4.0 The Plant and Directly Associated Facilities

This chapter provides descriptions of the proposed SCCF, key electrical generating facilities and systems and their operation, and the directly associated facilities on the SGS site based on currently available plans and conceptual design information. The descriptions include estimates of the expected character, quality, and quantity of discharges and emissions from the plant operations. In addition, proposed measures and systems to control and, as necessary, treat the expected discharges and emissions are described to provide reasonable assurance that the plant design, construction, and operation will comply with all applicable regulatory requirements and standards. SECI is not seeking any variances from applicable nonprocedural requirements.

4.1 Background

Based on its IRP process, SECI has determined there is a need for additional power supply resources beginning in the 2022 time frame to meet the electricity demands of its Member cooperatives. SECI has also determined that an integral part of the most cost-effective and reliable portfolio of resources to meet this future power supply need is the addition of the proposed SCCF at its existing SGS site in Putnam County.

SCCF will involve the construction and operation of a new natural gas-fired approximately 1,183-MW (gross nominal)/1,050-MW (nominal net), two-on-one, combined-cycle generating facility and onsite associated facilities on an approximately 32-acre portion of the SGS site. The SGS site currently contains two approximately 650-MW (winter net) coal-fired steam electric generating units (i.e., Units 1 and 2) and associated facilities. One of the two Existing SGS Units will be permanently removed from service coincident with the declared commercial operation of SCCF. SCCF will be located directly south of the Existing SGS Units facilities. An additional 23 acres of land will be temporarily used for construction laydown and craft personnel parking. Construction activities for SCCF are scheduled to begin between mid-2019 and early 2020, or after all regulatory approvals are obtained, with targeted commercial operation of SCCF approximately 36 months later.

SCCF will utilize existing infrastructure, including the cooling water supply and discharge pipelines to the St. Johns River and the intake and discharge structures in the river. The new switchyard for the Project will be interconnected with the existing SGS switchyard, and electricity generated by SCCF will be transmitted to the Florida transmission network through the existing 230-kV transmission lines running west from the SGS site. SECI is not proposing any modifications to the existing intake and discharge structures. No new offsite associated facilities are proposed as part of the Project.

The proposed Project combined-cycle electric generating facilities will consist of two CTGs, two HRSGs, and one STG. SCCF also includes onsite associated facilities, such as electrical equipment enclosures, a mechanical draft cooling tower, exhaust stacks, an administration building that will include a control room and maintenance area, a warehouse, parking, fuel gas regulation station and heaters, diesel fired emergency fire water pump, aboveground service/fire water storage tank, aqueous ammonia tanks, a switchyard expansion, step-up transformers, potable water and sanitary wastewater treatment facilities, a stormwater management system/stormwater ponds, piping tie-ins, and other facilities necessary to integrate with existing intake and discharge water infrastructure.

SECI has selected the advanced, large-frame GE Model 7HA.02 CTG for SCCF. When operated in combined-cycle mode, these large CTGs constitute the most efficient electric generating technology currently available for utility-scale power plants. These combined-cycle plants can achieve an efficiency of over 60 percent, compared to CTGs alone in simple-cycle mode at 35 to 38 percent and coal-fired steam plants at 32 to 42 percent. When a CTG is operated alone in simple-cycle mode, the hot exhaust gases from the CTG are released to the atmosphere. In combined-cycle configuration, the hot exhaust gases from the CTG are used to produce steam in the HRSG, and the steam is used to drive an STG to generate additional electricity. Thus, a combined-cycle power plant can generate 25 to 50 percent more electricity without burning more fuel or producing additional air emissions. Figure 4.1.0-1 presents a conceptual process schematic of a two-on-one combined-cycle power plant.

The proposed SCCF will be designed with technologies to control air emissions. The two CTGs will be equipped with dry low-NO_x (DLN) combustors to control NO_x air emissions. The HRSGs will be equipped with SCR systems to further reduce NO_x emissions. Emissions of CO and VOCs will be limited through use of an oxidation catalyst system. Emissions of other regulated air pollutants (i.e., SO_2 and particulate matter [PM]) will be controlled through use of low sulfur, clean burning natural gas as the only fuel fired in the CTGs, HRSGs, and dew point fuel heaters as well as good combustion practices for additional PM control. In addition, SCCF will minimize GHG emissions through the use of clean-burning natural gas,

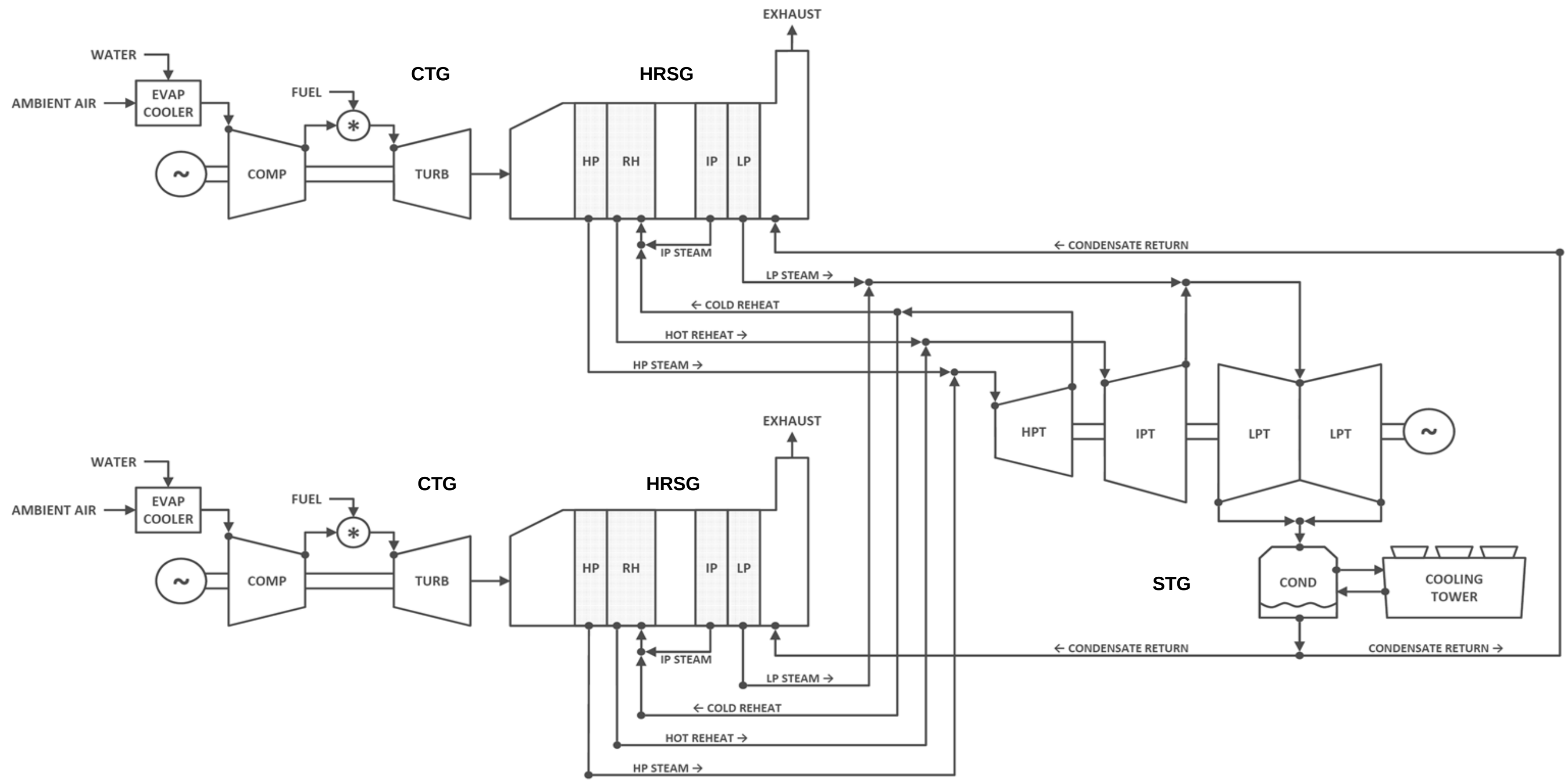

FIGURE 4.1.0-1.

TWO-ON-ONE COMBINED-CYCLE CONCEPTUAL SCHEMATIC

Sources: B&V, 2016.

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highly efficient combined-cycle electric generating technology, and removal from service of one of the Existing SGS Units. The facility will not include bypass stacks and will generally operate in combined-cycle mode. However, the STG can be bypassed if and when necessary, and hence the facility will be capable of operating absent the STG. In either configuration, the exhaust gas will be released through two approximately 199′ stacks.

The proposed SCCF is also designed to minimize the use of cooling and process water. The condenser cooling system will be a closed-loop system consisting of a 16-cell mechanical draft cooling tower. The proposed mechanical draft cooling tower will be approximately 60′ high. Cooling tower makeup water for the Project will be provided from the St. Johns River through an interconnection with the existing water intake pipeline and structure. No in-water construction activities are expected for the Project.

Higher quality freshwater needs for plant steam cycle makeup and other general plant uses (collectively “SCCF service water”) for the Project will be provided through groundwater withdrawals from new wells within the Project area. General plant uses will include equipment wash water, pump seals, evaporative cooler makeup water, and emergency fire water. The SCCF service water will be filtered and treated in trailer-mounted demineralization systems, which will be regenerated offsite to avoid the need for onsite disposal of treatment wastewaters. Potable water for drinking, safety showers, eyewash stations, and other sanitary uses will be treated in a new potable water treatment facility within the SCCF site area. Sanitary wastewater will be treated in a new packaged treatment facility. The treated sanitary wastewater and other treated low-volume wastewaters will be collected in a wastewater collection sump and discharged in combination with the cooling tower blowdown through the existing water discharge pipeline and structure to the St. Johns River, similar to existing SGS operations. Any solids produced by the treatment system will be disposed of at the existing SGS landfill.

The stormwater management system for SCCF is designed to handle and treat the 25-year, 24-hour storm event and meet all federal, state, regional, and local requirements. Potential contact stormwater runoff from the power block and equipment areas will be collected and treated through a new SCCF oil/water separator and routed to a new SCCF wastewater collection sump prior to discharge to the St. Johns River. Noncontact stormwater runoff from the facility area will be collected and routed to a stormwater retention pond. During construction, stormwater runoff from the construction laydown and parking areas will also be collected and treated in retention ponds, and best management practices (BMPs) will be utilized to minimize erosion from the disturbed areas during construction activities.

No new offsite associated transmission lines are currently needed for the proposed Project.

Natural gas fuel for SCCF will be supplied through a new, approximately 21-mile pipeline lateral from the FGT natural gas transmission system. The new pipeline lateral, including the portion to the onsite meter/regulation yard and the yard itself, will not be permitted, majority-owned, constructed, or operated by SECI. Therefore, SECI is not seeking certification of the lateral and pipeline lateral gas yard as associated facilities in this SCA.

4.2 Site Layout

Figure 4.2.0-1 shows the general layout of the proposed SCCF power plant facilities in relation to the Existing SGS Units on a recent aerial photograph. SCCF facilities will be located south of the Existing SGS Units and southwest of the existing hyperbolic cooling towers. The proposed SCCF will be located within an approximately 32-acre area, which currently contains upland mixed hardwood and conifer forest. As shown in Figure 4.2.0-1, the Project will also involve the temporary use of two areas to the north of the proposed plant facilities for construction laydown (approximately 17.4 acres) and construction craft worker parking (approximately 5.6 acres). With the construction of SCCF, less than 30 percent of the 1,996-acre site will include developed areas, with more than 70 percent remaining undeveloped. The site will, therefore, continue to easily meet the Putnam County floor area ratio (0.5:1) and impervious surface coverage requirements (70 percent) in Section 7.02.03, Putnam County Land Development Code. A temporary stormwater retention pond will be located along the west edge of the parking area. The construction laydown area also currently contains primarily upland mixed hardwood and conifer forest, and the construction parking area is cleared and was previously used for maintenance worker parking and equipment staging. There are no wetlands on the approximately 55-acre total area to be disturbed by the proposed SCCF. After construction, the parking area will be seeded and allowed to revegetate with grass. The construction laydown area will be utilized for future outages. As shown in Figure 4.2.0-1, a vegetative buffer will be maintained between the SCCF facilities and the southern boundary north of West River Road. This buffer will exceed the 60′ requirement in the Development Agreement with Putnam County.

