BIG BEND POWER STATION
NORTH AND SOUTH ECONOMIZER ASH PONDS
CLOSURE PLAN

Prepared for

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Gibsonton, Florida 33534

Prepared by

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Florida Board of Professional Engineers Certificate of Authorization No. 5392

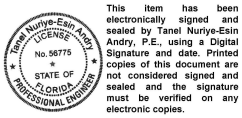
Wood Project No. 300996x2

October 2018

CERTIFICATION
Tampa

Engineering Certification

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Wood Environment & Infrastructure Solutions, Inc., 1101 Channelside Drive, Suite 200, Tampa, FL 33602, a corporation authorized to operate as a business providing engineering consulting services (5392) by the State of Florida Department of Professional Regulation, Board of Engineers. I further certify that I, or others under my direct supervision, have prepared the geotechnical engineering evaluations, findings, opinions, calculations, conclusions or technical advice hereby represented in this document.



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Date: October 3, 2018

Report Title: Big Bend Power Station
North and South Economizer Ash Pond
Closure Plan

Tampa Electric Company

October 2018

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1.0 INTRODUCTION

Tampa Electric Company (TECO) is planning to excavate the existing coal combustion residual (CCR) from the ponds known as the North and South Economizer Ash Ponds (NEAP and SEAP) at the Big Bend Power Station located at 13031 Wyandotte Road, Apollo Beach, Florida. The NEAP and SEAP along with the Economizer Ash Suction Pond (EASP) comprise the Economizer Ash & Pyrites Pond System (EAPPS).

As part of this work, TECO intends to meet the applicable requirements of 40 CFR Part 257 entitled "Disposal of Coal Combustion Residuals from Electric Utilities". TECO plans closure by removal of the CCR within the pond embankments to meet the specific criteria of 40 CFR Part 257.102(c). After CCR removal from the NEAP and SEAP, both pond footprints as well as the adjacent EASP footprint will be restored to approximate pre-development conditions with positive surface drainage using uncontaminated fill derived from the existing dikes and other sources of clean fill if necessary.

This document presents the written closure plan for the dewatering, removal of CCRs, and restoration of the area and generally follows the requirements of 40 CFR Part 257.102(b). **Figure 1** shows the existing conditions and **Figures 2** and **3** show conceptual CCR removal and pond closure.

2.0 SITE DESCRIPTION

The EAPPS, located southeast of the main plant area, was placed into service in 1985 to receive economizer ash and pyrites for disposal. (Reference **Figure 1**). The system includes two CCR surface impoundments and one water management pond. The impoundments are the NEAP and SEAP, and the EASP is for stormwater management. The ponds are impounded by earthen perimeter dikes with approximately 2.5 horizontal to 1 vertical slopes, and the interiors of the ponds are lined with 80 mil HDPE geomembranes. Exterior slopes are grassed and mowed frequently to allow for scheduled berm inspections. The perimeter dike around the system has a crest elevation of approximately 31 feet (Plant Datum[1]). The original grades in this area were approximately elevation 6 feet (Plant Datum). The floor elevations of the SEAP and NEAP were cut to approximately 5.5 feet (Plant Datum).

The total footprint of the EAPPS is approximately 21 acres. The surface area of the EASP is about 1.5 acres, the NEAP approximately 5 acres, and the SEAP approximately 7 acres. The EASP receives stormwater from several areas (basins) within the power station via a system of sumps, pumps

[1] Plant Datum is used for construction. To convert to NAVD, subtract 1.971 from Plant Datum.

and interconnected piping. The NEAP is about two-thirds filled with CCR, with most of the eastern portion filled to within about 2 feet of the top of the dike and CCR sloping down into open water in its west end. The SEAP is filled to capacity with ash to about dike level, with a perimeter drainage ditch which was installed to convey stormwater from the impoundment to the Long Term Fly Ash Pond (LTFAP) located to the south of the SEAP via three stormwater discharge pipes. The existing conditions of the EAPPS is presented as **Figure 1**.

3.0 CLOSURE PLAN

Tampa Electric Company (TECO) plans to close the NEAP and the SEAP in accordance with the "Closure by Removal" provisions of 40 CFR Part 257.102(c). Accordingly, all CCRs will be excavated and hauled by truck to a permitted off-site landfill. Dewatering of the pore water in the stored ash and then additional stacking and drying will be required to allow for excavation and hauling, respectively. After removal and disposal of the CCRs and excavation of the perimeter berm, the project area will then be regraded and stabilized with grass seed or sod.

