

5.0 Environmental Effects of Site Preparation and Plant and Associated Facilities Construction

This chapter discusses the expected environmental effects of site preparation and construction of the plant and associated facilities on the CCC Site. The potential environmental effects are assessed in terms of their relationships with the physical and natural and socioeconomic conditions on and in the vicinity of the Site as described in Chapter 3.0, as well as in terms of compliance with applicable regulations and standards. Chapter 9.0 describes the expected environmental effects due to construction of the off-Site associated transmission line and water pipeline linear facilities.

5.1 Land Impact

5.1.1 General Construction Impacts

Figure 5.1.1-1 illustrates the general areas on the CCC Site that will be disturbed by construction of the proposed power plant and associated on-Site facilities. Approximately 193 acres of the approximately 400-acre Site will be impacted by construction activities. As shown in Figure 5.1.1-1, approximately 54 acres located to the north and east of the power block area will be disturbed for construction laydown, including the construction stormwater detention ponds, and approximately 11.5 acres for construction parking. Other areas within the disturbed area for the plant facilities may be temporarily used for laydown and parking during the construction process. After construction is complete, the construction laydown area, including the associated stormwater detention ponds, and a portion of the construction parking area will be cleared of all equipment and materials, seeded, and allowed to revegetate to natural conditions. A portion (3 to 5 acres) of the parking area will be maintained for future DEF and contractor use during plant maintenance outages and other support purposes.

As discussed previously, Sabal Trail will have the responsibility for the permitting, construction, and maintenance of the approximately 310- by 225-ft (approximately 1.6 acres) natural gas metering/regulating yard in the southeastern portion of the Site

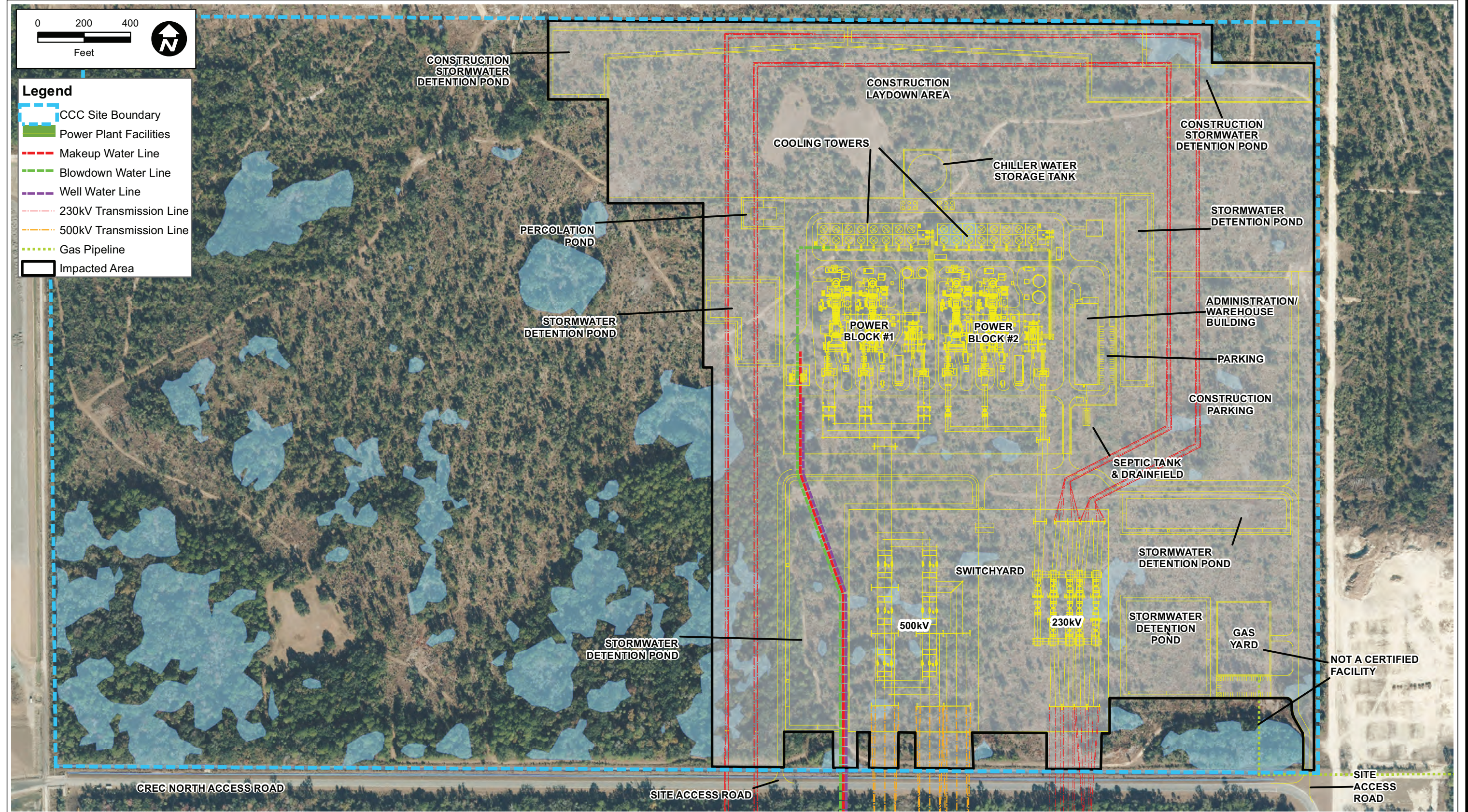


FIGURE 5.1.1-1.
LAND IMPACTED BY CONSTRUCTION OF THE CCC PROJECT

Sources: FDOT, 2011; AMEC, 2013; Burns & McDonnell, 2014; ECT, 2014.



and the gas pipeline entering the Site and running to the yard. The gas yard and pipeline are not proposed for certification in this SCA.

The on-Site construction activities for the Project will involve the following general phases:

- Site preparation and filling.
- Access roads, laydown/parking area, and stormwater system construction.
- Utilities work.
- Foundations and civil works.
- Equipment erection.
- Bulk commodity installation.
- Site cleanup.

The initial Site preparation activities will involve the grubbing and clearing of vegetation from the areas to be used for construction and the removal of unsuitable materials. Cleared vegetation will be disposed off-Site at an appropriately permitted facility or burned on-Site in accordance with applicable state and county open burning requirements. The cleared areas will be graded and stabilized. Erosion control measures, such as silt fencing, will be installed to control sediment in runoff from the disturbed areas.