Figure 4.2.0-2 provides a more detailed layout of the proposed SCCF facilities and temporary construction laydown and parking areas on a recent aerial photograph. As shown in the figure, the main power block area (i.e., CTG, HRSG, and STG exhaust stacks, etc.) will be located in the northern portion of the Project area. The administration/control building will be located south of the power block area, and the cooling tower and permanent stormwater retention pond will be situated in the southern portion of the Project area. The switchyard expansion will be located west of the power block area and will be interconnected with the

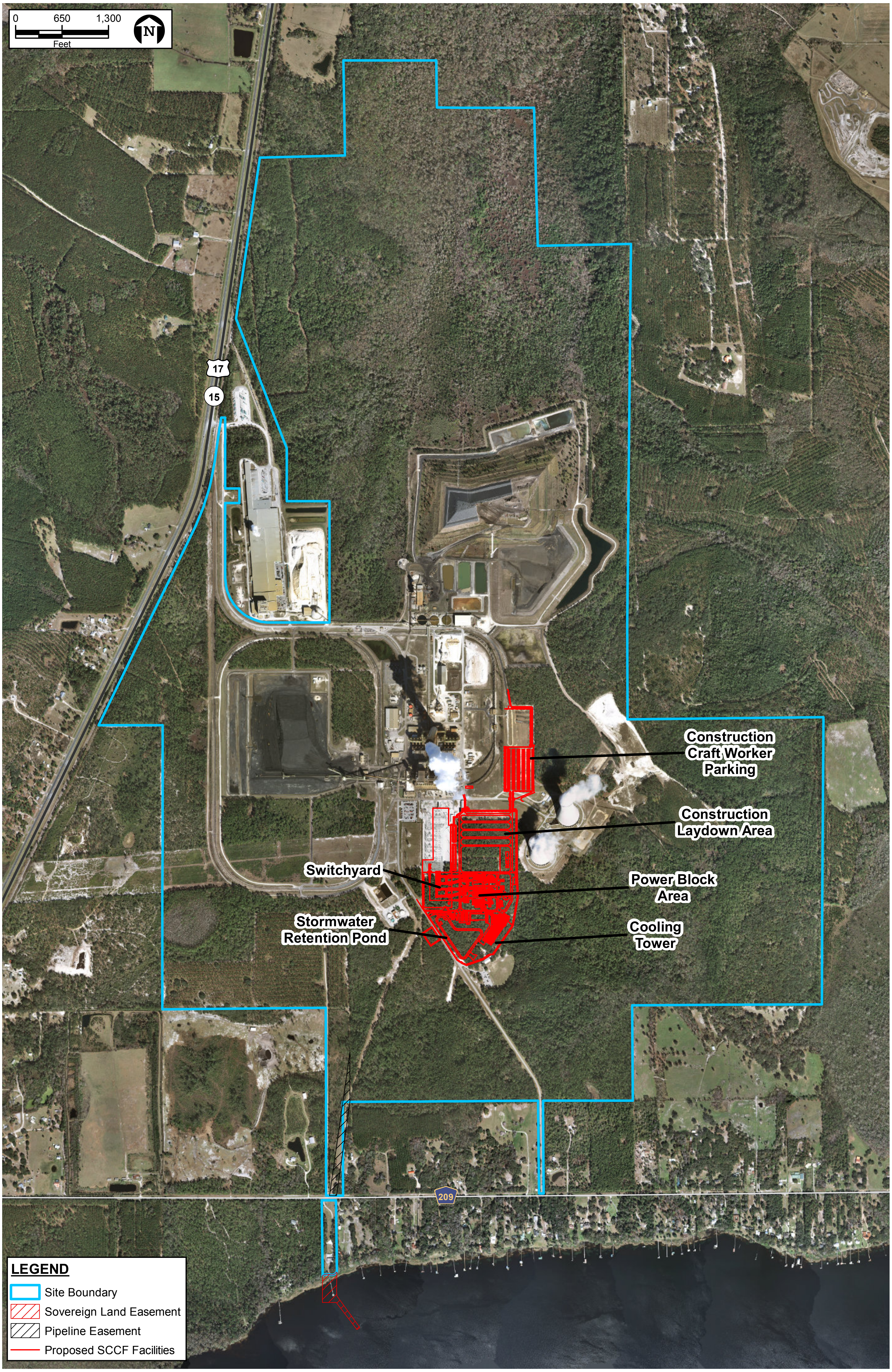

FIGURE 4.2.0-1.
LOCATION OF PROPOSED SCCF FACILITIES ON SGS SITE

Sources: FDOT, 2017; Putnam Co PA, 2016; ECT, 2017.

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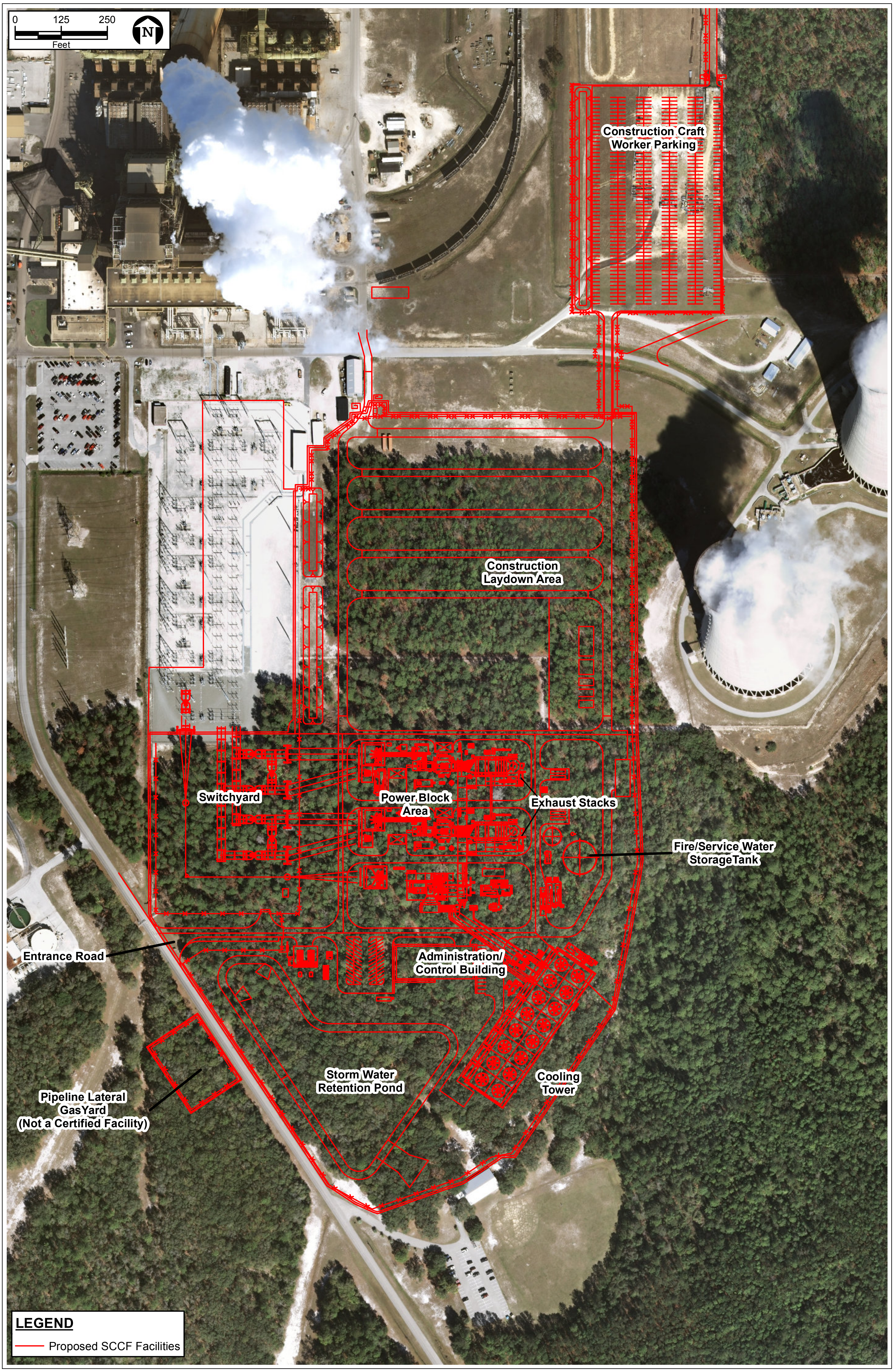

FIGURE 4.2.0-2.
LAYOUT OF SCCF FACILITIES

Sources: FDOT, 2017; Putnam Co PA, 2016; B & V, 2016; ECT, 2017.

existing SGS switchyard and 230-kV transmission lines running west from the SGS site. Operational employees will access SCCF from CR 209 (West River Road) and enter on the west side of the facilities. All large trucks will access SCCF from U.S. 17. The pipeline lateral gas yard will be located west of the stormwater pond and west of the access road.

Figure 4.2.0-3 provides a detailed site arrangement plan for the proposed SCCF facilities, including an equipment identification legend. This figure shows the locations of the air emissions sources, including the two HRSG exhaust stacks, 16-cell mechanical draft cooling tower, fuel gas heaters, and emergency diesel fuel-fired fire water pump. Table 4.2.0-1 provides the approximate dimensions of the major buildings, equipment, and structures for the proposed SCCF. As shown in this table, the tallest structures will be the two HRSG stacks at approximately 199′ above grade, the two HRSGs at approximately 100′ above grade, and the mechanical draft cooling tower at 60′ above grade. The tallest structures for the proposed Project will be significantly shorter than some of the existing structures on the SGS site.

The scaled site plan presented in Figure 4.2.0-3 also shows the locations and sizes of the parking lot areas, vehicular accessways, stormwater retention ponds, and other design features of SCCF. The parking spaces provided for the administration/control/maintenance building will exceed the required number of parking spaces for the approximately 30 operational employees split into two shifts and four spaces required for the building under the Putnam County LDC. Table 4.2.0-1 provides the dimensions of the only two buildings for SCCF. The Project will comply with the substantive requirements of Articles 6, 7, and 12 of the Putnam County LDC.

Figures 4.2.0-4 and 4.2.0-5 present conceptual renderings of the proposed SCCF facilities from different viewpoints. Based on the location of the proposed Project within the SGS site and the existing wooded buffer areas to the east, south, and west of the facilities, it is anticipated that only the two HRSG stacks and the tops of the two HRSG structures will be potentially visible from offsite public viewpoints. From a visual standpoint, however, they will blend in with the existing facilities.

4.3 Fuel

Key factors in SECI’s decision to select the combined-cycle technology for the proposed SCCF to meet its future power needs were fuel availability and costs and the use of proven, highly efficient technology. Use of clean burning natural gas will enable SECI to take advantage of competitive fuel pricing and availability opportunities in the future marketplace to provide low-cost, reliable electricity to its Member cooperatives.

N

GRAPHIC SCALE

0 125 250

SCALE IN FEET

ID	DESCRIPTION
1	STEAM TURBINE
2	COMBUSTION TURBINE
3	HEAT RECOVERY STEAM GENERATOR (HRSG)
4	HEAT RECOVERY STEAM GENERATOR STACK
5	PORTABLE DEMIN WATER TREATMENT AREA
6	WASH WATER DRAINS TANK / FALSE START DRAINS TANK
7	ADMIN/CONTROL/WAREHOUSE/MAINT BUILDING
8	BOILER FEED PUMPS
9	COOLING TOWER
10	COOLING TOWER CHEMICAL FEED BUILDING
11	SPACE RESERVED FOR FUTURE GAS COMPRESSION
12	NOT USED
13	NOT USED
14	FUEL GAS REGULATOR STATION
15	POWER DISTRIBUTION CENTER
16	STEAM TURBINE ELECTRICAL EQUIPMENT ENCLOSURE
17	FIRE PUMP ENCLOSURE
18	SERVICE FIRE WATER STORAGE TANK
19	DEMIN WATER STORAGE TANK
20	AMMONIA UNLOADING/STORAGE TANK AREA
21	ACID STORAGE TANK
22	COMBUSTION TURBINE STEP-UP TRANSFORMER
23	COMBUSTION TURBINE AUX TRANSFORMER
24	STEAM TURBINE STEP-UP TRANSFORMER
25	CYCLE CHEM FEED AND SAMPLE PANEL ENCLOSURE
26	STORM WATER RUNOFF POND
27	SWITCH YARD
28	BULK HYDROGEN TUBE TRAILERS
29	PIPELINE LATERAL GAS YARD
30	POTABLE WATER WELL
31	SERVICE WATER WELL
32	CONTINUOUS EMISSIONS MONITORING SYSTEM
33	COOLING TOWER MCC ENCLOSURE
34	AMMONIA VAPORIZATION SKID
35	OIL/WATER SEPARATOR
36	MEDIUM VOLTAGE SWITCHGEAR
37	CIRCULATING WATER PUMPS
38	AUXILIARY COOLING WATER PUMPS
39	GENERATOR REMOVAL AREA
40	GENERATOR REMOVAL CRANE PAD
41	CT MAINTENANCE CRANE PAD
42	WAREHOUSE
43	CT ELECTRICAL PACKAGE (PEECC)
44	CT BATTERY COMPARTMENT
45	CT PERFORMANCE GAS HEATERS
46	WASTE WATER COLLECTION SUMP
47	LOAD COMMUTATED INVERTER
48	PRE-PACKAGED SANITARY TREATMENT SYSTEM
49	POTABLE WATER STORAGE TANK AND SKID
50	CATWALK
51	STORM WATER POND EMERGENCY OVERFLOW WEIR
52	FUEL GAS DEW POINT HEATER W/METERING
53	HRSG BLOW DOWN TANK
54	HRSG PDC
55	SCR BASKET REMOVAL AREA
56	CONSTRUCTION LAYDOWN AREA
57	CONSTRUCTION CONTRACTING PARKING