3.1 Closure Sequence

The closure process will involve the following major tasks:

1. Reroute existing EASP stormwater piping along the west side of the ponds directly to the LTFAP. This will eliminate the need to continue EASP operation after the closure project is complete.
2. Pump all surface water from the EAPPS to the LTFAP.
3. Dewater CCRs in the NEAP and SEAP prior to removal.
4. Remove and further dewater CCRs from the NEAP and SEAP and prepare for off-site disposal.
5. Remove liner from EASP for disposal and inspect sub-base of NEAP and SEAP for presence of CCRs.
6. Excavate and dispose any impacted soils found beneath the liner.
7. Remove stormwater overflow piping and restore north dike of the LTFAP.
8. Regrade and stabilize footprint of EAPP system.

3.2 Dewatering Effluent and Stormwater Management

Temporary pumping equipment will be used to move the surface water from the EASP, NEAP, and SEAP to the LTFAP and then to continue to keep the EAPPS dewatered in this manner for the duration of the project.

3.3 CCR Dewatering

CCR should be dewatered to allow equipment access on the ash surface as well as to facilitate excavation and handling. Dewatering will also be required to desaturate the CCR. Typically, dewatering will produce about 20 percent of the total volume of the saturated CCR as water (i.e. a cubic yard of saturated CCR will produce about 40 gallons of water). CCR may consolidate somewhat as this water is removed, but experience suggests that consolidation of CCR may be significantly less than would be expected for natural silty sediments of similar soft consistency.

Dewatering can be accomplished using various methods, including trenches, french drains, well-points, or dewatering pits. Decanting of the surface water in the NEAP should allow considerable drainage through the slope at the west end of the CCR. Initial trenching and ash excavation can be accomplished using the perimeter dikes as a stable work platform. Temporary piezometers will be installed to monitor the impoundment water table within the pond as an indication of surface stability for equipment operation on the ash surface. CCR should be dewatered so as to maintain the impoundment water table at least 3 to 5 feet below the surface to allow access for light, low-pressure, tracked equipment and at an even lower level for higher pressure or heavier equipment.

3.4 CCR Excavation, Drainage, and Staging

Once a pond is drained, stormwater diverted, and at least some of the CCR rendered unsaturated, excavation of CCR may commence. CCR moisture content for transport must generally be low enough to pass the paint filter test. However, some moisture will be required for dust control. The practically achievable moisture content range that meets these two conditions will vary due to variations in the ash, but a general guide will be near or slightly below the optimum moisture content as determined by the Standard Proctor test (ASTM D698). Lower moisture contents are desirable to reduce transport and disposal costs, which are normally charged by the ton, but variations in weather and ash composition will prevent optimization of moisture levels in all the ash.

Dewatering will generally desaturate the ash but will likely not bring it down to moisture content range required for handling and transport. Ash will likely require staging in small stockpiles to allow additional drainage and drying. Spreading and turning could also be considered. A relatively

level area will be needed to allow these operations. The steep, lined slopes that comprise most of the interior of the SEAP and NEAP are unlikely to be acceptable for such operations due to equipment access, ash slope stability, and liner protection considerations. The NEAP ash could be staged onto the relatively flat SEAP surface (which should be dewatered and monitored for stability). A temporary staging platform, lined to avoid contact of ash with the underlying soils, could then be constructed in the NEAP footprint to allow staging of the SEAP ash. Alternately, such a staging area could be constructed elsewhere for staging of ash.

The ash should be loaded carefully into the over the road trucks planned for transport to avoid issues of dusting, tracking, or other ash losses. If necessary, trackout controls would be installed in accordance with the provisions of the Stormwater Pollution Prevention Plan (SWP3) for the project.