Next, the plant facilities and switchyard areas will be filled to raise elevations of the areas for flood protection. Prior to placement of the fill, surface vibratory compaction will be performed. Any ground improvement methods (e.g., vibro-replacement or compaction grouting) will be performed prior to the placement of permanent fill. When compacted, the fill will effectively seal off the limestone strata and reduce the risk of sinkhole activity. The entire plant facilities area, including the power blocks, cooling towers, administration/warehouse building, and generator step-up transformer area, will be raised approximately 8 to 9± ft to an elevation of 15 ft-msl, which will protect the facilities from predicted Category 2 storm surge flooding levels. The switchyard area will be raised approximately 2 to 3± ft to an elevation of 9 ft-msl. Certain critical equipment will have additional flood protection measures, such as being constructed on pedestals or foundations. Structural fill materials, such as crushed limestone, will be obtained from locally available sources and applied and compacted in lifts. Again, erosion control measures will be installed to control sediment runoff. Also, sloped areas will be seeded and revegetated to stabilize the areas.

The first areas to be developed on the Site will be the access roads, stormwater management drainage ditches and detention ponds, and construction laydown and parking areas. As discussed in Section 4.8, the Project's stormwater management plan includes two temporary detention ponds for construction and five ponds for construction and permanent operations. For the balance of construction, all surface water runoff from the disturbed areas will be directed to one of the stormwater detention ponds. The construction laydown and parking areas and Site access and internal roads will be stabilized with limestone or similar locally available aggregate material.

During construction, no use of explosives is anticipated. Disturbed areas will be revegetated as soon as practicable to stabilize the soil and minimize sediment runoff.

The next general phases of construction will involve underground utility and civil works. Underground work will consist of the installation of such facilities as cooling water, firewater, sewer, drain, and other pipelines and electrical duct banks and grounding. Foundations to support heavy loads (i.e., CTGs, HRSGs, STGs, stacks, etc.) will be constructed using reinforced spread footings and/or piles, depending on final geotechnical specifications. Detailed foundation design will be completed during final design of the Project. Because of the somewhat variable soil and rock conditions, it is anticipated that foundations for heavily loaded structures will consist of deep foundations (piles or drilled shafts) founded on competent rock at depths below the variable rock formations. Other foundation options that will be evaluated include grouting or stone columns to ensure suitable bearing for shallow foundations for lightly loaded structures.

During the underground utility and foundation works, some limited, temporary dewatering activities may be required for facilities with deeper foundations. In general, the temporary dewatering activities will be accomplished through standard construction dewatering techniques, such as dewatering wells, French drains, trenches, sheet pile walls, and sump pumps. During construction, dewatering activities may periodically occur at various locations on the Site. Water withdrawn during the dewatering operations will be routed to the stormwater detention ponds. As described in Section 5.3, these temporary dewatering activities are not expected to adversely impact on- and off-Site surface water and groundwater resources. The dewatering activities will be conducted in accordance with all applicable requirements. Once the Project's

detailed design and construction plans are finalized, a dewatering plan, if required, will be submitted to FDEP prior to commencing dewatering activities.

After completion of the civil and foundation works, structural steel erection activities will be conducted followed by mechanical equipment erection and installation. Next, bulk piping and electrical systems will be installed, and remaining activities to complete the equipment and facility construction and site cleanup will be conducted. All equipment and systems will be appropriately tested prior to initiation of startup activities for the Project.

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

During construction, the construction labor force will use portable chemical toilets or chemical holding tanks. A licensed contractor will pump sanitary sewage from the portable toilets and holding tanks as needed and transport the waste to a permitted offsite disposal facility. Potable water for consumption and hand washing during construction will be provided by bottled water.

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

Individual contractors/subcontractors may generate hazardous waste while performing work. However, working with the contractors/subcontractors, DEF will be responsible for the on-Site storage, recordkeeping, and overall management of all hazardous waste generated at the Site. DEF will be responsible for the on-Site management of

hazardous waste, including manifesting and transporting for final off-Site disposition at an approved hazardous waste disposer in accordance with applicable federal, state, and local hazardous waste regulations.

It is anticipated that on-Site construction activities for the Project will begin in January 2016, or as soon as all permits/approvals are received, and will be completed to meet the scheduled commercial operation dates for the first and second combined cycle units in May 2018 and December 2018, respectively. Construction employment will average approximately 450 workers over the approximately 24-month construction period.

5.1.2 Roads

The construction workforce will average approximately 450 workers for the overall 24-month construction period. A peak of approximately 700 workers is anticipated, but up to 1,000 construction workers could be needed. During operation, the Project will employ approximately 50, but up to 75 employees.

During construction of the CCC Project, construction labor force and delivery traffic will use the existing roadway system in the vicinity of the Site, i.e., U.S. 19, West Power Line Street, and North Access Road. These same roads and intersections were used by construction traffic during development of the CREC units and are adequate for the CCC Project construction traffic. No access or modifications to state of Florida right-of-way or transportation facilities is necessary or proposed. Two Site access points are proposed via the North Access Road along the southern boundary of the Site. The proposed access roads will run north on the Site to the plant area. Section 5.7.3 of this SCA discusses the potential transportation impacts during construction. In addition, as discussed in previous paragraphs, DEF may utilize an existing road running parallel to the eastern boundary of the Site for access during Project construction and operation rather than the access point in the southeastern corner of the Site identified in Figure 4.2.0-2.

As discussed in Section 4.9.1, although the majority of equipment and materials for construction will be delivered to the Site by trucks, some larger equipment, such as the CTs, HRSGs, and STGs, may be delivered via the railroad system using the existing rail line along West Power Line Street or barged from Port of Tampa.

5.1.3 Flood Zones

As shown in Figure 3.1.4-1, the entire CCC Site is located within the 100-year flood zone. The Site, as well as lands to the east of the Site to U.S. 19, is located within an area designated by Citrus County as a Coastal High Hazard Area and is subject to flooding under Category 1 storm surge conditions. As discussed in Section 5.1.1, for flood protection, the plant facilities area will be filled to raise the area by approximately 8 to 9 ft, which will protect the facilities from predicted Category 2 storm surge flooding levels. The switchyard area will be filled to raise the area by approximately 2 to 3 ft. Also, certain critical equipment and structures will be built on pedestals for additional flood protection to Category 3 storm surge levels. Based on these flood protection measures, the Project will comply with the Citrus County requirements for structures in the Coastal High Hazard Area.