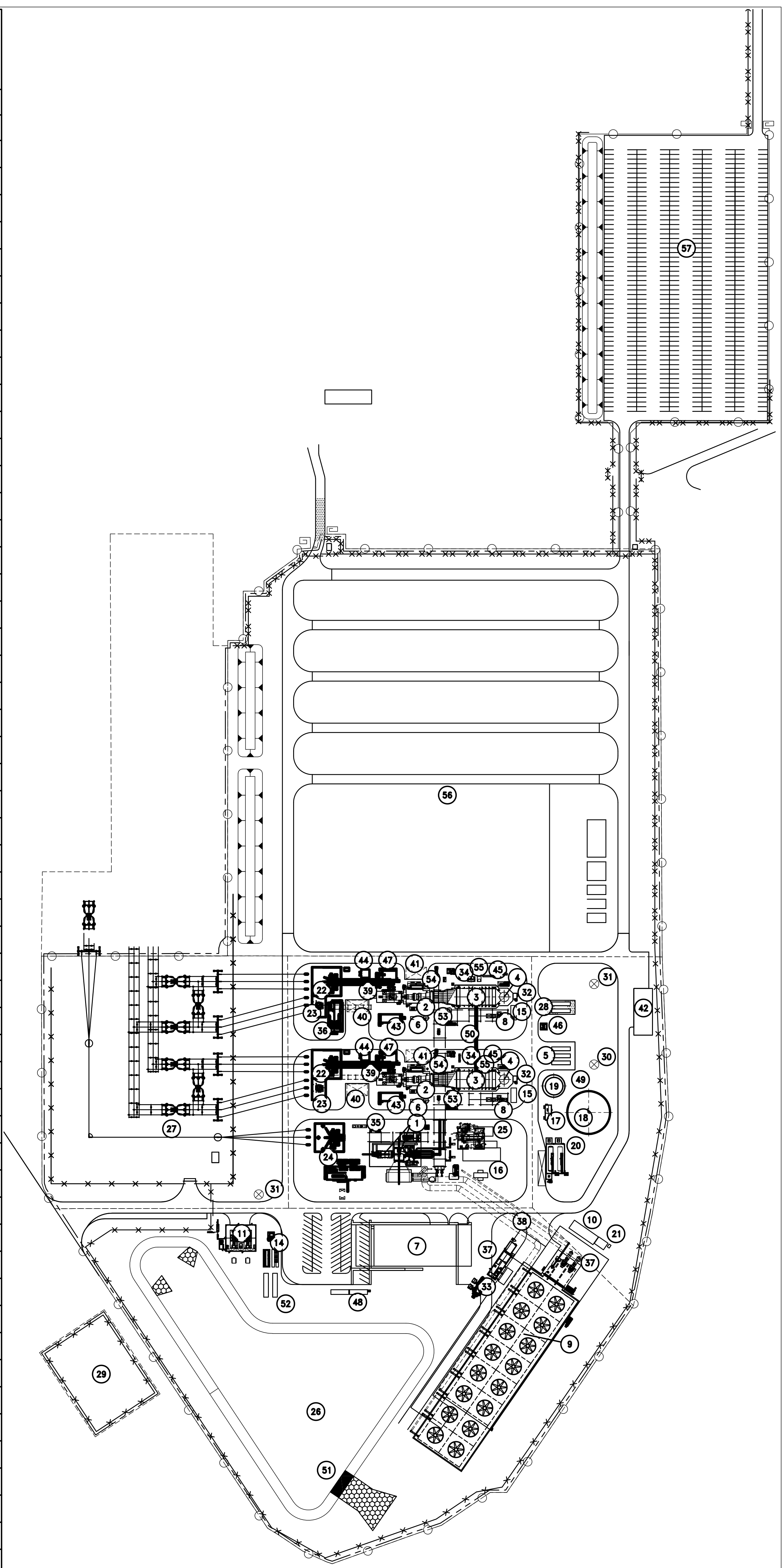

FIGURE 4.2.0-3.

DETAILED SITE ARRANGMENT OF SCCF FACILITIES

Sources: B&V, 2017; ECT, 2017.

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Table 4.2.0-1. Approximate Dimensions of Onsite Major Structures and Facilities

Description	Structure (ft)			
	Height Above Grade	Width	Length	Diameter
CTG	26.5	32	120	Not applicable
CTG step-up transformer containment	20	62	62	Not applicable
CTG step-up transformer	18	20	42	Not applicable
CTG auxiliary transformer containment	12	25	46	Not applicable
CTG auxiliary transformer	10	16	16	Not applicable
HRSG	100.25	37	134.6	Not applicable
HRSG stack	199	Not applicable	Not applicable	23.5
Cooling tower	60	125	440	Not applicable
Administration/control/maintenance building	26	90	210	Not applicable
Warehouse	30	40	100	Not applicable
STG electrical equipment enclosure	16	28	75	Not applicable
STG	60	75	140	Not applicable
STG step-up transformer containment	15	62	62	Not applicable
Medium-voltage switchgear building	16	25	60	Not applicable
STG electrical equipment enclosure	12	18	42	Not applicable
Circulating water treatment enclosure	30	30	35	Not applicable
Service/fire water storage tank	64	Not applicable	Not applicable	90
Demineralizer water storage tank	40	Not applicable	Not applicable	50

Sources: B&V, 2016.
SECI, 2017.

FIGURE 4.2.0-4.

CONCEPTUAL RENDERING OF PROPOSED SCCF FACILITIES
LOOKING FROM SOUTHWEST TO NORTHEAST
Sources: SECI, 2017.

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FIGURE 4.2.0-5.

CONCEPTUAL RENDERING OF PROPOSED SCCF FACILITIES
LOOKING FROM WEST TO EAST

Sources: SECI, 2017.

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4.3.1 Natural Gas

Natural gas will be the only fuel fired in the two SCCF CTGs, two HRSG duct burners, and two dew point fuel heaters. Natural gas fuel will be supplied via a lateral from the FGT natural gas pipeline system. No onsite storage will be provided for the natural gas.

Table 4.3.1-1 depicts the typical composition of pipeline-quality natural gas. The heat content of natural gas is typically approximately 1,027 British thermal units per standard cubic foot (Btu/scf), higher heating value (HHV). For air permitting, FDEP recommends the estimates of SO_2 emissions be conservatively based on a maximum natural gas sulfur content of 2.0 grains per 100 standard cubic feet (gr/100 scf), while, in practice, pipeline-quality natural gas typically has a sulfur content of less than 1.0 gr/100 scf.

Table 4.3.1-1. Typical Natural Gas Composition

Gas Composition	Mole Percent (by volume)
I-pentane	<0.012
N-pentane	0.007
Propane	0.189
I-butane	0.03
N-butane	0.032
Nitrogen	0.41
Methane	95.045
Carbon dioxide	1.09
Ethane	3.173
Other characteristics	
Heat content (HHV)	1,027 Btu/scf
Sulfur content	2.0 gr/100 scf*

*FDEP-recommended maximum value for air permitting purposes.

Sources: SECI, 2017.
ECT, 2016.

The efficiency of power production in a combined-cycle power plant is affected by ambient temperature, typically with higher temperatures resulting in less efficient power production. Greater natural gas consumption occurs at lower ambient temperatures as the air is denser and the gas turbine is capable of burning more gas and producing more electricity. For SCCF, fuel use will also be affected by whether the HRSG duct burners are fired. Indicative estimates of the total average and maximum natural gas fuel consumption rates for the Project are 7,050 million British thermal units per hour (MMBtu/hr) HHV and

7,576 MMBtu/hr HHV, respectively. Appendix 10.2.5 presents detailed natural gas consumption rates for various ambient temperatures and operating loads.

4.3.2 ULSD Fuel Oil

Ultra-low-sulfur diesel (ULSD) fuel oil will be used as fuel for the emergency fire water pump. ULSD fuel oil will be delivered to the site by tanker truck and stored in an approximately 500-gallon, above grade, double-walled tank with leak detection and an appropriately designed spill containment enclosure. The ULSD fuel oil will have a maximum sulfur content of 0.0015 percent by weight.

The quantity of ULSD fuel oil used for Project operations will depend on the number of hours the emergency fire water pump is operated. Typically, the emergency fire water pump will only be operated for periodic routine testing purposes. For air permitting, the emergency fire water pump is assumed to be operating for a maximum of 100 hours per year (hr/yr) for routine testing and maintenance.

4.4 Air Emissions and Controls

4.4.1 Air Emissions Units

SCCF will consist of the following air emissions units:

- Two CTGs, GE Model 7HA.02, fired exclusively with pipeline-quality natural gas.
- Two HRSGs equipped with duct burners fired exclusively with pipeline-quality natural gas.
- Two fuel gas dew point heaters fired exclusively with pipeline-quality natural gas.
- One emergency fire water pump engine, rated at 250 horsepower (hp) and fired exclusively with ULSD fuel oil.
- One 16-cell wet mechanical draft cooling tower.

As discussed previously, coincident with the declared commercial operation of SCCF, SECI intends to permanently remove from service one of the two Existing SGS Units. Emissions reductions due to the unit’s removal from service will be used to offset emissions from SCCF, which will result in a decrease in SGS emissions for most pollutants.

NO_x emissions from combustion sources, including the CTG/HRSGs, fuel gas dew point heaters, and an emergency fire water pump engine, will consist of two components: oxidation of combustion air atmospheric nitrogen (thermal NO_x and prompt NO_x) and conversion of chemically bound fuel nitrogen (fuel NO_x).

Thermal NO_x results from the oxidation of atmospheric nitrogen under high-temperature combustion conditions. Prompt NO_x is formed near the combustion flame front from the oxidation of intermediate combustion products, such as nitrogen and nitric oxide. Fuel NO_x arises from the oxidation of nonelemental nitrogen contained in the fuel. The conversion of fuel-bound nitrogen (FBN) to NO_x depends on the bound nitrogen content of the fuel. In contrast to thermal NO_x, fuel NO_x formation does not vary appreciably with combustion variables, such as temperature or residence time. Fuel NO_x associated with natural gas or ULSD fuel oil combustion is negligible.

CO emissions result from incomplete combustion of carbon and organic compounds. Factors affecting CO emissions include firing temperatures, residence time in the combustion zone, and combustion chamber mixing characteristics. VOC emissions also result from incomplete combustion of carbon and organic compounds. The same factors that affect CO emissions generally are the same factors that affect VOC emissions.

PM/PM_{10}/$PM_{2.5}$ emissions from fuel-burning equipment result when hydrocarbons are not completely combusted or when sulfur and nitrogen in the fuel are oxidized and post-combustion aerosols are formed. SO_2 emissions from fuel-burning equipment are a direct result of the sulfur content of the fuel combusted. GHG emissions, expressed as carbon dioxide equivalent (CO_2e), primarily consists of carbon dioxide (CO_2) and are a direct result of the combustion of carbon and organic compounds. PM/PM_{10}/$PM_{2.5}$, SO_2, and GHG emissions are controlled by high efficiency combustion and exclusive use of clean fuels.

4.4.1.1 CTG/HRSG Units

Potential annual emissions for the Project were developed based on both CTGs operating 8,760 hr/yr per turbine, and the HRSG duct burners operating 8,760 hr/yr per duct burner. The CTGs and HRSG duct burners will be fired exclusively with pipeline-quality natural gas.

4.4.1.2 Fuel Gas Dew Point Heaters

The Project will include two fuel gas dew point heaters, each having a maximum heat input rating of 9.99 MMBtu/hr or less. Potential annual emissions will be based on operating 8,760 hr/yr, and firing exclusively with pipeline-quality natural gas. Emissions will be controlled by using good combustion practices.

4.4.1.3 Emergency Fire Water Pump Engine

The Project will include one diesel fuel-fired emergency fire water pump. The emergency fire water pump will be driven by a nominal 250-hp diesel engine. The emergency fire water pump engine will be fired exclusively with ULSD fuel oil and will meet emissions standards of 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Excluding operation during emergency conditions, the emergency fire water engine will be operated for a maximum of 100 hr/yr for routine testing and maintenance. Potential annual emissions are based on operating 500 hr/yr in accordance with U.S. Environmental Protection Agency (EPA) guidance.

4.4.1.4 Cooling Tower

The Project will include one 16-cell mechanical draft cooling tower to dissipate heat from the Project steam cycle. Cooling water withdrawn from the St. John's River will be used as makeup water to replace losses due to evaporation from the cooling tower.

PM/PM_{10}/$PM_{2.5}$ emissions will occur from the cooling tower as a result of water being entrained in the air stream. Evaporative cooling towers rely on the latent heat of water evaporation to exchange heat between the process and air passing through the cooling tower. Because of direct contact between the cooling water and ambient air, a small portion of the recirculating cooling water is entrained in the air stream and discharged from the cooling tower as drift droplets. These water droplets contain the same concentration of dissolved solids as found in the recirculating cooling water. Large water droplets quickly settle out of the cooling tower exhaust stream and deposit near the tower. The remaining smaller water droplets may evaporate prior to being deposited in the area surrounding the cooling tower. These evaporated droplets represent potential PM/PM_{10}/$PM_{2.5}$ emissions because of the PM/PM_{10}/ $PM_{2.5}$ formed by crystallization of the dissolved solids contained in the droplet.

Table 4.4.1-1 presents the net emissions change for SCCF, which is based on the potential emissions from SCCF combined with the emissions decrease due to the permanent removal from service of one of the Existing SGS Units. The net emissions change represents the highest emissions increase or the least emissions decrease based on offsetting potential emissions from SCCF with the removal from service of either Existing SGS Unit 1 or 2. The net emissions increase for each pollutant are compared to PSD significant emissions rates, which are thresholds for triggering PSD review. Since SCCF is located at an existing major source, PSD review is required for any pollutant with a net emissions increase greater than the listed PSD significant emissions rate (SER) for that pollutant.

As shown in Table 4.4.1-1, the results of the netting analysis show SCCF will have a net emissions increase greater than the PSD SER for VOCs only with the permanent removal from service of either Existing SGS Unit 1 or 2. All other pollutants will have a net emissions decrease and will not be subject to PSD review.

Table 4.4.1-1. Annual Net Emissions Change and PSD Applicability Analysis

Pollutant	Net Emissions Change (tpy)*	PSD SER (tpy)	PSD Review Required?
CO	-656	100	No
NO_x	-261	40	No
SO_2	-4,544	40	No
PM (filterable)	-119	25	No
PM_{10} (filterable and condensable)	-518	15	No
$PM_{2.5}$ (filterable and condensable)	-518	10	No
VOC	75	40	Yes
Lead	0.0	0.6	No
Fluorides	Negligible	3	No
H_2SO_4 mist	-55	7	No
Hydrogen sulfide	Negligible	10	No
Total reduced sulfur	Negligible	10	No
Reduced sulfur compounds	Negligible	10	No
Municipal waste combustor			
Organics	Not applicable	3.5×10^{-6}	No
Metals	Not applicable	15	No
Acid gases	Not applicable	40	No
Municipal solid waste landfills†	Not applicable	50	No
Mercury	Not applicable	0.1	No
GHG (as CO_2e)	-165,053	75,000	No

Note: H_2SO_4 = sulfuric acid.
Emissions rate calculations are provided in the PSD application in Appendix 10.2.5.

