162	169.74	85	0.2	256	0
WP	828200	828200	210	109.78	86	0.2	256	0
WP	828250	828250	117	133.56	81	0.2	256	0
WP	828300	828300	282	260.67	82	0.2	256	0
WP	828350	828350	188	294.38	81	0.2	256	0
WP	828400	828400	203	52.12	86	0.2	256	0
WP	828450	828450	81	39.85	88	0.2	256	0
WP	828500	828500	166	283.47	89	0.2	256	0
WP	828550	828550	116	92.73	84	0.2	256	0
WP	829000	829000	79	806.77	98	0.2	256	0
WP	829100	829100	145	179.34	89	0.2	256	0
WP	829200	829200	168	187.95	89	0.2	256	0
WP	829700	829700	230	100.41	93	0.2	256	0
WP	829400	829400	102	158.83	91	0.2	256	0
WP	829600	829600	177	26.9	81	0.2	256	0
WP	829500	829500	315	476.57	89	0.2	256	0
WP	829300	829300	20	439.75	92	0.2	256	0
WP	829800	829800	74	311.6	94	0.2	256	0

	JUNC_ID	INVT	Z_MAX	T_MAX
ZMAX	82100	-2.00	2.00	0.00
ZMAX	821000	-2.00	2.55	14.35
ZMAX	821100	-1.10	2.50	14.43
ZMAX	821190	-4.50	4.72	18.75
ZMAX	821200	-4.50	5.15	18.72
ZMAX	821290	0.87	5.66	18.93
ZMAX	821300	0.87	6.90	18.83
ZMAX	821390	8.00	10.96	17.28
ZMAX	821400	9.00	11.49	17.22
ZMAX	821490	19.00	20.78	14.97
ZMAX	821500	20.50	25.87	14.50
ZMAX	82200	-2.50	2.00	0.00
ZMAX	822000	-2.10	2.01	16.27
ZMAX	822050	0.50	3.62	15.57
ZMAX	822100	-2.10	2.95	17.03
ZMAX	822110	-1.10	3.31	16.60
ZMAX	822150	-2.00	2.98	17.12
ZMAX	822190	-2.00	2.99	17.12
ZMAX	822200	-1.00	3.09	17.07
ZMAX	822250	-1.10	3.76	16.30
ZMAX	822290	-0.65	5.44	15.72
ZMAX	822300	-0.65	6.31	17.07
ZMAX	822350	0.00	5.99	15.17
ZMAX	822390	1.00	6.13	15.57
ZMAX	822400	1.50	9.31	20.55
ZMAX	822410	2.80	9.31	20.57
ZMAX	822420	3.00	10.25	24.60
ZMAX	822490	4.00	10.30	24.52
ZMAX	822500	5.00	11.36	22.80
ZMAX	82300	-2.50	2.00	0.00
ZMAX	823000	-2.00	2.00	8.47
ZMAX	823100	-2.00	4.10	22.80
ZMAX	823170	-0.50	4.20	22.68
ZMAX	823180	1.17	4.58	22.42
ZMAX	823190	0.09	4.90	22.15
ZMAX	823200	0.22	5.27	21.93
ZMAX	823290	1.40	6.50	21.10
ZMAX	823300	3.00	6.59	21.12
ZMAX	823380	3.20	7.23	19.48
ZMAX	823390	3.30	7.53	18.93
ZMAX	823400	3.60	9.46	17.80
ZMAX	823490	5.00	9.46	17.80
ZMAX	82400	-2.60	2.00	0.00
ZMAX	824000	-2.54	2.01	6.77
ZMAX	824080	-1.01	2.25	16.03
ZMAX	824085	0.30	2.36	16.65
ZMAX	824100	0.30	3.10	19.65
ZMAX	824110	3.40	4.33	20.63
ZMAX	824120	1.50	3.58	16.77
ZMAX	824130	3.70	4.74	18.15
ZMAX	824140	5.00	6.10	14.48
ZMAX	824200	3.60	5.54	20.33
ZMAX	824300	3.90	6.00	17.90
ZMAX	824400	5.20	7.51	13.95
ZMAX	824490	1.15	4.83	21.13
ZMAX	824500	2.00	5.73	20.90
ZMAX	824590	3.00	5.91	21.82
ZMAX	824600	3.50	5.91	21.85
ZMAX	824650	5.00	5.91	21.85
ZMAX	82510	-4.00	2.00	0.00
ZMAX	825100	-4.00	2.00	10.28
ZMAX	825200	-4.00	2.03	20.05
ZMAX	825220	4.00	4.99	20.58
ZMAX	825230	4.00	5.60	16.90
ZMAX	825300	4.00	6.71	16.62
ZMAX	825390	4.00	6.85	20.73
ZMAX	825400	5.50	11.51	20.85
ZMAX	825410	6.10	6.89	19.92
ZMAX	825420	6.30	12.92	19.82
ZMAX	825429	8.00	9.31	19.98
ZMAX	825430	6.50	12.94	19.80
ZMAX	825500	9.41	13.32	19.78
ZMAX	825600	-4.00	2.14	12.37
ZMAX	825610	-3.60	2.11	14.17
ZMAX	825615	-3.00	2.11	14.18
ZMAX	825620	1.20	3.19	16.28
ZMAX	825630	1.20	3.59	16.25
ZMAX	825650	-4.00	2.12	12.45
ZMAX	825653	-1.05	2.12	12.37
ZMAX	825655	-1.29	2.12	12.55
ZMAX	825700	3.00	6.00	19.70
ZMAX	825800	3.63	5.45	16.12
ZMAX	825900	4.00	5.80	15.27
ZMAX	82615	-4.00	2.00	0.00
ZMAX	82620	-3.50	2.00	0.00
ZMAX	82645	-3.50	2.00	0.00
ZMAX	826150	-4.00	2.07	12.32
ZMAX	826190	-4.00	2.09	12.42
ZMAX	826200	-3.50	2.03	12.50
ZMAX	826245	-3.20	2.13	15.78
ZMAX	826250	-3.17	2.42	15.85
ZMAX	826290	0.00	2.45	16.25
ZMAX	826295	6.00	13.88	25.15
ZMAX	826300	1.00	3.04	14.97
ZMAX	826305	1.40	3.43	15.07

ZMAX	826310	1.50	3.74	15.07
ZMAX	826315	2.00	4.02	15.02
ZMAX	826320	2.50	4.80	14.72
ZMAX	826325	6.00	6.87	14.62
ZMAX	826350	8.12	10.35	14.58
ZMAX	826400	8.14	14.50	25.13
ZMAX	826450	-3.50	2.03	11.67
ZMAX	826500	-3.50	2.20	21.25
ZMAX	826550	-2.00	2.21	13.12
ZMAX	826560	-2.53	2.48	21.15
ZMAX	826570	-2.62	4.39	21.03
ZMAX	826600	-1.00	5.63	21.00
ZMAX	826640	2.20	8.74	20.23
ZMAX	826650	2.20	8.84	20.15
ZMAX	826665	2.64	9.66	19.82
ZMAX	826685	8.98	9.80	27.27
ZMAX	826700	9.28	13.73	27.15
ZMAX	826750	2.64	9.74	19.75
ZMAX	826780	8.03	12.44	18.65
ZMAX	826790	27.50	29.75	15.50
ZMAX	826800	28.00	31.84	15.27
ZMAX	826850	8.27	15.63	18.62
ZMAX	826855	17.50	21.53	16.13
ZMAX	826860	18.00	24.82	16.08
ZMAX	826865	29.00	33.73	16.05
ZMAX	826900	29.50	36.43	16.02
ZMAX	826940	41.00	43.02	16.28
ZMAX	826950	41.10	44.68	16.25
ZMAX	826970	8.50	15.79	18.97
ZMAX	826980	10.00	16.37	18.88
ZMAX	826990	10.50	18.72	18.83
ZMAX	82900	-1.00	2.00	0.00
ZMAX	82930	-1.50	2.00	0.00
ZMAX	82940	-4.00	2.00	0.00
ZMAX	829000	-1.00	2.14	13.75
ZMAX	829100	1.70	2.66	15.70
ZMAX	829190	-1.00	2.18	14.78
ZMAX	829200	0.00	3.93	20.37
ZMAX	829300	-1.50	2.09	12.75
ZMAX	829400	-4.00	2.12	16.37
ZMAX	829410	-3.90	2.12	14.03
ZMAX	829450	-3.81	2.12	14.28
ZMAX	829500	-3.50	2.20	18.35
ZMAX	829510	-1.00	2.21	18.38
ZMAX	829600	-0.50	2.38	19.07

	PIPE_ID	FROM	TO	SIZE(INCH)	LENGTH	INV_U	ZMAXU	INV_D	ZMAXD	QMAX	VMAX	TMAX
QMAX	9821000	821000	82100	60.	500.	-2.00	2.55	-2.00	2.00	1035.75	1.99	14.37
QMAX	9821100	821100	821000	83.	144.	-1.10	2.50	-2.00	2.55	513.57	4.69	14.43
QMAX	9821190	821100	821190	138.	1615.	-1.10	2.50	-4.50	4.72	-388.66	-2.70	18.72
QMAX	1821200	821200	821190	96.	135.	-4.50	5.15	-4.50	4.72	388.75	4.49	18.62
QMAX	9821290	821290	821200	140.	1890.	0.87	5.66	-4.50	5.15	330.87	0.83	18.93
QMAX	1821300	821300	821290	54.	120.	0.87	6.90	0.87	5.66	110.34	6.83	18.75
QMAX	2821300	821300	821290	54.	120.	0.87	6.90	0.87	5.66	110.34	6.83	18.75
QMAX	3821300	821300	821290	54.	120.	0.87	6.90	0.87	5.66	110.34	6.83	18.75
QMAX	9821390	821390	821300	132.	2790.	8.00	10.96	0.87	6.90	255.96	1.94	17.28
QMAX	1821400	821400	821390	43.	320.	9.00	11.49	8.00	10.96	85.34	6.55	17.18
QMAX	2821400	821400	821390	43.	320.	9.00	11.49	8.00	10.96	85.34	6.55	17.18
QMAX	3821400	821400	821390	43.	320.	9.00	11.49	8.00	10.96	85.34	6.55	17.18
QMAX	9821490	821490	821400	96.	4690.	19.00	20.78	9.00	11.49	83.30	2.32	14.97
QMAX	1821500	821500	821490	24.	320.	21.50	25.87	20.00	20.78	21.79	7.11	14.50
QMAX	2821500	821500	821490	36.	320.	20.50	25.87	19.00	20.78	62.12	10.84	14.77
QMAX	9822000	822000	82200	60.	500.	-2.10	2.01	-2.50	2.00	971.45	0.72	16.28
QMAX	1822100	822100	822000	60.	113.	-2.00	2.95	-2.00	2.01	275.06	6.14	17.03
QMAX	2822100	822100	822000	60.	150.	-2.10	2.95	-2.10	2.01	243.46	5.91	17.03
QMAX	3822100	822100	822000	60.	150.	-2.10	2.95	-2.10	2.01	243.46	5.91	17.03
QMAX	9822150	822150	822100	96.	965.	-2.00	2.98	-2.00	2.95	89.40	0.55	18.10
QMAX	9822190	822190	822150	96.	890.	-2.00	2.99	-2.00	2.98	37.26	0.23	17.17
QMAX	1822200	822200	822190	54.	320.	-1.00	3.09	-2.00	2.99	37.96	2.43	16.00
QMAX	9822110	822110	822100	73.	785.	-1.10	3.31	-2.00	2.95	687.98	1.35	15.75
QMAX	1822250	822250	822110	57.	320.	-1.10	3.76	-1.10	3.31	693.10	5.11	15.67
QMAX	9822290	822290	822250	128.	1460.	-0.65	5.44	-1.10	3.76	649.18	1.94	15.67
QMAX	1822300	822300	822290	48.	105.	-0.65	6.31	-0.65	5.44	76.43	6.06	17.78
QMAX	2822300	822300	822290	48.	105.	-0.65	6.31	-0.65	5.44	76.43	6.06	17.78
QMAX	3822300	822300	822290	48.	105.	-0.65	6.31	-0.65	5.44	76.43	6.06	17.78
QMAX	9822350	822350	822290	96.	1870.	0.00	5.99	-0.65	5.44	491.78	1.89	14.82
QMAX	9822390	822390	822350	96.	2265.	1.00	6.13	0.00	5.99	285.38	1.36	21.25
QMAX	1822400	822400	822390	48.	100.	1.50	9.31	1.00	6.13	142.37	11.20	21.13
QMAX	2822400	822400	822390	48.	100.	1.50	9.31	1.00	6.13	142.37	11.20	21.13
QMAX	9822410	822410	822400	144.	1240.	2.80	9.31	1.50	9.31	131.35	1.25	30.35
QMAX	1822420	822420	822410	24.	260.	3.00	10.25	2.80	9.31	30.81	9.71	30.27
QMAX	2822420	822420	822410	36.	260.	3.00	10.25	2.80	9.31	98.65	8.50	30.47
QMAX	9822490	822490	822420	144.	4100.	4.00	10.30	3.00	10.25	106.85	1.18	20.22
QMAX	1822500	822500	822490	38.	115.	5.00	11.36	4.00	10.30	86.11	6.78	15.75
QMAX	2822500	822500	822490	30.	115.	5.00	11.36	4.00	10.30	29.13	-10.00	19.22
QMAX	1822050	822050	822000	24.	320.	0.50	3.62	-0.50	2.01	20.62	6.55	15.57
QMAX	2822050	822050	822000	24.	320.	0.50	3.62	-0.50	2.01	35.24	7.00	15.57
QMAX	9823000	823000	82300	60.	500.	-2.00	2.00	-2.50	2.00	327.11	0.25	14.00
QMAX	1823100	823100	823000	60.	140.	-2.00	4.10	-2.00	2.00	155.56	8.41	22.82
QMAX	9823170	823170	823100	90.	2515.	-0.50	4.20	-2.00	4.10	96.63	1.06	22.33
QMAX	1823180	823170	823180	60.	320.	1.92	4.20	1.26	4.58	-96.85	-3.49	22.22
QMAX	1823190	823180	823190	48.	320.	1.17	4.58	0.09	4.90	-32.61	-2.67	21.75
QMAX	2823190	823180	823190	48.	320.	1.17	4.58	0.09	4.90	-32.61	-2.67	21.75
QMAX	3823190	823180	823190	48.	320.	1.17	4.58	0.09	4.90	-32.61	-2.67	21.75
QMAX	1823200	823190	823200	48.	320.	1.18	4.90	0.22	5.27	-49.20	-3.98	21.50
QMAX	2823200	823190	823200	48.	320.	1.18	4.90	0.22	5.27	-49.20	-3.98	21.50
QMAX	9823290	823290	823200	79.	1160.	1.40	6.50	0.22	5.27	94.84	1.91	21.42