5.1.4 Topography and Soils

As discussed in Section 3.1.2, the Site is currently relatively flat, ranging from approximately 3 to 10 ft-msl. For flood protection, the plant facilities and switchyard areas will be filled and raised above existing topographic conditions. The construction activities will also alter runoff and percolation rates in the specific areas of the new structures and facilities. Stormwater runoff from these affected areas will be collected and directed to appropriately designed drainage systems and detention ponds in accordance with applicable stormwater management requirements (see Section 4.8 and Appendix 10.4). Also, during construction, appropriate erosion and sediment control measures will be implemented. Overall, the proposed changes in site topography in the Project facilities areas will not significantly impact conditions and runoff on the remaining undisturbed portion of the Site and offsite areas.

Detailed onsite geotechnical investigations have been conducted to assess soil stability, bearing strength, and sinkhole potential, as described in Sections 3.3.1.2 through 3.3.1.4. The results of these investigations will be used to develop final detailed designs and construction plans for appropriate equipment and structure foundations. The construction activities will not affect soil or geotechnical conditions on the remainder of the Site or offsite areas.

5.2 Impact on Surface Water Bodies and Uses

5.2.1 Impact Assessment

Construction within the CCC Site will have negligible impacts on surface water bodies and uses. There are no open surface waters or streams on the Site, which precludes any direct or indirect impacts to onsite waters or water quality. Site preparation will require clearing and grading. Erosion, sedimentation, and runoff control measures, both pre- and postconstruction, will meet all applicable nonprocedural requirements, including Part IV of Chapter 373, F.S., and Chapter 62-330, F.A.C., and applicable Citrus County comprehensive plan and LDC requirements. The stormwater detention ponds will be constructed early in the Project construction activities to provide stormwater water treatment for on-Site runoff during the construction. BMPs and a sediment control plan will also be implemented during site construction. Appendix 10.4 contains a copy of the stormwater management plan.

Cooling tower makeup water for the proposed CCC Project will be withdrawn from the head of the existing intake canal at the former CREC Unit 3 cooling water intake structure, and blowdown water from the cooling towers will be discharged into the head of the existing discharge canal (see Section 4.5.1). Conveyance of cooling water to and from the Site will require construction of subsurface pipelines (see Section 9.6). BMPs for erosion and sediment control will be employed to mitigate temporary impacts from construction and dewatering. Waterway or wetland-related impacts will be mitigated following measures described in Appendix 10.4.

The withdrawal of cooling tower makeup water will utilize existing intake bays, which will not require substantive structural modifications or in-water construction, with only replacement of traveling screens and water pumps needed. No dredging of sediments in front of the intake bays is planned.

Construction of the new outfall structure in the northeast end of the discharge canal for discharge of cooling tower blowdown will utilize temporary cofferdams, such that construction of the outfall will be performed in the dry. Any in-water excavated material will be disposed an upland area. Installation of cofferdams and dewatering and use of silt curtains and other appropriate turbidity and sedimentation controls to mitigate

water quality will be regulated by a Section 404 dredge and fill permit, also discussed in Appendix 10.4.

In-water activities to access the intake bays during screen modification or during out-fall construction will be subject to seasonal considerations for in-water work dictated by CREC's manatee protection plan (see Appendix 10.6.6). Qualified observers will be required to monitor for manatees as well as sea turtles during any in-water construction activities. No impacts will occur to navigational or recreational uses, and no public water supplies exist in the area that will be affected.

5.2.2 Measuring and Monitoring

Monitoring of construction runoff and the operation and maintenance of BMPs for erosion and sediment control will be undertaken as required by applicable construction permits (i.e., NPDES Generic Permit for Stormwater Discharge from Large and Small Construction Activities, Chapter 62-621, F.A.C.). Routine monitoring of the discharge canal as required by CREC's existing NPDES permit will continue through the construction period; additional compliance monitoring specific to the operation of the CCC Project units may be incorporated into the revised NPDES permit. No surface water monitoring of the adjacent Crystal Bay or Gulf of Mexico is anticipated. Any in-water construction will require surveillance by manatee and sea turtle observers.

5.3 Groundwater Impacts

5.3.1 Impact Assessment

The proposed Site preparation and facility construction activities for the Project may have potential short-term effects on groundwater in the Upper Floridan aquifer on the Site due to temporary dewatering activities. These limited, temporary dewatering activities may be required for the circulating water pipe, makeup water pipe coming from the intake structure, and deep sumps and the bottom of French drains. In addition, temporary dewatering may be required for plant facilities that need deep foundations for support. The facilities using spread footers or concrete/crushed concrete mats will generally require no dewatering. In some areas of the Site, the Upper Floridan aquifer is at, or very near, the ground surface. However, because of the temporary and localized nature of the potential dewatering impacts, construction of the

Project is not expected to have significant adverse impacts on on- or off-Site groundwater resources.

The flow direction of the Floridan aquifer in the Site area is from the east to the west. This flow direction minimizes the adverse impact potential to public use or potable water wells. The only two wells located to the west are both industrial use category.

Stormwater detention ponds will be constructed early in the construction process and will be used to manage dewatering water. Additional detention/infiltration ponds specifically for dewatering water may be developed, as needed. The specific means and methods for dewatering activities will be determined during detailed design with additional investigation of groundwater recharge rates. As needed, a specific dewatering plan will be prepared prior to commencing the dewatering activities. This plan will be used to meet the substantive requirements of FDEP's Generic Permit for Produced Groundwater from Any Uncontaminated Site, Section 62-621.300, F.A.C., for the discharge of dewatering water to a stormwater management system that discharges to surface waters.

Potential chemical effects can result from construction and dewatering activities and the disturbance (mobilization) of constituents from soils into the water and from oxidation of the groundwater during construction and site preparation. Given the stratigraphy at the Site, it is anticipated that chemical effects will be minimal. Such chemical effects could include disassociation of calcite-releasing bicarbonate and calcium ions, which can increase the hardness of the water. In addition, iron in the soils can oxidize and cause ferrous iron to form ferric iron.

Based on the existing Site and adjacent area conditions, these potential aquifer impacts and short-term groundwater drawdowns will not have significant impacts to surface water bodies and wetlands in the vicinity of this Site. No impacts to the drinking water supply are expected.