*Net emissions change represents the highest emissions increase or least emissions decrease based on offsetting potential emissions from SCCF with the removal from service of either Existing SGS Unit 1 or 2.
†Nonmethane organic compounds

Source: ECT, 2017.

Detailed information on the netting analysis is provided in Appendix 10.2.5, Air Construction/Prevention of Significant Deterioration Permit Application.

Table 4.4.1-2 presents the proposed emission concentrations and hourly emission rates for each pollutant with HRSG duct burners unfired and fired.

Table 4.4.1-2. SCCF CTG/HRSG Proposed Emissions Rates

Pollutant		Duct Burners	
		Unfired	Fired
NO_x	(ppmvd @ 15% oxygen gas)	7	7
CO	(ppmvd @ 15% oxygen gas)	10	10
VOC	(ppmvd @ 15% oxygen gas)	1.0	2.0
SO_2	(lb/hr)	Not applicable	Not applicable
PM	(lb/hr)	Not applicable	Not applicable
PM_{10}	(lb/hr)	Not applicable	Not applicable
$PM_{2.5}$	(lb/hr)	Not applicable	Not applicable
H_2SO_4 mist	(lb/hr)	Not applicable	Not applicable

Note: There are no numerical emissions rates for SO_2, PM, PM_{10}, $PM_{2.5}$, or H_2SO_4 mist. Emissions will be controlled by exclusive use of pipeline-quality natural gas and ULSD fuel oil.
H_2SO_4 = sulfuric acid.

Sources: B&V, 2016.
ECT, 2017.

4.4.2 Air Emissions Controls

The SCCF design will incorporate state-of-the-art combined-cycle CTG technology and air quality emissions controls. The high thermal efficiency of the GE Model 7HA.02 will reduce emissions per unit of output by producing each megawatt-hour of electricity with less fuel compared to most other fossil fuel-fired power generation facilities. This high-thermal efficiency design will result in lower air emissions per megawatt-hour of electrical power generated.

The CTG/HRSG units will be equipped with DLN combustors, state-of-the-art controls, and an SCR system to minimize NO_x emissions. Efficient combustion results in lower CO and VOC emissions rates. The CTG/HRSG units will utilize advanced combustion equipment and operational practices to obtain highly efficient combustion. In addition, an oxidation catalyst will be installed to further reduce CO and VOC emissions. The use of pipeline-quality natural gas, along with highly efficient combustion, will limit $PM/PM_{10}/PM_{2.5}$ and GHG emissions from the CTG/HRSG units.

SO_2 and sulfuric acid (H_2SO_4) mist emissions result from conversion of sulfur in the fuel and are minimized by the low sulfur content of the fuels proposed for the Project; i.e., pipeline-quality natural gas for the CTG/HRSG units and fuel gas dew point heaters and ULSD fuel oil for the emergency fire water pump diesel engine.

The mechanical draft cooling towers will be equipped with high efficiency drift eliminators or similar devices that will limit the drift loss rate to 0.0005 percent of the recirculating cooling water flow rate. This represents the most effective method of reducing the amount of drift and, thus, minimization of $PM/PM_{10}/PM_{2.5}$ emissions from cooling towers.

4.4.3 Control Technology

Control of air emissions from SCCF will be accomplished by use of clean fuels, good combustion controls, high thermal efficiency design, and SCR and oxidation catalyst control technology. Table 4.4.3-1 presents a summary of air emissions controls for SCCF.

Table 4.4.3-1. Summary of Project Air Emissions Controls

	Pollutant	Control Method
CTG/HRSG	• CO and VOC • NO_x • SO_2 and H_2SO_4 mist • $PM/PM_{10}/PM_{2.5}$ • GHG	• Oxidation catalyst • DLN combustors and SCR • Pipeline-quality natural gas • Good combustion practice • High efficiency combined-cycle CTG design
Fuel gas dew point heaters	• NO_x, CO, VOC, and $PM/PM_{10}/PM_{2.5}$ • SO_2 and H_2SO_4 mist • GHG	• Good combustion practice • Pipeline-quality natural gas
Cooling tower	• $PM/PM_{10}/PM_{2.5}$	• High efficiency drift eliminators, or similar devices
Emergency fire water pump diesel engine	• NO_x, CO and VOC • SO_2 and H_2SO_4 mist • $PM/PM_{10}/PM_{2.5}$ • GHG	• Good combustion practice • ULSD fuel oil • Compliance with Code of Federal Regulations, Title 40, Part 60, Subpart IIII; limited hours of operation for testing and maintenance

Sources: Black & Veatch, 2017.
SECI, 2017.
ECT, 2017.

4.4.4 Design Data for Control Equipment

SCCF will include SCR and DLN combustion to control NO_x emissions and oxidation catalyst to control CO and VOC emissions from the CTG/HRSG. The SCR system will be designed to control NO_x emissions to meet the NO_x emissions limits specified in the new source performance standards (NSPS) for stationary CTGs, Code of Federal Regulations (CFR), Title 40, Part 60, Subpart KKKK, as well as the proposed project-specific NO_x limits. The oxidation catalyst will be designed to control CO and VOC emissions to meet proposed project-specific CO limits and VOC BACT limits. More detailed information on the proposed emissions control technologies is provided in Appendix 10.2.5, Air Construction/Prevention of Significant Deterioration Permit Application.

4.4.5 Design Philosophy

Air emissions controls planned for SCCF have been designed to fully comply with applicable state and federal regulations and to minimize air emissions by using efficient generating and pollution prevention technologies.

SCCF will be a natural gas-fired combined-cycle CTG electrical generating facility designed to provide the most energy efficient means of electrical power generation by generating the maximum electrical power output per unit of fuel combusted. By maximizing the megawatt output per unit of fuel consumed, the air pollutant emissions per megawatt output will be minimized. Pollution prevention is incorporated in the design by exclusive use of clean fuels, high efficiency combustion technology, and post-combustion control. The CTG/HRSGs and fuel gas dew point heaters will be fired exclusively with pipeline-quality natural gas. ULSD fuel oil will be used as the sole fuel for the emergency fire water pump engine. DLN combustion will minimize NO_x emissions during the CTG combustion process. SCR and an oxidation catalyst will be installed post-combustion to further reduce NO_x and CO/VOC emissions, respectively.

4.5 Plant Water Use

Operation of the proposed SCCF will require the use of surface water withdrawn from the St. Johns River and groundwater withdrawn from the Upper Floridan aquifer system. River water will be used for condenser cooling, (i.e., cooling tower makeup water) purposes. The primary uses of groundwater will be for SCCF service water, which requires high quality water. Groundwater will also be the source of potable water for SCCF. The proposed Project water systems are designed to:

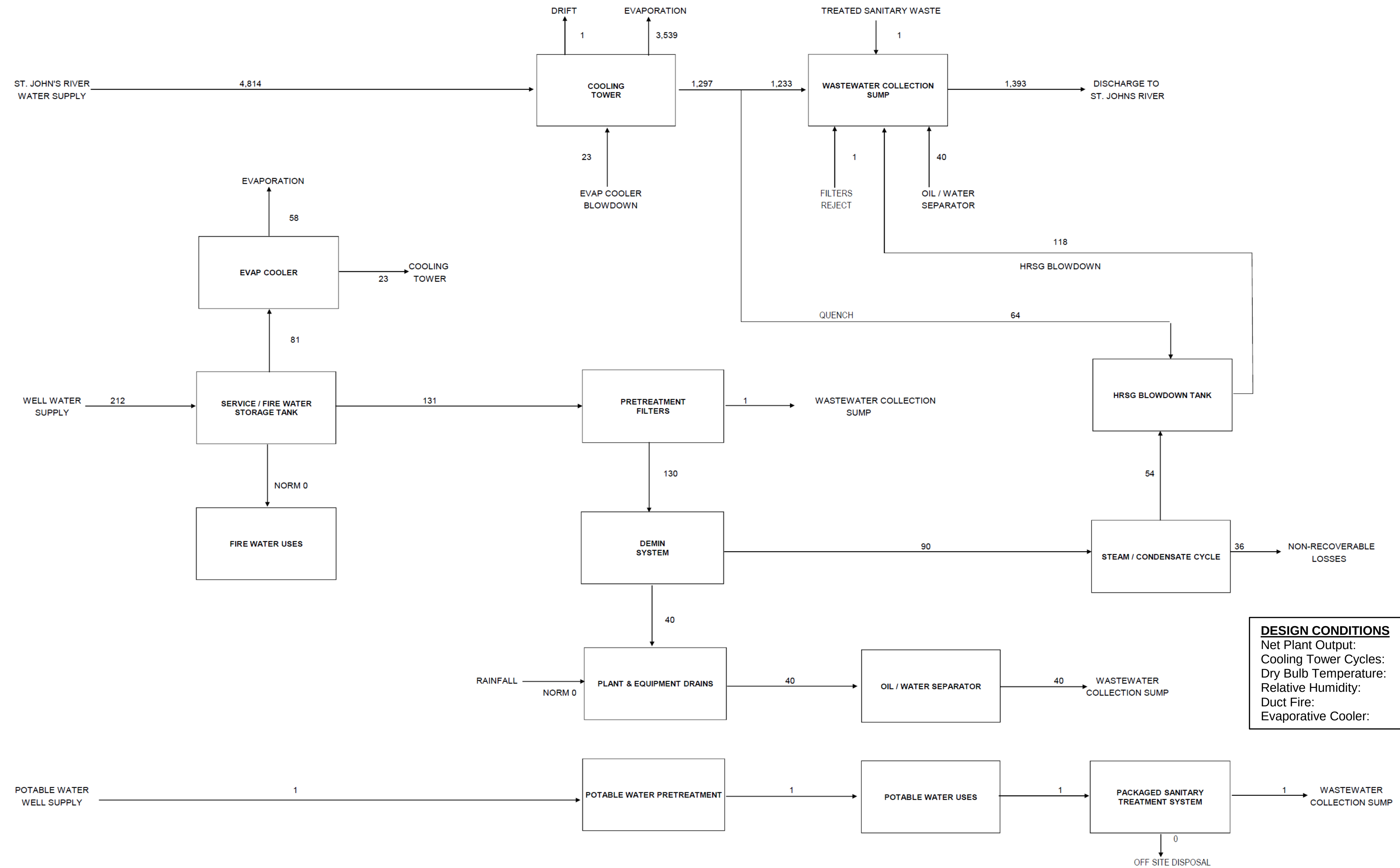
- Maximize water reuse.
- Minimize groundwater use and withdrawals.
- Minimize water consumption.
- Manage water quality within the plant systems.
- Minimize potential water quality impacts.

The qualities of water used in different plant systems will vary with plant operating conditions (i.e., percent capacity or load), as well as with ambient meteorological conditions (i.e., temperature and relative humidity). Figures 4.5.0-1 and 4.5.0-2 present the estimated annual average and peak water use, respectively, under different assumed operating conditions. Table 4.5.0-1 provides a summary of the major water flows for the annual average and peak operating conditions.

Table 4.5.0-1. Summary of Major Flows/Uses/Reuse in Water Balances for SCCF

Water Flow/Use/Reuse	Water Use (gpm) Annual Average (Figure 4.5.0-1)	Water Use (gpm) Peak (Figure 4.5.0-2)
River Water		
• Withdrawal for cooling tower makeup	4,814	5,737
• Cooling tower evaporation	3,539	4,219
• Reuse for HRSG quench water	64	70
• Cooling tower blowdown	1,297	1,559
• Total discharge to river (river water and groundwater)	1,393	1,660
Groundwater		
• Plant service water	212	286
• Potable/sanitary water	1	1
• Total withdrawal	213	287
• Reuse for cooling tower makeup	23	42

Sources: B&V, 2016.
ECT, 2016.



DESIGN CONDITIONS	
Net Plant Output:	1,050 MW
Cooling Tower Cycles:	3.5
Dry Bulb Temperature:	86°F
Relative Humidity:	56.0%
Duct Fire:	Off
Evaporative Cooler:	On

NOTE:

1. FLOWS ARE IN GALLONS PER MINUTE.
2. FLOWS SHOWN ARE BASED ON AVERAGE DAILY WATER USE AT CONDITIONS INDICATED.
3. WATER MASS BALANCE IS PRELIMINARY.

FIGURE 4.5.0-1.

WATER MASS BALANCE FOR SCCF—ANNUAL AVERAGE

Source: B&V, 2016.

