This section is divided into the following resource topics:

- Air Resources, *Section 3.1.*
- Surface Water, *Section 3.2.*
- Geology and Soils, *Section 3.3.*
- Groundwater, *Section 3.4.*
- Acoustic Environment, *Section 3.5.*
- Biological Resources: Forestry, *Section 3.6.*
- Other Biological Resources, *Section 3.7.*
- Land Resources, *Section 3.8.*
- Visual Resources, *Section 3.9.*
- Transportation, *Section 3.10.*
- Historic/Cultural Properties, *Section 3.11.*
- Public Health and Safety, *Section 3.12.*
- Socioeconomics and Environmental Justice, *Section 3.13.*

The following sections are presented for each resource topic listed above:

Affected Environment – this section describes the environment of the areas that may be affected by the Proposal or Alternate site. Because resource topics are often interrelated; one section may refer to another. The Affected Environment section addresses the region of influence for each resource. This is the area that the Proposal or Alternate site may reasonably affect. Regions of influence are specific to each resource topic. Limits of regions of influence may be natural features (such as drainage divides), political boundaries (such as Warren County), or industry-accepted norms for the resource (such as 50 kilometers [km] for one aspect of air quality).

Environmental Consequences – This section objectively evaluates the Proposal and Alternate site. Environmental Consequences present a scientific analysis of the direct and indirect environmental impacts and forms the analytic basis for the summary comparison of impacts presented in Section 2.0. All relevant reports prepared by

Oglethorpe and its consultants were reviewed to independently evaluate and verify the accuracy and comprehensiveness of the information provided by Oglethorpe. Because resource topics are often interrelated, one section may refer to another. The following items are addressed for each resource:

Identification of Issues – This discussion presents the issues analyzed, which the public or agencies identified (refer to *Section 1.4, Public Participation*), or which RUS identified during preparation of this document.

Impact Assessment – The results of the impact analysis for various components of the Proposal and Alternate site are presented.

Measures Incorporated to Reduce Impacts and Additional Potential Mitigation Measures – These are measures that Oglethorpe has committed to implementing. Impacts have been assessed assuming that these measures will be implemented if the Proposal and Alternate site is implemented. Additional mitigation is identified if appropriate. Mitigation includes measures not already included in the Proposal and the Alternate.[27] The CEQ states that mitigation measures must be considered even for impacts that would not be considered significant, and where it is feasible to develop them: "Mitigation measures must be considered even for impacts that by themselves would not be considered 'significant.' Once the Proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not 'significant') must be considered, and mitigation measures must be developed when it is feasible to do so" (CEQ 1981, Question 19). However, appropriate measures to mitigate impacts have been incorporated into the Proposal or Alternate.

Mitigation can include things such as: (1) avoiding an impact altogether by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of an action and its implementation; (3) rectifying an impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of an action; or (5) compensating for an impact by replacing or providing substitute resources or environments.

3.1 AIR RESOURCES

3.1.1 Local Meteorology

3.1.1.1 Climate and Meteorology

Central Georgia, where the Proposal is located, is characterized by warm and humid summers and moderate winters. Average afternoon high summer temperatures are in

[27] 40 CFR 1502.14(f)

the lower 90s. Readings of 90 or higher can be expected on 70 to 80 days. Overnight summer lows usually range from the upper 60s to lower 70s. Temperatures during winter months are more variable: stretches of mild weather often alternate with cold spells. Winter high temperatures average in the mid-50s to lower 60s. Lows average in the mid-30s. Lows of 32 degrees or lower can be expected on 40 to 50 days. On average, periods with freezing temperatures occur between mid-November and mid- to late March (NOAA 2009). Climate conditions in Appling County are similar (National Atlas 2010).

A measurable amount of rain falls on approximately 120 days each year, producing annual amounts averaging between 45 and 50 inches. Snow is uncommon, with an average annual total of less than one inch (NOAA 2009). The average annual precipitation at Augusta (40 miles east of the Warrenton site) over the 30-year period from 1961 to 1990 was 45 inches, with a maximum of 66 and a minimum of 33 inches (Southeast Regional Climate Center 1997). Averaging over many years, the driest months are September and October and the wettest month is March. Thunderstorms are common in the spring and summer months. On a typical year, thunder will be heard on 50 to 60 days (NOAA 2009). Precipitation ranges are similar in Appling County (USGS 2009a).

From the late 1990s through 2002 and again from 2006-2009, much of the State of Georgia was in a condition of drought (NDMC 2010).

Regional prevailing winds at both the Proposal and Alternate site are from the south and southwest during most of the year.

3.1.1.2 Ambient Air Quality

Terminology

Ambient Air Quality. Ambient air quality refers to the actual existing chemical makeup of the atmosphere at any particular location.

Primary and Secondary Pollutants. Primary pollutants are those that are directly emitted from a combustion process. Secondary pollutants are those that form as a result of chemical reactions in the atmosphere.

Carbon Monoxide (CO). Carbon monoxide is an odorless, colorless gas that is a by-product of incomplete burning of fossil fuels. Motor vehicles are by far the largest CO source in the U.S. Inhaled CO enters the bloodstream and impairs the delivery of oxygen. At the levels that may be found in ambient air above the NAAQS, CO primarily affects people with cardiovascular disease. CO is monitored using specialized CO analyzers (EPD 2009, pp. 7-8).

Nitrogen Oxides (NO_X). Nitrogen oxides are a group of highly reactive gasses that include nitrous oxide, nitric oxide and nitrogen dioxide (NO_2). Nitrogen oxides exist in various forms in the atmosphere. The bulk of these compounds in the atmosphere are produced from high temperature combustion and lightning. Nitrogen, the major component of air, is a very stable molecule and is essentially inert unless subjected to extreme conditions. The oxides of nitrogen are less stable, however, and are key participants in atmospheric chemistry, converting back and forth between numerous states under different conditions. These oxides of nitrogen are of concern because they are precursors of ozone formation, and because they can react with other materials in the atmosphere and form particulate matter (EPD 2009, p. 32).

Sulfur Dioxide (SO_2). Sulfur dioxide is a colorless reactive gas that is formed by burning sulfur-containing material, such as coal. Most SO_2 emission in Georgia comes from electric generation. Exposure to SO_2 at levels in ambient air above the NAAQS can cause impairment of respiratory function, aggravation of existing respiratory disease (especially bronchitis), and a decrease in the ability of the lungs to clear foreign particles. SO_2 can be oxidized in the atmosphere into sulfuric acid, which contributes to acid rain (EPD 2009).

Ozone. Ozone is the secondary pollutant of greatest concern in most parts of the country, and it is a main ingredient of urban smog. At levels in ambient air above the NAAQS, ozone can impair normal functioning of the lungs and can reduce the ability to perform physical exercise. Long-term exposure may cause loss of lung function. Ozone is created by chemical reactions between NO_X and volatile organic compounds (VOC) in the presence of sunlight. In Georgia, vegetation emits large amounts of VOCs, so ozone is controlled primarily through control of NO_x (EPD 2009, pp. 21-22).

Inhalable Particulate Matter (PM). Unlike the chemical-specific gaseous emissions described above, these are non-chemical-specific solid or liquid particles that are small enough to be inhaled. Particulate matter is classified as PM_{10} [particles less than 10 micrometers (one millionth of a meter) in diameter] or $PM_{2.5}$ (particles less than 2.5 micrometers in diameter). PM can impair lung function.

Conditions at Proposal and Alternate Sites

The State of Georgia does not have air quality monitoring sites in Warren County or in Appling County (Figure 3-1). The monitoring sites shown in Figure 3-1 are not all the same, and are intended for different purposes. For example, different stations may monitor for different pollutants. Data from some sites are intended to represent only local conditions resulting from a single source or a small number of sources, while data from other sites are intended to represent regional conditions.

The EPD provided the following ambient background concentrations of NO_2, SO_2, CO, and PM_{10} to be used when evaluating compliance with ambient air quality standards:

- For CO, 1,210 micrograms per cubic meter (ug/m^3) for the one-hour averaging time and 939 ug/m^3 for the 8-hour averaging time (the averaging times, shown in Table 3-1, are intended to address both shorter-term and longer-term effects). This information is from a CO monitoring site in Paulding County.

- For PM10, 38 ug/m^3 for the 24-hour averaging time, and 20 ug/m^3 for the annual average. These data are based on a statewide study of rural ambient air concentrations.

- For $PM_{2.5}$, 29.8 ug/m^3 for the 24-hour averaging time, and 13.5 ug/m^3 for the annual average. The data are from the Augusta Bungalow Road monitor (Oglethorpe Power Corporation 2010o, pp. 5-6).

- For NO_2, an annual average of 7.2 ug/m^3. For one-hour NO_2, the EPD provided a background concentration of 40 ug/m^3 (Oglethorpe Power Corporation 2010n, p. 4). Both values are from the Paulding monitor.

- For SO_2, 59 ug/m^3, 24 ug/m^3, and 5.2 ug/m^3 for the 3-hour, 24-hour, and annual averaging times, respectively. This data is from a Bibb County monitoring site. For one-hour SO_2, the EPD provided an unofficial background concentration for the Macon SE monitor equivalent to 73 ug/m^3 (Oglethorpe Power Corporation 2010e, p. 4).

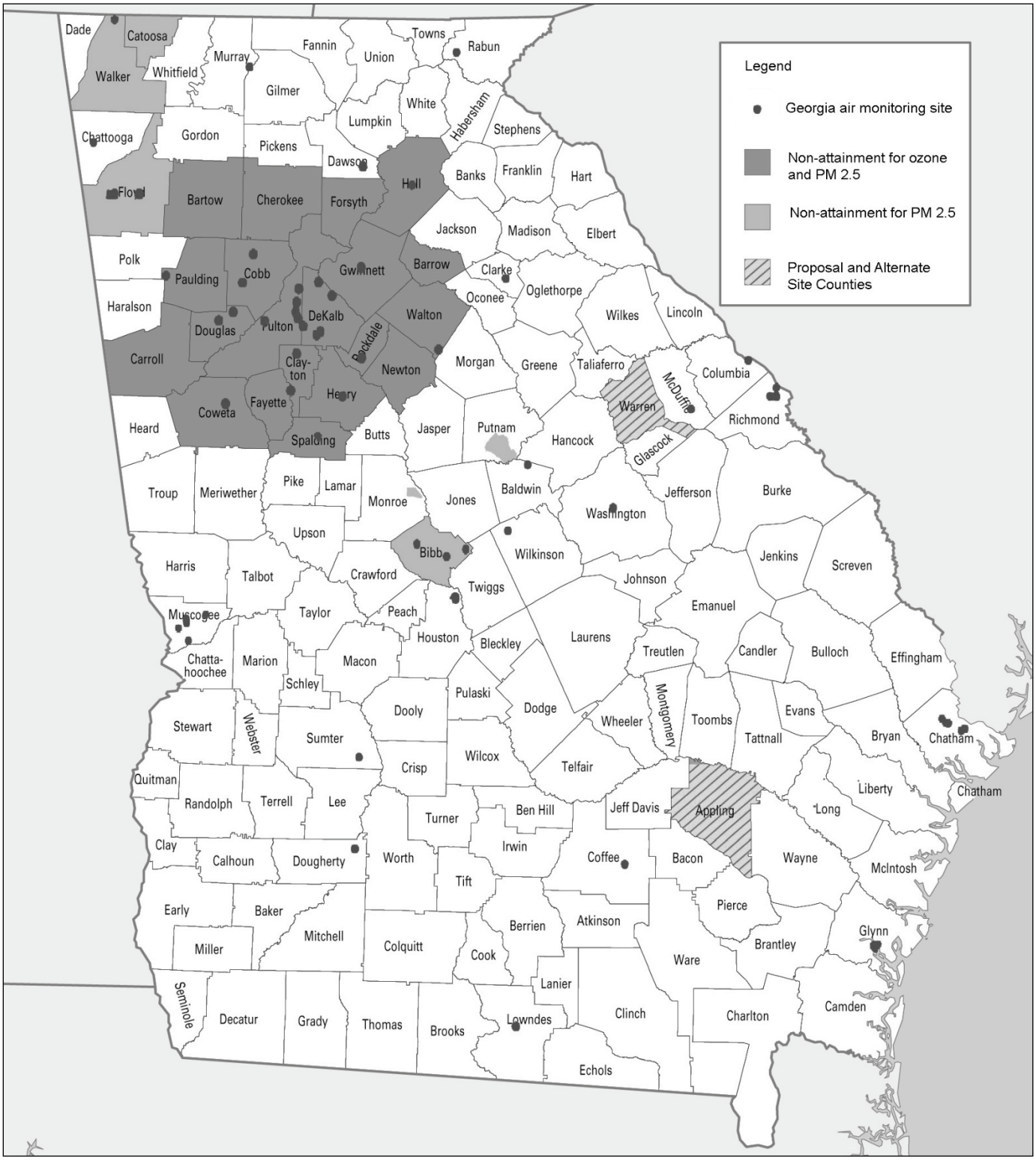


Figure 3-1. Georgia NAAQS Non-Attainment Areas, 2008, with Proposal and Alternate.
Sources: USGS 2009a; Kim 2008; EPD 2009, p. 6

3.1.2 Federal/State Regulation of Air Pollutants

3.1.2.1 Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS)

The Clean Air Act (CAA) requires the EPA Administrator to identify pollutants that may endanger public health or welfare. The Administrator is required to issue air quality criteria that reflect current scientific knowledge useful in indicating the type and extent of all identifiable effects on public health or welfare that may be expected from the presence of such pollutant in ambient air. Under the CAA, the EPA Administrator establishes NAAQS for each pollutant for which air quality criteria have been issued. The EPA is to set standards where “the attainment and maintenance are requisite to protect public health” with “an adequate margin of safety.” In 1971, the EPA established standards for five “criteria” pollutants as required by the Clean Air Act. The standards and pollutants have changed over time to keep up with improvements in scientific knowledge and now consist of six pollutants. The current list is summarized in Table 3-1.

Table 3-1. National Ambient Air Quality Standards (NAAQS)

Pollutant	Symbol	Averaging Time	Parts per Million (ppm)	Micrograms per Cubic Meter (ug/m^3)
Ozone	O_3	8 hours	0.075	--
Carbon Monoxide	CO	1 hour	35	40,000
		8 hours	9	10,000
Inhalable Particulate Matter	PM_{10}	24 hours	--	150
	$PM_{2.5}$	24 hours	--	35
	$PM_{2.5}$	Annual	--	15
Nitrogen Dioxide	NO_2	Annual	0.053	--
		1 hour	0.100	--
Sulfur Dioxide	SO_2	3 hours	0.5	--
		24 hours	0.14	--
		Annual	0.03	--
		1 hour	0.075	--
Lead	Pb	Rolling 3-month average	--	0.15

Source: 40 CFR Part 50. Detailed criteria for compliance are included in these regulations.

Primary standards set limits to protect public health, including the health of "sensitive" populations such as children, the elderly, and people with heart or lung disease.

Secondary standards set limits to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation and buildings. The primary and secondary standards are the same except that carbon monoxide has no secondary standard; there is no one-hour secondary standard for nitrogen dioxide; and sulfur dioxide has separate primary and secondary standards, with the 3-hour standard the secondary and the others primary.[28]

Georgia Standards

The State of Georgia has adopted the NAAQS.[29]

3.1.2.2 Ambient Air Quality Planning

The CAA requires each state to identify areas with ambient air quality that do not attain the NAAQS (nonattainment areas). States are required to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. Currently, more than half the people in the U.S. live in areas that do not meet one or more of the NAAQS. Figure 3-1 shows non-attainment areas in Georgia.

Outside the nonattainment areas, the focus of the CAA regulatory programs related to the NAAQS is to ensure that no new sources of the criteria pollutants cause or contribute to violations of the NAAQS. These programs include:

- New source performance standards (NSPS). These standards are intended to promote use of the best air pollution control technologies, taking into account the cost of such technology and any other non-air quality health and environmental impacts and energy requirements.
- Prevention of significant deterioration (PSD) standards for areas that are in attainment of NAAQS. These standards require an analysis to ensure the application of best available control technology (BACT) for criteria pollutants, and require modeling to demonstrate that NAAQS will not be violated.
- Operating permit. A PSD permit was issued for the Proposal upon EPD's determination that NSPS, PSD and other standards will be achieved (EPD 2010b, EPD 2010c). Oglethorpe applied for an air quality permit from the EPD in August 2009 and updated it in October 2009 (Oglethorpe Power Corporation 2009b). Additional updated information was submitted by letter during 2010 and is addressed in this final EIS.

[28] 40 CFR Part 50
[29] Georgia rules for air quality control. 391-3-1-.01(4)(f)1

3.1.2.3 Classification for PSD

In the Clean Air Act Amendments of 1977, Congress specified the initial classification of lands for PSD purposes. Certain lands, such as national parks and wilderness areas, where existing good air quality is deemed to be of national importance, were designated as Class I. All other areas to which the PSD provisions apply were classified as Class II. As shown in Table 2-1, the nearest Class I area to the Proposal site is Shining Rock Wilderness Area (135 miles), and the nearest Class I area to the Alternate site is Okefenokee Wilderness Area (40 miles). Because there is a Class I area within 300 km (186 miles) of the Proposal, Oglethorpe conducted modeling to assess potential impacts to the Class I area.

PSD Increments

EPA established "PSD Increments" to prevent deterioration of air quality in Class I and Class II areas. Increments are the maximum allowable increase in ambient air concentrations of a criteria pollutant from a baseline concentration (EPA 2010d). EPA has established PSD Increments for NO_2, SO_2, PM_{10}, and $PM_{2.5}$.[30] The Class I and Class II PSD Increment thresholds are listed in Table 3-2 and are the maximum concentrations allowed from all Increment-consuming stationary sources in an area, not just those from the Proposal (or the Alternate).

Table 3-2. PSD Increments.

Pollutant	Averaging Period	Class I PSD Increment (ug/m^3)	Class II PSD Increment (ug/m^3)
NO_2	Annual	2.5	25
PM_{10}	24-hour	8.0	30
	Annual	4.0	17
$PM_{2.5}$	24-hour	2.0	9
	Annual	1.0	4
SO_2	3-hour	25.0	512
	24-hour	5.0	91
	Annual	2.0	20

[30] EPA published the PM2.5 standards in October 2010; however, they are not applicable until October 20, 2011, and are not applicable to this project (Federal Register Vol. 75, No. 202, Wednesday, October 20, 2010, p. 64898).

Threshold Significance Analysis

EPA requires a threshold significance analysis to determine the need to prepare NAAQS and Increment analyses. In this analysis, only the Proposal's (or Alternate's) sources are modeled and the potential impacts evaluated. For each pollutant, modeled results are compared to PSD significant impact levels (SILs) established by EPA (Table 3-3). If the highest off-property concentration for a given pollutant attributable to the Proposal (or the Alternate) is less than the Class II SIL for all averaging periods, then further analyses for that pollutant are not required. This is because the emissions increases resulting in impacts less than the Class II SIL, by definition, are unable to either cause or contribute to any exceedance of the NAAQS or PSD Class II Increment. If concentrations exceed the SIL, NAAQS and PSD Class II increment analyses are required to demonstrate that the Proposal (or the Alternate) neither causes nor contributes to any exceedance.

Table 3-3. Significant Impact Levels (SILs).

Pollutant	Averaging Period	Proposed Class I SIL (mg/m^3)	Class II SIL (ug/m^3)
CO	1-hour	--	2000
	8-hour	--	500
NO_2[1]	1-hour	--	9.4
	Annual	0.1	1
Ozone[2]	8-hour	--	--
PM_{10}	24-hour	0.3	5
	Annual	0.2	1
$PM_{2.5}$[3]	24-hour	--	1.2
	Annual	--	0.3
SO_2[4]	1-hour	--	7.8
SO_2	3-hour	1.0	25
	24-hour	0.2	5
	Annual	0.1	1

[1] No SIL or PSD Increment has been established for 1-hour NO_2 PSD modeling analysis. Oglethorpe's proposed SIL is set as 5% of the NAAQS (Oglethorpe Power Corporation 2010n, p. 3).
[2] No SIL has been established for ozone.
[3] Proposed Class II SILs shown; based on guidance from the EPD, they are the minimum of the proposed SILs from the EPA's September 21, 2007 proposed rule for Class II areas (Oglethorpe Power Corporation 2010o, p. 4). These were adopted by EPA on October 20, 2010, along with Class I SILs of 0.06 (annual) and 0.07 (24-hour) (Federal Register Vol. 75, No. 202, p. 64866).
[4] No SIL or PSD Increment has been established for 1-hour SO_2 PSD modeling analysis. Oglethorpe's proposed SIL is set as 4% of the NAAQS (Oglethorpe Power Corporation 2010e, pp. 2 and 3).

The geographic area where significant impacts may occur is used to define the significant impact area (SIA) within which compliance with the NAAQS and PSD Class II Increments must be demonstrated. The SIA encompasses a circle centered on the

Proposal (or the Alternate) with a radius extending out to either (1) the farthest location where the predicted ambient impact of a pollutant from the project exceeds the Class II SIL, or (2) a distance of 50 kilometer (km), whichever is less. All sources within a distance of 50 km of the edge of a SIA are assumed to potentially contribute to ground-level concentrations within the SIA and are considered for possible inclusion in the NAAQS and PSD increment analyses. Because the Proposal and the Alternate site are approximately 200 km apart, neither affects the other's SIA.

For Class I analysis, Oglethorpe conducted screening modeling for the 8 Class I areas that are located within 300 km of the Proposal.

3.1.2.4 Hazardous Air Pollutants (HAPs) and Toxic Air Pollutants (TAPs)

There are nearly two hundred hazardous air pollutants (HAPs) regulated under the CAA.[31] The Proposal will not emit enough HAPs to be considered a major source. The Proposal's estimated HAPs emissions are discussed in Section 3.1.4.

EPD regulates the emissions of toxic air pollutant (TAP) emissions.[32] A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. HAPs are a subset of TAPs. The EPD has issued guidelines (EPD 1998) that specifically identify as a TAP a toxic pollutant for which any of the following toxicity-determined values has been established:

- EPA Integrated Risk Information System (IRIS) reference concentration (RfC) or unit risk.
- Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL).
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV)
- National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL).
- Lethal Dose – 50 percent (LD50) Standards.

[31] Federal regulations under 40 CFR Part 63 have been established to reduce the potential HAP emissions from sources in specifically regulated industrial source classifications (Clean Air Act Section 112(d)) or on a case-by-case basis (Clean Air Act Section 112(g)) for facilities not regulated as a specific industrial source type.
[32] Georgia Rules for Air Quality Control, 391-3-1-.02(2)(a)3(ii).

The TAP Guidelines (EPD 1998) specify that these sources should be referenced in the priority of the above bulleted list to determine long-term and short-term acceptable ambient concentrations (AACs) based on the exposure limits that are provided.

The stationary sources of HAP and TAP from the Proposal are the biomass boiler and the emergency fire pump engines. However, given the emergency nature of the fire pumps, EPD does not require TAP from these sources to be evaluated (EPD 2009).

Mercury

Mercury is often the HAP/TAP of primary concern in combustion processes, particularly fossil fuel combustion.

The Mercury Cycle. Mercury cycles through air, land, biota and water in various chemical forms. Once in aquatic systems, mercury can exist in dissolved or particulate forms and can undergo a number of chemical transformations. Sediments contaminated with mercury at the bottom of surface waters can serve as an important reservoir of the element, with sediment-bound mercury recycling back into the aquatic ecosystem for decades or longer. Mercury also has a long retention time in soils, from which it may continue to be released to surface waters and other media for long periods of time (EPA 1997b, page 2-4). Much of the mercury circulating through today's environment was released years ago, when mercury was more commonly used in many industrial, commercial, and residential applications. Land and water surfaces can repeatedly re-emit mercury into the atmosphere after its initial release into the environment.

EPA has estimated that about one-third of U.S. mercury emissions are deposited within the contiguous U.S. and the remainder enter the global cycle, and also reports that “current estimates are that less than half of all mercury deposition within the U.S. comes from U.S. sources” (EPA 2008b).

Mercury Emissions Sources. EPA has reported that natural sources of mercury constitute roughly between one-fifth and one-third of current worldwide mercury air emissions. Anthropogenic sources account for the remainder, roughly split equally between direct mercury emissions and re-emitted mercury (EPA 2008b, EPA 1998a, page 7-2).

The EPA has reported estimates of annual total global mercury emissions from all sources, both natural and anthropogenic, at roughly 5,000 tons per year, although this value is highly uncertain, and was based on data collected in 1994 and 1995 (EPA 1998a, page 7-2). EPA estimated that in 1994-1995, U.S. direct anthropogenic mercury emissions represented about 8 percent of the direct anthropogenic global total and U.S. utility emissions represented about 2.5 percent of the direct anthropogenic global total (EPA 1998a, page 7-2 and Table 7-1). U.S. utility mercury emissions have declined

slightly since EPA reported these values, and emissions from some other sources, notably utilities in China, have increased (NETL 2009a, Figure 8). World-wide, North American (includes entire continent, not just the United States) stationary fossil fuel combustion emissions account for approximately one percent of the global (anthropogenic plus naturally-occurring) annual mercury emissions (United Nations Environmental Programme 2008).[33]

In 2008 Georgia utilities emitted to the air 1.9 tons (3,776 lbs) of mercury and mercury compounds, which is approximately 4.2% of total U.S. electric utility mercury air releases according to EPA's 2008 Toxic Release Inventory data[34] (EPA 2008a).

Human Health and Wildlife Effects

Mercury Toxicity. The toxic effects of mercury depend on its chemical form and the route of exposure. Methylmercury is the most toxic form; other forms are minor contributors to human mercury exposure (EPA/FDA 2004). Methylmercury is particularly damaging to developing embryos, which are five to ten times more sensitive than adults. Exposure to methylmercury is usually by ingestion (USGS 2000).

Risk to People. Almost all human exposure to methylmercury is through fish consumption (EPA 1997a). Estimates developed by the World Health Organization and published by the U.S. Agency of Toxic Substances and Disease Registry (ATSDR) indicate that 99.6 percent of methylmercury intake arises from fish consumption (ATSDR 1999). EPA has concluded that "self-caught freshwater fish represent the pathway most impacted by utility Hg emissions."[35]

Risk to Wildlife. In several areas of the United States, concentrations of mercury in fish and wildlife are high enough to be a risk to wildlife (e.g., Wisconsin and Florida) (USGS 2000).

[33] Per Table 1.5, North American stationary combustion sources in 2000 had emissions of 79.6 Mg/yr. World-wide total 2000 mercury emissions were 7,710 Mg/yr per Table 1.28.
[34] The U.S. total for electric utilities was 89,637 pounds of mercury and mercury compounds.
[35] Federal Register/Vol. 71, No. 111/Friday, June 9, 2006/Rules and Regulations, page 33393

Environments Where Methylmercury is a Problem

Although mercury is a globally dispersed contaminant, it is not a problem everywhere. Aside from grossly polluted environments, mercury is normally a problem only where the rate of natural formation of methylmercury from inorganic mercury is greater than the reverse reaction (USGS 2000). Environments that are known to favor the production of methylmercury include those with high organic carbon, low pH, and low dissolved oxygen, such as estuarine and lake-bottom sediments. These include certain types of wetlands, dilute low-pH lakes in Northeast and North central United States, parts of the Florida Everglades, newly flooded reservoirs, and coastal wetlands, particularly along the Gulf of Mexico, Atlantic Ocean, and San Francisco Bay (USGS 2000).

Fish Consumption Advisories. As of 2008, all 50 states, the District of Columbia and five tribes have issued fish consumption advisories. The EPA 2008 National Listing of Fish Advisories contains over four thousand advisories nationwide, representing 43 percent of the nation's total lake acreage and 39 percent of the nation's total river miles (EPA 2009a, pp. 1 and 2). The EPA has issued fish consumption guidelines for a large number of reservoirs and streams in the state based on the presence of mercury in fish (EPA 2010a).

Regulation of Air Emissions. EPD has established two state rules to reduce mercury deposition from existing and new Georgia coal-fired power plants.[36]. Neither the Georgia state rules nor the federal Clean Air Mercury Rule (CAMR) program (now vacated by a court ruling) regulate biomass power plants as such emissions are small relative to a similar coal-fired unit.

3.1.2.5 Visibility Analysis

The visibility analysis evaluates whether there are impacts to nearby sensitive receptors that are potentially sensitive to plume visibility impacts. Sensitive receptors include airports, state parks, or state historic sites.

3.1.2.6 Particulate Matter Emissions from Biomass Combustion

Particulate matter emissions, both filterable and condensable, are emitted via combustion of fuels. Filterable PM consists of unburned materials and ash while condensable PM results from condensing of organic and other precursor pollutants. PM emissions are specific to the fuel combusted, control devices utilized, and boiler combustion design.

PM emissions are limited by federal and state regulations. Federal regulations under 40 CFR Part 60 require new, modified, or reconstructed sources to control emissions to the level achievable by the best-demonstrated technology as specified in the applicable

[36] Georgia Rules for Air Quality Control 391-3-1-.02(2)(sss) and (ttt)

provisions. Such regulations often include a specific limit for PM or opacity (or both). In addition, federal regulations as currently proposed, 40 CFR Part 63 will utilize PM limits as surrogates for metallic hazardous air pollutants (HAP). EPD regulates PM and opacity emissions from combustion sources under Georgia Rules for Air Quality Control 391-3-1-.02(2)(d). Finally, unit-specific emission limits for PM would be established as BACT as part of the PSD permitting process. Impacts of PM are also addressed as part of the NAAQS and Increment dispersion modeling analyses.

3.1.3 Global Climate Change

This discussion is based primarily on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, *Climate Change 2007*, which is the most recent comprehensive source of information on global climate change. IPCC authors and contributors are scientists representing hundreds of research institutes and universities around the world and 180 member governments.

Some of the highlights of the IPCC 2007 report:

Global Warming: "Warming of the earth's climate is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Eleven of the last twelve years (1995-2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850) (IPCC 2007a, p. 5).

Sea Level Rise. Global average sea level rose at an average rate of 1.8 mm per year over 1961 to 2003. Sea level rise is caused by thermal expansion of ocean water and by melting ice. Oceans have been absorbing more than 80 percent of the heat added to the climate system. Since 1961, the average temperature of global oceans has increased to depths of approximately 10,000 feet. This warming causes seawater to expand, contributing to sea level rise. "Widespread decreases in glaciers and icecaps have contributed to sea level rise." "Losses from the ice sheets of Greenland and Antarctica have very likely contributed to sea level rise over 1993 to 2003" (IPCC 2007a, p. 5).

Increases in Greenhouse Gases: "Global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentrations are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture" (IPCC 2007a, p. 2). Between 1970 and 2004 global greenhouse gas emissions increased by 70 percent (IPCC 2007b, p. 3).

Human Contribution to Global Warming. “The understanding of anthropogenic warming and cooling influences on climate change has improved…leading to very high confidence [at least a 9 out of 10 chance of being correct] that the global average net effect of human activities since 1750 has been one of warming...” and the rate of increase in warming “is very likely [> 90 percent] to have been unprecedented in more than 10,000 years” (IPCC 2007a, p. 3). “The carbon dioxide radiative forcing increased by 20 percent from 1995 to 2005, the largest change for any decade in at least the last 200 years” (IPCC 2007a, p. 4). “Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations” (IPCC 2007a, p. 10).

A more recent publication from the U.S. Global Change Research Program (GCRP), focused on U.S. impacts, reports as its first key finding: “Global warming is unequivocal and primarily human-induced” (GCRP 2009, p. 12). The report concludes that the “human-induced emissions of heat-trapping gases” that are the primary cause of global warming “come mainly from the burning of fossil fuels” (GCRP 2009, p. 12).

While both the IPCC and the GCRP have found that the body of data collected to date show that average global temperatures are increasing and that sea level is rising. There are large uncertainties associated with predicting any particular climate impacts, where a “climate” consists of the meteorological conditions (temperature, precipitation, wind) that prevail in a particular region.

3.1.4 Environmental Consequences

Because most issues and consequences are the same for both the Proposal and the alternative project, they are discussed together.

3.1.4.1 Identification of Issues

The following air quality related issues were identified through the EIS scoping and development process, for both the Proposal and the Alternate site:

- Introduction of mercury to the environment through the burning of trees that may have taken up mercury from soils.
- Potential health effects from mercury and other toxic air pollutants.
- Concern about particulate emissions being higher from biomass plants than oil or gas plants.
- Health effects from diesel particulate emissions and toxic air pollutants from trucks delivering fuel.

- Global climate change.
- Adequate stack height.
- Implementation of appropriate control technology.
- Health impacts from particulates and other emissions.
- Carcinogenic emissions.

3.1.4.2 Impact Assessment - Proposal

Ambient Air Quality Standards

The impact of the Proposal on ambient air quality standards is described in "Warren County Biomass Electric Generation Facility Construction Permit Application Volume II – Modeling" dated October 2009 (Oglethorpe Power Corporation 2009b). The calculations are based on estimates of potential emissions from the Proposal, information concerning the physical characteristics of the plant such as the height and exit diameter of the stacks, and information about the meteorology in the area around the Proposal.

The projected potential emissions associated with the plant (including cooling tower, fugitive material handling, and fugitive road traffic emissions) are shown in Table 3-4 (EPD 2010b, pp. 9-10; Oglethorpe Power Corporation 2009b, Volume II, Table 1-1).

Table 3-4. Potential Facility Emissions, Tons per Year (tpy).

Pollutant	Potential Emissions (tpy)	Thresholds (tpy)	PSD Permitting Triggered?
CO	625	100	Yes
NO_x	649	40	Yes
PM[1]	144	25	Yes
PM_{10}[1]	144	15	Yes
$PM_{2.5}$[2]	144	10	Yes
SO_2	56	40	Yes
Volatile Organic Compounds (VOC)	39	40	No
H_2SO_4	6.9	7	No
Fluorides	-	3	No
Lead	0.000813	0.6	No
Total HAP	19.9	25	No
Maximum Single HAP	9.9	10	No

[1] PM emissions are filterable particulate only. PM_{10} emissions are estimated as total particulate emissions (filterable + condensable). PM_{10} filterable emissions are based on the speciation of the PM. Due to the differences in the material handling particulate specifications, filterable PM emissions are very similar to total PM_{10} emissions.
[2] $PM_{2.5}$ emissions assumed to be equal to PM_{10} emissions for PSD applicability purposes.

Threshold Significance Analysis

As shown in Table 3-4, the emissions from the Proposal trigger PSD requirements for CO, NO_x, PM_{10}, $PM_{2.5}$ and SO_2. Therefore, these pollutants are subject to threshold significance analysis. However, as noted in the table, PM emissions are very similar to PM_{10} emissions and were not separately modeled. In addition, PM_{10} was used as a surrogate for $PM_{2.5}$ (Oglethorpe Power Corporation 2010b, pp. 3-1 and 3-2).

The modeled emission rates are shown in Table 3-5 (EPA 2010c; Oglethorpe Power Corporation 2009b, Volume II, Table 4-2; with additions from Oglethorpe Power Corporation 2010e, p. 2; and 2010s, pp. 1 and 2). PM_{10} is considered a surrogate for $PM_{2.5}$ (Oglethorpe Power Corporation 2010o, pp. 7 to 10). Note that the one-hour SO_2 limit was not in effect at the time the permit application was submitted; it was finalized on June 22, 2010, with an effective date of August 22, 2010. Oglethorpe submitted supplemental SO_2 1-hour Class II area modeling to the EPD on July 27, 2010 (Oglethorpe Power Corporation 2010e).

Table 3-5. Biomass Boiler Modeled Rates.

Pollutant	BACT Limit (lb/MMBtu)	BACT-equivalent Emissions (lb/hr)[1]	Short-term Emissions (lb/hr)[2]	Avg. Period	Modeled Emission Rate (lb/hr)	Multiplier of Short-term Rate
CO	0.080	102.56	223.84 111.92	1-hour 8-hour	2,238.40 1,119.20	20 10
NO_2[3]	0.3	398.7	299.03	1-hour	299.03	1
NO_2	0.10	128.2	153.89	Annual	153.89	1
PM_{10} and $PM_{2.5}$	0.018	23.08	25.18	24-hour Annual	25.18 25.18	1 1
SO_2[4]	0.10	128.2	132.9	1-hour	132.9	1
SO_2	0.010	12.82	13.99	3-hour 24-hour Annual	111.92 69.95 13.99	8 5 1

[1] BACT-equivalent rate based on BACT limits and annual sustainable heat input rate of 1,282 million British thermal units per hour (MMBtu/hr)

[2] Short-term rate based on BACT limits used in air permit application (same as BACT limits shown, except NO_2 was 0.110, and short-term heat input rate of 1,399 MMBtu/hr except for 1-hour SO_2 and 1-hour NO_x, which are based on the worst-case load of 1,329 MMBtu/hr (Oglethorpe Power Corporation 2010o, p. 2; 2010s, p. 2).

[3] To account for short-term variability in the proposed boiler's NO_x emission rate, the modeled maximum 1-hour NO_x emission rate for the boiler is based on a 0.3 lb/MM NO_x emission factor instead of the 0.11 lb/MM Btu 30-day rolling average NO_x BACT limit used in the permit application.

[4] To account for short-term variability in the proposed boiler's SO_2 emission rate, the modeled maximum 1-hour SO_2 emission rate for the boiler is based on a 0.10 lb/MM SO_2 emission factor instead of the 0.01 lb/MM Btu 30-day rolling average SO_2 BACT limit.

As shown in Table 3-6, the modeled impacts for the Proposal were below the SILs for all averaging periods for CO, for annual NO_2, and for all SO_2 averaging periods except the one-hour; therefore, no further analyses are required for these. The Table 3-6 results are from Oglethorpe's air permit application and later updates (Oglethorpe Power Corporation 2009b, Volume II, Tables 3-6 and 5-1 through 5-4; 2010g, Table 2; 2010u, Table 2).

Impacts of PM_{10} were above the SILs for both averaging periods, requiring that NAAQS and Class II Increment analyses be performed based on a SIA of 3.72 km (Oglethorpe Power Corporation 2010l, p. 8).

Table 3-6. Significance Analysis Results, Proposal.

Pollutant	Averaging Period	PSD Class II SIL ($\mu g/m^3$)	Maximum Modeled Impact ($\mu g/m^3$)	Monitoring de Minimus Level ($\mu g/m^3$)	NAAQS and Increment Analyses Required?[1]
CO	1-hour	2,000	568.3	--	No
	8-hour	500	138.6	575	No
NO_2	1-hour	9.4	44.9	--	Yes
	Annual	1	0.73	14	No
$PM_{2.5}$	24-hour	1.2	6.75	--	Evaluated
	Annual	0.3	1.34	--	Evaluated
PM_{10}	24-hour	5	33.2	30	Yes
	Annual	1	4.1	17	Yes
SO_2	1-hour	7.8	15.7	--	Yes
	3-hour	25	16.8	512	No
	24-hour	5	4.2	91	No
	Annual	1	0.1	20	No

[1] As noted in Table 3-3, the SILs for $PM_{2.5}$, 1-hour NO_2 and 1-hour NO_2 are proposed. The Class II Increment for $PM_{2.5}$ has not yet been established.

NAAQS (Primary)

Oglethorpe conducted NAAQS analysis for one-hour NO_2 and for one-hour SO_2 and submitted the results to the EPD. The analyses showed that the NAAQS would not be exceeded, and that the Proposal would not cause or contribute to an NAAQS violation for either one-hour NO_2 or one-hour SO_2 (Oglethorpe Power Corporation 2010n, pp. 4 to 7; 2010g, pp. 4 to 6).

Because the modeled impact level exceeded the threshold above which additional analysis is required (Table 3-6), additional NAAQS analysis was performed for PM_{10}. The analysis included sources from the Proposal as well as regional inventory sources described in the submitted application. Background concentrations provided by EPD were added to the modeled impacts prior to comparison with the NAAQS (EPD 2009). The analysis demonstrated that the Proposal does not cause or contribute to any exceedance of the NAAQS at any ambient receptor (Oglethorpe Power Corporation 2009b, Volume II, pp. 5-8 and 5-9). A later refined analysis confirmed this conclusion (Oglethorpe Power Corporation 2010l).

In Oglethorpe's air permit application, PM_{10} was used as a surrogate for $PM_{2.5}$ (Oglethorpe Power Corporation 2009b, Volume II, p. 1-2). Based on later EPA memoranda and input from EPD, Oglethorpe conducted additional analyses to support the use of PM_{10} as a surrogate (Oglethorpe Power Corporation 2010o, pp. 1 and 2). The

additional analysis confirmed that the Proposal would not cause or contribute to an NAAQS violation for $PM_{2.5}$ (Oglethorpe Power Corporation 2010o, p. 6).

Class II Increments

No Class II Increment has been established for either one-hour NO_2 or SO_2, therefore increment modeling was not required (Oglethorpe Power Corporation 2010n, p. 3; 2010g, p 3).

Similar to the PM_{10} NAAQS analysis, a Class II Increment analysis was performed for PM_{10}. The analysis included sources from the Proposal as well as regional inventory sources described in the submitted application. The analysis demonstrated that the Proposal does not cause or contribute to any exceedance of the Class II Increment at any ambient receptor (Oglethorpe Power Corporation 2009b, pp. 5-6 and 5-7). A later refined analysis confirmed this conclusion (Oglethorpe Power Corporation 2010l).

Class I Increments

For each of the eight Class I areas within 300 km of the Proposal site, the screening modeling involved using the AERMOD model to assess impacts to 10 receptors at a distance of 50 km from the Proposal site. The 10 receptors were on an arc of the 50-km radius from the plant, in the direction of the Class I area (Oglethorpe Power Corporation 2009b, Volume II, Figure A-5). For all eight Class I areas, the maximum modeled impact for SO_2 and NO_x was below the SIL and for seven areas the maximum modeled impact for PM_{10} was below the SIL. However, there was one receptor representing one Class I area (Shining Rock, the nearest Class I area) that had a maximum 24-hour PM_{10} modeled impact (0.325 ug/m^3) slightly above the SIL (0.3 ug/m^3). Because AERMOD is not approved beyond 50 miles, to conclusively demonstrate compliance, Oglethorpe used another model, CALPUFF, to assess 24-hour PM_{10} impacts at the actual Shining Rock Class I site, which is approximately 215 km from the Proposal site (Oglethorpe Power Corporation 2010k, pp. 1 to 2). The maximum overall modeled impact at the Class I area was 0.011 ug/m^3, below the SIL of 0.3 ug/m^3. Based on these results, the Proposal would not cause or contribute to any violations of allowable Class I Increment at any Class I area within 300 km of the Proposal site (Oglethorpe Power Corporation 2010m, p. 17).

Soils and Vegetation

The secondary NAAQS were developed by EPA to provide protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 3-7 shows that no impacts exceed the secondary NAAQS standards. Thus, there are no adverse impacts expected on soils or vegetation from the Proposal.

Table 3-7. Soil and Vegetation Impacts, Proposal.

Pollutant	Avg. Period	Total Conc. ($\mu g/m^3$)	Secondary NAAQS ($\mu g/m^3$)	Minimum Vegetation Sensitivity ((µg/m3)	Any Exceedance? (Yes/No)
CO	1 week	68	N/A	1,800,000	No
NO_2	4 hours 8 hours 1 month annual	131 107 2 1	N/A N/A N/A 100	3,760 3,760 564 94	No
PM_{10}	24-hour annual	<150 < 50	150 50	150 50	No
SO_2	1 hour 3 hours annual	71 17 0.09	N/A 1,300 N/A	917 786 18	No
H_2S	4 hours	N/A	N/A	N/A	No
Ethylene	3-4 hours 24 hours	N/A N/A	N/A N/A	N/A N/A	No
Fluorine	10 days	0.03	N/A	0.5	No
Beryllium	1 month	0.00002	N/A	0.01	No
Lead	3 months	0.00007	0.15	2	No

Source: Oglethorpe Power Corporation 2010j, Table 3-1

Class II Visibility

There were no sensitive receptors identified by EPD within 10 km of the Proposal (EPD 2009). As the PM10 SIA was 3.72 km and no sensitive receptors were located within the SIA, no visibility analysis was originally required as part of the permitting process by EPD. However, subsequent review found that the Thomson-McDuffie airport is within the 1-hour NO_2 significant impact radius. Oglethorpe performed a Level II VISCREEN analysis for this airport and determined that no adverse impacts are predicted (EPD 2010c).

Particulate Emissions

When uncontrolled, biomass filterable particulate emission rates are high, especially compared to fuel oil or natural gas combustion units. However, filterable particulate emissions from fuel oil- or natural gas-fired boilers are typically uncontrolled whereas the Proposal would use a baghouse to ensure filterable PM emissions are 0.010 lb/MMBtu or less (Oglethorpe Power Corporation 2009a). If uncontrolled, fuel oil filterable PM emissions are higher than the proposed biomass boiler controlled

emissions at 0.0143 lb/MMBtu for No. 2 fuel oil and 0.0245 lb/MMBtu for No. 6 fuel oil with a sulfur content of 0.05 percent (EPA 1998c). Condensable emissions from the proposed Project would be similar to those for fuel oil and natural gas based on vendor and AP-42 factors.

Federal PM Emission Limits. The proposed biomass boiler would be subject to the PM and visible emissions (opacity) limits under 40 CFR 60 Subpart Db. This regulation specifies PM limits of 0.030 lb/MMBtu and opacity limits of 20 percent (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity. The PM and opacity standards apply at all times, except during periods of startup, shutdown or malfunction. A continuous opacity monitoring system would be used to ensure that opacity (and therefore PM) emissions are minimized.

State PM Emission Limits. The proposed biomass boiler would be subject to Georgia Rules for Air Quality Control 391-3-1-.02(2)(d), known as Rule(d). This regulation limits PM emissions from all fuel-burning equipment. It also limits opacity emissions from equipment constructed or modified after January 1, 1972. For the proposed biomass boiler, this rule establishes a PM limit of 0.10 lb/MMBtu and a 20 percent opacity limit (except one 6-minute period per hour of up to 27 percent).

BACT Unit-Specific Emission Limits. As the Proposal is subject to PSD permitting for PM, a BACT analysis was conducted for the proposed biomass boiler. In this analysis, an applicant evaluates the best control technology, considering technical and economic feasibility. Based on this unit-specific evaluation, the Proposal includes the best available control technology, a baghouse, to minimize filterable PM and ensure it does not exceed 0.010 lb/MMBtu. Other control technologies (the SNCR for NO_x and the duct sorbent injection for SO_2; discussed in Section 2.5.2.11) and boiler design would help to minimize condensable PM emissions, and the Proposal would also meet a total PM (condensable plus filterable) emission limit of 0.018 lb/MMBtu (Oglethorpe Power Corporation 2009b, Volume I, Table 4-2). By meeting BACT, the Proposal has taken all steps required under clean air regulations to minimize PM emissions from the proposed biomass boiler.

Air Toxic Emissions

National Emission Standards for Hazardous Air Pollutants (NESHAP). The two stationary sources of HAP at the Proposal would both be subject to federal NESHAP upon commencement of operation. The emergency fire pump engines would be subject to 40 CFR 63 Subpart ZZZZ, which requires compliance with 40 CFR 60 Subpart IIII emission limits for NO_x plus non-methane hydrocarbons (NMHC) and PM. By limiting the NMHC, organic TAP is minimized; similarly, by limiting PM, metallic TAP is minimized.

The proposed biomass boiler will be subject to NESHAP JJJJJJ(6J), which is the NESHAP for industrial boilers that are non-major sources of HAP. This rule was finalized on February 21, 2011 (40 CFR 63). The proposed NESHAP 6J would establish

both CO and PM limits more stringent than currently required by 40 CFR 60 Subpart Db. Monitoring to demonstrate compliance with the limits would be performed using CEMS (CO) and COMS (PM).FF

Boiler Type and Control Devices. The Proposal includes a biomass-fired bubbling fluidized bed (BFB) boiler equipped with a baghouse for PM control, sorbent injection for SO_2 and acid gas control, and a SNCR system for NO_x control. This boiler type meets the project objective of the most efficient and flexible energy generation from biomass and was selected based upon a detailed technical review of potential source types to meet the need for renewable power generation expressed by Oglethorpe's member electrical cooperatives.

While circulating fluidized bed (CFB) boilers are also sometimes used for biomass combustion, they are primarily used for either coal combustion or when a wide mix of fuel types are intended. Given the difference in design of a CFB, the additional circulating loop in the boiler results in additional load and reduces the overall project efficiency. For biomass, a CFB and a BFB provide essentially equivalent combustion, but the CFB requires additional equipment (for the circulating loop) with no gain in combustion quality. Thus, CFB technology is inconsistent with the purpose of generating renewable energy in the most efficient and practical way.

In comparison to a stoker boiler, a BFB provides much better combustion, as the HAP emission factor discussion contained in the submitted application documents (Oglethorpe Power Corporation 2009b, Volume I, Table 1-1). Specifically, AP-42 background data as well as engineering knowledge from boiler manufacturers cites that fluidized bed combustion boilers have more complete combustion than other biomass boiler types and thus, lower organic compound emissions (DeFusco et al. 2007). While a stoker boiler, which is often used for biomass combustion, can achieve generally similar controlled emissions of PSD-regulated pollutants, it cannot achieve the same low emissions of HAP. In addition, a stoker boiler provides less flexibility to adapt to normal variations in the biomass composition. Therefore, stoker technology is inconsistent with the goal of maximizing the capability of the facility to accommodate a wide range of biomass composition.

While the boiler type itself minimizes organic pollutant emissions (including organic TAP), the selected control devices would help reduce the metal and acid TAP.

Air Toxics Modeling. The EPD Guideline (1998) recommends a tiered approach to model TAP impacts, beginning with screening analyses using the conservative dispersion model SCREEN3, followed by refined modeling, if necessary. SCREEN3 utilizes worst-case conditions for all modeling analyses and results in conservatively high modeled impacts.

In the submitted application, the boiler TAP modeling analyses demonstrated that the screening analysis results were well below the AACs even with this highly conservative modeled scenario and usage of the conservative SCREEN3 model (Oglethorpe Power Corporation 2009b, Volume I, pp. 3-3 to 3-4).