3.5 Staging Area

Staging areas will be maintained within the lined portions of the EAPPS to allow stockpiling, drying, and loading of the ash. At a minimum, graded areas will be maintained at an elevation at least 3 feet above the water levels within the NEAP and SEAP, sloping to a low point to allow the ash to drain and dry out in preparation for loading and hauling. Although the perimeter berm of the EAPPS will be excavated to follow the level of the ash being removed from the ponds, its minimum elevation will be maintained at least 3 feet above the ash level to provide complete ongoing containment of the CCR and leachate as the project proceeds. Dewatering pits will be installed to allow collection and pumping of leachate and stormwater to the LTFAP. The size of the staging area should be large enough to facilitate the planned rate of offsite CCR disposal. If the open areas of the EAPPS prove to be inadequate to support stacking and drying of the ash, the contractor will be directed to prepare a bermed and lined area to perform the drying and loadout operation. It is possible that the Long-Term Bottom Ash Pond (LTBAP) could be used temporarily for this operation. In any case, all dewatering effluent would be pumped into either the LTFAP or another lined pond within the Big Bend Recycle Water System and no offsite discharge would occur.

3.6 Liner Protection

The liners in the NEAP and SEAP provide a clear demarcation between the bottom of the ash and the uncontaminated subbase. As such, damage of the liner during final excavation of CCRs will be avoided as much as possible to limit contamination of the berm material and underlying soil. To this end, excavation should generally be conducted by skilled operators briefed in the importance of maintaining the liner and using untoothed buckets. Excavation should generally proceed along

the exposed liner so that the liner can be continuously observed. Traffic on the liners should be limited to lightweight, rubber-tired equipment operated to avoid sharp turns. Installation of wells and well points should employ rounded PVC tips and be conducted by hand jetting at low pressures or other means protective of the liner.

3.7 Liner Removal

Once the CCR has been entirely excavated from the NEAP and/or SEAP, the liner should be inspected and any liner breeches should be located by obtaining coordinates using a handheld Global Positioning System (GPS) unit. The liners for both ash impoundments and the water management (suction) pond will then be cut and removed in sections.

3.8 Confirmation of Removal

Section 257.102(c) of the CCR Rule states: "Closure by removal of CCR. An owner or operator may elect to close a CCR unit by removing and decontaminating all areas affected by releases from the CCR unit. CCR removal and decontamination of the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to § 257.95(h) for constituents listed in appendix IV to this part." TECO or its representative will inspect the exposed soils after liner removal and prior to any other grading operations to confirm CCR removal. The GPS locations of the previously detected liner breeches (if any) will be carefully inspected for the presence of any contamination (CCRs). A minimum of 6 inches of soil will be removed from beneath the breeched areas of the liner. However, actual dept of soil removal will be based on visual inspection of the soil by Tampa Electric's third party geotechnical engineer.

3.9 Regrading of Berms

After removal of all visible ash, the area may be backfilled and regraded with a slight slope to match surrounding grade and to provide positive drainage. It appears that the berm volumes will provide adequate fill for this purpose. After rough grading to approximate final elevations the area will be proof rolled with rubber-tired equipment to provide adequate compaction to support grassing and stabilization. Stabilization will then be performed by grassing the area with seed or sod. Any excess fill not needed for the project would be stockpiled elsewhere on the site for use on other company projects. Post closure care for this facility will consist of stabilization of all disturbed areas by seeding or sodding.

3.10 North Dike LTFAP

The south dike of the SEAP/north dike of the LTFAP can be reconfigured to reduce the crest elevation to approximately 21 feet. This will involve cutting and re-anchoring the liner on the interior of the north berm of the LTFAP. The crest will be excavated along with the north slope to match the profile and elevation of the other three sides (east, west and south) the LTFAP berm, generally a 12-foot minimum crest width and 2.5H to 1 V slopes. The LTFAP North Berm Design plan and profiles are presented in **Figures 2** and **3**.

3.11 Groundwater Monitoring

Upon completion of the closure project, groundwater monitoring will continue in accordance with the requirements of Consent Order No. 00-1275 and the Big Bend RAP until it is verified that the goals of the RAP have been accomplished.

3.12 CCR Quantity

The original drawings, bathymetric survey, and topographic survey of the NEAP and SEAP (modified to reflect approximate current conditions) were used to develop an opinion of probable volume of CCR material to be removed. Based on this information, a total ash volume of 570,000 tons (427,000 cubic yards) was calculated as the approximate maximum quantity stored in the impoundment. Experience with estimating volumes based on boring data suggests a potential contingency of +/- 20 percent would be prudent.