QMAX	1823300	823300	823290	48.	230.	3.00	6.59	1.40	6.50	94.62	3.17	21.25
QMAX	9823380	823380	823300	71.	1360.	3.20	7.23	3.00	6.59	98.12	2.04	16.90
QMAX	9823390	823390	823380	82.	900.	3.30	7.53	3.20	7.23	98.77	2.24	16.82
QMAX	1823400	823400	823390	52.	380.	3.60	9.46	3.30	7.53	99.01	6.80	16.77
QMAX	9823490	823490	823400	90.	2000.	5.00	9.46	3.60	9.46	-12.95	-0.55	14.23
QMAX	9824000	824000	82400	60.	500.	-2.54	2.01	-2.60	2.00	906.38	0.63	13.50
QMAX	1824080	824080	824000	84.	175.	-1.01	2.25	-2.54	2.01	137.80	4.42	16.00
QMAX	2824080	824080	824000	84.	175.	-1.01	2.25	-2.54	2.01	137.80	4.42	16.00
QMAX	9824085	824085	824080	84.	2125.	0.30	2.36	-1.01	2.25	35.53	0.59	19.88
QMAX	1824100	824100	824085	66.	100.	0.30	3.10	0.30	2.36	35.32	3.53	19.82
QMAX	9824110	824110	824100	84.	1800.	3.40	4.33	1.00	3.10	13.54	0.83	20.63
QMAX	1824200	824200	824110	36.	122.	3.60	5.54	3.40	4.33	13.54	4.05	20.43
QMAX	9824120	824120	824100	84.	1285.	1.50	3.58	1.00	3.10	29.57	1.21	16.45
QMAX	9824130	824130	824120	84.	1490.	3.70	4.74	1.50	3.58	17.20	0.96	18.15
QMAX	1824300	824300	824130	36.	264.	3.90	6.00	3.70	4.74	17.21	4.62	18.00
QMAX	9824140	824140	824120	84.	2615.	5.00	6.10	1.50	3.58	17.98	1.20	14.48
QMAX	1824400	824400	824140	36.	138.	5.20	7.51	5.00	6.10	18.18	4.48	14.20
QMAX	1824490	824000	824490	30.	100.	1.59	2.01	1.15	4.83	-27.33	-5.79	21.13
QMAX	2824490	824000	824490	30.	100.	1.59	2.01	1.15	4.83	-27.33	-5.79	21.13
QMAX	9824500	824500	824490	60.	2550.	2.00	5.73	1.15	4.83	54.71	1.33	20.78
QMAX	9824590	824590	824500	60.	2780.	3.00	5.91	2.00	5.73	22.54	0.89	28.10
QMAX	1824600	824600	824590	48.	110.	3.50	5.91	3.00	5.91	22.04	-1.00	28.10
QMAX	9824650	824650	824600	84.	2250.	5.00	5.91	3.50	5.91	11.41	1.00	13.78
QMAX	9825100	825100	82510	144.	500.	-4.00	2.00	-4.00	2.00	495.05	0.36	16.62
QMAX	1825200	825200	825100	144.	125.	-4.00	2.03	-4.00	2.00	309.88	1.29	20.30
QMAX	9825610	825610	825600	133.	2550.	-3.60	2.11	-4.00	2.14	173.00	0.42	16.30
QMAX	1825650	825650	826190	140.	475.	-4.00	2.12	-4.00	2.09	384.54	1.29	14.27
QMAX	9825650	825650	825600	168.	825.	-4.00	2.12	-4.00	2.14	-379.28	-0.91	14.30
QMAX	9825653	825653	825650	97.	2050.	-1.05	2.12	-4.00	2.12	37.58	0.12	26.92
QMAX	1825655	825653	825655	24.	200.	-1.05	2.12	-1.29	2.12	-5.88	-1.07	26.50
QMAX	9825615	825615	825655	96.	650.	-1.00	2.11	-1.29	2.12	7.74	0.05	12.53
QMAX	9825616	825615	825610	126.	235.	-3.00	2.11	-3.60	2.11	171.86	0.44	16.28
QMAX	1825700	825700	825615	24.	150.	3.00	6.00	1.50	2.11	13.98	4.69	19.70
QMAX	9825620	825620	825615	144.	1580.	1.20	3.19	-3.00	2.11	162.57	1.75	16.28
QMAX	1825630	825630	825620	96.	121.	1.20	3.59	1.20	3.19	81.30	3.09	16.22
QMAX	2825630	825630	825620	96.	121.	1.20	3.59	1.20	3.19	81.30	3.09	16.22
QMAX	1825800	825800	825630	72.	320.	3.63	5.45	3.58	3.59	81.38	3.70	16.12
QMAX	2825800	825800	825630	72.	320.	3.63	5.45	3.58	3.59	81.38	3.70	16.12
QMAX	9825900	825900	825800	144.	680.	4.00	5.80	3.63	5.45	49.01	1.48	14.30
QMAX	9825220	825220	825200	120.	5910.	4.00	4.99	-4.00	2.03	48.77	0.25	20.58
QMAX	9825410	825410	825220	120.	810.	6.10	6.89	4.00	4.99	41.57	1.43	19.92
QMAX	1825420	825420	825410	36.	129.	6.30	12.92	6.10	6.89	30.59	7.10	19.92
QMAX	9825430	825430	825420	120.	1170.	6.50	12.94	6.30	12.92	41.59	0.98	19.82
QMAX	9825429	825429	825630	120.	1700.	8.00	9.31	3.50	3.59	20.63	1.92	19.98
QMAX	1825500	825500	825430	30.	125.	9.41	13.32	8.82	12.94	30.95	6.43	16.27
QMAX	9825230	825230	825200	192.	5900.	4.00	5.60	-4.00	2.03	77.72	0.50	16.90
QMAX	1825230	825230	825220	54.	340.	4.00	5.60	4.00	4.99	9.08	2.55	20.80
QMAX	1825300	825300	825230	60.	110.	4.00	6.71	4.00	5.60	86.23	5.01	16.65
QMAX	9825390	825390	825300	192.	845.	4.00	6.85	4.00	6.71	81.30	-0.95	20.98
QMAX	1825400	825400	825390	36.	135.	5.50	11.51	4.00	6.85	81.29	11.57	20.85
QMAX	9826150	826150	82615	84.	500.	-4.00	2.07	-4.00	2.00	832.94	0.64	13.52
QMAX	9826190	826190	826150	120.	1450.	-4.00	2.09	-4.00	2.07	385.36	0.60	14.30
QMAX	9826200	826200	82620	84.	500.	-3.50	2.03	-3.50	2.00	1349.81	1.13	12.70
QMAX	9826245	826245	826200	122.	7150.	-3.20	2.13	-3.50	2.03	362.82	0.59	15.97
QMAX	1826250	826250	826245	144.	240.	-3.17	2.42	-3.20	2.13	362.58	3.69	15.90
QMAX	9826290	826290	826250	96.	5140.	0.00	2.45	-3.17	2.42	172.77	0.46	25.07
QMAX	1826295	826295	826290	54.	180.	6.00	13.88	3.00	2.45	156.33	10.14	25.15
QMAX	1826400	826400	826295	30.	120.	8.38	14.50	7.59	13.88	39.72	8.05	20.85
QMAX	2826400	826400	826295	42.	120.	8.14	14.50	7.68	13.88	89.45	9.31	21.20
QMAX	1826300	826300	826290	84.	320.	1.00	3.04	0.00	2.45	38.13	3.62	14.97
QMAX	9826305	826305	826300	120.	485.	1.40	3.43	1.00	3.04	25.77	1.52	15.20
QMAX	1826310	826310	826305	72.	120.	1.50	3.74	1.40	3.43	25.76	2.85	15.07
QMAX	9826315	826315	826310	120.	595.	2.00	4.02	1.50	3.74	25.78	1.19	14.88
QMAX	1826320	826320	826315	60.	340.	2.50	4.80	2.20	4.02	25.84	3.88	14.72
QMAX	9826325	826325	826320	120.	260.	6.00	6.87	2.50	4.80	25.85	-1.66	14.62
QMAX	1826350	826350	826325	36.	300.	8.12	10.35	6.88	6.87	25.85	5.38	14.58
QMAX	9826450	826450	82645	78.	500.	-3.50	2.03	-3.50	2.00	1436.60	1.20	12.75
QMAX	9826500	826500	826450	126.	2950.	-3.50	2.20	-3.50	2.03	699.42	1.14	21.42
QMAX	1826550	826550	826500	120.	195.	-2.00	2.21	-3.50	2.20	352.21	1.42	13.28
QMAX	9826560	826560	826500	114.	4950.	-2.53	2.48	-3.50	2.20	669.60	1.09	21.15
QMAX	1826570	826570	826560	72.	100.	-2.02	4.39	-2.53	2.48	239.68	8.81	21.03
QMAX	2826570	826560	826570	72.	100.	-1.99	2.48	-2.62	4.39	-212.94	-8.16	21.03
QMAX	3826570	826560	826570	72.	100.	-2.07	2.48	-2.55	4.39	-217.16	-8.25	21.03
QMAX	9826600	826600	826570	108.	1210.	-1.00	5.63	-2.62	4.39	669.81	3.82	20.97
QMAX	9826640	826640	826600	106.	4055.	2.20	8.74	-1.00	5.63	604.24	2.58	20.23
QMAX	1826650	826650	826640	96.	116.	2.20	8.84	2.20	8.74	204.62	2.64	19.35
QMAX	2826650	826650	826640	96.	116.	2.20	8.84	2.20	8.74	204.62	2.64	19.35
QMAX	3826650	826650	826640	96.	116.	2.20	8.84	2.20	8.74	204.62	2.64	19.35
QMAX	9826665	826665	826650	112.	715.	2.64	9.66	2.20	8.84	599.16	2.91	18.93
QMAX	9826685	826685	826665	96.	650.	8.98	9.80	4.00	9.66	15.84	-2.74	27.27
QMAX	1826700	826700	826685	30.	380.	9.28	13.73	8.98	9.80	15.84	4.99	27.22
QMAX	1826750	826750	826665	96.	340.	2.64	9.74	2.64	9.66	297.42	2.66	18.72
QMAX	2826750	826750	826665	96.	340.	2.64	9.74	2.64	9.66	297.42	2.66	18.72
QMAX	9826780	826780	826750	120.	1460.	8.03	12.44	2.64	9.74	434.58	3.74	18.65
QMAX	1826850	826780	826850	48.	100.	8.68	12.44	8.27	15.63	-99.96	-8.27	17.18
QMAX	2826850	826850	826780	48.	100.	8.31	15.63	8.03	12.44	105.33	8.61	16.25
QMAX	9826855	826855	826850	120.	2120.	17.50	21.53	8.27	15.63	282.63	3.39	16.13
QMAX	1826860	826860	826855	43.	100.	18.00	24.82	17.50	21.53	91.11	9.15	14.53
QMAX	9826865	826865	826860	120.	2080.	29.00	33.73	18.00	24.82	282.71	4.30	16.05
QMAX	1826900	826900	826865	48.	240.	29.50	36.43	29.00	33.73	108.60	8.52	15.12
QMAX	2826900	826900	826865	48.	240.	29.50	36.43	29.00	33.73	108.60	8.52	15.12
QMAX	9826940	826940	826900	180.	1900.	41.00	43.02	29.50	36.43	189.68	1.09	16.28
QMAX	1826950	826950	826940	48.	304.	41.10	44.68	41.00	43.02	94.88	5.65	16.25
QMAX	2826950	826950	826940	48.	304.	41.10	44.68	41.00	43.02	94.88	5.65	16.25
QMAX	9826790	826790	826750	120.	4810.	27.50	29.75	2.64	9.74	103.35	1.87	15.50
QMAX	1826800	826800	826790	48.	140.	28.00	31.84	27.50	29.75	51.79	5.27	15.30

QMAX	2826800	826800	826790	48.	140.	28.00	31.84	27.50	29.75	51.79	5.27	15.30
QMAX	9826970	826970	826850	120.	1170.	8.50	15.79	8.27	15.63	172.11	-1.51	19.58
QMAX	9826980	826980	826970	120.	1525.	10.00	16.37	8.50	15.79	142.34	1.87	18.87
QMAX	1826990	826990	826980	54.	340.	10.50	18.72	10.00	16.37	117.52	7.36	21.85
QMAX	9829000	829000	82900	48.	500.	-1.00	2.14	-1.00	2.00	1264.66	1.97	13.77
QMAX	9829100	829100	829000	60.	450.	1.70	2.66	-1.00	2.14	13.97	0.06	15.70
QMAX	9829190	829190	829000	84.	1600.	-1.00	2.18	-1.00	2.14	72.84	0.73	20.48
QMAX	1829200	829200	829190	29.	100.	0.00	3.93	-1.00	2.18	52.59	7.33	20.38
QMAX	2829200	829200	829190	24.	100.	0.00	3.93	-1.00	2.18	20.23	6.41	20.38
QMAX	9829400	829400	82940	84.	500.	-4.00	2.12	-4.00	2.00	488.06	0.57	16.35
QMAX	9829410	829410	829400	120.	1100.	-3.90	2.12	-4.00	2.12	150.15	0.48	18.80
QMAX	1829450	829450	829410	132.	200.	-3.81	2.12	-3.90	2.12	146.45	1.07	18.97
QMAX	9829500	829500	829450	133.	1350.	-3.50	2.20	-3.81	2.12	140.92	1.07	19.10
QMAX	9829300	829300	82930	48.	500.	-1.50	2.09	-1.50	2.00	1334.19	1.79	12.75
QMAX	9829501	829500	829300	85.	1400.	-1.10	2.20	-1.50	2.09	103.70	0.93	18.38
QMAX	9829510	829510	829500	120.	1750.	-1.00	2.21	-1.10	2.20	12.07	0.14	19.73
QMAX	1829600	829600	829510	30.	260.	-0.50	2.38	-1.00	2.21	11.99	2.38	19.57