For all averaging periods, if refined modeling had been completed, the predicted impacts would be expected to be an even smaller percentage of the AACs. Thus, the Proposal would result in impacts that are substantially less than the health-based AAC thresholds established by EPD. This result demonstrates that there would be no unacceptable cancer risk associated with emissions from the Proposal.

Potential Mercury Emissions. As a biomass combustion facility, the Proposal is expected to have relatively small mercury emissions relative to a similar fossil fuel-fired power plant. The vendor has estimated baghouse outlet emission of less than 1×10^{-06} lb/MMBtu, equivalent to 11.23 pounds per year (lb/yr) at full capacity.[37] The estimated breakdown of the mercury emissions by the form of the mercury is shown in Table 3-8.

Table 3-8. Estimated Maximum Mercury Emissions.

	Biomass Boiler	
	%	lb/yr
Total	100	11.23
Particulate (Hg_{part})	15	1.68
Mercury ion (Hg^{++})	0	0.00
Elemental gaseous (Hg^{0})	85	9.55

The Proposal's potential mercury emissions represent approximately 0.3 percent of 2008 state-wide mercury air emissions from utilities and 0.01 percent of U.S. mercury air emissions from utilities.

Mercury Air Toxic Impacts. The potential ambient concentrations (not deposition) of mercury were considered as part of the toxics analysis. Based on the screening analyses, potential maximum 15-minute averaged mercury concentrations were approximately 0.01 percent of the AAC and potential maximum annual averaged mercury concentrations were less than 0.01 percent of the AAC (Oglethorpe Power Corporation 2009b, Volume II, Table F-1).

Potential Mercury Deposition. Mercury speciation into Hg^{0}, Hg^{++} and Hg_{part} has been studied for wildfires. While not identical to the biomass combustion for the Proposal, this speciation is considered the best available data. Studies have found that Hg_{part} is variable and depends on the moisture content of the fuels; on average, Hg_{part} (described as particle-phase mercury in the studies) is 15 percent of Hg emissions from biomass combustion (Finley et al. 2009). Hg^{++} (described as reactive gaseous mercury in the studies) was not detected in the biomass smoke (Obrist et al. 2007). Thus, Hg^{0} is

[37] Actual mercury emissions will depend on the mercury content of the fuel and on how much is captured in the baghouse. Emissions of 11.23 lb/yr would be result if the mercury content of the wood averaged approximately 9 parts per billion (ppb) (dry basis) and there was no capture in the baghouse. While the mercury content of the fuel is unknown, a recent study that involved mercury analysis of stem wood from 30 locations across the U.S. found results ranging from 1.0 to 4.0 ppb, with an average of 2.3 ppb mercury (NCASI 2005). Other studies have found stem wood concentrations of 0.20 ppb and 37 ppb (Pang 1997 and Zhang et al. 1995, cited in NCASI 2005), 1.2 ppb (Siwik et al. 2010). A range of 14 to 70 ppb from trees in Ontario has been reported (Friedli et al. 2002).

presumed to be 85 percent of Hg emissions from biomass combustion. For the Proposal, the estimated mercury speciation is shown in Table 3-8.

Most mercury emissions are not deposited locally and enter the global mercury cycle. EPA has estimated the global/non global split of mercury emissions, which are dependent upon the form of mercury. For the estimated maximum mercury emissions of 11.23 lb/yr from the Proposal, Table 3-9 shows the splits based on EPA estimates, and the total estimated non-global (local) portion (EPA 2005, p. 2-50).

Table 3-9. Potential Local Mercury Deposition.

	Apportionment		Non-Global Mercury
	Global	Non-Global	Biomass Boiler (lb/yr)
Hg_{part}	64%	36%	0.6
Hg^{++}	32%	68%	-
Hg^{0}	99%	1%	0.1
Total			0.7

As shown in Table 3-9, local mercury deposition from the Proposal is expected to be less than one lb/yr within the area surrounding Warrenton (e.g., a 75-mile radius). In comparison, the recently permitted Santee Cooper Pee Dee coal-fired generating station in Florence, South Carolina is expected to have mercury emissions of 115.6 lb/yr and local deposition of up to 16.84 lb/yr. In the risk assessment for that facility, the maximum Hazard Quotient (HQ), which is the estimated exposure dose divided by the chemical-specific reference dose (the maximum daily oral intake that is estimated to pose no appreciable risk of adverse health effects, even to sensitive populations), was calculated for a subsistence fisher. An HQ greater than one indicates a potential health hazard. Several scenarios were evaluated. For the mercury emissions from the Pee Dee facility, the worst-case scenario HQ for the subsistence child was 0.027 and for the subsistence adult (for a 70-year lifetime), 0.038, both far below a level of concern (Trinity Consultants 2009, p. 4-20).[38] Note that this is an incremental hazard that does not account for any hazard from existing conditions. For example, the risk calculations do not include existing mercury levels in fish.

Incremental impacts from the potential local mercury deposition from the Proposal would be expected to be much smaller since the Pee Dee risk analysis used 16.84 lb/yr of local deposition compared to the Proposal potential local deposition level of 0.70 lb/yr.

A sunfish consumption advisory of one meal per week has been in place since 1999 for Short Creek, southwest of Warrenton, the only existing advisory for Warren County

[38] The worst-case scenario assumed a one-acre water body with a 10-acre watershed, with the assumption that this water body could support a fish population capable of sustaining subsistence level consumption rates.

(EPA 2010a). Based on the expected potential local mercury deposition emissions, the Proposal is not expected to have any impact on this existing advisory or result in any future advisories.

Diesel Engine Emissions

Emissions from the combustion of diesel in delivery trucks on-site were evaluated for PM, NO_x, CO, and VOC (hydrocarbon emissions). Of particular concern were particulate emissions from diesel trucks. Therefore, PM emissions were evaluated within a five-mile radius of the site. While PM, including that originating from diesel exhaust, may contain toxic chemicals, the primary concern is the PM (California EPA Air Resources Board 2010). NO_x, CO, and VOC emissions were evaluated on-site while trucks would be idling.

Diesel particulate emissions from the delivery trucks were evaluated using emission factors for heavy-duty diesel trucks from the 1980s/1990s to conservatively account for usage of older trucks with higher potential PM emissions (Steenland et al. 1998). Calculations accounted for travel of the trucks within 5 miles of the Proposal as well as on-property. Scenarios for both the maximum daily truck traffic of 340 trucks/day (as included in Oglethorpe Power Corporation 2009b, Volume II, p. 5-47), and the anticipated typical truck traffic of 160 trucks/day were evaluated.

Although biomass delivery trucks may travel up to 75 miles to reach the Proposal site, selection of a five mile radius for evaluating local PM impacts is conservative as truck engine PM emissions are not expected to migrate much beyond the location where they are actually emitted. Further, some deliveries would have even shorter distances if purchased from the neighboring Georgia-Pacific sawmill. Table 3-10 presents the round-trip truck travel PM emissions expected within a 5-mile radius of the Proposal.

Table 3-10. Potential PM Emissions from Travelling Diesel Trucks.

	Delivery Trucks[a]		PM[b] Emissions (g/VMT)	On-Property Travel[c] (VMT/truck)	Warrenton Travel[d] (VMT/truck)	Total Travel (VMT/truck)	Truck Traffic PM[e] Emissions (tpy)	
	Maximum (trucks/yr)	Average (trucks/yr)					Max.	Avg.
Delivery Trucks	123,760	58,240	0.60	1.88	10.00	11.88	0.97	0.46

[a] Based on assumption of 7 days/week and 52 weeks/yr of operation with a daily maximum of 340 trucks and daily average of 160 trucks, but it should be recognized that it is unlikely that the facility will operate at that frequency.
[b] Based on value appropriate for 1980s and 1990s heavy-duty diesel trucks: 0.4-1.0 g/mile in 1980s and 0.1-0.6 g/mile in 1990s (Steenland et al. 1998).
[c] Distance for travel on Proposal property as noted in PSD permit application Volume I Appendix C Table C-9.
[d] Conservatively assumes 5 miles, each way, through Warrenton city vicinity. Distance may be much shorter if chips are obtained from the neighboring Georgia-Pacific sawmill.
[e] Calculated as: (Trucks/yr) * (PM, g/VMT) * (Total Travel, VMT/truck) / (453.6 g/lb) / (2,000 lb/ton) = (PM, tpy)
VMT – vehicle miles traveled. g – gram

The delivery trucks also have the potential to idle. When approaching Warrenton, the trucks may pass through up to five intersections with stop signs or signals. (See discussion in Section 3.10.1.) Further, some idling may occur at the truck scales on the Proposal site and while dumping chips (note that the facility has six truck dumpers to help prevent delivery back-ups). Table 3-11 presents the estimated idling emissions expected in the Proposal area based on EPA factors (EPA 1998b) while Table 3-12 presents the total PM emissions from truck travel and idling within the Warrenton area.

Table 3-11. Potential PM Emissions from Diesel Truck Idling near Proposal.

	Delivery Trucks[a]		PM[b] Emissions (g/VMT)	On-Property Travel[c] (VMT/truck)	Warrenton Travel[d] (VMT/truck)	Total Travel (VMT/truck)	Truck Traffic PM[e] Emissions (tpy)	
	Max (trucks/yr)	Avg (trucks/yr)					Max.	Avg.
Delivery Trucks	123,760	58,240	2.57	0.33	0.33	0.67	0.23	0.11

[a] Based on assumption of 7 days/week and 52 weeks/yr of operation with a daily maximum of 340 trucks and daily average of 160 trucks, but it should be recognized that it is unlikely that the facility will operate at that frequency.
[b] Source: EPA 1998b
[c] Assumes idling of 5 minutes per truck to allow for measurement at scales and 15 minutes for usage of chip truck dumpers.
[d] Assumes 10 minutes, each way, through Warrenton city limits for stopping at intersections. Time may be much shorter if chips obtained from neighboring Georgia-Pacific sawmill.
[e] Calculated as: (Trucks/yr) * (PM, grams/hour) * (Total Idling, hr/truck) / (453.6 g/lb) / (2,000 lb/ton) = (PM, tpy)

Table 3-12. Total Potential PM Emissions from Diesel Delivery Trucks near Proposal.

Delivery Trucks	Maximum Delivery Trucks Per Year			Average Delivery Trucks Per Year		
	Travel PM (tpy)	Idling PM (tpy)	Total PM (tpy)	Travel PM (tpy)	Idling PM (tpy)	Total PM (tpy)
	0.97	0.23	1.21	0.46	0.11	0.57

As shown in Table 3-12, maximum potential diesel truck engine PM emissions from idling and traffic are 1.21 tpy for the worst-case scenario of 340 trucks/day for all days of the year and 0.57 tpy for the normal scenario of 160 trucks/day for all days of the year. These emissions would be distributed amongst the Warrenton vicinity with the highest emissions for a single location occurring within the property of the Proposal (i.e., in the vicinity of the chip dumpers). PM emissions of this magnitude are not expected to have a significant impact on air quality in the area surrounding the Proposal. Emissions from idling trucks on-site were evaluated for NO_X, CO, and VOC (non-methane hydrocarbons). Based on a maximum of 340 trucks per day for all days of the year, maximum emissions of each of the pollutants from idling trucks on-site are listed in Table 3-13, below.

Table 3-13. Total Potential Maximum NO_x, CO, and VOC Emissions from Diesel Delivery Trucks Idling On-Site

Pollutant	Emissions[a]	
	lb/day	tpy
VOC (nonmethane)	4.46	0.81
CO	28.76	5.25
NO_X	24.67	4.50

From AP-42, Volume II: Mobile Sources, Appendix J: Heavy Duty Diesel Trucks; Emissions based on 1985 model diesel trucks, 340 trucks per day for every day of the year, each truck traveling at 1 mph for 1 mile. (Idling emissions were removed from AP-42.)

The yearly maximum emissions from idling trucks on-site are low compared to the overall emissions from the operation of the biomass boilers.

GHG Emissions

GHG, including carbon dioxide (CO_2), were not required to be evaluated for PSD permitting at the time Oglethorpe submitted its permit application for the Proposal, and therefore were not quantified or discussed in the application (Oglethorpe Power Corporation 2009b). The Proposal will use biomass as the primary fuel for the boiler.

Minimal, if any, amounts of ultra-low sulfur diesel (ULSD) would be used for startup of the boiler only. Oglethorpe is pursuing sole biomass/biodiesel usage for the Proposal in an effort to rely entirely on renewable fuels.

Combustion of biomass would be expected, in general, to have less impact on GHG emissions than combustion of fossil fuels. The carbon tied up in fossil fuels, without human intervention, would remain so. Biomass, on the other hand, is part of a continuous cycle of removal of carbon from the atmosphere (during growth) and release of carbon to the atmosphere (during decomposition). In its final Greenhouse Gas Tailoring Rule (EPA 2010e), which determines which stationary sources become subject to permitting requirements for GHG emissions under PSD and other Clean Air Act programs, EPA did not exempt biomass sources. However, EPA is "mindful of the role that biomass or biogenic fuels and feedstocks could play in reducing anthropogenic GHG emissions," and did "seek further comment" on how it "might address emissions of biogenic carbon dioxide under the PSD and Title V programs through a future action (EPA 2010e, pp. 421-422). On January 12, 2011, EPA announced its plan for a three-year deferral of permitting requirements for CO_2 emissions from biomass-fired and other biogenic sources. EPA plans to complete the rulemaking for the deferral by July 2011. During the three-year period, "the agency will seek input on critical scientific issues from its partners within the federal government and from outside scientists who have relevant expertise" (EPA 2011).

Decomposition (other than combustion) can also release GHGs far more potent than CO_2. Some of the biomass to be combusted at the Proposal would consist of forest residuals that may otherwise be left on the forest ground or landfilled (in which case there would be some level of anaerobic decomposition). During the anaerobic decomposition process, methane (CH_4), a GHG gas is released. In Table A-1 of EPA's final Mandatory GHG Reporting Rule, CH_4 is noted to have a global warming potential of 21 times more than that of an equivalent ton of CO_2[39].

Using the Tier 1 calculation methodologies of Subpart C of the EPA final Mandatory GHG Reporting Rule, potential emissions from the biomass combustion of the Proposal would be as follows:

- Biogenic CO_2 emissions of 1,161,185 tpy.
- Non-biogenic CO_{2e} emissions of 24,437 tpy.
- Total biogenic and non-biogenic CO_{2e} emissions of 1,185,622 tpy.

CO_2 emissions from fuel delivery trucks would contribute a small amount to the total emissions, about 3,500 tons of CO_2 per year (TVA 1993). In 2007, net U.S. GHG emissions were 6,087.5 teragrams/yr of CO_2 equivalent (CO_{2e}), which is 6,710 million tpy (EPA 2009d, Table 2-1). Thus, without taking any account of the carbon sequestration attributable to forest regeneration, or the far lower CO_2 impacts from

[39] Federal Register Volume 74, No. 209, October 30, 2009.

burning forest residue rather than allow decompositions, the Proposal's total CO_{2e} emissions are nevertheless less than 0.018 percent of the US 2007 actual GHG emissions. When excluding biogenic emissions, the Proposal's GHG emissions would be negligible relative to existing U.S. GHG emissions.

GHG emissions are minimized from the Proposal by the selection of biomass as the fuel. The impact from the construction and operation of the Proposal is not expected to make any discernible difference in global climate change.

3.1.4.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The Proposal incorporates Best Management Practices (BMPs) such as use of dust control measures during construction. A number of control devices are also included in the Proposal to reduce potential emissions and their impacts, and selection of biomass as a fuel helps to minimize the amounts of pollutants that form ozone, acid rain, and non-biogenic GHG.

As discussed in the submitted application, the Proposal is subject to Best Available Control Technology for pollutants requiring PSD permitting. Tables 3-14 and 3-15 summarize the proposed BACT for the Proposal.

No additional mitigation measures have been identified.

3.1.4.4 Impact Assessment – Alternate

Ambient Air Quality Standards

The impact of the Alternate on ambient air quality standards is described in "Appling County Biomass Electric Generation Facility Construction Permit Application Volume II – Modeling" dated November 2009 (Oglethorpe Power Corporation 2009f). The calculations are based on estimates of potential emissions from the Alternate project, information concerning the physical characteristics of the plant such as the height and exit diameter of the stacks, and information about the meteorology in the area around the Alternate.

Table 3-14. Proposed Primary BACT Limits.

Unit	Pollutant[1]	Limit	Unit	Averaging Period	Proposed BACT
BFB Boiler	$NO_{x/}$	0.110	lb/MMBtu	30-day	Selective Non-Catalytic Reduction
	SO_2	0.010		30-day	Duct Sorbent Injection
	$PM/PM_{10}/PM_{2.5}$ (Filterable)	0.010		3-hour	Baghouse
	$PM_{10}/PM_{2.5}$ (Total)	0.018		3-hour	
	CO	0.08		30-day	Good Design and Operating Practices
Fire Pump Engines (each)[2]	NO_x + NMHC	3.0	g/Hp-hr	3-hour	Good Design and Operating Practices
	SO_2	15	ppmw	N/A	Fuel Sulfur Content
	$PM/PM_{10}/PM_{2.5}$	0.15	g/Hp-hr	3-hour	Good Design and Operating Practices
	CO	--	--	N/A	
Biomass Unloading Operations	$PM/PM_{10}/PM_{2.5}$	0.005	GR/CF	3-hour	Baghouse
Biomass Processing Building					
Biomass Transfer Tower					
Boiler Building Biomass Transfer					
Mobile Longwood Chipping					
Sorbent Storage Silo					Bin Vent Filter[4]
Sand Storage Silo					
Sand Day Silo					
Fly Ash Storage Silo					
Bottom Ash Storage Area					
Cooling Tower			Drift	N/A	Drift Eliminators
Fugitive Dust Emissions[3]		Varies with Emission Unit			Water Spray and/or Dust Reduction Devices

[1] Compliance with $PM_{2.5}$ limits is assumed inherent with compliance with PM_{10} limits as vendors did not provide $PM_{2.5}$ estimates.
[2] Fire pumps would operate for a maximum of 500 hours per year, total, and only 100 hours per year of non-emergency operation.
[3] Refer to Sections 2 and 5 of Volume I of the application (Oglethorpe Power Corporation 2009b) for detail on the fugitive dust emission sources.
[4] The bin vent filter is a type of fabric filter.
g/Hp-hr – gram per Horsepower-hour
ppmw – parts per million by weight
GR/CF – grain per cubic foot

Table 3-15. Proposed Secondary BACT Limits.

Unit	Pollutant	Limit	Units	Averaging Period
BFB Boiler	NOx	648.1	Tons	Annual
	SO2	56.2	Tons	Annual
	CO	625.4	Tons	Annual

As the facility is essentially the same as the Proposal, only located at another site, the potential emissions are very similar to those from the Proposal (Table 3-4). The only difference is the estimated potential emissions from the Alternate for PM_{10} and $PM_{2.5}$ are both 140 tpy rather than the 144 tpy from the Proposal (Oglethorpe Power Corporation 2010c, Table 1-1).

Likewise, the significance analysis results are similar (Table 3-16). Note that updates were not made for the Alternate; therefore, $PM_{2.5}$, the one-hour NO_2, and the one-hour SO_2 are not included. Results for these pollutants, if analyzed, would likely be similar to the results for the Proposal. Based on the 2009 results, only PM_{10} required additional analyses.

Table 3-16. Significance Analysis Results, Alternate.

Pollutant	Averaging Period	PSD Class II SIL ($\mu g/m^3$)	Maximum Modeled Impact ($\mu g/m^3$)	NAAQS and Increment Analyses Required?
CO	1-hour	2,000	1960.93	No
	8-hour	500	304.1	No
NO_2	Annual	1	0.73	No
PM_{10}	24-hour	5	33.2	Yes
	Annual	1	4.1	Yes
SO_2	3-hour	25	16.8	No
	24-hour	5	4.2	No
	Annual	1	0.1	No

National Ambient Air Quality Standards (NAAQS)

The PM_{10} analysis included sources from the Alternate as well as regional inventory sources described in the submitted application (Oglethorpe Power Corporation 2009f). Background concentrations provided by Georgia Environmental Protection Division (EPD) were added to the modeled impacts prior to comparison with the NAAQS (EPD 2009). The analysis demonstrated that the Alternate does not cause or contribute to any exceedance of the NAAQS at any ambient receptor.

Class II Increments

Class II Increment analysis was performed for PM_{10}. The analysis included sources from the Alternate as well as regional inventory sources described in the submitted application (Oglethorpe Power Corporation 2009f). The analysis demonstrated that the Alternate does not cause or contribute to any exceedance of the Class II Increment at any ambient receptor.

Soils and Vegetation

The modeling results from the PSD NAAQS can be assessed against the secondary NAAQS standards, which have been developed by EPA to provide protection for public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 3-17 shows that no impacts exceed the secondary NAAQS standards. Thus, there are no adverse impacts expected on soils or vegetation from the Alternate.

Table 3-17. Soil and Vegetation Impacts, Alternate.

Pollutant	Avg. Period	Total Conc.[1] (micrograms per cubic meter)	Secondary NAAQS (micrograms per cubic meter)	Exceeds NAAQS? (Yes/No)
CO	1-hour	1960.3	N/A	No
	8-hour	304.1	N/A	No
NO_2	Annual	0.73	100	No
PM_{10}	24-hour	68.5	150	No
SO_2	3-hour	24.88	1,300	No
	24-hour	4.91	N/A	No
	Annual	0.09	N/A	No

[1] CO, NO_2 and SO_2 impacts include only facility sources since the impacts do not exceed the SILs

Visibility

The Baxley Municipal Airport is located approximately 10 km west southwest of the Alternate site. If the Alternative is pursued, a visibility analysis may be required as part of the air permit application.

Particulate Matter Emissions from Biomass Combustion

Because the same boiler and fuel would be used, the analysis for particulate emissions from biomass combustion was identical to that for the Proposal, described in Section 3.1.4.3.

Air Toxic Emissions, Diesel Engine Emissions and GHGs

The analysis of air toxic emissions, including mercury; diesel engine emissions; and GHGs for the Proposal is equally applicable to the Alternate. Refer to Section 3.1.4.3 for the discussions.

The EPA currently reports no fish consumption guidelines for Appling County (EPA 2010a).

3.1.4.5 Environmental Consequences—No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on air resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.2 SURFACE WATER

The Proposal is located in the Savannah River Basin, near its divide with the Ogeechee River Basin. The Alternate site is located in the Satilla River Basin, near its divide with the Altamaha Basin (Figure 3-2). All these rivers flow to the Georgia coast (the Savannah, which forms the border with South Carolina, also flows to the South Carolina coast).

Special Status Streams

Wild and Scenic Rivers. One river segment in Georgia has been designated as a federal Wild and Scenic River (WSR) under the WSR Act: a portion of the Chattooga River in far northeast Georgia, north of the area shown in Figure 3-2. Federal agencies have studied two other rivers in Georgia for possible designation as WSRs: the Ogeechee and the Suwanee, which originates in the Okeefenokee Swamp in southern Georgia and flows into Florida. Neither has been designated as a WSR (WSR Council 2010). The National Park Service (NPS) maintains a list of more than 3,400 free-flowing river segments in the U.S. that it believes possesses one or more "'outstandingly remarkable' natural or cultural values judged to be of more than local or regional significance." While the river segments on this National Rivers Inventory (NRI) do not have specific legal protection, the CEQ specifies coordination with the NPS and incorporation of feasible avoidance/mitigation measures when a stream is impacted as a result of a federal action. There are 52 NRI river segments in Georgia, all of which

were placed on the NRI in 1982 (NPS 2008). Those that are near the Proposal and the Alternate site are discussed in the sections below.

Georgia Scenic Rivers. The Georgia Scenic River Act of 1969 provided protection to four Georgia rivers, none of which are near the Proposal or the Alternate site.

3.2.1 Affected Environment – Proposal Site

Figure 3-3 shows the Ogeechee River Basin, which lies west of the Proposal site, and the Little River and Brier Creek Subbasins of the Savannah River Basin. All drainage from the Proposal Site flows to the Brier Creek Subbasin. This is shown in more detail in Figure 3-4. The east-flowing perennial stream shown in the eastern part of Figure 3-4 flows into Brier Creek. Drainage from the Proposal site flows into one tributary of this stream at the north side of the Proposal site, and into another tributary at the east side of the Proposal site. The west side of the site is higher in elevation and is on the divide with the Ogeechee River Basin.

3.2.1.1 Proposal Water Sources

Planned water sources for the Proposal include potable, non-potable, and gray water. Potable water will be available from the Thomson-McDuffie County water system (originating from the Clarks Hill Lake northeast of Warrenton and Usry Pond south of Thomson), and from the City of Warrenton (originating from Rocky Comfort Creek Dam 46). Non-potable surface water will be available from the City of Warrenton (originating from Rocky Comfort Creek Dam 50). See Figure 3-3 for locations of water resources. Municipal treated wastewater will be available from the Thomson-McDuffie wastewater treatment plant and the planned City of Warrenton wastewater treatment plant (Figures 2-15 and 2-16).

The Thomson-McDuffie water system is currently permitted to withdraw from Clarks Hill Reservoir for the purpose of municipal water supply at a maximum 24-hour rate of 3.0 million gallons per day (MGD) and a maximum monthly average of 2.0 MGD (EPD 1992). Thomson-McDuffie also has a permit to withdraw from Usry Pond on Sweetwater Creek for the purpose of municipal water supply at a maximum 24-hour rate of 2.0 MGD and a maximum monthly rate of 1.5 MGD (EPD 2000). Recent usage reports indicate that McDuffie County currently has approximately 0.93 MGD excess capacity (on a monthly average basis) from the Clarks Hill Lake and a total excess monthly average capacity available from Usry Pond at 0.7 MGD, for a combined total excess capacity of 1.63 MGD.

Clarks Hill Reservoir (also called J. Strom Thurmond Reservoir), is located northeast of the Proposal site on the Savannah River and is partially in Georgia and partially in South Carolina (Figures 3-2 and 3-3). Clarks Hill is a multi-purpose reservoir, managed

for navigation, hydropower, flood control, recreation, fish & wildlife, and water supply & water quality. During a drought, the USACE water managers give priority to water supply and water quality (USACE Savannah District 2010c).

Usry Pond is on Sweetwater Creek, in the Brier Creek Subbasin of the Savannah River Basin (Figure 3-3).

Rocky Comfort Creek Dam 50 (Figure 3-3), located in the Upper Ogeechee River subbasin on Goldens Creek, is one of four watershed dams in the area that were originally built by the NRCS for flood protection. The City of Warrenton maintains and has water withdrawal rights from Dam 50, but does not currently withdraw water from the dam's reservoir. Another NRCS watershed dam, **Rocky Comfort Creek Dam 46** (Figure 3-3), is used as the Warrenton municipal water supply. The City of Warrenton currently is permitted to withdraw 0.83 MGD as a daily maximum, and 0.75 MGD as a monthly maximum, from Rocky Comfort Creek Dam 46 (EPD 1977). The most recent daily maximum withdrawal reported was 0.52 MGD. The City of Warrenton is in the process of expanding their surface water treatment plant and has requested from the Georgia EPD a modification of their permit to increase its water withdrawal from Rocky Comfort Creek Dam 46 to 1.3 MGD (Burns & McDonnell 2009b).

Figure 3-2. Central and Southern Georgia River Basins.
Sources: USGS 2009a, University of Georgia n.d.

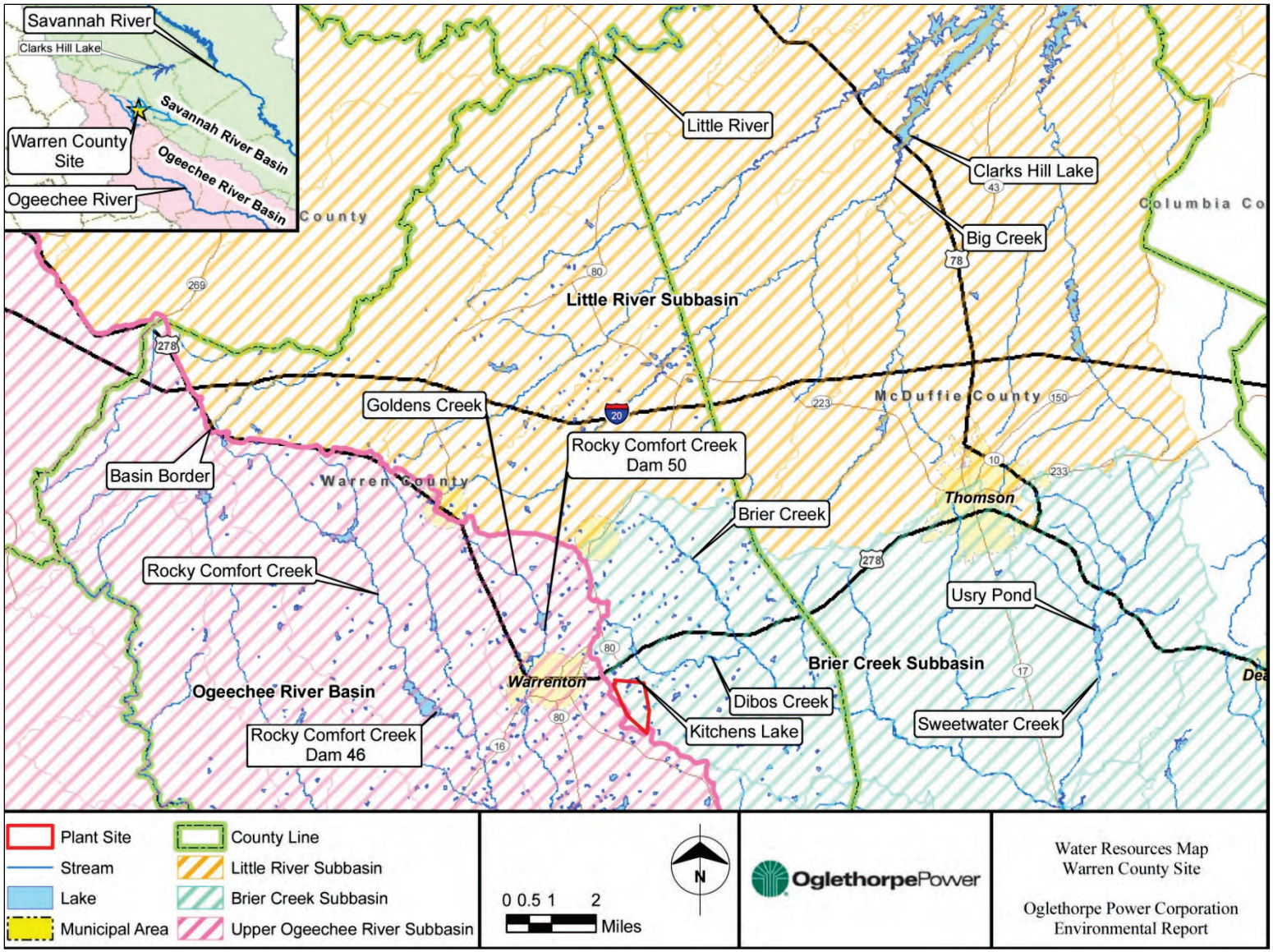


Figure 3-3. Proposal Area Water Resources.
Source: Burns & McDonnell 2010a

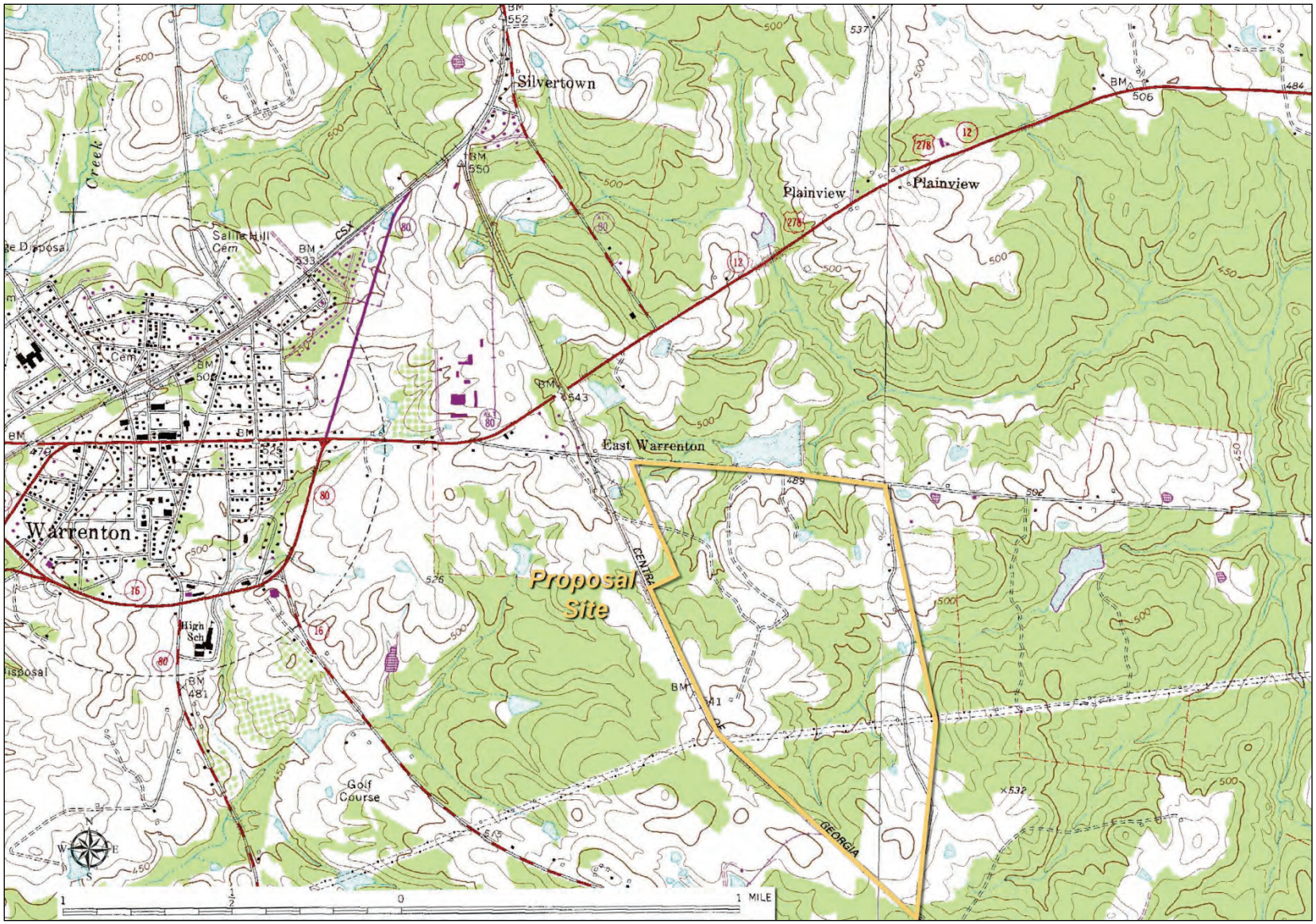


Figure 3-4. Proposal Site Topography.
Source: USGS 1987a, 1987b

3.2.1.2 Water Quality

List of impaired waters under the Clean Water Act. Under Sections 303(d) and 305(b) of the Clean Water Act (CWA), states are required to develop and maintain lists of water bodies that do not meet water quality standards (impaired waters). The CWA requires that states establish priority rankings for waters on the lists and develop "total maximum daily loads" (TMDLs) for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards. Impaired waters in vicinity of the Proposal are shown in Figure 3-5 and summarized in Table 3-18.

Fish consumption/mercury. The Georgia EPD has issued fish consumption advisories based on the presence of mercury in fish for many lakes and streams in Georgia. These include the Clarks Hill Lake, the McDuffie PFA (public fishing area) south of Thomson, and the Little River in Wilkes County (EPA 2010a).

3.2.1.3 NRI Rivers

There are no NRI river segments in Warren County. The 84-mile segment of Brier and Big Brier Creeks, from the GA 17 bridge to the Savannah River confluence, is on the NRI. The NPS describes it as a "natural, undeveloped scenic stream" and considers it to have "outstandingly remarkable values" (ORVs) in these categories: scenic, recreational, fish, wildlife, history and cultural (NPS 2008). The GA 17 bridge is approximately 10 miles from the Proposal Site (Figure 1).

3.2.2 Affected Environment – Alternate

Topography and surface water conditions are very different in Appling County, which is located in the Coastal Plains, compared with Warren County, which is located in the Piedmont (see discussion in Section 3.3). The alternate site area is flat, with large areas of standing water (Figure 3-6) and "marshy or swampy areas" (Figure 3-7). Figure 3-6 shows watershed boundaries codes (hydrologic unit codes or HUCs) for the smallest watershed units on USGS maps. The Alternate site is near the Altamaha River (HUCs beginning with 30701); however, it is in the Sapilla River Basin (HUCs beginning with 30702).

3.2.2.1 Water Sources

Because of the presence of a high-yield groundwater supply, surface water sources were not evaluated, except for the potential use of gray water from the City of Baxley.

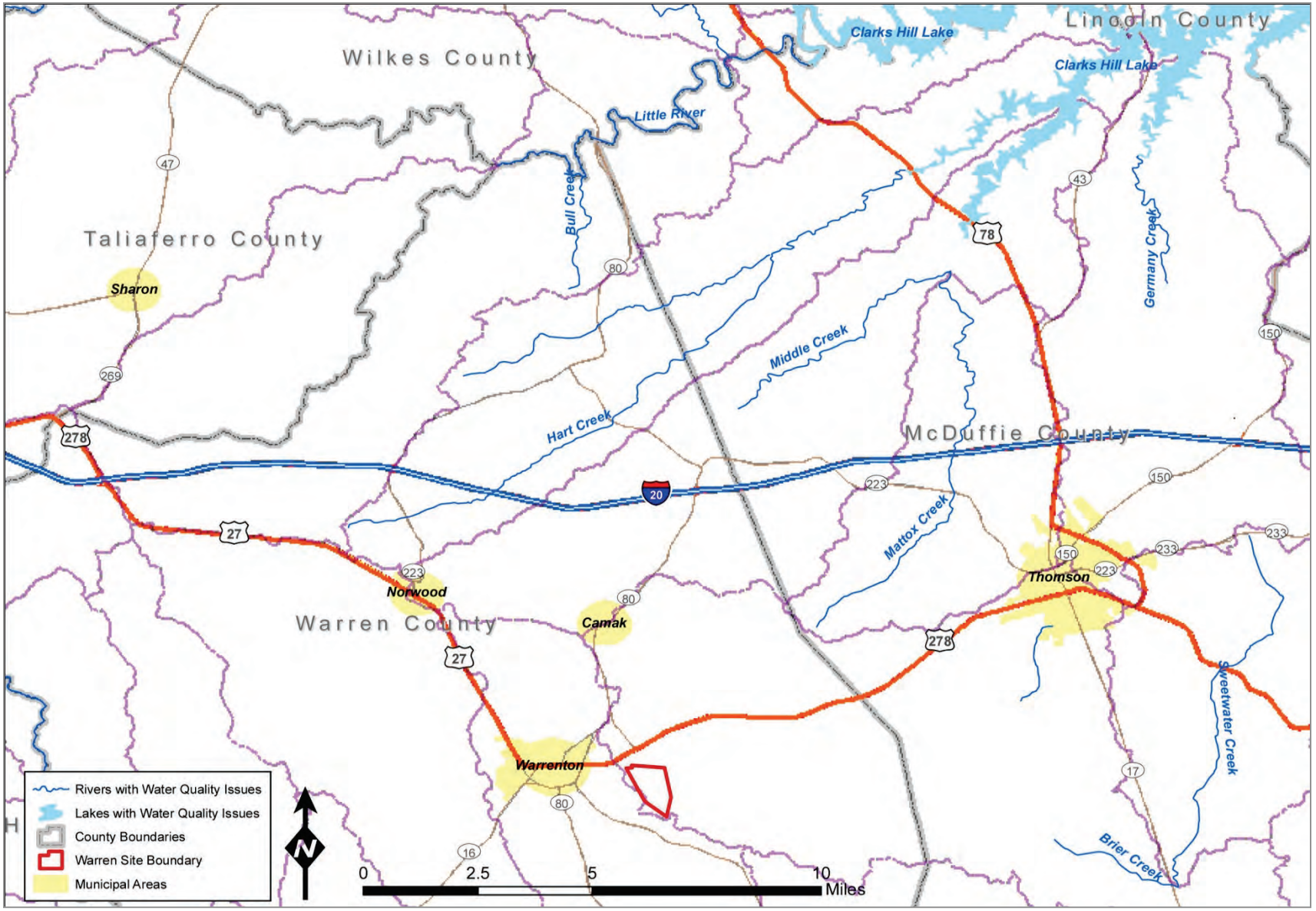


Figure 3-5. 303(d)/305(b) Waters near the Proposal Area.

Source: Georgia EPD 2008

Table 3-18. 303(d)/305(b) Waters Near the Proposal Area.

Reach Location/County	River Basin/Use	Criterion Violated	Potential Causes	Extent, miles	Category	Priority	Notes
Little River from Rocky Creek to Clarks Hill Lake/Wilkes Co.	Savannah/Fishing	Fecal coliform bacteria	Nonpoint/unknown	4	4a (at least one use not met; TMDL completed)		TMDL completed for fecal coliform bacteria.
Little River from Williams Creek to Rocky Creek; McDuffie/Wilkes Co.	Savannah/Fishing			10	3 (insufficient data for determination)		Not enough data to make an assessment of use support; should be possible in 2010 (Note: designated as supporting in 2010; EPD 2010a).
Brier Creek, from Big Brier Creek to Sweetwater Creek near Thomson/McDuffie Co.	Savannah/Fishing	Fecal coliform bacteria	Nonpoint/unknown	3	4a		TMDL completed for fecal coliform bacteria
Mattox Creek, from headwaters to Big Creek/McDuffie	Savannah/Fishing	Fish impacted	Nonpoint/unknown, urban runoff	9	5 (at least one use not met; TMDL not completed)	2014	
Middle Creek from Childers Creek to Big Creek, near Wrightsboro/McDuffie Co.	Savannah/Fishing	Dissolved oxygen	Nonpoint/unknown	6	4a		TMDL completed for dissolved oxygen
Sweetwater from headwaters to Brier Creek/McDuffie Co.	Savannah/Fishing			8	3		Macroinvertebrate data are currently under evaluation for listing assessment. Listing decision expected by 2012 (EPD 2010a).
Whites Creek, downstream of Thomson WPCP/McDuffie Co.	Savannah/Fishing			2	3		Previously listed (2006) then removed based on municipality effluent toxicity testing; however, not enough instream data to place in Category 1.
Bull Creek, from headwaters to Little River/Warren.	Savannah/Fishing			3	3		Need to collect more macroinvertebrate data.
Savannah River, from Clarks Hill Lake to Stevens Creek Dam/Columbia Co.	Savannah/Drinking Water	Dissolved oxygen	Dam release	9	4a		TMDL completed for dissolved oxygen

Source: EPD 2008; with 2010a updates

3.2.2.2 Water Quality

List of impaired waters under the Clean Water Act. Impaired waters from the State's 303(d)/305(b) list in vicinity of the Alternate site are shown in Figure 3-8 and summarized in Table 3-19.

Fish consumption/mercury. Water bodies near the alternate site area for which the Georgia EPD has issued fish consumption advisories based on the presence of mercury in fish include, among others, the Altamaha River near Baxley (EPA 2010a).

3.2.2.3 NRI Rivers

A 128-mile stretch of the Altamaha River, from the junction of the Oconee and Ocmulgee Rivers to the mouth of the Altamaha is on the NRI. A portion of this stream segment is in Appling County. The NPS describes the river as "located in the terraces of the Coastal Plain Province" and "heavily canopied with extensive mixed hardwoods and swamp lands with large cypress-tupelo stands." The Altamaha River ORVs are in the following categories: scenic, recreation, geology, fish, wildlife, fish and cultural (NPS 2008). The Ocmulgee (20 miles west), Oconee (20 miles west), Ohoopee (20 miles northeast) and the Satilla (35 miles south) are also on the NRI.

3.2.3 Environmental Consequences

In Georgia, waters are regulated under the Georgia Water Quality Control Act, which grants the EPD the authority to establish rules and regulations pertaining to water quality and quantity, set permit conditions and effluent limitations, and set permissible limits of surface water usage for both consumptive and non-consumptive uses through the Board of Natural Resources (Georgia Department of Natural Resources (GDNR), Water Quality Control). The Georgia Erosion and Sedimentation Control Act is administered by the EPD and requires permits for specific land disturbing activities (GDNR, Erosion and Sedimentation Control).

3.2.3.1 Identification of Issues

Most surface water related issues fall into the two broad categories; 1) potential adverse impacts on surface water quality from discharges associated with construction and operation and 2) potential changes in hydrology from water withdrawal or diversion. The following specific issues were identified during the scoping process and the EIS development process.

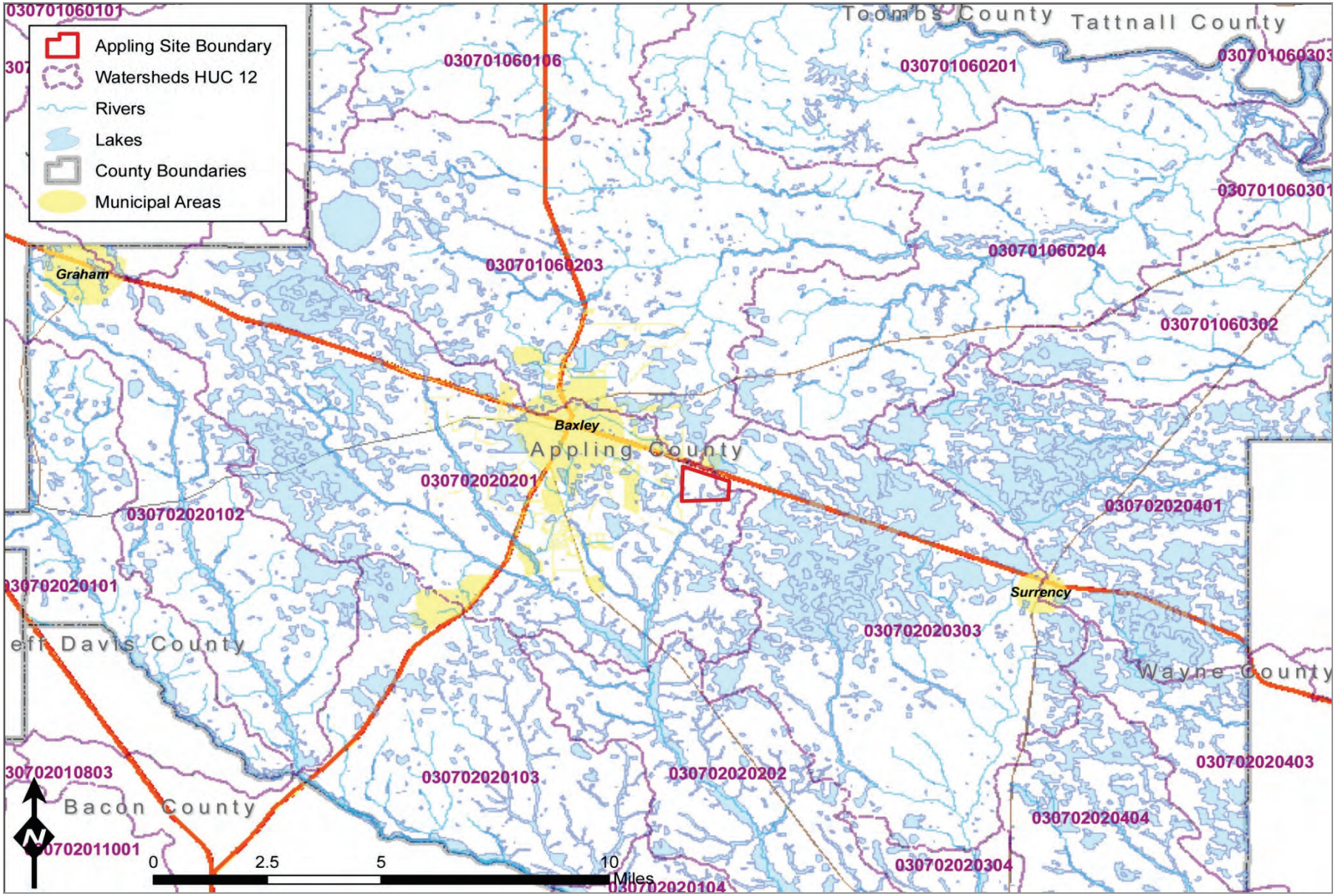


Figure 3-6. Alternate Area Watershed Boundaries and Water Features.