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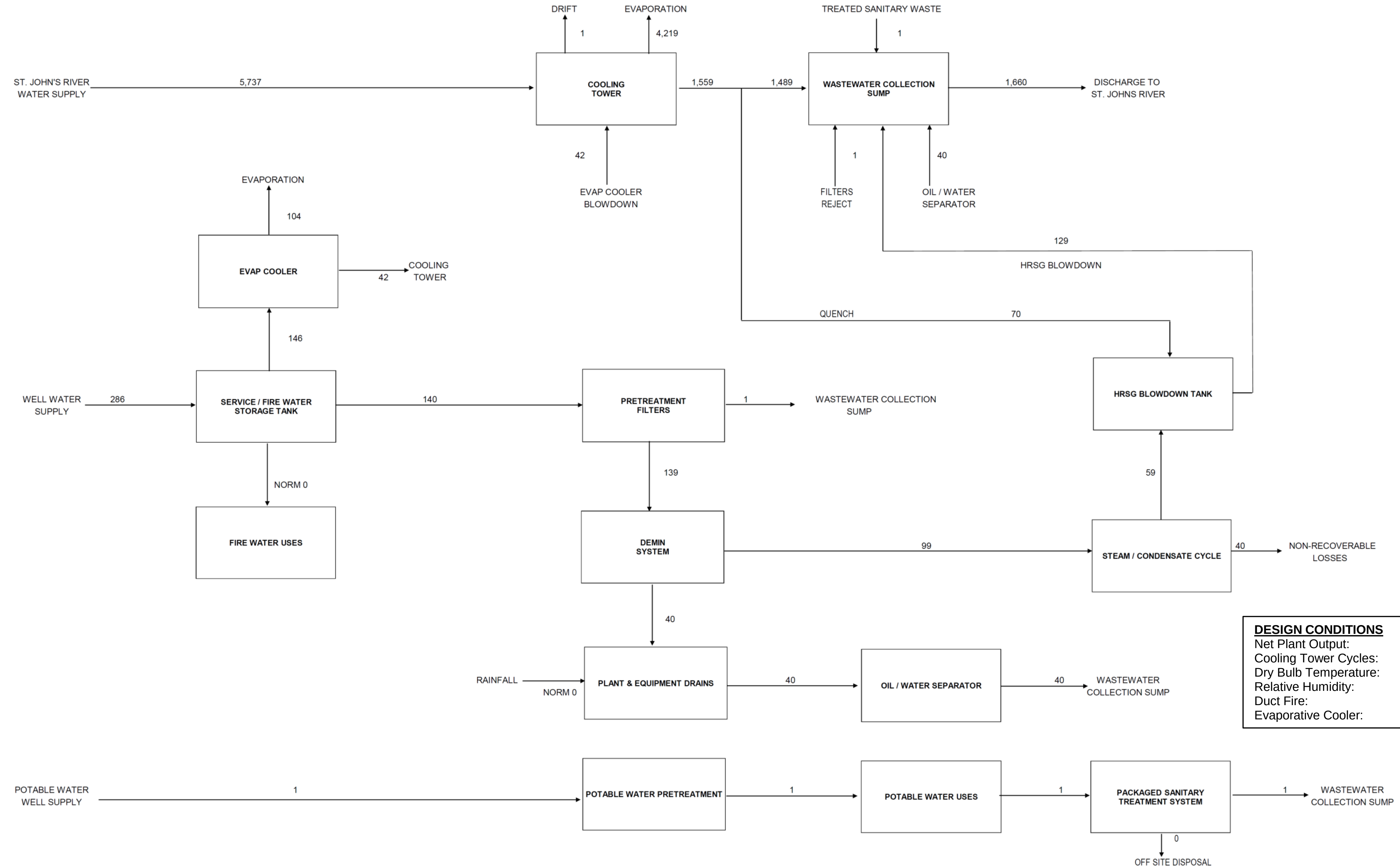

DESIGN CONDITIONS	
Net Plant Output:	1,050 MW
Cooling Tower Cycles:	3.5
Dry Bulb Temperature:	95°F
Relative Humidity:	33.0%
Duct Fire:	On
Evaporative Cooler:	On

NOTE:

1. FLOWS ARE IN GALLONS PER MINUTE.
2. FLOWS SHOWN ARE BASED ON AVERAGE DAILY WATER USE AT CONDITIONS INDICATED.
3. WATER MASS BALANCE IS PRELIMINARY.

FIGURE 4.5.0-2.

WATER MASS BALANCE FOR SCCF—PEAK

Source: B&V, 2016.

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As shown in Table 4.5.0-1, the use of river surface water withdrawn from the St. Johns River for cooling tower makeup water is by far the largest plant water use. The makeup water will be withdrawn through the existing SGS river intake structure and pipeline. Cooling tower makeup water is required to replace water lost through evaporation in the condenser cooling process and manage water quality within the cooling system to avoid equipment fouling and damage. The blowdown water will be discharged to the river through the existing SGS pipeline and discharge structure. Approximately 30 percent of the cooling tower makeup water withdrawn from the St. Johns is discharged back into the river. The cooling water system will be compliant with Clean Water Act (CWA) Section 316(b) requirements applicable to new units at existing facilities, because it employs a closed-cycle recirculating cooling system. The existing SGS intake structure has a design through-screen velocity of less than 0.5 fps, considered BTA for mitigation of impingement mortality effects from existing cooling water intakes.

Under the existing COCs for SGS Units 1 and 2, COC B.III.B.3 allows a maximum annual surface water withdrawal from the St. Johns River for cooling tower makeup and general plant service water use of up to 15,783 million gallons per year (MGY). This water volume represents an average daily withdrawal of approximately 43.24 million gallons per day (MGD). As shown in Figures 4.5.0-2, the proposed peak river water withdrawals for SCCF will be approximately 8.26 MGD or 3,015 MGY. The anticipated maximum water use for the Remaining SGS Unit is 11.1 MGD. Based on these uses, the total annual combined surface water withdrawals for SCCF and the Remaining SGS Unit are projected to be within the current allocation. Therefore, a sufficient surface water use allocation is available and approved under the existing COCs for SGS to serve the needs of SCCF, and no additional surface water use is requested as part of this SCA.

As shown in Table 4.5.0-1, the total groundwater needed for SCCF is 213 gpm (0.307 MGD) on an annual average daily basis and 287 gpm (0.413 MGD) on a peak daily basis. The primary uses for groundwater will be for SCCF service water and potable water purposes. SCCF service water requires high quality fresh groundwater instead of tidally influenced river water. Even with higher quality, the groundwater will require additional treatment (i.e., filtration and demineralization) prior to use for HRSG steam cycle makeup, equipment wash water, and pump seals. Potable water will be treated in an onsite treatment system designed in accordance with all applicable nonprocedural requirements. The groundwater will be provided through withdrawals from two new SCCF service water wells and one new potable water well installed in the SCCF area.

Existing COC B.III.B.2 currently allows a maximum annual groundwater withdrawal from the Upper Floridan aquifer for demineralizer/steam cycle makeup, potable water, and general plant uses of up to

200.75 MGY (0.55 MGD). In the original certification of SGS Units 1 and 2 in 1979, the approved groundwater use for Units 1 and 2 was 0.85 MGD on an average annual basis. Based on effective measures to conserve and reuse water after the units were in operation, SECI was able to minimize the actual groundwater use significantly below the approved allocation. Thus, in 1999, SECI requested a modification of the original COCs to decrease its groundwater use allocation to the current 0.55 MGD amount, releasing 0.3 MGD to be used for a gypsum wallboard facility adjacent to the SGS site under a separate consumptive use permit for the wallboard facility.

The Remaining SGS Unit withdrawals will be approximately 0.313 MGD (114.2 MGY). Combined with the annual average 112.1 MGY (0.307-MGD) needs for the proposed Project, a minimal (0.07 MGD) increase in the authorization from 200.75 MGY (0.55 MGD) to 226.3 MGY (0.62 MGD) is necessary and requested as part of this SCA.

Overall, the SCCF combined with the Remaining SGS Unit will be more water efficient by utilizing less groundwater per MW of electricity generated. The Existing SGS Units each produce nominal 736 MW, with a groundwater allocation of 200.75 MGY. The SCCF combined with the Remaining SGS Unit will have a nominal gross capacity of approximately 1,919 MW (1,183 MW + 736 MW) with a proposed groundwater allocation of only 226.3 MGY. Stated another way, for comparison purposes, the Existing SGS Units utilize approximately 0.136 million gallons per year (MGY)/MW; whereas the proposed SCCF and Remaining Unit will need approximately 0.118 MGY/MW. This is a significant improvement in overall water efficiency for power output.

SECI has carefully considered opportunities for water reuse, both within the overall facilities and from outside sources, and water conservation measures to minimize the use of groundwater. The only wastewater treatment plant (WWTP) within reasonable proximity to the SGS site and with reclaimed water treatment capability is the City of Palatka Platt Drew WWTP located approximately 10 miles south of the SGS site. Based on SECI communications with the City and the City's annual reuse report to SJRWMD, the WWTP produces an average of 1.2 MGD of reclaimed water, but that water is already committed to various properties and facilities and not available for SECI use (see Appendix 10.8). Further, reclaimed water typically has elevated levels of dissolved solids that would require extensive and expensive treatment to meet the water quality requirements for plant steam cycle makeup water. Acceptable disposal of the rejected wastewater for the treatment process would also be an issue. The use of tidally influenced St. Johns River water would have similar water quality and treatment issues. The potential use of stormwater is considered impractical due to the large area that would be disturbed (i.e., wetlands impacts) to capture and store the stormwater to generate sufficient quantities to meet SCCF needs. Also, soil conditions on the SGS site are not conducive to store water without lining the capture areas, and rainfall is too seasonal and sporadic to be able to supply a continuous, reliable water source. The use of lower quality, tidally influenced river water for major cooling tower makeup water use minimizes groundwater use. As shown in Table 4.5.0-1, other water conservation measures include the reuse of certain wastewater streams for cooling tower makeup and HRSG quench water and the use of the combined-cycle technology, which uses approximately 30 percent less water per MW of electric generation for cooling than other fossil fuel, steam technologies.

Appendix 10.8 provides additional consumptive use information and supporting information for the requested groundwater use.

4.5.1 Heat Dissipation System

4.5.1.1 System Design

The condenser cooling system for SCCF will consist of a 16-cell, closed-cycle, mechanical draft cooling tower for heat dissipation. The cooling tower will be designed to remove approximately 1.9 billion British thermal units per hour at a dry bulb temperature of 86°F and 100-percent load. The cooling tower will be designed to typically operate at approximately 3.5 cycles of concentration to maintain suitable water quality in the system.

Makeup water for the Project cooling tower will be supplied through withdrawals from the St. Johns River using the existing SGS intake pipeline and structure. Figure 4.5.1-1 shows the location of the intake and discharge pipelines and structures in the St. Johns River and the onshore intake pump house. The 36″ intake pipe runs underground from the pump house to the river shoreline and then runs offshore in a buried trench under an approximately 325′ concrete dock. The intake structure is mounted on a bulkhead at the end of the dock (see Figure 4.5.1-2). The structure is located within a circular, sheet pile cofferdam that is 1′ above the river bottom and provides a trough around the structure to ensure a constant water supply (see Figure 4.5.1-3).

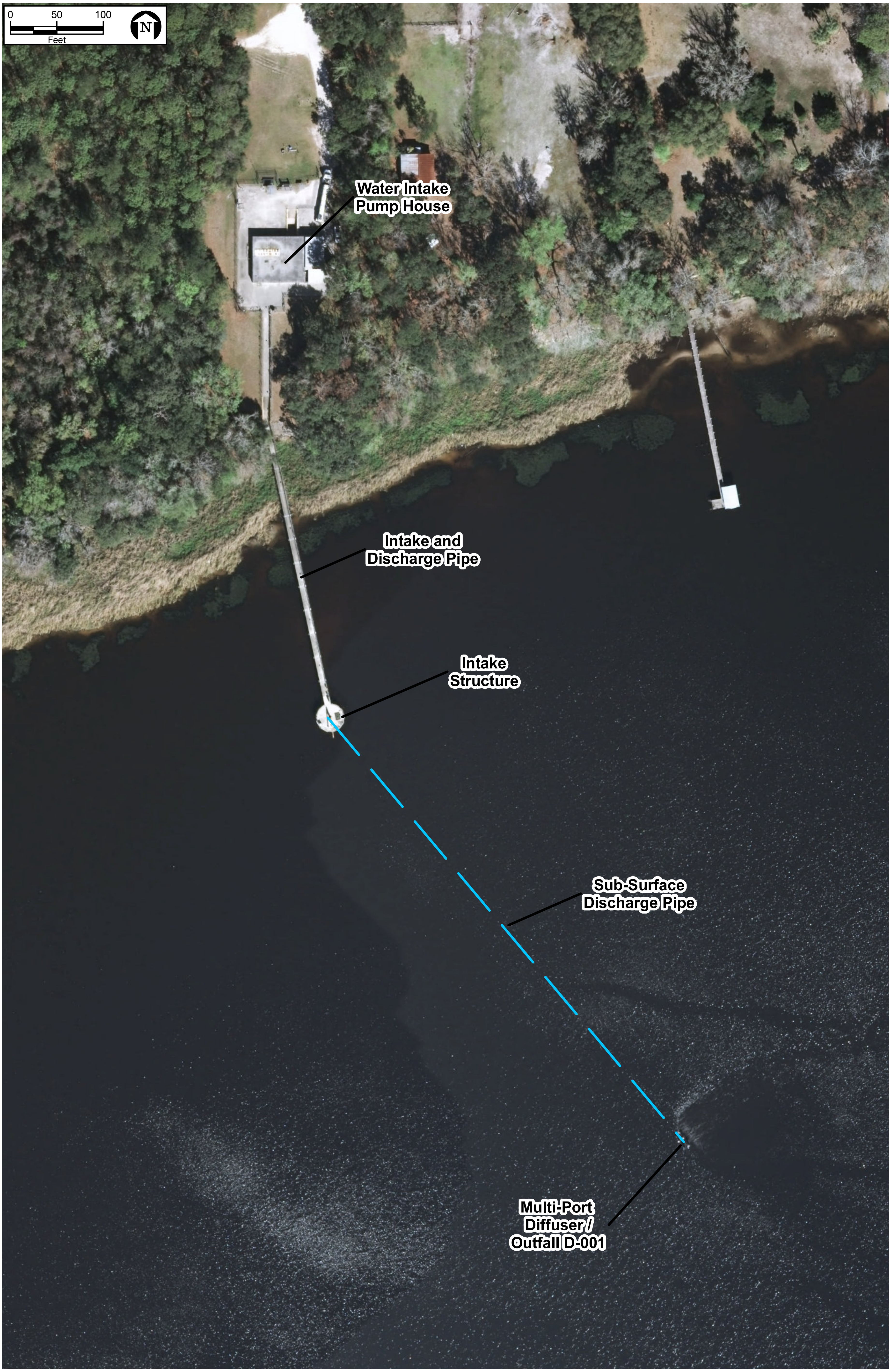

FIGURE 4.5.1-1.
LOCATION OF EXISTING SGS COOLING WATER INTAKE AND DISCHARGE STRUCTURES

Sources: FDOT, 2017; Putnam Co PA, 2016; ECT, 2017.

