TAMPA ELECTRIC COMPANY
BIG BEND II SOLAR
POWER PLANT PROJECT
ENVIRONMENTAL RESOURCE PERMIT APPLICATION

PREPARED FOR:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Southwest District Office
Division of Environmental Resources
13051 North Telecom Parkway
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DECEMBER 2020
200661-0200-12NR

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TAB 1

APPLICATIONS FORMS

Form 62-330.060(1) 404 Section A

Application for Individual and Conceptual Approval Environmental Resource Permit, State 404 Program Permit, and Authorization to Use State-Owned Submerged Lands

Florida Department of Environmental Protection/

Water Management Districts

Effective [date]

Instructions for Use of This Form:

This form is designed to assist you in submitting a complete application. All applications must include Section A-General Information for All Activities. Sections B through H list typical information that is needed based on the proposed activities and are only required as applicable. Part 1-C of Section A will guide you to the correct sections needed based on your proposed activities. Applicants are advised to consult Chapter 62-330, F.A.C., and the Environmental Resource Permit Applicant's Handbook Volumes I and II for information regarding the ERP permitting process and requirements while preparing their application. Internet addresses for Chapter 62-330, F.A.C., and the Applicant's Handbook, Agency contact information, and additional instructions for this form can be found in Attachment 1.

What Sections of the Application Must I Fill Out?

Type of Activity	Section A	Section B	Section C	Section D	Section E	Section F	Section G	Section H	Section I
Fill in wetlands or waters for a single family residence?	Y	Y	N	N	N	N	N	N	Y, if in assumed waters
Docks, shoreline stabilization, seawalls associated with a single family residence?	Y	Y	N	N	N	Y, as needed	N	N	Y, if in assumed waters
Wetland impacts (other than association with an individual residence)?	Y	N	Y	N	N	N	N	N	Y, if in assumed waters
Boating facilities, a marina, jetty, reef, or dredging?	Y	N	Y	Y	N	Y, as needed	N	N	Y, if in assumed waters
Any work on state owned submerged land?	Y	N	Y	N	N	Y	N	N	Y, if in assumed waters
Construction of a stormwater management system?	Y	N	Y, as needed	N	Y	N	N	N	N
Constructing a mitigation bank?	Y	N	Y	N	Y, as needed	N	Y	N	Y, if in assumed waters
Creating a mine?	Y	N	Y, as needed	N	N	N	N	Y	Y, if in assumed waters

If you have any questions, or would like assistance completing this form, please contact the staff of the nearest office of either the Florida Department of Environmental Protection (DEP) or a Water Management District (WMD) (see Attachment 2).

Section A:
General Information for All Activities

Part 1: Name, Application Type, Location, and Description of Activity

A. Name of project, including phase if applicable: **Tampa Electric Company (TEC) Big Bend II Solar Power Plant.**

B. This is for (check all that apply):

☒ Construction and operation of **new** works, activities, and/ or a stormwater management system

☐ **Conceptual Approval** of proposed works, activities and/ or a stormwater management system

☐ Modification or alteration of **existing** works, activities, and/or a stormwater management system. Provide the existing DEP or WMD permit #, if known: Note: Minor modifications do not require completion of this form, and may instead be requested by letter in accordance with section 6.2 of Applicant's Handbook Volume I.

☐ **Maintenance or repair** of works, activities, and/ or a stormwater management system previously permitted by the DEP or WMD. Provide existing permit #, if known:

☐ Abandonment or removal of works, activities, and/ or a stormwater management system.

Provide existing DEP or WMD permit #, if known:

☐ Operation of an **existing unpermitted** work, activity, and/or stormwater management system.

☐ Construction of additional phases of a permitted work, activity, or system.

Provide the existing DEP or WMD permit #, if known:

☐ A State 404 Program authorization:

☐ Exemption ☐ General Permit ☐ Individual Permit

If requesting an Exemption or General Permit provide Rule #, if known:

☐ **By checking this box**, I hereby voluntarily waive, in accordance with Rule 62-330.090(8), F.A.C., the agency action deadlines in section 5.5.3 of Volume I in the event my project also requires a State 404 Program authorization (other than an exemption) under Chapter 62-331, F.A.C., and request that the agency actions for the ERP and State 404 Program authorizations be issued at the same time. (This is strongly recommended to ensure consistency, and to reduce the potential need for project modifications to resolve inconsistencies that may occur when the agency actions are issued at different times.) If this box is checked and the Agency(ies) determines that no State 404 Program authorization is required, the Agency will continue to abide by section 5.5.3 of Volume I.

C. **List the type of activities proposed. Check all that apply, and provide the supplemental information requested in each of the referenced application sections.** Please also reference Applicant's Handbook Volumes I and II for the type of information that may be needed.

☐ Activities associated with one single-family residence, duplex, triplex, or quadruplex that do not qualify for an exemption or a General Permit: **Provide the information requested in Section B. Do not complete Section C.**

☒ Activities within wetlands or surface waters, or within 25 feet of a wetland or surface water, (not including the activities associated with an individual single-family residence). Examples include dredging, filling, outfall structures, docks, piers, over-water structures, shoreline stabilization, mitigation, reclamation, and restoration/enhancement. **Provide the information requested in Section C.**

☐ Activities within navigable or flowing surface waters such as a multi-slip dock or marina, dry storage facility, dredging, bridge, breakwaters, reefs, or other offshore structures: **In addition to Section C, also provide the information requested in Section D.**

☐ Activities that are (or may be) located within, on, or over state-owned submerged lands (See Chapter 18-21, F.A.C. https://www.flrules.org/gateway/ChapterHome.asp?Chapter=18-21): **In addition to Section B or C, also provide the information requested in Section F.**

☒ Construction or alteration of a stormwater management system serving residential, commercial, transportation, industrial, agricultural, or other land uses, or a solid waste facility (excluding mines that are regulated by DEP). **Provide the information requested in Section E.**

☐ Creation or modification of a Mitigation Bank (refer to Chapter 62-342, F.A.C. https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-342): **Provide the information requested in Section G.**

☐ Mines (as defined in Section 2.0 of Applicant's Handbook Volume I) that are regulated by the DEP: **Provide the information requested in Section H.**

☐ Other, describe: Please contact the Agency to determine which additional sections of the application are needed. See Attachment 2 for Agency contacts.

D. Describe in general terms the proposed project, system, works, or other activities. For permit modifications, please briefly describe the changes requested to the permit: **TEC proposes to build another solar power plant with internal access roads and a stormwater management system on the Big Bend Power Station property (i.e., Big Bend II Solar) located in Apollo Beach, Hillsborough County, Florida (see Figures 1 and 2). Installation of a solar power plant is just one example of how TEC invests in renewable energy sources.**

E. Project/Activity Street/Road Address or other location (if applicable): **Access Roads: U.S. Highway 401 and Dickman Road**

City: **Apollo Beach** County(ies): **Hillsborough** Zip: **33752**

Note: For utility, road, or ditch/canal activities, provide a starting and ending point using street names and nearest house numbers or provide length of project in miles along named streets or highways. **N/A**

F. Project location map and Section, Township, and Range information (use additional sheets if needed): Please attach a location map showing the location and boundaries of the proposed activity in relation to major intersections or other landmarks. 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. **Please refer to Figures 1 and 2.**

Section(s): **15 and 22;** Township: **31 South;** Range: **19 East (Hillsborough County, Florida).**
Land Grant name, if applicable: **N/A**

G. Latitude (DMS) **27° 40' 50.957" N;** Longitude (DMS) **82° 23' 34.963" W**; (Taken from central location of the activity). Explain source for obtaining latitude and longitude (i.e. U.S.G.S. Quadrangle Map, GPS, online resource): **Google Earth**.

H. Tax Parcel Identification Number(s): **U-15-31-19-1SF-000000-00600.00; U-15-31-19-1SF-000000-00800.00; U-15-31-19-1SF-000000-00900.00; U-15-31-19-1SF-000000-01000.00; and U-22-31-19-1SF-000000-01100.00.**[Number may be obtained from property tax bill or from the county property appraiser's office; if on multiple parcels, provide multiple Tax Parcel Identification Numbers]

I. Directions to Site (from major roads; include distances and landmarks as applicable): **From the city of Tampa, take Interstate (I)-75 south for approximately 14 miles to Apollo Beach, Exit 246. Exit on ramp heading west onto Big Bend Road. Proceed west for about 1.5 miles to U.S. Highway 41. At the intersection of Big Bend Road and U.S. Highway 41, turn south onto U.S. Highway 41 and proceed for approximately 0.95 mile to turn off on the right side of the Highway, approximately 0.2 mile pass the crossing of 230-kilovolt transmission lines. There will be a locked gate that can be used to access the property on the eastern side. To access the western side of the property, instead of turning south proceed another mile to the west on Big Bend Road from the intersection with U.S. Highway 41 to the turn in the road heading south. At this turn, the road is now Dickman Road. Proceed another 0.57 mile south on Dickman Road to an unpaved access road located on the east side of the roadway. Proceed to locked gate at the northwestern corner of the project site. The project site is a secured facility. Please contact TEC prior to property access.**

J. Project area or phase area: **191.312 acres**

K. Name of waterbody(ies) (if known) in which activities will occur or into which the system will discharge: **Newman Branch.**

The following questions (M-O) are not applicable to activities related to an individual single-family residence, including a dock, pier, and/or seawall associated with that residence.

L. Is it part of a larger plan of development or sale? ☐ yes ☒ no

M. Impervious or semi-impervious area excluding wetlands and other surface waters (if applicable): **Currently, there are approximately 1.27 acres of existing impervious surfaces onsite, however a total of approximately 5.52 acres of impervious surfaces will be associated with the proposed development.**

N. Volume of water the system is capable of impounding (if applicable): **Approximately 1.0 acre-ft. of water quality treatment is available between the elevation and the top of the dry detention swale for the proposed substation.**

Normal Pool: acre-feet. Depth ft.
Maximum Pool: acre-feet. Depth ft.

Part 2: Supplemental Information, and Permit History

A. Is this an application to modify an existing Environmental Resource Permit or to construct or implement part of a multi-phase project, such as a project with a Conceptual Approval permit? ☐ Yes ☒ No (If you answered "yes", please provide permit numbers below*):*

Agency	Date	Permit/Application No.	Project Name

B. Indicate if there have been any **pre-application meeting(s)** with the DEP, WMD, or delegated local government, or other discussions, meetings, or coordination with other stakeholders or agencies about the proposed project, system or activity. **Yes.** If so, please provide the date(s), location(s) of the meeting, and the name(s) of Agency staff that attended the meeting(s):

Agency	Date	Location	Meeting Attendees
DEP	**6/7/2017**	**Southwest District Office**	**Mark Langford and Ryan Martin with DEP and Nate Alcoz and Paul Carpinone with TEC**
DEP	**6/28/2017**	**Southwest District Office**	**Mark Langford with DEP, Nate Alcoz with TEC and Tony Arcuri with ECT**
EPC/HC	**6/29/2017**	**EPC/HC Office**	**Reggie Sanford, Eric Caplan, Michelle Jenkins, Sterlin Woodard, Diana Lee, and Jason Waters with EPC/HC and Paul Carpinone, Stanley Kroh, Byron Burrows and Nate Alcoz with TEC**
DEP	**8/22/2017**	**Southwest District Office**	**Mark Langford and Ryan Martin with DEP, Nate Alcoz with TEC and Tony Arcuri and Robert Johnson with ECT**

C. **Attach a depiction (plan and section views), which clearly shows the works or other activities proposed to be constructed.** Use multiple sheets, if necessary, a scale sufficient to show the location and type of works, and include a north arrow and a key to any symbols used. **Specific information to be included in the plans is based on the activities proposed and is further described in Sections B-H**. However, supplemental information may be required based on the specific circumstances or location of the proposed works or other activies.

TEC has undertaken an initiative to develop, own and operate solar photovoltaic (PV) projects as part of our broader energy resource mix. TEC has been conducting a site selection study to identify potential sites for development of up to 1,200 megawatts (MW) of solar PV electric generating facilities. Based on the assumption that 1 MW of solar generation requires approximately 5 acres of land, the planned facilities would require approximately 6,000 acres of buildable land. TEC focused the siting efforts on lands located within or in proximity to our service territory (i.e., Hillsborough, Pasco and Polk Counties). The study also focused on parcels that had single landowners and capable of supporting at least 50 to 75 MW of solar PV electric generation (i.e., a minimum of 250 to 375 acres). Proximity to existing roadways and TEC's existing electrical transmission lines were also considered in evaluating the potential locations. In addition, TEC identified potential environmental constraints

such as the presence of wetlands, surface water bodies, and threatened and endangered species based on information from available data sources. Initially, TEC reviewed over 200 potential solar power sites that encompassed a total of over 70,000 acres. Several potential solar power sites were selected for further evaluation. TEC conducted more detailed due diligence analyses on these subject properties including onsite field studies such as environmental site assessments, wetland and other surface water delineations, listed species surveys, cultural resource assessments, grand tree surveys, etc. After it was determined that the majority of the land surveyed on a subject property was highly altered and therefore potentially available for development of a solar PV project, TEC designed a site plan that specifically avoided or minimized impacts to wetlands and their upland buffers and to other surface waters such as natural and channelized/otherwise altered creeks, upland cut ditches, and man-made ponds. In addition to our in-house review, TEC also reviewed other potential sites proposed by other solar power plant developers. TEC selected several project sites to permit the development of solar PV electric generating facilities. One of the properties that was already under TEC ownership and was evaluated by TEC for permitting the construction of a new PV renewable energy generating facility is the Big Bend II property (formerly known as the ABH Expansion). The proposed Big Bend II Solar Plant project site is approximately 191.3 acres and located south-southeast of the Big Bend Power Generating Plant in Hillsborough County, Florida (Sections 15 and 22, Township 31 South, Range 19 East). The property is situated three-quarters of a mile south of Big Bend Road and stretches between U.S. Highway 41 (South Tamiami Trail) on the east to Dickman Road on the west.

The land is currently used as pasture for cattle. Most of the land in the project area is flat and ranges from approximately 1.0 to 10.3 ft. above sea level. TEC proposed this project site due to its 1) altered condition (upland areas have mostly been converted to agriculture), 2) availability as a large area of open, undeveloped land, 3) proximity to an existing 69-kilovolt (kV) electrical transmission line (Circuit 66061) located along U.S. Highway 41 for connection to the power grid and 4) potential for direct access from two separate paved roadways (i.e., U.S. Highway 41 and Dickman Road).

The proposed solar energy generation facility will employ thin-film PV panels that absorb sunlight and directly produce electricity. The facility will consist of a solar field of PV panels mounted on steel support structures, an electrical collection system that aggregates the output from the PV panels and converts the electricity from direct current (DC) to alternating current (AC), and an electrical substation where all of the facility output will be combined and transformed to a voltage of 69-kV and then tapped into the existing 69-kV electrical transmission line located along the eastern side of the project site. The PV panels will be anti-reflective coated and will be attached to single-axis tracking systems mounted on embedded (pounded) steel posts. The tracking system will allow the panels to rotate east-to-west throughout the day to track the movement of the sun, maximizing energy yield. Support posts will extend approximately 4 to 7 ft. above grade to elevate the panels and any exposed electrical equipment at least 1 foot above established base flood elevation(s) for the project site. When fully constructed, the tracking system will have a maximum height of up to 15 ft. at full rotation, and approximately 6 ft. in height at stow (horizontal). The PV panels will be arranged in north-to-south rows with center-to-center spacing of approximately 12 to 16 ft. The rows of PV panels will be organized into electrical groups referred to as "arrays." The arrays will include inverters that convert the DC power from the solar panels to AC power, which is utilized on the power grid. Each array will encompass approximately 15 acres to produce approximately 3 MW of electricity and will include one modular inverter. The size of each array will depend on the capacity of the inverters mounted on the array's associated inverter skid. Each inverter skid is anticipated to be an approximately 10-ft.-by-35-ft. structure up to 15 ft. in height. The inverter skids will be mounted on steel or concrete structures to be elevated above base flood elevation. Each inverter skid will have an associated transformer to step up the electricity voltage from the inverter output voltage to a distribution voltage of 34.5 kV, which will minimize electrical losses in the collection system. From each such transformer, electricity will be conveyed via a 34.5 kV collection system circuit to a 34.5 kV bus within the proposed onsite electrical substation. The approximately 0.67-acre electrical substation, to be located at the northeastern corner of the project site, will combine the total electrical output from the arrays and raise the voltage from 34.5 kV to 69 kV to match the electrical grid at the point of interconnection. The Big Bend II Solar Project will have a maximum capacity of 31.03 MW of AC electricity for transmission into the power grid. Given this capacity is less than the 75-MW threshold established by the Florida Electrical Power Plant Siting Act, the Project is not a certified electric generation facility. The final project design may

be modified based on results of ongoing engineering and site studies but will not alter the Project's overall footprint or maximum generation capacity.

There is an existing, unpaved driveway into the Project from U.S. Highway 41 located approximately 0.95 mile south of the intersection of U.S. Highway 41 and Big Bend Road and an unpaved access from Dickman Road located approximately 0.57 mile south of the intersection of Big Bend Road and Dickman Road. The unpaved driveway off U.S. Highway 41 will be used as the plant main entrance. The existing 16-ft wide access road off Dickman Road will be used to gain access to the plant service entrance. Approximately 12- to 20-ft. wide, interior roads will be installed for access to the arrays, inverter skids and substation. These interior access roads will be constructed at-grade or up to 6 inches above grade and may incorporate a geotextile fabric or geogrid underlayment, where needed. The most critical/heaviest loads utilizing these access roads will be the high-voltage equipment and inverter skid deliveries. Internal site access roads will be constructed of crushed concrete and/or aggregate base material over compacted native subgrade. The internal roads will be designed in accordance with Hillsborough County standards.

The construction and operation of the proposed solar power plant was specifically designed to avoid or minimize impacts to wetlands and other surface waters and their associated upland buffers to the extent practicable. A portion of the solar arrays are proposed to be built over two isolated wet pasture wetlands and three dead-end ditches located at the northwestern corner of the project site. This pasture area is flat and compacted due to cattle trampling over the years. Thus, during construction no regrading will be necessary for the placement of the solar arrays. As stated previously, the solar panels will be attached to single-axis tracking systems mounted on embedded (pounded) H-frame steel posts. The tracking system will allow the panels to rotate throughout the day almost eliminating any permanent shading at the ground level. Each post will be approximately 0.125 square inches in area and spaced every 25 feet. Since there will be no regrading necessary, shading from the panels would be virtually eliminated and only small, widely spaced poles will be embedded during construction, the placement of the arrays over the wet pastures and dead-end ditches is not considered to be a permanent fill impact. During construction, temporary matting will be used short-term for the placement of heavy equipment within wet pastures and dead-end ditches, as needed. After construction, TEC will return any inadvertently disturbed soils to the pre-existing grade and seed with grasses. In addition to the solar arrays, TEC proposes to partially fill approximately 0.083 acre of four drainage ditches for the construction of internal access road crossings. The construction of access roads at the four existing drainage crossings is also required for the construction, maintenance and operation of the proposed solar arrays. Unlike the solar array construction, the proposed fill in ditches is a permanent impact. Stormwater treatment for the proposed facilities will also be necessary. Therefore, surface runoff from the access roads (unpaved) will be directed via overland flow to the 25-ft. wide Vegetative Natural Buffers (VNB) located throughout the site. The VNB are areas with vegetation suitable for nutrient uptake and soil stability that will be set aside between developed areas and a receiving water or wetlands for stormwater treatment purposes. These buffers have been designed to provide treatment from the first 1/2 inch of runoff from the added semi-impervious surfaces (i.e., substation, access roads and inverter pads). In addition, the substation location is a single stormwater basin with a concentrated semi-impervious (rocked) surface and therefore a water quality treatment area will be constructed as a stormwater best management practice before discharge to the VNB. The dry detention area will be constructed and designed to provide a water quality treatment volume for the substation area to store the first 1/2 inch of runoff over the impervious areas. Finally, the post development peak discharge rate will not exceed the pre-development peak discharge rate for the 25-year frequency, 24-hour duration storm event.

Initial site clearing activities within the Project boundary involves removal of trees necessary for solar array installation and prevention of shading on the panels. Trees within the actual solar array/inverter and roadway areas will be entirely removed, including stumps and roots. Minimal site grading will be undertaken for the construction of proposed swales. Areas disturbed by grading will be seeded with native grasses. The seed mix within the solar panel area will be low-growing grasses or vegetative cover designed to minimize mowing and reduce maintenance. Sloped areas particularly subject to erosion will be protected by seeding and other appropriate erosion control methods. Herbicides may

be used sparingly for vegetation maintenance. Site preparation activities will be conducted in accordance with applicable Hillsborough County and DEP stormwater management requirements.

Construction and maintenance access to the solar power plant will be gained via U.S. Highway 41 and Dickman Road onto the existing or improved farm roads. Staging areas will be located within the footprint of the project construction areas. Where proposed construction activities occur adjacent to wetlands, appropriate erosion and sediment controls (i.e., Best Management Practices) will be implemented to prevent disturbance of the wetland or wetland buffers. Sediment controls include the installation of staked silt fences along wetland buffers. Following the completion of construction, no disturbances to wetland substrates and/or vegetation will occur as a result of operation or maintenance activity. If needed, a spill prevention, control, and countermeasures (SPCC) plan will also be developed and implemented for Project construction. The SPCC plan would address fuels, lubricants, and hydraulic fluids expected to be used for construction equipment. The equipment will be properly maintained to minimize leaks and, as warranted, prevent spills. Equipment and vehicle maintenance will be performed offsite at an appropriate facility.

Due to the highly altered condition of the project area and implementation of environmentally sensitive project designs, construction and maintenance activities should not result in significant adverse impacts on habitat, wildlife, or aquatic life. Construction duration is anticipated to be approximately 4 to 8 months. Initial site preparation activities are scheduled to begin in June 2021 after acquisition of local, State and/or federal permitting approvals, and installation and commissioning of the Project is expected to be completed in April 2022. The Project is anticipated to have an operational lifespan of approximately 25 to 30 years.

On May 2 and December 20, 2017, wetland ecologists with Environmental Consulting & Technology, Inc. (ECT) conducted wetland delineations and jurisdictional determinations on the Big Bend II Property. On October 29 and November 16, 2020, the project site was again field reviewed by ECT wetland ecologists to identify any potential changes from the previous jurisdictional determination conducted 3 years ago. In 2017 and 2020, ECT delineated wetlands and other surface waters in the field using accepted, standard State and federal wetland delineation methodologies (e.g., the DEP regulations, Section 62-340 Florida Administrative Code [F.A.C.], including the Florida Wetlands Delineation Manual [1995] and the Routine Onsite Determination Methods as described in the U.S. Army Corps of Engineers [USACE] 1987 Wetlands Delineation Manual, the 2010 Regional Supplement to the USACE Wetlands Delineation Manual: Atlantic and Gulf Coastal Plan Region [Version 2.0], and the most current vegetative index [2016 and 2018 USACE National Wetland Plant List], respectively). Pink surveyor's flags labeled with the words "wetlands delineation" were tied at strategic locations along the identified jurisdictional boundaries on existing vegetation. Each flag was labeled with a code to identify the wetland/surface water. George F. Young, Inc. (GFY), the Project Surveyor, followed the ECT ecologists in the field to survey the wetland flagged locations. The coordinates of wetland-flagged locations were also taken by ECT using a hand-held, differentially corrected, Trimble global positioning system (GPS). The GPS wetland-flagged location coordinates and a corresponding map were produced by ECT and provided to GFY for assistance in conducting the certified wetland survey. The revised wetland survey provided in Appendix B is believed to be accurate and consistent with both State and federal wetland delineation methods and adequate to use for project planning and wetland permitting. The surveyed jurisdictional lines were overlaid on the project site and together with other available existing and proposed project-related data are provided on the site plan construction drawings (see Appendix A). Figures 1 and 2 provide the location of the project. Figure 3 is a soils map of the project site. Figure 4 is a natural resources map that provides land use and cover information for the project site. Appendices A, B, C, D, E, F, G and H provide the site construction plans; deeds and property boundary/wetland surveys; geotechnical engineering reports; ground photographs of representative wetlands and other surface waters; drainage report; cultural resource assessment survey reports; completed baseline wetland Uniform Mitigation Assessment Method worksheets; and Frac-Out Contingency Plan, respectively.

TEC contracted with Culpepper and Terpening, Inc. and ECT to provide engineering and stormwater designs and environmental consulting for preparation of the Environmental Resource Permit application for the Project, respectively. DEPCOM will be constructing the proposed Project. ECT is

the designated Environmental Consultant for the Project. TEC will own and operate the Big Bend II Solar power generation facility.

D. Processing Fee: Please submit the application processing fee along with this application form and supplemental information. Processing fees vary based on the size of the activity, the type of permit applied for, and the reviewing Agency. Please reference Appendix D of Applicant's Handbook Volume I to determine the appropriate fee. **The permit application processing fee for a project that involves a total project area of less than 640 acres and less than 50 acres of works in, on or over wetlands and other surface waters is $9,000.00 (Rule 62-4.050(4)(h)4.a.(IV), F.A.C.). This permit application processing fee is included along with this permit application and supplemental information.**

Part 3: Applicant and Associated Parties Information

Instructions: Please complete the following sections. For corporations, list a person who is a registered agent or officer of the corporation who has the legal authority to bind the corporation.

A. Applicant (Entity Must Have Sufficient Real Property Interest)
☒ **This is a Contact Person for Additional Information**

Last Name: **Kroh** First Name: **Stanley** Middle Initial: **M**
Title: **Manager of Land and Stewardship Programs, Environmental Services** Company: **Tampa Electric Company**
Address: **P.O. Box 111**
City: **Tampa** State: **Florida** Zip: **33601-0111**
Home Telephone: **N/A** Work Telephone: **813-228-4257**
Cell Phone: **N/A**
E-mail Address: **smkroh@tecoenergy.com**

Correspondence will be sent via email, unless you check here to receive it via US Mail: ☒

B. Land Owner(S) (If Different or in Addition to Applicant)
☐ **Check here if landowner is also a co-applicant**

Last Name: First Name: Middle Initial:
Title: Company:
Address:
City: State: Zip:
Home Telephone: Work Telephone:
Cell Phone:
E-mail Address:

Correspondence will be sent via email, unless you check here to receive it via US Mail: ☐

C. Operation and Maintenance Entity(see Applicant's Handbook I, Section 12.3)

Last Name: First Name: Middle Initial:
Title: Company:
Address:
City: State: Zip:
Home Telephone: Work Telephone:
Cell Phone:
E-mail Address:

Correspondence will be sent via email, unless you check here to receive it via US Mail: ☐

D. Co-Applicant (If Different or In Addition to Applicant and Owner)

Last Name: First Name: Middle Initial:
Title: Company:
Address:
City: State: Zip:
Home Telephone: Work Telephone:
Cell Phone:
E-mail Address:

Correspondence will be sent via email, unless you check here to receive it via US Mail: ☐

E. Registered Professional Consultant

☐**This is a contact person for additional information**

Last Name: First Name: Middle Initial:
Title: Company:
Address:
City: State: Zip:
Home Telephone: Work Telephone:
Cell Phone:
E-mail Address:
Correspondence will be sent via email, unless you check here to receive it via US Mail: ☐

F. Environmental Consultant

☒**This is a contact person for additional information**

Last Name: **Arcuri** First Name: **Anthony** Middle Initial: **N**
Title: **Principal Scientist/Natural Resources Power & Energy Manager**
Company: **Environmental Consulting & Technology, Inc.**
Address: **1408 North Westshore Boulevard, Suite 115**
City: **Tampa** State: **Florida** Zip: **33607**
Home Telephone: **N/A** Work Telephone: **813-289-9338**
Cell Phone: **813-293-0762**
E-mail Address: **tarcuri@ectinc.com**
Correspondence will be sent via email, unless you check here to receive it via US Mail: ☐

Part 4: Signatures and Authorization to Access Property

Instructions: For multiple applicants please provide a separate Part 4 for each applicant. For corporations, the application must be signed by a person authorized to bind the corporation. A person who has sufficient real property interest (see Section 4.2.3(d) of Applicant's Handbook Volume I) is required in (B) to authorize access to the property, except when the applicant has the power of eminent domain.

A. By signing this application form, I am applying 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 relieve me of any obligation for obtaining any other required federal, state, water management district, or local permit prior to commencement of construction. I agree to operate and maintain the permitted system unless the permitting agency authorizes transfer of the permit to a different responsible operation and maintenance 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.

Typed/Printed Name of Applicant or Applicant's Authorized Agent	Signature of Applicant or Applicant's Authorized Agent	Date
Stanley M. Kroh	Stanley M. Kroh	12/24/2020

Manager of Land and Stewardship Programs, Environmental Services
(Corporate Title if applicable)

B. Certification of Sufficient Real Property Interest And Authorization For Staff To Access The Property:

I certify that:

☒ **I possess sufficient real property interest in or control, as defined in Section 4.2.3 (d) of Applicant's Handbook Volume I,** over the land upon which the activities described in this application are proposed and I have legal authority to grant permission to access those lands. I hereby grant permission, evidenced by my signature below, for staff of the Agency to access, inspect, and sample the lands and waters of the property as necessary for the review of the proposed works and other activities specified in this application, upon advance notice. I authorize these agents or personnel to enter the property as many times as may be necessary to make such review, inspection, and/ or sampling. Further, if a permit is granted, upon advance notice, I agree to provide entry to the project site for such agents or personnel with proper identification to determine compliance with permit conditions and permitted plans and specifications.

OR

☐ I represent an entity having **the power of eminent domain and condemnation authority**, and I/we shall make appropriate arrangements to enable staff of the Agency to legally access, inspect, and sample the property as described above.

Typed/Printed Name	Signature	Date
Stanley M. Kroh	Stanley M. Kroh	12/24/2020

Manager of Land and Stewardship Programs, Environmental Services
(Corporate Title if applicable)

C. Designation of Authorized Agent (If Applicable):

I hereby designate and authorize 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)

Form 62-330.060(1) 404 Section C

Section C: Supplemental Information for Works or Other Activities In, On, or Over Wetlands and/or Other Surface Waters

Instructions: **This section is for applications that do not involve activities associated with an individual single-family residence, duplex, triplex, or quadruplex. For those activities, please use Section B.** This form is to be completed if the proposed work or activity will occur in, on, over, or within 25 feet of a wetland or other surface water. The supplemental information required by this section is in addition to the information required by Section A of the application.

Part 1: Wetland or Other Surface Water Impact Summary

1. Describe the basic purpose of the project or activity: **The basic purpose of the project is to build a new solar power plant to provide an alternate method of producing clean energy and continue to provide the public with sufficient and uninterrupted electrical power service.**

2. Total area of work (dredging, filling, construction, alteration, or removal) in, on, or over wetlands or other surface waters: **A portion of the solar arrays are proposed to be constructed over approximately 2.11 acres of two, small isolated wet pasture wetlands (i.e., 1.66 acres of W1-643 and 0.45 acre of W1A-643) and 0.36 acre of three dead-end ditches (i.e., 0.14 acre of OSW10-514, 0.08 acre of OSW11-514 and 0.14 acre of OSW12-514) located at the northwestern corner of the project site. In addition to the construction of solar arrays, TEC proposes to fill approximately 0.083 acre of four drainage ditches (i.e., 0.009 acre of OSW1-514, 0.044 acre of OSW7-514, 0.019 acre of OSW7A-514 and 0.011 acre of OSW12) for the construction of internal access road crossings (i.e., 3,615.48** sq. ft.; **0.083** ac. **of proposed fill impacts in other surface waters).**

3. Total volume of material to be dredged or filled in wetlands or other surface waters:
   a. to be dredged: **0** cubic yards,
   b. to be filled: **451** cubic yards.

4. Identify the seasonal high water level (SHWL) and wetland normal pool elevations for each wetland or surface water within the project site. For tidal wetlands and/or surface waters provide the elevation of mean high and mean low water. Include an aerial photograph showing the location of each sampling location, dates, datum, and methods used to determine these elevations. **On July 16, 2015, a geotechnical investigation was completed by S&ME, Inc. to determine subsurface conditions at the project site (see Appendix C). On October 13, 2016, another geotechnical investigation was concluded by Ardaman & Associates, Inc. of the project site (see Appendix C). The subsurface investigations encountered seasonal high groundwater levels at depths ranging from 0.5 to 4 feet below the existing ground surface.**

5. Name of waterbody(ies) (if applicable & if known) in which work will occur? **Work is not proposed in a named waterbody. However, the project site drains into Newman Branch located partially onsite and ultimately this drainage discharges into Hillsborough Bay located offsite.**

6. Is the activity proposed in an Outstanding Florida Water or Aquatic Preserve?
   ☐ yes, name: ☒ no ☐ I don't know

Has there ever been a formal or informal wetland determination for the project site? If yes, provide the identifying number and/or a copy of the jurisdictional map. **No. On May 2 and December 20, 2017, wetland ecologists with Environmental Consulting & Technology, Inc. (ECT) conducted wetland delineations and jurisdictional determinations on the Big Bend II Property. On October 29 and November 16, 2020, the project site was again field reviewed by ECT wetland ecologists to identify any potential changes from the previous jurisdictional determination conducted 3 years ago. The revised wetland survey provided in Appendix B is believed to be accurate and consistent with both State and federal wetland delineation methods and adequate to use for project planning and wetland permitting. The wetland determination has not been verified by DEP agency staff.**

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

8. Provide recent aerials legible for photointerpretation (no photocopies) with a scale of 1" = 400 ft, or more detailed, with project boundaries and wetland boundaries delineated on the aerial. **See Figure 4.**

9. Provide maps accurately portraying the existing and proposed natural vegetative community types and land cover classifications using recognized classification schemes. Suggested sources include: the Florida Natural Areas Inventory Guide to the Natural Communities of Florida (2010) available at http://www.fnai.org/naturalcommguide.cfm, or the Florida Land Use and Cover Classification System (FLUCCS) (FDOT 1999, available at http://www.dot.state.fl.us/surveyingandmapping/documentsandpubs/fluccmanual1999.pdf). For vegetated areas dominated by exotic vegetation, use the descriptors representative of the native community type that was present prior to exotic infestation. **The Florida Land Use, Cover and Forms Classification System (FLUCFCS) (Florida Department of Transportation [FDOT], 1999) was used to identify the land use and cover types for the proposed project site. The surveyed wetlands were overlaid on the most current aerial photographic background available and observed FLUCFCS types were mapped. These FLUCFCS categories were classified and mapped to Level III. It should be noted that the FLUCFCS Level II classification of 510 Streams and Waterways is not extended to Level III classifications in the 1999 FDOT FLUCFCS. To better define the drainages that exist on the project site, modified land use/cover codes were incorporated. Therefore, a modified land use/cover Level III code was utilized from the State Mining Reclamation and Restoration Standards (Rule 62C-16.0051[4], Florida Administrative Code [F.A.C.]). The natural stream on the project site was classified as a FLUCFCS 511. Portions of the natural stream were channelized or otherwise altered. These altered stream segments were identified as FLUCFCS 512. Any man-made drainage ditches cut through uplands were classified as FLUCFCS 514. Finally, a wildlife-based habitat classification scheme was included by using the Florida Natural Areas Inventory (FNAI) 2010 Guide to the Natural Communities of Florida. FNAI categories are based on "natural" areas. However, disturbed areas are also categorized under "Appendix 2. Altered Land Cover Types".**

   Historic aerial photographs indicate that in 1957, the land was in a relatively native state. It appears that the land cover was pine, cabbage palm, and saw palmetto with two marshes—one apparently freshwater and the other a salt marsh. A cross grid of small ditches is evident and the upper reaches of Newman Branch, a tidal creek, were bypassed by a ditch originating at U.S. Highway 41. It is probable that the area was used as rangeland as a faint network of lines suggests cattle paths. The 1982 aerial photograph shows that portions of the property were cleared and converted to row cropping and pastures. The grid of agricultural ditches was extended to drain the land to Newman Branch. The freshwater marsh is no longer in existence; it appears to have been filled when the land was converted to row cropping. Aerial photographs indicate that over the decades, various parts of the land have been used for row cropping, cattle pastures, hay, nursery stock (trees, palms), and sod. Sometime between 1976 and 1984, construction was started on the south gypsum holding area. By 1991, the south gypsum area was completed. By the end of 2019, the south gypsum holding area was removed and the land was returned to pre-existing grade. The land today is mostly open improved pasture and many of the ditches were filled or no longer interconnect. Most of the

soils in the area are mapped as 57 Wabasso fine sand, 0 to 2 percent slopes and 27 Malabar fine sand; both are classified by the Natural Resources Conservation Service of the U.S. Department of Agriculture as "Farmland of unique importance". The land is currently used as pasture for cattle.

On May 2 and December 20, 2017, ECT wetland ecologists conducted land use and cover mapping of the project site. On October 29 and November 16, 2020, ECT ecologists conducted an additional field review of the project site to determine if any changes to land use and/or cover occurred over the past three years. Due to changes in land use/cover, there are now six wetlands (W) and 16 other surface waters (OSW) on the project site. Currently, there are three mangrove swamps (i.e., W2A-612, W2B-612 and W2C-612), one saltwater marsh (W2-642) and two wet prairie/wet pasture wetlands (i.e., W1-643 and W1A-643). In addition, there are two natural stream segments (i.e., OSW4-511 and OSW8-511), one altered stream reach (i.e., OSW6-512), 12 man-made drainage ditches dug through uplands (i.e., OSW1-514, OSW2-514, OSW3-514, OSW7-514, OSW7A-514, OSW7B-514, OSW9-514, OSW10-514, OSW11-514, OSW12-514, OSW12A and OSW13-514) and one small pond (i.e., OSW5-534). Ground photographs of representative wetlands and other surface waters are provided (see Appendix D). The following narrative describes 16 of the land use/cover types occurring within the project site.

100 URBAN AND BUILT-UP

193 Urban Land in transition without positive indicators of intended activity (FNAI: Developed) – This area was the south gypsum holding area that has been recently removed and restored to original grade. The land is recruiting vegetation from the surrounding landscape such as crabgrasses (*Digitaria* spp,), saltbush (*Baccharis halimifolia*), and bahiagrass (*Paspalum notatum*).

194 Other Open Land (FNAI: Developed) – These areas are generally along internal roadsides and serve to provide parking for contractors, staging areas, etc. These areas are often grassy and maintained by mowing.

200 AGRICULTURE

211 Improved Pastures (FNAI: Pasture-improved) – This category is used where grasses have been planted to provide forage for cattle, horses, or other domesticated grazers. The old row crop fields were converted to pastures with the seeding of bahiagrass. The pastures have recruited patches of West Indian dropseed (*Sporobolus jacquemontii*), bermudagrass (*Cynodon dactylon*), cogongrass (*Imperata cylindrica*), and numerous forbs like fogfruit (*Phyla nodiflora*) and fanpetals (*Sida* spp.). Electrical power transmission lines partially border the project site on the northern and eastern sides and cross the project site at the northeastern corner adjacent to U.S. Highway 41. These transmission line corridors are located within areas being used for pasture and thus the land is of dual use.

241 Tree Nurseries (FNAI: Agriculture) –The property has an abandoned tree nursery that was originally planted with laurel oaks (*Quercus laurifolia*) and Senegal date palms (*Phoenix reclinata*). Eight or so rows of laurel oaks remain. The palms have reproduced and most of the understory of the area is a dense tangle of Senegal date palms and Brazilian peppers (*Schinus terebithifolia*).

400 UPLAND FORESTS

422 Brazilian Pepper (FNAI: Invasive Exotic Monoculture) – Brazilian peppers were introduced to Florida in the mid-1800s as an ornamental. The high production of berries has allowed the tree to spread rapidly especially in areas of disturbance. The pepper trees are present on the project site along the ditches and fence lines and have also invaded the understories of cabbage palm groves and mixed hardwoods.

425 Temperate Hardwood (FNAI: Mesic Hammock) – This forest is composed of a mix of mostly live oaks (*Quercus virginiana*), laurel oaks (*Quercus laurifolia*), and cabbage palms (*Sabal palmetto*) with a few slash pines (*Pinus elliottii*). Brazilian peppers form the majority of the understory.

428 Cabbage Palm (FNAI: None) – These areas are stands where cabbage palms form the majority of the canopy cover and often the understory is open. On the project site, Brazilian peppers have invaded these areas and constitute the subcanopy/shrub layer.

434 Hardwood-Conifer Mixed (FNAI: Mesic Hammock) – There is one remnant forested area that has a mix of oaks and slash pines in the canopy layer. Brazilian peppers are in the subcanopy/shrub layer of the community.

500 WATER

511 Natural Streams (FNAI: Blackwater Stream) – A blackwater stream arises from sandy lowlands and may be perennial or intermittent. On this project site, some remnant portions of Newman Branch occur along the southwestern and southeastern corners of the project site. The stream is tidally influenced, but the upper reaches near U.S. Highway 41 remain fresh water. The stream is overhung by large live oaks, cabbage palms and other trees. The tidally influenced portion of the creek supports the growth of red and black mangroves (*Rhizophora mangle* and *Avicennia germinans*, respectively).

512 Altered Streams (FNAI: Canal/ditch) – Natural streams that have been channelized or otherwise altered are classified as FLUCFCS 512. On this project site, Newman Branch has been altered by the excavation of a canal, road construction, and various ditching efforts.

514 Upland Cut Ditches (FNAI: Canal/ditch) – Ditches and canals are constructed conveyances to drain surface water and are considered jurisdictional if they have a 1:4 or steeper depth to width ratio, or have an ordinary high water line, or contain wetland plant species. The ditches on the project site were excavated sometime in the late 1940s or early 1950s. The largest ditch/canal is about 35 feet wide, is tidally influenced, and empties into Tampa Bay. The tidally influenced portions of the ditches support black and red mangroves and other salt-tolerant plants. Brazilian peppers and cabbage palms are present along the banks of most of the ditches.

534 Reservoirs less than 10 acres (FNAI: Artificial Pond) – A small man-made pond occurs in the southeastern area of the project site.

600 WETLANDS

612 Mangrove Swamps (FNAI: Mangrove Swamp) – In the lowest elevations of the salt marsh, black mangroves and red mangroves have become well established. The density of the canopy has excluded other salt-tolerant plant species. These mangroves are also present in the tidally influenced portions of the ditches and the named creek on the project site.

642 Saltwater Marshes (FNAI: Salt Marsh) – A tidally influenced salt marsh is present at the southwest corner of the project site. The marsh has wide areas of white sand underlain with black sand and dense patches of marsh-hay cordgrass (*Spartina patens*) and salt grass (*Distichlis spicata*) together with seashore dropseed (*Sporobolus virginicus*) and seashore paspalum (*Paspalum vaginatum*). A considerable number of white mangroves (*Laguncularia racemosa*) are spreading throughout the center of the salt marsh. Other species noted in the salt marsh were sea-lavender (*Limonium carolinianum*), yellowtops (*Flaveria floridana*), and seapurslane (*Sesuvium portulacastrum*). The marsh is connected to a tidal creek, Newman Branch, although the connection has been altered by the excavation of a canal.

643 Wet Prairies (FNAI: Wet Prairie) – For the mapping purposes, the FLUCFCS code for wet prairie is being used for wet pasture that has recruited native wetland species. The areas were apparently planted with bahiagrass and have recruited bushy bluestem (*Andropogon glomeratus*), seashore dropseed, seashore paspalum, hurricanegrass (*Fimbristylis cymosa*), marsh fimbry (*Fimbristylis spadea*), fogfruit (*Phyla nodiflora*), manyflower marshpennywort (*Hydrocotyle umbellata*), coinwort (*Centella asiatica*), and other wetland plant species. The area is maintained by grazing and infrequent mowing.

800 TRANSPORTATION, COMMUNICATION, AND UTILITIES

814 Roads and Highways (FNAI: Road) – A number of internal, unpaved access roads are already present and used on the project site.

The acreages and percentages of land cover and use types are provided on Figure 4.

10. Impact Summary Tables (located at the end of this section):
    a. For all projects, complete Table 1, 2 and 3 as applicable. **Table 1 has been completed; Tables 2 and 3 are not applicable.**
    b. For shoreline stabilization projects, provide the information requested in Table 4. **N/A**

11. If the activity is located on state owned submerged lands and requires a lease or easement, provide a list of names and addresses from the latest county tax assessment roll of all property owners located within a 500 ft. radius of the proposed lease or easement boundary in mailing label format, or you may elect to send notice to those persons by certified mail, with the return-receipt card addressed to the DEP or water management district, as applicable, in accordance with subsection 18-21.005(3), F.A.C., and Section 253.115, F.S. Attach additional sheets, if necessary. **N/A**

    1. Name:
       Mailing Address:
       City, State, Zip Code:

    2. Name:
       Mailing Address:
       City, State, Zip Code:

    3. Name:
       Mailing Address:
       City, State, Zip Code:

    4. Name:
       Mailing Address:
       City, State, Zip Code:

    5. Name:
       Mailing Address:
       City, State, Zip Code:

    6. Name:
       Mailing Address:
       City, State, Zip Code:

Part 2: Environmental Considerations

Note: for many questions, a state statute/Applicant's Handbook Volume I (AH I)/State 404 Program Applicant's Handbook section is cited to assist the applicant in addressing these questions.

1. Elimination or Reduction of Impacts (Avoidance and Minimization). Describe measures taken to eliminate or reduce impacts to wetlands and other surface waters (*Refer to AH I Section 10.2.1*). **During an environmentally responsive siting of the Tampa Electric Company (TEC) solar power plant, TEC investigated over 200 potential solar plant sites totaling over 70,000 acres. In addition to their in-house review, TEC also reviewed other potential sites proposed by other solar power plant developers. Ultimately, the proposed project site was chosen because: 1) of proximity to an existing electrical transmission line (Circuit 66061) located along U.S. Highway 41 for connection to the power grid, 2) there is a potential for direct access from two separate paved roadways, 3) it has a large and adequate area of open and vacant land available, and 4) it is mostly highly disturbed, agricultural land. In this already highly altered area, solar power plant construction or maintenance should not significantly impact native vegetation, wildlife, or aquatic life. After the project site was selected, impacts to wetlands and other surface waters were avoided or minimized by the following actions:**

   1) The alignment of the solar arrays and access roads was selected to avoid or minimize impacts to wetlands and other surface waters within the project site to the extent practicable.

   2) Construction of the solar facility will mostly result in minor re-grading activities associated with access roads and the arrays.

   3) All of the existing agricultural operations will be removed from the project site and the proposed facility will result in the future minimal use by humans or machinery after construction is completed.

   Therefore, the proposed project has been designed in the most environmentally sensitive manner possible.

2. Fish, Wildlife, Listed Species, and their Habitats. Provide results of any wildlife assessments that have been conducted on the project site and provide any comments, biological opinions, formal or informal consultation decisions, or recommended actions you have received pertaining to the project from the Florida Fish and Wildlife Conservation Commission, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. (*Refer to AH I Section 10.2.2*). **Prior to submission of ERP applications, surveys for listed species are always conducted to verify presence/absence of listed species and any unique or critical habitats that could potentially support them, identify and map the location of any listed species, assess the potential impacts to listed species from project development, and determine appropriate minimization measures and/or mitigation for any potential impacts to listed species. In addition to an inventory of the occurrence of any vertebrate species, any sightings of listed species would include recording the number of individuals, documenting the location using a global positioning system, identifying and mapping the representative habitat and taking photographs.**

   On September 8, 2016 and May 2 and December 20, 2017, ECT ecologists conducted preliminary listed species surveys of the project site. On October 29 and November 16, 2020, ECT ecologists also conducted additional surveys for listed species on the project site. The field surveys were performed by ECT ecologists traversing the more accessible areas of the project site by vehicle and walking in areas restrictive to vehicular use (e.g. difficult terrain and/or dense vegetation). Weather conditions were mostly clear, warm (86+ F.) and humid for both field days in the fall of 2020. Several species of animals were observed during the wildlife surveys either directly or through signs thereof such as calls, tracks, scat, burrows, etc. Avian species seen or indirectly identified through calls included killdeer (*Charandrius vociferus*), gray catbird (*Dumetella carolinensis*), northern mockingbird (*Mimus polyglottus*), eastern meadowlark (*Sturnella magna*), red-winged blackbird (*Agelaius phoeniceus*), boat-tailed grackle (*Quiscalus major*),

palm warbler (*Dendroica palmarum*), pine warbler (*Setophaga pinus*), mourning dove (*Zenaida macroura*), common ground dove (*Columbina passerina*), black vulture (*Coragyps atratus*), turkey vulture (*Cathartes aura*), cattle egret (*Bubulcus ibis*), laughing gull (*Leucophaeus atricilla*), black-bellied duck (*Dendrocygna autumnalis*), American kestrel (*Falco sparverius*), and red-shouldered hawk (*Buteo lineatus*). Green anole (*Anolis caroliniana*) and brown anole (*A. sagrei*) were the only herpetofauna seen. Gray squirrel (*Sciurus carolinensis*) was the only mammal observed. However, raccoon (*Procyon lotor*) tracks were seen along Newman Branch. Finally, numerous mangrove tree crabs (*Aratus pisonii*) and fiddler crabs (*Uca* spp.) were observed in the salt marsh.

Most of the project site planned for development consists of pastureland currently being used for cattle grazing or fallow agricultural land previously used for row cropping, hay, nursery stock (trees, palms), and sod. The above-referenced wildlife species as well as others in the area that have become adapted to agricultural operations and regional wildlife populations are not expected to be significantly affected by the proposed actions.

Specific impacts to terrestrial and aquatic animals due to site construction varies by species and depends primarily on the extent of habitat alteration and continued availability of such habitat after construction. The project site is not located on or in the vicinity of any federally designated critical habitat. In addition, no aquatic habitats critical to the continued regional presence of important species will be affected. The use of mostly agricultural land together with existing paths and roads will minimize habitat losses and creation of barriers to animals' movements.

Individual small burrowing mammals (e.g., rodents), reptiles, or amphibians may be lost during site clearing. Such individual losses, however, will not affect local or regional populations. No losses of medium-sized or large mammals, birds, or other mobile species due to direct impacts or habitat alterations are expected because of the mobility of these animals. Therefore, no adverse impacts are expected to local or regional populations of game species, species of special concern or commercial importance, or threatened or endangered species occurring or potentially occurring within the project area.

Since the solar arrays will be mostly installed on the existing agricultural uplands, no significant impacts to resident birds or migratory species are expected. Local disturbance or displacement of wildlife due to construction noise will be minor and short-term since construction activities in any one location will be intermittent and are not expected to last more than a few weeks.

3. Water quantity impacts to wetlands and other surface waters (*Refer to AH I Section 10.2.2.4 and AH II*).

   a. Does the activity include a proposed surface water management system with a control elevation different than the wetland normal pool elevation(s) of existing or proposed created wetlands or other surface waters? **No. The Drainage Report is provided in Appendix E.**

   b. If yes to (a), provide documentation (e.g. drawdown assessment or other methods) that shows the proposed surface water management system will not change the hydroperiod of the existing or created wetland or other surface water. **N/A**

4. Public Interest Test. Please describe how the proposed activity will ***not be contrary*** to the public interest, OR if such an activity significantly degrades or is located within an Outstanding Florida Water (OFW), that the regulated activity will be ***clearly in*** the public interest (*Refer to AH I Section 10.2.3*).
   The proposed project will not be contrary to the public interest because of the associated environmental benefits. The proposed solar PV facility is a renewable and sustainability method of energy generation. In addition, as stated previously, the siting of the proposed project was conducted in the most environmentally sensitive manner possible. After the project site was selected, disturbances to terrestrial, wetland, and aquatic systems at the project site were further minimized or avoided to reduce any potential impacts to sensitive habitats and/or

endangered and threatened species associated with solar power plant construction and maintenance. The following methods were utilized to avoid or minimize potential project-related impacts:

1) **The alignment of the solar arrays and access roads was selected to avoid or minimize impacts to wetlands and other surface waters within the project site.**
2) **Construction of the solar facility will mostly result in minor re-grading activities associated with access roads and arrays.**
3) **All of the existing agricultural operations will be removed from the project site and the proposed facility will result in the future minimal use by humans or machinery after construction is completed.**

Therefore, the proposed activity will not be contrary to the public interest and will ultimately serve the citizens with sufficient and uninterrupted electrical power service.

a. Please describe how the project will be designed to avoid adverse effects to public health, safety, or the welfare or the property of others. **Constructing the solar power plant on TEC-owned property located mostly on agricultural land will avoid any adverse effects to the public health, safety or welfare because the area is not located on the property of private citizens. After construction, TEC will resume a normal maintenance and patrolling program on the project site. The intent of this maintenance and patrolling program is to maintain the structural safety of the facility and uninterrupted transmission of electrical power. These activities will be conducted in order to explore alternate methods of producing clean, renewable energy and continue to provide the public with sufficient and uninterrupted electrical power service.**

b. Please describe how the project will be designed to avoid adverse effects to the conservation of fish and wildlife, including endangered or threatened species, or their habitats. **The potential for occurrence of the listed species on the project site was determined by a habitat analysis, literature review, and ground surveys. The 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 (FWC), 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. The FWC Historic Water Bird Colony Locator and Bald Eagle Nest Locator/Historical Bald Eagle Nesting Areas websites were accessed for the occurrence of any documented wading bird rookeries or bald eagle (*Haliaeetus leucocephalus*) nest sites within the surrounding area, respectively. The Audubon Florida Eagle Watch Bald Eagle Nest Locator was also accessed for more up to date information on bald eagle nesting. In addition, the USFWS Wood Stork (WOST) Nesting Colonies Map was reviewed for recent nearby wood stork colonies active between 2010 and 2019. The FNAI Species Tracking List identified 23 listed plants and 21 listed animals (8 reptiles, 12 birds and 1 mammal) as occurring within Hillsborough County, Florida. Based upon an evaluation of habitat preference and distribution of species, out of the 44-listed plant and animal species recorded for the County, no listed plant species, 11 listed animal species (4 reptiles and 7 birds) and one delisted, but still protected bird species, were identified as having the potential to occur within or in proximity to the project site. No listed species were observed on the project site during field surveys. The following narrative provides details on the twelve state-protected or managed species and federally protected species considered to be wetland dependent that have the potential to occur on or within project environs.**

HERPETOFAUNA

American Alligator

The American alligator (*Alligator mississippiensis*) is the largest aquatic reptile in North America. It has a long-armored body with thick scales or bony plates. It has short, powerful legs and a long, round snout. American alligators occur in every county of Florida inhabiting freshwater marshes, swamps, rivers, and lakes. The American alligator is federally protected by the Endangered Species Act as a threatened species due to its similarity of appearance to the American crocodile (*Crocodylus acutus*), a federally-designated threatened reptile species, and as a federally-designated threatened species by Florida's Endangered and Threatened Species Rule. This listing provides federal protection for alligators, while allowing for state-approved management and control programs. American alligators can be legally taken only by individuals with proper licenses and permits. No alligators were seen onsite. Since development is not anticipated to significantly impact wetlands or the drainage ditches on the project site, adverse effects to the American alligator are considered unlikely from construction activities and there are no development restrictions associated with the species. However, if the presence of alligators on the property presents a safety issue during construction, maintenance or operation, TEC could elect to have alligators legally trapped and removed from the property by FWC-licensed and permitted alligator trappers.

Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is both a State threatened species and candidate species for federal protection under the Endangered Species Act. It is a medium to large terrestrial reptile with a gray to brown colored upper shell, a yellow bottom shell and stumpy, unwebbed feet used for burrowing. It inhabits a variety of high, dry sandy habitats such as longleaf pine-xeric oak, sandhill, scrub, dry hammock, pine flatwoods, dry prairie, coastal grasslands and dunes, mixed hardwood-pine communities and pastures. During the initial field surveys on May 2 and December 20, 2017, 15 to 20 percent of potentially suitable upland habitats located within and along the project limits were surveyed for gopher tortoise burrows. No gopher tortoise burrows were found during the surveys. On October 29 and November 16, 2020, the project site was again surveyed for listed species and no gopher tortoise burrows were found. A 100 percent gopher tortoise burrow survey will be conducted prior to construction to locate tortoises and their burrows as required under FWC's Gopher Tortoise Permitting Guidelines (Revised August 2020). If potentially occupied gopher tortoise burrows are found on the project site, appropriate authorizations will be requested from FWC prior to construction to relocate tortoises from the development footprint to an approved recipient site. Burrow commensal species will either be avoided or relocated prior to construction in accordance with the FWC Gopher Tortoise Permitting Guidelines. The gopher tortoise surveying, permitting, and relocation will be conducted by an authorized gopher tortoise agent with ECT. Any remaining gopher tortoise burrows located on the project site that are not within or near the development footprint, and therefore considered to not be potentially affected by clearing or construction activities, will be protected using exclusion fencing, if necessary.

Short-tailed Snake and Florida Pine Snake

The State-threatened short-tailed snake (*Stilosoma extenuatum*) and Florida pine snake (Pituophis *melanoleucus mugitus*) are fossorial species. The short-tailed snake is a small, slender fossorial snake with a gray colored body with several brown spots that are separated by yellow to red sections, a small head that is indistinct from its body, smooth scales, and a tail that makes up less than 10 percent of the body length. The Florida pine snake is a large, powerful snake with disproportionately small head that ranges from beige to tan in color. These fossorial species prefer xeric habitats and the Florida pine snake is a commensal species commonly associated with the tunnels of gopher tortoises as well as pocket gophers. Xeric upland habitats do not occur on the project site. Therefore, these two species of listed snakes are not expected to occur. Any Florida pine snakes or other

commensals that might be encountered during permitted gopher tortoise burrow excavations would also be relocated in accordance with guidance found in the FWC Gopher Tortoise Permitting Guidelines prior to any construction activities.

BIRDS

Wood Stork

The wood stork (*Mycteria americana*) is a State and federally listed threatened species. It is a large, long-legged wading bird with mostly white plumage, except for the black tail and some of the wing feathers, gray rough scaly skin on the head and upper neck, a black bill and black legs with pink toes. It forages in a variety of freshwater and saltwater wetlands and ditches. It nests in mixed hardwood swamps, sloughs, mangroves and cypress domes/strands in Florida. The closest recorded wood stork colony is a potentially active nesting site located 11.35 miles to the northeast (name: Ferman Corporation; atlas number: 0; last active in 2019). The project site and environs does contain suitable wood stork foraging and nesting habitat, but no wood storks were seen during the wildlife surveys. Wood storks are not expected to be adversely affected by the development of the project site because:

1. **The closest nesting site is 11.35 miles away; therefore, regional populations of nesting wood storks should not be disturbed by construction activities.**
2. **The project site is surrounded by adequate habitat of better quality so that during construction any local wood stork populations should not be deprived of habitat on which to forage.**
3. **TEC proposes less than a tenth of an acre of fill in ditches, which should not affect the amount of suitable foraging habitat in the Core Foraging Area of nearby colonies.**

Little Blue Heron, Tricolored Heron, and Roseate Spoonbill

Little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), and roseate spoonbill (*Platalea alata*) are all State listed as a threatened species. The little blue heron is a medium to large, long-legged heron with a dark blue-gray body, greenish legs, purple-maroon head and neck, yellow eyes, and a long pointed pale blue or greenish bill with a black tip. The tricolored heron is a medium to large, long-legged, long-necked heron with a long pointed yellowish or greyish bill with a black tip. The legs and feet are dark. Adults have a blue-grey head, neck, back and upper wings, with a white line along the neck. The belly is white. The roseate spoonbill is a large wading bird known for its pink plumage and distinctive spoon-shaped bill. Its upper neck and back are colored white, while the wings and feathers underneath display the more recognizable light shade of pink. Wading birds inhabit freshwater, saltwater and/or brackish water wetland habitats. The FWC Historic Water Bird Colony Locator indicates that the closest historic water bird colonies (last known as active in the 1990s) are located 4.25 miles to the northwest (i.e., Water Bird Colony atlas numbers: 615007 and 615333). None of the listed wading birds were seen onsite. However, another wading bird species was observed utilizing cattle pasture on the project site (i.e., cattle egrets were observed foraging in the fields). Based on the presence of wetlands, wading birds have the potential to utilize the project site for foraging and nesting. However, no wading bird nests were found during ground searches. Wading bird populations in the immediate region should not be significantly affected by development because there is ample foraging area of better quality occurring on adjoining lands. Therefore, the proposed construction activities and use of the project site will not impact the ability of wading birds to forage.

Florida Sandhill Crane

The Florida sandhill crane (*Antigone canadensis pratensis*) is state listed as a threatened species. It is a large bird that can be almost 4 feet in height. It is a gray long-legged and long-necked bird with a bald spot of red skin on its head, white cheeks, and a long and pointed bill. It inhabits freshwater marshes, prairies, pastures, and pond/lake edges in peninsular Florida to southern Georgia. Florida sandhill cranes prefer foraging in wet prairies, the shallow edges of freshwater marshes and ponds, pasture, and other grassy ruderal habitats. Their nest is a mound of herbaceous plant materials in shallow water or the ground of marshy areas. There are two subspecies of sandhill cranes that occur in Florida: the greater sandhill crane (*Antigone canadensis tabida*) and the state-designated threatened Florida sandhill crane. The project site has open land that would provide foraging habitat for Florida sandhill cranes, but no potential nesting habitat for this species. No Florida sandhill cranes or nest sites were seen during surveys of the project site. The FWC recommends that surveys for nesting sandhill cranes be conducted immediately prior to any construction that occurs during the January through August breeding season. If there is evidence of nesting during this period, FWC recommends that any active Florida sandhill crane nests be buffered by 400 feet to avoid disturbance by human activities. If nesting is discovered after construction has begun or if maintaining the recommended buffer is not possible, TEC will coordinate with FWC regarding permitting needs and mitigation options.

Florida Burrowing Owl

The burrowing owl (*Athene cunicularia floridana*) is state listed as a threatened species. The Florida burrowing owl is a small, ground-dwelling owl with long legs, white chin stripe, round head, and stubby tail. Adults are boldly spotted and barred with brown and white. It prefers open xeric pastures with low vegetation. There are no xeric pastures on the project site and no burrowing owls or burrows were found. Since no burrowing owls or their burrows were seen during the survey, the likelihood of occurrence for the burrowing owl is considered very low. ECT will survey for the burrowing owl concurrent with pre-clearing surveys for the gopher tortoise. If burrowing owls are discovered after construction has begun or if maintaining the recommended buffer is not possible, TEC will coordinate with FWC regarding permitting needs and mitigation options.

Southeastern American Kestrel

Two subspecies of American kestrel occur in Florida: a northern subspecies (*Falco sparverius sparverius*) that winters here between September and April, and a resident, non-migratory subspecies, the southeastern American kestrel. The southeastern American kestrel is a State listed threatened species. The southeastern American kestrel is the smallest falcon in the United States. The male has blue-gray wings, while the female is larger and has a more uniformly rufous back and wings. Both sexes have a mustached black-and-white facial pattern with strong perpendicular lines extending below the eye and near the ear, and a black band at the base of a rufous tail. Falcons in general have long, pointed wings and long tails. Kestrels seen in Florida during May-June are resident southeastern American kestrels. American kestrel nest in cavities that they do not excavate. Instead, they must depend on woodpeckers and natural processes to create holes in trees. Kestrels nest predominantly in dead, but standing longleaf pine trees, called snags, usually in the abandoned cavities of pileated woodpeckers. Typically, American kestrels can be seen perching on telephone wires at the edge of a field or other open area. Kestrels nest between mid-March and early June. American kestrels were seen perching and foraging along the electrical transmission lines located to the north and east of the project site and on slash pine snags located onsite.

Bald Eagle

Although the bald eagle is no longer classified by the USFWS or FWC as threatened or endangered, it is protected under the Federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, as well as Florid State Rule. Bald eagles are large, predatory raptors that are recognizable for their brown body and wings, white head and tail, and hooked yellow beak. Their feet, which are also yellow, are equipped with sharp black talons. No bald eagles nor nest sites were observed during the wildlife survey. According to the FWC Bald Eagle Nest Locator and Historical Bald Eagle Nesting Areas websites, a nest site is located approximately 0.94 miles to the northeast of the project site (i.e., Nest ID HL041/Nesting Area ID 979—last known active in 2010). Because the closest known bald eagle nest location is greater than 0.9 mile away and thus outside the 660-ft. nest protection buffer, construction activities will not negatively affect bald eagles. If a nest site is established on or near to the project site all applicable state and federal guidelines will be followed during construction.

SUMMARY

The project site offers scant habitat for forage and nesting/denning for most wildlife, except for animals that have adapted to urban conditions. The nearby coastline of Tampa Bay with its beaches, salt marshes/flats and mangrove swamps provide considerably better opportunities for use by wading birds, passerines and raptors. The continual agricultural use for more than 60 years has extirpated any threatened or endangered plant species that may have been on the land prior to clearing in the 1950s. No listed/protected species were observed on the project site. A 100 percent survey for gopher tortoise burrows will be performed prior to any construction activities to determine whether potentially active burrows are located within areas of potential construction. Based on the analyses and survey conducted, potential adverse effects to State listed threatened or endangered animal species are not anticipated from development of the project site as long as any gopher tortoises and burrow commensals within potentially active burrows located within areas of potential construction are captured and relocated, eastern indigo snake protection measures are employed, and no nesting areas of any listed species are found to be in conflict with proposed construction activities.

c. Please describe how the project will be designed to avoid adverse effects to navigation or the flow of water or cause harmful erosion or shoaling. **There are no proposed impacts to navigation or the flow of water. Harmful erosion is also not anticipated because a staked silt screen barrier will be installed along the upland buffers to wetlands and other surface waters in proximity to construction activities.**

d. Please describe how the project will be designed to avoid adverse effects to the fishing or recreational values or marine productivity in the vicinity of the activity. The Big Bend II Solar Power Plant is proposed to be constructed on TEC-owned property. There are no potential areas for fishing on the project site. Therefore, the proposed project should not significantly affect fishing or other forms of passive recreation locally or in the region. The proposed location of the project site is inland and thus will not adversely affect fisheries or marine productivity. **The Big Bend II Solar Power Plant is proposed to be constructed on TEC-owned property. There are no potential areas for fishing on the project site. Therefore, the proposed project should not significantly affect fishing or other forms of passive recreation locally or in the region. The proposed location of the project site is inland and thus will not adversely affect fisheries or marine productivity.**

e. Will the project be of a temporary or permanent nature? **Permanent.**

f. Please describe how the project will be designed to avoid adverse impacts to significant historical and archaeological resources, under the provisions of section 267.061, F.S. **Initially, the project site was approximately 96.9 acres in size and only consisted of the land to the west of U.S. Highway 41 (i.e., the ABH property). At the request of TEC, ECT subcontracted the services of Janus Research (Janus) to conduct a Cultural Resource Assessment Survey (CRAS) to determine possible impacts to historic properties listed, or eligible for listing, in the *National Register of Historic Places* (NRHP) and if there are any significant archaeological or historical resources recorded on the project site and the likelihood that the proposed action will affect any such site. In June and July 2017, a CRAS was conducted by Janus of the ABH property. The CRAS report determined that no newly or previously recorded archaeological sites were identified and no further investigation was needed. However, an unrecorded segment of a previously recorded historic linear resource, US 41/Tamiami Trail (8HI12129) was identified. This newly identified segment is considered National Register ineligible due to the loss of its historic physical integrity. On July 28, 2017, the CRAS report was submitted to the Florida Division of Historical Resources (FDHR) for review. On August 29, 2017, the State Historic Preservation Officer (SHPO) concurred with the findings of the CRAS report and found the submitted report to be complete and sufficient in accordance with Chapter 1A-46, F.A.C. The project site was expanded to approximately 191.3 acres and renamed the ABH Expansion or Big Bend II Solar. However, plans for development were put on hold. Recently, TEC has decided to proceed with development of the Big Bend II Solar property. Therefore, TEC again requested ECT to subcontract the services of Janus to conduct a CRAS addendum survey on the remaining un-surveyed portions at the project site. In November 2020, Janus conducted another CRAS addendum survey for the remaining land at the project site. On December 23, 2020, Janus submitted the CRAS addendum report to SHPO. The CRAS report determined that no newly or previously recorded archaeological sites or archaeological occurrences were identified. Twenty-one shovel tests were conducted and no cultural materials were recorded. The survey also confirmed the absence of any historic resources. Based on the CRAS addendum survey and previous survey efforts overlapping the current project site, no further investigation was recommended. In addition, in the highly unlikely event unforeseen archaeological finds are discovered during construction, all activities involving subsurface disturbances will cease in the vicinity of the discovery and the FDHR will be notified. Following a determination of the importance of such finds, TEC will work with FDHR to assess mitigation measures necessary to minimize adverse impacts. A copy of the CRAS reports and the prior SHPO response are appended to this ERP application (see Appendix F). As soon as it is received, a copy of the SHPO response to the CRAS addendum report will be provided to DEP. It is understood that the DEP will be submitting copies of the SHPO letters along with this permit application to the FDHR for a determination of effects in accordance with Section 106 of the NHPA.**

g. Please describe how the project will be designed to avoid adverse effects to the current condition and relative value of functions being performed by areas affected by the proposed regulated activity. **The proposed activity was designed to keep construction mostly within upland agricultural areas. Impacts to wetlands were completely avoided or minimized. During construction, sediment controls, including the installation of staked silt fences along upland buffers to wetlands, will be employed in the vicinity of project construction. The proposed stormwater management system will treat water quality in stormwater runoff from pollutant sources associated with the proposed construction prior to entering adjacent wetlands.**

h. Provide a description of how water quality will be maintained in wetlands and other surface waters that will be preserved or will remain undisturbed, both on and offsite. Please address both short-term (such as during construction) and long-term water quality considerations (*Refer to AH I Section 10.2.4*). **During construction, sediment controls, including the installation of staked silt fences along upland buffers to wetlands, will be employed in the vicinity of project construction. The proposed stormwater management system will treat water quality in stormwater runoff from pollutant sources associated with the proposed construction prior to entering adjacent wetlands (see Appendix E).**

5. Water Quality.

   Provide a description of how water quality will be maintained in wetlands and other surface waters that will be preserved or will remain undisturbed, both on and offsite. Please address both short-term (such as during construction) and long-term water quality considerations (*Refer to AH I Section 10.2.4*). **The proposed stormwater management system will provide the required water quality treatment for the new pollutant sources. When the proposed activities occur adjacent to wetlands, appropriate sediment control methods will be used, as required. During construction, sediment controls include the installation of staked silt fences along upland buffers to wetlands in the vicinity of project construction.**

6. Class II Waters; Waters approved for shellfish harvesting *(Refer to AH I Section 10.2.5)*.

   a. Will the project occur in Class II that are NOT approved for shellfish harvesting? If yes, please provide a plan or procedure detailing the measures to be taken to meet the requirements of *AH I Section 10.2.5(a)*. **No**

   b. Is the project located adjacent to or in close proximity to Class II waters? If yes, please provide a plan or procedure detailing the measures to be taken to meet the requirements of *AH I Section 10.2.5(b)*. **No**

   c. Is the project located in Class II or Class III waters that are classified as “approved”, “restricted”, “conditionally approved”, or “conditionally restricted”? If yes, demonstrate that the project meets the requirements of *AH I Section 10.2.5(c)*. **No**

7. Vertical seawalls. Are vertical seawalls proposed in an estuary or lagoon as part of the project? If yes, please describe how the project meets the requirements of *AH I Section 10.2.6*. **No**

8. Secondary Impacts (*AH I Section 10.2.7*).

   a. Will an upland buffer, with a minimum width of 15' and an average width of 25', be provided between the proposed activities and existing wetlands or wetlands to be preserved, enhanced, restored, or created? Provide the location and dimension of all buffers on the plans. If not, demonstrate that secondary impacts will not occur or describe how they will be offset. **Upland buffers of 30 ft. are being provided along the wetlands on the project site (see Appendix A). After construction of the proposed facility, the buffers will be maintained, but shall remain in an undeveloped condition.**

   b. If listed species are present or may be present, then coordination with wildlife agencies is needed. Have you coordinated with the FFWCC and/or USFWS? If so, please provide correspondence from the wildlife agencies indicating concurrence with the species management plan(s). **During the wildlife surveys, no gopher tortoise burrows were identified on the project site. A 100 percent gopher tortoise survey will be conducted prior to initiation of construction to locate all tortoises and their burrows as required under FWC’s Gopher Tortoise Permitting Guidelines (Revised August 2020). If potentially occupied gopher tortoise burrows are found on the project site, appropriate authorizations will be requested from FWC prior to construction to relocate tortoises from the development footprint to an approved recipient site. Burrow commensal species will either be avoided during construction or excavated**

and relocated along with gopher tortoises prior to construction in accordance with FWC Gopher Tortoise Permitting Guidelines. The gopher tortoise surveying, permitting and relocation will be conducted by a certified gopher tortoise agent with ECT.

c. What measures will be taken to avoid impacts to wetland-dependent wildlife and/or listed species that use uplands for nesting or denning? **TEC will comply with all habitat management guidelines for listed species that use uplands for nesting or denning. Based upon wildlife surveys, no wetland dependent wildlife species that use upland habitat for nesting or denning have been found or are expected to use the disturbed agricultural areas on the project site. A 100 percent gopher tortoise survey will be conducted prior to initiation of construction to locate all tortoises and their burrows as required under FWC's Gopher Tortoise Permitting Guidelines (Revised August 2020). If potentially occupied gopher tortoise burrows are found on the project site, appropriate authorizations will be requested from FWC prior to construction to relocate tortoises from the development footprint to an approved recipient site. Burrow commensal species will either be avoided during construction or excavated and relocated along with gopher tortoises prior to construction in accordance with FWC Gopher Tortoise Permitting Guidelines. The gopher tortoise surveying, permitting and relocation will be conducted by a certified gopher tortoise agent with ECT.**

d. Describe whether there are any other relevant activities that are very closely linked and causally related to any proposed dredging or filling in wetlands or other surface waters that have the potential to cause impacts to significant historical and archaeological resources. **Initially, the project site was approximately 96.9 acres in size and only consisted of the land to the west of U.S. Highway 41 (i.e., the ABH property). At the request of TEC, ECT subcontracted the services of Janus to conduct a CRAS to determine possible impacts to historic properties listed, or eligible for listing, in the NRHP and if there are any significant archaeological or historical resources recorded on the project site and the likelihood that the proposed action will affect any such site. In June and July 2017, a CRAS was conducted by Janus of the ABH property. The CRAS report determined that no newly or previously recorded archaeological sites were identified and no further investigation was needed. However, an unrecorded segment of a previously recorded historic linear resource, US 41/Tamiami Trail (8HI12129) was identified. This newly identified segment is considered National Register ineligible due to the loss of its historic physical integrity. On July 28, 2017, the CRAS report was submitted to the FDHR for review. On August 29, 2017, the SHPO concurred with the findings of the CRAS report and found the submitted report to be complete and sufficient in accordance with Chapter 1A-46, F.A.C. The project site was expanded to approximately 191.3 acres and renamed the ABH Expansion or Big Bend II Solar. However, plans for development were put on hold. Recently, TEC has decided to proceed with development of the Big Bend II Solar property. Therefore, TEC again requested ECT to subcontract the services of Janus to conduct a CRAS addendum survey on the remaining un-surveyed portions at the project site. In November 2020, Janus conducted another CRAS addendum survey for the remaining land at the project site. On December 23, 2020, Janus submitted the CRAS addendum report to SHPO. The CRAS report determined that no newly or previously recorded archaeological sites or archaeological occurrences were identified. Twenty-one shovel tests were conducted and no cultural materials were recorded. The survey also confirmed the absence of any historic resources. Based on the CRAS addendum survey and previous survey efforts overlapping the current project site, no further investigation was recommended. In addition, in the highly unlikely event unforeseen archaeological finds are discovered during construction, all activities involving subsurface disturbances will cease in the vicinity of the discovery and the FDHR will be notified. Following a determination of the importance of such finds, TEC will work with FDHR to assess mitigation measures necessary to minimize adverse impacts. A copy of the CRAS reports and the prior SHPO response are appended to this ERP application (see Appendix F). As soon as it is received, a copy of the SHPO response to the CRAS addendum report will be provided to DEP. It is understood that the DEP will be submitting copies of the SHPO letters along with this permit application to the FDHR for a determination of effects in accordance with Section 106 of the NHPA.**

e. Are there additional future phases or extensions of the proposed activities that are not shown? If yes, please describe. **N/A**

9. Cumulative Impacts. Is the proposed mitigation located within the same drainage basin (*Refer to AH I Figures 10.2.8.1 – 10.2.8.5)* as the proposed wetland impacts? **No wetland mitigation is proposed.** If not, please submit a Cumulative Impact Evaluation in accordance with *AH I Section 10.2.8*.
The construction and operation of the proposed solar power plant was specifically designed to avoid or minimize impacts to wetlands and other surface waters and their associated upland buffers to the extent practicable. A portion of the solar arrays are proposed to be built over two isolated wet pasture wetlands (i.e., 1.66 acres of W1-643 and 0.45 acre of W1A-643) and three dead-end ditches (i.e., 0.14 acre of OSW10-514, 0.08 acre of OSW11-514 and 0.14 acre of OSW12-514) located at the northwestern corner of the project site. This pasture area is flat and compacted due to cattle trampling over the years. Thus, during construction no regrading will be necessary for the placement of the solar arrays. The solar panels will be attached to single-axis tracking systems mounted on embedded (pounded) H-frame steel posts. The tracking system will allow the panels to rotate east-to-west throughout the day to track the movement of the sun, maximizing energy yield and almost eliminating any permanent shading at the ground level. Each post will be approximately 0.125 square inches in area and spaced every 25 feet. Since there will be no regrading necessary, shading from the panels would be virtually eliminated and only small, widely spaced poles will be embedded during construction, the placement of the arrays over the wet pastures and dead-end ditches is not considered to be a permanent fill impact. During construction, temporary matting will be used short-term for the placement of heavy equipment within wet pastures and dead-end ditches, as needed. After construction, TEC will return any inadvertently disturbed soils to the pre-existing grade and seed with grasses. In addition to the solar arrays, TEC proposes to partially fill approximately 0.083 acre of four drainage ditches (i.e., 0.009 acre of OSW1-514, 0.044 acre of OSW7-514, 0.019 acre of OSW7A-514 and 0.011 acre of OSW12) for the construction of internal access road crossings. The construction of access roads at the four existing drainage crossings is also required for the construction, maintenance and operation of the proposed solar arrays. Unlike the solar array construction, the proposed fill in ditches is a permanent impact. However, wetland mitigation is not proposed for the filling of the upland cut ditches pursuant to Subsection 10.2.2.2 of the ERP Applicant's Handbook, Volume 1. Finally, TEC proposes to install an electrical connection underneath OSW7-514 to the northern and southern arrays. This electrical connection is to carry internal generated power to the appropriate internal equipment. TEC will install the underground electrical conductor by directional boring, commonly called horizontal directional drilling or HDD (i.e., a steerable trenchless method of installing underground pipes, conduits and cables in a shallow arc along a prescribed bore path by using a surface launched drilling rig, with minimal impact on the surrounding area). The directional bore will be installed a minimum of 3 ft. under the bottom grade of the ditch channel. The bore holes will be in uplands located approximately 10 ft. landward of the top of banks. The proposed boring will not result in either primary or secondary impacts. A Frac-Out Contingency Plan for the directional bore is also provided in Appendix H.

10. Mitigation Plan (*Refer to AH I Section 10.3*). **N/A**

a. If a mitigation bank is proposed to offset wetland/other surface water impacts, provide: **N/A**

i. the name of the bank: **N/A**. A letter of reservation from the banker will be required once the application has been evaluated. **N/A**

ii. If the mitigation bank was assessed using UMAM, provide UMAM worksheets for impact area(s). **The completed baseline wetland UMAM worksheets are provided in Appendix G.** If the bank was assessed using a method other than UMAM, then prepare the impact assessment using the same method. **N/A**

b. If mitigation is proposed to offset wetland/other surface water impacts, please provide a mitigation plan that includes, at a minimum, the following: **N/A**

i. ☐ Proposed mitigation narrative:
   (1) ☐ Describe the current and proposed condition for each type of mitigation component (restoration, enhancement, creation, preservation), including:
      (a) ☐ Describe current and proposed vegetation
      (b) ☐ Describe current and proposed hydrologic conditions for the proposed mitigation.
      (c) ☐ Describe the soil types from NRCS maps and confirm if actual soil conditions appear to match.
   (2) ☐ Provide details of the proposed construction/mitigation activities including phasing and timing, as appropriate.
   (3) ☐ Identify measures that will be implemented during and after construction to avoid adverse impacts related to the proposed activities.
   (4) ☐ A mitigation implementation and monitoring schedule with dates.
   (5) ☐ Identify the success criteria.
   (6) ☐ Describe the anticipated site conditions in and around the mitigation area after the mitigation plan is successfully implemented.
   (7) ☐ Provide a comparison of current fish and wildlife habitat to expected habitat after the mitigation plan is successfully implemented.

ii. ☐ Provide a Management Plan that includes, as appropriate, aspects of operation and maintenance, including water management practices, vegetation establishment, exotic and nuisance species control, fire management, and control of access.

iii. ☐ Maps:
   (1) ☐ Soil map (include soil names/codes, hydrologic soil groups and hydric soil types).
   (2) ☐ Topographic map of the mitigation area and adjacent contributing and receiving areas.
   (3) ☐ Hydrologic features map of the mitigation area and adjacent contributing and receiving areas.
   (4) ☐ Vegetative communities map (using FLUCCS or other appropriate classification system).
   (5) ☐ For all maps, identify source.

iv. Provide the necessary supporting information for the application of sections 62-345.400 - .600 (Uniform Mitigation Assessment Method (UMAM)). To meet this requirement, submittal of UMAM worksheets is acceptable for impact and mitigation areas.

v. If onsite and/or offsite applicant-responsible mitigation is proposed, submit a draft Conservation Easement document or other form of restrictive covenant that provides for protection of the mitigation area in perpetuity. Standard forms, as described in subsection 62-330.301(6), F.A.C., are available from the Agency or on its website.

vi. If onsite and/or offsite applicant-responsible mitigation is proposed, submit a cost estimate for completing the mitigation, including monitoring and maintenance.

vii. If onsite and/or offsite applicant-responsible mitigation is proposed and the proposed mitigation exceeds $25,000, please provide a draft financial assurance document. Standard forms, as described in subsection 62-330.301(5), F.A.C., are available from the agency or on its website.

viii. Identify the entity responsible for monitoring, maintenance, and long-term stewardship of the mitigation area (i.e. the landowner or homeowner association, not the consultant or contractor that will do the work).

Note: If your project is in retained waters, it is highly recommended that you coordinate the design of any mitigation plan that also may be required for the Corps permit to meet the requirements of both permits. Pre-application meetings with both the applicable Agency and the Corps can help you to choose a mitigation option that is acceptable to both the applicable Agency and the Corps.

Part 3: Plans

Plans: The information listed in the checklist below represents the typical information required on the submitted project plans. The Plans checklists in each application section are cumulative unless otherwise noted. Separate plans for each application section are not required.

1. ☒ Include the following on the construction plans and cross sections:

   a. ☒ An Existing Conditions sheet showing the entire project and wetland/other surface water boundaries. Include the following: Acreage and type (herbaceous, forested or other surface water) of each wetland/other surface water.
   b. ☒ A Proposed Conditions sheet showing the entire project and wetland/other surface water boundaries with construction plan overlay.
   c. ☒ A Proposed Wetland Impact sheet that includes the following:
      i. ☒ Acreage and type (herbaceous, forested, or other surface water) of each wetland/other surface water to be impacted.
      ii. ☒ Proposed upland buffers with dimensions.
      iii. ☐ Identify the seasonal high water and wetland normal pool elevations on the plans.
   d. ☒ Include wetland boundaries on all construction plan sheets.

2. ☐ If onsite and/or offsite applicant-responsible mitigation is proposed, submit mitigation plans and cross sections including, at a minimum: **N/A**

   a. ☐ existing conditions plan sheet identifying upland and wetland communities and acreage of each, topography, drainage patterns, and location of cross-section detail.
   b. ☐ proposed conditions plan sheet identifying proposed improvements by type (restoration, enhancement, creation, preservation), acreage of each, topography, drainage patterns, and location of cross-section detail.
   c. ☐ monitoring plan sheet including proposed improvements, monitoring transects, photostations, and mitigation signage (if applicable).
   d. ☐ cross-section and/or profile detail(s) sheet(s) including representative section of each type of mitigation component. Include existing and proposed conditions and representative elevations.
   e. ☐ planting schedule, plant species including common and scientific names divided into three sections (canopy, shrub, herbaceous) by mitigation component, quantity, spacing, size, and elevation range.

Table 1 - Project Wetland (WL) And Other Surface Water (OSW) And Impact Summary

WL & SW ID	UMAM ASSESSMENT AREA NAME(S)	WL & SW TYPE *	WL & SW SIZE (acres)	WL & SW NOT IMPACTED (acres)	TEMPORARY WL &SW IMPACT SIZE (acres)	TEMPORARY WL & SW IMPACT TYPE	PERMANENT WL &SW IMPACT SIZE (acres)	PERMANENT WL & SW IMPACT TYPE	MITIGATION ID **
W1	N/A	643	1.66	1.66	N/A	N/A	1.66	N/A	N/A
W1A	N/A	643	0.45	0.45	N/A	N/A	0.45	N/A	N/A
W2	N/A	642	2.31	2.31	N/A	N/A	N/A	N/A	N/A
W2A	N/A	612	0.29	0.29	N/A	N/A	N/A	N/A	N/A
W2B	N/A	612	0.16	0.16	N/A	N/A	N/A	N/A	N/A
W2C	N/A	612	0.35	0.35	N/A	N/A	N/A	N/A	N/A
OSW1	N/A	514	0.32	0.311	N/A	N/A	0.009	F	N/A
OSW2	N/A	514	0.10	0.10	N/A	N/A	N/A	N/A	N/A
OSW3	N/A	514	0.07	0.07	N/A	N/A	N/A	N/A	N/A
OSW4	N/A	511	0.33	0.33	N/A	N/A	N/A	N/A	N/A
OSW5	N/A	534	0.01	0.01	N/A	N/A	N/A	N/A	N/A
OSW6	N/A	512	0.64	0.64	N/A	N/A	N/A	N/A	N/A
OSW7	N/A	514	2.14	2.096	N/A	N/A	0.044	F	N/A
OSW7A	N/A	514	0.29	0.271	N/A	N/A	0.019	F	N/A
OSW7B	N/A	514	0.001	0.001	N/A	N/A	N/A	N/A	N/A
OSW8	N/A	511	0.25	0.25	N/A	N/A	N/A	N/A	N/A

WL & SW ID	UMAM ASSESSMENT AREA NAME(S)	WL & SW TYPE *	WL & SW SIZE (acres)	WL & SW NOT IMPACTED (acres)	TEMPORARY WL &SW IMPACT SIZE (acres)	TEMPORARY WL & SW IMPACT TYPE	PERMANENT WL &SW IMPACT SIZE (acres)	PERMANENT WL & SW IMPACT TYPE	MITIGATION ID **
OSW9	N/A	514	0.16	0.16	N/A	N/A	N/A	N/A	N/A
OSW10	N/A	514	0.14	0.14	N/A	N/A	N/A	N/A	N/A
OSW11	N/A	514	0.08	0.08	N/A	N/A	N/A	N/A	N/A
OSW12	N/A	514	0.14	0.129	N/A	N/A	0.011	F	N/A
OSW12A	N/A	514	0.01	0.01	N/A	N/A	N/A	N/A	N/A
OSW13	N/A	514	0.19	0.19	N/A	N/A	N/A	N/A	N/A
PROJECT TOTALS:			10.091	10.008	0		0.083		

Comments:

- *Land use/cover types were identified for the project area using the Florida Land Use, Cover and Forms Classification System (FLUCFCS)-Level III (FDOT, 1999) and the 2010 Florida Natural Areas Inventory (FNAI) system.

Codes (multiple entries per cell not allowed):

- Wetland & Surface Water ID: Include ID on submitted wetland and surface water impact maps
- Wetland Type: from an established wetland classification system
- Impact Type: D=dredge; F=fill; H=change hydrology; S=shading; C=clearing; O=other

Table 2 - Project On-Site Mitigation Summary N/A

MITIGATION ID	UMAM ASSESSMENT AREA NAME(S)	TARGET TYPE	CREATION AREA (acres)	RESTORATION AREA (acres)	ENHANCEMENT AREA (acres)	WETLANDS PRESERVE AREA (acres)	UPLAND PRESERVE AREA (acres)	OTHER AREA (acres)
PROJECT TOTALS:								

COMMENTS:

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

Table 3 - Project Off-Site Mitigation Summary N/A

MITIGATION ID	UMAM ASSESSMENT AREA NAME(S)	TARGET TYPE	CREATION AREA (acres)	RESTORATION AREA (acres)	ENHANCEMENT AREA (acres)	WETLANDS PRESERVE AREA (acres)	UPLAND PRESERVE AREA (acres)	OTHER AREA (acres)
PROJECT TOTALS:								

COMMENTS:

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

Table 4 - Shoreline Stabilization N/A

Stabilization	Linear Ft. New	Linear Ft. Replaced	Linear Ft. Repaired	Linear Ft. Removed	Slope H: V:	Toe Width (Ft.)
Natural Vegetation (living shoreline)					**N/A**	**N/A**
Rip Rap + Vegetation						
Rip Rap						
Seawall + Rip Rap						
Vertical Seawall						
Other Shoreline Stabilization Type						

Size of Rip Rap

Type of Rip Rap

Form 62-330.060(1) 404 Section E

Section E: Supplemental Information Required for Works or Other Activities Involving a Stormwater Management System
(Other Than a Single-Family Project)

Instructions: The information listed in the checklists below represents the level of information that is usually required to evaluate an application. Information can be provided within reports, plans, and documents. 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. The supplemental information required by this section is in addition to the information required by Section A of the application.

Part 1: Stormwater Management System Summary

Provide drainage calculations, signed and sealed by an appropriate registered professional, and supporting documentation demonstrating that the proposed project meets the conditions for issuance under 62-330.301(1)(a),(b),(c),(e), F.A.C. The drainage calculations should include, but not necessarily be limited to, the following:

1. General Site Information:

   a. ☒ Provide pre-development and post-development drainage map(s), as appropriate, that include drainage patterns and basin boundaries with acreage served by each hydraulically separate system, showing the direction of flows, including any off-site runoff being routed through or around the system; topographic information; and connections between wetlands and other surface waters. **See Drainage Report in Appendix E.**

   b. ☒ Provide the results of any percolation tests, where appropriate, and soil borings that are representative of the actual site conditions. Identify the wet season high water table elevations, soil profiles, and hydraulic conductivity. Include dates, datum, and methods used to determine these soil parameters. **See Geotechnical Engineering Reports in Appendix C and Drainage Report in Appendix E.**

   c. ☒ Identify the onsite hydrologic soil classification (e.g. Type A, B/D, D). Reference the source, such as the USDA/NRCS Soil Survey, used in estimating the onsite hydrologic soil classification. Provide maps, as appropriate, with the project limits delineated. **See Drainage Report in Appendix E.**

   d. ☒ Identify the seasonal high water or mean high tide elevation for receiving waters/wetlands into which runoff will be discharged. Include dates, datum, and methods used to determine these elevations. **See Drainage Report in Appendix E.**

   e. ☒ Identify the name of each receiving waterbody to which the proposed stormwater management system will discharge **Newman Branch.**

   f. ☒ Indicate the existing land use and land cover. **Open vacant land with roads; abandoned upland pasture and tree/palm nurseries; remnant native woods; exotic vegetation; wet pastures, salt marsh, and mangrove swamps; and natural/altered stream, ditches and a small pond.**

g. ☒ Provide the acreage and percentages of the total project, of the following:
   1. Impervious surfaces (excluding buildings, wetlands, and other surface waters);
   2. Buildings;
   3. Pervious surfaces (green areas not including wetlands);
   4. Lakes, canals, retention areas, other open water areas; and
   5. Wetlands (Please compare to Section C to ensure consistency in wetland acreages).

   See Drainage Report in Appendix E.

h. ☒ Provide the location and description of any nearby existing offsite features (such as wetlands and other surface waters, stormwater management ponds, and buildings or other structures) which might be affected by or affect the proposed construction or development. **See Drainage Report in Appendix E.**

2. Water Quality Analysis:

a. ☒ Provide a description of the proposed stormwater treatment methodology that addresses the type of treatment, pollution abatement volumes, and recovery analysis. **See Drainage Report in Appendix E.**

b. ☒ Is the receiving waterbody known to be impaired and/or have an established Total Maximum Daily Load (TMDL) or Basin Management Action Plan (BMAP)? If so, please provide specific descriptions of all water quality parameters for which the waterbody is known to be impaired. For more information about water quality, impaired waters, and to determine whether a TMDL has been adopted in your project area, refer to: https://floridadep.gov/dear/water-quality-evaluation-tmdl/content/final-tmdl-reports. To determine whether a BMAP exists, or is being developed in your project area, refer to: https://floridadep.gov/dear/water-quality-restoration/content/basin-management-action-plans-bmaps.

