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 comprising GREC. The potential effects are assessed in terms of their relationships with the physical and natural resources 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.

5.1 LAND IMPACT

5.1.1 GENERAL CONSTRUCTION IMPACTS

Figure 5.1.1-1 illustrates the general areas on the GREC Site and offsite on GRU's DGS property that will be disturbed by construction of the proposed power plant and associated facilities. Approximately 60.5 acres of the total 131-acre GREC Site will be disturbed by construction of the power plant and associated onsite facilities. As shown on Figure 5.1.1-1, an additional approximately 4.6 acres located in the southern portion of the Site will be temporarily disturbed for use as craft parking during construction of the facilities. After construction is complete, this area will be restored and revegetated to natural conditions. The remaining areas (approximately 66 acres) of the Site will remain undisturbed by the construction and operation of the power plant.

As shown on Figure 5.1.1-1, an approximately 1.8-acre area outside the GREC Site on the DGS property will be disturbed by construction of the new GRU-owned switchyard and transmission line. In addition, an approximately 8-acre area located immediately east of the GREC Site on the DGS property will be temporarily used for construction laydown, supply trailers, etc., and related purposes. This area primarily consists of cleared grassy fields surrounded by access roads and manmade swales. The area also includes two small, isolated depressions (i.e., 0.03 and 0.08 acre) that are classified as freshwater

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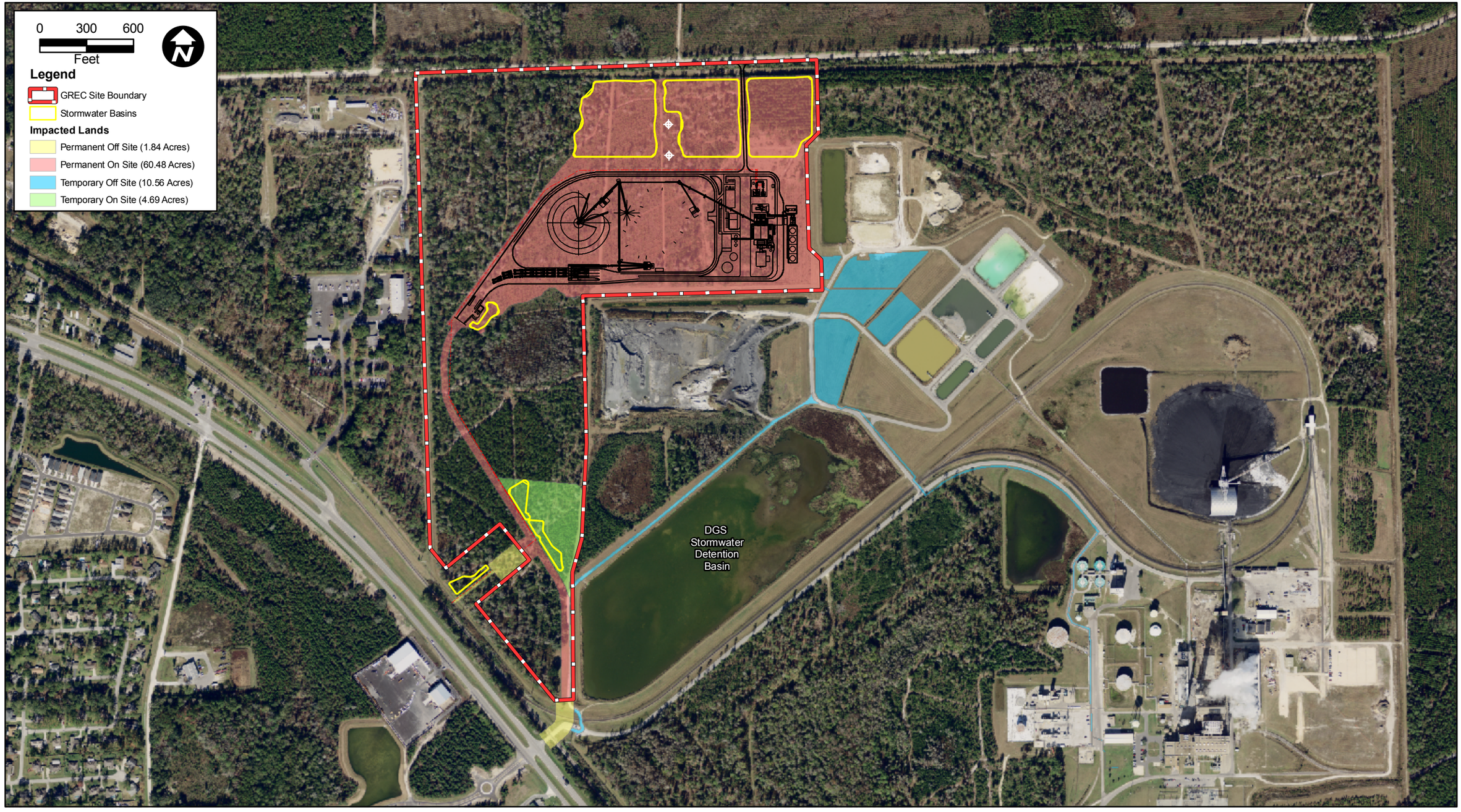

FIGURE 5.1.1-1.

LAND DISTURBED BY CONSTRUCTION ON GREC SITE
AND DGS SITE

Source: FDOT, 2008; Zachry, 2009; Genesis, 2009; ECT, 2009.

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marsh wetlands. These small wetland areas will be filled during preparation of the construction laydown area. After construction is complete, the laydown area will be revegetated as grassy fields. Other limited areas on the DGS property to be temporarily disturbed by GREC construction include the construction access road and the natural gas and sewer pipeline corridor.

As shown on Figure 5.1.1-1, an existing large stormwater detention basin, which was used during the construction of the DGS facilities and remains in place for stormwater detention, is located on the DGS property directly south of the offsite construction laydown area. This area will be used, if necessary, for management of runoff from the offsite construction laydown area and as an alternative means to manage groundwater resulting from construction dewatering activities for underground excavations involving foundations, electrical duct banks, and underground utilities for the GREC facilities.

Overall, the permanent areas to be developed for the GREC biomass power plant will consist of the steam turbine generator, fluidized bed boiler, cooling tower, power island equipment, switchyard, biomass fuel yard equipment, including material handling and fuel offloading and storage facilities, water/wastewater treatment systems, a main access road with scale house, an onsite internal perimeter road, the office/control room, and maintenance facility. As shown on Figure 5.1.1-1, there will be three large stormwater detention basins developed in the northern portion of the Site and one smaller basin at the scale house area for use during construction. These four basins will be converted into permanent stormwater basins for the power plant and associated fuel yard once construction is completed. Security fencing will be placed around the perimeter of the GREC Site.

Site preparation of the facility areas will commence with the grubbing and clearing of vegetation and removal of unsuitable materials in structural areas. Vegetation cleared and grubbed from the Site will be disposed offsite in compliance with applicable requirements. Pockets of material unsuitable for buildings or heavy equipment foundations may be found on the Site during site clearing operations. Removal of any unsuitable material and the unavoidable removal of some adjacent material may be required. Unsuitable material may be temporarily stockpiled onsite for future use, to the extent possible. Silt fenc-

ing will encompass the stockpiles, except for vehicle access points. Inactive side slopes of the stockpiles will be stabilized as soon as practical by application of seed in accordance with FDOT temporary grass seeding specifications. Stockpiles will not be located in wetland areas or in areas that will be affected by construction activities. The removed material will be replaced, as necessary, by structural fill. Structural fill will be obtained from locally available offsite sources and applied and compacted in lifts. If required, an initial thin lift of fill, preferably limestone, will be used to provide a stable course for subsequent lifts. The fill will be placed and compacted in such a manner as to provide support for the plant foundations, pipe and conveyor support structures, electrical duct banks, trenches, and manholes.

The first areas to be constructed will be the access road, stormwater basins, and perimeter drainage ditches and berms. The development of these areas will include installation of erosion control devices around all areas to be disturbed including all soil stockpile areas. For the balance of construction, all surface water runoff from disturbed areas will be directed to one of the stormwater basins. Section 4.8 and Appendix 10.4.1 of this SCA provide additional information regarding the stormwater management plans, basins, and erosion/sediment controls during construction.

Construction laydown and parking areas will be the second areas to be developed. These temporary areas will be stabilized with aggregate or similar locally available material and will be brought to grade and revegetated during the completion of construction.

During construction, no explosives will be used. Construction roads will be surfaced with crushed stone or similar material, and some will be paved to become permanent roads during final grading activities. Excavation, clearing, and filling activities will be performed to achieve the required grades. Disturbed areas to be revegetated will be brought to grade as quickly as possible and seeded to stabilize the soil and minimize runoff.