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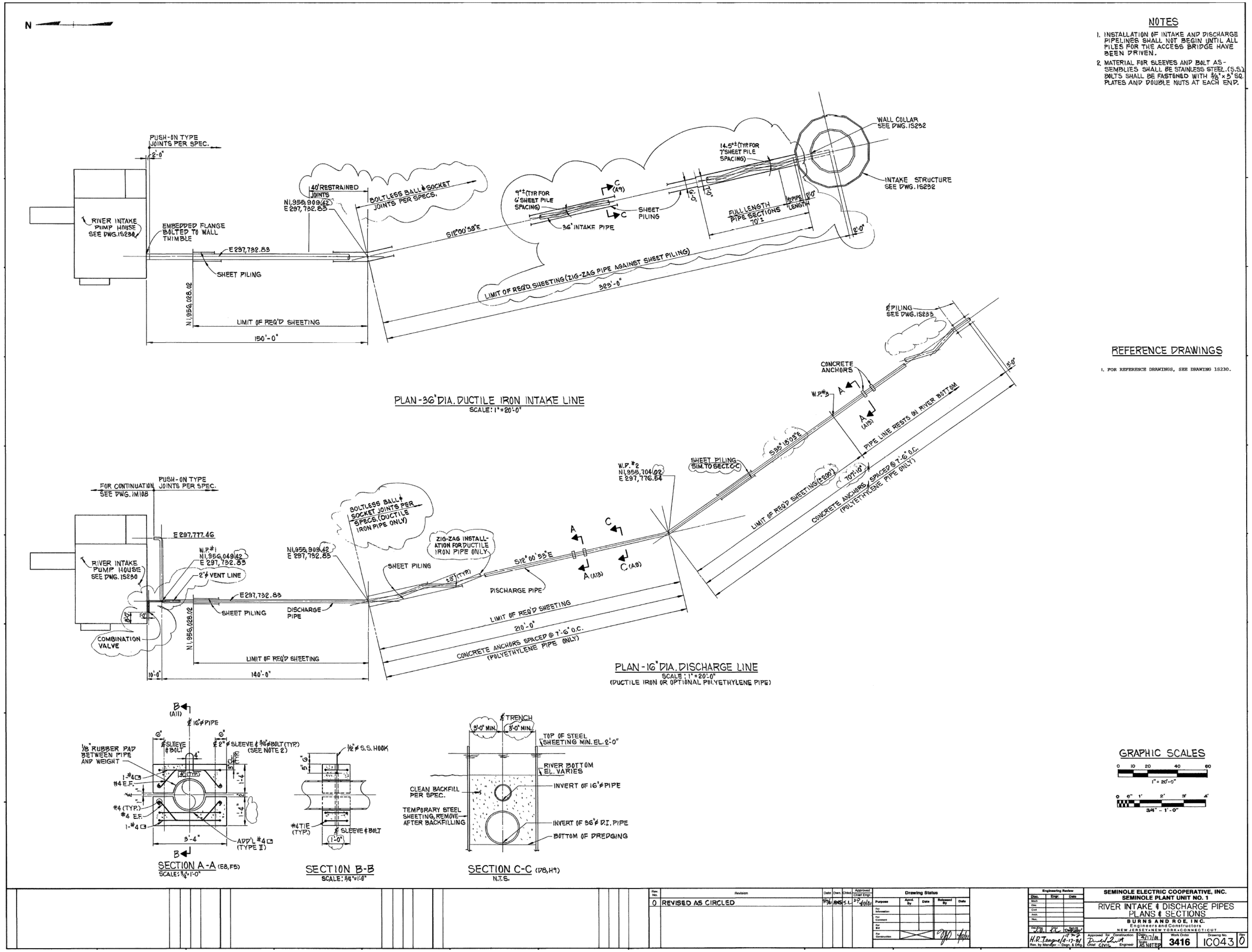

FIGURE 4.5.1-2.

RIVER INTAKE AND DISCHARGE PIPES PLANS AND SECTIONS

Source: Burns and Roe, 1981.

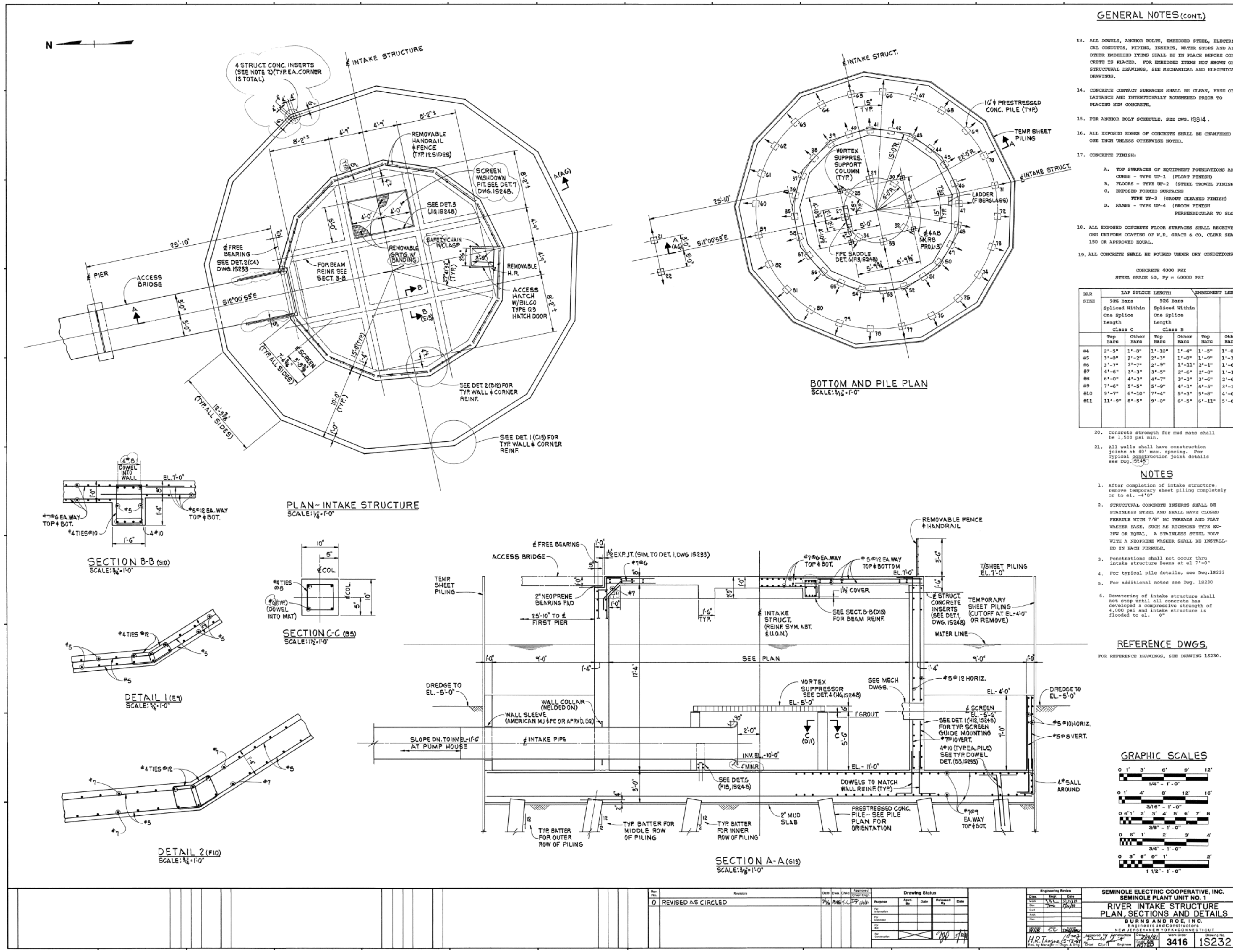

FIGURE 4.5.1-3.

RIVER INTAKE, STRUCTURE, PLAN, SECTIONS, AND DETAILS

Source: Burns and Roe, 1981.

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The intake consists of a system of 12 Johnson cylindrical, fine opening, wedgewire screens with a screen slot size of 2 millimeters. Although there are 12 screen slots, only 10 screens are in service at all times, except during cleaning when one screen is isolated for cleaning. The configuration and operation of the intake structure will not change for SCCF. The through-screen intake velocity will remain less than 0.5 fps, which, along with closed-cycle cooling, is considered to be best available technology (BTA) to mitigate impingement effects under CWA Section 316(b) requirements. Therefore, the proposed SCCF is not expected to involve any in-water activities.

Blowdown from the Project cooling tower will be routed to a new SCCF wastewater collection sump and then pumped to the SGS waste water treatment facility where it will be combined with cooling tower blowdown and other wastewaters from the Remaining SGS Unit before being discharged to the St. Johns River at the existing, permitted Outfall D-001. As shown in Figures 4.5.1-1 and 4.5.1-2, the 16″ discharge pipeline runs underground to the river shore and then is buried in the same trench as the intake pipeline under the concrete dock. After reaching the intake structure at the end of the dock, the discharge pipe lies on the river bottom and runs in a northwest to southeast direction for an additional approximately 600′. The end of the pipe is fitted with a 28′, 15-port/riser diffuser (see Figure 4.5.1-4). The 15 ports/risers are 6″ in diameter with 2′ spacing between the risers. The end of each riser has a 2″ reducer/nozzle oriented upward at a 20-degree angle to horizontal. The discharge ports are situated approximately 8′ below the river surface level. Therefore, Outfall D-001 discharges approximately 900′ from the north shore of the St. Johns River at a depth that enhances mixing in deeper waters and avoids any sensitive vegetation beds nearer the shore.

4.5.1.2 Source of Cooling Water

The quantity of water used to supply makeup water to cooling towers is influenced by the need to avoid the formation of precipitates within the cooling system that adversely affect heat transfer. Therefore, the quantity of makeup water is highly dependent on the quality (i.e., dissolved solids) of the water source, which, in turn, affects the number of cycles of concentration. Similar to the Existing SGS Units, the SCCF cooling tower will be operated at approximately 3.5 cycles of concentration.

The source of cooling tower makeup water for SCCF will primarily be the St. Johns River. As shown in Figures 4.5.0-1 and 4.5.0-2, the annual average and peak daily cooling tower makeup water withdrawals will be approximately 6.932 MGD and 8.261 MGD, respectively. Also, as shown in the figures, a small quantity of makeup water will be provided by reuse of evaporative cooler blowdown, which is supplied by well withdrawals from the Upper Floridan aquifer. Approximately 70 percent of the cooling tower makeup

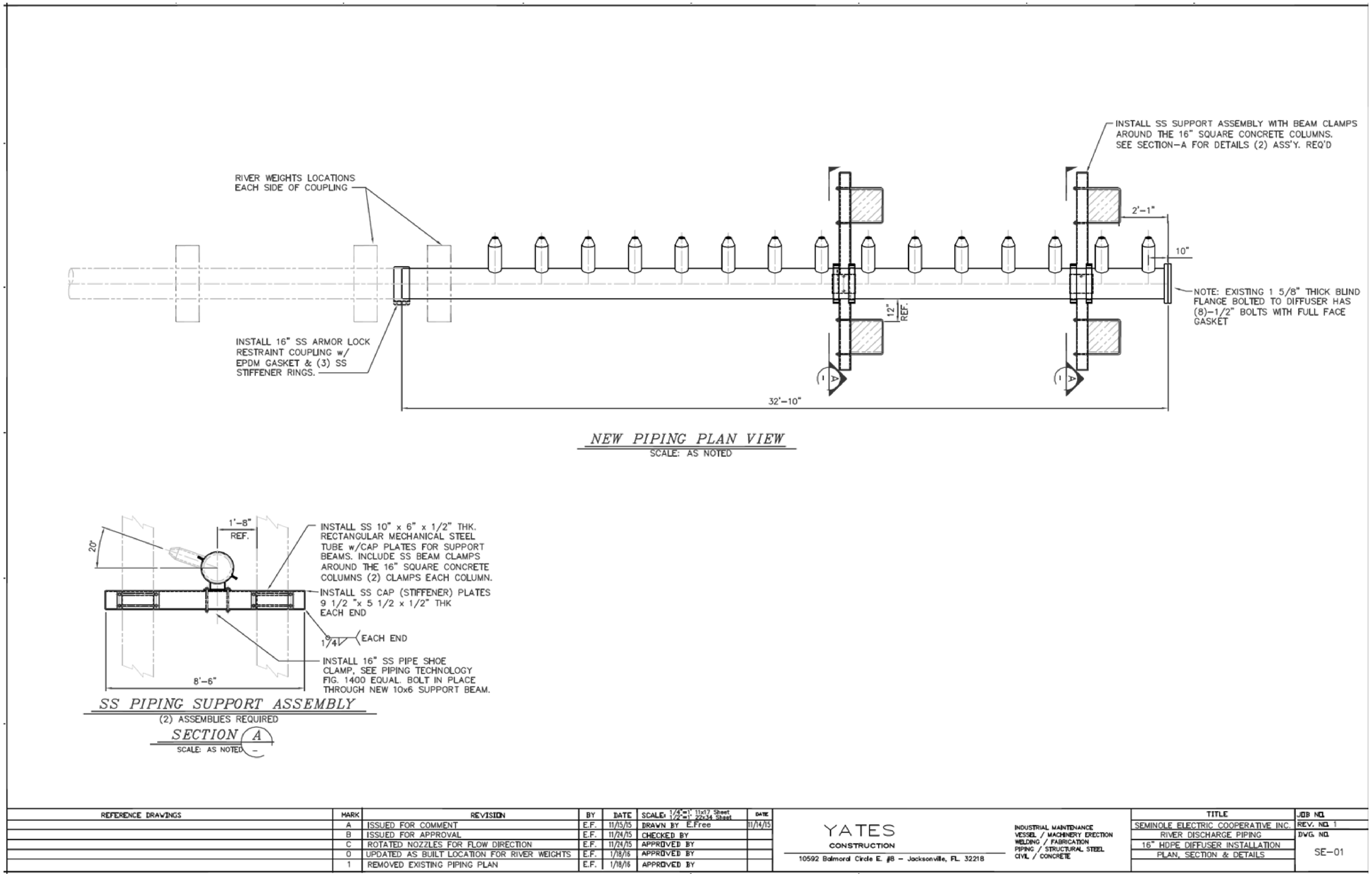

FIGURE 4.5.1-4.