   ☒ yes ☐ no ☐ don't know

   If yes, provide calculations demonstrating that the proposed project will not contribute to violations of state water quality standards in accordance with the applicable Applicant's Handbook, Vol. II. **According to the DEP Impaired Waters Rule, Newman Branch (WBID 1708) is designated as an impaired waterbody for Fecal Coliform (Enterococci Bacteria) and Dissolved Oxygen.**

c. ☒ Does the project have a direct discharge to Class I or II waters; Outstanding Florida Waters (OFW); or Class III waters, which are approved, conditionally approved, restricted, or conditionally restricted for shellfish harvesting? *To determine whether your project is within or will discharge to an OFW, or for more information about OFWs in general, refer to: https://floridadep.gov/dear/water-quality-standards/content/outstanding-florida-waters.*

   ☐ yes ☒ no ☐ don't know

   If yes, additional treatment in accordance with the applicable Applicant's Handbook, Vol. II, may be required. **N/A**.

d. ☒ Provide construction plans and calculations that address the required treatment volume and recovery, as well as stage-storage and design elevations, which demonstrate compliance with the appropriate water quality treatment criteria in the applicable Applicant's Handbook, Vol. II**. See Drainage Report in Appendix E.**

e. ☒ Provide a description of the engineering methodology, assumptions, and references for the parameters listed above and a copy of all 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, and justification for model selection. **See Drainage Report in Appendix E.**

3. Water Quantity Analysis:

Provide calculations and documentations demonstrating that the project, as proposed, meets the applicable design criteria as indicated in the applicable Applicant's Handbook, Vol. II. Typically, the information would include, at a minimum, but not necessarily limited to, the following:

a. ☒ For projects requiring pre-development analysis, provide an analysis of the pre-development peak rate of discharge and/or volume of runoff for all design storm events. Account for all onsite depressional storage and offsite contributing area. Please refer to the applicable Applicant's Handbook, Vol. II for the design storm event(s) that apply to your project. **See Drainage Report in Appendix E**.

b. ☒ Provide an analysis of the post-development peak rate of discharge and/or volume of runoff for all applicable design storm events. Account for all onsite storage and offsite contributing area. Please refer to the applicable Applicant's Handbook, Vol. II for the design storm event(s) and criteria that apply to your project. **See Drainage Report in Appendix E**.

These analyses should include:

1. ☒ Runoff characteristics, including area, runoff curve number or runoff coefficient, and time of concentration for each drainage basin in the pre-development and post-development condition;
2. ☒ Design storms used including rainfall depth, duration, frequency, and distribution;
3. ☒ Runoff hydrograph(s) for each drainage basin for all required design storm event(s);
4. ☒ Stage-storage computations for any area, such as a reservoir, closed basin, detention area, or channel, used in storage routing;
5. ☒ Stage-discharge computations for any storage areas at a selected control point, such as control structure or natural restriction;
6. ☒ Flood routings through on-site conveyance and storage areas;
7. ☒ Water surface profiles in the primary drainage system for each required design storm event(s);
8. ☒ Runoff peak rates and volumes discharged from the site for each required design storm event(s);
9. ☒ Design tailwater elevation(s) for each storm event at all points of discharge (include source or method of estimate); and
10. ☐ Pump specifications and operating curves for range of possible operating conditions (if used in system). **N/A**.

c. ☒ 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, input and output data, justification for model selection, and, if necessary, a description of the program. **See Drainage Report in Appendix E**.

4. Floodplain Analysis (where applicable).

   a. ☒ If the project is in a known floodplain of a stream or other water course, identify the appropriate floodplain boundary and approximate flooding elevations of any lake, stream, or other watercourse located on or adjacent to the site. **See Drainage Report in Appendix E.**

   b. ☐ For traversing works, in accordance with the applicable Applicant's Handbook, Vol. II, provide: **N/A.**

      1. ☐ Hydraulic calculations for all proposed traversing works; and
      2. ☐ Water surface profiles showing upstream impact of traversing works.

   c. ☐ For impacts to regulated floodplains, in accordance with the applicable Applicant's Handbook, Vol. II, provide: **N/A.**

      1. ☐ Location and volume of encroachment within regulated floodplain(s); and
      2. ☐ Plans and calculations for compensating floodplain storage, if necessary, and calculations required for determining minimum building and road flood elevations.

Part 2: Construction Plans

1. Provide clear, construction level detailed plans for the system. The plans must be signed and sealed by an appropriate registered professional as required by law. These plans should include cumulative information from all applicable sections, as well as the following:

See Construction Plans in Appendix A for items requested below:

   a. ☒ Project area boundary and total land area (as defined in A.H. Vol. I, subsection 2.0(a)(107), including distances and orientation from roads or other landmarks.

   b. ☒ Existing topography extending at least 100 feet off the project area. All topography shall include location and description of benchmarks, reference to NGVD 1929 or NAVD 1988 along with the conversion factor.

   c. ☒ Proposed site plan with acreage, including the following:
      1. ☒ plan view of proposed development, including impervious surfaces and water management areas;
      2. ☒ land cover and natural communities*;
      3. ☒ wetlands and other surface waters*;
      4. ☒ undisturbed uplands*;
      5. ☐ aquatic communities*; **N/A.**
      6. ☒ proposed buffers*;
      7. ☒ proposed impacts to wetlands and other surface waters, and any proposed connections/outfalls to other surface waters or wetlands, (if applicable); and
      8. ☐ onsite wetland mitigation areas*. **N/A.**
      9. ☐ For phased projects, provide a master development plan clearly delineating the limits of each phase of construction. **N/A.**

      *Information should reflect that provided in Section C.

d. ☒ Paving, Grading, and Drainage Information, which includes, but is not necessarily limited to, the following:
   1. ☒ Existing topography;
   2. ☒ Boundaries of wetlands and other surface waters and upland buffers (see Section C);
   3. ☒ Plan view of proposed development;
   4. ☒ Proposed elevations and/or profiles, including:
      a) ☒ roadway, parking, and pavement grades;
      b) ☐ floor slabs, walkways, and other paved surfaces; **N/A.**
      c) ☐ earthwork grades for pervious landscaped areas; **N/A**. and
      d) ☒ perimeter site grading, tying back into existing grades.
   5. ☒ Location of all water management areas, including elevations, dimensions, side slopes, and design water depths;
   6. ☒ Location, size, and invert elevations of existing and proposed stormwater conveyance systems;
   7. ☒ Vegetative cover plan for all on-site and off-site earth surfaces disturbed by construction; and
   8. ☒ Rights-of-way and easements for the system, including all on-site and off-site areas to be reserved for water management purposes (including access), and rights-of-way and easements for the existing drainage system, if any.

e. ☒ Stormwater detail information, including but not necessarily limited to, the following:
   1. ☒ Cross section of all stormwater management areas, including elevations, dimensions, side slopes, and proposed stabilization measures (with location of the cross section(s) shown on the corresponding plan view);
   2. ☒ Detail of all proposed control structures, including elevations, dimensions, and skimmer, where applicable; and
   3. ☒ Details of proposed stormwater management systems, such as underdrains, exfiltration trenches, vaults, and other proposed Best Management Practices (BMPs).

f. ☒ Location and description of any nearby existing offsite features (such as wetland and other surface waters, stormwater management ponds, and building or other structures) which might be affected by or affect the proposed construction or development.

Part 3: Construction Schedule and Techniques

Provide a construction schedule and a description of construction techniques, sequencing, and equipment. This information should include, as applicable, the following. **See Construction Plans in Appendix A.**

a. ☒ Access and staging of equipment;

b. ☒ 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.

c. ☒ The location of disposal site(s) for any excavated material, including temporary and permanent disposal sites.

d. ☒ A demolition plan for any existing structures to be removed.

e. ☐ Dewatering plan details. 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**. Currently, not applicable, but a Consumptive Use or Water Use permit may be required for dewatering.**

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; **N/A.**

Part 4: Operation and Maintenance and Legal Documentation:

a. ☒ Describe the overall maintenance and operation schedule for the proposed system. **The stormwater system will be inspected every 6 months and following major storm events.**

b. ☒ Identify the entity (or entities) that will be responsible for operating and maintaining the system (or parts of the system) to demonstrate that the entity (or entities) meet(s) the requirements of section 12.3 of the Applicant's Handbook, Vol. I. **Tampa Electric Company, the landowner, will provide operation and maintenance of the project site and stormwater system.**

1. ☐ If different from the permittee, provide 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.

2. ☐ 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.

c. ☐ Provide drafts of all proposed conservation easements, stormwater management system easements, draft property owner's association documents, and plats for the property containing the proposed system. **N/A.**

d. ☐ Provide legal reservations for access to the treatment system for maintenance and operation by future maintenance entities for subdivided projects. **N/A**.

e. ☐ Provide indication of how water and wastewater service will be supplied. **N/A.**

f. ☒ 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 Appendices A and B.**

g. ☐ If any associated land agreements are required to implement the proposed activities, such as flowage easements across lands not owned by the applicant, include such documentation. If negotiations are underway, but not yet concluded, regarding such land use agreements, please indicate that and provide an anticipated date for providing that documentation. A permit cannot be issued for an activity to use lands that are not owned by the applicant or for which the applicant does not hold a sufficient real property interest to use those lands. **N/A.**

5: Water Use

a. ☐ Describe how irrigation will be provided to the project. Will the surface water system be used for water supply, including landscape irrigation, or recreation? **N/A.**

b. ☐ If a Consumptive Use or Water Use permit has been issued for the project, state the permit number: **N/A.**

c. ☒ If a Consumptive Use or Water Use permit has not been issued for the project, indicate if such a permit will be required. ☐ yes ☒ no ☐ don't know
If yes, please indicate when the application for a permit will be submitted: **N/A.**

d. ☒ Indicate how any existing wells located within the project site will be utilized or abandoned. **The existing wells will be capped and abandoned.**

Part 6: Special Basin Information

a. Is your project within a special basin as described in the applicable Applicant's Handbook, Vol. II?

☐ yes ☒ no ☐ don't know

b. If yes, please demonstrate that the project will meet the applicable special basin criteria. **N/A.**

TAB 2

FIGURES

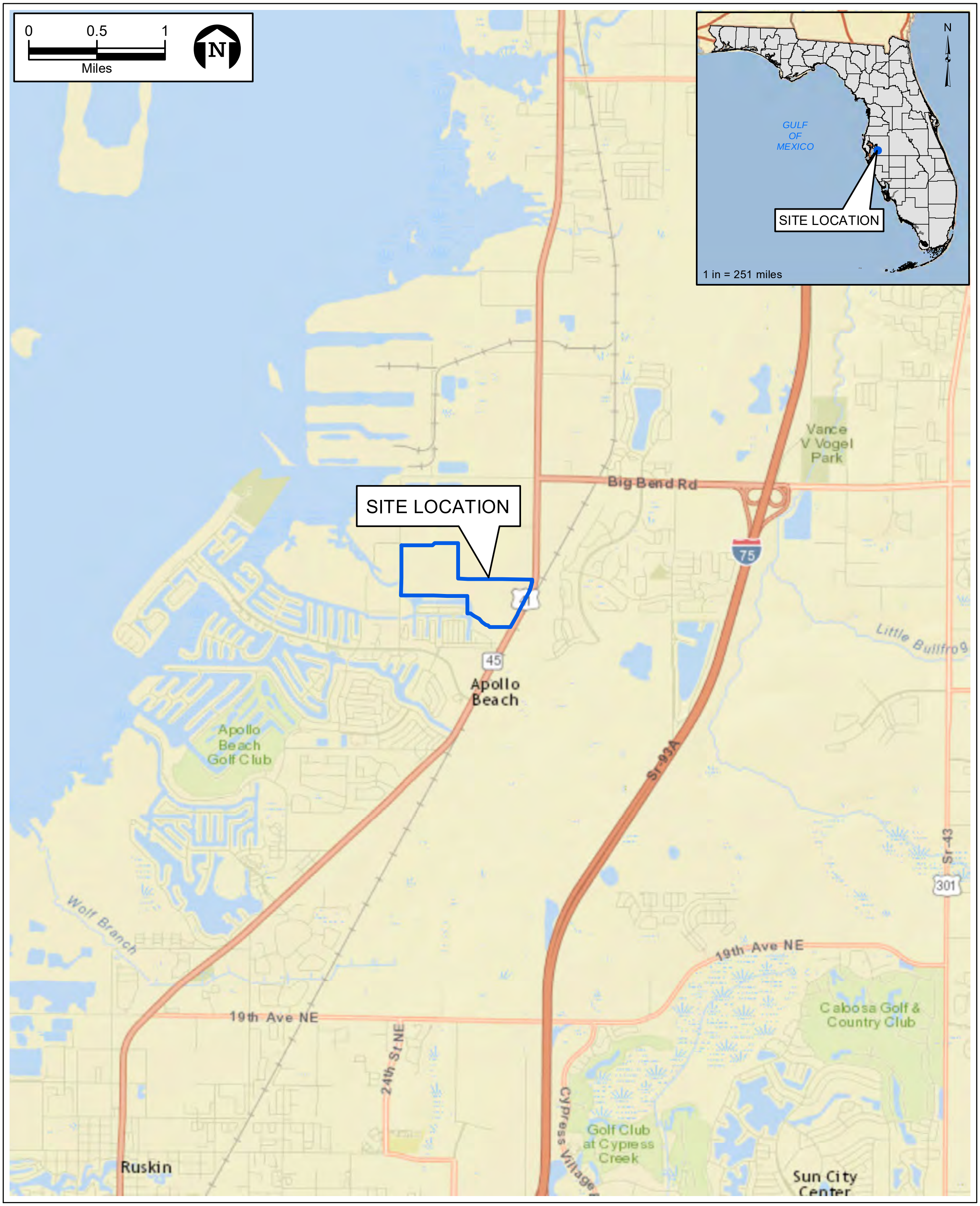


FIGURE 1. SITE LOCATION MAP
TAMPA ELECTRIC COMPANY
BIG BEND II SOLAR POWER PLANT
HILLSBOROUGH COUNTY, FLORIDA

Sources: ESRI Street Map Data, 2017; George F. Young Inc., 2017; ECT, 2017.

TECO. TAMPA ELECTRIC AN EMERA COMPANY

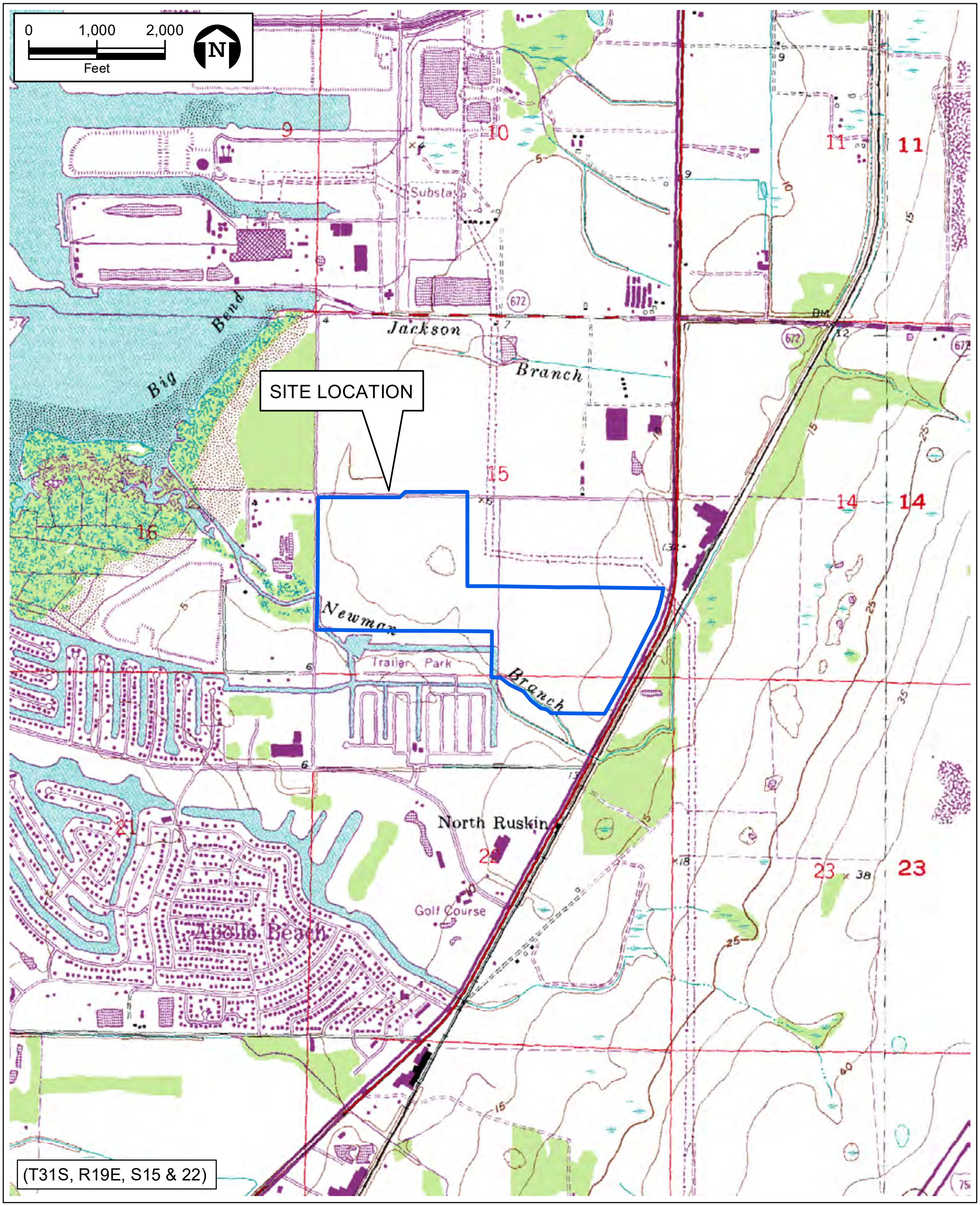
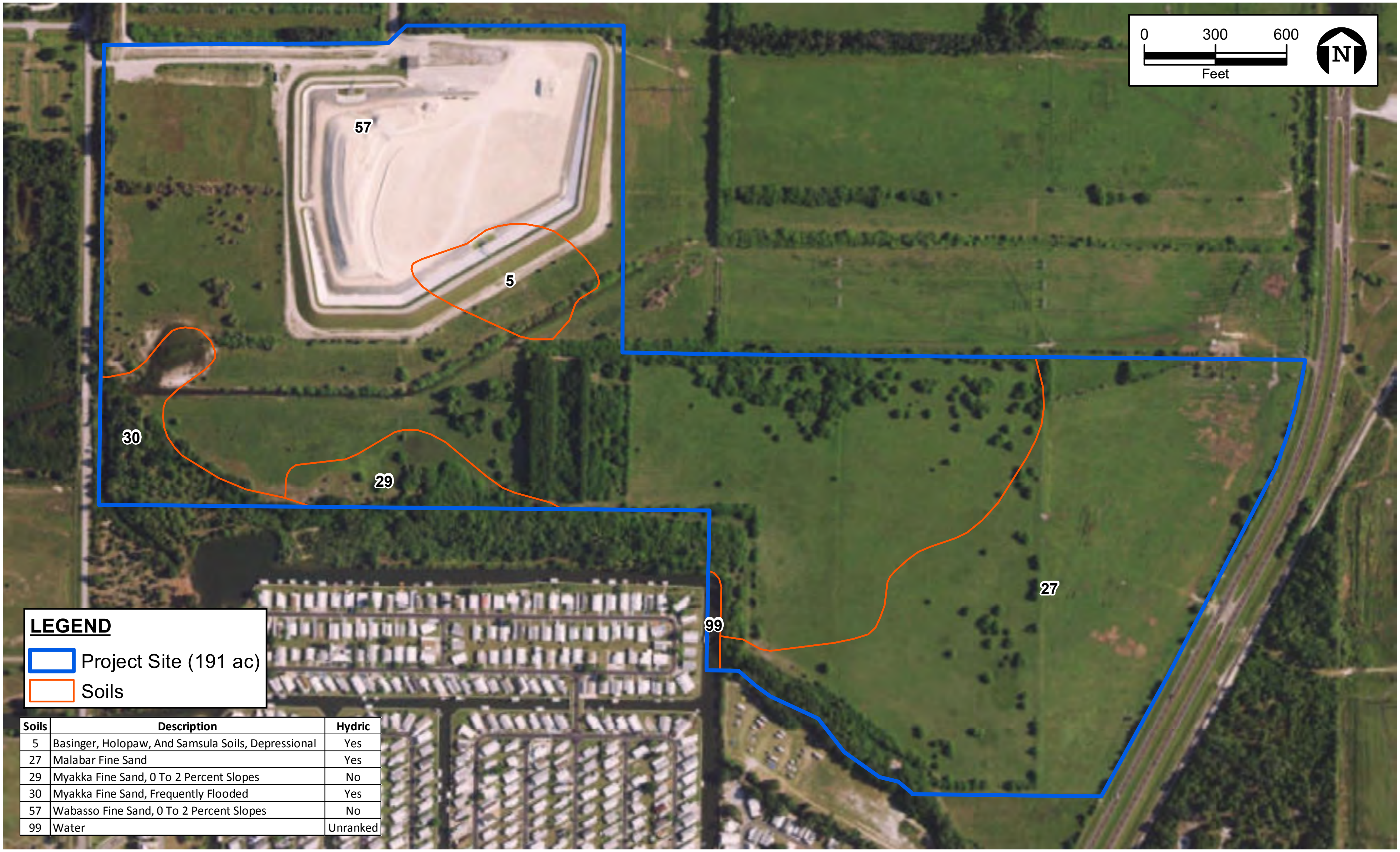


FIGURE 2. USGS TOPOGRAPHIC QUADRANGLE MAP
TAMPA ELECTRIC COMPANY
BIG BEND II SOLAR POWER PLANT
HILLSBOROUGH COUNTY, FLORIDA

Sources: USGS Quad Map of Gibsonton, FL, 1987; George F. Young Inc., 2017; ECT, 2017.

TECO
TAMPA ELECTRIC
AN EMERA COMPANY



Soils	Description	Hydric
5	Basinger, Holopaw, And Samsula Soils, Depressional	Yes
27	Malabar Fine Sand	Yes
29	Myakka Fine Sand, 0 To 2 Percent Slopes	No
30	Myakka Fine Sand, Frequently Flooded	Yes
57	Wabasso Fine Sand, 0 To 2 Percent Slopes	No
99	Water	Unranked

FIGURE 3. SOILS MAP
TAMPA ELECTRIC COMPANY
BIG BEND II SOLAR POWER PLANT
HILLSBOROUGH COUNTY, FLORIDA

Sources: USDA FSA Aerial Photograph, 2015; NRCS, 2016; George F. Young Inc., 2017; ECT, 2017.

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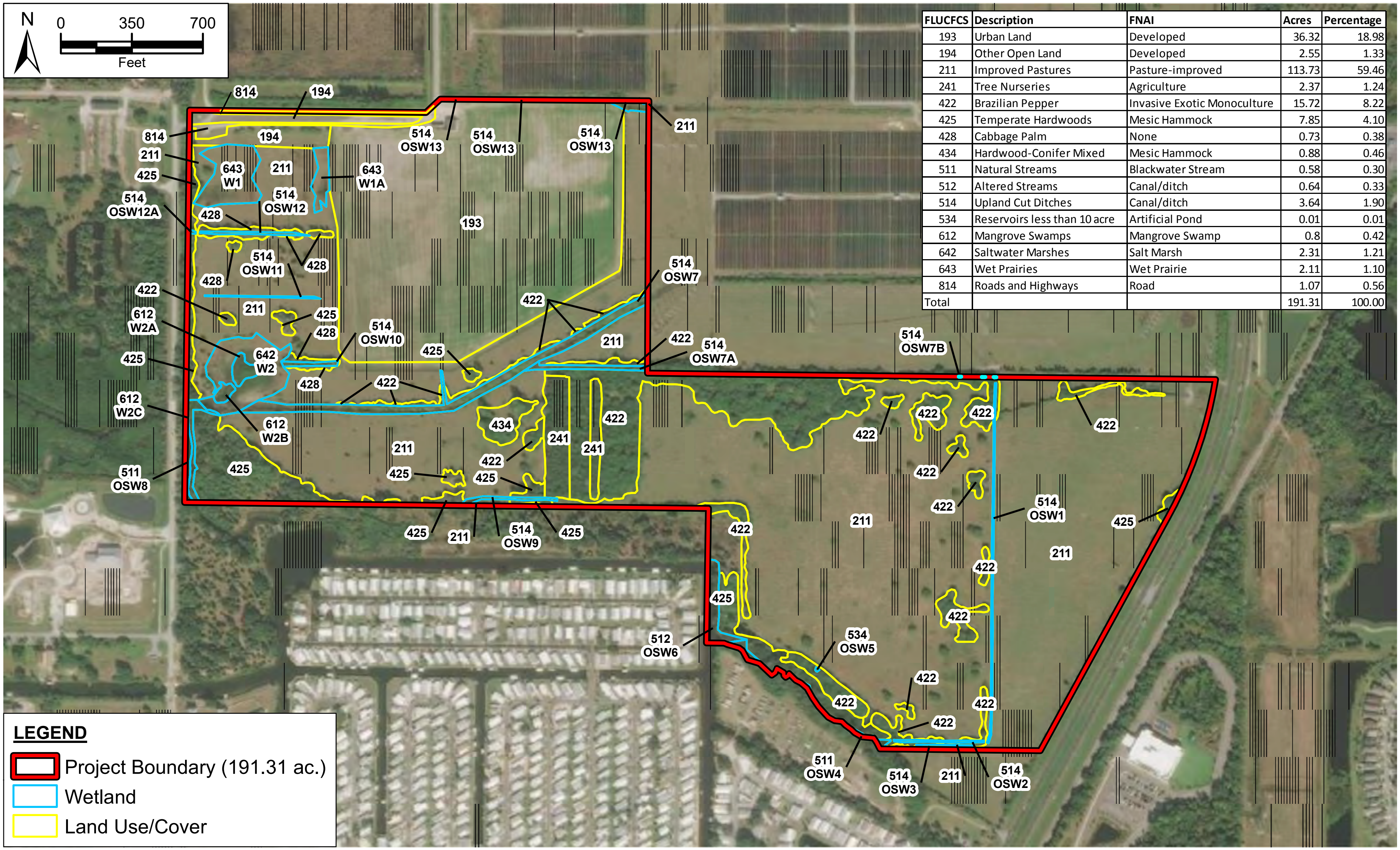
TAMPA ELECTRIC
AN EMERA COMPANY



FLUCFCS	Description	FNAI	Acres	Percentage
193	Urban Land	Developed	36.32	18.98
194	Other Open Land	Developed	2.55	1.33
211	Improved Pastures	Pasture-improved	113.73	59.46
241	Tree Nurseries	Agriculture	2.37	1.24
422	Brazilian Pepper	Invasive Exotic Monoculture	15.72	8.22
425	Temperate Hardwoods	Mesic Hammock	7.85	4.10
428	Cabbage Palm	None	0.73	0.38
434	Hardwood-Conifer Mixed	Mesic Hammock	0.88	0.46
511	Natural Streams	Blackwater Stream	0.58	0.30
512	Altered Streams	Canal/ditch	0.64	0.33
514	Upland Cut Ditches	Canal/ditch	3.64	1.90
534	Reservoirs less than 10 acre	Artificial Pond	0.01	0.01
612	Mangrove Swamps	Mangrove Swamp	0.8	0.42
642	Saltwater Marshes	Salt Marsh	2.31	1.21
643	Wet Prairies	Wet Prairie	2.11	1.10
814	Roads and Highways	Road	1.07	0.56
Total			191.31	100.00

FIGURE 4.
NATURAL RESOURCES MAP
BIG BEND II SOLAR POWER PLANT PROJECT
HILLSBOROUGH COUNTY, FLORIDA

Sources: Maxar Imagery, 2020; ECT, 2020.

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AN EMERA COMPANY

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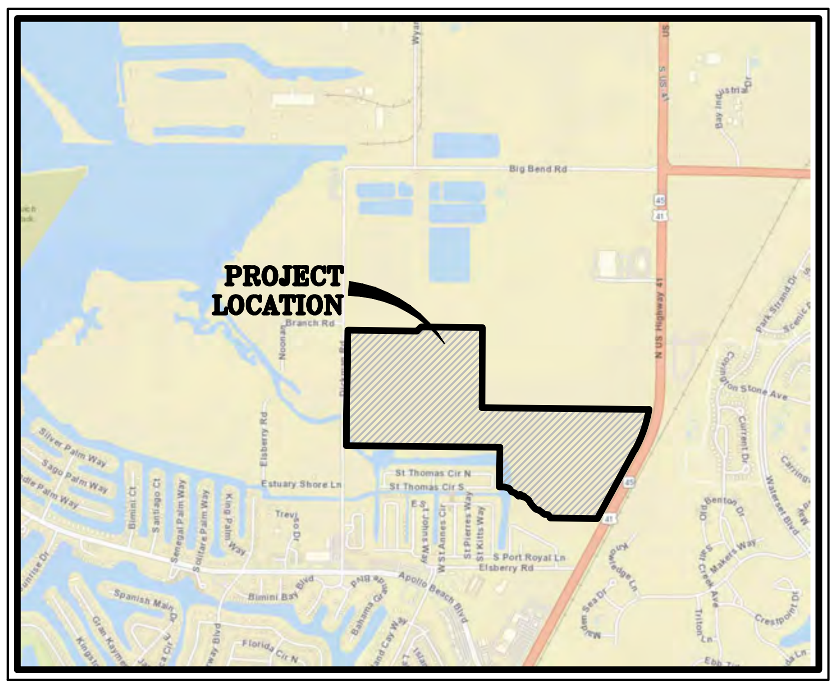
TAB 3

APPENDIX A
SITE CONSTRUCTION PLANS

STORMWATER MANAGEMENT PLANS
FOR
BIG BEND II SOLAR
IN
SECTIONS 15 & 22, TOWNSHIP 31 SOUTH, RANGE 19 EAST
HILLSBOROUGH COUNTY, FLORIDA
PREPARED FOR
TAMPA ELECTRIC COMPANY



LOCATION MAP N.T.S.
SECTIONs 15 & 22, TOWNSHIP 31 SOUTH, RANGE 19 EAST

VICINITY MAP N.T.S.

NOTE:
DRAWING PREPARED IN AN 11X17 FORMAT. THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

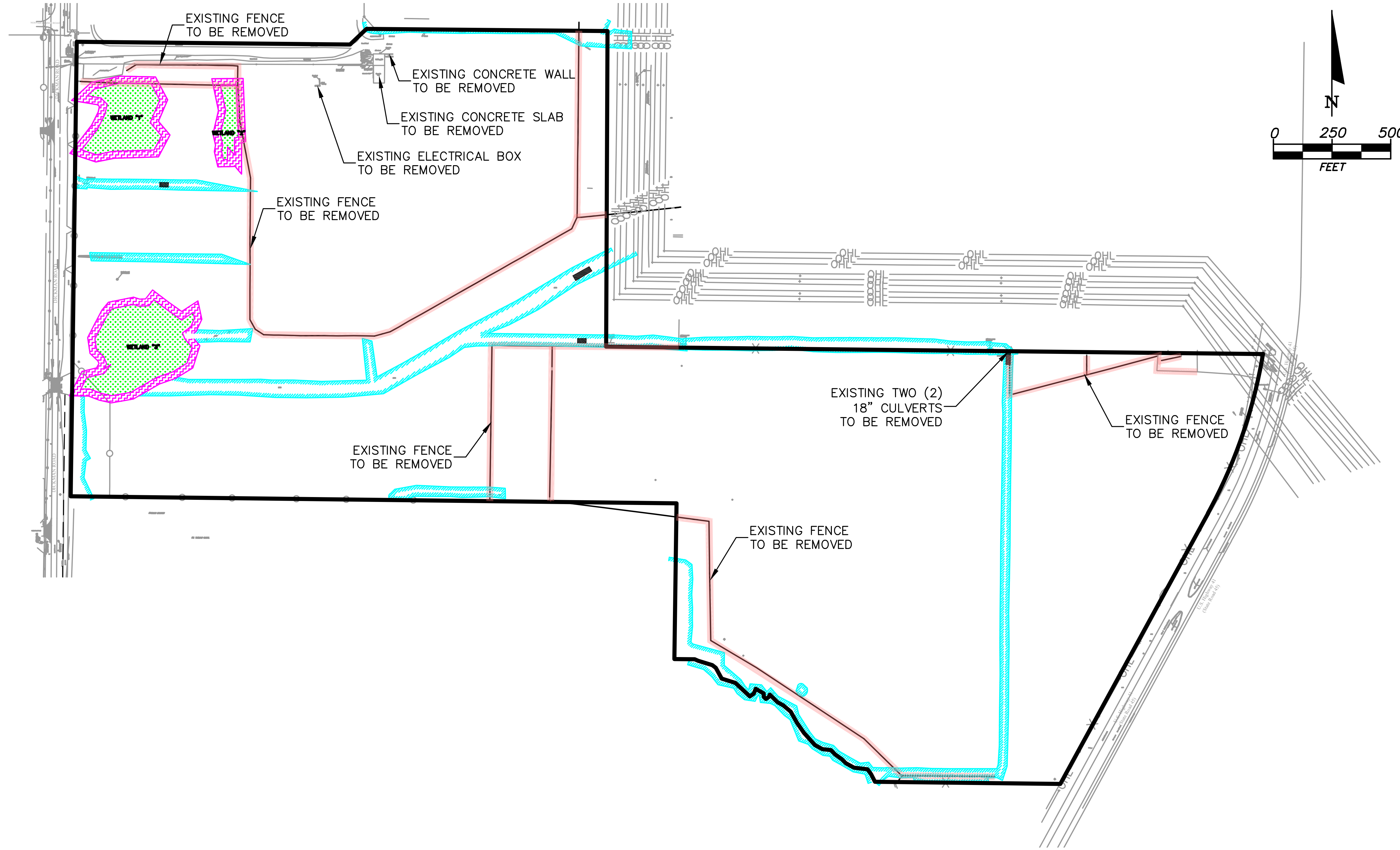
This item has been digitally signed and sealed by James Parker Terpening, PE on 12/22/2020 using a Digital Signature. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

PERMIT PLANS
DECEMBER 22, 2019

JAMES P. TERPENING JR, P.E. FL. REG. NO. 24276

DATUM:
1. ELEVATIONS SHOWN ON THE PLANS ARE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988).

CULPEPPER & TERPENING INC
2980 SOUTH 25th STREET • FORT PIERCE, FLORIDA 34981
PHONE 772-464-3537 • FAX 772-464-9497 • www.ct-eng.com
STATE OF FLORIDA BOARD OF PROFESSIONAL ENGINEERS AUTHORIZATION NO. 4286



LEGEND

▬▬	PROPERTY BOUNDARY
— — x — —	EXISTING FENCE
— — x — —	EXISTING FENCE TO BE DEMOLISHED
OSW	OTHER SURFACE WATERS
FL	FLOW LINE
	WETLAND AREA
	WETLAND AREA SETBACK REQUIRE 30' BUFFER
	OTHER SURFACE WATERS (OSW) REQUIRE 15' BUFFER

JAMES PARKER TERPENING JR. LICENSE No 24276 STATE OF FLORIDA PROFESSIONAL ENGINEER

JAMES P. TERPENING JR., P.E.
FL. REG. NO. 24276

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

C&T JOB NO. 20-158

DESIGNED BY	DRAWN BY
JPT 12-17-20	AND 12-18-20
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.	.

ENGINEER OF RECORD: JAMES P. TERPENING, P.E. NO. 24276

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STATE OF FLORIDA BOARD OF PROFESSIONAL ENGINEERS AUTHORIZATION NO. 4286

TECO

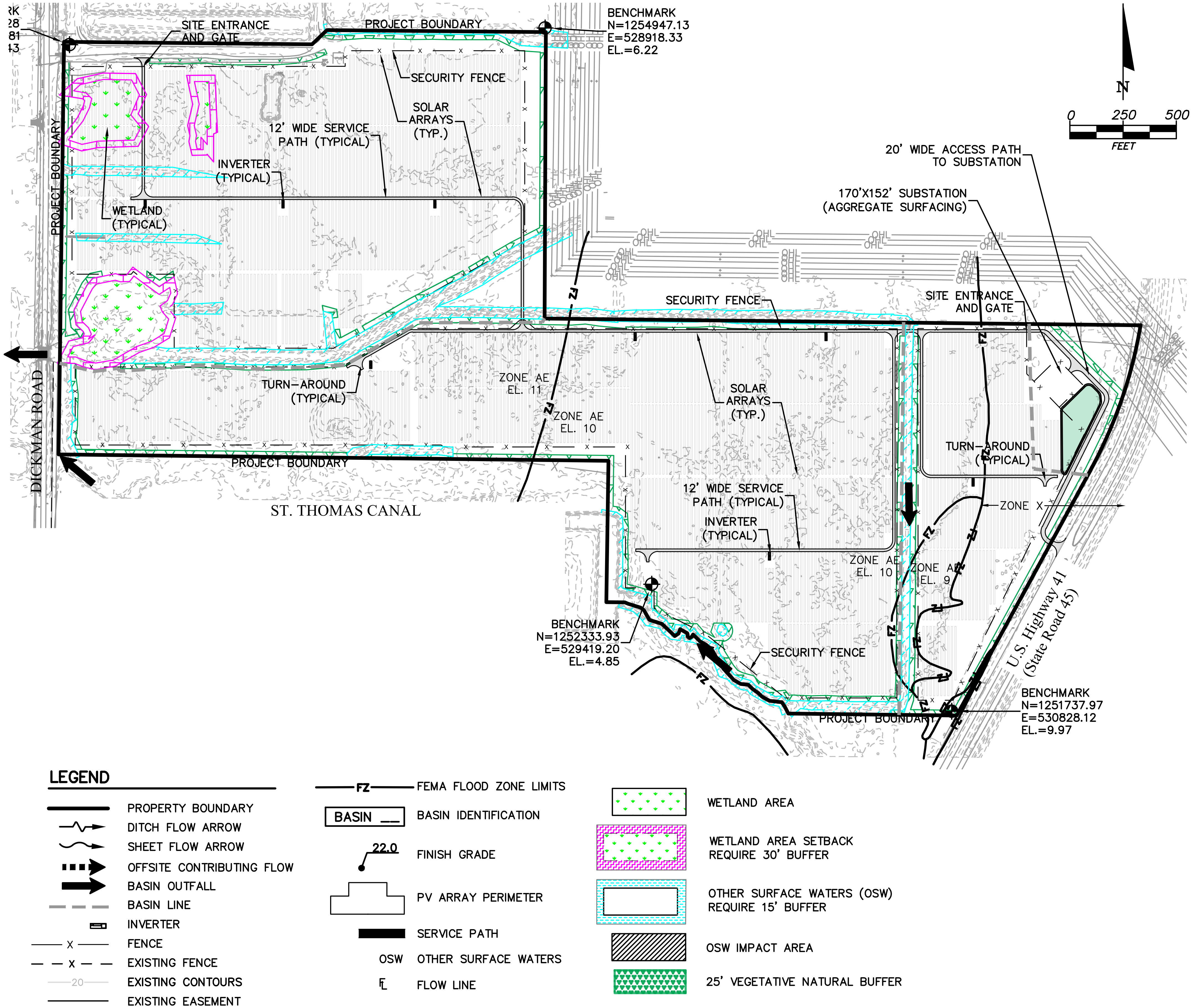
PROJECT NAME

BIG BEND SOLAR II

DEMOLITION PLAN

SHEET NO.

CE1



BIG BEND II SOLAR

OWNER
TAMPA ELECTRIC COMPANY
702 N. FRANKLIN STREET
PLAZA 8
TAMPA, FLORIDA 33602

APPLICANTS:
TAMPA ELECTRIC COMPANY
702 N. FRANKLIN STREET
PLAZA 8
TAMPA, FLORIDA 33602

ENGINEER
JAMES P. TERPENING JR, P.E.
CULPEPPER & TERPENING, INC.
2980 SOUTH 25TH. STREET
FORT PIERCE, FL 34981
PHONE: (772) 464-3537
FAX: (772) 464-9497
BTERPENING@CT-ENG.COM

SURVEYOR:
THOMAS P. KIERNAN
CULPEPPER & TERPENING, INC.
2980 SOUTH 25TH. STREET
FORT PIERCE, FL 34981
PHONE: (772) 464-3537
FAX: (772) 464-9497
TKIERNAN@CT-ENG.COM

1.) **PROJECT NAME:** BIG BEND II SOLAR

2.) **LOCATION:** PROJECT IS LOCATED NORTH OF APOLLO BEACH BLVD., SOUTH OF BIG BEND ROAD, EAST OF DICKMAN ROAD, AND WEST OF N. U.S. HIGHWAY 41.

3.) **LAND USES:** EXISTING LAND USES: AGRICULTURAL AG
PROPOSED LAND USE: SOLAR ENERGY CENTER

4.) **PROJECT DESCRIPTION:** 31.03 MW (AC) SOLAR ENERGY FACILITY

5.) **SEC/TOWN/RANGE:** SECTION 15, TOWNSHIP 31 SOUTH, RANGE 19 EAST

6.) **PARCEL ID NUMBER:** U-15-31-19-1SF-000000-00600.0, U-15-31-19-1SF-000000-00800.0, U-15-31-19-1SF-000000-00900.0, U-15-31-19-1SF-000000-01000.0,

7.) **SITE AREA:** 191.31 ACRES

8.) **ZONING:** AR

9.) **LAND USE:** AR

10.) **FLOOD ZONE:** ZONE X AND AE
MAP ID: 12057C0492H AND 12057C0494H
DATED: AUG. 28, 2008

11.) **EXISTING : IMPERVIOUS AND PERVIOUS DATA**

IMPERVIOUS COVERAGE	ACREAGE	SF	PERCENT OF SITE
BUILDINGS	0.00	0	0.0%
PADS AND MISCELLANEOUS AREAS	0.08	3,535	0.0%
STABILIZED ACCESS PATHS	1.19	51,666	0.6%
TOTAL IMPERVIOUS COVERAGE	1.27	55,201	0.6%
PERVIOUS COVERAGE	**ACREAGE**	**SF**	**PERCENT OF SITE**
OPEN SPACE (INCLUDING WETLANDS)	190.04	8,278,263	99.4%
TOTALS	**191.31**	**8,333,464**	**100%**

12.) **PROPOSED : IMPERVIOUS AND PERVIOUS DATA**

IMPERVIOUS COVERAGE	ACREAGE	SF	PERCENT OF SITE
SUBSTATION	0.67	25,840	0.3%
INVERTER PADS	0.07	3,168	0.0%
STABILIZED ACCESS PATHS	4.79	208,552	2.5%
TOTAL IMPERVIOUS COVERAGE	5.53	237,560	2.8%
PERVIOUS COVERAGE	**ACREAGE**	**SF**	**PERCENT OF SITE**
OPEN SPACE (INCLUDING WETLANDS)	185.78	8,095,904	97.2%
TOTALS	**191.31**	**8,333,464**	**100%**

13.) **CONSTRUCTION SCHEDULE**
START: JUNE 2021 COMPLETE: APRIL 2022

14.) **UTILITY SERVICE**
WATER SERVICE NONE
SEWAGE SERVICE NONE
SOLID WASTE NONE

15.) **PARKING:**
THE SOLAR ENERGY FACILITY IS AN UNMANNED AND REMOTELY MONITORED RESTRICTED ACCESS FACILITY. EMPLOYEES DO NOT REPORT TO THIS FACILITY ON A DAILY BASIS AND ROUTINE MAINTENANCE CREWS WILL PARK INSIDE THE FENCED AREA. THEREFORE, NO PARKING SPACES WILL BE PROVIDED.

16.) **SECURITY FENCING**
A.) PERIMETER FENCE SHALL BE 6'-0" CHAIN LINK WITH 3 STRANDS OF BARBED WIRE ON EXTENSION ARMS TO MAKE AN OVERALL TOTAL HEIGHT OF 7'-0"
B.) SUBSTATION FENCE SHALL BE 6'-0" CHAIN LINK WITH 3 STRANDS OF BARBED WIRE ON EXTENSION ARMS TO MAKE AN OVERALL TOTAL HEIGHT OF 7'-0".

17.) **PROPERTY SET BACK**
A MINIMUM OF 50 FOOT SETBACK FROM PROPERTY LINE TO THE SOLAR ARRAY WILL BE PROVIDED.

18.) THE MAXIMUM HEIGHT OF THE PV PANELS SHALL BE 15 FEET AS MEASURED WHEN THE PANELS ARE TILTED TO THE DESIGN DEGREE THAT CREATES THE GREATEST OVERALL HEIGHT.

JAMES PARKER TERPENING JR. LICENSE No. 24276 STATE OF FLORIDA PROFESSIONAL ENGINEER

JAMES P. TERPENING JR., P.E.
FL. REG. NO. 24276

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TECO
PROJECT NAME
BIG BEND SOLAR II

DEVELOPMENT PLAN

SHEET NO.
CE2

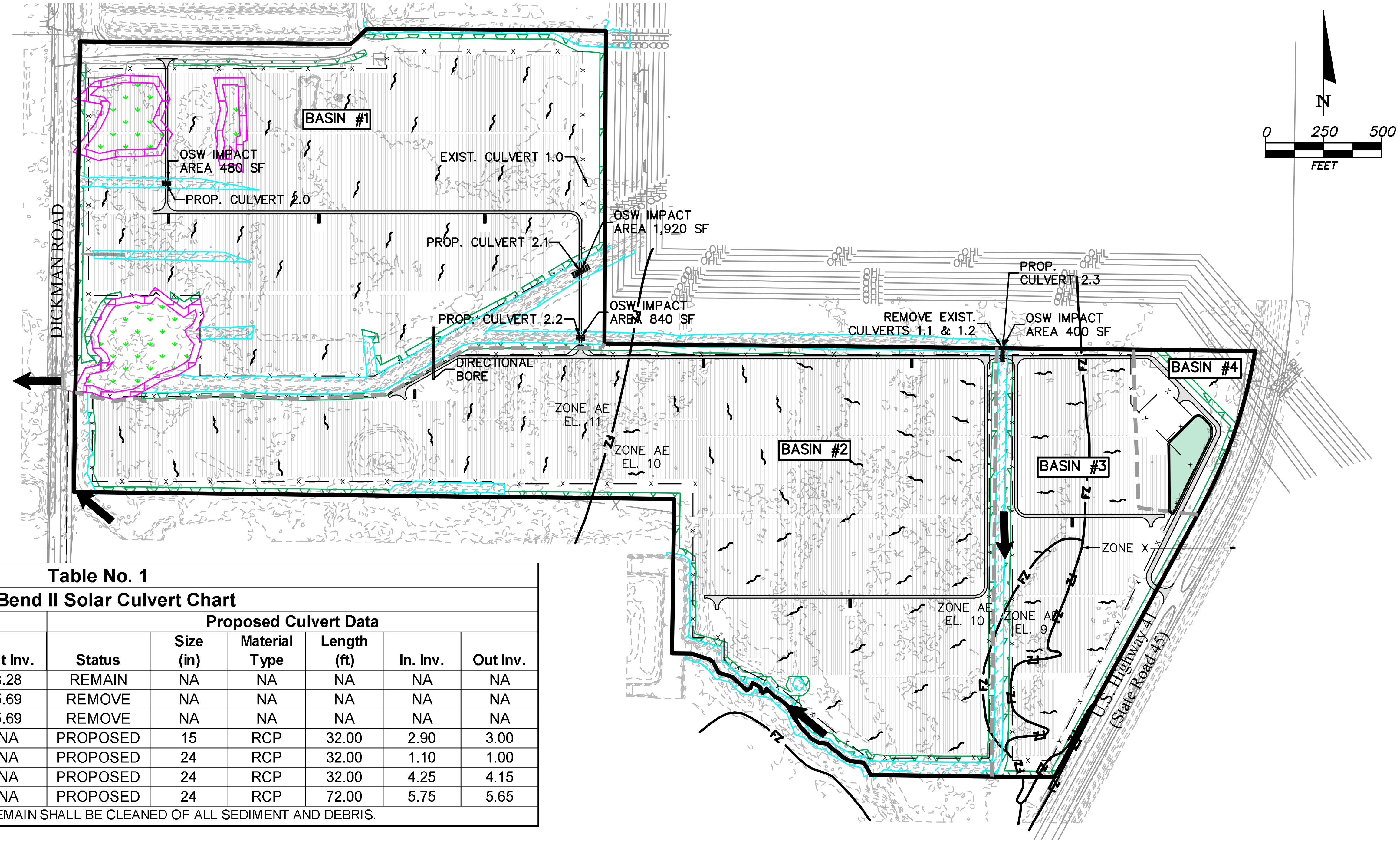

Table No. 1

Big Bend II Solar Culvert Chart

Existing Culvert Data					Proposed Culvert Data					
Culvert No.	Material Type	Size (in)	In. Inv.	Out Inv.	Status	Size (in)	Material Type	Length (ft)	In. Inv.	Out Inv.
1.0	CMP	36	3.57	3.28	REMAIN	NA	NA	NA	NA	NA
1.1	CMP	24	5.82	5.69	REMOVE	NA	NA	NA	NA	NA
1.2	CMP	24	5.82	5.69	REMOVE	NA	NA	NA	NA	NA
2.0	NA	NA	NA	NA	PROPOSED	15	RCP	32.00	2.90	3.00
2.1	NA	NA	NA	NA	PROPOSED	24	RCP	32.00	1.10	1.00
2.2	NA	NA	NA	NA	PROPOSED	24	RCP	32.00	4.25	4.15
2.3	NA	NA	NA	NA	PROPOSED	24	RCP	72.00	5.75	5.65

*EXISTING CULVERTS WHICH ARE PROPOSED TO REMAIN SHALL BE CLEANED OF ALL SEDIMENT AND DEBRIS.

LEGEND

- PROPERTY BOUNDARY
- DITCH FLOW ARROW
- SHEET FLOW ARROW
- OFFSITE CONTRIBUTING FLOW
- BASIN OUTFALL
- BASIN LINE
- INVERTER
- X — FENCE
- X — EXISTING FENCE
- 20 — EXISTING CONTOURS
- EXISTING EASEMENT
- FZ — FEMA FLOOD ZONE LIMITS
- BASIN ___ — BASIN IDENTIFICATION
- 22.0 — FINISH GRADE
- PV ARRAY PERIMETER
- SERVICE PATH
- OSW — OTHER SURFACE WATERS
- FLOW LINE
- WETLAND AREA
- WETLAND AREA SETBACK REQUIRE 30' BUFFER
- OTHER SURFACE WATERS (OSW) REQUIRE 15' BUFFER
- OSW IMPACT AREA
- 25' VEGETATIVE NATURAL BUFFER

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TECO

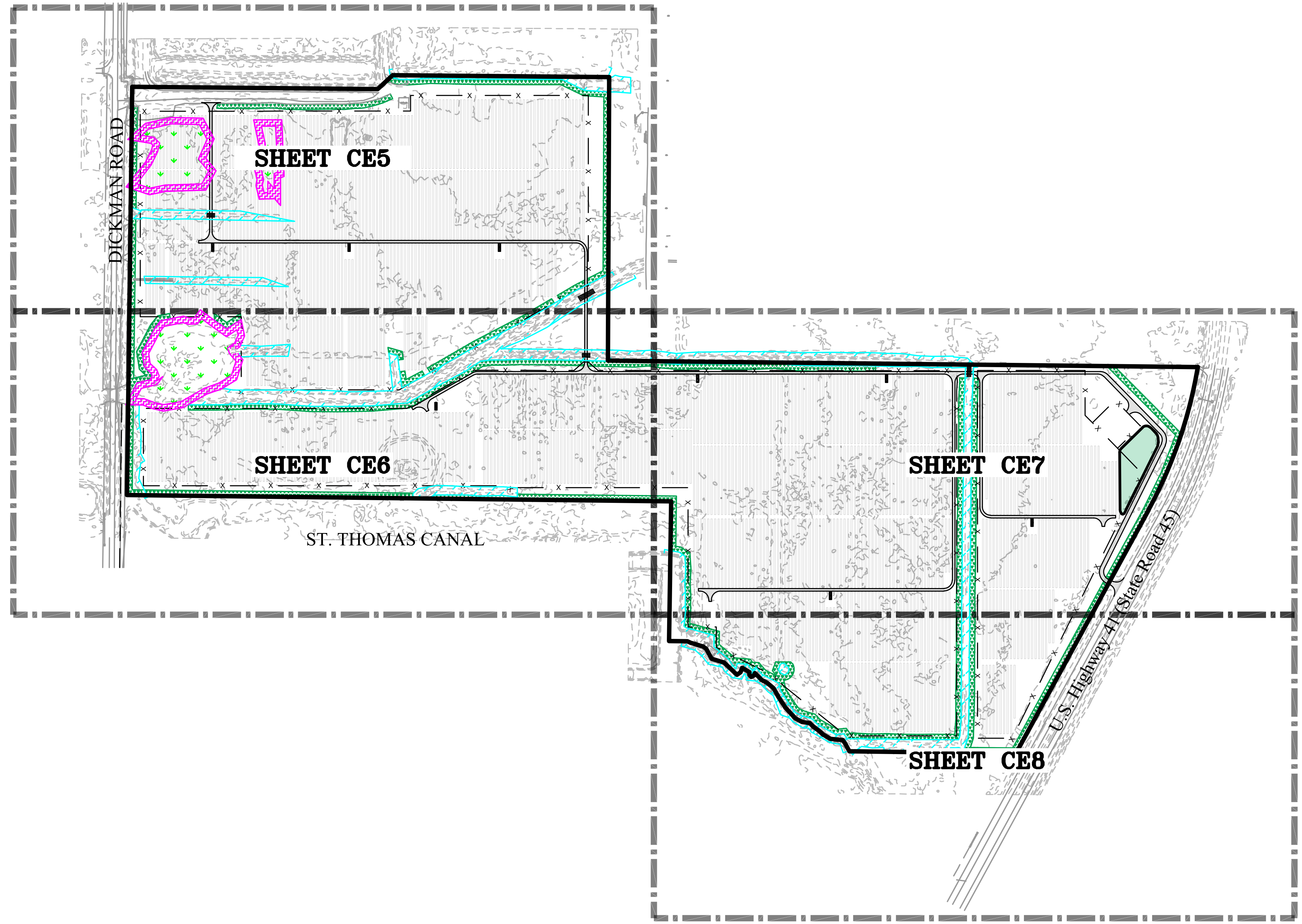
PROJECT NAME

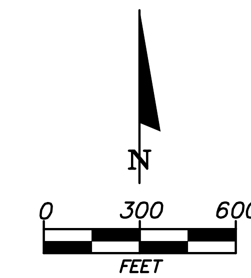
BIG BEND SOLAR II

DRAINAGE PLAN

SHEET NO.

CE3





LEGEND

	PROPERTY BOUNDARY
	DITCH FLOW ARROW
	SHEET FLOW ARROW
	OFFSITE CONTRIBUTING FLOW
	BASIN OUTFALL
	BASIN LINE
	INVERTER
— x —	FENCE
– – x – –	EXISTING FENCE
20	EXISTING CONTOURS
	EXISTING EASEMENT
FZ	FEMA FLOOD ZONE LIMITS
BASIN ___	BASIN IDENTIFICATION
22.0	FINISH GRADE
	PV ARRAY PERIMETER
	SERVICE PATH
OSW	OTHER SURFACE WATERS
℄	FLOW LINE
	WETLAND AREA
	WETLAND AREA SETBACK REQUIRE 30' BUFFER
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	OSW IMPACT AREA
	25' VEGETATIVE NATURAL BUFFER

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TECO

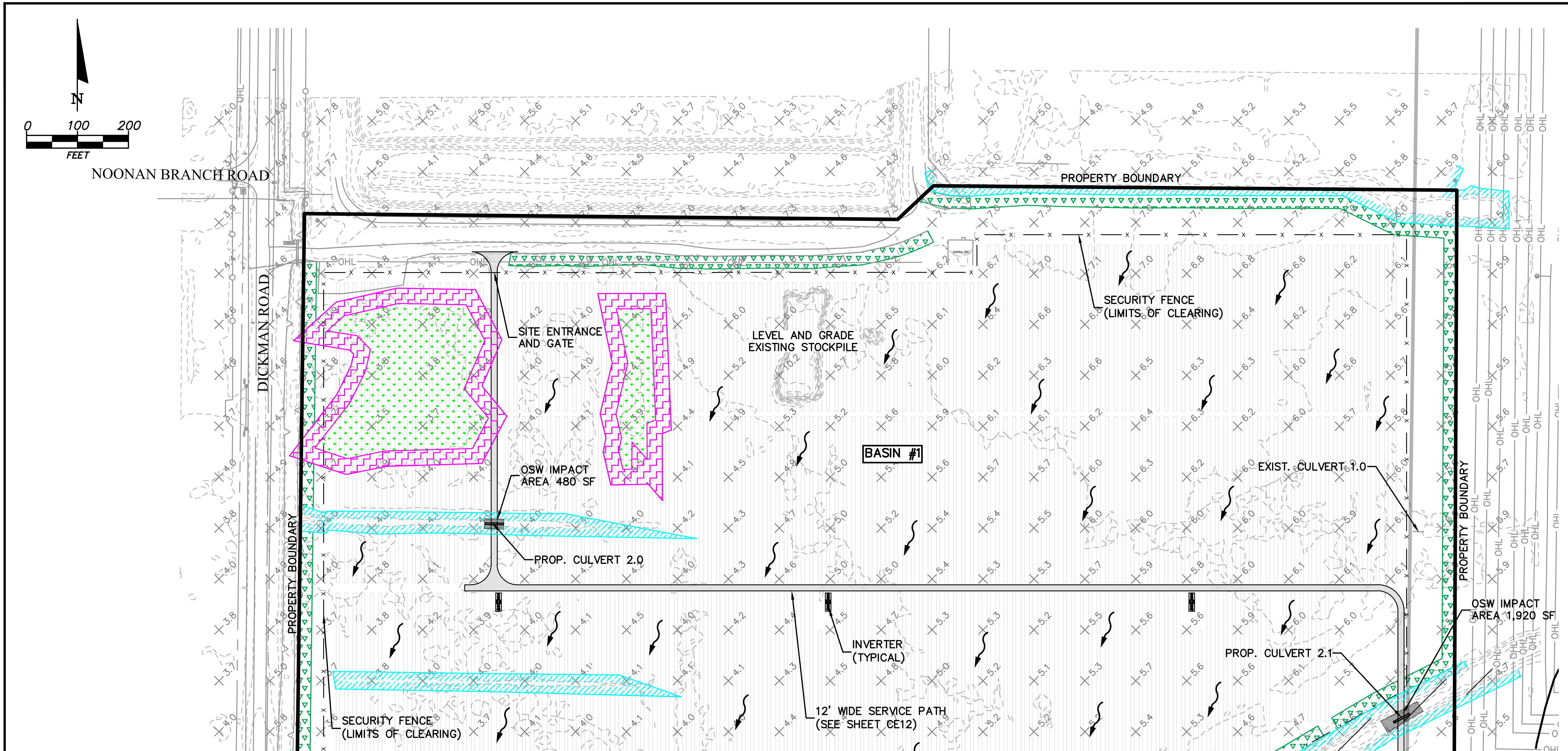
PROJECT NAME

BIG BEND SOLAR II

GRADING PLAN KEY SHEET

SHEET NO.

CE4



MATCHLINE SEE SHEETCE6

LEGEND

- PROPERTY BOUNDARY
- DITCH FLOW ARROW
- SHEET FLOW ARROW
- OFFSITE CONTRIBUTING FLOW
- BASIN OUTFALL
- BASIN LINE
- INVERTER
- FENCE
- EXISTING FENCE
- EXISTING CONTOURS
- EXISTING EASEMENT
- FZ — FEMA FLOOD ZONE LIMITS
- BASIN ___ — BASIN IDENTIFICATION
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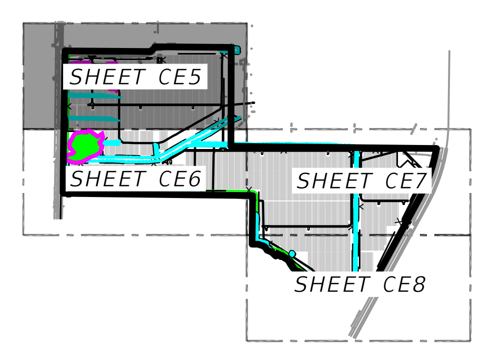
KEY PLAN



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TECO

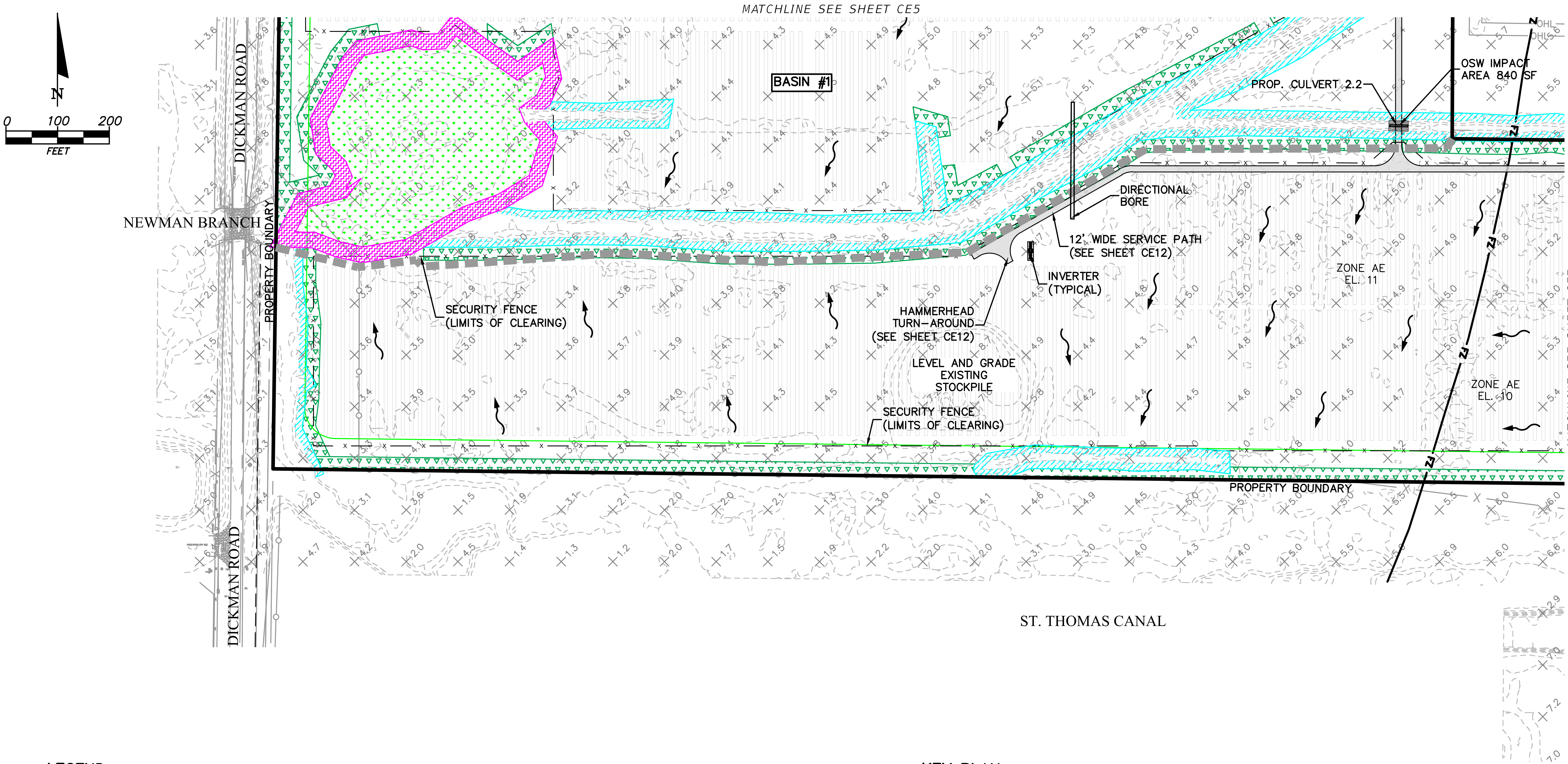
PROJECT NAME

BIG BEND SOLAR II

GRADING PLAN

SHEET NO.

CE5



LEGEND

- PROPERTY BOUNDARY
- DITCH FLOW ARROW
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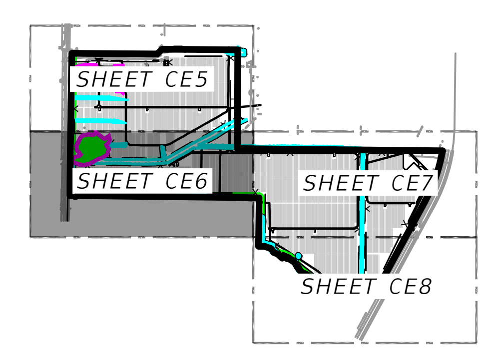

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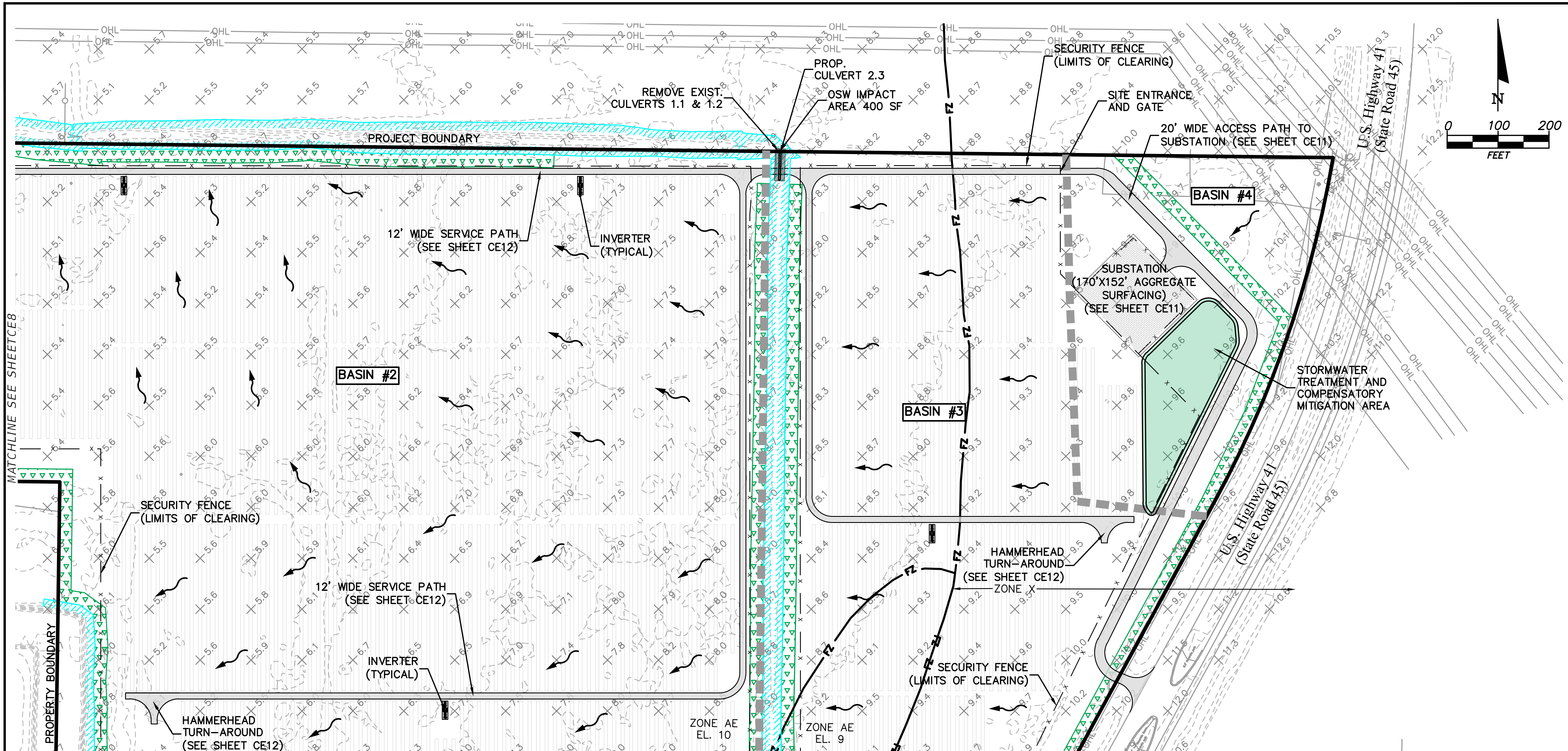
TECO
PROJECT NAME
BIG BEND SOLAR II

GRADING PLAN

SHEET NO.
CE6



MATCHLINE SEE SHEET CE8

LEGEND

- PROPERTY BOUNDARY
- DITCH FLOW ARROW
- SHEET FLOW ARROW
- OFFSITE CONTRIBUTING FLOW
- BASIN OUTFALL
- BASIN LINE
- INVERTER
- FENCE
- EXISTING FENCE
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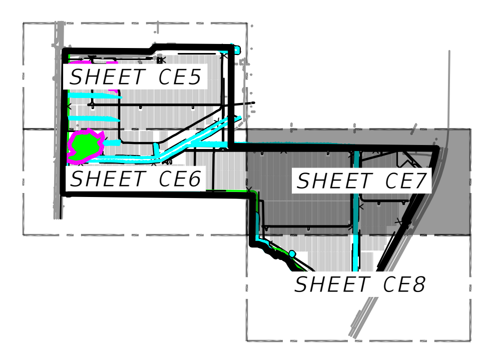
KEY PLAN



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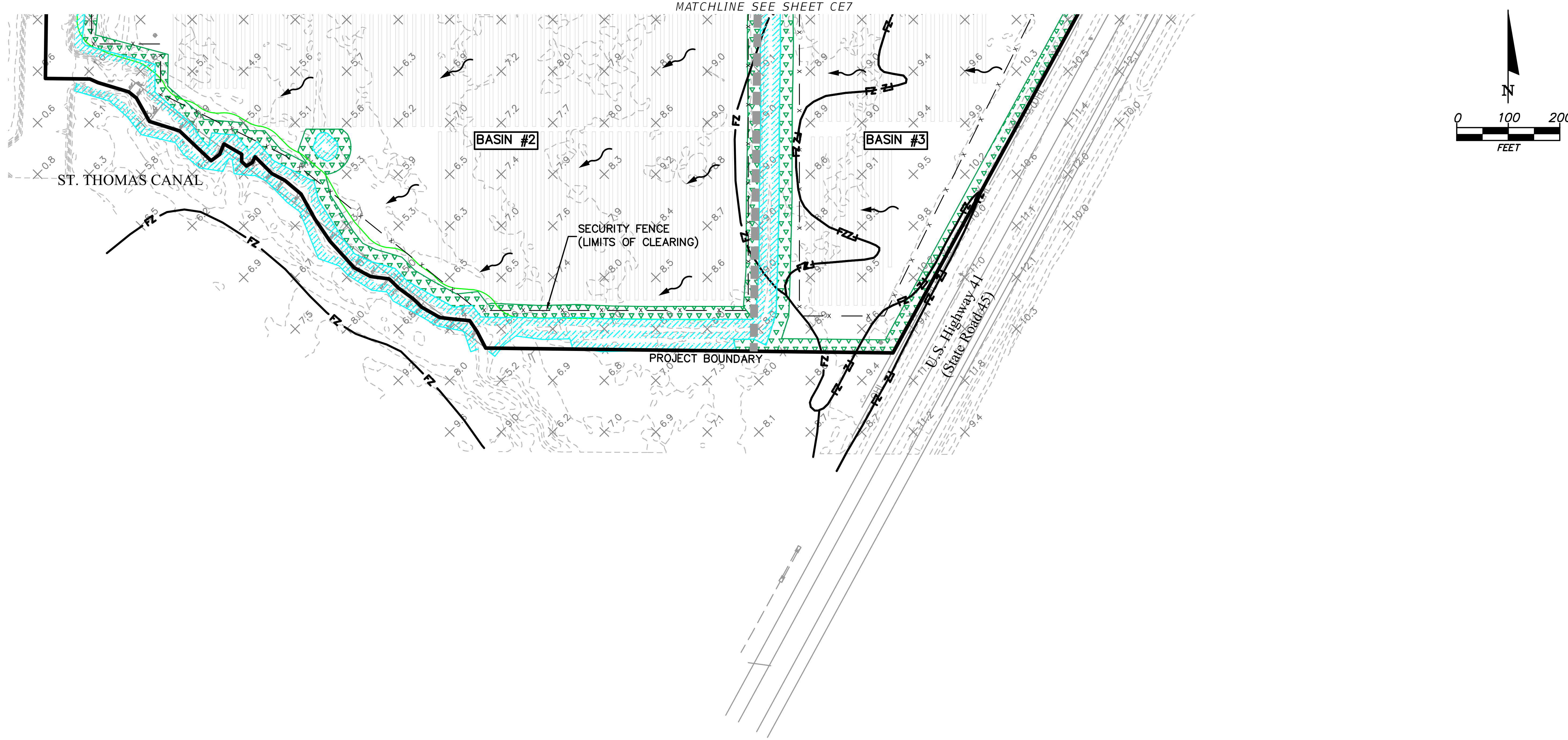
TECO
PROJECT NAME
BIG BEND SOLAR II

GRADING PLAN

SHEET NO. CE7

MATCHLINE SEE SHEET CE7



LEGEND

- PROPERTY BOUNDARY
- DITCH FLOW ARROW
- SHEET FLOW ARROW
- OFFSITE CONTRIBUTING FLOW
- BASIN OUTFALL
- BASIN LINE
- INVERTER
- FENCE
- EXISTING FENCE
- EXISTING CONTOURS
- EXISTING EASEMENT
- FZ — FEMA FLOOD ZONE LIMITS
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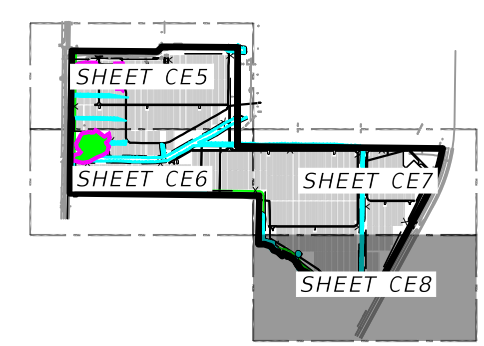
KEY PLAN



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TECO

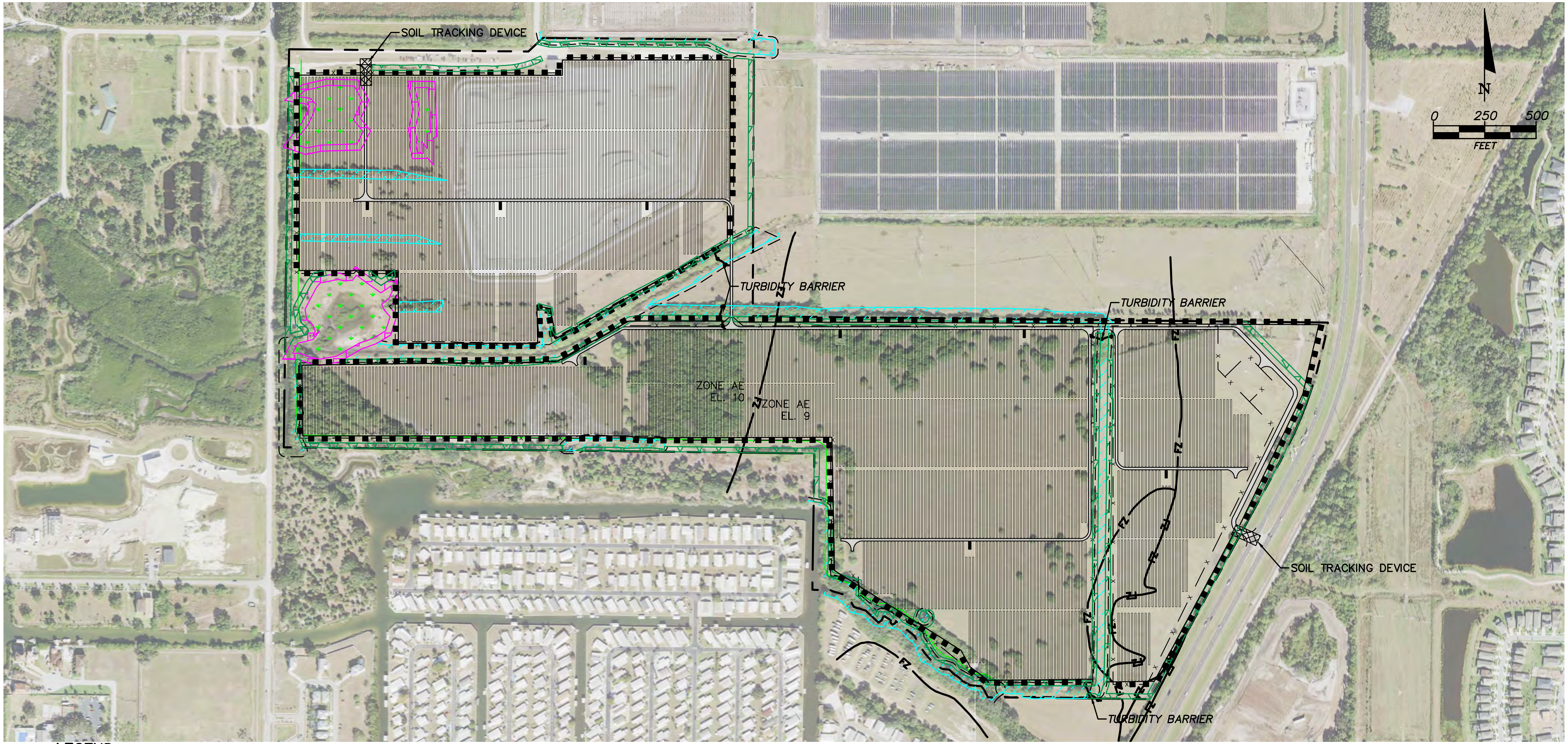
PROJECT NAME

BIG BEND SOLAR II

GRADING PLAN

SHEET NO.

CE8



LEGEND

PROPERTY BOUNDARY
DITCH FLOW ARROW
SHEET FLOW ARROW
OFFSITE CONTRIBUTING FLOW
BASIN OUTFALL
BASIN LINE
INVERTER
FENCE
EXISTING FENCE
EXISTING CONTOURS
EXISTING EASEMENT

FZ FEMA FLOOD ZONE LIMITS
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OSW OTHER SURFACE WATERS
FL FLOW LINE

WETLAND AREA
WETLAND AREA SETBACK REQUIRE 30' BUFFER
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25' VEGETATIVE NATURAL BUFFER

TURBIDITY BARRIER
SOIL TRACKING DEVICE
SILT FENCE

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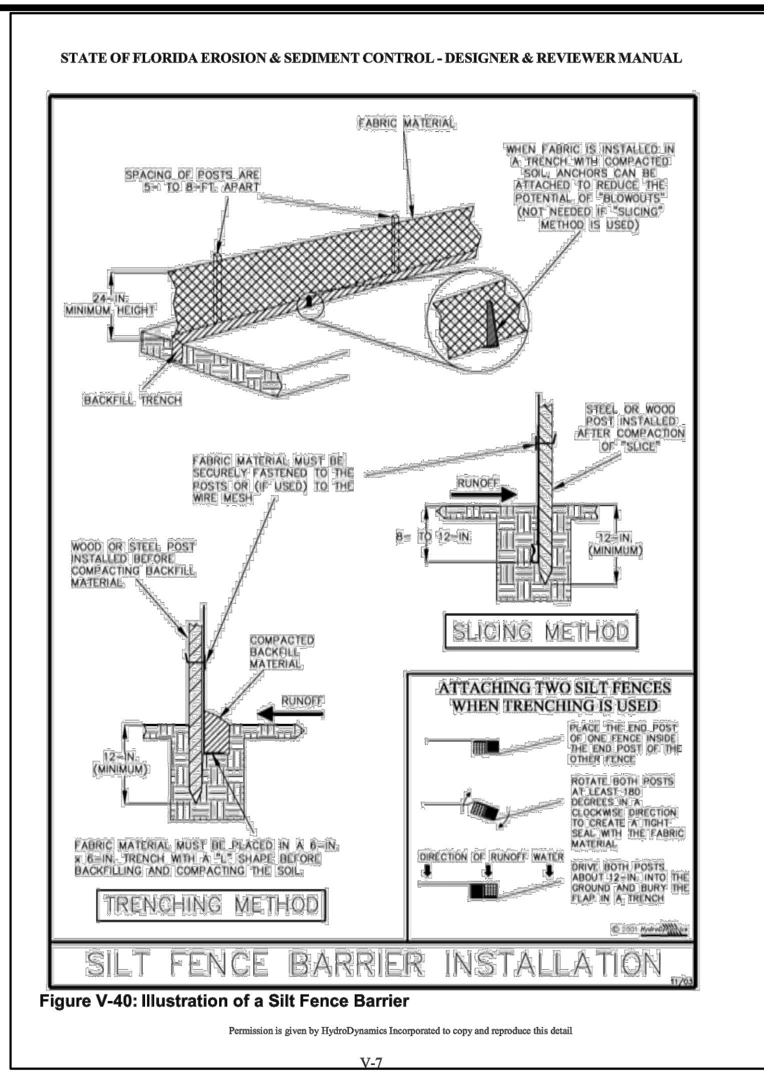
TECO
PROJECT NAME
BIG BEND SOLAR II

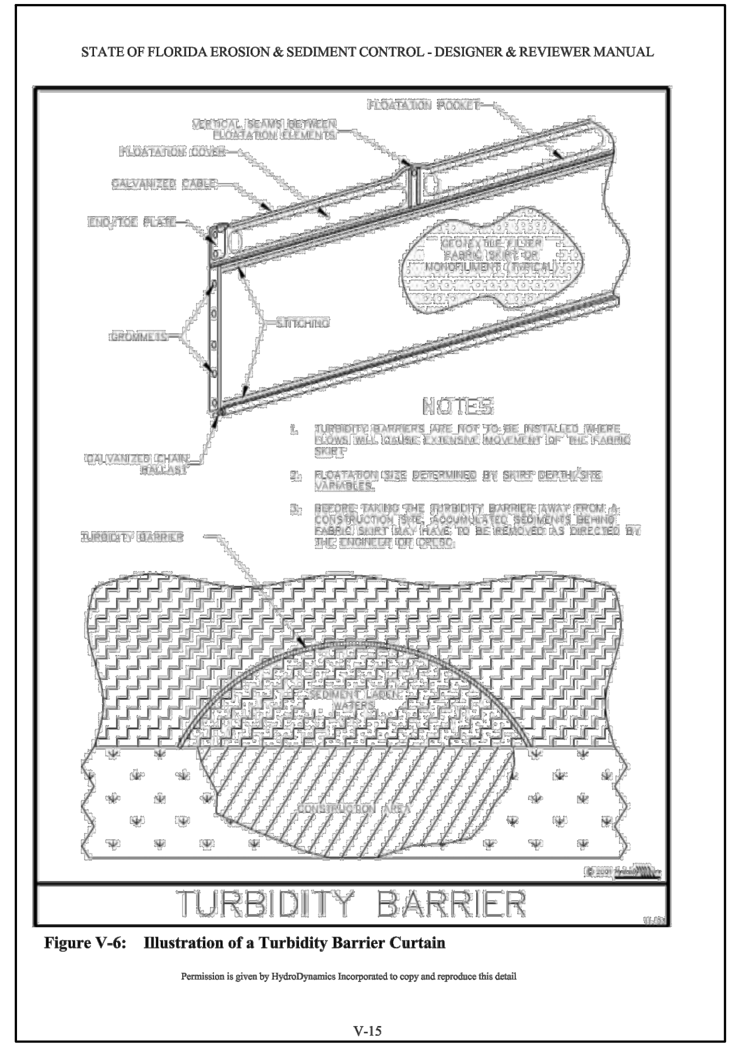
EROSION CONTROL PLAN

SHEET NO.
CE9



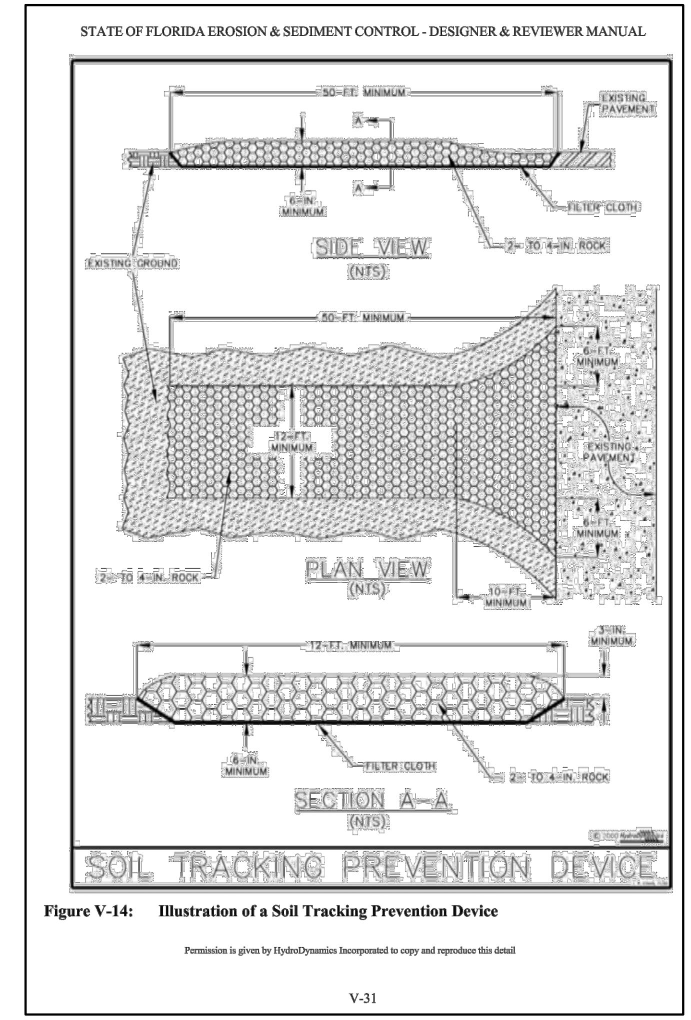
SILT FENCE BARRIER INSTALLATION

NOT TO SCALE



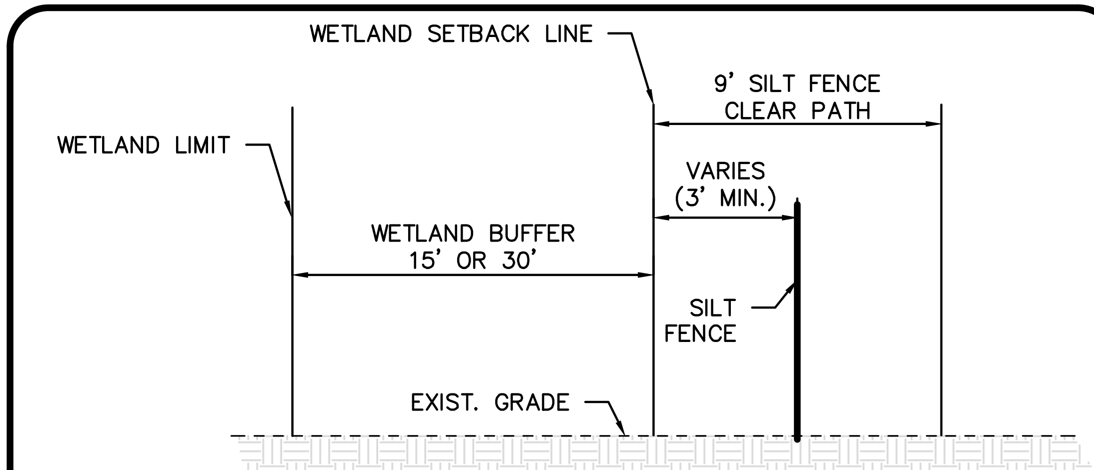
TURBIDITY BARRIER

NOT TO SCALE



SOIL TRACKING PREVENTION DEVICE

NOT TO SCALE



CLEAR PATH DETAIL

NOT TO SCALE

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TECO

PROJECT NAME

BIG BEND SOLAR II

EROSION CONTROL DETAILS

SHEET NO.

CE10

Section 1	Project Name and location information:	Big Bend II Solar Energy Center
Section 2	Describe the nature of the construction activity:	31.03 MW (AC) Solar Energy Facility
Section 3	Describe the intended sequence of major soil disturbing activities:	0-2 days; install perimeter sediment and erosion controls 3-10 days; clearing and site prep 11-40 days; earthwork - filling & grading 41-120 days; roadway and underground construction 121-128 Site Stabilization
Section 4	Total area of the site:	191.31 Acres
Section 5	Total area of the site to be disturbed:	157.5 Acres
Section 6	Existing data describing the soil or quality of any stormwater discharge from the site:	Soil Types: • Basinger, Holopaw, and Samsula soils, depressional • Malabar fine sand, 0 to 2 percent slopes • Myakka fine sand, 0 to 2 percent slopes • Myakka fine sand, frequently flooded • Wabasso fine sand, 0 to 2 percent slopes
Section 7	Estimate the drainage area size for each discharge point:	Outfall – 191.31 Acres
Section 8	Latitude and longitude of each discharge point and identify the receiving water or MS4 for each discharge point:	LAT: 27.7839° LONG: -82.3961°
Section 9	Give a detailed description of all controls, Best Management Practices (BMPs) and measures that will be implemented at the construction site for each activity identified in the intended sequence of major soil disturbing activities section. Provide time frames in which the controls will be implemented. NOTE: All controls shall be consistent with performance standards for erosion and sediment control and stormwater treatment set forth in s. 62-40.432, F.A.C., the applicable Stormwater or Environmental Resource Permitting requirements of the Department or a Water Management District, and the guidelines contained in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual, FDOT, FDEP, and any subsequent amendments.	
	• Prior to clearing, a silt fence (trenched 6 inches deep and backfilled on the uphill side), may be installed as required. Floating turbidity barrier will be installed to the limits of soil disturbance along the shoreline. • Disturbed portions of the site where construction activities have permanently ceased shall be stabilized with sod or other permanent stabilization methods no later than 60 days after the last construction activity. • All installation shall be commenced as depicted on the attached site map and installation "typical".	
Section 10	Describe all temporary and permanent stabilization practices. Stabilization practices include temporary seeding, mulching, permanent seeding, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, vegetative preservations, etc.	
	• Grassing or mulch shall be used to stabilize all disturbed areas.	
Section 11	Describe all structural controls to be implemented to divert stormwater flow from exposed soils and structural practices to store flows, retain sediment on-site or in any other way limit stormwater runoff. These controls include silt fences, earth dikes, diversions, swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, coagulating agents and temporary or permanent sediment basins.	
	The site has been designed to minimize earthwork, therefore the contractor isn't required to widescale clearing and grading actives and thus reducing the disturbed areas.	
Section 12	Describe all sediment basins to be implemented for areas that will disturb 10 or more acres at one time. The sediment basins (or an equivalent alternative) should be able to provide 3,600 cubic feet of storage for each acre drained. Temporary sediment basins (or an equivalent alternative) are recommended for drainage areas under 10 acres.	
	No temporary sedimentation basins are proposed as runoff will be directed to permanent surface water management system.	