	WEIR_ID	FROM	TO	ZCREST	ZU	ZD	ZMAXU	QMAX	ZMAXD	TMAX
QWEIR	7821200	821200	821190	7.50	-4.50	-4.50	5.15	0.00	4.72	0.0
QWEIR	7821300	821300	821290	10.60	0.87	0.87	6.90	0.00	5.66	0.0
QWEIR	7821400	821400	821390	14.90	9.00	8.00	11.49	0.00	10.96	0.0
QWEIR	7821500	821500	821490	26.20	20.50	19.00	25.87	0.00	20.78	0.0
QWEIR	7822050	822050	822000	4.50	0.50	-2.10	3.62	0.00	2.01	0.0
QWEIR	7822100	822100	822000	6.50	-2.10	-2.10	2.95	0.00	2.01	0.0
QWEIR	7822200	822200	822190	6.50	-1.00	-2.00	3.09	0.00	2.99	0.0
QWEIR	7822250	822250	822110	6.08	-1.10	-1.10	3.76	0.00	3.31	0.0
QWEIR	7822300	822300	822290	12.00	-0.65	-0.65	6.31	0.00	5.44	0.0
QWEIR	7822400	822400	822390	12.50	1.50	1.00	9.31	0.00	6.13	0.0
QWEIR	7822420	822420	822410	12.50	3.00	2.80	10.25	0.00	9.31	0.0
QWEIR	7822500	822500	822490	15.40	5.00	4.00	11.36	0.00	10.30	0.0
QWEIR	7823100	823100	823000	6.50	-2.00	-2.00	4.10	0.00	2.00	0.0
QWEIR	7823180	823180	823170	6.00	1.17	-0.50	4.58	0.00	4.20	0.0
QWEIR	7823190	823190	823180	6.00	0.09	1.17	4.90	0.00	4.58	0.0
QWEIR	7823200	823200	823190	6.00	0.22	0.09	5.27	0.00	4.90	0.0
QWEIR	7823300	823300	823290	9.00	3.00	1.40	6.59	0.00	6.50	0.0
QWEIR	7823400	823400	823390	9.80	3.60	3.30	9.46	0.00	7.53	0.0
QWEIR	7824080	824080	824000	6.50	-1.01	-2.54	2.25	0.00	2.01	0.0
QWEIR	7824100	824100	824085	5.50	0.30	0.30	3.10	0.00	2.36	0.0
QWEIR	7824200	824200	824110	9.30	3.60	3.40	5.54	0.00	4.33	0.0
QWEIR	7824300	824300	824130	10.00	3.90	3.70	6.00	0.00	4.74	0.0
QWEIR	7824400	824400	824140	11.00	5.20	5.00	7.51	0.00	6.10	0.0
QWEIR	7824490	824490	824000	7.50	1.15	-2.54	4.83	0.00	2.01	0.0
QWEIR	7824600	824600	824590	12.50	3.50	3.00	5.91	0.00	5.91	0.0
QWEIR	7825200	825200	825100	10.00	-4.00	-4.00	2.03	0.00	2.00	0.0
QWEIR	7825300	825300	825230	12.00	4.00	4.00	6.71	0.00	5.60	0.0
QWEIR	7825400	825400	825390	15.00	5.50	4.00	11.51	0.00	6.85	0.0
QWEIR	7825420	825420	825410	12.80	6.30	6.10	12.92	11.01	6.89	19.8
QWEIR	6825430	825430	825429	12.40	6.50	8.00	12.94	20.68	9.31	19.8
QWEIR	7825500	825500	825430	13.00	9.41	6.50	13.32	47.22	12.94	19.8
QWEIR	6825600	825600	825200	4.80	-4.00	-4.00	2.14	0.00	2.03	0.0
QWEIR	7825630	825630	825620	13.50	1.20	1.20	3.59	0.00	3.19	0.0
QWEIR	7825655	825655	825653	6.80	-1.29	-1.05	2.12	0.00	2.12	0.0
QWEIR	7825700	825700	825615	9.20	3.00	-3.00	6.00	0.00	2.11	0.0
QWEIR	7825800	825800	825630	13.50	3.63	1.20	5.45	0.00	3.59	0.0
QWEIR	7826250	826250	826245	10.00	-3.17	-3.20	2.42	0.00	2.13	0.0
QWEIR	7826295	826295	826290	14.00	6.00	0.00	13.88	0.00	2.45	0.0
QWEIR	7826300	826300	826290	10.00	1.00	0.00	3.04	0.00	2.45	0.0
QWEIR	7826310	826310	826305	10.00	1.50	1.40	3.74	0.00	3.43	0.0
QWEIR	7826320	826320	826315	10.20	2.50	2.00	4.80	0.00	4.02	0.0
QWEIR	7826350	826350	826325	13.00	8.12	6.00	10.35	0.00	6.87	0.0
QWEIR	7826400	826400	826295	14.00	8.14	6.00	14.50	93.74	13.88	25.1
QWEIR	7826500	826500	826450	6.00	-3.50	-3.50	2.20	0.00	2.03	0.0
QWEIR	7826550	826550	826500	4.00	-2.00	-3.50	2.21	0.00	2.20	0.0
QWEIR	7826570	826570	826560	5.00	-2.62	-2.53	4.39	0.00	2.48	0.0
QWEIR	7826650	826650	826640	11.00	2.20	2.20	8.84	0.00	8.74	0.0
QWEIR	7826700	826700	826685	14.00	9.28	8.98	13.73	0.00	9.80	0.0
QWEIR	7826750	826750	826665	12.00	2.64	2.64	9.74	0.00	9.66	0.0
QWEIR	7826800	826800	826790	34.00	28.00	27.50	31.84	0.00	29.75	0.0
QWEIR	7826850	826850	826780	14.70	8.27	8.03	15.63	234.98	12.44	18.6
QWEIR	7826860	826860	826855	24.00	18.00	17.50	24.82	196.82	21.53	16.1
QWEIR	7826900	826900	826865	36.00	29.50	29.00	36.43	72.87	33.73	16.0
QWEIR	7826990	826990	826980	18.50	10.50	10.00	18.72	27.72	16.37	18.8
QWEIR	7829100	829100	829000	2.00	1.70	-1.00	2.66	141.16	2.14	15.7
QWEIR	7829200	829200	829190	5.00	0.00	-1.00	3.93	0.00	2.18	0.0
QWEIR	7829600	829600	829510	5.00	-0.50	-1.00	2.38	0.00	2.21	0.0
QWEIR	90221	82100	0	-2.00	-2.00	0.00	2.00	1035.75	0.00	14.4
QWEIR	90222	82200	0	-2.50	-2.50	0.00	2.00	971.45	0.00	16.3
QWEIR	90223	82300	0	-2.50	-2.50	0.00	2.00	327.11	0.00	14.0
QWEIR	90224	82400	0	-2.60	-2.60	0.00	2.00	906.38	0.00	13.5
QWEIR	90225	82510	0	-4.00	-4.00	0.00	2.00	495.05	0.00	16.6
QWEIR	90226	82615	0	-4.00	-4.00	0.00	2.00	832.94	0.00	13.5
QWEIR	90227	82620	0	-3.50	-3.50	0.00	2.00	1349.81	0.00	12.7
QWEIR	90228	82645	0	-3.50	-3.50	0.00	2.00	1436.60	0.00	12.8
QWEIR	90229	82900	0	-1.00	-1.00	0.00	2.00	1264.66	0.00	13.8
QWEIR	90230	82930	0	-1.50	-1.50	0.00	2.00	1334.19	0.00	12.8
QWEIR	90231	82940	0	-4.00	-4.00	0.00	2.00	488.06	0.00	16.4

	JUNC_ID	INVT	Z_MAX	T_MAX
ZMAX	82100	-2.00	2.00	0.00
ZMAX	821000	-2.00	2.19	12.23
ZMAX	821100	-1.10	2.39	12.30
ZMAX	821190	-4.50	5.28	18.30
ZMAX	821200	-4.50	6.07	18.22
ZMAX	821290	0.87	6.35	19.85
ZMAX	821300	0.87	8.46	19.73
ZMAX	821390	8.00	11.56	17.95
ZMAX	821400	9.00	12.96	17.92
ZMAX	821490	19.00	21.36	14.57
ZMAX	821500	20.50	26.44	14.25
ZMAX	82200	-2.50	2.00	0.00
ZMAX	822000	-2.10	2.01	15.75
ZMAX	822050	0.50	4.69	15.00
ZMAX	822100	-2.10	3.86	16.75
ZMAX	822110	-1.10	4.15	16.43
ZMAX	822150	-2.00	3.91	16.82
ZMAX	822190	-2.00	3.91	16.82
ZMAX	822200	-1.00	4.29	16.63
ZMAX	822250	-1.10	4.86	15.72
ZMAX	822290	-0.65	6.19	15.25
ZMAX	822300	-0.65	8.14	18.50
ZMAX	822350	0.00	6.92	14.58
ZMAX	822390	1.00	7.02	14.82
ZMAX	822400	1.50	11.68	20.78
ZMAX	822410	2.80	11.68	20.82
ZMAX	822420	3.00	12.51	25.32
ZMAX	822490	4.00	12.53	25.28
ZMAX	822500	5.00	13.96	22.90
ZMAX	82300	-2.50	2.00	0.00
ZMAX	823000	-2.00	2.00	12.97
ZMAX	823100	-2.00	5.14	24.77
ZMAX	823170	-0.50	5.22	24.82
ZMAX	823180	1.17	5.45	24.08
ZMAX	823190	0.09	5.96	22.43
ZMAX	823200	0.22	6.28	21.58
ZMAX	823290	1.40	6.96	19.57
ZMAX	823300	3.00	7.25	19.42
ZMAX	823380	3.20	8.06	17.62
ZMAX	823390	3.30	8.46	17.35
ZMAX	823400	3.60	10.20	17.05
ZMAX	823490	5.00	10.20	17.05
ZMAX	82400	-2.60	2.00	0.00
ZMAX	824000	-2.54	2.01	13.00
ZMAX	824080	-1.01	2.66	15.77
ZMAX	824085	0.30	2.74	16.17
ZMAX	824100	0.30	3.49	20.50
ZMAX	824110	3.40	4.57	19.75
ZMAX	824120	1.50	4.01	16.42
ZMAX	824130	3.70	4.99	17.87
ZMAX	824140	5.00	6.41	14.25
ZMAX	824200	3.60	5.97	19.48
ZMAX	824300	3.90	6.48	17.67
ZMAX	824400	5.20	8.28	13.85
ZMAX	824490	1.15	5.95	20.95
ZMAX	824500	2.00	6.54	20.78
ZMAX	824590	3.00	6.63	21.48
ZMAX	824600	3.50	6.63	21.53
ZMAX	824650	5.00	6.63	21.55
ZMAX	82510	-4.00	2.00	0.00
ZMAX	825100	-4.00	2.00	10.02
ZMAX	825200	-4.00	2.09	17.75
ZMAX	825220	4.00	5.52	18.00
ZMAX	825230	4.00	5.80	15.88
ZMAX	825300	4.00	7.06	15.63
ZMAX	825390	4.00	7.16	15.92
ZMAX	825400	5.50	13.67	20.65
ZMAX	825410	6.10	7.35	17.47
ZMAX	825420	6.30	13.14	17.40
ZMAX	825429	8.00	9.66	18.57
ZMAX	825430	6.50	13.22	17.38
ZMAX	825500	9.41	13.60	17.37
ZMAX	825600	-4.00	2.23	13.68
ZMAX	825610	-3.60	2.26	13.98
ZMAX	825615	-3.00	2.26	14.00
ZMAX	825620	1.20	4.05	16.65
ZMAX	825630	1.20	4.52	16.63
ZMAX	825650	-4.00	2.16	13.67
ZMAX	825653	-1.05	2.17	13.57
ZMAX	825655	-1.29	2.26	13.97
ZMAX	825700	3.00	6.79	19.48
ZMAX	825800	3.63	5.97	15.77
ZMAX	825900	4.00	6.30	15.27
ZMAX	82615	-4.00	2.00	0.00
ZMAX	82620	-3.50	2.00	0.00
ZMAX	82645	-3.50	2.00	0.00
ZMAX	826150	-4.00	2.07	11.20
ZMAX	826190	-4.00	2.09	11.25
ZMAX	826200	-3.50	2.05	12.50
ZMAX	826245	-3.20	2.27	15.43
ZMAX	826250	-3.17	2.85	15.38
ZMAX	826290	0.00	2.96	19.43
ZMAX	826295	6.00	14.76	19.93
ZMAX	826300	1.00	3.44	15.13
ZMAX	326305	1.40	3.81	15.15

* 100 yr Proposed Stage =
4.01 NGVD
− 1.97
2.04 NAVD

ZMAX	826310	1.50	4.10	15.13
ZMAX	826315	2.00	4.37	15.07
ZMAX	826320	2.50	5.13	14.65
ZMAX	826325	6.00	7.02	14.57
ZMAX	826350	8.12	10.89	14.53
ZMAX	826400	8.14	15.13	19.93
ZMAX	826450	-3.50	2.07	12.15
ZMAX	826500	-3.50	2.49	20.67
ZMAX	826550	-2.00	2.49	20.68
ZMAX	826560	-2.53	3.06	20.35
ZMAX	826570	-2.62	5.89	20.05
ZMAX	826600	-1.00	7.56	20.03
ZMAX	826640	2.20	9.92	18.85
ZMAX	826650	2.20	10.21	18.65
ZMAX	826665	2.64	10.86	18.20
ZMAX	826685	8.98	11.02	18.33
ZMAX	826700	9.28	14.28	22.32
ZMAX	826750	2.64	11.16	17.98
ZMAX	826780	8.03	14.16	16.62
ZMAX	826790	27.50	30.32	15.00
ZMAX	826800	28.00	34.08	14.75
ZMAX	826850	8.27	16.53	16.58
ZMAX	826855	17.50	22.82	15.37
ZMAX	826860	18.00	25.36	15.33
ZMAX	826865	29.00	35.27	15.32
ZMAX	826900	29.50	37.14	15.28
ZMAX	826940	41.00	43.56	15.37
ZMAX	826950	41.10	47.34	15.25
ZMAX	826970	8.50	16.82	16.92
ZMAX	826980	10.00	17.74	16.75
ZMAX	826990	10.50	19.20	16.48
ZMAX	82900	-1.00	2.00	0.00
ZMAX	82930	-1.50	2.00	0.00
ZMAX	82940	-4.00	2.00	0.00
ZMAX	829000	-1.00	2.29	13.50
ZMAX	829100	1.70	2.86	15.38
ZMAX	829190	-1.00	2.34	13.83
ZMAX	829200	0.00	4.90	20.10
ZMAX	829300	-1.50	2.19	12.75
ZMAX	829400	-4.00	2.19	14.10
ZMAX	829410	-3.90	2.17	14.08
ZMAX	829450	-3.81	2.17	14.07
ZMAX	829500	-3.50	2.40	18.27
ZMAX	829510	-1.00	2.40	18.32
ZMAX	829600	-0.50	2.69	19.55

	PIPE_ID	FROM	TO	SIZE(INCH)	LENGTH	INV_U	ZMAXU	INV_D	ZMAXD	QMAX	VMAX	TMAX
QMAX	9821000	821000	82100	60.	500.	-2.00	2.19	-2.00	2.00	835.11	1.62	14.62
QMAX	9821100	821100	821000	83.	144.	-1.10	2.39	-2.00	2.19	568.88	5.48	17.38
QMAX	9821190	821100	821190	138.	1615.	-1.10	2.39	-4.50	5.28	-507.45	-2.73	18.23
QMAX	1821200	821200	821190	96.	135.	-4.50	6.07	-4.50	5.28	507.63	6.20	18.15
QMAX	9821290	821290	821200	140.	1890.	0.87	6.35	-4.50	6.07	429.85	0.86	19.85
QMAX	1821300	821300	821290	54.	120.	0.87	8.46	0.87	6.35	143.35	8.87	19.60
QMAX	2821300	821300	821290	54.	120.	0.87	8.46	0.87	6.35	143.35	8.87	19.60
QMAX	3821300	821300	821290	54.	120.	0.87	8.46	0.87	6.35	143.35	8.87	19.60
QMAX	9821390	821390	821300	132.	2790.	8.00	11.56	0.87	8.46	368.91	2.10	17.95
QMAX	1821400	821400	821390	43.	320.	9.00	12.96	8.00	11.56	122.98	7.49	17.87
QMAX	2821400	821400	821390	43.	320.	9.00	12.96	8.00	11.56	122.98	7.49	17.87
QMAX	3821400	821400	821390	43.	320.	9.00	12.96	8.00	11.56	122.98	7.49	17.87
QMAX	9821490	821490	821400	96.	4690.	19.00	21.36	9.00	12.96	136.57	2.76	14.57
QMAX	1821500	821500	821490	24.	320.	21.50	26.44	20.00	21.36	23.34	7.56	14.25
QMAX	2821500	821500	821490	36.	320.	20.50	26.44	19.00	21.36	83.70	12.82	14.55
QMAX	9822000	822000	82200	60.	500.	-2.10	2.01	-2.50	2.00	1392.44	1.03	15.87
QMAX	1822100	822100	822000	60.	113.	-2.00	3.86	-2.00	2.01	382.45	8.08	16.77
QMAX	2822100	822100	822000	60.	150.	-2.10	3.86	-2.10	2.01	341.51	7.98	16.77
QMAX	3822100	822100	822000	60.	150.	-2.10	3.86	-2.10	2.01	341.51	7.98	16.77
QMAX	9822150	822150	822100	96.	965.	-2.00	3.91	-2.00	3.86	145.96	0.64	17.57
QMAX	9822190	822190	822150	96.	890.	-2.00	3.91	-2.00	3.91	62.47	0.29	16.53
QMAX	1822200	822200	822190	54.	320.	-1.00	4.29	-2.00	3.91	64.74	3.97	15.52
QMAX	9822110	822110	822100	73.	785.	-1.10	4.15	-2.00	3.86	982.72	1.53	15.03
QMAX	1822250	822250	822110	57.	320.	-1.10	4.86	-1.10	4.15	1002.02	6.79	15.00
QMAX	9822290	822290	822250	128.	1460.	-0.65	6.19	-1.10	4.86	926.01	1.95	15.00
QMAX	1822300	822300	822290	48.	105.	-0.65	8.14	-0.65	6.19	114.69	9.07	18.98
QMAX	2822300	822300	822290	48.	105.	-0.65	8.14	-0.65	6.19	114.69	9.07	18.98
QMAX	3822300	822300	822290	48.	105.	-0.65	8.14	-0.65	6.19	114.69	9.07	18.98
QMAX	9822350	822350	822290	96.	1870.	0.00	6.92	-0.65	6.19	759.91	2.41	14.08
QMAX	9822390	822390	822350	96.	2265.	1.00	7.02	0.00	6.92	347.19	1.52	21.13
QMAX	1822400	822400	822390	48.	100.	1.50	11.68	1.00	7.02	173.20	13.70	21.00
QMAX	2822400	822400	822390	48.	100.	1.50	11.68	1.00	7.02	173.20	13.70	21.00
QMAX	9822410	822410	822400	144.	1240.	2.80	11.68	1.50	11.68	156.36	1.10	31.98
QMAX	1822420	822420	822410	24.	260.	3.00	12.51	2.80	11.68	37.70	11.83	32.00
QMAX	2822420	822420	822410	36.	260.	3.00	12.51	2.80	11.68	115.92	10.20	32.00
QMAX	9822490	822490	822420	144.	4100.	4.00	12.53	3.00	12.51	123.45	1.16	21.08
QMAX	1822500	822500	822490	38.	115.	5.00	13.96	4.00	12.53	106.35	8.43	16.85
QMAX	2822500	822500	822490	30.	115.	5.00	13.96	4.00	12.53	36.25	-10.00	16.90
QMAX	1822050	822050	822000	24.	320.	0.50	4.69	-0.50	2.01	26.56	8.42	15.00
QMAX	2822050	822050	822000	24.	320.	0.50	4.69	-0.50	2.01	45.38	9.00	15.00
QMAX	9823000	823000	82300	60.	500.	-2.00	2.00	-2.50	2.00	592.08	0.45	13.25
QMAX	1823100	823100	823000	60.	140.	-2.00	5.14	-2.00	2.00	190.12	10.41	24.77
QMAX	9823170	823170	823100	90.	2515.	-0.50	5.22	-2.00	5.14	121.69	0.76	26.52
QMAX	1823180	823170	823180	60.	320.	1.92	5.22	1.26	5.45	-131.21	-3.78	20.57
QMAX	1823190	823180	823190	48.	320.	1.17	5.45	0.09	5.96	-45.79	-3.62	20.30
QMAX	2823190	823180	823190	48.	320.	1.17	5.45	0.09	5.96	-45.79	-3.62	20.30
QMAX	3823190	823180	823190	48.	320.	1.17	5.45	0.09	5.96	-45.79	-3.62	20.30
QMAX	1823200	823190	823200	48.	320.	1.18	5.96	0.22	6.28	-64.37	-5.05	18.18
QMAX	2823200	823190	823200	48.	320.	1.18	5.96	0.22	6.28	-64.37	-5.05	18.18
QMAX	9823290	823290	823200	79.	1160.	1.40	6.96	0.22	6.28	137.40	1.70	19.57