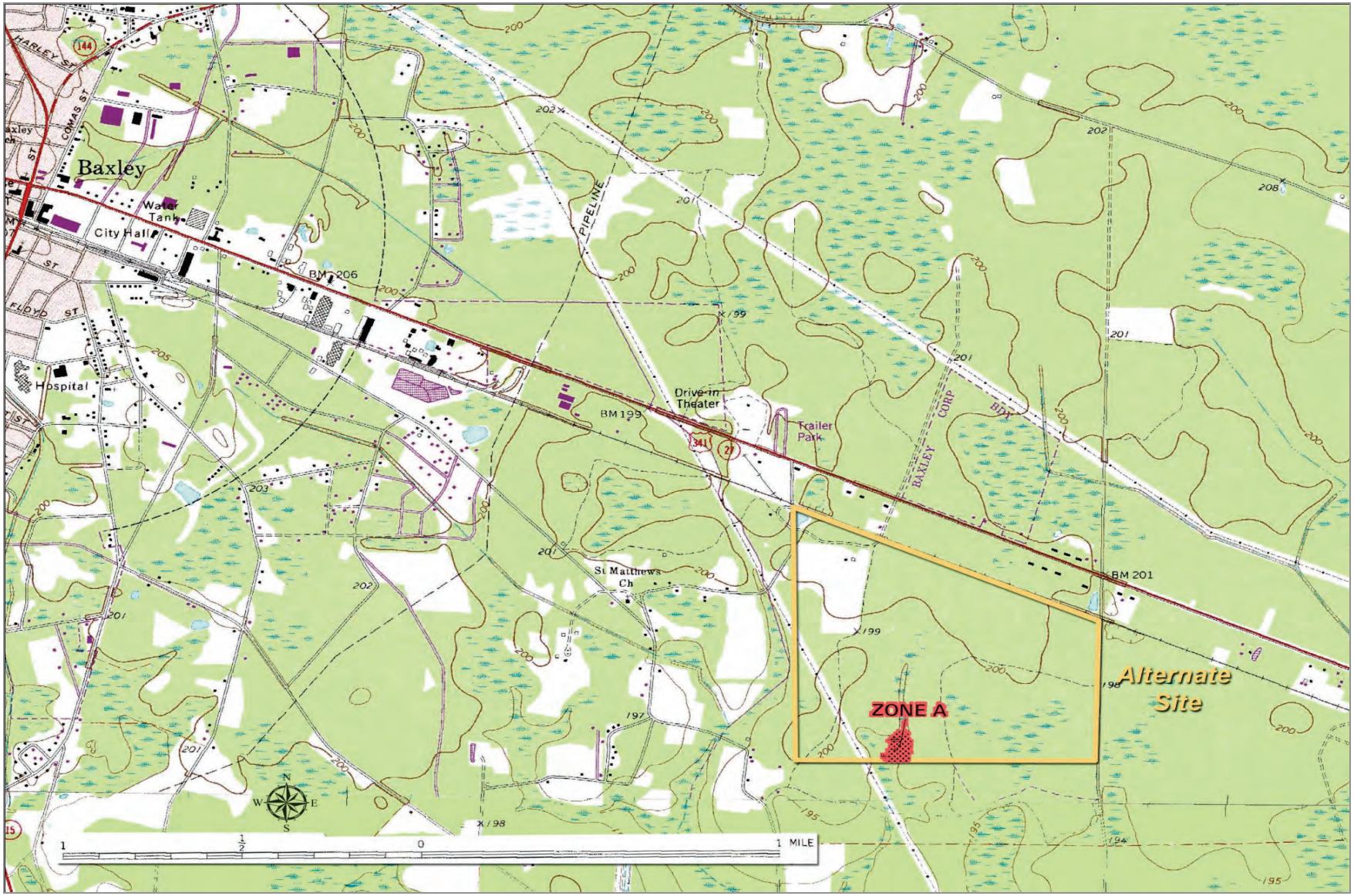


Figure 3-7. Topographic Features near the Alternate Site.
Source: USGS 1988

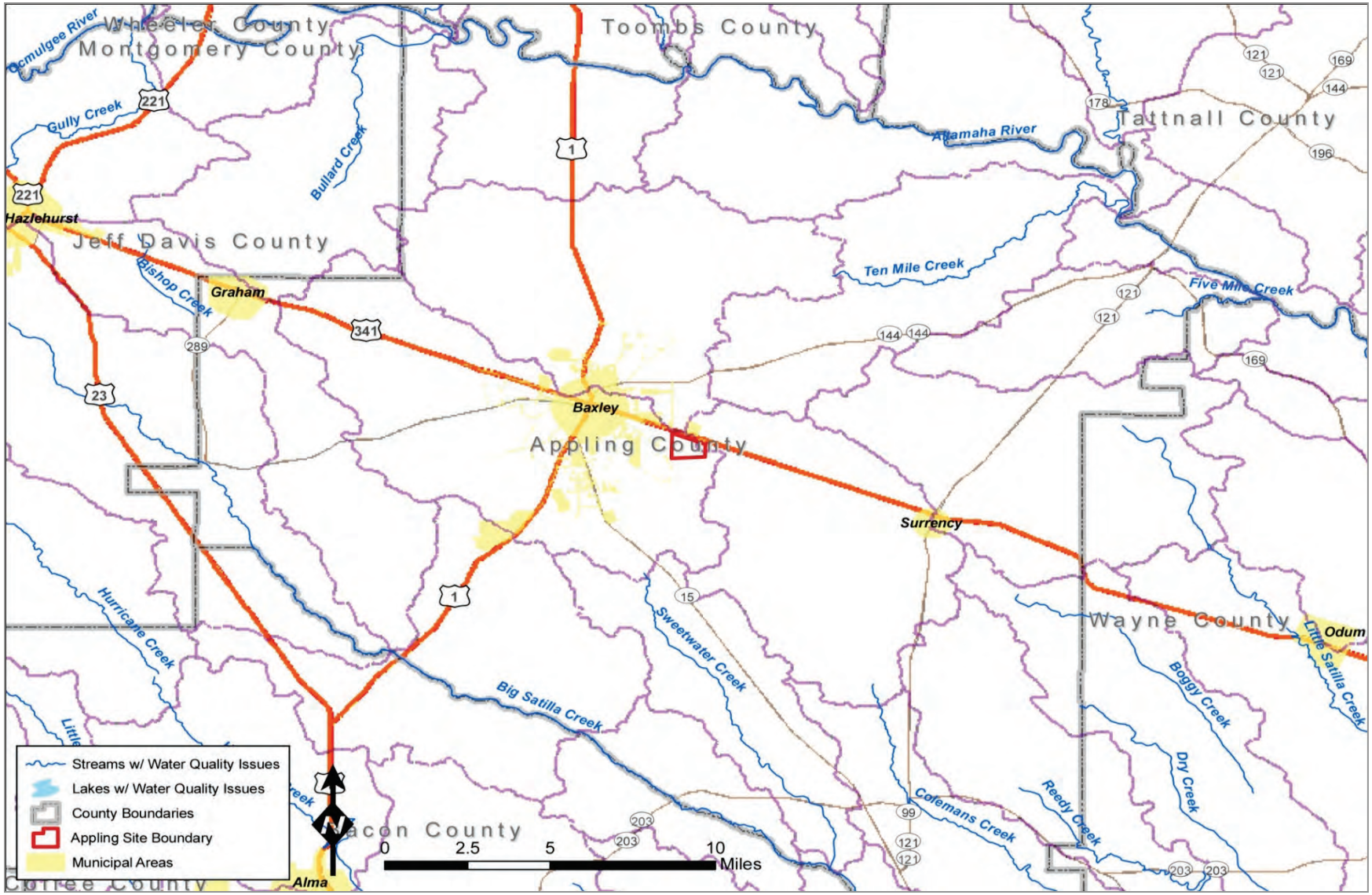


Figure 3-8 303(d)/305(b) Waters near the Alternate Area.

Source: Georgia EPD 2008

Table 3-19. 303(d)/305(b) Waters Near the Alternate Area.

Reach Location/County	River Basin/Use	Criterion Violated	Potential Causes	Extent miles	Category	Priority	Notes
Gully Creek, from Rocky Branch to Ocmulgee River/Jeff Davis Co.	Ocmulgee/ Fishing	Dissolved oxygen, fecal coliform bacteria	Nonpoint/ unknown	4	4a (at least one use not met; TMDL completed)		TMDL completed for dissolved oxygen and fecal coliform bacteria
Bullard Creek, from 0.25 mile upstream of Altamaha Road to Altamaha River/Jeff Davis Co.	Altamaha/ Fishing	Fish impacted (Bio F)	Nonpoint/ unknown	8	4a		TMDL completed for Bio F.
Hurricane Creek, from downstream of Little Creek to Ten Mile Creek near Alma/Bacon Co.	Satilla/ Fishing	Fecal coliform bacteria	Nonpoint/ unknown	20	4a		TMDL completed for dissolved oxygen and fecal coliform
Little Hurricane Creek, from GA 32 to Hurricane Creek/Bacon/Ware/Pierce Co.	Satilla/ Fishing	Dissolved oxygen, fecal coliform bacteria	Nonpoint/ unknown, urban runoff	22	4a		TMDL completed for dissolved oxygen and fecal coliform
Five Mile Creek from headwaters to Altamaha River/Appling Co.	Altamaha/ Fishing	Bio F	Nonpoint/ unknown	9	4a		TMDL completed dissolved for Bio F.
Ten Mile Creek from Little Ten Mile Creek to Altamaha River	Altamaha/ Fishing	Dissolved oxygen	Nonpoint/ unknown	13	4a		TMDL completed for dissolved oxygen.
Big Satilla Creek, from headwaters near Hazelhurst to Sweetwater Creek near Baxley/Jeff Davis/Appling Co.	Satilla/ Fishing	Dissolved oxygen, fecal coliform	Urban runoff	34	4a		TMDL completed for dissolved oxygen and fecal coliform
Colemans Creek, from Dry Branch south of Surrency to Big Satilla Creek near Screven/Appling/Wayne Co.	Satilla/ Fishing	Fecal coliform bacteria	Urban runoff	17	4a		TMDL completed for dissolved oxygen and fecal coliform
Little Satilla, from Keene Bay Branch to Dry Branch near Odum/Wayne Co.	Satilla/ Fishing	Fecal coliform bacteria	Urban runoff	10	4a		TMDL completed for dissolved oxygen and fecal coliform
Boggy Creek, from headwaters to Lake Lindsay Grace	Satilla/ Fishing	Dissolved oxygen	Nonpoint/ unknown	10	5 (at least one use not met; TMDL not completed)	2015	TMDL complete for dissolved oxygen.
Sweetwater Creek, from Black Water Creek to Big Satilla Creek near Baxley	Satilla/ Fishing	Dissolved oxygen, fecal coliform	Urban runoff	12	4a		TMDL completed for dissolved oxygen and fecal coliform

Source: EPD 2008, 2010a

Water Quality Issues

- Impaired runoff water quality could be generated from disturbed sites and adjacent areas as a result of construction activities and operation.
- The Proposal could modify drainage networks and change surface flows (magnitudes and/or timing), create channel and bank erosion, and increase sedimentation along streams affected by the placement of the Proposal components.
- Contamination of existing surface water resources could occur from spills or leaks from equipment or storage of petroleum products, lubricants, or hazardous materials; water quality could be degraded by turbidity or other pollutant increases resulting from the dewatering discharges, channel disturbance, or discharges of construction materials or debris into streams, ponds, or lakes.

- ***Hydrologic Issues***
  - Lower lake levels at Clarks Hill Lake may result from power plant withdrawals, resulting in reduced flows from Clarks Hill Lake downstream to the Savannah River.
  - Increased consumptive use of surface water could reduce the availability of this resource for other uses.
  - Increased water withdrawals from Rocky Comfort Creek could put undue stress on this waterway and greatly reduce its assimilative capacity.
  - Potential reduction in river/creek flow due to interbasin transfer and wastewater diversion.

3.2.3.2 Impact Assessment - Proposal

Surface water impacts from constructing and operating the Proposal involve effects on water quantity and related water bodies, and effects on water quality. Surface water quantity impacts would occur at and beyond the boundary of the Proposal.

- ***Storm Water Runoff during Construction***

Construction activities have the potential to impact surface water primarily by exposing soil, which then may be eroded and deposited into streams and other water bodies.

The maximum area of surface disturbance for plant facilities would include approximately 145 acres within the 343 acres at the site. Areas that will be disturbed during construction include the biomass plant, stormwater retention ponds, and construction lay down areas (Figure 2-15). Temporary soil disturbance would occur as part of the installation of the water lines. Some temporary, localized surface disturbance

would occur as part of the reconductoring for the Union Point Maxeys 115 kV upgrade, when the line supports are replaced. Otherwise, only minor disturbance would be associated with the reconductoring because no excavation would be required.

The north central portion and southeast portion of the site would be disturbed for construction of stormwater retention ponds. Construction of the plant and the construction lay down area would disturb the site north of the transmission lines, and a small area would be disturbed during construction of the access road. All ground disturbance areas associated with the project construction would be subject to Georgia storm water regulations.

Impacts to surface water quantity and existing water features would occur at the Proposal primarily as a result of topographic modifications during construction. These impacts would include changes in watershed areas that contribute runoff to streams and ponds, corresponding modifications to streamflows, existing natural pond volumes and wetland hydrology, accelerated channel and bank erosion, and attendant downstream sedimentation.

During construction, short-term runoff and erosion impacts would occur from excavation, equipment staging, vehicular access at the Proposal, and parking and laydown areas. Short-term impacts to water quality could potentially result from spills, leaks, or improper disposal of construction materials or sediment and other contaminants carried in downstream runoff.

The nearest impaired stream segment on Georgia's 2008 Integrated 305(b)/303(d) Report within the drainage of the Proposal area is on Brier Creek, approximately 10 miles downstream of the site (Figure 3-5). Surface water criterion violated in streams in the vicinity of the Proposal Site are fecal coliform and dissolved oxygen (Table 3-18). The Proposal is not expected to have any discernible effect on this or any other impaired stream.

To minimize the impacts of storm water runoff, Georgia requires a NPDES storm water permit for any construction activity that disturbs more than one acre. The Proposal construction would be eligible for coverage under the 2008 re-issuance of the NPDES general permits to discharge storm water associated with construction activity, specifically the general permit for infrastructure activity (GAR10002). To invoke coverage under the general permit, Oglethorpe would submit an NOI to EPD. The permit requires development of an erosion, sedimentation and pollution Control Plan (ES&P), which is intended to reduce the amount of sediment and other pollutants in storm water by providing an appropriate and comprehensive system of BMPs and sampling plans required by the Georgia Water Quality Control Act and the *Manual for Erosion and Sediment Control in Georgia* (GDNR Environmental Protection Division

(EPD), General Permit GAR10002). According to Permit No. GAR10002, items that must be included in an ES&P are:

- Erosion, sedimentation, and pollution control plan checklist.
- Site description.
- Description of appropriate controls and measures to be implemented at the site.
- Inspections.
- Maintenance.
- Sampling requirements.
- Non-storm water discharges.

The ES&P outlines the erosion and sediment controls and pollution prevention measures which must be implemented at construction sites according to EPA's most recent stormwater rule.[40] The new rule also imposes an enforceable numeric limit on turbidity from stormwater discharges from large construction sites and requires monitoring to ensure compliance with the numeric limit. Effective January 4, 2011, EPA stayed the new rule "so that EPA can reconsider the record basis for calculating the numeric effluent limitation." EPA "plans to remove the stay when such reconsideration is completed."[41]

Potential Stream Impacts during Construction

There are no perennial streams at the Proposal site. The Evans Primary – Fury's Ferry 115 kV upgrade would cross four streams, two of which, Bettys Branch and Mount Enna Branch, are considered perennial. The Union Point – Maxeys 115 kV upgrade would cross 16 streams and creeks including five perennial waterways: Sherrils Creek, Calloway Creek, Thornton Creek, Tuggle Creek, and Hurricane Creek. None of these streams would be directly impacted. Implementation of BMPs will prevent or minimize stream impacts during construction.

The Thomson-McDuffie potable/gray water route would cross nine streams, four of which are considered perennial: Whites Creek, Gin Branch, Brier Creek, and Grier Branch. The section of Brier Creek that is on the NRI is approximately 10 miles downstream of the location where the pipeline would cross Brier Creek. The proposed Dam 50 surface water main would cross five streams, none of which are perennial.

[40] Federal Register, Tuesday, December 1, 2009, Volume 74, No. 229, pp. 62996-63058. 40 CFR Part 450.
[41] Federal Register, Friday, November 5, 2010, Volume 75, No. 214, p. 68215, 40 CFR Part 450.

Impacts on surface water can depend on how the lines would be constructed. Except for the potable water line from the City of Warrenton and the gray water line from the City of Warrenton, Oglethorpe will not be constructing the water lines; they will be constructed by Warren County and Thomson-McDuffie County. However, these parties are expected to apply for government funding and would need to follow all applicable regulations. Trenching the lines into the ground would result in greater ground disturbance than boring the lines. Construction using a trenching technique would require the ground to be cut open for line installation. Boring would create ground disturbance at isolated spots along the line. It is not known at this time what technique would be used to install the line. A combination of both trenching and boring may also be used. With either technique, some temporary impacts to water quality would occur near the construction site from construction traffic and ground disturbance from installation. Temporary increased turbidity and localized sedimentation of the stream bottom may occur. However, these impacts would be temporary. Additionally, implementing required BMPs would minimize water quality impacts.

Storm Water Runoff during Operation

Woodyard Runoff Pond (Item 17 on Figure 2-15). Storm water runoff from the woodyard would drain to the woodyard runoff pond. The wood yard runoff pond would also receive approximately 14,400 gpd (10 gpm) of process wastewater from floor drains. Any wastewater which could potentially contain oil would be routed to an oil/water separator prior to introduction into the wood yard runoff pond. Pond effluent would be pumped through a back-washable pressure filter system for suspended solids reduction, and the capability would be provided to feed a coagulant chemical ahead of the filters to enhance filtration of suspended solids. Treated water from the wood yard runoff pond would be reused as makeup water for the cooling tower. The system (pond, treatment system and associated tanks) would be designed, and levels would be maintained, to provide sufficient capacity in the woodyard runoff pond to contain at minimum a 24-hour duration storm with a return period of 25 years (or any more stringent requirements of EPD). Thus, storm water runoff from the wood pile would not have the potential to impact surface waters, except in the case of a low-probability storm event (i.e., the maximum rainfall that would be expected to occur in a 24-hour period once every 25 years).

Other Runoff Ponds (Items 21 on Figure 2-15). The remainder of site storm water runoff would be routed to two storm water runoff ponds. One is located at the southeast corner of the plant, and the other pond is located north of the plant (Figure 2-15). Adequate retention time and treatment would be provided in accordance with local and state requirements prior to final discharge to existing onsite drainage features. The storm water runoff from the parts of the site that drain to these two ponds is expected to contain low concentrations of any pollutants including sediment. These two ponds would be covered under the *2006 Reissuance of NPDES General Permit GAR000000* to discharge storm water associated with industrial activity. To invoke coverage by the

General Permit, Oglethorpe would submit a NOI to EPD. The permit requires development of a storm water pollution prevention plan (SWPPP), which is intended to reduce the amount of sediment and other pollutants in storm water and to ensure compliance with Georgia Water Quality Control Act and the Clean Water Act (GDNR EPD, General Permit). According to Permit No GAR000000, relevant items that must be included in a SWPPP are:

- The pollution prevention team.
- A description of the potential pollution sources.
- A description of the BMPs that would be used (e.g., silt fences, straw bales, rock dams, mulching) and where they would be installed.
- A comprehensive site evaluation/inspection.

Operation Wastewater Discharges

As described in Sections 2.5.2.7 through 2.5.2.9, all wastewater from the Proposal would be treated and either re-used as cooling water or discharged to the City of Warrenton treatment system. The Warrenton wastewater treatment plant would discharge directly to Rocky Comfort Creek under its own NPDES permit.

Operation Water Withdrawals

The biomass plant will require approximately 2.0 MGD of raw intake water for operation. That supply is expected from the following sources, as explained below:

- Potable water supply from Thomson-McDuffie County, 0.50 MGD, originating from Clarks Hill Reservoir and Usry Pond (could be increased if necessary).
- Potable water supply from City of Warrenton, 0.50 MGD, originating from Rocky Comfort Creek Dam 46 (not yet confirmed).
- Untreated surface water from the City of Warrenton, 0.30 MGD, originating from Rocky Comfort Creek Dam 50.
- Reclaimed gray water from Thomson-McDuffie County, 0.70 MGD.
- Reclaimed gray water from City of Warrenton, 0.2 MGD.

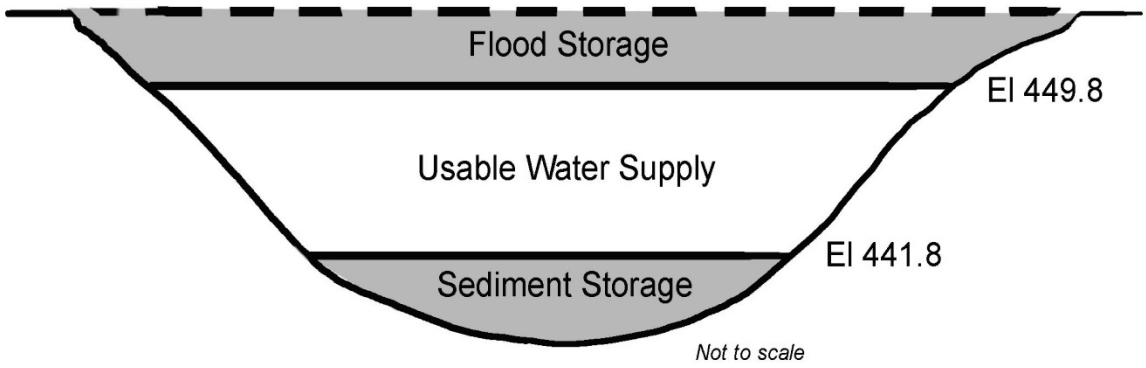
Oglethorpe's total allowable maximum receipt from all sources is 2.2 MGD, which is 10 percent more than its estimated need. As detailed in the discussions below, all supplies are expected to be dependable sources and Oglethorpe's use is not expected to impact other users. In addition, except for the wastewater diversion, any withdrawals would be within the permit limits as defined by the EPD. The EPD considers potential impacts to other water users and environmental impacts when making its permitting decisions. The providers are allocating water from their excess supplies, except for the potable water

supply from the City of Warrenton, and the City of Warrenton has applied for increased withdrawals.

The potable water and untreated surface water withdrawals are from three different watershed subbasins: Clarks Hill Reservoir is in the Little River Subbasin, Usry Pond is in the Brier Creek Subbasin, and both Rocky Comfort Creek Dam 46 and Dam 50 are in the Ogeechee River Basin (Figure 3-3). This distribution among watersheds helps reduce the impact on any one stream system.

Thomson-McDuffie Potable Water. Thomson-McDuffie has offered Oglethorpe 0.5 million gallons per day (MGD) from its public drinking water system, with sources at Clarks Hill Reservoir and Usry Pond (Figure 3.3). Thomson-McDuffie's combined maximum withdrawal rate from its sources is 5.0 MGD on a 24-hour basis and 3.5 MGD on a monthly basis. Oglethorpe's allowable 0.50 MGD withdrawal is 10 percent and 14 percent, respectively, of the maximum permitted daily and monthly withdrawal from the Thomson-McDuffie combined sources. Recent usage reports from the EPD indicated that Thomson-McDuffie had a total excess monthly average capacity of 1.63 MGD. Thus, Oglethorpe's use of 0.5 MGD is not expected to affect the available water for other current users. During scoping concerns were expressed regarding potential impacts on Clarks Hill Lake levels or on outflows to the Savannah River. Clarks Hill is a very large reservoir, with 725 billion gallons of storage (on October 3, 2010) and an average daily outflow (during September 2010) of 3,909 cfs (2,526 MGD) (USACE Savannah District 2010a). The entire 0.5 MGD maximum potential withdrawal from the two Thomson-McDuffie potable sources that originate from Clarks Hill and Usry Pond represents 0.02 percent of the reported Clarks Hill outflow. This rate of withdrawal would have no discernible effect on lake levels or outflow at Clarks Hill.

City of Warrenton Potable Water. The City of Warrenton has conditionally offered Oglethorpe 0.5 MGD from its surface water treatment plant, which is supplied by Rocky Comfort Creek Dam 46. The City of Warrenton is currently permitted to withdraw from Dam 46 at a maximum daily rate of 0.83 MGD and a maximum monthly rate of 0.75 MGD. The City's actual maximum daily demand was 0.54 MGD in 2005 and projected at 0.58 for 2010 (G. Ben Turnipseed Engineers, Inc. 2009b, Table 1). There is insufficient capacity under the City's current permit for the additional 0.5 MGD for Oglethorpe and the City has applied for an increased withdrawal from Dam 46 of a maximum 24 hour rate of 1.3 MGD. This application is under review with EPD. This request was supported by an analysis of the dependable yield of the reservoir (G. Ben Turnipseed Engineers, Inc. 2009b). Dam 46, which was constructed by the Soil Conservation Service (now the Natural Resources Conservation Service [NRCS]), is used for sediment containment, municipal water supply and flood control. The diagram below shows this schematically.



The bottom part of the reservoir, up to elevation 441.8 feet, is used for sediment storage. The volume from elevation 441.8 to 449.8 feet is available for municipal water supply, and the volume above elevation 449.8 feet (normal pool) is used for flood control. Thus, to retain the sediment storage volume withdrawals cannot reduce the level below 441.8, and to provide the necessary flood control volume the lake elevation under normal conditions must be kept at or below elevation 449.8 feet (G. Ben Turnipseed Engineers, Inc. 2009b, p. 9). The flow that can be withdrawn under all expected conditions of precipitation while maintaining these levels *and* maintaining an acceptable flow rate to sustain Rocky Comfort Creek is considered the dependable yield. The minimum acceptable release rate from the reservoir, the 7Q10[42] flow rate, was calculated as 0.336 cfs. Based on an iterative modeling process, the dependable yield of the reservoir was estimated at 1.964 MGD, which is 51 percent more than the City's maximum requested daily withdrawal of 1.3 MGD (G. Ben Turnipseed Engineers, Inc. 2009b, pp. 13 and 15).

Reservoir water level impacts. With the added withdrawals, there would be more fluctuations in the Dam 46 reservoir water levels, based on modeling. Reservoir elevations were modeled for the period from mid-2005 to the end of 2008, both with and without the added 0.5 MGD withdrawal. Without the withdrawal, the reservoir level was near the top of the usable water supply surface (449.8) the majority of the period, with a low elevation approximately four feet below that, during a severe drought. With the added 0.5 MGD withdrawals, modeled fluctuations in water levels were greater, with the low level near the top of the sediment storage level (see diagram above) (G. Ben Turnipseed Engineers, Inc. 2009b, Figures 2 and 3). Under some circumstances these fluctuations may have an aesthetic or use impact; however, the area surrounding the reservoir is largely agriculture and timber, and these uses would not expect to be impacted by the greater fluctuations. Based on the Turnipseed analysis, the fluctuations would not impact the uses for which the reservoir was constructed (water supply, flood control, and sediment control).

[42] Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.

Stream flow impacts. The 7Q10 minimum flow has been used by EPD (and others) as a reasonable minimum flow rate. Similar to floods, naturally-occurring low flow conditions are part of the natural stresses that aquatic life must respond to. In addition, flows in Rocky Creek downstream of Dam 46 have been highly modified from natural conditions since the dam was constructed in the 1960s.

Based on the Turnipseed studies, the most noticeable change in stream conditions may be low flow conditions with longer duration. While the minimum flow with the added withdrawals would not go below a low flow condition that would occur in any case (7Q10), other studies have found that with added withdrawals the duration of low flow conditions on a stream increases (Brandt et al. 2009). EPA has pointed out that when there are point sources of pollutants, low-flow conditions can aggravate the effects of the pollutants because there is less dilution (EPA 2009c), however, the same EPA document did not mention any other potential adverse impacts from low-flow conditions.

City of Warrenton Untreated Surface Water. The City of Warrenton has also offered 0.3 MGD of untreated surface water from its Rocky Comfort Creek Dam 50 source. The reported dependable yield of Dam 50 is 0.365 MGD (G. Ben Turnipseed Engineers, Inc. 2009c, p. 13). While Oglethorpe could potentially use 82 percent of the dependable yield of water from the Dam 50 source, it would be the only user of this source. The same conditions were applied in the modeling for Dam 50, with a top of sediment storage elevation of 470.0 feet, a top of water supply storage elevation of 476.0 feet, and a calculated 7Q10 flow of 0.09 cfs (G. Ben Turnipseed Engineers, Inc. 2009c, Table 1 and p. 10).

Because the Dam 50 reservoir is not currently used, the modeled water level without withdrawals was usually close to the normal pool elevation of 476. However, with the 0.3 MGD withdrawal, the modeled water level fluctuated between 470 and 476 feet (G. Ben Turnipseed Engineers, Inc. 2009c, Figures 3 and 4).

Overall Impacts on Rocky Comfort Creek System. While both Rocky Comfort Creek Dams 46 and 50 are in the Rocky Comfort Creek watershed, Dam 50 is actually on Goldens Creek, a tributary of Rocky Comfort Creek that flows into Rocky Comfort Creek south of Warrenton. The combined maximum withdrawals for the Proposal from the Rocky Comfort Creek system would be 0.8 MGD. G. Ben Turnipseed Engineers calculated an average flow of 5.82 MGD for Rocky Comfort Creek in the Reservoir Dependable Yield Analysis they prepared for the City of Warrenton. These withdrawals represent approximately 14 percent of the average flow of Rocky Comfort Creek. This reduction in flow is likely to be discernible; however, based on the analysis, flows would not drop below the existing 7Q10 flows. The streams are already highly regulated because of the reservoirs, and, if approved, the reductions are within the bounds of

what EPD considers acceptable in terms of impacts on other users and aquatic systems.

Use of Reclaimed Water. The use of reclaimed water from both the Thomson-McDuffie and the City of Warrenton wastewater treatment plants would reduce the discharge to Whites Creek and Rocky Comfort Creek, respectively. Thomson-McDuffie is permitted to discharge 2.5 MGD to Whites Creek and would be redirecting 0.7 MGD of their normal discharge to Oglethorpe (EPA 2000). The average annual flow of Whites Creek is one cubic foot per second (cfs) (0.65 MGD) (Cao 2009). Because of the quantity discharged, Thomson-McDuffie's wastewater treatment plant is the main contributor to creek flow (EPA 2000). As a result, the diversion of wastewater would decrease the flow of Whites Creek. However, it would not affect the creek's base flow. The base flow is defined by the United States Geological Survey (USGS) as the "natural flow in a stream" and therefore does not include direct discharges. Since Thomson-McDuffie would not be withdrawing any water from Whites Creek for Oglethorpe's use, the base flow of Whites Creek would not be affected. In addition, pollutant loading to Whites Creek would be reduced, thereby allowing improvement to water quality conditions downstream when compared to existing conditions.

The NPDES discharge permit has not been finalized for Warrenton's new wastewater treatment plant; however, the anticipated treatment capacity of the plant is 0.75 MGD (City of Warrenton 2009). Quantity and quality of reclaimed water purchased by Oglethorpe from Warrenton's new treatment plant would be controlled through a user agreement. The City of Warrenton has offered 0.2 MGD of reclaimed water from their new treatment plant which would otherwise discharge to Rocky Comfort Creek. G. Ben Turnipseed Engineers calculated an average flow of 5.82 MGD for Rocky Comfort Creek in the Reservoir Dependable Yield Analysis they prepared for the City of Warrenton. If the entire 0.2 MGD of wastewater is diverted to Oglethorpe, this represents 3.4 percent of the average flow of Rocky Comfort Creek.

The 0.2 MGD of wastewater diversion combined with the other 0.8 MGD maximum withdrawals from the Rocky Comfort Creek system represents 17 percent of the flow of Rocky Comfort Creek. This reduction may be noticeable in terms of reservoir levels and stream flows. However, except for the wastewater diversion, any withdrawals would be within the permit limits as defined by the EPD. The EPD considers potential impacts to other water users and environmental impacts when making its permitting decisions.

3.2.3.3 Measures Incorporated into the Proposal to Reduce Impacts and Potential Additional Mitigation

Following are actions that would be incorporated into the Proposal to reduce or prevent impacts:

Minimization of Hydrologic Impacts

- Use of reclaimed water from Thomson-McDuffie and Warrenton wastewater treatment plants would reduce pollutant load in Whites Creek and Rocky Comfort Creek, respectively; both Whites Creek and Rocky Comfort Creek are subject to Total Maximum Daily Load Development for chronic toxicity and fecal coliform, respectively.
- Use of reclaimed water from Thomson-McDuffie and Warrenton wastewater treatment plants would reduce the amount of surface water withdrawn for Oglethorpe biomass plant operation.
- Reuse of storm water runoff from wood pile and wastewater from plant drains as makeup water for cooling tower would reduce the amount of storm water runoff to onsite drainage features.
- Surface water will be obtained from multiple watersheds, thereby reducing the impact to any single watershed.

Minimization of Surface Water Quality Impacts

- An ES&P Control Plan would be implemented to prevent impacts to streams and other water bodies from storm water runoff during construction.
- A SWPPP would be implemented to prevent impacts to stream and other water bodies from storm water runoff during operation.
- Site storm water runoff would be directed to storm water retention ponds located on the property.
- Disturbed areas would be re-vegetated early to minimize soil erosion.
- Construction features for the control of erosion and water pollution would be included in the plans and specifications.
- An Spill Prevention, Control, and Countermeasure (SPCC) Plan would be provided as required for containment and control of liquids that have the potential to contaminate surface water.
- The dumping of chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful waste into or alongside steams or impoundments, or into natural or manmade channels leading thereto, would be prohibited.
- Wood yard runoff would be collected in a wastewater collection pond for treatment, reuse and ultimate discharge to the City of Warrenton's wastewater treatment plant and wastewater treatment would include an oil/water separation for oily wastes and filtration.

- The biomass plant wastewater treatment system would be designed for minimal discharge of 1,000 gpd of wastewater, accomplished through reuse of all plant wastewater to the maximum extent practical.
- All runoff water that may be contaminated would be collected and treated.
- Long-term operational impacts to surface water quality from storm water discharges would be avoided or minimized by complying with the NPDES General Permit for storm water discharges associated with industrial activity.

No additional mitigation measures have been identified.

3.2.3.4 Assessment of Impacts – Alternate

Storm Water Runoff During Construction

Approximately 154 acres at the Alternate site would be disturbed during plant construction. The disturbed area includes the biomass plant, stormwater retention ponds, woodyard runoff pond, cooling tower blow-down storage pond, contractor parking lot, and construction lay down area. Large wetland areas located in the center, northeast corner, and east end of the property would be avoided. Some temporary, localized surface disturbance would occur as part of the Hatch – Offerman transmission upgrade, when the new line supports are placed.

Construction activities have the potential to impact surface water primarily by exposing soil which then may be eroded and deposited into streams and other water bodies. All ground disturbance areas associated with the project construction would be subject to the state storm water pollution prevention requirements described for the Proposal in Section 3.2.3.3.

Potential Stream Impacts during Construction

The replaced Hatch - Offerman transmission line would cross six streams, four of which are considered perennial: Bay Creek, Big Satilla Creek, Dry Branch and Fishing Creek. None of these streams would be directly impacted, as the transmission lines would span the streams. Implementation of BMPs would prevent or minimize stream impacts during construction.

Storm Water Runoff During Operation

Woodyard Runoff Pond and Power Block Runoff Pond. A storm water runoff pond will be provided for the woodyard area, and another for the power block/cooling tower (Figure 2-20). These ponds would also receive process wastewater from floor drains. Any wastewater which could potentially contain oil will be routed to an oil/water separator prior to introduction into the wood yard runoff pond. Pond effluent will be

pumped through a back-washable pressure filter system for suspended solids reduction, and the capability will be provided to feed a coagulant chemical ahead of the filters to enhance filtration of suspended solids. Treated water from these ponds will be reused as makeup water for the cooling tower, and cooling tower blow-down will be discharged to the cooling tower blow-down storage pond. From the cooling tower blow-down storage pond, wastewater will be discharged to Baxley's land application treatment system. Storm water runoff and cooling tower blowdown from these ponds would not have the potential to impact surface waters since it will be reused and eventually discharged to Baxley. These ponds and the treatment system would be designed to prevent overflow for all conditions up to and including the 24-hour 25-year precipitation event.

Other Storm Water Runoff Ponds. The remainder of site storm water runoff will be routed to two storm water runoff ponds. Adequate retention time and treatment would be provided in accordance with local and state requirements prior to final discharge to existing onsite drainage features. The storm water runoff from the parts of the site that drain to these two ponds is expected to contain low concentrations of any pollutants including sediment. These two ponds would be covered under the *2006 Reissuance of NPDES General Permit GAR000000* to discharge storm water associated with industrial activity. Most stream/creeks onsite flow to Sweetwater Creek.

3.2.3.5 Measures Incorporated into the Alternate to Reduce Impacts and Potential Additional Mitigation

The same measures identified in Section 3.2.3.3 for the Proposal for *Minimization of Surface Water Quality Impacts* are applicable to the Alternate, except that wastewater would be discharged to the City of Baxley's system rather than the City of Warrenton's.

3.2.3.6 Assessment of Impacts – No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on surface water resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.3 GEOLOGY AND SOILS

There are four distinct physiographic provinces in Georgia (Figure 3-9). The Proposal site is at the edge of the Piedmont and the Alternate site is in the Coastal Plain. The **Piedmont** physiographic province of Georgia is composed of hard igneous and metamorphic rocks derived from the melting or partial melting, then recrystallization of ancient (300 to 600 million year old) sediments that were once deeply buried and subjected to high temperatures and pressures. They were re-exposed during a collision between the African and North American Continents about 250 to 300 million years ago (USGS 2004).

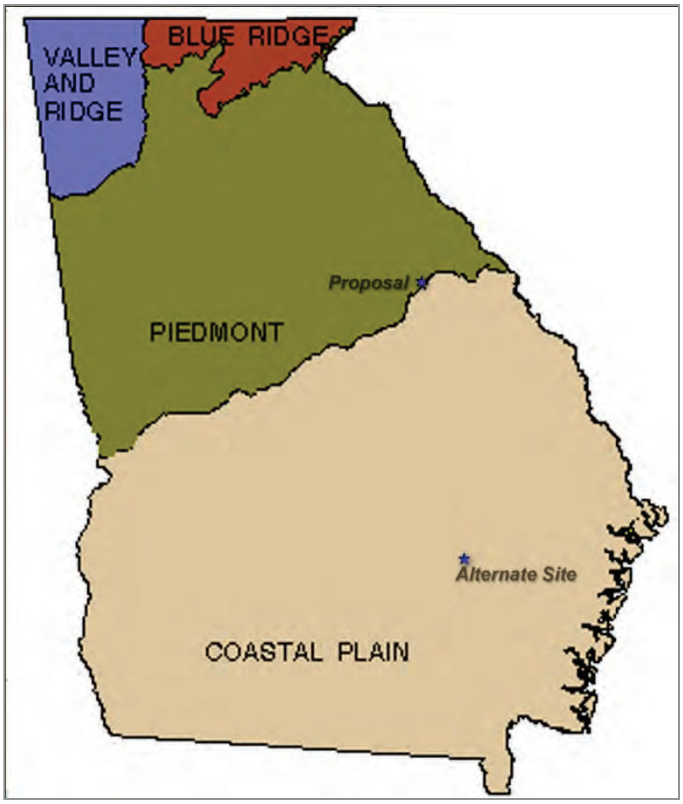


Figure 3-9. Physiographic Provinces of Georgia.

The **Fall Line** is the boundary between the Piedmont and the Coastal Plain. Its name arises from the occurrence of waterfalls and rapids that are the inland barriers to navigation on Georgia's major rivers. Those waterfalls and rapids occur where the rivers drop off the hard crystalline rocks of the Piedmont onto the more readily eroded sedimentary rocks of the Coastal Plain. Upstream from the Fall Line, rivers and streams typically have minimal floodplains and they do not have well-developed meanders (curves that nearly or do reverse the direction of flow). Within a mile or so downstream from the Fall Line, rivers and streams typically have floodplains or marshes across which they flow, and within three or four miles they meander. (University of Georgia, undated).

The Coastal Plain is a region of much younger sedimentary rocks and sediments. These strata dip toward the southeast, and so they are younger nearer the coast (Figure 3-10). The sedimentary rocks of the Coastal Plain partly consist of sediment eroded from the Piedmont over the last 100 million years or so, and partly of limestone generated by marine organisms and processes at sea (University of Georgia - Geology Department, n.d).

3.3.1 Affected Environment--Proposal

3.3.1.1 Geology

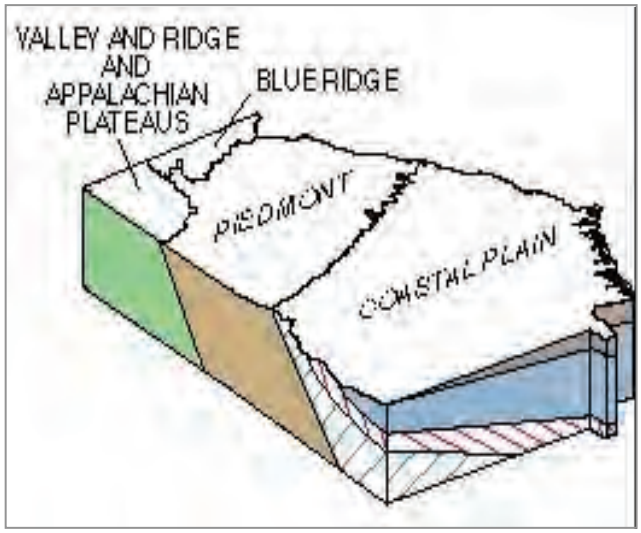


Figure 3-10. Geologic Cross Section.

As part of a groundwater evaluation, Oglethorpe's contractor drilled one boring at the Proposal site in 2008. The geologic profile at that location is as follows: clay from the surface to 5 feet; medium to coarse sand with mica and quartz from 5 to 36 feet; and gneiss (metamorphosed granite) from 36 feet to the full depth of the boring at 528 feet (Golder Associates Inc. 2009a). The sand is a breakdown product of the gneiss, resulting from eons of weathering, and the clay is a further breakdown product of the sand. This sand and clay material is called residuum, meaning that it formed from the bedrock where it is now located and was not transported from elsewhere.

3.3.1.2 Soils

Soil types at the Proposal site are mapped in Figure 3-11 and summarized in Table 3-20. Dominant soil types are sandy loam on 2 to 10 percent slopes, with gneiss as the parent material. The soils are primarily well drained, not subject to ponding or flooding, and none are classified as hydric.

3.3.2 Affected Environment—Alternate

3.3.2.1 Geology

The Alternate site is in that part of the Coastal Plains underlain by limestone (marine) bedrock deposits.

3.3.2.2 Soils

Soil types at the Alternate site are mapped in Figure 3-12 and summarized in Table 3-21. Slopes are flat, and all soils are developed from marine deposits. The soils are primarily poorly drained, subject to ponding or flooding, and all except one are classified as hydric.

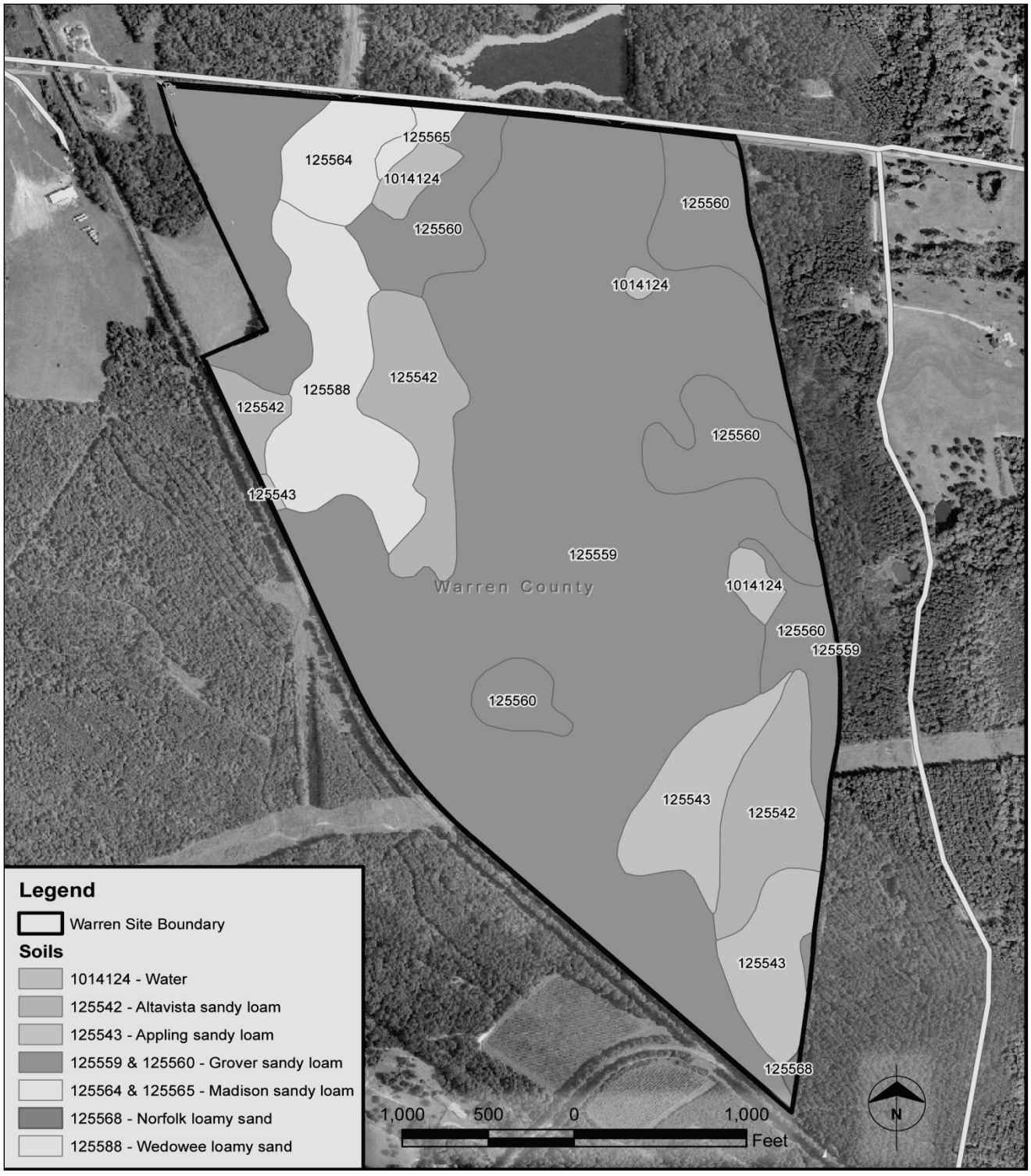


Figure 3-11. Proposal Site Soils.
Sources: NRCS 2010a, 2010b

Table 3-20. Proposal Site Soil Characteristics.

Characteristics	Alta Vista (125542)	Appling (125543)	Grover (125559& 125560)	Madison (125564& 125565)	Norfolk (125568)	Wedowee (125588)	Notes
Description	Sandy loam, 0 to 2% slopes	Sandy loam, 2 to 6% slopes	Sandy loam, 2 to 6% and 6 to 10% slopes	Sandy loam, 2 to 6% and 6 to 10% slopes	Loamy sand, 2 to 6% slopes	Loamy sand, 6 to 10% slopes	Loam is a soil that is a mixture of sand and clay with decaying organic material.
Landform setting and position	Stream terraces	Hills/summit	Hills: summit and shoulders	Hills: summit and shoulders	Interfluve (between two stream valleys)	Hills: shoulders	
Parent material	Alluvium (stream deposited)	Residuum weathered from mica schist or gneiss	Residuum weathered from mica schist or gneiss	Residuum weathered from mica schist or gneiss	Marine deposits		Residuum is the soil that results from bedrock weathering in place (not transported).
Drainage class	Moderately well-drained	Well-drained	Well-drained	Well-drained	Well-drained	Well-drained	
Frequency of flooding	Occasional	None	None	None	None	None	
Frequency of ponding	None	None	None	None	None	None	
Hydric Classification	No	No	No	No	No	No	

Sources: NRCS 2010a, NRCS 2010b

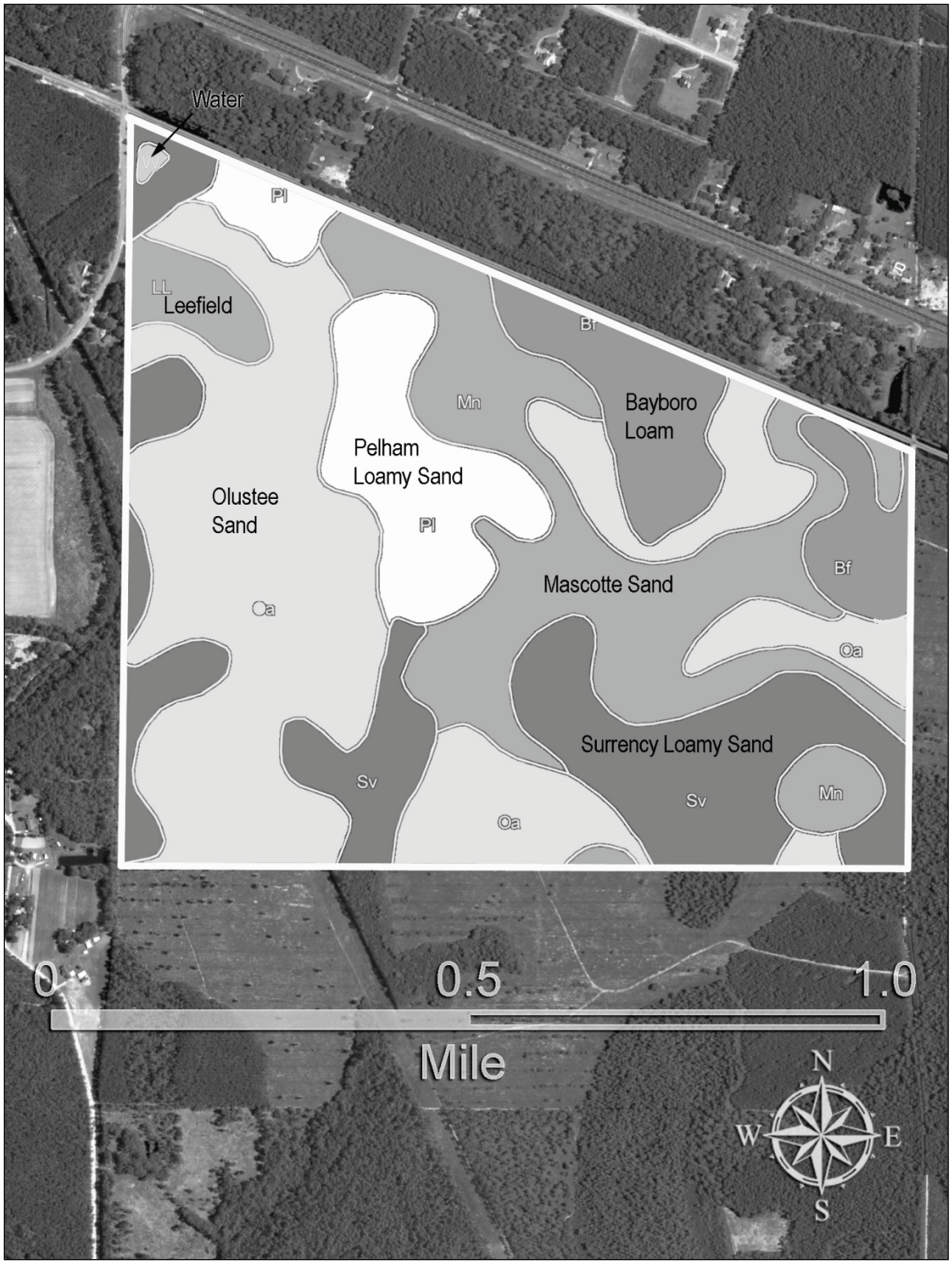


Figure 3-12. Alternate Site Soils.
Source: NRCS 2010b

Table 3-21. Alternate Site Soil Characteristics.