The existing grade for most of the project area perimeters ranges from an elevation of 180 ft on the north, 184 ft on the south, 183 ft on the east, and 182 ft on the west. The

major facility site areas will be filled 3 to 5 ft above existing grades. Figure 4.8.3-3 provided previously in Section 4.0 illustrates the final grading plan.

Foundations required to support heavy loads (i.e., such as building columns, boiler, turbine, and generator) will be supported by reinforced concrete spread footings, and/or piles, depending on final geotechnical evaluations.

If necessary, temporary dewatering effluent for initial site preparation will be routed to the onsite construction sediment basins or, if needed, the large stormwater detention basin on the DGS property. Dewatering sediment will naturally settle out in the basins, and the treated water will be routed to the basin discharge points. Dewatering, when required, will be accomplished by localized pumping of water in the immediate area under construction. The dewatering system will be designed to control turbidity. Lowering the water table in the area allows backfilling with structural fill (i.e., sand, limestone, etc.) by lift placement and compaction of suitable soils. After initial filling of sites for deep foundations, additional dewatering may be required. The dewatering system will be designed to control turbidity with water contained onsite or routed to the sediment basins.

The duration of dewatering in a specific area will generally be limited to 6 months or the time it takes to complete the specific foundation. Since the areas of dewatering will be located a significant distance from the Site boundaries, no offsite impacts to groundwater are anticipated. There will be no impacts to the underlying deeper aquifers, because excavation and dewatering activities will be short-termed and limited to the surficial aquifer system. Once the detailed design is completed, a dewatering plan, if required, will be submitted prior to commencing dewatering activities. Under SRWMD rules, temporary dewatering activities do not require consumptive use authorization.

Temporary and permanent ditches and other control structures will be designed to maintain nonerosive water velocities.

Solid waste generated during construction activities will be disposed of in accordance with applicable rules and regulations. Typical municipal solid waste will be collected in

appropriate containers located around the construction areas and will be transported off-site for disposal at an approved solid waste landfill. Construction debris, such as scrap wood, concrete, and metal, will first be transported to a specified storage area on the Site where the debris will be separated and stockpiled for potential salvage and recycling. Licensed salvage companies will bid for purchase of the salvageable materials and will periodically be allowed access to the Site to purchase and remove the materials for salvage and recycling. Construction debris that is not salvaged and recycled will be transported to a permitted offsite construction and demolition debris disposal facility.

During construction, the construction labor force will use portable chemical toilets and/or permitted holding tanks. A licensed contractor will pump all sanitary sewage from the portable toilets and holding tanks as needed and transport the waste to a permitted offsite disposal facility. As discussed in Section 4.2.5, the GREC Site will ultimately tie into GRU's sanitary waste system at a lift station at the DGS facilities. Potable water for consumption during construction will be obtained from bottled water suppliers.

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

Good engineering practices will be implemented to support power block foundations; therefore, no adverse impact is anticipated to soil stability or bearing strength, and overall settling of the land area will be negligible. Slight settling may take place in areas of construction, but this will be moderate and localized in extent. Further, geotechnical studies will be conducted to develop final designs for foundations to support heavy loads and equipment.

Most of the areas designated for construction of facilities and structures will require filling. Those areas requiring fill will average approximately 3 to 5 ft of fill above existing grades. The fill will come from locally available sources. Construction-related changes in site topography will not have any adverse effect on aesthetics or the local viewsheds, because offsite viewsheds are located at a significant distance and are shielded by heavily wooded areas.

Groundwater levels will not be significantly affected by modifications to soil percolation due to construction activities in the project area. Slight changes in percolation rates may occur, but such changes will have negligible impacts on water levels on the overall Site, because the surface infiltration will affect only localized areas within the project area.

It is anticipated that onsite construction activities for GREC will begin in December 2010 and be completed by September 2013. The peak employment, which is expected to occur in early 2013, will be approximately 426 construction workers and management. Construction employment will average approximately 168 workers over the 34-month construction period.

5.1.2 ROADS

Construction traffic from U.S. 441 will use the existing construction/secondary entrance road to the DGS site. Initially, during the construction phase, all traffic and equipment deliveries will access the main facility area in the northern portion of the GREC Site using the existing secondary access road running along the western side of the large existing stormwater pond on the DGS property (see Figure 5.1.1-1). Also, early in construction, the permanent main access road for GREC will be constructed, including traffic improvements at the entrance on U.S. 441. These improvements will include extending acceleration, deceleration, and turning lanes and installing appropriate information and warning signs in accordance with FDOT regulations. After the main access road has been adequately stabilized and surfaced, both the main access road and, to a lesser extent, the secondary road on the DGS property will be used for construction worker access and material/equipment deliveries. Figure 5.1.2-1 illustrates the conceptual design and roadway

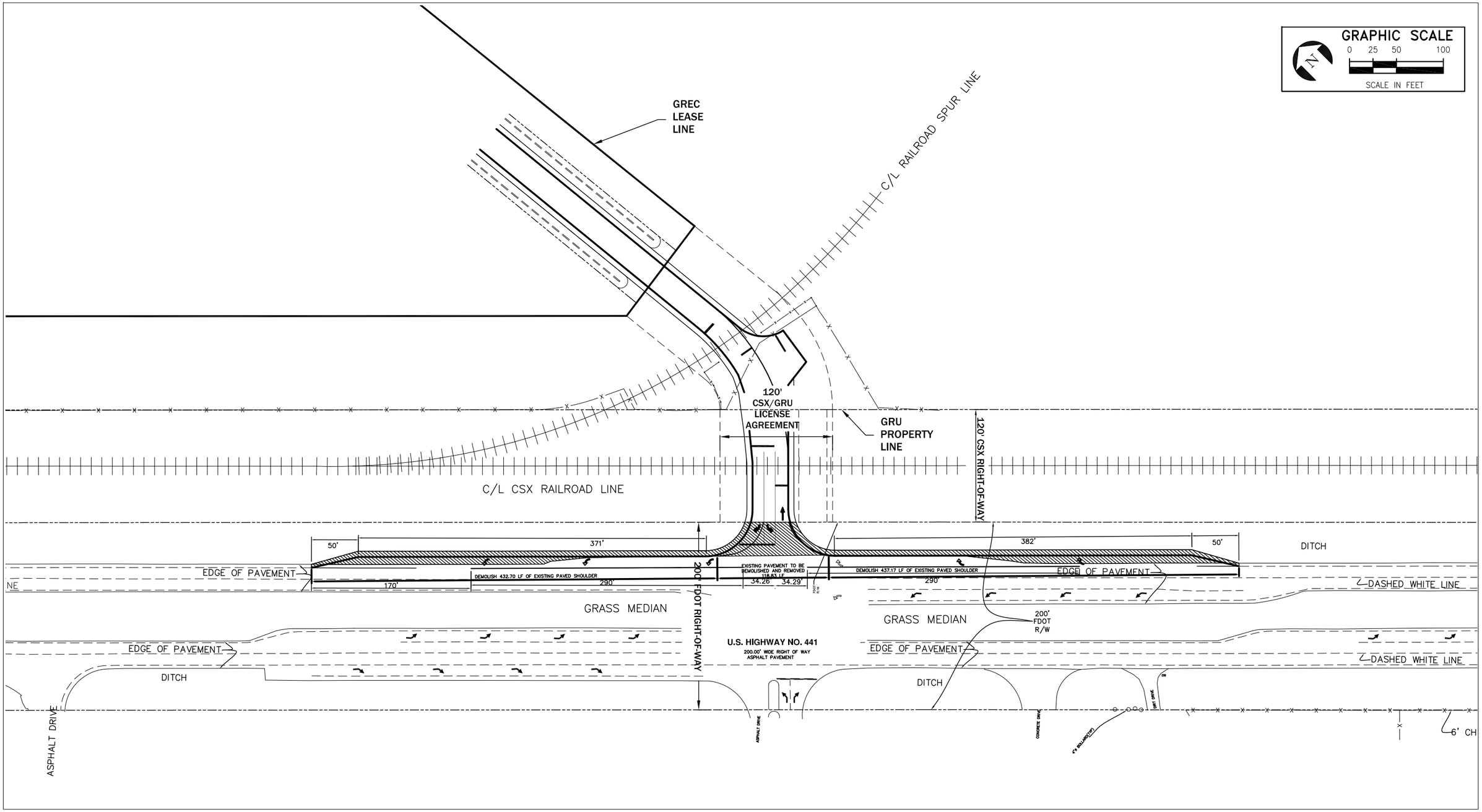

FIGURE 5.1.2-1.