RIVER DISCHARGE PIPING PLAN VIEW

Source: Yates Construction, 2015.

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water will be lost to the atmosphere through the evaporative cooling process. The remaining approximately 30 percent of the makeup water will be discharged back to the river as blowdown.

4.5.1.3 Dilution System

SCCF will not use additional water to dilute the cooling tower blowdown.

4.5.1.4 Blowdown, Screened Organisms, and Trash Disposal

Cooling tower blowdown will be discharged to the wastewater collection sump prior to combining with discharges from the Remaining SGS Unit and ultimately discharged through Outfall D-001 in the St. Johns River. Organisms and debris collected on the intake screens will be flushed using an air-burst system to backflow air through the intake structure and flush it back into the St. Johns River.

4.5.1.5 Injection Wells

No injection wells are proposed.

4.5.2 Domestic/Sanitary Wastewater

The domestic/sanitary wastewater system for the proposed SCCF will include discharges from bathrooms, showers, drinking fountains, sinks, and eyewash stations. Sanitary wastewater will be generated by activities of employees and visitors to the plant. As shown in Figures 4.5.0-1 and 4.5.0-2, the estimated wastewater flows will be approximately 1 gpm or 1,440 gallons per day (gpd). There are no public or regional wastewater systems or facilities available in the area to serve the Project. Therefore, similar to the existing SGS operations, sanitary wastewaters for SCCF will be collected and treated in a new package treatment plant. The sanitary treatment system is designed in accordance with applicable state and local requirements, including Chapters 62-600, 62-601, and 62-699, F.A.C. As shown in Figure 4.5.0-1, the treated sanitary wastewater will be routed to the overall plant wastewater collection sump and discharged to the St. Johns River in combination with cooling tower blowdown and other low-volume wastewaters from both the Project and the Remaining SGS Unit facilities. Additional sanitary wastewater service needs during construction of SCCF will be handled by portable chemical toilets.

4.5.3 Potable Water Systems

There are no public or regional potable water facilities available in the area to serve the potable water needs of the proposed SCCF. For the Project, potable water for use by the employees and visitors will be supplied using treated groundwater withdrawn from a new potable water well in the plant area. As shown in Figure 4.5.0-1, the typical potable water needs are estimated to be approximately 1 gpm or 1,440 gpd.

Groundwater will be treated in a new potable water treatment system, including filtration and chlorination. The system will supply pressurized potable water to sinks, safety showers, eyewash stations, and sanitary users in the administration building and other needed facilities in the plant.

The proposed potable water system will be classified as a non-transient, non-community system, since it will regularly serve at least 25 of the same persons over 6 months per year. The system will be designed, constructed, and operated in accordance with applicable nonprocedural requirements, including Chapters 62-550, 62-555, and 62-699, F.A.C., as applicable. The specific design and specifications for the potable water system will be refined during the detailed engineering/design stage of the Project.

4.5.4 Process Water Systems

SCCF service water will be supplied by groundwater withdrawn from two new wells located in the area of the proposed facilities. As shown in Table 4.5.0-1, the SCCF service water needs will be approximately 212 gpm (0.305 MGD) and 286 gpm (0.410 MGD) on an annual average and peak daily basis, respectively. The two new wells will be designed and developed to each have a capacity of supplying approximately 300 gpm, so the groundwater could be withdrawn from each well individually or a combination of both wells. As shown in the site arrangement presented in Figure 4.2.0-3, the wells will be located approximately 800′ apart. As shown in Figure 4.5.0-1, the well water will initially be routed to the service/fire water storage tank, which will be sized to provide a minimum of three days of SCCF service water storage plus dedicated capacity for emergency fire protection water in accordance with National Fire Protection Association (NFPA) requirements.

SCCF service water includes plant steam cycle makeup and other general plant uses. General plant uses will include equipment wash water, pump seals, evaporative cooler makeup water, and emergency fire water. The evaporative coolers are used to cool the inlet air to the CTGs, which increases the density of the air and, in turn, increases the efficiency and power output of the CTGs. Blowdown from the evaporative coolers will be reused to supplement makeup water for the cooling tower.

As noted previously, two SCCF service water wells will supply water to the service/fire water storage tank. This water will be filtered and run through a water softener to improve quality for general equipment and maintenance use. Treated groundwater used as washdown water may contain oil and will be collected in the plant drains, treated using an oil/water separator, and routed to the new SCCF wastewater collection sump and then pumped to the SGS waste water treatment facility where it will be combined with cooling tower blowdown and other wastewaters from the Remaining SGS Unit for discharge.

For the highest quality demineralized water needed for steam cycle makeup, water will be drawn from the service/fire water storage tank and run through a portable demineralizer to produce high quality water that will be stored in a demineralized water storage tank. Such treatment is required to remove dissolved salts and other minerals that may cause corrosion damage to the HRSG. As needed, the portable treatment systems will be transported offsite for regeneration; thus, the systems will not require onsite wastewater disposal.

4.6 Chemical and Biocide Waste

The following sections describe the wastewater streams that will be produced by the proposed SCCF operations. The descriptions include the stream origin, any treatment chemicals, and onsite treatment and disposal plans. As presented in the water balances in Figures 4.5.0-1 and 4.5.0-2, the Project will produce wastewaters from six plant-related systems:

- Cooling tower blowdown.
- Water treatment.
- HRSG steam cycle blowdown.
- Plant and equipment drains.
- Sanitary wastewater.
- Metal cleaning waste.

In addition, stormwater runoff from the plant area will be appropriately collected and treated prior to discharge (refer to Section 4.8).

4.6.1 Cooling Tower Blowdown

Blowdown from the cooling tower is required to manage water quality in the circulating water to avoid equipment damage. The blowdown will be discharged to the St. Johns River through the existing SGS discharge pipeline and diffuser. Recirculating water in the cooling tower may be intermittently treated with a soft foulant deposit cleaner/biodetergent chemical to prevent deposits in the cooling system. The recirculating water will also be treated with sulfuric acid for scale and pH control. The cooling water will be periodically treated with a biocide, and the blowdown will be dechlorinated prior to discharge. Chemicals will be stored in replaceable tanks surrounded by spill containment measures.

4.6.2 Water Treatment

As shown in Figures 4.5.0-1 and 4.5.0-2, water used for HRSG steam cycle makeup water and other low-volume uses will be treated prior to use. The treatment will consist of filtration and demineralization. Filter backwashes produce a small waste stream (i.e., less than 1 gpm), which is routed to the plant wastewater collection sump for discharge to the St. Johns River. Demineralization treatment will be conducted in portable, trailer-mounted demineralized water treatment systems. As needed, these portable systems will be taken offsite for regeneration.

4.6.3 HRSG Steam Cycle Blowdown

Blowdown from the HRSG steam cycle will be quenched with cooling tower blowdown water and routed to the wastewater collection sump. The HRSG water may be treated with typically used chemicals, such as H_2SO_4, to control pH and prevent corrosion of the equipment.

4.6.4 Plant and Equipment Drains

Treated groundwater used for equipment washdown water and pump seals, as well as rainfall runoff from equipment areas, may contact oil. These wastewaters will be collected in floor drains and routed through an oil/water separator. The treated water will be sent to the plant wastewater collection sump and discharged with other wastewaters to the St. Johns River.

4.6.5 Sanitary Wastewater

Wastewater from sanitary uses will be collected and treated in a packaged sanitary treatment system. The treatment system may include the use of chlorine as a disinfecting agent. The treated water will be routed to the plant wastewater collection sump for discharge with other wastewaters. Any solids generated in the treatment system will be collected and transported to the existing onsite SGS landfill or offsite for appropriate disposal.

4.6.6 Metal Cleaning Waste

The HRSG and feedwater piping may be chemically cleaned initially during commissioning and also periodically during the life of plant. The chemicals used will not be permanently stored onsite but will be delivered to the site by a licensed contractor at the time of the scheduled periodic cleanings. The chemical cleaning solutions to be used for acid and alkaline cleaning of the HRSG must be consistent with the HRSG manufacturer's recommendations. Chemicals typically used in HRSG and feedwater pipe cleaning include the following:

- Inhibited citric acid.
- Organic chelates, such as ethylene diamine tetra-acetic acid.
- Disodium phosphate.
- Trisodium phosphate.
- Nonfoaming wetting agents.
- Foam inhibitors.

In addition, periodic CTG washes may occur using a blend of nonionic surfactants, corrosion inhibitors, organic solvents, and demineralized water. Metal cleaning wastewaters will consist of the cleaning solutions and material removed during the cleaning process. Wastewaters generated by these activities will be collected and disposed offsite in accordance with applicable requirements.

4.6.7 Other Chemicals

Another chemical that will be used onsite will be aqueous ammonia. Aqueous ammonia will be injected into the SCR catalyst system to control NO_x air emissions. Aqueous ammonia will be delivered to the SCCF plant area by tanker truck and stored in specifically designed storage tanks. The ammonia solution concentration will be 19% or less. Therefore, a risk management plan will not be required under Section 112(r) of the Clean Air Act as implemented by EPA regulations in 40 CFR Part 68.

4.7 Solid and Hazardous Wastes

Non-hazardous and potentially hazardous wastes generated as part of the operation of the proposed SCCF will be managed in accordance with applicable federal, state, and local regulations. Project CTGs will be fired on clean natural gas, which does not produce solid wastes. Project operations will not require permanent onsite solid waste management units/disposal areas. Any solid or hazardous wastes generated by the Project will be disposed of at an offsite permitted solid waste or hazardous waste management facility.

4.7.1 Solid Wastes

During SCCF operations, small quantities of non-hazardous solid wastes will be periodically generated. These wastes will generally include water treatment solids, used air inlet filters, grease, used oil, used oil filters, maintenance-related waste materials, and general plant and office refuse. Used oil and spent lubricating oil will be collected and transported offsite by a licensed contractor/transporter for recycling or disposal in accordance with applicable federal, state, and local requirements. Other maintenance-related wastes, such as rags, scrap wood and steel, machine parts, electrical materials, or empty containers and packaging, will be collected, segregated in disposal containers, and transported offsite by a licensed waste hauler for recycling or disposal, in accordance with applicable federal, state, and local requirements. Solid wastes will be disposed at a permitted solid waste management facility (likely the existing Putnam County landfill) that has sufficient capacity to accept the relatively small amount of solid waste expected to be generated.

4.7.2 Hazardous Wastes

The proposed SCCF may occasionally generate small quantities (i.e., less than 1 kilogram of acutely hazardous waste and less than 100 kilograms of hazardous waste per month) of potential hazardous wastes during operations and maintenance activities, which results in a conditionally exempt small-quantity generator status.[1] These wastes generally may include laboratory chemicals, solvents, cleaning fluids, and paints. To the extent practicable, SECI will select materials for use in SCCF operations that produce only non-hazardous wastes. Potentially hazardous wastes will be collected, managed, and temporarily stored in a designated hazardous waste storage area and periodically transported from the site by a licensed hazardous waste transporter for disposal at an appropriately permitted facility, in accordance with applicable federal, state, and local regulations. Batteries, bulbs (lamps), and mercury-containing devices will be managed as universal wastes, as appropriate.

4.8 Onsite Drainage System

As discussed previously, the Project will involve construction activities in the onsite power plant facilities area. The Project will include stormwater management systems designed in accordance with applicable local, state, and federal nonprocedural requirements, including Chapter 373, Part IV, F.S.; Chapter 62-330, F.A.C.; the SJRWMD Applicant's Handbook, Volume II; and Section 7.08, Putnam County LDC. Appendix 10.4 contains a copy of the stormwater management plan.