Characteristics	Bayboro loam Bf	Leefield soils LL	Mascotte sand Mn	Olustee sand Oa	Pelham loamy sand, Pl	Surrency loamy Sand, Sv	Notes
Description	Loam and clay, 0 to 2% slopes	Loamy sand, sandy loam, clay, 0 to 2% slope	Sand, 0 to 2% slopes	Sand, loamy sand, and sandy clay loam, 0 to 2% slopes	Loamy sand, sandy clay loam, 0 to 2% slopes	Loamy sand, sand, sandy loam, sandy clay loam, 0 to 1% slopes	Loam is a soil that is a mixture of sand and clay with decaying organic material.
Landform setting and position	Depressions	Flats	Flats	Flats	Flats, depressions	Depressions, drainageways	
Parent material	Marine deposits	Marine deposits	Marine deposits	Marine deposits	Marine deposits	Marine deposits	Residuum is the soil that results from bedrock weathering in place (not transported).
Drainage class	Very poorly drained	Somewhat poorly drained	Very poorly drained	Somewhat poorly drained	Poorly drained	Very poorly drained	
Frequency of flooding	None	None	None	None	Frequent	None	
Frequency of ponding	Frequent	None	Frequent	None	None	Frequent	
Hydric Classification	Hydric	Hydric	No	Hydric	Hydric	Hydric	Hydric soils are those that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season.

Sources: NRCS 2010a, 2010b

3.3.3 Environmental Consequences

3.3.3.1 Identification of Issues

Issues identified were primarily related to soils. Soil resources issues are primarily related to construction activities, but impacts may also occur from operational activities. The potential issues identified in public scoping included:

- Potential for soil erosion primarily during and immediately after construction.
- Potential for nutrient loss in the soil from removal of slash (branches and other residue left on the forest floor after timber harvesting) for biomass uses following timber harvesting.

3.3.3.2 Impact Assessment - Proposal

Geologic Impacts

There are no areas of geological importance within the Proposal site. The Proposal is located in an area not considered to be seismically active. While a few historic earthquake epicenters are located near the Proposal area, the potential for strong ground motion from an earthquake is unlikely. Landslides rarely occur in the region because of the general low relief. As such, landslide-prone areas were not identified in the Proposal vicinity. Karst formations are not present at or near the Proposal site; therefore, the potential for sinkhole development, associated with karst, is unlikely. In summary, geological hazards are unlikely to impact the Proposal area.

Direct Soil Impacts

The Proposal would require excavating soils to construct facility components. Approximately 45 percent of the site area (159 acres) will be disturbed by construction activities (Figure 3-13). Of this, approximately 53 acres would consist of short-term impacts from construction laydown areas and related parking, site excavation areas, and a construction storm water pond.

Proposal components would permanently alter approximately 106 acres of existing soils. Additional relatively small acreage areas may eventually be required for other ancillary facilities or to configure property boundaries.

During construction and operation, topsoil would be salvaged from the facility footprint and stockpiled for future use. Implementing Best Management Practices (BMPs) would require recontouring and revegetation of excavations to create stable slopes. BMPs would be used to prevent unnecessary scarring of natural surroundings and vegetation at the construction site. Storm water runoff and erosion controls would be developed under NPDES/SWPPP permit requirements for construction and industrial activities.

Soil contamination would be minimized by spill prevention, reporting, and cleanup practices required under EPD regulations. Stockpiled soil materials not used as engineered fill or landscaping would be replaced on disturbed areas when construction has been completed and disturbed areas would be repaired and reseeded.

The permanent alteration of approximately 106 acres of soil would be a long-term impact. Erosion control and recontouring practices, as described in the BMPs for soils and water and implemented in accordance with approved permits, would minimize impacts. No additional mitigation measures are needed.

Minimal soil impacts would be associated with the replacement of the support structures on the Union Point – Maxeys line. Temporary soil impacts would occur during construction with the installation of the water lines.

Soil Nutrients

Soil nutrient loss is primarily an off-site concern related to harvesting biomass. As determined in the preliminary reports, the analysis of this EIS is limited to the plant and associated facilities. Since RUS and Oglethorpe have no ownership/control of the forests being harvested they are not within the scope of the EIS. Additionally, harvesting is already occurring and therefore not dependent on this Proposal and therefore is not a connected action. A general discussion is presented here.

The quantities of nutrients contained in aboveground biomass, roots, forest floor, and soil are referred to as the “nutrient pool”. The potential for nutrient loss due to removal of slash is influenced by rates of nutrient inputs and outputs. Atmospheric inputs and mineral weathering are the primary sources of nutrient additions to the forest. Estimates of individual nutrient inputs from the atmosphere range from less than one to 15 pounds per acre per year (lb/ac/yr) and are cumulative in nature, i.e., a 5 lb/ac/yr input can amount to a 500 lb/ac input over a 100-year growth cycle. The only source of nitrogen in the soil is from the atmosphere; no nitrogen becomes available from geologic weathering such as occurs with other nutrients. The decomposition and mineralization of the accumulated organic reserves within the forest floor and mineral soil combined with material supplied by annual litterfall are the primary internal sources of available nitrogen. Literature estimates of nitrogen release from organic reserves vary considerably with location and forest type.

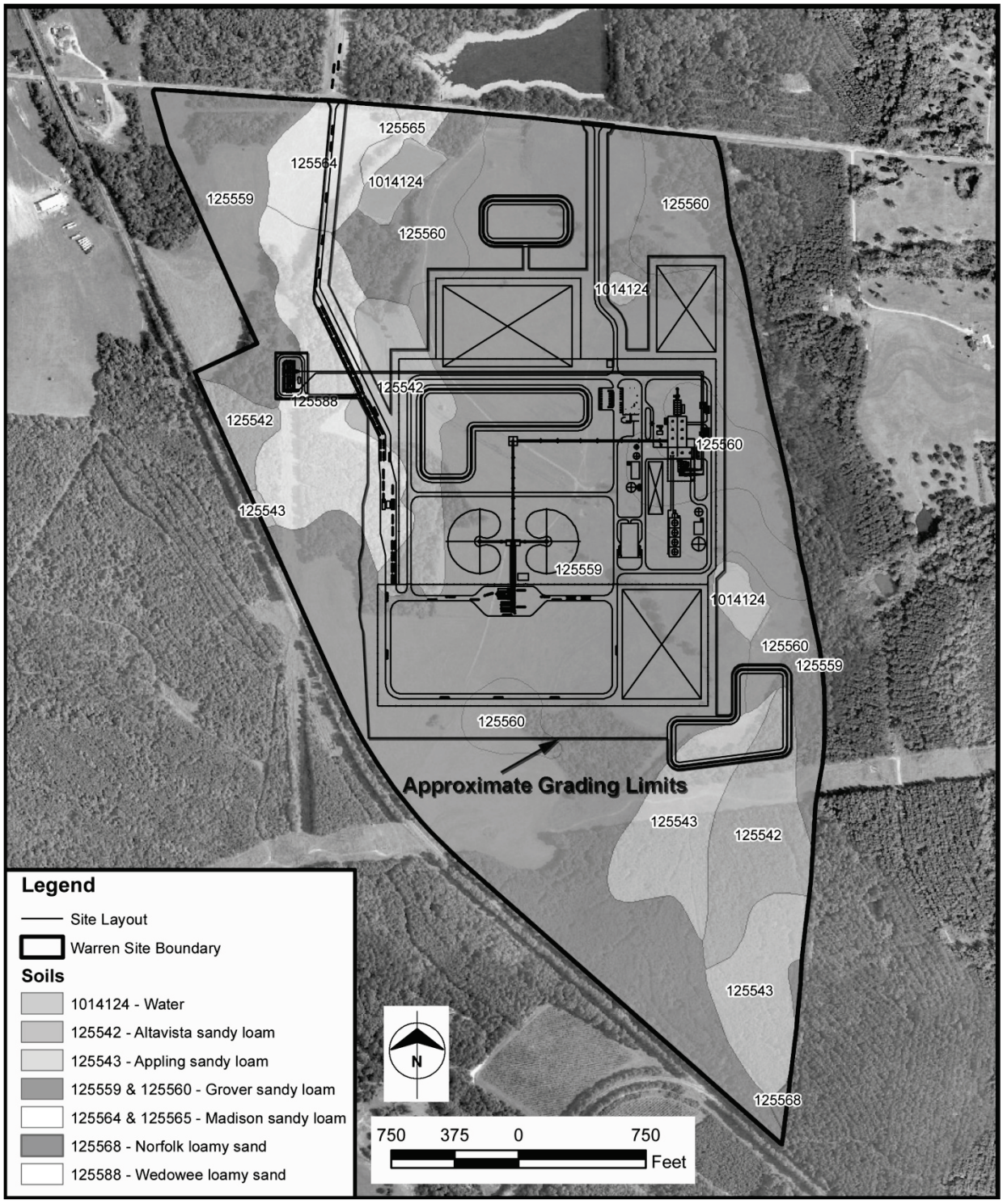


Figure 3-13 Proposal Site Soil Impacts
Source: Burns and McDonnell

Nutrient outputs also occur through leaching and timber harvest. When compared to the total pool, nutrient loss due to timber harvest of above-ground biomass is a relatively small percentage for most elements (Knoepp and Swank 1997). An analysis of the balance between inputs and losses for a subsequent harvest occurring 20 years after the harvest of the currently existing forest found no significant change for calcium, magnesium, and potassium (Knoepp and Swank 1997).

Loss of nutrients can be minimized through management techniques; for example, timber harvesting during the dormant season tends to retain nutrients at the site (Hacker 2005). Proper use of erosion and sediment controls through BMPs limit erosion and leaching of nutrients, thereby helping to retain the nutrient pool (Hacker 2005). According to the Georgia Forestry Commission, BMP compliance has improved gradually since compliance surveys were first conducted in 1991: the overall statewide percentage of implementation increased from 65 percent in 1991 to 92 percent in 2007; with 86 percent of acres in compliance in 1991 and 99.7 percent in compliance in 2007 (GFC 2008, pp. 17-18).

Soils in the southern states experience deficiencies in nitrogen and phosphorous, especially once the tree canopy covers the ground. Fertilization with both nitrogen and phosphorous during the forests' intermediate age typically increases growth and adequately addresses any nutrient loss potentially due to erosion, leaching, and timber harvesting (Fox et al. 2006).

Concerns have been expressed about removal of slash and the impacts on nutrient levels. An analysis of stem-only versus whole tree harvest in the Piedmont found that the stem had disproportionately less nutrients (nitrogen, phosphorous, potassium, calcium and magnesium) than the whole tree (Tew et al. 1986). Others have found that maintaining the very finest parts (leaves and small twigs) on-site, then preventing erosion of the leaf litter and organic soil, is most important in preserving nutrients (Hacker 2008; Frankman et al. 2004, p. 233; USDA FS 2008, p 2-3). In this case also, implementation of BMPs is important in maintaining soil nutrients.

In summary, the reduction in loss of nutrients through timber harvesting and slash removal can be controlled or minimized by management practices and sound practices such as harvesting during specific times of the year, longer periods of time between harvests, and the addition of erosion and sediment controls.

3.3.3.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Runoff and erosion control practices would be required as part of the National Pollution Discharge Elimination System (NPDES) storm water permit approval process administered by the Georgia Environmental Protection Division (EPD). A Storm Water Pollution Prevention Plan (SWPPP) would be required for construction activities under

the NPDES program. A NPDES general storm water permit for industrial activities would be required for the Proposal operation. Measures to control erosion and sedimentation and protect water quality may also be permit requirements under Sections 404 and 401 of the Clean Water Act (CWA), as administered by the USACE, EPD, and the U.S. Environmental Protection Agency (EPA).

Implementation of forestry BMPs will minimize soil erosion and soil and nutrient loss in biomass harvesting. While RUS has no control over these measures, based on reports from the Georgia Forestry Commission as discussed above, forestry BMPs would be expected to be implemented by the great majority of those engaged in harvesting timber. No additional mitigation measures are proposed.

3.3.3.4 Impact Assessment – Alternate

Geologic Resources

As with the Proposal, there are no areas of geologic importance at or near the Alternate site. Similarly, seismic hazard and landslide potential is very low and the area is not karst.

The Alternate would not impact unique geological features, as none are present in or near the Alternate area. No geologic hazards are present at or near the Alternate site.

Direct Soil Impacts

The Alternate would require excavating soils to construct facility components. The total area of soils disturbed for construction activities and plant components is approximately 154.4 acres and comprises approximately 44.1 percent of the alternative plant site (Figure 3-14). Of this, approximately 19.7 acres would consist of short-term impacts from construction laydown areas and related parking, site excavation areas, and a construction storm water pond. Alternate site components would permanently alter approximately 105 acres of existing soils.

Additional relatively small acreage areas may eventually be required for other ancillary facilities or to configure property boundaries. The reconductoring/rebuilding of the

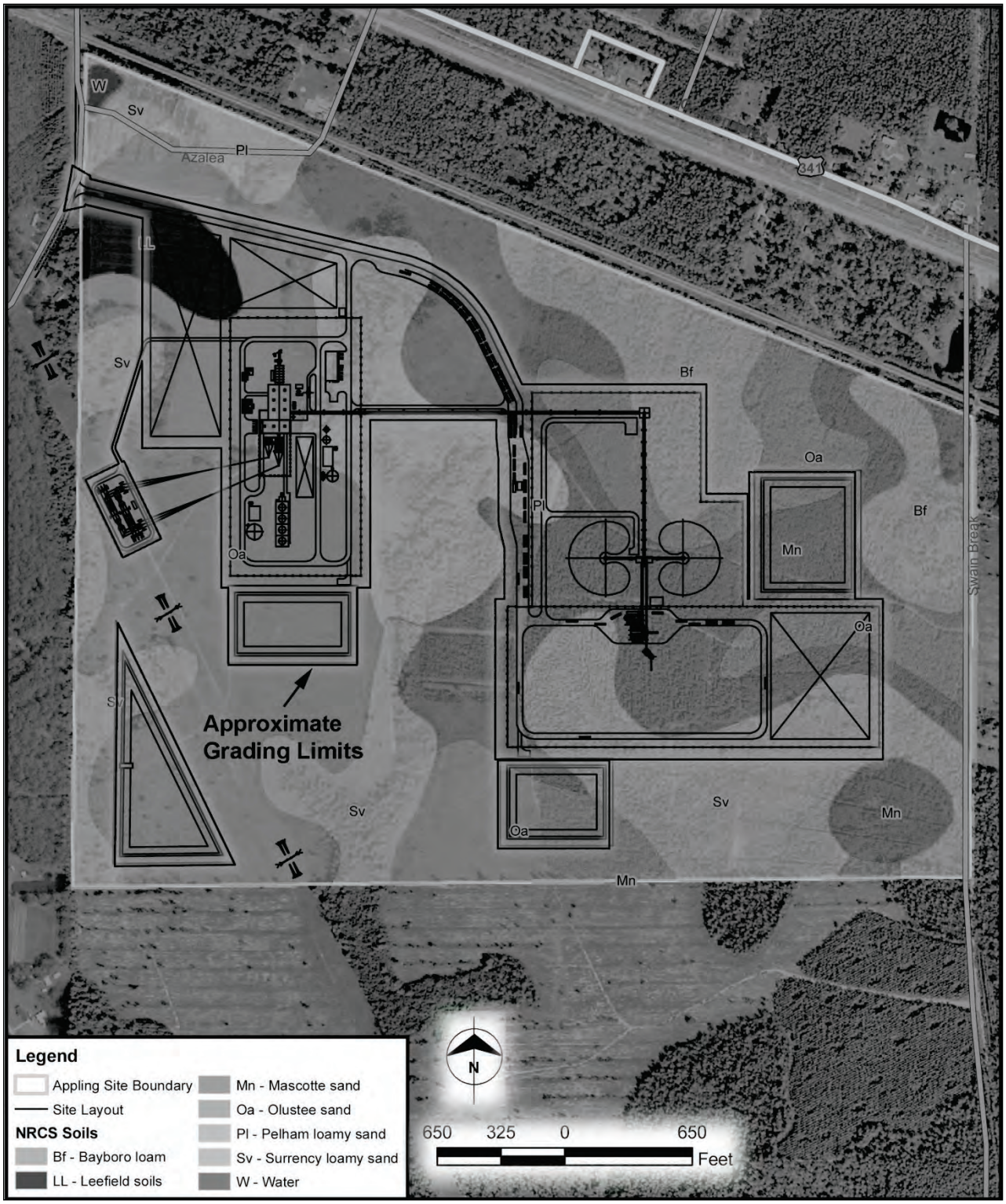


Figure 3-14. Alternate Site Soil Impacts

Source: Burns and McDonnell 2010e

Hatch – Offerman transmission line will result in approximately an acre total of isolated permanent soil impacts at the locations of the supports.

The permanent alteration of approximately 105 acres of soil would be a long-term impact. During construction and operation, topsoil would be salvaged from the facility footprint and stockpiled for future use. Implementing Best Management Practices (BMPs) would require recontouring and revegetation of excavations to create stable slopes. BMPs would be used to prevent unnecessary scarring of natural surroundings and vegetation at the construction site. Storm water runoff and erosion controls would be developed under NPDES/SWPPP permit requirements for construction and industrial activities. Soil contamination would be minimized by spill prevention, reporting, and cleanup practices required under EPD regulations. Stockpiled soil materials not used as engineered fill or landscaping would be replaced on disturbed areas when construction has been completed and disturbed areas would be repaired and reseeded.

3.3.3.5 Measures Incorporated into the Alternate to Reduce Impacts and Additional Potential Mitigation

The same measures as described for the Proposal in Section 3.3.3.4 are also applicable to the Alternate.

3.3.3.6 Impact Assessment – No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on geology or soil resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.4 GROUNDWATER

Groundwater may be present in the spaces between particles such as sand grains (pore spaces) in a sand formation or sandstone bedrock. Pore spaces that existed when the rock formed, such those between sand grains in a sandstone, are called primary pore spaces. Secondary pore spaces are those that developed after the rock was formed, such as solutioned joints in limestone or fractures in many types of bedrock. When pore spaces are plentiful and/or relatively large, and connected to each other, the formation has a relatively high permeability (water can move more quickly through the formation). When there are few and/or small pore space and they are not connected, permeability is relatively low. Highly productive groundwater reservoirs (aquifers) are generally

characterized by large thickness of highly permeable saturated material capable of being replenished. Figure 3-15 shows the general distribution of aquifers in Georgia.

3.4.1 Affected Environment—Proposal

Because the crystalline rocks in the Piedmont formed under intense heat and pressure, they have few primary pore spaces, and the porosity and permeability of the unweathered and unfractured bedrock are extremely low. In the Piedmont, groundwater can be obtained from two sources: (1) the residuum, and (2) fractures in the rock (Miller 2009). Locally, the occurrence and availability of ground water varies greatly because of the complex variability in rock type (some areas have larger and more interconnected fractures than others). Such variability makes it difficult to predict ground-water availability (Miller 2009).

Oglethorpe conducted a pumping test to evaluate groundwater as a potential water source. The estimated total sustainable yield from the test well was 0.09 to 0.15 MGD, well below the estimated total need for the Proposal (Golder Associates Inc. 2009a, p. 9). While additional wells may have increased the total yield, the results from the pumping test were not encouraging and Oglethorpe did not investigate groundwater further. A well may be used for water supply during construction.

The Proposal site is not within a groundwater recharge area and is in an area with low susceptibility to groundwater contamination (Warren County 2004, Figures N-2 and N-3).

3.4.2 Affected Environment—Alternate

The Alternate site is underlain by the highly productive Floridan aquifer, which underlies the Coastal Plains in Georgia. There is also a surficial aquifer underlying the Alternate site; however, groundwater supply sources that are being considered for the Alternate site are located in the Floridan aquifer system.

The Floridan aquifer system covers an area of approximately 100,000 square miles. Large volumes of water move quickly in and out of the aquifer. Despite the large volumes of water being withdrawn from the system, water levels have not declined greatly except where local pumping is concentrated or where the yield of the system is minimal (Miller 2009). Permeability within the Floridan aquifer is variable; however, in most places it can be divided into the Upper and Lower Floridan aquifer, which are separated by a less-permeable confining unit that restricts the movement of groundwater between the two aquifers.

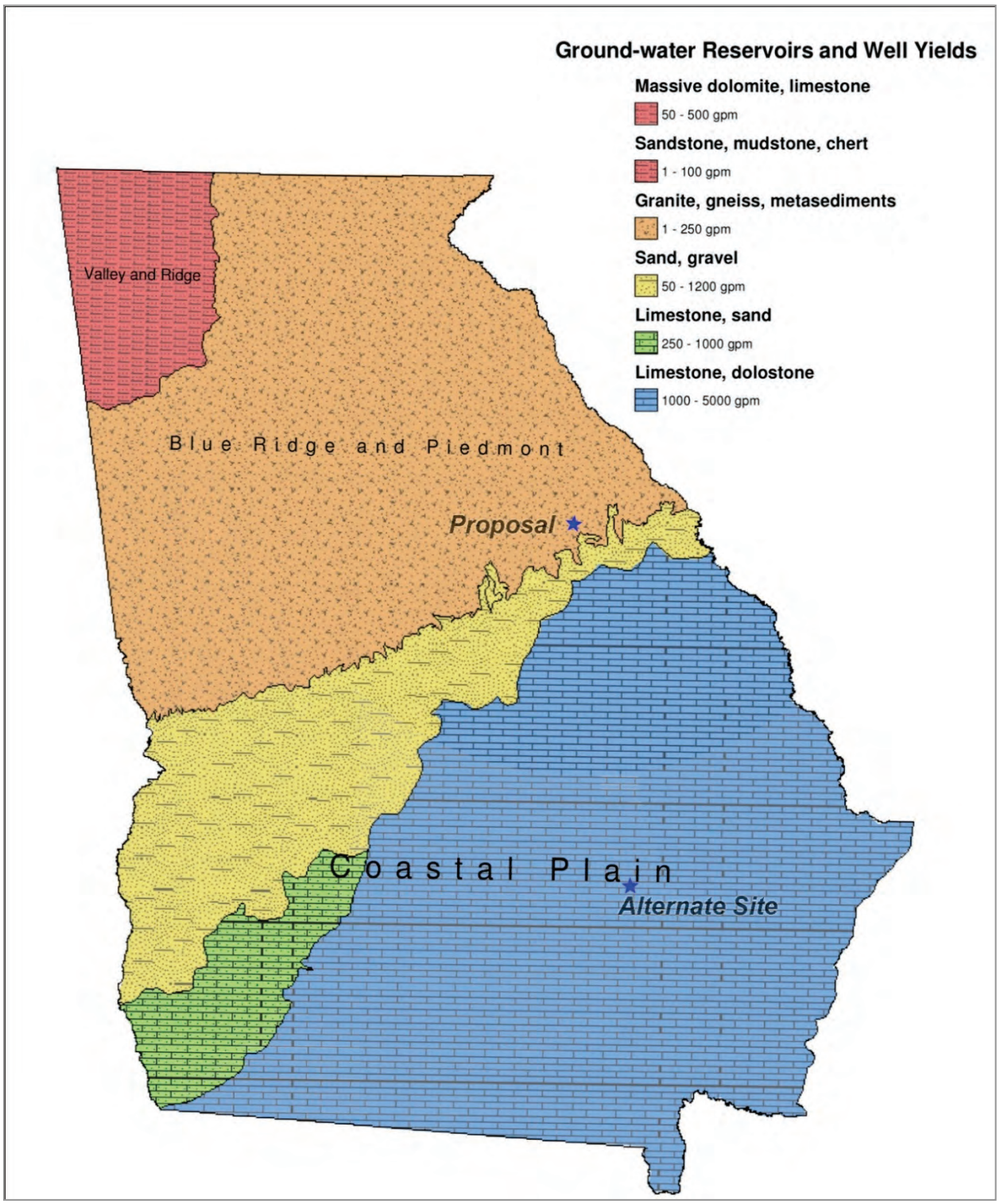


Figure 3-15. Georgia Groundwater Reservoirs and Well Yields.

The City of Baxley supplies itself and Appling County with potable water from the Floridan aquifer under a groundwater withdrawal permit and a permit to operate a public drinking water supply. The permit was issued by the GDNR in 2008 and is to expire in 2017. The most recent usage reports indicate that the City of Baxley has approximately 0.54 MGD excess capacity (on a monthly basis). Under the terms of the drinking water system permit, the City plant can store up to 3.0 MGD a day of water, and an average of 0.62 MGD (daily) is consumed. Under the provisions of groundwater permit, Baxley is authorized to withdraw a total of 1.4 MGD monthly average and 1.4 MGD annual average from a total of three groundwater wells, located at different points in the City.

3.4.3 Environmental Consequences

3.4.3.1 Identification of Issues

Issues identified during scoping and in the EIS development process are as follows:

- Impacts from large withdrawals of groundwater (depletion of aquifers).
- Potential impacts to groundwater from surface water withdrawals.
- Potential for groundwater contamination.
- Impacts from construction dewatering.

While the Alternate would use groundwater during operation, the Proposal would not withdraw or use any groundwater except possibly during construction. Therefore, for the Proposal, only the potential for groundwater contamination and impacts from construction dewatering are considered.

3.4.3.2 Impact Assessment - Proposal

Groundwater Withdrawal – Construction

Groundwater may be withdrawn during construction for the purpose of dewatering an excavation and/or to supply water for construction needs.

Construction dewatering can temporarily impact other groundwater users by lowering the groundwater level. The Georgia Groundwater Use Act specifies the following with regards to permit requirements for groundwater withdrawal for dewatering:

“Any person withdrawing ground water in excess of 100,000 gpd for dewatering the subsurface rock to a depth of not more than thirty (30) feet, or to a greater depth if approved by the Division, for the purpose of construction of trenches for sewer or water pipes, or excavation for foundations, or utility construction shall be excluded from obtaining a permit to withdraw ground water, provided such use is for a period of not

more than sixty (60) days, unless an extension of time is approved by the Division for a justifiable reason."

A groundwater withdrawal permit is required if withdrawal exceeds 100,000 gpd and does not meet one or more of the purposes stated above.

While the full extent of excavation required for construction will not be known until the design is complete, according to preliminary design, the deepest excavation is estimated to be 15 feet, for the biomass fuel unloading pits. The location for these pits is on a 10 foot knoll which would be removed and then another 15 feet would need to be excavated for construction of the fuel unloading pits (Bellassai 2009).

The regional water table elevation is not known for this site but would be confirmed later during a geotechnical investigation. If the geotechnical investigation indicates presence of groundwater at this elevation, the groundwater level would have to be lowered, a process known as dewatering, to enable construction to be performed in a dry condition. Depending on the methods employed for constructing the fuel unloading pits below the groundwater table, there may be some short term impact on the local groundwater. Because the excavation would be shallow, localized and short-term, any impacts to the groundwater table would be highly localized, should dewatering be needed. The extent of the impact would be far less than the distance to the nearest **major** groundwater withdrawal wells, which are in the town of Camak, located approximately four miles northeast of the site (USGS 2009b). **However, without site-specific data it is not possible to assess potential impacts to residential wells near the Proposal site. If construction dewatering would be necessary**, impacts would be assessed through testing at the site to determine actual aquifer parameters, and in consideration of the contractor's selection of construction methodology. **Based on the site geology, unavoidable impacts to nearby residential wells from construction dewatering appear unlikely. However, if any residential wells are impacted by construction dewatering, an alternative water supply would be provided to affected residences.**

Dewatering methods employed would be determined by the contractor to match their planned construction procedures. Typically, methods include deep wells, well points, water flow barriers (sheet piles) and pumping from sumps within the excavation.

If a groundwater well is considered for construction, additional testing would be done to verify that no nearby residential wells are impacted.

Potential Contamination of Groundwater

Chemicals and fuels that have the potential to impact groundwater would be used at the plant; and waste ash, if not properly disposed of, has the potential to impact groundwater. Chemicals and fuels can cause contamination by spillage that then migrates downward through soil to groundwater, or can be carried by surface water that then infiltrates through soil to groundwater. Current laws and regulations governing

storage of chemicals and fuels that can harm groundwater, and required action for spills of those materials, are intended to prevent groundwater impact from storage and use of those chemicals and fuels. Proper containment as required by law results in minimal potential for groundwater impacts from spills during construction and operation. Spill kits, absorptive materials, and/or oil containment booms will be utilized if a chemical or oil spill occurs during construction. Ash will be disposed of off site in a permitted landfill. Construction of the water lines and the reconductoring would not be expected to affect groundwater.

A SPCC Plan would be developed by Oglethorpe in accordance with the Oil Pollution Prevention Regulation. The SPCC Plan is intended to address locations of oil storage, operating procedures that prevent oil spills, control measures installed that can prevent a spill from reaching navigable waters, and countermeasures to contain, clean up, and mitigate the effects of an oil spill that impacts waterways. In the event of a spill, actions in the SPCC plan would be implemented.

3.4.3.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The Proposal includes the following measures to reduce or prevent potential adverse environmental impacts on groundwater:

- Fly ash and bottom ash would be conveyed pneumatically to a single, elevated storage silo and would be trucked off site for disposal.

- A SPCC Plan would be developed for containment and control of liquids that have the potential to contaminate groundwater.

- The Proposal site is not in a groundwater recharge area and is in an area with low potential for groundwater impacts.

No additional mitigation measures have been evaluated.

3.4.3.4 Impact Assessment – Alternate

Temporary Construction Dewatering Wells

If construction dewatering is necessary, the impacts to groundwater levels would be temporary. Water levels reduced during dewatering would recover quickly after construction ends and the dewatering wells are stopped.

Operational Uses of Groundwater

Two on-site groundwater wells in the Floridan aquifer could provide a majority of the source water for the plant with a potential withdrawal rate of 800,000 gallons per day. The withdrawal of groundwater will require a permit from Georgia EPD.

Appling County is on the outer part of a 24-county region that EPD has identified based on vulnerability for or contribution to salt water intrusion. Excessive pumping from the Floridan aquifer has led to intrusion of salt water into the aquifer at some locations along the Georgia coast. Appling County is in that part of the region where there would not be restrictions on pumping; however, industrial users may be required to evaluate alternative water sources as a substitute for groundwater use, and may be required to maximize use of recycled or reclaimed water (EPD 2007).

In general, the localized lowering of the groundwater table that results from pumping can potentially impact yields in nearby wells. Site-specific pump testing would be needed to assess potential impacts.

In other parts of Georgia, widespread pumping from the Floridan aquifer for irrigation has resulted in impacts on surface water features dependent on groundwater for part of their water supply (Rugel et al. 2009). While conditions are different in Appling County, additional information would be needed to assess potential impacts on surface water features.

Should Oglethorpe decide to pursue the Alternate, additional investigation would be needed to assess the impacts of groundwater withdrawal.

Potential Contamination of Groundwater

As with the Proposal, spills and ash would have potential to impact groundwater, and, as with the Proposal, an SPCC plan will be implemented and ash will be containerized and disposed of off site in a permitted landfill.

3.4.3.5 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The same measures that would be implemented for the Proposal are also applicable to the Alternate site. Additional measures to reduce groundwater impacts may be appropriate, should Oglethorpe decide to pursue this site.

3.4.3.6 Impact Assessment – No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on groundwater resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by the construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.5 ACOUSTIC ENVIRONMENT

3.5.1 Noise Terminology and Guidelines

Noise-sensitive receptors are those that may be subject to stress or significant interference from noise. They often include residential dwellings, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. Industrial, commercial, agricultural and undeveloped land uses generally are not considered to be sensitive to ambient noise. No noise regulations were identified that are applicable to the Proposal from the State of Georgia or from Warren County. RUS will follow the standards established by the U.S. Department of Housing and Urban Development (HUD) as noted in this section.[43]

Acoustic Terminology

Noise is often considered unwanted sound; however, response to noise is highly individualized and is influenced by both acoustic and non-acoustic factors. Acoustic factors include the sound's amplitude, duration, frequency content, and fluctuations. Non-acoustic factors include the listener's ability to become accustomed to the sound, the listener's attitude towards the noise and the noise source, the listener's view of the necessity of the noise, and the predictability and consistency of the noise.

Amplitude and frequency physically characterize sound energy. Sound amplitude is measured in decibels (dB) and are based on a logarithmic scale. The reference sound pressure corresponds to the typical threshold of human hearing. A 3 dB change in a continuous broadband noise is generally considered "just barely perceptible" to the average listener. Similarly, a 5 or 6 dB change is generally considered "readily perceptible" and a 10 dB change is generally considered a doubling (or halving) of the apparent loudness (FHWA 2007).

Frequency is measured in hertz (Hz), which is the number of cycles per second. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz.

[43] 24 CFR 51

Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the low and high frequencies. As such, the A-weighting scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels (dBA).

Noise in the environment is constantly fluctuating; examples could be when a car drives by, a dog barks, or a plane passes overhead. The average sound level for a specific time period is called the L_{eq}. An additional sound metric is the L_{dn}. The L_{dn} is a 24-hour, A-weighted average sound level that is often used to represent community sound levels. With the L_{dn}, a 10 dB nighttime penalty is added to the nighttime hours to account for added sensitivity to noise during the night. L_{eq} and L_{dn} are both used in the analysis.

HUD Standards

The U.S. Department of Housing and Urban Development (HUD) has adopted environmental standards, criteria, and guidelines for determining acceptability of federally assisted projects and proposed mitigation measures that achieve the goal of a suitable living environment (Table 3-22).

Table 3-22. HUD Standards.

Rating	Outdoor (dBA)
Acceptable	Not exceeding 65
Normally Unacceptable	65 to 75
Unacceptable	Above 75

Source: 24 CFR 51.103(c), Exterior Standards.

3.5.2 Affected Environment – Proposal

The land in the vicinity of the Proposal site is used primarily for agricultural, forestry, industrial and residential purposes. There are several commercial establishments and industrial properties located to the northwest of the Proposal site including the Georgia Pacific sawmill, TRW Automotive (recently closed), and the Timberman Wood Yard. The East Warrenton Industrial Park, which includes Plastic Tubing Industries, Inc., is located adjacent to the Proposal on the northwest side. The Warrenton Quarry is located southwest of the Proposal site. There are commercial and industrial land uses nearby, but no major airports or highways. There are noise sources in the area, with

vehicular traffic, residential tools (e.g. chain saws and lawn mowers), barking dogs, insects, and farming equipment being the primary sources of existing sound in the immediate surrounding area (Burns & McDonnell 2009b, p. 3-52).

A contractor with Oglethorpe completed an ambient sound survey for the Proposal site in October 2008. Sound level monitors were placed at three locations around the site (Figure 3-16). Each monitor recorded sounds for seven days (168 hours) in duration. Figure 3-17 is a graph of the noise levels that were captured during the study period.

The contractor also conducted an ambient sound survey for roads located near the facility in November 2009 to establish daytime and nighttime ambient baselines near the roadways to contrast against future predicted sound levels that could be attributable to potential increases in truck traffic associated with the Proposal. Figure 3-18 shows the six locations where monitoring occurred during the survey. Table 3-23 provides the sound pressure levels for each of the six locations.

Table 3-23. Noise Measurements Near Local Roads at the Proposal Site.

Measurement Point	Average Measured Daytime L_{eq} (dBA)	Maximum Measured Daytime L_{eq} (dBA)	Minimum Measured Daytime L_{eq} (dBA)	Daytime Traffic Count (vehicles/ measurement)	Measured Nighttime L_{eq} (dBA)	Nighttime Traffic Count (vehicles/ measurement)
MP1	45	52	41	0-1	38	0
MP2	69	71	65	23-29	57	1
MP3	63	64	61	13-21	36	0
MP4	62	64	61	17-32	55	2
MP5	52	53	52	3-8	35	0
MP6	63	67	59	1-9	59	1

Source: Burns & McDonnell 2010b

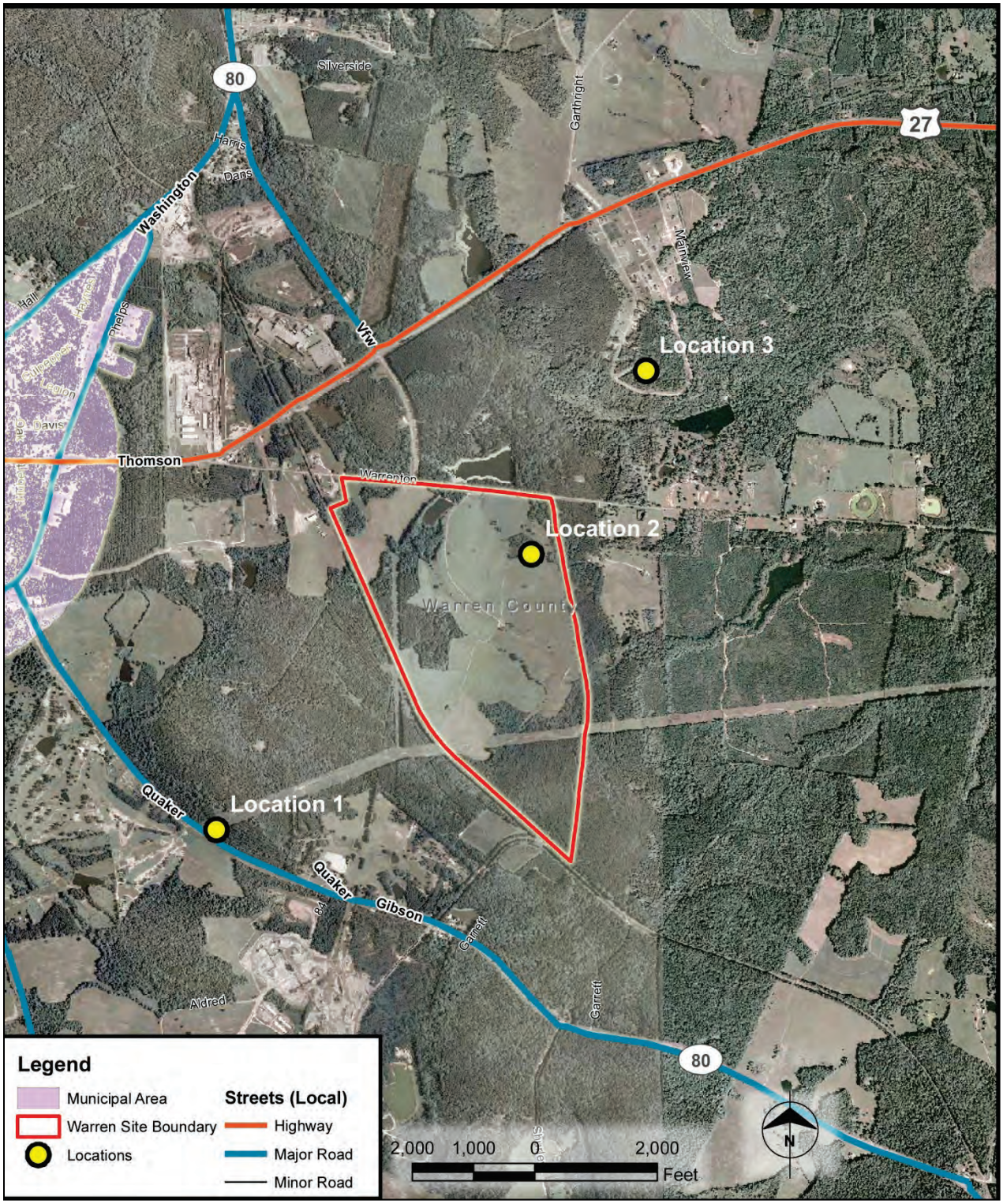


Figure 3-16. Proposal Site Sound Measurement Locations.
Source: Burns & McDonnell 2009b

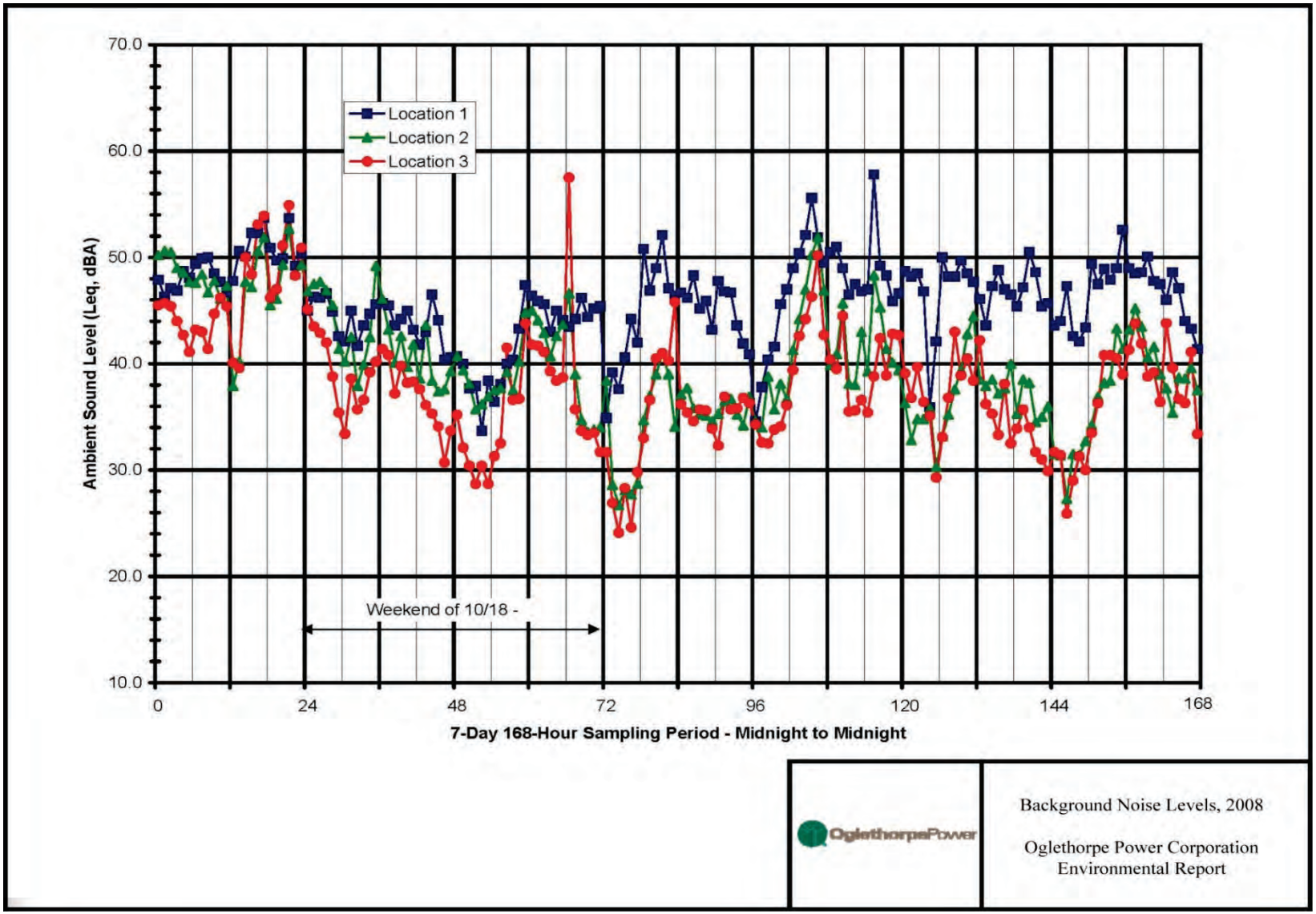


Figure 3-17. Background Noise Levels near the Proposal Site.
Source: Burns & McDonnell 2009b

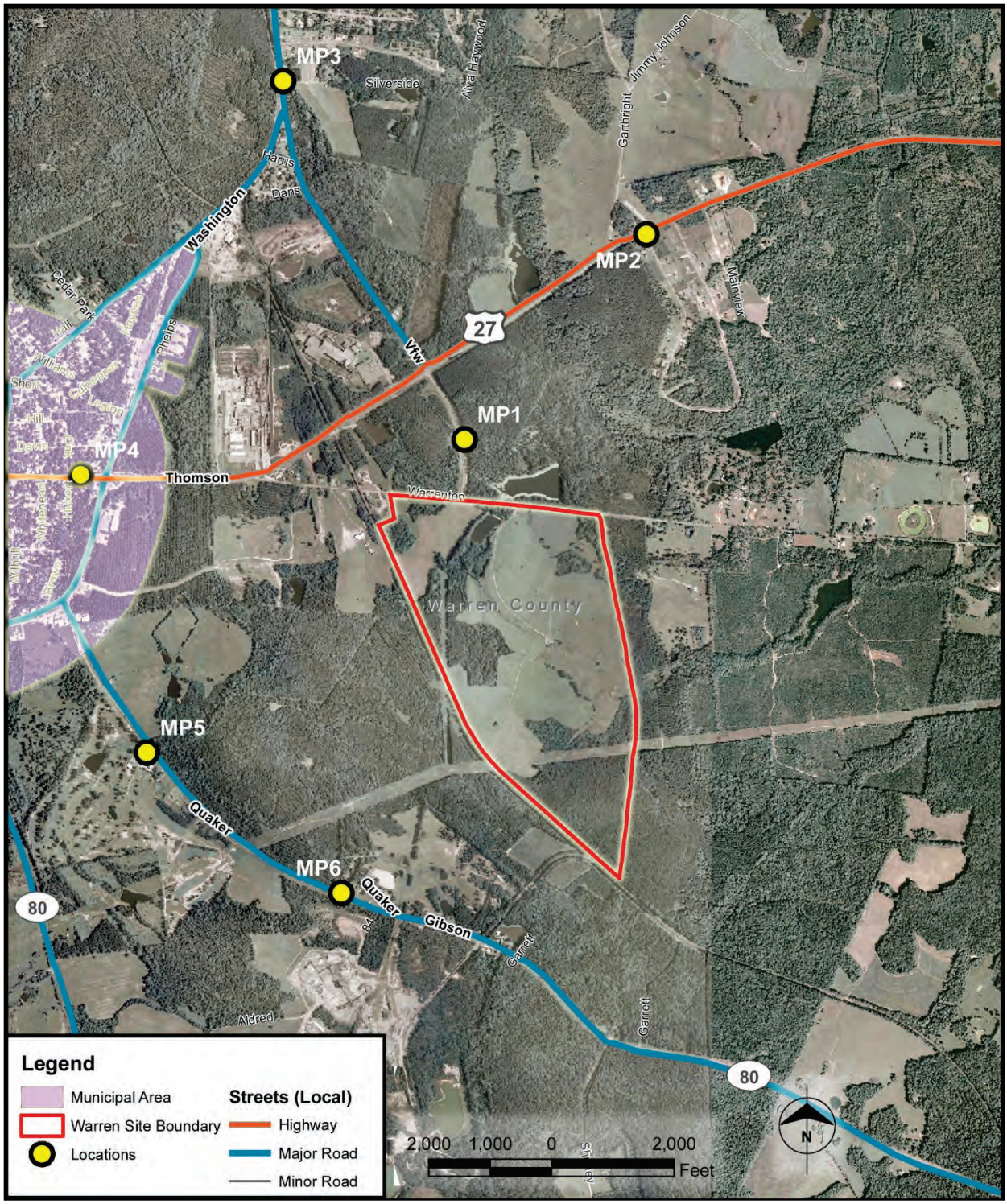


Figure 3-18. Proposal Sound Measurement Locations Near Local Roads.
Source: Burns and McDonnell 2010

3.5.3 Affected Environment - Alternate

A contractor with Oglethorpe conducted an ambient sound survey for the Alternate site in 2008. Sound level monitors were placed at four locations near the closest residences to the Alternate site. The locations included: Hundreds Road, Jekyll Road, Dogwood Drive, and Golden Isles Parkway (Figure 3-19). Each continuous data logger recorded sounds for seven days (168 hours) in duration. Manual measurements were also made during the start and finish of the monitoring period.

3.5.4 Environmental Consequences

Noise impacts would originate from construction activities at the Proposal site and plant operations, including fuel delivery. The analyses include an overview of issues related to potential noise impacts, methodologies used to address impacts and measures that would be implemented to minimize any impacts.

3.5.4.1 Identification of Issues

The following issues were identified during scoping and the EIS development process:

- Construction noise, including traffic.
- Limit noise to business hours.
- Operational noise levels.
- Buffer between the plant and the surrounding community.

3.5.4.2 Impact Assessment - Proposal

Construction Noise

Construction will take place over a three-year period (Section 2.5.2.14). The Proposal has the potential to cause a localized and temporary increase in ambient noise levels near roadways used for transporting equipment and materials and around the construction of the electrical generating facility. During construction, delivery of construction materials is expected to average between 15 and 25 large trucks per day with occasional days of up to 50 large trucks per day. The actual noise levels generated by construction would vary on a daily and hourly basis, depending on the activity that is occurring, and the types and number of pieces of equipment that are operating. Such increases in noise levels would occur only during the construction period and as such, are considered short-term impacts. Some short-term increases in noise from construction equipment would also occur during the reconductoring of the transmission lines and the installation of the water lines.