PLAN VIEW OF ENTRANCE ROAD

Source: EDA, 2009; ECT, 2009.

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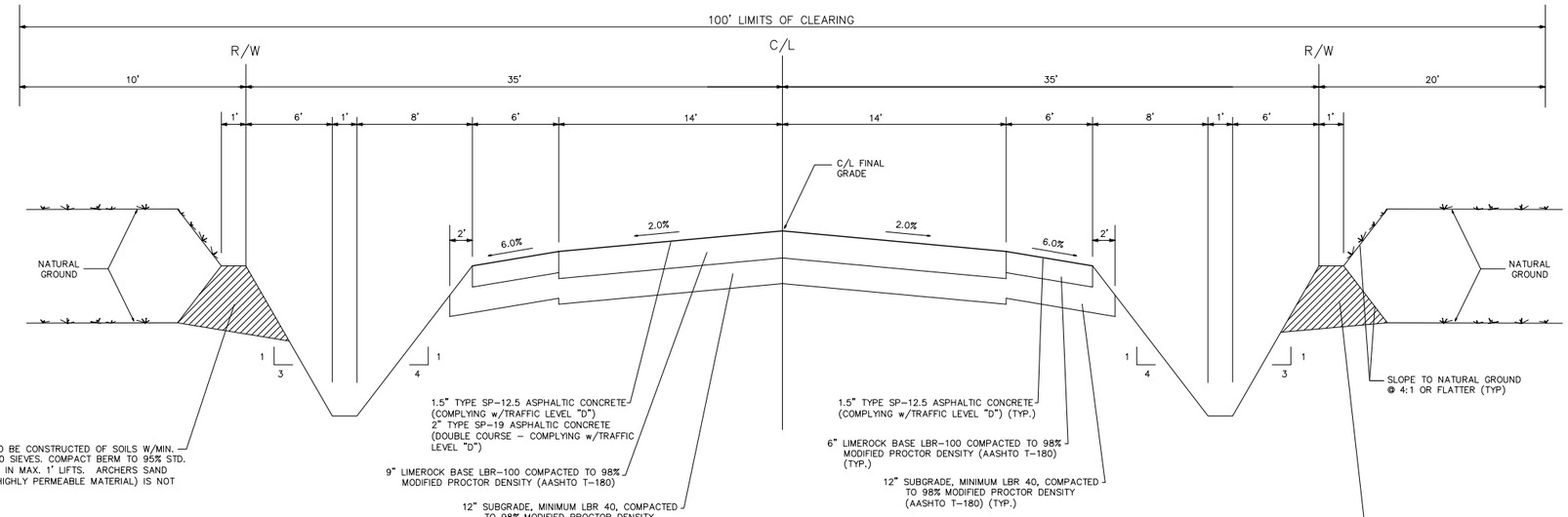
improvements at the entrance road on U.S. 441. Appendix 10.11 provides a copy of the FDOT driveway/connection permit application for this entrance road.

The main access road will be approximately 3,400 ft in length, arranged as a two-laned road. The main access road will lead to an onsite perimeter two-laned road of approximately 4,600 ft that loops around the biomass fuel handling, offloading, and storage areas and around the plant. The onsite road system is designed such that trucks can be weighed upon arrival when full, proceed to the offloading area to offload fuel, and continue around the plant and fuel yard, so no backing up is required. The trucks can then be weighed again when empty upon exiting the plant. This design will also ensure that trucks waiting to be weighed and unloaded will not impede traffic flow. Plant roads will be elevated to a minimum of 3 ft above surrounding existing grade to maintain access during all weather conditions. Final development of the main access road will include placement of two 14-ft-wide asphalt lanes built over approximately 12-inch-thick aggregate base material. The base material will extend 6 ft off the edge of the shoulder of the road to a four-to-one slope blending into existing grades or the drainage ditch. Both temporary and permanent culverts and ditches will be installed to maintain existing stormwater flow patterns and direct flow to the stormwater detention basins. Figure 5.1.2-2 contains a typical cross-section for the main access road.

The construction period for GREC is projected to be approximately 34 months, beginning in December 2010 and ending in September 2013. After approximately 3 months of equipment checkout and testing, GREC is scheduled to begin commercial operation in December 2013. Over the construction period, construction employment will average approximately 168 workers, with a peak employment of approximately 426 workers occurring over a 3-month period in late 2012 and early 2013. To assess the potential impacts of GREC-related construction and operation traffic on U.S. 441 and a nearby intersection, a detailed traffic impact analysis was conducted by Genesis Group (Genesis). The results of this analysis are discussed in Section 5.7.2, and Appendix 10.7.1 of this SCA provides a copy of this report. The results show that the construction-related traffic for GREC will not adversely affect the existing LOS for U.S. 441 or the nearby intersection of U.S. 441 and Northwest 43rd Street.



TYPICAL ROADWAY CROSS-SECTION 70' RIGHT-OF-WAY
DESIGN SPEED - 30 MPH
NOT TO SCALE

PAVING, GRADING AND DRAINAGE SPECIFICATIONS

1. GENERAL: ALL ROADWAY AND DRAINAGE CONSTRUCTION, INCLUDING MATERIALS, CONSTRUCTION TECHNIQUES, AND TECHNICAL STANDARDS, SHALL BE IN ACCORDANCE WITH THE LATEST F.D.O.T. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND THE LATEST F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARDS.

2. ALL AREAS OF NEW CONSTRUCTION SHALL BE PREPARED AFTER SITE DEMOLITION. TOP SOIL REMAINING ONSITE MAY BE STOCKPILED FOR FINE GRADING IN LANDSCAPED AREAS, IF SUITABLE. THE CONTRACTOR SHALL FURNISH ALL FILL REQUIRED AND DISPOSE OF ALL EXCESS OR UNSUITABLE MATERIAL OFFSITE IN ACCORDANCE WITH ALL REGULATORY REQUIREMENTS.

3. ALL NEW ASPHALT PAVEMENT CONSTRUCTION SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:

A. EARTHWORK: FILL MATERIALS SHALL CONFORM TO AASHTO SOIL GROUPS A-1, A-3, OR A-2-4 AND SHALL BE PLACED IN 6"-12" LOOSE LIFTS AND COMPACTED TO 95% DENSITY USING MODIFIED PROCTOR METHOD (AASHTO T-180).

B. SUBSOIL EXCAVATION: WHERE SUBSOIL EXCAVATION IS REQUIRED, UNSUITABLE MATERIALS SHALL BE REMOVED TO A DEPTH OF 18" BELOW THE LIMEROCK BASE AND BACKFILLED WITH CLEAN FILL.

C. STABILIZED SUBGRADE: ALL STABILIZED MATERIAL SHALL BE TYPE 'B' CONFORMING TO SECTION 914-3 AND PLACED ACCORDING TO SECTION 160 IN ONE 12" MINIMUM COMPACTED LIFT. SUBGRADE SHALL BE STABILIZED TO A MINIMUM LBR VALUES AND DENSITIES AS SHOWN IN THE TYPICAL SECTIONS.

D. BASE COURSE: ALL MATERIAL SHALL BE LIMEROCK CONFORMING TO SECTION 911 AND PLACED ACCORDING TO SECTION 200 IN ONE 6" MINIMUM COMPACTED LIFT OR DOUBLE COMPACTED LIFT. ALL BASE MATERIAL SHALL BE COMPACTED TO 98% DENSITY BY MODIFIED PROCTOR METHOD (AASHTO T-180). THE PRIME COAT SHALL CONFORM TO SECTION 300.

E. ASPHALTIC CONCRETE: ALL ASPHALTIC CONCRETE MATERIAL SHALL BE 1-1/4" THICK F.D.O.T. TYPE SP-12.5 AND SHALL CONFORM TO TYPE SP-12.5 AS PER DESIGN SECTIONS SECTION 330. ALL ASPHALTIC CONCRETE CONSTRUCTION SHALL CONFORM TO SECTION 330.

4. ALL CONCRETE USED FOR CONSTRUCTION OF DRAINAGE STRUCTURES, SIDEWALKS, AND CURBING SHALL BE CLASS I CONFORMING TO SECTION 346.

5. PVC STORM SEWER SHALL BE ASTM D-3034, SDR 35 6. SIDEWALK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 522.

7. REINFORCED CONCRETE PIPE SHALL CONFORM TO SECTION 941.

8. ALL PAVEMENT MARKINGS REQUIRED IN THE R/W SHALL BE THERMOPLASTIC AND INCLUDE RAISED PAVEMENT MARKERS, WHERE REQUIRED CONFORMING TO SECTION 711.