Section 13	Describe all permanent stormwater management controls such as, but not limited to, detention or retention systems or vegetated swales that will be installed during the construction process.	
	• The Project's vegetative natural buffers will be installed during the construction phase, to assist in the site water quality discharge management.	
Section 14	Waste disposal, this may include construction debris, chemicals, litter, and sanitary wastes.	All construction materials and debris will be placed in a dumpster and hauled off site to a landfill or other proper disposal site. No materials will be buried on site.
Section 15	Offsite vehicle tracking from construction entrances/exits	Off-site vehicle tracking of sediments and dust generation will be minimized via a rock construction entrance, street sweeping, and the use of water to keep dust down.
Section 16	The proper application rates of all fertilizers, herbicides and pesticides used at the construction site:	Florida friendly fertilizers and pesticides will be used at a minimum and in accordance with the manufacturer's suggested application rates.
Section 17	The storage, application, generation and migration of all toxic substances:	All paints and other chemicals will be stored in a locked covered shed
Section 18	Other	Port-o-lets will be placed away from storm sewer systems, storm inlet(s), surface waters and wetlands. No vehicle maintenance shall be conducted on site. A washdown area shall be designated at all times and will not be located in any area that will allow for the discharge of polluted runoff.
Section 19	Provide a detailed description of the maintenance plan for all structural and non-structural controls to assure that they remain in good and effective operating condition. Contractor shall provide routine maintenance of permanent and temporary sediment and erosion control features in accordance with the technical specifications or as follows, whichever is more stringent: • Silt fence shall be inspected at least weekly. Any required repairs shall be made immediately. Sediment deposits shall be removed when they reach approximately one half the height of the barrier. • Maintenance shall be performed on the rock entrance when any void spaces are full of sediment. • Inlet(s)/outfalls shall be inspected immediately after each rain event and any required repairs to the filter inlets, silt fence, or filter fabric shall be performed immediately. • Bare areas of the site that were previously seeded shall be re-seeded per manufactures' instructions. • Mulch and sod that has been washed out shall be replaced immediately • Maintain all other areas of the site with proper controls as necessary.	
Section 20	Inspections: Describe the inspection and inspection documentation procedures, as required by the FDEP NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities. Qualified personnel will inspect all points of discharges, all disturbed areas of construction that have not been stabilized, constructed areas and locations where vehicles enter and exit the site, and all BMPs at least once every 7 calendar days and within 24 hours of the end of a rainfall event that is 0.5 inches or greater. Where sites have been finally stabilized, said inspections shall be conducted at least once every month until the Notice of Termination is filed.	
Section 21	Identify and describe all sources of non-stormwater discharges as allowed by the FDEP NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities.	
	It is expected that no non-stormwater discharges will occur from the site during construction period;	
Section 22	All contractor(s) and subcontractor(s) identified in the SWPPP must sign the following certification:	
	"I certify under penalty of law that I understand, and shall comply with, the terms and conditions of the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities and this Stormwater Pollution Prevention Plan prepared thereunder."	

JAMES PARKER TERPENING JR. LICENSE No 24276 STATE OF FLORIDA PROFESSIONAL ENGINEER

JAMES P. TERPENING JR., P.E.
FL. REG. NO. 24276

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

C&T JOB NO. 20-158	
DESIGNED BY JPT 12-17-20	DRAWN BY AND12-18-20
CHECKED BY .	CHECKED BY .
ENGINEER OF RECORD: JAMES P. TERPENING, P.E. NO. 24276	

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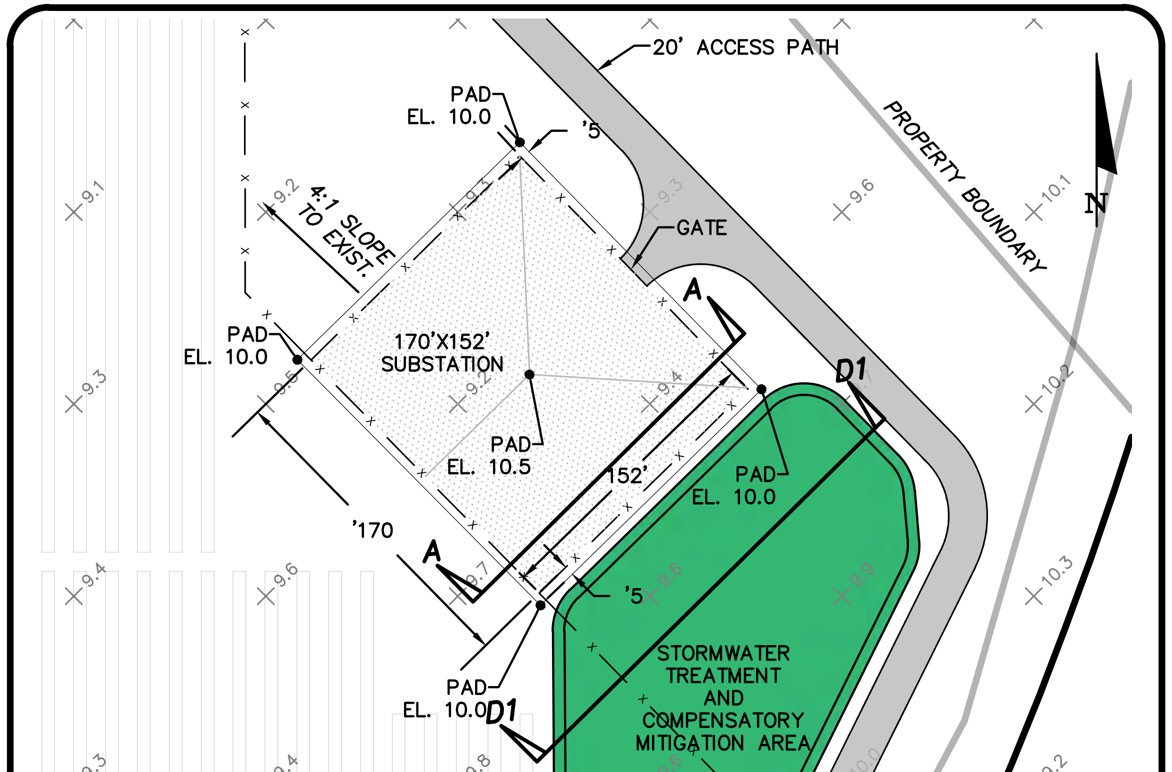
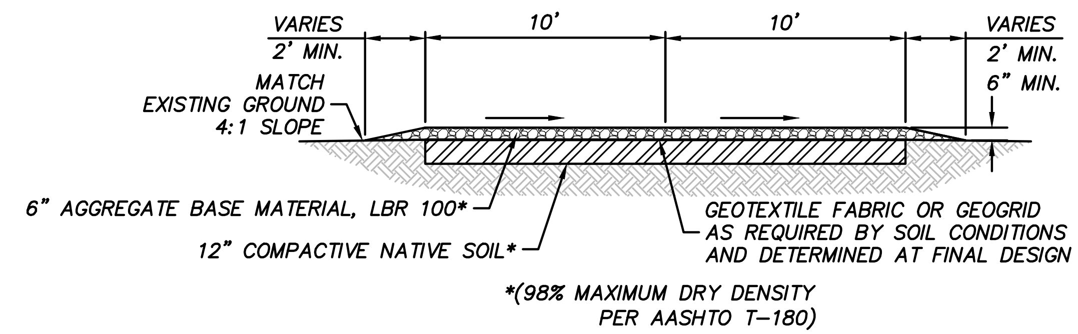
TECO
PROJECT NAME
BIG BEND SOLAR II

EROSION CONTROL DETAILS

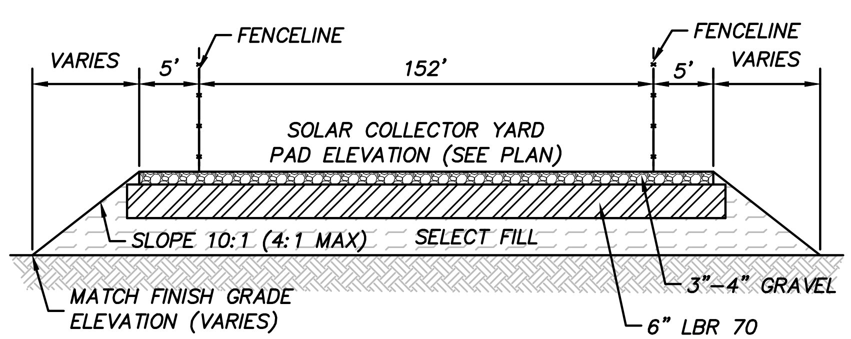
SHEET NO.
CE11



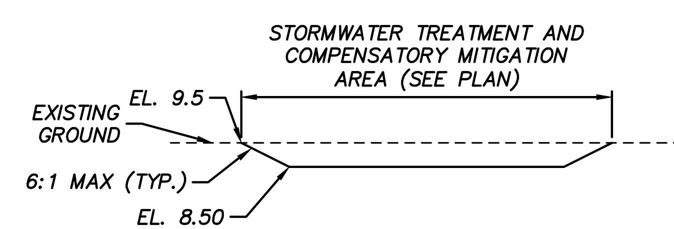
SUBSTATION DETAIL
1"=100'



20' WIDE ACCESS PATH
NOT TO SCALE



SUBSTATION SEC. A-A
NOT TO SCALE



SUBSTATION SECTION D1-D1
NOT TO SCALE

JAMES PARKER TERPENING JR. LICENSE No 24276 STATE OF FLORIDA PROFESSIONAL ENGINEER

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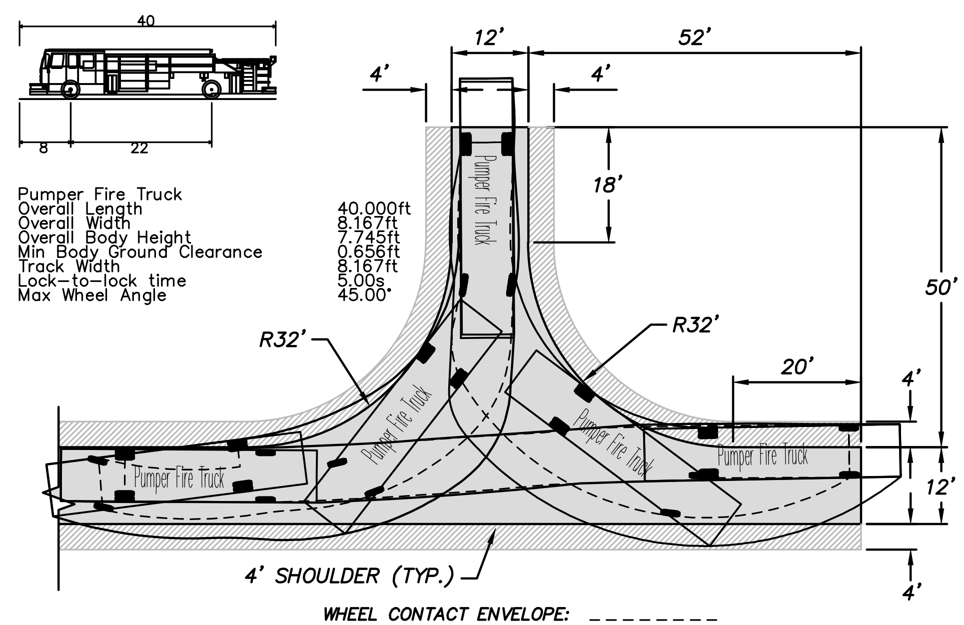
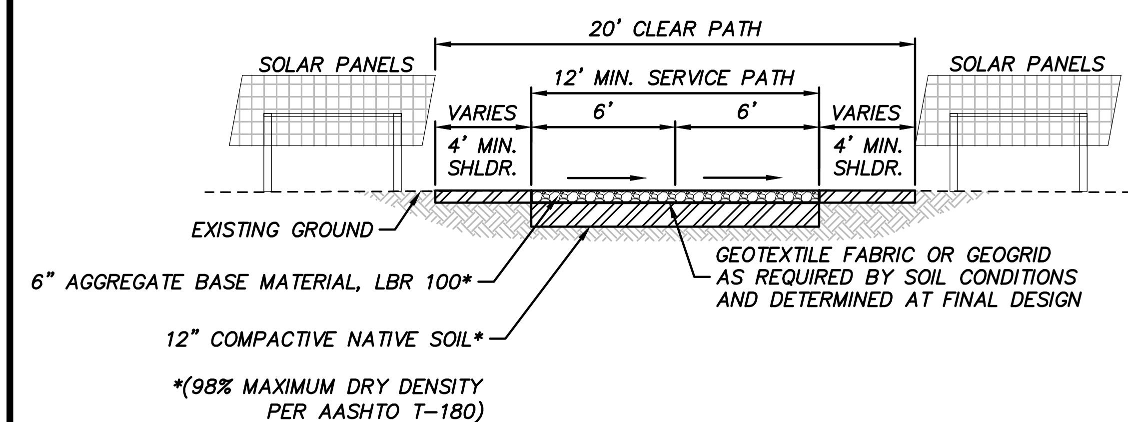
TECO
PROJECT NAME
BIG BEND II SOLAR

DETAILS AND TYPICAL SECTIONS

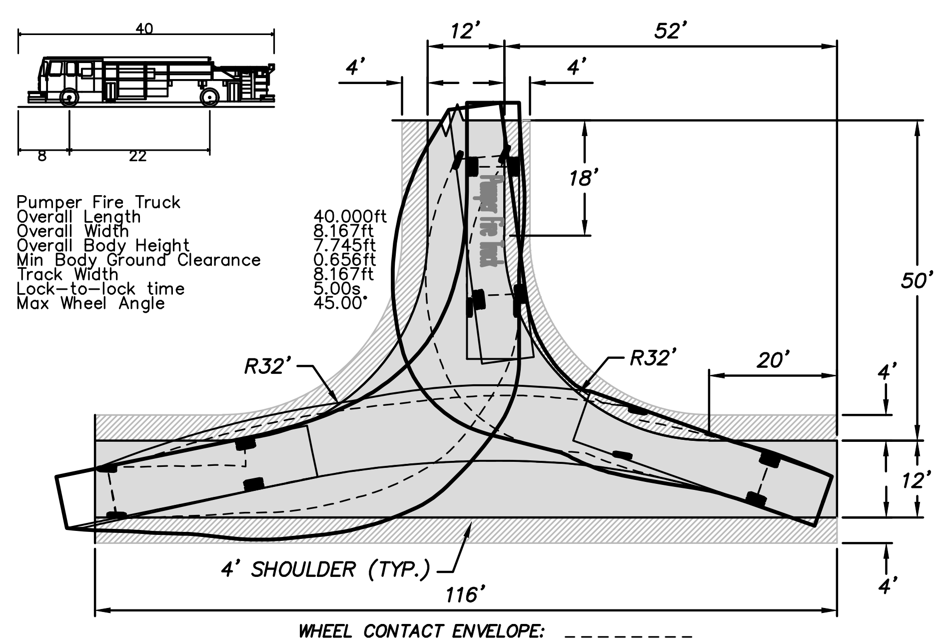
SHEET NO.
CE12



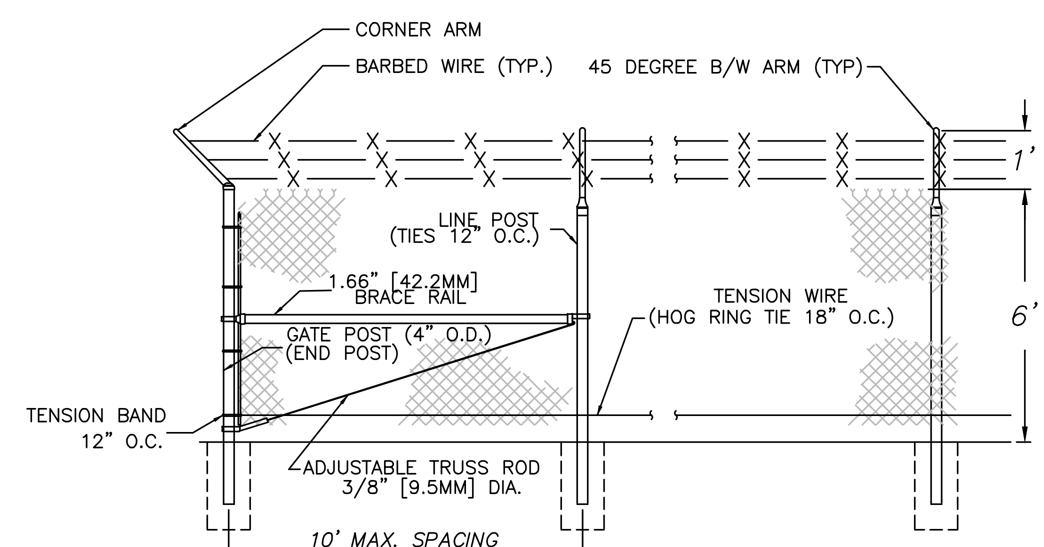
HAMMERHEAD TURN-AROUND
NOT TO SCALE



TYPICAL 12' MINIMUM SERVICE PATH
NOT TO SCALE



TEE TURN-AROUND
NOT TO SCALE



SECURITY FENCE DETAIL
NOT TO SCALE

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FL. REG. NO. 24276

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PROJECT NAME
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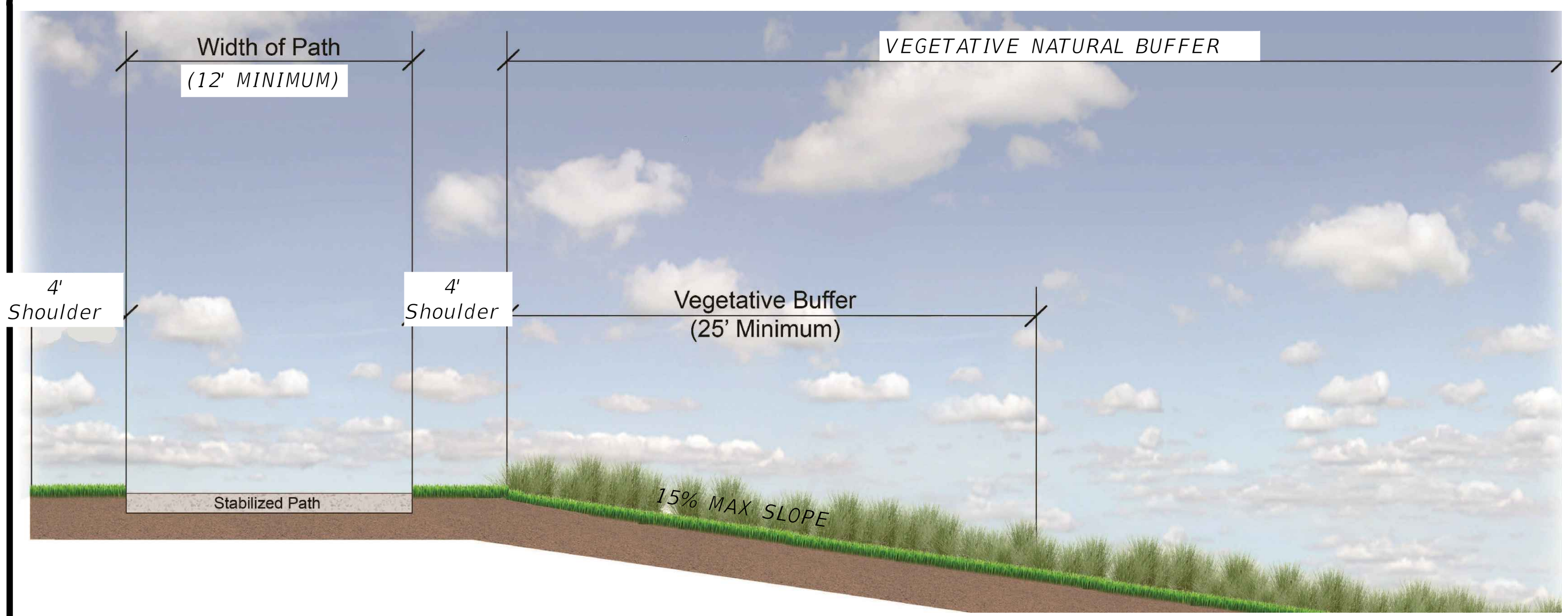
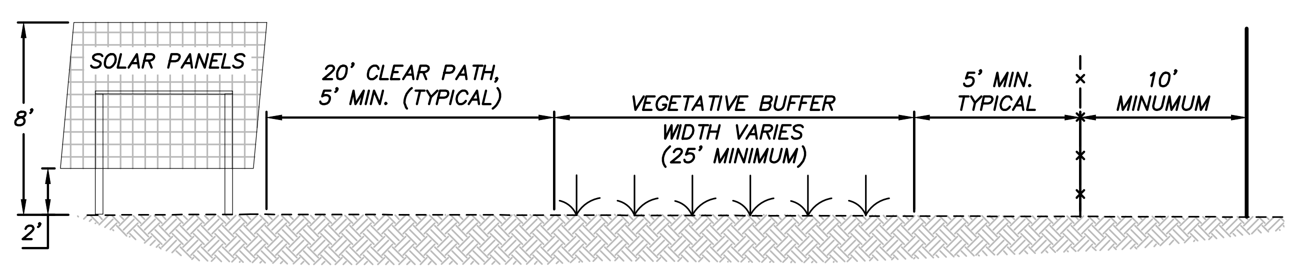
DETAILS AND TYPICAL SECTIONS

SHEET NO.
CE13

P:\Proj-2020\20-158 TECO Big Bend II\Eng\20-158 Details.dwg Plotted: 12/22/2020 9:41 AM By: NICOLE DEMERITTE



VEGETATED NATURAL BUFFER GRAPHIC
NOT TO SCALE



VEGETATED NATURAL BUFFER
NOT TO SCALE

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PROJECT NAME
BIG BEND II SOLAR

DETAILS AND TYPICAL SECTIONS

SHEET NO.
CE14

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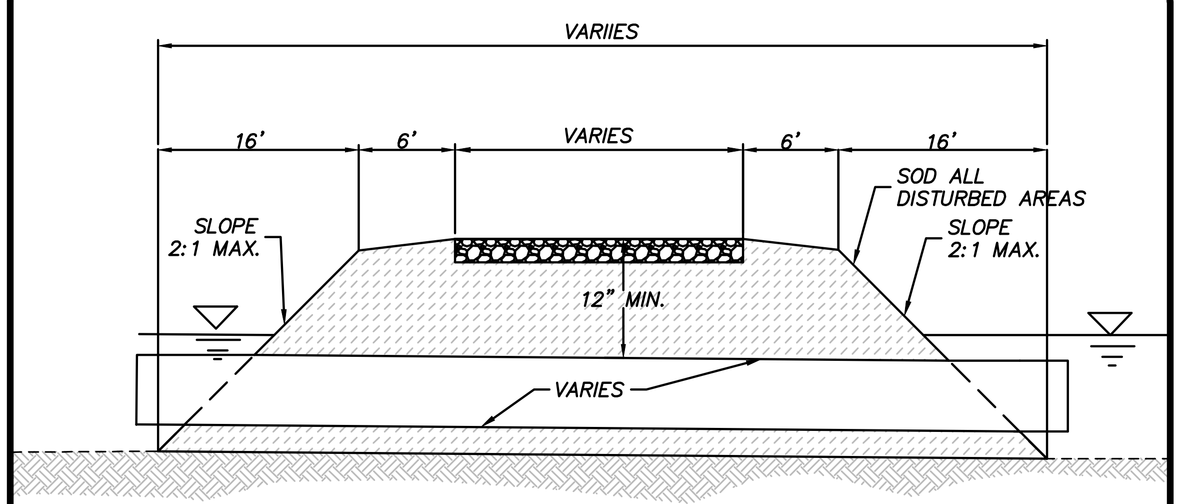
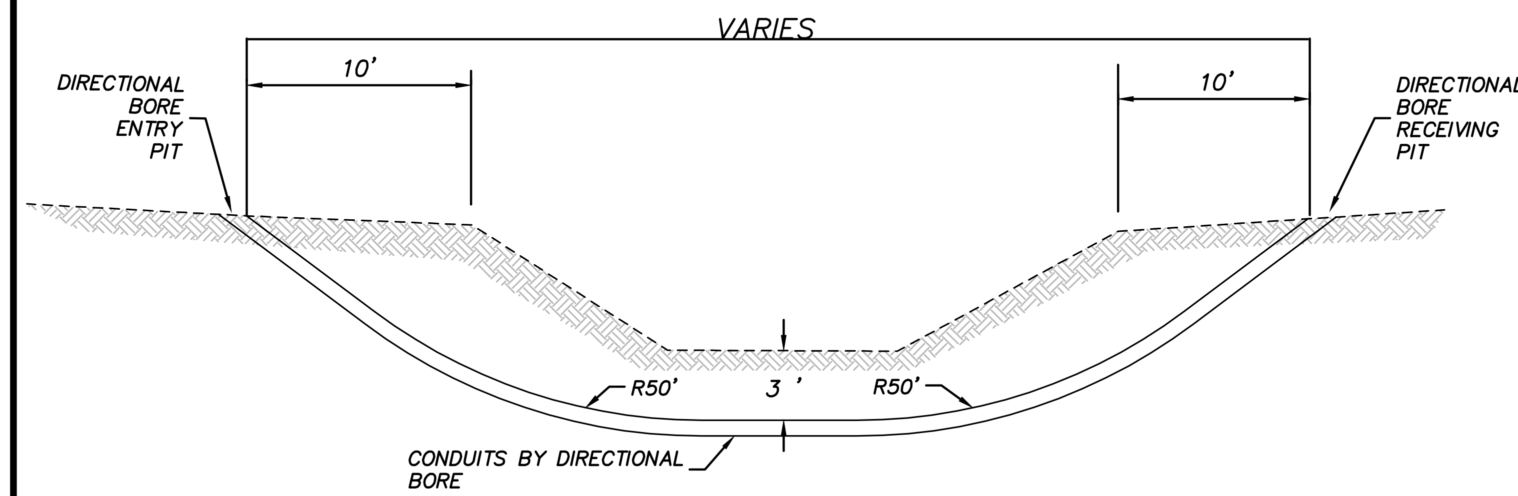
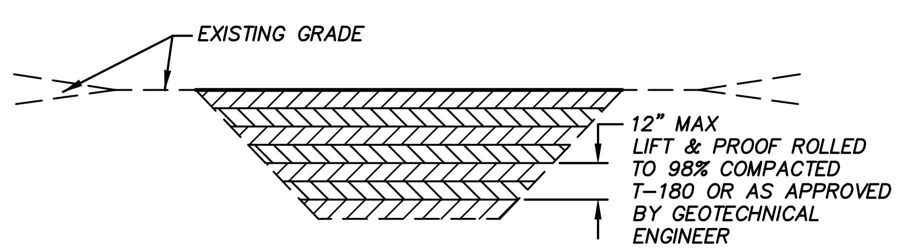


TYPICAL PATHWAY CROSSING
NOT TO SCALE



DITCH DIRECTIONAL BORE
NOT TO SCALE



TYPICAL FILL PLACEMENT & COMPACTION DETAIL
NOT TO SCALE

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TECO
PROJECT NAME
BIG BEND II SOLAR

DETAILS AND TYPICAL SECTIONS

SHEET NO.
CE15

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1. GENERAL

A. SOIL TESTING: SOIL TESTING SHALL BE PERFORMED BY A CERTIFIED TESTING LABORATORY.

2. EARTHWORK AND GRADING

A. MATERIALS AND CONSTRUCTION METHODS FOR EARTHWORK, EXCAVATION, EMBANKMENT AND GRADING SHALL MEET THE REQUIREMENTS OF FDOT SECTION 120 AND SHALL BE PERFORMED TO ACHIEVE FINAL GRADES, ELEVATIONS AND TYPICAL SECTIONS AS SHOWN ON THE PLANS FOR PROPOSED WORK.

B. CLEARING AND GRUBBING: CLEARING AND GRUBBING SHALL MEET THE REQUIREMENTS OF FDOT SECTION 110 AND SHALL BE PERFORMED WITHIN THE LIMITS OF THE PROJECT WORK. ALL MATERIAL SHALL BE REMOVED FROM THE SITE OF THE PROJECT AND SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL, REGIONAL, STATE AND FEDERAL LAWS, REGULATIONS AND ORDINANCES.

C. ROUGH GRADE: THE CONTRACTOR SHALL GRADE THE SITE TO MEET THE REQUIREMENTS OF FDOT SECTIONS 110 AND 120 AND SHALL CONFORM TO THE LINES, GRADES, AND TYPICAL SECTIONS AS SHOWN ON THE PLANS.

D. SODDING, SEED AND MULCH: SODDING, SEED AND MULCH SHALL MEET THE REQUIREMENTS OF FDOT SECTIONS 570 AND 981 AND SHALL BE PLACED IN ALL DISTURBED AREAS NOT OTHERWISE ADDRESSED IN PLANS.

3. DRAINAGE IMPROVEMENTS

MATERIALS, TRENCH EXCAVATION, PIPE LAYING AND BACKFILLING OPERATIONS FOR DRAINAGE IMPROVEMENTS SHALL MEET THE REQUIREMENTS OF FDOT SECTIONS 125 AND 430. PIPE SHALL BE LAID IN TRUE ALIGNMENT IN A PIPE TRENCH WITH AN ADEQUATE SUPPORTING VALUE AND "BEDDED" TO THE DETAIL SHOWN IN THE PLANS AND FDOT SECTION 430. ALL BACKFILL SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180, UNLESS OTHERWISE SHOWN ON THE PLANS.

THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO COMPLETE THE WORK FOR DRAINAGE IMPROVEMENTS AT THE LOCATIONS, SIZES, AND TYPES SHOWN ON THE PLANS FOR THE FOLLOWING ITEMS:

A. REINFORCED CONCRETE PIPE: REINFORCED CONCRETE PIPE SHALL MEET THE REQUIREMENTS OF CLASS III OF ASTM C-76, WALL THICKNESS "B", LATEST REVISION, AS MODIFIED BY FDOT SECTION 430. GASKETS FOR PIPE JOINTS SHALL BE ROUND RUBBER GASKETS AND SHALL MEET THE REQUIREMENTS OF FDOT SECTION 942.

B. CORRUGATED ALUMINUM PIPE: CORRUGATED ALUMINUM PIPE SHALL MEET THE REQUIREMENTS OF FDOT SECTION 945, AND SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS.

4. MAINTENANCE OF TRAFFIC

MAINTENANCE OF TRAFFIC SHALL BE IN ACCORDANCE WITH FDOT INDICES 600-670.

THE WORK

EXISTING UTILITIES AND STRUCTURES:

EXISTING UTILITIES, STRUCTURES AND FACILITIES SHOWN ON THE DRAWINGS WERE LOCATED AS ACCURATELY AS POSSIBLE FROM THE RECORDS EXAMINED. NO GUARANTEE IS MADE THAT ALL EXISTING FACILITIES ARE SHOWN OR THAT THOSE SHOWN ARE ENTIRELY ACCURATE. THE CONTRACTOR SHALL ASSURE HIMSELF OF THE ACTUAL LOCATION OF THE UTILITIES, STRUCTURES, OR FACILITIES PRIOR TO PERFORMANCE OF ANY WORK IN THE VICINITY. THE UTILITY COMPANIES OR UTILITY AGENCIES WILL CO-OPERATE WITH THE CONTRACTOR'S OPERATIONS. PRIOR TO START OF THE WORK, THE CONTRACTOR SHALL REQUEST EACH UTILITY AGENCY TO ADVISE HIM OF THE LOCATION OF THEIR FACILITIES IN THE VICINITY. THE OWNER WILL ASSUME NO LIABILITY FOR DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE CONTRACTOR'S OPERATION IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, OR TO THE TEMPORARY BRACING AND SHORING OF SAME. IN THE EVENT THAT IT IS NECESSARY TO SHORE, BRAVE, OR SWING A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHOULD BE CONTACTED AND THEIR PERMISSION SECURED AS TO THE METHOD USED FOR ANY SUCH WORK.

RESTORATION OF DAMAGED STRUCTURES OR UTILITIES:
IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR, REBUILD OR RESTORE TO ITS FORMER CONDITION, ANY AND ALL PORTIONS OF EXISTING UTILITIES, STRUCTURES, EQUIPMENT, APPURTENANCES OR FACILITIES, WHICH MAY BE DISTURBED OR DAMAGED DUE TO THIS CONSTRUCTION OPERATION.

ABANDONMENT OF SEPTIC TANKS:
ABANDONMENT OF SEPTIC TANKS SHALL BE IN ACCORDANCE WITH THE HEALTH DEPARTMENT POLICY UNDER FLORIDA ADMINISTRATIVE CODE 64E-6.001.

FINAL CLEANUP:
UPON COMPLETION OF THE WORK, BUT BEFORE FINAL PAYMENT WILL BE MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE PROJECT AREA, ALL FALSEWORK, EQUIPMENT, SURPLUS AND DISCARDED MATERIALS, RUBBISH AND TEMPORARY STRUCTURES WHICH RESULT FROM THE WORK UNDER THIS AGREEMENT, AND SHALL RESTORE IN AN ACCEPTABLE MANNER, ALL PROPERTY WHICH HAS BEEN DAMAGED DURING THE PROSECUTION OF THE WORK.

RECORD INFORMATION:
UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL OBTAIN AND SUBMIT RECORD INFORMATION TO THE OWNER. THIS INFORMATION SHALL INCLUDE THE FOLLOWING:

1. DRAINAGE SYSTEM:
   A. HIGH POINTS AND LOW POINTS OF SITE;
   B. LOCATION, SIZE, TYPE, LENGTH AND INVERT OF ALL CULVERTS.

2. PATHWAYS AND GRADING:
THE RECORD INFORMATION SHALL BE CERTIFIED BY A FLORIDA PROFESSIONAL LAND SURVEYOR. LOCATIONS SHALL BE MADE BY REFERENCE TO CENTERLINE STATIONING AND OFFSET OR BY OTHER MEANS ACCEPTABLE TO THE OWNER. ELEVATIONS SHALL BE ACCORDING TO THE NORTH AMERICAN VERTICAL DATUM (NAVD).

3. GEOTECHNICAL TESTING :
INCLUDES ALL PROCTORS, LBR AND DENSITIES.

GENERAL NOTES

1. ALL DISTURBED AREAS TO BE SEEDED AND MULCHED, UNLESS OTHERWISE NOTED IN THE PLAN.
2. THE VEGETATIVE DRAINAGE FEATURES REQUIRE ESTABLISHMENT OF VEGETATIVE COVER PRIOR TO THE REMOVAL OF THE SILT FENCING.
3. ALL SLOPES GREATER THAN 4:1 SHALL BE SODDED.
4. THE LOCATION OF EXISTING UTILITIES SHOWN IS APPROXIMATE ONLY AND MUST BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING WORK.
5. THESE PLANS SHALL NOT BE USED FOR CONSTRUCTION UNLESS THEY ARE MARKED "APPROVED FOR CONSTRUCTION" IN THE TITLE BLOCK.
6. CONTRACTOR TO OBTAIN AND REVIEW ALL PERMITS PRIOR TO STARTING CONSTRUCTION
7. ALL NUISANCE EXOTIC VEGETATION ON-SITE MUST BE REMOVED IN CONJUNCTION WITH SITE DEVELOPMENT.
8. DRAWING SCALE MAY CHANGE DUE TO REPRODUCTION.

JAMES PARKER TERPENING JR
LICENSE
No 24276
STATE OF FLORIDA
PROFESSIONAL ENGINEER

JAMES P. TERPENING JR, P.E.
FL. REG. NO. 24276

REVISIONS

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TECO
PROJECT NAME
BIG BEND II SOLAR

GENERAL NOTES

SHEET NO.
CE16

TAB 4

APPENDIX B

DEEDS AND PROPERTY BOUNDARY/WETLAND SURVEYS

FEE SIMPLE DEED

THIS INDENTURE, Made this 4th day of August, 1969, between THE EXCHANGE NATIONAL BANK OF TAMPA, a corporation created and existing under the national banking laws of the United States of America, as Trustee and in its own right, party of the first part, and TAMPA ELECTRIC COMPANY, a Florida corporation, whose post office address is P. O. Box 111, Tampa, Florida, 33601, party of the second part,

W I T N E S S E T H:

That the said party of the first part, for and in consideration of the sum of Ten Dollars and other valuable considerations, to it in hand paid by the said party of the second part, the receipt whereof is hereby acknowledged, has granted, bargained, sold, conveyed and confirmed to the said party of the second part, its successors and assigns forever, all those certain parcels of land lying and being in the County of Hillsborough, and State of Florida, more particularly described as Parcels "A", "B" and "C" as shown on Schedule "A" attached hereto and by reference made a part hereof;

TOGETHER WITH all and singular, the tenements, hereditaments and appurtenances thereunto belonging or appertaining; and every right, title, or interest, legal or equitable, of the said parties of the first part, of, in and to the same.

TO HAVE AND TO HOLD the same unto the said party of the second part, and its successors and assigns, to its own proper use, benefit and behoof, in fee simple, forever.

IN WITNESS WHEREOF, the said THE EXCHANGE NATIONAL BANK OF TAMPA has caused its name to be hereunto subscribed by its Vice President and Trust Officer and its corporate seal to be hereunto affixed and this instrument duly attested by its Cashier, in its capacity as Trustee and in its own right as herein described, the day and year first above written.

THE EXCHANGE NATIONAL BANK OF TAMPA

By J. Thurman Howell
Vice President and Trust Officer

ATTEST:

[signature]
Cashier

Signed, sealed and delivered
in the presence of:

Clara Bublies

Jane E. Hartley

IMAGED

This instrument was prepared by
CHARLES C. WHITAKER, II OF
HOLLAND & KNIGHT
2110 Exchange National Bank Bldg.
Tampa, Florida 33602

STATE OF FLORIDA)
: ss.
COUNTY OF HILLSBOROUGH)

I HEREBY CERTIFY, That on this 4th day of August, 1969, before me, the undersigned authority, personally appeared J. Thurman Hively, Jr. and H. W. Warkentine, to me known to be the persons described in and who executed the foregoing instrument as Vice President and Trust Officer, and Cashier, respectively, of THE EXCHANGE NATIONAL BANK OF TAMPA, a corporation, and who severally and duly acknowledged the execution of such instrument as such officers aforesaid, for and on behalf of and as the act and deed of said corporation, in its capacity as Trustee and in its own right as therein described, for the uses and purposes therein expressed, pursuant to authority lawfully conferred upon them by said corporation; and that the seal affixed thereto is the true and genuine corporate seal of said corporation and was affixed thereunto by the said Cashier, under like authority, he being the proper custodian thereof.

WITNESS my hand and official seal the date aforesaid.

Chrystelle Gonzalez
Notary Public State of Florida at Large

My commission expires: Dec. 28, 1972.

OFF REC 2065 PG 11

SCHEDULE "A" (Page One)

Attached to Fee Simple Deed from THE EXCHANGE NATIONAL BANK OF TAMPA, a corporation created and existing under the national banking laws of the United States of America, as Trustee and in its own right, to Tampa Electric Company, a Florida corporation, dated the 4th day of August, 1969.

PARCEL "A": Tracts 8, 9, 10, 11 and 12 of RUSKIN TOMATO FARMS, according to plat thereof recorded in Plat Book 27 at page 110, Public Records of Hillsborough County, Florida, LESS right-of-way for U. S. Highway 41, and LESS the West 60 feet of Tract 12.

PARCEL "B": A parcel of land lying in Tampa Bay between the Hillsborough County Bulkhead Line as recorded in Plat Book 36 on page 91 of the Public Records of Hillsborough County, Florida, and the mean high water line of the easterly shore of Tampa Bay and lying in Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, more particularly described as follows:

Commence at the northeast corner of Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, run thence North 88° 56' 28" West along the northerly boundary of said Section 16 a distance of 800 feet; run thence South 01° 03' 32" West a distance of 200 feet to a point on the mean high water line of the easterly shore of Tampa Bay for a point of beginning; run thence North 88° 56' 28" West along a line 200 feet south of and parallel to the westerly projection into Tampa Bay of the northerly boundary line of said Section 16 a distance of 2878.32 feet, more or less, to intersect the Hillsborough County Bulkhead Line as recorded in Plat Book 36 on page 91 of the Public Records of Hillsborough County, Florida; run thence South 34° 59' 22" West along said Bulkhead Line to intersect the northerly extension of the dividing line between Sections 20 and 21 in Township 31 South, Range 19 East, Hillsborough County, Florida; leaving said Bulkhead Line, run thence southerly along the northerly extension of the dividing line between said Sections 20 and 21 to a point on the mean high water line of the easterly shore of Tampa Bay; meander thence northeasterly, easterly, northerly, southeasterly, northwesterly and northeasterly along the mean high water line of the easterly shore of Tampa Bay to the point of beginning.

SCHEDULE "A" (Page Two)

Attached to Fee Simple Deed from THE EXCHANGE NATIONAL BANK OF TAMPA, a corporation created and existing under the national banking laws of the United States of America, as Trustee and in its own right, to Tampa Electric Company, a Florida corporation, dated the 4th day of August, 1969.

PARCEL "C": A tract of land in Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, described as follows:

Commence at the northeast corner of said Section 16, run thence southerly along the easterly boundary of said Section 16 to the northeast corner of the SE 1/4 of said Section 16; run thence westerly along the northerly boundary of the E 1/2 of the SE 1/4 of said Section 16 to the northwest corner of the E 1/2 of the SE 1/4 of said Section 16; run thence southerly along the westerly boundary of the E 1/2 of the SE 1/4 of said Section 16 to the southwest corner of the E 1/2 of the SE 1/4 of said Section 16; run thence westerly along the southerly boundary of said Section 16 to a point on the easterly boundary of Apollo Beach Subdivision, Unit 8, as recorded in Plat Book 37 on page 94 of the Public Records of Hillsborough County, Florida; run thence northerly along the easterly boundary of said Apollo Beach Subdivision, Unit 8, to the northeast corner of said Apollo Beach Subdivision, Unit 8, run thence westerly along the northerly boundary of said Apollo Beach Subdivision, Unit 8, and the northerly boundary of said Apollo Beach Subdivision, Unit 8, Section "A", as recorded in Plat Book 35 on page 97 of the Public Records of Hillsborough County, Florida, to intersect the Government Meander Line as established in October, 1847; run thence North 36° 30' East along said Government Meander Line to a point on the mean high water line of the easterly shore of Tampa Bay; meander thence easterly, northerly, southeasterly, northwesterly and northeasterly along said mean high water line to intersect the northerly boundary line of said Section 16; run thence easterly along the northerly boundary line of said Section 16 to the point of beginning.

Form 117 2-67 2M

POLICY NO. **W 100361**

AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY
STANDARD FORM A — 1962

TITLE INSURANCE COMPANY
OF MINNESOTA

a Stock Company, of Minneapolis, Minnesota

TITLE INSURANCE COMPANY OF MINNESOTA, herein called the Company, for a valuable consideration, hereby insures the party named in Schedule A, hereinafter called the Insured, the heirs, devisees, personal representatives of such Insured, or if a corporation, its successors by dissolution, merger or consolidation, against loss or damage not exceeding the amount stated in Schedule A, together with costs, attorneys' fees and expenses which the Company may become obligated to pay as provided in the Conditions and Stipulations hereof, which the Insured shall sustain by reason of:

1. any defect in or lien or encumbrance on the title to the estate or interest covered hereby in the land described or referred to in Schedule A, existing at the date hereof, not shown or referred to in Schedule B or excluded from coverage in Schedule B or in the Conditions and Stipulations; or

2. lack of a right of access to and from the land;

all subject, however, to the Conditions and Stipulations hereto annexed, which Conditions and Stipulations, together with Schedules A and B, are hereby made a part of this policy; all as of the effective date of this policy.

IN WITNESS WHEREOF, the said Title Insurance Company of Minnesota has caused its corporate name and seal to be hereunto affixed by its duly authorized officers as of the date shown in Schedule A, the policy to be valid when countersigned by an authorized officer or agent of the Company.

TITLE INSURANCE COMPANY OF MINNESOTA

TITLE INSURANCE COMPANY OF MINNESOTA CORPORATE SEAL

R M Bearce
President

R. J. Garwood
Secretary

Countersigned:

Edward J. Kohrs
Authorized Officer or Agent

File No. 69-1P

Policy No. W 100361

Amount $
PARCEL A - $1,433,800.00
PARCEL B 40,000.00
PARCEL C 530,000.00
PARCEL D 196,200.00

SCHEDULE A

1. Policy Date December 15, 1969 at 8:00 A. .M.

2. The Insured hereunder, in whom title to the fee simple estate is vested, at the date hereof, is:

TAMPA ELECTRIC COMPANY, a Florida corporation

3. The land referred to in this policy is situated in the County of Hillsborough, State of Florida and is described as follows:

SEE SCHEDULE "A" ATTACHED.

MINNESOTA TITLE SINCE 1907

File No. 69-1P Policy No. W 100361

SCHEDULE B

This policy does not insure against loss or damage by reason of the following:

1. Facts which would be disclosed by an accurate survey of the premises herein described.
2. Mechanics' or materialmen's liens or other lien claims, if any, where no notice thereof appears on record.
3. General or special taxes and assessments required to be paid in the year 1969 and subsequent years.
4. Rights and claims of parties in possession.
5. PARCEL A - Rights of Hillsborough County in and to the North 60 feet of Tracts 9, 10, 11 and 12 by virtue of that certain drainage easement from Francis J. Corr, Incorporated, a Michigan corporation, in deed dated February 17, 1960, filed for record on February 24, 1960 and recorded in O.R. Book 470 at page 85 of the public records of Hillsborough County, Florida.
6. PARCELS B, C, AND D - Rights of Coastal Petroleum Company, its successors and assigns, under leases with Trustees of Internal Improvement Fund of State of Florida as to any portion of insured lands which may be submerged or filled land.
7. PARCELS B AND D - Rights of the United States Government by reason of the Government's control over navigable waters in the interest of commerce and navigation.
8. PARCEL B - Oil, gas and mineral reservations in Deed No. 24621 (1931-29) from Trustees of Internal Improvement Fund of State of Florida to Francis J. Corr and Paul B, Dickman dated March 20, 1969.
9. PARCEL C - Rights of the State Road Department of State of Florida and/or County of Hillsborough in and to the East 75 feet of the E 1/2 of NE¼ and to the South 75 feet of the East 1080 feet of the E 1/2 of NE¼, all lying and being in Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, which land is described in that certain "Subordination of Encumbrance", dated September 5, 1968, filed December 4, 1968 and recorded in O.R. Book 1971 at page 765.
10. PARCELS A, C, AND D - Hillsborough County zoning regulations.
11. PARCELS B, C AND D - Riparian rights are neither guaranteed nor insured.
12. Notwithstanding the amount of the total exposure under this policy, the exposure of Title Insurance Company of Minnesota as to each individual parcel insured hereby shall not exceed the purchase price of that parcel as indicated hereinabove, it being the intent hereof to limit liability in the same manner as if separate policies had been issued on each of the above four (4) parcels, and as if each policy had been issued for the amount of the purchase price set forth hereinabove.

MINNESOTA TITLE SINCE 1907

CONDITIONS AND STIPULATIONS

1. Definition of Terms

The following terms when used in this policy mean:

(a) "land": the land described, specifically or by reference, in Schedule A and improvements affixed thereto which by law constitute real property;

(b) "public records": those records which impart constructive notice of matters relating to said land;

(c) "knowledge": actual knowledge, not constructive knowledge or notice which may be imputed to the Insured by reason of any public records; and

(d) "date": the effective date.

2. Exclusions from the Coverage of this Policy

This policy does not insure against loss or damage by reason of the following:

(a) The refusal of any person to purchase, lease or lend money on the estate or interest covered hereby in the land described in Schedule A.

(b) Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions, or location of any improvement now or hereafter erected on said land, or prohibiting a separation in ownership or a reduction in the dimensions or area of any lot or parcel of land.

(c) Governmental rights of police power or eminent domain unless notice of the exercise of such rights appears in the public records at the date hereof.

(d) Title to any property beyond the lines of the land expressly described or referred to in Schedule A, or title to areas within or rights or easements in any abutting streets, roads, avenues, lanes, ways or waterways (except to the extent the right of access to and from said land is covered by the insuring provisions of this policy), or the right to maintain therein vaults, tunnels, ramps or any other structure or improvement, unless this policy specifically provides that such titles, rights or easements are insured.

(e) Defects, liens, encumbrances, adverse claims against the title as insured or other matters (1) created, suffered, assumed or agreed to by the Insured; or (2) known to the Insured either at the date of this policy or at the date such Insured acquired an estate or interest insured by this policy and not shown by the public records, unless disclosure thereof in writing by the Insured shall have been made to the Company prior to the date of this policy; or (3) resulting in no loss to the Insured; or (4) attaching or created subsequent to the date hereof.

(f) Loss or damage which would not have been sustained if the Insured were a purchaser for value without knowledge.

3. Defense and Prosecution of Actions—Notice of Claim to be Given by the Insured.

(a) The Company, at its own cost and without undue delay, shall provide for the defense of the Insured in all litigation consisting of actions or proceedings commenced against the Insured, which litigation is founded upon defect, lien or encumbrance insured against by this policy, and may pursue such litigation to final determination in the court of last resort.

(b) In case any such action or proceeding shall be begun, or defense interposed, or in case knowledge shall come to the Insured of any claim of title or interest which is adverse to the title as insured, or which might cause loss or damage for which the Company shall or may be liable by virtue of this policy, the Insured shall notify the Company thereof in writing. If such notice shall not be given to the Company within ten days of the receipt of process or pleadings or if the Insured shall not, in writing, promptly notify the Company of any defect, lien or encumbrance insured against which shall come to the knowledge of the Insured, then all liability of the Company in regard to the subject matter of such action, proceeding or matter shall cease and terminate; provided, however, that failure to notify shall in no case prejudice the claim of any Insured unless the Company shall be actually prejudiced by such failure and then only to the extent of such prejudice.

(c) The Company shall have the right at its own cost to institute and prosecute any action or proceeding or do any other act which in its opinion may be necessary or desirable to establish the title as insured; and the Company may take any appropriate action under the terms of this policy whether or not it shall be liable thereunder and shall not thereby concede liability or waive any provision of this policy.

(d) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding, the Insured shall secure to it the right to so prosecute or provide defense in such action or proceeding, and all appeals therein, and permit it to use, at its option, the name of the Insured for such purpose. Whenever requested by the Company the Insured shall give the Company all reasonable aid in any such action or proceeding, in effecting settlement, securing evidence, obtaining witnesses, or prosecuting or defending such action or proceeding, and the Company shall reimburse the Insured for any expense so incurred.

4. Notice of Loss—Limitation of Action

In addition to the notices required under paragraph 3(b), a statement in writing of any loss or damage for which it is claimed the Company is liable under this policy shall be furnished to the Company within sixty days after such loss or damage shall have been determined and no right of action shall accrue to the Insured under this policy until thirty days after such statement shall have been furnished, and no recovery shall be had by the Insured under this policy unless action shall be commenced thereon within five years after expiration of said thirty day period. Failure to furnish such statement of loss or damage, or to commence such action within the time hereinbefore specified, shall be a conclusive bar against maintenance by the Insured of any action under this policy.

5. Option to Pay, Settle or Compromise Claims

The Company shall have the option to pay or settle or compromise for or in the name of the Insured any claim insured against or to pay the full amount of this policy and such payment or tender of payment, together with all costs, attorneys' fees and expenses which the Company is obligated hereunder to pay, shall terminate all liability of the Company hereunder.

6. Payment of Loss

(a) The liability of the Company under this policy shall in no case exceed, in all, the actual loss of the Insured and costs and attorneys' fees which the Company may be obligated hereunder to pay.

(b) The Company will pay, in addition to any loss insured against by this policy, all costs imposed upon the Insured in litigation carried on by the Company for the Insured, and all costs and attorneys' fees in litigation carried on by the Insured with the written authorization of the Company.

(c) No claim for damages shall arise or be maintainable under this policy (1) if the Company, after having received notice of an alleged defect, lien or encumbrance not excepted or excluded herein removes such defect, lien or encumbrance within a reasonable time after receipt of such notice; or (2) for liability voluntarily assumed by the Insured in settling any claim or suit without written consent of the Company.

(d) All payments under this policy, except payments made for costs, attorneys' fees and expenses, shall reduce the amount of the insurance pro tanto and no payment shall be made without producing this policy for endorsement of such payment unless the policy be lost or destroyed, in which case proof of such loss or destruction shall be furnished to the satisfaction of the Company.

(e) When liability has been definitely fixed in accordance with the conditions of this policy the loss or damage shall be payable within thirty days thereafter.

7. Liability Noncumulative

It is expressly understood that the amount of this policy is reduced by any amount the Company may pay under any policy insuring the validity or priority of any mortgage or deed of trust shown or referred to in Schedule B hereof or any mortgage or deed of trust hereafter executed by the Insured which is a charge or lien on the land described or referred to in Schedule A, and the amount so paid shall be deemed a payment to the Insured under this policy.

8. Coinsurance and Apportionment

(a) In the event that a partial loss occurs after the Insured makes an improvement subsequent to the date of this policy, and only in that event, the Insured becomes a coinsurer to the extent hereinafter set forth.

If the cost of the improvement exceeds twenty per centum of the amount of this policy, such proportion only of any partial loss established shall be borne by the Company as one hundred twenty per centum of the amount of this policy bears to the sum of the amount of this policy and the amount expended for the improvement. The foregoing provisions shall not apply to costs and attorneys' fees incurred by the Company in prosecuting or providing for the defense of actions or proceedings in behalf of the Insured pursuant to the terms of this policy or to costs imposed on the Insured in such actions or proceedings, and shall apply only to that portion of losses which exceed in the aggregate ten per cent of the face of the policy.

Provided, however, that the foregoing coinsurance provisions shall not apply to any loss arising out of a lien or encumbrance for a liquidated amount which existed on the date of this policy and was not shown in Schedule B; and provided further, such coinsurance provisions shall not apply to any loss if, at the time of the occurrence of such loss, the then value of the premises, as so improved, does not exceed one hundred twenty per centum of the amount of this policy.

(b) If the land described or referred to in Schedule A is divisible into separate and noncontiguous parcels, or if contiguous and such parcels are not used as one single site, and a loss is established affecting one or more of said parcels but not all, the loss shall be computed and settled on a pro rata basis as if the face amount of this policy was divided pro rata as to the value on the date of this policy of each separate independent parcel to the whole, exclusive of any improvements made subsequent to the date of this policy, unless a liability or value has otherwise been agreed upon as to each parcel by the Company and the Insured at the time of the issuance of this policy and shown by an express statement herein or by an endorsement attached hereto.

9. Subrogation upon Payment or Settlement

Whenever the Company shall have settled a claim under this policy, all right of subrogation shall vest in the Company unaffected by any act of the Insured, and it shall be subrogated to and be entitled to all rights and remedies which the Insured would have had against any person or property in respect to such claim had this policy not been issued. If the payment does not cover the loss of the Insured, the Company shall be subrogated to such rights and remedies in the proportion which said payment bears to the amount of said loss. If loss should result from any act of the Insured, such act shall not void this policy, but the Company, in that event, shall be required to pay only that part of any losses insured against hereunder which shall exceed the amount, if any, lost to the Company by reason of the impairment of the right of subrogation. The Insured, if requested by the Company, shall transfer to the Company all rights and remedies against any person or property necessary in order to perfect such right of subrogation, and shall permit the Company to use the name of the Insured in any transaction or litigation involving such rights or remedies.

10. Policy Entire Contract

Any action or actions or rights of action that the Insured may have or may bring against the Company arising out of the status of the title insured herein must be based on the provisions of this policy.

No provision or condition of this policy can be waived or changed except by writing endorsed hereon or attached hereto signed by the President, a Vice President, the Secretary, an Assistant Secretary or other validating officer of the Company.

11. Notices, Where Sent

All notices required to be given the Company and any statement in writing required to be furnished the Company shall be addressed to it at its Home Office at Minneapolis, Minnesota 55401.

Note: This policy valid only if Schedule A and B is attached.

TITLE INSURANCE POLICY

Issued through the office of:

MINNESOTA TITLE SINCE 1907

TITLE INSURANCE COMPANY OF MINNESOTA

Home Office
TITLE INSURANCE BUILDING
MINNEAPOLIS, MINNESOTA 55401

Card # 2383
Docket # 125
Frank Conn

TITLE INSURANCE POLICY

AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY

STANDARD FORM A - 1962

MINNESOTA TITLE SINCE 1907

TITLE INSURANCE COMPANY OF MINNESOTA

Home Office
TITLE INSURANCE BUILDING
MINNEAPOLIS, MINNESOTA 55401

TITLE INSURANCE POLICY

Issued through the office of:

MINNESOTA TITLE SINCE 1907

TITLE INSURANCE COMPANY OF MINNESOTA

Home Office
TITLE INSURANCE BUILDING
MINNEAPOLIS, MINNESOTA 55401

Attached to Title Insurance Company of Minnesota Policy No. W 100361 dated December 15, 1969.

SCHEDULE "A"

PARCEL A

Tracts 8, 9, 10, 11 and 12 of RUSKIN TOMATO FARMS, according to plat thereof recorded in Plat Book 27 at page 110, Public Records of Hillsborough County, Florida, less right-of-way for U. S. Highway No. 41, and less the West 60 feet of Tract 12.

PARCEL B

A parcel of land lying in Tampa Bay between the Hillsborough County Bulkhead Line as recorded in Plat Book 36 on page 91 of the Public Records of Hillsborough County, Florida, and the mean high water line of the easterly shore of Tampa Bay and lying in Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, more particularly described as follows:

Commence at the northeast corner of Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, run thence North 88° 56' 28" West along the northerly boundary of said Section 16 a distance of 800 feet; run thence South 01° 03' 32" West a distance of 200 feet to a point on the mean high water line of the easterly shore of Tampa Bay for a point of beginning; run thence North 88° 56' 28" West along a line 200 feet south of and parallel to the westerly projection into Tampa Bay of the northerly boundary line of said Section 16 a distance of 2878.32 feet, more or less, to intersect the Hillsborough County Bulkhead Line as recorded in Plat Book 36 on page 91 of the Public Records of Hillsborough County, Florida; run thence South 34° 59' 22" West along said Bulkhead Line to intersect the northerly extension of the dividing line between Sections 20 and 21 in Township 31 South, Range 19 East, Hillsborough County, Florida; leaving said Bulkhead Line, run thence southerly along the northerly extension of the dividing line between said Sections 20 and 21 to a point on the mean high water line of the easterly shore of Tampa Bay; meander thence northeasterly, easterly, northerly, southeasterly, northwesterly and northeasterly along the mean high water line of the easterly shore of Tampa Bay to the point of beginning.

Attached to Title Insurance Company of Minnesota Policy No. W100361 dated December 15, 1969.

PARCEL C

A tract of land in Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida, described as follows:

Commence at the northeast corner of said Section 16, run thence southerly along the easterly boundary of said Section 16 to the northeast corner of the SE 1/4 of said Section 16; run thence westerly along the northerly boundary of the E 1/2 of the SE 1/4 of said Section 16 to the northwest corner of the E 1/2 of the SE 1/4 of said Section 16; run thence southerly along the westerly boundary of the E 1/2 of the SE 1/4 of said Section 16 to the southwest corner of the E 1/2 of the SE 1/4 of said Section 16; run thence westerly along the southerly boundary of said Section 16 to a point on the easterly boundary of Apollo Beach Subdivision, Unit 8, as recorded in Plat Book 37 on page 94 of the Public Records of Hillsborough County, Florida; run thence northerly along the easterly boundary of said Apollo Beach Subdivision, Unit 8, to the northeast corner of said Apollo Beach Subdivision, Unit 8; run thence westerly along the northerly boundary of said Apollo Beach Subdivision, Unit 8, and the northerly boundary of said Apollo Beach Subdivision, Unit 8, Section "A", as recorded in Plat Book 35 on page 97 of the Public Records of Hillsborough County, Florida, to intersect the Government Meander Line as established in October, 1847; run thence North 36° 30' East along said Government Meander Line to a point on the mean high water line of the easterly shore of Tampa Bay; meander thence easterly, northerly, southeasterly, northwesterly and northeasterly along said mean high water line to intersect the northerly boundary line of said Section 16; run thence easterly along the northerly boundary line of said Section 16 to the point of beginning.

Attached to Title Insurance Company of Minnesota Policy No. W 100361
Dated December 15, 1969.

PARCEL D

A parcel of land lying between the Government Meander line as established in October, 1847, and the approximate mean high water line of the easterly shore of Tampa Bay, more particularly described as follows:

Commence at the northeast corner of Section 16, Township 31 South, Range 19 East, Hillsborough County, Florida; run thence North 88° 56' 28" west along the north boundary of said Section 16 a distance of 935 feet, more or less, to intersect the Government Meander Line; run thence South 47° West along said Government Meander Line a distance of 2640 feet to a point; run thence South 36° 30' West along said Government Meander Line a distance of 356 feet, more or less, to intersect the mean high water line of the easterly shore of Tampa Bay, which point of intersection is the point of beginning of this description; run thence South 36° 30' West along said Government Meander Line to a point on the northerly boundary of Apollo Beach Subdivision Unit 8, as recorded in Plat Book 37 at page 94 of the Public Records of Hillsborough County, Florida; run thence westerly along the northerly boundary of said Apollo Beach Subdivision Unit 8 to the northwesterly corner of said Apollo Beach Subdivision Unit 8; run thence northwesterly to the northerly extension of the boundary between Sections 20 and 21, in Township 31 South, Range 19 East, along a line located by running in a northwesterly direction to a point on an established bulkhead line, as recorded in Plat Book 36 at page 91 of the Public Records of Hillsborough County, Florida, said point lying 1200 feet North 45° 37' 51" East of a point of intersection of said bulkhead line and the bulkhead line of Parcel No. 7 as recorded in Plat Book 37 at page 67 of the Public Records of Hillsborough County, Florida; run thence northerly along the northerly extension of the line dividing said Sections 20 and 21 in Township 31 South, Range 19 East, Hillsborough County, Florida, to intersect the mean high water line of the easterly shore of Tampa Bay, meander thence northeasterly and easterly along said mean high water line of the easterly shore of Tampa Bay to the point of beginning.

DOCUMENTARY SUR TAX ≈ 60.50 FLORIDA NOV-7'73 P.B. 10820 DEPT. OF REVENUE

HILLSBOROUGH COUNTY 115988

HILLSBOROUGH COUNTY 076941

STATE OF FLORIDA DOCUMENTARY STAMP TAX DEPT. OF REVENUE NOV-7'73 P.B. 11059 164.10

EXECUTORS' DEED

OFF. REC. 2781 PG 754

THIS INDENTURE, made this 11th day of October, 1973, between Francis Jerome Corr and George Bartley Corr, as Co-executors of the Estate of Francis John Corr, Deceased, of the County of Hillsborough, State of Florida, (hereinafter referred to as "Grantors") and Tampa Electric Company, a Florida corporation (hereinafter referred to as "Grantee"), whose post office address is Post Office Box 111, Tampa, Hillsborough County, Florida 33601,

W I T N E S S E T H :

That the said Grantors, for and in consideration of the sum of Ten and no/100ths ($10.00) Dollars and other good and valuable considerations to said Grantors in hand paid by said Grantee at or before the ensealing and delivery of these presents, the receipt whereof is hereby acknowledged, have granted, bargained, sold, conveyed and confirmed, and by these presents do grant, bargain, sell, convey and confirm, unto the said Grantee, and to its successors and assigns forever, all of the following-described land, situate, lying and being in Hillsborough County, Florida, and described as follows, to-wit:

A 59230

RECEIVED Nov 7 4 33 PM '73 CLERK CIRCUIT COURT HILLSBOROUGH COUNTY, FLA.

> The West 524.90 feet of the North half of Tract 14 and the North half of Tract 13, LESS the West 60 feet of said North half of Tract 13 of RUSKIN TOMATO FARMS, as per map or plat thereof recorded in Plat Book 27 on page 110, of the Public Records of Hillsborough County, Florida.
>
> Subject to taxes for the year 1973 and subsequent years.

TOGETHER WITH all and singular, the tenements, hereditaments, and appurtenances thereunto belonging or appertaining; and every right, title or interest, legal or equitable, of the said Grantors and of the decedent of, in and to the same.

This Instrument Was Prepared By
JACK S. NEWSOME OF

TO HAVE AND TO HOLD the same unto the said Grantee, its successors and assigns, to their proper use, benefits and behoof forever.

This conveyance is made pursuant to that certain court order of the Circuit Judge, Probate Division, of Hillsborough County, Florida, dated September 12, 1973, in that proceeding before the said Circuit Judge entitled In Re: Estate of Francis John Corr, Deceased, Number 58778-C.

IN WITNESS WHEREOF, the said Grantors have caused these presents to be executed the day and year first above written.

Signed, sealed and delivered in the presence of:

Judith Daniel

Evelyn Kuiper

Judith Daniel

Evelyn Kuiper

Francis Jerome Corr

Francis Jerome Corr, as Co-Executor of the Estate of Francis John Corr, Deceased

George Bartley Corr

George Bartley Corr, as Co-Executor of the Estate of Francis John Corr, Deceased

STATE OF FLORIDA

COUNTY OF HILLSBOROUGH

I HEREBY CERTIFY, that on this 11th day of October, 1973 before me, an officer duly authorized to take acknowledgments in the State aforesaid and in the County aforesaid, personally appeared Francis Jerome Corr and George Bartley Corr as Co-Executors of the Estate of Francis John Corr, Deceased, to me known to be the persons described in and who executed the foregoing instrument and acknowledged before me that they executed the same.

WITNESS my signature and official seal at Tampa, in the County of Hillsborough, State of Florida, the day and year last aforesaid.

Judith Daniel

NOTARY PUBLIC, State of Florida At Large

My Commission Expires:

Notary Public, State of Florida at Large
My Commission expires, Apr. 20, 1974

Card # 8847
File # 10719

Return to
Macfarlane,
Ferguson
(KJP)

From: Francis J. Corr
To: Tampa Electric
10-11-73

TECO. APPROVAL

Initial	Date	
[illegible]	12/18/73	BIG BEND COOLING POND PROPERTY
[illegible]	12-19-73	$54,660

J
125

INSTRUMENT#: 2016429079, BK: 24490 PG: 1427 PGS: 1427 - 1436 10/28/2016 at 04:52:57 PM, DOC TAX PD(F.S.201.02) $47040.00 DEPUTY CLERK:BLOGGANS Pat Frank,Clerk of the Circuit Court Hillsborough County

THIS INSTRUMENT PREPARED BY:
Jackson H. Bowman, Esquire
Moore, Bowman & Rix, P.A.
300 West Platt Street, Suite 100
Tampa, Florida 33606
Telephone: 813-318-9000

Tax Parcel I.D. Nos.: 051555-0000; 051556-0000; and 051558-0100

SPECIAL WARRANTY DEED

THIS INDENTURE, made this 25th day of Oct., 2016 between **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company, whose post office address is 3001 West Hallandale Beach Boulevard, Suite 300, Pembroke Park, Florida 33009, (hereinafter called the "Grantor") and **TAMPA ELECTRIC COMPANY**, a Florida corporation, whose business address is 702 N. Franklin Street, Tampa Florida 33602 (hereinafter called the "Grantee").

WITNESSETH, that Grantor, for and in consideration of the sum of Ten and 00/100 Dollars, and other valuable consideration, to it in hand paid by Grantee, the receipt whereof is hereby acknowledged, has granted, bargained, sold and conveyed to Grantee, its successors and assigns forever, all the following described property in Hillsborough County, Florida (hereinafter, the "Property"):

> That certain real property which is more particularly described by legal description in **Exhibit "A"** attached hereto and incorporated herein by this reference, together with all fixtures, improvements and appurtenances thereunto appertaining;

SUBJECT TO the matters set forth in **Exhibit "B"** attached hereto and incorporated herein by the reference;

TO HAVE AND TO HOLD the Property, with the appurtenances, unto Grantee, its successors and assigns, in fee simple forever;

THE GRANTOR does specially warrant the title to said Property subject to the matters referred to herein, and will defend the same against the lawful claims of all persons claiming by, through, or under Grantor, but against none other;

AND Grantor has such authority to convey the property legally described in Exhibit "A" as set forth in **Exhibit "C"** attached hereto and incorporated herein by this reference.

IN WITNESS WHEREOF, Grantor has executed this Special Warranty Deed effective as of this 25th day of October, 2016.

As to Sam Jazayri
Signed, sealed and delivered
in the presence of:

(Print Name) DAVID WINGARD

(Print Name) STEPHEN HAMILTON

GRANTOR:

APOLLO BEACH HOLDINGS, LLC, a Florida limited liability company

By:
Sam Jazayri, Managing Member

And

As to John Tavone
Signed, sealed and delivered
in the presence of:

(Print Name) DAVID WINGARD

(Print Name) STEPHEN HAMILTON

By:
John Tavone, Managing Member

STATE OF FLORIDA
COUNTY OF Broward

The foregoing instrument was acknowledged before me this 25 of October, 2016, by San Jazayri, Managing Member of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company, who is (____) personally known to me, or (____) who has produced a Florida driver's license as identification.

CECILE OCONNOR
MY COMMISSION EXPIRES
April 22, 2018
#FF 115062
Bonded thru Budget Notary Services
NOTARY PUBLIC STATE OF FLORIDA

Cecile S Connor
NOTARY PUBLIC, State of Florida
Print Name: Cecile Oconnor
My Commission Expires:______________

(Affix Notary Seal above)

STATE OF FLORIDA
COUNTY OF Broward

The foregoing instrument was acknowledged before me this 25 of October, 2016, by John Tavone, Managing Member of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company, who is (____) personally known to me, or (____) who has produced a Florida driver's license as identification.

CECILE OCONNOR
MY COMMISSION EXPIRES
April 22, 2018
#FF 115062
Bonded thru Budget Notary Services
NOTARY PUBLIC STATE OF FLORIDA

Cecile S Connor
NOTARY PUBLIC, State of Florida
Print Name: Cecile Oconnor
My Commission Expires:______________

(Affix Notary Seal above)

Exhibit "A"

LEGAL DESCRIPTION

Lot 15, Ruskin Tomato Farms, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida, LESS the East 360.27 feet thereof, together with the East ½ of closed right-of-way for Noonan Road abutting thereon, and together with the North ½ of Lot 14 of said Ruskin Tomato Farms, LESS the West 524.90 feet thereof, and together with the West ½ of closed right-of-way for Noonan Road abutting thereon.

AND

The East 360.27 feet of Tract 15 and that part of Lot 16 lying West of State Road No. 45, Ruskin Tomato Farms, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida.

AND

A portion of Lot 17, Ruskin Tomato Farms, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida, explicitly described as follows:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence on the North boundary thereof N 89°16' W, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 for the Point of Beginning; thence on said Westerly right-of-way line S 28°40' W, a distance of 1219.84 feet; thence N 61°53' W, a distance of 1520.03 feet to the West line of the NE ¼ of said Section 22; thence on said West boundary North, a distance of 378.55 feet to the North boundary of aforesaid Section 22; thence on said North boundary S 89°16'E, a distance of 1923.18 feet to the Point of Beginning.

LESS THAT PORTION OF THE ABOVE DESCRIBED PARCEL DESCRIBED AS FOLLOWS:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence on the North boundary there of N 89°16'00" W, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 (State Road No. 45); thence on said Westerly right-of-way line S 28°35'52" W, a distance of 1020.67 feet to the Point of Beginning; thence continue on said right-of-way line S 28°35'52" W, a distance of 200.00 feet; thence N 61°58'00" W, a distance of 1522.30 feet to the center of a former 60 foot right-of-way now vacated; thence on said centerline N 00°41'15" E a distance of 378.55 feet to the Northwest corner of aforesaid Lot 17 and a point in the centerline of a slough, thence meander Southeasterly along said centerline of slough a distance of 1226 feet more or less to a point which lies N 61°58'00" W, a distance of 529.45 feet from the Point of Beginning; thence S 61°58'00" E a distance of 529.45 feet to the Point of Beginning;

ALSO LESS that portion thereof conveyed to Hillsborough County, a political subdivision of the State of Florida, by Warranty Deed recorded in Official Records Book 22442, Page 155, Public

Records of Hillsborough County, Florida, lying within the following metes and bounds description:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida thence along the North boundary line of said Northeast quarter, N 89°18'30: W, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 (State Road No. 45), thence along said Westerly right-of-way line of Highway 41 (Sate Road No. 45), S 28°37'30" W, a distance of 580.10 feet to the Point of Beginning; thence continue along said Westerly right-of-way line of Highway 41 (State Road No. 45), S 28°37'30" W, a distance of 439.74 feet; thence departing said Westerly right-of-way line of Highway 41 (State Road No. 45), N 61°42'37" W, a distance of 529.45 feet to the centerline of a slough; thence along said centerline of a slough the following three (3) courses: N 39°01'51" W, a distance of 17.34 feet; N 44°21'53" W, a distance of 85.59 feet; N 31°28'04" W, a distance of 82.01 feet; thence departing said centerline of a slough, S 89°18'30" E, a distance of 790.52 feet to said Westerly right-of-way line of Highway 41 (State Road No. 45) and the Point of Beginning.

Exhibit "B"

1. Existing Leases that have been assigned by Grantor to Grantee.

2. Taxes and assessments for 2016 and subsequent years, a lien, which are not yet due and payable.

3. All covenants, limitations, easements, reservations, and easements of record.

4. Applicable zoning restrictions and regulations imposed by governmental authority.

5. All riparian rights and submerged land rights, mineral rights and any rights, dedications, easements, restrictions of record, interests or claims which may exist or arise by reason of rights-of-way, dirt roads, trail roads, paths, power or other utility lines, fences or improvements of any kind located on the property, encroaching from the Property onto adjacent lands, or encroaching from adjacent lands onto the Property.

Exhibit "C"

Limited Liability Company Affidavit

STATE OF FLORIDA)
COUNTY OF BROWARD)

Before me, the undersigned authority, personally appeared SAM JAZAYRI and JOHN TAVONE ("Affiants") who being by me first duly sworn, on oath deposes and says that:

1. That Affiants are the sole MANAGERS of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company, (the "Company") and is authorized to execute this Affidavit on behalf of Company.
2. Said Company is in good standing, validly formed and currently existing under the laws of the State of Florida and under valid articles of organization and regulations and has not been terminated or dissolved. The Company is authorized to do business in the State of Florida.
3. The following parties are all of the managers/members of said Company:

Managers:	**Members**:
SAM JAZAYRI JOHN TAVONE	WEST COAST BEACH PARTNERS, LLC, a Florida limited liability company (100.00%)

The Company is managed by its Managers and the Managers have the full and exclusive right, power and authority to manage the affairs of the Company and to bind the Company. There is no Operating Agreement for the Company as it is a single member limited liability company and a disregarded entity for tax purposes. True and correct copies of the Articles of Organization, and Amended Articles of Organization for the Company as well as a Certificate of Good Standing from the State of Florida have been provided to Fidelity National Title Insurance Company.

4. Affiant, in their capacity as Managers of the Company, are authorized on behalf of the Company to convey or mortgage, on behalf of the Company,

the Company's real property and are also authorized to execute, on behalf of the Company, any instruments of conveyance such as deeds, affidavits, etc. associated with the sale of any Company real property, which is described as:

LEGAL DESCRIPTION

Lot 15, Ruskin Tomato Farms, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida, LESS the East 360.27 feet thereof, together with the East ½ of closed right-of-way for Noonan Road abutting thereon, and together with the North ½ of Lot 14 of said Ruskin Tomato Farms, LESS the West 524.90 feet thereof, and together with the West ½ of closed right-of-way for Noonan Road abutting thereon.

AND

The East 360.27 feet of Tract 15 and that part of Lot 16 lying West of State Road No. 45, Ruskin Tomato Farms, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida.

AND

A portion of Lot 17, Ruskin Tomato Farms, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida, explicitly described as follows:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence on the North boundary thereof N 89°16' W, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 for the Point of Beginning; thence on said Westerly right-of-way line S 28°40' W, a distance of 1219.84 feet; thence N 61°53' W, a distance of 1520.03 feet to the West line of the NE ¼ of said Section 22; thence on said West boundary North, a distance of 378.55 feet to the North boundary of aforesaid Section 22; thence on said North boundary S 89°16'E, a distance of 1923.18 feet to the Point of Beginning.

LESS THAT PORTION OF THE ABOVE DESCRIBED PARCEL DESCRIBED AS FOLLOWS:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence on the North boundary there of N 89°16'00" W, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 (State Road No. 45); thence on said Westerly right-of-way line S 28°35'52" W, a distance of 1020.67 feet to the Point of Beginning; thence continue on said right-of-way line S 28°35'52" W, a distance of 200.00 feet; thence N 61°58'00" W, a distance of 1522.30 feet to the center of a former 60 foot right-of-way now vacated; thence on said centerline N

00°41'15" E a distance of 378.55 feet to the Northwest corner of aforesaid Lot 17 and a point in the centerline of a slough, thence meander Southeasterly along said centerline of slough a distance of 1226 feet more or less to a point which lies N 61°58'00" W, a distance of 529.45 feet from the Point of Beginning; thence S 61°58'00" E a distance of 529.45 feet to the Point of Beginning;

ALSO LESS that portion thereof conveyed to Hillsborough County, a political subdivision of the State of Florida, by Warranty Deed recorded in Official Records Book 22442, Page 155, Public Records of Hillsborough County, Florida, lying within the following metes and bounds description:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida thence along the North boundary line of said Northeast quarter, N 89°18'30: W, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 (State Road No. 45), thence along said Westerly right-of-way line of Highway 41 (Sate Road No. 45), S 28°37'30" W, a distance of 580.10 feet to the Point of Beginning; thence continue along said Westerly right-of-way line of Highway 41 (State Road No. 45), S 28°37'30" W, a distance of 439.74 feet; thence departing said Westerly right-of-way line of Highway 41 (State Road No. 45), N 61°42'37" W, a distance of 529.45 feet to the centerline of a slough; thence along said centerline of a slough the following three (3) courses: N 39°01'51" W, a distance of 17.34 feet; N 44°21'53" W, a distance of 85.59 feet; N 31°28'04" W, a distance of 82.01 feet; thence departing said centerline of a slough, S 89°18'30" E, a distance of 790.52 feet to said Westerly right-of-way line of Highway 41 (State Road No. 45) and the Point of Beginning.

5. Neither the Company, nor the Managers, nor the sole Member have filed bankruptcy or are debtors in any bankruptcy proceeding since the date the Company acquired title to the land, as described in the Commitment (as hereinafter defined), and the execution of a warranty deed by the Company on or about even date herewith is done so in the ordinary course of business.

6. This affidavit is given to induce Fidelity National Title Insurance Company to issue a title insurance policy.

7. Affiants further state that they are familiar with the nature of an oath and with the penalties as provided by the laws of the State of Florida for falsely swearing to statements made in an instrument of this nature. Affiants further certify that they have fully read this affidavit and understands its contents.

Signature Page is the next page

[*SIGNATURE PAGE TO LIMITED LIABILITY COMPANY AFFIDAVIT*]

Print Name: SAM JAZAYRI, Manager of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company.

STATE OF FLORIDA)
)ss
COUNTY OF BROWARD)

The foregoing instrument was sworn to, subscribed and acknowledged before me this 25th day of October, 2016 by SAM JAZAYRI, a Manager of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company, on behalf of the company, who is personally known to me or who has produced ______________________ as identification.

Cecile O Connor
(Signature of Notary Public)

Cecile Oconnor
(Printed Notary Name)

CECILE OCONNOR MY COMMISSION EXPIRES April 22, 2018 #FF 115062 Bonded thru Budget Notary Services NOTARY PUBLIC STATE OF FLORIDA

Print Name: JOHN TAVONE, Manager of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company.

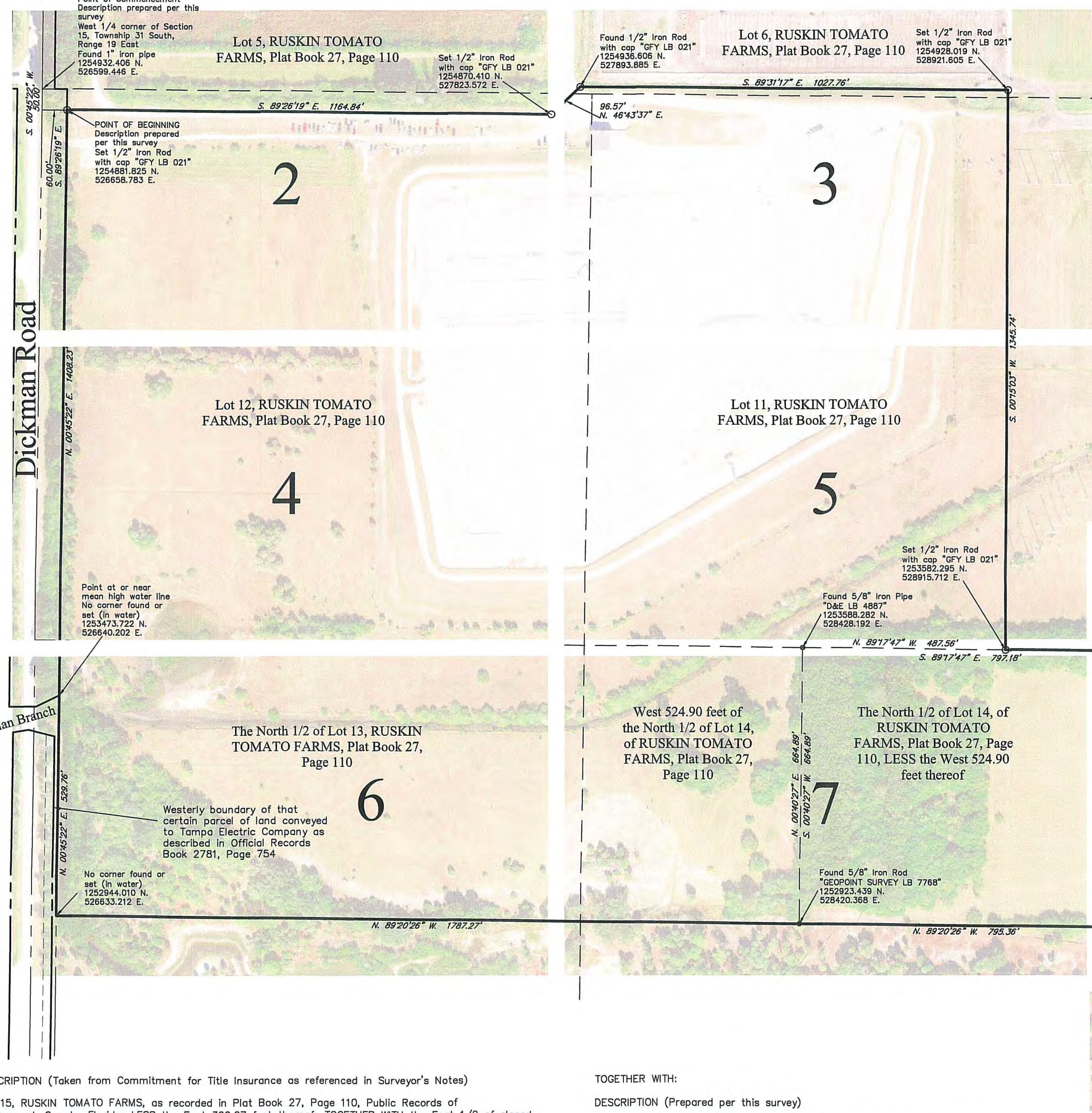
STATE OF FLORIDA)
)ss
COUNTY OF BROWARD)

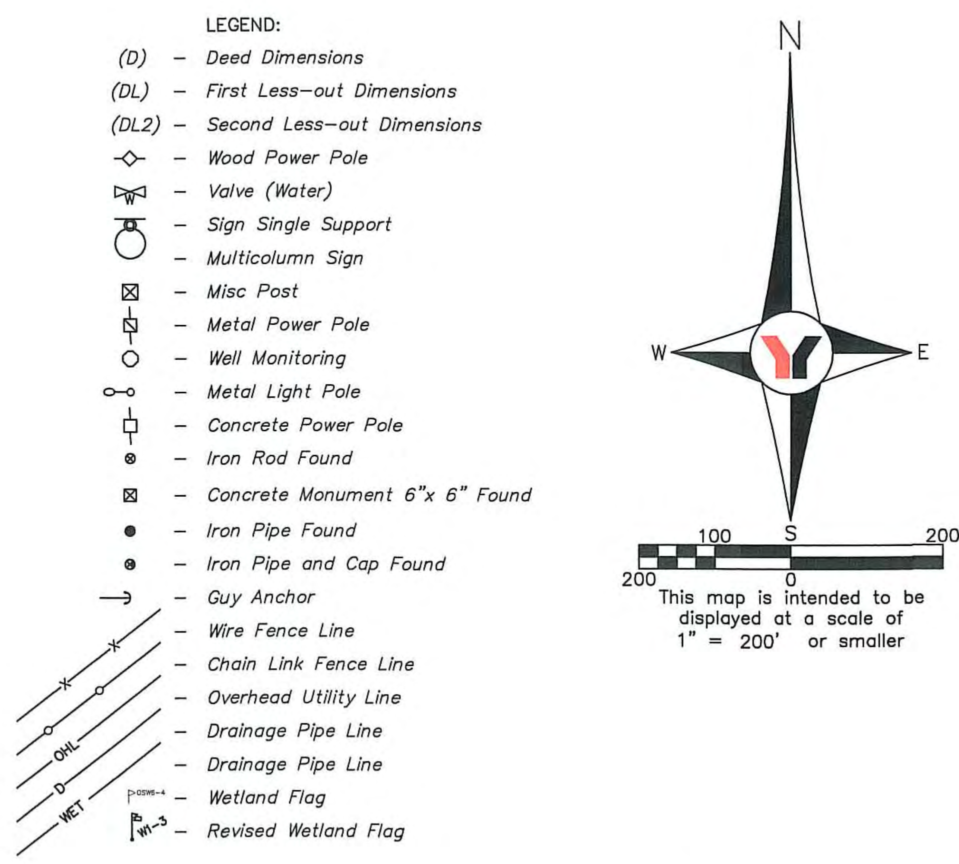
The foregoing instrument was sworn to, subscribed and acknowledged before me this 25th day of October, 2016 by JOHN TAVONE, a Manager of **APOLLO BEACH HOLDINGS, LLC**, a Florida limited liability company, on behalf of the company, who is personally known to me or who has produced ______________________ as identification.

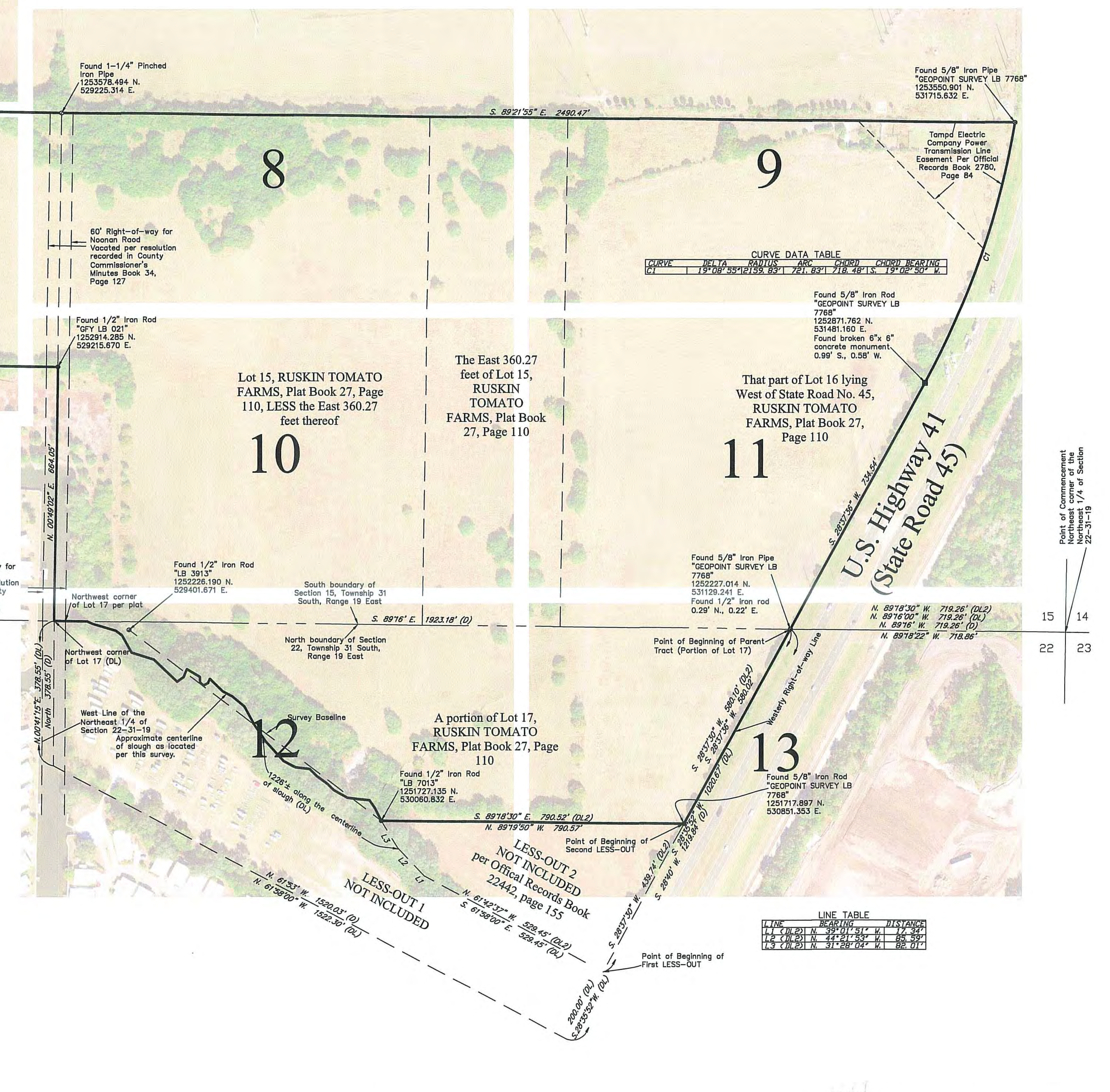
Cecile O Connor
(Signature of Notary Public)

Cecile Oconnor
(Printed Notary Name)

CECILE OCONNOR MY COMMISSION EXPIRES April 22, 2018 #FF 115062 Bonded thru Budget Notary Services NOTARY PUBLIC STATE OF FLORIDA







DESCRIPTION (Taken from Commitment for Title Insurance as referenced in Surveyor's Notes)

Lot 15, RUSKIN TOMATO FARMS, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida; LESS the East 360.27 feet thereof; TOGETHER WITH the East 1/2 of closed right-of-way for Noonan Road abutting thereon; and
TOGETHER WITH the North 1/2 of Lot 14, of said RUSKIN TOMATO FARMS, LESS the West 524.90 feet thereof; and TOGETHER WITH the West 1/2 of closed right-of-way for Noonan Road abutting thereon.

AND

The East 360.27 feet of Lot 15, and that part of Lot 16 lying West of State Road No. 45, RUSKIN TOMATO FARMS, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida.

AND

A portion of Lot 17, RUSKIN TOMATO FARMS, as recorded in Plat Book 27, Page 110, Public Records of Hillsborough County, Florida, explicitly described as follows:

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence on the North boundary thereof North 89°16' West, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 for the POINT OF BEGINNING; thence on said Westerly right-of-way line South 28°40' West, a distance of 1219.84 feet; thence North 61°53' West, a distance of 1520.03 feet to the West line of the Northeast 1/4 of said Section 22; thence on said West boundary North, a distance of 378.55 feet to the North boundary of aforesaid Section 22; thence on said North boundary South 89°16' East, a distance of 1923.18 feet to the POINT OF BEGINNING;

LESS that portion of the above described parcel described as follows;

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence on the North boundary thereof North 89°16'00" West, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 (State Road No. 45); thence on said Westerly right-of-way line South 28°35'52" West, a distance of 1020.67 feet to the POINT OF BEGINNING; thence continue on said right-of-way line South 28°35'52" West, a distance of 200.00 feet; thence North 61°58'00" West, a distance of 1522.30 feet to the center of a former 60 foot right-of-way now vacated; thence on said centerline North 00°41'15" East, a distance of 378.55 feet to the Northwest corner of aforesaid Lot 17 and a point in the centerline of a slough, thence meander Southeasterly along said centerline of slough a distance of 1226 feet more or less to a point which lies North 61°58'00" West, a distance of 529.45 feet from the Point of Beginning; thence South 61°58'00" East, a distance of 529.45 feet to the POINT OF BEGINNING;

ALSO LESS that portion thereof conveyed to Hillsborough County, a political subdivision of the State of Florida, by Warranty Deed recorded in Official Records Book 22442, Page 155, Public Records of Hillsborough County, Florida, lying within the following metes and bounds description;

Commence at the Northeast corner of the Northeast quarter of Section 22, Township 31 South, Range 19 East, Hillsborough County, Florida; thence along the North boundary of said Northeast quarter, North 89°18'30" West, a distance of 719.26 feet to the Westerly right-of-way line of Highway 41 (State Road No. 45), thence along said Westerly right-of-way line of Highway 41 (State Road No. 45), South 28°37'30" West, a distance of 580.10 feet to the POINT OF BEGINNING; thence continue along said Westerly right-of-way line of Highway 41 (State Road No. 45), South 28°37'30" West, a distance of 439.74 feet; thence departing said Westerly right-of-way line of Highway 41 (State Road No. 45), North 61°42'37" West, a distance of 529.45 feet to the centerline of a slough; thence along said centerline of a slough the following three (3) courses: North 39°01'51" West, a distance of 17.34 feet; North 44°21'53" West, a distance of 85.59 feet; North 31°28'04" West, a distance of 82.01 feet; thence departing said centerline of a slough, South 89°18'30" East, a distance of 790.52 feet to said Westerly right-of-way line of Highway 41 (State Road No. 45) and the POINT OF BEGINNING.