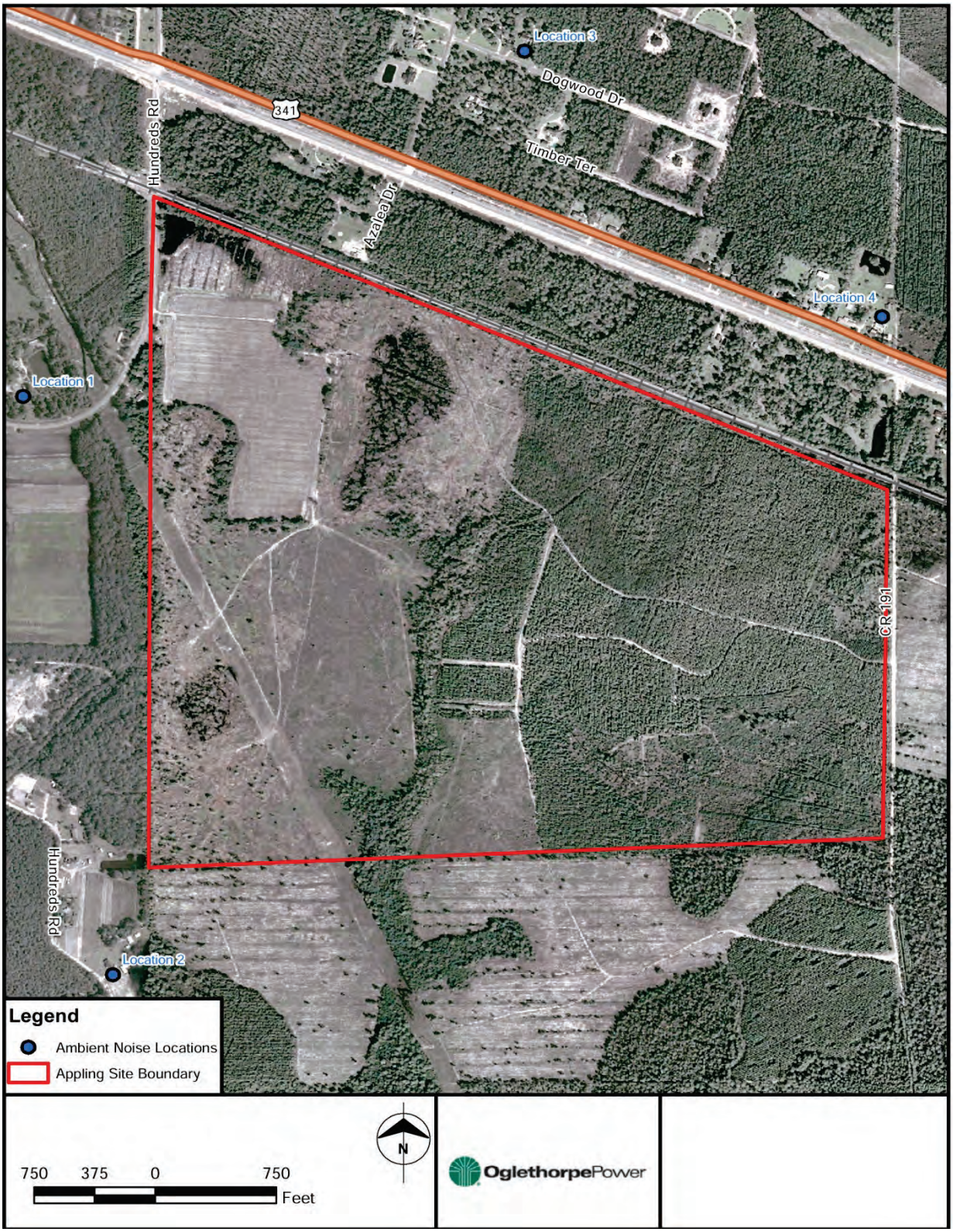


Figure 3-19. Sound Measurement Locations – Alternate Site.
Source: Burns and McDonnell

Refer to Table 3-24 for typical construction noise levels. The noisiest pieces of construction equipment are likely to be graders, cranes, pneumatic tools, compactors, concrete trucks, loaders, and dump trucks.

When construction is near completion, a short-term occurrence of steam blows would generate noise impulses. The steam blows would be necessary to remove debris in the steam turbine part of the power generation equipment prior to initial startup of the units. The steam blows would occur during the daytime on several occasions over a period of approximately two-to-four weeks depending on the number of steam blows that are required to meet the cleanliness requirements prior to operation. The typical sequence time is five minutes per blow and 30 - 60 minutes between blows to re-fill the drums, heat the water and repressurize.

Table 3-24. Typical Construction Equipment Noise Levels

Description	Noise Level, dBA Measured 50 feet from Source
Jackhammer	88
Grader	85
Loader	85
Concrete Mixer	85
Dump Truck	84
Mobile Crane	83
Compactor (ground)	82
Backhoe	80
Generator	81

Source: FHWA 2008

Operational Noise

To evaluate the sound levels from the operation of the Proposal, the primary noise sources were identified and modeled. The noise modeling for the plant operations was performed using industry-accepted sound modeling software, the Computer Aided Design for Noise Abatement (CadnaA), published by DataKustik, Ltd., Munich, Germany.

The primary noise sources on-site that are part of the project are the boiler, cooling tower, materials handling, air quality control systems, induced draft (ID) fan, forced draft fans steam turbine generator (STG), and the generator step-up transformer (GSUT) fans associated with the operation of the facility. These are all major contributors to the overall sound levels expected as a result of the Proposal.

The Proposal was subjected to a noise analysis for the plant operations that included scenarios with and without noise attenuation mitigation for various components. Sound attenuation for various components including cooling fan propeller types, boiler enclosures, materials handling, air quality control systems was evaluated. A final mix of sound attenuation components includes:

- Cooling tower fans will be constructed of multi-blade propeller type specifically designed for low noise operation.
- Cooling tower gear boxes will be constructed with low noise equipment.
- Major components such as the steam generator, ductwork and associated equipment will be insulated.
- Air handling blowers will have discharge silencers.
- Induced draft fans for air supply will have discharge silencers.
- Mobile chipper will be used on an intermittent basis during non-night hours and will be operated behind a barrier wall constructed to minimize noise levels.

The level of sound attenuation noted above plus other vibration reducing and noise reducing elements results in a predicted L_{dn} noise level of 45-60 dBA at all existing receptor dwellings, with predicted L_{dn} noise levels of approximately 50-60 dBA at the Proposal boundaries, except for a small area along the eastern property boundary with estimated L_{dn} levels of approximately 65 dBA.

Traffic Noise

In order to quantify the noise associated with the truck traffic on local roadways that would be delivering wood to the Proposal site, the predicted future No Action Alternative sound levels associated with traffic were compared to the predicted Proposal sound levels that included the delivery trucks.

Existing ambient sound levels were quantified by taking four sets (three daytime sets and one nighttime set) of five-minute sound measurements at six different measurement points in areas that could be impacted by an increase in traffic due to fuel delivery trucks traveling to the Proposal. The traffic noise measurement points, shown in Figure 3-19, were chosen because they were representative of noise receptors along a section of a major road leading to the Proposal.

The land uses surrounding the measurement points are a mix of agricultural, industrial, and residential uses. Vehicular traffic was the primary contributor to the sound levels during the measurement periods. The daytime and nighttime sound levels measured are listed in Table 3-25.

Table 3-25 Daytime and Nighttime Sound Levels with Traffic Count (Proposal)

Measurement Point (MP)	Average Measured Daytime L_{eq} (dBA)	Maximum Measured Daytime L_{eq} (dBA)	Minimum Measured Daytime L_{eq} (dBA)	Daytime Traffic Count (vehicles/ measurement)	Measured Nighttime L_{eq} (dBA)	Nighttime Traffic Count vehicles/ measurement)
MP1	45	52	41	0-1	38	0
MP2	69	71	65	23-29	57	1
MP3	63	64	61	13-21	36	0
MP4	62	64	61	17-32	55	2
MP5	52	53	52	3-8	35	0
MP6	63	67	59	1-9	59	1

Source: Burns & McDonnell 2010b

The Federal Highway Administration's Traffic Noise Model (FHWA TNM) was used to predict the sound levels at the measurement points under the following scenarios:

- Existing conditions.
- 2012 No Action Alternative.
- 2012 Construction Employee Traffic (during peak construction).
- 2012 Construction Heavy Traffic (during peak construction).
- 2014 Post-Construction.[44]

Traffic counts were obtained from Appendix E of the *Warren County 100 MW Biomass Facility Traffic Impact Study* (Burns & McDonnell 2010c) which consists of turning movement diagrams for the four scenarios. A heavy vehicle percentage of 15 percent was used for the roads in all scenarios. Traffic data was not available for the road on which MP1 is located, which is a continuation of VFW Road and would become the facility's entrance roadway. For both the existing and 2012 No Action Alternative scenarios, the northbound and southbound lanes each were assumed to have 10 vehicles per hour, using a heavy vehicle percentage of 15 percent. For the 2012 construction scenarios, employee-based traffic and fuel delivery-based traffic counts were calculated for the continuation of VFW Road. For the employee-based traffic count, 425 cars were added to both of the northbound and southbound No Action Alternative traffic counts. The construction delivery-based traffic count was calculated by adding 50 heavy vehicles to the northbound and southbound No Action Alternative traffic counts. The 2014 Post-Construction vehicle count was calculated similarly. For the entrance roadway, 41 heavy vehicles per hour and 16 employees per hour were added to the No Action Alternative traffic counts. The results from FHWA TNM modeling is listed in Table 3-26, below.

[44] When the modeling was done, the plant was expected to be in operation in 2014.

Table 3-26. Predicted Sound Levels from FHWA TNM (L_{dn})

Receiver	Existing Sound Level	2012 No Action Alternative	2012 Construction Employee Traffic*	2012 Construction Heavy Traffic*	2014 Post-Construction*
MP1	55	55	67	69	68
MP2	67	67	71	71	69
MP3	72	72	76	76	75
MP4	69	69	69	69	72
MP5	61	61	61	61	65
MP6	68	68	68	68	72

**Maximum traffic count for NB and SB sides of the road (Burns & McDonnell 2010c)*

For MP1-MP6 the predicted noise levels were generated on a worst-case basis, with all the fuel delivery trucks predicted to pass by the individual MP rather than being distributed over major roads. The increases in predicted sound levels at MP2-MP6 attributed to the Proposal when compared to the existing sound levels and the 2012 No Action alternative are predicted to be 2-4 dBA. This is a result of the existing sound levels already being at elevated levels due to existing traffic on the roadways near those MP sites. Increases of 3dBA are generally considered imperceptible. For MP1, which is along VFW Road, which is the new road leading into the Proposal and currently has limited amounts of traffic, the sound level is predicted to increase by 13 dBA (from 55dbA to 68 dBA) once the plant is in operation. However, there are no residences or other sensitive receptors that would be affected by the increase in noise. MP2-MP6 were in the general vicinity of residences but the noise increases associated with the Proposal are relatively small.

3.5.4.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The following actions would be incorporated into the Proposal to reduce or prevent impacts:

- Construction activities would be limited to daytime hours.
- All operational equipment would be properly maintained to keep the noise attenuation components of the Proposal in good working order.
- All trucks used in the Oglethorpe fuel delivery process would be required to comply with Interstate Motor Carrier Noise Emission Standards (40 CFR 202.10).
- The construction specifications will include the requirement that noise levels not exceed 65 dBA at the nearest residential receptor.

- Once the Proposal is in operation, Oglethorpe will conduct a noise survey to verify that the noise values of 65 dBA (ambient plus noise from the Proposal) is not being exceeded at the nearest residential receptor.

3.5.4.4 Impact Assessment – Alternate

Construction Noise

Construction noise conditions are expected to be the same as those described for the Proposal in Section 3.5.4.2. Impacts will be greater because of the greater number of residences nearby.

Operational Noise

Operational noise conditions are expected to be the same as those described for the Proposal in Section 3.5.4.2. Impacts will be greater because of the greater number of residences nearby.

Traffic Noise

While a noise analysis was not conducted for the Alternate site, levels similar to those for the Proposal are expected.

3.5.4.5 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The same measures identified for the Proposal would also be applicable for the Alternate.

3.5.4.6 Impact Assessment – No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on acoustical resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.6 BIOLOGICAL RESOURCES: FORESTRY

In 2008, forestland covered approximately 67 percent of Georgia's 37.1 million acres (USDA FS 2009). As shown in Table 3-27, the total amount of forestland in Georgia has

increased steadily over the past several decades, increasing by approximately 700,000 acres from 1989 to 2008. There are 172 primary wood product manufacturing facilities in Georgia that convert logs to products, including 12 pulp mills, 9 engineered-wood product mills and 93 saw mills. In addition, there are more than 1,200 secondary manufacturers that further convert manufactured wood products into furniture, molding, paper products, containers, cabinetry, and other goods. In Warren County, two lumber mills produce hardwood and softwood lumber and pallets. Byproducts available for sale from these mills are bark, chips, sawdust, and shavings (GFC 2009).

Table 3-27. Georgia Forest Land (million acres).

	1989	1997	2004	2008
Total Forestland	24.1	24.4	24.8	24.8
Timberland	23.6	23.8	24.2	24.4
Other/Reserved	0.5	0.6	0.6	0.4
Non-forestland	13.0	12.7	12.3	12.3

Source: GFC 2004, USDA FS 2009

Of the 24.8 million acres of forestland in Georgia in 2008, 24.4 million acres was timberland available for commercial production. The remaining forestland in the state (0.4 million acres) included areas where timber production was either unproductive or prohibited.

As shown in Table 3-28, timberland in Georgia consisted of 45.5 percent softwoods and 53.3 percent hardwoods in 2008. The most prevalent softwood groups were loblolly-shortleaf pine and longleaf-slash pine. The most prevalent hardwood groups were oak-hickory and oak-gum-cypress.

Approximately six percent of timberland in the state is disturbed each year, of which half is a result of commercial harvesting for wood products (GFC 2004). The remaining disturbances are a result of natural phenomena, such as insects, disease, weather, or fire, or a result of other human and animal disturbances.

Table 3-28. Georgia Forest by Group Type, 2008.

Forest-Type Group		Acres (thousand)
Softwood types		
	White-red-jack pine	37
	Longleaf-slash pine	3,637
	Loblolly-shortleaf pine	7,427
	Other eastern softwoods	18
	Total softwoods	**11,119**
Hardwood types		
	Oak-pine	2,901
	Oak-hickory	6,395
	Oak-gum-cypress	3,194
	Elm-ash-cottonwood	494
	Tropical hardwoods	4
	Exotic hardwoods	40
	Total hardwoods	**13,028**
Non-stocked		277
Total timberland		**24,424**

Source: USDA FS 2009

3.6.1 Affected Environment--Proposal

Forests on Site

Eight scattered wooded areas ranging from approximately 3 to 16 acres cover 14 percent of the site. Recently cleared areas, including the site south of the southern transmission line and another area on the west, cover 22 percent of the site.

Forests. Vegetation identified in upland forests includes loblolly pine, water oak, willow oak, sweetgum, slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), winged elm (*Ulmus alata*), greenbrier (*Smilax* sp.), poison ivy (*Toxicodendron radicans*), Virginia creeper, red maple, mockernut hickory, pignut hickory, American beech, black cherry (*Prunus serotina*), catalpa (*Catalpa speciosa*), hackberry (*Celtis occidentalis*), and chokecherry (*Prunus virginiana*). Vegetation identified in bottomland sites includes red maple, hazel alder (*Alnus serullata*), privet (*Ligustrum vulgare*), wax myrtle (*Morella cerifera*), sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), winged elm, ironweed (*Vernonia* spp.), and Japanese stilt grass (*Microstegium vimineum*) (Burns & McDonnell 2009b, p. 3-19).

Recently Harvested Areas. These areas had been occupied by pine with minor components consisting of sweetgum, red maple, blackgum (*Nyssa sylvatica*), and oaks (Burns & McDonnell 2009b, p. 3-19).

Forests within Biomass Fuel Area

Transportation of forest biomass for fuel use is generally considered infeasible beyond 75 miles (Dartnell 2009). Table 3-29 and Table display the average annual growth and removals of growing-stock on timberland within 75 miles of the Proposal site.

Table 3-29. Average Net Annual Growth of Growing-Stock on Timberland within 75 Miles of the Proposal Site (million cubic feet)

Major Species Group	Total Net Growth	Stand Origin		
		Natural Stands	Artificial Regeneration	Other
Pines	544	197	346	1.3
Other softwoods	6.9	7.0	-0.07	0.001
Soft hardwoods	82	76	5.1	0.5
Hard hardwoods	88	83	4.3	.05
Unassigned hardwoods	0.1	0.1	0	0
Total	721	363	355	2.3

Source: Miles 2009

Table 3-30. Average Annual Removals of Growing-Stock on Timberland within 75 miles of the Proposal Site (million cubic feet)

Major Species Group	Total Removals	Stand Origin		
		Natural Stands	Artificial Regeneration	Other
Pines	392	184	198	10
Other softwoods	0.3	0.2	0.02	0.04
Soft hardwoods	51	37	8.0	6.7
Hard hardwoods	46	29	11.2	6.0
Unassigned hardwoods	0	0	0	0
Total	489	249	218	23

Source: Miles 2009

The average net annual growth is 721 million cubic feet, which equates to approximately 20 to 25 million green tons.[45] The net annual removal of approximately 489 million cubic feet equates to approximately 14 to 17 million green tons. The difference between the annual growth and removal is 232 million cubic feet, or approximately 6 to 8 million green tons. Approximately half of the growth and removal are natural stands of timber. Pines account for approximately three-quarters of the growth on timberland and approximately four-fifths of removals. The Proposal would require approximately 1.3 million green tons of wood per year.

3.6.2 Affected Environment—Alternate

Forests on Site

Based on site visits in October 2008 and June 2009, the Alternate site is composed of forest, recently-harvested forest land, agricultural land, and maintained utility right-of-way. Most of the site (85 percent) is used for timber production. Recently cleared areas have left approximately 50 percent of the site as standing timber.

Forests. Timber found in the remaining 50 percent of standing timber included: Loblolly pine, longleaf pine, slash pine, pond pine, and pond cypress. Understory vegetation found in these areas consisted of blackberry *(Rubus* sp.*)*, cinnamon fern *(Osmunda cinnamomea)*, broomsedge *(Andropogon Virginian)*, goldenrod (*Solidago* sp.), Carolina redroot (*Lachnanthes caroliniana*), sweetbay (*Magnolia virginiana*), dahoon, privet *(ligustrum* sp.*).*

Recently Harvested Areas. The vegetation found in the recently harvested forest land (approximately 35 percent) included longleaf pine, gallberry *(Ilex glabra)* waxmyrtle, saw palmetto *(Serenoa repens)*, broomsedge, blackberry, goldenrod, sumac *(Rhus* spp.*)* and grasses (Burns & McDonnell 2010d, p. 3-19).

Forests within Biomass Fuel Area

Approximately two-thirds of the land in Appling County is occupied by forests. The dominant forest types in Appling County are the slash pine, sweetbay/swamp tupelo/red maple, and loblolly pine forest types. A majority of the slash and loblolly pine in the county is found in managed forests, 64 percent and 75 percent, respectively, while the sweetbay/swamp tupelo/red maple are all found in natural stands. Slash pine forests are dominated by slash pine (*Pinus elliottii*) trees. Other trees commonly found in this forest type include sweetbay (*Magnolia virginiana*), swamp tupelo (*Nyssa biflora*), pondcypress (*Taxodium ascendens*), pond pine (*Pinus serotina*), loblolly pine (*Pinus taeda*), live oak (*Quercus virginiana*), red maple (*Acer rubrum*), longleaf pine (*Pinus*

[45] The density of green wood is highly variable, depending on tree species, moisture content, wood type (sapwood or heartwood) and location. Based on the wood types, the density was assumed to be in the range of 57 to 70 pounds per cubic foot. Source: (Simpson & TenWolde, 1999).

palustris), and numerous species of oaks (*Quercus* spp.). Typical understory vegetation in this forest type includes waxmyrtle (*Myrica cerifera*), gallberry (*Ilex coriacea*), dahoon (*Ilex cassine*), yaupon (*Ilex vomitoria*), pitcher plants (*Sarracenia purpurea*), dwarf palmetto (*Sabal minor*), blueberry (*Vaccinium* spp.), and huckleberry (*Vaccinium* spp.). Other forest types in Appling County include the sweetbay/swamp tupelo/red maple and loblolly pine forest types.

3.6.3 Environmental Consequences

This section discusses the forests and forest industry impacts from the Proposal, impact assessment methods, and mitigation measures.

3.6.3.1 Identification of Issues

The following issues were identified in scoping and in the EIS development process:

- Effects of the Proposal on forests on-site.
- Effects of the Proposal on high quality native forests elsewhere in the region.
- Effects of the Proposal on forest sustainability in the region.
- Concern regarding implementation of BMPs.
- Concern regarding conversion of native forests to monoculture row crop forestry, potentially with introduction of non-native species.
- Concern regarding deforestation of floodplains.
- Effects on longleaf pine ecosystem.
- Concern about perceived lack of regulation of logging and timber production.
- Concern regarding potential use of biomass not obtained legally.
- Concern regarding nitrogen depletion from slash removal and subsequent use of nitrogen fertilizers.
- What type of biomass will be used and where will it be obtained?
- Control of haul radius from plant.
- Preference for use of woody debris to reduce forest impacts.

3.6.3.2 Impact Assessment - Proposal

Direct Impacts

The Proposal would cause long-term and short-term impacts to some forests on site (Table 3-31). Areas impacted for the long term would not regenerate into forest for the life of the Proposal. Long-term impacts would be caused by construction of an access road and permanent plant facilities while short-term impacts would be caused by temporary construction-related activities. Areas impacted for the short term could

regenerate to forest following Proposal construction. The Proposal would have short-term impacts to 1.5 acres of bottomland hardwood forest and 12.8 acres of recently harvested oak-pine forest land. Long-term impacts would occur to 0.7 acres of bottomland hardwood forest and 9.9 acres of the recently harvested property. A haul road would be constructed through a portion of the bottomland forest. The remainder of the recently harvested oak-pine forested areas would be allowed to naturally revegetate. An area south of the existing transmission lines would be used for construction of a storm water pond and would not revegetate to a forest. An additional area of upland forest consisting of 3.7 acres would be removed by construction and would not be revegetated to forest. Any forest impacts from reconductoring would be minor as the only intrusive activity would be replacement of supports. Any forest impacts from water line installation would also be minor because the great majority of the water lines would be in existing road or railroad right-of-way.

Table 3-31. Summary of Acreages of Affected Forest for Construction and Operation of the Proposal.

Facilities	Agriculture/ Pasture		Upland Forest		Harvested Forest		Bottomland Hardwood Forest		Total of Vegetation Affected	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Power Plant Facilities	103.7	83.0	7.0	3.7	12.2	9.3	1.5	0.7	124.4	96.7
Construction Laydown	15.2	7.7	0	0	0	0	0	0	15.2	7.7
Construction Parking	2.9	0	1.2	0	0	0	0	0	4.1	0
Substation	0.6	0.6	0	0	0.6	0.6	0	0	1.2	1.2
Total	122.4	91.3	8.2	3.7	12.8	9.9	1.5	0.7	144.9	105.6

Source: Burns and McDonnell 2009b

Indirect Impacts

Concerns were raised in scoping regarding various aspects and impacts of timber harvest. The following discussion is general as RUS will not be involved with fuel procurement. As determined in the preliminary reports, the analysis of this EIS is limited to the plant and associated facilities. Since RUS and Oglethorpe have no ownership/control of the forests being harvested they are not within the scope of the EIS. Additionally, harvesting is already occurring and therefore not dependent on this Proposal and therefore is not a connected action. The individual effects on a particular tract of forest land are not known because Oglethorpe has not entered into any timber contracts and the percentage of the fuel source attributable to harvest residue, unmerchantable timber, urban wood waste, and wood waste from sawmills is unknown.

A major concern raised was sustainability of forests. The Proposal, in combination with the harvests of existing industry, would increase demand for wood, but it would not compete with high-value wood for lumber. It could compete for wood residue from forest harvests; however, much low-quality, or previously unmerchantable, wood from harvests is not currently being recovered. A portion of this unmerchantable wood provides nutrients. A market for this wood would be beneficial for landowners seeking to prepare sites for replanting, as it would eliminate the need for them to remove the material. The average net annual growth within a 75-mile radius of the proposed Project is 720.6 million cubic feet of wood (approximately 22.4 million green tons) while annual removals are 489.8 million cubic feet (15.3 million green tons); thus, the forests within a 75-mile radius of the Proposal are growing approximately 7 million more green tons per year than are being harvested. The wood demand for the Oglethorpe facility is expected to be 1.3 million green tons per year, which is approximately 18 percent of the excess growth.

The forest industry is very important to Georgia's economy: the Georgia Forestry Commission (GFC) reports that it contributes $27.7 billion to Georgia's economy (GFC 2008, p. 1). Excess harvesting is not a current concern: the GFC reports that tree volumes are at an all-time high, even while 106 acres of forest land are lost to development every day (GFC 2008, p. 1). An increasing amount of forest land is being left idle, and tree planting has decreased, due to low timber prices (GFC 2008, pp. 7-8).

As discussed in Section 3.3.3.3, forestry BMPs are widely implemented.

In its scoping comments, the GFC provided information to show that the forest industry in Georgia is sustainable, and that BMPs are protective and widely implemented. RUS concurs with the GFC's support of biomass energy generation as a positive additional use of Georgia's forest products.

3.6.3.3 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

Because of the use of BMPs for site construction, impacts to the remaining on-site forest resources would be reduced.

3.6.3.4 Impact Assessment – Alternate

The Alternate site would cause long-term and short-term impacts to forests on site. Areas impacted for the long term would not regenerate into forest for the life of the Alternative. Long-term impacts would be caused by construction of an access road and permanent plant facilities while short-term impacts would be caused by temporary construction-related activities. On-site forest impacts are summarized in Table 3-32.

The rebuilt Hatch – Offerman transmission line would result in long-term impacts to approximately 130 acres of forest (15 acres deciduous, 49 acres evergreen, 2 acres mixed, and 64 acres wooded wetland). These estimates are based on the 2001 National Land Cover Data Set.

Table 3-32. Summary of Acreages of Affected Forest for Construction and Operation of the Alternate.

Facilities	Agriculture/ Pasture		Upland Forest		Harvested Forest		Bottomland Hardwood Forest		Total of Vegetation Affected	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
Power Plant Facilities	8.1	4.0	70.4	61.7	54.0	37.0	0.0	0.0	132.5	102.8
Construction Laydown	6.9	0.0	7.4	0.0	1.7	0.0	0.0	0.0	16.0	0.0
Construction Parking	2.1	0.0	0.0	0.0	1.5	0.0	0.0	0.0	3.6	0.0
Substation	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	2.2	2.2
Total	17.2	4.0	77.8	61.7	59.4	39.2	0.0	0.0	154.4	105.0

Source: Burns and McDonnell 2010d

3.6.3.5 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The same measures described for use with the Proposal in Section 3.6.3.3 are also applicable to the Alternate.

3.6.4 Impact Assessment - No-Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County sites or their surroundings. The Proposal and Alternate sites would not be constructed or operated, and therefore, there would be no effects on forestry resources.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.7 OTHER BIOLOGICAL RESOURCES

3.7.1 Affected Environment – Proposal

3.7.1.1 Upland Vegetation

Most of the Proposal site (62 percent) is used for pasture or hay production, or is maintained right-of-way. Three ponds, the largest of which is approximately 2.5 acres in size, cover a little over one percent of the site (National Agricultural Imagery Program 2009).

Vegetation in pasture/right-of-way areas consists of species such as broomsedge (*Andropogon virginicus*), dogfennel (*Eupatorium capillifolium*), yellowdicks (*Helenium amarum*), tall fescue (*Schedonorus phoenix*), sericea lespedeza (*Lespedeza cuneata*), Johnsongrass (*Sorghum halepense*), Bermuda grass (*Cynodon dactylon*), timothy grass (*Phleum pratense*), and wheat (*Triticum sp*.). The pastures and rangelands are grazed and cut for hay. The pastures are subdivided with fences to allow for rotational grazing. Right-of-way vegetation also included blackberry, goldenrod (*Solidago* spp.), and early successional forest species. (Burns & McDonnell 2009b, p. 3-19).

3.7.1.2 Wetlands and Other Waters of the U.S.

The jurisdictional authority for protection of Waters of the U.S. is derived from several sources, beginning with the Clean Water Act of 1972 (CWA). Section 404 of the CWA authorizes the USACE to grant permits for discharges of dredged or fill materials into Waters of the U.S., and it gives the USACE authority to enforce against violations Executive Order 11990 directs federal agencies to take action to minimize the destruction, loss, or degradation of Waters of the U.S.

KCI Technologies, Inc. (KCI), under contract to Oglethorpe, conducted a pedestrian survey of the Proposal area on September 22 and 23, 2008 to determine presence of potentially jurisdictional waters of the U.S. KCI identified ten features it considered potentially jurisdictional: two wetlands, four open water ponds (as discussed below, one of these is a former pond), and five intermittent streams (KCI Technologies, Inc. 2008b, p. 5).

The presence of wetlands was determined based on the USACE *Wetlands Delineation Manual, 1987.* "Wetlands" refers to areas which meet the criteria for the definition of a wetland, as adopted by the EPA and the USACE for administering Section 404 of the CWA. According to this definition, wetlands are:

> "[T]hose areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted

for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."[46]

The potentially jurisdictional waters reported by KCI at the Proposal site are summarized below (KCI Technologies, Inc. 2008b, pp. 5-8) (Figure 3-20).

Wetlands on Site

KCI identified two potentially jurisdictional wetlands, with a total of 0.54 acres.

Wetland 01 is a medium-quality emergent/forested 0.37-acre wetland located downstream (north) of the dam for Pond 03. This wetland formed in the area between the dam and the culvert under East Warrenton Road. This wetland is currently impacted by the presence of the road right-of-way, the culvert, and by influences from the upstream pond habitat. The edges of the wetland area are forested and the central portion of the wetland is emergent. Wetland vegetation includes red maple, black willow (*Salix nigra*), hazel alder (*Alnus serrulata*), sweetgum, common rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*) and broadleaf arrowhead (*Sagittaria latifolia*).

Wetland 04 is a medium-quality emergent/forested 0.17-acre wetland located at the southeastern corner of Pond 03 at the point where Stream 05 flows into the pond. This wetland is impacted by the surrounding agricultural pasturelands. This wetland is formed from a spring near the southeastern corner of Pond 03 and from stream flow from Stream 05 when it is flowing. The edges of this wetland area are forested and the central is emergent. Wetland vegetation includes red maple, black willow, hazel alder, sweet gum, common rush, and woolgrass.

Ponds

KCI reported three open-water ponds with a total of 4.83 acres (KCI Technologies, Inc. 2008b, pp. 6 and 7). In addition, they identified a former pond, Pond 06. This former livestock pond was once supplied by piped water from an adjacent spring across the intermittent drainage. KCI concluded that due to the lack of wetland hydrology, the former Pond 06 would not be considered a wetland, based on the 1987 Wetland Delineation Manual (KCI Technologies, Inc. 2008b).

[46] (33 CFR 328.3(b)

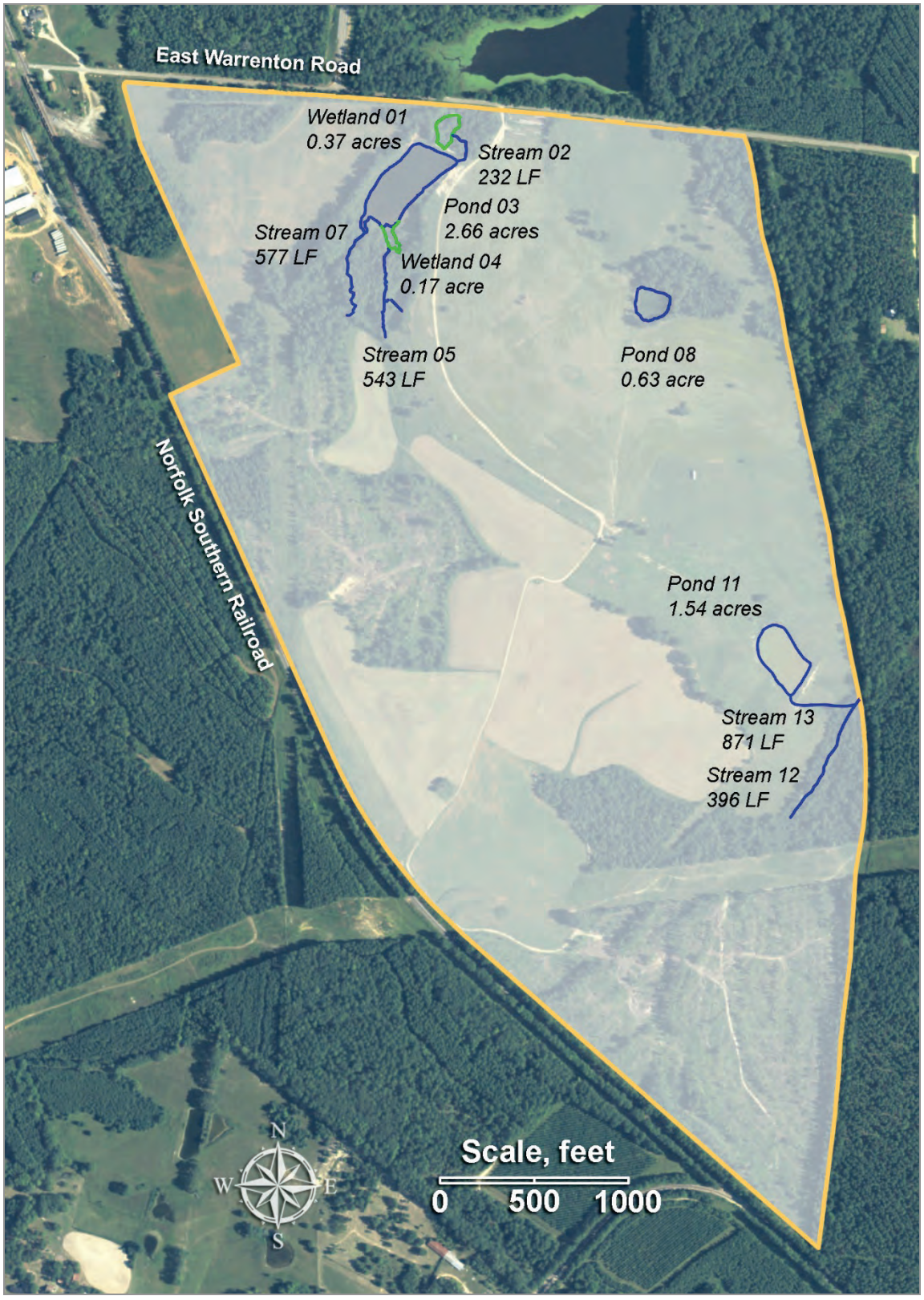


Figure 3-20. Water Features Identified by KCI at Proposal Site.
Source: KCI Technologies, Inc. 2008b

The water supply pipe is currently broken and no longer supplies water to this former pond. This pond has changed from an open water area to a successional forested wetland. Vegetation includes river birch, red maple, American sycamore, black willow, hazel alder, sweet gum, and common rush. The three open-water ponds are described below.

Pond 03 is an open-water 2.66-acre pond used to water livestock. Pond 03 is drained by Stream 02, which originates at the emergency overflow from the pond and flows into Wetland 01. There is also a pipe through the dam that allows the level of the pond to be regulated by the land owner. This pond is fed by Stream 05 and Stream 07. Pond 03 is located in a lightly wooded area and is surrounded by wooded and open pastureland area. Vegetation surrounding the pond includes red maple, black willow, hazel alder, sweet gum, woolgrass, and common rush.

Pond 08 – KCI reported this pond as potentially jurisdictional; however, based on their reported description, it may be an isolated pond unconnected to streams, and therefore not jurisdictional. Pond 08 is a poor-quality 0.63-acre open water habitat that appears to be highly enriched with nutrients from the surrounding agricultural fields and livestock pastures. Pond 08 is located in a lightly wooded area and is surrounded by wooded and open pastureland area. Vegetation surrounding the pond includes river birch, red maple, American sycamore, black willow, hazel alder, sweet gum, woolgrass, and common rush.

Pond 11 is an open water 1.54-acre pond in an open pasture that is used to water livestock. This water body is drained by Stream 12, which originates at the emergency overflow from the pond. Vegetation surrounding the pond includes pasture grasses, broomsedge, woolgrass, and common rush.

On-Site Streams

KCI identified five intermittent streams it considered potentially jurisdictional, with a total length of 2,619 linear feet (LF). Stream widths range from 3 to 4 feet, with bank-full heights of 1.5 to 2 feet. The substrate of these streams consisted of gravel and sand with some silt. Typical streamside vegetation consisted of red maple, yellow poplar, pines, privet, grape, and smilax. The streams were largely dry during the site visit.

Coordination has been completed with the USACE Savannah District with concurrence in the preliminary jurisdictional determination.

Other Wetlands

Wetlands mapped as part of the National Wetland Inventory (NWI) along the length of the Evans Primary – Fury's Ferry and the Union Point - Maxeys transmission line reconductoring are shown in Figures 3-21 and 3-22, respectively. NWI wetlands along the Thomson-McDuffie water line route and the Dam 50 water line route are shown in Figures 3-23 and 3-24, respectively.

3.7.1.3 Riparian Areas and Floodplains

Riparian Areas

The only streams on the Proposal site are the intermittent streams described in Section 3.7.1.2.

Floodplains

The Federal Emergency Management Agency (FEMA), through the National Flood Insurance Program (NFIP), has primary responsibility for developing and implementing regulations and procedures to control development in areas subject to flooding. The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968.

To implement the NFIP, FEMA prepares Flood Insurance Rate Maps (FIRMs) that show special flood hazard areas (SFHAs) where flood insurance is mandatory. The 100-year flood, or base flood, is the flood having a one percent chance of being equaled or exceeded in any given year. The base flood is the national standard used by the NFIP and all federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base flood elevations (BFEs) are typically shown on FIRMs.

Floodplains may have value in the following areas:

- Natural values for water resources: moderation of floods, water quality maintenance, and groundwater recharge. Forested floodplains provide the most water resource value.

- Natural values for living resources: fish, wildlife and plant resources. Forested floodplains also provide the most living resource value.

- Beneficial values for cultural resources: open space, recreation. An example of this use would be parks or athletic playing fields that could be fairly easily restored after flooding.

- Beneficial values for cultivated resources: agriculture, aquaculture and forestry.

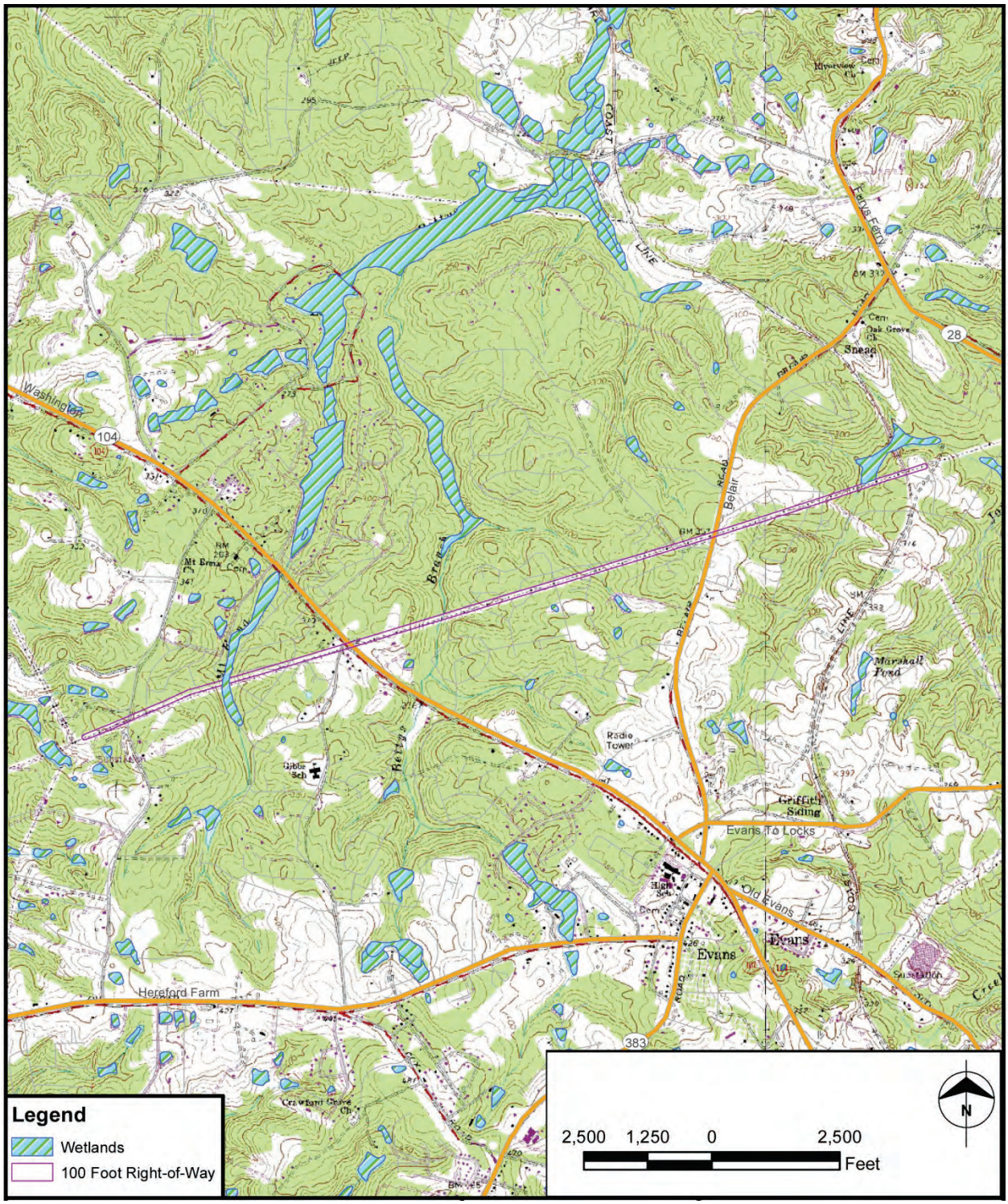


Figure 3-21. NWI Wetlands, Evans Primary – Fury's Ferry 115-kV Line Upgrade.
Source: Burns and McDonnell 2010

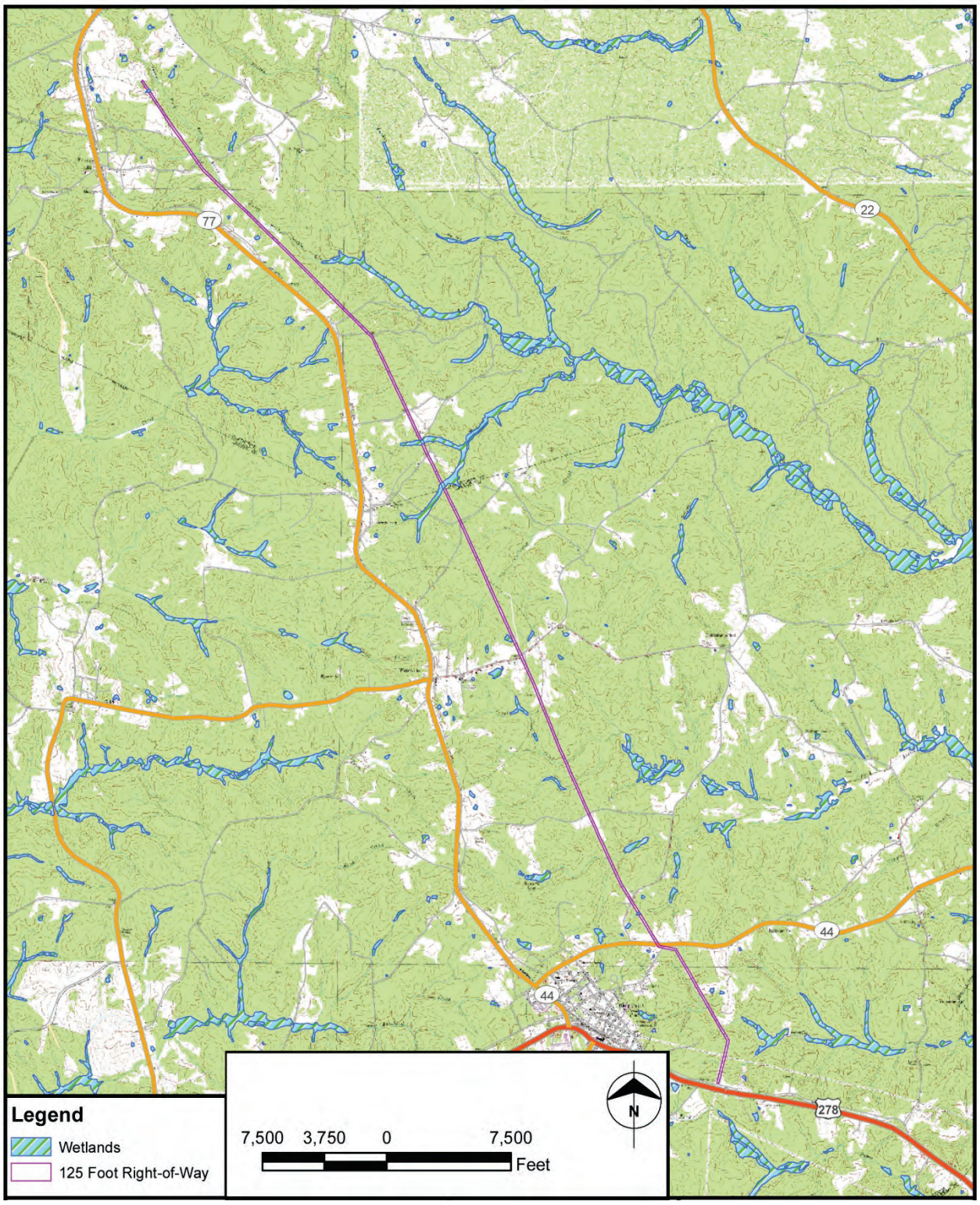


Figure 3-22. NWI Wetlands, Union Point - Maxeys 115-kV Line Upgrade.
Source: Burns and McDonnell 2010

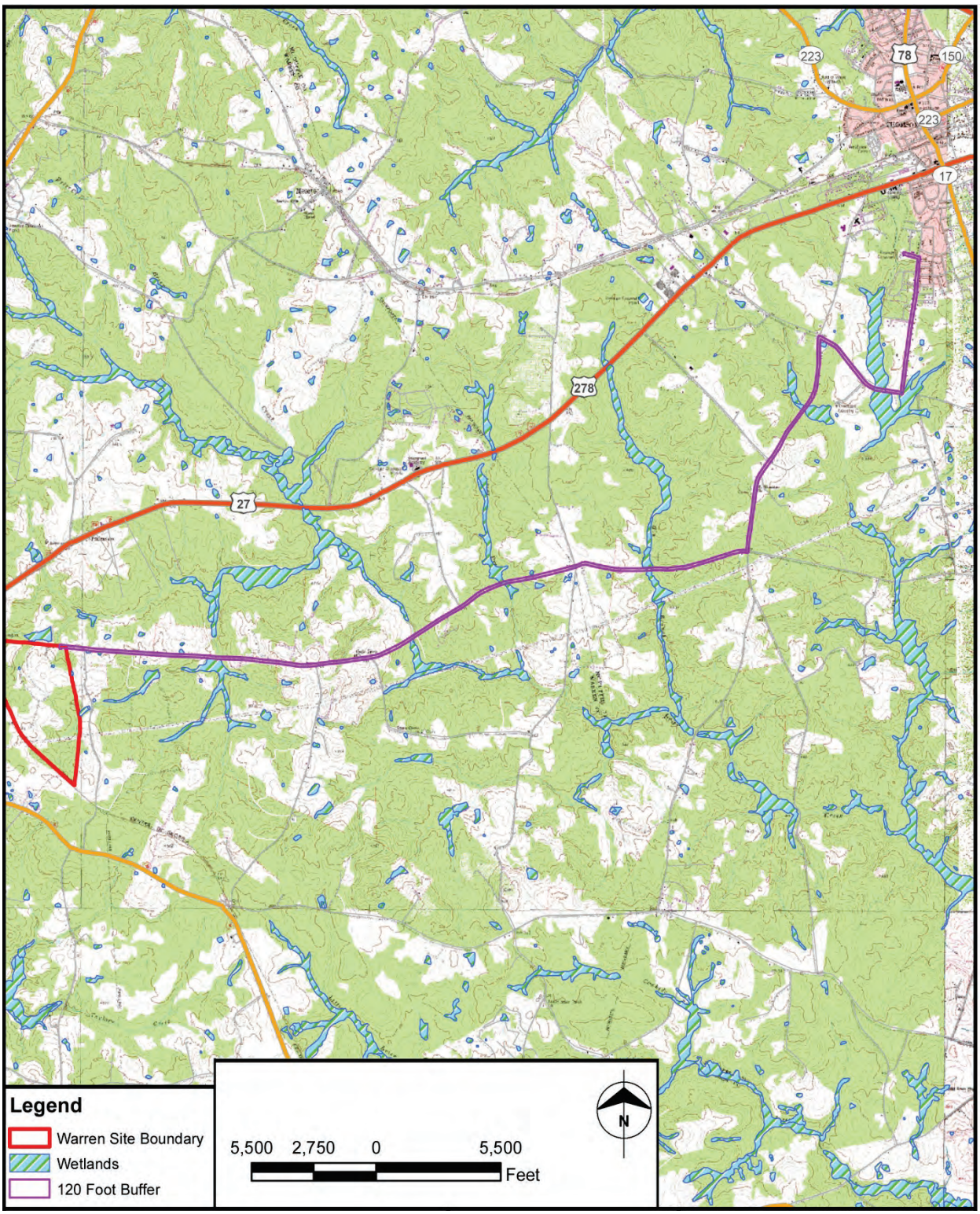


Figure 3-23. NWI Wetlands, Thomson-McDuffie Water Line Route.
Source: Burns and McDonnell 2010.