9. ALL PAVEMANT MARKING, SYMBOLS AND STRIPING WITHIN THE SITE SHALL MEET THE LATEST FLORIDA HANDICAP ACCESSIBILLITY CODE. PAVEMENT MARKING SHALL BE 4" BLUE/WHITE (HANDICAP) OR WHITE (REGULAR) AND SHALL CONFORM TO THE LATEST F.D.O.T. AND M.U.T.C.D. STANDARDS.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A GEOTECHNICAL CONSULTANT TO PROVIDE A FIELD INVESTIGATION REPORT DELINEATING RECOMMENDATIONS FOR UNDERCUTTING AND/OR UNDERDRAINS. A COPY OF THIS REPORT SHALL BE FORWARDED TO THE OWNER AND ENGINEER FOR REVIEW AND APPROVAL PRIOR TO UNDERCUTTING OR INSTALLING UNDERDRAIN. UNIT PRICES SHALL BE PROVIDED FOR UNDERDRAIN AND UNDERCUTTING. THE CONTRACTOR SHALL NOT CONSTRUCT BASE COURSE UNTIL THE REPORT IS REVIEWED AND APPROVED BY THE OWNER AND THE ENGINEER.

11. SOIL TESTING RESULTS SHALL BE PROVIDED FOR THE PAVEMENT CONSTRUCTION. TESTING RESULTS SHALL BE SUBMITTED FOR THE SUBGRADE AND BASE COURSE, IN ACCORDANCE WITH THE DESIGN SECTION. A MINIMUM OF 5 TEST LOCATIONS SHALL BE PROVIDED ONSITE. THE TESTING REPORT SHALL DENOTE THE TEST LOCATIONS. THE CONTRACTOR SHALL NOT PROCEED TO THE SUBSEQUENT PAVEMENT SECTION UNTIL TESTING -RESULTS ARE APPROVED FOR PREVIOUS SECTION. ALL TESTING REQUIRED WITHIN THE COUNTY R/W SHALL BE COORDINATED WITH THE COUNTY INSPECTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTING COST.

12. LANDSCAPING: FINAL GRADING IN OPEN AREAS AND LANDSCAPE ISLANDS SHALL BE COORDINATED WITH THE LANDSCAPE CONTRACTOR AND THE OWNER. THE CONTRACTOR SHALL ALSO COORDINATE THE PLACEMENT OF ANY IRRIGATION AND ELECTRICAL CONDUIT SLEEVES DURING CONSTRUCTION.

FIGURE 5.1.2-2.

TYPICAL ACCESS ROADWAY CROSS-SECTION

Sources: EDA, 2009; ECT, 2009.

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5.1.3 FLOOD ZONES

Figure 3.1.4-1 presents the FEMA FIRM for the Site. As shown on Figure 3.1.4-1, many of the 100-year flood zones on the overall DGS property have been significantly altered by the previous development activities for the existing DGS facilities, as well as by the installation of perimeter drainage ditches and timbering activities. The GREC Site is shown to contain two areas of 100-year flood zones: along the northern border and in the southern portion of the Site. The northern area flood zone will be impacted by construction of the stormwater detention basins for the main power plant facilities, and the southern area will be crossed by the main access road and transmission line. GREC will have appropriately designed stormwater management and drainage systems to control and treat runoff during construction and operation. Appendix 10.4.2 provides details on the planned stormwater management plan. Construction of GREC will not adversely affect flood elevations or cause flooding on adjacent, offsite properties.

5.1.4 TOPOGRAPHY AND SOILS

The general slopes on the Site go from high on the east to low on the west and high on the south to low on the north. The maximum elevation is at 184 ft on the south end and slopes down to an elevation of 180 ft along the north. The slope is nearly uniform to the east and west with localized, isolated low areas that collect water during rainfall events.

Based on GRU's experience with the construction and operation of the existing DGS power plant facilities, no adverse effects on topography and soil stability are expected due to GREC construction activities. Some portions of the Site will require filling between 3 to 5 ft above existing grades to support the proposed facilities and provide for appropriate drainage. Overall site topography will not be significantly altered by these construction-related alterations.

Construction activities will alter runoff and percolation rates in the specific areas of the new structures and facilities. Stormwater runoff from these areas will be collected and directed to appropriately designed drainage and attenuation systems in accordance with applicable stormwater management requirements (see Section 4.8 and Appendix 10.4).

5.2 IMPACTS ON SURFACE WATER BODIES AND USES

Approximately 65 acres of GREC Site will be disturbed by construction activities, which can potentially temporarily affect the hydrology and water quality of the adjacent receiving bodies of waters due to the alteration of stormwater runoff. To prevent or reduce the surface water impacts from stormwater runoff by construction activities, an appropriately designed stormwater management plan will be implemented both during construction and plant operation.

5.2.1 IMPACT ASSESSMENT

The stormwater management plan includes four wet detention basins with a total area of 14.38 acres and two dry detention basins with a total area of 0.58 acre. These permanent stormwater basins will be used to treat stormwater runoff during construction. In addition, a temporary dry retention basin will be created to manage stormwater in the craft parking area during construction. Appendix 10.4.2 of this SCA presents the stormwater management plan.

5.2.2 MEASURING AND MONITORING PROGRAMS

A stormwater management plan (see Appendix 10.4.2 and Section 4.8) will be implemented during plant construction. Monitoring of stormwater discharges during construction will be conducted in accordance with the requirements of a multisector NPDES permit for stormwater discharges.

5.3 GROUNDWATER IMPACTS

5.3.1 IMPACT ASSESSMENT

The proposed site preparation and facility construction activities for the GREC Site will have short-termed effects on groundwater in the surficial aquifer on the Site due to temporary dewatering activities. These limited, temporary dewatering activities will be required for some plant facility structures with relatively deep foundations, such as the power block equipment foundations and truck unloading system. Temporary dewatering

may also be necessary during construction of the surface water management system as described in Subsection 4.8.8.

Other plant facility and structure foundations may consist of concrete or crushed stone mats or spread footings for relatively lighter load-bearing facilities and pilings for heavier structures. Construction of these types of foundations generally will require no dewatering activities.

Current SRWMD water use permitting rules do not apply to construction dewatering. Further, SRWMD's August 29, 2009, proposed Rule 40B-2.051(3) indicates that no permit is required for "[w]ithdrawals made for dewatering activities for a total period not to exceed 180 consecutive days." The duration of each GREC dewatering task will generally be limited to less than 6 months. Once the detailed design is completed, a dewatering plan, if required, will be submitted prior to commencing dewatering activities.

An SWPPP for construction activities has been prepared and is presented in Appendix 10.4.2. An NOI application for stormwater discharge will be submitted to FDEP under the generic permit for stormwater discharge from large and small construction activities prior to commencing construction activities in accordance with Chapter 62-25, F.A.C. Appendix 10.2.2 provides a copy of this NOI application. Deep foundations extending below the water table will need to be dewatered for construction. When dewatering is needed for excavation areas extending below the water table or following rainfall events, the water will be pumped and handled as required and specified in the construction SWPPP document (Appendix 10.4.2). No direct offsite dewatering will occur.

Should dewatering be required during construction of the surface water management system, or the facility itself, permit coverage under FDEP's Generic Permit for Produced Groundwater from Any Uncontaminated Site, Rule 62-621.300(2), F.A.C., will be obtained prior to any discharge of dewatering water to surface waters or a stormwater management system that discharges to surface waters. The foregoing generic permits are issued under the authority of FDEP's EPA-approved NPDES permitting program.

Temporary dewatering effluent for initial site preparation will be routed to the construction sediment basins. Additionally, there is an existing construction stormwater detention basin located on the DGS site directly south of the GREC power plant facilities that was used during the construction of DGS and remains in place for stormwater detention. This area may be used (only if necessary) as an additional location to control water resulting from construction dewatering activities. Dewatering sediment will naturally settle out in the basins, and the treated water will be routed to noncontact stormwater discharge points. Dewatering, when required, will be accomplished by localized pumping of water in the area under construction. Lowering the water table in the area allows backfilling with structural fill (i.e., sand, limestone, etc.) by lift placement and compaction of suitable soils. After initial filling of sites for deep foundations, additional dewatering may be required. The dewatering system will be designed to control turbidity with water contained onsite or routed to the sediment basins.

As described in Subsection 3.3.2.1, the surficial aquifer at the GREC Site has an average saturated thickness of only 7 or 8 ft, and the transmissivity is estimated to average approximately 15 ft/yr. Considering these observed conditions, the water level drawdowns from dewatering are expected to extend laterally only a short distance away from areas of dewatering. For example, drawdowns exceeding 0.2 ft will likely be limited to a distance of less than 50 ft from the dewatering areas. Since the areas of dewatering will be located a significant distance from the site boundaries, no offsite impacts to groundwater are anticipated. Furthermore, these shallow and short-termed dewatering activities are not likely to affect the intermediate or Floridan aquifers on or in the vicinity of the Site, due to the presence of a competent confining unit beneath the surficial aquifer. Therefore, the proposed temporary dewatering activities are not expected to have adverse impacts to onsite or offsite groundwater resources.