QMAX	1823300	823300	823290	48.	230.	3.00	7.25	1.40	6.96	138.05	3.35	19.17
QMAX	9823380	823380	823300	71.	1360.	3.20	8.06	3.00	7.25	160.17	2.12	17.08
QMAX	9823390	823390	823380	82.	900.	3.30	8.46	3.20	8.06	161.17	2.23	17.00
QMAX	1823400	823400	823390	52.	380.	3.60	10.20	3.30	8.46	105.76	7.25	14.85
QMAX	9823490	823490	823400	90.	2000.	5.00	10.20	3.60	10.20	-47.54	-0.42	14.68
QMAX	9824000	824000	82400	60.	500.	-2.54	2.01	-2.60	2.00	1406.58	0.98	13.25
QMAX	1824080	824080	824000	84.	175.	-1.01	2.75	-2.54	2.01	225.17	6.78	15.82
QMAX	2824080	824080	824000	84.	175.	-1.01	2.75	-2.54	2.01	225.17	6.78	15.82
QMAX	9824085	824085	824080	84.	2125.	0.30	2.82	-1.01	2.75	48.12	0.76	20.72
QMAX	1824100	824100	824085	66.	100.	0.30	3.51	0.30	2.82	47.41	4.12	20.75
QMAX	9824110	824110	824100	84.	1800.	3.40	4.57	1.00	3.51	20.00	0.90	19.75
QMAX	1824200	824200	824110	36.	122.	3.60	5.97	3.40	4.57	20.01	4.68	19.58
QMAX	9824120	824120	824100	84.	1285.	1.50	4.01	1.00	3.51	44.08	1.54	15.90
QMAX	9824130	824130	824120	84.	1490.	3.70	4.99	1.50	4.01	24.93	1.11	17.87
QMAX	1824300	824300	824130	36.	264.	3.90	6.48	3.70	4.99	24.94	5.32	17.73
QMAX	9824140	824140	824120	84.	2615.	5.00	6.41	1.50	4.01	27.31	1.33	14.25
QMAX	1824400	824400	824140	36.	138.	5.20	8.28	5.00	6.41	27.60	5.32	14.03
QMAX	1824490	824000	824490	30.	100.	1.59	2.01	1.15	5.95	-37.18	-7.78	20.95
QMAX	2824490	824000	824490	30.	100.	1.59	2.01	1.15	5.95	-37.18	-7.78	20.95
QMAX	9824500	824500	824490	60.	2550.	2.00	6.54	1.15	5.95	74.52	1.39	20.38
QMAX	9824590	824590	824500	60.	2780.	3.00	6.63	2.00	6.54	35.90	1.03	28.93
QMAX	1824600	824600	824590	48.	110.	3.50	6.63	3.00	6.63	35.11	1.19	28.93
QMAX	9824650	824650	824600	84.	2250.	5.00	6.63	3.50	6.63	18.26	-1.12	13.58
QMAX	9825100	825100	82510	144.	500.	-4.00	2.00	-4.00	2.00	785.83	0.57	17.12
QMAX	1825200	825200	825100	144.	125.	-4.00	2.09	-4.00	2.00	504.76	2.09	17.85
QMAX	9825610	825610	825600	133.	2550.	-3.60	2.26	-4.00	2.23	299.94	0.71	16.53
QMAX	1825650	825650	826190	140.	475.	-4.00	2.16	-4.00	2.10	602.47	1.99	14.10
QMAX	9825650	825650	825600	168.	825.	-4.00	2.16	-4.00	2.23	-595.54	-1.40	13.93
QMAX	9825653	825653	825650	97.	2050.	-1.05	2.17	-4.00	2.16	-64.13	-0.20	12.07
QMAX	1825655	825653	825655	24.	200.	-1.05	2.17	-1.29	2.26	-7.86	-1.43	14.52
QMAX	9825615	825615	825655	96.	650.	-1.00	2.26	-1.29	2.26	9.59	0.06	12.25
QMAX	9825616	825615	825610	126.	235.	-3.00	2.26	-3.60	2.26	297.71	0.74	16.55
QMAX	1825700	825700	825615	24.	150.	3.00	6.79	1.50	2.26	15.55	5.25	19.48
QMAX	9825620	825620	825615	144.	1580.	1.20	4.05	-3.00	2.26	288.14	2.73	16.65
QMAX	1825630	825630	825620	96.	121.	1.20	4.52	1.20	4.05	144.09	3.89	16.60
QMAX	2825630	825630	825620	96.	121.	1.20	4.52	1.20	4.05	144.09	3.89	16.60
QMAX	1825800	825800	825630	72.	320.	3.63	5.97	3.58	4.52	131.34	4.54	15.77
QMAX	2825800	825800	825630	72.	320.	3.63	5.97	3.58	4.52	131.34	4.54	15.77
QMAX	9825900	825900	825800	144.	680.	4.00	6.30	3.63	5.97	76.95	1.71	14.25
QMAX	9825220	825220	825200	120.	5910.	4.00	5.52	-4.00	2.09	103.82	0.49	18.00
QMAX	9825410	825410	825220	120.	810.	6.10	7.35	4.00	5.52	96.70	1.98	17.47
QMAX	1825420	825420	825410	36.	129.	6.30	13.14	6.10	7.35	44.10	8.90	17.47
QMAX	9825430	825430	825420	120.	1170.	6.50	13.22	6.30	13.14	96.72	1.00	17.40
QMAX	9825429	825429	825630	120.	1700.	8.00	9.66	3.50	4.52	38.36	2.34	17.52
QMAX	1825500	825500	825430	30.	125.	9.41	13.60	8.82	13.22	33.50	6.95	15.03
QMAX	9825230	825230	825200	192.	5900.	4.00	5.80	-4.00	2.09	95.63	0.60	15.88
QMAX	1825230	825230	825220	54.	340.	4.00	5.80	4.00	5.52	12.04	2.83	16.48
QMAX	1825300	825300	825230	60.	110.	4.00	7.06	4.00	5.80	106.53	5.49	15.68
QMAX	9825390	825390	825300	192.	845.	4.00	7.16	4.00	7.06	95.47	0.99	20.75
QMAX	1825400	825400	825390	36.	135.	5.50	13.67	4.00	7.16	95.46	13.31	20.65
QMAX	9826150	826150	82615	84.	500.	-4.00	2.05	-4.00	2.00	1425.24	1.09	13.08
QMAX	9826190	826190	826150	120.	1450.	-4.00	2.10	-4.00	2.05	604.39	0.94	13.93
QMAX	9826200	826200	82620	84.	500.	-3.50	2.05	-3.50	2.00	1990.05	1.66	12.53
QMAX	9826245	826245	826200	122.	7150.	-3.20	2.27	-3.50	2.05	536.23	0.86	15.55
QMAX	1826250	826250	826245	144.	240.	-3.17	2.85	-3.20	2.27	535.85	5.18	15.38
QMAX	9826290	826290	826250	96.	5140.	0.00	2.96	-3.17	2.85	383.77	0.83	20.05
QMAX	1826295	826295	826290	54.	180.	6.00	14.76	3.00	2.96	166.53	10.73	19.93
QMAX	1826400	826400	826295	30.	120.	8.38	15.13	7.59	14.76	39.97	8.10	16.83
QMAX	2826400	826400	826295	42.	120.	8.14	15.13	7.68	14.76	90.04	9.37	16.92
QMAX	1826300	826300	826290	84.	320.	1.00	3.44	0.00	2.96	51.65	3.94	14.82
QMAX	9826305	826305	826300	120.	485.	1.40	3.81	1.00	3.44	34.15	1.64	15.23
QMAX	1826310	826310	826305	72.	120.	1.50	4.10	1.40	3.81	34.15	3.07	15.05
QMAX	9826315	826315	826310	120.	595.	2.00	4.37	1.50	4.10	34.18	1.29	14.88
QMAX	1826320	826320	826315	60.	340.	2.50	5.13	2.20	4.37	34.24	4.28	14.67
QMAX	9826325	826325	826320	120.	260.	6.00	7.02	2.50	5.13	34.24	1.81	14.57
QMAX	1826350	826350	826325	36.	300.	8.12	10.89	6.88	7.02	34.24	5.87	14.53
QMAX	9826450	826450	82645	78.	500.	-3.50	2.06	-3.50	2.00	2061.35	1.72	12.73
QMAX	9826500	826500	826450	126.	2950.	-3.50	2.49	-3.50	2.06	1168.65	1.82	20.73
QMAX	1826550	826550	826500	120.	195.	-2.00	2.49	-3.50	2.49	522.42	1.98	13.27
QMAX	9826560	826560	826500	114.	4950.	-2.53	3.06	-3.50	2.49	1129.95	1.65	20.18
QMAX	1826570	826570	826560	72.	100.	-2.02	5.89	-2.53	3.06	318.09	11.42	19.88
QMAX	2826570	826560	826570	72.	100.	-1.99	3.06	-2.62	5.89	-294.73	-10.97	20.05
QMAX	3826570	826560	826570	72.	100.	-2.07	3.06	-2.55	5.89	-298.84	-11.05	20.05
QMAX	9826600	826600	826570	108.	1210.	-1.00	7.56	-2.62	5.89	1131.98	4.89	20.03
QMAX	9826640	826640	826600	106.	4055.	2.20	9.92	-1.00	7.56	1047.38	2.57	18.85
QMAX	1826650	826650	826640	96.	116.	2.20	10.21	2.20	9.92	362.96	3.93	17.80
QMAX	2826650	826650	826640	96.	116.	2.20	10.21	2.20	9.92	362.96	3.93	17.80
QMAX	3826650	826650	826640	96.	116.	2.20	10.21	2.20	9.92	362.96	3.93	17.80
QMAX	9826665	826665	826650	112.	715.	2.64	10.86	2.20	10.21	1079.96	2.96	17.53
QMAX	9826685	826685	826665	96.	650.	8.98	11.03	4.00	10.86	89.12	-2.74	18.43
QMAX	1826700	826700	826685	30.	380.	9.28	14.28	8.98	11.03	26.90	6.27	19.87
QMAX	1826750	826750	826665	96.	340.	2.64	11.16	2.64	10.86	538.29	4.08	17.23
QMAX	2826750	826750	826665	96.	340.	2.64	11.16	2.64	10.86	538.29	4.08	17.23
QMAX	9826780	826780	826750	120.	1460.	8.03	14.16	2.64	11.16	818.25	5.03	16.62
QMAX	1826850	826780	826850	48.	100.	8.68	14.16	8.27	16.53	-100.42	-8.23	14.68
QMAX	2826850	826850	826780	48.	100.	8.31	16.53	8.03	14.16	105.54	8.64	14.37
QMAX	9826855	826855	826850	120.	2120.	17.50	22.82	8.27	16.53	488.18	4.37	15.37
QMAX	1826860	826860	826855	43.	100.	18.00	25.36	17.50	22.82	91.23	9.16	13.35
QMAX	9826865	826865	826860	120.	2080.	29.00	35.27	18.00	25.36	488.26	5.89	15.32
QMAX	1826900	826900	826865	48.	240.	29.50	37.14	29.00	35.27	109.94	8.60	13.60
QMAX	2826900	826900	826865	48.	240.	29.50	37.14	29.00	35.27	109.94	8.60	13.60
QMAX	9826940	826940	826900	180.	1900.	41.00	43.56	29.50	37.14	335.73	1.09	15.35
QMAX	1826950	826950	826940	48.	304.	41.10	47.34	41.00	43.56	168.02	8.52	15.25
QMAX	2826950	826950	826940	48.	304.	41.10	47.34	41.00	43.56	168.02	8.52	15.25
QMAX	9826790	826790	826750	120.	4810.	27.50	30.32	2.64	11.16	169.23	1.99	15.00
QMAX	1826800	826800	826790	48.	140.	28.00	34.08	27.50	30.32	82.17	7.45	14.90

Existing ★ 100 yr Q through ditch section equa 44.1 CFS.