3.13 Project Schedule

Based on the estimated rate of dewatering and the disposal rate for the ash, the project is estimated to take 36 months to complete. The project schedule is presented in **Table 1** below.

Table 1 – NEAP and SEAP Closure Schedule

Activity	Start Date	End Date
Closure Plan Development	October 2016	October 2018
FDEP Plan Review	October 2018	TBD
Dewatering	October 2018	May 2021
Removal of CCR	October 2018	May 2021
Removal of Berms and Liner	May 2021	July 2021
Regrading of Site	July 2021	October 2021
Groundwater Monitoring	October 2021	October 2023

Note: TBD = To Be Determined

3.14 Stormwater Management

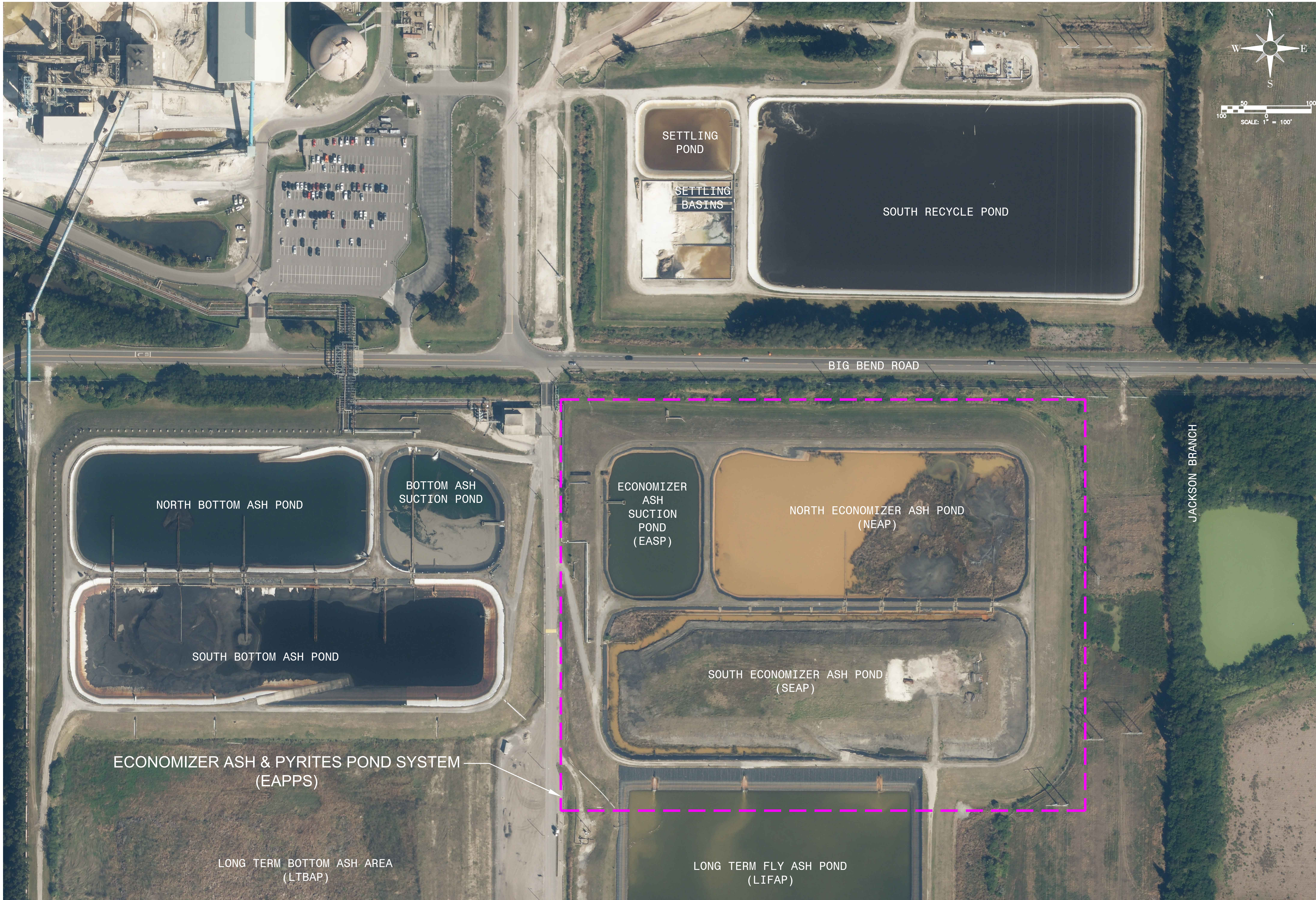
All stormwater runoff produced from rainfall which comes in contact with the economizer ash contained within the EAPPS will be pumped to the LTFAP and contained within the closed cycle Big Bend Recycle Water System. During removal of CCRs from the project, the contractor will gradually excavate the perimeter berm to a level that facilitates continued dewatering and excavation of CCRs in this manner. As berm material is removed, the contractor will either truck the material for use as clean fill to other areas of the Big Bend site or stockpile the material to be used as final backfill within the footprint of the EAPPS closure project. At least 72 hours prior to any disturbance of the perimeter berm, Tampa Electric will submit a Notice of Intent to Use NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities TECO's contractor will certify conformance with the permit and the SWP3 for the project. The SWP3 will specify the siltation controls and measures to prevent offsite siltation. These may include silt screens, hay bales, trackout pads or other measures to prevent escape of silt from the site. A Notice of Termination will be submitted at the end of the project upon completion of site stabilization.