Potential chemical effects from dewatering activities can result from the disturbance (mobilization) of constituents from the soils into the water and from oxidation of the groundwater. The surficial soils on the Site are composed primarily of quartz sands with several water-soluble constituents (including calcite and iron). Oxidation can cause the disassociation of calcite releasing bicarbonate and calcium anions, which can increase the

hardness of water. Oxidation of the dissolved iron can cause ferrous iron to form ferric iron. However, in the onsite water table aquifer composed primarily of silica sands, the oxidation reactions will be minimal and potential groundwater quality impacts will be insignificant.

Based on the existing Site and adjacent offsite conditions, the potential shallow and short-termed groundwater drawdowns from dewatering will have no significant impacts on wetlands or surface water bodies in the vicinity of the Site. Also, since the surficial aquifer in the Site area is not used for potable water supply purposes, and due to the competent confining layer between the aquifer systems, the temporary surficial aquifer dewatering drawdown will not affect drinking water supplies or other uses of deeper aquifer systems in the GREC Site area.

5.3.2 MEASURING AND MONITORING PROGRAMS

The proposed site preparation and facility construction activities for the GREC Site do not warrant any type of groundwater monitoring program.

As described in Subsections 3.3.1 and 3.3.2, previous baseline monitoring has been conducted to establish existing conditions with regard to groundwater levels, groundwater quality, and other hydrogeologic parameters.

5.4 ECOLOGICAL IMPACTS

5.4.1 IMPACT ASSESSMENT

Construction of GREC, including onsite linear facilities, has the potential to impact terrestrial and aquatic ecological resources through direct impacts from site clearing and construction of structures or indirect impacts from sedimentation, increased surface water runoff, erosion, fugitive dust, or accidental damage due to heavy equipment movement or utilization. These impacts may be temporary or permanent in nature and would include effects on wildlife, terrestrial and aquatic habitats, and important species. The use of careful site design, including avoidance and minimization techniques, and implementation of BMPs during construction will minimize construction impacts. The following subsections provide information on the potential impacts to ecological resources.

5.4.1.1 Terrestrial Systems

Upland Vegetation Communities

Terrestrial vegetation communities within the footprint of GREC have been previously impacted through clearing and silvaculture activities. No unique or pristine vegetation assembles will be affected by GREC.

The GREC power plant and associated facilities will occupy approximately 60.5 acres, or approximately one-half of the Site. Of this, 99.5 percent is comprised of upland vegetation communities, including approximately 0.43 acre of graded and drained road (8145), 2.37 acres of dirt trails/logging roads (8146), 1.77 acres of other open land (194), 2.70 acres of herbaceous dry prairie (310), 20.07 acres of mixed hardwood/conifer forest (434), and 32.87 acres of pine plantation (441). Approximately 4.6 acres of impact within the Site will be temporary associated with construction worker parking. This area will be revegetated when construction is complete. The community types that will be affected by GREC are prevalent on the GREC Site or 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 GREC footprint overlain on the land use community types, and Table 5.4.1-1 summarizes temporary and permanent impacts by community type.

An additional approximately 8 acres outside of and just to the east of the Site on DGS property will be used for temporary construction laydown. Currently, the temporary construction laydown areas consist primarily upland grassed fields (194). These areas will be revegetated when construction is complete.

Wildlife Communities

As previously discussed, the GREC Site does not contain unique habitats or wildlife species. Areas proposed for construction activities are generally the lower quality upland and wetland habitats on the Site. Common wildlife species will relocate to nearby similar habitats. No adverse impacts to state- or federal-listed upland wildlife species are expected to occur.

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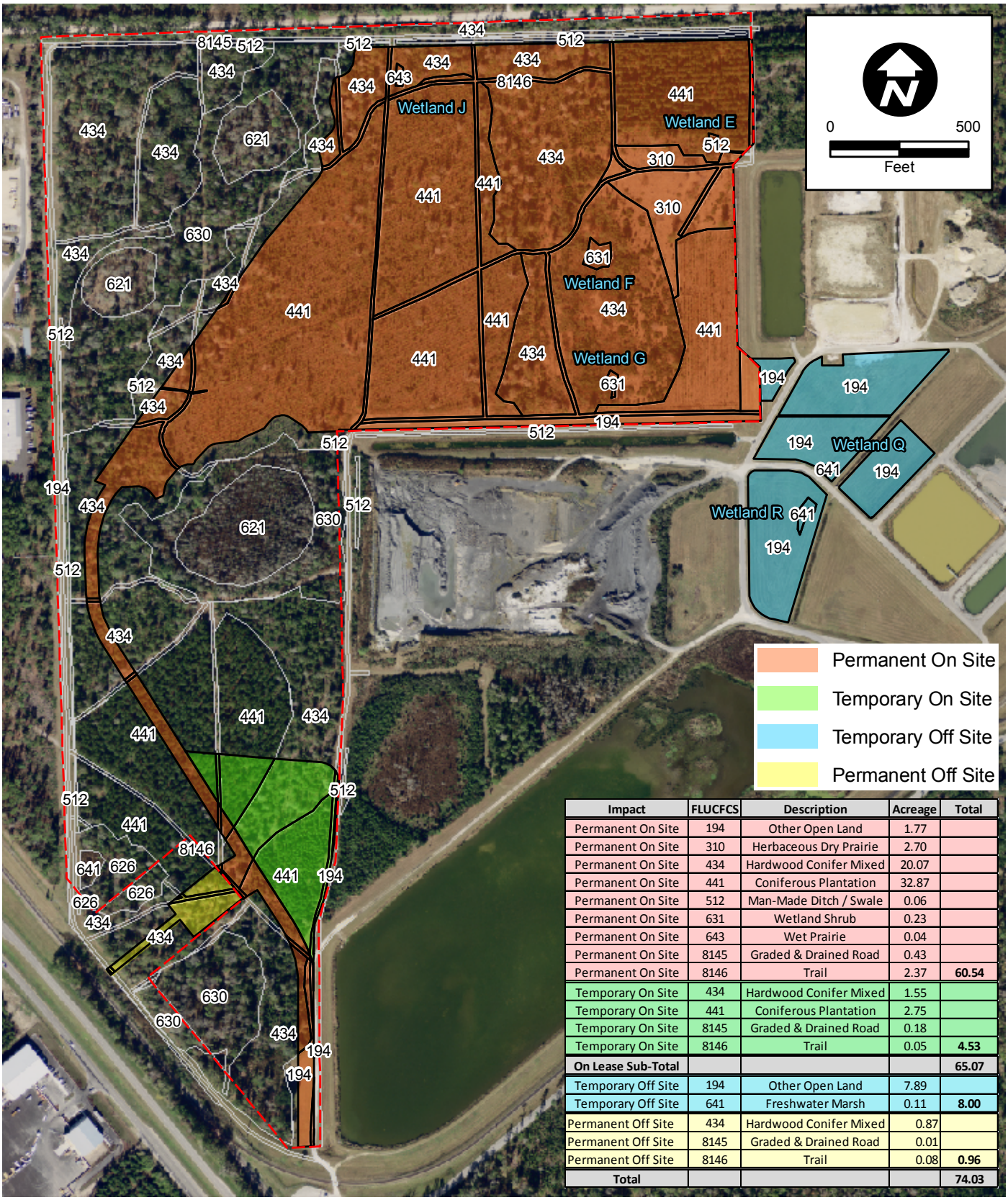

Impact	FLUCFCS	Description	Acreage	Total
Permanent On Site	194	Other Open Land	1.77	
Permanent On Site	310	Herbaceous Dry Prairie	2.70	
Permanent On Site	434	Hardwood Conifer Mixed	20.07	
Permanent On Site	441	Coniferous Plantation	32.87	
Permanent On Site	512	Man-Made Ditch / Swale	0.06	
Permanent On Site	631	Wetland Shrub	0.23	
Permanent On Site	643	Wet Prairie	0.04	
Permanent On Site	8145	Graded & Drained Road	0.43	
Permanent On Site	8146	Trail	2.37	**60.54**
Temporary On Site	434	Hardwood Conifer Mixed	1.55	
Temporary On Site	441	Coniferous Plantation	2.75	
Temporary On Site	8145	Graded & Drained Road	0.18	
Temporary On Site	8146	Trail	0.05	**4.53**
On Lease Sub-Total				**65.07**
Temporary Off Site	194	Other Open Land	7.89	
Temporary Off Site	641	Freshwater Marsh	0.11	**8.00**
Permanent Off Site	434	Hardwood Conifer Mixed	0.87	
Permanent Off Site	8145	Graded & Drained Road	0.01	
Permanent Off Site	8146	Trail	0.08	**0.96**
Total				**74.03**

FIGURE 5.4.1-1.