TOGETHER WITH:

DESCRIPTION (Prepared per this survey)

A parcel of land lying in Section 15, Township 31 South, Range 19 East, Hillsborough County, Florida, being a part of Lots 5, 6, 11, 12, 13, and 14 of RUSKIN TOMATO FARMS as per the map or plat thereof recorded in Plat Book 27, Page 110 of the Public Records of Hillsborough County, Florida, being more particularly described as follows:

Commence at a 1" iron pipe found at the West 1/4 corner of said Section 15; thence on the West boundary of said Section 15, South 00°45'22" West, a distance of 50.00 feet; thence departing said West boundary, South 89°26'19" East, a distance of 60.00 feet to a 1/2 inch iron rod with a plastic cap bearing the inscription "GFY LB 021" set at the POINT OF BEGINNING said point being on the Easterly right-of-way line of Dickman Road as described in Official Records Book 1971, Page 750 of the Public Records of Hillsborough County, Florida; thence continue South 89°26'19" East, a distance of 1164.84 feet to a 1/2 inch iron rod with a plastic cap bearing the inscription "GFY LB 021" set; thence North 46°43'37" East, a distance of 96.57 feet to a 1/2 inch iron rod with a plastic cap bearing the inscription "GFY LB 021" set; thence South 89°31'17" East, a distance of 1027.76 feet to a 1/2 inch iron rod with a plastic cap bearing the inscription "GFY LB 021" set; thence South 00°15'03" West, a distance of 1345.74 feet to a 1/2 inch iron rod with a plastic cap bearing the inscription "GFY LB 021" set on the Northerly boundary of said Lot 14; thence on said Northerly boundary, North 89°17'47" West, a distance of 487.56 feet to a 5/8 inch iron rod with a plastic cap bearing the inscription " D&E LB 4887" found at the Northwest corner of that certain parcel being the North 1/2 of said Lot 14 LESS The West 524.90 feet thereof; thence on the Westerly boundary of said certain parcel, South 00°40'27" West, a distance of 664.89 feet to a 5/8" iron rod with a plastic cap bearing the inscription "GEOPOINT SURVEY LB 7768" found on the South boundary of the North 1/2 of said Lot 14; thence on said South boundary and the South boundary of the North 1/2 of said Lot 13, North 89°20'26" West, a distance of 1787.27 feet to a point on the Westerly boundary of that certain parcel of land conveyed to Tampa Electric Company as described in Official Records Book 2781, Page 754 of the Public Records of Hillsborough County, Florida; thence on said Westerly boundary, North 00°45'22" East, a distance of 529.76 feet to a point on or near the Northerly mean high water line of Noonan Branch, said point being on said Easterly right-of-way line of Dickman Road; thence on said Easterly right-of-way line, North 00°45'22" East, a distance of 1408.23 feet to the POINT OF BEGINNING.

The above described parcels contain a total of 191.312 acres more or less, or 8,333,531 square feet more or less.

SURVEYOR'S NOTES:

1. Coordinates Shown on this survey are based on Florida State Plane Coordinate System, West Zone, as referenced to the North American Datum of 1983, adjustment of 1990, NAD83(90). Control for this survey is based on Tampa Electric Company "Construction Marker Locations and Plot Plan Index, Big Bend Station", drawing number 349-FY-2XA, dated 12-16-08. Stations used for this survey include stations 102, 107, 110, and 114. Bearings shown on this map are based on the West boundary of the Southwest 1/4 of Section 15-31-19 bears S. 00°45'22" W.
2. There may be underground installations within the subject property which were not located and are not shown.
3. Legal description and title information for this survey taken from Commitment for Title Insurance, Order No.: 5991695, REVISION B (CAS) 10/11/2016, as issued by Squire Patton Boggs (US) LLP and underwritten by Fidelity National Title Insurance Company with an effective date of October 03, 2016 at 6:00 AM. An additional legal descrtiption of property not included in the referenced Commitment was prepare per this survey. No other instruments of record reflecting ownership, easements or rights of way were furnished to the undersigned, unless otherwise shown.
4. This survey is not valid without the signature and the original raised seal of a Florida Licensed Surveyor and Mapper and is only for informational purposes unless so validated.
5. Aerial photography for this survey was obtained from the Florida Department of Transportation, flight date February, 2017.
6. On May 2 and December 20, 2017, Chelsie Vandaveer and Mallory Meadows, wetland ecologists with Environmental Consulting & Technology, Inc., conducted wetland delineations and jurisdictional determinations on the Tampa Electric Company Big Bend II Solar Site in Hillsborough County, Florida. Wetlands and surface waters were delineated in the field using accepted, standard State and federal wetland delineation methodologies (e.g., the Florida Department of Environmental Protection regulations, Section 62-340, Florida Administrative Code, including the Florida Wetlands Delineation Manual [1995] and the Routine Onsite Determination Methods as described in the U. S. Army Corps of Engineers [USACE] 1987 Wetlands Delineation Manual, the 2010 Regional Supplement to the USACE Wetlands Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), and the most current vegetative index [2016 USACE National Wetland Plant List], respectively).
7. This survey is a graphic depiction of the current boundary and visible improvements in accordance with the legal description shown hereon and may not reflect ownership.
8. There may be additional easements, reservations, restrictions and/or other matters of record affecting this property that are not shown hereon that may (or may not) be found in the public records of this county. The undersigned has not performed an independent search for additional records.
9. The printed dimensions shown on this survey supersede any scaled dimensions; there may be items drawn out of scale to graphically show their location.
10. "Certification" is understood to be an expression of professional opinion by the surveyor and mapper based on the surveyor and mapper's knowledge and information, and that it is not a guarantee or warranty, expressed or implied.
11. This survey has been exclusively prepared for the named entities shown hereon and is not transferable. No other person or entity is entitled to rely upon and/or re-use this survey for any purpose without the expressed, written consent of George F. Young, Inc. and the undersigned professional surveyor and mapper.
12. Unauthorized copies and/or reproductions via any medium of this survey or any portions thereof are expressly prohibited without the written consent of George F. Young, Inc. and the undersigned professional surveyor and mapper.
13. Additions or deletions to survey maps or reports by other than the signing party or parties are prohibited without written consent of the signing party or parties.
14. This survey is valid as to the last date of field survey and not the signature date (if any).
15. This survey displays data of revised wetland flag locations as field located on November 17, 2020, in terms of "Revised Wetland "1"" & "Revised Wetland "1A"" shown hereon. These revised locations were designated in the field by Environmental Consulting & Technology, Inc. (ECT, Inc. – see note 16 below). The position of wetland flag "W1-14" shown hereon was provided by ECT, Inc. and was not found or surveyed in the field. Its position was established with unknown procedures/precisions and is approximate in nature. No other data shown hereon was physically verified on this date. This work was performed by this firm under the job number "17003201TS", for reference.
16. On October 29 and November 16, 2020, Brandon Gray and Chelsie Vandaveer, wetland ecologists with Environmental Consulting & Technology, Inc., conducted wetland delineations and jurisdictional determinations on the approximately 192-acre Big Bend II property located on the existing Tampa Electric Company Big Bend Power Generating Station site in the Apollo Beach area of unincorporated Hillsborough County, Florida. Wetlands and surface waters were delineated in the field using accepted, standard State and federal wetland delineation methodologies (e.g., the Florida Department of Environmental Protection regulations, Section 62-340, Florida Administrative Code, including the Florida Wetlands Delineation Manual [1995] and the Routine Onsite Determination Methods as described in the U. S. Army Corps of Engineers [USACE] 1987 Wetlands Delineation Manual, the 2010 Regional Supplement to the USACE Wetlands Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0), and the most current vegetative index [2018 USACE National Wetland Plant List], respectively).
17. Wetland area "W3" was omitted as a part of revision 3 of this survey as instructed by ECT, Inc. on November 18, 2020. It is the express intent of this survey revision to display the revised wetland areas as determined by ECT, Inc. on the dates specified in note 16 above, superseding the determinations as specified in note 6 above.

FILE: C:\Project\Sur\17-0032-00TS-ECT ABH Expansion\Dwg\17003200ts br revised 20180501.dwg

REVISED NO.	BY	DATE	DESCRIPTION
1	LSB	3/22/18	Revise wetland flag numbers
2	LSB	5/1/18	Revise wetland flag numbers
3	MWS	11/19/20	Remove Wetland '3' on Sht 3, Add Revised Wetlands '1' & '1A' on Sht 2
4			
5			
6			
7			
8			
9			
10			

	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE	1/8/18	

PREPARED FOR:
ECT
1408 N. Westshore Boulevard, Suite 115
Tampa, Florida 33602

Since 1919
George F. Young, Inc.
1921 TAMPA EAST BOULEVARD TAMPA, FLORIDA 33619
PHONE (813) 223-1747 FAX (813) 229-0657
BUSINESS ENTITY LB21
ARCHITECTURE•ENGINEERING•ENVIRONMENTAL•LANDSCAPE•PLANNING•SURVEYING•UTILITIES
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Wayne A. Sanborn PSM #4173
11/20/20

ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 1 OF 13

PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
DSW12-1A	1254281.84	526689.33
DSW12-1	1254281.69	526805.66
DSW12-2A	1254293.99	526651.07
DSW12-2	1254281.16	526856.01
DSW12-3	1254279.48	527006.84
DSW12-4	1254277.69	527103.65
DSW12-14	1254275.34	526708.31
DSW12-15	1254282.49	526711.33

LINE TABLE

LINE	BEARING	DISTANCE
L304	N. 22°54'24" E.	7.76'
L305	S. 89°30'46" E.	94.33'
L306	S. 89°23'51" E.	50.35'
L307	S. 89°21'51" E.	150.84'
L308	S. 88°56'26" E.	96.83'
L309	N. 89°53'44" E.	64.22'
L310	S. 71°06'48" E.	39.19'
L311	S. 00°16'09" W.	10.41'

Revised Wetland Flag Table

Flag#	Northing	Easting
W1-1	1254510.20	526747.82
W1-2	1254421.43	526679.15
W1-3	1254400.54	526742.76
W1-4	1254415.41	526815.24
W1-5	1254420.66	526988.79
W1-6	1254480.49	527020.17
W1-7	1254538.26	526972.61
W1-8	1254632.94	527013.23
W1-9	1254702.74	526976.18
W1-10	1254705.40	526844.24
W1-11	1254680.78	526735.68
W1-12	1254651.66	526703.57
W1-13	1254642.08	526762.01
W1-14*	1254615.19	526788.58
W1-15	1254572.73	526778.75
W1A-1	1254414.30	527276.17
W1A-2	1254379.43	527284.16
W1A-3	1254379.85	527301.58
W1A-4	1254433.36	527302.06
W1A-5	1254399.06	527331.62
W1A-6	1254470.03	527331.55
W1A-7	1254476.80	527348.36
W1A-8	1254695.09	527339.04
W1A-9	1254694.85	527271.56
W1A-10	1254588.58	527293.90
W1A-11	1254488.66	527270.38
W1A-12	1254442.13	527281.55

REVISED

NO.	BY	DATE	DESCRIPTION
1	LSB	3/22/18	Revise wetland flag numbers
2	LSB	5/1/18	Revise wetland flag numbers
3	MWS	11/19/20	Remove Wetland '3' on Sht 3, Add Revised Wetlands '1' & '1A' on Sht 2
4			
5			
6			
7			
8			
9			
10			

	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE		1/8/18

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Since 1919

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ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 2 OF 13

FILE: C:\Project\Sur\17-0032-00TS-ECT ABH Expansion\Dwg\17003200ts br revised 20180501.dwg
PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
DSW13-1	1254975.77	528920.35
DSW13-2	1254913.12	528892.70
DSW13-3	1254913.15	528941.17
DSW13-4	1254920.34	528952.33
DSW13-5	1254915.96	528969.97
DSW13-6	1254912.21	529008.72
DSW13-7	1254867.76	529008.94
DSW13-8	1254871.39	528958.01
DSW13-9	1254873.03	528907.62
DSW13-10	1254879.49	528847.92
DSW13-11	1254880.62	528830.14
DSW13-12	1254873.88	528821.36
DSW13-13	1254882.76	528802.41
DSW13-14	1254931.94	528702.07
DSW13-15	1254932.13	528587.67
DSW13-16	1254931.76	528490.50
DSW13-17	1254933.36	528391.84
DSW13-18	1254932.85	528293.42
DSW13-19	1254935.61	528160.17
DSW13-20	1254938.14	528074.91
DSW13-21	1254931.19	527969.26
DSW13-22	1254932.09	527929.30
DSW13-23	1254939.71	527897.68
DSW13-24	1254966.23	527891.68

LINE TABLE

LINE	BEARING	DISTANCE
L329	S. 23°48'51" W.	68.47'
L330	N. 89°58'04" E.	48.47'
L331	N. 57°11'35" E.	13.27'
L332	S. 76°02'17" E.	18.17'
L333	S. 84°28'18" E.	38.94'
L334	S. 00°16'33" E.	44.44'
L335	N. 85°55'30" W.	51.06'
L336	N. 88°08'15" W.	50.42'
L337	N. 83°49'35" W.	60.05'
L338	N. 86°21'39" W.	17.81'
L339	S. 52°31'13" W.	11.07'
L340	N. 64°52'49" W.	20.92'
L341	N. 63°53'27" W.	111.74'
L342	N. 89°54'14" W.	114.40'
L343	S. 89°46'50" W.	97.18'
L344	N. 89°04'20" W.	98.67'
L345	S. 89°42'12" W.	98.42'
L346	N. 88°48'47" W.	133.27'
L347	N. 88°18'08" W.	85.30'
L348	S. 86°14'09" W.	105.88'
L349	N. 88°42'18" W.	39.96'
L350	N. 76°27'22" W.	32.53'
L351	N. 12°43'48" W.	27.20'

REVISED NO.	BY	DATE	DESCRIPTION
1	LSB	3/22/18	Revise wetland flag numbers
2	LSB	5/1/18	Revise wetland flag numbers
3	MWS	11/19/20	Remove Wetland '3' on Sht 3, Add Revised Wetlands '1' & '1A' on Sht 2
4			
5			
6			
7			
8			
9			
10			

	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE	1/8/18	

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ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 3 OF 13

PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
DSW10-2	1253618.55	527270.25
DSW10-3	1253617.75	527385.68
DSW10-4	1253642.87	527390.54
DSW10-5	1253635.68	527269.05
DSW11-2	1253963.58	527015.76
DSW11-3	1253967.71	526732.05
DSW11-4	1253962.99	526732.86
DSW11-5	1253958.31	527014.10
DSW12-1A	1254281.84	526689.33
DSW12-1	1254281.69	526805.66
DSW12-2A	1254293.99	526651.07
DSW12-2	1254281.16	526856.01
DSW12-3A	1254270.90	526688.11
DSW12-3	1254279.48	527006.84
DSW12-4A	1254273.09	526650.79
DSW12-4	1254277.69	527103.65
DSW12-5	1254263.45	527203.36
DSW12-6	1254263.97	527153.49
DSW12-7	1254264.50	527103.63
DSW12-8	1254266.19	527055.38
DSW12-9	1254267.88	527007.12
DSW12-10	1254268.78	526957.75
DSW12-11	1254269.67	526908.37
DSW12-12	1254268.64	526856.62
DSW12-13	1254267.62	526804.86
DSW12-14	1254275.34	526708.31
DSW12-15	1254282.49	526711.33
W1-21	1254277.81	527167.88
W1-22	1254261.95	527251.69
W1-29	1253961.08	527273.81
W1-30	1253950.64	527303.46
W2-4	1253579.57	527150.26
W2-5	1253614.25	527120.23
W2-6	1253641.04	527109.66
W2-7	1253666.63	527144.35
W2-8	1253702.37	527160.70
W2-9	1253728.33	527155.18
W2-10	1253695.73	527105.84
W2-11	1253748.67	527031.29
W2-12	1253781.89	526987.39
W2-13	1253756.53	526967.29
W2-14	1253754.55	526923.45
W2-15	1253762.13	526899.55
W2-16	1253743.93	526810.01
W2-17	1253721.07	526791.23
W2-18	1253659.22	526759.05
W2-19	1253615.58	526736.51
W2-20	1253567.82	526744.00
W2-21	1253538.93	526774.16

LINE TABLE

LINE	BEARING	DISTANCE
L215	N. 46°14'20" W.	41.76'
L216	N. 08°54'43" W.	48.34'
L217	N. 27°19'11" E.	49.12'
L218	N. 27°29'23" E.	69.72'
L219	N. 39°23'38" E.	29.58'
L220	N. 78°30'28" E.	91.37'
L221	S. 72°24'28" E.	25.08'
L222	N. 87°25'07" E.	43.88'
L223	N. 38°23'24" E.	32.36'
L224	S. 52°53'27" E.	55.05'
L225	S. 54°37'09" E.	91.44'
L226	N. 56°32'44" E.	59.14'
L227	S. 11°59'36" E.	26.54'
L228	S. 24°34'37" W.	39.31'
L229	S. 53°35'13" W.	43.11'
L230	S. 21°32'34" E.	28.80'
L231	S. 40°52'49" E.	45.88'
L232	S. 17°23'32" W.	71.56'
L248	S. 88°04'27" E.	159.48'
L249	N. 86°36'50" E.	121.71'
L250	S. 10°57'05" W.	25.58'
L251	N. 89°36'06" W.	115.43'
L252	S. 88°21'29" W.	150.08'
L253	N. 88°28'54" W.	289.46'
L254	N. 89°02'46" W.	281.28'
L255	N. 09°48'17" W.	4.79'
L256	S. 89°09'58" E.	283.74'
L257	S. 89°26'40" E.	258.07'
L264	N. 70°36'17" W.	31.43'
L272	N. 79°17'14" W.	85.31'
L294	N. 88°13'37" W.	48.36'
L295	N. 89°23'54" W.	49.87'
L296	N. 89°23'54" W.	49.87'
L297	N. 87°59'30" W.	48.28'
L298	N. 87°59'30" W.	48.28'
L299	N. 88°57'39" W.	49.38'
L300	N. 88°57'39" W.	49.38'
L301	S. 88°51'48" W.	51.77'
L302	S. 88°51'48" W.	51.77'
L303	N. 85°25'29" W.	96.86'
L304	N. 22°54'24" E.	7.76'
L305	S. 89°30'46" E.	94.33'
L306	S. 89°23'51" E.	50.35'
L307	S. 89°21'51" E.	150.84'
L308	S. 88°56'26" E.	96.83'
L309	N. 89°53'44" E.	64.22'
L310	S. 71°06'48" E.	39.19'
L311	S. 00°16'09" W.	10.41'
L312	N. 86°38'34" W.	37.38'

REVISED NO.	BY	DATE	DESCRIPTION
1	LSB	3/22/18	Revise wetland flag numbers
2	LSB	5/1/18	Revise wetland flag numbers
3	MWS	11/19/20	Remove Wetland '3' on Sht 3, Add Revised Wetlands '1' & '1A' on Sht 2
4			
5			
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7			
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9			
10			

	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE	1/8/18	

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ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS

SHEET NO. 4 OF 13

PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
OSW7A-1A	1253641.86	528380.13
OSW7A-1	1253562.09	530634.81
OSW7A-2A	1253620.94	528382.58
OSW7A-2	1253560.89	530624.78
OSW7A-3A	1253623.06	528427.90
OSW7A-3	1253600.51	528425.51
OSW7A-4A	1253622.70	528502.37
OSW7A-4	1253603.15	528504.48
OSW7B-7A	1253611.49	529044.37
OSW7B-7	1253591.76	529041.91
OSW7B-8A	1253616.24	529114.73
OSW7B-8	1253596.84	529109.34
OSW7-5A	1253619.94	528675.43
OSW7-5	1253427.70	527301.22
OSW7-6A	1253616.47	528961.45
OSW7-6	1253427.51	527364.05
OSW7-12	1253596.57	527893.37
OSW7-13	1253593.76	527903.32
OSW7-16	1253552.89	528150.45
OSW7-17	1253639.28	528299.79
OSW7-18	1253763.44	528537.54
OSW7-19	1253905.58	528777.60
OSW7-20	1253989.21	528943.25
OSW7-21	1253986.50	529040.68
OSW7-22	1253858.99	528780.90
OSW7-23	1253752.68	528617.94
OSW7-24	1253689.64	528496.97
OSW7-25	1253548.16	528238.76
W3-3	1254354.80	528877.39

LINE TABLE

LINE	BEARING	DISTANCE
L157	S. 63°51'23" W.	289.39'
L158	S. 56°52'55" W.	194.56'
L159	S. 62°28'19" W.	136.41'
L160	S. 67°45'33" W.	126.23'
L161	S. 06°41'03" E.	21.06'
L162	N. 87°19'31" E.	45.37'
L163	S. 89°43'17" E.	74.47'
L164	S. 89°05'08" E.	173.08'
L165	S. 89°18'18" E.	286.04'
L166	S. 86°34'06" E.	83.06'
L167	N. 86°08'29" E.	70.52'
L168	S. 83°15'38" E.	62.08'
L172	N. 80°59'57" W.	65.15'
L173	S. 85°41'43" W.	67.63'
L174	N. 89°05'10" W.	91.47'
L175	N. 88°26'59" W.	264.20'
L176	N. 89°07'27" W.	181.89'
L177	S. 88°05'07" W.	79.02'
L178	S. 89°35'22" W.	63.24'
L179	S. 83°13'52" W.	56.93'
L180	S. 55°59'50" W.	80.80'
L202	S. 74°13'48" E.	10.34'
L205	N. 60°10'14" E.	104.79'
L206	N. 59°57'17" E.	172.53'
L207	N. 62°25'27" E.	268.21'
L208	N. 59°22'09" E.	278.99'
L209	N. 63°12'45" E.	185.57'
L326	N. 78°16'56" W.	48.92'

REVISED

NO.	BY	DATE	DESCRIPTION
1	LSB	3/22/18	Revise wetland flag numbers
2	LSB	5/1/18	Revise wetland flag numbers
3	MWS	11/19/20	Remove Wetland '3' on Sht 3, Add Revised Wetlands '1' & '1A' on Sht 2
4			
5			

REVISED

NO.	BY	DATE	DESCRIPTION
6			
7			
8			
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	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE	1/8/18	

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SEE SHEET 1 OF 13 FOR SIGNATURE, DATE, AND SEAL

ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 5 OF 13

PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
OSW7-1	1253444.13	527020.35
OSW7-3	1253427.52	527134.47
OSW7-4	1253427.67	527221.60
OSW7-5	1253427.70	527301.22
OSW7-6	1253427.51	527364.05
OSW7-7	1253428.11	527442.99
OSW7-8	1253424.44	527491.30
OSW7-9	1253424.75	527582.77
OSW7-10	1253419.05	527702.53
OSW7-28	1253381.74	527795.42
OSW7-29	1253379.35	527636.51
OSW7-30	1253380.28	527504.57
OSW7-31	1253391.03	527348.88
OSW7-32	1253392.48	527230.75
OSW7-33	1253387.44	527060.64
OSW8-1	1253302.07	526675.77
OSW8-2	1253224.20	526685.74
OSW8-3	1253137.84	526682.91
OSW8-4	1253111.33	526697.24
OSW8-5	1253103.99	526684.60
OSW8-6	1253021.03	526674.47
OSW8-7	1252950.71	526707.92
OSW8-8	1252928.33	526717.53
OSW10-2	1253618.55	527270.25
OSW10-3	1253617.75	527385.68
OSW10-4	1253642.87	527390.54
OSW10-5	1253635.68	527269.05
W2-1	1253450.30	526999.78
W2-2	1253474.75	527068.74
W2-3	1253511.28	527128.87
W2-4	1253579.57	527150.26
W2-5	1253614.25	527120.23
W2-6	1253641.04	527109.66
W2-19	1253615.58	526736.51
W2-20	1253567.82	526744.00
W2-21	1253538.93	526774.16
W2-22	1253508.94	526786.81
W2-23	1253485.33	526774.13
W2-24	1253505.81	526803.69
W2-25	1253468.47	526775.60
W2-26	1253450.65	526701.86
W2-27	1253401.85	526676.29
W2-27A	1253448.71	526639.87
W2-28	1253401.40	526714.36
W2-29	1253382.81	526763.45
W2-30	1253373.08	526807.16
W2-31	1253387.38	526890.47

LINE TABLE

LINE	BEARING	DISTANCE
L184	S. 89°08'27" W.	158.93'
L185	N. 89°35'46" W.	131.94'
L186	N. 86°03'06" W.	156.06'
L187	N. 89°17'40" W.	118.14'
L188	S. 88°18'05" W.	170.18'
L189	S. 89°58'52" W.	170.17'
L190	S. 73°18'24" E.	21.48'
L191	S. 83°50'13" E.	48.32'
L192	S. 80°11'19" E.	67.06'
L193	N. 89°53'49" E.	87.12'
L194	N. 89°58'46" E.	79.63'
L195	S. 89°49'13" E.	62.83'
L196	N. 89°33'45" E.	78.94'
L197	S. 85°39'07" E.	48.45'
L198	N. 89°48'21" E.	91.47'
L199	S. 87°16'38" E.	119.89'
L200	N. 88°29'09" E.	209.12'
L210	N. 76°24'53" E.	75.86'
L211	N. 36°57'45" E.	46.73'
L212	S. 55°16'53" W.	35.97'
L213	N. 28°13'21" E.	26.80'
L214	N. 22°52'17" W.	32.55'
L215	N. 46°14'20" W.	41.76'
L216	N. 08°54'43" W.	48.34'
L217	N. 27°19'11" E.	49.12'
L229	S. 53°35'13" W.	43.11'
L230	S. 21°32'34" E.	28.80'
L231	S. 40°52'49" E.	45.88'
L232	S. 17°23'32" W.	71.56'
L233	S. 58°43'18" W.	70.35'
L234	S. 70°28'39" W.	73.17'
L235	S. 60°04'22" W.	126.12'
L236	S. 80°15'42" W.	84.53'
L237	N. 77°27'25" W.	44.78'
L238	N. 69°15'47" W.	52.49'
L239	N. 89°19'06" W.	38.07'
L240	S. 00°18'07" W.	99.78'
L241	S. 07°17'54" E.	78.51'
L242	S. 01°52'37" W.	86.40'
L243	S. 28°23'24" E.	30.13'
L244	S. 59°51'32" W.	14.62'
L245	S. 06°57'19" W.	83.58'
L246	S. 25°26'22" E.	77.87'
L247	S. 23°14'35" E.	24.36'
L248	S. 88°04'27" E.	159.48'
L249	N. 86°36'50" E.	121.71'
L250	S. 10°57'05" W.	25.58'
L251	N. 89°36'06" W.	115.43'
L252	S. 88°21'29" W.	150.08'

2	3		
4	5		
6	7	8	9
		10	11
		12	13

REVISED NO.	BY	DATE	DESCRIPTION
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10			

	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE	1/8/18	

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ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 6 OF 13

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FILE: C:\Project\Sur\17-0032-00TS-ECT ABH Expansion\Dwg\17003200ts br revised 20180501.dwg

Wetland Flag Table

Flag#	Northing	Easting
OSW7-11	1253424.58	527911.58
OSW7-12	1253596.57	527893.37
OSW7-13	1253593.76	527903.32
OSW7-14	1253429.87	527926.84
OSW7-15	1253500.77	528059.54
OSW7-16	1253552.89	528150.45
OSW7-17	1253639.28	528299.79
OSW7-25	1253548.16	528238.76
OSW7-26	1253475.71	528101.64
OSW7-27	1253396.36	527961.50
OSW7A-1A	1253641.86	528380.13
OSW7A-1	1253562.09	530634.81
OSW7A-2A	1253620.94	528382.58
OSW7A-2	1253560.89	530624.78
OSW7A-3A	1253623.06	528427.90
OSW7A-3	1253600.51	528425.51
OSW7A-4A	1253622.70	528502.37
OSW7A-4	1253603.15	528504.48
OSW7A-5A	1253619.94	528675.43
OSW7A-5	1253600.37	528686.35
OSW7A-6A	1253616.47	528961.45
OSW7A-6	1253593.22	528950.45
OSW7A-7A	1253611.49	529044.37
OSW7A-7	1253591.76	529041.91
OSW7A-8A	1253616.24	529114.73
OSW7A-8	1253596.84	529109.34
OSW9-1	1252943.56	528004.91
OSW9-2A	1252959.81	528021.55
OSW9-3A	1252975.34	528107.84
OSW9-3	1252959.41	528095.61
OSW9-4A	1252969.22	528250.09
OSW9-4	1252958.66	528250.04
OSW9-5A	1252954.27	528304.44
OSW9-5	1252968.33	528310.40
OSW9-6A	1252968.29	528418.13
OSW9-6	1252957.37	528417.52
OSW9-7A	1252951.23	528470.72
OSW9-7	1252964.11	528470.47

LINE TABLE

LINE	BEARING	DISTANCE
L161	S. 06°41'03" E.	21.06'
L162	N. 87°19'31" E.	45.37'
L163	S. 89°43'17" E.	74.47'
L164	S. 89°05'08" E.	173.08'
L165	S. 89°18'18" E.	286.04'
L166	S. 86°34'06" E.	83.06'
L167	N. 86°08'29" E.	70.52'
L168	S. 83°15'38" E.	62.08'
L172	N. 80°59'57" W.	65.15'
L173	S. 85°41'43" W.	67.63'
L174	N. 89°05'10" W.	91.47'
L175	N. 88°26'59" W.	264.20'
L176	N. 89°07'27" W.	181.89'
L177	S. 88°05'07" W.	79.02'
L178	S. 89°35'22" W.	63.24'
L179	S. 83°13'52" W.	56.93'
L180	S. 55°59'50" W.	80.80'
L181	S. 62°08'55" W.	155.09'
L182	S. 60°28'54" W.	161.04'
L183	S. 84°57'58" W.	166.73'
L200	N. 88°29'09" E.	209.12'
L201	N. 06°02'30" W.	172.96'
L202	S. 74°13'48" E.	10.34'
L203	S. 08°10'05" E.	165.57'
L204	N. 61°53'11" E.	150.44'
L205	N. 60°10'14" E.	104.79'
L206	N. 59°57'17" E.	172.53'
L352	N. 85°26'00" W.	52.51'
L353	N. 89°58'45" W.	107.73'
L354	N. 89°08'59" W.	60.31'
L355	N. 87°32'12" W.	142.39'
L356	S. 79°47'32" W.	87.67'
L357	S. 45°42'13" W.	23.26'
L358	S. 89°35'01" E.	49.26'
L359	N. 68°38'40" E.	44.50'
L360	S. 89°43'20" E.	154.43'
L361	S. 85°22'57" E.	54.58'
L362	N. 88°25'51" E.	113.13'
L363	S. 83°25'03" E.	53.55'
L364	N. 01°06'42" W.	12.88'

REVISED NO.	BY	DATE	DESCRIPTION	REVISED NO.	BY	DATE	DESCRIPTION
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ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS

PLOTTED: 05/01/18 14:21:32

Wetland Flag Table

Flag#	Northing	Easting
DSW7A-8A	1253616.24	529114.73
DSW7A-8	1253596.84	529109.34
DSW7A-9A	1253608.95	529176.38
DSW7A-9	1253586.65	529173.69
DSW7A-10A	1253602.23	529227.67
DSW7A-10	1253580.83	529236.98
DSW7B-11A	1253602.52	529258.08
DSW7B-11	1253584.68	529258.61
DSW7B-12A	1253607.45	529335.28
DSW7B-12	1253582.19	529334.92
DSW7B-13A	1253608.37	529423.68
DSW7B-13	1253582.33	529424.88
DSW7B-14A	1253610.51	529525.41
DSW7B-14	1253580.14	529529.71
DSW7B-15A	1253609.23	529625.19
DSW7B-15	1253581.09	529634.15
DSW7B-16A	1253610.78	529709.11
DSW7B-16	1253585.36	529708.08
DSW7B-17A	1253604.96	529796.22
DSW7B-17	1253575.57	529800.57
DSW7B-18A	1253605.79	529893.34
DSW7B-18	1253572.60	529896.28
DSW7B-19A	1253605.94	529979.94
DSW7B-19	1253572.51	529979.81
DSW7B-20A	1253604.59	530077.95
DSW7B-20	1253573.37	530080.26
DSW7B-21A	1253605.13	530151.84
DSW7B-21	1253572.44	530149.88
DSW7B-22A	1253601.78	530240.26
DSW7B-22	1253568.98	530243.94
DSW7B-23A	1253599.97	530312.69
DSW7B-23	1253568.20	530311.95
DSW7B-24A	1253590.27	530383.66
DSW7B-24	1253568.88	530383.16

LINE TABLE

LINE	BEARING	DISTANCE
L125	S. 89°12'28" E.	98.02'
L126	N. 89°34'33" E.	73.89'
L127	S. 87°49'30" E.	88.48'
L128	S. 88°34'10" E.	72.46'
L129	S. 82°13'06" E.	71.62'
L130	S. 87°18'45" E.	71.34'
L134	N. 86°36'32" W.	70.26'
L135	S. 89°27'19" W.	71.21'
L136	N. 89°20'41" W.	68.01'
L137	N. 87°53'32" W.	94.13'
L138	N. 89°14'08" W.	69.63'
L139	S. 89°30'38" W.	100.45'
L140	N. 89°56'33" W.	83.53'
L141	N. 88°13'13" W.	95.75'
L142	N. 83°57'23" W.	93.00'
L143	S. 86°41'30" W.	74.06'
L144	S. 89°28'40" W.	104.44'
L145	N. 88°48'02" W.	104.86'
L146	S. 89°54'41" W.	89.96'
L147	N. 88°07'55" W.	76.35'
L148	N. 01°41'53" W.	17.85'
L149	N. 86°20'58" E.	77.35'
L150	N. 89°24'07" E.	88.41'
L151	N. 88°47'52" E.	101.75'
L152	S. 89°16'00" E.	99.78'
L153	N. 88°56'21" E.	83.93'
L154	S. 86°10'21" E.	87.30'
L155	N. 89°30'27" E.	97.13'
L156	N. 89°54'00" E.	86.60'
L168	S. 83°15'38" E.	62.08'
L169	S. 82°31'48" E.	51.73'
L170	S. 23°31'02" E.	23.34'
L171	N. 84°44'41" W.	63.56'
L172	N. 80°59'57" W.	65.15'

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ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 8 OF 13

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PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
DSW1-1A	1253533.11	530626.73
DSW1-1	1253533.59	530634.70
DSW1-2A	1253344.90	530619.06
DSW1-2	1253348.33	530627.72
DSW1-3A	1253298.28	530621.08
DSW1-3	1253298.86	530628.00
DSW1-4A	1253168.29	530619.73
DSW1-4	1253168.62	530626.71
DSW1-5A	1253025.84	530617.25
DSW1-5	1253026.79	530624.59
DSW7B-25A	1253586.92	530454.92
DSW7B-25	1253564.72	530453.30
DSW7B-26A	1253587.71	530541.37
DSW7B-26	1253565.49	530542.13
DSW7B-27A	1253583.61	530563.53
DSW7B-27	1253562.73	530562.45
DSW7B-28A	1253579.54	530614.91
DSW7B-28	1253565.05	530616.46
DSW7B-29A	1253562.09	530634.81
DSW7B-29	1253560.89	530624.78

LINE TABLE

LINE	BEARING	DISTANCE
L89	N. 86°33'13" E.	7.98'
L90	S. 02°09'28" W.	185.39'
L91	S. 00°19'27" E.	49.47'
L92	S. 00°34'03" W.	130.25'
L93	S. 00°51'23" W.	141.85'
L114	N. 01°00'46" E.	290.20'
L115	N. 00°35'42" E.	130.00'
L116	N. 02°28'52" W.	46.66'
L117	N. 02°20'01" E.	188.37'
L118	N. 63°26'06" W.	9.30'
L119	S. 87°32'30" W.	54.07'
L120	N. 02°58'01" E.	20.90'
L121	S. 85°28'35" E.	51.54'
L122	S. 48°09'50" E.	7.84'
L123	S. 49°00'04" E.	18.63'
L124	S. 83°10'39" W.	10.10'
L130	S. 87°18'45" E.	71.34'
L131	N. 89°28'40" E.	86.45'
L132	S. 01°57'40" E.	22.24'
L133	S. 89°30'21" W.	88.83'
L134	N. 86°36'32" W.	70.26'

CURVE DATA TABLE

CURVE	DELTA	RADIUS	ARC	CHORD	CHORD BEARING
C1	19°08'55"	2159.83'	721.83'	718.48'	S. 19°02'50" W.

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JOB NO. 17003200TS

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Wetland Flag Table

Flag#	Northing	Easting
OSW4-25	1252266.52	529404.14
OSW6-2	1252669.77	529182.43
OSW6-3	1252658.49	529248.35
OSW6-4	1252645.46	529266.57
OSW6-5	1252592.94	529269.82
OSW6-6	1252525.49	529265.74
OSW6-7	1252468.39	529268.70
OSW6-8	1252421.92	529267.85
OSW6-9	1252391.34	529268.65
OSW6-10	1252316.02	529261.71
OSW6-11	1252300.82	529277.48

LINE TABLE

LINE	BEARING	DISTANCE
L28	S. 80°17'23" E.	66.88'
L29	S. 54°25'47" E.	22.40'
L30	S. 03°32'28" E.	52.62'
L31	S. 03°27'42" W.	67.57'
L32	S. 02°58'03" E.	57.18'
L33	S. 01°02'52" W.	46.48'
L34	S. 01°29'55" E.	30.59'
L35	S. 05°15'52" W.	75.64'
L36	S. 46°03'16" E.	21.90'
L37	S. 74°50'51" E.	131.22'

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Flag#	Northing	Easting
DSW1-5A	1253025.84	530617.25
DSW1-5	1253026.79	530624.59
DSW1-6A	1252878.14	530614.60
DSW1-6	1252878.69	530622.99
DSW1-7A	1252738.27	530611.97
DSW1-7	1252738.02	530621.87
DSW1-8A	1252599.68	530611.53
DSW1-8	1252599.94	530619.50
DSW1-9A	1252449.85	530609.90
DSW1-9	1252450.02	530616.61
DSW1-10A	1252311.20	530608.45
DSW1-10	1252311.94	530618.10

LINE TABLE

LINE	BEARING	DISTANCE
L93	S. 00°51'23" W.	141.85'
L94	S. 00°37'08" W.	148.11'
L95	S. 00°27'22" W.	140.67'
L96	S. 00°59'00" W.	138.10'
L97	S. 01°06'16" W.	149.95'
L98	S. 00°37'06" E.	138.09'
L110	N. 00°35'57" E.	138.66'
L111	N. 00°37'24" E.	149.84'
L112	N. 00°10'55" E.	138.59'
L113	N. 01°04'38" E.	139.89'
L114	N. 01°00'46" E.	290.20'

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Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 11 OF 13

PLOTTED: 05/01/18 14:21:32 LOGIN: sbrown

Wetland Flag Table

Flag#	Northing	Easting
OSW2A-1A	1251765.43	530114.30
OSW2A-1	1251771.12	530113.75
OSW2A-2A	1251745.12	530086.79
OSW2A-3A	1251772.70	530044.46
OSW2A-3	1251720.69	530066.85
OSW2A-4	1251725.15	530046.17
OSW2-3A	1251759.57	530383.22
OSW2-3	1251767.92	530381.09
OSW2-4A	1251761.41	530302.68
OSW2-4	1251768.69	530305.56
OSW2-5A	1251760.48	530235.80
OSW2-5	1251771.74	530239.15
OSW2-6A	1251758.84	530172.42
OSW2-6	1251769.94	530167.85
OSW2-7A	1251771.64	530128.54
OSW2-7	1251764.12	530131.01
OSW3-3A	1251747.15	530381.98
OSW3-3	1251737.08	530372.71
OSW3-4A	1251747.49	530284.51
OSW3-4	1251735.19	530286.18
OSW3-5A	1251748.02	530239.01
OSW3-5	1251741.37	530240.98
OSW4-2A	1251766.46	530032.07
OSW4-3A	1251774.68	530022.16
OSW4-3	1251794.48	530027.84
OSW4-4A	1251783.99	529972.98
OSW4-4	1251790.99	529995.88
OSW4-5A	1251812.48	529923.44
OSW4-5	1251825.85	529932.68
OSW4-6A	1251830.04	529891.67
OSW4-6	1251845.92	529898.58
OSW4-7A	1251850.45	529877.60
OSW4-7	1251868.50	529876.61
OSW4-8A	1251854.00	529844.49
OSW4-8B	1251880.39	529802.43
OSW4-8	1251881.24	529832.83
OSW4-9A	1251899.82	529784.74
OSW4-9	1251898.22	529796.70
OSW4-10A	1251912.80	529747.56
OSW4-10	1251930.68	529771.12
OSW4-11A	1252001.14	529712.08
OSW4-11	1252008.13	529722.25
OSW4-12A	1252021.02	529685.59
OSW4-12	1252040.33	529714.52
OSW4-13A	1252064.08	529643.52
OSW4-13	1252079.47	529638.83
OSW4-14A	1252078.37	529613.09
OSW4-14	1252105.62	529616.33
OSW4-15A	1252076.88	529608.03
OSW4-15B	1252079.26	529585.76
OSW4-15	1252098.10	529609.20
OSW4-16A	1252104.84	529582.13
OSW4-16	1252093.30	529595.30
OSW4-17A	1252111.84	529559.69
OSW4-17	1252126.16	529569.79
OSW4-18A	1252116.17	529555.22
OSW4-18	1252128.70	529540.72
OSW4-19A	1252086.63	529541.62
OSW4-19	1252100.26	529533.92
OSW4-20A	1252090.95	529511.94
OSW4-20	1252104.10	529515.59
OSW4-21A	1252113.10	529485.35
OSW4-21	1252123.90	529496.70
OSW4-22A	1252139.46	529467.50
OSW4-22	1252152.90	529478.28
OSW4-23A	1252154.75	529400.69
OSW4-23	1252181.37	529444.83
OSW4-24A	1252185.84	529376.10
OSW4-24	1252217.03	529403.40
OSW4-25A	1252219.83	529338.31
OSW4-25	1252266.52	529404.14
OSW4-26A	1252240.73	529267.30
OSW5-1A	1252110.95	529745.45
OSW5-1	1252107.68	529751.59
OSW5-2	1252115.90	529762.26
OSW5-3	1252130.34	529746.24
OSW5-4	1252116.64	529741.29
OSW6-10	1252316.02	529261.71
OSW6-11	1252300.82	529277.48

LINE TABLE

LINE	BEARING	DISTANCE
L1	N. 18°50'45" W.	43.65'
L2	N. 50°19'32" W.	12.88'
L3	N. 79°16'50" W.	50.05'
L4	N. 60°05'50" W.	57.15'
L5	N. 61°04'10" W.	36.30'
L6	N. 34°34'52" W.	24.79'
L7	N. 83°52'49" W.	33.30'
L8	N. 57°53'40" W.	49.65'
L9	N. 42°18'58" W.	26.28'
L10	N. 70°45'19" W.	39.38'
L11	N. 21°52'55" W.	95.20'
L12	N. 53°06'46" W.	33.12'
L13	N. 44°20'01" W.	60.20'
L14	N. 64°50'43" W.	33.62'
L15	S. 73°35'31" W.	5.27'
L16	N. 83°53'42" W.	22.39'
L17	N. 08°04'56" W.	25.83'
L18	N. 72°40'30" W.	23.51'
L19	N. 45°54'41" W.	6.22'
L20	S. 24°43'16" W.	32.52'
L21	N. 81°43'07" W.	29.99'
L22	N. 50°12'18" W.	34.61'
L23	N. 34°06'16" W.	31.84'
L24	N. 77°06'34" W.	68.54'
L25	N. 38°20'29" W.	39.64'
L26	N. 48°01'49" W.	50.83'
L27	N. 73°35'58" W.	74.02'
L35	S. 05°15'52" W.	75.64'
L36	S. 46°03'16" E.	21.90'
L37	S. 74°50'51" E.	131.22'
L38	S. 00°51'24" W.	49.50'
L39	S. 49°16'50" E.	54.66'
L40	S. 49°35'53" E.	43.93'
L41	S. 32°25'21" E.	34.36'
L42	S. 43°39'09" E.	27.37'
L43	S. 78°10'05" E.	18.73'
L44	N. 13°26'49" E.	29.24'
L45	S. 85°00'23" E.	29.18'
L46	S. 37°49'23" E.	41.60'
L47	N. 70°56'56" E.	14.71'
L48	N. 43°28'30" E.	10.36'
L49	S. 40°42'34" E.	34.50'
L50	S. 62°39'22" E.	85.21'
L51	S. 13°29'57" E.	33.11'
L52	S. 32°15'05" E.	91.58'
L53	S. 38°14'23" E.	41.33'
L54	S. 64°49'40" E.	39.92'
L55	S. 73°46'30" E.	45.60'
L56	S. 44°12'56" E.	31.50'
L57	S. 59°31'14" E.	39.57'
L58	S. 61°07'11" E.	72.18'
L59	N. 83°46'05" E.	32.15'
L60	S. 37°20'48" E.	27.40'
L61	S. 88°41'37" E.	69.31'
L62	S. 05°31'16" E.	5.72'
L63	S. 53°33'45" W.	34.19'
L64	S. 39°13'18" W.	31.53'
L66	N. 88°01'08" W.	69.42'
L67	N. 88°41'29" W.	80.56'
L68	S. 89°12'12" W.	66.89'
L69	S. 88°31'04" W.	63.40'
L70	N. 82°44'01" W.	41.75'
L71	N. 18°10'59" W.	7.92'
L72	S. 87°31'25" E.	39.35'
L73	N. 88°33'14" E.	71.32'
L74	S. 87°22'14" E.	66.48'
L75	S. 89°24'57" E.	75.53'
L76	N. 89°52'39" E.	79.51'
L80	N. 89°16'23" W.	80.40'
L81	S. 88°44'55" W.	86.55'
L82	N. 82°12'52" W.	45.62'
L83	N. 16°30'05" W.	6.94'
L84	S. 89°19'57" E.	45.50'
L85	S. 89°48'00" E.	97.47'
L86	S. 88°57'42" E.	71.74'
L365	S. 47°58'10" E.	21.57'
L366	S. 52°23'24" W.	13.47'
L367	N. 61°57'41" W.	6.96'
L368	N. 36°10'15" W.	7.05'
L369	N. 19°51'56" E.	14.57'

REVISED NO.	BY	DATE	DESCRIPTION
1	LSB	3/22/18	Revise wetland flag numbers
2	LSB	5/1/18	Revise wetland flag numbers
3	MWS	11/19/20	Remove Wetland '3' on Sht 3, Add Revised Wetlands '1' & '1A' on Sht 2
4			
5			
6			
7			
8			
9			
10			

	INITIALS	DATE
CREW CHIEF	CEH	1/8/18
DRAWN	LSB	2/26/18
CHECKED	WAS	2/27/18
FIELD BOOK		
FIELD DATE	1/8/18	

PREPARED FOR:
ECT
1408 N. Westshore Boulevard, Suite 115
Tampa, Florida 33602

George F. Young, Inc.
Since 1919
1921 TAMPA EAST BOULEVARD TAMPA, FLORIDA 33619
PHONE (813) 223-1747 FAX (813) 229-0657
BUSINESS ENTITY LB21
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SEE SHEET 1 OF 13 FOR SIGNATURE, DATE, AND SEAL

ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS

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LEGEND:

- (D) – Deed Dimensions
- (DL) – First Less-out Dimensions
- (DL2) – Second Less-out Dimensions
- Wood Power Pole
- Valve (Water)
- Sign Single Support
- Multicolumn Sign
- Misc Post
- Metal Power Pole
- Well Monitoring
- Metal Light Pole
- Concrete Power Pole
- Iron Rod Found
- Concrete Monument 6"x 6" Found
- Iron Pipe Found
- Iron Pipe and Cap Found
- Guy Anchor
- Wire Fence Line
- Chain Link Fence Line
- Overhead Utility Line
- Drainage Pipe Line
- Drainage Pipe Line
- Wetland Flag
- Revised Wetland Flag

Wetland Flag Table

Flag#	Northing	Easting
OSW1-10A	1252311.20	530608.45
OSW1-10	1252311.94	530618.10
OSW1-11A	1252183.92	530609.69
OSW1-11	1252184.27	530615.98
OSW1-12A	1252018.38	530606.83
OSW1-12	1252019.43	530615.67
OSW1-13A	1251880.23	530606.20
OSW1-13	1251880.07	530612.33
OSW1-14A	1251797.32	530600.66
OSW1-14	1251796.02	530609.43
OSW1-15A	1251758.21	530587.81
OSW1-15	1251754.10	530595.88
OSW2-1A	1251759.38	530573.45
OSW2-1	1251767.71	530574.01
OSW2-2A	1251757.17	530452.60
OSW2-2	1251768.09	530460.60
OSW3-1A	1251744.56	530526.15
OSW3-1	1251736.75	530527.91
OSW3-2A	1251745.85	530453.71
OSW3-2	1251736.06	530453.10

LINE TABLE

LINE	BEARING	DISTANCE
L65	S. 88°57'08" W.	120.87'
L66	N. 88°01'08" W.	69.42'
L76	N. 89°52'39" E.	79.51'
L77	S. 89°48'29" E.	113.41'
L78	S. 03°50'46" W.	8.35'
L79	S. 89°28'18" W.	74.81'
L80	N. 89°16'23" W.	80.40'
L86	S. 88°57'42" E.	71.74'
L87	S. 88°58'47" E.	72.45'
L88	S. 12°41'59" E.	8.01'
L99	S. 00°57'05" W.	127.69'
L100	S. 00°06'28" W.	164.84'
L101	S. 01°22'23" W.	139.40'
L102	S. 01°58'34" W.	84.10'
L103	S. 17°54'45" W.	44.06'
L104	N. 63°00'38" W.	9.06'
L105	N. 18°11'19" E.	41.17'
L106	N. 03°49'22" E.	83.09'
L107	N. 00°15'41" E.	138.15'
L108	N. 00°59'23" E.	165.56'
L109	N. 00°33'29" W.	127.29'

REVISED

NO.	BY	DATE	DESCRIPTION
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FIELD BOOK		
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SEE SHEET 1 OF 13 FOR SIGNATURE, DATE, AND SEAL

ABH Expansion
Boundary Survey
Sections 15 and 22, Township 31 South, Range 19 East

JOB NO. 17003200TS
SHEET NO. 13 OF 13

TAB 5

APPENDIX C

GEOTECHNICAL ENGINEERING REPORTS

Report of Geotechnical Services
TECO Solar Project
Apollo Beach, Florida
S&ME Project No. 1484-15-017

Prepared for:
Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Prepared by:
S&ME, Inc.
111 Kelsey Lane, Ste E
Tampa, FL 33619

July 16, 2015

July 16, 2015

Tampa Electric Company
P.O. Box 111
Tampa, FL 33601-0111

Attention: Mr. Joshua Alston, E.I.

Reference: **Report of Geotechnical Services**
TECO Solar Project
Apollo Beach, Florida
S&ME Project No. 1484-15-017
Florida Certificate of Authorization No. 6712

Dear Mr. Alston:

S&ME, Inc. (S&ME) has completed our geotechnical engineering services for the proposed solar power generating facility near Tampa Electric Company's Big Bend Power Station in Apollo Beach, Florida. Our services were provided pursuant to S&ME Proposal Nos. 14-1500460 and 14-1500460A dated June 19, 2015 and June 30, 2015, respectively. Our services were authorized with the issuance of Tampa Electric Company Work Order No. 2551065-05 dated June 30, 2015 and Change Order No. 1 dated July 1, 2015.

The purpose of our services was to explore the subsurface conditions at the subject site pertinent to site preparation and foundation support. The following report presents our geotechnical findings and recommendations.

S&ME appreciates the opportunity to be of service to Tampa Electric Company. Please contact us if you have any questions.

Sincerely,

S&ME, Inc.

Graham T. Zoeller, P.E.
Project Engineer
Florida License No. 79426

Philip J. Erbland, P.E.
Senior Engineer
Florida License No. 52621

PHILIP J. ERBLAND
LICENSE
No. 52621
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

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List of Tables

Appendices

1.0 Introduction

1.1 Purpose

The purpose of our services was to explore the subsurface conditions at the subject site pertinent to site preparation and foundation support, to determine the general engineering characteristics of the materials encountered, and to provide to the design engineers information to aid in their design.

1.2 Project Information

We understand that Tampa Electric Company (TEC) plans to construct a solar power generating facility near its Big Bend Power Station. The facility will include solar panels, inverters, transformers and a substation. The solar panels will be mounted on driven steel piers (such as W6 or W8 members). Current plans require that these piles be driven to a depth of approximately 10 feet below finished grades. Multiple skids containing an inverter and transformer will be placed throughout the site, the locations of which are currently unknown, with loads on the order of 2 to 4 kips. The skids will be raised on a steel structure supported by a shallow foundation system. The substation will be built onsite, off US 41 near the existing telephone tower. The substation will include a larger transformer with a reported weight of 125 kips supported on a mat foundation 12 feet by 20 feet in plan size. No stormwater ponds are expected to be constructed.

1.3 Scope of Study and Report Format

This exploration included a site reconnaissance, field exploration, laboratory testing, and a geotechnical engineering analysis. The following sections of this report present a discussion of the details surrounding the field exploration, laboratory testing programs, site conditions, and our corresponding conclusions and recommendations. Figures are provided in Appendix I and laboratory test results are provided in Appendix II. The field and laboratory testing procedures are presented in Appendix III.

2.0 Site Information

2.1 Site Reconnaissance

The subject property is located south of Big Bend Road and is bounded to the west by Dickman Road and the east by US 41 in Apollo Beach, Florida. The location of the site is depicted on the Site Location Plan (Figure 1 in Appendix I). Based on information provided by TEC, the subject property is approximately 154 acres in size. At the time of our exploration, the eastern portion of the site was in use as cattle rangeland while the western portion consisted of the power line/utility easement and overgrown, undeveloped areas. Numerous drainage ditches crossed the property (some with standing water). There was also a heavily overgrown area near the north center of the site that was unable to be observed.

2.2 Site History

Based on a review of historical aerial photography dating back to 1938, the subject site was undeveloped rangeland from 1938 to sometime before 1965. By 1965, the northern half of the site was used for farming of row crops. By 1976, it appears that most of the row crops are gone and the site is likely used as cattle rangeland. At some time between 1976 and 1984 construction was started on the south gypsum holding area and the ditch along the south side of the site was constructed. By 1991 construction of the south gypsum area was completed. No significant changes were noted between 1991 and 2015.

2.3 Soil Survey Information

The Soil Survey of Hillsborough County, Florida, prepared by the U.S. Department of Agriculture Natural Resource Conservation Service (formerly the Soil Conservation Service) was reviewed for the preparation of this report. Borings S-1 to S-2 and S-4 to S-8 are in an area identified as Wabasso fine sand. Wabasso fine sand is poorly drained with a published seasonal high water table of ½ to 1½ feet below the ground surface. The area around boring S-3 is mapped as Basinger, Holopaw, and Samsula soils, depressional. These soil types are typically very poorly drained with a published seasonal high water table at the ground surface. Borings S-9 and B-1 to B-3 are in an area mapped as Malabar fine sand. Malabar fine sand is poorly drained with a published seasonal high water table of 0 to 1 feet below the ground surface.

3.0 Exploration and Testing Programs

3.1 Field Exploration

Our field exploration included locating utilities in the proposed boring locations using Ground Penetrating Radar (GPR) and electromagnetic techniques. The GPR and electromagnetic surveys were performed by Cardno under contract to S&ME on June 30, 2015. A copy of the survey results are presented in Appendix I. No utility conflicts were noted or observed it the field. After the utility scanning was complete, TEC revised the locations of borings B-1 and B-2 and as such these boring locations were not scanned for utilities prior to drilling.

Our field exploration consisted of the following:

- Nine (9) Standard Penetration Test (SPT) borings to a depth of 15 feet to evaluate the soils in the footprint of the proposed solar array;
- Three (3) Standard Penetration Test (SPT) borings to a depth of 50 feet to evaluate the soils in the footprint of the proposed substation; and,
- One (1) bulk soil sample obtained near the ground surface in the substation area for Limerock Bearing Ratio testing.

The test locations and depths were selected by S&ME. The boring locations were initially located in the field by S&ME personnel using a handheld GPS unit and were survey located by SurvTech Solutions, Inc. after the conclusion of the field exploration. The obtained coordinates are presented on the boring logs. The field testing was performed between July 1, 2015 and July 2, 2015. The approximate boring locations are shown on the Field Test Location Plan (Figure 2) in Appendix I.

SPT sampling began at the ground surface in all of the borings except for borings B-1 and B-2. The upper 4 feet of these borings were advanced using a hand auger to check for buried utilities. The soil test borings were advanced using rotary wash methods. Sampling of the soils was accomplished using the SPT procedure (ASTM D1586). Rock coring was attempted in boring B-3 in general accordance with ASTM D2113. However, the soil conditions were not conducive to coring and very poor recovery was obtained. Therefore, no additional coring was attempted. The deep borings were grouted upon completion using bentonite chips in accordance with Water Management District requirements while the shallow borings were backfilled with native materials.

Our initial scope included soil resistivity testing using the Wenner Four-Electrode method in the substation area. However, this item was deleted from the scope of services by TEC prior to mobilization.

The field exploration results are presented in Appendix I and the procedures used are described in Appendix III.

3.2 Laboratory Test Program

Representative soil samples and cores obtained during our field sampling operation were packaged and transferred to our office for evaluation by a geotechnical engineer in order to confirm the field descriptions of the various soil strata. Laboratory testing was performed on selected samples as deemed necessary to aid in soil classification and to further define the engineering properties of the soils. The laboratory tests performed consisted of percent fines analyses, corrosion series testing, and Limerock Bearing Ratio (LBR) testing.

4.0 Subsurface Conditions

4.1 Subsurface Conditions

The borings generally encountered interbedded layers of very loose to medium dense sandy soils with varying amounts of silt and clay from the ground surface to a depth of approximately 12 to 22 feet below the ground surface. Borings S-1 to S-6, and S-8 and S-9 were terminated in this material at a depth of 15 feet. The sandy soils between 2 and 6 feet below the ground surface in borings S-1, S-2, and S-4 to S-9 contained a significant amount of shell and cemented sand nodules. A four-foot-thick interbedded layer of firm sandy clay was encountered at a depth of approximately 8 feet in boring S-4. Stiff to very hard clayey soils were encountered beneath the sand strata to the termination depth of 15 feet in boring S-7 and to the termination depth of 50 feet in borings B-1 to B-3.

The above subsurface description is of a highly generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in Appendix I should be reviewed for specific information at individual boring locations. The depth and thickness of the subsurface strata indicated on the soil profiles were generalized from and interpolated between test locations. The transition between materials will be more or less gradual than indicated and may be abrupt. Information on actual subsurface conditions exists only at the specific boring locations and is relevant to the time the exploration was performed. Variations may occur and should be expected between boring locations. The samples that were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded.

4.2 Subsurface Water

Subsurface water was encountered at a depth of approximately 3½ to 4 feet at the time of our exploration. Subsurface water levels may fluctuate due to seasonal changes in precipitation amounts or with construction activity in the area. The subsurface water information presented in this report was collected at the time of our exploration.

4.3 Laboratory Test Results

Percent fines analyses, corrosion series tests, and a LBR test were performed on selected soil samples. The laboratory classification results are presented on the soil boring logs presented in Appendix I at the depth of the individually tested soil samples while the corrosion and LBR results are presented in Appendix II.

4.3.1 Percent Fines Analyses

Six soil samples were selected for determination of percentage of fine-grained material using the test procedures outlined in ASTM D1140. The results of these tests are useful in evaluating soil suitability and densification methods.

4.3.2 Corrosion Series

Corrosion tests consisted of pH, resistivity, chlorides, and sulfates. Samples were taken from borings B-1 and S-1. The pH of the samples was determined in accordance with Florida Department of Transportation (FDOT) laboratory test method FM 5-550. The resistivity of the samples was determined in accordance with FDOT laboratory test method FM 5-551. The concentrations of chlorides and sulfates were determined using FDOT laboratory test methods FM 5-552 and FM 5-553, respectively. Based on the results, the sample tested from boring B-1 was moderately aggressive to steel and concrete. The sample tested from boring S-1 was found to be extremely aggressive to steel and moderately aggressive to concrete. A summary of the corrosion series testing results can be found in Appendix II.

4.3.3 Limerock Bearing Ratio (LBR) Test

One (1) LBR test was performed in accordance with FDOT laboratory test method FM 5-515. The LBR test included a Modified Proctor test from the existing subgrade soils at location R-1. The test showed that the material has a LBR value of 28. The LBR data is presented in Appendix II.

5.0 Conclusions and Recommendations

5.1 General

The conclusions and recommendations presented in this report are based on the preceding project information and the results of this exploration. Actual subsurface conditions may vary between or away from the soil boring locations. If it becomes apparent during construction that the conditions encountered vary substantially from those presented herein, this office should be notified at once. At that time, the conditions can be evaluated and the recommendations of this report modified, in written form, if necessary.

During review of these recommendations, it should be kept in mind that, as with any previously developed site, unexpected subsurface conditions may be encountered. These conditions could include such things as undiscovered fill deposits, remnants of previous development, or buried debris. These variable conditions can normally be handled during construction by field engineering evaluation.

5.2 Site Geotechnical Considerations

Based on our evaluation and analyses, these soils will be capable of supporting the anticipated structural loads on the proposed shallow and deep foundation systems previously presented after the completion of the recommended site preparation program presented herein. The recommended site preparation program involves the densification the subgrade foundation surfaces to compress loose surface soils, as well as subgrade soils disturbed by other site preparation procedures, thereby creating a more uniform and less yielding soil mass. The above-created conditions will promote uniform settlement of the structure, thereby reducing the incidence and magnitude of differential settlement.

5.3 Shallow Foundation Design Considerations

Assuming our site preparation recommendations are followed as recommended in Section 5.5, the proposed transformer structure may be supported on a shallow foundation system. Based on the provided 12 foot by 20 foot transformer pad supporting a load of 125 kips, post-construction settlement potential should be on the order of 1¼ inches or less. Other ancillary soil-supported pad foundations (up to 10 feet by 10 feet) should be designed for maximum allowable bearing pressure 900 psf. Post-construction settlement potential based on this bearing pressure should be on the order of 1¼ inch or less.

Foundations should bear at least 18 inches below the finished exterior grades to develop the design bearing pressure. Isolated column footings should be a minimum of 24 inches wide, regardless of the resulting bearing pressure. This recommendation is made to help prevent a "localized" or "punching" shear failure condition, which could exist with very narrow footings.

The soils in the foundation excavation bottoms should be compacted to densities equivalent to at least 95 percent of the Modified Proctor (ASTM D1557) maximum dry density. Due to limited access in smaller individual excavations, compaction of sandy bearing level soils (if loosened by the excavation process) can probably be best achieved by making several passes with a relatively lightweight, walk-behind vibratory sled or roller.

All foundation excavation bottoms should be evaluated by a representative of the Geotechnical Engineer prior to backfilling and prior to reinforcing steel and concrete placement. This evaluation will help determine if individual footings are directly underlain by suitable bearing material. Any loose material should be properly compacted or undercut and replaced with well-compacted fill or crushed aggregate such as No. 57 stone. If practical, concrete placement should be completed the same day as the footing excavation.

5.4 Deep Foundation Design Considerations

Based on information provided, we understand some items may be supported on driven pipe foundations. The following table presents soil properties for use in deep foundation design:

Table 5-1 – Deep Foundation Design Parameters for Solar Panels

Boring	Layer	Depth (feet)	Soil Type	Cohesion (psf)	Friction Angle (ϕ)	Unit Weight (pcf)	$k^{(1)}$ (pci)	E_{50}
S-1	1	0 – 2	Sand	0	29	108	15	0
	2	2 – 8	Sand	0	31	112	39	0
	3	8 – 12	Sand	0	28	107	12	0
	4	12 – 15	Sand	0	31	111	33	0
S-2	1	0 – 2	Sand	0	31	111	33	0
	2	2 – 6	Sand	0	36	123	94	0
	3	6 – 12	Sand	0	30	109	24	0
	4	12 – 15	Sand	0	31	112	39	0
S-3	1	0 – 3	Sand	0	30	109	24	0
	2	3 – 6	Sand	0	28	106	6	0
	3	6 – 12	Sand	0	30	111	30	0
	4	12 – 15	Sand	0	35	120	79	0
S-4	1	0 – 2	Sand	0	29	108	18	0
	2	2 – 8	Sand	0	31	111	33	0
	3	8 – 12	Clay	750	0	109	100	0.01
	4	12 – 15	Sand	0	34	118	67	0
S-5	1	0 – 2	Sand	0	29	108	18	0
	2	2 – 4	Sand	0	34	117	61	0
	3	4 – 8	Sand	0	29	108	15	0
	4	8 – 11	Sand	0	32	114	48	0
	5	11 – 15	Sand	0	29	108	15	0
S-6	1	0 – 8	Sand	0	29	109	21	0
	2	8 – 12	Sand	0	32	114	45	0
	3	12 – 15	Sand	0	28	107	12	0
S-7	1	0 – 2	Sand	0	28	107	12	0
	2	2 – 8	Sand	0	32	113	42	0
	3	8 – 12	Sand	0	29	108	15	0
	4	12 – 15	Clay	2250	0	116	1000	0.005
S-8	1	0 – 2	Sand	0	28	107	12	0
	2	2 – 6	Sand	0	31	111	33	0
	3	6 – 12	Sand	0	29	108	18	0
	4	12 – 15	Sand	0	34	117	64	0

Boring	Layer	Depth (feet)	Soil Type	Cohesion (psf)	Friction Angle (ϕ)	Unit Weight (pcf)	k(1) (pci)	E_{50}
S-9	1	0 – 4	Sand	0	30	109	24	0
	2	4 – 6	Sand	0	29	108	15	0
	3	6 – 12	Sand	0	32	113	42	0
	4	12 – 15	Sand	0	29	108	15	0

(1) k - lateral modulus of subgrade reaction

Table 5-2 – Deep Foundation Design Parameters for Substation Structures

Boring	Layer	Depth (feet)	Soil Type	Cohesion (psf)	Friction Angle (ϕ)	Unit Weight (pcf)	k(1) (pci)	E_{50}
B-1 to B-3	1	0 – 2	Sand	0	29	108	15	0
	2	2 – 12	Sand	0	30	111	30	0
	3	12 – 17	Silty Sand	0	28	107	12	0
	4	17 – 22	Sandy Clay	1875	0	114	500	0.007
	5	22 – 50	Clay	5000	0	135	2000	0.004

(1) k - lateral modulus of subgrade reaction

A factor of safety of 3.0 should be used to establish an allowable foundation capacity assuming a load test will not be performed at the site. We recommend the upper 4 feet of depth be neglected in the side frictional resistance calculations due to the potential disturbance of the upper soils during the construction process. The water table should be modeled at the existing ground surface and the effective unit weight of soil and concrete should be used for design below this depth to account for the fluctuation of the subsurface water level.

5.5 Site Preparation Recommendations

5.5.1 Demolition/Stripping

Site preparation should begin with the removal of all unsuitable surface materials. This will include clearing and grubbing all vegetation, stripping organic-laden topsoil, and undercutting any unsuitable surface materials from proposed construction areas. As a minimum, it is recommended that the clearing operations extend at least 5 feet beyond the perimeter of development area. Strippings, debris and organic soils should be disposed in accordance with the owner's instructions.

Stumps and taproots should be completely removed from within proposed building areas, and voids created should be cleaned and backfilled with well-compacted structural fill as defined in Section 5.5.4. Any holes larger than 3 feet in diameter, resulting from the removal of any object or material, should be ramped to allow compaction of the bottom and sides with mechanical equipment prior to filling.

Provisions should then be made to relocate any interfering utility lines within the construction area to appropriate locations. In this regard, it should be noted that if abandoned underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion, which may subsequently result in excessive settlements.

In conjunction with demolition and backfilling operations, it may be necessary to establish positive temporary groundwater and surface water control measures to improve construction trafficability and facilitate drying of the surface soils to allow acceptable compaction. The groundwater level should be lowered at least 1 foot beneath the surface of any excavations made during construction and 2 feet below the surface of any vibratory compaction operations.

5.5.2 Evaluation of Exposed Subgrade Soils

Following stripping operations, the exposed subgrade should be evaluated by the Geotechnical Engineer. At the Engineer's discretion, this evaluation may include proofrolling with a heavily loaded tandem-axle dump truck or similar rubber-tired equipment under the observation of the geotechnical engineer. Unstable areas should be scarified, the moisture content brought closer to optimum, and re-compacted in place, or the areas may be undercut as recommended by the Geotechnical Engineer. In general, the extent and depth of any undercutting will depend heavily upon final grades, the climatic conditions during construction, the aggressiveness of the earthwork schedule, site drainage, and the grading contractor's experience, equipment, means, and methods.

5.5.3 Surface Soil Compaction

Following surface stripping and ground modification activities, the exposed soils should be compacted with overlapping passes of a vibratory drum roller with a drum diameter of at least 30 inches. Densities equivalent to at least 95 percent of the Modified Proctor maximum dry density should be uniformly obtained to a depth of at least 12 inches below the compacted surface. Regardless of the degree of compaction achieved, a minimum of eight (8) complete overlapping coverages should be made in the building pad areas with the compaction equipment to help increase the density and improve the uniformity of the underlying sandy soils. The roller coverage should be divided evenly into two (2) perpendicular directions.

5.5.4 Structural Fill/Backfill

Structural fill/backfill materials should consist of cohesionless sandy soil containing no more than 12-percent fines (material passing the No. 200 sieve) by weight (Unified Soil Classification of SP or SP-SM) and having a maximum dry density of at least 95 pounds per cubic foot (pcf) as determined by a laboratory Modified Proctor compaction test (ASTM D1557). The soil should be relatively free of organics (less than 2.5%), deleterious matter, and elongated or flat particles susceptible to degradation.

Structural fill should be placed and compacted in loose lift thicknesses appropriate for the compaction equipment being used. For vibratory drum rollers at least 30 inches in diameter, the maximum loose lift thickness should be no greater than 12 inches in thickness. All material being used as soil fill should be tested and approved by the Geotechnical Engineer before being placed.

Structural fill/backfill should be compacted until densities of at least 95 percent of the Modified Proctor maximum dry density are uniformly obtained in the lift being compacted.

5.5.5 *Use of On-Site Materials as Structural Fill*

Soils meeting the requirements for structural fill as discussed above are preferred for use as structural fill beneath foundation elements. It is our opinion that the upper sands encountered in the top 2 are suitable for reuse as structural fill with proper moisture control. The soils encountered below this depth typically had a high percentage of shell to a depth of approximately 6 feet and are also acceptable as fill material. However, some of the borings had interbedded layers of clayey sand and clay with a fines content exceeding 12 percent. These soils, if encountered, will likely be difficult to place and compact given the higher fines content and moisture sensitivity of this material. Therefore, these materials are not acceptable for use as structural fill and should be placed in non-structural areas or removed from the site.

5.5.6 *Excavations*

The soil boring data indicates excavation (if required) will primarily extend through very loose to medium dense, sandy soils. The subsurface water level, if encountered, should be maintained at least 1 foot below the bottom of excavations to mitigate bottom instability and at least 2 feet below the surface where vibratory compaction operations are being performed.

Groundwater control measures should be anticipated prior to initiating any excavations deeper than about 1 foot below existing grades at the site. Water can likely be controlled at the site by pumping from sumps located in perimeter ditches or pits located away from potential foundation bearing areas. The designer of the dewatering system should address the effects on surrounding structures in the design.

All excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29CFR Part 1926) excavation trench safety standards. The contractor is solely responsible for site safety. This information is provided only as a service and under no circumstances should S&ME be assumed to be responsible for construction site safety.

5.6 Slab Design and Construction

Soil-supported slabs are acceptable at the site provided that our site preparation and fill/backfill recommendations are followed. A subgrade modulus (k) of 180 pounds per cubic inch (pci), based on the 12-inch-diameter plate load test, is appropriate for design of the slabs. This modulus value should be appropriately reduced when designing the slab thickness to accommodate wide area loads. Detailed settlement analyses for the slab should be performed if it will be subjected to large, wide area loads.

Suitable granular material should be used as backfill materials for utility trenches located beneath slab areas. The backfill should be placed and compacted in accordance with the recommendations discussed in Sections 5.5.3 and 5.5.4. Also, the slab should be designed with proper joints to keep stresses within the appropriate limits, achieve adequate load transfer across joints, and reduce the potential for irregular crack formation.

The performance of concrete slabs is also affected by the concrete mix that is used. A relatively high water–cement ratio of the concrete can cause aesthetic disruptions, such as unsightly slab curling and shrinkage cracking. We recommend a concrete mix design be selected with a water–cement ratio not exceeding 0.45. In addition, we recommend water curing for the first 3 days to minimize cracking and curling.

5.7 Pavement Recommendations

We have not been provided with detailed traffic loading information at this time and minimum pavement section layer thicknesses have been provided in the following sections based on our experience with similar facilities. If the facility will be subject to significant truck vehicle traffic then it will be necessary to perform a detailed pavement design considering the desired pavement design life, terminal serviceability, and expected traffic loading.

5.7.1 Flexible Pavement Recommendations

We recommend using a layered pavement section consisting of a compacted soil subgrade, a graded aggregate base course (compacted Florida Limerock, crushed concrete, or equivalent), and an asphaltic concrete surface course. The asphaltic concrete surface course should consist of Superpave mix (such as SP-9.5).

The asphaltic concrete mix should be a current Florida Department of Transportation (FDOT)-approved design. Samples of the materials delivered to the project should be tested to verify that the aggregate gradation and asphalt content satisfies the mix design requirements. The asphalt should be compacted to FDOT specifications. After placement and field compaction, the wearing surface should be cored to evaluate material thickness and to perform laboratory density tests. Cores should be obtained at a frequency of at least one (1) core per 3,000 square feet of placed pavement or a minimum of two (2) cores per day’s production.

Because detailed traffic loading information is currently unavailable, we have generalized our pavement recommendations into two groups. The group descriptions and the recommended component thicknesses are presented in the following table. The component layer thicknesses below are based on a structural number analysis with the following estimated daily traffic volume for a 15-year pavement design life.

Light duty: Auto parking areas; light panel and pickup trucks; 10,000 18-kip equivalent axle loads for a 15-year design life.

Heavy duty: Driveways; delivery vehicles and semi-trucks; 50,000 18-kip equivalent axle loads for a 15-year design life.

Table 5-3 – Flexible Pavement Component Recommendations

Layer	Minimum Thickness – Light Duty	Minimum Thickness – Heavy Duty
Asphaltic Concrete (SP-9.5)	1.5 inches	2 inches
Limerock or Crushed Concrete base course compacted to at least 98 percent of the Modified Proctor (ASTM D1557) to yield a min. LBR = 100	6 inches	8 inches
Sub-base compacted to at least 98 percent of the Modified Proctor (ASTM D1557) to yield a min. LBR = 40	12 inches	12 inches

Based on our testing, the site soils did not yield a Limerock Bearing Ratio (LBR) value of 40. Therefore, they should be stabilized to obtain a minimum LBR value of 40. In the areas receiving high traffic loads from service trucks, we recommend increasing the asphaltic concrete thickness to a minimum of 2 inches and the base course to 8 inches. A minimum of 18 to 24 inches should be maintained between the bottom of the base course and the seasonal high water level.

5.7.2 Rigid Pavement Recommendations

Areas of the site where heavy vehicle loads with sharp turning movements are anticipated may require the use of rigid pavement. For these areas, we recommend a concrete pavement. The concrete should have a minimum flexural strength of 500 pounds per square inch (psi) at 28 days when tested in accordance with ASTM C-78. Based on our experience, a minimal thickness of 5 inches should be utilized for standard duty applications and a minimal thickness of 6 inches should be utilized for heavy-duty applications. We recommend a reinforcing steel mat, preferably #4 bars, spaced at 16 inches on center. However, the steel reinforcement within the concrete pavement should be designed by the Civil Engineer.

The subgrade should be prepared to achieve a minimum LBR of 20 as mixed and pulverized to a depth of 12 inches below the concrete base elevation. The subgrade soils should be compacted to a minimum density of 98 percent of the Modified Proctor maximum dry density (ASTM D-1557). It is suggested that a rigid pavement be utilized in areas in which service trucks load, backup, and turn.

Concrete should be reinforced with welded wire fabric or reinforcing bars to assist in controlling cracking from drying shrinkage and thermal changes. Sawed or formed control joints should be included. Saw cuts should not cut through the welded wire fabric or reinforcing steel and dowels should be utilized at formed and/or cold joints.

5.7.3 Pavement Drainage Considerations

One of the most critical influences on the pavement performance in Florida is the relationship between the pavement subgrade and the seasonal high groundwater level. Many roadways and parking areas have been destroyed as a result of deterioration of the base and the base/surface course bond. Regardless of the type of base selected, we recommend that the seasonal high groundwater level and the bottom of the base course be separated by at least 18 to 24 inches, depending on base type. Limerock base should have a minimum separation of 24 inches from the seasonal high ground water table while crushed concrete should have a minimum of 18 inches separation.

According to the FDOT design standards, a minimum of 18 inches separation is required between the bottom of the base course and any clayey material. Our experience has shown that this value results in acceptable pavement performance and is the recommended minimum value. Based on the provided site grade, the existing site soils meet this guideline; however, if areas of cut are planned in pavement areas, undercutting and replacement with structural fill may be required.

5.8 Guidelines for Construction Observation and Testing

A representative number of in-place field density tests should be performed in the compacted existing soils and in each lift of structural fill or backfill to confirm that the required degree of compaction has been obtained. In-place density tests should also be performed at representative locations in the bearing level soils in the footing excavation bottoms. Field density tests should be performed at a frequency of not less than one (1) test per 2,500 square feet per lift in the structure areas, or at a minimum of two (2) test locations, whichever is greater. For compacted fill placed beneath pavements, field density tests should be performed at a frequency of not less than one (1) test per 5,000 square feet per lift, or at a minimum of two (2) tests per lift, whichever is greater. In addition, we recommend that at least one (1) density test be performed for every 100 feet of soil-supported wall footing, one (1) density test for each soil-supported column footing, and one (1) density test per lift for every 200 linear feet of utility trenches.

6.0 Limitations

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, and bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested. S&ME should be provided the opportunity to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by observation and monitoring of earthwork and foundation construction activities.

Appendices

Appendix I – Additional Figures

Figure 1 - Site Location Plan

Figure 2 - Field Test Location Plan

SUE Figure

Legend to Soil Classification and Symbols

Soil Boring Logs

APPROXIMATE SCALE

0 2000 FT.

NORTH

PHILIP J. ERBLAND, P.E.
LICENSE NO. 52621

TECO SOLAR PROJECT	DATE 7-15-15	JOB NO. 1484-15-017	FIGURE 1

S&ME

111 Kelsey Lane, Suite E Tampa, Florida 33619 (813) 623-6646
Florida Certificate of Authorization No. 6712

SITE LOCATION PLAN

BIG BEND POWER STATION
APOLLO BEACH, FLORIDA

1484-15-017.dwg

LEGEND

APPROXIMATE LOCATION OF SPT BORING

APPROXIMATE LOCATION OF LBR SAMPLE

APPROXIMATE SCALE

0 400 FT.

NORTH

PHILIP J. ERBLAND, P.E.
LICENSE NO. 52621

TECO SOLAR PROJECT

S&ME

111 Kelsey Lane, Suite E Tampa, Florida 33619 (813) 623-6646
Florida Certificate of Authorization No. 6712

DATE	JOB NO.	FIGURE
7-15-15	1484-15-017	2

FIELD TEST LOCATION PLAN

BIG BEND POWER STATION
APOLLO BEACH, FLORIDA

1484-15-017.dwg

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LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)

- Fill
- Asphalt
- Concrete
- Topsoil
- Gravel
- Sand
- Silt
- Clay
- Organic
- Silty Sand
- Clayey Sand
- Sandy Silt
- Clayey Silt
- Sandy Clay
- Silty Clay
- Limestone

WATER LEVELS

(Shown in Water Level Column)

∇ = Water Level At Termination of Boring

▼ = Water Level Taken After 24 Hours

HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very Stiff	15 to 30
Hard	30 to Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	Over 50

SAMPLER TYPES

(Shown in Samples Column)

- Shelby Tube
- Split Spoon
- Rock Core
- No Recovery

TERMS

Standard Penetration Resistance - The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot as Specified in ASTM D-1586.

REC - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

RQD - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.