5.3.2 Measuring and Monitoring Programs

The proposed site preparation and facility construction activities for the CCC Project do not warrant the implementation of a groundwater monitoring program. Under FDEP's generic permit for discharge of produced groundwater, periodic water quality

sampling of the dewatering water may be needed if the water is discharged from the detention ponds.

5.4 Ecological Impacts

5.4.1 Impact Assessment

Potential impacts to terrestrial and aquatic ecological resources within the areas to be developed on the proposed CCC Site will be based on the effects associated with Site clearing and project construction on the existing floral and faunal communities. Potential impacts may include effects on wildlife and aquatic habitat, wetlands, and important species. Since the majority of the areas selected for development have already been either altered or otherwise disturbed through past logging activities, and the proposed construction activities are mostly planned to occur in areas lacking in sensitive wetland or upland environments, the potential for impacts to ecological resources is expected to be minor. The following subsections provide information on the potential impacts to ecological resources.

5.4.1.1 Terrestrial Systems—Flora

Construction on the CCC Site will impact approximately 192.59 acres, or approximately one-half of the Site. Of this impacted area, approximately 96 percent is comprised of upland vegetation communities, including approximately 4.64 acres of dirt trails/logging roads (814), 2.17 acres of herbaceous dry prairie (310), 10.28 acres of pine-mesic oak (414), and 168.06 acres of mixed hardwoods (438). The upland community types that will be affected by on-Site construction are prevalent on the Site and in the surrounding vicinity, and, therefore, their displacement is not expected to cause a significant adverse impact. Figure 5.4.1-1 depicts the proposed CCC Site layout overlain on the land use community types, and Table 5.4.1-1 summarizes existing, impacted, and remaining acreages by community type.

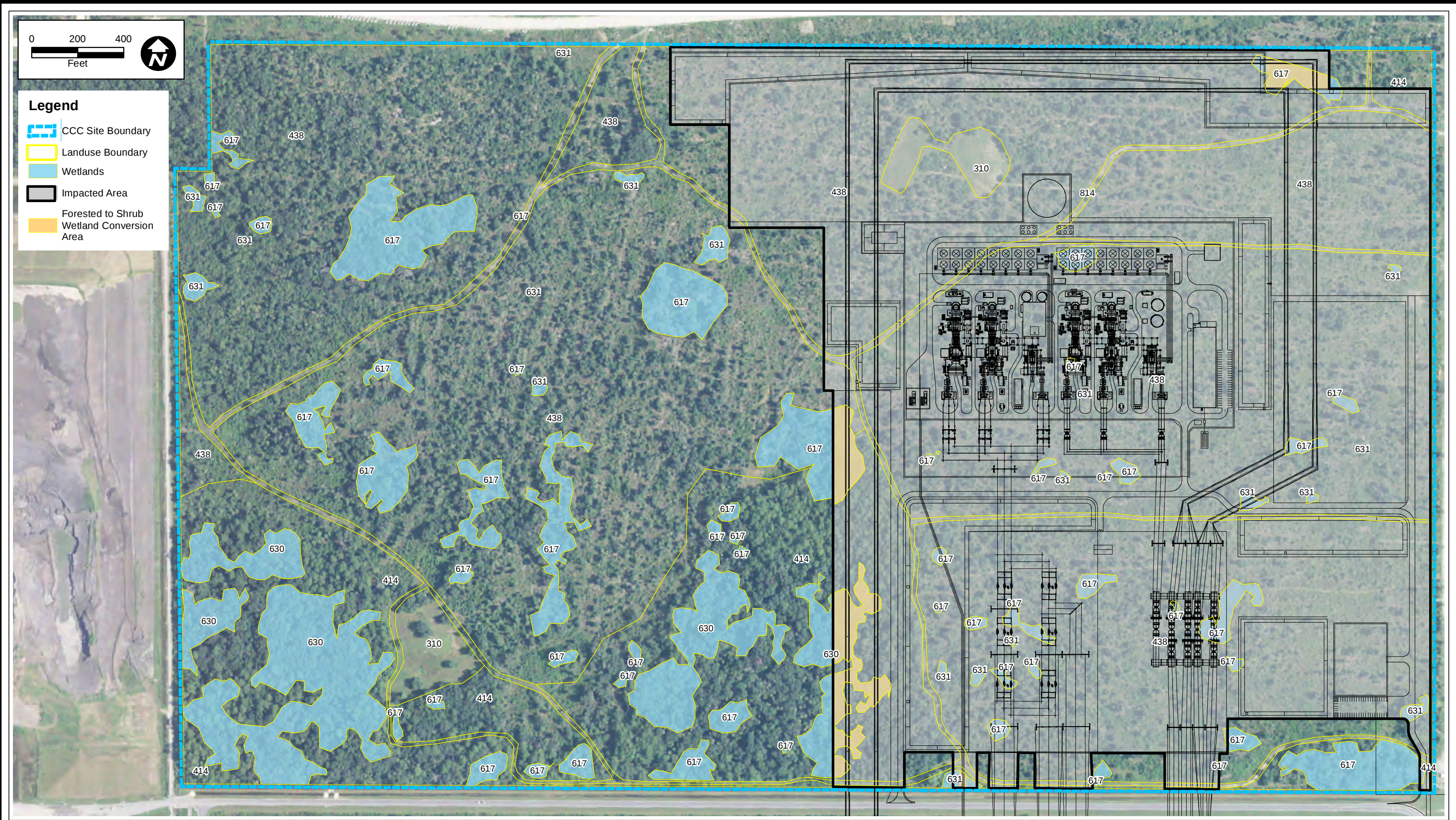


FIGURE 5.4.1-1.
LAND USE CONSTRUCTION IMPACTS

FLUCFCS	Description	Acreage	%	Impacted	%	Remaining	%
310	Herbaceous (Dry Prairie)	4.91	1.2%	2.17	0.5%	2.74	0.7%
414	Pine-Misc Oak	53.00	13.3%	10.28	2.6%	42.72	10.7%
438	Mixed Hardwoods	285.43	71.5%	168.06	42.0%	118.37	29.6%
814	Road	10.68	2.7%	4.54	1.2%	6.04	1.5%

FLUCFCS	Description	Acreage	%	Converted	%	Impacted	%	Remaining	%
617	Mixed Wetland Hardwoods	23.26	5.8%	-1.46	-0.4%	4.65	1.2%	18.61	4.7%
630	Wetland Forested Mixed	19.9	5.0%	-2.05	-0.5%	2.05	0.5%	17.85	4.5%
631	Wetland Shrub	1.77	0.4%	-0.04	0.0%	0.74 *	0.2%	1.03	0.3%
641	Wetland Herbaceous	0	0.0%	+3.55	+0.9%	0.00	0.0%	0.00	0.0%
TOTALS:		399.95	100%	3.55	0.9%	192.59	48.2%	207.36	51.8%

Sources: NAIP, 2013; AMEC, 2013; Burns & McDonell, 2014; ECT, 2014.