Figure 4.8.1-1 depicts the proposed stormwater management plan for the power plant facilities development area. As shown in the figure, the SCCF area, including the construction laydown area, is divided into six sub-basins. A portion of the existing SGS switchyard (i.e., sub-basin OSB-1) outside the SCCF area will also drain to the proposed stormwater system. Under the plan design, stormwater runoff from these sub-basin areas will be routed via overland flow, ditches, and an underground storm sewer system to a dry retention pond (i.e., P-1) located in the southwest portion of the development area. The pond will be designed to provide water quality treatment through retention and infiltration. The dry retention pond will also be designed to provide retention for the full 25-year/24-hour design storm event and drawdown of the design storm volume within 72 hours. The pond will have an emergency overflow structure to provide control for storm events that exceed the 25-year/24-hour design storm. Any pond discharge through the

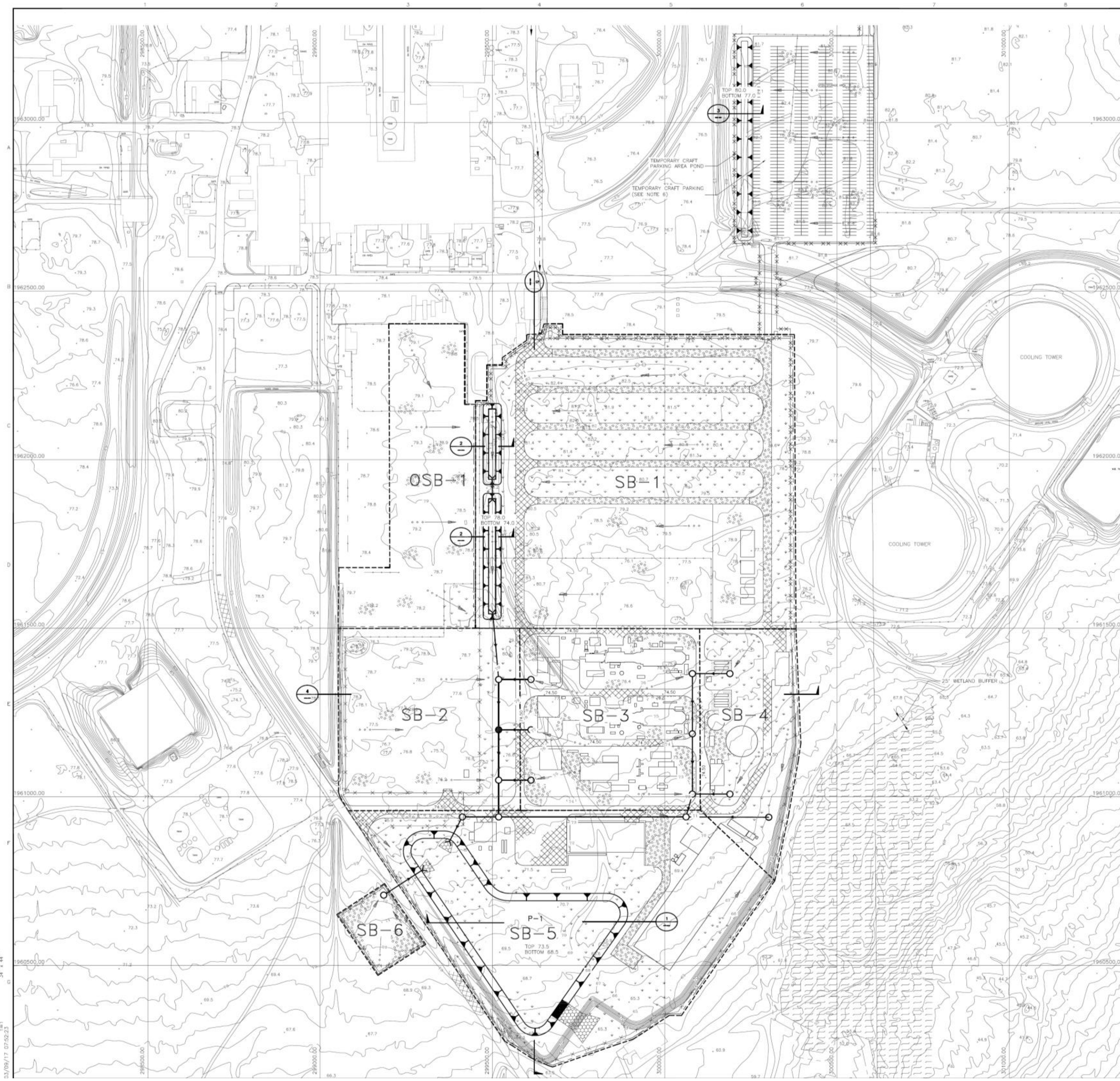
[1] The U.S. Environmental Protection Agency recently promulgated revisions to its hazardous waste regulations that change the designation "conditionally-exempt small quantity generator" to "very small quantity generator." See 40 CFR §§ 260.10, 262.14. The Florida Department of Environmental Protection is currently in rulemaking to incorporate these and other EPA rule revisions into Florida's hazardous waste management rules in Chapter 62-730, F.A.C. (https://www.flrules.org/Gateway/View_notice.asp?id+19062457).

emergency overflow structure will sheet flow south-southeast to undeveloped onsite upland and wetland areas similar to existing conditions.

Contact stormwater from areas with oil-containing sources within the power block area, as well as equipment washdown water, will be collected through drains and routed to an oil/water separator via an oil/water waste piping system. Secondary containment with valved drains at the source will be provided for areas with large oil storage volumes. After storm events in excess of 0.5″, secondary containments will be inspected for a strong presence of free product prior to draining the containment to the SCCF oil/water separator. The oil/water separator will be designed to provide treatment to an effluent concentration of 10 ppm or less. The oily waste will be transported offsite to an approved disposal or recycling facility. The treated effluent from the oil/water separator will be routed to the plant wastewater collection sump for discharge along with cooling tower blowdown and other plant wastewaters.

The stormwater retention pond will be developed early in the construction activities after clearing and grubbing to provide a source of fill material and to provide for management of stormwater during construction. Temporary sumps and lift stations will be used during construction to manage stormwater until the permanent stormwater management system is established. Also, appropriate BMPs will be implemented to control erosion from disturbed areas during construction.

As shown in Figure 4.8.1-1, the proposed temporary construction craft worker parking area will be located north of the construction laydown area. The craft worker parking area currently contains remnants of old aggregate surfacing and is overgrown with vegetation. To support craft worker parking during construction, the area will be surfaced with aggregate, and a temporary dry retention pond for stormwater management will be constructed along the west edge of the parking area. The pond will be designed to provide water quality treatment for stormwater runoff from the parking area during construction. After construction is complete, the aggregate surfacing of the parking area and the temporary retention pond will be removed, and the area will be allowed to revegetate with grass.



GENERAL NOTES

Operation Phase Site Acreage & Surfacing						
Sub Basin	Total Area		Pervious	Impervious - other	Impervious - Building	Impervious - Water Surface
	(Acres)	(% Impervious)*	(Acres)	(Acres)	(Acres)	(Acres)
SB-1	18.31	52%	8.86	8.72	0.00	0.73
SB-2	6.53	83%	1.08	5.45	0.00	0.00
SB-3	6.46	100%	0.00	6.46	0.00	0.00
SB-4	4.11	77%	0.95	3.06	0.10	0.00
SB-5	13.82	61%	5.41	3.84	0.47	4.10
SB-6	0.83	100%	0.00	0.83	0.00	0.00
OSB-1**	5.63	95%	0.28	5.35	0.00	0.00
Total Site	55.69	70%	16.58	33.71	0.57	4.83

*% Impervious includes Impervious - Other, Impervious-Building, and Impervious-Water Surfaces.

**OSB-1 is an offsite basin that contributes to the onsite stormwater system. It is outside of the disturbed limits and the surfacing is unchanged from pre-development condition.

Dry Retention Pond (P-1) Stage Data		
Elevation (ft-NAVD88)	Surface Area (acres)	Remarks
68.50	3.24	The bottom of retention pond
69.50	3.41	The bottom of affective storage (See Note 1)
70.50	3.58	
71.50	3.75	
72.50	3.93	Elevation of emergency overflow weir
73.50	4.11	Top of Bank

Note 1: The bottom 1 foot of the pond is reserved for sediment storage and is not considered in stomrwater capacity evaluation.

Temporary Craft Parking Area Pond Stage Data		
Elevation (ft-NAVD88)	Surface Area (acres)	Remarks
77.00	0.26	The bottom of temporary craft parking retention pond
78.00	0.37	
79.00	0.48	
79.50	0.54	Elevation of emergency overflow weir
80.00	0.60	Top of Bank

NOTES

1. ELEVATIONS ARE REPORTED AS NAVD88.
2. TOP OF CONCRETE/FINISHED FLOOR ELEVATION IS 75.00 NAVD 88, UNLESS NOTED OTHERWISE.
3. WETLANDS SHOWN ON THESE DRAWINGS ARE FOR REFERENCE ONLY.
4. ALL AREAS WITHIN LOOP ROAD OF EQUIPMENT AND BUILDING AREAS TO BE AGGREGATE SURFACED. ALL OTHER AREAS NOT INDICATED WITH SURFACING SHALL BE SEEDED/SODDED WITH BAHIA.
5. ENERGY DISSIPATORS TO BE DESIGNED BY EPC CONTRACTOR TO NON-ERODIBLE DISCHARGE VELOCITIES.
6. TEMPORARY CRAFT PARKING WILL BE AGGREGATE SURFACED DURING CONSTRUCTION AND WILL BE RESTORED TO A PRE-DEVELOPMENT CONDITION (GRASS / AGGREGATE) AFTER CONSTRUCTION.
7. TEMPORARY VISUAL BARRIER SYSTEM SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR TO PROTECT THE FLORIDA OUTSTANDING WETLANDS AS REQUIRED BY THE SITE CERTIFICATION APPLICATION.
8. AT THE END OF CONSTRUCTION THE CONTRACTOR SHALL REMOVE ALL SEDIMENT BUILDUP FROM THE STORMWATER RETENTION POND. IN ADDITION, THE CONTRACTOR SHALL TEST THE POND TO CONFIRM THE FINAL INFILTRATION RATE.

LEGEND

SB-X STORM WATER SUB BASIN AREA
WETLAND BUFFER
DISTURBED AREA LIMITS
BASIN DIVIDE
TEMPORARY CONSTRUCTION FENCE
SECURITY FENCE
CATCH BASIN
MANHOLE
OVERFLOW CONTROL STRUCTURE
STORM SEWER SYSTEM
SURFACE FLOW INDICATOR
DITCH FLOW INDICATOR
CULVERT
CONTAINMENT AREA W/GEOMEMBRANE LINER (SEE NOTE 2)
WETLANDS
ASPHALT
AGGREGATE
GRASS
RIP-RAP
EXISTING VEGETATION
SLOPE INDICATOR

FOR PERMITTING PURPOSES ONLY

THE DISTRIBUTION AND USE OF THE NATIVE FORMAT CAD FILE OF THIS DRAWING IS UNCONTROLLED. THE USER SHALL VERIFY TRACEABILITY OF THIS DRAWING TO THE LATEST CONTROLLED VERSION.

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2017.03.09 14:41:34 -05'00'

JOHN C. BARRANCO, JR. LICENSE No 72091 09/MAR/2017 STATE OF FLORIDA PROFESSIONAL ENGINEER

FIGURE 4.8.1-1.

PROPOSED STORMWATER MANAGEMENT PLAN—PLANT AREA

Source: B&V, 2017.

Seminole Electric COOPERATIVE, INC.

4.9 Heavy Equipment and Materials

4.9.1 Construction Equipment and Materials Handling

The major components of SCCF that will be transported to and erected on the site include:

- CTGs.
- HRSGs.
- HRSG stacks.
- STG.
- Warehouse
- Administrative/control room/ maintenance building.
- Cooling towers.
- Air quality control systems.
- Transformers.

Construction equipment and materials will be delivered to the site by trucks using the existing roadway system, similar to previous construction activities for the Existing SGS Units. The trucks will travel to the site area using US 17 and will turn east on the main SGS plant access road. Certain heavy equipment will also be transported to the site area using the existing railroad line along the east side of US 17 with an existing rail spur running into the SGS site. These roads and rail have been used for delivery of heavy equipment for other construction activities, as well as coal for the Existing SGS Units, at SGS and are adequate to support the deliveries.

Once on the site, the equipment and construction materials will be unloaded for immediate erection or placed in the designated construction laydown area using portable cranes, haulers, and trucks. As shown in Figure 4.2.0-2, the approximately 17.4-acre construction laydown area will be located north of the proposed Project power block area. The construction laydown area, as well as construction parking area, will be cleared, graded, and, as needed, filled early in the initial construction activities. The areas will also be covered with limestone, crushed rock, or other cover materials to stabilize the area and provide suitable work areas for construction trailers and prefabrication, preassembly, welding, painting, and other activities necessary for preparation of the equipment. Temporary fencing will be installed around the construction laydown and parking areas to limit access.

As discussed in Section 4.8, appropriate stormwater runoff management systems will be provided to control potential sediment erosion impacts. Also, as needed, a water wagon will be used to control fugitive dust in the laydown and parking areas.

Construction of the Project is expected to result in a balanced cut-and-fill site in that required material will be available from onsite excavated or graded areas. Should onsite sources be insufficient to achieve design elevations, clean fill materials with appropriate geotechnical properties will be obtained from sources in the region and delivered to the site by trucks. The materials will be placed in the fill area, graded, and compacted. Appropriate stormwater management systems will be installed to control sediment erosion impacts.

4.9.2 Operations Material Handling

Materials to support operation of the proposed SCCF will be transported to the site by trucks using existing roadways. The transport, handling, and storage facilities for these materials will include appropriate pollution control measures. Routine materials for the operations typically include receiving and storing of the following:

- Water treatment chemicals.
- Aqueous ammonia.
- Process gases.
- Lubricating oils.
- Hydraulic fluids.

4.10 Associated Linear Facilities

SECI is not seeking certification of any offsite associated linear facilities in this SCA.

4.11 Emergency Disaster Preparedness Plans

SECI has prepared emergency preparedness and response programs focused on providing rapid, effective protection of human health and the environment during emergency situations or events. SECI has developed a corporate framework for emergency response and business continuity that outlines the scope and contents of the site-specific business continuity plan (BCP) for SGS, MGS, and Headquarters. The SGS BCP includes checklists for emergency response to a range of events, including fire or explosion, chemical releases, crimes in progress, and severe weather disasters such as hurricanes. SCCF will establish its own BCP consistent with that of SGS prior to commercial operation of the new facility.