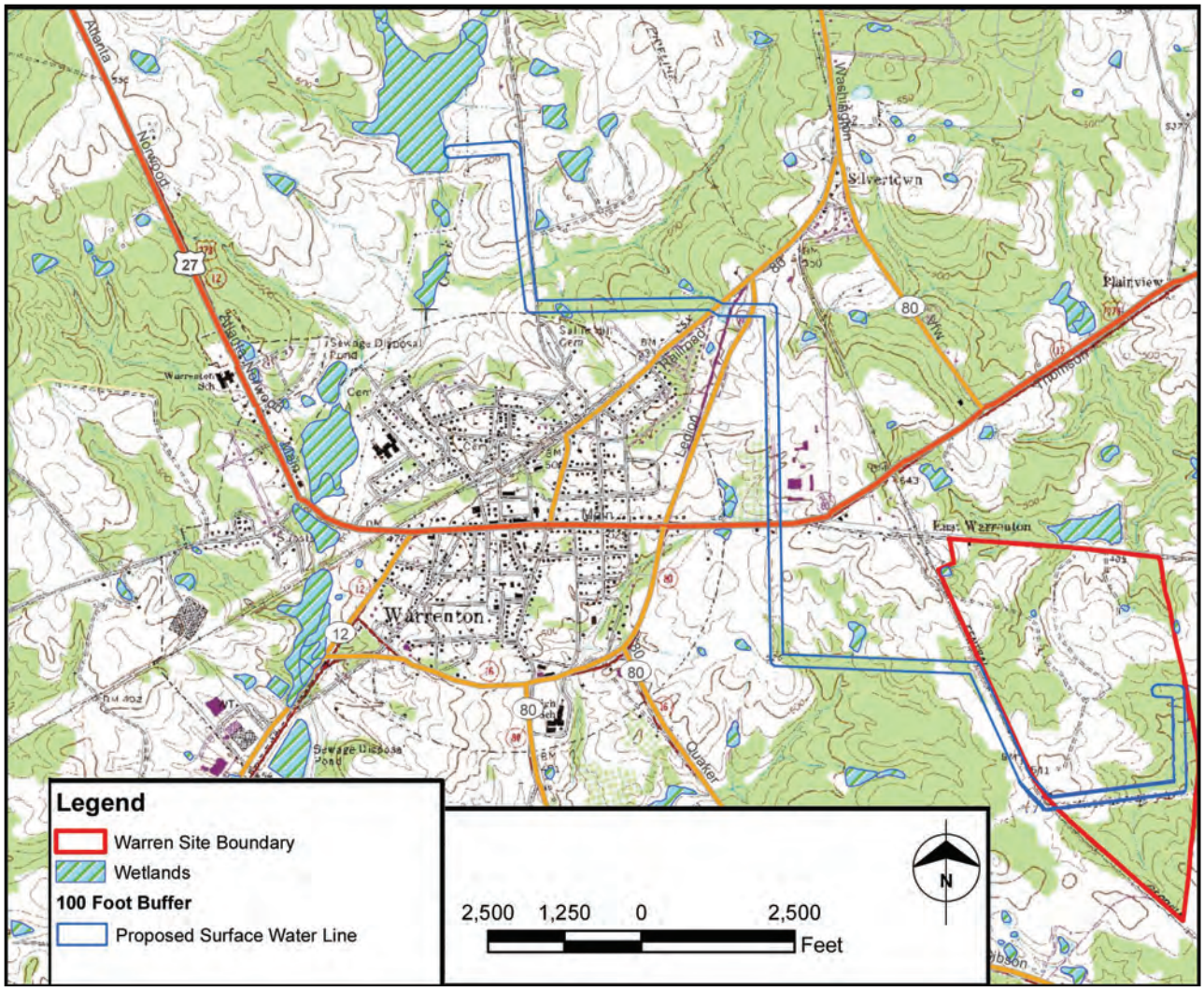


Figure 3-24. NWI Wetlands, Dam 50 Water Line Route.

Source: Burns and McDonnell 2010.

Federal Executive Order (EO) 11988 directs federal agencies to take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. The Order also requires agencies to elevate structures above the base flood level whenever possible. The object of the Order is to avoid the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Executive Order 11988 also requires the following:

> If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in this Order requires siting in a floodplain, the agency shall, prior to taking action, (i) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this Order, and (ii) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

There are no mapped flood zones or floodplains at the Proposal site (FEMA 2010).

FEMA 100-year floodplains along the length of the Evans Primary – Fury's Ferry and the Union Point - Maxeys transmission line reconductoring are shown in Figures 3-25 and 3-26, respectively. FEMA 100-year floodplains along the Thomson-McDuffie water line route and the Dam 50 water line route are shown in Figures 3-27 and 3-28, respectively. Oglethorpe will not be responsible for the reconductoring and installation of water lines, which will be done by other parties. Reconductoring of the transmission lines will most likely be done by Georgia Transmission Corporation, with funding through RUS (which would require additional NEPA documentation). The water lines will be installed by Thomson-McDuffie and Warren County. All applicable regulations would be followed (Oglethorpe Power Corporation 2010h).

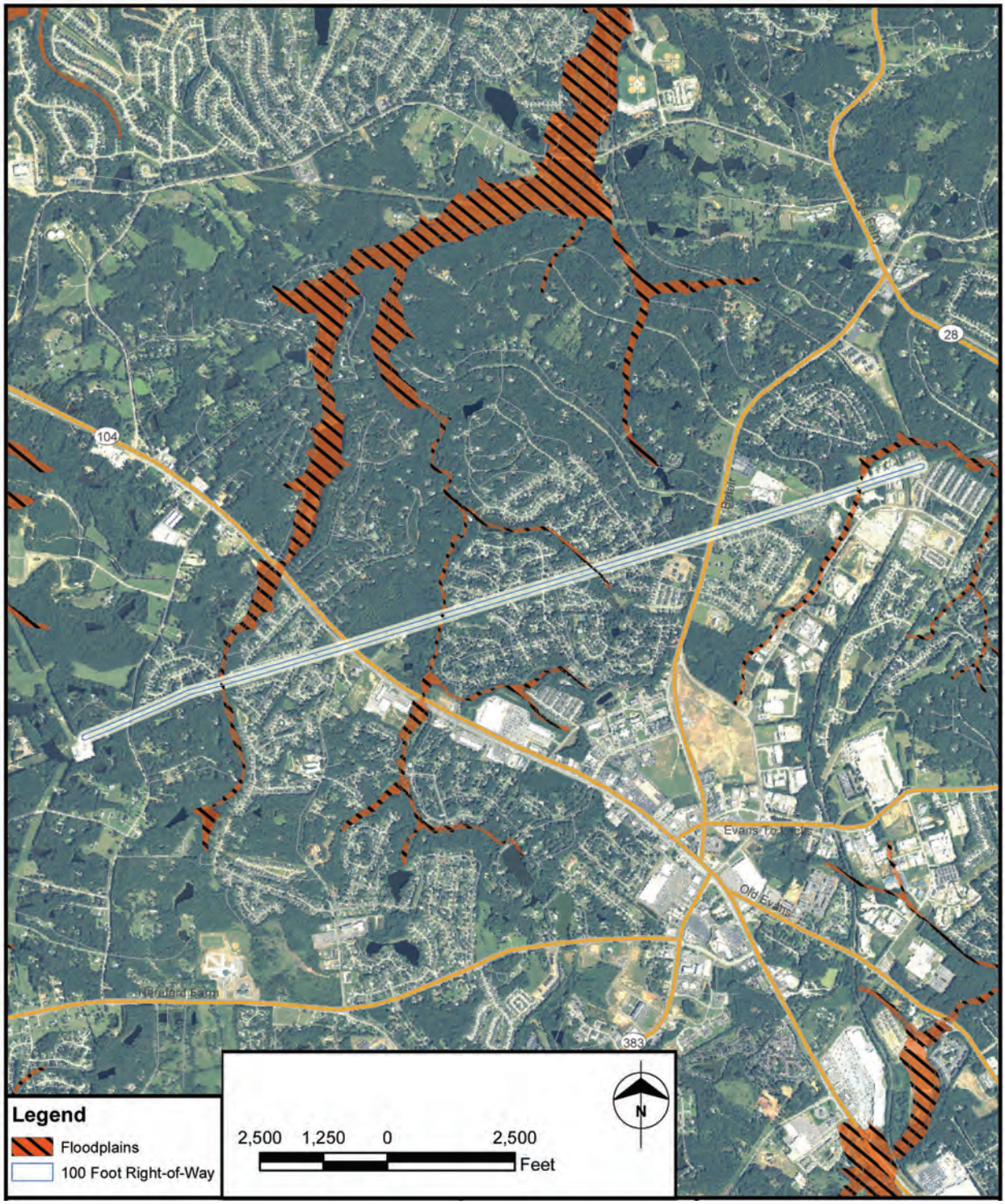


Figure 3-25. 100-Year Floodplains, Evans Primary – Fury's Ferry 115-kV Line Upgrade.

Source: Burns and McDonnell 2010

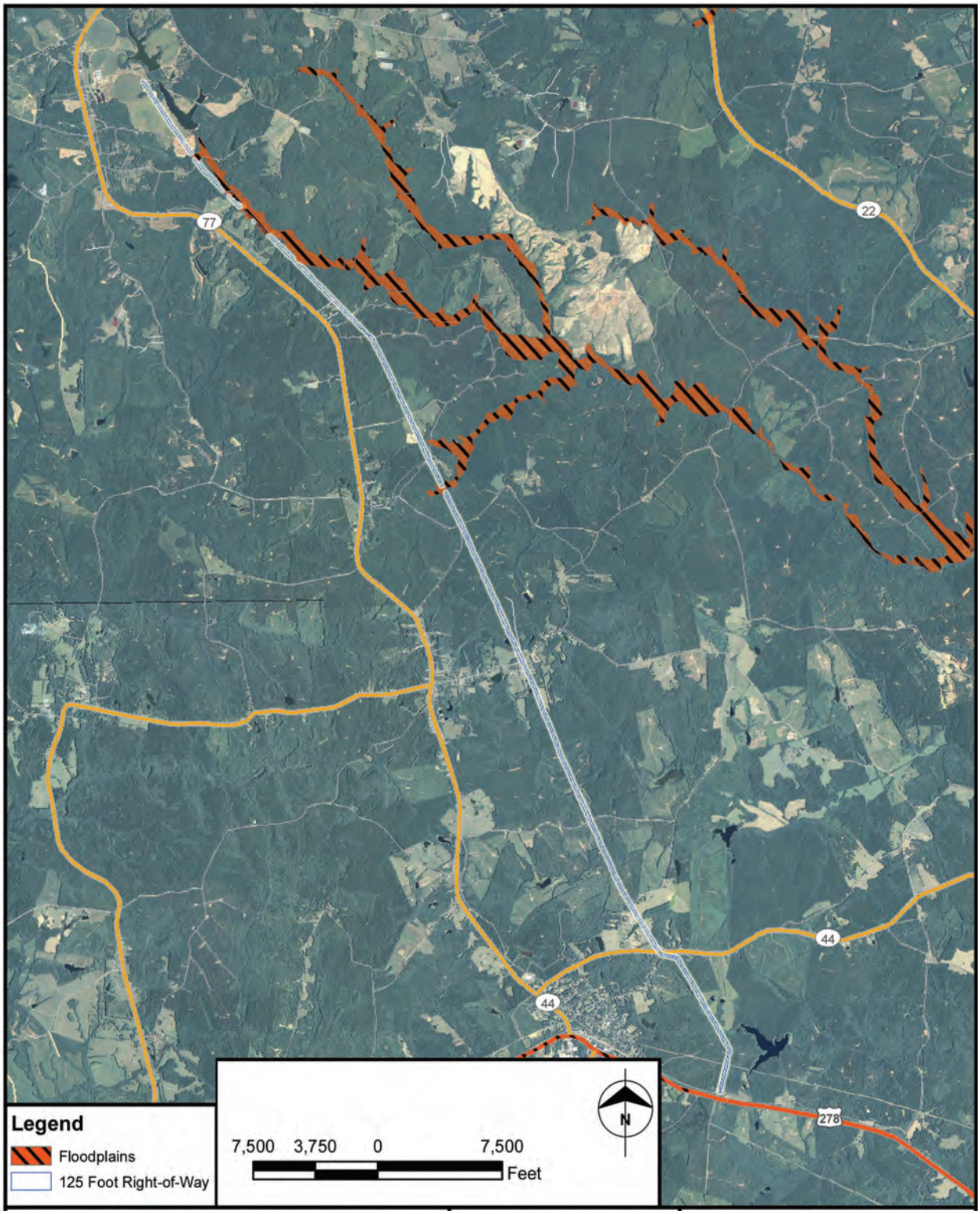


Figure 3-26. 100-Year Floodplains, Union Point - Maxeys 115-kV Line Upgrade.
Source: Burns and McDonnell 2010

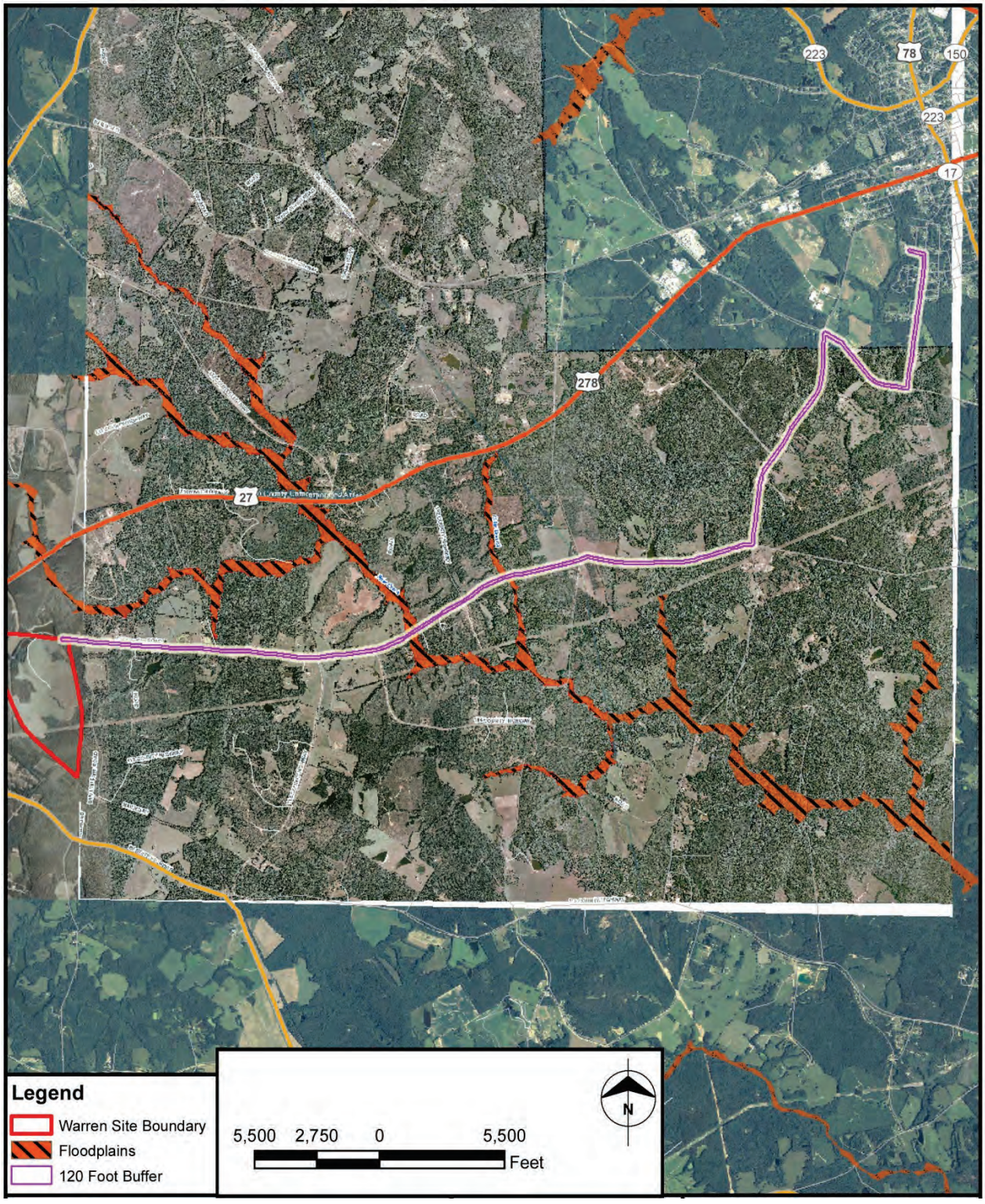


Figure 3-27. 100-Year Floodplains, Thomson-McDuffie WaterLine Route.
Source: Burns and McDonnell 2010

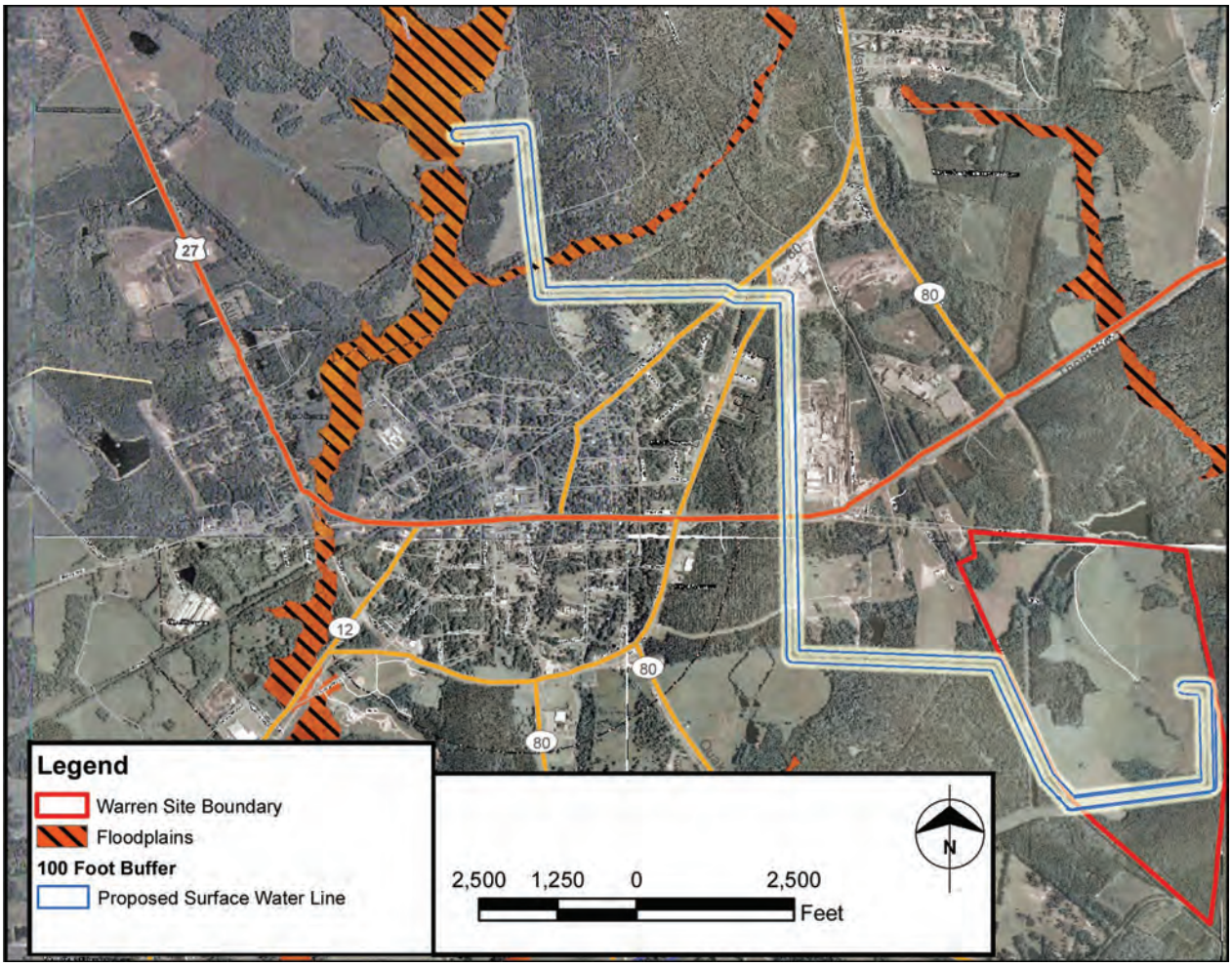


Figure 3-28. 100-Year Floodplains, Dam 50 Water Line Route.
Source: Burns and McDonnell 2010.

3.7.1.4 Wildlife Resources

Game species observed during the July 2009 site visit included white-tailed deer, Eastern gray squirrel, Eastern Wild Turkey (*Meteagris gallopava silvestris)*, Mourning Dove (*Zenaida macroura*), and Northern Bobwhite (*Colinus virginianus*). Other bird species observed included American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), Brown-headed Cowbird *(Molothrus ater)*, Barn Swallow (*Hirundo rustica*), Eastern Kingbird *(Tyrannus tyrannus)*, Hairy Woodpecker (*Picoides villosus*), Indigo Bunting (*Passerina cyanea)*, Northern Cardinal (*Cardinalis cardinalis*), Northern Mockingbird (*Mimus polyglottos*), Purple Martin (*Progne subis*), Turkey Vulture (*Cathartes aura*), and Wood Thrush (*Hylocichla mustelina*) (Oglethorpe Power Corporation 2010b). These species are all common to Georgia, including the area in the vicinity of the Proposal site.

3.7.1.5 Fisheries and Aquatic Resources

There are no perennial streams at the Proposal site, therefore minimal aquatic resources, including fish, would be expected to be sustained, except those in the constructed livestock ponds on the Proposal site.

3.7.1.6 Special Status Species—Proposal

Proposal Site

The Georgia DNR Wildlife Resources Division records locations of special concern, animals, plants and natural communities by "quarter quad." "Quarter quad" refers to one quarter (northwest [NW], northeast [NE], southwest [SW], or southeast [SE]) of a standard USGS topographic map (quadrangle) that covers 7.5 minutes of latitude and 7.5 minutes of longitude. Special status species include those that the US Fish and Wildlife Service (FWS) has identified under the Endangered Species Act[47] as threatened or endangered (T or E, federally-listed species), and included under special regulations such as the Bald and Golden Eagle Protection Act (BGEPA)[48], as well as those the DNR has identified as threatened or endangered in Georgia (T or E, state-listed species), and those DNR has identified as rare or unusual.[49] The DNR provided information about its database of special status species (National Heritage Database) in scoping comments and noted that the database is limited. The data comes from various sources, and many areas have not been thoroughly surveyed.[50]

In its July 8, 2009 scoping letter to RUS, the DNR Wildlife Resources Division reported one Natural Heritage Database occurrence within three miles of the Proposal site: the

[47] 16 USC 1531-1544
[48] 16 U.S.C. 668-668d, 54 Stat. 250
[49] GA ST § 12-3, 27-2, 27-3
[50] The July 8, 2009 letter from the DNR Wildlife Resources Division is included in the Scoping Report (Oglethorpe Power Corporation, 2010a) in Appendix B (in the hard copy, it is on a CD in the back pocket of the EIS), on page 55 of 235 in the electronic file.

Etheostoma fricksium (Savannah darter), approximately 3 miles northeast of the site in Brier Creek (Oglethorpe Power Corporation 2010a). The Savannah darter's historic distribution included clear or tannin-stained streams or small rivers in a few watersheds in eastern Georgia and southern South Carolina. Its present distribution is approximately half its historic distribution (NatureServe 2009). The Savannah darter is neither federally nor state-listed; however, it is considered "imperiled" in Georgia because of its rarity (DNR 2008c). While its range is small, it is common and stable within its range (NatureServe 2009). The Savannah darter would not be expected to be located on the Proposal site because the necessary habitat is not present.

Table 3-33 summarizes the state-listed species reported in Warren County. As shown, no federally-listed species are currently designated in Warren County by the FWS.

Table 3-33. State-Listed Species in Warren County.

Species	Federal Status	State Status	Habitat	Threats
Reptile				
Spotted turtle (*Clemmys guttata*)	No Federal Status	Endangered	Small shallow water bodies surrounded by undisturbed meadow or undergrowth.	Habitat alteration/fragmentation and grazing.
Invertebrate				
Atlantic pigtoe mussel (*Fusconaia masoni)*	No Federal Status	Endangered	Found in unpolluted, fast-flowing water in coarse sand/gravel substrate	Impoundments, siltation, pollution.
Plant				
Granite rock stonecrop (*Sedum pusillum)*	No Federal Status	Threatened	Granite outcrops among mosses in partial shade under red cedar trees	Habitat loss through quarrying or extensive dumping.

Source: FWS 2004b, DNR 2008e, NatureServe 2009

The Proposal site is mostly in the SE quarter of the Warrenton, Georgia USGS 7.5-minute quadrangle. The DNR Wildlife Resources Division reported no locations of special concern animals, plants, or natural communities within this quarter-quad (DNR 2008a). The eastern part of the site lies within the SW quarter of the Thomson West USGS 7.5-minute quadrangle. The DNR Wildlife Resources Division also reported no locations of special concern animals, plants, or natural communities within this quarter-quad (DNR 2008b).

Three state-listed species have been identified in Warren County (Table 3-33), although none have been reported in the two quarter quads that include the Proposal. There is

no habitat on the Proposal site for the **Atlantic pigtoe mussel**. On July 17, 2009, a biologist from Oglethorpe's contractor visited the site, observed the ponds, and "traversed all terrestrial areas". His observations regarding potential suitable habitat for the other two species at the Proposal site are summarized below (Oglethorpe Power Corporation 2010b). Species-specific presence and absence surveys were not completed.

Spotted turtle. The biologist concluded that the wetland and shallow water areas on the Proposal site do not provide suitable habitat for the spotted turtle "due to their small size, use by livestock (i.e., ponds), and nearby recent disruption due to logging causing additional habitat fragmentation." Additionally, the Proposal site was "… lacking suitable travel corridors and nesting areas: for this species" (Oglethorpe Power Corporation 2010b). Most of the area around the wetlands and ponds is used for grazing.

Granite rock stonecrop. The biologist reported the following: "..all terrestrial areas of the Proposed Project site were traversed and qualitatively evaluated for suitable habitat to support the granite stonecrop. Within the logged forested areas, no suitable habitat was located and the areas were highly disturbed. Within the non-logged forested areas, no major rock outcrops, indicating underlying shallow bedrock, were documented. Throughout the Proposed Project site Eastern red cedar and other low-branching, shade-producing tree species were not prevalent." The biologist concluded that habitat suitable for supporting the granite stonecrop was not present (Oglethorpe Power Corporation 2010b).

Transmission Line Corridors

Digital species accounts and species range data were obtained and overlaid in ArcGIS. Table 3-34 lists the presence of known species by ¼ quadrangles near

the transmission line upgrades. Three state-listed threatened species and one state listed species of concern occur near the Evans Primary-Fury's Ferry 115kV upgrades. One of the state listed species, Georgia aster (*Symphyotrichum georgianum*), is also a candidate for federal listing. The other two state listed threatened species are the sweet pitcherplant (*Sarracenia rubra*), and the Ocmulgee skullcap (*Scutellaria ocmulgee*).

The Evans Primary line crosses the potential range of one federally listed endangered species, relict trillium (*Trillium reliquum*). Habitats for known populations are relatively close to creeks or rivers where high relative humidity is maintained for most of the year, especially under the hardwood canopy during the late spring and summer seasons. Plants are typically found in forests where other forms of disturbance were noted (e.g., on several abandoned roadbeds, a road embankment, an abandoned railroad grade fill, near an abandoned quarry, etc.), but surrounding woods (the probable seed source) in each case had been subjected only to cutting of selected trees at various times in the past.

Table 3-34 summarizes the data provided by the FWS and the GDNR.

Table 3-34. Special Status Species – By County and Project (Transmission)

Common Name	Scientific Name	State Status	Federal Status	Evans Primary – Fury's Ferry 115kV			Union Point - Maxeys 115kV	
				County	Quadrangle		County	
				Columbia	Martinez SW 1/4	Evans SE 1/4	Oglethorpe	Greene
bald eagle	*Haliaetus leucocephalus*	T	BGEPA	X				X
lean crayfish	*Cambarus strigosus*	T					X	
Broad River burrowing crayfish	*Distocambarus devexus*	T					X	
pool sprite	*Amphianthus pusillus*	T	T	X			X	X
sun-loving draba	*Draba aprica*	E		X				
Georgia plume	*Elliottia racemosa*	T		X				
dwarf hatpins	*Eriocaulon koernickianum*	E						X
Shoals spiderlily	*Hymenocallis coronaria*	T		X				
black-spored quillwort	*Isoetes melanospora*	E	E					X
mat-forming quillwort	*Isoetes tegetiformans*	E	E	X				X
Carolina trefoil	*Lotus helleri*	E					X	
pineland barbara buttons	*Marshallia ramosa*	R		X				
Indian olive	*Nestronia umbellula*	R					X	
yellow nailwort	*Paranychia virginica*	E		X				
Dixie Mountain breadroot	*Pediomelum piedmontanum*	E		X				
harperella	*Ptilimnium nodosum*	E	E					X
Oglethorpe oak	*Quercus oglethorpensis*	T					X	X
sweet pitcherplant	*Sarracenia rubra*	T		X		X		
Ocmulgee skullcap	*Scutellaria ocmulgee*	T		X	X			

Table 3-34. Special Status Species – By County and Project (Transmission)

Common Name	Scientific Name	State Status	Federal Status	Evans Primary – Fury's Ferry 115kV			Union Point - Maxeys 115kV	
				County	Quadrangle		County	
				Columbia	Martinez SW 1/4	Evans SE 1/4	Oglethorpe	Greene
granite stonecrop	*Sedum pusillum*	T		X			X	X
Georgia Aster	*Symphyotrichum georgianum*	T	C	X	X	X		
relict trillium	*Trillium reliquum*	E	E	X				

T - Threatened; E - Endangered; R - Rare; U – Unusual; C - Candidate species under review for federal listing. BGEPA – Bald and Golden Eagle Protection Act. Source: Georgia Wildlife Resources Division, Georgia Department of Natural Resources, FWS.

Habitat of the sweet pitcherplant includes acidic soils of open bogs, sandhill seeps, Atlantic white-cedar swamps, wet savannas, low areas in pine flatwoods, and along sloughs and ditches (Patrick et al. 1995). Management of this species includes avoiding site draining, controlling woody vegetation encroachment with prescribed burns and timber removal.

The preferred habitat of the Ocmulgee skullcap includes forested terraces, hardwood slopes and riverbanks of the tributaries to the Ocmulgee, Oconee, and Savannah Rivers. Suggested management of this species includes thinning of surrounding shade trees and control of exotic weeds, especially Japanese honeysuckle (Patrick et al. 1995).

The Georgia aster *(Symphyotrichum georgianum)* preferred habitat includes savannah/prairie communities. The FWS estimates there are "possibly as many as 120 populations" in the Southeast, including in "possibly as many as 18 counties in Georgia." According to the FWS, "Most remaining populations survive adjacent to roads, utility rights of way and other openings where current land management mimics natural disturbance regimes".[51]

Water Pipeline Routes

Digital species accounts and species range data were obtained and overlaid in ArcGIS. Table 3-35 lists the presence of known species by ¼ quadrangles for the Thomson-McDuffie gray water line. Within Warren County, there is one state listed threatened species (granite stonecrop), one state listed endangered species (Atlantic pigtoe) and one state listed uncommon species (spotted turtle). The proposed surface water main from Dam 50 is entirely within Warren County. Based on ¼ quadrangle data obtained from the Georgia National Heritage Program, none of the listed species were known to

[51] Federal Register, December 6, 2007, Volume 72, No. 234, pp. 69044 and 69045. 50 CFR Part 17.

inhabit any of the ¼ quadrangles that would be crossed by the Dam 50 water line. The Thomson McDuffie line occurs within Warren County and McDuffie Counties. There are seven state listed species and one federally listed species within McDuffie County. Of these state listed species, four are listed as threatened, two are listed as rare and one is listed as uncommon. One of the state listed threatened species (Georgia aster) is also a federal candidate for listing as a threatened or endangered species. Based on the ¼ quadrangle data obtained from the GDNR, the Georgia aster (*Symphyotrichum georgianum)* has been recorded near the area of this project (Table 3-35). No other state or federally listed species are known to occur near the proposed Thomson McDuffie gray water line.

The Dam 50 water line is located entirely in the SE quarter of the Warrenton, Georgia USGS 7.5-minute quadrangle. The DNR Wildlife Resources Division reported no locations of special concern animals, plants, or natural communities within this quarter-quad (DNR 2008a).

Table 3-35 lists the species, their listing status, and their known presence near the proposed facilities. Species known to occur near the area are discussed in greater detail below.

Table 3-35. Special Status Species – By County and Project (Water Lines).

Common Name	Scientific Name	State Status	Federal Status	County		Dam 50 Water Line	Thomson McDuffie Gray Water Line		
						Quad.	Quadrangle		
				Warren	McDuffie	Warrenton	Thomson West		
						SE 1/4	NE 1/4	SE 1/4	SW 1/4
spotted turtle	*Clemmys guttata*	U		X					
Atlantic pigtoe	*Fusconaia masoni*	E		X					
bald eagle	*Haliaeetus leucocephalus*	T	BGEPA		X				
southern hognose snake	*Heterodon simus*	T			X				
sandbar shiner	*Notropis scepticus*	R			X				
granite stonecrop	*Sedum pusillum*	T		X					
pink ladyslipper	*Cypripedium acaule*	U			X				
Carolina bogmint	*Macbridea caroliniana*	R			X				
Oglethrope oak	*Quercus oglethorpensis*	T			X				
Georgia aster	*Symphyotrichum georgianum*	T	C		X		X	X	X

T - Threatened; E - Endangered; R - Rare; U – Unusual; C - Candidate species under review for federal listing. BGEPA – Bald and Golden Eagle Protection Act. Source: Georgia Wildlife Resources Division, Georgia Department of Natural Resources, FWS.

Preferred habitat of the Georgia aster *(Symphyotrichum georgianum)* includes savannah/prairie communities. Most of the remaining populations survive next to roads, utility rights-of-way and other clearings (FWS 2004a, 2004b).

3.7.2 Affected Environment – Alternate

3.7.2.1 Upland Vegetation

The Alternate was surveyed during wetlands delineation on October 1 and 2, 2008 and during a vegetative assessment on June 23 and 24, 2009 to survey the plant communities present. During the wetland delineation, sample plots were taken to characterize the vegetation. During the vegetative assessment, a pedestrian survey of vegetation communities was conducted. Based on the site visits the Alternate site is composed of forest, recently-harvested forest land, agricultural land, and maintained utility right-of-way. Approximately 10 percent of the site is used for agriculture, which has been left fallow and volunteer forbs and grasses have begun to grow. Maintained right-of-ways consist of less than five percent (Burns & McDonnell 2010d, pp. 3-19 and 3-20). Vegetation in the areas of pasture/right-of-way consists of species such as flatsedges *(Cyperus* spp*.)*, Egyptian grass *(Dactyloctenium aegyptium)* and dogfennel *(Eupatorium capillifolium)* (Burns & McDonnell 2010d, p. 3-20).

3.7.2.2 Wetlands and Other Waters of the U.S.

KCI Technologies, Inc. (KCI), under contract to Oglethorpe, conducted a pedestrian survey of the Alternate site on October 1 and 2, 2008 to determine presence of potentially jurisdictional waters of the U.S. KCI identified seven features it considered jurisdictional: five wetlands and two intermittent streams (KCI Technologies, Inc. 2008d, p. 5).

The potentially jurisdictional waters reported by KCI at the Alternate site are summarized below (KCI Technologies, Inc. 2008d, pp. 5-8) (Figure 3-29). The USACE Savannah District concurs with the preliminary determination (USACE Savannah District 2010b).

Wetlands

Wetland 01 is a medium-quality forested/emergent 2.04 acre wetland located on the east side of Hundreds Road and south of the Southern Railroad right-of-way, in the northwest corner of the project property. This wetland has areas of impacted logging operations and is emergent, but the area adjacent to the northern boundary along the railroad right-of way is forested. Wetland vegetation included pond cypress, red maple, black gum, slash pine, pond pine, sweet bay, wax myrtle, titi, tenangled pipewort *(Eriocaulon decangulare)*, woolgrass, flat sedge (*Cyperus odortus)*, common rush, and cinnamon fern *(Osmunda cinnamomea).* Pond 2, which exhibits wetland characteristics,

is contained within Wetland 01 and has an area of 0.91 acres. The area of Wetland 01 plus Pond 2 totals 2.95 acres.

Wetland 04 is a high-quality forested 15.56 acre wetland located within the east-central portion of the property and extends south of the southern property boundary in the vicinity of the electrical transmission line right-of-way. This wetland leaves the project property to the south. Wetland vegetation includes pond cypress, red maple, black gum, slash pine, pond pine, sweet bay, pipewort, woolgrass, falt sedge, common rush, and cinnamon fern. This wetland has limited impacts resulting from logging operations.

Wetland 07 is a medium-quality forested 1.98 acre wetland located in the northeast corner of the project property, west of Swain Break Road. This wetland has been impacted by logging operations. Wetland vegetation includes pond cypress, red maple, longleaf pine, slash pine, pond pine, sweet bay, and cinnamon fern.

Wetland 08 is a medium-quality forested 2.75 acres wetland located in the northeast corner of the project property, west of Swain Break Road and immediately south of the railroad right-of-way. This wetland has been impacted by logging operations and the railroad. Wetland vegetation includes pond cypress, red maple, longleaf pine, slash pine, pond pine, sweet bay, and cinnamon fern.

Ponds

KCI reported one open-water pond, Pond 02, within the Alternate site.

Pond 02 is an open-water 0.91-acre pond located in the northwest corner of the project property, east of Hundreds Road and south of the railroad right-of-way. This water body is surrounded by Wetland 01 and connects to wetlands north of the railroad. Pond 02 is fed by surface flows from Wetland 01 and other wetland areas north of the railroad right-of-way. A narrow wooded buffer that is located within an area that has been logged in the past. Vegetation includes red maple, black willow, hazel alder, sweet bay, tenangled pipewort, flat sedge, common rush, and cinnamon fern.

Streams

KCI identified two unnamed intermittent drainage ditch drains that they considered potentially jurisdictional, with a total length of 1,786 linear feet (LF). Stream widths range from 7 to10 feet, with bank-full heights of 3 to 4 feet. The substrate of these streams consisted of gravel and sand. These drainage ditches were dredged to drain the wetlands allowing them to dry out and be used for timber production. Typical streamside vegetation consisted of longleaf pine, red maple, sweet bay, Dahoon holly, wax myrtle, titi, privet, grape and smilax. All channels were dry at the time of KCI's visit.

NWI Wetland associated with the Hatch-Offerman 230-kV transmission line that would be built adjacent to the existing line are shown in Figures 3-30a, b and c.

3.7.2.3 Riparian Areas and Floodplains

Riparian Areas

The only streams on the Alternate site are the intermittent streams described in Section 3.7.2.2.

Floodplains

A zone AE (where base flood elevations have been determined) 100-year floodplain is present just off the western edge of the site. At the southern part of the site, a Zone A 100-year floodplain is present where no base flood elevations have been determined. The Zone A floodplain is shown in Figure 3-7.

FEMA 100-year floodplains associated with the Hatch-Offerman 230-kV transmission line that would be built adjacent to the existing line are shown in Figures 3-31a, b and c.

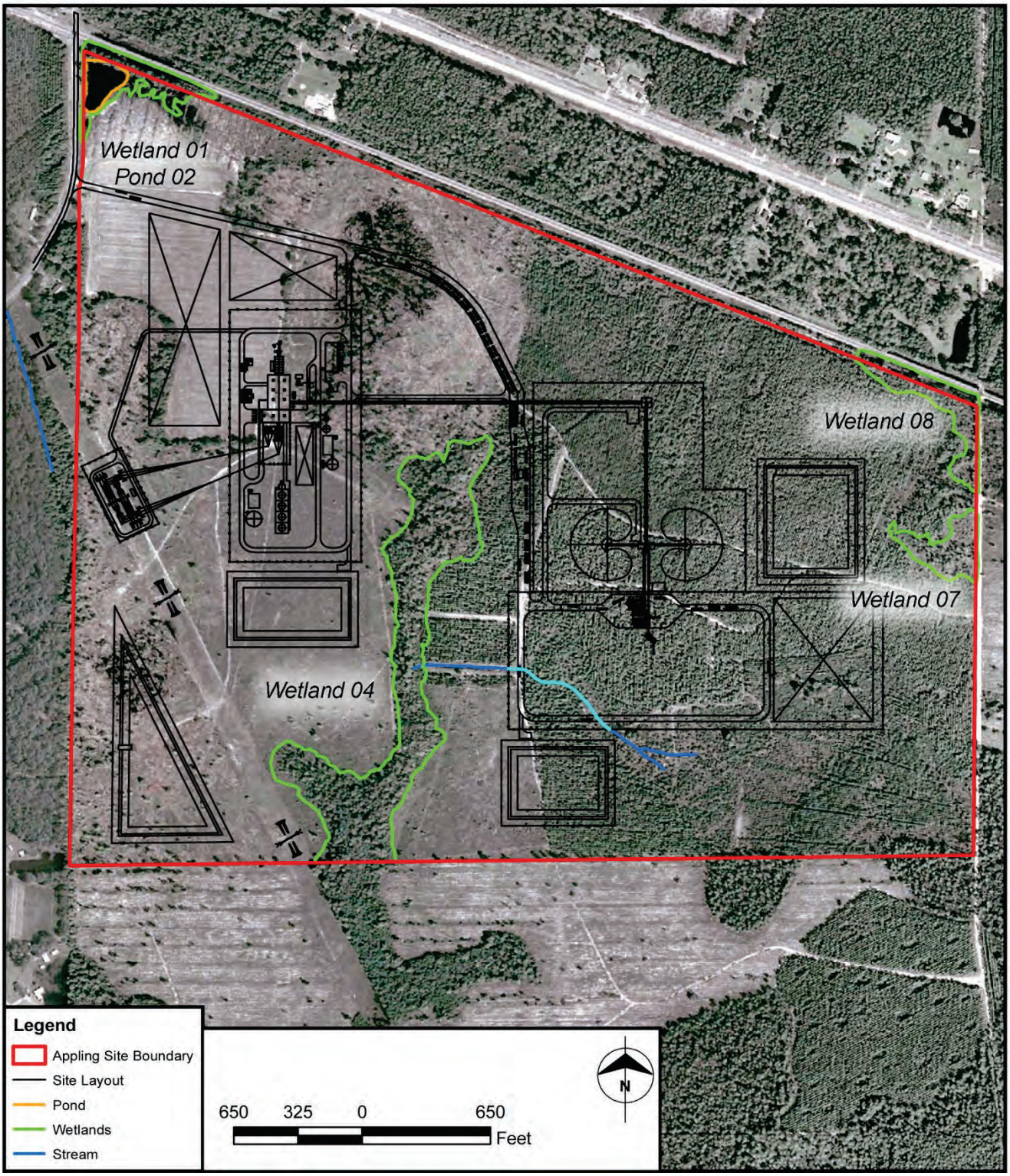


Figure 3-29. Waters of the U.S. at the Alternate Site.
Source: Burns and McDonnell 2010

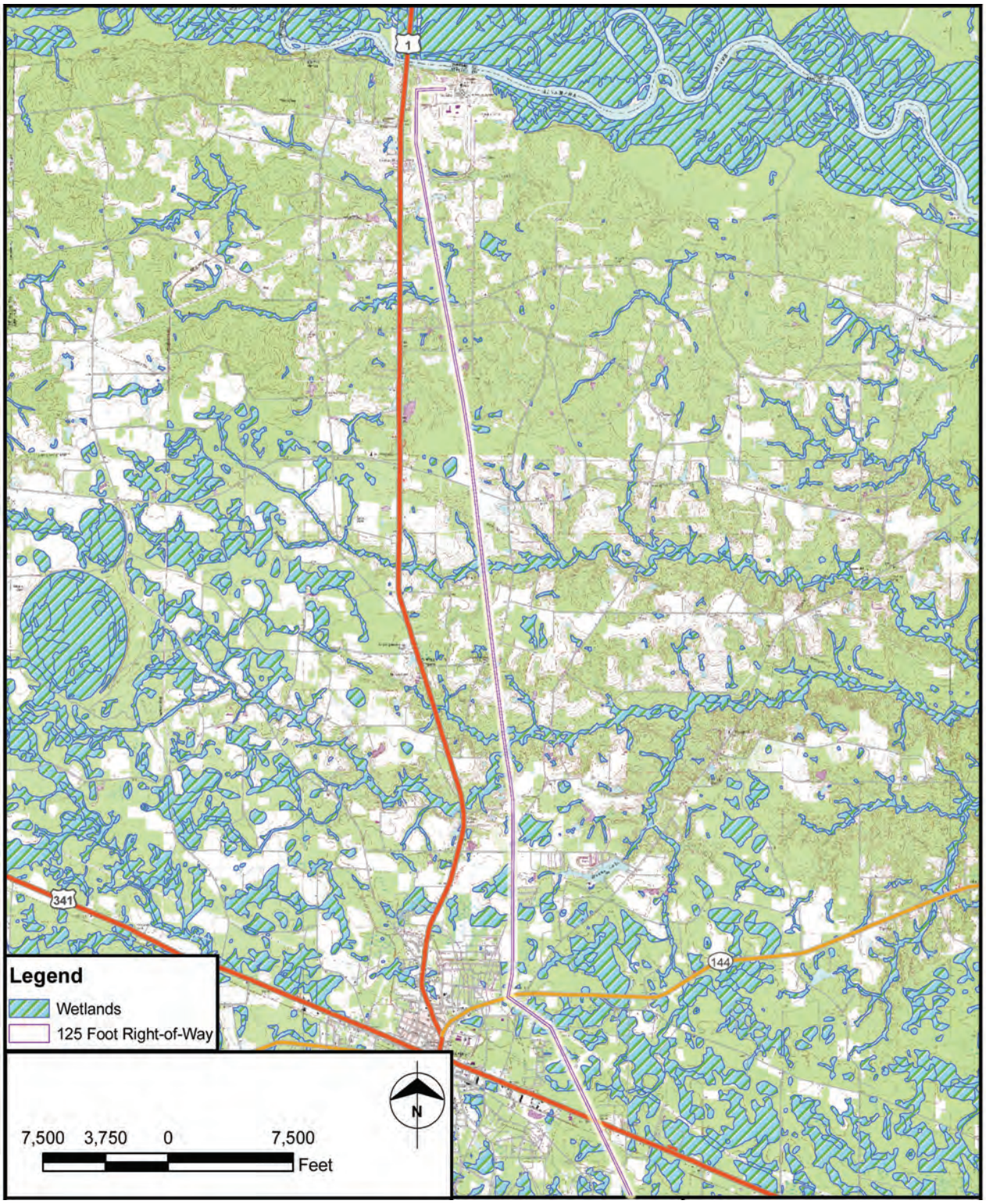


Figure 3-30a. NWI Wetlands, Hatch-Offerman 230-kV Transmission Line, North Section

Source: Burns and McDonnell 2010

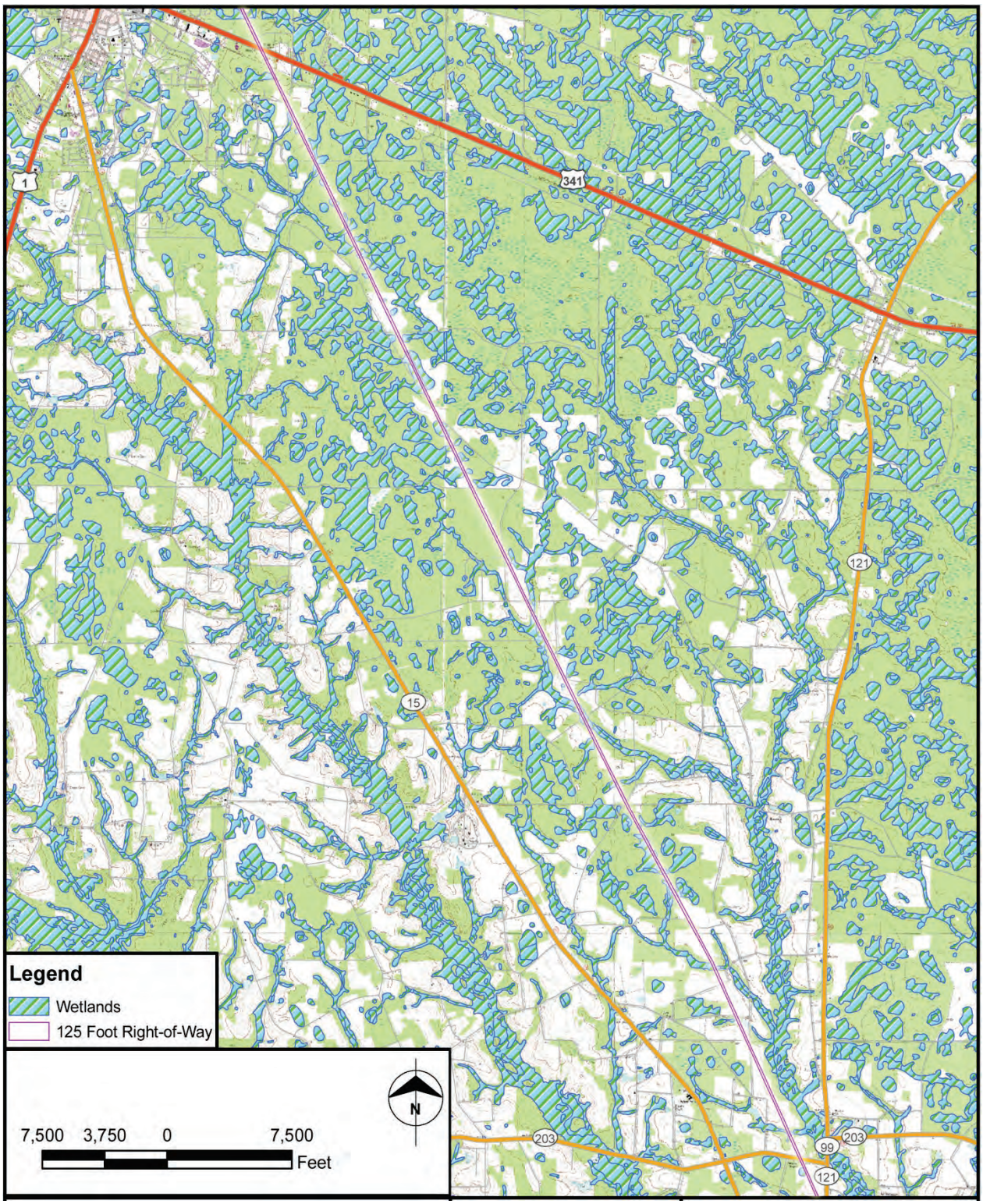


Figure 3-30b. NWI Wetlands, Hatch-Offerman 230-kV Transmission Line, Middle Section