QMAX	1823300	823300	823290	48.	230.	3.00	7.25	1.40	6.96	137.98	3.35	19.18
QMAX	9823380	823380	823300	71.	1360.	3.20	8.06	3.00	7.25	160.13	2.12	17.08
QMAX	9823390	823390	823380	82.	900.	3.30	8.46	3.20	8.06	161.15	2.23	16.98
QMAX	1823400	823400	823390	52.	380.	3.60	10.20	3.30	8.46	105.78	7.26	14.85
QMAX	9823490	823490	823400	90.	2000.	5.00	10.20	3.60	10.20	-47.51	-0.42	14.67
QMAX	9824000	824000	82400	60.	500.	-2.54	2.01	-2.60	2.00	1393.63	0.97	13.25
QMAX	1824080	824080	824000	84.	175.	-1.01	2.66	-2.54	2.01	212.50	6.47	15.75
QMAX	2824080	824080	824000	84.	175.	-1.01	2.66	-2.54	2.01	212.50	6.47	15.75
QMAX	9824085	824085	824080	84.	2125.	0.30	2.74	-1.01	2.66	47.65	0.76	20.60
QMAX	1824100	824100	824085	66.	100.	0.30	3.49	0.30	2.74	47.04	4.12	20.72
QMAX	9824110	824110	824100	84.	1800.	3.40	4.57	1.00	3.49	20.00	0.91	19.75
QMAX	1824200	824200	824110	36.	122.	3.60	5.97	3.40	4.57	20.01	4.68	19.58
QMAX	9824120	824120	824100	84.	1285.	1.50	4.01	1.00	3.49	44.10	1.54	15.88
QMAX	9824130	824130	824120	84.	1490.	3.70	4.99	1.50	4.01	24.92	1.11	17.87
QMAX	1824300	824300	824130	36.	264.	3.90	6.48	3.70	4.99	24.93	5.32	17.73
QMAX	9824140	824140	824120	84.	2615.	5.00	6.41	1.50	4.01	27.31	1.33	14.25
QMAX	1824400	824400	824140	36.	138.	5.20	8.28	5.00	6.41	27.60	5.32	14.03
QMAX	1824490	824000	824490	30.	100.	1.59	2.01	1.15	5.95	-37.18	-7.78	20.95
QMAX	2824490	824000	824490	30.	100.	1.59	2.01	1.15	5.95	-37.18	-7.78	20.95
QMAX	9824500	824500	824490	60.	2550.	2.00	6.54	1.15	5.95	74.51	1.39	20.38
QMAX	9824590	824590	824500	60.	2780.	3.00	6.63	2.00	6.54	35.90	1.03	28.87
QMAX	1824600	824600	824590	48.	110.	3.50	6.63	3.00	6.63	35.12	1.19	28.87
QMAX	9824650	824650	824600	84.	2250.	5.00	6.63	3.50	6.63	18.26	-1.12	13.58
QMAX	9825100	825100	82510	144.	500.	-4.00	2.00	-4.00	2.00	785.77	0.57	17.15
QMAX	1825200	825200	825100	144.	125.	-4.00	2.09	-4.00	2.00	504.71	2.09	17.85
QMAX	9825610	825610	825600	133.	2550.	-3.60	2.26	-4.00	2.23	299.86	0.71	16.53
QMAX	1825650	825650	826190	140.	475.	-4.00	2.16	-4.00	2.09	602.55	1.99	14.08
QMAX	9825650	825650	825600	168.	825.	-4.00	2.16	-4.00	2.23	-595.71	-1.40	13.93
QMAX	9825653	825653	825650	97.	2050.	-1.05	2.17	-4.00	2.16	61.59	0.19	12.17
QMAX	1825655	825653	825655	24.	200.	-1.05	2.17	-1.29	2.26	-7.87	-1.43	14.50
QMAX	9825615	825615	825655	96.	650.	-1.00	2.26	-1.29	2.26	12.11	0.07	11.87
QMAX	9825616	825615	825610	126.	235.	-3.00	2.26	-3.60	2.26	297.64	0.74	16.55
QMAX	1825700	825700	825615	24.	150.	3.00	6.79	1.50	2.26	15.55	5.25	19.48
QMAX	9825620	825620	825615	144.	1580.	1.20	4.05	-3.00	2.26	288.10	2.73	16.65
QMAX	1825630	825630	825620	96.	121.	1.20	4.52	1.20	4.05	144.07	3.89	16.60
QMAX	2825630	825630	825620	96.	121.	1.20	4.52	1.20	4.05	144.07	3.89	16.60
QMAX	1825800	825800	825630	72.	320.	3.63	5.97	3.58	4.52	131.33	4.54	15.77
QMAX	2825800	825800	825630	72.	320.	3.63	5.97	3.58	4.52	131.33	4.54	15.77
QMAX	9825900	825900	825800	144.	680.	4.00	6.30	3.63	5.97	76.93	1.71	14.25
QMAX	9825220	825220	825200	120.	5910.	4.00	5.52	-4.00	2.09	103.79	0.49	18.00
QMAX	9825410	825410	825220	120.	810.	6.10	7.35	4.00	5.52	96.67	1.98	17.47
QMAX	1825420	825420	825410	36.	129.	6.30	13.14	6.10	7.35	44.10	8.90	17.47
QMAX	9825430	825430	825420	120.	1170.	6.50	13.22	6.30	13.14	96.69	1.00	17.40
QMAX	9825429	825429	825630	120.	1700.	8.00	9.66	3.50	4.52	38.35	2.34	17.52
QMAX	1825500	825500	825430	30.	125.	9.41	13.60	8.82	13.22	33.51	6.95	15.05
QMAX	9825230	825230	825200	192.	5900.	4.00	5.80	-4.00	2.09	95.62	0.60	15.88
QMAX	1825230	825230	825220	54.	340.	4.00	5.80	4.00	5.52	12.04	2.83	16.47
QMAX	1825300	825300	825230	60.	110.	4.00	7.06	4.00	5.80	106.53	5.49	15.68
QMAX	9825390	825390	825300	192.	845.	4.00	7.16	4.00	7.06	95.47	0.99	20.75
QMAX	1825400	825400	825390	36.	135.	5.50	13.67	4.00	7.16	95.45	13.31	20.65
QMAX	9826150	826150	82615	84.	500.	-4.00	2.07	-4.00	2.00	1424.67	1.09	13.08
QMAX	9826190	826190	826150	120.	1450.	-4.00	2.09	-4.00	2.07	604.62	0.94	13.92
QMAX	9826200	826200	82620	84.	500.	-3.50	2.05	-3.50	2.00	1990.59	1.66	12.53
QMAX	9826245	826245	826200	122.	7150.	-3.20	2.27	-3.50	2.05	536.11	0.86	15.55
QMAX	1826250	826250	826245	144.	240.	-3.17	2.85	-3.20	2.27	535.77	5.18	15.38
QMAX	9826290	826290	826250	96.	5140.	0.00	2.96	-3.17	2.85	383.66	0.83	20.10
QMAX	1826295	826295	826290	54.	180.	6.00	14.76	3.00	2.96	166.53	10.73	19.93
QMAX	1826400	826400	826295	30.	120.	8.38	15.13	7.59	14.76	39.97	8.10	16.83
QMAX	2826400	826400	826295	42.	120.	8.14	15.13	7.68	14.76	90.04	9.37	16.92
QMAX	1826300	826300	826290	84.	320.	1.00	3.44	0.00	2.96	51.64	3.94	14.82
QMAX	9826305	826305	826300	120.	485.	1.40	3.81	1.00	3.44	34.14	1.64	15.23
QMAX	1826310	826310	826305	72.	120.	1.50	4.10	1.40	3.81	34.14	3.07	15.07
QMAX	9826315	826315	826310	120.	595.	2.00	4.37	1.50	4.10	34.18	1.29	14.88
QMAX	1826320	826320	826315	60.	340.	2.50	5.13	2.20	4.37	34.23	4.28	14.65
QMAX	9826325	826325	826320	120.	260.	6.00	7.02	2.50	5.13	34.24	1.81	14.57
QMAX	1826350	826350	826325	36.	300.	8.12	10.89	6.88	7.02	34.24	5.87	14.53
QMAX	9826450	826450	82645	78.	500.	-3.50	2.07	-3.50	2.00	2080.31	1.74	12.52
QMAX	9826500	826500	826450	126.	2950.	-3.50	2.49	-3.50	2.07	1167.84	1.82	20.73
QMAX	1826550	826550	826500	120.	195.	-2.00	2.49	-3.50	2.49	523.15	1.98	13.27
QMAX	9826560	826560	826500	114.	4950.	-2.53	3.06	-3.50	2.49	1129.11	1.65	20.18
QMAX	1826570	826570	826560	72.	100.	-2.02	5.89	-2.53	3.06	318.05	11.42	19.88
QMAX	2826570	826560	826570	72.	100.	-1.99	3.06	-2.62	5.89	-294.65	-10.97	20.05
QMAX	3826570	826560	826570	72.	100.	-2.07	3.06	-2.55	5.89	-298.76	-11.05	20.05
QMAX	9826600	826600	826570	108.	1210.	-1.00	7.56	-2.62	5.89	1131.25	4.89	20.03
QMAX	9826640	826640	826600	106.	4055.	2.20	9.92	-1.00	7.56	1046.73	2.57	18.85
QMAX	1826650	826650	826640	96.	116.	2.20	10.21	2.20	9.92	362.63	3.93	17.80
QMAX	2826650	826650	826640	96.	116.	2.20	10.21	2.20	9.92	362.63	3.93	17.80
QMAX	3826650	826650	826640	96.	116.	2.20	10.21	2.20	9.92	362.63	3.93	17.80
QMAX	9826665	826665	826650	112.	715.	2.64	10.86	2.20	10.21	1078.80	2.97	17.45
QMAX	9826685	826685	826665	96.	650.	8.98	11.02	4.00	10.86	85.83	-2.74	18.78
QMAX	1826700	826700	826685	30.	380.	9.28	14.28	8.98	11.02	26.90	6.27	19.78
QMAX	1826750	826750	826665	96.	340.	2.64	11.16	2.64	10.86	538.22	4.08	17.23
QMAX	2826750	826750	826665	96.	340.	2.64	11.16	2.64	10.86	538.22	4.08	17.23
QMAX	9826780	826780	826750	120.	1460.	8.03	14.16	2.64	11.16	818.06	5.04	16.62
QMAX	1826850	826780	826850	48.	100.	8.68	14.16	8.27	16.53	-100.43	-8.23	14.70
QMAX	2826850	826850	826780	48.	100.	8.31	16.53	8.03	14.16	105.53	8.64	14.38
QMAX	9826855	826855	826850	120.	2120.	17.50	22.82	8.27	16.53	488.18	4.37	15.37
QMAX	1826860	826860	826855	43.	100.	18.00	25.36	17.50	22.82	91.23	9.16	13.35
QMAX	9826865	826865	826860	120.	2080.	29.00	35.27	18.00	25.36	488.26	5.89	15.32
QMAX	1826900	826900	826865	48.	240.	29.50	37.14	29.00	35.27	109.94	8.60	13.60
QMAX	2826900	826900	826865	48.	240.	29.50	37.14	29.00	35.27	109.94	8.60	13.60
QMAX	9826940	826940	826900	180.	1900.	41.00	43.56	29.50	37.14	335.72	1.09	15.35
QMAX	1826950	826950	826940	48.	304.	41.10	47.34	41.00	43.56	168.02	8.52	15.25
QMAX	2826950	826950	826940	48.	304.	41.10	47.34	41.00	43.56	168.02	8.52	15.25
QMAX	9826790	826790	826750	120.	4810.	27.50	30.32	2.64	11.16	169.23	1.99	15.00
QMAX	1826800	826800	826790	18.	140.	28.00	34.08	27.50	30.32	82.17	7.45	14.90

Proposed
100 yr Q
through dike
section equal
44.1 CFS.

QMAX	2826800	826800	826790	48.	140.	28.00	34.08	27.50	30.32	82.17	7.45	14.90
QMAX	9826970	826970	826850	120.	1170.	8.50	16.82	8.27	16.53	304.99	-2.09	17.50
QMAX	9826980	826980	826970	120.	1525.	10.00	17.74	8.50	16.82	245.41	2.56	16.47
QMAX	1826990	826990	826980	54.	340.	10.50	19.20	10.00	17.74	117.73	7.38	24.13
QMAX	9829000	829000	82900	48.	500.	-1.00	2.29	-1.00	2.00	1885.91	2.86	13.53
QMAX	9829100	829100	829000	60.	450.	1.70	2.86	-1.00	2.29	21.75	0.09	15.38
QMAX	9829190	829190	829000	84.	1600.	-1.00	2.34	-1.00	2.29	89.45	0.87	20.23
QMAX	1829200	829200	829190	29.	100.	0.00	4.90	-1.00	2.34	64.56	8.99	20.13
QMAX	2829200	829200	829190	24.	100.	0.00	4.90	-1.00	2.34	24.84	7.86	20.13
QMAX	9829400	829400	82940	84.	500.	-4.00	2.19	-4.00	2.00	760.34	0.89	14.13
QMAX	9829410	829410	829400	120.	1100.	-3.90	2.17	-4.00	2.19	230.86	0.73	18.50
QMAX	1829450	829450	829410	132.	200.	-3.81	2.17	-3.90	2.17	222.97	1.62	18.52
QMAX	9829500	829500	829450	133.	1350.	-3.50	2.40	-3.81	2.17	217.27	1.60	18.53
QMAX	9829300	829300	82930	48.	500.	-1.50	2.19	-1.50	2.00	1922.29	2.54	12.75
QMAX	9829501	829500	829300	85.	1400.	-1.10	2.40	-1.50	2.19	155.42	1.32	18.30
QMAX	9829510	829510	829500	120.	1750.	-1.00	2.40	-1.10	2.40	15.98	0.17	20.62
QMAX	1829600	829600	829510	30.	260.	-0.50	2.69	-1.00	2.40	15.73	3.20	20.50