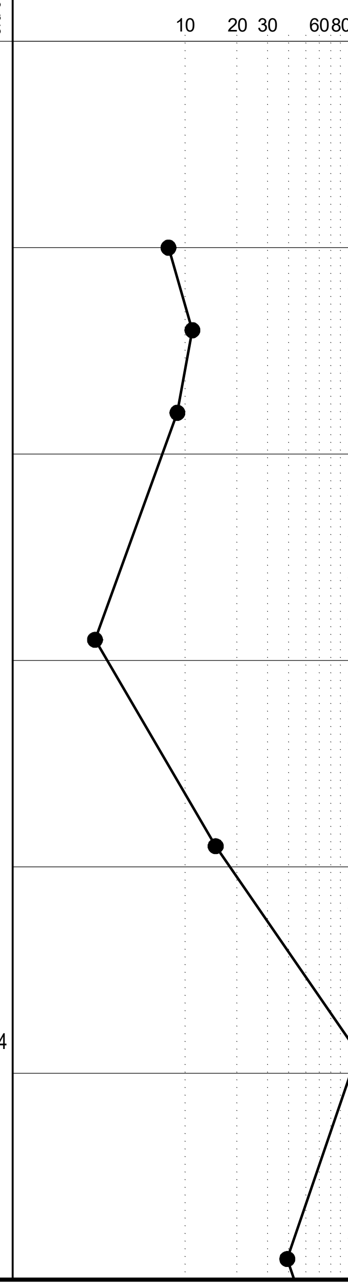
S&ME

ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

PROJECT:	TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	BORING LOG	B-1

DATE DRILLED: **7/2/15**	ELEVATION: **8.9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88 -Set 20 feet of HW Casing**
DRILL RIG: **Mud Bug**	BORING DEPTH: **50.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **4 ft ATD**	
HAMMER TYPE: **Safety**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-428** / EASTING: **9752.9**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS	N VALUE
		SLIGHTLY SILTY SAND (SP-SM) gray, fine			HA						
		- - - Light brown									
		- - - Dark brown			HA						
			▽								
5		**SAND (SP)** loose, pale brown, fine		3.9	SS-1		2	4	4		8
		- - - Medium dense			SS-2		2	4	7		11
		- - - Loose			SS-3		2	4	5		9
10				-1.1							
		SLIGHTLY CLAYEY SAND (SP-SC) very loose, dark gray, fine									
15				-6.1	SS-4		1	2	1		3
		SANDY CLAY (CL) stiff, pale gray, trace phosphate nodules									
20				-11.1	SS-5		1	4	11		15
		CEMENTED CLAY (CL) hard, pale gray, trace phosphate nodules									
25				-16.1	SS-6		21	39	50/4		50/4
					SS-7		19	24	15		39



NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT: TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	BORING LOG B-1

DATE DRILLED: **7/2/15**	ELEVATION: **8.9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88 -Set 20 feet of HW Casing**
DRILL RIG: **Mud Bug**	BORING DEPTH: **50.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **4 ft ATD**	
HAMMER TYPE: **Safety**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-428** / EASTING: **9752.9**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS	N VALUE
		CEMENTED CLAY (CL) hard, pale gray, trace phosphate nodules *(continued)*									
35		- - - Trace cemented sand nodules		-26.1	SS-8		36	50/3			50/3
40				-31.1	SS-9		50/4				50/4
45		**CLAY (CL)** hard, gray, with cemented sand nodules		-36.1	SS-10		17	50/6			50/6
50		**INDURATED CLAY (CL)** hard, olive		-41.1	SS-11		15	35	50/6		50/6
		Boring terminated at 50 ft Backfilled with bentonite chips upon completion Target Depth									

S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

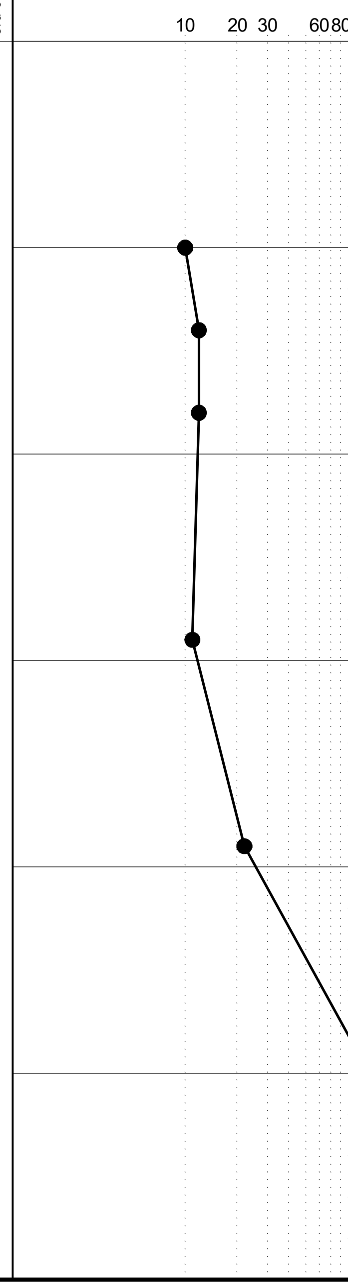
S&ME

PROJECT: TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	**BORING LOG**	**B-2**

DATE DRILLED: **7/2/15**	ELEVATION: **9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88** **-Set 22 feet of HW Casing**
DRILL RIG: **Mud Bug**	BORING DEPTH: **50.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **4 ft ATD**	
HAMMER TYPE: **Safety**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**	NORTHING: **-543.8**	EASTING: **9818.9**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	BLOW COUNT / CORE DATA: 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0–4	**SLIGHTLY SILTY SAND (SP-SM)** gray, fine - - - Light brown - - - Dark brown	▽ (4 ft)		HA HA				
4–12	**SAND (SP)** loose, pale brown, fine - - - Medium dense		4.0	SS-1	2	4	6	10
				SS-2	3	5	7	12
				SS-3	3	5	7	12
10			-1.0					
12–17	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, dark gray, trace clayey nodules, fine			SS-4	3	5	6	11
15			-6.0					
17–22	**SAND (SP)** medium dense, gray, fine			SS-5	3	9	13	22
20			-11.0					
22–	**CEMENTED CLAY (CL)** hard, pale gray, trace cemented sand nodules			SS-6	4	50/5		50/5
25			-16.0					
				SS-7	14	50/4		50/4

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

PROJECT: TECO Solar Project, Apollo Beach, Florida, S&ME Project No. 1484-15-017	BORING LOG	B-2

DATE DRILLED: **7/2/15**	ELEVATION: **9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88 -Set 22 feet of HW Casing**
DRILL RIG: **Mud Bug**	BORING DEPTH: **50.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **4 ft ATD**	
HAMMER TYPE: **Safety**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-543.8** / EASTING: **9818.9**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	CEMENTED CLAY (CL) hard, pale gray, trace cemented sand nodules *(continued)*							
35	- - - Trace phosphate nodules		-26.0	SS-8	50/5			50/5
	- - - With cemented sand nodules							
40			-31.0	SS-9	50/4			50/4
	CLAY (CL) hard, gray, trace phosphate nodules							
45			-36.0	SS-10	36	32	36	68
	SANDY CLAY (CL) very stiff, gray, with cemented sand nodules			SS-11	46	11	16	27
50	Boring terminated at 50 ft Backfilled with bentonite chips upon completion Target Depth		-41.0					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS: 10 20 30 60 80

S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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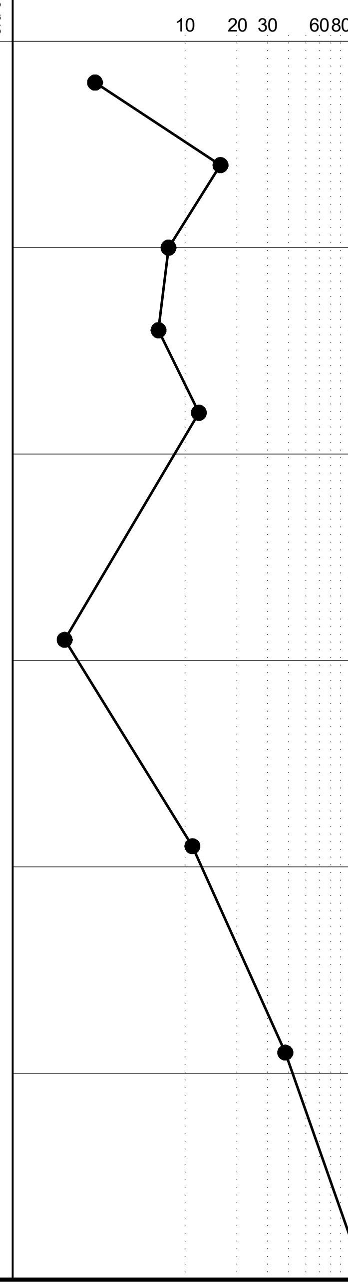
PROJECT:	**TECO Solar Project** **Apollo Beach, Florida** **S&ME Project No. 1484-15-017**	**BORING LOG**	**B-3**

DATE DRILLED: **7/2/15**	ELEVATION: **9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88** **-Set 20 feet of HW Casing**
DRILL RIG: **CME 45-B**	BORING DEPTH: **50.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.5 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-423.3** EASTING: **9901.9**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) very loose, gray, fine - - - Light brown, trace roots			SS-1	1	1	2	3
	- - - Medium dense, pale reddish yellow, no roots	▽		SS-2	5	8	8	16
5	**SAND (SP)** loose, gray, fine		4.0	SS-3	2	4	4	8
				SS-4	2	3	4	7
	SLIGHTLY SILTY SAND (SP-SM) medium dense, brown, fine			SS-5	3	5	7	12
10			-1.0					
	SILTY SAND (SM) very loose, dark gray, fine							
15			-6.0	SS-6	3	1	1	2
	SANDY CLAY (CL) stiff, gray, trace phosphate nodules							
20			-11.0	SS-7	1	4	7	11
	CEMENTED CLAY (CL) hard, pale gray, trace phosphate nodules							
25			-16.0	SS-8	12	16	22	38
				SS-9	49	50/6		50/6

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



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PROJECT:	TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	BORING LOG	B-3

DATE DRILLED: **7/2/15**	ELEVATION: **9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88 -Set 20 feet of HW Casing**
DRILL RIG: **CME 45-B**	BORING DEPTH: **50.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.5 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-423.3** / EASTING: **9901.9**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS	N VALUE
	CEMENTED CLAY (CL) hard, pale gray, trace phosphate nodules *(continued)*								
35	- - - With cemented sand nodules		-26.0	SS-10	5	50/4			50/4
				RC-1		10%	0%		
40			-31.0	SS-11	20	32	50/5		50/5
45			-36.0	SS-12	41	50/3			50/3
	SANDY CLAY (CL) hard, pale olive, trace phosphate nodules			SS-13	25	50/6			50/6
50	Boring terminated at 50 ft Backfilled with bentonite chips upon completion Target Depth		-41.0						

SPT scale: 10 20 30 60 80

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PROJECT: TECO Solar Project, Apollo Beach, Florida, S&ME Project No. 1484-15-017	BORING LOG S-1

DATE DRILLED: **7/1/15**	ELEVATION: **3.8 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.6 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-1119.8** EASTING: **5331.7**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) very loose, gray, trace organics, fine			SS-1	1	1	2	3
	- - - Pale brown							
	SLIGHTLY CLAYEY SAND (SP-SC) medium dense, pale yellow, with shell fragments, fine	▽		SS-2	3	6	6	12
5	- - - Loose, pale brown, trace shell fragments		-1.2	SS-3	6	4	4	8
				SS-4	3	4	6	10
				SS-5	2	1	1	2
10			-6.2					
	- - - With silt seams			SS-6	2	3	5	8
15	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-11.2					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS: 10 20 30 60 80

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S&ME

PROJECT:	**TECO Solar Project** **Apollo Beach, Florida** **S&ME Project No. 1484-15-017**	**BORING LOG**	**S-2**

DATE DRILLED: **7/1/15**	ELEVATION: **5.1 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88** **%200 = Percent passing a #200 sieve**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.8 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-75.4** / EASTING: **6513.2**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) loose, gray, fine - - - Pale brown			SS-1	1	2	6	8
	- - - Dense	∇		SS-2	13	10	21	31
5	- - - Medium dense, pale brown, with shell fragments, with cemented sand nodules		0.1	SS-3	11	12	9	21
	CLAYEY SAND (SC) medium dense, reddish brown, fine - - - Loose, gray, %200 = 44%			SS-4	1	2	2	4
				SS-5	4	4	4	8
10			-4.9					
	SAND (SP) loose, fine			SS-6	6	6	4	10
15	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-9.9					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS: 10 20 30 60 80

S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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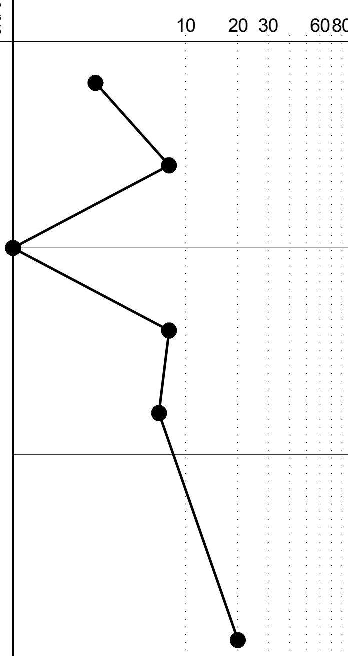
PROJECT: TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	BORING LOG S-3

DATE DRILLED: **7/1/15**	ELEVATION: **4.9 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.8 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-1495.8** / EASTING: **6634.6**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) very loose to loose, gray, fine			SS-1	1	1	2	3
				SS-2	6	6	2	8
	CLAYEY SAND (SC) loose, dark gray, trace roots, fine	∇						
5	- - - Very loose		-0.1	SS-3	1	0	1	1
	SLIGHTLY SILTY SAND (SP-SM) loose, gray			SS-4	1	3	5	8
				SS-5	3	3	4	7
10			-5.1					
	SAND (SP) medium dense, gray, trace clay nodules, fine			SS-6	6	8	12	20
15	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-10.1					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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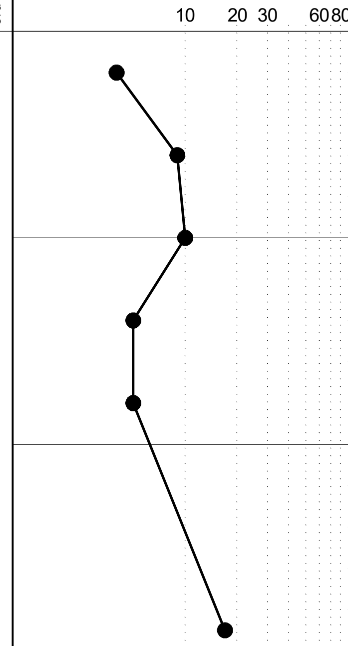
S&ME

PROJECT: **TECO Solar Project** **Apollo Beach, Florida** **S&ME Project No. 1484-15-017**	**BORING LOG** **S-4**

DATE DRILLED: **7/1/15**	ELEVATION: **6.3 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88** **%200 = Percent passing a #200 sieve**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.5 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-694** EASTING: **7773.6**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) very loose, brown, fine			SS-1	1	2	2	4
	- - - Reddish brown							
	- - - Loose, light brown, with shell fragments, with cemented sand nodules	▽		SS-2	6	5	4	9
5			1.3	SS-3	4	5	5	10
	SAND (SP) loose, light gray, fine			SS-4	2	2	3	5
	SANDY CLAY (CL) firm, gray, %200 = 66%			SS-5	1	2	3	5
10			-3.7					
	CLAYEY SAND (SC) medium dense, gray, %200 = 49%							
15			-8.7	SS-6	5	7	10	17
	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth							

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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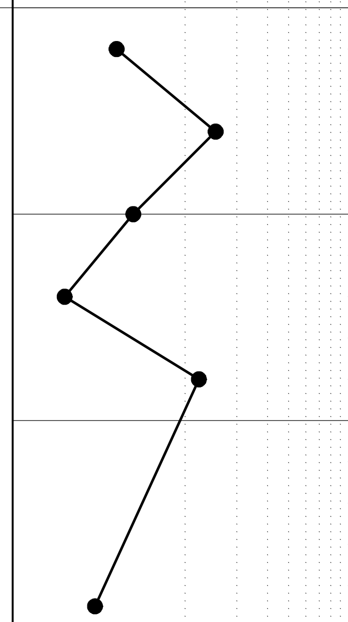
S&ME

PROJECT:	TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	BORING LOG	S-5

DATE DRILLED: **7/1/15**	ELEVATION: **5.1 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88** **%200 = Percent passing a #200 sieve**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.4 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **53.7** / EASTING: **7077.7**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
		SLIGHTLY SILTY SAND (SP-SM) very loose, dark gray, fine			SS-1		1	1	3	4
		- - - Medium dense, brown - - - With shell fragments, with cemented sand nodules	▽		SS-2		7	8	7	15
5		- - - Loose, trace shell fragments, no cemented sand nodules		0.1	SS-3		3	2	3	5
		CLAYEY SAND (SC) very loose, trace shell fragments, trace shell fragments, fine, %200 = 16%			SS-4		1	1	1	2
		SAND (SP) medium dense, gray, fine			SS-5		2	5	7	12
10				-4.9						
		- - - Very loose			SS-6		1	2	1	3
15		Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-9.9						

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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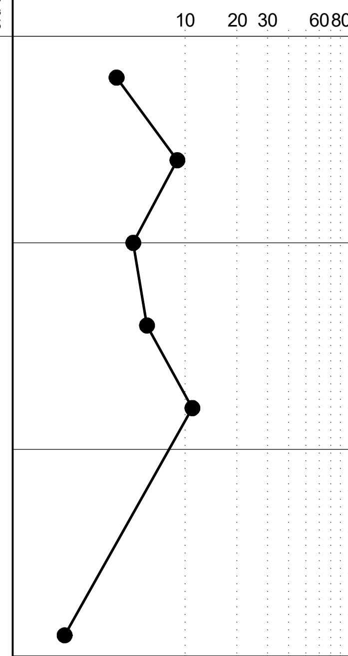
S&ME

PROJECT: **TECO Solar Project** **Apollo Beach, Florida** **S&ME Project No. 1484-15-017**	**BORING LOG**	**S-6**

DATE DRILLED: **7/1/15**	ELEVATION: **6.5 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88** **%200 = Percent passing a #200 sieve**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.5 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **663.6** / EASTING: **8193.5**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS	N VALUE
		SLIGHTLY SILTY SAND (SP-SM) very loose, gray, fine - - - Pale brown			SS-1		1	2	2		4
		CLAYEY SAND (SC) loose, reddish brown, fine, %200 = 20%	▽		SS-2		3	6	3		9
5		**SLIGHTLY SILTY SAND (SP-SM)** loose, brown, with shell fragments, with cemented sand nodules, fine		1.5	SS-3		4	3	2		5
		NO RECOVERY			SS-4		3	3	3		6
		SAND (SP) medium dense, pale gray, fine			SS-5		3	5	6		11
10				-3.5							
		SLIGHTLY SILTY SAND (SP-SM) very loose, dark gray, fine			SS-6		1	0	2		2
15		Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-8.5							



S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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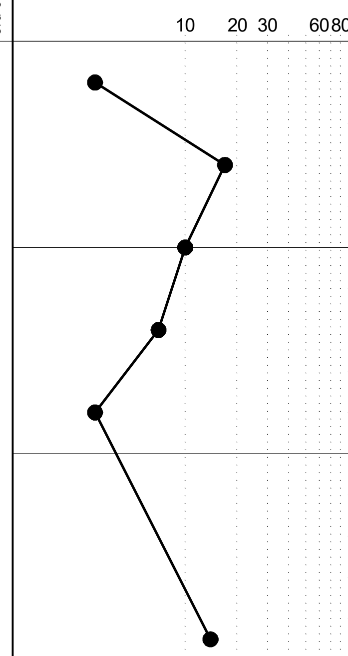
S&ME

PROJECT:	TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	**BORING LOG**	**S-7**

DATE DRILLED: **7/1/15**	ELEVATION: **7.3 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.5 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**	NORTHING: **-705.7**	EASTING: **8558.7**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) very loose, gray, trace roots, fine - - - Brown			SS-1	1	1	2	3
	CLAYEY SAND (SC) medium dense, yellowish brown, fine	∇		SS-2	2	10	7	17
5	**SLIGHTLY SILTY SAND (SP-SM)** medium dense, yellowish brown, with shell fragments, fine		2.3	SS-3	4	5	5	10
	SAND (SP) loose, pale brown, trace shell fragments			SS-4	2	3	4	7
	SLIGHTLY SILTY SAND (SP-SM) very loose, dark gray			SS-5	1	1	2	3
10			-2.7					
	CLAY (CL) stiff, pale gray							
				SS-6	4	5	9	14
15	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-7.7					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

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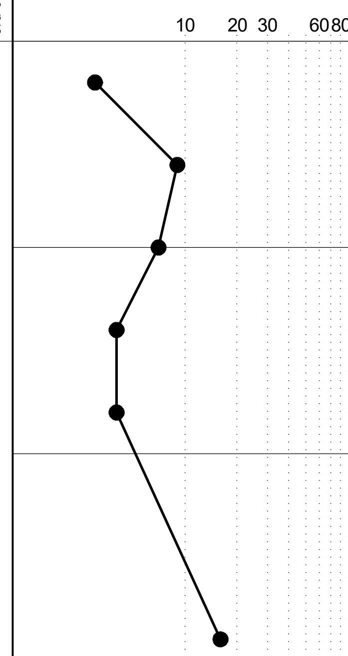
S&ME

PROJECT: TECO Solar Project, Apollo Beach, Florida, S&ME Project No. 1484-15-017	BORING LOG	S-8

DATE DRILLED: **7/1/15**	ELEVATION: **6.4 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **3.5 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**	NORTHING: **18.5**	EASTING: **8168.7**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) very loose, brown, trace roots, fine			SS-1	1	1	2	3
	- - - Loose, pale yellow, with shell fragments	▽		SS-2	2	3	6	9
5	- - - No shell fragments		1.4	SS-3	3	4	3	7
	- - - Very loose			SS-4	1	2	2	4
	- - - Gray			SS-5	2	2	2	4
10			-3.6					
	- - - Medium dense, dark gray			SS-6	3	7	9	16
15	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-8.6					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS



S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	TECO Solar Project Apollo Beach, Florida S&ME Project No. 1484-15-017	BORING LOG	S-9

DATE DRILLED: **7/1/15**	ELEVATION: **8.3 feet**	NOTES: **-Horizontal coorindates reference plant datum, elevations reference NAVD88 %200 = Percent passing a #200 sieve**
DRILL RIG: **CME 45-B**	BORING DEPTH: **15.0 ft**	
DRILLER: **R. Swint, Sr.**	WATER LEVEL: **4 ft ATD**	
HAMMER TYPE: **Auto**	LOGGED BY: **R. Swint**	
SAMPLING METHOD: **Split Spoon**		NORTHING: **-703.2** EASTING: **9326.4**
DRILLING METHOD: **Mud Rotary**		

DEPTH (feet)	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	SLIGHTLY SILTY SAND (SP-SM) loose, brown, trace roots, fine - - - Yellowish brown - - - With shell fragments			SS-1	2	2	3	5
				SS-2	4	4	3	7
5	- - - Very loose, gray, no shell fragments	∇ (4 ft)	3.3	SS-3	1	1	2	3
	SAND (SP) loose, gray, fine			SS-4	3	4	6	10
	SLIGHTLY SILTY SAND (SP-SM) loose, dark brown			SS-5	3	5	5	10
10			-1.7					
	- - - Very loose, dark gray, fine, %200 = 9%			SS-6	2	1	2	3
15	Boring terminated at 15 ft Backfilled with cuttings upon completion Target Depth		-6.7					

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS: 10 20 30 60 80

S&ME BORING LOG 1484-15-017.GPJ S&ME.GDT 7/16/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

Appendix II – Laboratory Test Results

Summary of Corrosion Testing Results

Limerock Bearing Ratio Test Report

Summary of Corrosion Testing Results

TECO Solar Project
Apollo Beach, Florida
S&ME Project No. 1484-15-017

Boring No.	Depth Range, Feet		pH (FM 5-550)	Resistivity (ohm-cm) (FM 5-551)	Chlorides (ppm) (FM 5-552)	Sulfates (ppm) (FM 5-553)	Environmental Classification (Soil)*	
	From	To					Steel	Concrete
B-1	4	6	7.0	5,000	30	27.8	Moderately Aggressive	Moderately Aggressive
S-1	4	6	7.9	1,000	135	402.1	Extremely Aggressive	Moderately Aggressive

*As per FDOT Structures Design Guidelines, Table 1.1

Form No. TR-FM 5-515 Tampa Branch 184
Revision No. 0
Revision Date:12/13/2011

LIMEROCK BEARING RATIO TEST REPORT
FM 5-515

S&ME Quality Assurance

S&ME, Inc.Tampa, 111 Kelsey Lane, Suite E / Florida 33619/ p 813-623-6646 fax 813-623-3795
Florida Certificate of Authorization No. 6712

PROJECT: TECO Solar Project

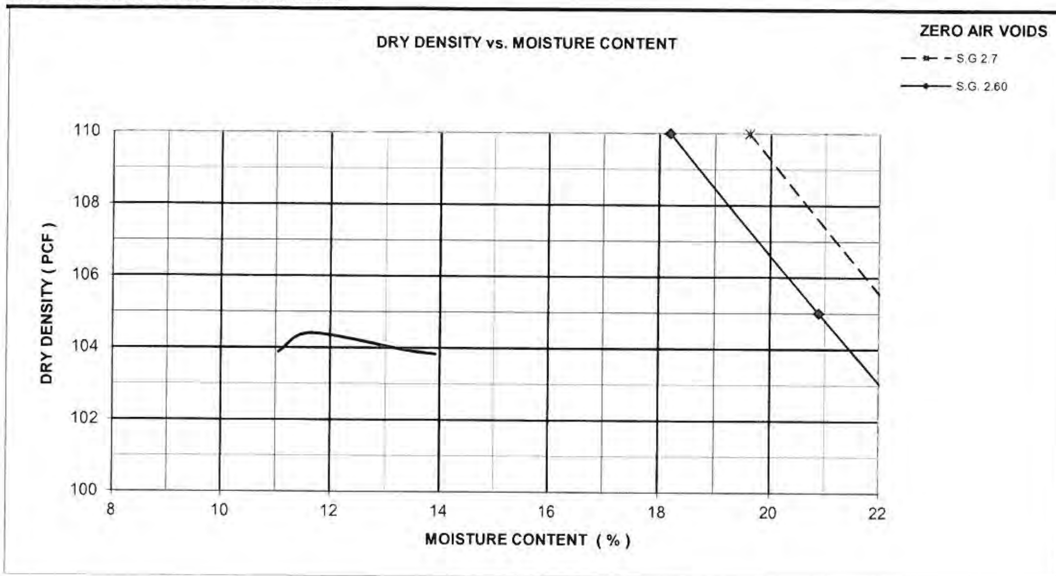
REPORT DATE: July 13, 2015

CLIENT : TECO

JOB NO: 1484-15-017
LBR SAMPLE NO: L1
REPORT NO: NA

COPIES: TECO

SAMPLE LOCATION:	R1	**DATE SAMPLED:**	7/2/2015
SOIL DESCRIPTION:	Brown sand	**SAMPLED BY:**	G. Zoeller

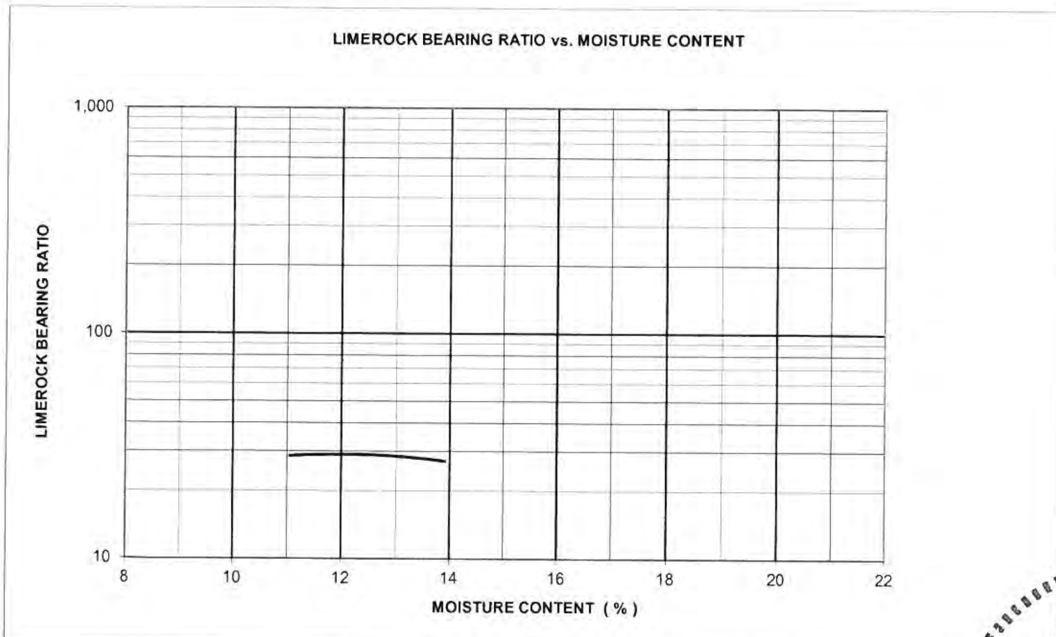


DATE COMPACTED: 7/8/2015
DATE PENETRATED: 7/10/2015
TESTED BY: A. Lawrence

ANTICIPATED USE OF SOIL: Subgrade
SURCHARGE: 20 lb
AASHTO CLASSIFICATION *: -
USCS CLASSIFICATION *: -
** classifications based on visual methods*

MAXIMUM DRY DENSITY (pcf):
104.4

OPT. MOISTURE CONTENT (%):
11.6



LIMEROCK BEARING RATIO (LBR):
28

MINIMUM REQUIRED LBR:
NA

Sampling performed as outlined in practice ASTM D75 (AASHTO T2)
This report shall not be reproduced, except in full, without the written authorization of S&ME.

PHILIP J. ERBLAND LICENSE No. 52621 STATE OF FLORIDA PROFESSIONAL ENGINEER

Appendix III – Field and Laboratory Test Procedures

FIELD AND LABORATORY TEST PROCEDURES

Soil Test Boring Procedures (ASTM D1586)

The borings were advanced by a rotary drilling process which utilized a viscous bentonite drilling fluid to flush the cuttings and stabilize the hole. At regular intervals, the drilling tools were withdrawn and soil samples obtained with a standard 1⅜-inch inside diameter, 2-inch outside diameter, split tube sampler in general accordance with ASTM D1586.

The sampler was initially seated 6 inches to penetrate any loose cuttings then driven an additional foot to 1½ feet with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the foot increment after the 6-inch seating blows was recorded and is designated as the standard penetration resistance, N-value. Penetration resistance is an index to the soil's strength and density.

The samples were classified in the field by an engineering technician as they were obtained. Representative portions of each soil sample were then sealed in containers and transported to our laboratory. The samples were examined by a geotechnical engineer to visually check the field classification. Boring data, including sampling intervals, penetration resistance N-values, soil classifications, and groundwater level are presented on the Soil Profiles.

Rock Coring (ASTM D2113)

Once competent limestone was encountered, an HWG-size core barrel was used to obtain nominal 3-inch-diameter core samples. Coring was completed in 5 foot-long runs. Recovered cores were photographed, placed in core boxes, and transported to our laboratory. The samples were examined by a geotechnical engineer to visually check the field classification. Core data, including recovery and RQD, are presented on the Soil Profiles. Coring was performed in general accordance with ASTM D2113.

Hand Auger Boring Procedures (ASTM D1452)

The hand auger borings are performed in general accordance with ASTM D1452. A 6-inch-long bucket is manually advanced into the soil in approximate 6-inch intervals. The soil is removed from the auger hole at each interval and the samples were classified in the field by an engineering technician as they were obtained. Representative portions of each soil sample were then sealed in containers and transported to our laboratory. The samples were examined by a geotechnical engineer to visually check the field classification.

Determination of Soils Finer than No. 200 Sieve (ASTM D1140)

The clay and silt content of granular soils affects their physical properties such as strength, compressibility, and permeability. Selected samples were tested to determine the percent, by weight, of soil particles finer than the No. 200 sieve (silt and clay size particles). Soil particles finer than 75 microns were flushed through a No. 200 sieve using water. The coarse materials retained on the No. 200 sieve were dried to obtain their dry weight. The dry weight of materials retained on the No. 200 sieve was compared to the dry weight of the total test specimen. The difference in weight, expressed as a percentage of the pre-wash weight, is designated as the percentage of "fines" (silt and clay size particles).

Environmental Classification (FM 5-550 to 5-553)

Environmental corrosion tests were conducted in for this project. Environmental corrosion tests were conducted in accordance with FDOT test designations FM 5-550, FM 5-551, FM 5-552, and FM 5-553. The environmental corrosion tests are used to measure soil parameters such as pH, resistivity, and sulfate and chloride content.

Limerock Bearing Ratio Test (FM 5-515)

The LBR test was performed in accordance with FDOT test designation FM 5-515 including a Modified Proctor test. The LBR test is a measure of the bearing capacity of a soil. The test consists of measuring the load required to cause a standard circular plunger to penetrate a specimen at a specified rate. The LBR is the load in psi required to force the plunger into the soil 0.1 inch expressed as a percentage of the load in psi required to force the same plunger the same depth into a standard sample of crushed limerock which is 800 psi.

October 13, 2016
File Number 16-55-9671
Doc. #03
Revised

Tampa Electric Company (TECO)
Engineering & Project Management
P.O. Box 111
Tampa, FL 33601-0111

Attention: Mr. Joe Legner, P.E., S.E.
Lead Civil-Structural Engineer

Subject: **Report of Geotechnical Engineering Services**
Due Diligence Evaluation – 95 Acre ABH Property in Big Bend Area
South Hillsborough County, Florida

Dear Mr. Legner:

Ardaman & Associates, Inc. is pleased to submit this report presenting the results of our subsurface soil exploration for the above referenced project. Our services were provided in general accordance with those outlined in our Proposal No. 16-p290, dated September 2, 2016, and authorized under Work Order No. 2597532-6, dated September 13, 2016. The purpose of this limited exploration program was to obtain general subsurface data at the project site to evaluate the feasibility of the proposed construction.

This geotechnical study covers foundation soils well within the influence of foundation loads, but does not cover deep soil or bedrock strata. The assessment of site environmental conditions for the presence of pollutants in the soil, rock, or groundwater at this site was beyond the scope of this exploration.

This Report of Geotechnical Engineering Services was prepared for the exclusive use of **TECO** and their consultants. The conclusions and recommendations made herein are applicable only to those structures and facilities described herein. This geotechnical study was performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

PROJECT INFORMATION

Project information was provided by emails and during telephone conversations. This information consisted of a brief description of the subject project and a draft scope of engineering services. We understand the subject project will consist of the construction of a utility-scale photovoltaic (PV) solar facility. The proposed facility includes structures to support the PV panels, roadway access, and facilities for connecting the PV panels to the existing power transmission and distribution (T&D) system.

As this project is in the due diligence phase, no site specific loading information or detailed site plan is available at this time. The scope of the exploration program performed was to allow general evaluation regarding the viability of the proposed construction. Detailed engineering analyses of foundations is beyond the scope of work for this phase. It is our understanding that engineering analyses and foundation design will follow in a later phase when more detailed project information becomes available if TECO proceeds with the planned construction.

Ardaman was provided plans (SUNLINK TECHTRACK SINGLE AXIS TRACKER FOR PHOTOVOLTAIC ARRAY AT TECO) for a similar project on October 11, 2016 via email. The provided project is in close proximity, located to the north of the subject site. Page 3 of the provided plans shows a Post Schedule tabulating the minimum embedment depths with regards to the Row Type, Post Type, Size, etc. The minimum embedment depths presented for that specific project ranged from 13.75 feet to 28.25 feet.

SITE LOCATION AND CONDITIONS

The subject site is located in Apollo Beach, Hillsborough County, Florida. Specifically, this site is located immediately west of U.S. 41, approximately ¾ miles south of Big Bend Road.

Representatives of **Ardaman & Associates** mobilized onsite September 21, 2016, to stake boring locations and to perform field testing. At the time of field testing, the site was undeveloped, consisting of mostly tall grasses with sporadic small trees and brush. The northern, western, and southern borders of the site were defined by wooded areas and barbed wire fencing. The site is currently used as a pasture. Satellite imagery from Google Earth indicates that the site has remained relatively unchanged since 1995.

Satellite imagery from Google Earth was also reviewed for ground surface features at the proposed project location. Based on this review, the natural ground surface elevation ranges from approximately +5 to +10 feet above sea level. The natural ground surface appears to slope gently from east to west, towards the bay.

In addition, the "Soil Survey of Hillsborough County, Florida", published by the USDA Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general project vicinity. This soil survey report indicated that the upper soils across the subject site consisted of Malabar fine sand and Wabasso fine sand. Malabar fine sand is typically found in low-lying sloughs and shallow depressions in the flatwoods areas. It is nearly level and poorly drained. The seasonal high water table is reported to fluctuates from the soil surface to a depth of about 10 inches during wet periods. Wabasso fine sand is typically found on plains in the flatwoods areas. It is nearly level (0 to 2 percent slope) and poorly drained. The seasonal high water table is reported to fluctuate from the soil surface to a depth of 10 inches for most of the year; however, during prolonged dry periods it can drop to 40 inches below the surface.

FIELD EXPLORATION

Testing Locations

The soil test locations and depths were selected by our office. The actual boring locations were established in the field by **Ardaman & Associates** representatives using a handheld GPS device. The approximate test locations are shown on the Test Location Plan (Figure 1) attached to this report, and should be considered accurate only to the degree implied by the method used. If more precise locations are required, we suggest that you contact a registered surveyor. It is important to note that ground surface elevations at the boring locations were neither furnished nor determined.

Standard Penetration Test

Twelve (12) Standard Penetration Test (SPT) soil borings (B-01 through B-12) were drilled to evaluate the stratification and engineering properties of the subsurface soils throughout the project site. The SPT soil borings were drilled with the use of a CME Power Drill Rig using Bentonite "Mud" drilling procedures. Ten – 25 feet deep SPT borings were initially performed as proposed in our scope of services and two additional borings to a depth of 30 feet were selected by Ardaman to be performed due to scheduled drilling equipment energy calibration. The initially performed SPT soil borings extended to the approximate depth of 25 feet below the existing ground surface with the exception of soil boring B-05, which extended to 30 feet due to encountering very soft soils at the proposed 25 feet termination depth. Soil sampling was performed in general accordance with the procedures outlined in ASTM Standard D-1586. These procedures are also summarized in Appendix B of this report.

<u>Piezo-Cone Penetrometer Test</u>

Thirteen (13) Piezo-Cone Penetrometer Test (CPTu) penetrations (CPT-11 through CPT-20, including CPT-12A, CPT-17A, and CPT-19A) were also performed throughout the project site. Cone exploration techniques were selected in order to improve the quality and continuity of data for evaluation of subsurface conditions. CPT technology is in wide use and provides excellent and detailed data for defining the engineering properties of the soil in each stratum encountered, and for structure settlement evaluations. The CPT penetrations extended to depths ranging from approximately 9 to 25 feet below the existing ground surface. At three locations (CPT-12, CPT-17, and CPT-19) shallow refusal depths were encountered. At these locations, the test location was either offset (CPT-12A), or a mechanical auger was used to advance through shallow stiff soil layers and testing advanced to further depth (CPT-17A and CPT-19A). CPT testing was performed in general accordance with the procedures outlined in ASTM Standard D-5778. The general procedures for performing the CPT penetrations are summarized in Appendix B of this report.

<u>Mechanical Auger Boring</u>

Two (2) mechanical auger borings (CPT-17A and CPT-19A) were drilled to penetrate stiff soil layers and to verify soil conditions at the testing locations. The mechanical auger borings were drilled to approximately 11 feet below the existing ground surface using a power auger system. Soil sampling was performed in general accordance with the procedures outlined in ASTM Standard D-1452. These procedures are also summarized in Appendix B of this report.

LABORATORY TESTING

The field soil boring logs and recovered soil samples were transported to our Tampa office following the completion of the field exploration activities. Each representative sample was checked by a geotechnical engineer in our laboratory to identify the engineering classification of the soil. The visual classification of the samples was performed using the current Unified Soil Classification System in general accordance with the procedures outlined in ASTM Standard D-2488. No laboratory testing was performed for this phase of the project; however, soil samples will be available if testing is required at a later date.

SUBSURFACE CONDITIONS

The delineation of the vertical extent of individual soil strata, the identification of pertinent soil engineering properties, where applicable, and a description of each geologic layer discovered in the course of this geotechnical study, are given on the Soil Boring Profiles (Figure 2) and CPT Sounding Logs (Appendix A) included in this report. The soil boring profiles were prepared by a geotechnical engineer based upon a technical review of the field soil boring logs and a visual classification of the recovered soil samples. It should be noted that the stratification lines shown are used to indicate a transition from one soil type to another. The actual boundary between the illustrated soil strata may be gradual or indistinct. Consequently, the stratification boundary lines, shown on the soil boring profiles, represent our best estimate of the location of the transition between distinct soil strata. They are in no way intended to designate a depth of exact geological change. Furthermore, the recommendations contained in this report are based on the contents of the soil boring profiles and the CPT sounding logs. While the borings are representative of subsurface conditions at their respective locations and vertical reaches, local variations which are characteristic of the subsurface materials of the region, or which may be due to man-made alteration of the native geologic conditions, may be encountered.

<u>Standard Penetration Test</u>

The soils encountered during SPT testing were generally similar to those encountered during CPT testing. The SPT borings located throughout the project site typically encountered a surficial sand layer from the ground surface to approximately 12 to 18 feet below the ground surface. A clayey sand strata was found within the surficial sand in roughly half of the borings (B-01, B-03, B-05, B-07, B-08, and B-10) from approximately 2 to 8 feet. A soft clayey sand to clay layer was encountered overlying hard limestone at 15 to 20 feet bgs in five borings (B-02, B-03, B-7, B-10 and B-22). SPT N-values in the upper 10 feet ranged from 2 to 21 bpf. The clayey layers overlying the limestone around 15 feet generally recorded low blow counts from 1 to 14 bpf, a majority of which were less than 5 bpf. N-values in the limestone ranged from 10 bpf to refusal.

Soil borings B-05 and B-06 did not encounter limestone. Boring B-05 was extended to 30 feet because very soft conditions were penetrated under the static weight of the drilling tools and hammer at the proposed termination depth of 25 feet.

Soil borings B-11 and B-12 were completed following the initial exploration program and were terminated at a depth of 30 feet bgs. These borings were consistent with the previously completed soil explorations. A generally medium dense to dense shallow sand layer was encountered from the ground surface to a depth of 16.5 to 17.5 feet. At the location of B-11, a very soft clay underlies the shallow soils followed by a 9 bpf clayey sand. This boring was terminated at 30 feet bgs in a hard limestone layer. Boring B-11 was performed in proximity to B-05, which had been extended to 30 feet due to soft layers at the proposed termination depth. Boring B-12 encountered very loose clayey sand below the shallow sand. Hard weathered limestone was found from 23.5 feet to the termination depth of the boring.

As indicated on the Soil Boring Logs, the measured borehole water levels ranged from 2 to 3 feet below the existing ground surface at the time of the September field exploration. Water levels of 0.5 to 2 feet were recorded on the October 10, 2016 drilling date. These water level readings may differ from the actual stable groundwater table due to variations in the permeability of soil layers. The degree of accuracy of the reported water levels is also related to the time allowed for the borehole water level to come to equilibrium. It should be noted that fluctuations in the ground water level may occur due to variations in rainfall and other environmental or physical factors at the time measurements are made.

Piezo-Cone Penetrometer Test Soundings

The CPT soundings performed throughout the project site encountered generally similar subsurface profiles. The soundings typically encountered sandy soils from the ground surface to depths ranging from 12 to 18 feet below the ground surface. Underlying the surficial sand was a strata of softer clayey soils overlying a very hard layer, probably limestone. Cone advancement refusal occurred at a very hard layer at approximately 15 to 24 feet below grade, probably a hardpan stratum. 'Equivalent' SPT N-values in the upper sands typically ranged from 10 to 30 blows per foot of penetration (bpf). 'Equivalent' N-values from 1 to 10 bpf were recorded in the soft clayey strata, and equivalent N-values from 40 to 100 bpf were found at the termination depth.

At the location of CPT-12, shallow refusal occurred at a depth of 3.5 feet in a dense sand layer with 'equivalent' N-values approaching 100 bpf. The test location was then offset approximately 20 feet to the southwest and CPT-12A was performed. The dense layer was encountered in CPT-12A, but the cone was able to advance through it to a depth of approximately 17 feet.

At test locations CPT-17 and CPT-19, shallow refusal was encountered at approximately 9 feet. A mechanical auger was then used to advance through the dense layer to 11 feet and testing resumed to depths of 23 and 24 feet, respectively (CPT-17A and CPT-19A).

EVALUATION

The field exploration program indicated similar soil conditions throughout the project site. The soils encountered consisted of a surficial sand layer approximately 12 feet deep with some clayey soils found around 5 feet. Underlying the surficial sand was a soft clay layer found around 15 feet overlying hard limestone to the termination depth of 25 feet. Thin, hard layers were seen in the shallower soil layers as indicated by the CPT testing.

It is Ardaman's opinion that the encountered soil profile is suitable for the proposed construction considering proper site preparation and support by foundations such as steel "H" or "I" section piles to support the lateral loads of the PV solar panels. These piles are likely to have tip depths less than 30 feet and are capable of punching through the isolated, shallow hard lenses encountered at some test locations in the upper 15 feet of the soil profile so adequate embedment is achievable with proper installation equipment. Problematic soils such as buried debris or organics were not encountered. The soil boring profiles (Figure 2) and CPT sounding logs (Appendix A) are attached for your reference. In addition, a graphical representation of soil resistance with depth is attached as Figure 3.

Provided data shows that H-Section-beams were used to support similar structures at a site to the immediate north to the intended concept for this project site. At the nearby site provided for reference, the steel section foundations ranged from approximately 13.75 feet to 28.25 feet below the ground surface. Foundation capacity analyses for recommended tip depth were not within this scope of services for this project, and proposed structure loads were not provided. However, for discussion of general evaluation of the site, we can assume foundations to those used for the reference site may be required at the subject site. The anticipated foundation loading is anticipated to be primarily lateral and uplift. Although some soft pockets of clay or loose sand were encountered in the range of the referenced pile termination depths, these piles are likely not end bearing reliant as minimal compression load is anticipated. Hard limestone was encountered at depths as shallow as 15 feet which is on the upper limits of the pile termination depths. An H-Section pile can punch several feet into rock; however, practical refusal of the pile may occur if a deeper (i.e. 20+ feet) embedment is recommended at the shallower rock locations. We anticipate that piles terminated in shallow rock will develop the required lateral and uplift capacity.

CLOSURE

Detailed evaluation and recommendations were beyond the scope of work performed for this report. The subsurface conditions provided above are based on the limited exploration proposed for this phase of the project and apply only to this specific project and site. **Ardaman** looks forward to providing evaluation and recommendations as project plans develop. As this is a preliminary study, additional geotechnical study may be required in subsequent phases of the project.

We appreciate the opportunity to be of service to **TECO** on this important project. Should you have any questions in regards to this report, or if we can be of any further assistance, please contact this office.

Very truly yours,

ARDAMAN & ASSOCIATES, INC.
Florida Certificate of Authorization No. 00005950

Jordan T. Fox
Staff Engineer, E.I.

Whitney A. Stevens, P.E.
Senior Geotechnical Engineer
Florida License 70821

Ross T. McGillivray, PE
Senior Consultant
Florida License 17920

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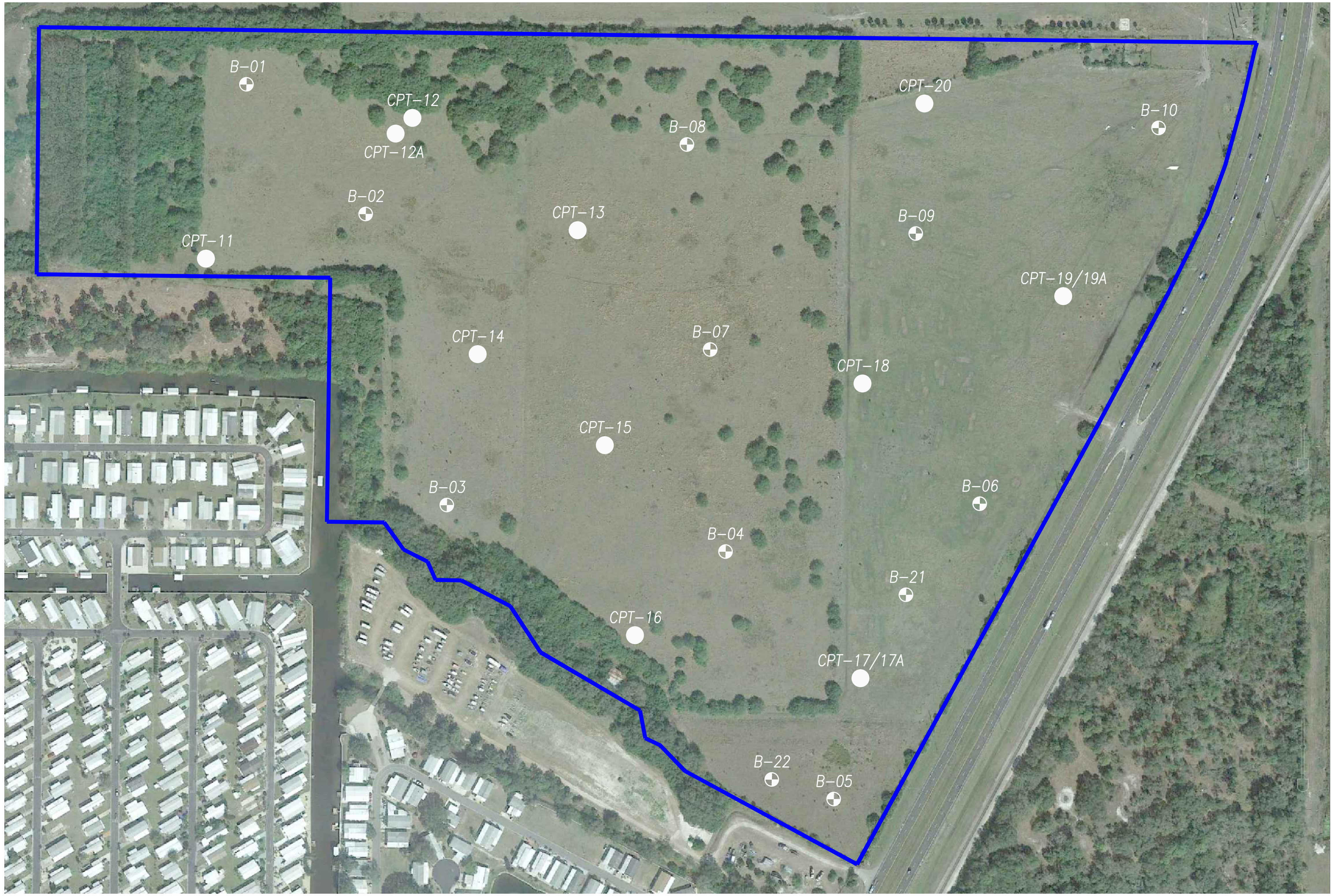
Distribution: 2 - Addressee
1 - File

Attachments: Figure 1 – Site Location Plan
Figure 2 – Test Location Plan
Figure 3 – SPT N Summary
Appendix A: CPT Sounding Logs
Appendix B: Field Testing Procedures

ATTACHMENTS



REFERENCE: GOOGLE EARTH PRO 2016

LEGEND

- APPROXIMATE LOCATION OF SPT BORING (B-XX)
- APPROXIMATE LOCATION OF CPT SOUNDING (CPT-XX)

0 150 300
APPROXIMATE SCALE: 1"=300'

TEST LOCATION PLAN

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH SOLAR SITE
BIG BEND AREA BY U.S. 41
APOLLO BEACH, FLORIDA

DRAWN BY: ajd	CHECKED BY: JTF	DATE: 10/12/16
FILE NO. 16-55-9671	APPROVED BY: WAS	FIGURE: 1

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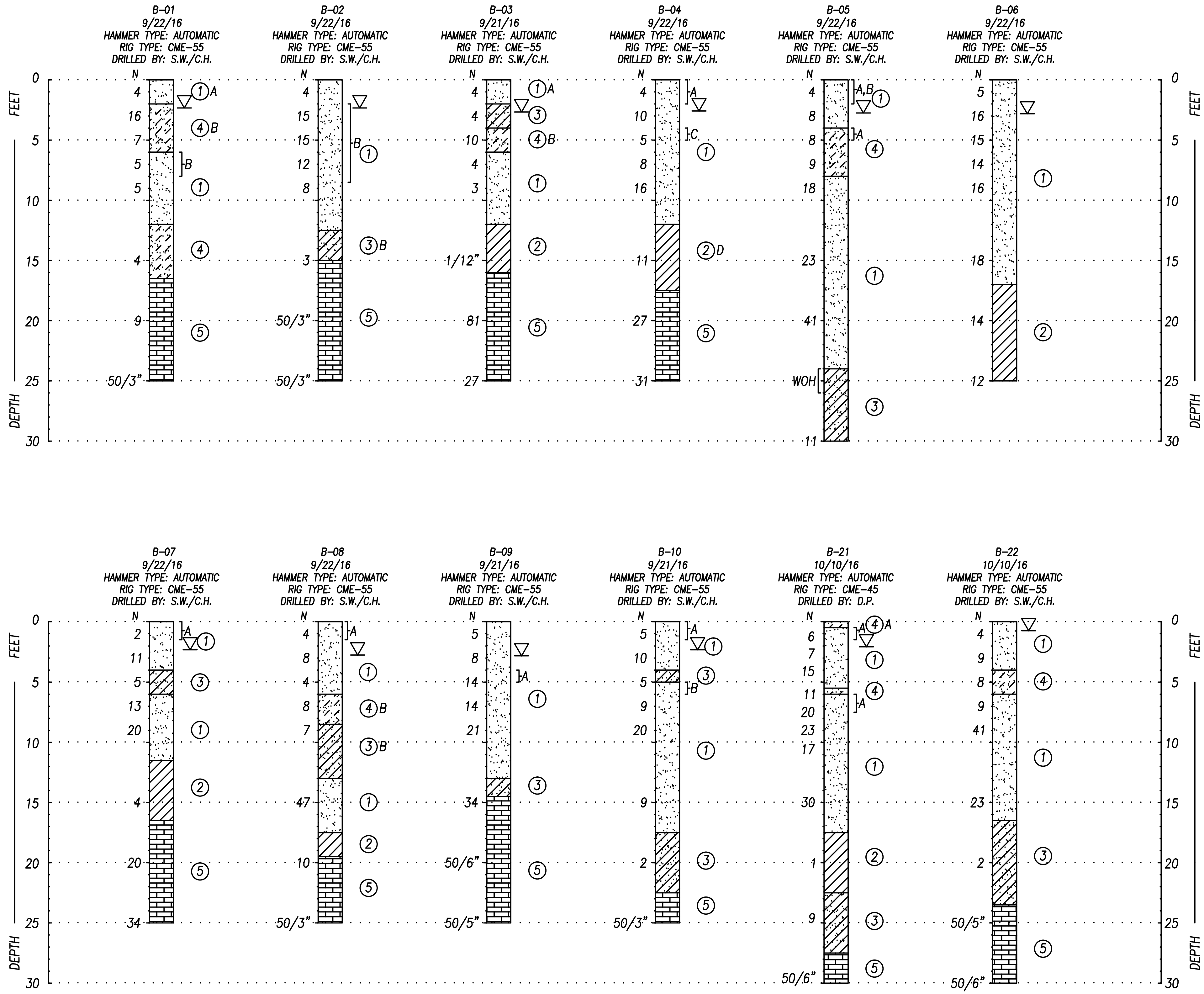

LEGEND

① GRAYISH BROWN FINE SAND (SP/SP-SM)
② GRAY SANDY CLAY TO CLAY (CL/CH)
③ BROWNISH GRAY CLAY TO VERY CLAYEY FINE SAND (SC)
④ BROWNISH GRAY TO BROWN SLIGHTLY CLAYEY FINE SAND (SP-SC)
⑤ VERY LIGHT BROWN HIGHLY WEATHERED TO WEATHERED LIMESTONE (LS)
A SOME ROOTS
B TRACE TO SOME SHELL
C TRACE TO SOME CLAYEY SAND SEAMS
D SOME LIMESTONE
HAMMER TYPE: AUTOMATIC
(SP) UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) SYMBOL
▽ GROUNDWATER LEVEL MEASURED ON DATE DRILLED
N SPT N-VALUE IN BLOWS PER FOOT
WOH SOILS WERE PENETRATED UNDER STATIC WEIGHT OF RODS & HAMMER
50/2" 50 BLOWS PER 2 INCHES OF SAMPLER PENETRATION

SOIL BORING PROFILES

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH SOLAR SITE
BIG BEND AREA BY U.S. 41
APOLLO BEACH, FLORIDA

DRAWN BY: ajd	CHECKED BY: JTF	DATE: 10/12/16
FILE NO. 16-55-9671	APPROVED BY: WAS	FIGURE: 2

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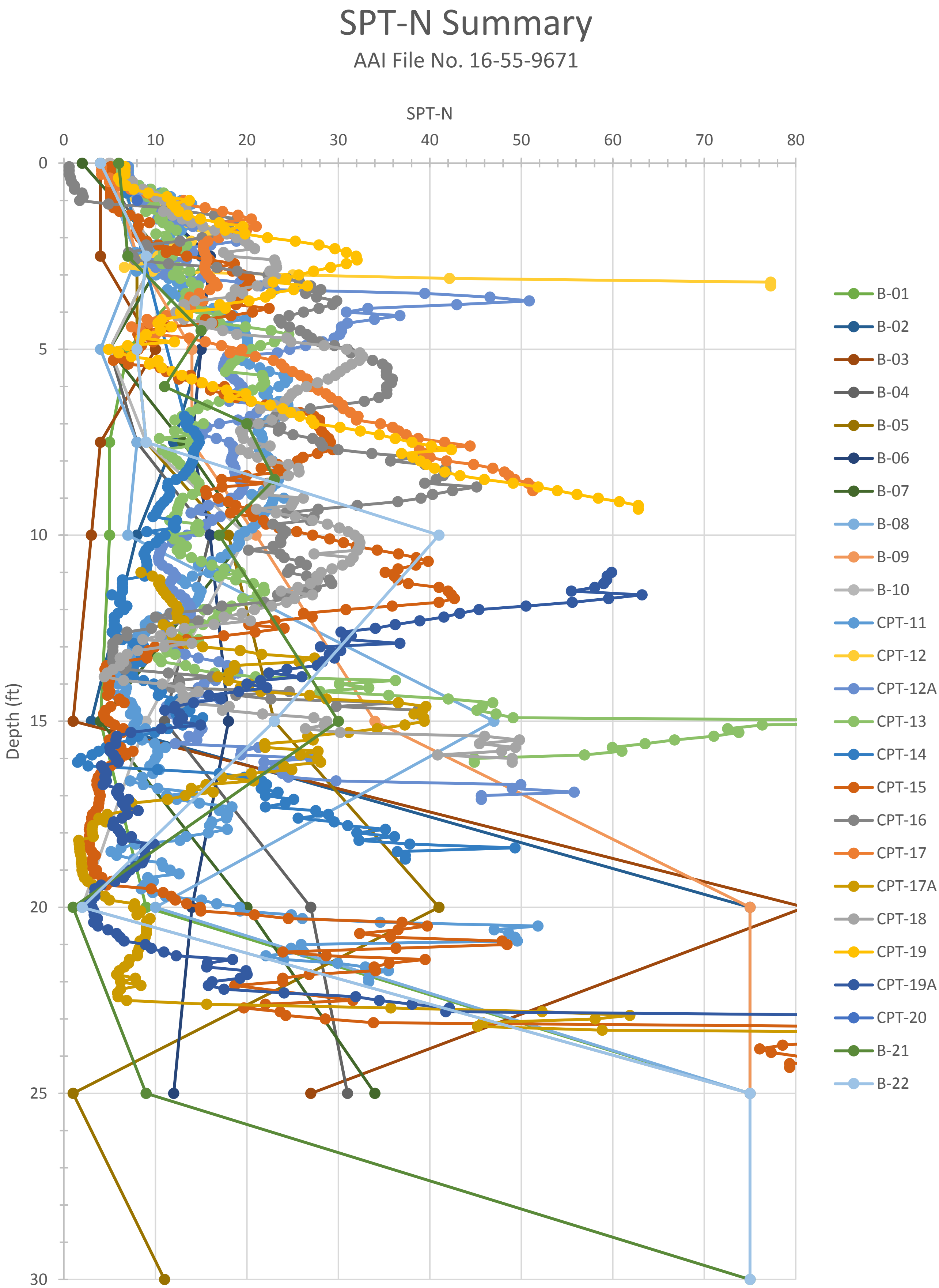
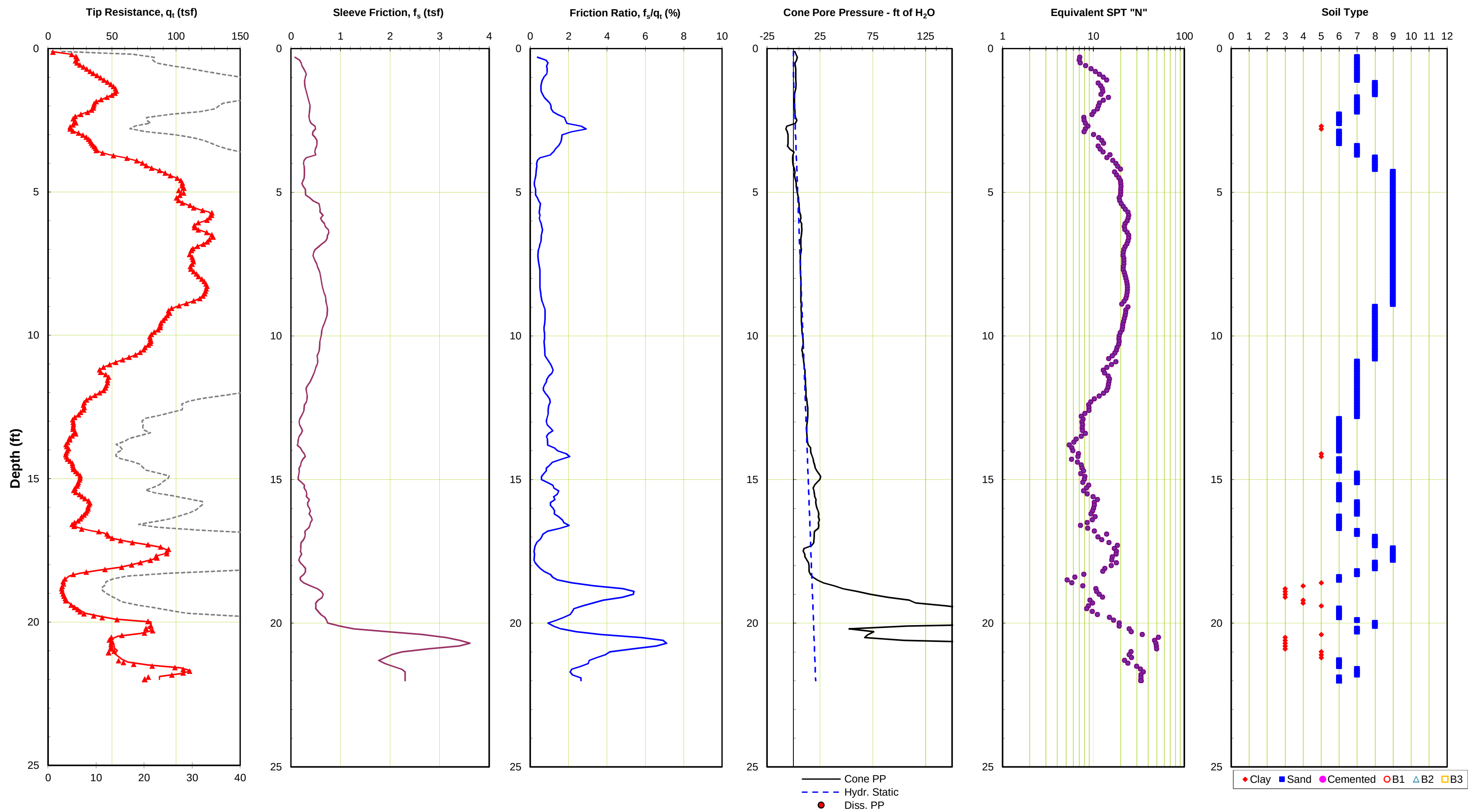


SPT-N Summary
AAI File No. 16-55-9671
SPT-N
0
10
20
30
40
50
60
70
80
0
5
10
15
20
25
30
Depth (ft)
B-01
B-02
B-03
B-04
B-05
B-06
B-07
B-08
B-09
B-10
CPT-11
CPT-12
CPT-12A
CPT-13
CPT-14
CPT-15
CPT-16
CPT-17
CPT-17A
CPT-18
CPT-19
CPT-19A
CPT-20
B-21
B-22

Figure 3

APPENDIX A



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-11

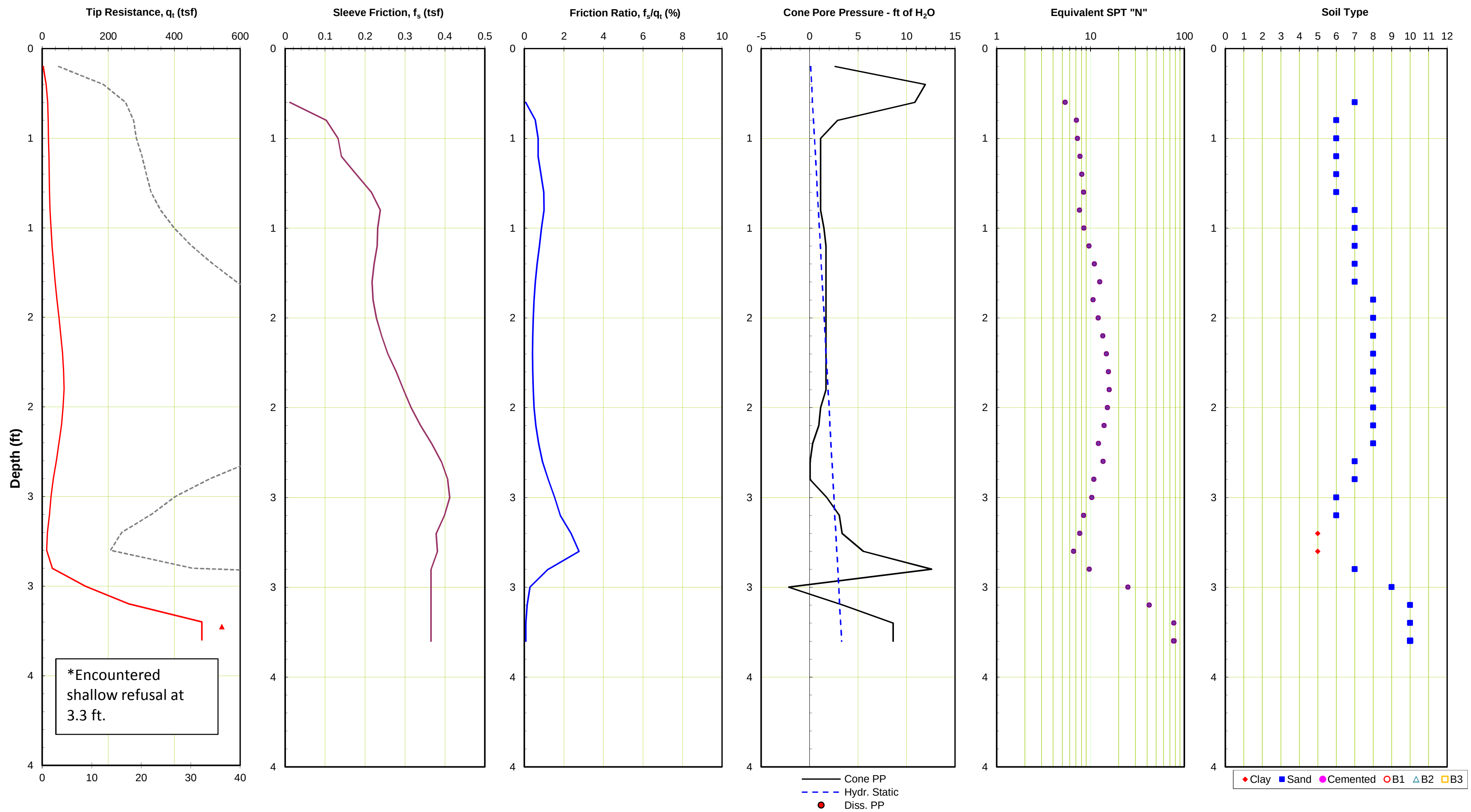
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/23/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-12

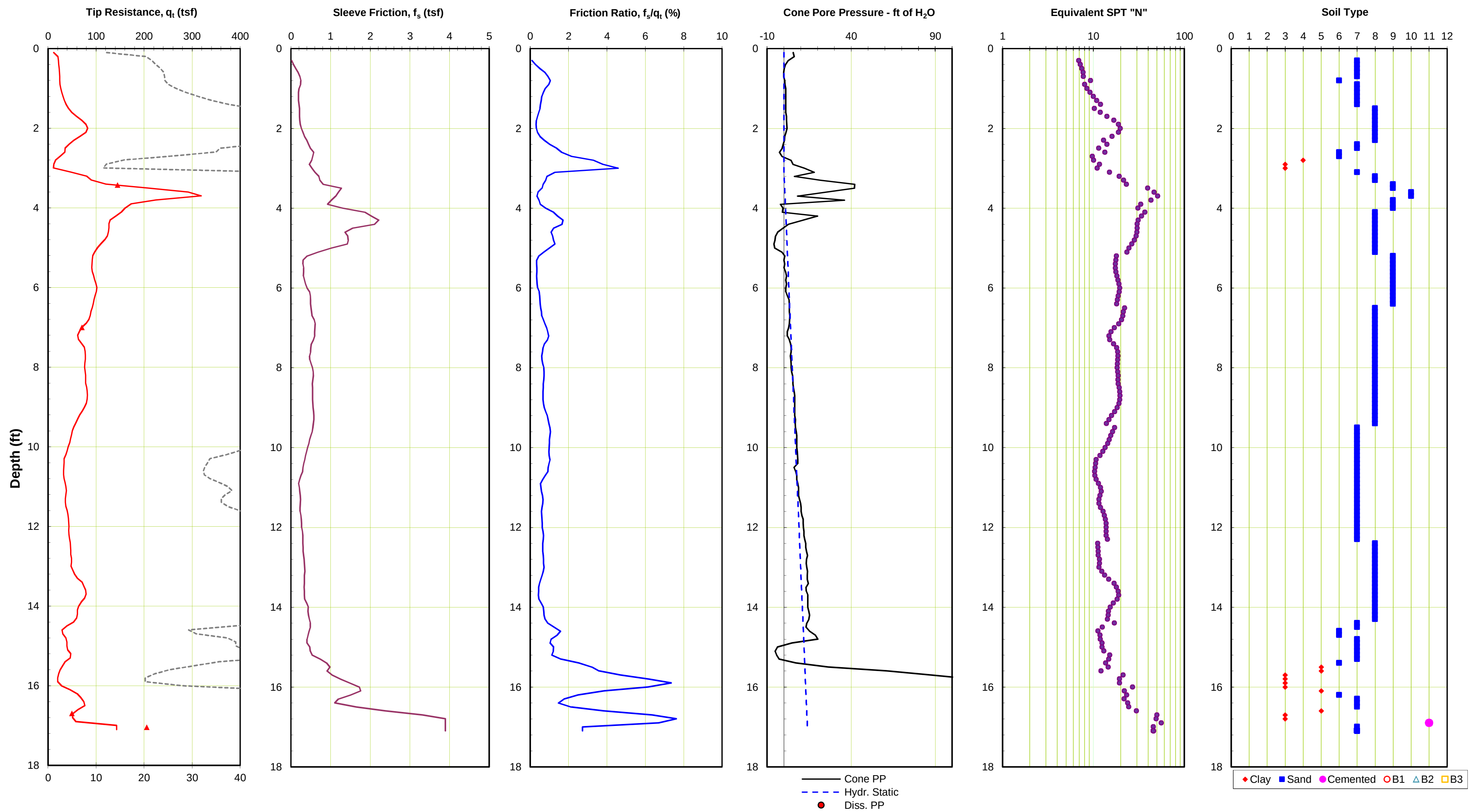
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-12A

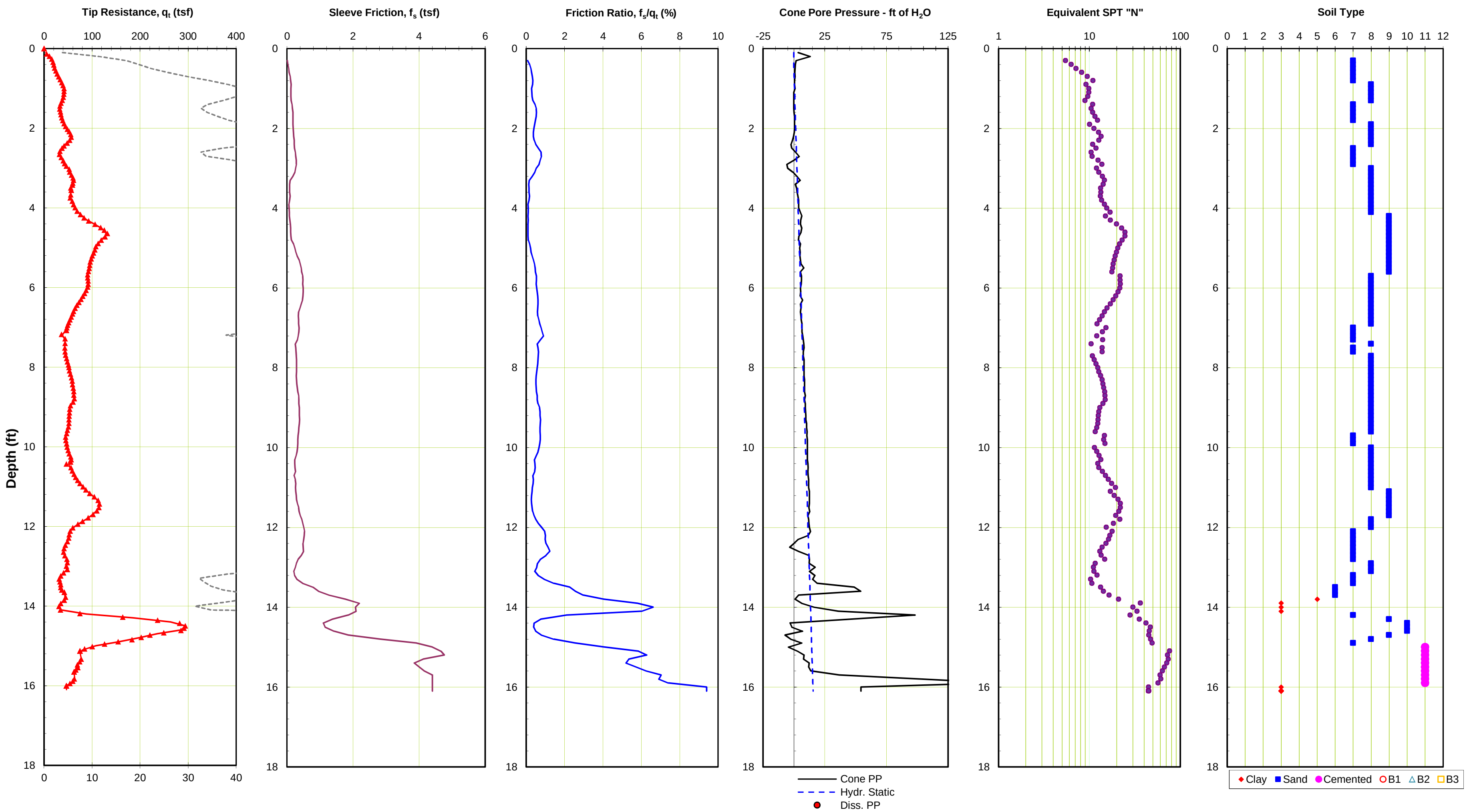
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-13

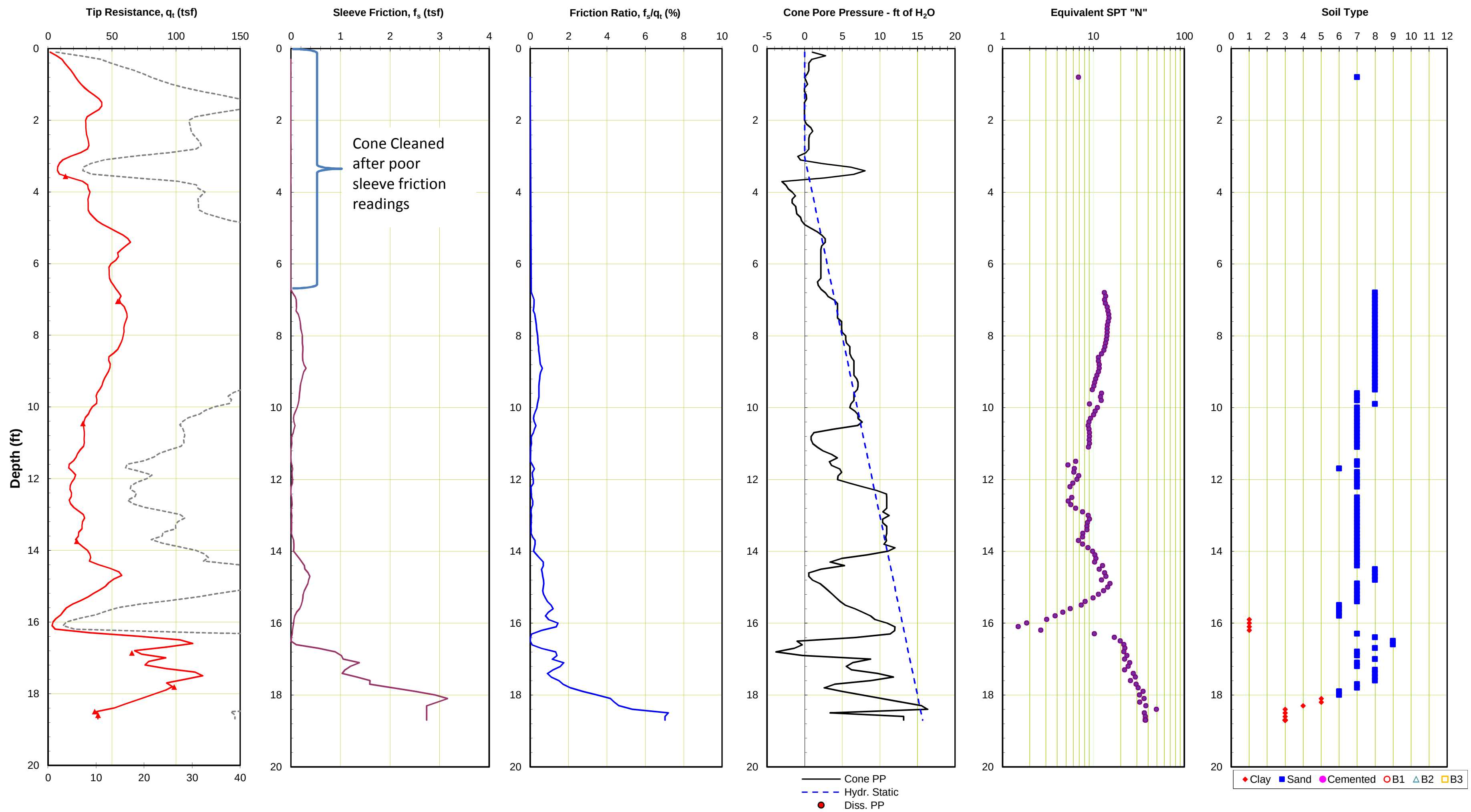
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description	Soil I.D. #	Soil Description
1	Sensitive Fine Grained	7	Silty Sand to Sandy Silt
2	Organic Material	8	Sand to Silty Sand
3	Clay	9	Sand
4	Silty Clay to Clay	10	Gravelly Sand to Sand
5	Clayey Silt to Silty Clay	11	Very Stiff Fine Grained (OC Clay)
6	Sandy Silt to Clayey Silt	12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-14

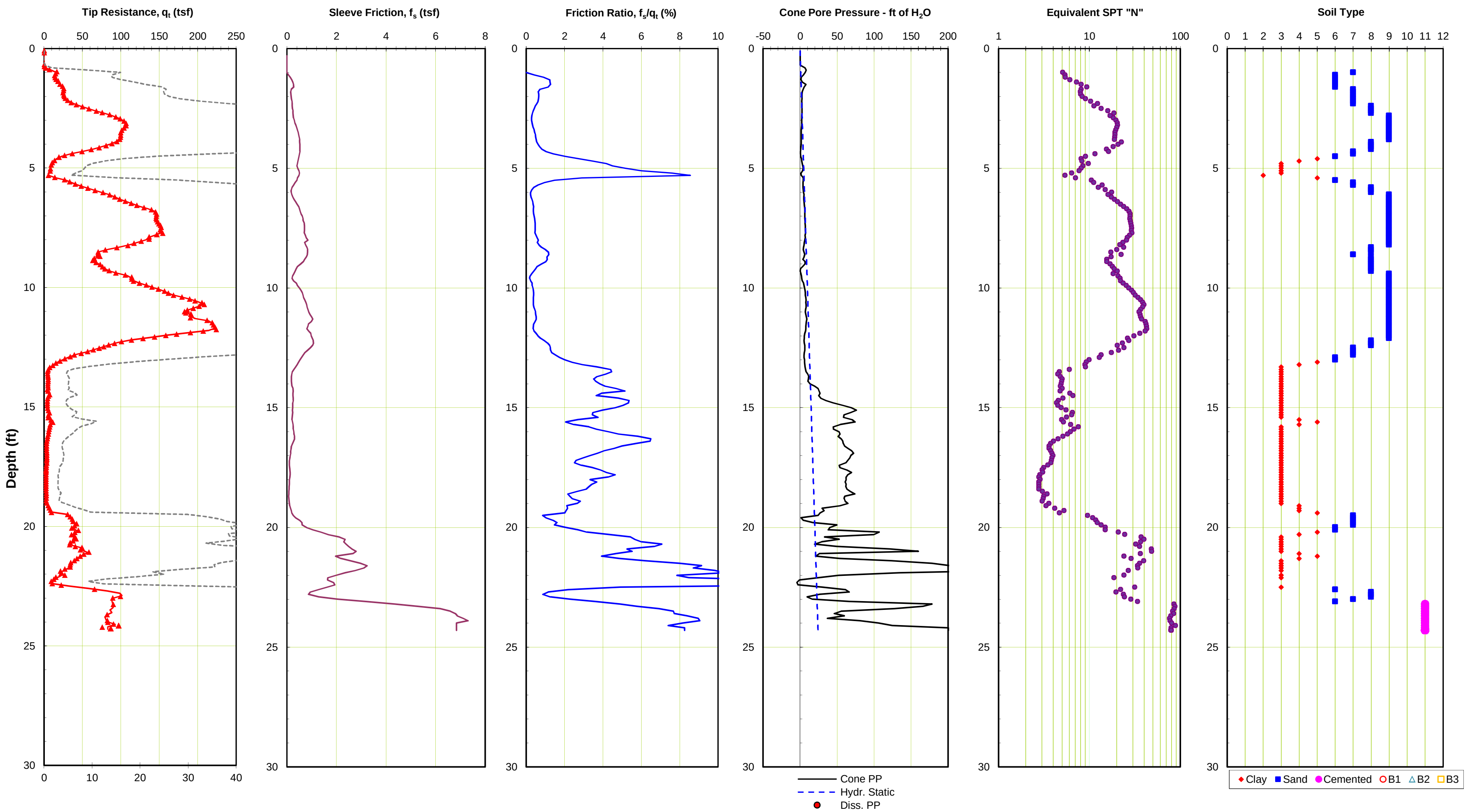
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-15

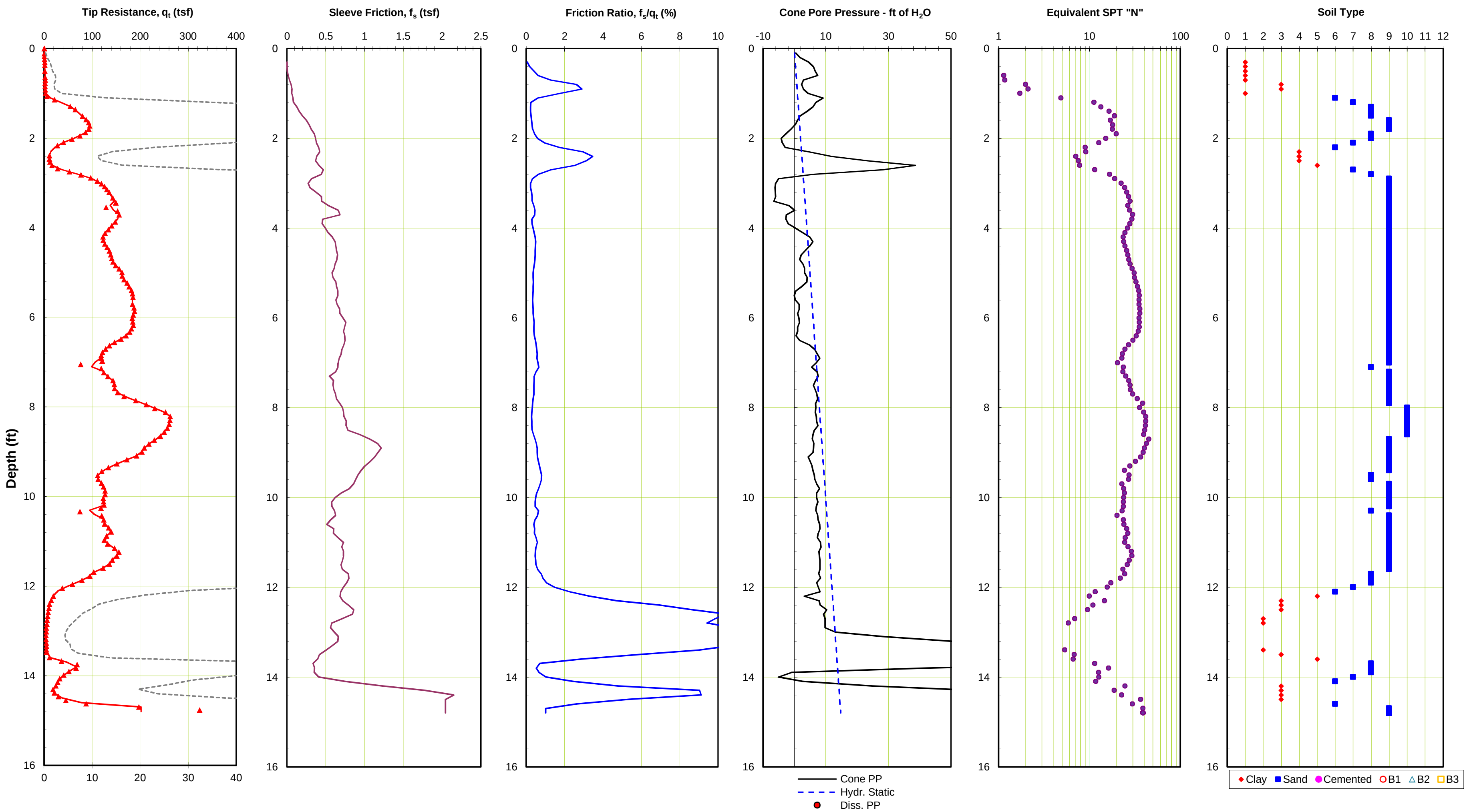
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description	Soil I.D. #	Soil Description
1	Sensitive Fine Grained	7	Silty Sand to Sandy Silt
2	Organic Material	8	Sand to Silty Sand
3	Clay	9	Sand
4	Silty Clay to Clay	10	Gravelly Sand to Sand
5	Clayey Silt to Silty Clay	11	Very Stiff Fine Grained (OC Clay)
6	Sandy Silt to Clayey Silt	12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-16

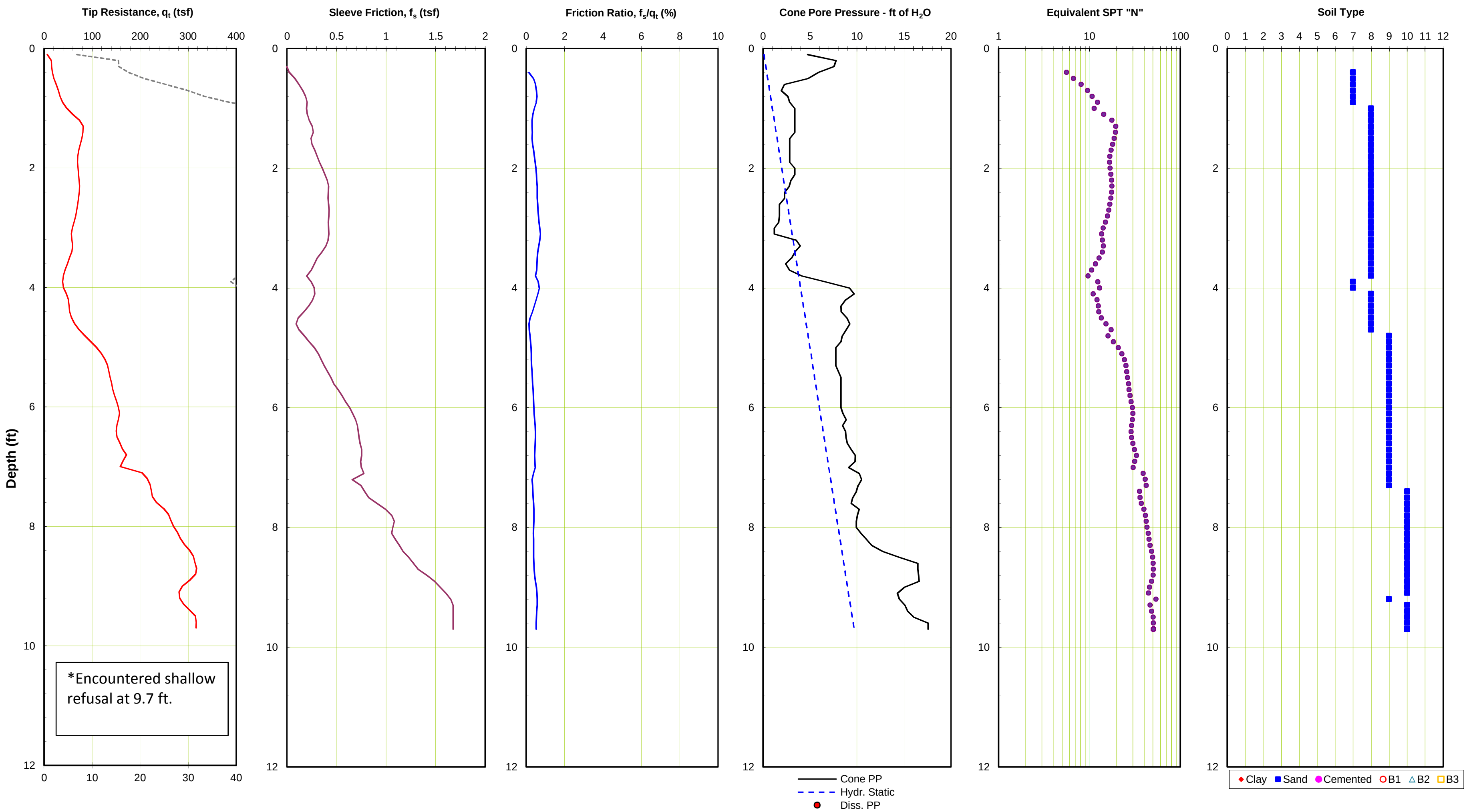
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description	Soil I.D. #	Soil Description
1	Sensitive Fine Grained	7	Silty Sand to Sandy Silt
2	Organic Material	8	Sand to Silty Sand
3	Clay	9	Sand
4	Silty Clay to Clay	10	Gravelly Sand to Sand
5	Clayey Silt to Silty Clay	11	Very Stiff Fine Grained (OC Clay)
6	Sandy Silt to Clayey Silt	12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-17

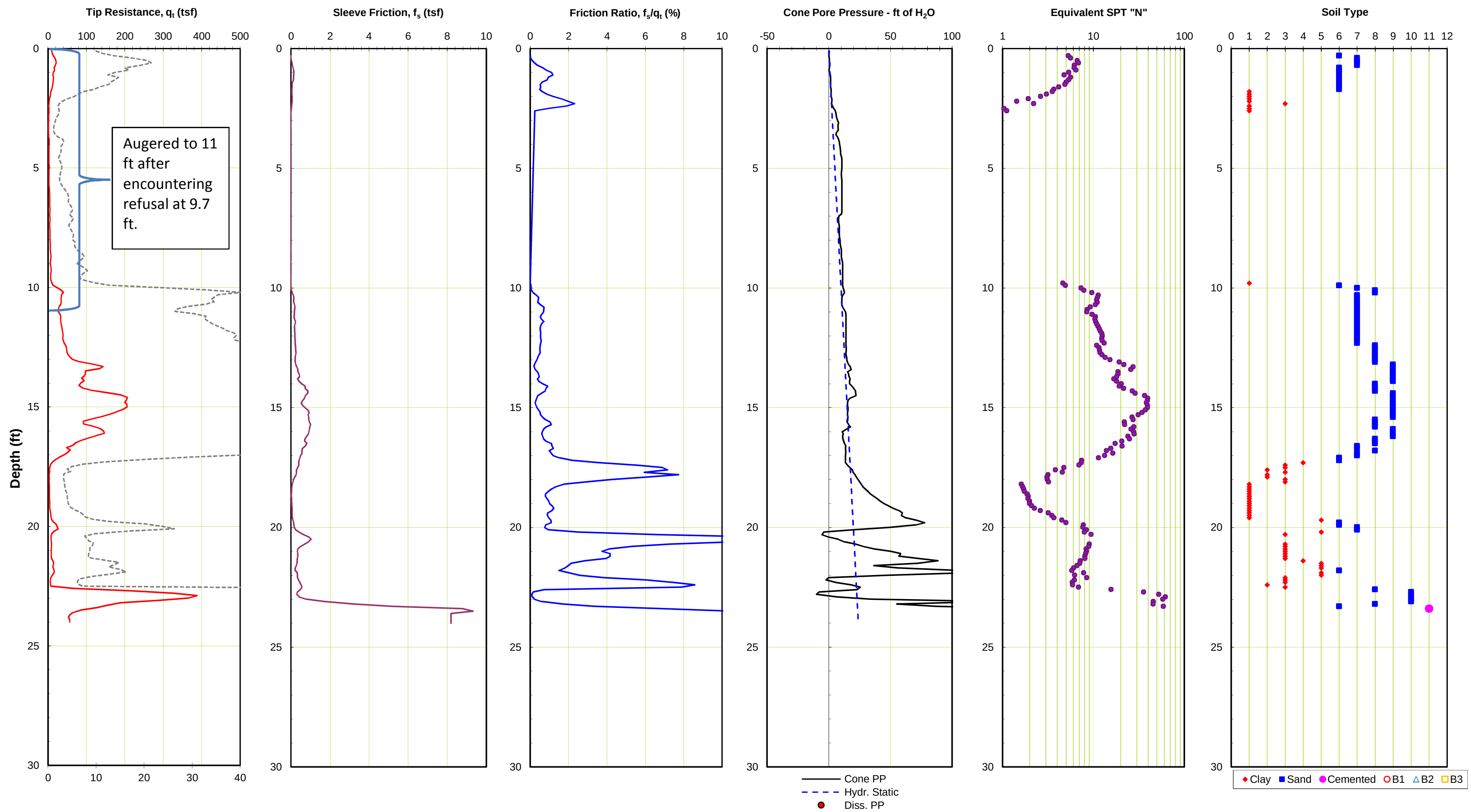
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-17A

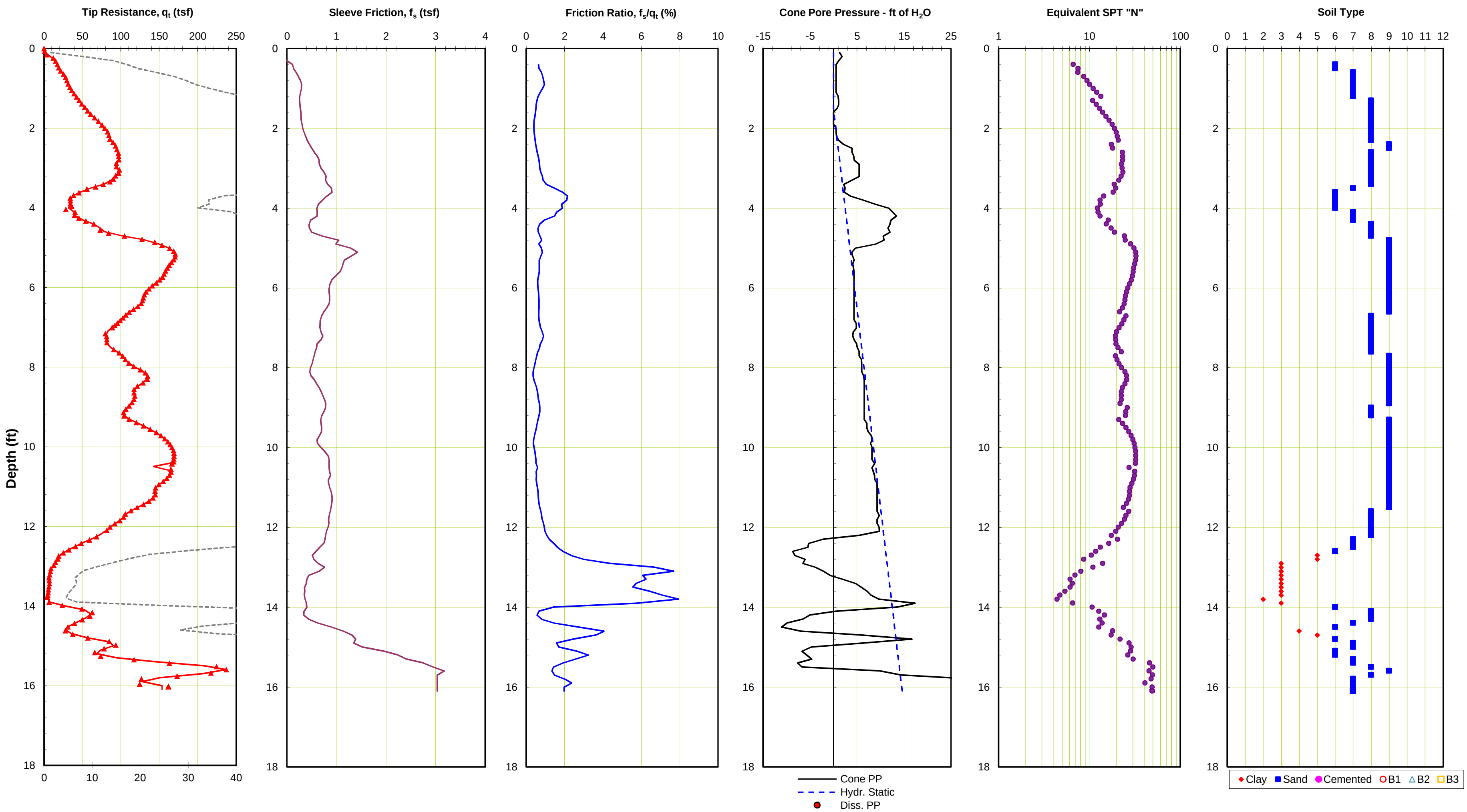
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-18

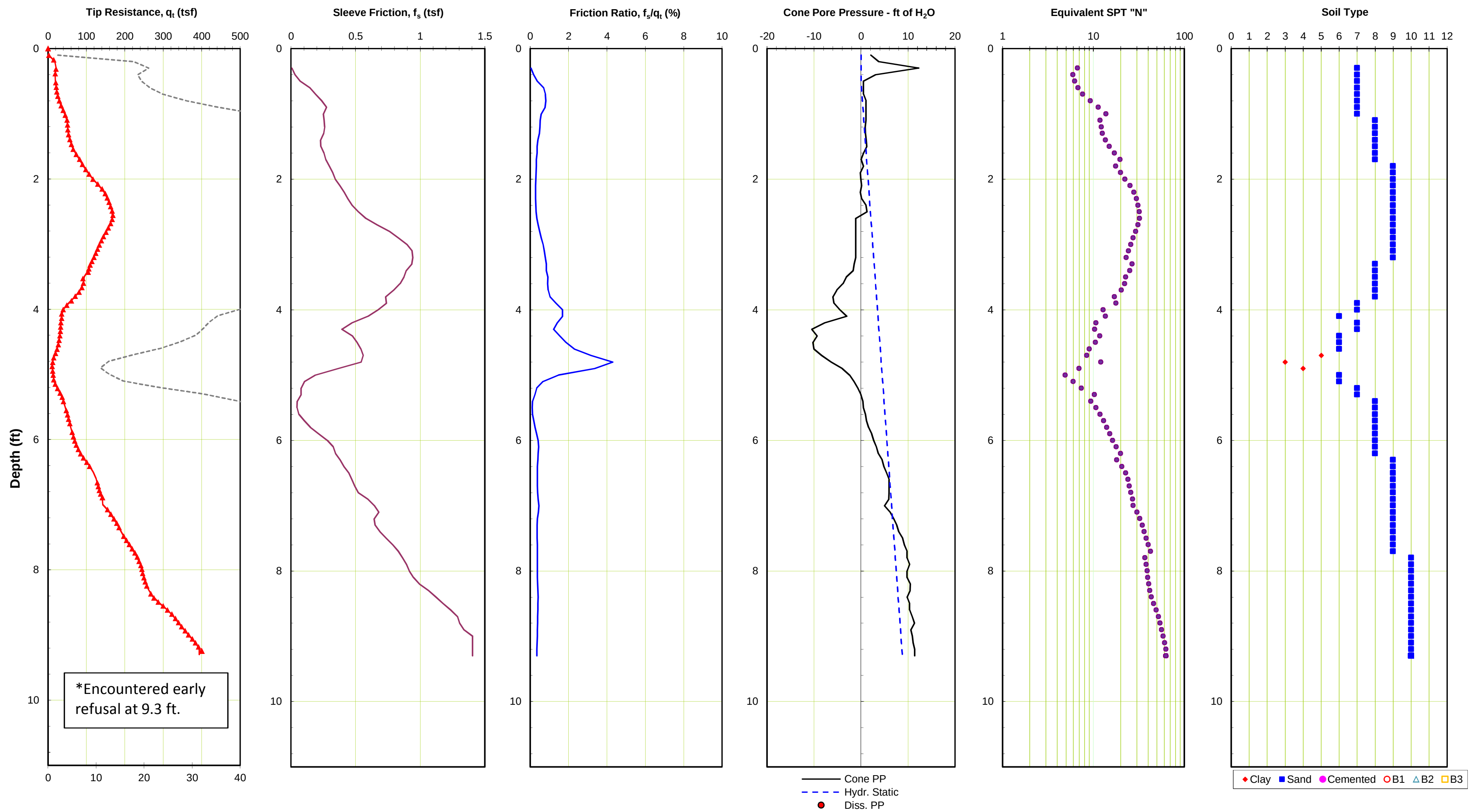
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/23/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-19

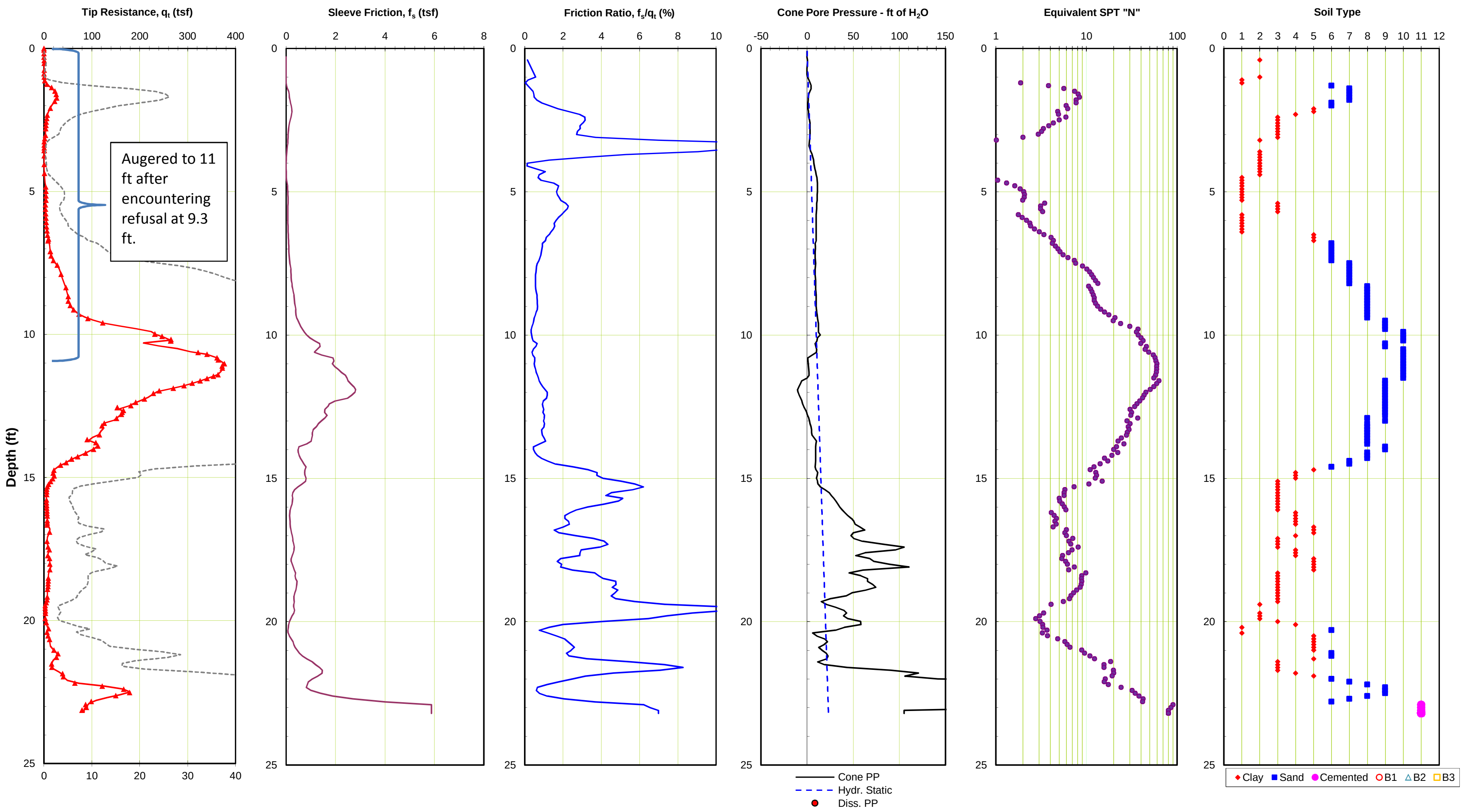
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/23/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
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9	Sand
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11	Very Stiff Fine Grained (OC Clay)
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Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-19A

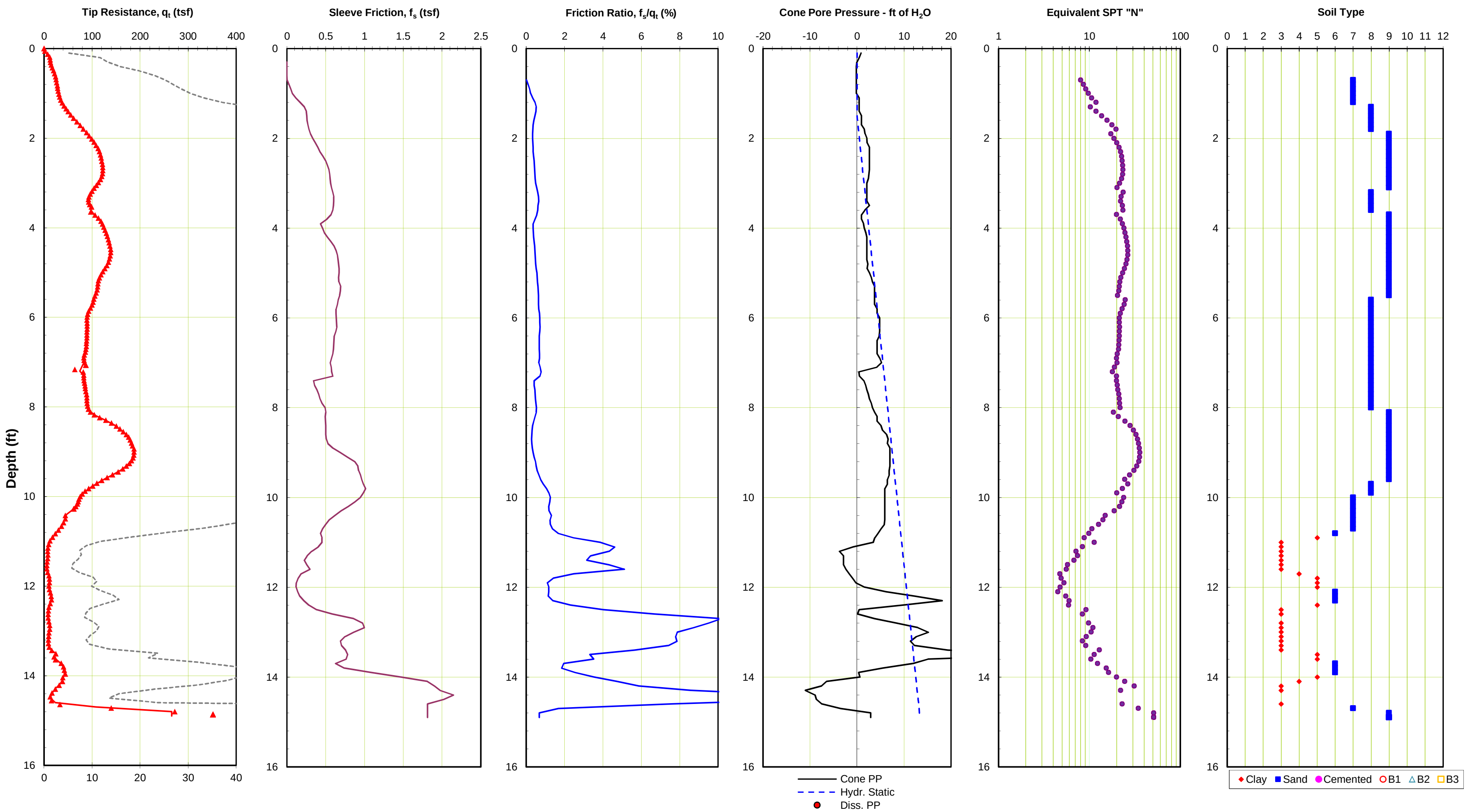
Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/26/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented



Soil I.D. #	Soil Description
1	Sensitive Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay
6	Sandy Silt to Clayey Silt

Soil I.D. #	Soil Description
7	Silty Sand to Sandy Silt
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained (OC Clay)
12	Sand to Clayey Sand (Cemented)

Notes: Vertek Cone, Pore Pressure at u2
S/N 3340.103.E

CPT-20

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants

ABH Solar Panels
Big Bend

Job No. 16-55-9671 | Test Date: 9/23/2016

Soil Classification by Robertson et al, 1986

I.D. #'s 11 and 12 are Over Consolidated or Cemented

APPENDIX B

FIELD TESTING PROCEDURES

Prior to initiating the field activities, the Sunshine State One-Call of Florida, Inc. Call Center (Call Sunshine) was notified of our intent to perform soil test boring, utilizing a drill rig. The location, date, and other operation particulars were provided to allow participating utility companies the opportunity to mark the location of their buried lines, prior to our field activities. No conflicts with underground utilities were encountered at the boring locations.