4.0 REFERENCES

Geosyntec. 2017. Basis of Design and Preliminary Closure Evaluation Report; Economizer Ash and Pyrite Ponds; Big Bend Station, January 2017.

USEPA, April 2015. 40 CFR Part 257, Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, EPA-HQ-RCRA-2009-0640.

FIGURES



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TAMPA ELECTRIC CO.
BIG BEND POWER STATION

NORTH & SOUTH ECONOMIZER ASH POND CLOSURE PLAN
EXISTING CONDITIONS
APOLLO BEACH, FLORIDA

DATE: September 19, 2018
DRAWN BY: M.VIVES
CHECKED BY: T.ANDRY
PROJECT NO.: 300996X2

FIGURE 1

PROJECT NUMBER: 300996x2 CITY: TAMPA
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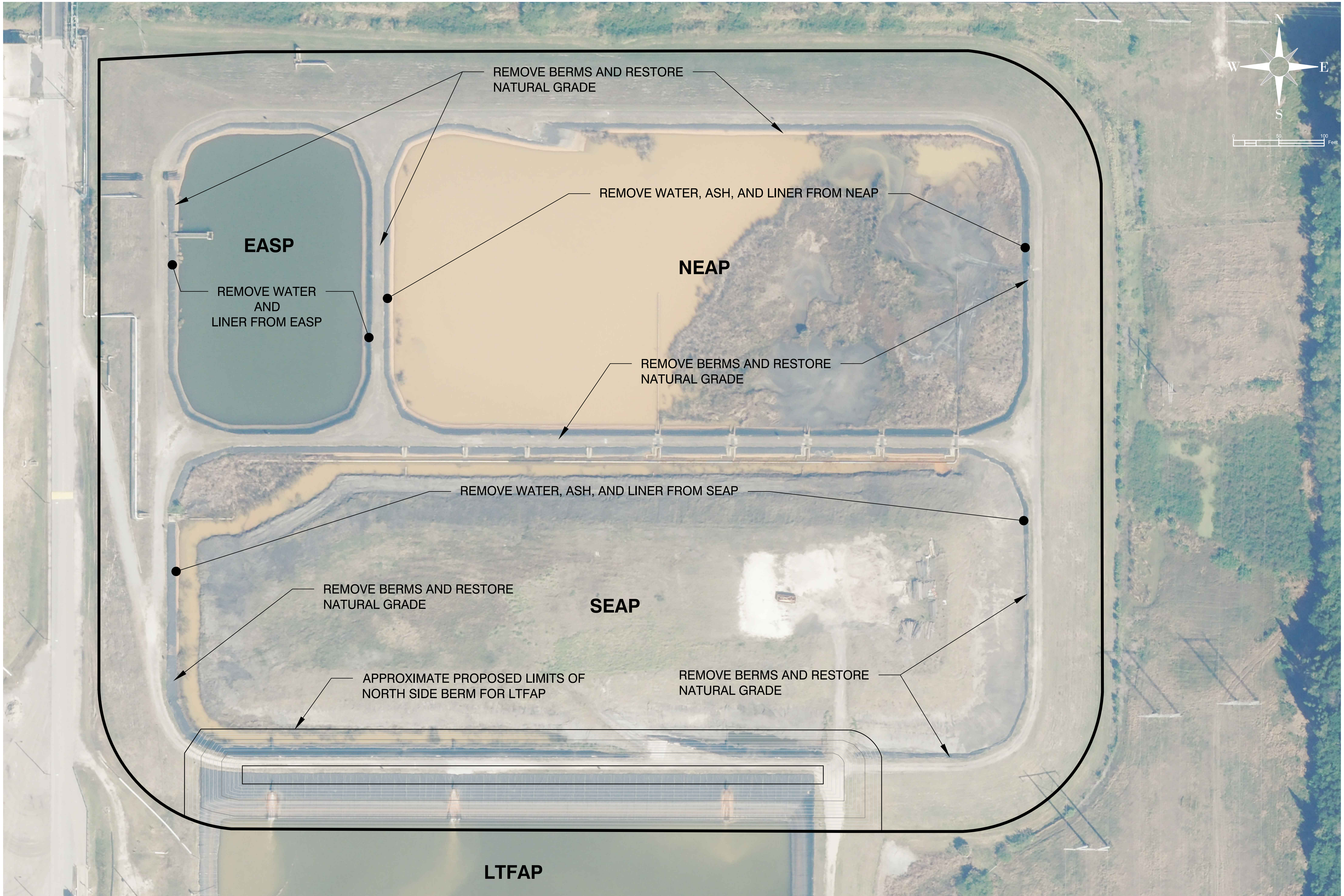