Source: Burns and McDonnell 2010

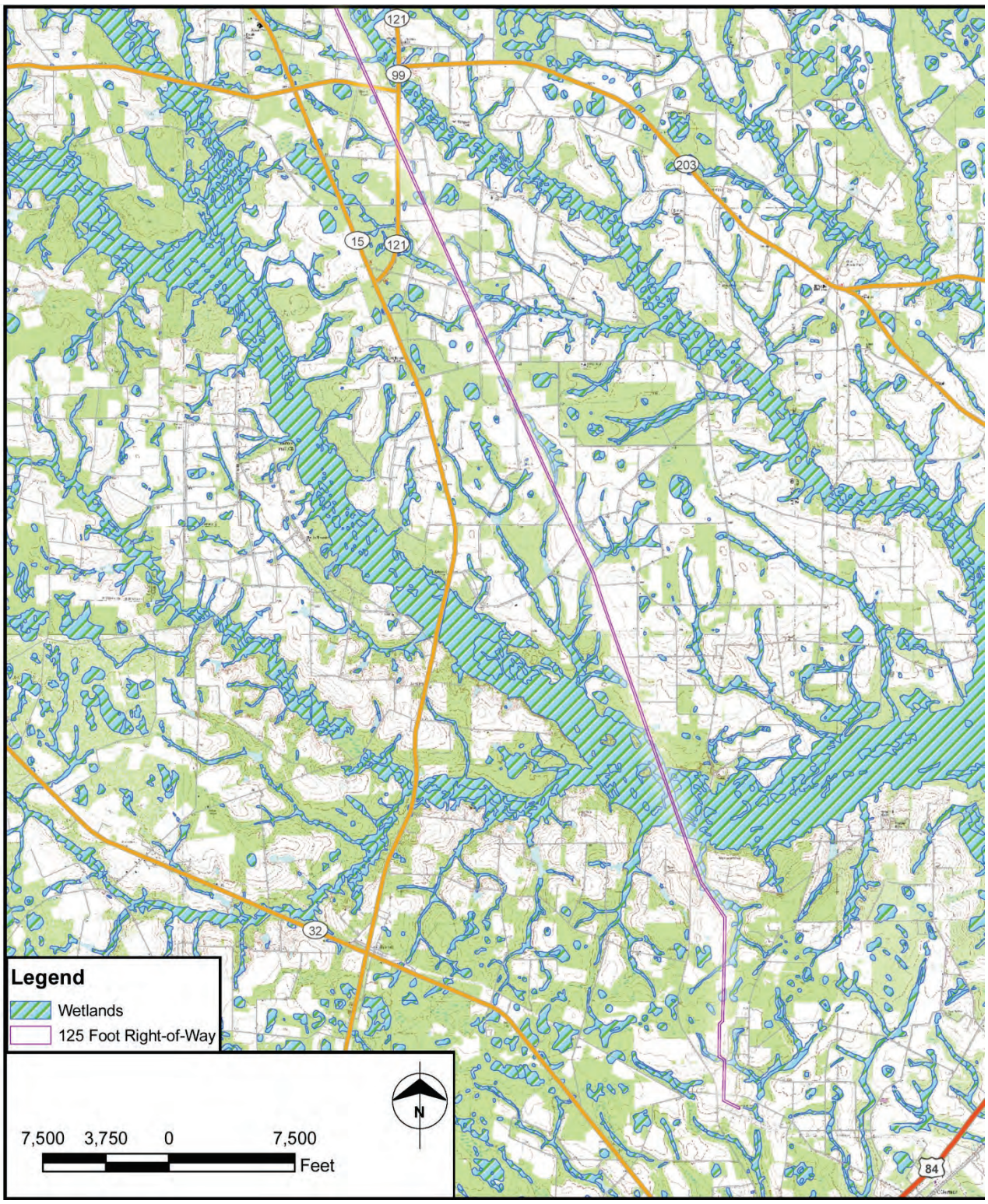


Figure 3-30c. NWI Wetlands, Hatch-Offerman 230-kV Transmission Line, South Section

Source: Burns and McDonnell 2010

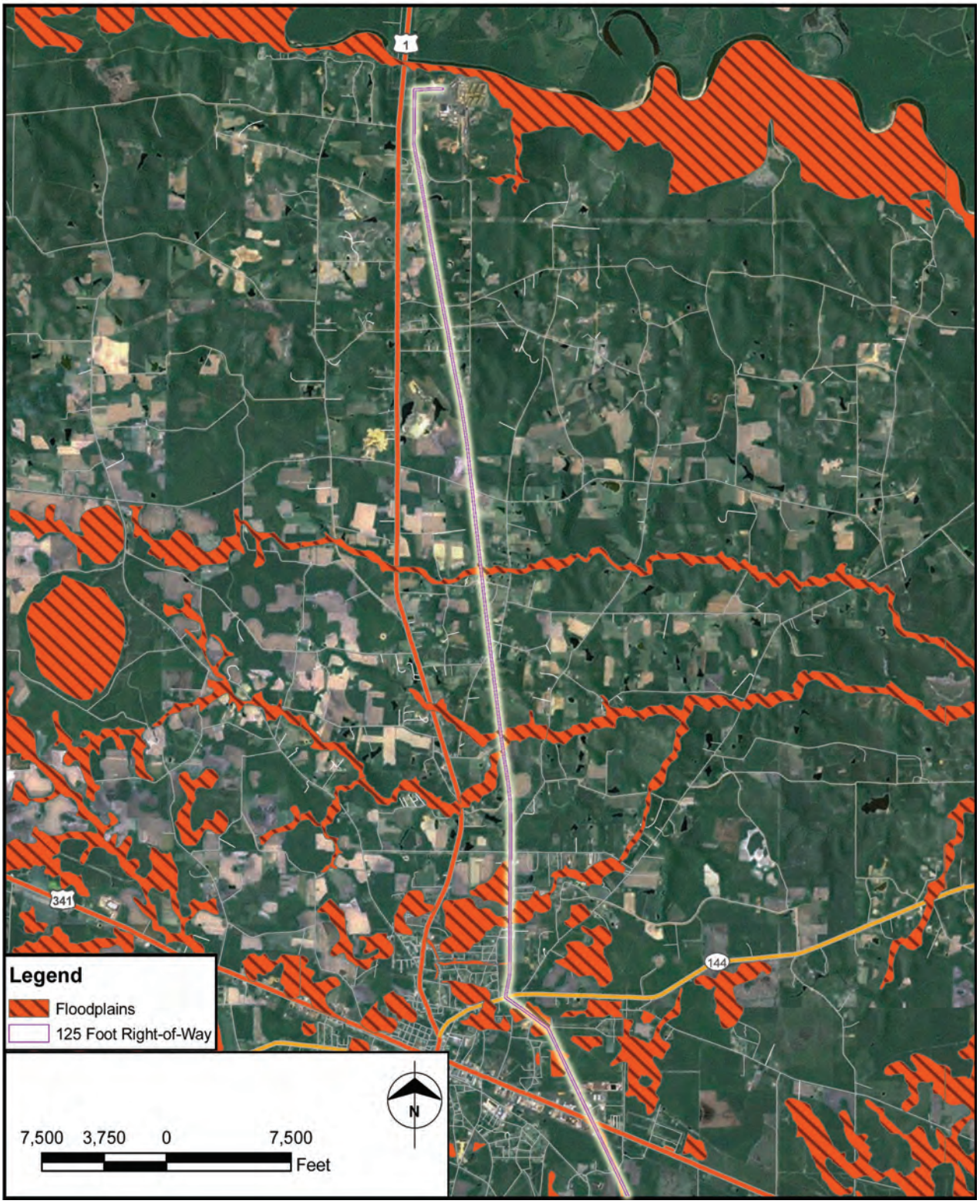


Figure 3-31a. 100-Year Floodplains, Hatch-Offerman 230-kV Transmission Line, North Section

Source: Burns and McDonnell 2010

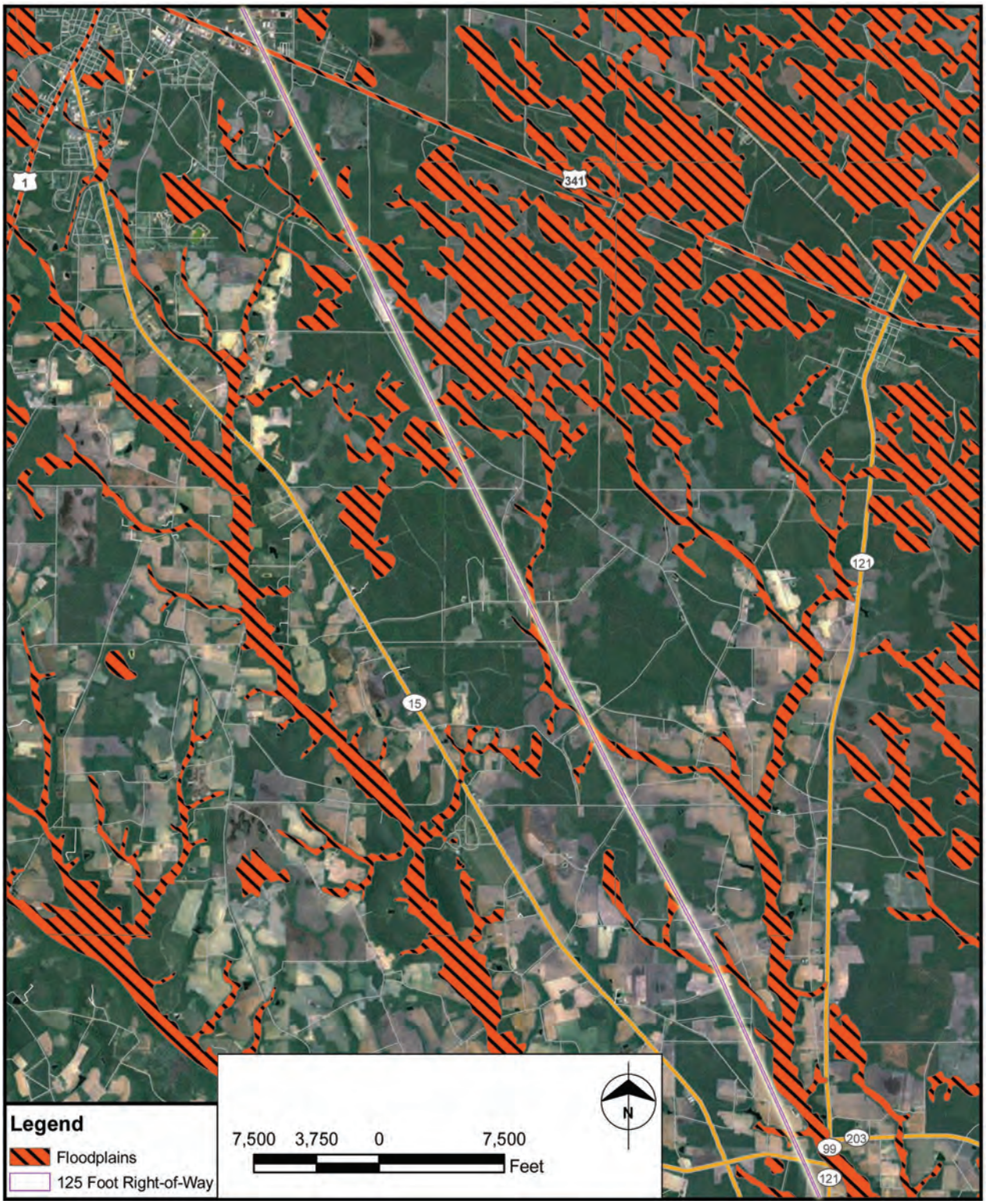


Figure 3-31b. 100-Year Floodplains, Hatch-Offerman 230-kV Transmission Line, Middle Section

Source: Burns and McDonnell 2010

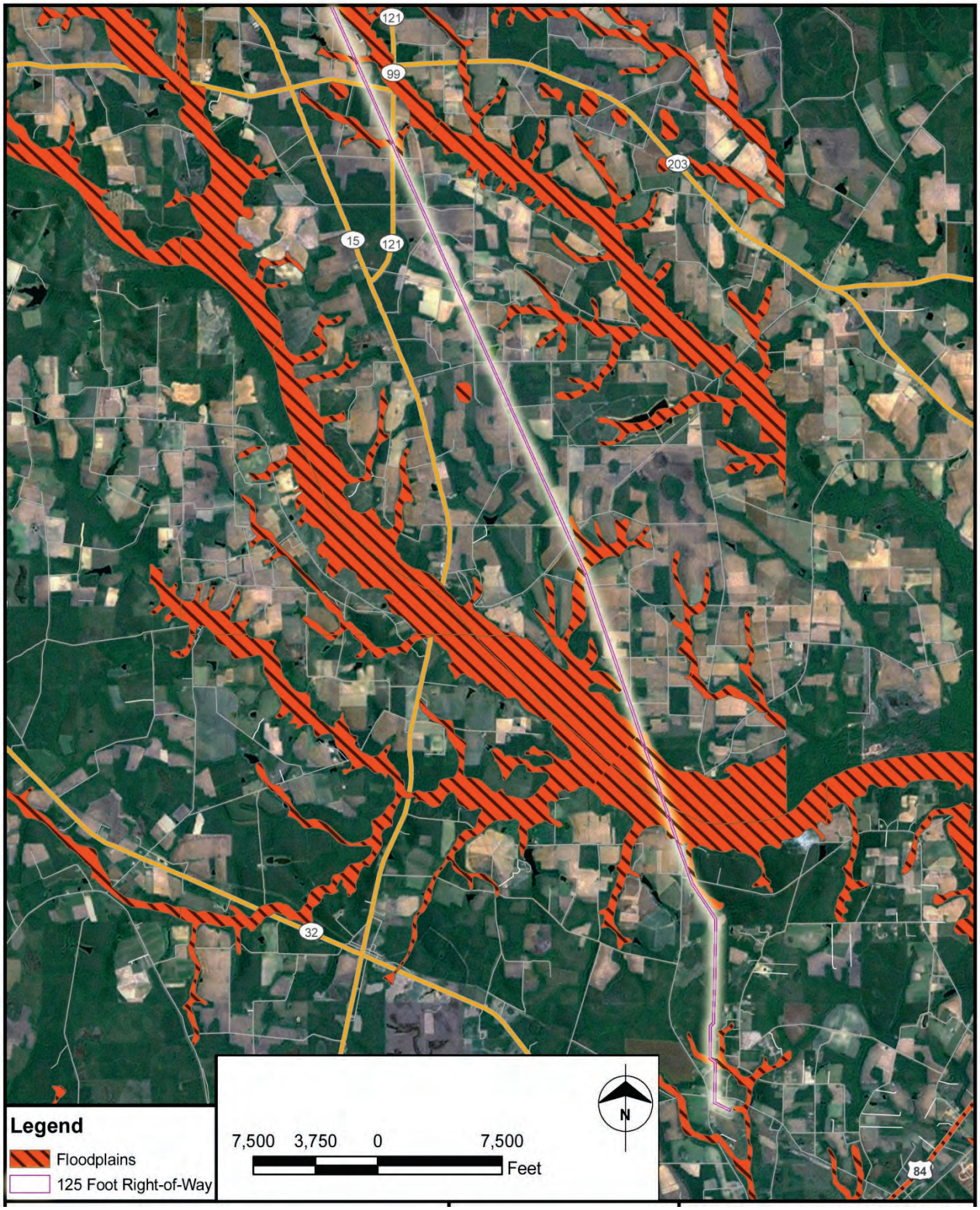


Figure 3-31c. 100-Year Floodplains, Hatch-Offerman 230-kV Transmission Line, South Section

Source: Burns and McDonnell 2010

3.7.2.4 Wildlife Resources

During a site visit in July 2009, a biologist observed many of the same species observed at the Proposal site. Representative additional non-game wildlife observed at the Alternate site included black rat snake (*Elaphe obsoleta obsoleta*), cottonmouth (*Agkistrodon piscivorus*), Eastern garter snake (*Thamnophis sirtalis sirtalis*), Eastern hognose snake (*Heterodon platirhinos*), other unidentified snake species, Eastern Towhee (*Pipilo erythrophthalmus*), and Pileated woodpecker (*Dryocopus pileatus*), among other passerine bird species. These species are all common to the region surrounding and including the Alternate site.

3.7.2.5 Fisheries and Aquatic Resources

There are no perennial streams at the Alternate site, therefore, no stream or riverine fisheries and minimal aquatic resources would be expected to be sustained, except those in the constructed ponds.

3.7.2.6 Special Status Species - Alternate

The FWS information regarding federally- and state-listed species in Appling County is listed in Table 3-36.

Federally-Listed Species

The FWS reports the following federally-listed species in Appling County (Table 3-36): red-cockaded woodpecker, eastern indigo snake, wood stork and short-nose sturgeon. Habitat for red-cockaded woodpeckers requires longleaf and loblolly pine that are at least 50 years old with a park-like understory. These conditions are not present on site. The eastern indigo snake prefers areas of large unfragmented suitable habitat. Impacts to the eastern indigo snake is not anticipated due to the frequent management of the pine stand by prescribed fire, amount of logging onsite, human encroachment within the Alternate site, relatively high traffic areas nearby, and development in the surrounding areas. Wood storks prefer coastal areas, islands, swamps with standing water, and standing water for foraging; none of these features are present on site except for the small constructed pond. There is no sturgeon habitat on site (Burns and McDonnell 2010e, p. 1-23).

None of these species were reported on the DNR quarter-quad summaries that include the alternate site.

State-Listed Species

In addition to the federally-listed species, the DNR reports the following state-listed species in Appling County: bald eagle and gopher tortoise (Table 3-36). Bald eagles (also protected under the Bald and Golden Eagle Protection Act [BGEPA]) generally

prefers nesting and foraging locations close to a significant water source. There are no significant water sources near the Alternate site, and no bald eagle nests were observed on site during the July 2009 site visit (Burns and McDonnell 2010e, p. 1-23). The gopher tortoise may use a variety of dry habitats in the southeast for creating burrows. The gopher tortoise is not expected to be present due to the frequent management of the pine stand by prescribed fire, amount of logging onsite, human encroachment within the Alternate site, relatively high traffic areas nearby, and development in the surrounding areas.

Neither of these species was reported on the DNR quarter-quad summaries that include the alternate site.

Table 3-36.Federally- and State-Listed Species in Appling County

Species	Federal Status	State Status	Habitat	Threats
Birds				
Red-cockaded woodpecker (*Picoides borealis)*	E	E	Nest in mature pine with low understory vegetation (<1.5m); forage in pine and pine hardwood stands > 30 years of age, preferably > 10" dbh	Reduction of older age pine stands and to encroachment of hardwood midstory in older age pine stands due to fire suppression
Wood stork (*Mycteria americana)*	E	E	Primarily feed in fresh and brackish wetlands and nest in cypress or other wooded swamps	Decline due primarily to loss of suitable feeding habitat, particularly in south Florida. Other factors include loss of nesting habitat, prolonged drought/flooding, raccoon predation on nests, and human disturbance of rookeries.
Reptiles				
Eastern indigo snake *(Drymarchon corais couperi)*	T	T	During winter, den in xeric sandridge habitat preferred by gopher tortoises; during warm months, forage in creek bottoms, upland forests, and agricultural fields	Habitat loss due to uses such as farming, construction, forestry, and pasture and to overcollecting for the pet trade
Gopher tortoise *(Gopherus polyphemus)*	No Federal Status	T	Well-drained, sandy soils in forest and grassy areas; associated with pine overstory, open understory with grass and forb groundcover, and sunny areas for nesting	Habitat loss and conversion to closed canopy forests. Other threats include mortality on highways and the collection of tortoises for pets.

Table 3-36.Federally- and State-Listed Species in Appling County

Species	Federal Status	State Status	Habitat	Threats
Fish				
Shortnose sturgeon (*Acipenser brevirostrum)*	E	E	Atlantic seaboard rivers	Construction of dams and pollution, habitat alterations from discharges, dredging or disposal of material into rivers, and related development activities.
Plants				
Creeping Morning-glory *(Evolvulus sericeus var sericeus)*	No Federal Status	E	Sparsely vegetated, partially shaded outcrops of Altamaha Grit sandstone.	
Parrot pitcher-plant *(Sarracenia psittacina)*	No Federal Status	T	Acid soils of open bogs, wet savannahs, and low areas in pine flatwoods.	

Source: FWS 2004a

In its July 8, 2009 scoping letter to RUS, the DNR Wildlife Resources Division reported two Natural Heritage Database occurrences within three miles of the alternate site and both were the *Sarracenia minor var. minor* (hooded pitcherplant). One location was 2.5 miles northwest of the site and one was 3.0 miles northwest of the site (Oglethorpe Power Corporation 2010a). The hooded pitcherplant is found in wet savannas and pitcherplant bogs. The alternate site is located partially in the SE and partially in the SW quarter quad of the Baxley, Georgia quadrangle. The DNR does not report the hooded pitcher plant in the SE quad; however, it is listed in the SW quad. The hooded pitcherplant is neither federally nor state-listed. While hooded pitcherplant is consider unusual it is apparently secure and of no immediate conservation concern (DNR 2008d). No hooded pitcher plants were observed during wetland surveys (KCI Technologies, Inc. 2008d).

3.7.3 Environmental Consequences

3.7.3.1 Identification of Issues

The following issues related to biological resources (other than forestry resources) were identified in the scoping and EIS development process:

- Potential impacts to Waters of the U.S.
- Impacts to floodplains.
- Overall impacts on wildlife.
- Potential impacts to species of special concern.
- Concern about impacts to Georgia's longleaf ecosystem.
- The DNR Wildlife Resource Division recommended completing surveys for species of concern before any construction begins.

3.7.4 Impact Assessment - Proposal

3.7.4.1 Impacts on Upland Vegetation

A total of approximately 122.4 acres of agriculture/pasture land would be impacted at the Proposal Site. Of this, approximately 91.3 acres would be impacted long-term. Where short-term impacts would occur, vegetation would be re-established as soon as practicable.

Revegetation of short-term impacts to vegetation communities would use native seed mixtures. Most of the revegetation efforts would occur in areas that are previously disturbed, non-native dominated vegetation communities. Revegetation with native grasses would improve the ecological quality of these areas.

Oglethorpe would prepare and implement an Invasive Species Management Plan to prevent, control, and manage invasive plants during construction and maintenance activities for the Proposal. The Plan would identify actions to be taken by construction crews (including contractors) and operations personnel. Such actions would include revegetation of non-native areas with native plant species, surveys of construction areas for invasive plants, prevention of the spread of invasive plants, appropriate monitoring, and other appropriate measures.

3.7.4.2 Impacts on Wetlands and Waters of the United States

Executive Order 11990, Protection of Wetlands, requires each federal agency to minimize the destruction, loss or degradation of wetlands when providing federally undertaken, financed, or assisted construction and improvements, as well as other activities. Each agency shall avoid new construction located in wetlands unless "the agency finds (1) that there is no practicable alternative to such construction, and (2) that

the Proposal includes all practicable measures to minimize harm to wetlands which may result from such use."

Impacts at the Proposal Site

Under the Proposal, the site haul road would cross a portion of one open water pond (Pond 08), which would result in an estimated 0.02 acre impact to the pond (Figure 3-32). Pond 08 is a poor-quality, 0.63-acre, man-made stock pond. Approximately 0.05 acres of Wetland 01 would be unavoidably impacted by the roadway improvements on East Warrenton Road. No other impacts to Waters of the U.S. are anticipated by the Proposal.

The Proposal layout was designed to avoid and protect wetland and streams to the extent practicable. Under the current design, the Proposal avoids impacts to wetlands and streams to the extent that no individual section 404 permit would be required. Temporary or minor permanent impacts would be permitted through a Nationwide Permit in coordination with the Savannah District of the USACE.

Impacts at Transmission Line Upgrades

According to NWI maps, the Evans Primary – Fury's Ferry 115kV line right-of-way has approximately 0.37 acres of wetlands within it (Figure 3-21). The Union Point – Maxeys 115kV line right-of-way has approximately 2.50 acres of wetlands (Figure 3-22). Based on the NWI maps, the types of wetlands found within the exiting rights-of-way include emergent wetlands, forested wetlands, shrub wetlands and ponds.

If the existing structures are used for the proposed upgrades, as is expected with the Evans Primary – Fury's Ferry line, the only potential concern would be indirect impacts on Waters of the U.S. with construction equipment or from nearby soil disturbance. Should new structures be required as part of the upgrades, as is expected with the Union Point – Maxeys line, Waters of the U.S. within the right-of-way would be spanned and structures would be located outside of Waters of the U.S. BMPs would be implemented to protect the wetlands from sedimentation. Access with construction equipment would be planned to avoid wetlands if practicable, and where necessary mitigation measures such as matting would minimize impacts to wetland areas. It is not anticipated that clearing of forested wetlands would occur because the existing right-of-way is currently cleared and maintained. Riparian areas near stream crossings would not be cleared as a result of these upgrades. The work would be done in accordance with general nationwide permit 12 (NWP 12).

Impacts at Water Lines

According to NWI maps, the Thomson McDuffie gray water main has approximately 3.62 acres of wetlands within the measured 120 foot buffer (Figure 3-23). Based on a 40-foot wide construction easement within this buffer, approximately 1.1 acres of the NWI-mapped wetland may be disturbed (Oglethorpe Power Corporation 2010i). The Dam 50 surface water main has approximately 0.51 acres of wetlands within the 200 foot buffer (Figure 3-24). Based on a 40-foot wide construction easement within this buffer, approximately 0.1 acre of the NWI-mapped wetland would be disturbed (Oglethorpe Power Corporation 2010i). Based on the NWI maps, the types of wetlands found within the exiting rights-of-way include forested wetlands, shrub wetlands and ponds. The Thomson-McDuffie line includes 9 stream crossings and the Dam 50 line includes 5 stream crossings.

The potential impacts to Waters of the U.S. vary depending on the type of construction used to install the proposed facilities. Trenching, or cutting the pipeline into the ground would cause greater ground disturbance than boring. Depending on the size of the area, boring under wetlands and streams can minimize the potential impacts to those resources. Oglethorpe will not have responsibility for the installation of the water lines. The Thomson-McDuffie gray water main would be installed by Thomson-McDuffie and the Dam 50 surface water main would be installed by Warren County. Both parties would request funding from government sources and would follow applicable regulations and other requirements (Oglethorpe Power Corporation 2010h). Impacts to Waters of the U.S. would likely be minor and may qualify for authorization under general nationwide permits (NWP 12) as a minimal impact activity.

BMPs would be implemented to protect the wetlands from sedimentation. Access with construction equipment will be planned to avoid wetlands, if practicable, and where necessary, proper measures such as matting would minimize impacts to wetland areas. Riparian areas near stream crossings should not be cleared as a result of those two facilities. Use of BMPs would help minimize and mitigate potential surface water impacts and erosion issues near the stream crossings.

Mitigation

Compliance with NPDES requirements of the CWA would reduce adverse impacts to receiving wetland and riparian water bodies within the Proposal site and in downstream receiving waters. The Proposal would be expected to produce some increased siltation within the stream, open-water, and wetland habitats during the construction phase. Standard erosion and sedimentation control devices and other BMPs would minimize potential impacts. Measures to minimize impacts to wetlands and streams include:

- Preservation of wetland and riparian vegetation beyond the limits of construction.
- Early re-vegetation of disturbed areas to minimize soil erosion.
- The use of slope drains, detention/retention structures, surface, subsurface, and cross drains, designed in such a manner that discharge would occur in locations where surface and subsurface water quality would not be affected.
- Inclusion of construction features for the control of predicted erosion and water pollution in the plans and specifications (Georgia Standard Specifications – 1993, Section 151 through 171 and 700 through 715 identify the pollution control measures which may be used).
- Mitigation for any impacts to waters of the U.S. would be determined through coordination with the Savannah District of the USACE for a CWA Section 404 permit. Mitigation ratios would be according to the USACE, Savannah District Standard Operating Procedures for Compensatory Mitigation for wetlands. If mitigations credits are available in an authorized mitigation bank or in lieu fee program, any mitigation would consist of the purchase of a suitable number of credits from such bank or program. Otherwise, any mitigation would take place on-site but may take place off-site when no practicable opportunity for on-site mitigation is available. If mitigation takes place off-site it would be in close proximity to the authorized impacts and, to the extent practicable, in the same watershed.
- Boring under stream crossings for the installation of water lines would reduce impacts. Oglethorpe will not be responsible for the water line installations.

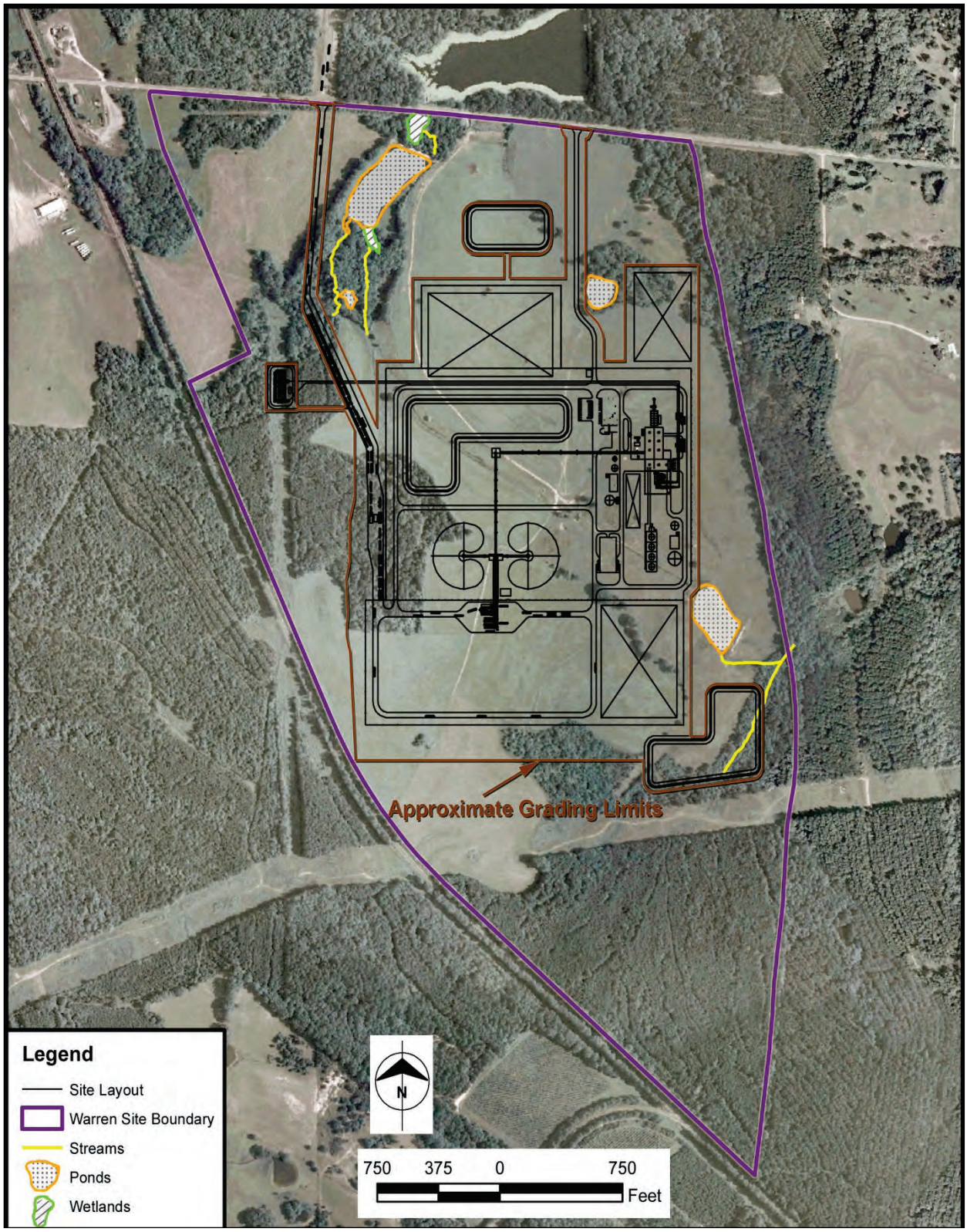


Figure 3-32. Impacts to Waters of the U.S. at the Proposal Site.
Source: Burns and McDonnell

3.7.4.3 Impacts on Riparian Areas and Floodplains

EO 11988, Floodplain Management (42 Federal Register 26951), directs Federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by floodplains. Agencies implement the EO by evaluating the potential effects they take in floodplains and considering alternatives that would avoid adverse effects. If the only practicable alternative requires siting in a floodplain, the agency must design or modify its action in order to minimize potential harm and circulate a notice containing an explanation of why the action is proposed to be located in the 100-year floodplain.

There are no floodplains at the Proposal site, and construction at the Proposal site would not impact floodplains.

The Evans Primary – Fury's Ferry 115kV upgrade project crosses approximately 360 feet of floodplains within its current alignment (Figure 3-25). Floodplain impacts, if any, would be minimal as the few floodplains present are narrow, the crossings are transverse, and no structure replacement is anticipated. Floodplain data was not entirely available for the Union Point – Maxeys transmission line. No data could be located from Greene County. Therefore, floodplain totals include only Oglethorpe, Taliaferro and Warren counties. Within those counties, the Union Point – Maxeys 115kV upgrade project crosses approximate 3,100 feet of floodplains with its current alignment (Figure 3-26). As one of these floodplain crossings is longitudinal and rather long, there will be some impacts. Because of the length of the crossing, some replacement structures would need to be located in the floodplain. However, these would only be replacing existing structures.

The Thomson McDuffie gray water/potable water main route crosses two floodplains (Figure 3-27). These are narrow floodplains and the crossings are transverse. The proposed Dam 50 water line route crosses 235 feet of floodplains (Figure 3-28). For both these crossings, some impact would occur during construction; however, no long-term impact would be expected. The proposed Dam 50 line would have a permanent pump house, which would likely need to be located in a floodplain. If so, Warren County, which would be constructing the pump house, would need to obtain a floodplain development permit. If the structure interferes with the conveyance of flood water (i.e., is located in a floodway), a no-rise certification may be needed. However, it is unlikely that the structure would need to be located in a floodway.

3.7.4.4 Impacts on Wildlife Resources

Construction of the Proposal would displace much of the wildlife that currently inhabits the site. Avoidance of wetlands, streams, and remaining woodland areas will help mitigate the impacts.

The upgrades to existing transmission line facilities would not require any new right-of-way. Upgrades to these lines would not result in additional habitat fragmentation or conversion of existing habitat types. These upgrades may result in a temporary disturbance to wildlife in the area during the construction phase. Construction traffic and noises may make the surrounding areas undesirable for wildlife activities, but should return to normal after construction ends.

The proposed gray water/potable water route from Thomson/McDuffie County would be constructed within the existing road rights-of-way. Habitat loss would be minimal and may only consist of tree removal within the road right-of-way.

The proposed surface water main from Dam 50 would require new right-of-way to be cleared in some areas, while using existing rights-of-way in others. A 200 foot wide corridor was evaluated for this line. With the clearing of new right-of-way, it is expected that impacts to wildlife would be greater with certain portions of this line that cross woodlands, compared with impacts from other water line construction evaluated in this EIS. While the proposed line is within existing right-of-way as practicable, two sections traverse wooded areas, as shown in Figure 3-28. Up to approximately 43 acres of woodland habitat could be impacted. The exact width of the construction easement and permanent easement will be determined after further project engineering design is completed; the width of both the construction easement and permanent easement are estimated at 40 feet.

3.7.4.5 Impacts on Fisheries and Aquatic Resources

While there is little aquatic habitat on the Proposal site, avoidance of wetlands and streams minimizes the impacts to aquatic resources.

Some localized stream impacts, and therefore impacts to some aquatic resources, will occur with construction of the water lines; however these will be short-term during construction. With implementation of BMPs the streams would be expected to return to their pre-construction condition shortly after construction completion.

3.7.4.6 Impacts on Special Status Species

Proposal Site

An analysis of the current sensitive species listed for the project area was completed at state- and federal-levels. Information for the habitat requirements, distributions, and (if present) date of last occurrence was also acquired specific to Warren County, Georgia. One species with federal protection as well as four species with state-level protection were noted as having distributions in the area that includes the Proposal. The known distributions for these species do not state that the species has been documented from all areas within the given distribution; however, the species has been documented at points close enough within an area to warrant inclusion within the range for that species.

The location of extant populations of the Atlantic pigtoe was determined through desktop analysis. Potential habitat to support bald eagles, Georgia aster, granite stonecrop, and spotted turtle were assessed at the Proposal during a site visit on July 17, 2009. The entire site was visited with specific attention to the presence of raptor nests, granite outcrops, cedar trees, and wetland areas.

The Atlantic pigtoe, bald eagle, Georgia aster, granite stonecrop, and spotted turtle are not likely to be found at the Proposal location. During the preliminary desktop assessment, four of the five species could be determined to not likely be present at the Proposal due to their habitat requirements.

With respect to the fifth species (i.e. spotted turtle), the potentially suitable habitat found onsite for the spotted turtle was small, isolated, and lacking suitable travel corridors and nesting areas.

The recent clear-cut logging efforts conducted by the previous owner on the southern and western portions of the site have impacted the habitat for all wildlife species. No large perennial raptor nests were located that may be used by bald eagles. The cultivated and pastureland agricultural areas present throughout the open portions of the property makes it unlikely that bald eagles roost or forage within the Proposal site. Both the Georgia aster and granite stonecrop are not found on the Proposal. The Georgia aster is generally found in oak-savannah settings which are not found on the property. The granite stonecrop requires granite outcrops and considerable shade, often under Eastern red cedars. These conditions are not found on the property. Isolated patches of emergent wetlands, which may be considered suitable habitat for the spotted turtle, are located within the Proposal, but these wetlands are small and isolated, and the upland areas used for nesting and travel corridors are not present. These areas are vital to this species' survival in an area. Therefore it is not likely the spotted turtle would be located at the site.

There were no areas located within the Proposal site that were likely to densely concentrate migratory bird species. Combined with human interaction in the area, it is

unlikely that migratory songbirds or waterfowl are drawn to the area and would therefore be subjected to additional impacts from the Proposal.

Based on the analysis and site visit, no temporary or permanent impacts to listed species or sensitive areas are expected at the Proposal site.

Transmission Lines

It is not likely that the proposed facilities would have an impact on the sweet pitcherplant or Ocmulgee skullcap. The project area is anticipated to include only existing utility right-of-way and should not result in clearing of forested terraces, hardwood slopes, white-cedar swamps, or low areas in pine flatwoods. The Evans Primary-Fury's Ferry project could potentially impact the Georgia aster. This plant is known to inhabit existing utility rights-of-way and is known to occur near the project area.

For the relict trillium (*Trillium reliquum*) plants are found in forests where other forms of disturbance were noted (e.g., on several abandoned roadbeds, a road embankment, an abandoned railroad grade fill, near an abandoned quarry, etc.), but surrounding woods (the probable seed source) in each case had been subjected only to cutting of selected trees at various times in the past.

Oglethorpe will not be responsible for the reconductoring of the transmission lines, which will most likely be done by Georgia Transmission Corporation, with funding through RUS (which would require additional NEPA documentation) (Oglethorpe Power Corporation 2010h). The responsible parties should coordinate with the FWS and DNR to determine if field studies are required for the Georgia aster or relict trillium. If field studies are required, agency consultation should include coordination of any field studies prior to final design and construction to verify the presence or absence of these plants within the project limits of construction.

Water Lines

While all of the linear water facilities may use existing rights-of-way, it is possible that the Thomson McDuffie water line could have the potential impact on the Georgia aster because of its known presence near the project area. The responsible parties should coordinate with the FWS and DNR to determine if field studies are required specific to this species. If determined necessary, coordination should then take place that includes any field studies prior to final design and construction to verify the presence or absence of these plants within the project limits of construction.

3.7.4.7 Measures Incorporated into the Proposal to Reduce Impacts and Additional Potential Mitigation

The following measures will be implemented:

- Disturbed areas will the stabilized and revegetated as soon as practicable.
- Implementation of the measures to minimize impacts to surface water (Section 3.2.3.3) will minimize impacts to wetlands and other Waters of the U.S., and to fisheries and aquatic life.
- In the site selection and design layout, wetlands and Waters of the U.S. have been avoided to the extent practicable.
- Oglethorpe would prepare and implement an Invasive Species Management Plan to prevent, control, and manage invasive plants during construction and maintenance activities for the Proposal. The Plan would identify actions to be taken by construction crews (including contractors) and operations personnel. Such actions would include revegetation of non-native areas with native plant species, surveys of construction areas for invasive plants, prevention of the spread of invasive plants, appropriate monitoring, and other appropriate measures.

In addition, mitigation for impacts to Waters of the U.S. will be implemented as described in Section 3.7.5.7.

3.7.5 Environmental Consequences—Alternative

3.7.5.1 Impacts on Upland Vegetation

A total of approximately 17.2 acres of agriculture/pasture land would be impacted at the Alternate. Of this, approximately 4.0 acres would be impacted long-term. Where short-term impacts would occur, vegetation would be re-established as soon as practicable.

Revegetation of short-term impacts to vegetation communities would use native seed mixtures. Most of the revegetation efforts would occur in areas that are previously disturbed, non-native dominated vegetation communities. Revegetation with native grasses would improve the ecological quality of these areas.

3.7.5.2 Impacts on Wetlands and Waters of the United States

A wetland delineation for the Alternate was completed in October 2008. A total of seven potential waters of the U.S. were delineated, including four PFO wetlands, one PUB wetland, and two intermittent streams. Under the Alternate none of the proposed plant facilities is located within a wetland area, including USACE jurisdictional or non-jurisdictional wetlands.

Impacts at the Alternate

The Alternate layout was designed to avoid and protect wetlands and streams to the extent practicable; however, there would be stream impacts along approximately 640 feet of stream on the southeastern portion of the overall project, in the long wood storage yard (Figure 3-29). Alternate site impacts may require a Section 404 permit from the USACE.

Impacts at the Transmission Line Upgrade

Based on the NWI mapping, the replacement Hatch – Offerman transmission line would cross approximately 65 acres of wooded wetlands and 14 acres of emergent herbaceous wetlands. While herbaceous wetlands could likely be spanned, the wooded wetlands would need to be cleared. A Section 404 permit from the USACE would likely be needed.

3.7.5.3 Impacts on Riparian Areas and Floodplains

Impacts at the Alternate

No impacts would result from the implementation of the Alternate because floodplains would be avoided by project facilities.

Impacts at the Transmission Line Upgrade

Floodplains are extensive in the Alternate area, and unavoidable with linear features such as transmission lines (Figures 3-31a, -b, and –c). Approximately 28,000 feet of floodplains would be crossed. Impacts would be minimized by spanning floodplains where possible, and avoiding floodways.

3.7.5.4 Impacts on Wildlife Resources

Construction of the Alternate would displace much of the wildlife that currently inhabits the site. Avoidance of wetlands, streams, and remaining woodland areas will help mitigate the impacts.

The upgrades to the existing transmission line facilities would require additional new right-of-way; however, the right-of-way would be adjacent to the existing line. While up to approximately 130 acres of forest may need to be cleared, the clearing would not result in habitat fragmentation.

3.7.5.5 Impacts on Fisheries and Aquatic Resources

While there is little aquatic habitat on the Proposal site, avoidance of wetlands and streams minimizes the impacts to aquatic resources.

Some localized stream impacts, and therefore impacts to some aquatic resources, will occur with construction of transmission line, however these will be short-term.

3.7.5.6 Impacts on Special Status Species

Based on the habitat analysis presented in Section 3.7.2.6, no impacts to special status species would be expected at the Alternate site.

Potential impacts resulting from upgrading the 38-mile Hatch – Offerman transmission line have not been evaluated.

3.7.6 Environmental Consequences—No-Action Alternative

No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on biological resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.8 LAND RESOURCES

3.8.1 Affected Environment - Proposal

3.8.1.1 Land Uses and Zoning

Land use in Warren County, as determined from tax records, is summarized in Figure 3-33. Based on tax records, approximately 90 percent of the land in Warren County is used for either forestry or agriculture, with approximately 78 percent of that amount forestry and 22 percent agriculture (CSRA Regional Development Center 2009).

Concept-level future land use, as envisioned by the CSRA, is shown in Figure 3-34. The Proposal site is within the area that CSRA designates as “production,” which includes industrial use.

Land use and development in unincorporated Warren County is regulated by the Warren County Land Use Ordinance, which establishes 12 zoning districts. The Proposal site property is currently zoned forestry-agriculture (FOR-AG). The FOR-AG District is established to maintain large enough tracts of property for agriculture and timber harvesting and to prevent the subdivision of land for residential use. The minimum lot size for the subdivision of property in the FOR-AG district is 25 acres. Most of the property adjacent to the Proposal site is also zoned FOR-AG. One of the parcels to the west of the property is zoned industrial, and there is a small parcel to the northwest of the property zoned for highway business. The industrial zoning is intended for industrial parks, warehousing, business parks, wholesale and manufacturing. The highway business zoning primarily provides for highway-oriented commercial uses but also permits institutional and office uses (Burns & McDonnell 2009b, p. 3-35 and 3-38; Warren County Land Use Ordinance).

Figure 3-35 shows land use at the Proposal site and extends out approximately one mile. West of the Proposal site, on the north end is the 100-acre East Warrenton Industrial Park is Plastic Tubing Industries, Inc. There are several commercial establishments northwest of the Proposal site. The Canal Wood Corporation is directly adjacent to the northwest corner of the Proposal site. Further northwest are the Georgia Pacific sawmill, former TRW Automotive site, and the Timbermen Wood Yard. The Warrenton Quarry is southwest of the Proposal site (Burns & McDonnell 2009b, p. 3-41).

The City of Warrenton’s eastern edge is located less than one mile from the Proposal site. There are residences, apartment complexes and businesses located within the city.

Additional residences and businesses are located along Highway 80, to the west of the Proposal site. The Warrenton Country Club and public golf course is also located along Highway 80. There is an area of scattered rural residences and agricultural land along East Warrenton Road east of the Proposed Project site, and there is another residential area off Highway 278 northeast of the Proposal site. Most of the remaining land within one mile of the Proposal site is forestland.

In total, there are approximately 137 residences, 3 apartment complexes, 17 commercial establishments, and 5 industrial establishments within one mile of the Proposal site. There are approximately 15 residences within one half-mile of the Proposal site boundary, the majority of which are in the scattered development northeast of the site (Figure 3-35).

3.8.1.2 Prime and Unique Farmland

The Federal Farmland Protection Policy Act (FPPA), enacted by Congress in 1984, established criteria for identifying and considering the effects of federal actions on the conversion of farmland to nonagricultural uses. The basic purpose of the FPPA is to minimize the extent of farmland conversion and impacts and to "assure that federal programs are administered in a manner that, to the extent practicable, would be compatible with state, unit of local government, and private programs and policies to protect farmland." The NRCS administers the FPPA program and has developed a process to assess impacts when farmland is converted to other uses.

To comply with the FPPA, the NRCS developed the Land Evaluation and Site Assessment (LESA) system. It is a tool for evaluating the relative effect development projects will have on farmland. The impacted farmland is scored in two areas, and the more valuable the farmland, the higher the score. The two parts of the evaluation are the Land Evaluation (LE) section and the Site Assessment (SA) section. The LE section is a straightforward evaluation that considers the acreage impacted and the value of that acreage for farming. The SA section considers cultural aspects. If the impacted farmland has major farm investments (irrigation systems, barns, etc.), is important to the local farm economy, and is in an area that has been developed for farming rather than urban use, it receives a higher SA score.