* 0.09 Acres are temporary impact.



Table 5.4.1-1 Construction Impacts on the CCC Site by FLUCFCS Type

FLUCFCS	Description	Existing Acreage	Existing Percentage of Total Site	Impacted Acreage	Impacted Percentage of Total Site	Remaining Acreage	Remaining Percentage of Total Site
310	Herbaceous dry prairie	4.91	1.2	2.17	0.5	2.74	0.7
414	Pine-mesic oak	53.00	13.3	10.28	2.6	42.77	10.7
438	Mixed hardwoods	286.43	71.6	168.06	42.0	118.44	29.6
617	Mixed Wetland Hardwoods	23.26	5.8	4.65	1.2	18.61	4.7
630	Wetlands forested mixed	19.9	5.0	2.05	0.5	17.85	4.5
631	Wetland shrub	1.77	0.4	0.74	0.2	1.12	0.3
814	Roads/Trails (logging roads)	10.68	2.7	4.64	1.2	6.10	1.5
	TOTAL	399.95	100	192.59	48.2	207.63	51.9

Note: **Bold** = wetlands.

Source: ECT, 2014

As indicated in Section 3.3.6.1, a few populations of state-endangered coastal vervain have been observed along the roadside in the northeastern portion of the Site. Potential impacts associated with construction of the facilities may result in damage or mortality of these plants. However, coastal vervain is known to colonize in open and disturbed sites such as roadsides; therefore, there is a possibility for it to recolonize the areas that are left for revegetation after construction or to establish on the western part of the Site that will be left undisturbed. The Project Site is owned by DEF; thus, no permitting process for this plant species is required by USFWS. In accordance with Citrus County LDC requirements, prior to start of construction, DEF will conduct a tree survey on the Site and develop plans to comply with Citrus County's tree preservation and protection standards.

5.4.1.2 Terrestrial Systems—Fauna

Construction impacts to wildlife resources at the Site may occur in the form of direct impacts (displacement, mortality) in the proposed construction area or indirect impacts (noise, human presence) in preserved on-Site and surrounding natural habitats. In the areas to be cleared for construction, mobile fauna will be displaced. Less motile or fossorial species may be lost due to clearing and earth-moving activities.

The most conspicuous faunal elements observed on the Site are birds. It is unlikely that Site preparation and construction activities will affect regional populations of any bird species. This is due to the fact that birds are highly mobile, and similar or better quality habitats are available on the remainder of the Site and in the nearby environs. Although no longer listed, the active bald eagle nest on-Site is located well away from proposed construction activities and falls outside the recommended USFWS/FWC buffer of 660 ft for construction activities.

It is also unlikely that Project clearing/construction would impact most of the mammal species found on-Site. The better quality habitats on the Site (located on the western portion of the Site) will not be affected by clearing or construction activities. Many reptiles and all amphibians are not likely to be affected by the Project construction, because no aquatic habitats will be impacted. Also, populations of these animals are expected to be minimal in the affected habitats.

Power plant construction is not expected to significantly impact regional populations of any endangered, threatened, or of special concern species. Of the 39 listed wildlife species confirmed as possibly occurring in Citrus County, only two of those species were confirmed on-Site in surveys conducted in 2013 and 2014: eastern indigo snake and gopher tortoise. The state-listed gopher tortoise does occur in areas scheduled for power plant construction, and DEF will comply with current FWC gopher tortoise permitting and relocation rules prior to commencing construction. DEF will also comply with USFWS's protection measures for the federally endangered eastern indigo snake (USFWS, 2013). This will include education and instruction to construction workers, placement of educational signage, and the allowance of the snakes to leave the area unharmed if discovered on-Site.

The bald eagle nest, located in the southwestern portion of the CCC Project Site, will not be affected by proposed development activities. The nest is more than 0.25 mile away from the Project footprint. The construction activities will also be well beyond the currently recommended FWC and USFWS buffers of 330 to 660 ft. In addition, the Project's construction will not reduce any of the eagle's on-Site foraging habitats.

While other listed species may occur in or use the areas to be impacted, these areas do not represent valuable wildlife habitats. Better habitats exist elsewhere on the

western half of the Site (which will remain undisturbed) and certainly in the region. Therefore, no adverse impacts are expected to occur to regional populations of any listed species.

5.4.1.3 Wetland/Aquatic Systems

The CCC Site layout has been designed to avoid and minimize impacts to wetland communities of better quality to the greatest extent possible. However, given the distribution of on-Site wetland communities, it was not possible to entirely avoid wetlands. The Site layout is designed to preserve the larger, higher quality wetlands and impact only those that were smaller, isolated, and of lower quality. This is why the proposed power plant facilities will be located in the eastern part of the Site, which has been impacted by past silvicultural activities. The vast majority (83 percent) of the wetlands on-Site will remain intact. There are no open water aquatic systems (i.e., streams, lakes, ponds) on the Site. Prior to its purchase by DEF, the entire Site was permitted for limestone mining as part of the Holcim Crystal River Quarry.

Construction on the Site will mostly impact lower quality, smaller, isolated wetlands, which collectively occupy approximately 7.44 acres or 1.9 percent of the entire Site. Some of these wetlands were created incidentally by silviculture activities in formerly upland areas. Approximately 4.65 acres of mixed wetland hardwoods (617), 2.05 acres of wetlands forested mixed (630), and 0.74 acre of wetland shrub (631) are located within the facility footprint. However, approximately 3.51 acres of those forested wetlands types will be converted to wetland shrub category, because the new on-Site 230-kV transmission lines will be located along the western and eastern sides of the power plant footprint. Figure 5.4.1-1 shows these wetland areas highlighted in yellow.

The reason for conversion of the forested wetlands types to a shrub wetland category is dictated by the need to create vegetative clearances for safe operation of the electrical transmission lines. Tree trimming and removal will be limited to the amount necessary to ensure the safe and reliable operation of the power lines. All trimming will be performed within the guidelines of all applicable codes and BMPs.