STANDARD PENETRATION TEST

The Standard Penetration Test is a widely accepted method of in-situ testing of foundation soils (ASTM D 1586). A 2-foot long, 2-inch outside diameter (1-3/8-inch inside diameter), split-barrel ("spoon") sampler, attached to the end of drilling rods, is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each six inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load. The N-value is considered to be indicative of the relative density of cohesionless soils and the consistency of cohesive soils.

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. Usually, the circulating fluid, which is a bentonite drilling mud, also serves to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or to prevent the loss of circulating fluid.

Representative split-spoon samples from soils at every 5 feet of drilled depth and from different stratum are brought to our laboratory in airtight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for at least 60 days prior to being discarded. After completion of a test boring, the hole is kept open until a steady state ground water level is recorded. The hole is then sealed if necessary, and backfilled.

Piezocone Penetration Test

The site exploration program for this project included the performance of Piezocone Penetration Test ($CPTu_2$) soundings in general accordance with ASTM Standard D-5778. Piezocone exploration techniques were selected in order to improve the quality and continuity of data for evaluation of subsurface conditions. CPT technology is in wide use nationally and internationally, and is recognized as a superior method for site soils characterization, especially when thin layers of soft soil might affect foundation performance or excavation safety. Additionally, $CPTu_2$ soundings allow the collection of pore pressure data that is very useful when evaluating the presence of a vertical seepage gradient which may be indicative of sinkhole activity. The system utilized by Ardaman & Associates, Inc. for this project includes a pore pressure element mounted between the cone tip and the friction sleeve (u_2) to measure water pressures induced by pushing the cone through the soil.

Procedures for use of the friction sleeve cone penetrometer in Florida were developed at the University of Florida in the early 1970's. [1] In 1974, Ardaman & Associates, Inc. developed a Piezocone system for site

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explorations in difficult soils, [2] and has been a leader in the application of Piezocone technology for site characterization and foundation design. Many others have recognized that the cone penetrometer is the best system for exploration of soil conditions for foundation design [3 4 5].

The characteristics of the Piezocone Penetrometer used by Ardaman for this project are as follows:

Tip Area:	10.0 cm^2
Friction Sleeve:	150 cm^2
Piezometric Element:	U_2, a filter element mounted above the cone tip and below the friction sleeve

The cone is typically inserted and extracted by a high capacity hydraulic jack mounted in a heavy truck, but in certain applications, the cone may be inserted using a drill rig. The cone data acquisition system consists of electronic load cells to measure tip resistance, sleeve friction and pore water pressure. A portable computer is used to collect the load cell data. A complete suite of load cell readings is recorded at least every one second. The correlation with soil properties is detailed in Reference 4, and in a subsequent paper presented to the Transportation Research Board 77th Annual Meeting, Committee A2K01, Soil and Rock Instrumentation by Kurup and Tumay. Calibration testing by Ardaman & Associates, Inc. and many university researchers has shown that cone techniques provided finer resolution of soil profile variations than SPT borings due to the continuity of the measurements. In addition, cone techniques were proven to provide reliable measurement of soil strength.

Extensive testing using cone techniques by Ardaman & Associates in Florida with correlations between SPT borings and CPT data has proven that CPT exploration techniques can provide more vertically detailed site characterization data and better data for definition of soil engineering properties than Standard Penetration Test borings.

---

[1] The Piezometer Probe", In-Situ Measurement of Soil Properties, Vol. I (ASCE), NC State, Raleigh, Wissa, A.E.Z, Martin, R.T., and Garlanger, J.E., 1975

[2] Guidelines for Cone Penetration Test Performance and Design" Report FHWA-TS-78-209, Federal Highway Administration, Washington, D.C., Schmertmann, J.H., 1978

[3] Penetrometers for Soil Permeability and Chemical detection, P. W. Mayne, PhD, PE and S. E. Burns, PhD, PE; Report to National Science Foundation and U.S. Army Research Office, Georgia Institute of Technology School of Civil and Environmental Engineering, July 1998.

[4] A Continuous Intrusion Electronic Miniature Cone Penetration Test System, M. T. Tumay, PhD, P. U. Kurup, PhD and R. L. Boggess; Geotechnical Site Characterization, Robertson & Mayne (eds) © 1998 Balkema, Rotterdam, ISBN 90 54 10 939 4

[5] National Report on CPT, Mayne, P.W., Mitchell, J. K., Auxt, J.A. and Yilmaz, R. "Proceedings, Cone Penetration Testing (CPT'95), Vol. 1, Linkoping, Sweden, USNS/ISSMFE, Oct 1995, 263-276.

FIELD TESTING PROCEDURES

MECHANICAL AUGER BORINGS

Mechanical auger boring samples are obtained by simultaneously pressing and turning a continuous flight auger into the ground with a truck mounted, rotary rig. After the auger bit cuts 5 feet into the ground, the tool is withdrawn and the auger flight contents examined. Although the sample is mixed, it is sufficient for identification and classification. The auger flights are advanced 5 feet at a time, until the boring is terminated. Upon completion, each borehole is filled in with borehole cuttings and local soil.

TAB 6

APPENDIX D
GROUND PHOTOGRAPHS

Photograph No. 1. View of Wetland W1 facing south.

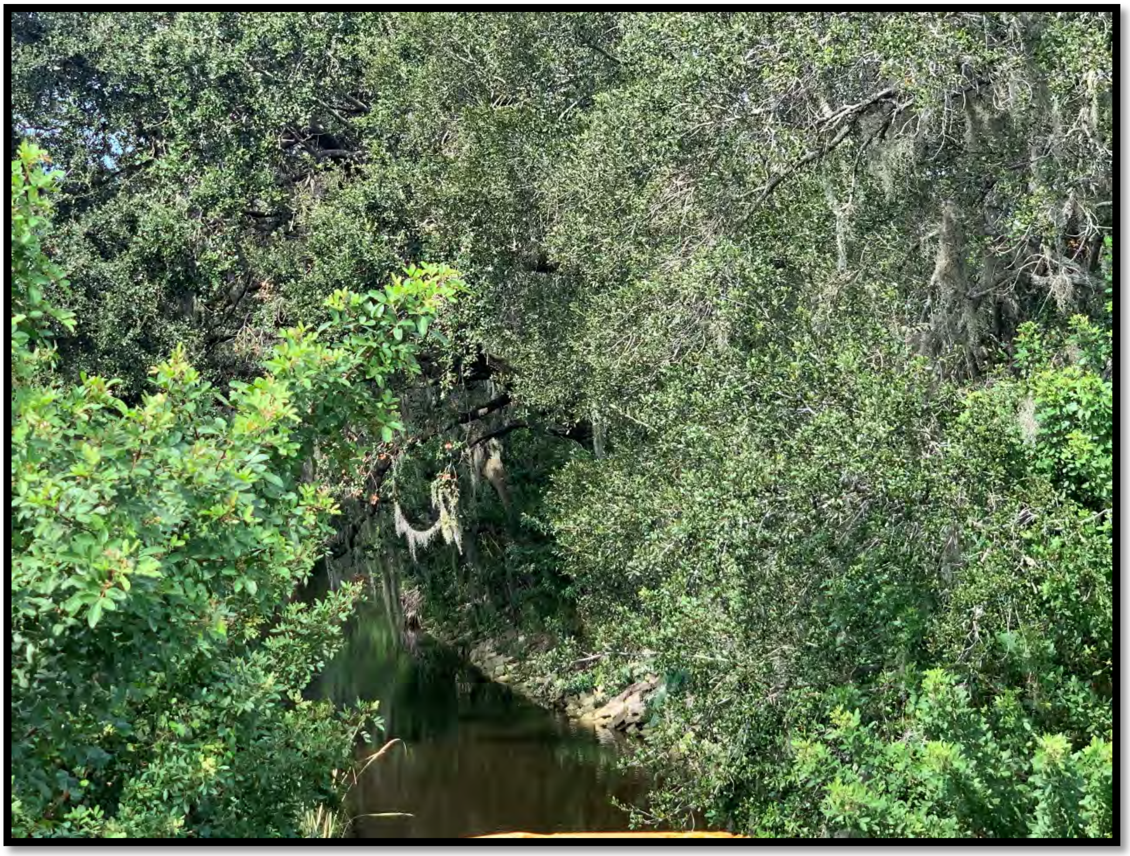
Photograph No. 2. View of Wetland W1A facing southwest.

Photograph No. 3. View of Wetland W2 is in foreground and Wetlands W2A and W2B are in the background facing southwest.

Photograph No. 4. View of OSW1 facing north.

Photograph No. 5. View of OSW2 facing west.

Photograph No. 6. View of OSW3 facing west.



Photograph No. 7. View of OSW4 facing west.

Photograph No. 8. View of OSW5 facing south.

Photograph No. 9. View of OSW6 facing west.

Photograph No. 10. View of OSW7 facing east.

Photograph No. 11. View of OSW7A facing east.

Photograph No. 12. View of OSW7B facing west.

Photograph No. 13. View of OSW8 in foreground and W2C in background facing southeast.

Photograph No. 14. View of OSW9 facing east.

Photograph No. 15. View of OSW10 facing west.

Photograph No. 16. View of OSW11 facing west.

Photograph No. 17. View of OSW12 facing west from east end.

Photograph No. 18. View of OSW12A facing west.

Photograph No. 19. View of OSW13 facing west.

TAB 7

APPENDIX E
DRAINAGE REPORT

BIG BEND II SOLAR

HILLSBOROUGH COUNTY, FLORIDA

CULPEPPER & TERPENING, INC
CONSULTING ENGINEERS | LAND SURVEYORS

DRAINAGE CALCULATIONS

DECEMBER 2020

C&T Project No. 20-158

Certificate of Authorization No. 4286

PREPARED BY
Culpepper & Terpening, Inc
2980 South 25th Street
Fort Pierce, Florida
Tel. (772) 464-3537
www.ct-eng.com

PREPARED FOR
Tampa Electric Company
702 N. Franklin Street
Plaza 8
Tampa, Florida 33602

Big Bend II Solar Drainage Calculations

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Big Bend II Solar Drainage Calculations

SECTION 1 – GENERAL INFORMATION

1.1. Facility Information

Florida Renewable Partners, LLC is proposing a Solar Power Generation Facility (the "Facility") known as "Big Bend II Solar". The Facility is located within Sections 15 and 22, Township 31S, Range 19E of Hillsborough County.

The Facility is generally located north of Apollo Beach Boulevard, south of Big Bend Road, east of Dickman Road, and west of N. U.S. Highway 41 (State Road 45) in Hillsborough County, Florida. A general location map is shown in Figure 1 "Location Map" on page 3.

The facility is located on an approximately 191.31 acre site. The facility will generate 31.03 MW of power generation and will include the following features: solar array panels, 0.07 acres of associated inverters, 4.78 acres of semi-pervious gravel pathways and a 0.67 acre substation. An existing 1.27 acres of impervious area historically exists. Therefore, there is a net increase of impervious area of only 4.25 acres.

The site has historically been used in tomato farming operations and currently is used as agricultural pasture for cattle grazing. The existing drainage system consists of overflow to a system of agricultural ditches that are interconnected through a series of culverts. Minimal site grading will be undertaken as part of the solar development.

In review of FEMA Flood Maps No. 12057C0492H and 12057C0494H for Hillsborough County, dated August 28, 2008, portions of the site are located within FEMA Flood Zone Designation of Zone AE. The rest of the site lies within Zone X with a 0.2% annual chance floodplain. However, as the site lies within a tidal area, no adverse impacts to the floodplain will occur. Further, inverters and PV solar arrays are elevated above the 100 year stage on piles to minimize the earthwork within the floodplain and compensatory storage in the dry retention system adjacent to the substation for the minimal fill within the floodplain.

The site study area is divided into four (4) onsite Drainage Basins. All Drainage Basins, ultimately discharge west to Newman Branch which is to Tampa Bay. The site development plan has considered the historical drainage patterns and no alterations to them are proposed as part of this project. The Pre-Development Basin Map is included on page 5 and the Post-Development Basin Map is included on page 6.

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Figure 1 – Location Map

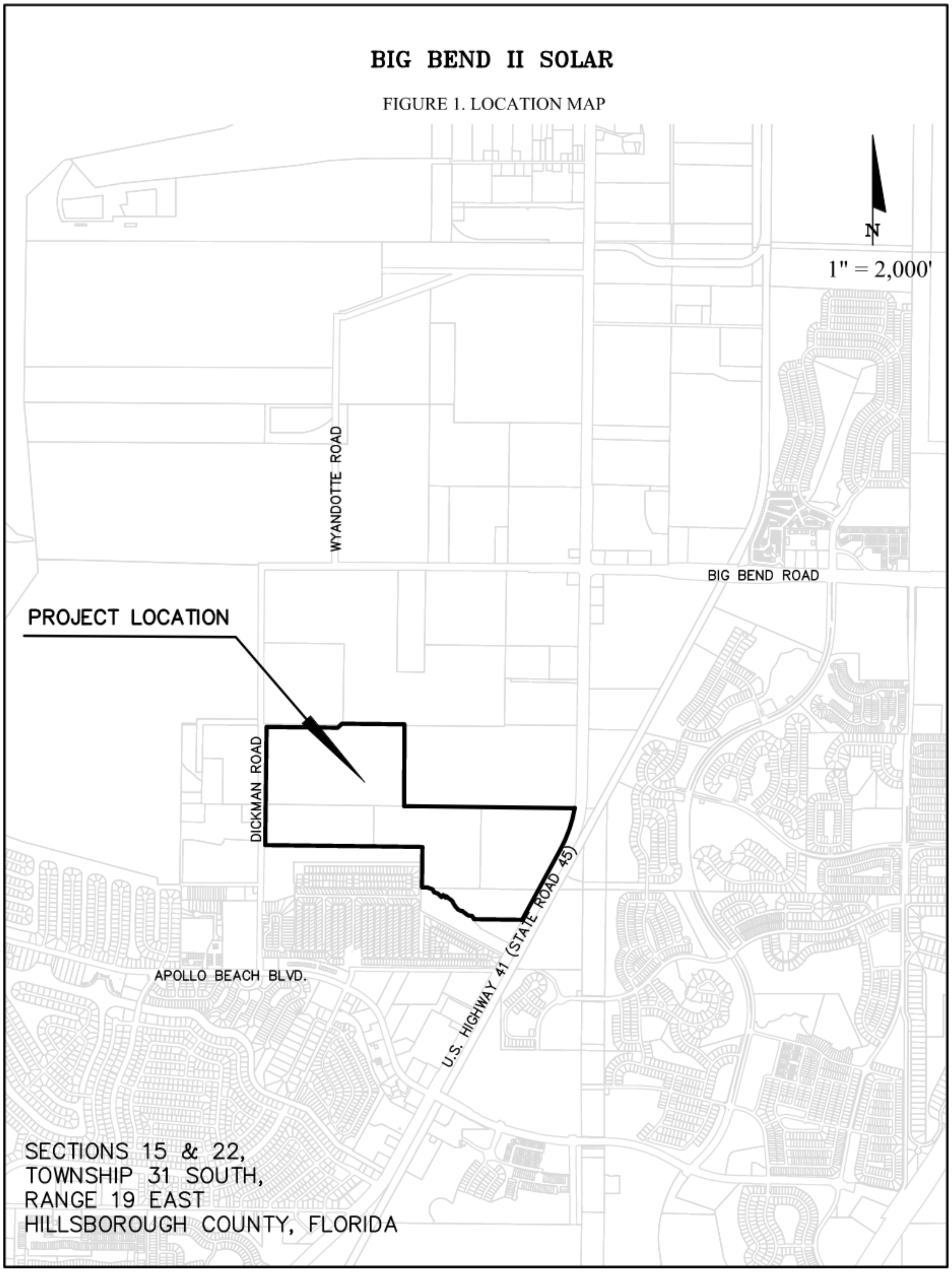


Figure 2 – FEMA Flood Map

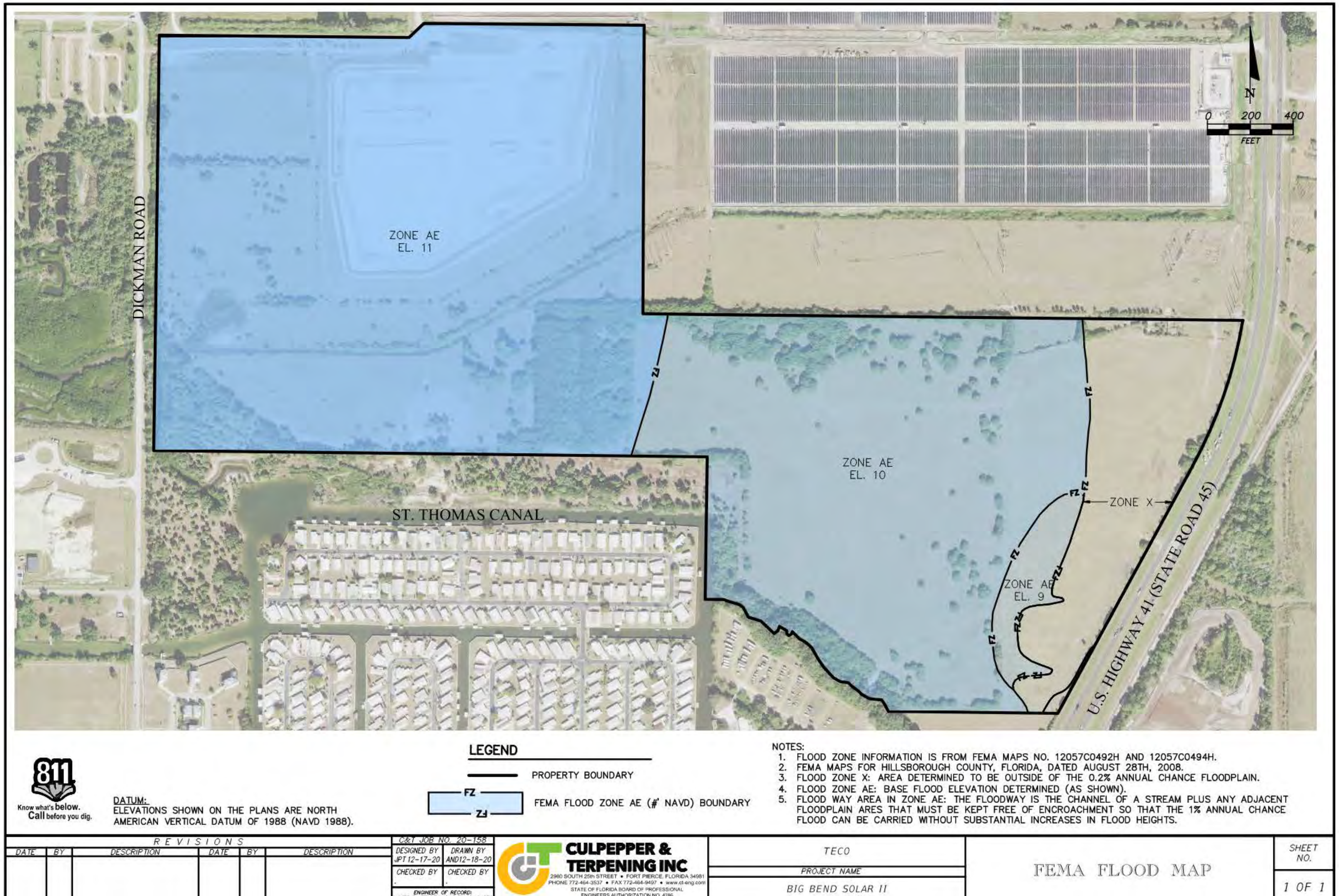


Figure 3 – Pre-Development Basin Map

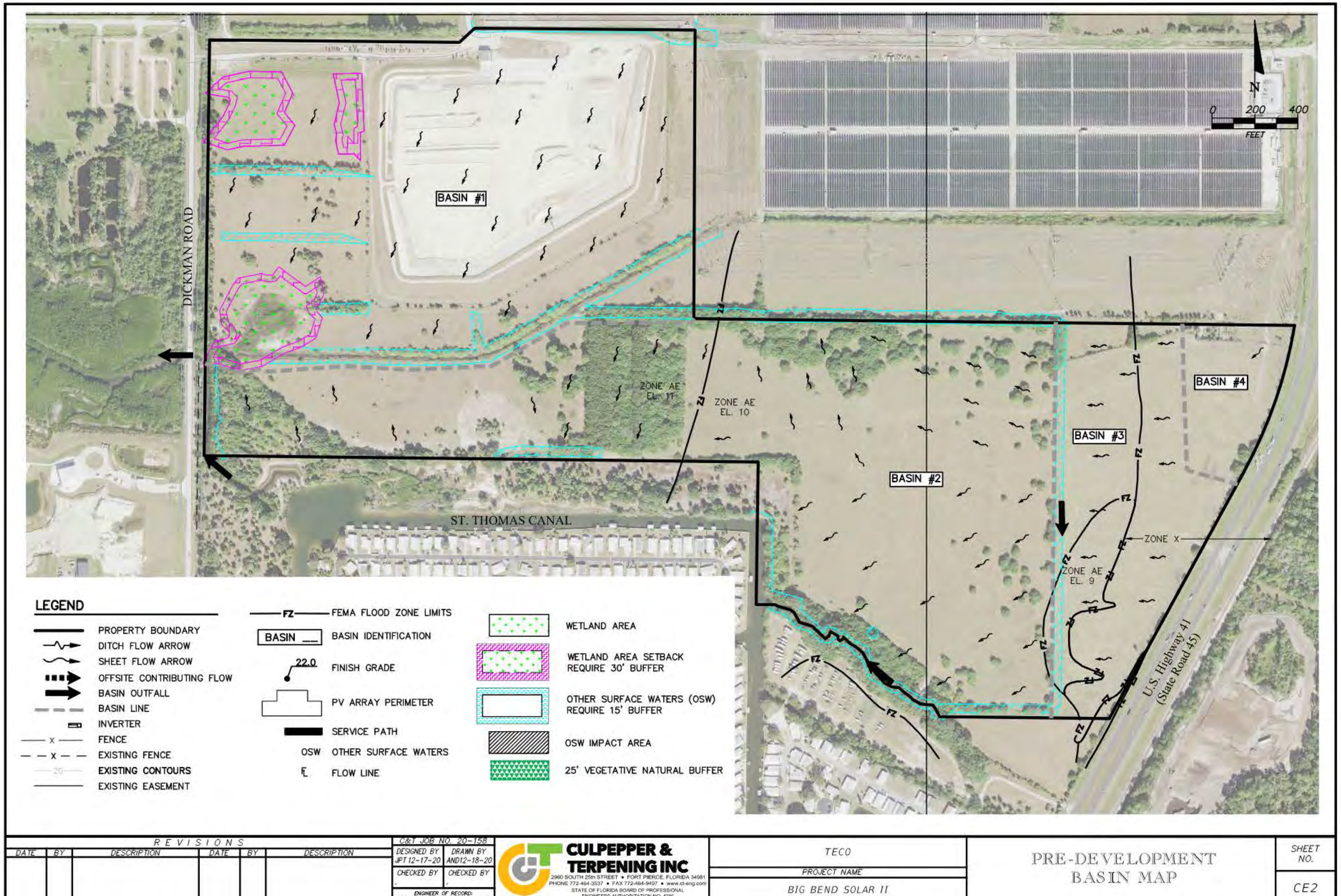
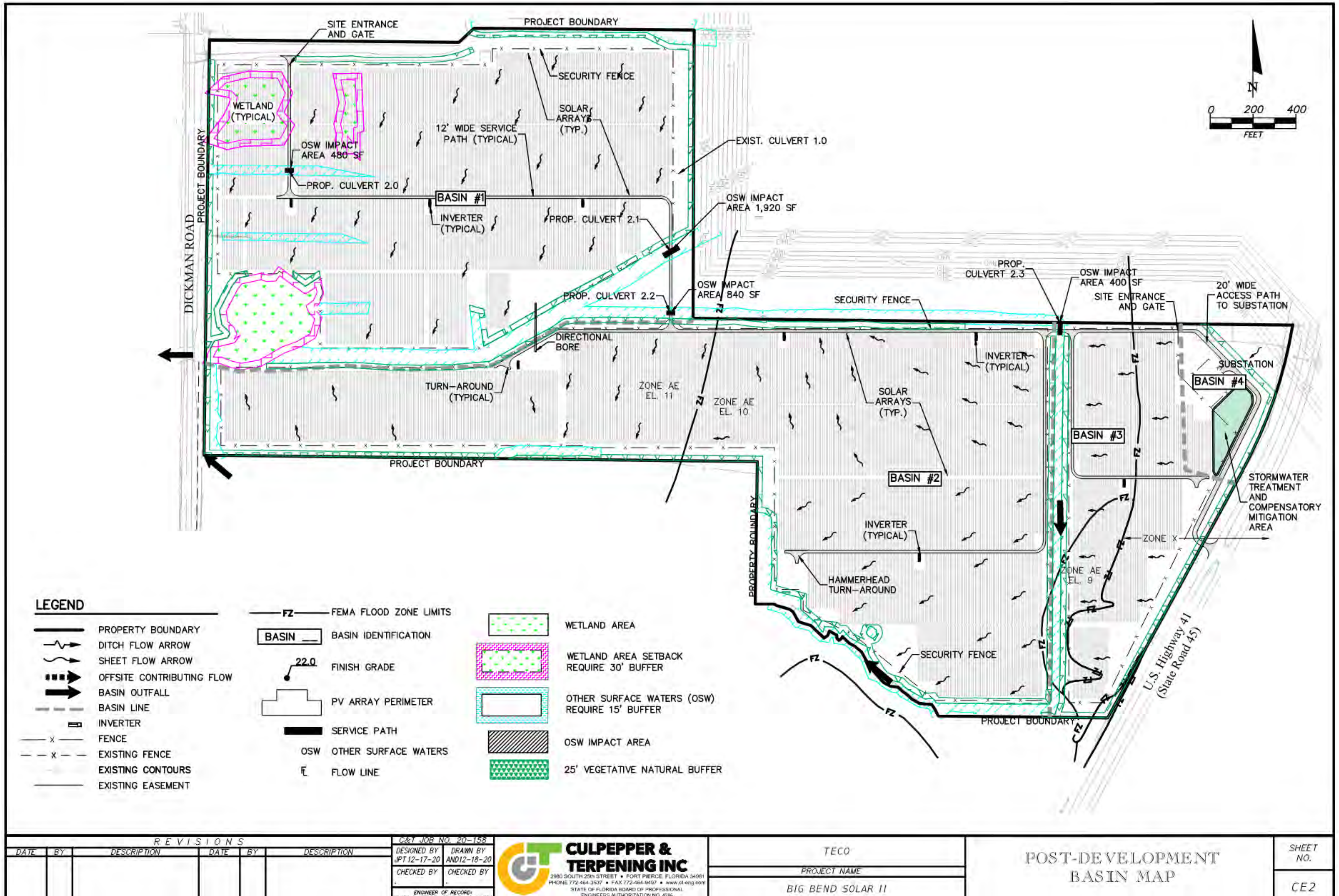


Figure 4 – Post-Development Basin Map



SECTION 2 – DESIGN APPROACH

The Facility will be designed such that no adverse water quantity or quality to the receiving waters will occur as a result of the development of the Facility, as required by the Southwest Florida Water Management District (the "SWFWMD") regulations and under Section 62-330.304 of the Florida Administrate Code. The facility will be designed in accordance with a "Civil Light" approach.

2.1. Civil Light Design Elements

The Civil Light Design Elements include:

- Minimize impacts to existing native vegetation by siting solar arrays within existing agricultural use areas;
- Minimize grading by utilizing existing historical drainage patterns;
- Minimize grading by using sheet flow conveyance at or near existing grade;
- Grassing of site (less semi-impervious areas);
- Minimize the introduction of impervious area by using semi-impervious materials i.e.: (rocked) pathways, (rocked) inverter pads, and a (rocked) substation pad;
- Inverters and PV solar arrays are elevated above the 100 year stage on piles to minimize the earthwork within the floodplain;
- Preservation of pre-development water quantity;
- Preservation of historical offsite drainage;
- In Basin compensation for any proposed fill located within the 100 year floodplain; and
- Vegetated Natural Buffers to provide water quality treatment of added semi-impervious area.

2.2. Design Requirements and Methodology

The design requirements and methodology is as follows:

I. Water Quantity:

- Site will be analyzed on a pre-development vs post-development water quantity basis for all basins.

II. Water Quality:

- The project will be analyzed for water quality for the added impervious areas on a basin by basin approach;
- In accordance with SWFWMD Applicant's Handbook Vol. II, Section 4.0 and per direction from FDEP during the pre-application meeting, the stormwater treatment volume shall be the runoff volume generated from the first 1.00 inch for the added impervious areas;
- The Site will be analyzed on a Basin by Basin water quality analysis; and,
- All semi-impervious areas were considered full impervious for the purpose of the analysis.

III. Floodplain:

- A review of the FEMA Flood Zone Maps will be completed. However, as the site lies within a tidal area, no adverse impacts to the floodplain will occur.

SECTION 3 – STORMWATER ANALYSIS

3.1. Pre-Development

3.1.1. Water Quantity

- All Basins ultimately discharge into Newman Branch which is to Tampa Bay and the tailwater conditions are based on oceanic tidal conditions.

3.1.2. Water Quality

- The Pre-Development site was analyzed in accordance with the Harper Report 2007 Methodology for annual nutrient runoff volumes for both nitrogen and phosphorus;
- The Pre-Development nutrient loadings were determined based on the Harper Report 2007 tabular data; and
- A Pre-Development Land Use of Pasture was utilized for each basin, with a typical runoff concentration of nitrogen and phosphorus of 3.47 mg/l and 0.616 mg/l, respectively.

3.1.3. Floodplain Analysis

- The is located within FEMA Flood Map No. 12057C0492H and 12057C0494H for Hillsborough County, dated August 28, 2008;
- Portions of the site are located within Floodplain having a FEMA Flood Zone designation of AE; and
- A copy of the FEMA Flood Map is included as Figure 2 on page 4.

3.2. Post-Development

3.2.1. Water Quantity

- The existing drainage patterns are preserved in the Post-Development Condition;
- There is no proposed mass grading of the site, therefore the four (4) drainage basins, their hydraulic connectivity and outfalls are all preserved in the Post-Development Condition;
- Restoration of the site to a natural grassland sheet flow condition, which had previously been agricultural pasture in the Pre-Development state results in increased Time of Concentration, decrease in the runoff Curve Number, and increased soil storage.
- All Basins ultimately discharge into Tampa Bay;
- Tailwater conditions are based on oceanic tidal conditions; and,
- Thus, a pre-development versus post-development analysis is not necessary as the post-development conditions will not have a negative impact on the downstream waterbody, the Gulf of Mexico/the Atlantic Ocean.

3.2.2. Water Quality

The site was analyzed for Water Quality Volume based on 1 inch of runoff generated from the added impervious areas.

3.2.2.1. Vegetated Natural Buffers

- The stormwater runoff from the added impervious areas will be treated with Vegetated Natural Buffers (the "VNB");
- Vegetated Natural Buffers (the "VNB") are defined in the Florida Department of Environmental Protection (the "FDEP) and Water Management Districts Environmental Resource Permit Stormwater Quality Applicant's Handbook Design Requirements for Stormwater Treatment Systems in Florida, March 2001 Draft (the "Handbook"), as "Areas with vegetation suitable for nutrient uptake and soil stabilization that are set aside between developed areas and receiving water or wetland for stormwater treatment purposes."
- VNBs are further explained in the Handbook to serve as an effective best management (the "BMP") for the control of nonpoint source pollutants in overland flow systems. The VNB serves as an effective BMP by provided opportunities for the runoff from the developed areas to infiltrate and percolate into and through the soils.
- Additionally stated in the Handbook, VNBs are most commonly utilized as an alternative to swale/berm systems installed between the developed area and the receiving waters".
- Due the extremely low intensity of a Solar Project, the small contributing area of semi-impervious surfaces and large runs of grassed areas between the developed areas and the receiving waters, the Solar Projects lend themselves to be the perfect candidate for the VNB BMP treatment system.
- Furthermore, by restoration of the existing agricultural use to a natural grassland condition will greatly improve the site's ability to effectively utilize the VNB for maximum water quality benefits.
- The design of the Big Bend II Solar Project, incorporates the design criteria for Vegetative Natural Buffers, in accordance with the 2001 FDEP Handbook. The site was designed based on the VNB Design Criteria, and the project includes these VNB design features:
  - A minimum width of 25 feet;
  - Ground slopes less than a 6:1 slope;
  - Infiltration rate is greater than 1" per hour;
  - Length of the VNB, measured perpendicular to the runoff flow direction is at least as long as the contributing areas;
  - Runoff from the contributing area is evenly distributed across the buffer, so that short-circuiting does not occur;
  - The VNBs will be placed in downstream areas within the basins so that runoff may be intercepted by the vegetative buffer prior to discharge.

  - The VNB contains existing or planted vegetation suitable for infiltrating stormwater and soil stabilization; and,
  - The site will be owned and operated by a single responsible entity.

3.2.2.2. Nutrient Analysis

- The Post-Development site was analyzed in accordance with the Harper Report 2007 Methodology for annual nutrient runoff volumes for both nitrogen and phosphorus;
- The Post-Development nutrient loadings were determined based on the Harper Report 2007 tabular data; and
- A Post-Development Land Use of Rangeland was utilized for each basin, with a typical runoff concentration of nitrogen and phosphorus of 1.15 mg/l and 0.055 mg/l, respectively.

3.2.3. Floodplain Analysis

- There are no anticipated negative impacts to Floodplain as a result of the at-grade proposed development. Compensatory mitigation for all areas filled within the floodplain are provided with in the dry detention system provided in Basin 4 adjacent to the Substation.

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SECTION 4 – RESULTS

4.1. Water Quantity

There is no proposed mass grading of the site, therefore the four (4) drainage basins, their hydraulic connectivity and outfalls are all preserved in the Post-Development Condition. Restoration of the site to a natural grassland sheet flow condition, which had previously been agricultural pasture in the Pre-Development state results in increased time of concentration, decrease in the runoff Curve Number, and increased soil storage.

All Basins ultimately discharge into Newman Branch which is tidal to Tampa Bay and tailwater conditions are based on oceanic tidal conditions. Thus, a pre-development versus post-development analysis is not necessary as the post-development conditions will not have a negative impact on the downstream waterbody.

4.2. Water Quality

The Facility has been designed to utilize VNBs as the primary water quality treatment for the volume of runoff generated from 1 inch over the added impervious areas.

4.2.1. Vegetated Natural Buffers

The Vegetated Natural Buffers will be located along the perimeter of the project site, downstream of all of the proposed construction features ofthe site. Further, the VNBs will enhance the water quality of the runoff by promoting natural deposition, infiltration, and absorption;

A summary of the Water Quality Analysis is shown in Table No. 1 "Water Quality Analysis Summary," below and the full Water Quality Analysis can be found in Appendix 2.

Table No. 1		
Water Quality Analysis Summary		
Basin	**Required Water Quality Volume (ac-ft.)**	**Provided Water Quality Volume (ac-ft.)**
1	0.17	5.16
2	0.18	6.74
3	0.08	2.03
4	0.09	0.40
Total	**0.46**	**14.33**

4.2.2. Nutrient Analysis

The existing site is currently utilized for agricultural pasture, which uses a significant amount of fertilizer and pesticides for the production of the crops. The use of fertilizers and pesticides on the existing site leads to a large amount of nutrient runoff from the property.

Currently, the existing site has no treatment methods to limit or treat the high laden, nutrient rich stormwater runoff, which causes a great burden on the downstream and connecting tributaries.

In the Post-Development Condition the existing agricultural pasture will be restored to a natural grassland condition. Therefore, a vast decrease in the nutrient loadings for the site will greatly improve the water quality of the stormwater runoff and directly decrease the nutrient burden on the downstream connecting tributaries.

The site's water will improve by the following parameters:

- Decrease in Nutrient Loadings:
    - Net Reduction in Annual Nitrogen Load of 50.78 kg/yr. (56% reduction)
    - Net Reduction in Annual Phosphorus Load of 14.12 kg/yr. 88% reduction)
- The site is an unmanned facility and will only require minor traffic for minimal maintenance needs;
- Grasses will be planted below the solar panels;
- No fertilizers will be utilized on site; and
- The equipment and solar panels will be naturally cleaned by rainwater.

A summary of the Nutrient Analysis is shown in Table No. 2 "Nutrient Analysis Summary," below and the full Nutrient Analysis can be found in Appendix 2.

Table No. 2

Nutrient Analysis Summary

Basin	CN		Soil Storage (in.)		Nitrogen (kg/yr)		Phosphorus (kg/yr)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	50	40	10.06	14.99	43.73	11.08	7.76	0.53
2	49	41	10.41	14.67	30.16	16.66	5.35	0.80
3	49	41	10.41	14.19	8.96	6.08	1.59	0.29
4	49	48	10.41	10.70	7.31	5.56	1.30	0.27
Average	**49**	**43**	**10.32**	**13.64**	**22.54**	**9.85**	**4.00**	**0.47**
Total	**NA**	**NA**	**NA**	**NA**	**90.16**	**39.39**	**16.01**	**1.88**

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SECTION 5 – CONCLUSIONS

- All requirements of FDEP, SWFWMD and Hillsborough County addressing stormwater attenuation, water quantity and quality have been addressed and satisfied with this report;
- All State, Local and Federal flood protection requirements have been satisfied;
- The facility is located on an approximately 191.31 acre site.
- The site's Post-Development total impervious area is approximately 3% of the 191.31 acre site;
  - Impervious Area:
    - Substation Area = 0.67 acres
    - Proposed Access Path = 4.78 acres
    - Inverter Pads = 0.07 acres
    - Total Impervious = 5.52 acres
  - Historically the site contains 1.27 acres of impervious area. Therefore, there is only a net increase of 4.25 acres of impervious.
- The site is hydrologically divided up into four (4) drainage basins;
- Basins 1-4 ultimately discharges to Newman Branch which is tidal to Tampa Bay;
- Tailwater conditions are based on oceanic tidal conditions. Thus, a pre-development versus post-development analysis is not necessary as the post-development conditions will not have a negative impact on the downstream waterbody;
- The sites water quality volume provided by Vegetated Natural Buffers exceeds the required water quality volume;
  - Total Site Required Water Quality Volume = 0.46 ac-ft.
  - Total Site Provided Water Quality Volume = 14.33 ac-ft.
- The Restoration of the existing agricultural use to a natural grassland condition has greatly decrease the site annual nutrient runoff;
  - Net Reduction in Annual Nitrogen Load of 50.78 kg/yr. (56% reduction)
  - Net Reduction in Annual Phosphorus Load of 14.12 kg/yr. 88% reduction)
- Best Management Practices have been utilized in preparing an Erosion Sediment Control Plan to comply with the NPDES. Further, since the site does not require extensive earthwork, much of the existing pastureland will be maintained during the construction of the site.

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Big Bend II Solar Drainage Calculations

I, James P. Terpening, PE, do certify that the application for Big Bend II Solar has been designed in full compliance with the requirements of the Southwest Florida Water Management District, Hillsborough County and the Florida Department of Environmental Protection. All plans, calculations, reports, or other documents that have been submitted in support of the application bearing my signature and seal have been prepared in full recognition of and compliance with these requirements.

Submitted by:

This item has been digitally signed and sealed by James Parker Terpening, PE on 12/28/2020 using a Digital Signature. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

James P. Terpening, PE Date
Florida Registration #24276
EOR Responsibility – 100% Pages 1-57

Appendix 1 – Pre-Development Analysis

Big Bend II Energy Center Energy Center
Basin 1

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area	=	77.07	acre	
b) Impervious Area	=	1.27	acre	
c) % Impervious	=	2%		98 CN
d) %Pervious	=	98%		49 CN

e) Soil Type:

	Percentage	Num.	Name	Soil Group	Curve Number
1)	7%	5	Basinger, Holopaw & Samsula	A/D	49
2)	3%	30	Myakaa Fine Sand	A/D	49
3)	90%	57	Wabasso Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:

CN = **50**

g) Soil Storage: (S)

S = (1000/CN) - 10 = 10.06 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	7%	5	Basinger, Holopaw & Samsula	A/D	39
2)	3%	30	Myakaa Fine Sand	A/D	39
3)	90%	57	Wabasso Fine Sand	A/D	39

a) Drainage Area	=	77.07 acre	
b) Impervious Area	=	1.34 acre	
c) % Impervious	=	2%	98 CN
d) Pervious Area	=	75.73 acre	39 CN

e) Weighted Calculation:

CN = **40**

f) Soil Storage: (S)

S = (1000/CN) - 10 = 14.99 in

Big Bend II
Solar Energy Center
Pre-Development
Basin 1

Land Use Summary	
Description	**Acres**
Impervious	
Existing Impervious	1.27
Total Impervious	**1.27**
Pervious	
Wetlands	4.93
Open Space	70.87
Total Pervious	**75.80**
Total Area	**77.07**
Basin Area	**77.07**
Percent Impervious	**2%**
Percent Pervious	**98%**

Big Bend II Solar Energy Center
Basin 2

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area	=	82.85	acre		
b) Impervious Area	=	0.00	acre		
c) % Impervious	=	0%		98	CN
d) %Pervious	=	100%		49	CN

e) Soil Type:

	Percentage	Num.	Name	Soil Group	Curve Number
1)	26%	27	Malabar Fine Sand	A/D	49
2)	6%	29	Myakaa Fine Sand	A/D	49
3)	5%	30	Myakaa Fine Sand	A/D	49
4)	63%	57	Wabasso Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:

CN = **49**

g) Soil Storage: (S)

S = (1000/CN) - 10 = 10.41 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	26%	27	Malabar Fine Sand	A/D	39
2)	6%	29	Myakaa Fine Sand	A/D	39
3)	5%	30	Myakaa Fine Sand	A/D	39
4)	63%	57	Wabasso Fine Sand	A/D	39

a) Drainage Area	=	82.85 acre		
b) Impervious Area	=	2.15 acre		
c) % Impervious	=	3%	98	CN
d) Pervious Area	=	80.70 acre	39	CN

e) Weighted Calculation:

CN = **41**

f) Soil Storage: (S)

S = (1000/CN) - 10 = 14.67 in

Big Bend II
Solar Energy Center
Pre-Development
Basin 2

Land Use Summary	
Description	**Acres**
<u>**Impervious**</u>	
Existing Impervious	0.00
Total Impervious	**0.00**
<u>**Pervious**</u>	
Wetlands	2.31
Open Space	80.54
Total Pervious	**82.85**
Total Area	**82.85**
Basin Area	**82.85**
Percent Impervious	**0%**
Percent Pervious	**100%**

Big Bend II Solar Energy Center
Basin 3

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area	=	24.67	acre	
b) Impervious Area	=	0.00	acre	
c) % Impervious	=	0%		98 CN
d) %Pervious	=	100%		49 CN

e) Soil Type:

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:

CN = 49

g) Soil Storage: (S)

S = (1000/CN) - 10 = 10.41 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	39

a) Drainage Area	=	24.67	acre	
b) Impervious Area	=	0.98	acre	
c) % Impervious	=	4%		98 CN
d) Pervious Area	=	23.70	acre	39 CN

e) Weighted Calculation:

CN = 41

f) Soil Storage: (S)

S = (1000/CN) - 10 = 14.19 in

Big Bend II
Solar Energy Center
Pre-Development
Basin 3

Land Use Summary	
Description	**Acres**
<u>Impervious</u>	
Existing Impervious	0.00
Total Impervious	**0.00**
<u>Pervious</u>	
Wetlands	0.74
Open Space	23.93
Total Pervious	**24.67**
Total Area	**24.67**
Basin Area	**24.67**
Percent Impervious	**0%**
Percent Pervious	**100%**

Big Bend II Solar Energy Center
Basin 4

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a)	Drainage Area	=	6.72	acre	
b)	Impervious Area	=	0.00	acre	
c)	% Impervious	=	0%		98 CN
d)	%Pervious	=	100%		49 CN
e)	Soil Type:				

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:

CN = **49**

g) Soil Storage: (S)

S = (1000/CN) - 10 = 10.41 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	39

a)	Drainage Area	=	6.72 acre	
b)	Impervious Area	=	1.06 acre	
c)	% Impervious	=	16%	98 CN
d)	Pervious Area	=	5.66 acre	39 CN
e)	Weighted Calculation:			

CN = **48**

f) Soil Storage: (S)

S = (1000/CN) - 10 = 10.70 in

Big Bend II
Solar Energy Center
Pre-Development
Basin 4

Land Use Summary	
Description	**Acres**
Impervious	
Existing Impervious	0.00
Total Impervious	**0.00**
Pervious	
Wetlands	0.00
Open Space	6.72
Total Pervious	**6.72**
Total Area	**6.72**
Basin Area	**6.72**
Percent Impervious	**0%**
Percent Pervious	**100%**

Appendix 2 – Post-Development Analysis

Big Bend II Energy Center Energy Center
Basin 1

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area	=	77.07	acre	
b) Impervious Area	=	1.27	acre	
c) % Impervious	=	2%		98 CN
d) %Pervious	=	98%		49 CN
e) Soil Type:				

	Percentage	Num.	Name	Soil Group	Curve Number
1)	7%	5	Basinger, Holopaw & Samsula	A/D	49
2)	3%	30	Myakaa Fine Sand	A/D	49
3)	90%	57	Wabasso Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:
CN = **50**

g) Soil Storage: (S)
S = (1000/CN) - 10 = 10.06 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	7%	5	Basinger, Holopaw & Samsula	A/D	39
2)	3%	30	Myakaa Fine Sand	A/D	39
3)	90%	57	Wabasso Fine Sand	A/D	39

a) Drainage Area	=	77.07 acre	
b) Impervious Area	=	1.34 acre	
c) % Impervious	=	2%	98 CN
d) Pervious Area	=	75.73 acre	39 CN

e) Weighted Calculation:
CN = **40**

f) Soil Storage: (S)
S = (1000/CN) - 10 = 14.99 in

Big Bend II
Solar Energy Center
Post-Development
Basin 1

Land Use Summary	
Description	**Acres**
Impervious	
Access Path	1.31
Inverters	0.03
Total Impervious	**1.34**
Pervious	
Wetlands	4.93
Open Space	70.80
Total Pervious	**75.73**
Total Area	**77.07**
Basin Area	**77.07**
Percent Impervious	2%
Percent Pervious	98%

Little Manatee River Solar Energy Center

WATER QUALITY ANALYSIS

Basin 1

1 FDEP/SFWMD Water Quality Criteria:

a. As per an agreement with FDEP, water quality treatment will be provided for the added impervious areas, i.e. pathways, inverter pads and substation yard. Per the SWFWMD AHB V.II Section 3.5 a water quality treatment volume must be provided for one-inch of runoff from the contributing area.

2 Required Water Quality Treatment Volume:

a. Rainfall, P	=	1.00	in							
Rainfall, P	=	0.08	ft							
b. WQ Added Impervious Area	=	Inverters		+	Access Paths	+	Substation	=		Ac.
WQ Added Impervious Area	=	0.03		+	1.31	+	0.00	=	1.34 Ac.	
c. WQ Required Volume Ac-ft)	=	P (ft)		x	WQ Area (ac.)	x	1.00	=		
WQ Required Volume Ac-ft)	=	0.08		x	1.34	x	1.00	=	0.11	
Required WQ Volume	**=**	**0.11**	**ac-ft**							

3 Provided Water Quality Treatment Volume:

a. Soil Storage (ft)	=	(1000/CN) - 10	/	12				
Soil Storage (ft)	=	(1000/41)-10	/	12				
Soil Storage (ft)	=	1.25	ft					
b. Available Soil Storage (ft)	=	Soil Storage (ft)	-	(Rainfall) (ft)				
Available Soil Storage (ft)	=	1.25	-	0.08				
Available Soil Storage (ft)	=	1.17	ft					
c. Vegetated Natural Buffer Area (Ac)	=	WQ Required Volume Ac-ft)	/	Available Soil Storage (ft)				
Vegetated Natural Buffer Area (Ac)	=	0.11	/	1.17				
Vegetated Natural Buffer Area (Ac)	=	0.10	Ac					
d. VNB Required Width (ft)	=	VNB Area*43560	/	Length (ft)				
VNB Required Width (ft)	=	4162	/	7710				
VNB Required Width (ft)	=	1	ft					
e. Provided WQ Volume (ac-ft)	=	Provided VNB Width (ft)	*	Length (ft)	*	Available Soil Storage (ft)	/	43560
Provided WQ Volume (ac-ft)	=	25		7710	*	1.17		
Provided WQ Volume (ac-ft)	**=**	**5.16**	**ac-ft**					

Big Bend II Solar Energy Center
Basin 2

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area = 82.85 acre
b) Impervious Area = 0.00 acre
c) % Impervious = 0% 98 CN
d) %Pervious = 100% 49 CN
e) Soil Type:

	Percentage	Num.	Name	Soil Group	Curve Number
1)	26%	27	Malabar Fine Sand	A/D	49
2)	6%	29	Myakaa Fine Sand	A/D	49
3)	5%	30	Myakaa Fine Sand	A/D	49
4)	63%	57	Wabasso Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:
CN = 49

g) Soil Storage: (S)
S = (1000/CN) - 10 = 10.41 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	26%	27	Malabar Fine Sand	A/D	39
2)	6%	29	Myakaa Fine Sand	A/D	39
3)	5%	30	Myakaa Fine Sand	A/D	39
4)	63%	57	Wabasso Fine Sand	A/D	39

a) Drainage Area = 82.85 acre
b) Impervious Area = 2.15 acre
c) % Impervious = 3% 98 CN
d) Pervious Area = 80.70 acre 39 CN
e) Weighted Calculation:
CN = 41

f) Soil Storage: (S)
S = (1000/CN) - 10 = 14.67 in

Big Bend II
Solar Energy Center
Post-Development
Basin 2

Land Use Summary	
Description	**Acres**
Impervious	
Access Path	2.10
Inverters	0.04
Total Impervious	**2.15**
Pervious	
Wetlands	2.31
Open Space	78.39
Total Pervious	**80.70**
Total Area	**82.85**
Basin Area	**82.85**
Percent Impervious	3%
Percent Pervious	97%

Big Bend II Solar Energy Center

WATER QUALITY ANALYSIS

Basin 2

1 FDEP/SFWMD Water Quality Criteria:

a. As per an agreement with FDEP, water quality treatment will be provided for the added impervious areas, i.e. pathways, inverter pads and substation yard. Per the SWFWMD AHB V.II Section 3.5 a water quality treatment volume must be provided for one-inch of runoff from the contributing area.

2 Required Water Quality Volume:

a. Rainfall, P	=	1.00	in							
Rainfall, P	=	0.08	ft							
b. WQ Added Impervious Area	=	Inverters		+	Access Paths	+	Substation	=		Ac.
WQ Added Impervious Area	=	0.04		-	2.10	-	0.00	=	2.15	Ac.
c. WQ Required Volume	=	P (ft)		x	WQ Area (ac.)	x	1.00	=		ac-ft
WQ Required Volume	=	0.08		x	2.15	x	1.00	=	0.18	ac-ft
Required WQ Volume	**=**	**0.18**	**ac-ft**							

3 Provided Water Quality Treatment Volume:

a.	Soil Storage (ft)	=	(1000/CN) - 10	/	12			
	Soil Storage (ft)	=	(1000/41)-10	/	12			
	Soil Storage (ft)	=	1.22	ft				
b.	Available Soil Storage (ft)	=	Soil Storage (ft)	-	(Rainfall) (ft)			
	Available Soil Storage (ft)	=	1.22	-	0.08			
	Available Soil Storage (ft)	=	1.14	ft				
c.	Vegetated Natural Buffer Area (Ac)	=	WQ Required Volume	/	Available Soil Storage (ft)			
	Vegetated Natural Buffer Area (Ac)	=	0.18	/	1.14			
	Vegetated Natural Buffer Area (Ac)	=	0.16	Ac				
d.	VNB Required Width (ft)	=	VNB Area*43560	/	Length (ft)			
	VNB Required Width (ft)	=	6833	/	10300			
	VNB Required Width (ft)	=	1	ft				
e.	Provided WQ Volume (ac-ft)	=	Provided VNB Width (ft)	*	Length (ft)	*	Available Soil Storage (ft) /	43560
	Provided WQ Volume (ac-ft)	=	25		10300	*	1.14	
	Provided WQ Volume (ac-ft)	**=**	**6.74**	**ac-ft**				

Big Bend II Solar Energy Center
Basin 3

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area = 24.67 acre
b) Impervious Area = 0.00 acre
c) % Impervious = 0% 98 CN
d) %Pervious = 100% 49 CN
e) Soil Type:

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:
CN = 49

g) Soil Storage: (S)
S = (1000/CN) - 10 = 10.41 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	39

a) Drainage Area = 24.67 acre
b) Impervious Area = 0.98 acre
c) % Impervious = 4% 98 CN
d) Pervious Area = 23.70 acre 39 CN
e) Weighted Calculation:
CN = 41

f) Soil Storage: (S)
S = (1000/CN) - 10 = 14.19 in

Big Bend II
Solar Energy Center
Post-Development
Basin 3

Land Use Summary	
Description	**Acres**
Impervious	
Existing Access Path	0.98
Inverters	0.00
Total Impervious	**0.98**
Pervious	
Wetlands	0.73
Open Space	22.97
Total Pervious	**23.70**
Total Area	**24.67**
Basin Area	**24.67**
Percent Impervious	**4%**
Percent Pervious	**96%**

Big Bend II Solar Energy Center

WATER QUALITY ANALYSIS

Basin 3

1 **FDEP/SFWMD Water Quality Criteria:**

a. As per an agreement with FDEP, water quality treatment will be provided for the added impervious areas, i.e. pathways, inverter pads and substation yard. Per the SWFWMD AHB V.II Section 3.5 a water quality treatment volume must be provided for one-inch of runoff from the contributing area.

2 **Required Water Quality Treatment Volume:**

a. Rainfall, P	=	1.00	in							
Rainfall, P	=	0.08	ft							
b. WQ Added Impervious Area	=	Inverters	+	Access Paths	+	Substation	=		Ac.
WQ Added Impervious Area	=	0.00	-	0.98	-	0.00		0.98	Ac.
c. WQ Required Volume	=	P (ft)	x	WQ Area (ac.)	x	1.00	=		ac-ft
WQ Required Volume	=	0.08	x	0.98	x	1.00	=	0.08	ac-ft

Required WQ Volume = 0.08 ac-ft

3 Provided Water Quality Treatment Volume:

a.	Soil Storage (ft)	=	(1000/CN) - 10	/	12			
	Soil Storage (ft)	=	(1000/41)-10	/	12			
	Soil Storage (ft)	=	1.18	ft				
b.	Available Soil Storage (ft)	=	Soil Storage (ft)	-	(Rainfall) (ft)			
	Available Soil Storage (ft)	=	1.18	-	0.08			
	Available Soil Storage (ft)	=	1.10	ft				
c.	Vegetated Natural Buffer Area (Ac)	=	WQ Required Volume	/	Available Soil Storage (ft)			
	Vegetated Natural Buffer Area (Ac)	=	0.08	/	1.10			
	Vegetated Natural Buffer Area (Ac)	=	0.07	Ac				
d.	VNB Required Width (ft)	=	VNB Area*43560	/	Length (ft)			
	VNB Required Width (ft)	=	3223	/	3225			
	VNB Required Width (ft)	=	1	ft				
e.	Provided WQ Volume (ac-ft)	=	Provided VNB Width (ft)	*	Length (ft)	*	Available Soil Storage (ft) /	43560
	Provided WQ Volume (ac-ft)	=	25		3225	*	1.10	
	Provided WQ Volume (ac-ft)	**=**	**2.03**	**ac-ft**				

Big Bend II Solar Energy Center
Basin 4

SCS Curve Number, Soil Storage, & Tc Derivation:

1) Natural Condition:

a) Drainage Area	=	6.72	acre	
b) Impervious Area	=	0.00	acre	
c) % Impervious	=	0%		98 CN
d) %Pervious	=	100%		49 CN
e) Soil Type:				

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	49

Soil Group from USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.
Due to existing onsite drainge improvements the first letter of the Dual Hyrologic Soil Group was utilized.

f) Weighted Calculation:
CN = 49

g) Soil Storage: (S)
S = (1000/CN) - 10 = 10.41 in

2) Post-Development Condition:

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Grassland (good condition)

	Percentage	Num.	Name	Soil Group	Curve Number
1)	100%	27	Malabar Fine Sand	A/D	39

a) Drainage Area	=	6.72	acre	
b) Impervious Area	=	1.06	acre	
c) % Impervious	=	16%		98 CN
d) Pervious Area	=	5.66	acre	39 CN
e) Weighted Calculation:				

CN = 48

f) Soil Storage: (S)
S = (1000/CN) - 10 = 10.70 in

Big Bend II
Solar Energy Center
Post-Development
Basin 4

Land Use Summary	
Description	**Acres**
Impervious	
Access Path	0.39
Inverters	0.00
Substation	0.67
Total Impervious	**1.06**
Pervious	
Wetlands	0.00
Open Space	5.66
Total Pervious	**5.66**
Total Area	**6.72**
Basin Area	**6.72**
Percent Impervious	**16%**
Percent Pervious	**84%**

Big Bend II Solar Energy Center

WATER QUALITY ANALYSIS

Basin 4

1 FDEP/SFWMD Water Quality Criteria:

a. As per an agreement with FDEP, water quality treatment will be provided for the added impervious areas, i.e. pathways, inverter pads and substation yard. Per the SWFWMD AHB V.II Section 3.5 a water quality treatment volume must be provided for one-inch of runoff from the contributing area.

2 Required Water Quality Treatment Volume:

a. Rainfall, P	=	1.00	in
Rainfall, P	=	0.08	ft

b. WQ Added Impervious Area	=	Inverters	+	Access Paths	+	Substation	=		Ac.
WQ Added Impervious Area	=	0.00	-	0.39	-	0.67		1.06	Ac.
c. WQ Required Volume	=	P (ft)	x	WQ Area (ac.)	x	1.00	=		ac-ft
WQ Required Volume	=	0.08	x	1.06	x	1.00	=	0.09	ac-ft

Required WQ Volume = 0.09 ac-ft

3 Provided Water Quality Treatment Volume:

a.	Soil Storage (ft)	=	(1000/CN) - 10	/	12			
	Soil Storage (ft)	=	(1000/48)-10	/	12			
	Soil Storage (ft)	=	0.89	ft				
b.	Available Soil Storage (ft)	=	Soil Storage (ft)	-	(Rainfall) (ft)			
	Available Soil Storage (ft)	=	0.89	-	0.08			
	Available Soil Storage (ft)	=	0.81	ft				
c.	Vegetated Natural Buffer Area (Ac)	=	WQ Required Volume	/	Available Soil Storage (ft)			
	Vegetated Natural Buffer Area (Ac)	=	0.09	/	0.81			
	Vegetated Natural Buffer Area (Ac)	=	0.11	Ac				
d.	VNB Required Width (ft)	=	VNB Area*43560	/	Length (ft)			
	VNB Required Width (ft)	=	4763	/	870			
	VNB Required Width (ft)	=	5	ft				
e.	Provided WQ Volume (ac-ft)	=	Provided VNB Width (ft)	*	Length (ft)	*	Available Soil Storage (ft) /	43560
	Provided WQ Volume (ac-ft)	=	25		870	*	0.81	
	Provided WQ Volume (ac-ft)	**=**	**0.40**	**ac-ft**				

Big Bend II Solar Energy Center
Basin 1

Stormwater Treatment to Meet the Post-Less Than or Equal to Pre-Pollution Reduction Target Goal.

Methodology based on Evaluation of Current Stormwater Design Criteria within the State of Florida Final Report, dated June 2007

Based on Design Example 3 (Page 7-29)
Calculate Pre and Post-Development Conditions

Per the Harper Report Table 4-23, Hillsborough County is located in Meteorological Zone 4

Pre-Development Conditions:

1 **Land Use:** Pasture

Pre development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac.) - OSW (ac.)
Pre development Use Area 72.14 72.14 ac.

Use		Pervious	Impervious	Area (ac)
Pasture		70.87	1.27	72.14
	Totals*	70.87	1.27	**72.14**

**Jurisdictional Areas, Jurisdictional Area buffers/upland preserves, Lakes and Ditches are excluded from the total area since the area will have the same loading characteristics under pre and post conditions.*

2 **Ground Cover/Soil Types:**

	% of Site	Num.	Name	Soil Group	CN
1)	7%	5	Basinger, Holopaw & Samsula	A/D	49
2)	3%	30	Myakaa Fine Sand	A/D	49
3)	90%	57	Wabasso Fine Sand	A/D	49

Soil Group from NRCS/USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.

3 **Impervious Areas:**

Percent Impervious	2%
Percent DCIA	2%

4 **Curve Number:**

Use Area	72.14	acre
Impervious Area	1.27	acre
% NDCIA	0%	
%Pervious	100%	
Impervious CN	98	
Pervious CN	49	
Weighted CN	49	

Annual C Value	0.034

The Mean annual runoff coefficient (C-value) was determined by using the Harper Report Appendix C for a CN of 49 and 2% DCIA

5 **Estimation of Pre-Development Loadings**

A. **Pre-Development Runoff Volume**

Use	Hydraulic Group[1]	NDCIA Curve Number[2]	Annual Runoff Coefficient[3]	Annual Rainfall Depths[4] (in/yr)	Annual Runoff[5] (ac-ft/yr)
Pasture	Varies	49	0.034	50	10.22

1. Soils based on USDA Soil Survey Hillsborough County
2. NDCIA Pre-Development Curve number
3. Appendix C Harper Report
4. Appendix A.3 Harper Report
5. Annual Runoff = (Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (72.14 * 50.00 * 0.034)/12 = 10.22 ac-ft/yr

B. **Total Nitrogen & Phosphorus**

Use	Typical Runoff Concentration[1] (mg/l) Nitrogen	Phosphorus
Pasture	3.47	0.616

1. Harper Report Table 4-17: Typical Runoff Concentration for Pasture

****Nitrogen**

$$\frac{10.22\ \text{ac-ft}}{yr}\cdot\frac{43{,}560\ ft^2}{ac}\cdot\frac{7.48\ gal}{ft^3}\cdot\frac{3.785\ liter}{gal}\cdot\frac{3.47\ \text{mg}}{liter}\cdot\frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{10.22\ \text{ac-ft}}{yr}\cdot\frac{43{,}560\ ft^2}{ac}\cdot\frac{7.48\ gal}{ft^3}\cdot\frac{3.785\ liter}{gal}\cdot\frac{0.62\ \text{mg}}{liter}\cdot\frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
43.73	7.76

Post-Development Conditions:

1 **Land Use:**

Impervious		
Access Path	1.31	acres
Inverters	0.03	acres
Pervious		
Wetlands	4.93	acres
Open Space	70.80	acres
Total	**77.07**	**acres**

Post Development Use Area*	**72.14**

*Post development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac) - OSW (ac.)

Use	Pervious	Impervious	Area (ac)
Undeveloped/Rangeland/Forest	70.80	1.34	72.14
Totals*	**70.80**	**1.34**	**72.14**

**Stormwater management systems are not included in estimates of post-development loadings since incidental mass inputs of pollutants to these systems are included in the estimation of removal effectiveness. Additionally Jurisdictional Areas and Jurisdictional Area buffer/upland preserves are not included since the area has the same loadings under pre and post conditions.*

2 **Ground Cover/Soil Types**

Use	Hydraulic Group
Undeveloped/Rangeland/Forest	Varies

3 **Impervious/DCIA Areas**

Impervious Area	1.34 acre
% DCIA	2%

4 **Calculate composite non-DCIA curve number from TR-55:**

Non DCIA	0.00	98 CN
Pervious Area	70.80	39 CN
Non DCIA CN	**39**	

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Pature, grassland, or range- good condition.

Annual C Value	0.026

The Mean annual runoff coefficient (C-value) was determined by using a CN of 39 and 2% DCIA

5 **Calculate annual runoff volume for developed area:**

Use	Annual Runoff Coefficient[1]	Annual Rainfall Depths[2] (in/yr)	Annual Runoff[3] (ac-ft/yr)
Undeveloped/Rangeland/Forest	0.026	50	7.81

1. Appendix C Harper Report
2. Appendix A.3 Harper Report
3. Annual Runoff = (Use Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (72.14 * 50.00 * 0.026)/12 = 7.81 ac-ft/yr

6 **Calculate post-development loading prior to stormwater treatment**

Use	Typical Runoff Concentration (mg/l)[1] Nitrogen	Phosphorus
Undeveloped/Rangeland/Forest	1.15	0.055

1. Harper Report Table 4-17: Typical Runoff Concentration for Undeveloped/Rangeland/Forest

****Nitrogen**

$$\frac{7.81\text{ ac-ft}}{yr}\cdot\frac{43{,}560\ ft^2}{ac}\cdot\frac{7.48\ gal}{ft^3}\cdot\frac{3.785\ liter}{gal}\cdot\frac{1.15\text{ mg}}{liter}\cdot\frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{7.81\text{ ac-ft}}{yr}\cdot\frac{43{,}560\ ft^2}{ac}\cdot\frac{7.48\ gal}{ft^3}\cdot\frac{3.785\ liter}{gal}\cdot\frac{0.06\text{ mg}}{liter}\cdot\frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
11.08	0.53

7 **Conclusion**

The Post-Development Nutrient Loadings are less than the Pre-Development Nutrient Loadings, therefore no additional treatment is required.

Nutrient Loadings	Pre	Post	Criteria Met
Nitrogen (kg/yr)	43.73	11.08	yes
Phosphorus (kg/yr)	7.76	0.53	yes

Big Bend II Solar Energy Center
Basin 2

Stormwater Treatment to Meet the Post-Less Than or Equal to Pre-Pollution Reduction Target Goal.

Methodology based on Evaluation of Current Stormwater Design Criteria within the State of Florida Final Report, dated June 2007

Based on Design Example 3 (Page 7-29)
Calculate Pre and Post-Development Conditions

Per the Harper Report Table 4-23, Hillsborough County is located in Meteorological Zone 4

Pre-Development Conditions:

1 **Land Use:** Pasture

Pre development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac.) - OSW (ac.)
Pre development Use Area 80.54 80.54 ac.

Use	Pervious	Impervious	Area (ac)
Pasture	80.54	0.00	80.54
Totals*	80.54	0.00	**80.54**

**Jurisdictional Areas, Jurisdictional Area buffers/upland preserves, Lakes and Ditches are excluded from the total area since the area will have the same loading characteristics under pre and post conditions.*

2 **Ground Cover/Soil Types:**

	% of Site	Num.	Name	Soil Group	CN
1)	26%	27	Malabar Fine Sand	A/D	49
2)	6%	29	Myakaa Fine Sand	A/D	49
3)	5%	30	Myakaa Fine Sand	A/D	49
4)	63%	57	Wabasso Fine Sand	A/D	49

Soil Group from NRCS/USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.

3 **Impervious Areas:**

Percent Impervious	0%
Percent DCIA	0%

4 **Curve Number:**

Use Area	80.54	acre
Impervious Area	0.00	acre
% NDCIA	0%	
%Pervious	100%	
Impervious CN	98	
Pervious CN	49	
Weighted CN	49	

Annual C Value	0.021

The Mean annual runoff coefficient (C-value) was determined by using the Harper Report Appendix C for a CN of 49 and 0% DCIA

5 **Estimation of Pre-Development Loadings**

A. **Pre-Development Runoff Volume**

Use	Hydraulic Group[1]	NDCIA Curve Number[2]	Annual Runoff Coefficient[3]	Annual Rainfall Depths[4] (in/yr)	Annual Runoff[5] (ac-ft/yr)
Pasture	Varies	49	0.021	50	7.05

1. Soils based on USDA Soil Survey Hillsborough County
2. NDCIA Pre-Development Curve number
3. Appendix C Harper Report
4. Appendix A.3 Harper Report
5. Annual Runoff = (Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (80.54 * 50.00 * 0.021)/12 = 7.05 ac-ft/yr

B. **Total Nitrogen & Phosphorus**

Use	Typical Runoff Concentration[1] (mg/l) Nitrogen	Phosphorus
Pasture	3.47	0.616

1. Harper Report Table 4-17: Typical Runoff Concentration for Pasture

****Nitrogen**

$$\frac{7.05\text{ ac-ft}}{yr}\cdot\frac{43{,}560\ ft^2}{ac}\cdot\frac{7.48\ gal}{ft^3}\cdot\frac{3.785\ liter}{gal}\cdot\frac{3.47\text{ mg}}{liter}\cdot\frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{7.05\text{ ac-ft}}{yr}\cdot\frac{43{,}560\ ft^2}{ac}\cdot\frac{7.48\ gal}{ft^3}\cdot\frac{3.785\ liter}{gal}\cdot\frac{0.62\text{ mg}}{liter}\cdot\frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
30.16	5.35

Post-Development Conditions:

1 **Land Use:**

Impervious		
Access Path	2.10	acres
Inverters	0.04	acres
Pervious		
Wetlands	2.31	acres
Open Space	78.39	acres
Total	**82.85**	**acres**

Post Development Use Area*	**80.54**

*Post development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac) - OSW (ac.)

Use	Pervious	Impervious	Area (ac)
Undeveloped/Rangeland/Forest	78.39	2.15	80.54
Totals*	**78.39**	**2.15**	**80.54**

**Stormwater management systems are not included in estimates of post-development loadings since incidental mass inputs of pollutants to these systems are included in the estimation of removal effectiveness. Additionally Jurisdictional Areas and Jurisdictional Area buffer/upland preserves are not included since the area has the same loadings under pre and post conditions.*

2 **Ground Cover/Soil Types**

Use	Hydraulic Group
Undeveloped/Rangeland/Forest	Varies

3 **Impervious/DCIA Areas**

Impervious Area	2.15 acre
% DCIA	3%

4 **Calculate composite non-DCIA curve number from TR-55:**

Non DCIA	0.00	98 CN
Pervious Area	78.39	39 CN
Non DCIA CN	**39**	

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Pature, grassland, or range- good condition.

Annual C Value	0.035

The Mean annual runoff coefficient (C-value) was determined by using a CN of 39 and 3% DCIA.

5 **Calculate annual runoff volume for developed area:**

Use	Annual Runoff Coefficient[1]	Annual Rainfall Depths[2] (in/yr)	Annual Runoff[3] (ac-ft/yr)
Undeveloped/Rangeland/Forest	0.035	50	11.75

1. Appendix C Harper Report
2. Appendix A.3 Harper Report
3. Annual Runoff = (Use Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (80.54 * 50.00 * 0.035)/12 = 11.75 ac-ft/yr

6 **Calculate post-development loading prior to stormwater treatment**

Use	Typical Runoff Concentration (mg/l)[1] Nitrogen	Phosphorus
Undeveloped/Rangeland/Forest	1.15	0.055

1. Harper Report Table 4-17: Typical Runoff Concentration for Undeveloped/Rangeland/Forest

****Nitrogen**

$$\frac{11.75\ \text{ac-ft}}{yr} \cdot \frac{43{,}560\ ft^2}{ac} \cdot \frac{7.48\ gal}{ft^3} \cdot \frac{3.785\ liter}{gal} \cdot \frac{1.15\ \text{mg}}{liter} \cdot \frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{11.75\ \text{ac-ft}}{yr} \cdot \frac{43{,}560\ ft^2}{ac} \cdot \frac{7.48\ gal}{ft^3} \cdot \frac{3.785\ liter}{gal} \cdot \frac{0.06\ \text{mg}}{liter} \cdot \frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
16.66	0.80

7 **Conclusion**

The Post-Development Nutrient Loadings are less than the Pre-Development Nutrient Loadings, therefore no additional treatment is required.

Nutrient Loadings	Pre	Post	Criteria Met
Nitrogen (kg/yr)	30.16	16.66	yes
Phosphorus (kg/yr)	5.35	0.80	yes

Big Bend II Solar Energy Center
Basin 3

Stormwater Treatment to Meet the Post-Less Than or Equal to Pre-Pollution Reduction Target Goal.

Methodology based on Evaluation of Current Stormwater Design Criteria within the State of Florida Final Report, dated June 2007

Based on Design Example 3 (Page 7-29)
Calculate Pre and Post-Development Conditions

Per the Harper Report Table 4-23, Hillsborough County is located in Meteorological Zone 4

Pre-Development Conditions:

1 **Land Use:** Pasture

Pre development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac.) - OSW (ac.)
Pre development Use Area #REF! 23.93 ac.

Use	Pervious	Impervious	Area (ac)
Pasture	23.93	0.00	23.93
Totals*	23.93	0.00	**23.93**

**Jurisdictional Areas, Jurisdictional Area buffers/upland preserves, Lakes and Ditches are excluded from the total area since the area will have the same loading characteristics under pre and post conditions.*

2 **Ground Cover/Soil Types:**

	% of Site	Num.	Name	Soil Group	CN
1)	100%	27	Malabar Fine Sand	A/D	49

Soil Group from NRCS/USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.

3 **Impervious Areas:**

Percent Impervious 0%
Percent DCIA 0%

4 **Curve Number:**

Use Area	23.93	acre
Impervious Area	0.00	acre
% NDCIA	0%	
%Pervious	100%	
Impervious CN	98	
Pervious CN	49	
Weighted CN	49	

Annual C Value	0.021

The Mean annual runoff coefficient (C value) was determined by using the Harper Report Appendix C for a CN of 49 and 0% DCIA

5 **Estimation of Pre-Development Loadings**

A. **Pre-Development Runoff Volume**

Use	Hydraulic Group[1]	NDCIA Curve Number[2]	Annual Runoff Coefficient[3]	Annual Rainfall Depths[4] (in/yr)	Annual Runoff[5] (ac-ft/yr)
Pasture	Varies	49	0.021	50	2.09

1. Soils based on USDA Soil Survey Hillsborough County
2. NDCIA Pre-Development Curve number
3. Appendix C Harper Report
4. Appendix A.3 Harper Report
5. Annual Runoff = (Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (23.93 * 50.00 * 0.021)/12 = 2.09 ac-ft/yr

B. **Total Nitrogen & Phosphorus**

Use	Typical Runoff Concentration[1] (mg/l) Nitrogen	Phosphorus
Pasture	3.47	0.616

1. Harper Report Table 4-17: Typical Runoff Concentration for Pasture

****Nitrogen**

$$\frac{2.09\ \text{ac-ft}}{yr} \times \frac{43{,}560\ ft^2}{ac} \times \frac{7.48\ gal}{ft^3} \times \frac{3.785\ liter}{gal} \times \frac{3.47\ \text{mg}}{liter} \times \frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{2.09\ \text{ac-ft}}{yr} \times \frac{43{,}560\ ft^2}{ac} \times \frac{7.48\ gal}{ft^3} \times \frac{3.785\ liter}{gal} \times \frac{0.62\ \text{mg}}{liter} \times \frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
8.96	1.59

Post-Development Conditions:

1 **Land Use:**

Impervious		
Existing Access Path	0.98	acres
Inverters	0.00	acres
Pervious		
Wetlands	0.73	acres
Open Space	22.97	acres
Total	**24.67**	**acres**

Post Development Use Area*	**23.94**

*Post development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac) - OSW (ac.)

Use	Pervious	Impervious	Area (ac)
Undeveloped/Rangeland/Forest	22.97	0.98	23.94
Totals*	**22.97**	**0.98**	**23.94**

**Stormwater management systems are not included in estimates of post-development loadings since incidental mass inputs of pollutants to these systems are included in the estimation of removal effectiveness. Additionally Jurisdictional Areas and Jurisdictional Area buffer/upland preserves are not included since the area has the same loadings under pre and post conditions.*

2 **Ground Cover/Soil Types**

Use	Hydraulic Group
Undeveloped/Rangeland/Forest	Varies

3 **Impervious/DCIA Areas**

Impervious Area	0.98 acre
% DCIA	4%

4 **Calculate composite non-DCIA curve number from TR-55:**

Non DCIA	0.00	98 CN
Pervious Area	22.97	39 CN
Non DCIA CN	**39**	

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Pature, grassland, or range- good condition.

Annual C Value	0.043

The Mean annual runoff coefficient (C-value) was determined by using a CN of 39 and 4% DCIA.

5 **Calculate annual runoff volume for developed area:**

Use	Annual Runoff Coefficient[1]	Annual Rainfall Depths[2] (in/yr)	Annual Runoff[3] (ac-ft/yr)
Undeveloped/Rangeland/Forest	0.043	50	4.29

1. Appendix C Harper Report
2. Appendix A.3 Harper Report
3. Annual Runoff = (Use Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (23.94 * 50.00 * 0.043)/12 = 4.29 ac-ft/yr

6 **Calculate post-development loading prior to stormwater treatment**

Use	Typical Runoff Concentration (mg/l)[1] Nitrogen	Phosphorus
Undeveloped/Rangeland/Forest	1.15	0.055

1. Harper Report Table 4-17: Typical Runoff Concentration for Undeveloped/Rangeland/Forest

****Nitrogen**

$$\frac{4.29\ \text{ac-ft}}{yr} \times \frac{43{,}560\ ft^2}{ac} \times \frac{7.48\ gal}{ft^3} \times \frac{3.785\ liter}{gal} \times \frac{1.15\ mg}{liter} \times \frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{4.29\ \text{ac-ft}}{yr} \times \frac{43{,}560\ ft^2}{ac} \times \frac{7.48\ gal}{ft^3} \times \frac{3.785\ liter}{gal} \times \frac{0.06\ mg}{liter} \times \frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
6.08	0.29

7 **Conclusion**

The Post-Development Nutrient Loadings are less than the Pre-Development Nutrient Loadings, therefore no additional treatment is required.

Nutrient Loadings	Pre	Post	Criteria Met
Nitrogen (kg/yr)	8.96	6.08	yes
Phosphorus (kg/yr)	1.59	0.29	yes

Big Bend II Solar Energy Center
Basin 4

Stormwater Treatment to Meet the Post-Less Than or Equal to Pre-Pollution Reduction Target Goal.

Methodology based on Evaluation of Current Stormwater Design Criteria within the State of Florida Final Report, dated June 2007

Based on Design Example 3 (Page 7-29)
Calculate Pre and Post-Development Conditions

Per the Harper Report Table 4-23, Hillsborough County is located in Meteorological Zone 4

Pre-Development Conditions:

1 **Land Use:** Pasture

Pre development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac.) - OSW (ac.)
Pre development Use Area 6.72 6.72 ac.

Use	Pervious	Impervious	Area (ac)
Pasture	6.72	0.00	6.72
Totals*	6.72	0.00	**6.72**

**Jurisdictional Areas, Jurisdictional Area buffers/upland preserves, Lakes and Ditches are excluded from the total area since the area will have the same loading characteristics under pre and post conditions.*

2 **Ground Cover/Soil Types:**

	% of Site	Num.	Name	Soil Group	CN
1)	100%	27	Malabar Fine Sand	A/D	49

Soil Group from NRCS/USDA Hillsborough County Soil Survey
Curve numbers from TR 55 Table 2-2b Cultivated Agricultural Lands - Pasture, grassland, or range - continuous forage for grazing - Fair Condition.

3 **Impervious Areas:**

Percent Impervious	0%
Percent DCIA	0%

4 **Curve Number:**

Use Area	6.72	acre
Impervious Area	0.00	acre
% NDCIA	0%	
%Pervious	100%	
Impervious CN	98	
Pervious CN	49	
Weighted CN	49	

Annual C Value	0.061

The Mean annual runoff coefficient (C value) was determined by using the Harper Report Appendix C for a CN of 49 and 0% DCIA

5 Estimation of Pre-Development Loadings

A. Pre-Development Runoff Volume

Use	Hydraulic Group[1]	NDCIA Curve Number[2]	Annual Runoff Coefficient[3]	Annual Rainfall Depths[4] (in/yr)	Annual Runoff[5] (ac-ft/yr)
Pasture	Varies	49	0.061	50	1.71

1. Soils based on USDA Soil Survey Hillsborough County
2. NDCIA Pre-Development Curve number
3. Appendix C Harper Report
4. Appendix A.3 Harper Report
5. Annual Runoff = (Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (6.72 * 50.00 * 0.061)/12 = 1.71 ac-ft/yr

B. Total Nitrogen & Phosphorus

Use	Typical Runoff Concentration[1] (mg/l) Nitrogen	Phosphorus
Pasture	3.47	0.616

1. Harper Report Table 4-17: Typical Runoff Concentration for Pasture

****Nitrogen**

$$\frac{1.71\ \text{ac-ft}}{yr}\ \frac{43{,}560\ ft^2}{ac}\ \frac{7.48\ gal}{ft^3}\ \frac{3.785\ liter}{gal}\ \frac{3.47\ \text{mg}}{liter}\ \frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{1.71\ \text{ac-ft}}{yr}\ \frac{43{,}560\ ft^2}{ac}\ \frac{7.48\ gal}{ft^3}\ \frac{3.785\ liter}{gal}\ \frac{0.62\ \text{mg}}{liter}\ \frac{1\ kg}{10^6\ mg}$$

Annual Load (kg/yr)**	
Nitrogen	Phosphorus
7.31	1.30

Post-Development Conditions:

1 **Land Use:**

Impervious

Access Path	0.39	acres
Inverters	0.00	acres
Substation	0.67	acres

Pervious

Pervious	5.66	acres
Wetlands	0.00	acres
Total	**6.72**	**acres**

Post Development Use Area*	**6.72**

*Post development Use Area = Total Area (ac.) - Wetlands (ac.) - Wetland Uplands (ac) - OSW (ac.)

Use	Pervious	Impervious	Area (ac)
Undeveloped/Rangeland/Forest	5.66	1.06	6.72
Totals*	**5.66**	**1.06**	**6.72**

**Stormwater management systems are not included in estimates of post-development loadings since incidental mass inputs of pollutants to these systems are included in the estimation of removal effectiveness. Additionally Jurisdictional Areas and Jurisdictional Area buffer/upland preserves are not included since the area has the same loadings under pre and post conditions.*

2 **Ground Cover/Soil Types**

Use	Hydraulic Group
Undeveloped/Rangeland/Forest	Varies

3 **Impervious/DCIA Areas**

Impervious Area	1.06 acre
% DCIA	10%

4 **Calculate composite non-DCIA curve number from TR-55:**

Non DCIA	0.00	98 CN
Pervious Area	5.66	39 CN
Non DCIA CN	**39**	

Pervious Curve numbers from TR 55 Table 2-2c Other Agricultural Lands - Pature, grassland, or range- good condition.