	WEIR_ID	FROM	TO	ZCREST	ZU	ZD	ZMAXU	QMAX	ZMAXD	TMAX
QWEIR	7821200	821200	821190	7.50	-4.50	-4.50	6.07	0.00	5.28	0.0
QWEIR	7821300	821300	821290	10.60	0.87	0.87	8.46	0.00	6.35	0.0
QWEIR	7821400	821400	821390	14.90	9.00	8.00	12.96	0.00	11.56	0.0
QWEIR	7821500	821500	821490	26.20	20.50	19.00	26.44	30.66	21.36	14.2
QWEIR	7822050	822050	822000	4.50	0.50	-2.10	4.69	21.74	2.01	15.0
QWEIR	7822100	822100	822000	6.50	-2.10	-2.10	3.86	0.00	2.01	0.0
QWEIR	7822200	822200	822190	6.50	-1.00	-2.00	4.29	0.00	3.91	0.0
QWEIR	7822250	822250	822110	6.08	-1.10	-1.10	4.86	0.00	4.15	0.0
QWEIR	7822300	822300	822290	12.00	-0.65	-0.65	8.14	0.00	6.19	0.0
QWEIR	7822400	822400	822390	12.50	1.50	1.00	11.68	0.00	7.02	0.0
QWEIR	7822420	822420	822410	12.50	3.00	2.80	12.51	0.46	11.68	25.3
QWEIR	7822500	822500	822490	15.40	5.00	4.00	13.96	0.00	12.53	0.0
QWEIR	7823100	823100	823000	6.50	-2.00	-2.00	5.14	0.00	2.00	0.0
QWEIR	7823180	823180	823170	6.00	1.17	-0.50	5.45	0.00	5.22	0.0
QWEIR	7823190	823190	823180	6.00	0.09	1.17	5.96	0.00	5.45	0.0
QWEIR	7823200	823200	823190	6.00	0.22	0.09	6.28	39.66	5.96	21.6
QWEIR	7823300	823300	823290	9.00	3.00	1.40	7.25	0.00	6.96	0.0
QWEIR	7823400	823400	823390	9.80	3.60	3.30	10.20	66.17	8.46	17.0
QWEIR	7824080	824080	824000	6.50	-1.01	-2.54	2.66	0.00	2.01	0.0
QWEIR	7824100	824100	824085	5.50	0.30	0.30	3.49	0.00	2.74	0.0
QWEIR	7824200	824200	824110	9.30	3.60	3.40	5.97	0.00	4.57	0.0
QWEIR	7824300	824300	824130	10.00	3.90	3.70	6.48	0.00	4.99	0.0
QWEIR	7824400	824400	824140	11.00	5.20	5.00	8.28	0.00	6.41	0.0
QWEIR	7824490	824490	824000	7.50	1.15	-2.54	5.95	0.00	2.01	0.0
QWEIR	7824600	824600	824590	12.50	3.50	3.00	6.63	0.00	6.63	0.0
QWEIR	7825200	825200	825100	10.00	-4.00	-4.00	2.09	0.00	2.00	0.0
QWEIR	7825300	825300	825230	12.00	4.00	4.00	7.06	0.00	5.80	0.0
QWEIR	7825400	825400	825390	15.00	5.50	4.00	13.67	0.00	7.16	0.0
QWEIR	7825420	825420	825410	12.80	6.30	6.10	13.14	52.60	7.35	17.4
QWEIR	6825430	825430	825429	12.40	6.50	8.00	13.22	38.90	9.66	17.4
QWEIR	7825500	825500	825430	13.00	9.41	6.50	13.60	120.52	13.22	17.4
QWEIR	6825600	825600	825200	4.80	-4.00	-4.00	2.23	0.00	2.09	0.0
QWEIR	7825630	825630	825620	13.50	1.20	1.20	4.52	0.00	4.05	0.0
QWEIR	7825655	825655	825653	6.80	-1.29	-1.05	2.26	0.00	2.17	0.0
QWEIR	7825700	825700	825615	9.20	3.00	-3.00	6.79	0.00	2.26	0.0
QWEIR	7825800	825800	825630	13.50	3.63	1.20	5.97	0.00	4.52	0.0
QWEIR	7826250	826250	826245	10.00	-3.17	-3.20	2.85	0.00	2.27	0.0
QWEIR	7826295	826295	826290	14.00	6.00	0.00	14.76	173.24	2.96	19.9
QWEIR	7826300	826300	826290	10.00	1.00	0.00	3.44	0.00	2.96	0.0
QWEIR	7826310	826310	826305	10.00	1.50	1.40	4.10	0.00	3.81	0.0
QWEIR	7826320	826320	826315	10.20	2.50	2.00	5.13	0.00	4.37	0.0
QWEIR	7826350	826350	826325	13.00	8.12	6.00	10.89	0.00	7.02	0.0
QWEIR	7826400	826400	826295	14.00	8.14	6.00	15.13	291.20	14.76	19.9
QWEIR	7826500	826500	826450	6.00	-3.50	-3.50	2.49	0.00	2.07	0.0
QWEIR	7826550	826550	826500	4.00	-2.00	-3.50	2.49	0.00	2.49	0.0
QWEIR	7826570	826570	826560	5.00	-2.62	-2.53	5.89	219.83	3.06	20.0
QWEIR	7826650	826650	826640	11.00	2.20	2.20	10.21	0.00	9.92	0.0
QWEIR	7826700	826700	826685	14.00	9.28	8.98	14.28	39.30	11.02	22.3
QWEIR	7826750	826750	826665	12.00	2.64	2.64	11.16	0.00	10.86	0.0
QWEIR	7826800	826800	826790	34.00	28.00	27.50	34.08	5.68	30.32	14.8
QWEIR	7826850	826850	826780	14.70	8.27	8.03	16.53	650.92	14.16	16.6
QWEIR	7826860	826860	826855	24.00	18.00	17.50	25.36	416.01	22.82	15.3
QWEIR	7826900	826900	826865	36.00	29.50	29.00	37.14	319.25	35.27	15.3
QWEIR	7826990	826990	826980	18.50	10.50	10.00	19.20	155.03	17.74	16.5
QWEIR	7829100	829100	829000	2.00	1.70	-1.00	2.86	209.12	2.29	15.4
QWEIR	7829200	829200	829190	5.00	0.00	-1.00	4.90	0.00	2.34	0.0
QWEIR	7829600	829600	829510	5.00	-0.50	-1.00	2.69	0.00	2.40	0.0
QWEIR	90221	82100	0	-2.00	-2.00	0.00	2.00	835.11	0.00	14.6
QWEIR	90222	82200	0	-2.50	-2.50	0.00	2.00	1392.44	0.00	15.9
QWEIR	90223	82300	0	-2.50	-2.50	0.00	2.00	592.08	0.00	13.2
QWEIR	90224	82400	0	-2.60	-2.60	0.00	2.00	1393.63	0.00	13.2
QWEIR	90225	82510	0	-4.00	-4.00	0.00	2.00	785.77	0.00	17.1
QWEIR	90226	82615	0	-4.00	-4.00	0.00	2.00	1424.67	0.00	13.1
QWEIR	90227	82620	0	-3.50	-3.50	0.00	2.00	1990.59	0.00	12.5
QWEIR	90228	82645	0	-3.50	-3.50	0.00	2.00	2080.31	0.00	12.5
QWEIR	90229	82900	0	-1.00	-1.00	0.00	2.00	1885.91	0.00	13.5
QWEIR	90230	82930	0	-1.50	-1.50	0.00	2.00	1922.29	0.00	12.8
QWEIR	90231	82940	0	-4.00	-4.00	0.00	2.00	760.34	0.00	14.1

APPENDIX D

MODEL RESULT COMPARISON TABLES

2.33-YEAR (MEAN ANNUAL) EVENT
5-YEAR EVENT
10-YEAR EVENT
25-YEAR EVENT
50-YEAR EVENT
100-YEAR EVENT

Model Results Comparison - 2.33 Year Event
Proposed Model Results Minus Modified Existing Model Results
****Results compiled from the .smx model files.**

Existing Conditions Model Results				Proposed Conditions Model Results	
Junction	Stage	Magnitude of Stage Change	*1 Indicates Positive Stage Change	Junction	Stage
82400	2	0		82400	2
824000	2.01	0		824000	2.01
824080	2.04	0		824080	2.04
824085	2.08	-0.01		824085	2.07
824100	2.4	0		824100	2.4
824110	3.95	0.01	1	824110	3.96
824120	2.78	0		824120	2.78
824130	4.32	0		824130	4.32
824140	5.61	0		824140	5.61
824200	4.9	0		824200	4.9
824300	5.29	0.01	1	824300	5.3
824400	6.65	0		824400	6.65
824490	3.52	0		824490	3.52
824500	4.65	0		824500	4.65
824590	4.92	0		824590	4.92
824600	4.92	0		824600	4.92
824650	5.46	0		824650	5.46

Model Results Comparison - 5 Year Event
Proposed Model Results Minus Modified Existing Model Results
**Results compiled from the .smx model files.

Existing Conditions Model Results				Proposed Conditions Model Results	
Junction	Stage	Magnitude of Stage Change	*1 Indicates Positive Stage Change	Junction	Stage
82400	2	0		82400	2
824000	2.01	0		824000	2.01
824080	2.08	-0.01		824080	2.07
824085	2.15	-0.01		824085	2.14
824100	2.64	0		824100	2.64
824110	4.07	0		824110	4.07
824120	3.04	0		824120	3.04
824130	4.45	0		824130	4.45
824140	5.75	0		824140	5.75
824200	5.1	0		824200	5.1
824300	5.52	0		824300	5.52
824400	6.9	0		824400	6.9
824490	3.87	0		824490	3.87
824500	4.99	0		824500	4.99
824590	5.23	0		824590	5.23
824600	5.24	-0.01		824600	5.23
824650	5.57	0		824650	5.57

Model Results Comparison - 10 Year Event
Proposed Model Results Minus Modified Existing Model Results
**Results compiled from the .smx model files.

Existing Conditions Model Results				Proposed Conditions Model Results	
Junction	Stage	Magnitude of Stage Change	*1 Indicates Positive Stage Change	Junction	Stage
82400	2	0		82400	2
824000	2.02	0		824000	2.02
824080	2.17	-0.02		824080	2.15
824085	2.28	-0.02		824085	2.26
824100	2.96	0		824100	2.96
824110	4.23	0		824110	4.23
824120	3.39	0		824120	3.39
824130	4.63	0		824130	4.63
824140	5.94	0		824140	5.94
824200	5.37	0		824200	5.37
824300	5.81	0		824300	5.81
824400	7.23	0		824400	7.23
824490	4.42	0		824490	4.42
824500	5.43	0		824500	5.43
824590	5.64	0		824590	5.64
824600	5.65	0		824600	5.65
824650	5.71	0		824650	5.71

Model Results Comparison - 25 Year Event

Proposed Model Results Minus Modified Existing Model Results

**Results compiled from the .smx model files.

Existing Conditions Model Results				Proposed Conditions Model Results	
Junction	Stage	Magnitude of Stage Change	*1 Indicates Positive Stage Change	Junction	Stage
82400	2	0		82400	2
824000	2.01	0		824000	2.01
824080	2.28	-0.03		824080	2.25
824085	2.38	-0.02		824085	2.36
824100	3.1	0		824100	3.1
824110	4.33	0		824110	4.33
824120	3.58	0		824120	3.58
824130	4.74	0		824130	4.74
824140	6.1	0		824140	6.1
824200	5.54	0		824200	5.54
824300	6	0		824300	6
824400	7.51	0		824400	7.51
824490	4.83	0		824490	4.83
824500	5.73	0		824500	5.73
824590	5.91	0		824590	5.91
824600	5.91	0		824600	5.91
824650	5.91	0		824650	5.91

Model Results Comparison - 50 Year Event
Proposed Model Results Minus Modified Existing Model Results
**Results compiled from the .smx model files.

Existing Conditions Model Results				Proposed Conditions Model Results	
Junction	Stage	Magnitude of Stage Change	*1 Indicates Positive Stage Change	Junction	Stage
82400	2	0		82400	2
824000	2.01	0		824000	2.01
824080	2.54	-0.07		824080	2.47
824085	2.62	-0.05		824085	2.57
824100	3.37	-0.01		824100	3.36
824110	4.49	0		824110	4.49
824120	3.85	0		824120	3.85
824130	4.91	0		824130	4.91
824140	6.27	0		824140	6.27
824200	5.83	0		824200	5.83
824300	6.31	0		824300	6.31
824400	7.86	0		824400	7.86
824490	5.59	0		824490	5.59
824500	6.27	0		824500	6.27
824590	6.39	0		824590	6.39
824600	6.39	0		824600	6.39
824650	6.39	0		824650	6.39

Model Results Comparison - 100 Year Event
Proposed Model Results Minus Modified Existing Model Results
**Results compiled from the .smx model files.

Existing Conditions Model Results				Proposed Conditions Model Results	
Junction	Stage	Magnitude of Stage Change	*1 Indicates Positive Stage Change	Junction	Stage
82400	2	0		82400	2
824000	2.01	0		824000	2.01
824080	2.75	-0.09		824080	2.66
824085	2.82	-0.08		824085	2.74
824100	3.51	-0.02		824100	3.49
824110	4.57	0		824110	4.57
824120	4.01	0		824120	4.01
824130	4.99	0		824130	4.99
824140	6.41	0		824140	6.41
824200	5.97	0		824200	5.97
824300	6.48	0		824300	6.48
824400	8.28	0		824400	8.28
824490	5.95	0		824490	5.95
824500	6.54	0		824500	6.54
824590	6.63	0		824590	6.63
824600	6.63	0		824600	6.63
824650	6.63	0		824650	6.63

APPENDIX E

EXISTING/PROPOSED CONVEYANCE CALCULATIONS
MANNING'S EQUATION CALCULATIONS

ECT
Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Relocation
PROJECT NO. 100754-0400
SHEET NO. 1 OF 9
CALCULATED BY RAM DATE 12/28/2011
CHECKED BY ____ DATE ____

On S Conveyance (Maximum Q)

☆ mg ustion $Q(cfs) = \left(\frac{1.49}{n}\right) A R^{2/3} \sqrt{S}$

here: n = Mannings ghness Coeffi: ent
A = Area of low
R = Hydraulic Radius = $\frac{A}{P}$
P = Wetted Perimeter
S = Slope

☆ | nw show proposed culverted sections rovide ods ude capacity according to existing conditions.

Refer to figures 6 & 7 for locations identified in lations

E1

Existing culverted section through Big Bend Rail loop downstream of propo culverted sections 1, 2 & 3. he aximum Q all through this section is c lated using Manning Eq for full flow through the lvert. The culvert etai are as follo

121 LF of 24" RCP, n 0.012
/S INV EL = :55
/S INV EL. = - 77

A = πr
P = 2 r 3

$Q \left(\frac{49}{.012}\right) \cdot 3.14 \cdot (0.5) \sqrt{.0018}$

R A/ 0.5

$S = \frac{0.55 \quad 0.77}{12} = 0.0018$

Q 10. 7c

ECT
Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Relocation
PROJECT NO. 100754-0400
SHEET NO. 2 OF 9
CALCULATED BY [illegible] DATE 12/28/2011
CHECKED BY ______ DATE ______

The proposed culverts at culverted sections 1, 2 & 3
must be sized to provide conveyance for 10.47 cfs.

Based on site survey @ P1, the U VEL 17
the D/S INV EL = 1.0 Length 2FF

$S = \frac{0.7}{42} = 0.01\overline{6}$ Ft/Ft

Proposed 24" RCP at this location:

$Q = \left(\frac{1.49}{0.012}\right) \cdot 3.14 \cdot (0.5^{2/3}) \sqrt{0.01\overline{6}}$
$= 31.7$ cfs > 10.47

A 24 RCP @ ith of 0 $0.01\overline{6}$ Ft/Ft
wil be sufficient

Based on the site rvey @ P2, the U/S INV = -0.2,
the D/S INV = -0.4. Length = 90'
$S = \frac{0.2}{90} = 0.002$

Proposed 24" RCP @ this location
$Q = \left(\frac{1.49}{0.012}\right) 3.14 \cdot (0.5^{2/3}) \sqrt{0.002}$

$= 11.6$ cfs > 10.47
∴ " RCP @ P2 a sl of .
w be suff.

PROJECT TEC Gypsum Relocation
PROJECT NO. 100754-0400
SHEET NO. 3 OF 6
CALCULATED BY EPM DATE 12/28/2011
CHECKED BY ____ DATE ____

ECT
Environmental Consulting & Technology, Inc.

- Based on site survey @ P3, the U/S INV EL. = -0.4

The D/S INV EL. = -0.55, Length = 50'

$$S = \frac{0.15}{50} = 0.003 \text{ ft/ft}$$

Proposed 24" RCP @ this location.

$$Q = \left(\frac{1.49}{0.012}\right) \cdot 3.14 \cdot (0.5^{2/3}) \sqrt{0.003}$$

$$= 13.5 \text{ cfs} > 10.47$$

∴ A 24" RCP @ P3 with a slope of 0.003 ft/ft will [illegible] [illegible].

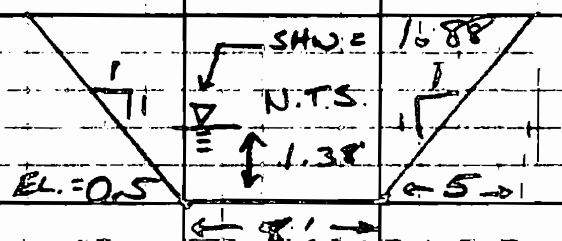
The discharge through P4 / P5 is not governed by a U/ or D/S culverted section. The ditch section where these crossings are proposed appears to be a dead end ditch to [illegible] flow for flow to continue through this [illegible]tch, culverts a[re] proposed to maintain [illegible].

An estimate of the current [illegible] through this ditch can be completed b[y] ca[lcu]lating the [flo]w through [a] trapezoidal channel with water at the SHW elev. as [illegible] survey the [ap]proximate dimensions [illegible] determined and used to [calcu]late the flow that must be conveyed through proposed culverted sections

Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Relocation
PROJECT NO. 100754-0400
SHEET NO. 4 OF 9
CALCULATED BY [illegible] DATE 12/28/2011
CHECKED BY ______ DATE ______

— Trapezoidal Section @ P4 — According to site survey estimate.