Almost all of the wetlands proposed for clearing are considered lower quality wetlands using FDEP's Uniform Mitigation Assessment Methodology (UMAM). Generally, these wetlands are small, isolated, lower quality wetlands located within the eastern part of

the Site, which has been impacted by past silvicultural activities. Impacts to these wetlands will be offset by the purchase of mitigation bank credits. Appendix 10.4 contains the environmental resource permit (ERP) application, which details wetland impacts, avoidance and minimization efforts, and a mitigation plan.

Secondary impacts to preserved wetland communities will be minimized by maintaining an average 25-ft and minimum 15-ft buffer surrounding the wetlands where no construction activities will occur.

No significant impacts to off-Site aquatic resources are expected to occur as a result of on-Site and associated linear facility construction. Any modifications to the existing intake structure along the intake canal will not involve in-water activities, so no impacts to aquatic resources are expected. Minor, temporary effects to water column and benthic biota may occur during installation of the new structure to discharge the Project cooling tower blowdown. Construction of the new discharge structure will not impact listed species, such as manatees or sea turtles, because the construction will be of limited duration and localized in nearshore areas. DEF will utilize manatee observers, as necessary. No discernible effects to aquatic resources are likely to occur from operations, as the discharge is expected to meet ambient water quality standards at the point of discharge.

Chapter 9.0 addresses potential impacts to wetland and aquatic resources from construction of the off-Site associated linear facilities.

5.4.2 Measuring and Monitoring Programs

As stated previously in Sections 3.3.5 and 3.3.6, the data used for this SCA include field studies conducted on the CCC Site in 2013 and 2014, as well as published data. No aquatic ecological studies on the Site were conducted recently, nor were such studies considered necessary for the purposes of evaluating impacts to aquatic systems from the proposed actions. No monitoring programs are proposed for biological resources during construction of the Project.

In-water construction activities for the new cooling tower blowdown discharge structure will require surveillance by manatee observers located aboard all vessels as required in CREC's manatee protection plan, which also requires specific vessel opera-

tion protocols and notification to FWC and USFWS if any stressed manatees are observed within the intake or discharge area (see Appendix 10.6.6). Notification is required for anticipated in-water work within the discharge canal during the period of November 15 through March 31. Major in-water construction in the discharge canal during this period will be avoided, if possible. In-water construction activities for the discharge structure will also comply with CREC's sea turtle rescue and handling guidance, which provides instructions for sea turtle observation, rescue, handling, notifications, and reporting requirements (see Appendix 10.6.5).

5.5 Air Impact

Construction of the CCC Project will result in three general categories of air emissions. First, land clearing, site preparation, and vehicle movement will generate fugitive dust emissions. Second, internal combustion engines in construction equipment will release NO_x, CO, and other motor fuel combustion products. Third, construction worker travel and material and equipment deliveries to and from the Site will result in vehicular emissions.

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

Fugitive dust emissions from construction on the Site will be minimized using reasonable precautions and implementing appropriate dust suppression control methods, as required. Standard control methods include the application of environmentally approved dust-suppressing chemicals or water to unpaved roads and other exposed surfaces and the seeding of exposed areas. All construction-related fugitive dust emissions will be temporary and will cease once construction is completed. Also, because the power block will be located approximately 1,500 ft from the CREC North Access Road to the south, 3,000 ft from West Power Line Road to the south (used primarily by CREC employees and delivery trucks), and approximately 2 miles from U.S. 19 to the east, potential fugitive dust impacts to off-Site areas are expected to be minimal.

Emissions from internal combustion engines will occur during Site preparation and construction because of the use of on-Site construction equipment for clearing, filling, excavation, and grading; concrete placement; and structural steel and major equipment installation. In addition to the pollutants associated with the combustion of motor fuel by the construction equipment engines, the following construction activities will result in minor emissions of VOCs:

- Evaporative losses from on-Site painting.
- Refueling of construction equipment.
- Application of adhesives and waterproofing chemicals.

Construction of the CCC Project will occur over an approximately 24-month period. As previously presented in Subsection 5.1.2, there will be an average of approximately 450 workers during that time, with peak employment of up to approximately 700 construction workers, with the potential for up to 1,000 workers for a short period. The majority of these construction personnel will be drawn from outside Citrus County and will commute to the job site. Conversely, construction workers from Citrus County who currently commute to job sites outside the county would travel fewer miles to the Site. While not readily quantifiable, the temporary net changes in vehicle-miles traveled (VMT) in the area would be relatively insignificant, as would any temporary net changes in areawide vehicular emissions.

The air quality impacts caused by construction activity will vary from day to day as a function of the level of activity, specific nature of the activity, weather conditions while the activity is occurring, and emissions controls applied to the activity. Appendix A of the CCC Project PSD air permit application in Appendix 10.2.5 of this SCA provides estimates of the emissions associated with the temporary construction activities. However, even under worst-case conditions, the maximum ambient impacts caused by construction emissions are expected to be modest, temporary, and limited to the general area of the Site under construction. Also, the main power block construction activities will take place approximately 1,000 ft from the nearest Site boundary to the east and more than 2 miles from U.S. 19. Thus, based on the type and nature of the construction-related emissions sources, potential maximum air quality impacts caused by potential construction-related emissions should be localized, primarily limited to

the immediate onsite area of the construction activity, and within CCC Site boundaries.

5.6 Solid Wastes

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

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

Individual contractors will be responsible for handling any hazardous materials required to perform their tasks, and, as noted in Section 5.1.1, individual contractors/subcontractors may generate hazardous waste while performing work. However, working with the contractors/subcontractors, DEF will be responsible for the on-Site storage, recordkeeping, and overall management of all hazardous waste that is generated at the Site. DEF will be responsible for the on-Site management of hazardous waste, including manifesting and transporting for final off-Site disposition at an approved hazardous waste disposer in accordance with federal, state, and local hazardous waste regulations.

5.7 Impact On Human Populations

5.7.1 Land Use Impacts

Projected construction impacts on land use on and in the vicinity of the Site are expected to be insignificant, because the Site will be developed adjacent to the existing CREC and specifically Crystal River Units 4 and 5. Water intake and discharge pipelines

and transmission lines for the Project will connect with existing facilities at CREC. Information presented in Section 3.2.3.2 describes the surrounding land uses, which are CREC to the west; permitted limestone mining to the east, north, and northeast; and a transmission line corridor and undeveloped land to the south. The nearest single-family residences to the planned location of the facilities that comprise the Project are located approximately 1.8 to 2.1 miles east along North Basswood Avenue and West Gallery Lane.