LAND USE CONSTRUCTION IMPACTS

Sources: FDOT, 2008; GREC,2009; EDA, 2009; ECT, 2009.

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

FLUCFCS	Description	Existing Acreage	Permanent Impact	Temporary Impact	Remaining Acreage	Remaining Percentage
194	Other open land	4.38	1.77		2.61	60
310	Herbaceous dry prairie	2.7	2.70		0	0
434	Hardwood conifer mixed	49.33	20.07	1.55	27.71	56
441	Coniferous plantation	44.89	32.87	2.75	9.27	21
512	Manmade ditch/swale	1.23	0.06		1.17	95
621	**Cypress wetland**	**6.3**			**6.3**	**100**
626	**Hydric pine plantation**	**1.05**			**1.05**	**100**
630	**Wetlands forested mixed**	**14.22**			**14.22**	**100**
631	**Wetland shrub**	**0.23**	**0.23**		**0**	**0**
641	**Freshwater marsh**	**0.21**			**0.21**	**100**
643	**Wet prairie**	**0.04**	**0.04**		**0**	**0**
8145	Graded and drained roads	2.2	0.43	0.18	1.59	72
8146	Trails (logging roads)	4.01	2.37	0.05	1.59	40
		130.79	60.54	4.53	65.72	50

Note: **Bold** community types are wetlands or other surface waters

Source: ECT, 2009

Noise, human presence, and operation of construction equipment are not expected to adversely affect wildlife populations, since these types of activities already occur in the area with the GRU DGS. Species in the vicinity have become accustomed to these activities as evidenced by the numerous wildlife observations in and around the existing power facilities.

5.4.1.2 Wetland/Aquatic Systems

Wetland Vegetation Communities

The GREC layout was designed to avoid and minimize impacts to wetland communities to the greatest extent possible. However, given the abundance and distribution of wetlands onsite, it was not possible to entirely avoid wetlands. The layout was designed to preserve the larger, higher quality wetlands and impact only those that were smaller, isolated, and of lower quality. The vast majority (98.6 percent) of the wetlands onsite will remain intact, including all forested wetlands.

On the Site, construction of GREC will only impact three small isolated wetlands and two swales, which combined occupy 0.33 acre. It appears these wetlands and swales were created incidentally to silviculture activities in formerly upland areas. Wetland J, a 0.04-acre wet prairie; Wetland G, a 0.05-acre shrub wetland; and Wetland F, a 0.18-acre shrub wetland, are located within the facility footprint. None of these nonforested wetlands are considered high quality using UMAM. An additional 0.11 acre of temporary impact to Wetlands Q and R will occur in the offsite temporary construction laydown areas east of the Site. These two wetlands are small, isolated, low-quality wet spots within the grassed fields. Impacts to these wetlands will be offset by preserving high-quality forested wetlands and upland buffers elsewhere on the GREC Site. Appendix 10.4 contains the ERP application, which details wetland impacts, avoidance and minimization efforts, and a mitigation plan.

Secondary impacts to wetland communities will be minimized by maintaining an average 50-ft and minimum 35-ft buffer surrounding the wetlands where no construction activities will occur.

Wetland-Dependent Wildlife Communities

As with the potential impacts to terrestrial wildlife communities, wetland-dependent wildlife species are those that are common to the area and were typically observed throughout wetlands and ponds on the DGS property. No adverse impacts are expected to these wildlife species for the same reasons discussed previously for terrestrial wildlife species.

5.4.1.3 Endangered and Threatened Species

Plants

No threatened or endangered plant species were observed on the GREC Site or in the adjacent offsite temporary construction laydown areas. Therefore, construction of GREC is not expected to have any effect on protected plant species.

Wildlife

Wildlife species listed as endangered, threatened, or of special concern were addressed in Section 3.3.6. Five listed wildlife species were documented in the Site vicinity (none were actually observed on the Site): alligator, little blue heron, snowy egret, white ibis, and wood stork. These species are all wetland-dependent species and were observed in the wetlands and ponds on the adjacent DGS property. No nesting by any of these species was observed on the GREC Site or the DGS property.

While these species may use the wetlands found on the GREC Site for foraging, construction of this facility will not adversely affect local populations of any of these species. This is due to the fact that wetlands and ponds on the remainder of the DGS property will be unaffected by the GREC Site construction.

5.4.2 MEASURING AND MONITORING PROGRAMS

5.4.2.1 Terrestrial Systems

No monitoring activities will be undertaken on terrestrial systems because no important terrestrial systems will be affected by Site construction activities.

5.4.2.2 Wetland/Aquatic Systems

The ecological monitoring program conducted on the Site in support of this SCA and ERP application is described in Subsections 3.3.5 and 3.3.6 for terrestrial and aquatic ecological resources. No continued monitoring programs are proposed for biological resources during the construction phase of the project.

5.5 AIR IMPACTS

Construction of GREC 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. And third, construction worker travel 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 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 construction site.

Fugitive dust emissions from the construction site will be minimized using appropriate dust suppression control methods. 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, since most of the main power plant facilities will be located approximately 1,100 ft from the nearest area of potential public exposure (i.e., rural Northwest 128th Lane) to the north of the facilities and approximately 3,400 ft from U.S. 441, potential fugitive dust impacts to offsite areas are expected to be minimal.

Emissions from internal combustion engines will occur during site preparation and construction due to the use of onsite construction equipment for site 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 onsite painting.
- Refueling of construction equipment.
- Application of adhesives and waterproofing chemicals.

Construction of GREC will occur over an approximately 34-month period. As previously presented in Subsection 5.1.2, there will be an average of approximately 168 workers during that time, with peak employment of approximately 426 construction workers. Some of these construction personnel may be drawn from outside Alachua County and will commute to the job site. Conversely, construction workers from Alachua 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 GREC PSD air permit application in Appendix 10.2.5 (Volume 3) of the 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 1,100 ft from the nearest site boundary along Northwest 128th Lane and approximately 0.8 mile from the closest residential development (Turkey Creek). Thus, based on the type and nature of the construction-related emission 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 well within the GREC property boundaries.

5.6 SOLID WASTES

Solid waste generated during construction activities will be disposed in accordance with applicable rules and regulations. Typical municipal solid waste will be collected in appropriate waste collection containers located around the construction areas, and the waste will be transported offsite for disposal at an approved solid waste landfill. Construction debris, such as scrap wood, concrete, and metal, will first be transported to a specified storage area on the Site where the debris will be separated and stockpiled for potential salvage and recycling. Construction debris that is not salvaged and recycled will be transported to a permitted offsite 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 any resulting hazardous wastes. This responsibility includes the proper recordkeeping, transportation, storage, handling, and offsite disposal of such wastes in accordance with federal and state hazardous waste regulations.

5.7 IMPACTS 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 since the Site is located adjacent to the existing DGS facility, which is currently operating as an electrical power generating facility. Information presented in Subsection 3.2.3.2 describes the surrounding land uses, which are the DGS property to the east and south, undeveloped land to the north, and primarily the Alachua County Public Works Department facilities to the west. Across U.S. 441 are commercial uses. GREC land use will be similar to the existing DGS facilities, but GREC will be located approximately 1,800 ft westward. GREC will have a setback of the power generation structures from U.S. 441 of approximately 3,400 ft.

The nearest residential development (Turkey Creek) to the planned location of the GREC power block facilities is located approximately 0.8 mile to the southwest of the Site.

The site plan for GREC and existing facilities was previously shown in Figure 4.2.0-2. The site plan shows the planned locations for construction of the new power plant structures (i.e., power block), fuel handling and storage areas, and access road. This plan also shows setbacks from the site boundaries and visual buffers for the main power plant facilities from the northern, southern, and western property boundaries.

5.7.2 CONSTRUCTION EMPLOYMENT

The construction workforce for GREC is estimated to peak at approximately 426 workers and average 168 workers for a 34-month duration. Employment is expected to be highest during the December 2012 through February 2013 time frame.