Annual C Value	0.14

The Mean annual runoff coefficient (C-value) was determined by using a CN of 39 and 16% DCIA

5 **Calculate annual runoff volume for developed area:**

Use	Annual Runoff Coefficient[1]	Annual Rainfall Depths[2] (in/yr)	Annual Runoff[3] (ac-ft/yr)
Undeveloped/Rangeland/Forest	0.14	50	3.92

1. Appendix C Harper Report
2. Appendix A.3 Harper Report
3. Annual Runoff = (Use Area x Rainfall Depth x Annual Runoff Coeff.)/12
   Annual Runoff = (6.72 * 50.00 * 0.140)/12 = 3.92 ac-ft/yr

6 **Calculate post-development loading prior to stormwater treatment**

Use	Typical Runoff Concentration (mg/l)[1] Nitrogen	Phosphorus
Undeveloped/Rangeland/Forest	1.15	0.055

1. Harper Report Table 4-17: Typical Runoff Concentration for Undeveloped/Rangeland/Forest

****Nitrogen**

$$\frac{3.92 \text{ ac-ft}}{yr} \cdot \frac{43{,}560\ ft^2}{ac} \cdot \frac{7.48\ gal}{ft^3} \cdot \frac{3.785\ liter}{gal} \cdot \frac{1.15\ \text{mg}}{liter} \cdot \frac{1\ kg}{10^6\ mg}$$

****Phosphorus**

$$\frac{3.92 \text{ ac-ft}}{yr} \cdot \frac{43{,}560\ ft^2}{ac} \cdot \frac{7.48\ gal}{ft^3} \cdot \frac{3.785\ liter}{gal} \cdot \frac{0.06\ \text{mg}}{liter} \cdot \frac{1\ kg}{10^6\ mg}$$

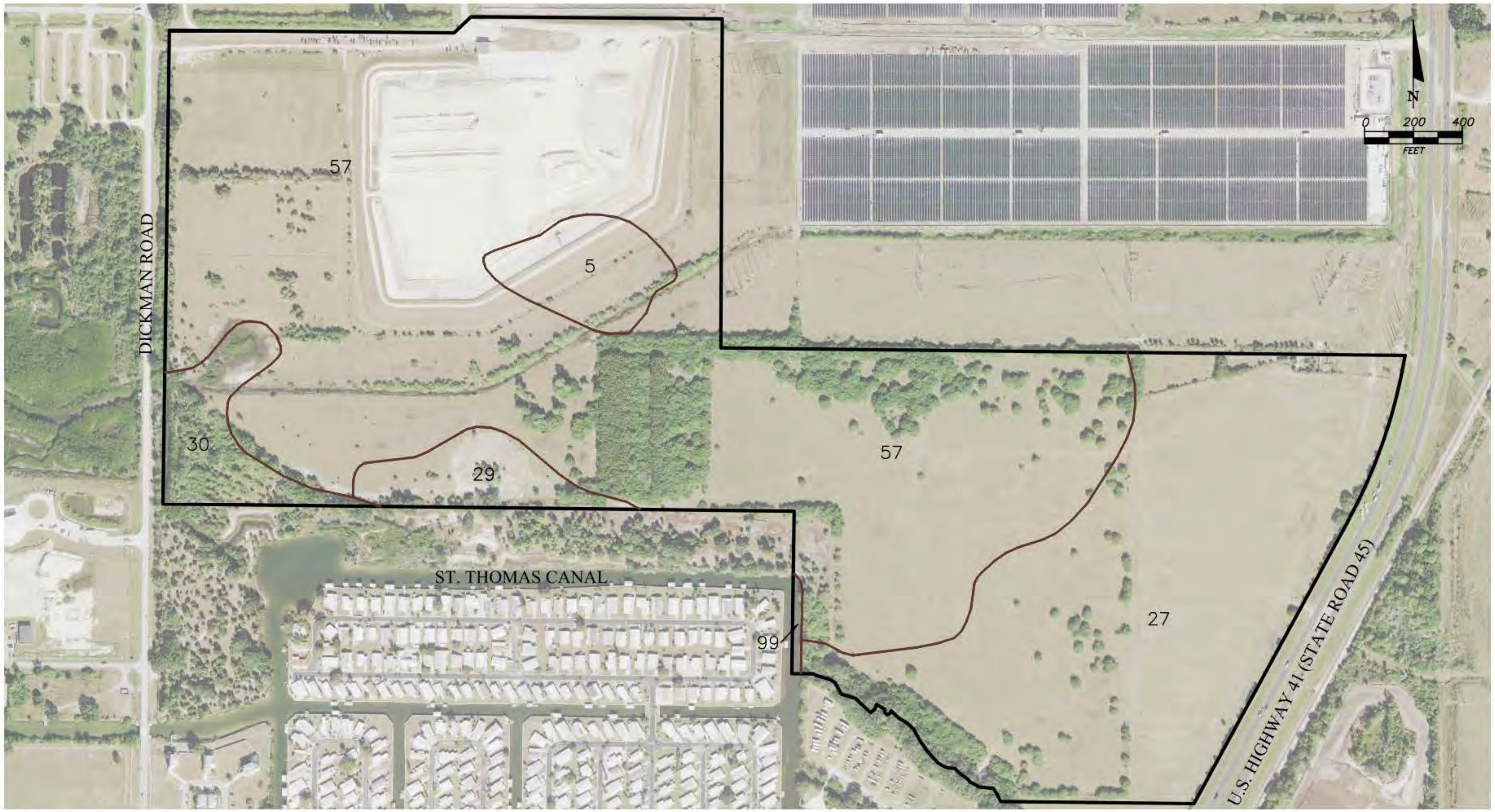
Annual Load (kg/yr)**	
Nitrogen	Phosphorus
5.56	0.27

7 **Conclusion**

The Post-Development Nutrient Loadings are less than the Pre-Development Nutrient Loadings, therefore no additional treatment is required.

Nutrient Loadings	Pre	Post	Criteria Met
Nitrogen (kg/yr)	7.31	5.56	yes
Phosphorus (kg/yr)	1.30	0.27	yes

Appendix 3 – Soils Exhibit



LEGEND

- PROPERTY BOUNDARY
- SOIL BOUNDARY LINE
- 57 SOIL NUMBER

811 Know what's below. Call before you dig.

DATUM:
ELEVATIONS SHOWN ON THE PLANS ARE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988).

USDA SOILS CLASSIFICATION:

SOIL NUMBER	SOIL TYPE
5	BASINGER, HOLOPAW & SAMSULA SOILS, DEPRESSIONAL
27	MALABAR FINE SAND, 0-2% SLOPES
29	MYAKKA FINE SAND, 0-2% SLOPES
30	MYAKKA FINE SAND, FREQUENTLY FLOODED
57	WABASSO FINE SAND, 0-2% SLOPES
99	WATER

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

C&T JOB NO. 20-158
DESIGNED BY JPT 12-17-20 | DRAWN BY AND 12-18-20
CHECKED BY | CHECKED BY
ENGINEER OF RECORD: JAMES P. TERPENING, P.E. NO. 24276

CULPEPPER & TERPENING INC
2980 SOUTH 25th STREET • FORT PIERCE, FLORIDA 34981
PHONE 772-464-3537 • FAX 772-464-9497 • www.ct-eng.com
STATE OF FLORIDA BOARD OF PROFESSIONAL ENGINEERS AUTHORIZATION NO. 4286

TECO
PROJECT NAME
BIG BEND SOLAR II

SOILS MAP

SHEET NO.
1 OF 1

TAB 8

APPENDIX F

CULTURAL RESOURCES ASSESSMENT SURVEY REPORTS AND PRIOR SHPO RESPONSE

JANUS MAIN OFFICE
1107 N. Ward Street
Tampa, FL 33607

JANUS RESEARCH
EST. 1979

Tel. 813.636.8200
Fax 813.636.8212
janus@janus-research.com

July 27, 2017

Timothy A. Parsons, Ph.D.
Director and State Historic Preservation Officer
Florida Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Re: Cultural Resource Assessment Survey for the ABH Property in Hillsborough County, Florida

Attention: Mr. Jason Aldridge, Compliance Review Supervisor, and Deputy State Historic Preservation Officer

Dear Mr. Aldridge:

Please find enclosed the Cultural Resource Assessment Survey (CRAS) report for the ABH Property in Hillsborough County. The CRAS was conducted by Janus Research at the request of Environmental Consulting & Technology, Inc. (ECT). Enclosed you will find the following documents:

- One unbound copy of the CRAS report;
- One CD containing a .pdf of the CRAS report, an electronic version of the survey log and site file form, selected photo, and GIS shapefiles of the survey area;
- One unbound copy of the site file form, and
- One unbound survey log.

This CRAS was conducted as part of due diligence and in anticipation of a future Environmental Resources Permit (ERP) and/or a U.S. Corps of Engineers permit that will require compliance with either Section 106 of the *National Historic Preservation Act (NHPA) of 1966* (Public Law 89-665, as amended), as implemented by 36 CFR 800 -- Protection of Historic Properties (incorporating amendments effective August 5, 2004); or revised Chapter 267, Florida Statutes (F.S.); or both. The objective was to identify cultural resources located within the project area of potential effect and to assess their significance in terms of eligibility for listing in the *National Register of Historic Places* (National Register) according to the criteria set forth in 36 CFR Section 60.4.

No previously recorded or newly recorded archaeological sites were identified within the archaeological APE. An unrecorded segment of a previously recorded historic linear resources, US 41/Tamiami Trail (8HI12129), was identified within the historic resources APE. This newly identified segment is considered National Register–ineligible due to the loss of its historic physical integrity.

At this time, we respectfully request your concurrence with the determinations of eligibility within this letter and the attached document. If you have questions regarding the subject project, please feel free to contact me at 813-636-8200 or kate_hoffman@janus-research.com.

Sincerely,

Kathleen S. Hoffman
Vice President

Cc: Anthony Arcuri, Environmental Consulting &Technology, Inc.

CULTURAL RESOURCES ASSESSMENT SURVEY OF THE ABH PROJECT HILLSBOROUGH COUNTY, FLORIDA

Prepared for:

Environmental Consulting and Technology, Inc.
1408 N. Westshore Boulevard, Suite 115
Tampa, Florida 33607

Prepared by:

Janus Research
1107 N. Ward Street
Tampa, Florida 33607

July 2017

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INTRODUCTION

A cultural resource assessment survey (CRAS) of the ABH Project in Hillsborough County, Florida was conducted for Environmental Consulting & Technology, Inc. (ECT) In June and July of 2017. The objective of this survey was to identify cultural resources located within and adjacent to the project area and to assess their significance in terms of eligibility for listing in the *National Register of Historic Places* (National Register) according to the criteria set forth in 36 CFR Section 60.4. The project area is located in Apollo Beach in unincorporated Hillsborough County (Figure 1). The ABH project area covers approximately 96.9 acres in Sections 15 and 22 of Township 31, South, Range 19 East on the Gibsonton (1956 Photorevised [PR] 1987) United States Geological Survey (USGS) quadrangle map.

This cultural resource assessment survey was conducted as part of due diligence and in anticipation of a future Environmental Resources Permit (ERP) and/or a U.S. Corps of Engineers permit that will require compliance with either Section 106 of the *National Historic Preservation Act (NHPA) of 1966* (Public Law 89-665, as amended), as implemented by 36 CFR 800 -- *Protection of Historic Properties* (incorporating amendments effective August 5, 2004); the revised Chapter 267, *Florida Statutes (F.S.);* or both.

No previously recorded or newly recorded archaeological sites were identified within the project APE. One historic linear resource, US 41/Tamiami Trail (8HI12129), is located within the historic resources APE and is considered National Register–ineligible.

AREA OF POTENTIAL EFFECT

According to 36 CFR 800.16(d), the APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking as well as its geographical setting, and must include measures to identify and evaluate both archaeological and historical resources. The project APE, therefore, considers the improvements that will be implemented as part of the proposed project and the extent of potential ground disturbance as well as the setting and character of the project area. The survey for archaeological sites typically focuses on identifying and evaluating cultural resources within the geographic limits of the proposed action and its associated ground disturbing activities. The identification and evaluation of structural resources generally includes an examination of the project area as well as adjacent areas to consider visual and auditory impacts.

The ABH Property is located within an area of Hillsborough County consisting predominantly of undeveloped land with residential areas in the environs. As currently proposed, the archaeological APE for the ABH project consists of the footprint of the 96.9 acres as shown on Figure 2. The historic APE includes this acreage as well as a larger area to the north, south, and west in order to accommodate any future improvements. The historic resources APE includes adjacent parcels up to a distance of 150 feet from the edge of the project area to allow for the consideration of potential visual impacts (Figure 2).

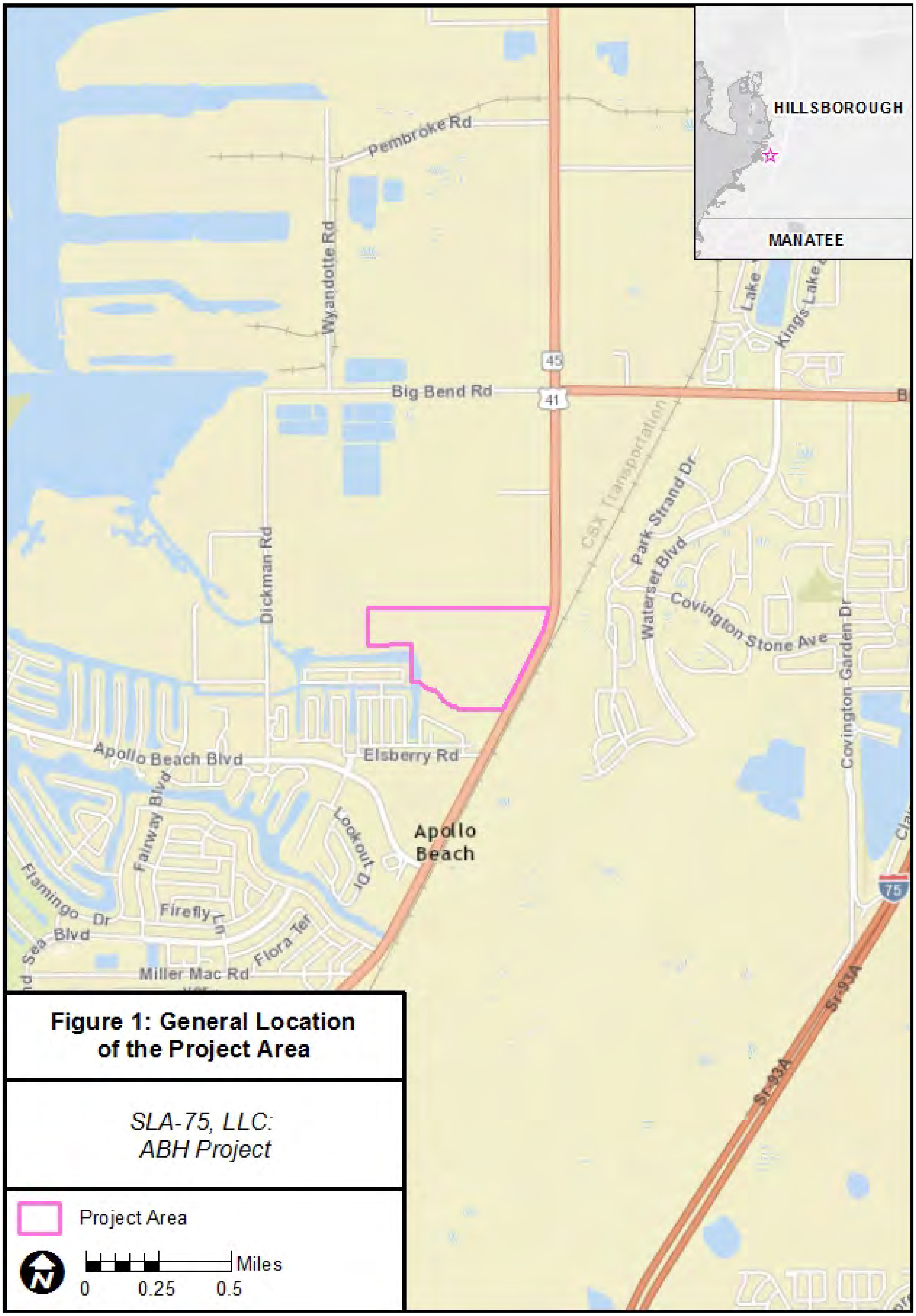

Figure 1: General Location of the Project Area

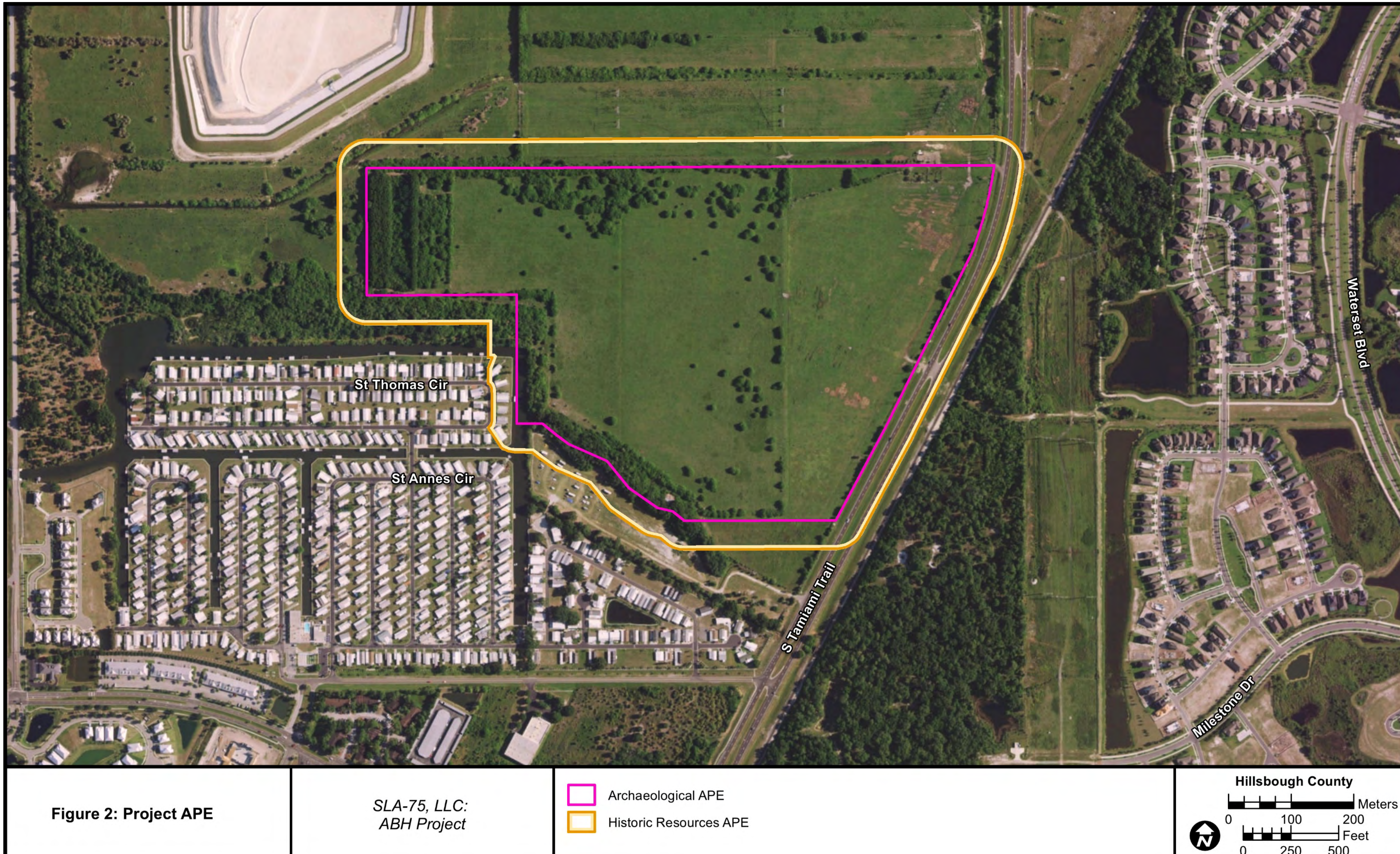

Figure 2: Project APE

SLA-75, LLC: ABH Project

ENVIRONMENTAL SETTING

Environmental and ecological factors had a direct influence on the choice of areas used and occupied by precontact and historic period populations. These factors change over time and are used to reconstruct past conditions that influenced early human occupation of the project area.

The project area is located in extreme western Hillsborough County within the Gulf Coast Lowlands physiographic region of the Atlantic Coastal Plain (White 1970: Plate 1-B; Rupert 1991:1). The Gulf Coastal Lowlands extend along the Gulf Coast of Florida from the western edge of the panhandle south to the Caloosahatchee River and west of a series of upland ridges. They contain a limestone substrate and tend to be low, flat or gradually sloping toward the coast, and often swampy (Rupert 1991:1).

Some topographic relief in this region is supplied by relict sand dunes of late Pleistocene age. Elevations range from sea level to a maximum of 60 feet above mean sea level (AMSL) within Dixie County (Rupert 1991:2). Elevations within the project area range from five to ten feet above mean sea level and slope down to the west toward Tampa Bay. The Alafia River lies four miles north of the project area, while the Little Manatee River is five miles to the southwest.

Major permanent streams and surface drainage systems in Hillsborough County include the Withlacoochee River, North Prong Alafia River, and the Peace River. The Withlacoochee River drains the northern part of the county, the North Prong Alafia River drains the western part, and the Peace River drains the central part to the Highlands County line. The Kissimmee River drains a large area in the southeastern part of the county. The many branches and creeks are interconnected to complete the drainage of the county.

The surface lithology of Hillsborough County is composed primarily of undifferentiated deposits of sand and clay of Pleistocene and Recent age, which are underlain by Miocene age limestones of the Tampa/St. Marks Formation, and by the Suwannee Limestone of Oligocene age (Knapp 1980). Limestone is present at or near the ground surface around the shore of Tampa Bay and along the central and lower portions of the Hillsborough River (Duerling and MacGill 1981; Knapp 1980). Precontact peoples exploited exposures of silicified limestone, or chert, as raw material for stone tool manufacture (Upchurch et al. 1982).

In Hillsborough County, three major rivers drain the uplands and discharge into Tampa Bay: the Hillsborough River, the Alafia River, and the Little Manatee River. Combined, these three rivers drain more than 1,300 square miles. The surface drainage is toward Old Tampa Bay, Hillsborough Bay, and Tampa Bay.

There is a relatively high degree of micro-environmental diversity within the region, particularly in the major river basins. This diversity would have provided a variety of plant and animal resources suitable for exploitation by precontact and early historic inhabitants. Vegetation in the project area is fairly homogeneous and consists primarily of unimproved pasture (79 acres, or 82 percent), with scattered pockets of Brazilian Pepper and isolated occurrences of palm and pine.

Pasture and flatwoods communities are generally characterized as having a relatively low ecological diversity that offered little in the way of subsistence resources to precontact hunters and gatherers (e.g. Milanich and Fairbanks 1980:17; Larson 1980:56). In the ABH project area, ditches are present that were dug to improved drainage, and a short segment of Newman Branch, with associated hardwood hammock, is present along the southwestern edge of the tract.

Hardwood hammocks along the springs, streams, creeks, and rivers, would have provided excellent forage for deer, which, in turn, would have attracted precontact hunters. A variety of edible plants could have been collected including persimmon, saw palmetto berries, oak and hickory nuts, pigeon plum, beautyberry, wild grapes, dahoon holly, arrowroot, and wild coffee. Ponds and marshes would have contained a number of edible aquatic plants including arrowroot, arrowhead, duck potato, and various rushes.

Physical Environment of the Project Area

A review of the GLO historic plat maps (Florida Department of Environmental Protection [FDEP] 1848) and surveyors' field notes (FDEP 1847) was conducted to examine past environmental conditions within the vicinity of the project area. The project area is located in an area illustrated on the historic plat map and described in the surveyors' notes as 3rd rate pine. An unnamed creek is located along the southwestern border of the project area. No cultural features or anomalies (roads, mounds, etc.) were noted on the property by the surveyor.

The drainage characteristics of soil is considered in the formulation of site location predictive models. *The Soil Survey of Hillsborough County* (United States Department of Agriculture [USDA] 1989) identified no soils or vegetation typically associated with high archaeological probability. The soil survey noted three soil types, all of which are poorly drained. The vegetation associated with these soils are summarized below.

Wabasso fine sand supports longleaf pine and slash pine, with an understory of lopsided indiagrass, gallberry, saw palmetto, pineland threeawn, and wax myrtle (USDA 1989:48–49). Malabar fine sand is located in low-lying sloughs and shallow depressions on the flatwoods and supports cabbage palm, longleaf pine, and slash pine, with an understory of broomsedge, bluestem, inkberry, maidencane, saw palmetto, and wax myrtle (USDA 1989:31–32). A very small portion of the project area contains Myakka fine sand. Vegetation consists of longleaf pine and slash pine, with an understory of gallberry, running oak, saw palmetto, pineland threeawn, and waxmyrtle (USDA 1989:32–33).

A review of historic aerial photographs from 1957 and 1968 (University of Florida, George A. Smathers Libraries 2017) was conducted to examine land use through time. In 1957 the project area and surrounding lands were undeveloped; the project area does show drainage ditches throughout the property, and US 41 is evident to the east. By 1968 the same ditches are also evident. Construction of the Apollo Beach development, which is also seen on the 1968 aerial, is shown to the south and west of the project area, and construction of the Big Bend Power Station was underway. Today, the project areas remains undeveloped and comprises pasture land and a series of drainage ditches.

PRECONTACT OVERVIEW

People have inhabited Florida for at least 14,000 years. The earliest cultural periods are pan-Florida in extent, while later cultures exhibited unique regional traits. The following discussion of the precontact time period is included in order to provide a framework within which the local archaeological record can be understood.

Paleoindian Period (12,000–7500 BC)

The earliest period of precontact cultural development dates from the time people first arrived in Florida. The greatest density of known Paleoindian sites is associated with the rivers of northern and north-central Florida where distinctive lanceolate projectile points and bone pins have been found in abundance in and along the Santa Fe, Silver, and Oklawaha Rivers (Dunbar and Waller 1983). The majority of these have been found at shallow fords and river crossings where the Native Americans presumably ambushed Pleistocene mammals.

The prevailing view of the Paleoindian culture, a view based on the uniformity of the known tool assemblage and the small size of most of the known sites, is that of a nomadic hunting and gathering existence, in which now-extinct Pleistocene megafauna were exploited. Settlement patterns were restricted by availability of fresh water and access to high-quality stone from which the specialized Paleoindian tool assemblages were made.

Archaic Period (7500–500 BC)

The Archaic period of cultural development was characterized by a shift in adaptive strategies stimulated by the onset of the Holocene and the establishment of increasingly modern climate and biota. It is generally believed to have begun in Florida around 7500 BC (Milanich 1994:63). This period is further divided into three sequential periods: the Early Archaic (7500–5000 BC), the Middle Archaic (5000–3000 BC), and the Late Archaic (3000–500 BC). The Late Archaic is subdivided into the Preceramic Late Archaic (3000–2000 BC) and the Orange Period (2000–500 BC).

Early Archaic (7500–5000 BC)

Cultural changes began after about 8000 BC in the late Paleoindian times with the onset of less arid conditions, which correlate with changes in projectile-point types, specifically a transition from lanceolate to stemmed varieties. Beginning about 7500 BC, Paleoindian points and knives were replaced by a variety of stemmed tools, such as the Kirk, Wacissa, Hamilton, and Arredondo types (Milanich 1994:63).

Kirk points and other Early Archaic diagnostic tools are often found at sites with Paleoindian components, suggesting that Early Archaic peoples and Paleoindians shared similar lifeways (Daniel and Wisenbaker 1987:33–34). However, it appears that the distribution of Early Archaic artifacts is wider than that of Paleoindian materials. Sites having both Paleoindian and Early Archaic components have been largely restricted to natural springs and the extensive perched water sources of northern Florida.

With the wetter conditions that began about 8000 BC and the extinction of some of the Pleistocene animal species that helped to sustain earlier populations, Paleoindian subsistence strategies were no longer efficient for gathering resources from a very different Florida environment. As environmental conditions changed, surface water levels throughout the state increased and new locales became suitable for occupation and resource extraction. Early Archaic peoples might be viewed as a population changing from the nomadic Paleoindian subsistence pattern to the more sedentary coastal- and riverine-associated subsistence strategies of the Middle Archaic period.

Middle Archaic Period (5000–3000 BC)
Throughout the Middle Archaic, environmental and climatic conditions would become progressively more like modern conditions, which appeared by the end of the period, circa 3000 BC. During this time, rainfall increased, surface water became much less restricted and, as a result, vegetation patterns changed. The Middle Archaic period is characterized by increasing population and a gradual shift toward shellfish, fish, and other food resources from freshwater and coastal wetlands as a significant part of their subsistence strategy (Watts and Hansen 1988:310; Milanich 1994:75–84). Pollen evidence from Florida and south-central Georgia indicates that after about 4000 BC, a gradual change in forest cover took place, with oaks in some regions giving way to pines or mixed forests. The vegetation communities that resulted from these changes are essentially the same as those present in historic times before widespread land alteration took place (Watts 1969, 1971; Watts and Hansen 1988).

The Middle Archaic artifact assemblage is characterized by several varieties of stemmed, broad-blade projectile points. The Newnan point is the most distinctive and widespread in distribution (Bullen 1975:31). Other stemmed points of this period include the less common Alachua, Levy, Marion, and Putnam points (Bullen 1968; Milanich 1994). In addition to these stemmed points, the Middle Archaic lithic industry in Florida included the production of cores, true blades, modified and unmodified flakes, ovate blanks, hammerstones, "hump-backed" unifacial scrapers, and sandstone "honing" stones (Purdy 1981; Clausen et al. 1975). Additionally, thermal alteration, a technique in stone tool production, reached its peak during the Middle to Late Archaic periods.

Three common types of Middle Archaic sites are known in Florida (Bullen and Dolan 1959; Purdy 1975). The first are small, special-use camps, which appear archaeologically as scatters of lithic waste flakes and tools such as scrapers, points, and knives. These sites are numerous in river basins and along wetlands and probably represent locations used for tool repair and food processing during hunting and gathering excursions (Milanich 1994:78). The second common site type is the large base camp. This type of site may cover several acres or more, and contain several thousand or more lithic waste flakes and tools. The third common type of site is the quarry-related site that occurs in localities of chert outcrops.

Middle Archaic sites are found in a variety of locations, including, for the first time, freshwater shell middens along the St. Johns River and the Atlantic Lagoon. Middle Archaic sites have been found in the Hillsborough River drainage northeast of Tampa Bay, along the southwestern Florida coast, and in South Florida locales such as Little Salt Spring in Sarasota County. In addition, Middle Archaic sites occurred throughout the forests of the interior of northern Florida (Milanich 1994:76).

Late Archaic Period (3000–500 BC)

After 3000 BC, there was a general shift in settlement and subsistence patterns emphasizing a greater use of wetland and marine food resources than in previous periods. This shift was related to the natural development of food-rich wetland habitats in river valleys and along the Atlantic and Gulf coasts (Bense 1994). By the Late Archaic period, a regionalization of precontact cultures began to occur as human populations became adapted to specific environmental zones across the peninsula.

Based on current evidence, it appears that relatively large numbers of Late Archaic peoples lived in some regions of the state but not in others. For example, large sites of this period are uncommon in the interior highland forests of northwestern Florida and northern peninsular Florida, regions where Middle Archaic sites are common. The few Late Archaic sites found in these areas are either small artifact scatters or are components within sites that contain artifacts from several different time periods. This dearth of sites in the interior forests suggests that non-wetland locales either were not inhabited year-round or were only inhabited by small populations (Milanich 1994:87).

Extensive Late Archaic middens are found along the northeastern coast. The importance of the wetlands in these regions to precontact settlements was probably similar to other coastal regions, especially the Central Peninsular Gulf Coast and the Northwest (Milanich 1994:85). However, in many of these coastal areas, such as Tampa Bay, many of the Late Archaic sites are inundated (Warren 1964, 1970; Warren and Bullen 1965; Goodyear and Warren 1972; Goodyear et al. 1980).

Orange Period (2000–500 BC)

By about 2000 BC or slightly earlier, the firing of clay pottery was either invented in Florida or the technique diffused from coastal Georgia and South Carolina, where early dates for pottery have been obtained (Milanich 1994:86). At one time, it was thought that the earliest pottery-manufacturing culture in Florida was the Orange culture of the St. Johns region in northeast Florida. But additional evidence from southwest Florida indicates fired clay pottery from northeastern and southwestern Florida is comparable to the early dates from sites in Georgia and South Carolina (Division of Archives 1970; Cockrell 1970; Widmer 1974; McMichael 1982; Russo 1991).

The earliest ceramics in Florida were tempered with plant fibers such as palmetto fiber or Spanish moss. The first use of pottery is well dated to the period from circa 2000 BC to 1000 BC, making fiber-tempered pottery a convenient horizon across the state. Originally, the Orange period was divided into sub-periods based on surface decoration. Recent research suggests that variations in Orange period paste, form, and decoration do not represent temporal changes (Sassaman 2003). In addition, early pottery was not limited to fiber-tempered wares. Sand-tempered pottery and thick St. Johns Plain (chalky wares) have also been recovered from Late Archaic period contexts.

Formative and Mississippian Periods (500 BC–AD 1513)

Changes in pottery and technology occurred in Florida during the Late Archaic period, also known as the Florida Transitional period; these changes mark the beginning of the Formative period. Fiber-tempered pottery was replaced by sand-tempered, limestone-tempered, and chalky temperless ceramics and three different projectile point styles (basally-notched, corner-notched, and stemmed) occur in relatively contemporaneous contexts. These pottery and tool traditions suggest population movement and social interaction between culture areas.

This period in Florida cultural history has many regional variants. The project area is located within the Central Peninsular Gulf Coast cultural region (Milanich 1994:211) (Figure 3).

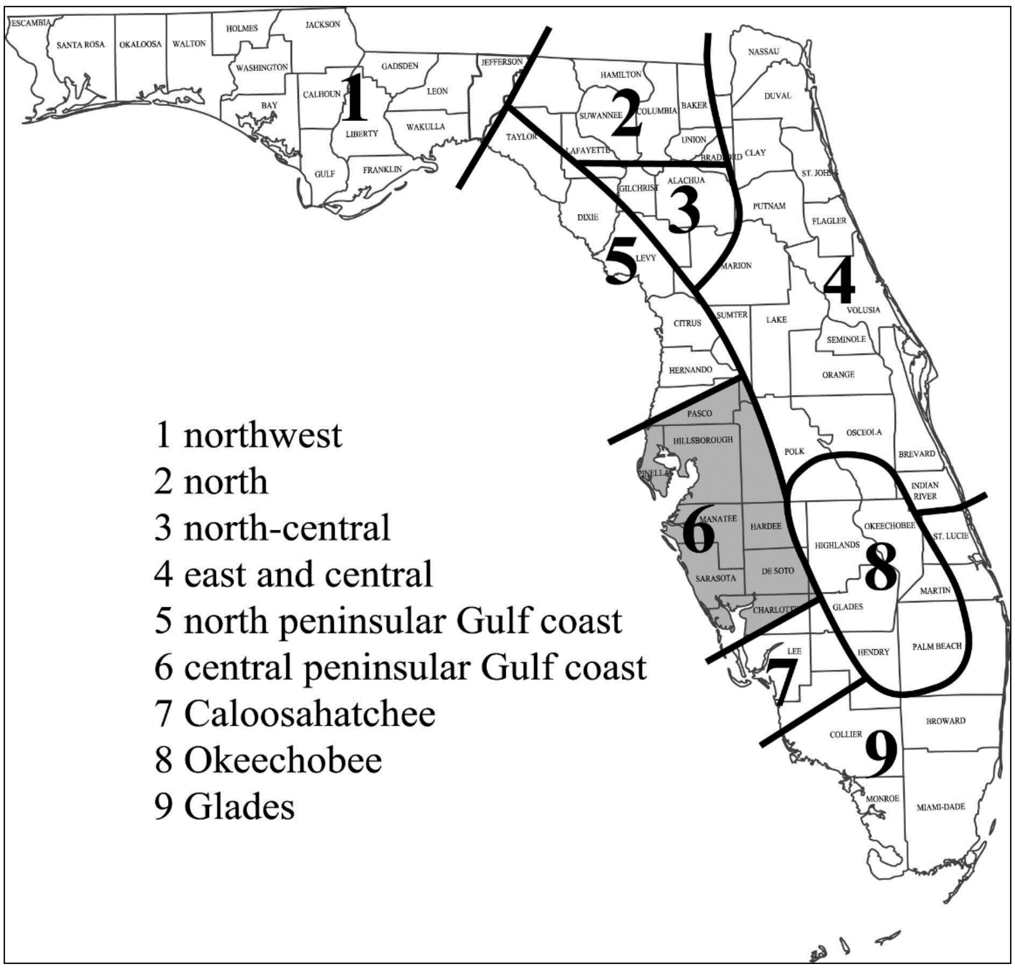

Figure 3: Central Peninsular Gulf Coast Cultural Region

Manasota Culture

During the Formative period, the Central Peninsular Gulf Coast region was dominated by the Manasota culture, primarily known as a coastal dwelling people. Sand-tempered plain pottery, as well as shell and bone tools, characterize their material culture (Luer and Almy 1982). The identification of interior Manasota sites has been hampered by the difficulty in distinguishing between the various types of undecorated, sand tempered pottery used by different precontact cultures of South Florida (Milanich 1994: 224–226). A chronology for the Manasota Culture based on variations in pottery and burial practices is presented in Table 1.

Table 1. Manasota Culture Chronology

Period	Dates
Safety Harbor	AD 900–1513
Late Weeden Island	AD 700–900
Early Weeden Island	AD 300–700
Manasota	500 BC–AD 300

Source: Milanich (1994); modified from Luer and Almy (1980, 1982)

Despite its characterization as a primarily coastal culture, a number of inland Manasota sites have been documented (Deming 1976; Wood 1976; Wharton 1977; Ellis 1977; Wharton and Williams 1980; Piper and Piper 1981; Piper, Hardin, and Piper 1982; Almy 1982; Austin and Ste. Claire 1982; Austin and Russo 1989). These sites exhibit characteristics that distinguish them from the typical Manasota site, and are similar to what Luer and Almy define as "inland from the shore" sites. These sites are described as existing in the pine flatwoods, often occurring on a small, low hillock or "mound" of sand near a freshwater source, and having artifact assemblages similar to those of coastal sites except for a significantly lesser amount of shell and shell tools (Luer and Almy 1982:39–43).

Weeden Island–Related Manasota Culture

During its later periods, the Manasota culture was influenced by the extensive Weeden Island socio-political complex, which is best known in northern Florida, southern Georgia, and Alabama—the recognized "heartland" of Weeden Island cultures. Present evidence suggests a date of circa AD 200 for the beginning of the Weeden Island period. Mound burial customs, artifact evidence of an extensive trade network, and settlement pattern data suggest a complex socio-religious organization, and Weeden Island pottery types are considered outstanding examples of pre-Columbian pottery in terms of technology and style. Evidence for the adoption of Weeden Island customs by local Manasota groups appears in the archaeological record around AD 300–900. This period in Manasota development is often referred to as "Weeden Island–related" (Milanich 1994:227; Luer and Almy 1982:46–47).

Safety Harbor Culture

The final pre-Columbian cultural manifestation to occur in this region was the Safety Harbor culture, which evolved out of the Manasota and later Weeden Island–related Manasota cultures. Similar to those regional cultures, the Safety Harbor culture had a subsistence economy based on gathering shellfish and other marine resources (Grange et al. 1979; Milanich 1994:412).

The Safety Harbor culture, known after Spanish contact to be the culture of the Tocobaga, is typified by ceremonial centers with truncated, pyramidal temple mounds and open village plazas surrounded by middens, as well as burial mounds with associated charnel structures. Most Safety Harbor sites are found along the coast, although villages, camps, and mounds are also located inland (Milanich 1994:395, 403). Although the Safety Harbor culture is centered on the Tampa Bay area and associated river drainages, it extends well to the north into Pasco, Hernando, and Citrus counties, and to the south and west into Sarasota, Polk, Manatee, Hardee, and Desoto counties. Safety Harbor pottery has also been found in mounds south of Charlotte Harbor in the Caloosahatchee archaeological area (Milanich 1994:391).

HILLSBOROUGH COUNTY HISTORY

Hillsborough County, located in west central Florida, was created on January 25, 1834. It extended north to Dade City and south to Charlotte County, and encompassed eight future counties (Mormino and Pizzo 1983:45). The first non-Indian settlement occurred in 1819 when Richard S. Hackley bought an 11-million-acre Spanish land grant that included all of Tampa Bay (Tebeau 1971:124).

In 1823, Colonel George Mercer Brooke was sent by the U.S. Army to establish a fortification on Tampa Bay near present-day central Tampa to suppress Indian unrest in the Florida Territory. Colonels Brooke and Gadsden selected a site within the land grant, forced Hackley to leave, and sited Fort Brooke by the Hillsborough River (Chamberlin 1968:12–13). The location offered the highest and driest land on the eastern shore of Tampa Bay, a supply of fresh water, and easy access to the interior from the sea. Because the fort offered the nearest and quickest access to forts and communities in the interior of Florida, it became a military depot and staging area for the Second Seminole War (Hillsborough County Planning Commission 1973: I-13).

Due to its isolated location, Hillsborough County grew very little after the Seminole Wars. A civilian community developed around Fort Brooke and some development took place as a result of the Armed Occupation Act of 1842. The Act provided 160-acre land grants to men over the age of 18, as long as they lived on the land for five years and cultivated at least five acres. Many of these settlers helped to establish Alafia, one of the oldest communities in Hillsborough County.

Raising cattle became the main industry of the land grant settlers. A fort, Alafia Garrison, was built in response to Native American uprisings in the area (HDR Engineering, Inc. 1992:15). Settlers were establishing settlements in other areas of Hillsborough County, as well. In 1856, John Brandon, a blacksmith and farmer from Mississippi, settled the Brandon area, calling it East Hills. When the railroad reached the area in 1890, East Hills was renamed Brandon (HDR Engineering, Inc. 1992:15).

Although blockade-runners carried supplies to other parts of the South and cattle were supplied to the Confederate Army, the Civil War hampered the County's economy (Hillsborough County Planning Commission 1973: I-13). The Civil War's end brought Reconstruction to the County, where military rule lasted from 1866 to 1869. The economy continued to decline.

Wartime and reconstruction impeded the county's development until the late 19th century. The county rebounded with the arrival of Henry Plant's railroad from Kissimmee in 1883–1884 (Westfall 1985:5). Plant had established the Jacksonville, Tampa & Key West Railway Line in 1883 (Harner 1973:23). In bringing the railroad to Tampa, Plant bypassed the community of Shiloh in the eastern part of the county, where J. T. Evers owned a small store. Realizing the potential of increased markets the railroad could bring, he purchased a large tract of land adjoining the railroad. Evers had the land platted in 1883 and named the new town Plant City after the railroad magnate. Other merchants followed Evers and moved to Plant City. In 1890, another railroad, the Florida Railway and Navigation Company, extended its rails to Tampa from Ocala via Plant City. Plant's railroad and others connected the formerly isolated Hillsborough County to Florida's interior, the east coast, and the nation (Hillsborough County Planning Commission 1973: I-14).

The brief Spanish-American War brought an immense and sudden influx of business, adding to the momentum of economic and population growth started by the railroad and cigar industries. Around the same time the Spanish-American War was being launched, another important industry for Hillsborough County was developing. Phosphate was discovered in 1899 at Dunnellon in Marion County. The discovery at Dunnellon began the industry that became most important to Hillsborough County. The largest phosphate deposits were found in the County's eastern portion.

During the previous decade, 11,000 acres of Hillsborough County were under cultivation, and beef cattle outnumbered the county's population. County farms produced rice, corn, oats, sugar, potatoes, and honey (HDR Engineering, Inc. 1992:17, 20). Citrus production increased and lumber and turpentine were harvested.

While industrialization and agriculture flourished, immigration and housing development slowed during World War I. Tourism increased as a result of the war in Europe, which forced Americans to vacation domestically and was fostered by the efforts of tycoons such as Henry Flagler and Henry Plant. During the early 20th century, the Seaboard Air Line laid tracks from Turkey Creek in Hillsborough County to Oneco in Manatee County. This rail line passed through the rural settlements of Lithia, Boyette, Balm, and Wimauma.

The Florida Land Boom era of the 1920s ushered in a time of great prosperity for Hillsborough County until a series of events brought that to an end, including a financial collapse in real estate and two hurricanes. During the economic decline of the Great Depression, the cigar industry was damaged when smokers gave up the luxury of cigars for less expensive cigarettes. Industry was in decline and factories closed or moved to the north and 4,000 workers were laid off during the decade (Ingalls 1985:129–130). In addition, many mines, mills, and citrus packing plants were closed.

The government established a Tampa headquarters for the Works Progress Administration (WPA). The WPA employed 8,000 people and funded large-scale projects such as the Davis Island airport (Mormino and Pizzo 1983:168). In other areas of the county, modern citrus canning plants and cooperatives were established in citrus grove areas (HDR Engineering, Inc. 1992:21).

The outbreak of World War II saw prosperity return to Hillsborough County. Three air bases were located in the County: MacDill Field, Drew Field, and Henderson Field (Hillsborough

County Planning Commission 1973:I-15). MacDill Field was opened in 1940 and became a staging area for the war. During the war, 25,000 soldiers were stationed at MacDill and Drew fields. In addition to air base activity, the port was expanded for the numerous shipbuilding enterprises (Hillsborough County Planning Commission 1973:I-15). Shipbuilding was again producing at full capacity with the industry employing 16,000 people (Mormino and Pizzo 1983:174). Many military personnel were introduced to the area during the war and many returned as permanent residents (Hillsborough County Planning Commission 1973: I-16).

World War II also produced a demand for food for the war effort. This need caused a rapid expansion in citrus canning in the grove belt region that included Brandon and Valrico (HDR Engineering, Inc. 1992:21). After World War II, Tampa continued to prosper as a place for company offices, retirees, and tourists. As retirees earned pensions that freed them from being dependent on their children, many moved to Florida. Building activity during the post-war years was equivalent to the market during the 1920s, but "without the speculative aspects" (Grismer 1950:286). Wholesalers and distributors of various goods that residents had been without during the lean war years were also flourishing (Grismer 1950:286).

The Federal Interstate System founded in the 1950s helped bring many new residents to Florida. Interstate 75 (I-75) connected the Midwest to the Tampa Bay area and large numbers of people migrated to the area. The retirees have fueled real estate development of affordable housing and retirement centers (Trigaux 1999:11h). Between 1950 and 1960, a 59 percent population increase occurred in Hillsborough County.

The project area remained relatively rural until the development of Apollo Beach which began in the late 1950s and early 1960s. The owner of the Apollo Beach development land sold a portion of the land to TEC in the early 1960s for the construction of the Big Bend Power Plant. The plant began operations in the 1970s with three generating units. A fourth unit was added in 1985. (TEC 2016). Development around the project area was sporadic and the area has remained largely rural until the more recent building boom that started in the early 21st century.

FLORIDA MASTER SITE FILE SEARCH AND LITERATURE REVIEW

An archaeological and historical literature and background information search pertinent to the project area was conducted to determine the types, chronological placement, and location of cultural resources within the archaeological APE. A review of Florida Master Site File (FMSF) data, previous surveys, property appraiser records, and historical research material was conducted to determine the potential for cultural resources within the project APE that are listed, eligible, or considered eligible for listing in the National Register, or that have potential or confirmed human remains. The FMSF is an important planning tool that assists in identifying potential cultural resources issues and resources that may warrant further investigation and protection. It can be used as a guide but should not be used to determine the State Historic Preservation Officer's (SHPO) official position about the significance of a resource.

Previous Cultural Resource Surveys

The FMSF search did not identify any previously conducted cultural resource surveys in the project area and no sites have been recorded within the tract. One previous archaeological survey was conducted east of the project area. The *Cultural Resource Assessment Survey of US 41 (SR 45) from 12th Street to Kracker Avenue Project Development and Environment (PD&E) Study, Hillsborough County, Florida* was conducted in 2008 by Archaeological Consultants, Inc. This FDOT corridor project encountered no archaeological sites but did result in the recording of a number of historic structures.

More recently, The *Cultural Resources Assessment Survey of the Tampa Electric Company (TEC) Big Bend Solar Pv Project, Hillsborough County, Florida* was conducted in 2016 by Janus Research. Located immediately north of the current study area, and covering 105.8 acres, no archaeological sites, isolated occurrences, or historic structures were encountered.

Previously Recorded Archaeological Sites

The search of the FMSF data did not identify any previously recorded archaeological sites within the archaeological APE. The search identified one previously recorded archaeological site approximately 0.85 miles from the project area (Figure 4). 8HI65 (Big Bend) is a precontact shell midden that has not been evaluated by the SHPO for inclusion in the National Register.

Previously Recorded and Potential Historic Structures

The FMSF background search identified no previously recorded historic structures within the historic resources APE. In addition, a review of the Unincorporated Hillsborough County Historic Landmarks Map (Hillsborough County Infrastructure and Development Services 2014) identified no locally designated historic landmarks within the vicinity of the historic APE. A search of property appraiser records identified one parcel to the north of the historic

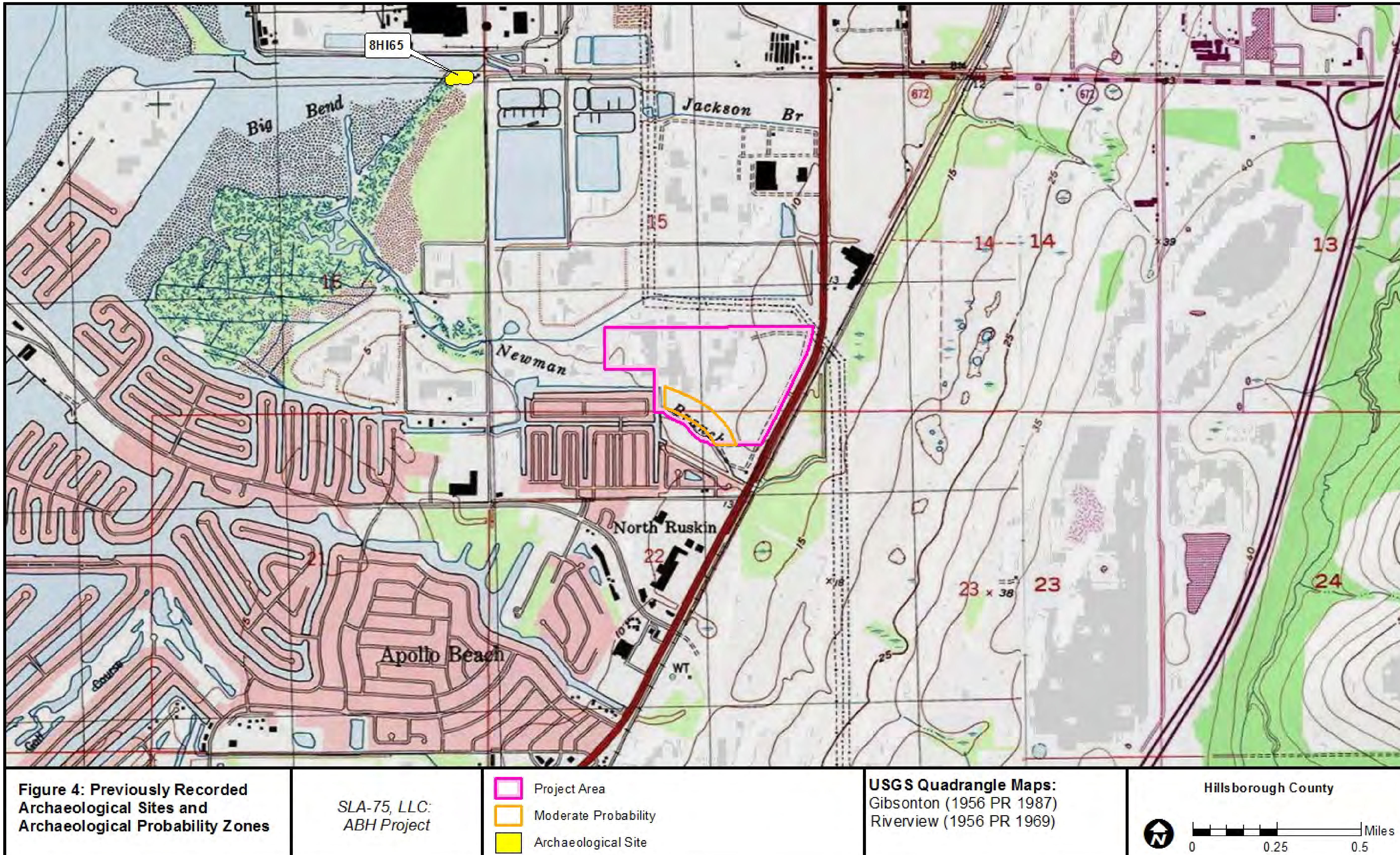

Figure 4: Previously Recorded Archaeological Sites and Archaeological Probability Zones

SLA-75, LLC: ABH Project

USGS Quadrangle Maps:
Gibsonton (1956 PR 1987)
Riverview (1956 PR 1969)

APE with an 'Actual Year Built' (AYRB) date of 1960. The current ABH parcel contains no structures.

A review of historic aerials from 1957 and 1968 (University of Florida, George A. Smathers Libraries 2017) noted that U.S. 41 was extant by 1957 and that the area surrounding the project area remained undeveloped at that time. No historic development was evident within or adjacent to the historic resources APE, with the exception of some drainage ditches within the project area.

PROJECT RESEARCH DESIGN AND SITE LOCATION MODEL

The background research and literature review, in conjunction with a consideration of pertinent environmental variables, contributed to the formulation of project-specific field methods designed to locate and evaluate previously unrecorded archaeological sites. Four environmental factors are typically employed in predicting site locations: soil type (soil drainage), distance to fresh (potable) water, distance to hardwood hammocks, and topography. Fresh water was an important resource for precontact populations, and would have been available from creeks and drainages in the area.

Hardwood hammocks provide a variety of resources that would have been exploited by the aboriginal inhabitants of this region. Hydric hardwood hammocks can contain abundant animal and plant life, particularly a variety of tubers. Mesic hardwood hammocks contain cabbage palms and other plants that produce edible foodstuffs. Other mesic hardwood species, such as ash and elm, are woods that are known to have been used for specific purposes, i.e., bows, canoes, mortars, and dart shafts (Newsom and Purdy 1983). Often, areas of higher relative elevation correspond with better-drained soils or the presence of hardwood hammocks (xeric and mesic). Hammock vegetation is present adjacent to small creeks and drainages scattered throughout the region, although to a minimal extent in the project area.

Relative elevation is the most difficult variable to quantify for central Florida because of the topographic diversity of the area. This variable has greater potential to locate sites in poorly to somewhat poorly drained areas of flatwoods than it does in typically undulating sandhill scrub environments. A slight topographic rise within a flatwood area adjacent to a wetland slough has a much greater potential for containing a precontact archaeological site than does the summit of a large, well-drained sand hill; even when both are the highest elevations within their respective environments. Given its proximity to Tampa Bay, the archaeological APE is at low elevations, and ranges from between five and ten feet above mean sea level.

The soils within the archaeological APE are all poorly drained and associated with the flatwoods. The soils as well as the review of the historic maps and aerials also suggest that most of the archaeological APE has a low potential for archaeological sites. An area adjacent to Newman Branch along the southwestern portion of the project area was identified and tested as having moderate probability for containing archaeological sites. No areas of high archaeological probability are identified within the project APE.

METHODS

Archaeological Field Methods

The archaeological field survey consisted of a pedestrian survey and subsurface testing. In total, 28 shovel tests were excavated during this investigation. Shovel tests were circular and approximately 50 centimeter (20 in) in diameter. They were excavated to a minimum depth of one meter (39 in) unless obstructed by solid clay or hardpan, or when slumping incurred due to the influx of groundwater. All excavated soils was sifted through 6.4 millimeter (¼-in) metal hardware cloth screen suspended from portable wooden frames and all shovel tests were backfilled upon completion.

Shovel tests were excavated systematically at 50 meter (164 ft.) intervals within the moderate site probability zone (n=18 of 28) adjacent to Newman Branch. The remaining shovel tests were excavated judgmentally in order to test the remaining low probability portion of the property. Additionally, all zones of low site probability were subjected to a careful surface inspection and shovel tested systematically or judgmentally to cover at least 10 percent of the project area. Testing was performed at the specified intervals unless obvious ground disturbance or standing water were encountered. The field crews were instructed to place additional, judgmental shovel tests in areas they deemed likely for sites, regardless of the probability zone or testing interval.

Standard archaeological methods for recording field data were followed throughout the project. The identification number, location, stratigraphic profile, soil descriptions, and environmental setting were recorded for every shovel test excavated. Locations of all shovel tests were recorded in the field with WAAS-enabled hand-held Global Positioning System (GPS) units. The locations of all shovel tests were also recorded on 1" = 64 m aerial photographs (Appendix A).

Historic Structures Survey

A historic resources reconnaissance survey was conducted to identify any previously unrecorded structures within and adjacent to the project APE for a distance of up to 150 feet. Property tax records and historic aerial photography were also consulted to assist in the identification of any such resources. For each resource identified, FMSF forms were completed with field data, including notes from site observations (Appendix B). Each resource's individual significance was then evaluated for its potential eligibility for inclusion in the National Register. Historic physical integrity was determined from site observations, field data, and photographic documentation.

RESULTS

Archaeological Results

A total of 28 shovel tests was excavated within the project APE during the current survey. No cultural material was recovered in any of the tests. The project area is low lying pasture with grasses, scattered Brazilian pepper, pines, and cabbage palm (Figure 5). Many shovel tests encountered solid clay at approximately 60 to 70 cm below surface (cmbs). The soil stratigraphy in the project area generally consisted of gray sand 0–30 cmbs, light gray or pale brown sand from 30–70 cmbs, and dark brown hydric soil, mottled gray and brown sand, brown clay, or water at 60 cmbs or below (Figure 6). The locations of shovel tests, and the area of moderate archaeological probability, as well as notes on current conditions are illustrated in Appendix A.

Figure 5: Pasture and Moderate Probability Area, Facing Southeast

Figure 6: Soil Stratigraphy in Shovel Test 3, Facing East

Historic Resources Results

The historic field survey resulted in the identification of an undocumented portion of US 41/Tamiami Trail (8HI12129) within the historic resources APE. The portion of the US 41/Tamiami Trail located within the APE runs in a roughly southwest/northeast direction south of Big Bend Road and north of Apollo Beach Boulevard, on the Gibsonton USGS quadrangle map (1956 PR 1987), in the City of Apollo Beach, Hillsborough County, Florida. The length of US 41/Tamiami Trail within the project APE is approximately 0.4 miles, and consists of a four-lane vehicular roadway split into two northbound and two southbound lanes and separated by a large grassy median. Overall, the entirety of the Tamiami Trail is approximately 245 miles in length. This small portion of the roadway also features one cross-over across the median. The roadway exhibits modern asphalt paving and marking, modern signage and lampposts, and the addition of bike lanes on both the northbound and southbound sides. Large powerlines also traverse the roadway in this location. The setting immediately along roadway still appears rural, although modern suburban neighborhoods are located in the vicinity, just out of view from the roadway. The CSX Railroad runs mostly parallel to this section of US 41/Tamiami Trail on the west side. The segment of US 41/Tamiami Trail (8HI12129) within the APE is shown on a current aerial in Figure 7. A current photograph of the roadway within the APE is shown in Figure 8.

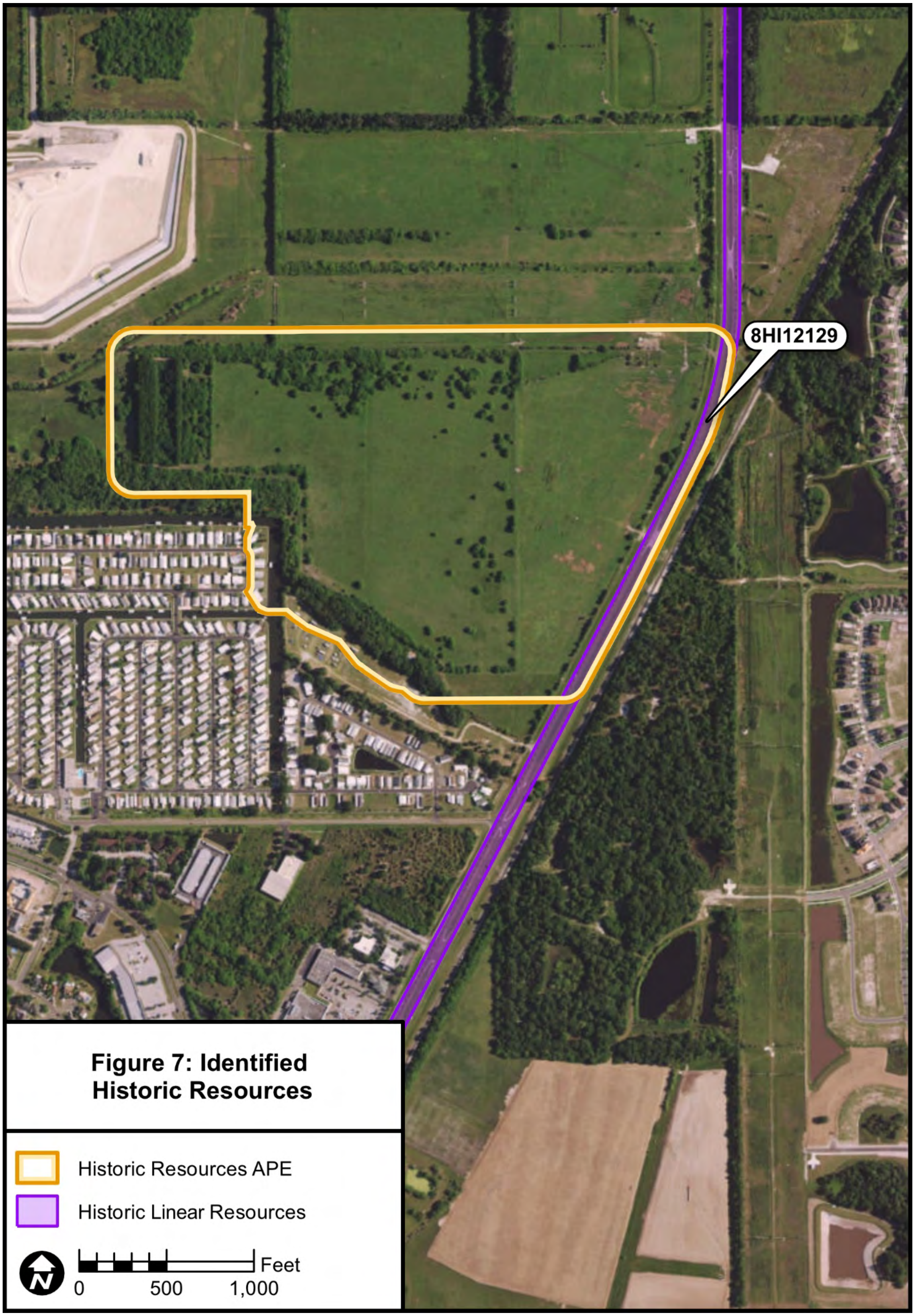

Figure 7: Identified Historic Resources

Figure 8: US 41/Tamiami Trail (8HI12129) within the APE, facing Southwest

The portion of US 41/Tamiami Trail within the current APE was constructed circa 1915 and originally constituted nothing more than a nine-foot-wide shell road paid for by a $30,000 local bond issue. Because of the growing importance of truck farming, this road and others were built to facilitate the transportation of produce to local markets throughout the 1920s (VisitRuskin 2017). The construction of the Tamiami Trail began in 1923 and was completed in 1928. Known originally as Ruskin Road within the APE, this roadway became part of the Tamiami Trail in the 1920s (ACI 2013a). This portion of the roadway was designated US 541 in 1932. In 1951, US 541 was decommissioned and the road was renamed US 41, with the roadway also being widened from two to four lanes in the 1950s (ACI 2013b).

A 7.7 mile-long portion of US 41/Tamiami Trail located approximately 2.25 miles north of the current project APE was previously documented by Archaeological Consultants, Inc. (ACI) as part of the 2013 *Cultural Resources Assessment Survey of US 41 from Kracker Avenue to South of SR 676 (Causeway Boulevard) Project Development and Environment Study, Hillsborough County, Florida*. This survey found US 41/Tamiami Trail to be ineligible for inclusion in the National Register, and the SHPO concurred with this finding on February 10, 2014.

Like the previously documented portion of US 41/Tamiami Trail to the north, the portion of the roadway within the current project APE has been drastically altered by non-historic improvements and widening. This segment of the roadway has undergone a series of substantial transformations based on modern transportation needs such that it no longer conveys its historic appearance. The road exhibits standard road design and common materials for modern road construction, and does not retain any traces of its original materials, configuration, or character. It has been altered by widening, modern painting, modern signage/streetlights, and the establishment of a large grassy median. Within the APE, there is no longer any evidence that the roadway is historic. This section of the roadway with the current APE exhibits similar characteristics to section to the north that has already been determined National Register–ineligible by the SHPO. Based on its compromised historic physical integrity, which greatly affects its significance, the section of US 41/Tamiami Trail located within the current project APE is considered ineligible for listing in the National Register under Criteria A, B, C, or D, either individually or as part of a historic district.

CONCLUSIONS

No newly or previously recorded archaeological sites were identified within the project APE. A total of 28 shovel tests was excavated within the project APE during the current survey. No cultural material was recovered in any of the tests. The historic field survey resulted in the identification of an undocumented portion of US 41/Tamiami Trail (8HI12129) within the historic resources APE. This section of US 41/Tamiami Trail (8HI12129) is considered ineligible for listing in the National Register. No further work is recommended.

Unanticipated Finds

Although unlikely, should construction activities uncover archaeological remains, it is recommended that activity in the immediate area of the remains be stopped while a professional archaeologist evaluates the remains. In the event that human remains are found during construction or maintenance activities, the provisions of Chapter 872.05 of the *Florida Statutes* will apply. Chapter 872.05 states that, when human remains are encountered, all activity that might disturb the remains shall cease and may not resume until authorized by the District Medical Examiner or the State Archaeologist. The District Medical Examiner has jurisdiction if the remains are less than 75 years old or if the remains are involved in a criminal investigation. The State Archaeologist has jurisdiction if the remains are 75 years of age or older.

Curation

An FMSF form (Appendix B), the Survey Log Sheets (Appendix C), and select photograph are curated at the FMSF in Tallahassee, along with a copy of this report. Field notes and other pertinent project records are temporarily stored at Janus Research and returned to the client, as appropriate.

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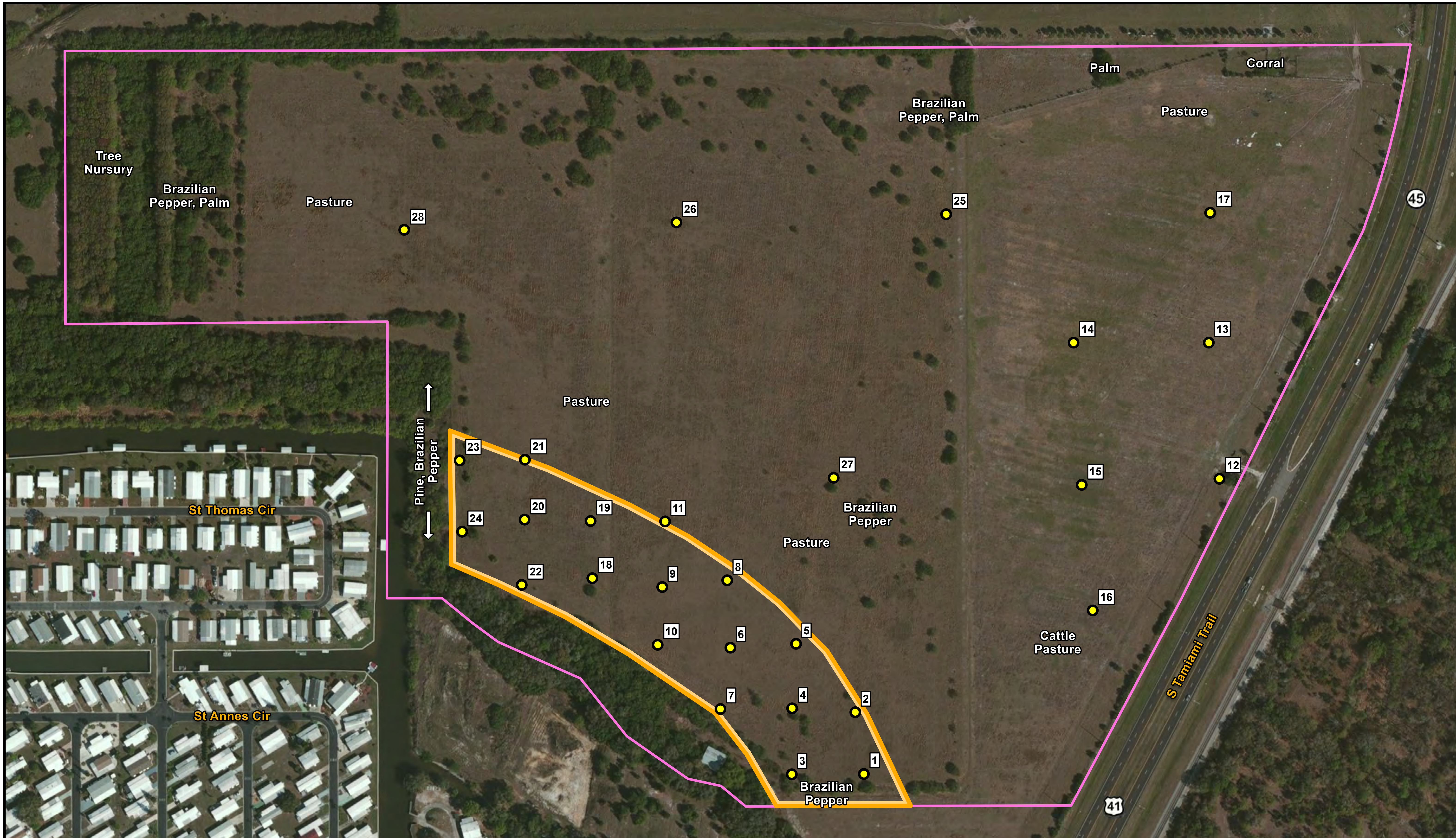
APPENDIX A:

SHOVEL TEST MAP



Shovel Test Map	*ABH Project*	Project Area; Moderate Probability; Negative Shovel Test	Hillsborough County; 0, 50, 100 Meters

APPENDIX B:

FMSF FORM

Page 1

☐ Original
☒ Update

RESOURCE GROUP FORM
FLORIDA MASTER SITE FILE
Version 4.0 1/07

Site #8 HI12129
Field Date 7-5-2017
Form Date 7-18-2017
Recorder# 1

NOTE: Use this form to document districts, landscapes, building complexes and linear resources as described in the box below. Cultural resources contributing to the Resource Group should also be documented individually at the Site File. **Do not use this form for National Register multiple property submissions** (MPSs). National Register MPSs are treated as Site File manuscripts and are associated to the individual resources included under the MPS cover using the Site File manuscript number.

Check ONE box that best describes the Resource Group:

- ☐ **Historic district** (NR category "district"): buildings and NR structures only: NO archaeological sites
- ☐ **Archaeological district** (NR category "district"): archaeological sites only: NO buildings or NR structures
- ☐ **Mixed district** (NR category "district"): includes more than one type of cultural resource (example: archaeological sites and buildings)
- ☐ **Building complex** (NR category usually "building(s)"): multiple buildings in close spatial and functional association
- ☐ **Designed historic landscape** (NR category usually "district" or "site"): can include multiple resources (see *National Register Bulletin #18*, page 2 for more detailed definition and examples: e.g. parks, golf courses, campuses, resorts, etc.)
- ☐ **Rural historic landscape** (NR category usually "district" or "site"): can include multiple resources and resources not formally designed (see *National Register Bulletin #30, Guidelines for Evaluating and Documenting Rural Historic Landscapes* for more detailed definition and examples: e.g. farmsteads, fish camps, lumber camps, traditional ceremonial sites, etc.)
- ☒ **Linear resource** (NR category usually "structure"): Linear resources are a special type of rural historic landscape and can include canals, railways, roads, etc.

Resource Group Name US 41/Tamiami Trail Multiple Listing [DHR only] ____
Project Name CRAS of the ABH Project FMSF Survey # ____
National Register Category (please check one): ☐building(s) ☒structure ☐district ☐site ☐object
Linear Resource Type (if applicable): ☐canal ☐railway ☒road ☐other (describe): ____
Ownership: ☐private-profit ☐private-nonprofit ☐private-individual ☐private-nonspecific ☐city ☐county ☒state ☐federal ☐Native American ☐foreign ☐unknown

LOCATION & MAPPING

	Street Number	Direction	Street Name	Street Type	Suffix Direction
Address:					

City/Town (within 3 miles) Apollo Beach In Current City Limits? ☒yes ☐no ☐unknown
County or Counties (do not abbreviate) Hillsborough
Name of Public Tract (e.g., park) ____

	Township	Range	Section	¼ section	Irregular-name
1)	30S	19E	2	☐NW ☐SW ☐SE ☐NE	
2)	30S	19E	14	☐NW ☐SW ☐SE ☐NE	
3)	30S	19E	15	☐NW ☐SW ☐SE ☐NE	
4)				☐NW ☐SW ☐SE ☐NE	

USGS 7.5' Map(s) 1) Name GIBSONTON USGS Date 1987
2) Name ____ USGS Date ____
Plat, Aerial, or Other Map (map's name, originating office with location) ____
Landgrant ____
Verbal Description of Boundaries (description does not replace required map) The segment of US 41/Tamiami Trail within the APE is located to the south of Big Bend Road and to the north of Apollo Beach Blvd, with a distance of approximately 0.4 miles.

DHR USE ONLY	OFFICIAL EVALUATION	DHR USE ONLY
NR List Date ____ ☐Owner Objection	SHPO – Appears to meet criteria for NR listing: ☐yes ☐no ☐insufficient info Date ____ Init.____ KEEPER – Determined eligible: ☐yes ☐no Date ____ NR Criteria for Evaluation: ☐a ☐b ☐c ☐d (see *National Register Bulletin 15*, p. 2)	

RESOURCE GROUP FORM

Site #8 HI12129

HISTORY & DESCRIPTION

Construction Year: 1915 ☒ approximately ☐ year listed or earlier ☐ year listed or later

Architect/Designer (last name first): Unknown Builder (last name first): Unknown

Total number of individual resources included in this Resource Group: # of contributing 1 # of non-contributing 0

Time period(s) of significance (choose a period from the list or type in date range(s), e.g. *1895-1925*)

1. Twentieth C American
2.
3.
4.

Narrative Description (*National Register Bulletin 16A* pp. 33-34; fit a summary into 3 lines or attach supplementary sheets if needed) See continuation sheet.

RESEARCH METHODS (check all that apply)

☒ FMSF record search (sites/surveys) ☐ library research ☐ building permits ☐ Sanborn maps
☐ FL State Archives/photo collection ☐ city directory ☐ occupant/owner interview ☐ plat maps
☐ property appraiser / tax records ☐ newspaper files ☐ neighbor interview ☐ Public Lands Survey (DEP)
☒ cultural resource survey ☐ historic photos ☐ interior inspection ☐ HABS/HAER record search
☒ other methods (specify) Historic aerial and aerial photographs

Bibliographic References (give FMSF Manuscript # if relevant) See continuation sheet.

OPINION OF RESOURCE SIGNIFICANCE

Potentially eligible individually for National Register of Historic Places? ☐ yes ☒ no ☐ insufficient information

Potentially eligible as contributor to a National Register district? ☐ yes ☒ no ☐ insufficient information

Explanation of Evaluation (required, see *National Register Bulletin 16A* p. 48-49. Attach longer statement, if needed, on separate sheet.) See continuation sheet.

Area(s) of Historical Significance (see *National Register Bulletin 15*, p. 8 for categories: e.g. "architecture", "ethnic heritage", "community planning & development", etc.)

1.
2.
3.
4.
5.
6.

DOCUMENTATION

Accessible Documentation Not Filed with the Site File - including field notes, analysis notes, photos, plans and other important documents

1) Document type Field notes Maintaining organization Janus Research
Document description File or accession #'s

2) Document type Field maps Maintaining organization Janus Research
Document description File or accession #'s

RECORDER INFORMATION

Recorder Name Janus Research Affiliation Janus Research

Recorder Contact Information 1107 N. Ward St., Tampa FL 33607 / (813) 636-8200 / janus@janus-research.com
(address / phone / fax / e-mail)

Required Attachments

1. PHOTOCOPY OF USGS 7.5' MAP WITH DISTRICT BOUNDARY CLEARLY MARKED
2. LARGE SCALE STREET, PLAT OR PARCEL MAP WITH RESOURCES MAPPED & LABELED
3. TABULATION OF ALL INCLUDED RESOURCES (name, FMSF #, contributing? Y/N, resource category, street address or township-range-section if no address)
4. PHOTOS OF GENERAL STREETSCAPE OR VIEWS (Optional: aerial photos, views of typical resources) Photos may be archival B&W prints OR digital image files. If submitting digital image files, they must be included on disk or CD AND in hard copy format (plain paper is acceptable). Digital images must be at least 1600 x 1200 pixels, 24-bit color, jpeg or tiff.

A. NARRATIVE DESCRIPTION OF SITE

The portion of the US 41/Tamiami Trail located within the project APE runs in a roughly southwest/northeast direction south Big Bend Road and north of Apollo Beach Boulevard, on the Gibsonton USGS quadrangle map (1956 PR 1987), in the City of Apollo Beach, Hillsborough County, Florida. The length of US 41/Tamiami Trail within the project APE is approximately 0.4 miles, and consists of a four-lane vehicular roadway split into two northbound and two southbound lanes and separated by a large grassy median. Overall, the entirety of the Tamiami Trail is approximately 245 miles in length. This small portion of the roadway also features one cross-over across the median. The roadway exhibits modern asphalt paving and marking, modern signage and lampposts, and the addition of bike lanes on both the northbound and southbound sides. Large powerlines also traverse the roadway in this location. The setting immediately along roadway still appears rural, although modern suburban neighborhoods are located in the vicinity, just out of view from the roadway. The CSX Railroad runs mostly parallel to this section of US 41/Tamiami Trail on the west side.

B. DISCUSSION OF SIGNIFICANCE

The portion of US 41/Tamiami Trail within the current APE was constructed circa 1915 and originally constituted nothing more than a nine-foot-wide shell road paid for by a $30,000 local bond issue. Because of the growing importance of truck farming, this road and others were built to facilitate the transportation of produce to local markets throughout the 1920s (VisitRuskin 2017). The construction of the Tamiami Trail began in 1923 and was completed in 1928. Known originally as Ruskin Road within the APE, this roadway became part of the Tamiami Trail in the 1920s (ACI 2013a). This portion of the roadway was designated US 541 in 1932. In 1951, US 541 was decommissioned and the road was renamed US 41, with the roadway also being widened from two to four lanes in the 1950s (ACI 2013b).

A 7.7 mile-long portion of US 41/Tamiami Trail located approximately 2.25 miles north of the current project APE was previously documented by Archaeological Consultants, Inc. (ACI) as part of the 2013 *Cultural Resources Assessment Survey of US 41 from Kracker Avenue to South of SR 676 (Causeway Boulevard) Project Development and Environment Study, Hillsborough County, Florida*. This survey found US 41/Tamiami Trail to be ineligible for inclusion in the National Register, and the SHPO concurred with this finding on February 10, 2014.

Like the previously documented portion of US 41/Tamiami Trail to the north, the portion of the roadway within the current project APE has been drastically altered by non-historic improvements and widening. This segment of the roadway has undergone a series of substantial transformations based on modern transportation needs such that it no longer conveys its historic appearance. The road exhibits standard road design and common materials for modern road construction, and does not retain any traces of its original materials, configuration, or character. It has been altered by widening, modern painting, modern signage/streetlights, and the establishment of a large grassy median. Within the APE, there is no longer any evidence that the roadway is historic. This section of the roadway with the current APE exhibits similar characteristics to section to the north that has already been determined National Register–ineligible by the SHPO. Based on its compromised historic physical integrity, which greatly affects its significance, the section of US 41/Tamiami Trail located within the current project APE is considered ineligible for listing in the National Register under Criteria A, B, C, or D, either individually or as part of a historic district.

C. HISTORY AND BIBLIOGRAPHY OF PAST WORK AT SITE

Archaeological Consultants, Inc. (ACI)

2013a Cultural Resources Assessment Survey of US 41 from Kracker Avenue to South of SR 676 (Causeway Boulevard) Project Development and Environment Study, Hillsborough County, Florida. On file, Florida Department of State, Division of Historical Resources, Tallahassee, Florida

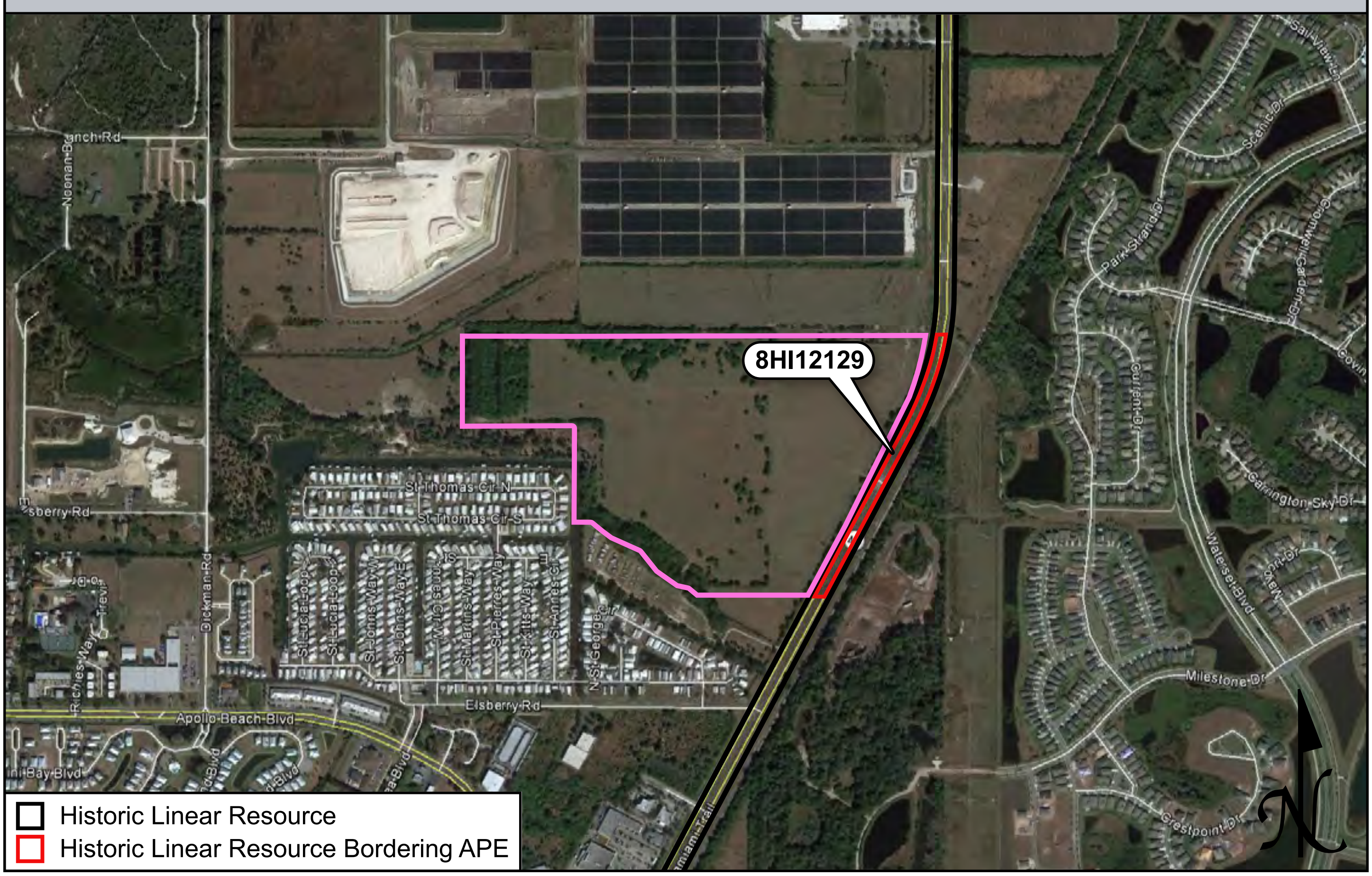
2013b Site file form for US 41 (8HI12129). On file, Florida Department of State, Division of Historical Resources, Tallahassee, Florida.

VisitRuskin

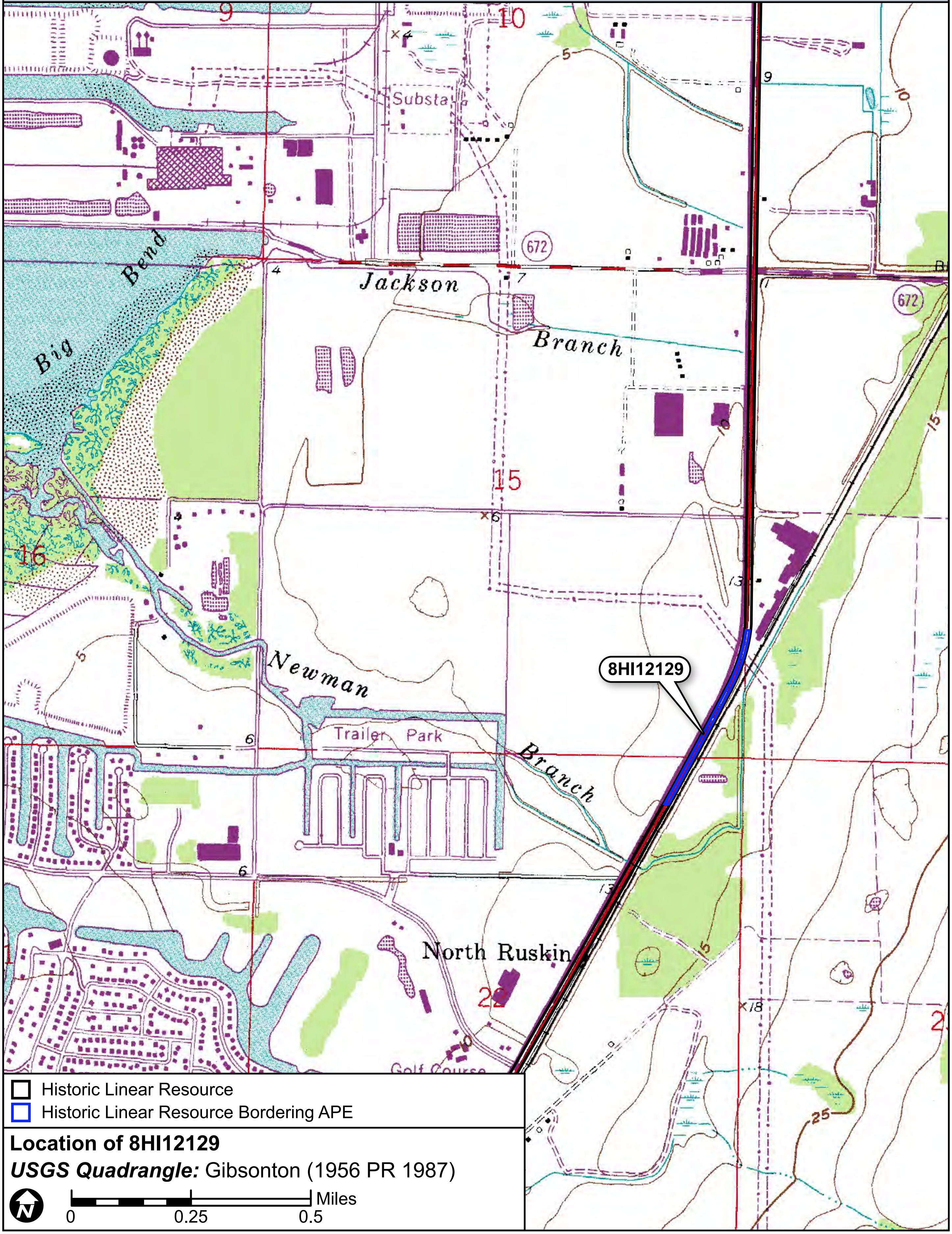
2017 *History of Ruskin*. Accessed online at http://visitruskin.com/Articles/history_of_ruskin.htm on July 18, 2017.

PHOTOGRAPH

SKETCH MAP



USGS QUADRANGLE MAP



Historic Linear Resource

Historic Linear Resource Bordering APE

Location of 8HI12129

USGS Quadrangle: Gibsonton (1956 PR 1987)

0 0.25 0.5 Miles

APPENDIX C:

SURVEY LOG SHEET

Ent D (FMSF only) ____________

Survey Log Sheet

Florida Master Site File
Version 4.1 1/07

Survey # (FMSF only) ____________

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (name and project phase) CRAS of the ABH Project, Hillsborough County

Report Title (exactly as on title page) Cultural Resource Assessment Survey of the ABH Project, Hillsborough County, Florida

Report Authors (as on title page, last names first)
1. Janus Research
2. ____________
3. ____________
4. ____________

Publication Date (year) 2017 **Total Number of Pages in Report** (count text, figures, tables, not site forms) 28

Publication Information (Give series, number in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)
Janus Research, 1107 N. Ward Street, Tampa FL 33607

Supervisors of Fieldwork (even if same as author) Names Kathleen Hoffman and Amy Streelman

Affiliation of Fieldworkers: Organization Janus Research City Tampa

Key Words/Phrases (Don't use county name, or common words like *archaeology*, *structure*, *survey*, *architecture*, *etc.*)
1. Apollo Beach
2. US 41
3. Tamiami Trail
4. ____________
5. ____________
6. ____________
7. ____________
8. ____________

Survey Sponsors (corporation, government unit, organization or person directly funding fieldwork)
Name ____________ Organization Environmental Consulting and Technology, Inc.
Address/Phone/E-mail 1408 N Westshore Blvd, Suite 115, Tampa, FL 33607

Recorder of Log Sheet Janus Research **Date Log Sheet Completed** 7-20-2017

Is this survey or project a continuation of a previous project? ☒ No ☐ Yes: Previous survey #s (FMSF only) ____________

Mapping

Counties (List each one in which field survey was done; attach additional sheet if necessary)
1. Hillsborough
2. ____________
3. ____________
4. ____________
5. ____________
6. ____________

USGS 1:24,000 Map Names/Year of Latest Revision (attach additional sheet if necessary)

	Name	Year
1.	GIBSONTON	1987
2.	RIVERVIEW	1969
3.		
4.		
5.		
6.		

Description of Survey Area

Dates for Fieldwork: Start 6-30-2017 End 7-7-2017 **Total Area Surveyed** (fill in one) ____ hectares 97 acres

Number of Distinct Tracts or Areas Surveyed 1

If Corridor (fill in one for each) **Width:** ____ meters ____ feet **Length:** ____ kilometers ____ miles

Survey Log Sheet

Survey #__________

Research and Field Methods

Types of Survey (check all that apply): ☒archaeological ☐architectural ☒historical/archival ☐underwater ☐damage assessment ☐monitoring report ☐other(describe):

Scope/Intensity/Procedures Pedestrian survey and subsurface testing. 28 shovel tests were excavated to a depth of between 60 and 100cm below ground surface. Historic resources were documented.

Preliminary Methods (check as many as apply to the project as a whole)

☐Florida Archives (Gray Building) ☐library research- *local public* ☐local property or tax records ☐other historic maps
☐Florida Photo Archives (Gray Building) ☐library-special collection - *nonlocal* ☐newspaper files ☒soils maps or data
☒Site File property search ☒Public Lands Survey (maps at DEP) ☒literature search ☒windshield survey
☒Site File survey search ☐local informant(s) ☐Sanborn Insurance maps ☒aerial photography
☒other (describe): Janus Library

Archaeological Methods (check as many as apply to the project as a whole)

☐Check here if **NO** archaeological methods were used.

☐surface collection, controlled ☐shovel test-other screen size ☐block excavation (at least 2x2 m)
☐surface collection, **un**controlled ☐water screen ☐soil resistivity
☒shovel test-1/4"screen ☐posthole tests ☐magnetometer
☐shovel test-1/8" screen ☐auger tests ☐side scan sonar
☐shovel test 1/16"screen ☐coring ☒pedestrian survey
☐shovel test-unscreened ☐test excavation (at least 1x2 m) ☐unknown
☐other (describe):

Historical/Architectural Methods (check as many as apply to the project as a whole)

☐Check here if **NO** historical/architectural methods were used.

☐building permits ☐demolition permits ☐neighbor interview ☐subdivision maps
☐commercial permits ☐exposed ground inspected ☐occupant interview ☒tax records
☐interior documentation ☒local property records ☐occupation permits ☐unknown
☒other (describe): Historic aerial photography

Survey Results (cultural resources recorded)

Site Significance Evaluated? ☒Yes ☐No

Count of Previously Recorded Sites 1 **Count of Newly Recorded Sites** 0

Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8". Attach additional pages if necessary.) Hi12129

Newly Recorded Site #'s (Are all originals and not updates? List site #'s without "8". Attach additional pages if necessary.)