The overall site plan for the proposed facilities is shown in Figure 4.2.0-1. The site plan shows the planned locations for construction of the new facilities (cooling towers, CTGs, HRSGs, STGs, etc.). This plan also shows setbacks from the site boundaries and visual buffers for the main power plant facilities. Except for the tallest structures, the Project facilities will not be visible from the closest nonresidentially and residentially developed properties. Even the tallest structures may not be visible depending on the extent of intervening vegetation. The eastern and northern adjacent properties are not scheduled to be mined for many years. The public land to the southeast is conservation land and is not allowed to be developed and will remain forested.

5.7.2 Construction Employment

The construction workforce for the Project is expected to peak at approximately 700 workers (with the potential need for up to 1,000 workers) and average 450 workers for an approximately 24-month duration. Employment is expected to be highest during 2017.

Approximately 25 percent of the construction workforce is expected to be drawn from Citrus, Levy, Marion, and other counties in the region within commuting distance to the Site. It is estimated that approximately another 30 percent of the construction workforce will be drawn from the state, with the remainder traveling from outside the state. Therefore, approximately 75 percent of the workforce is expected to travel to and temporarily stay near the Project Site. An average of 340 employees and up to 750 employees throughout the construction period will be from outside the region or outside the state. These workers are expected to temporarily relocate to areas within commuting distance of the Site. These workers will occupy available rental housing units or recreational vehicle park sites. As a result of this relatively short work period, the associated potential impacts on housing, schools, and other public facilities and

services are expected to be minimal and temporary. Construction is expected to occur primarily during daylight hours, with the majority of the construction workers onsite between 7 a.m. and 4 p.m. Chapter 7.0 provides more detailed information on the construction workforce, payrolls, and expenditures and economic benefits.

5.7.3 Transportation Impacts

Some temporary construction-related transportation impacts are expected as a result of the movement of construction workers, machines, and equipment to and from the Project Site. Initially, the construction traffic will involve fill and construction equipment deliveries. As the Site is prepared for development, these trips will be replaced with construction employee and supply delivery trips. A 2006 traffic analysis was prepared for the Crystal River Units 4 and 5 Clean Air Project, which was constructed by DEF in 2007. The estimated increase in construction employees was 600. Based on the results of the 2006 analysis and other factors, a transportation analysis of the Project's potential construction-related impacts assumed the following:

- Construction-related trip generation of 2.0.
- Vehicle occupancy rate of 1.4.
- 25 percent northbound trips.
- 75 percent southbound trips.
- A maximum peak of 1,000 employees.

Access to the Site during construction will be from West Power Line Street, which connects to U.S. 19 North approximately 2.3 miles to the east. Using the previous assumptions, a maximum of 1,429 daily trips will be generated during the expected peak construction employment period, with as many as an additional 100 daily trips for deliveries. The distribution of these trips is anticipated to be:

<u>Roadway</u>	<u>Direction</u>	<u>Trips</u>
U.S. 19	Northbound	382
U.S. 19	Southbound	1,147

The average construction workforce of 450 employees will generate a total of 643 daily trips with approximately 50 additional delivery trips:

<u>Roadway</u>	<u>Direction</u>	<u>Trips</u>
U.S. 19	Northbound	173
U.S. 19	Southbound	520

In addition, approximately 200 to 320 truck trips per day over the first 4 to 6 months of the construction period could be generated to bring fill to the Site. These truck trips will largely be offset by the reduced level of anticipated employee trips during the initial phase of the construction period.

The 2013 annual average daily traffic on U.S. 19 North just north of the intersection with CR 488 (West Dunnellon Road) is 8,600 trips. The adopted LOS is B, which, for this four-lane rural undeveloped section, is 25,600 daily trips. At the peak of construction, neither the northbound nor southbound projected traffic generated by Project construction will degrade the LOS.

DEF will encourage transportation demand management techniques to reduce the number of temporary construction-related vehicle trips on the road network. These techniques will include placing a bulletin board onsite that may be used by construction contractors to place car-pooling advertisements. All construction contractors will be requested to inform their employees that this service is available.

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

As discussed in Section 5.1.2, certain oversized, heavy equipment, such as the CTGs, may first be delivered to the Site area by rail or barge and then transported to the Site. A similar transport method was successfully used for certain equipment for construction of the CREC units. Any overweight or over-dimensional loads will comply with

the requirements of Chapter 316, F.S., and Chapter 14-26, F.A.C. DEF is not proposing, and the Project will not require, any road improvements to the existing roadway network. Two driveways will be added to North Access Road, a private road. As an alternative to the site access road in the southeastern corner of the Site, DEF may access the Site from the existing access road running parallel to the eastern Site boundary. Driveways, internal roads, and off-street parking and loading areas will be constructed in accordance with the applicable sections of Chapter 7 of the Citrus County LDC.

5.7.4 Housing Impacts

For the year 2010, the Florida Department of Labor and Employment Security (FDLES) reported a total of 2,308 construction workers in Citrus County (BEBR, 2011). As previously discussed in Section 5.7.2, the number of construction workers expected to be drawn from outside the region is predicted to range up to 75 percent of the workforce. These workers will temporarily relocate to the area to occupy available rental housing and/or rental or seasonal units. Relatively few construction workers are anticipated to be continuously employed throughout the 24-month construction period, and, consequently, associated impacts on housing are expected to be negligible.

In 2012, there were 77,904 total housing units in Citrus County. Using a similar vacancy rate from the 2010 U.S. Census, approximately 14,699 were vacant with approximately 2,374 for sale and 2,062 for rent. Therefore, the relatively small additional temporary demand for rental housing associated with the Project construction workforce is expected to be readily absorbed by available rental housing in Citrus County and/or the adjacent counties. In addition, as of July 2011, there were 2,606 licensed lodging units in 87 motels/hotels, 1,078 apartment units in 35 buildings/complexes, 75 rental condominiums, and 116 transient apartment units. Local construction workers are expected to maintain their established patterns of use based on their existing residences. The temporarily relocated workers from the region and/or from out of state will commute daily to the work site from rental housing or other temporary housing, thereby not creating any additional housing demands in the area.