$S = \frac{0.}{100} = 0.00 \frac{ft}{ft}$

$n = 0.03$ for weeded natural channels

$A = (8 \times 1.38) + (1.38 \cdot 1.38)$
$= 12.94$ SF

$Q = \left(\frac{1.49}{0.03}\right) 12.94 \cdot 1.1^{2/3} \cdot \sqrt{.001}$

$P = 8 + 2\left(\sqrt{1.38^2 + 1.38^2}\right)$
$= 11.9$

Max Q $= 21.65$ cfs

$R = A/P = 1.1$

— Based on site survey @ P4, the U/S INV EL. = 0.4. The D/S INV EL. = 0.2 Length = 50'

$S = \frac{0.2}{50} = 0.004$ Ft/Ft

Proposed 2-24" RCP @ this location.

$Q = \left(\frac{1.49}{0.012}\right) \cdot 3.14 \cdot (0.5^{2/3}) \cdot \sqrt{0.004}$

$= 2 \times 15.5$ cfs $= 31.0$ CFS > 21.65

∴ 2 24" RCP @ P4 with a slope of 0.004 ft/ft will be sufficient.

Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Relocation
PROJECT NO. 100754-0400
SHEET NO. 5 OF 9
CALCULATED BY RPM DATE 12/28/2011
CHECKED BY ______ DATE ______

- Trapezoidal Section @ P5 according to site survey estimate.

SHW = 1.88
1.5 : 1
NTS
1.5 : 1
~6
EL = 5.0
EL = 1.0
← 8' →

$S_B \; \frac{0.1}{75} = 0.001 \frac{ft}{ft}$

$A = (8 + 8.8)\,0.88 \times (1.5 \times 0.2$

$n = 0.03$ for weeded natural channels

$P = 8 + \sqrt{8.8^2 + (0.88 \times 1.$

$Q = \left(\frac{1.49}{0.03}\right) \cdot 16.2 \cdot 1.45^{2/3} \sqrt{0.001}$ = 11.2 ft

Max Q = 32.6 cfs

$A/P = 1.45$

Based on site survey @ the s EL = 0.8

The D/S INV. EL = 0.5 L 50

0.006 $\frac{ft}{ft}$

Proposed 2 - 24" RCP @ this location

$Q = \left(\frac{1.49}{0.012}\right) \cdot 3.14 \cdot (0.5^{2/3}) \sqrt{0.006}$

$= 2 \times 19.0 = 38.0$ 32.6

∴ 2 24" RCP @ P5 ... 0.006 $\frac{ft}{ft}$

will be sufficient.

Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Rebuild
PROJECT NO. 100754-0400
SHEET NO. 6 OF 9
CALCULATED BY RPM DATE 12/28/2011
CHECKED BY ______ DATE ______

- Existing culverted section (E2) through Big Bends Rail Loop is downstream of proposed culverted section P6. The maximum Q allowed through th ection is calculated using Mannings Equation for full flow through the culvert. The culvert details are as follows:

69 LF of 24" RCP, n = 0.012

U/S INV EL = 0.72

D/S INV EL = 0.52

$S = \frac{0.2}{69}$

Max $Q = \left(\frac{1.49}{0.012}\right) \cdot 3.14 \cdot (0.5^{2/3}) \cdot \sqrt{0.003}$

Max Q = 13.5 CFS

- Based on site survey @ P6, the U/S I V EL. = 1.9

The N EL 16 = 50 LF

S = 0.006 Ft/Ft

Proposed 24" R P @ this location:

$Q = \left(\frac{1.49}{0.012}\right) \cdot 3.1 \quad 5^{2/3}) \cdot \sqrt{0.006}$

- 19. FS > 13 cfs

∴ A 24" @ with a ope of .006 ft l e ufficient

Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Relocation
PROJECT NO. 100754-0400
SHEET NO. 7 OF 9
CALCULATED BY RPM DATE 12/28/2011
CHECKED BY ______ DATE ______

→ A culverted section @ P7 is required. Flow through this section can be retrieved from the Hillsborough Co. model that this drainage design is based upon. The model file can be found in Appendix B of this report.

- This section of Jackson Branch is modeled between junctions 824120 and 824100 in Hills. Co. Miscellaneous Coastal Streams model. The flows through that section are located in the .SMX file.
- The SMX file indicates that during the 100 yr event 44.10 CFS is the maximum flow.

- A culverted section @ P7 needs to be able to maintain the same conveyance without creating upstream impacts.

- Based on site survey at P7, the U/S INV EL = 0.6
The D/S INV EL = 0.0 $L = 250$ LF
Proposed 2-36" RCP @ this location

$$S = \frac{0.6}{250} = 0.0024 \frac{ft}{ft}$$

$$Q = \left(\frac{1.49}{0.012}\right) 7.1 \cdot (0.75^{2/3}) \cdot \sqrt{0.0024} = 35.6 \text{ cfs}$$

$$2(35.6) = 71.3 \text{ CFS} > 44.1$$

∴ 2 - 36" RCP with a slope of 0.0024 ft/ft will be sufficient. →

PROJECT TEC Gypsum Reload
PROJECT NO. 100754-0400
SHEET NO. 8 OF 9
CALCULATED BY RPM DATE 9/21/2012
CHECKED BY ____ DATE ____

Environmental Consulting & Technology, Inc.

box culvert, E3 is located at the ac ess road connection to the National Gypsum property. The maximum Q allowed through this section is calculated using Manning's Equation for full flow through the culvert. The existing culvert details are s follows:

24 LF of 4.5 8 Concrete Box Culvert, n = 0.012

U/S INV. EL. = .
D/S INV. EL. = 0.

$A = 4.5 \times 8 = 36$ SF

$P = 2(4.5) + 8 = 17$ Ft

$R = A/P = \frac{36}{17}$

$S = \frac{1.06 - 0.95}{24}$

0.0046

$Q = \left(\frac{1.49}{0.01}\right)(6)\ 36\ \sqrt{\ 04}$

M - 499 CFS

I any modifications oc ur @ E3, P8 must p ovide con eyance for 499.9 F more.

ECT
Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Re'aration
PROJECT NO. 100754-0400
SHEET NO. 9 OF 9
CALCULATED BY RM DATE 9/21/2012
CHECKED BY ____ DATE ____

- An existing box culvert, E4 is located at the rail loop where the proposed rail spur extension will be meeting the existing loop. The maximum Q allowed through this section is calculated using Manning's Equation for full flow through the culvert. The existing culvert details are as follows:

63 LF of 2 5'×3' Concrete Box Culverts
n = 0.012
U/S INV. EL = 1.66
D/S INV. EL = 1.60

A = 2(5×3) = 30SF
P = 2(3+3+5) = 22
R = A/P = 30/22

$$Q = \left(\frac{1.49}{0.012}\right)(30)(30/22)^{2/3}\sqrt{0.00095}$$

Max Q = 141.2 CFS

$$S = \frac{1.66-1.60}{63} = 0.00095$$

P9 must maintain existing conveyance.
P9 is a proposed culvert extension of 25 LF. To maintain the calculated conveyance, the proposed extension must have the following dimensions
63 existing ft plus 25 foot extension.

2 - 3'×5' concrete box culverts

U/S Inv = 1.69
D/S Inv = 1.60

S = 0.09/88 = 0.00100

APPENDIX F

PROJECT SITE RUNOFF CALCULATIONS

PROJECT TEC Gypsum Runoff
PROJECT NO. 100754-0400
SHEET NO. 1 OF 2
CALCULATED BY RPT DATE 1/4/2012
CHECKED BY ____ DATE ____

ECT

Environmental Consulting & Technology, Inc.

Project Area Runoff Volume Calculations

- TEC's Gypsum Relocation facility is proposed to capture all rainfall that falls within the project area and route the runoff produced through a pipe system to TEC's recycle ponds.

- The system is designed for the 25-year event. As shown in Figure 3, the rainfall amount for the 25yr/24hr event is 8.0 inches.

- The rainfall volume that will be captured and routed is dependent on the bermed project area, 22.5 Ac

- The SCS Method will be used to calculate this volume.

- $Q = \frac{(P-I_a)^2}{(P-I_a)+S}$ where $I_a = 0.2S$; $S = \frac{1000}{CN} - 10$

- The site has a CN of 98 because the berms capture 100% of the runoff.

$S = \frac{1000}{98} - 10 = 0.204$, $I_a = 0.2 \times 0.204 = 0.041$

- $Q = \frac{(8-0.041)^2}{(8-0.041)+0.204} = 7.76$ in

- Runoff Volume $= 22.5$ Ac $\cdot \left(\frac{7.76 \text{ in}}{12 \text{ in/ft}}\right) = 14.55$ Ac-Feet $= 633,798$ CF

ECT
Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Runoff
PROJECT NO. 100754-0400
SHEET NO. 2 OF 2
CALCULATED BY RPM DATE 1/4/2012
CHECKED BY ____ DATE ____

Cont...

The total volume captured and routed to TEC's process water ponds will be 633,798 CF

The ponds require an additional capacity for the storage of 633,798 CF of runoff. (See total in gallons below)

1 CF = 7.48 gallons

633,798 CF × 7.48 gal/CF =
4,740,809.0 Gallons

APPENDIX G

ROADWAY DRAINAGE CALCULATIONS
EXISTING SWALE SIZING CALCULATIONS

ECT
Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Roadway
PROJECT NO. 100754-0400
SHEET NO. 1 OF 2
CALCULATED BY RPM DATE 2/8/2012
CHECKED BY ______ DATE ______

Roadway Runoff Calculations

– Paved access roads are required for this facility. The cross section for these access roads shall include a drainage swale to capture the required treatment volume. According to the ERP manual, the required treatment volume is equal to the volume of the first 1" of rainfall. Since this accounts for pervious and impervious area, the ~~treatment~~ swales for the impervious area only of the access roads for the gypsum storage area are sized using 1¼" of rainfall over the impervious area of the access roads.

The impervious area of the access road connecting Wyandotte road to the gypsum storage area is approximately equal to 60,000 SF. The impervious area for the driveway from the storage area to the National Gypsum property is approximately 13,000 SF. (The approximate length of roadway for these areas is equal to 2,280 LF)

The required volume that needs to be treated is equal to $\left(\frac{73{,}000\ SF}{43{,}560\ SF/Ac}\right)\frac{1.25\ in}{12\ in/ft} = 0.175\ Ac\text{-}Ft$

$0.175\ Ac\text{-}Ft \approx 7623\ CF.$

Photograph No. 1. View of Wetland S1 facing south – swale overgrown with Brazilian peppers.

Photograph No. 2. View of Wetland S2 facing west – a double ditch system along south side of old field.

Photograph No. 3. View of Wetland S3 facing south – location where ditch from agricultural field enters project site.

Photograph No. 4. View of Wetland S3 facing north – view of canal that runs along east side of project.

Photograph No. 5. View of Wetland S4 facing west – ditch parallels south side of access road. Cattail cover is dense.

Photograph No. 6. View of Wetland S5 facing east – wide swale along access road.

Photograph No. 7. View of Wetland V1 facing south – southeast junction of several ditches. Ditches typically overgrown with Brazilian peppers.

Photograph No. 8. View of Wetland V1 facing north – ditch overgrown with paragrass.

Photograph No. 9. View of Wetland V2 looking north from center of channel.

Photograph No. 10. View of Wetland V2 looking south from center of channel.

Photograph No. 11. View of Wetland V2 looking east across channel.

Photograph No. 12. View of Wetland V3 facing west – turns west and parallels access road on north side. Cattails are majority of cover in this portion of the ditch.

Photograph No. 13. View of Wetland V4 facing north – large ditch that parallels Wetland V1.

Photograph No. 14. View of Wetland D1 facing east at box culvert.

ECT

Environmental Consulting & Technology, Inc.

PROJECT TEC Gypsum Roadway

PROJECT NO. 100754-0400

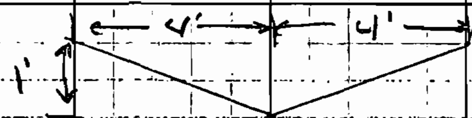
SHEET NO. 2 OF 2

CALCULATED BY RPM DATE 2/8/2012

CHECKED BY ______ DATE ______

The total length of roadway for these access roads is approximately 2,280 LF.

The cross section of a swale that would capture the required treatment volume is as follows.



Cross-sectional area = 4 SF

2280 LF × 4 SF = 9,120 CF of treatment provided.

∴ Swale is adequately sized and will contain the required treatment volume for the access roads associated with this project.

* Swales shall be designed with blocks to impede untreated flow into the roadway ditches that the access roads are crossing. These blocks should be 1' higher then the swale bottom in order to allow for the required treatment volume to be captured.

APPENDIX C

GROUND PHOTOGRAPHS

Photograph No. 17. View of culverted railroad crossing which drains Wetland W1 looking west from edge of Wetland W1.

APPENDIX D

COMPLETED USACE WETLAND JURISDICTION DETERMINATION FORMS

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): May 25, 2012

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD: Randy Melton, Tampa Electric Company, P.O. Box 111, Tampa, Florida 33601

C. **DISTRICT OFFICE, FILE NAME, AND NUMBER:Tampa Regulatory Office, SAJ-2012-**

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: The Tampa Electric Company (TEC) Big Bend Station consists of four (4) coal-fired steam generators which utilize wet flue gas desulfurization (FGD) control technology (i.e., wet scrubbers) to reduce emissions of sulfur oxides. Gypsum (hydrated calcium sulfate) produced as a by-product of the wet FGD control systems is currently sold for use in the production of wallboard, or stored on-site at the Big Bend Station. The existing gypsum handling and storage facilities are addressed in the current Big Bend Station Title V air operation permit (Air Permit No. 0570039-045-AV) as an unregulated emission unit. Since the existing on-site gypsum storage facility is near its storage capacity, TEC plans to install a new gypsum handling and storage facility which will provide the ability to store gypsum in: (a) a stock out pile using a radial stacker, (b) a gypsum storage dome, and (c) a gypsum pile management area. The new gypsum storage facility will be located northeast of the Big Bend Station south of the existing National Gypsum wallboard facility. Major components of the new gypsum handling and storage facility include:(1) Covered belt conveyors and enclosed belt transfer stations to transfer gypsum from the existing Big Bend Station gypsum processing area to a radial stacker; (2) Nominal 4,000 ton capacity kidney-shaped stock out storage pile; (3) Mobile equipment to transfer gypsum from the stock out pile to either the gypsum pile management area or to the reclaim hopper; (4) Covered belt conveyors to transfer gypsum from the reclaim hopper to either the truck load out silo or to the gypsum storage dome; (5) Nominal 100 ton capacity truck load out silo; (6) Nominal 25,000 ton capacity conical storage pile located inside an enclosed storage dome; and (7) Nominal 280,000 ton capacity gypsum pile management area. Gypsum from the existing Big Bend Station processing area will be transferred by covered belt conveyors to the radial stacker. Due to the long transfer distance, two covered belt conveyor transfer stations will be included. The radial stacker will then transfer the gypsum to the stock out pile. Gypsum will be reclaimed from the stock out pile using mobile equipment (e.g., front end

loaders) either directly to the above grade reclaim hopper or to the gypsum pile management area. Mobile equipment will be used to reclaim gypsum from the management area pile to the reclaim hopper. The radial stacker may also transfer gypsum directly to the reclaim hopper. From the reclaim hopper, covered belt conveyors will next transfer the gypsum to a diverter gate which will be used to convey the gypsum to either the truck load out silo or to a conical storage pile located inside the gypsum storage dome. A rotary plow will be used to transfer gypsum from the truck load out silo to trucks which will then transfer the gypsum to the nearby National Gypsum wallboard facility. Within the covered gypsum storage dome, gypsum will be transferred from the conical storage pile to trucks using mobile equipment for subsequent shipment to the National Gypsum wallboard facility. The only air pollutant associated with the new gypsum handling and storage facility stationary emission sources (i.e., conveyor belt transfers, storage piles, storage pile reclaim, and truck load out) is particulate matter (PM). Emissions of PM will be minor since the gypsum handled and stored will have a relatively high moisture content; i.e., an average moisture content of 8 to 10 percent by weight. In addition, the conveyor belts will be covered and the conveyer belt transfer stations and gypsum storage dome will be enclosed. TEC will take reasonable precautions to control fugitive and unconfined emissions of PM including enclosure of conveying systems, paving of roads, and use of water sprays on open storage piles as necessary. It is expected that the new gypsum and handling facility will either be exempt from FDEP air permitting requirements or require a minor modification air construction permit.
The proposed project will result in the permanent filling of approximately 0.79 acre of highly disturbed natural or man-made surface water features (i.e., 0.04 acre of altered natural stream channel, 0.72 acre of upland-cut ditches, and 0.03 acre of a hydrologically isolated depression). The start date scheduled for construction is October 30, 2013. The estimated completion date is April 29, 2015. Environmental Consulting & Technolgy, Inc. (ECT) performed the wetland jurisdictional determinations along the proposed impact areas on the project site. Acreages are only indicated on the form for wetland impact assessment areas. However, impact wetland acreages are provided in the attached Table 1.