The majority of the construction workforce is expected to be drawn from Alachua County and North Florida in the region within commuting distance to the Site. It is estimated that approximately 50 percent of the construction workforce will be drawn from Alachua County. The remainder of the construction workforce will be drawn from other counties and the surrounding region. These workers will temporarily relocate to areas within commuting distance to the Site. These workers will occupy available rental housing units or recreational vehicle park sites. The associated potential impacts on housing, schools, and other public facilities and services are expected to be minimal and temporary. Construction is expected to occur primarily during daylight hours, with the majority of the construction workers onsite between 7 a.m. and 7 p.m. Chapter 7.0 provides more detailed information on the construction workforce, payrolls, and expenditure and economic benefits.

5.7.3 TRANSPORTATION IMPACTS

A detailed traffic impact analysis to assess the potential transportation impacts due to construction and operation of GREC was conducted by Genesis. Appendix 10.7.1 of this SCA provides a copy of the analysis report, and the following provides a summary of the LOS analysis based on the peak construction period. The construction period of GREC is

projected to last 34 months, with completion to occur no later than late 2013. Peak construction employment will reach approximately 426 in early 2013. Employment will consist of 350 direct craft labor (construction labor), 65 indirect construction management and supervisory staff, and 11 operations and maintenance staff (plant operations). Truck deliveries could reach approximately 22 trips per day. The exact month when the peak truck deliveries will take place during the peak construction period is unknown; therefore, for conservative purposes, the peak is assumed to be at the same time as peak construction employment.

5.7.3.1 Trip Generation

Due to the uniqueness of this power plant land use, trip generation was calculated using rates from similar power plant projects, actual directional split counts during construction from another power plant, and engineering judgment. Table 5.7.3-1 provides the estimated a.m. and p.m. peak hour trip generation at peak construction.

5.7.3.2 Trip Distribution

Project traffic entering and exiting the primary driveway as calculated in the trip generation analysis was distributed manually on U.S. 441. Daily distribution was used for the roadway analysis for U.S. 441, and the a.m. and p.m. peak hour distribution was used for intersection analysis at U.S. 441 and Northwest 43rd Street. To estimate the distribution for the peak construction period, construction workers were distributed based on different lodging considerations (see Figure 5.7.3-1). Local construction workers and plant operations employees were distributed based on a turning movement count taken at the DGS facility. The count was taken on Tuesday, June 16, 2009, from 6 to 8 a.m. and 3 to 7 p.m. and measured existing DGS traffic distribution on U.S. 441. The distribution indicated a 50/50-percent split of daily traffic. Truck deliveries for the peak construction period were distributed based on a 95-percent northwest/5-percent southeast split of the trucks accessing the Site from U.S. 441. Overall, 736 daily trips were projected to enter/exit the GREC Site on U.S. 441 from the northwest and 292 daily trips from the southeast. Figure 5.7.3-1 shows the peak construction trip distribution.

Table 5.7.3-1. Peak Construction Trip Generation

	Enter	Exit	Total
Daily	514	514	1,028
a.m.	288	28	316
p.m.	28	288	316

Source: Genesis, 2009.

PEAK CONSTRUCTION

Peak Construction Project Traffic Daily Trip Distribution

Description	# of Employees/Trucks	# of Trips	Distribution on US 441 Northwest	Distribution on US 441 Southeast	Trips on US 441 Northwest	Trips on US 441 Southeast
Plant Operation Employees	11	22	50%	50%	11	11
Local Work Force	205	474	50%	50%	237	237
Non-Local Work Force:						
Travel trailers/motor homes	60	138	90%	10%	124	14
Local motels	50	116	90%	10%	104	12
Short term lease	70	162	90%	10%	146	16
Long commute	30	70	100%	0%	70	0
Truck Deliveries	23	46	95%	5%	44	2
TOTAL		**1,028**			**736**	**292**

Note: Work force trips combines Construction Labor with Management & Supervision, which have different trip rates

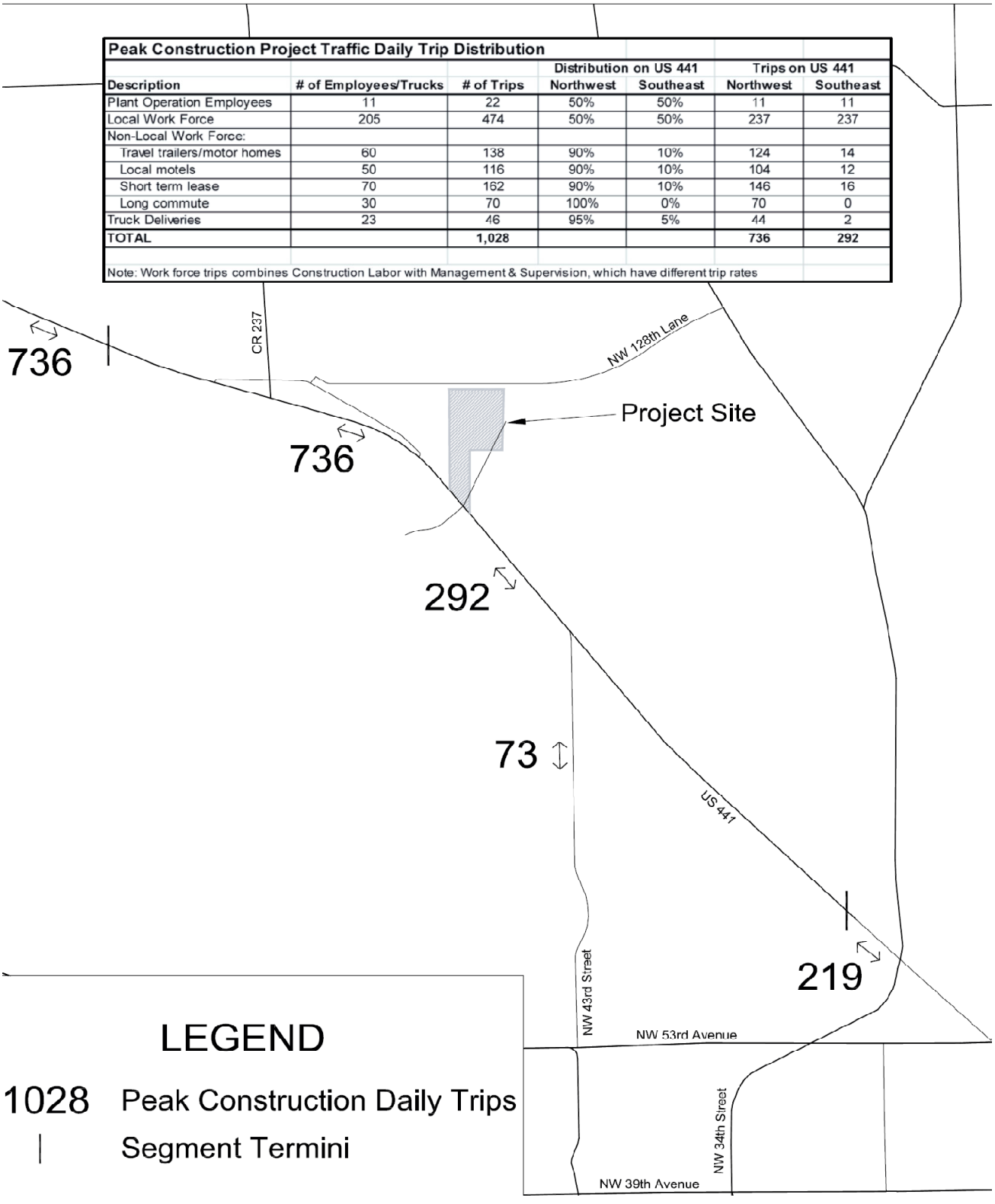

FIGURE 5.7.3-1.

PEAK CONSTRUCTION DAILY TRIPS

Source: Genesis, 2009.

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5.7.3.3 Roadway Analysis

Daily projected peak construction traffic was added to the estimated 2013 background traffic along the studied segment of U.S. 441 between Northwest 23rd Street and the GMA boundary. The highest single point loading of project traffic was the 736 trips that enter/exit the Site on U.S. 441 to/from the northwest. The resultant 2013 volume along the studied segment of U.S. 441 is 22,155, with an available service volume of 13,545. Based on this analysis, the LOS on U.S. 441 would remain at B, similar to existing conditions.

5.7.3.4 Intersection Analysis

The intersection of U.S. 441 and Northwest 43rd Street was studied to assess potential impacts from the peak construction traffic for the a.m. and p.m. peak hours. The a.m. and p.m. peak hour project trips were distributed similarly to the distribution applied for the roadway analysis. Figure 5.7.3-2 shows the a.m. and p.m. trip distribution. The GREC-related trips were added to the projected 2013 background traffic volumes. The analysis results show that after applying a growth rate and peak construction traffic, the intersection of U.S. 441 and Northwest 43rd Street will remain at a similar LOS B during the a.m. peak hour and LOS C during the p.m. peak hour as the existing conditions.