5.7.5 Public Services and Facilities Impacts

As with potential housing impacts, construction-related impacts to public services and facilities are not expected to be significant. The construction workforce is anticipated

to commute from their current residences or from temporary housing. Therefore, because a portion of the workforce is currently provided with public services and facilities associated with their existing residences and because public facilities are available for formerly occupied homes, apartments, and such temporary lodging facilities as hotels and motels, no significant changes in the demands upon public services are expected. During construction, bottled water and portable sanitary units will be used for the construction work force.

5.7.6 Noise Impacts

The CCC Project construction can generally be divided into several phases, with the noise level varying with the construction phase (based on Barnes *et al.*, 1977). The various construction phases are:

- Site preparation and excavation.
- Concrete pouring.
- Steel erection.
- Mechanical and electrical.
- Clean up.
- Startup and testing.

At the Project Site, potential noise impacts are expected to be minimal and mitigated by the distance between the construction area of the power block and the Site boundaries.

During the initial Site preparation and foundation excavation phase, heavy diesel-powered earth-moving equipment is expected to be the major source of noise. This equipment includes bulldozers, graders, sheepsfoot roller compactors, dump trucks, backhoes, and front-end loaders. Typical noise levels such equipment produces can approach 90 dBA at a distance of 50 ft. For example, at a 50-ft distance, a bulldozer produces 90 dBA, and a tractor scraper produces 87 dBA (EPA, 1971).

Equipment used during the concrete pouring stage typically includes concrete trucks, concrete pump truck cranes, and equipment for backfilling foundations. Pile drivers (102 dBA at 50 ft [EPA, 1971]) will also be used on the Site. The steel erection phase typically requires the use of cranes in varying sizes, air compressors, welders, material delivery trucks, concrete trucks, and front-end loaders. The machinery installation phase requires the same types of equipment as the steel erection phase. The final

phase, consisting generally of site cleanup and plant startup activities, is typically 10 dBA quieter than the other phases (Barnes *et al.*, 1977.)

During construction, noise related to truck traffic is normally the highest contributor due to noise levels generated (91 dBA at 50 ft [EPA, 1971]) and frequency. However, such impacts will be temporary since it would be limited to the construction phase.

A construction equipment inventory was developed for a typical construction project, with the high noise level equipment identified for evaluation. Table 5.7.6-1 presents the loudest equipment types generally operating at the Site during each construction phase. The composite average or equivalent site noise level, representing noise from all equipment averaged over the workday, is also presented.

The nearest property boundary is located approximately 1,000 ft east of the power block construction area. There is an unpaved road along this property boundary, but no businesses or residences are located directly along this eastern property boundary. The closest residential development is located approximately 1.8 miles to the east and is located east of U.S. 19. Table 5.7.6-2 presents average or equivalent construction noise levels projected at the eastern property boundary during construction. These noise results are conservative, because the only attenuating mechanism assumed was divergence of the sound waves; no attenuation from natural vegetation was factored into the analysis. Average noise levels during the loudest construction activities are projected to be between 60 and 64 dBA at the eastern property boundary. Noise from construction activities is not expected to be audible at the nearest residential development because of the distance and existing noise from vehicle traffic on U.S. 19.

The final phase, consisting generally of site cleanup and plant startup activities, is typically quieter than the other phases (Barnes *et al.*, 1977), except for steam blows during the final phase of plant startup and equipment preparation, cleaning, and testing. Steam blows involve exhausting steam for short periods of time. This process is typically infrequent, and available noise attenuation measures will be used to minimize noise emanating from steam blows.

Table 5.7.6-1. Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Maximum Equipment Noise Level at 50 ft (dBA)	Composite Site Noise Level for Construction Phase at 50 ft (dBA)
Site clearing and excavation	Bulldozer	90	89
	Truck	82	
	Backhoe	84	
	Grader	85	
	Tractor scraper	87	
	Compactor	83	
Concrete pouring	Ready-mix truck	84	87
	Mobile crane	85	
	Concrete pump	82	
	Pile driver	102	
Steel erection	Pneumatic tools	90	90
	Air compressor	76	
	Mobile crane	85	
	Cherry picker	80	
Mechanical	Pneumatic tools	90	89
	Air compressor	76	
	Mobile crane	85	
Cleanup	Truck	84	86
	Front-end loader	87	

Sources: Barnes *et al.*, 1977.
ECT, 2014.

Table 5.7.6-2. Projected Average Construction Noise Levels at Nearest (Eastern) Property Boundary Based on Composite Noise Levels

Construction Phase	Noise Level at Eastern Property Boundary (dBA)
Site clearing and construction	63
Concrete pouring	61
Steel erection	64
Mechanical	63
Cleanup	60

Source: ECT, 2014.

5.8 Impact on Landmarks and Sensitive Areas

As discussed in Sections 3.2.1 and 3.2.5, there are several state preserves and conservation lands located within the 5-mile study area surrounding the Site and CREC. Based on DEF's experience with CREC, the construction of the Project will have no impact upon these resources.

The closest sensitive areas to the Site are the Crystal River State Preserve Park and St. Martins Marsh Aquatic Preserve, which overlaps portions of the park. The northern portions of these areas are located approximately 0.25 mile south of the CCC Site. Construction of the Project will not affect public accessibility or recreational activities in these areas, since the park access and facilities, such as bicycle and hiking trails and kayaking and canoeing areas are located 3 to 4 miles south of the Site.

5.9 Impact of Archaeological and Historic Sites

Based on the cultural resources assessment survey conducted for the Site in May 2014 (see Appendix 10.7.1), the construction and operation of the CCC Project is not expected to disturb any archaeological or historical features eligible for the National Register of Historic Places. Therefore, no mitigation to such impacts will be required.

As detailed in Appendix 10.7.1, the Project is not anticipated to have adverse impacts on archaeological or historical resources. If unanticipated historical or archaeological artifacts or features are discovered at any time, DEF will notify the Florida Division of Historical Resources and consult with them to determine any appropriate action.

5.10 Special Features

Construction of the CCC Project will involve no unusual products, raw materials, garbage disposal services, or incinerator effluents and residues that will have influence on the environment and ecological systems on the Site and adjacent areas.

5.11 Benefits from Construction

The construction of the CCC Project will create numerous economic benefits to the area. These benefits include increased construction employment and sales taxes levied on construction materials. Chapter 7.0 of this SCA presents a detailed description of these benefits, as well as environmental benefits.