Site Forms Used: ☐Site File Paper Form ☒Site File Electronic Recording Form

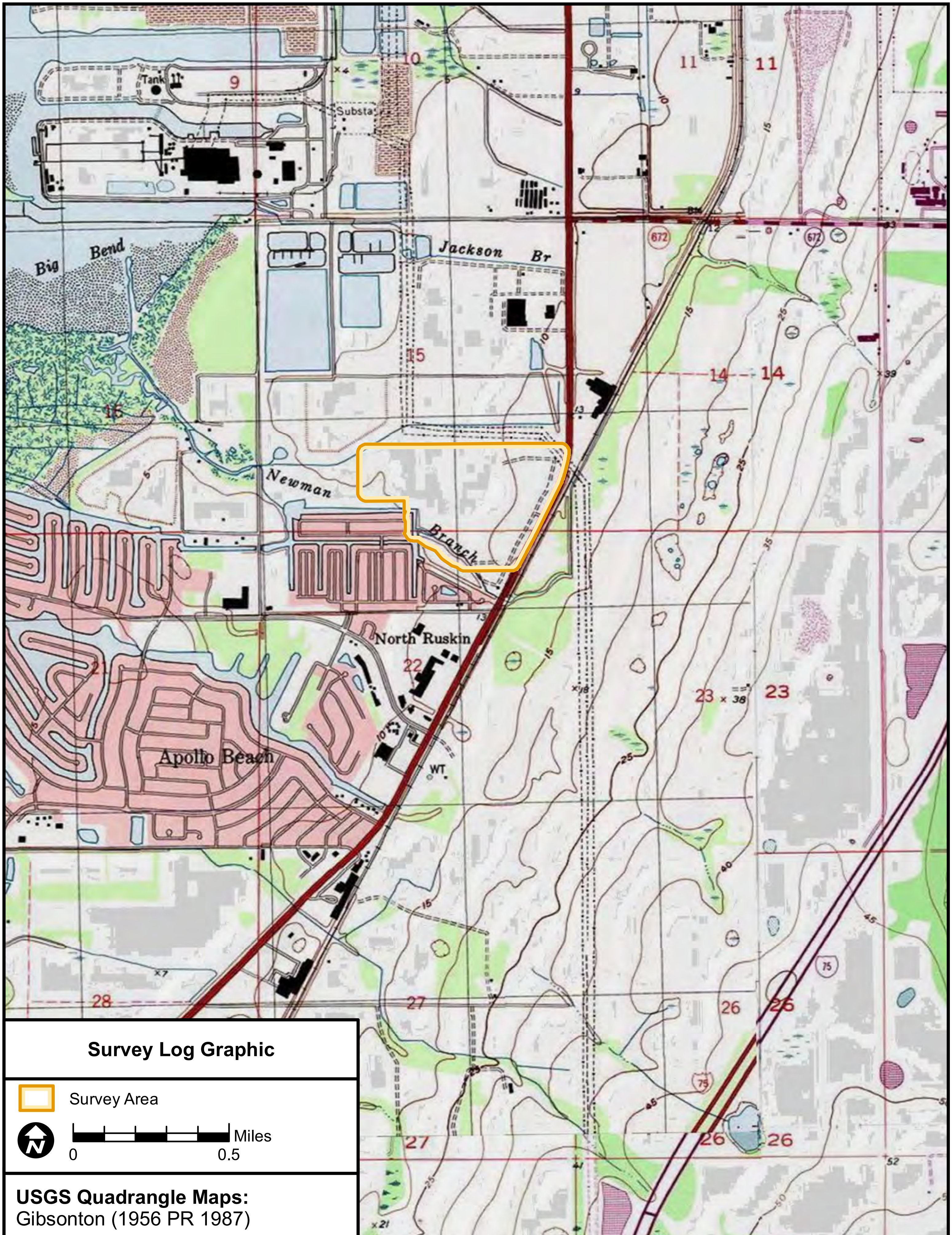
*****REQUIRED: ATTACH PLOT OF SURVEY AREA ON PHOTOCOPY OF USGS 1:24,000 MAP(S)*****

SHPO USE ONLY SHPO USE ONLY SHPO USE ONLY

Origin of Report: ☐872 ☐CARL ☐UW ☐1A32 # ☐Academic ☐Contract ☐Avocational ☐Grant Project # ☐Compliance Review: CRAT #

Type of Document: ☐Archaeological Survey ☐Historical/Architectural Survey ☐Marine Survey ☐Cell Tower CRAS ☐Monitoring Report ☐Overview ☐Excavation Report ☐Multi-Site Excavation Report ☐Structure Detailed Report ☐Library, Hist. or Archival Doc ☐MPS ☐MRA ☐TG ☐Other:

Document Destination: **Plotability:**



Survey Log Graphic

Survey Area

Miles
0 0.5

USGS Quadrangle Maps:
Gibsonton (1956 PR 1987)

FLORIDA DEPARTMENT *of* STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

August 29, 2017

Kathleen Hoffman
Vice President
Janus Research
1107 N. Ward Street
Tampa, FL 33607

RE: DHR Project File No.: 2017-3667, Received by DHR: July 28, 2017
RE: Cultural Resources Assessment Survey for the ABH Property in Hillsborough County, Florida

Dear Dr. Hoffman:

In June and July 2017, Janus Research conducted the above referenced survey on behalf of Environmental Consulting & Technology, Inc. (ECT). Our office proceeded to review this report with the expectation that ECT will be engaging in permitting processes that will require this office to comment on possible effects to cultural resources listed, or eligible for listing, in the *National Register of Historic Places (NRHP)*, or otherwise of historical, architectural, or archaeological significance. We recommend at the time such actions are taken, a copy of this letter be forwarded to the permitting agency(ies) with the application. This letter does not constitute a review under Section 106 of the *National Historic Preservation Act.*

Janus identified no new or previously recorded archaeological sites within the project area during their investigation. Janus did identify an undocumented portion of US 41/Tamiami Trail (8HI12129) within the project area. Janus recommended this section of US 41/Tamiami Trail as ineligible for listing in the National Register. Janus recommended no additional work.

Based on the information provided, our office concurs with these determinations and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.*

If you have any questions, please contact me by email at *Jason.Aldridge@dos.myflorida.com*, or by telephone at 850.245.6344 or 800.847.7278.

Sincerely,

Jason Aldridge

Jason Aldridge
Deputy State Historic Preservation Officer
for Compliance and Review

Historical Resources

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Tampa Bay ▪ Miami ▪ Ft. Myers ▪ Atlanta

December 23, 2020

Dr. Timothy A. Parsons
Director and State Historic Preservation Officer
Florida Division of Historical Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee, Florida 32399-0250

Re: Cultural Resources Assessment Survey Addendum for the TECO Big Bend Solar II Expansion, Hillsborough County, Florida

Attention: Mr. Jason Aldridge, Compliance Review Supervisor, and Deputy State Historic Preservation Officer

Dear Mr. Aldridge:

On behalf of Tampa Electric Company (TEC) and in association with Environmental Consulting & Technology, Inc. (ECT), Janus Research conducted a Cultural Resources Assessment Survey (CRAS) Addendum for the Tampa Electric Company (TEC) Big Bend Solar II Solar Expansion project area in Hillsborough County, Florida.

This CRAS was conducted in anticipation of United States Army Corps of Engineers (USACE) and Florida Department of Environmental Protection (FDEP) permits. This assessment complies with Section 106 of the National Historic Preservation Act (NHPA) of 1966 (Public Law 89-665, as amended), as implemented by 36 CFR 800 -- Protection of Historic Properties (incorporating amendments effective August 5, 2004); the revised Chapter 267, Florida Statutes (F.S.); standards embodied in the Florida Division of Historical Resources' (FDHR's) Cultural Resource Management Standards and Operational Manual (February 2003), and Chapter 1A-46 (Archaeological and Historical Report Standards and Guidelines), Florida Administrative Code. All work also conforms to professional guidelines set forth in the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716, as amended and annotated). Principal Investigators meet the Secretary of the Interior's Professional Qualification Standards (48 FR 44716) for archaeology, history, architecture, architectural history, or historic architecture.

The objective was to identify cultural resources located within the project area of potential effect (APE) and to assess their significance in terms of eligibility for listing in the *National Register of Historic Places* (National Register) according to the criteria set forth in 36 CFR Section 60.4.

Approximately 132.2 acres of the current 190.5 acres project area were surveyed during previous work associated with the TEC Big Bend Solar Project in 2015 and 2017 and no cultural resources were identified within the current APE as a result of that work. This included approximately 35.3 acres of the current project area surveyed during in the *Cultural Resources Assessment Survey of the Tampa Electric Company (TEC) Big Bend Solar PV Project, Hillsborough County* (Janus Research 2015; FMSF No. 22844; DHR Project File No. 2016-1484) and 96.9 acres of the current project area surveyed during the *Cultural Resources Assessment Survey for the ABH Property, Hillsborough County* (Janus Research 2017; FMSF Manuscript No. 24348; DHR Project File No. 2017-3667). In letters dated May 13, 2016 and August 29, 2017, respectively, the State Historic Preservation Office (SHPO)/FDHR concurred with the determination that no historic properties were identified during the survey and that no further investigations were necessary.

As a result of the current survey of the remaining 58.3 acres, no previously recorded or newly recorded archaeological sites or archaeological occurrences were identified. The survey also identified no previously recorded or newly recorded historic resources within the project APE. Based on the results of the CRAS Addendum, no further work is recommended.

At this time, we respectfully request your concurrence with the findings in this letter and the enclosed report. If you have questions regarding the subject project, please feel free to contact me at 813-636-8200 or kate_hoffman@janus-research.com.

Sincerely,

Kathleen S. Hoffman

Kathleen S. Hoffman
Vice President

Cc: Adriano Alcoz, Tampa Electric Company
Anthony Arcuri, Environmental Consulting &Technology, Inc

CULTURAL RESOURCES ASSESSMENT SURVEY ADDENDUM FOR THE TECO BIG BEND SOLAR II EXPANSION HILLSBOROUGH COUNTY, FLORIDA

Prepared for:
Environmental Consulting and Technology, Inc.
1408 N. Westshore Boulevard, Suite 115
Tampa, Florida 33607

Prepared by:

Janus Research
1107 N. Ward Street
Tampa, Florida 33607

December 2020

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INTRODUCTION

Fieldwork for the cultural resource assessment survey (CRAS) addendum for the Tampa Electric Company (TECO) Big Bend Solar II Expansion Project in southwestern Hillsborough County was conducted in November 2020. The objective of the survey was to identify cultural resources located within the project area (Figure 1) and to assess their significance in terms of eligibility for listing in the *National Register of Historic Places* (National Register) according to the criteria set forth in 36 CFR Section 60.4.

This CRAS addendum was conducted in anticipation of United States Army Corps of Engineers (USACE) and Florida Department of Environmental Protection (FDEP) permits. This assessment complies with Section 106 of the *National Historic Preservation Act (NHPA) of 1966* (Public Law 89-665, as amended), as implemented by 36 CFR 800 -- *Protection of Historic Properties* (incorporating amendments effective August 5, 2004); the revised Chapter 267, *Florida Statutes (F.S.)*; and standards embodied in the Florida Division of Historical Resources' (FDHR's) *Cultural Resource Management Standards and Operational Manual* (February 2003), and Chapter 1A-46 (*Archaeological and Historical Report Standards and Guidelines*), *Florida Administrative Code*. All work also conforms to professional guidelines set forth in the *Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation* (48 FR 44716, as amended and annotated). Principal Investigators meet the Secretary of the Interior's Professional Qualification Standards (48 FR 44716) for archaeology, history, architecture, architectural history, or historic architecture.

The Big Bend Solar II Expansion project area (project area) covers approximately 190.5 acres located in Sections 15 and 22 of Township 31 South, Range 19 East, on the Gibsonton (1956 Photorevised [PR] 1971) United States Geological Survey (USGS) quadrangle map (Figure 2). Approximately 132.2 acres of the project area were previously surveyed as part of other work related to the TEC Big Bend Solar Project. This included approximately 35.3 acres of the current project area surveyed during the *Cultural Resources Assessment Survey of the Tampa Electric Company (TEC) Big Bend Solar PV Project, Hillsborough County* (Janus Research 2015; Florida Master Site File Manuscript No. 22844) and 96.9 acres of the current project area surveyed during the *Cultural Resources Assessment Survey for the ABH Property, Hillsborough County* (Janus Research 2017; FMSF Manuscript No. 24348) (Figures 1 and 2). Neither of these previous investigations identified any cultural resources within the current archaeological or historic resources area of potential effect (APE), and the State Historic Preservation Officer (SHPO) concurred with the results of both surveys (Appendix A). Due to the association and overlap with the previous surveys, and because the current project area shares the same environmental and cultural contexts, the reader is referred to the 2015 and 2017 reports for more detailed environmental, archaeological, and historical overviews.

Project Description

The project consists of a new solar photovoltaic (PV) facility that will be constructed on a TECO-owned site in Hillsborough County, Florida that was historically agricultural land. The project will consist of solar photovoltaic panels, inverters, transformers, and a substation.

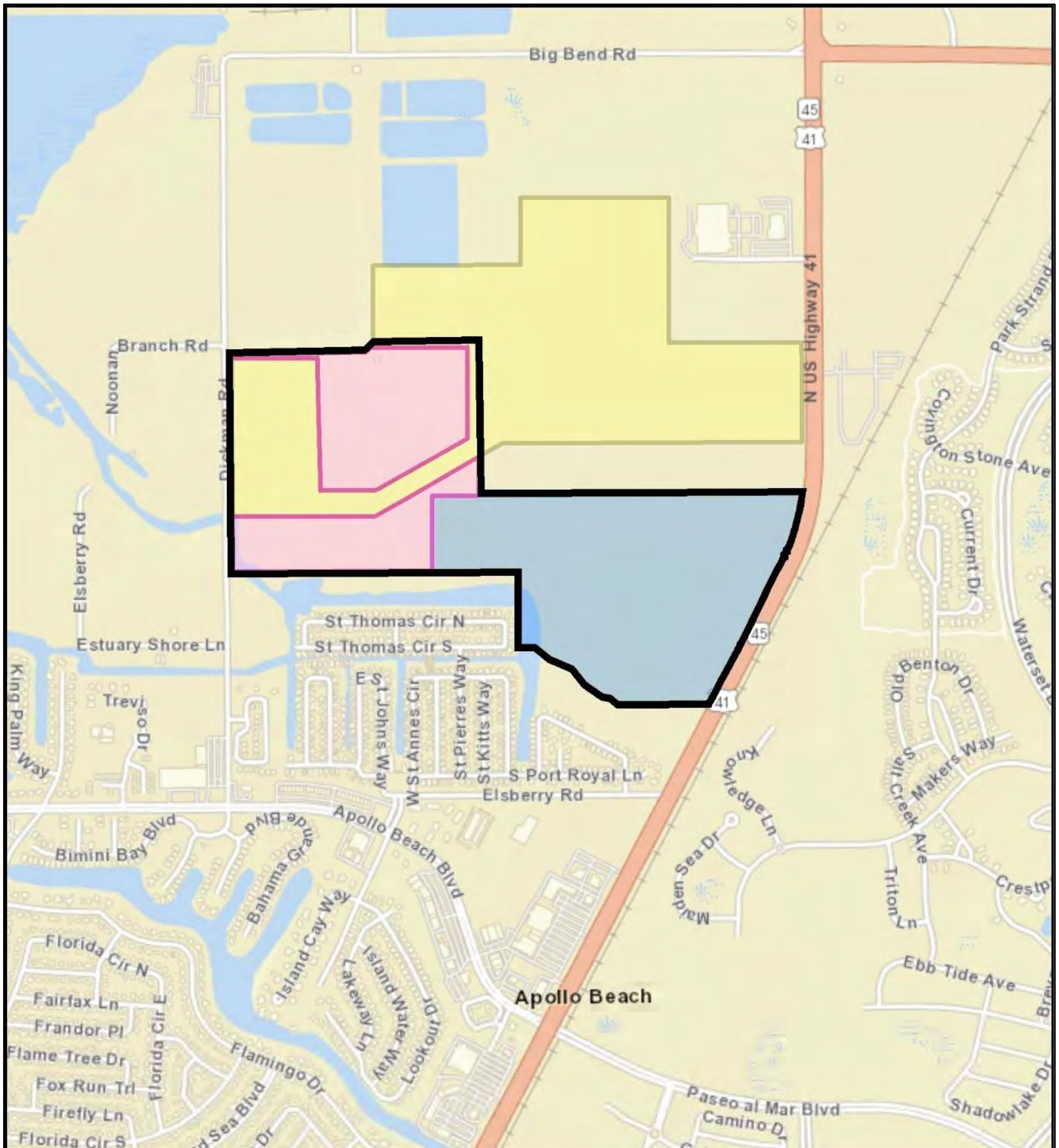


Figure 1: General Location of the Project Area Relative to Previous Surveys

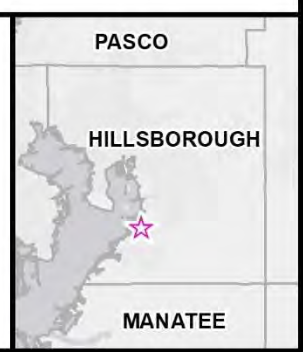
Project Area

Portion of Archaeological APE Surveyed During CRAS Addendum

2017 Archaeological Survey Limits (FMSF Manuscript No. 24348)

2015 Archaeological Survey Limits (FMSF Manuscript No. 22844)

0 0.5 1 Miles



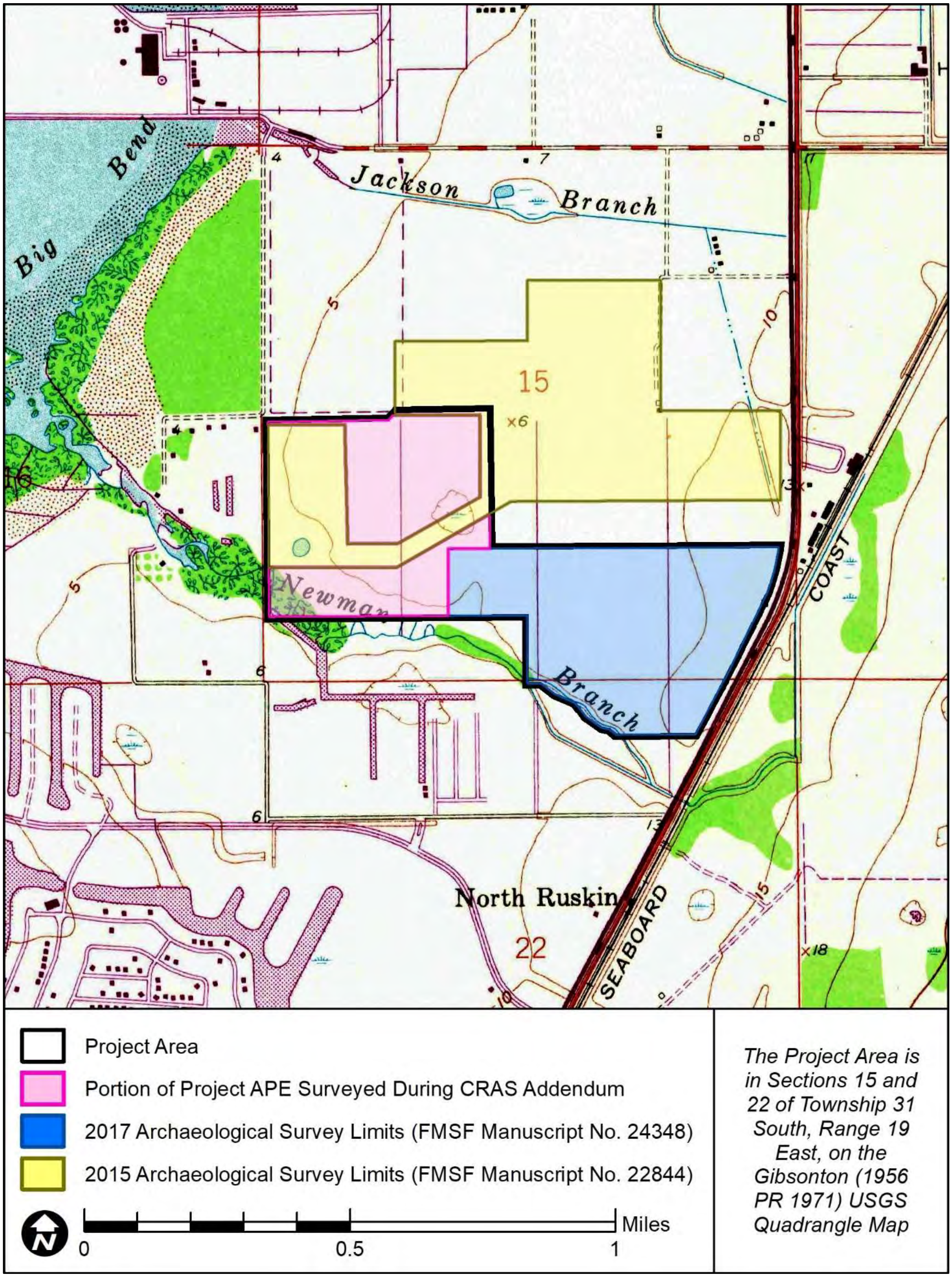


Figure 2: Project Area and Previous Surveys on Topographic Map

AREA OF POTENTIAL EFFECT

According to 36 CFR 800.16(d), the APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking as well as its geographical setting and must include measures to identify and evaluate archaeological resources. The project APE, therefore, considers the improvements that will be implemented as part of the proposed project and the extent of potential ground disturbance as well as the setting and character of the project area. The survey for archaeological sites typically focuses on identifying and evaluating cultural resources within the geographic limits of the proposed action and its associated ground disturbing activities.

The project area is located within an area of Hillsborough County consisting of sandy soils on flats of mesic or hydric lowlands (USDA 1989). The project area has been previously used for mining or agricultural purposes, and is currently undeveloped. Most of the surrounding area is part of the TECO Big Bend Power Station and includes solar fields and other TECO-related facilities, or is within an area that has been previously surveyed for cultural resources. Based on the nature of the proposed project, a well as the setting and character of the area, the historic and archaeological APE for the project (project APE) consists of the footprint of the project area (Figure 3).

PHYSICAL ENVIRONMENT OF THE PROJECT APE

An updated review of the physical environment of the project APE was conducted for the portion of the APE that was not previously surveyed for archaeological resources. A review of the General Land Office (GLO) historic plat map and surveyor’s field notes (FDEP 1847, 1857) was conducted to examine past environmental conditions within the vicinity of the archaeological APE. In the surveyor’s notes, the APE was described as 3rd rate pine land. A tidal creek, currently known as Newman Branch, is present within the southwestern corner of the APE (Figure 4). No cultural features or anomalies (roads, mounds, etc.) were noted within the APE by the surveyor.

A review of aerial photographs was conducted to examine land use changes through time (FDOT, Surveying and Mapping Office 1996–2019; University of Florida, George A. Smathers Libraries 1999–2016). In 1938 (Figure 5). The unsurveyed portion of the APE and surrounding lands were undeveloped and located in pine scrub, with the creek visible in the southwestern portion, and a large pond visible in the east. In 1957, the project APE contains drainage ditches and agricultural fields (Figure 6). By 1968, the same ditches are evident. Construction of the Apollo Beach development is shown outside of the project APE, to the south and west, and construction of the Big Bend Power Station was underway. Although development in the surrounding area subsequently increased, the project APE remained undeveloped in the 1970s and 1980s. In 1987, the gypsum mine formerly located in the northeastern portion of the unsurveyed area of the project APE is visible (Figure 7) and the former pond has been filled in. Today, the project area is undeveloped and the gypsum mine is no longer in operation.

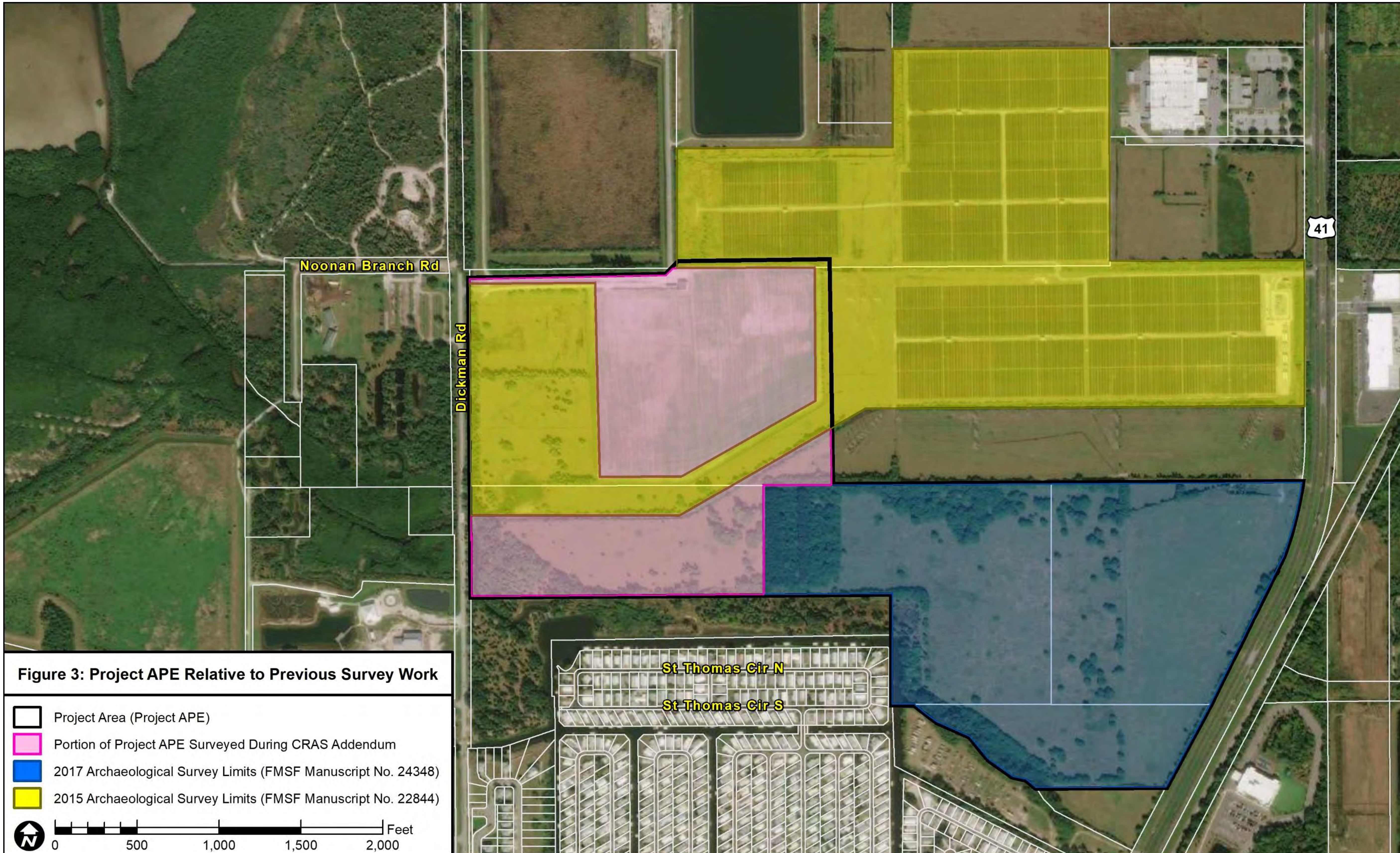


Figure 3: Project APE Relative to Previous Survey Work

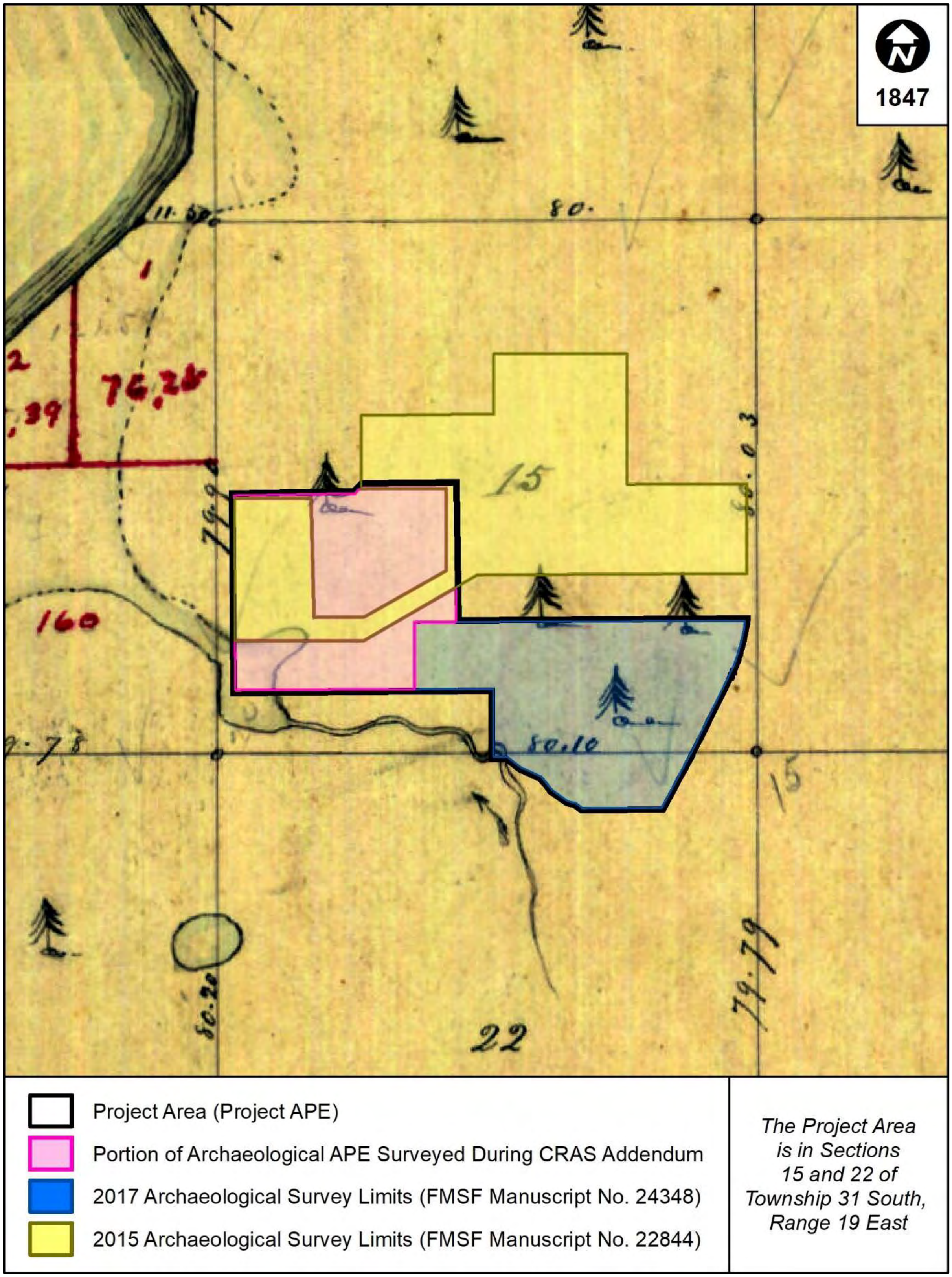


Figure 4: Approximate Location of Project APE and Previous Surveys on 1847 Plat

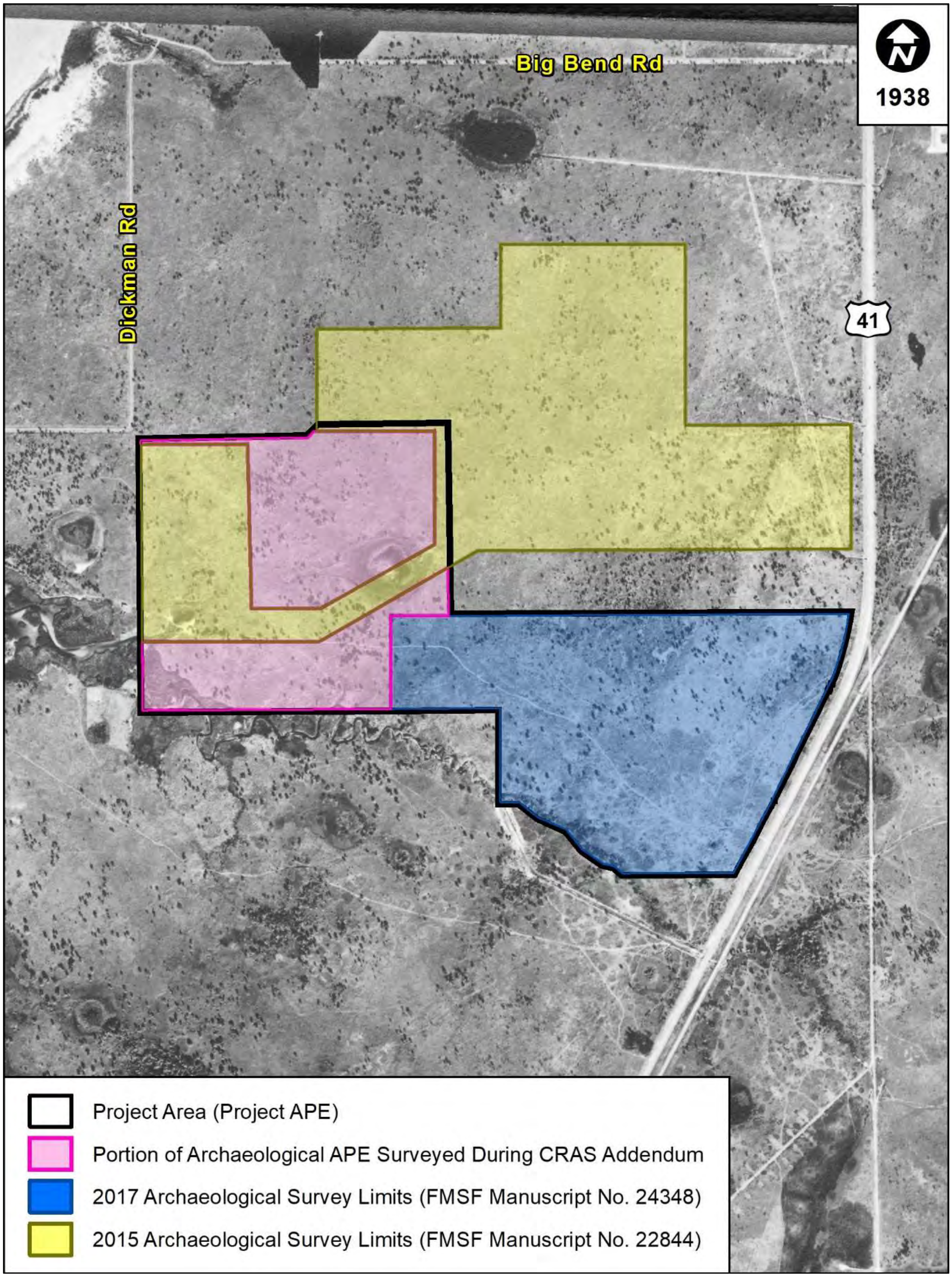


Figure 5: Approximate Location of Portion of the Project APE Surveyed During the CRAS Addendum on 1938 Aerial

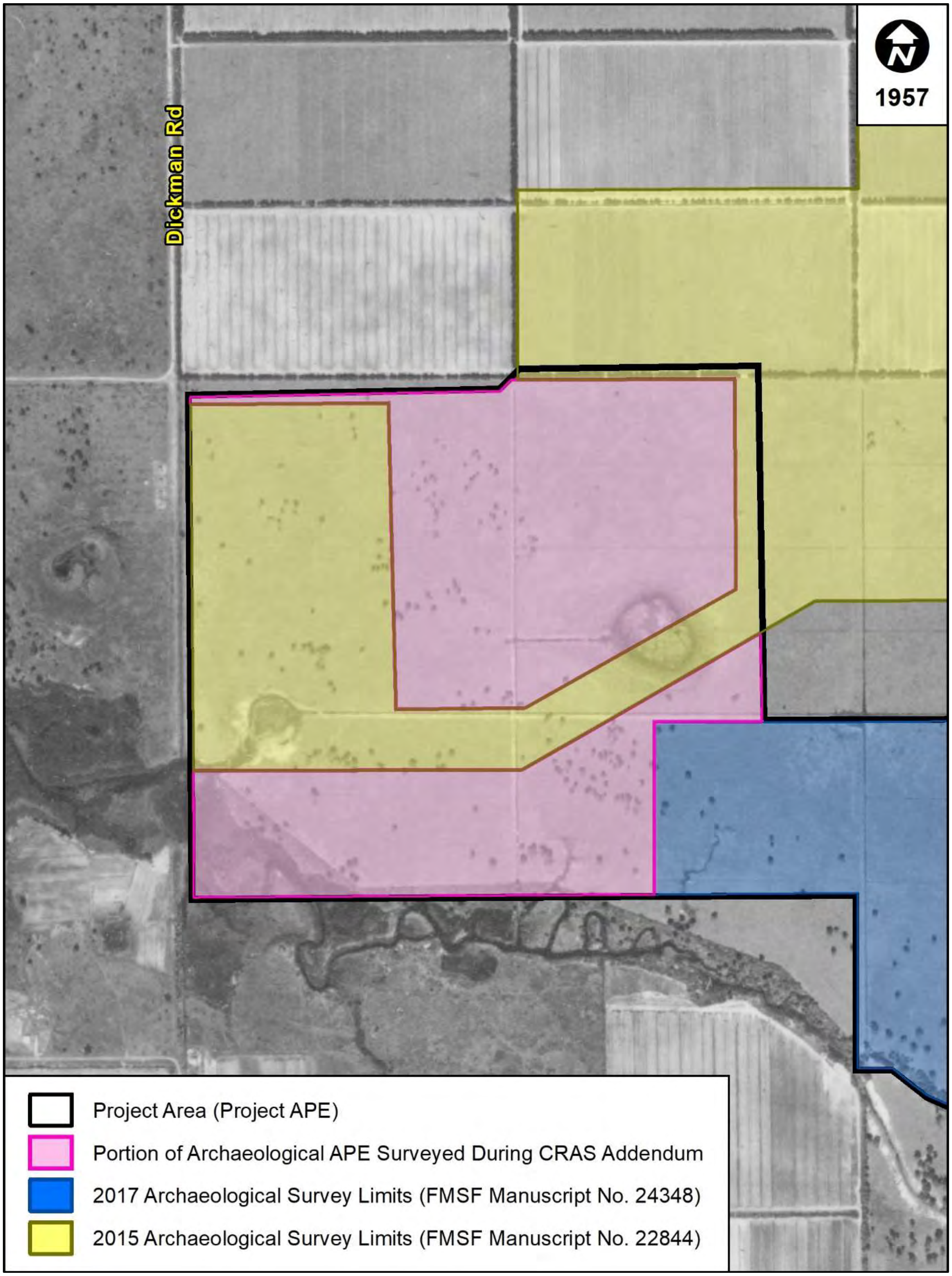


Figure 6: Approximate Location of Portion of the Project APE Surveyed During the CRAS Addendum on 1957 Aerial

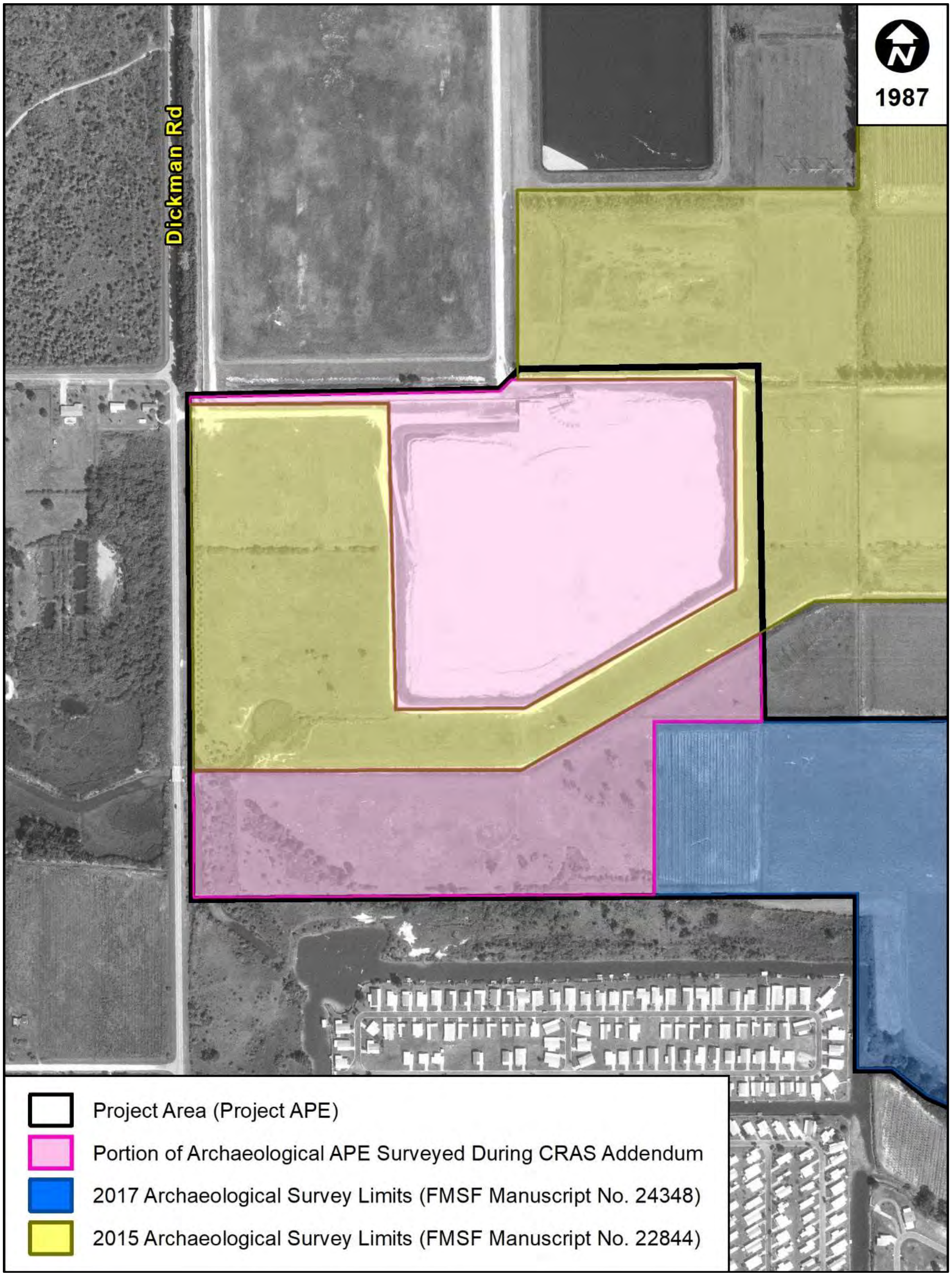


Figure 7: Approximate Location of Portion of the Project APE Surveyed During the CRAS Addendum on 1987 Aerial

Soil surveys from 1918, 1958, 1989, and 2020 were reviewed to understand the local environment and assess the potential for archaeological sites. The 1918 survey indicated that the previously unsurveyed portion of the APE fell within poorly drained flatwoods that exhibited standing water on the surface during wet periods. The 1958 soils survey also suggested the unsurveyed portion of the APE was in somewhat poorly drained flatwoods within and bordered by areas of tidal marsh to the south and a grassy freshwater pond on the east. The 1989 and 2020 soil survey reinforces the low lying nature of the APE, as well as the flooded and tidal nature of the soils in the southern portion of the unsurveyed portion of the APE. The soils in the unsurveyed portion of the APE (Table 1) are somewhat poorly to very poorly drained types associated with low lying flatwood or tidal areas.

Table 1. Characteristics of Soil Types within the Unsurveyed Portion of the Archaeological APE

Drainage Characteristics	Soil Type	Environmental Association
1918 Soil Survey		
Poorly Drained	Parkwood fine sandy loam, flatwoods phase	Level to gently sloping flatwoods. Standing water on surface during wet periods. Natural vegetation consisting of longleaf pine, saw palmetto, wiregrass, and broom sedge.
1958 Soil Survey		
Somewhat poorly drained	Leon fine sand, light-colored surface phase	Nearly level areas of flatwoods sloping down towards lower areas. Natural vegetation consisting of pine, wiregrass, and saw palmetto.
	Ruskin fine sand	Level or nearly level areas near the coast. Ditching used to remove excess surface water during wet seasons. Natural vegetation consists of pines with occasional cabbage palm and sparse saw palmetto, runner oak, shrubs, and grasses.
Inundated	Shallow Ponds with Grass	Shallow ponds and marshes mainly within flatwoods, covered in water from several inches to 3 feet in depth. Nature vegetation consist of water-tolerant plants like pickerelweed, waterlilies, bonnets, cattails, sedges, and grasses.
	Tidal Marsh	Level to nearly level areas just above sea level in narrow areas between tidal swamps and flatwoods. Covered in brackish water when tides are high. Natural vegetation consists of salt-tolerant grasses.
1989 and 2020 Soil Survey		
Poorly Drained	Myakka fine sand, 0-2 percent slopes	Broad plains in flatwoods with natural vegetation consisting of longleaf pine, slash pine, gallberry, running oak, saw palmetto, pineland threeawn, and wax myrtle.
	Myakka fine sand, frequently flooded	Found in tidal areas with natural vegetation consisting of mangrove trees, needlegrass rush, and cordgrass.
	Wabasso fine sand, 0-2 percent slopes	Low-lying plains in flatwoods with natural vegetation consisting of longleaf and slash pine with an understory of gallberry, lopsided Indiangrass, saw palmetto, pineland threeawn, and wax myrtle.

Drainage Characteristics	Soil Type	Environmental Association
Very Poorly Drained	Basinger, Holopaw, and Samsula soils, depressional	Swamps and depressions in the flatwoods with natural vegetation consisting of cypress, bluestem, maidencane, panicum, Jamaica sawgrass, and cutgrass. Undrained areas of this soil type are ponded for very long periods.

USDA 1918:33; 1958:26, 27, 34, 39; 1989:17, 31-33, 48; 2020:10, 29, 17, 18

FLORIDA MASTER SITE FILE SEARCH AND LITERATURE REVIEW

An updated search of FMSF data pertinent to the APE was conducted to determine the types, chronological placement, and location of cultural resources within the vicinity of the project APE. A review of FMSF data, previous surveys, property appraiser records, and historical research material was conducted to determine the potential for cultural resources within the project APE that are listed, eligible, or considered eligible for listing in the National Register, or that have potential or confirmed human remains. The FMSF is an important planning tool that assists in identifying potential cultural resources issues, and resources that may warrant further investigation and protection. It can be used as a guide but should not be used to determine the SHPO's official position about the significance of a resource.

Previously Conducted Cultural Resource Surveys

As noted previously, over two thirds of the project APE (132.2 acres) have been previously surveyed for archaeological resources as a result of the following surveys related to the TEC Big Bend Solar Project (see Figures 1–3):

- 35.3 acres of the current APE were surveyed during the *Cultural Resources Assessment Survey of the Tampa Electric Company (TEC) Big Bend Solar PV Project, Hillsborough County* (Janus Research 2015; Florida Master Site File Manuscript No. 22844)
- 96.9 acres of the current APE were surveyed during the *Cultural Resources Assessment Survey for the ABH Property, Hillsborough County* Janus Research 2017; FMSF Manuscript No. 24348)

A National Register–ineligible segment of US 41/Tamiami Trail (8HI12129) was documented adjacent to but outside of the current APE to the east during FMSF Manuscript No. 24348. However, no archaeological or historic resources were recorded within the current APE as a result of either of these previous surveys. SHPO concurred with these findings in letters dated May 13, 2016 and August 29, 2017, respectively (see Appendix A). No additional survey work has occurred within the project area since these previous surveys were completed.

Prior to the two surveys discussed above, a survey was conducted related to work along US 41 outside of the APE to the east: *CRAS, US 41 PD&E, 12th Street to Kracker Avenue* (Archaeological Consultants, Inc. [ACI] 2008). While the 2008 archaeological APE did not extend into the current APE, it identified no archaeological sites within the vicinity. In addition, the historic resources APE for the 2008 work extended slightly into the current project area, and identified no historic resources within the current APE.

Previously Recorded Archaeological Sites

An updated search of the FMSF data confirmed that no archaeological resources have been newly identified within the current APE since the previous work was conducted. Three previously recorded archaeological sites are located within one mile of the archaeological APE (Table 2). None of these sites have been evaluated by the SHPO for National Register eligibility and none are listed in the FMSF as having potential or confirmed human remains.

Table 2. Previously Recorded Archaeological Sites within One Mile of the Project Area

FMSF No.	Site Name	Site Type	National Register Evaluation*
8HI65	Big Bend	Shell midden	Not Evaluated
8HI100	Apollo Beach	General Vicinity Location of Cultural Material Dredged from Tampa Bay and Deposited as fill for development.	Not Evaluated
8HI101	Elsberry	Shell midden	Not Evaluated

* As recorded in the FMSF; may require re-evaluation

Previously Recorded and Potential Historic Resources

The updated search of the FMSF identified no newly or previously recorded historic resources within the current APE since the previous survey work was conducted. No potential extant historic resources were observed on the historic aerials. While the review of Hillsborough County Property appraiser data identified two parcels with Actual Year Built (AYRB) dates of 1960, these parcels were large parcels and no extant historic buildings were identified within or near the project APE during the current field effort.

PROJECT RESEARCH DESIGN AND SITE LOCATION MODEL

The background research and literature review, in conjunction with pertinent environmental variables, contributed to the formulation of project-specific field methods designed to locate and evaluate previously unrecorded archaeological sites within the previously unsurveyed portion of the current archaeological APE. Four environmental factors are typically used to help predict site locations: distance to fresh (potable) water, distance to hardwood hammocks, topography, and soil type (soil drainage).

Fresh water is an important resource, as the need for water is universal. This variable would have been of greater importance during the Paleoindian and Early Archaic periods (12,000–5000 BC) when the perched water system was more restricted. Before modern drainage, the unsurveyed portion of the archaeological APE was primarily within an area of low flatwoods which was likely seasonally wet. The southern portion of the APE was within a tidal area of brackish water along Newman Brach and there were scattered ponds in the area, including the former pond that was once intersected by the eastern boundary of the unsurveyed area. These ponds would have been the primary freshwater sources.

Hardwood hammocks (hydric, mesic, or xeric) provide a variety of resources that would have been exploited by the aboriginal inhabitants of this region. Often, areas of higher relative elevation correspond with better-drained soils or the presence of hardwood hammocks (xeric and mesic). No hammocks were identified within the APE during the review of historic plat maps or historic aerial photographs.

The characteristics of soils have been used by researchers to formulate predictive models for precontact site location. As mentioned previously, the soils within the archaeological APE are somewhat poorly to very poorly drained and contain depressional and tidal areas that were seasonally inundated. Based on the background research and analysis of environmental variables, the archaeological APE was determined to have a moderate to low potential for containing precontact period archaeological sites, with the moderate zone along the north side of the creek. Due to the level of previous disturbance associated with the filled pond, the area within and directly adjacent to its former location was considered to exhibit low site potential

METHODS

The field survey consisted of a pedestrian survey and subsurface testing. A visual inspection of exposed ground was conducted to look for evidence of archaeological sites or environmental features indicative of increased archaeological potential. The pedestrian survey also considered the presence of any historic resources. Shovel tests were excavated per the guidelines included in Module 3 of the FDHR's *Cultural Resource Management Standards and Operational Manual* (FDHR 2003). Shovel tests were circular and approximately 20 inches (50 centimeters) in diameter. They were excavated to a minimum depth of 39 inches (1 meter) unless excavation was inhibited by bedrock or pit slumping due to the influx of water. All excavated soil was dry screened through ¼-inch (0.64-centimeter) hardware cloth suspended from portable wooden frames.

Standard archaeological methods for recording field data were followed throughout the project. Current conditions were marked aerial field maps of the project APE and photographs taken to document the existing conditions. The identification number, location, stratigraphic profile, and soil descriptions were recorded for every shovel test excavated. The locations of all tests were plotted on field maps of the archaeological APE and recorded with WAAS-enabled hand-held Global Positioning System (GPS) units (UTM-NAD83). The location of the excavated shovel tests, as well as the current conditions of the archaeological APE, are illustrated relative to the archaeological APE on aerial imagery in Appendix B.

RESULTS

No newly or previously recorded archaeological sites or historic resources were identified within the APE. A large portion of APE that was not previously surveyed for archaeological resources (approximately 28 acres) consists of a former gypsum mine that has been heavily disturbed. The remaining portion of the previously unsurveyed area included in the APE is bordered to the southwest by Newman Branch, and consist primarily of improved pasture with areas of secondary growth consisting of saw palmetto, cabbage palms, Brazilian pepper, or oak with various grasses.

Twenty-one (21) shovel tests were excavated (Appendix B) and no cultural material was recovered. Representative photographs of the previously unsurveyed portion of the project APE are included in Figures 8–13. The strata observed in the shovel tests varied throughout the APE, which is consistent with the various soil types identified during the background research. Bedrock was encountered in Shovel Test (ST) 20 at a depth of 69 centimeters below surface (cmbs) but most of the shovel tests encountered water at depths ranging from approximately 68 cmbs to 90 cmbs, prior to reaching any bedrock. Marshy peat was often associated with the water encountered, at various depths (Figure 14). Evidence of fill was also present in several of the shovel tests. For example, the strata in Shovel Test 21 consisted of dark gray sand from 10 to 24 cmbs, light gray sand from 24 to 60 cmbs, dark brown sand, from 60 to 88 cmbs, and dark yellowish brown with shell fill from 88 to 100 cmbs, and water at 100 cmbs (Figure 15). Shovel Test 14 contained dark brown sand with rock and shell fill from 1 to 60 cmbs underlain by dark brown/gray sand with rock and shell fill from 60 to 100 cmbs (Figure 16).

CONCLUSIONS

No newly or previously recorded archaeological sites or archaeological occurrences were identified within the archaeological APE. Twenty-one (21) shovel tests were excavated within the archaeological APE and no cultural material was recovered. The survey also confirmed the absence of any historic resources within the APE. Based on the results of the CRAS addendum survey, and previous survey efforts overlapping the current project area, no further work is recommended within the current APE.

Unanticipated Finds

Should construction activities uncover archaeological remains, it is recommended that activity in the immediate area of the remains be stopped while a professional archaeologist evaluates the remains. If human remains are found during construction or maintenance activities, the provisions of Chapter 872.05, *F.S.* will apply. Chapter 872.05 states that, when human remains are encountered, all activity that might disturb the remains shall cease and may not resume until authorized by the District Medical Examiner or the State Archaeologist. The District Medical Examiner has jurisdiction if the remains are less than 75 years old or if the remains are involved in a criminal investigation. The State Archaeologist may assume jurisdiction if the remains are 75 years of age or older.

Curation

The Survey Log (Appendix C) and a copy of this report are curated at the FMSF in Tallahassee. Field notes and other pertinent project records are temporarily stored at Janus Research and returned to the client, as appropriate.

Figure 8: Existing Access Road in the Disturbed Northwestern Portion of the Previously Unsurveyed Portion of the Project APE, facing North

Figure 9: Disturbed Area of Former Gypsum Mine in the Previously Unsurveyed Portion of the Project APE, from Non-Historic Utility Building, facing West-Southwest

Figure 10: Grassy Area of Moderate Site Potential in the Previously Unsurveyed Portion of the Project APE, from North of Newman Branch, facing West

Figure 11: Grassy Area of Moderate Site Potential in the Previously Unsurveyed Portion of the Project APE, from ST 15, facing South toward Newman Branch

Figure 12: Small Clearing in Low, Forested Area of Oak, Pine, Palm, and Brazilian Pepper in Area of Low Site Potential in the Previously Unsurveyed Portion of the Project APE, from ST 1, facing North

Figure 13: Tidal Drainageway at Northern Edge of the Zone of Moderate Archaeological Site Potential, from Vicinity of STs 2 and 7, facing North

Figure 14: Soil Profile of ST 2 with Marshy Peat and Water from 80–95 cmbs, facing West and Down

Figure 15: Soil Profile of ST 21 Illustrating the Presence of Rock and Shell Fill from 88 to 100 cmbs and Water at 100 cmbs, facing East and Down

Figure 16: Soil Profile of ST 14 Illustrating the Presence of Rock and Shell Fill Throughout, facing East and Down

REFERENCES CITED

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Janus Research
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University of Florida, George A. Smathers Libraries
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APPENDIX A:

SHPO CONCURRENCE LETTERS FOR PREVIOUS SURVEY WORK WITHIN THE PROJECT APE

#22844

FLORIDA DEPARTMENT *of* STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

May 13, 2016

Lawrence N. Curtin
Holland & Knight LLP
315 South Calhoun Street, Suite 600
Tallahassee, Florida 32301

Re: DHR Project File No.: 2016-1484 / Received by DHR: April 25, 2016
Cultural Resources Assessment Survey of the Tampa Electric Company (TEC) Big Bend Solar PV Project, Hillsborough County Florida

Dear Mr. Curtin:

Our office received and reviewed the above referenced report in accordance with Chapters 267, *Florida Statutes,* for possible adverse impact to cultural resources (any prehistoric or historic district, site, building, structure, or object) listed, or eligible for listing, in the National Register of Historic Places (NRHP).

In July 2015, Janus Research conducted an archaeological Phase I survey of the Tampa Electric Company (TEC) Big Bend Solar Photovoltaic (PV) project area on behalf of the Tampa Electric Company. Janus identified no cultural resources within the project tract during this investigation.

Janus determined that the proposed project will have no effect on cultural resources listed, or eligible for listing in the NRHP, or otherwise of archaeological, historical, or architectural significance. Janus recommends no further investigation of the project area.

Based on the information provided, our office concurs with these determinations and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code*

If you have any questions, please contact Mary Berman, Historic Sites Specialist, by email at Mary.Berman@dos.myflorida.com, or by telephone at 850.245.6333 or 800.847.7278.

Sincerely

Timothy A Parsons, Ph.D.
Director, Division of Historical Resources
and State Historic Preservation Officer

#24348

FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

August 29, 2017

Kathleen Hoffman
Vice President
Janus Research
1107 N. Ward Street
Tampa, FL 33607

RE: DHR Project File No.: 2017-3667, Received by DHR: July 28, 2017
RE: Cultural Resources Assessment Survey for the ABH Property in Hillsborough County, Florida

Dear Dr. Hoffman:

In June and July 2017, Janus Research conducted the above referenced survey on behalf of Environmental Consulting & Technology, Inc. (ECT). Our office proceeded to review this report with the expectation that ECT will be engaging in permitting processes that will require this office to comment on possible effects to cultural resources listed, or eligible for listing, in the *National Register of Historic Places (NRHP)*, or otherwise of historical, architectural, or archaeological significance. We recommend at the time such actions are taken, a copy of this letter be forwarded to the permitting agency(ies) with the application. This letter does not constitute a review under Section 106 of the *National Historic Preservation Act*.

Janus identified no new or previously recorded archaeological sites within the project area during their investigation. Janus did identify an undocumented portion of US 41/Tamiami Trail (8HI12129) within the project area. Janus recommended this section of US 41/Tamiami Trail as ineligible for listing in the National Register. Janus recommended no additional work.

Based on the information provided, our office concurs with these determinations and finds the submitted report complete and sufficient in accordance with Chapter 1A-46, *Florida Administrative Code.*

If you have any questions, please contact me by email at *Jason.Aldridge@dos.myflorida.com*, or by telephone at 850.245.6344 or 800.847.7278.

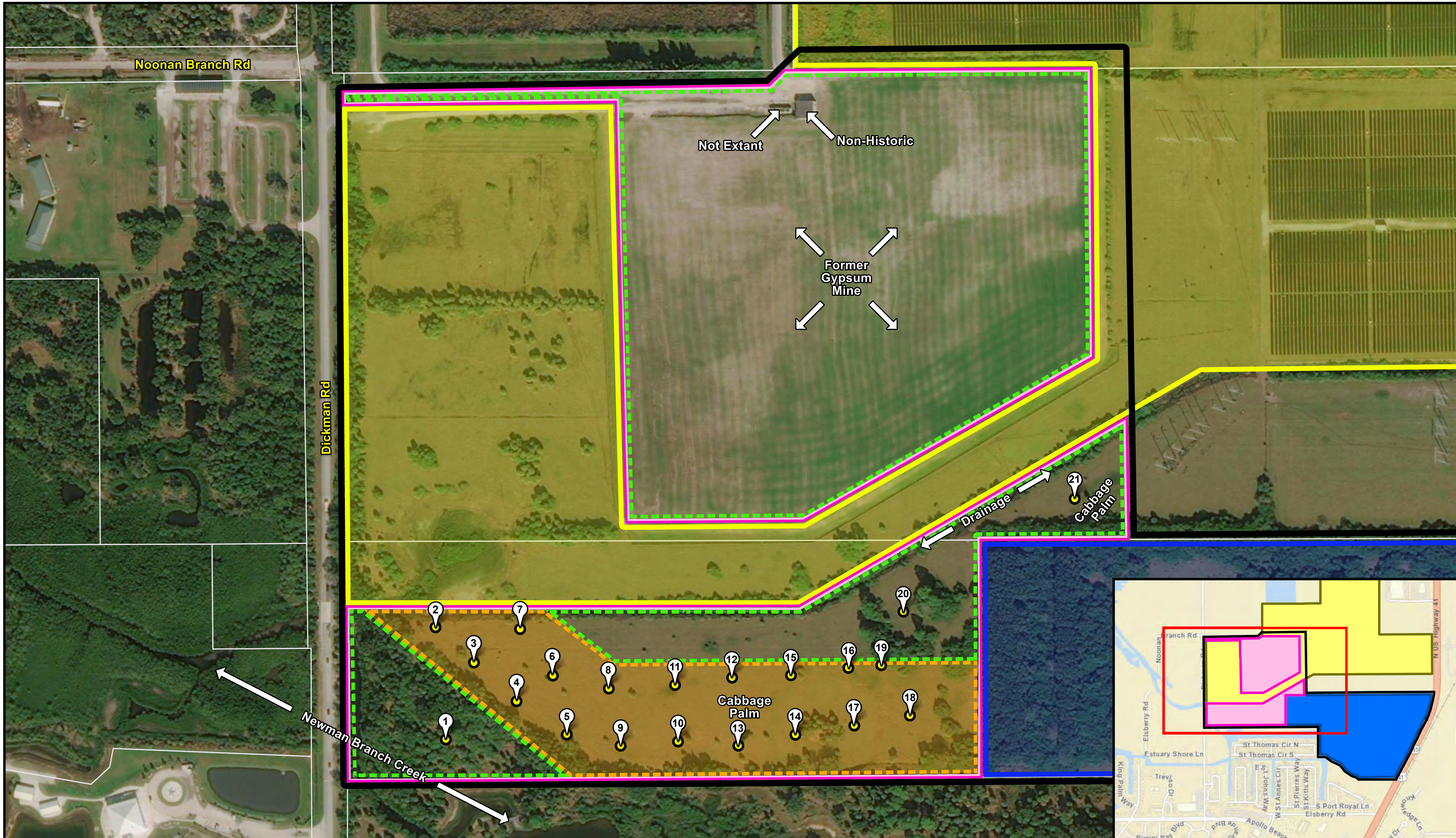
Sincerely,

Jason Aldridge

Jason Aldridge
Deputy State Historic Preservation Officer
for Compliance and Review

APPENDIX B:

LOCATIONS OF SHOVEL TESTS AND CURRENT CONDITIONS ILLUSTRATED ON AERIAL MAPPING



Shovel Test Locations and Current Conditions

TECO Big Bend Solar II Expansion

- Project Area (Archaeological APE)
- Negative Shovel Test
- Portion of Archaeological APE Surveyed During CRAS Addendum
- 2015 Archaeological Survey Limits (FMSF Manuscript No. 22844)
- 2017 Archaeological Survey Limits (FMSF Manuscript No. 24348)
- Zone of Moderate Archaeological Probability
- Zone of Low Archaeological Probability

CDP of Apollo Beach, Hillsborough County

0 50 100 Meters

APPENDIX C:

SURVEY LOG

Ent D (FMSF only) ____________

Survey Log Sheet

Florida Master Site File
Version 5.0 3/19

Survey # (FMSF only) ____________

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Manuscript Information

Survey Project (name and project phase)
Big Bend Solar II Expansion

Report Title (exactly as on title page)
CRAS ADDENDUM FOR THE TECO BIG BEND SOLAR II EXPANSION, HILLSBOROUGH COUNTY, FLORIDA

Report Authors (as on title page) 1. Janus Research 2. ____ 3. ____ 4. ____

Publication Year 2020 **Number of Pages in Report** (do not include site forms) 26

Publication Information (Give series, number in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)
Janus Research, 1107 N Ward St, Tampa FL 33607

Supervisors of Fieldwork (even if same as author) Names Kathleen S. hoffman; Amy Streelman

Affiliation of Fieldworkers: Organization Janus Research City Tampa

Key Words/Phrases (Don't use county name, or common words like *archaeology, structure, survey, architecture, etc.*)

1. Big
2. Bend
3. Solar
4. II
5. Newman
6. ____
7. ____
8. ____

Survey Sponsors (corporation, government unit, organization, or person funding fieldwork)

Name ____ Organization Environmental Consulting & Technology, Inc.

Address/Phone/E-mail 1408 N Westshore Blvd, Suite 115, Tampa, FL 33607

Recorder of Log Sheet Janus Research **Date Log Sheet Completed** 12-22-2020

Is this survey or project a continuation of a previous project? ☐No ☒Yes: Previous survey #s (FMSF only) ____

Project Area Mapping

Counties (select every county in which field survey was done; attach additional sheet if necessary)

1. Hillsborough
2. ____
3. ____
4. ____
5. ____
6. ____

USGS 1:24,000 Map Names/Year of Latest Revision (attach additional sheet if necessary)

1. Name GIBSONTON Year 1971
2. Name ____ Year ____
3. Name ____ Year ____
4. Name ____ Year ____
5. Name ____ Year ____
6. Name ____ Year ____

Field Dates and Project Area Description

Fieldwork Dates: Start 11-20-2020 End 11-23-2020 **Total Area Surveyed** (fill in one) ____ hectares 190.50 acres

Number of Distinct Tracts or Areas Surveyed 1

If Corridor (fill in one for each) **Width:** ____ meters ____ feet **Length:** ____ kilometers ____ miles

Survey Log Sheet

Survey # ____________

Research and Field Methods

Types of Survey (select all that apply): ☒archaeological ☒architectural ☐historical/archival ☐underwater ☐damage assessment ☐monitoring report ☐other(describe): ____________

Scope/Intensity/Procedures

21 shovel tests in previously unsurveyed areas at 50-m intervals in mod prob areas and judgmentally to cover 10% of low prob areas. No cultural material identified. 50 cm diameter shovel tests. All soil was screened. Visual inspection of project APE.

Preliminary Methods (select as many as apply to the project as a whole)

☐Florida Archives (Gray Building) ☐library research- *local public* ☒local property or tax records ☒other historic maps ☐LIDAR
☐Florida Photo Archives (Gray Building) ☐library-special collection ☐newspaper files ☒soils maps or data ☐other remote sensing
☒Site File property search ☐Public Lands Survey (maps at DEP) ☒literature search ☐windshield survey
☒Site File survey search ☐local informant(s) ☐Sanborn Insurance maps ☒aerial photography
☐other (describe): ____________

Archaeological Methods (select as many as apply to the project as a whole)

☐Check here if **NO** archaeological methods were used.

☐surface collection, controlled ☐shovel test-other screen size ☐block excavation (at least 2x2 m) ☐metal detector
☐surface collection, uncontrolled ☐water screen ☐soil resistivity ☐other remote sensing
☒shovel test-1/4"screen ☐posthole tests ☐magnetometer ☒pedestrian survey
☐shovel test-1/8" screen ☐auger tests ☐side scan sonar ☐unknown
☐shovel test 1/16"screen ☐coring ☐ground penetrating radar (GPR)
☐shovel test-unscreened ☐test excavation (at least 1x2 m) ☐LIDAR
☒other (describe): Desktop Analysis

Historical/Architectural Methods (select as many as apply to the project as a whole)

☐Check here if **NO** historical/architectural methods were used.

☐building permits ☐demolition permits ☐neighbor interview ☐subdivision maps
☐commercial permits ☐windshield survey ☐occupant interview ☐tax records
☐interior documentation ☒local property records ☐occupation permits ☐unknown
☒other (describe): Visual Survey of APE

Survey Results

Resource Significance Evaluated? ☐Yes ☒No

Count of Previously Recorded Resources 0 **Count of Newly Recorded Resources** 0

List Previously Recorded Site ID#s with Site File Forms Completed (attach additional pages if necessary)

List Newly Recorded Site ID#s (attach additional pages if necessary)

Site Forms Used: ☐Site File Paper Forms ☒Site File PDF Forms

REQUIRED: Attach Map of Survey or Project Area Boundary

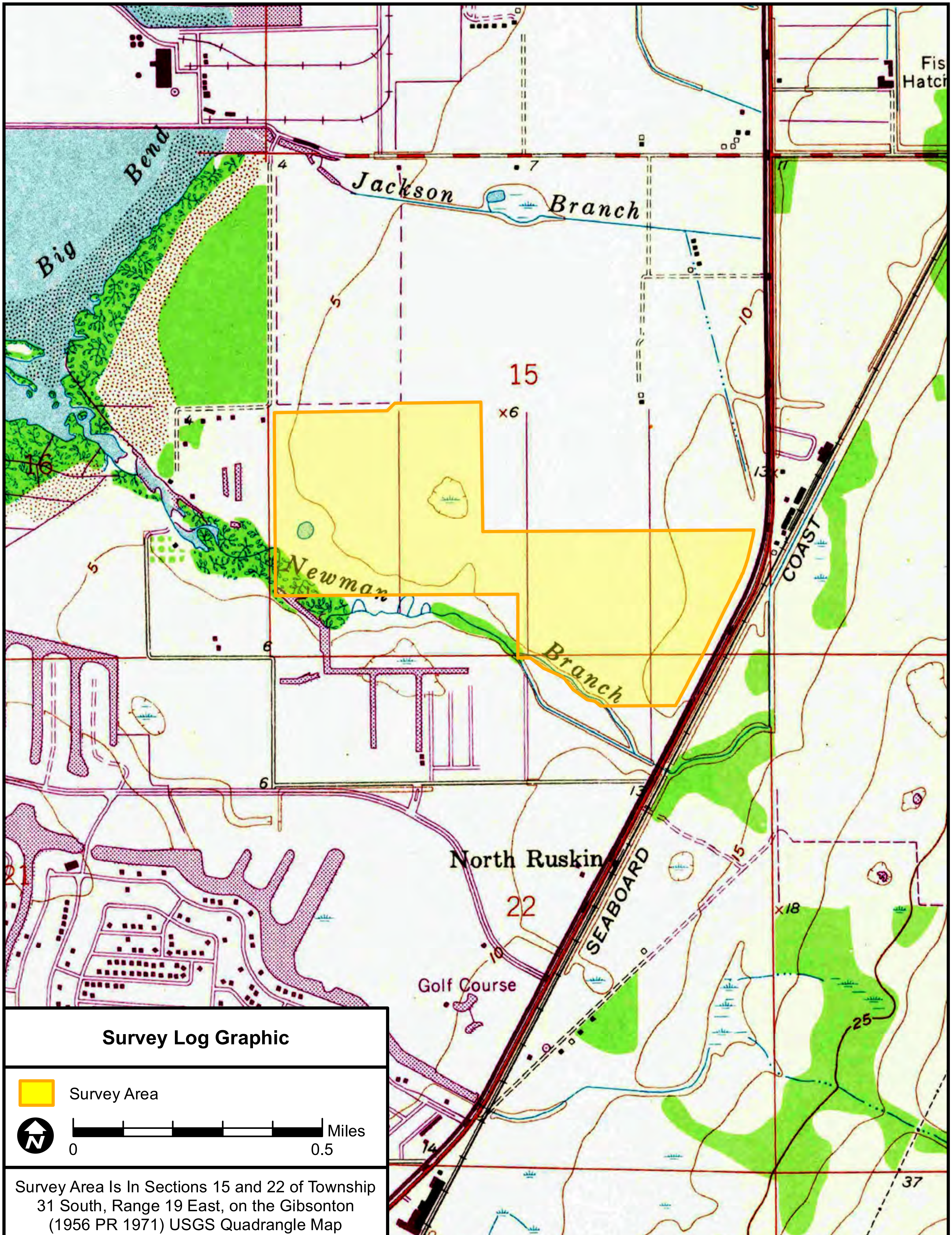
SHPO USE ONLY **SHPO USE ONLY** **SHPO USE ONLY**

Origin of Report: ☐872 ☐Public Lands ☐UW ☐1A32 # ____________ ☐Academic ☐Contract ☐Avocational
☐Grant Project # ____________ ☐Compliance Review: CRAT # ____________

Type of Document: ☐Archaeological Survey ☐Historical/Architectural Survey ☐Marine Survey ☐Cell Tower CRAS ☐Monitoring Report
☐Overview ☐Excavation Report ☐Multi-Site Excavation Report ☐Structure Detailed Report ☐Library, Hist. or Archival Doc
☐Desktop Analysis ☐MPS ☐MRA ☐TG ☐Other: ____________

Document Destination: Plottable Projects **Plotability:** ____________

Florida Master Site File / Div. of Historical Resources / R.A. Gray Bldg / 500 S Bronough St., Tallahassee, Florida 32399-0250
Phone 850.245.6440, Fax 850.245.6439, Email: SiteFile@dos.myflorida.com



Survey Log Graphic

Survey Area

0 0.5 Miles

Survey Area Is In Sections 15 and 22 of Township 31 South, Range 19 East, on the Gibsonton (1956 PR 1971) USGS Quadrangle Map

TAB 9

APPENDIX G

COMPLETED BASELINE WETLAND UMAM WORKSHEETS

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Big Bend II Solar		**Wetland 1 (W1)**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
643	**FDEP: 643** **FNAI: Wet Prairie** **SCS: Freshwater Marsh**	**Baseline**	**1.66 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
18 Tampa Bay	**Class III**	**None**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The area is situated on a terrace and is a depression located within improved pasture that is probably the result of contouring when the land was cleared and converted to pasture in the past. Water pools to the area and mostly stands until draining through the soil.

Assessment area description

The area was apparently planted with bahiagrass, but has recruited wetland species like bushy bluestem, hurricanegrass, seashore paspalum and frogfruit. The area is used as pasture and is maintained by grazing and mowing.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Big Bend Power Station, roads, and industrial and residential development	**Area is common in the general vicinity**

Functions	Mitigation for previous permit/other historic use
<u>BIOLOGICAL:</u> **Amphibian breeding; wading bird feeding; sandhill crane feeding; and reptile (snake) feeding).** **<u>PHYSICAL/CHEMICAL:</u>** **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)
HERPETOFAUNA: cricket frog, little grass frog, chorus frog, moccasin, black racer, ring-necked snake, yellow rat snake, coral snake, pygmy rattlesnake, brown snake, and garter snake; BIRDS: red-winged blackbird, killdeer, northern harrier, long-billed marsh wren, kestrel, wood stork, Florida sandhill crane, egrets, herons, ibis, and caracara; Mammals: armadillo, cotton mouse, raccoon, cotton rat, marsh rabbit, and white-tailed deer.	**Florida sandhill crane (ST, foraging, seasonal), tricolored heron (ST, foraging, seasonal), little blue heron (ST, foraging, seasonal), and wood stork (FT, foraging, seasonal).**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No wildlife observed, but probably attracts wading birds like cattle egrets and white ibis.

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
C. Vandaveer	**16-Nov-20**

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
Big Bend II Solar		**Wetland 1 (W1)**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Baseline	**C. Vandaveer**	**November 16, 2020**

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	Description
.500(6)(a) Location and Landscape Support w/o pres or current: **5** with:	**The area is surrounded by pasture and "other use" spaces that are part of the support infrastructure for the Big Bend Power Station. Small patches of woodlands, stormwater ponds, roads, and light industrial and residential developments are parts of the greater landscape.**
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: **5** with:	**The area is a depression where runoff pools and drains through the soil. The hydrology supports a marginal wetland plant community of graminoids and small forbs. Mucky soils and redox are present in the soil samples indicating that there is probably a high water table. The area is frequently disturbed by cattle and nearby heavy haul traffic, so wildlife use is probably discouraged and no evidence of wildlife usage was observed. The area has been managed for farm, and later, suburban development so no burning has taken place in decades.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: **5** with:	**The plant community is composed of a mix of graminoids and small forbs. The area was probably seeded with bahiagrass (*Paspalum notatum*), but this species is a minor component of the cover. The area has recruited bushy bluestem (*Andropogon glomeratus*), hurricanegrass (*Fimbristylis cymosa*), seashore paspalum (*Paspalum vaginatum*), frogfruit (*Phyla nodiflora*), coinwort (*Centella asiatica*), seapurslane (*Sesuvium portulacastrum*) and other small sedges and forbs. The area is maintained by grazing and mowing.**

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: **0.50** with:	Preservation adjustment factor = **N/A** Adjusted mitigation delta = **N/A**	FL = delta x acres = **N/A**

Delta = [with-current]	If mitigation	For mitigation assessment areas
	Time lag (t-factor) = **N/A** Risk factor = **N/A**	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
Big Bend II Solar		**Wetland 1A (W1A)**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
643	**FDEP: 643** **FNAI: Wet Prairie** **SCS: Freshwater Marsh**	**Baseline**	**0.45 acre**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
18 Tampa Bay	**Class III**	**None**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The area is situated on a terrace and is a depression located within an improved pasture that is probably the result of contouring when the land was cleared and converted to pasture in the past. Water pools to the area and mostly stands until draining through the soil.

Assessment area description

The area was apparently planted with bahiagrass, but has recruited wetland species like bushy bluestem, hurricanegrass, seashore paspalum and frogfruit. The area is used as pasture and is maintained by grazing and mowing.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Big Bend Power Station, roads, and industrial and residential development	**Area is common in the general vicinity**

Functions	Mitigation for previous permit/other historic use
BIOLOGICAL: **Amphibian breeding; wading bird feeding; sandhill crane feeding; and reptile (snake) feeding).** **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)
HERPETOFAUNA: cricket frog, little grass frog, chorus frog, moccasin, black racer, ring-necked snake, yellow rat snake, coral snake, pygmy rattlesnake, brown snake, and garter snake; BIRDS: red-winged blackbird, killdeer, northern harrier, long-billed marsh wren, kestrel, wood stork, Florida sandhill crane, egrets, herons, ibis, and caracara; MAMMALS: armadillo, cotton mouse, raccoon, cotton rat, marsh rabbit, and white-tailed deer.	**Florida sandhill crane (ST, foraging, seasonal), tricolored heron (ST, foraging, seasonal), little blue heron (ST, foraging, seasonal), and wood stork (FT, foraging, seasonal).**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

No wildlife observed, but probably attracts wading birds like cattle egrets and white ibis.

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
C. Vandaveer	**16-Nov-20**

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
Big Bend II Solar		**Wetland 1A (W1A)**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Baseline	**C. Vandaveer**	**November 16, 2020**

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	5		**The area is surrounded by pasture and "other use" spaces that are part of the support infrastructure for the Big Bend Power Station. Small patches of woodlands, stormwater ponds, roads, and light industrial and residential developments are parts of the greater landscape.**
.500(6)(b)Water Environment (n/a for uplands)	5		**The area is a depression where runoff pools and drains through the soil. The hydrology supports a marginal wetland plant community of graminoids and small forbs. Mucky soils and redox are present in the soil samples indicating that there is probably a high water table. The area is frequently disturbed by cattle and nearby heavy haul traffic, so wildlife use is probably discouraged and no evidence of wildlife usage was observed. The area has been managed for farm, and later, suburban development so no burning has taken place in decades.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	5		**The plant community is composed of a mix of graminoids and small forbs. The area was probably seeded with bahiagrass (*Paspalum notatum*), but this species is a minor component of the cover. The area has recruited bushy bluestem (*Andropogon glomeratus*), hurricanegrass (*Fimbristylis cymosa*), seashore paspalum (*Paspalum vaginatum*), frogfruit (*Phyla nodiflora*), coinwort (*Centella asiatica*), seapurslane (*Sesuvium portulacastrum*) and other small sedges and forbs. The area is maintained by grazing and mowing.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.50	

If preservation as mitigation,
Preservation adjustment factor = **N/A**
Adjusted mitigation delta = **N/A**

For impact assessment areas
FL = delta x acres = **N/A**

Delta = [with-current]

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
Big Bend II Solar		**Wetlands 2 (W2), W2A, W2B and W2C**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
612/642	**FDEP: 612/642** **FNAI: Mangrove Swamps/Salt Marsh**	**Baseline**	**3.11 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
18 Tampa Bay	**Class III**	**None**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Area is a topographic depression abutting a canal that opens to Newman Branch which empties into Tampa Bay. The area is inundated with saline/brackish water during high tides and drains during low tides.

Assessment area description

The main area is a salt marsh which has established mangroves in the lowest elevations. The area has been impacted by cattle, but has recovered a diverse community and is attractive to wildlife.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Big Bend Power Station, roads, pastures and industry in the general vicinity	**Few similar marshes**

Functions	Mitigation for previous permit/other historic use
BIOLOGICAL: **Wading bird feeding; forage fish habitat; reptile feeding** **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)
CRUSTACEANS: mangrove and fiddler crabs; HERPETOFAUNA: alligator and saltmarsh snake; BIRDS: herons, egrets, Florida sandhill crane, least tern, and wood stork; MAMMALS: raccoon and opossum.	**American alligator (FT(S/A), foraging), wood stork (FT, foraging, seasonal),tricolored heron (ST, foraging, longterm), little blue heron (ST, foraging, longterm), reddish egret (ST, foraging, longterm), and least tern (ST, foraging, nesting, longterm).**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wading bird and raccoon tracks, numerous mangrove and fiddler crabs

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
C. Vandaveer	**16-Nov-20**

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
Big Bend II Solar		**Wetlands 2 (W2), WA, WB and WC**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Baseline	**C. Vandaveer**	**November 16, 2020**

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	7		**The area is situated on a terrace that was converted to farmland during the 1940s and 1950s. The surrounding land is currently pasture with a small herd of cattle. The marsh abuts a canal that connects to Newman Branch, a tidal creek which allows wildlife movement to and from Hillsborough Bay. Roads, industries, and residential developments surround the greater landscape which limits terrestrial wildlife, but there is a preserved nature park (small maritime hammocks, other marshes, etc.) which provides additional habitat and a connection to the bay.**
.500(6)(b)Water Environment (n/a for uplands)	7		**The area is tidally influenced which is sufficient enough to support and allow the regeneration of the relatively diverse plant community. The area supports large numbers of fiddler and mangrove crabs which attracts wading birds and mammals like raccoons. The area was managed for farmland and is now managed as part of a suburban landscape and has not burned in decades although there are old tree stumps in the marsh that have charred wood.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	8		**The salt marsh plant community (W2) is composed of marsh-hay cordgrass (*Spartina patens*), salt grass (*Distichlis spicata*), seashore dropseed (*Sporobolus virginicus*), sea-lavender (*Limonium carolinianum*), yellowtops (*Flaveria floridana*) and sea purslane (*Sesuvium portulacastrum*). White mangrove (*Laguncularia racemosa*) and red mangrove (*Rhizophora mangle*) have become established near the center of the marsh (W2A and W2B) and seedlings are becoming established in the herbaceous zone. along the creek portion there are black mangroves (*Avicennia germinans*) and red mangroves (W2C). Cattle have access to the area; it is apparent that some grazing takes place, but grazing damage is relatively low and the wetland community is able to regenerate.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.73	

If preservation as mitigation,
Preservation adjustment factor = **N/A**
Adjusted mitigation delta = **N/A**

For impact assessment areas
FL = delta x acres = **N/A**

Delta = [with-current]

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]

TAB 10

APPENDIX H
FRAC-OUT CONTINGENCY PLAN

FRAC-OUT CONTINGENCY PLAN
FOR
DIRECTIONAL DRILLING

Table of Contents

FRAC-OUT Contingency Plan (FCP)

1.0 Introduction and Purpose

Directional bore operations have a potential to release drilling fluids into the surface environment through frac-out (A frac-out is the condition where drilling mud is released through fractured bedrock into the surrounding rock and sand and travels toward the surface.) Because drilling mud, consist largely of a bentonite clay-water mixture, they are not classified as toxic or hazardous substances. However, if it is released into the water bodies, bentonite has the potential to adversely impact fish and invertebrates.

While drilling fluids seepage associated with a frac-out is most likely to occur near the bore entry and exit points where the drilling head is shallow, frac-outs can occur in any location along a directional bore. This frac-out contingency plan (FCP) establishes operational procedures and responsibilities for the prevention, contaminate, and clean-up of frac-out associated with the proposed directional drilling utility project of Viasys.
All personnel and sub-contractors responsible for the work must adhere to this plan during the directional drilling process.

The specific objectives of this plan are to:

1. Minimize the potential for frac-out associated with directional drilling activities;
2. Provide for timely detection of frac-out;
3. Ensure an organized, timely and "minimum-impact" response in the event of a Frac-out and release of drilling bentonite;
4. Ensure that all appropriate notifications are made to the customer, management and safety personnel.

2.0 Site Supervisor/Foreman Responsibilities

The site supervisor/foreman has the overall responsibility for implementing this FCP. The site supervisor/foreman will ensure that all employees are trained prior to all drilling. The site supervisor/foreman shall be notified immediately when a frac-out is detected. The site supervisor/foreman will be responsible for ensuring that the safety department is aware of the frac-out, coordinating personnel, response, clean-up, regulatory agency, notification, and coordination to ensure proper clean-up, disposal of recovered material and timely reporting of the incident. The site supervisor/foreman shall ensure all waste disposal materials are properly containerized, labeled and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud.

The site supervisor/foreman shall be familiar with all aspects of the drilling activity, the contents of this Frac-out Contingency Plan and the conditions of approval under which the activity is permitted to take place. The site supervisor/foreman shall have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The site supervisor/foreman shall assure that a copy of this plan is available (onsite) and accessible to all workers are properly trained and familiar with the necessary procedures for response to frac-out, prior to commencement of drilling operations.

The site supervisor shall ensure that:

1. All equipment and vehicles are to be checked and maintained daily to prevent leaks of hazardous materials.
2. Spill kits and spill containment materials are available on-site at all times and that the equipment is in good working order.
3. Equipment required to contain and clean up a Frac-out release will be available at the work site.
4. If equipment is required to be operated near a riverbed, absorbent pads and plastic sheeting for placement beneath motorized equipment shall be used to protect the riverbed from engine fluids.

3.0 <u>Equipment</u>

The following equipment will be used to complete the bore under this plan.

1. Directional Drill: Vermeer 36 X 50 (certified by Vermeer Service Dept 8-08)
   Drill Specs are as follows
   - Load Capacities: 33,000 lbs of pull back and 44,000 lbs of rotation
   - Maximum drilling pressure of drill: 4995psi
   - Intended drilling pressure for this bore: between 150 & 200 psi
   - Maximum GPM allowed by machine: 70 GPM
   - Intended GPM for this bore: 8-10 GPM drilling out and maximum of 15 GPM pulling product back.
2. Vacuum System: 4,000 Gallon portable vacuum truck.

4.0 <u>Training</u>

Prior to the start of construction, the site supervisor/foreman, shall ensure that the crew members receive training in the following:

1. The previsions of the Frac-out Contingency Plan, equipment maintenance and site specific permit and monitoring requirements.

2. Inspection procedures for release prevention and containment equipment and materials.
3. Contractor crew obligation to immediately stop the drilling operation upon first evidence of the occurrence of a frac-out and to immediately report any frac-out release.
4. Contractor/crew member responsibilities in the event of a release.
5. Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate.
6. Protocols for communication with agency representatives who might be on-site during clean-up efforts.

5.0 Drilling Procedures

The following shall be followed each day, prior to the start of work. The Frac-out Contingency Plan shall be available on-site during construction period. The site supervisor/foreman shall be on-site at any time that drilling is occurring or is planned to occur The site supervisor/foreman shall ensure that a documented job briefing meeting (toolbox meeting) is held at the start of each day of drilling to review safety issues and the appropriate procedures to be followed in case of a frac-out. Questions shall be answered and clarification given on any point over which the drilling crew or other project staff has concerns.

Drilling pressure shall be closely monitored so they do not exceed those needed to penetrate the formation. Pressure levels shall be monitored randomly by the operator. Pressure levels shall be set at a minimum level to prevent frac-outs. During the pilot bore, maintain the drilled annulus. Cutters and reamers will be pulled back into previously-drilled sections after each new joint of pipe is added.

Once the drilling rig is in place, and drilling begins, the operator shall stop work whenever the pressure in the drill rig drops, or there is a lack of returns in the entrance pit. At this time the supervisor/foreman shall inform TEC representative of the potential frac-out. The supervisor and the drill rig operator shall work to coordinate the likely location of the frac-out. The location of the frac-out shall be recorded and notes made on the location and measures taken to address the concern. The following subsections shall be adhered to when addressing a frac-out situation.

Water containing mud, silt, bentonite, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake, flowing stream or any other water source. The bentonite used in the drilling process shall be either disposed of at an approved disposal facility or recycled in an approved manner. Other construction materials and waste shall be recycled, or disposed of, as appropriate.

5.1 Vacuum Truck

A 500 gallon capacity vacuum truck shall be staged on location from which it can be mobilized so that any place along the drill shot can be reached by the apparatus within 10 minutes of a frac-out.

5.2 Field Response to Frac-out Occurrence

The response of the field crew to a frac-out release shall be immediate and in accordance with procedures identified in this Plan. All appropriate emergency actions that do not pose additional threats to sensitive resources will be taken, as follows:

1. Directional boring will stop immediately.
2. The bore stem will be pulled back to relieve pressure on the frac-out.
3. The site supervisor/foreman will be notified to ensure that management and the safety department is notified, adequate response actions are taken and notifications made.
4. The site supervisor/foreman shall evaluate the situation and recommend the type and level of response warranted, including the level of notification required.
5. If the frac-out is minor, easily contained, has not reached the surface and is not threatening sensitive resources, a leak stopping compound shall be used to block the frac-out. If the use of leak stopping compound is not fully successful, the bore stem shall be redirected to a new location along the desired drill path where a frac-out has not occurred.
6. If the frac-out has reached the surface, any material contaminated with Bentonite shall be removed by hand, to a depth of 2-feet, contained and properly disposed of, as required by law. A dike or berm may be constructed around the frac-out to entrap released drilling fluid, if necessary. Clean sand shall be placed and the area returned to pre-project contours.
7. If a frac-out occurs, reaches the surface and becomes widespread, the site supervisor/foreman shall authorize a readily accessible vacuum truck and any other necessary equipment to be mobilized. If heavy equipment is used in the process of clean-up operations the vacuum truck can be placed on either end of the line of the drill so that the frac-out can be reached by crew on foot, or may be pulled by the heavy equipment, so that contaminated soils can be vacuumed up.

5.3 Response Close out Procedure

When the release has been contained and cleaned up, response close out activities will be conducted at the direction of the site supervisor/foreman and shall include the following:

1. The recovered drill fluid will either be recycled or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source.

2. All Frac-out excavation and clean-up sites will be returned to pre-project contours using clean fill, as necessary.
3. All containment measures (fiber, rolls, straw bale, etc.) will be removed, unless otherwise specified by the site supervisor/foreman and/ or TEC representative.

5.4 Construction Re-start

For small releases not requiring external notification, drilling may continue, if 100 percent containment is achieved through the use of a leak stopping compound or redirection of the bore and the clean-up crew remains at the frac-out location throughout the construction period.

For releases requiring external notification and/or other agencies, construction activities will not start without prior approval from the safety department or TEC representative.

5.5 Bore Abandonment

Abandonment of the bore will only be required when all efforts to control the frac-out within the existing directional bore have failed and approval is given by a TEC representative.

6.0 Notification

In the event of a frac-out that reaches any ditches within or outside TEC, the site supervisor/foreman will notify the TEC representative. All notifications will occur within 1 hour and proper documentation will be accomplished in a timely and complete manner. The following information will be provided:

1. Name and telephone number of person reporting.
2. Location of the release.
3. Date and time of release.
4. Type quantity, estimated size of release
5. How the release occurred
6. The type of activity that was occurring around the area of the frac-out.
7. Description of any sensitive areas, and their location in relation to the frac-out.
8. Description of the methods used to clean up or secure the site.
9. Listing of the current permits obtained for the project.

6.1 Communicating with Regulatory Agency Personnel

All employees will adhere to the following protocols when Regulatory Agency Personnel arrive on site. Only the site supervisor/foreman, safety department, or TEC representative are to coordinate communication with Regulatory Agency Personnel.

6.2 Documentation

The site supervisor/foreman shall record the frac-out event in his/her daily log and will also fill out a Root Cause detailing the specific cause of "frac-out" with a detailed drawing. The Root Cause will include the following: Details on the release event, including an estimated amount of bentonite released, the size of the area impacted, and the success of the clean-up action. The Root Cause report shall include the: Name and telephone number of person reporting; Date, How the release occurred; The type of activity that was occurring around the frac-out; The description of methods used to clean up or secure the site; and a listing of the current permits obtained for the project.

7.0 Project Completion and Clean-up

1. All materials and any other rubbish-construction debris shall be removed from the construction zone at the end of each workday.
2. Relief pits at the bore entry and exit will be filled and returned to natural grade
3. All protective measures (fiber rolls, straw bales, silt fence, etc.) will be removed unless otherwise specified by the site supervisor/foreman.