5.7.4 HOUSING IMPACTS

For the year 2005, the Florida Department of Labor and Employment Security (FDLES) reported a total of 6,098 construction workers in Alachua County (BEBR, 2008). Based on this available construction workforce, the majority of construction workers is expected to be drawn from within commuting distance of the Site and will not permanently relocate to the area. It is therefore expected that the majority of these construction workers will commute daily to and from the Site.

Also, as previously discussed in Subsection 5.7.2, the number of construction workers expected to be drawn from outside the region is predicted to range up to 50 percent of the workforce. These workers are anticipated to occupy available rental housing and/or rental or seasonal units in the area. Relatively few construction workers are anticipated to be

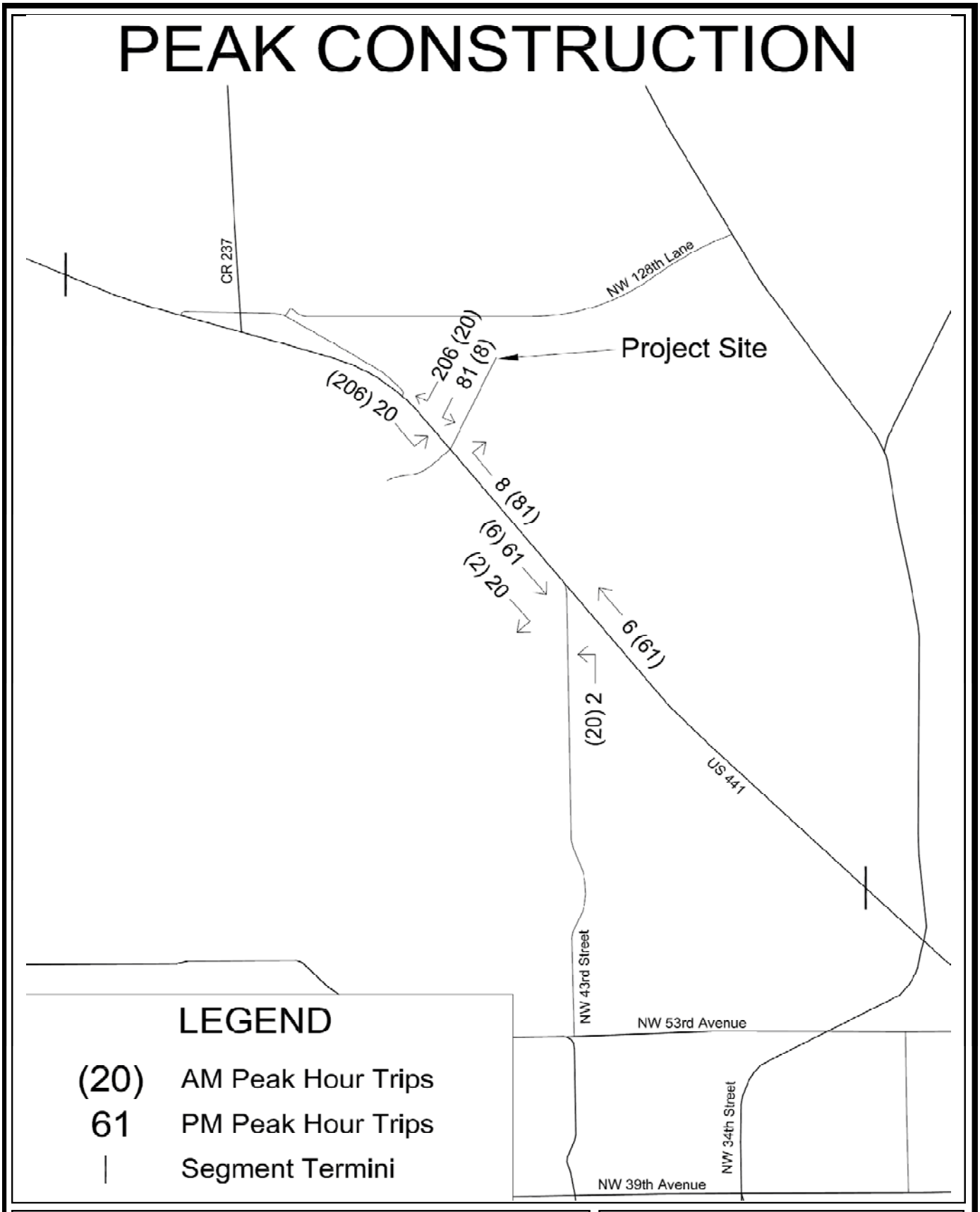

FIGURE 5.7.3-2.

PEAK CONSTRUCTION: a.m. AND p.m. PEAK HOUR TRIPS

Source: Genesis, 2009.

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continuously employed throughout the 34-month construction period, and, consequently, associated impacts on housing are expected to be negligible.

In 2000, there were 2,826 vacant housing units in Alachua County. In 2008, there were 468 total licensed lodgings with 32,610 units. Therefore, the relatively small additional temporary demand for rental housing associated with the GREC construction workforce is expected to be readily absorbed by available rental housing in Alachua County. Those commuting workers are expected to maintain their established patterns of use based on their existing residences, which are not expected to create any additional housing demands to 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. Approximately one-half of the construction workforce is anticipated to commute from their current residences, with only minimal temporary relocations expected. Therefore, because the workforce is currently provided with public services and facilities associated with their existing residences, no significant changes in the patterns of use or demands upon public services are expected. During construction, bottled water and portable sanitary units will be used for the construction workforce.

5.7.6 NOISE IMPACTS

GREC construction is expected to be typical of other power plants in terms of schedule, equipment used, and types of activities. 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 GREC Site, potential noise impacts are expected to be minimal and mitigated by the distance between the construction area of the main plant facilities and the site bounda-

ries. In addition, the property between the main plant facilities and the site boundary contains a thick growth of tress that provides noise divergence and attenuation.

During the initial site preparation and foundation excavation phase, heavy diesel-powered earth-moving equipment is 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, 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 clean-up 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 1,100 ft north of the power block construction area. There is an unpaved road (i.e., Northwest 128th Lane) along this property boundary, but no businesses or residences are located along this northern property

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 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, 2009.

boundary. The closest business-type facility (i.e., Alachua County Public Works Maintenance Complex) is located along the western property boundary and is approximately 2,200 ft from the main facility construction area. The closest residential development is approximately 0.8 mile to the southwest and is located on the other side of U.S. 441. Table 5.7.6-2 presents average or equivalent construction noise levels projected at the northern and western property boundaries during construction. These noise results are conservative, because the only attenuating mechanism assumed was divergence of the sound waves; no attenuation from natural vegetation or intervening structures was factored into the analysis. The GREC Site is heavily forested with trees and vegetation located between the construction area and property boundaries. Average noise levels during the loudest construction activities are projected to be between 60 and 64 dBA at the northern property boundary and between 48 and 52 dBA along the western property boundary. The projected level along the western property boundary is generally equal to or less than the ambient noise levels measured at a nearby location (Location 3 in Figure 3.3.8-1 and Table 3.3.8-2). Noise from construction activities is not expected to be audible at the nearest residential development due to the distance and the existing noise from vehicle traffic on U.S. 441.

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), except for steam blows during the final phase of plant startup and equipment preparation and cleaning. Steam blows involve exhausting steam for short periods of time. This process is typically infrequent and specialized noise attenuation equipment will be used to minimize noise emanating from steam blows.

5.8 IMPACTS ON LANDMARKS AND SENSITIVE AREAS

The closest regional resource is the San Felasco Hammock State Preserve located approximately 3 miles southwest of the Site. Devil's Millhopper State Geological Site, located approximately 3.2 miles to the south, is a National Natural Landmark. Given the distance from these resources, the construction of GREC will have no impact.

Table 5.7.6-2. Projected Average Construction Noise Levels (dBA) at Property Boundaries Based on Composite Noise Levels

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

Source: ECT, 2009.

5.9 IMPACTS OF ARCHAEOLOGICAL AND HISTORIC SITES

Based on the prior cultural resources assessment conducted for the Site and current view of known resources by FDHR (see Appendix 10.7.3), the construction of GREC is not expected to disturb any archaeological or historical features eligible for the NRHP. Therefore, no mitigation to such impacts will be required. In the unlikely event that such a feature is encountered during construction, activities will be halted until a certified archaeologist evaluates the find and determines its significance. If the find is significant, GREC LLC will take the appropriate measures to preserve or mitigate the impact to the find in coordination with FDHR.

5.10 SPECIAL FEATURES

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

5.11 BENEFITS FROM CONSTRUCTION

The site preparation and construction of GREC 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.