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NORTH & SOUTH ECONOMIZER ASH POND CLOSURE PLAN
PROPOSED CONDITIONS
APOLLO BEACH, FLORIDA

DATE: September 19, 2018
DRAWN BY: M.VIVES
CHECKED BY: T.ANDRY
PROJECT NO.: 300996X2

FIGURE 2

PROJECT NUMBER: 300996x2 CITY: TAMPA
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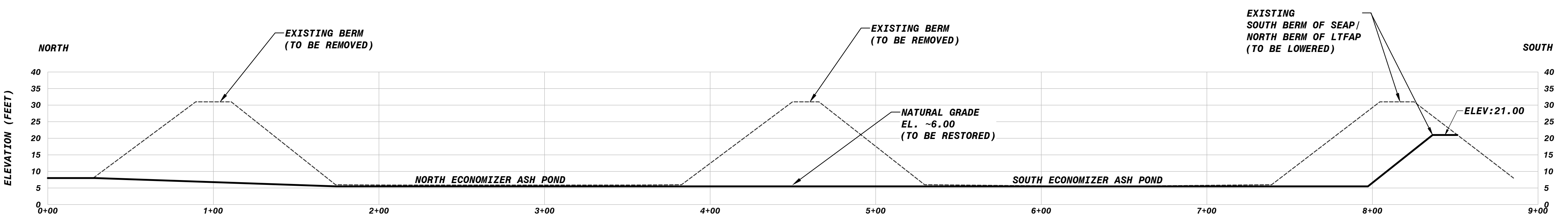

ECONOMIZER ASH AND PYRITES POND SYSTEM PROFILE

NO.	DATE	REVISION

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TAMPA ELECTRIC CO.
BIG BEND POWER STATION

NORTH & SOUTH ECONOMIZER ASH POND CLOSURE PLAN
PROPOSED NORTH-SOUTH CROSS SECTION
APOLLO BEACH, FLORIDA

DATE: September 19, 2018
DRAWN BY: M.VIVES
CHECKED BY: T.ANDRY
PROJECT NO.: 300996X2

FIGURE 3

PROJECT NUMBER: 300996x2 CITY: TAMPA
Z:\PROJECTS-C3D\300996x2 TECO Eco Ash Pond System\2018\Sept_2018\Closure Plan\300996x2_CP_Fig-3_OS-Xsection.dwg LAYOUT: FIGURE 3 SAVED: 9/20/2018 11:26 AM PLOTSTYLETABLE: CIVIL-MASTER.CTB PLOTTED: 9/20/2018 11:27 AM BY: VIVES, MARTIN