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State:Florida County/parish/borough: Hillsborough City: N/A
Center coordinates of site (lat/long in degree decimal format): Lat. -27.79765069° **N**, Long. -82.390469679° **W**.
Universal Transverse Mercator: x=363,023.329729 East and y=3,075,562.64751 North
Name of nearest waterbody: Tampa Bay

Identify (estimate) amount of waters in the review area:

Non-wetland waters: 1,755.5 linear feet: average of 20 ft width (ft) and/or 0.806 or 0.81 acres.
Cowardin Class: Riverine
Stream Flow: Intermittent
Wetlands: 0 acres.
Cowardin Class:

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal: N/A
Non-Tidal: N/A

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): September 8, 9, 12, and 15; December 13, 2011

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps

permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:Figures 1 through 14 and Sheets 4, 5, 5-1 through 5-9 in ERP application.

☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

  ☐ Office concurs with data sheets/delineation report.

  ☐ Office does not concur with data sheets/delineation report.

☐ Data sheets prepared by the Corps: .

☐ Corps navigable waters' study: .

☐ U.S. Geological Survey Hydrologic Atlas: .

  ☐ USGS NHD data.

  ☐ USGS 8 and 12 digit HUC maps.

☒ U.S. Geological Survey map(s). Cite scale & quad name:1 inch=2,000 feet; Gibsonton, 1987; Figure 2 in ERP application.

☒ USDA Natural Resources Conservation Service Soil Survey. Citation:Soils of Hillsborough County, 1987; Figure 3 in ERP application.

☒ National wetlands inventory map(s). Cite name:Gibsonston, 1987-USFWS 2006; Figure 5 in ERP application.

☐ State/Local wetland inventory map(s): .

☒ FEMA/FIRM maps:Figure 4 in ERP application.

☒ 100-year Floodplain Elevation is: 11.0 feet(National Geodectic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date):SWFWMD; Photo date 2011 on Figure 6 in ERP application.

or ☒ Other (Name & Date):Ground photographs; Photo dates September 8, 9, 12, and 15; December 13, 2011 in Appendix C in ERP application.

☐ Previous determination(s). File no. and date of response letter: .

☒ Other information (please specify):Land use/cover map and wetland jurisdictional limits for impact areas are depicted on Figure 7 in the ERP application; Attached is a table of the wetlands identified on the project site (i.e Table 1). All of the wetlands onsite were delineated using the top of bank along berms. therefore, standard USACE Routine Wetland Delineation forms were not completed/required for upland and wetland locations.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Randy Melton 5/7/12
Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)

TECO. TAMPA ELECTRIC

Table 1. Wetlands/Surface Waters on the Tampa Electric Company Big Bend Power Station Gypsum Storage Area/Conveyor Improvements Project Site

Site Number ***	Latitude	Longitude	Cowardin Class	Size*	Class of Aquatic Resource
S1	27.79693803 N	82.39218183 W	N/A**	0.124	Non-Section 10-NonWetland
S2	27.79648821 N	82.39220789 W	N/A**	0.02	Non-Section 10-NonWetland
S4	27.79638560 N	82.39418242 W	N/A**	0.037	Non-Section 10-NonWetland
S5	27.79623166 N	82.39356272 W	N/A**	0.003	Non-Section 10-NonWetland
S6A	27.79487342 N	82.39660462 W	N/A**	0.025	Non-Section 10-NonWetland
S6B	27.79455428 N	82.39591899 W	N/A**	0.001	Non-Section 10-NonWetland
S6C	27.79625910 N	82.39442367 W	N/A**	0.109	Non-Section 10-NonWetland
S6D	27.79486638 N	82.39486017 W	N/A**	0.055	Non-Section 10-NonWetland
S9	27.79664148 N	82.39032489 W	N/A**	0.029	Non-Section 10-NonWetland
S11	27.79982076 N	82.39026175 W	N/A**	0.26	Non-Section 10-NonWetland
V2	27.79930466 N	82.38936778 W	N/A**	0.054	Non-Section 10-NonWetland
V3	27.79685600 N	82.39248011 W	N/A**	0.018	Non-Section 10-NonWetland
V4A	27.79649128 N	82.39389394 W	N/A**	0.05	Non-Section 10-NonWetland
V4B	27.79685465 N	82.39261972 W	N/A**	0.021	Non-Section 10-NonWetland
TOTAL				**0.806**	

** The estimated amount of the aquatic resource within project limits is in acres.*
*** The National Wetlands Inventory does not have this wetland/surface water feature mapped for the project area.*

All wetland/surface water types are man-made upland cut ditches, except for V2 (natural stream) and S9 (pond).
**** S3, S7, S8, S10, S12, and V1 were present within the project vicinity, but are not located within project limits.*

APPENDIX E

COMPLETED UMAM AND E-WRAP FORMS

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
TEC BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT		**V2**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
511	**Natural Stream**	**Impact**	0.04 acre

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Wolf Branch	**Class III**	**None**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Connected to Tampa Bay, but location of assessment area does not appear to be tidally influenced.

Assessment area description

Channelized stream along densely wooded area between agricultural fields and industrial facilities.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
N/A	**N/A**

Functions	Mitigation for previous permit/other historic use
BIOLOGICAL: **Macroinvertebrate habitat; fish cover, spawning and nursery habitat; amphibian habitat and feeding; aquatic turtle cover, feeding and breeding (stream banks); and habitat heterogeneity (water depth, vegetation, woody debris).** **PHYSICAL/CHEMICAL:** **Water quality treatment; sediment/erosion control; recharge/discharge; detrital export; flood retention/detention.**	**No / Agriculture**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Coastal shiner, madtom, bullhead, pirate perch, swamp darter, least killifish, mosquitofish, sailfin molly, amphiuma, sirens, southern dusky salamander, leopard frog, loggerhead musk turtle, cottonmouth moccasin, water snakes, raccoon, opossum, river otter, kingfisher, wood stork, and wading birds.	**American alligator (SSC, habitat, long-term), wood stork (E, foraging, frequent), little blue heron (SSC, foraging and nesting, seasonal), snowy egret (SSC, foraging and nesting, seasonal), and tricolored heron (SSC, foraging and nesting, seasonal).**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Snowy egret, Northern cardinal, mud turtle, black racer, and mosquitofish.

Additional relevant factors:

Areas adjacent to stream used as a dump site for refuse.

Assessment conducted by:	Assessment date(s):
Bryan Delius	13-Dec-11

Form 62-345.900(1), F.A.C. [effective date 02-04-2004]

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
TEC BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT		**V2**
Impact or Mitigation: **Impact**	Assessment conducted by: **B. Delius**	Assessment date: **December 13, 2011**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Indicator	w/o pres or current	with	Description
.500(6)(a) Location and Landscape Support	**3**	0	**Outside habitats provide minimal support for wildlife. The majority of cover is invasive species that adversely affect wetland functions such as Brazilian peppers and Austrailan pines. Wildlife access is partially limited by deep ditches, railroad berms, and industrial facilities. Altered topography of stream reduces water quality treatment capabilities and increases the potential for flash flooding, which in turn greatly reduces the potential downstream benefits to Tampa Bay. Wetland function is negligibly protected by adjacent uplands. Land use in the area substantially reduces use by wildlife.**
.500(6)(b)Water Environment (n/a for uplands)	**5**	0	**Water levels and flows are altered from optimal conditions by artificial channelization. Water level indicators suggest a very flashy system. Sand bars suggest soil erosion and deposition, which is common in channelized streams. There is no evidence of past fires, which suggests fire has been artificially suppressed. There is no native vegetation present. Use by animals is lower than would be expected. Possible water quality degradation from agricultural/industrial runoff (i.e., sulfurous odor and milky sheen in water was observed during the assessment).**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	**2**	0	**The majority of plant species in the vegetation layers are invasives. Regeneration and natural recruitment are greatly reduced. Virtually no plant life in the channel is indicative of a permanent deviation from normal successional patterns. Moderate siltation. Greater than normal woody debris from dense invasive cover. Significant alteration of natural structure/topography through artificial channelization and the invasion of invasive species have greatly impacted the system. Minimal wildlife support.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.33	0

If preservation as mitigation,
Preservation adjustment factor = **N/A**
Adjusted mitigation delta = **N/A**

For impact assessment areas
FL = delta x acres = **-0.33 x 0.04 = 0.01**

Delta = [with-current]
-0.33

If mitigation
Time lag (t-factor) = **N/A**
Risk factor = **N/A**

For mitigation assessment areas
RFG = delta/(t-factor x risk) = **N/A**

Form 62-345.900(2), F.A.C. [effective date 02-04-2004]

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
TEC BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT		W1

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
641/619	FDEP: 641 FNAI: Depression Marsh SCS: 25-Freshwater Marsh	Impact	0.16 acre

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Wolf Branch	Class III	None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Assessment area is a topographic low within an larger area of historic maritime hammock. Surface runoff pools into the area. Area drains via culverts under railroad tracks into drainage ditches which ultimately empty into Tampa Bay.

Assessment area description

Area is a grassy marsh with some open water and wetland forest now dominated by Brazilian peppers.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Railroad tracks, power generation plant, and manufacturing plant	Most of the general landscape is urban/industrial.

Functions	Mitigation for previous permit/other historic use
BIOLOGICAL: Wading bird feeding; sandhill crane nesting; amphibian breeding; forage fish habitat; reptile feeding; rice rat nesting; and Florida round-tailed muskrat feeding and nesting. PHYSICAL/CHEMICAL: Water quality treatment; sediment/erosion control; recharge/discharge; detrital export; flood retention/detention.	No/Agriculture

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mammals: raccoon, opossum, muskrat; Birds: great blue, tricolor, and little blue herons, common and snowy egrets, sandhill crane, wood stork, bald eagle; Herpetofauna: cricket frog, alligator, amphiuma, mud snake, green tree frog, green water snake, banded water snake, bullfrog, pig frog, leopard frog, striped swamp snake, black swamp snake, lesser siren, greater siren.	Florida sandhill crane (T, foraging, nesting, seasonal), wood stork (E, foraging, seasonal), bald eagle (T, foraging, incidental), alligator (SSC, foraging, breeding, longterm), white ibis (SSC, foraging, longterm), tricolored heron (SSC, foraging, longterm), little blue heron (SSC, foraging, longterm), and snowy egret (SSC, foraging, longterm).

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Great egret, raccoon tracks, leopard frogs

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
Chelsie Vandaveer	20-Aug-12

Form 62-345.900(1), F.A.C. [effective date 02-04-2004]

PART II – Quantification of Assessment Area (Impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
TEC BIG BEND POWER STATION GYPSUM STORAGE AREA/CONVEYOR IMPROVEMENTS PROJECT		W1
Impact or Mitigation: Impact	Assessment conducted by: C. Vandavoor	Assessment date: August 20, 2012

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

Indicator	w/o pres or current	with	Description
.500(6)(a) Location and Landscape Support	4	0	The area is surrounded by relict maritime hammocks with extensive encroachment of Brazilian pepper trees. Rail lines, roads, industry, ditching, and row crop fields comprise most of the surrounding landscape. Birds and small animals can access the area and the surrounding land can support the life cycles of many of these animals, but larger wildlife usage is discouraged by human activity and noise levels. Area offers few benefits (mostly detritus) to downstream habitats and possible pollutant loads in discharges may adversely affect wildlife.
.500(6)(b)Water Environment (n/a for uplands)	4	0	Historic aerial photographs indicate that the area has ranged from open water to marsh over the past decades probably depending on rainfall and diversion of water with agricultural ditching. Row crop fields with extensive ditches to control water began in the general area in the 1930s. The area receives surface runoff which now originates from various roads, a double railroad track loop, and industry and probably carries pollutant loads. The area drains via culverts under the railroad track loop into a series of ditches, which empty into Tampa Bay. The hydrology supports the grass-dominated marsh, but is insufficient to exclude the Brazilian peppers which dominate the forested edges of the wetland.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	4	0	The area is currently a grassy marsh dominated by *Paspalum distichum* with a small area of open water and minor populations of *Crinum americanum*, *Acrostichum danaeifolium*, and *Typha domingensis*. Historic aerial photographs indicate that the area once had a wetland shrub or tree component, but this part of the system has been taken over by Brazilian peppers to the exclusion of almost all other species. The altering of the land first for farming and currently for industry leaves this wetland and its abutting forest as a relict habitats.

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.40; with: 0	Preservation adjustment factor = N/A Adjusted mitigation delta = N/A	FL = delta x acres = -0.40 x 0.16 = -0.64

Delta = [with-current]	If mitigation	For mitigation assessment areas
-0.4	Time lag (t-factor) = N/A Risk factor = N/A	RFG = delta/(t-factor x risk) = N/A

Wetland Rapid Assessment Procedure

☑ Check One

☑ Existing Conditi ☐ Proposed Conditions

(WRAP)

Application Number	Project Name	Date	Evaluator	Wetland Type
	TEC Gypsum Storage Area/Conveyor Improvements	2/13/2012	T. Arcuri	V2

Land Use	**FLUCCS Code**	Description:	Wetland Acreage
Industrial	511	Channelized Natural Stream	0.04

Wildlife Utilization (WU)	**Wetland Canopy (O/S)**	**Wetland Ground Cover (GC)**
0.5	0.5	0.5

Field Hydrology (HYD): 2.0

WQ Input & Treatment (WQ)*: 2.0

*The value of WQ is obtained by adding the TOTAL scores of Land Use Category and Pretreatment Category then dividing by 2

Habitat Support/Buffer

Buffer Type	(Score) x	(% of area) =	Sub Totals
422/740	0.5	75	0.375
511	1.0	25	0.25
			0.625

TOTAL: 0.50

Land Use Category (LU)

Land Use Category	(Score) x	(% of area) =	Sub Totals
Undeveloped	3.0	50	1.5
Agriculture	1.0	50	0.5

(LU) Total: 2.0

Pretreatment Category (PT)

Pretreatment	(Score) x	(% of area)	= Sub Totals
Undeveloped	3.0	50	1.5
Dry Retent.	1.0	50	0.5

(PT) Total: 2.0

WRAP SCORE: 0.33

Wildlife Utilization (WU)

Almost completely covered by Brazilian peppers. Wildlife use is limited, although water source available and travel through channel provides a covered corridor.

Wetland Canopy (O/S)

Dominated by Brazilian peppers.

Wetland Ground Cover (GC)

Very little herbaceous ground cover present under Brazilian peppers.

Habitat Support/Buffer

Adjacent habitat includes the adjacent channel, Brazilian pepper, and open disturbed lands.

Field Hydrology (HYD)

Carries runoff to Tampa Bay; flashing during storm events.

WQ Input & Treatment (WQ)

Pretreatment and input from surrounding disturbed uplands (i.e., agricultural fields and overgrown areas).