The assessment is done using the Farmland Conversion Impact Rating Form AD-1006, which is completed in coordination with the NRCS.[52]

[52] Instructions for completion of Form AD-1006 are in 7 CFR §658.5

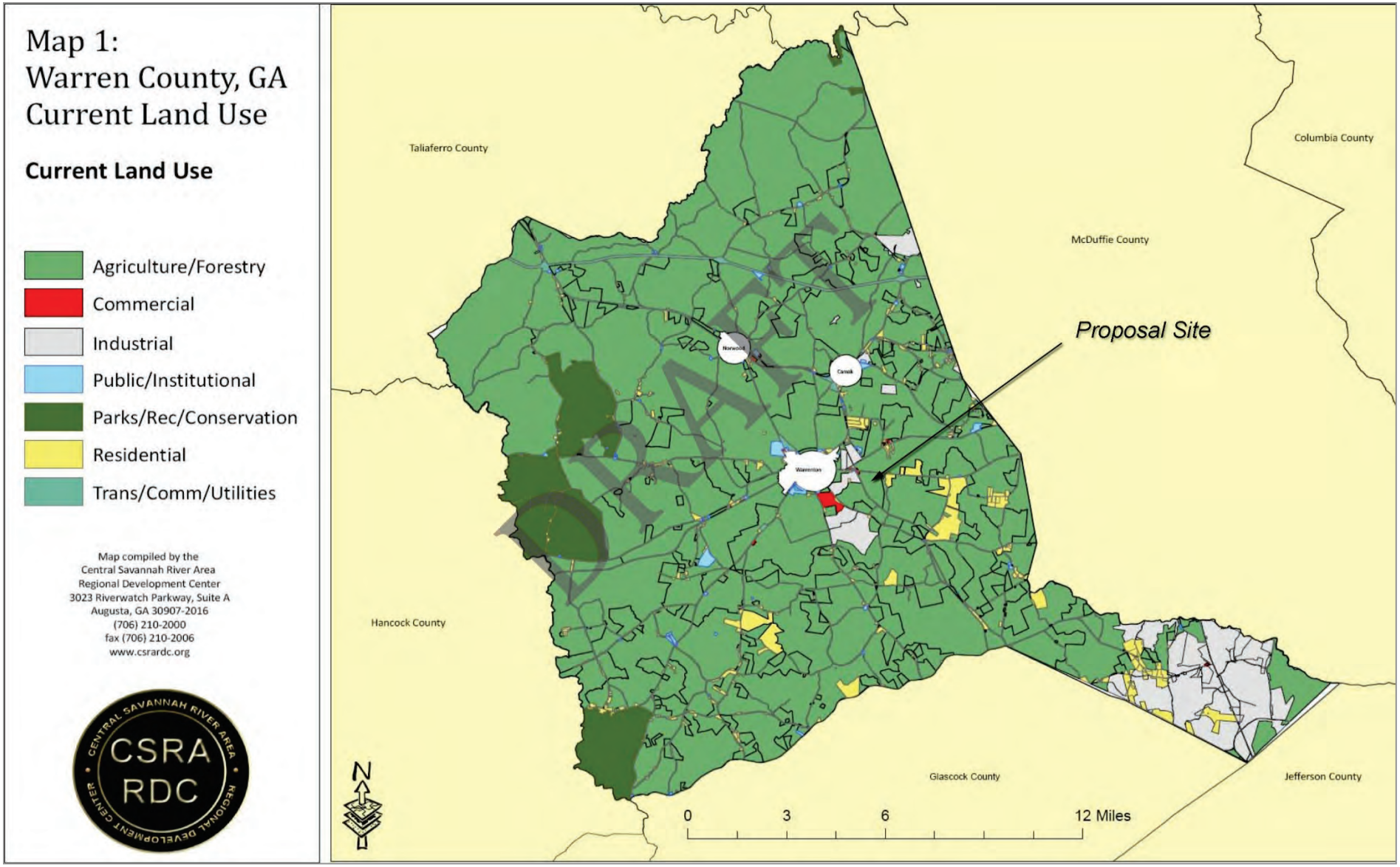


Figure 3-33. Warren County Land Use.
Source: CSRA Regional Development Center 2009

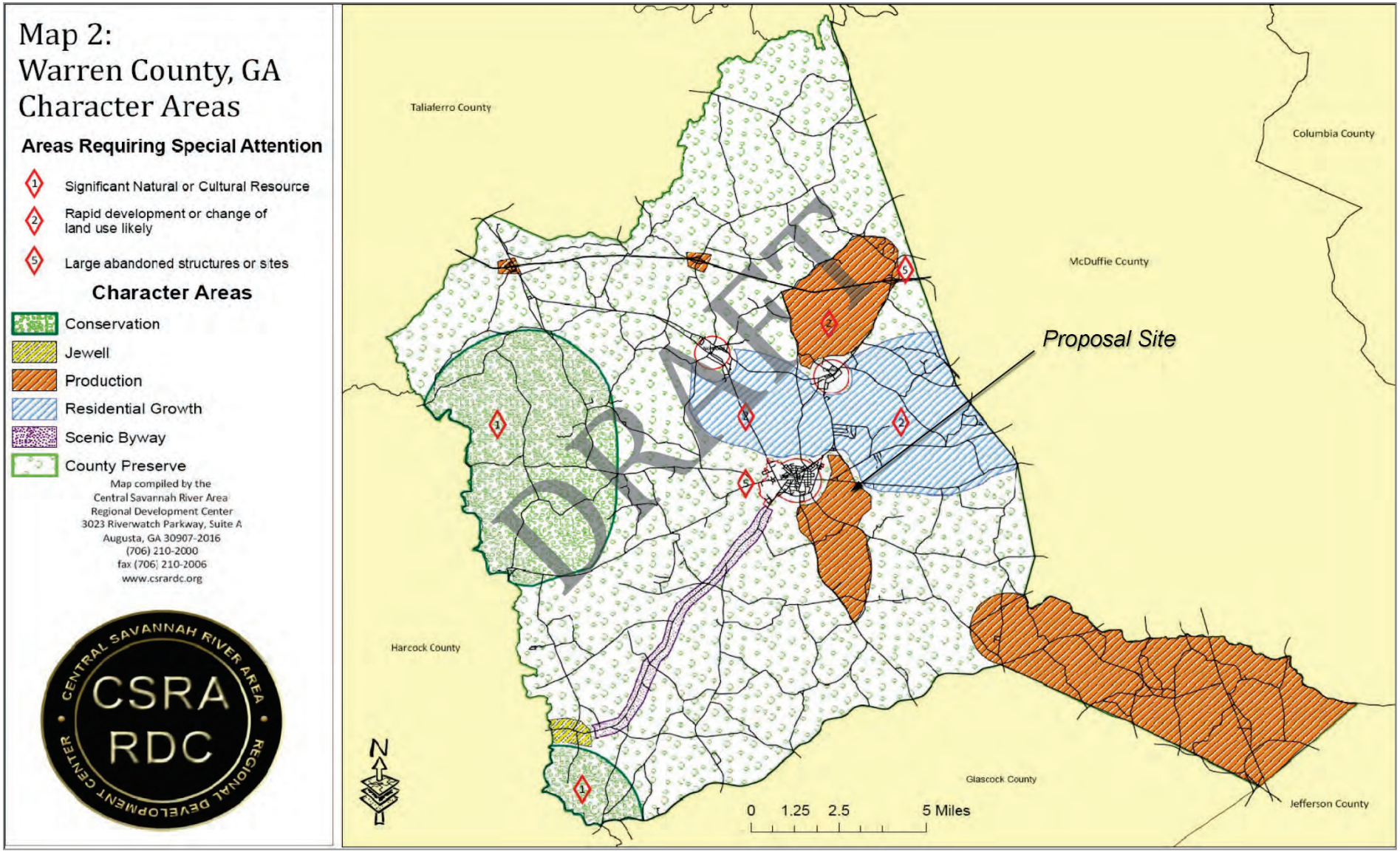


Figure 3-34. Concept Future Land Use, Warren County.
Source: CSRA Regional Development Center 2009

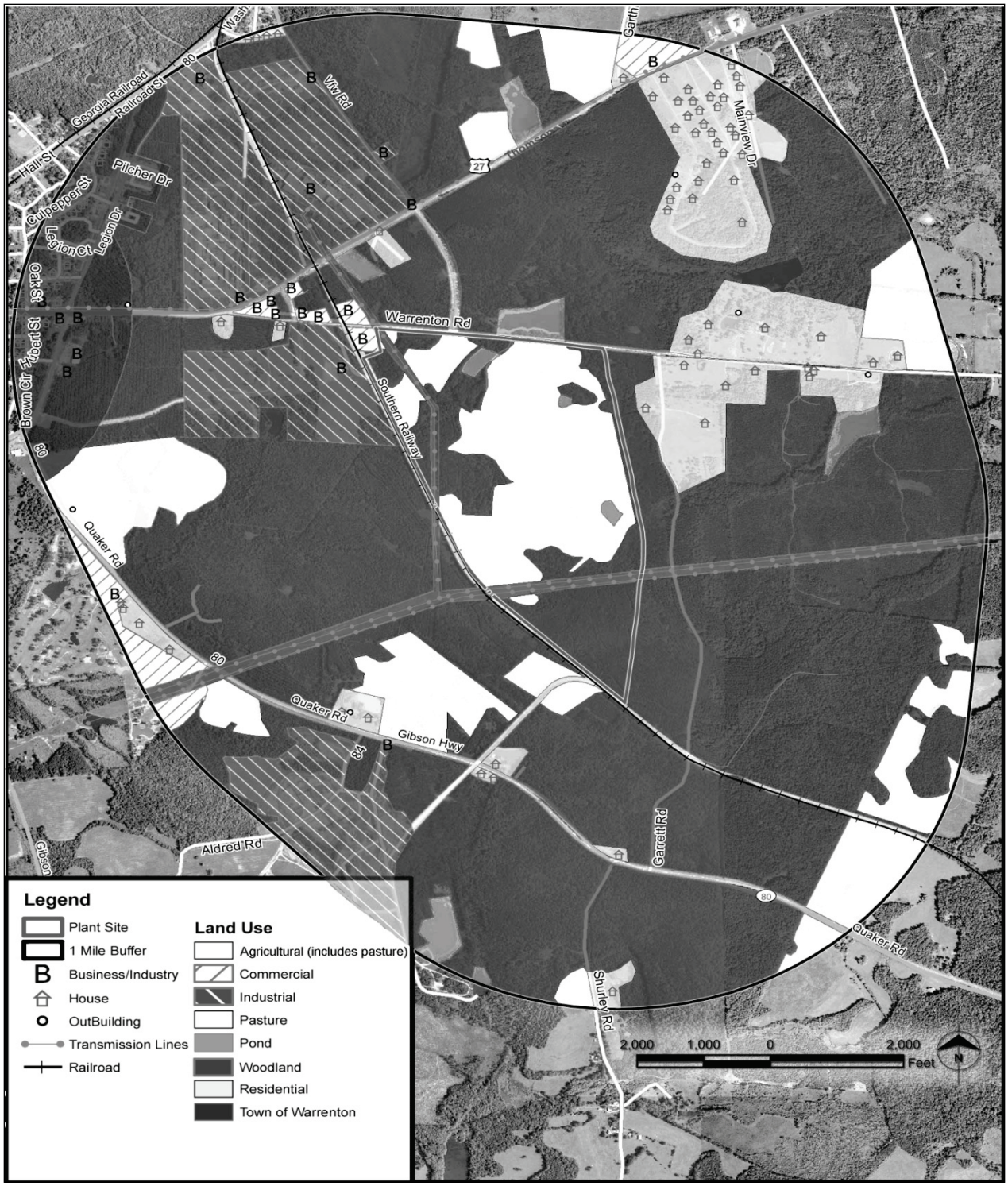


Figure 3-35. Land Use Near Proposal Site.
Source: Burns & McDonnell 2009b

The higher the rating, the better suited the location is for agriculture and is encouraged to be retained for agricultural uses. LESA scores of 226 and above are in the high protection bracket, a rating between 176 and 225 indicates a moderate need for protection, and a rating below 175 indicates low protection status. Sites receiving a total rating of less than 160 need not be given further consideration for protection and no additional sites need to be evaluated.

The USDA defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses (NRCS 2011). In addition to prime farmland, land may be classified as farmland of statewide importance, as determined by the state.

According to the NRCS, 16 soils are classified as prime farmland, and 10 soils are classified as farmland of statewide importance in Warren County. The entire area of the Proposed Project, excluding water features, is classified as prime or other important farmland, with 79 percent of the Proposed Project site considered prime farmland and 19.2 percent considered farmland of statewide importance. Soil types at the Proposal are mapped in Figure 3-11 and summarized in Table 3-20.

3.8.1.3 Formally Classified Lands

Based on data from the GDNR and the University of Georgia Natural Resources Spatial Analysis Laboratory, there are no federal or state lands in Warren County. Small areas in the extreme western portion of Warren County, approximately 9.5 miles from the Proposed Project site, are designated as Potential Conservation Opportunity Areas by the GDNR. These areas have been identified as part of a larger program to develop a Comprehensive Wildlife Conservation Strategy for Georgia. These areas are important to the conservation of biodiversity because they contain a large area of natural vegetation, have predicted habitat for rare species, or have a documented occurrence of rare species (DNR 2009e). There are also portions of the northern and western corners of the county that contain Potential Conservation Opportunity Areas; these areas are approximately 7.5 miles north of the Proposed Project Site and approximately 13.5 miles west of the site (Burns & McDonnell 2009b, p. 3-41).

The Warrenton City Park located in downtown Warrenton was identified as the only city park based on this search.

3.8.1.4 Recreation

The major federal recreation land in the area is Clarks Hill Lake, located about 20 miles northeast of Warrenton. The lake includes numerous campgrounds, picnic areas, swimming areas, boat ramps, hiking trails, and marinas managed by the USACE, state government, county governments, and private entities. Other public and private lakes and streams are found throughout the region, providing fishing and boating opportunities. Especially notable for fishing is the Ogeechee River, which flows from areas near the Proposed Project site southeast to the Atlantic Ocean near Savannah.

The Warrenton Country Club and public golf course is located on Quaker Road (Highway 80) to the west of the Proposal site (Burns & McDonnell 2009b, p. 3-59).

3.8.2 Affected Environment – Alternate

3.8.2.1 Land Use and Zoning

The Alternate site is located in central Appling County near the City of Baxley. Appling County is a member of the regional planning agency Heart of Georgia Altamaha Regional Development Center (HOGA RDC) that serves 17 counties and 63 cities in southeast Georgia. HOGA RDC provides assistance with comprehensive planning, community and economic development, and historic preservation (Burns & McDonnell 2010d, p. 3-39 and 3-42).

Adopted in 2007, the Appling County Joint Comprehensive Plan was established to plan for the future growth and development in Appling County and its municipalities, including Baxley. This plan establishes goals for economic development, natural and cultural resources, housing, land use, community facilities and services, and intergovernmental coordination (Burns & McDonnell 2010d, p. 3-42).

The Alternate site is located in unincorporated Appling county which it currently does not have a zoning ordinance (Burns & McDonnell 2010d, p. 3-42).

General land use around the Alternate site is shown in Figure 3-36. The land use is based on the National Agricultural Imagery Program (NAIP) 2009 photography, and is simplified into four categories: residential, industrial, agricultural/transmission line right of way, and timber. Roadways are not distinguished. Nearly all of the timber is planted in identifiable rows, and the timber is in various stages of growth. The house symbols are approximate and based on the aerial photograph. To the east and south of the Alternate site property is Rayonier timberland. There is a residential area to the west of the property along Hundreds Road. Several residences are located to the northeast of the property along US 341.

The Wildwoods Neighborhood is located north of the property which is on the north side of US 341. There is a mobile home northwest of the property which is also on the north side of US 341.

Industry near the property is located to the northwest of the site along US 341, which include Rayonier sawmill and several businesses in the Appling County Industrial Park East. In total, there are approximately 177 residences, 10 industrial establishments, and three commercial establishments within one mile of the Alternate site (Burns & McDonnell 2010d, p. 3-43). Approximately 50 of the residences are within one half-mile of the boundary of the Alternate site (Figure 3-36).

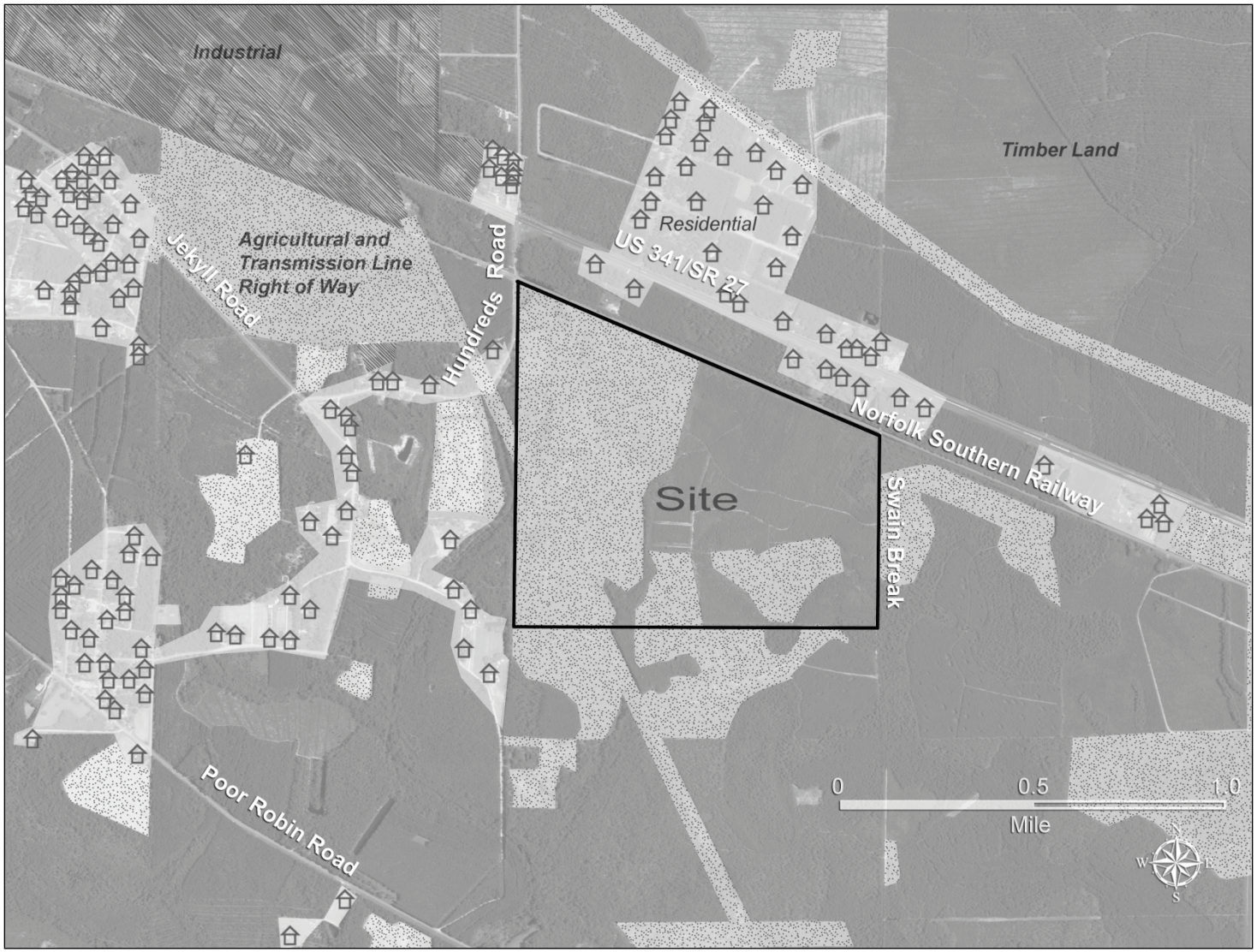


Figure 3-36. General Land Use Near Alternate Site.
Source: National Agricultural Imagery Program 2009

3.8.2.2 Prime Farmland

None of the site soil is classified as prime farmland. Approximately 62 percent of the soil on site is farmland of statewide importance. More than two-thirds of the Alternate site has been used for cattle and the remainder of the site is covered in forested vegetation. Soil types at the Alternate site are mapped in Figure 3-12 and summarized in Table 3-21.

3.8.2.3 Formally Classified Lands

There are two formally classified lands in Appling County, both on the Altamaha River and approximately 10 miles north of the site: The Bullard Creek WMA and the Moody Forest Natural Area. The Bullard Creek WMA is used for hunting and is managed by the DNR. The Moody Forest preserve is managed jointly by the DNR and the Nature Conservancy. The 4,500-acre preserve contains the only known example of the longleaf pine-blackjack oak forest and has longleaf and slash pine trees that are 200 to 300 years old and cypress-tupelo sloughs with trees over 600 years old (Nature Conservancy 2010). The state highway map (Figure 1-2) shows the Bullard Creek WMA and the Moody Forest Natural Area.

3.8.2.4 Recreation

The closest public recreation area (3 miles) to the Alternate site is the A. Randall Tuten Environmental Park on GA 15 at the Appling County Middle School campus. The Park includes a nature trail and community concert venue. Appling County Recreation Complex is 5 miles west of the Alternate site provides tournament fields. Lake Myers, which is a county park with fishing, boating, and swimming, is 10 miles west of the City of Baxley. The Altamaha River located 15 miles north of the Alternate site, which forms the northern border of Appling County, is popular for boating, hunting, fishing and other outdoor activities (Burns & McDonnell 2010d, p. 3~58).

3.8.3 Environmental Consequences

3.8.3.1 Identification of Issues

The main issues related to land resources include conflicts with land use plans and policies, long-term loss of current land uses and conflicts with special use areas. The following issues were identified during scoping and EIS development:

- Consistency with land use plans and ordinances.
- Consistency with existing land uses in the study area.
- Potential for loss of prime farmland and farmland of statewide importance.
- Impacts to public lands.

3.8.3.2 Impact Assessment - Proposal

Land Use and Zoning

The Proposal is consistent with the land use and development goals of the Joint Warren County Comprehensive Plan. Construction of a new biomass plant in Warren County is consistent with several of the plan's economic development goals, which include providing a climate conducive to business and industrial development, attracting new business, and creating employment opportunities for residents (Warren County 2004, p. E-31). The Proposal is also consistent with land use and development goals for adjacent properties identified by local officials. The Proposal site is located in an area with several existing industrial developments as well as an area with potential for future industrial development. Several sites in the surrounding area are being marketed by the Development Authority of Warren County for industrial development (McCorkle 2009).

The Proposal would be permitted, constructed, and operated in accordance with all applicable land use regulations, including the Warren County Land Use Ordinance. The property where the Proposal would be constructed would require a land use district map change from Forestry-Agriculture to Industrial (Thigpen 2009). Prior to construction, an application would be made to Warren County for a land use district map change.

The Proposal would involve the conversion of pastureland and recently harvested forestland to industrial land use. Adjacent and nearby land uses primarily include forestland and industrial. The Proposal would be compatible with these existing land uses and would not adversely impact the use or development of the adjacent and nearby properties. Residential areas in the vicinity of the Proposal would be impacted from a land use standpoint in that these areas would be located closer to an industrial land use after plant construction. However, the area is already characterized by a mix of land uses, including industrial, and the Proposal would not impact the continued residential use of these areas.

The nearest public facilities to the site are located within the City of Warrenton. There would be no impacts on public facilities. There would be no adverse impacts to public lands as a result of the Proposal.

Prime and Unique Farmland

Long-term impacts would occur to prime farmland soils within the Proposal site. Approximately 94 acres of soils affected would be prime farmland and 12 acres would be considered farmland of statewide importance (Figure 3-37). A total of approximately 53 acres would be a short-term impact, of which 43 acres would be prime farmland and 10 acres would be considered farmland of statewide importance.

A total of approximately 20 acres of prime farmland, and 0.3 acres of statewide important soils, and 0.09 acres which are not considered prime farmland would be

impacted by the construction laydown and construction parking areas. The short and long-term impacts represent a very small portion (0.32 percent) of the approximately 49,710 acres of prime farmland and farmland of statewide importance found in Warren County and would not be a substantial loss of prime farmland in the region. The FPPA Form AD-1006 score is 67. Because the score is far below the score of 160, which may warrant consideration of farmland protection, significant impacts to prime farmland for constructing and operating the proposed Project are not expected. Those areas not required for permanent components would be loosened and leveled by scarifying, harrowing, disking or other appropriate method, and these activities would not result in a long-term loss of productivity. A portion of the construction laydown areas and all of the construction parking areas could be returned to agricultural use at the end of construction activities. No additional mitigation measures would be required.

Formally Classified Lands

Except for the Warrenton City Park, located in the City of Warrenton, the nearest formally classified land is approximately 8 miles from the Proposal site. No formally classified lands would be impacted by the Proposal. Only upgrades to existing transmission lines are included in the Proposal; aside from temporary construction impacts, the upgraded transmission lines will have no more impact than the existing lines. Installation of water lines will also not have long-term impacts.

Recreation

There would be a loss of private hunting opportunities on the property proposed for facility construction, but the area is adjacent to an industrial park and is not likely heavily used for hunting.

3.8.3.3 Impact Assessment – Alternate

Land Use and Zoning

The Alternate is consistent with the land use and development goals of the Appling County Joint Comprehensive Plan (Appling County 2007). Construction of a new biomass plant in Appling County is consistent with several of the plan's economic development goals, which includes encouraging intense development in and around the City of Baxley, and the US 341 West Corridor. The Appling County site would be located in an area with several existing industrial developments.

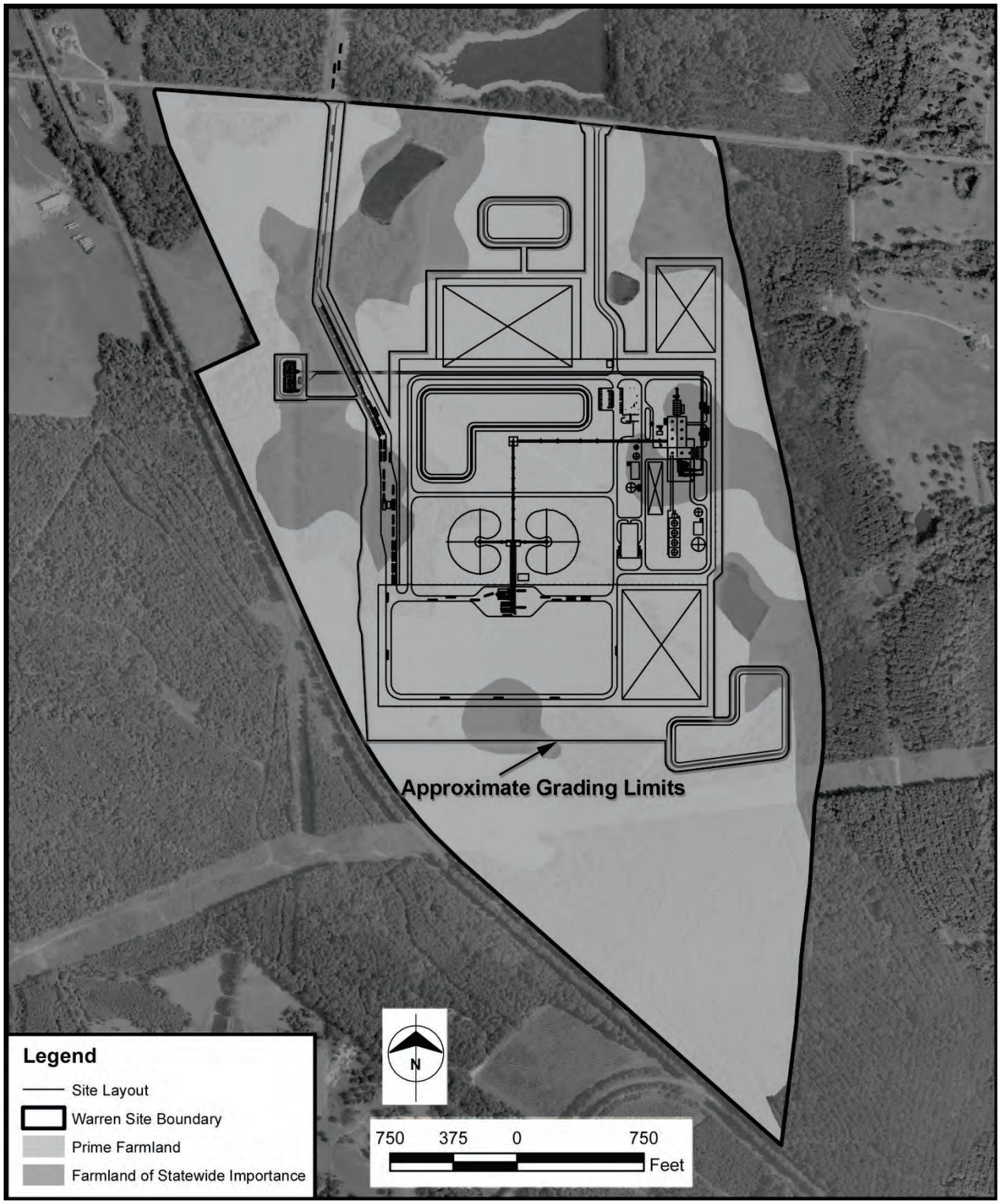


Figure 3-37. Farmland Impacts, Proposal Site.
Source: Burns and McDonnell 2010

Prior to construction, the property where the Alternate would be constructed would be annexed by the City of Baxley. The annexation process requires submittal of an annexation petition, followed by a public hearing. The City Council then makes a decision on the annexation. The City of Baxley has a Zoning Ordinance; however, Oglethorpe Power is exempt from local zoning ordinances.

The Alternate would be compatible with these existing land uses and would not adversely impact the use or development of the adjacent and nearby properties. Nearby residential areas would be impacted from a land use standpoint in that these areas would be located closer to an industrial land use after plant construction. However, the general area is already characterized by a mix of land uses, including industrial, and the Alternate would not directly impact the continued residential use of these areas.

Prime and Unique Farmland

There is no prime farmland at the Alternate site. The project would impact approximately 80 acres of farmland soils of Statewide importance (Figure 3-38).

Formally Classified Lands

Outside the City of Baxley, the nearest formally classified land is approximately 8 miles from the Proposal site. No formally classified lands would be impacted by the Proposal.

Recreation

No recreational areas or other areas were identified within one mile that would be impacted by the Alternative.

3.8.3.4 Impact Assessment—No-Action Alternatives

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on land use at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

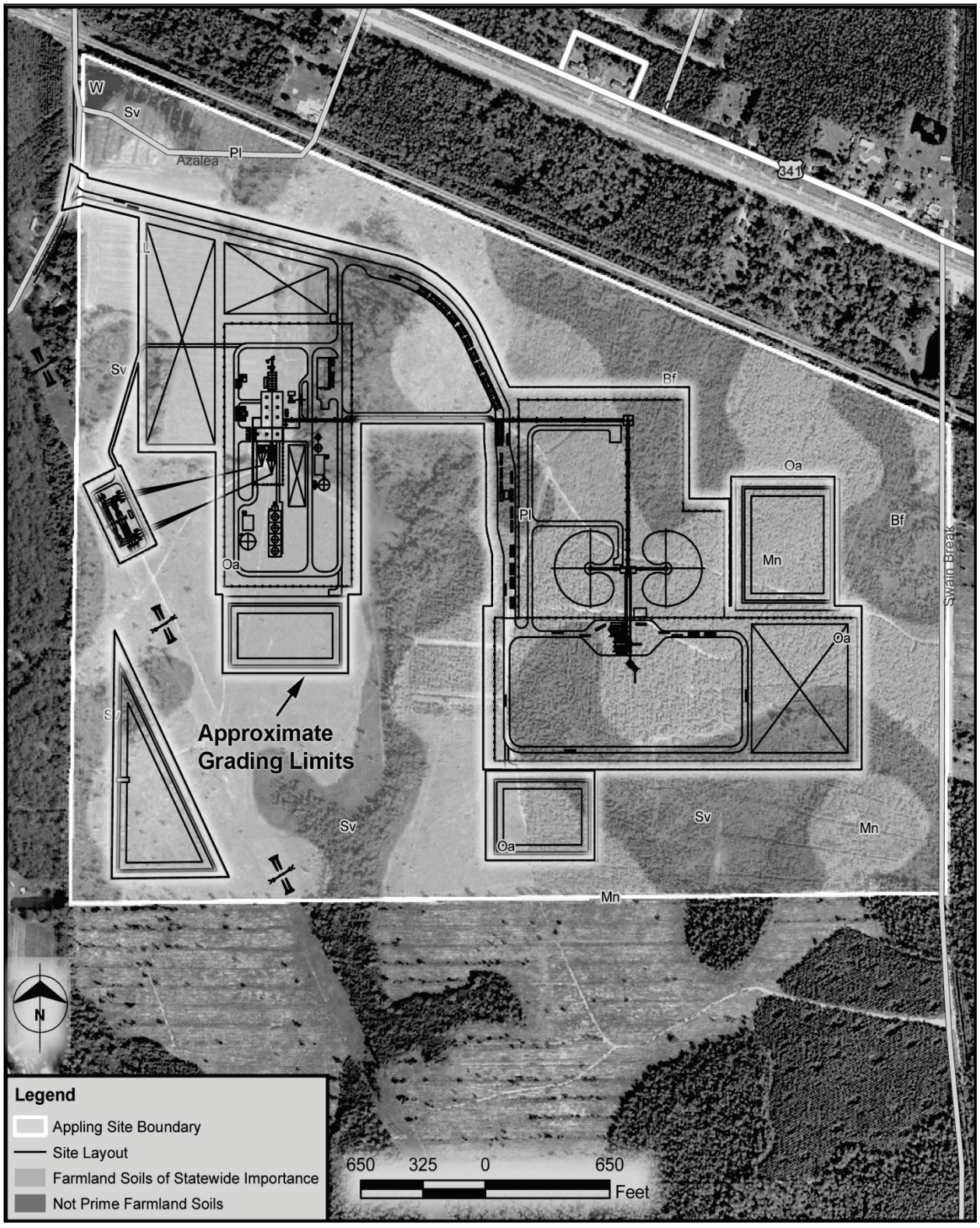


Figure 3-38. Farmland Impacts, Alternate Site.
Source: Burns and McDonnell 2010e

3.9 VISUAL RESOURCES

3.9.1 Affected Environment – Proposal

There are no public lands that would be within the area of visual influence of the plant. The power block and 220-foot tall stack would be visible from nearby residences, farms, businesses, and from the golf course to the west.

3.9.2 Affected Environment – Alternate

There are no public lands that would be within the area of visual influence of the plant. The power block and 220-foot tall stack would be visible from nearby residences, farms, and businesses.

3.9.3 Environmental Consequences

3.9.3.1 Identification of Issues

The following issues related to impacts on visual resources were identified through the scoping and EIS development processes:

- Visual intrusion of the facility, including the stack.
- Visual impacts to nearby residences.
- Visual impacts to travelers along US 278.
- Visual impacts on the City of Warrenton.
- Potential negative effects of plant lighting to the night environment.

3.9.3.2 Impact Assessment - Proposal

This analysis considers the potential visual impacts that would be anticipated as a result of changes in the landscape from the Proposal. Visual contrast is the measure of physical change in the existing landscape that results from introduction of the Proposal. The addition of the biomass facility, including the stack and other structures, would cause visible changes in the landscape. The visual presence of the Proposal would be influenced by factors including the amount of screening, the distance viewed, other disturbances in the viewshed, background terrain and textures, and the sensitivity of the viewer.

Potential visual impacts are determined by analyzing how visual contrasts are perceived from sensitive viewpoints. Sensitive viewpoints with potential to be impacted by the Proposal include residences within one mile of the Proposal, travelers along US 278, and the nearby community of Warrenton. Other sensitive viewpoints include recreational areas or other areas of unique scenic quality, although none were identified from which

the Proposal would be visible. Based on a review of the viewshed model, Oglethorpe concluded that only the stack and not the rest of the proposed plant would not be visible from the golf course located along GA 80. Potential levels of visual contrast were estimated by conducting a viewshed analysis using GIS software and data. The viewshed analysis maps those areas where the various facility components could potentially be seen and estimates the degree of visibility.

Visual Changes to the Landscape

The Proposal would introduce new elements into the local landscape, which is predominantly agricultural and forested. However, because the Proposal would be located adjacent to an area of industrial development, the overall visual contrast of the project in the landscape would be reduced. Figure 3-39 shows an aerial rendering and a front entrance rendering of the Proposal.

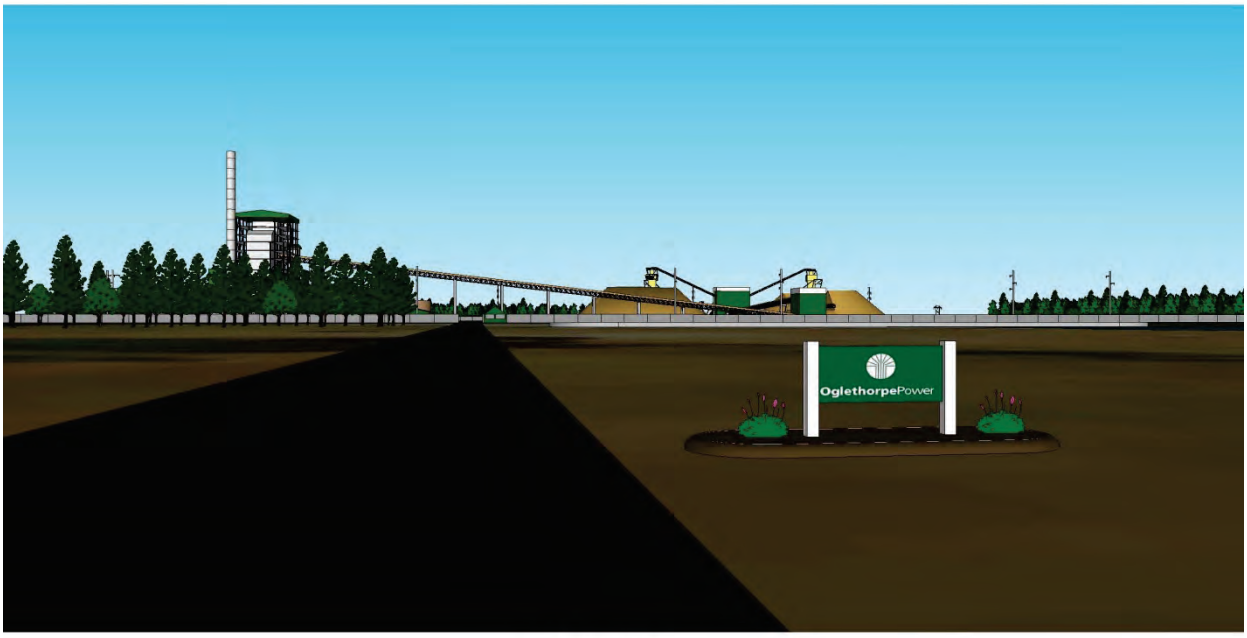
The most noticeable components of the Proposal would include the stack, the structures housing the boiler and turbine, and the two stockpiles of biomass. The stack would be approximately 220 feet[53] high and would be constructed of steel. The boiler would be housed in an outdoor structure with a roof, and the adjacent turbine room would be indoors. The height of the boiler roof would be 190 feet and the height of the turbine room would be 90 feet. The two kidney shaped stockpiles of processed biomass would have a combined storage capacity of approximately 8 million cubic feet or enough to fuel the boiler for 20 days. Other noticeable components of the Proposal would include biomass receiving and processing equipment, air quality control equipment, storage tanks for water, fuel and other materials, a substation, an administration building, and storm water retention ponds.

General facility lighting would be installed to provide for operation of the Proposal at all hours. Outdoor lighting would be installed to illuminate the roadways and equipment walkways. These lights would introduce a new visual element into the local landscape and would be most noticeable at night to those residences nearest the Proposal.

Lights would be shielded to minimize impacts to the surrounding areas. Obstruction lighting would be installed on the stack based on Federal Aviation Administration (FAA) requirements. The FAA requires obstruction lighting for structures exceeding 200 feet in height. Prior to construction, the FAA would be notified, and it would then recommend the most appropriate obstruction lighting system to be installed on the stack.

[53] The stack height would be finalized during the permitting process.

Aerial View



Front Entrance

Figure 3-39. Renderings of the Proposal.
Source: Burns and McDonnell 2010

Temporary, short-term visual impacts would result from construction activities. Earthmoving activities, structure construction, equipment installation, and other construction activities would contribute to the visual impacts on the existing landscape. The presence of large construction cranes would represent the most visible equipment used during the construction phase. Visual impacts as a result of construction activities would vary in degree depending on the phase of construction and the location of the viewer. Overall, visual impacts due to construction are considered low due to the short duration.

Sensitive Viewpoints

Sensitive viewpoints can include residences, travel routes, communities, recreational areas and other areas of unique scenic quality. Sensitive viewpoints with potential to be impacted by the Proposal were identified and inventoried. Identification of these viewpoints included review of recent aerial photos and other GIS data as well as field reconnaissance.

The inventory identified the following viewpoints: residences within one mile of the Proposal, travelers along US 278, and the nearby community of Warrenton. Except for the golf course on GA 80, from which only the stack would be visible, no recreational areas or other areas of unique scenic quality were identified that would be impacted by the Proposal.

Viewshed Analysis

A viewshed analysis was conducted to gain a basic understanding of the potential visual impacts on the landscape by the Proposal. The viewshed analysis used GIS software and data to determine the visibility of the Proposal from the surrounding areas. The results of this analysis essentially identified and mapped those areas where an observer might be able to see the various facility components given the model factors considered.

The viewshed calculations[54] conducted considered the effects of topography, stack and other structure heights, and the potential effects of intervening vegetation on line of

[54] Interpretation of viewshed calculation data can be complex. In general, viewshed calculations using simple topographic changes are reasonably reliable when identifying areas from where a specific project is not visible. In other words, the model easily determines if the project is not visible because there is a mountain between the observer and the project. However, identifying those areas where a given project is visible is far less reliable when modeling viewsheds using topography alone. This is especially true in heavily forested or developed areas where intervening vegetation and structures interrupt the viewshed.

At the same time, incorporation of vegetation into the viewshed model also reduces reliability of the model, since vegetation heights in the real world vary, foliage presence and absence changes with the seasons, vegetation data is often outdated, and the density of vegetation between the viewer and the viewpoint affects overall visibility. Nevertheless, viewshed calculations can provide useful insight into characteristics of the visual environment, and, when considered in coordination with real world knowledge of the study area, can provide useful information.

sight visibility. For all calculations, topography was determined using a 30 meter digital elevation model, which provides an estimate of the ground surface elevation for every 30 x 30 meter square area across the entire study area. Vegetation was modeled by overlaying forest cover data on top of the elevation data layer assuming an average tree height of 100 feet[55]. Forest cover is defined as those areas identified as predominately forest cover using the USGS National Land Cover Database. Preliminary stack and structure locations and heights were used in the analysis. Based on these inputs, the viewshed analysis mapped all places on the landscape where the Proposal would likely be visible.

To provide an additional level of interpretation to this analysis, the viewshed calculations were also considered with respect to visual distance zones, as described in the U.S. Department of Agriculture (USDA) Forest Service Landscape Aesthetics Manual (1995). Distance zones are immediate foreground, foreground, middleground, and background. Figure 3-40 displays the results of the viewshed analysis and identifies the foreground, middleground, and background visual distance zones from the Proposal. The viewshed analysis maps those areas where the various facility components could potentially be seen and estimates the degree of visibility. Visibility was assessed with a relative scale of high to low, with high indicating the most contrast with the existing landscape and having the greatest potential concern by viewers of the landscape. Sensitive viewpoints, including the City of Warrenton, US 278, and houses within one mile of the Proposal, are also displayed on the map.

***Immediate Foreground*.** This distance zone is 0 to 300 feet from the viewer. At this distance viewers can discern individual elements of plants (leaves, twigs, and flowers), small mammals and birds, and slight movement. At this level details are visible and all elements of the Proposal would be visible. The immediate foreground was not included in this analysis, because viewers within 300 feet of the structures would be on the Proposal site itself.

***Foreground*.** This distance zone is 0 to 0.5 mile from the viewer. At this distance viewers can discern masses of plant elements (clusters of leaves, tree trunks, large limbs, and masses of flowers), medium-sized mammals, and larger birds. At this level movement from the wind is discernable at tree boughs and tree tops. Individual forms are visible and the various structures of the Proposal would be visible.

As shown on the map, the Proposal would be most visible from within the one-half mile foreground distance zone. In those areas of the foreground where a viewer could see the Proposal, the degree of visibility would primarily be high, indicating that a viewer would see a large portion of the stack and other structures. Viewers would be able to

[55] The average tree height of 100 feet was determined based on the typical mature height of the most common tree found in Warren County, the loblolly pine (Bishop 2000).

discern individual forms or components of the Proposal, although small details would only be visible from within the immediate foreground (within 300 feet).

Sensitive viewpoints within the foreground include approximately 15 residences. For residences to the northwest and southwest, existing industrial development within close proximity to the Proposal would lessen the amount of visual contrast that would be created in the existing landscape, thus reducing the overall visual impact to sensitive viewpoints. However, the residences to the northeast are not currently near industrial development.

***Middleground*.** This distance zone is 0.5 to 4 miles from the viewer. At this distance viewers can discern silhouettes of landscape elements such as tree forms, large boulders, fields of flowers, and small rock outcroppings. Form, texture, color, and pattern are visible at this level. In addition, the silhouette of the Proposal would be visible.

***Background*.** This distance zone is 4 miles and beyond to the horizon. At this distance viewers can discern tree groves, large forest openings, and large rock outcroppings. At this level vertical distinctions of landforms and horizon lines provide the controlling visual character. The Proposal could possibly be visible above the tree canopy in areas where there is no background behind the structures such as from a hilltop. Throughout most of the study area this distance zone would not be visible due to intervening topography and vegetation.

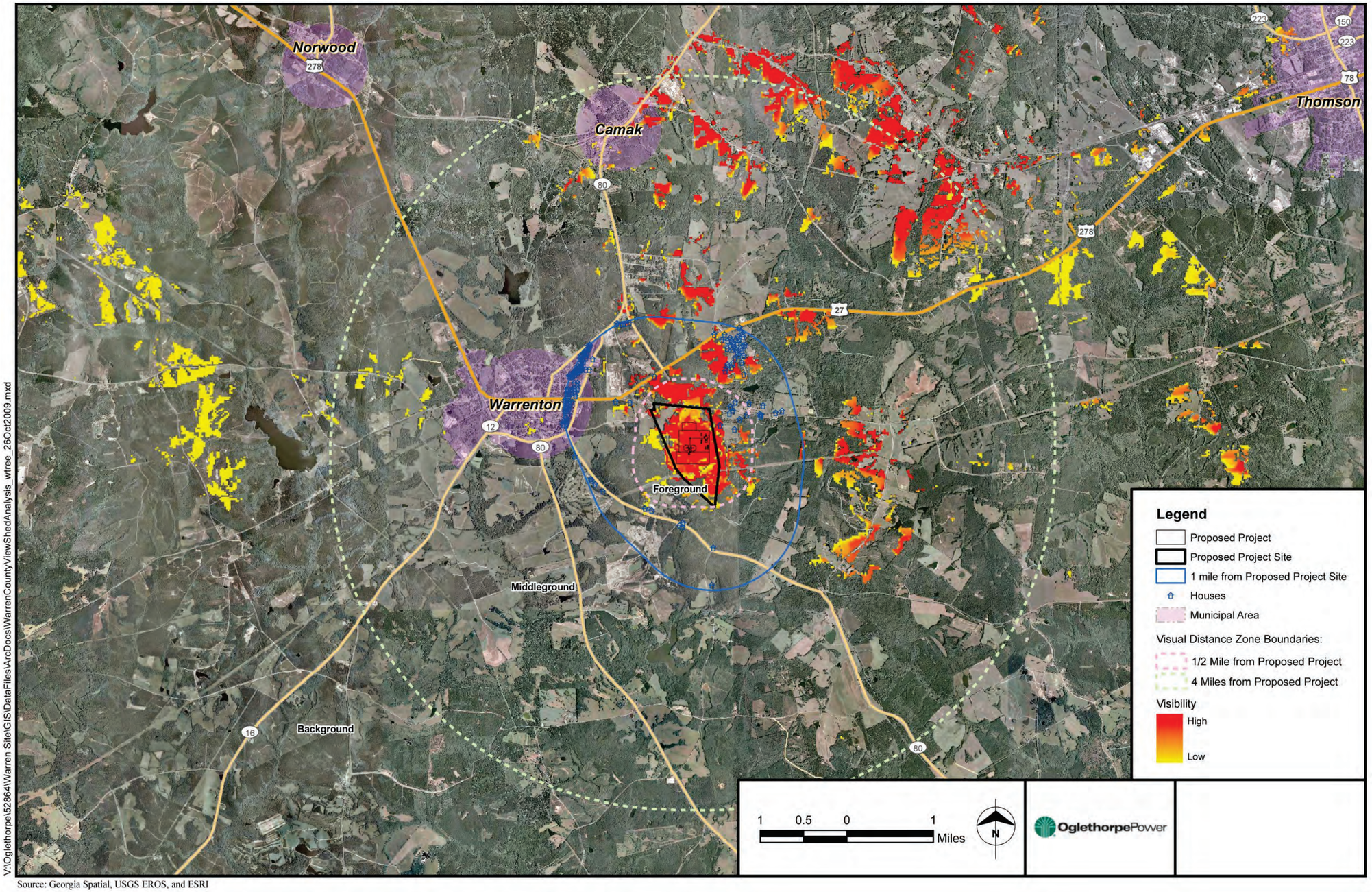


Figure 3-40. Viewshed Analysis, Proposal Site
Source: Burns and McDonnell 2010

The viewshed analysis suggests that the Proposal would be visible from scattered areas beyond four miles from the site. However, because these areas are within the background distance zone, the Proposal would not be a dominant form in the landscape. For the most part, the Proposal would blend in with the background terrain and textures. The degree to which the Proposal would impact the overall visual landscape would be reduced at these longer viewing distances, because the Proposal would be a smaller part of the overall vista.

Proposed Project

While there would be some visual impacts to the identified sensitive viewpoints, the Proposal would not result in a substantial dominant visual change in the landscape. This conclusion is based on the fact that the Proposal would be located adjacent to industrial land uses and because the visibility of the Proposal components would not be widespread, as demonstrated by the viewshed analysis. Except for the golf course on GA 80, from which only the stack would be visible, no recreational areas or areas of unique scenic quality were identified that would be impacted by the Proposal. While the countryside around the Proposal site may be considered scenic, it is typical of much of rural central Georgia.

3.9.3.3 Impact Assessment – Alternate

Identification of sensitive viewpoints included review of recent aerial photos and other GIS data as well as field reconnaissance. The inventory identified the following viewpoints: residences within one mile of the Alternate, travelers along US 341, and the nearby community of Baxley. No recreational areas or other areas of unique scenic quality were identified that would be impacted by the Alternate.

Due to intervening vegetation and topography, the Alternate would likely not be highly visible from many of the identified sensitive viewpoints. Residences nearest to the Alternate, including those along Hundreds Road to the southwest of the Alternate, would have the greatest potential for visual impact. The locations of four photograph points representing views from adjacent properties are indicated on Figure 3-41. Photograph 1-1 displays the view towards the Alternate site from a residence along Hundreds Road near the southwest corner of the site. The Alternate would likely be visible from viewpoints such as this where tree heights are shorter or where there is a break in the vegetation between the viewpoint and the Alternate. A landscape buffer would be planted along the property boundary to provide screening and lessen the visual impact of the Alternate on these residences. Photograph 1-2 displays the view towards the Alternate from a church located to the west of the site at the intersection of Jekyll Road and Hundreds Road.

Certain project components, such as the taller structures and the stack, may be visible above the tree line from viewpoints such as this. Taller structures would include the 190-foot high structure housing the boiler and the 220-foot high stack[56].

The Alternate may also be visible through breaks in the vegetation from residences along US 341. Travelers along US 341 would also likely view glimpses of the Alternate through breaks in the vegetation. Photograph 1-3 displays the view towards the Alternate site from a location to the north of the site along US 341 near the intersection of Swain Break Road. The Alternate would likely be visible from viewpoints such as this where the vegetation between the site and US 341 is sparse. In other locations along US 341, existing vegetation is denser between the site and US 341, and many of the project components would likely be screened from view. Photograph 1-4, taken from the intersection of US 341 and Azalea Avenue, provides an example of such a location.

Views of the Alternate from the community of Baxley would likely be limited. While the topography in this area is relatively flat, the tree cover would likely screen much of the project from view. It is possible that the stack may be visible above the tree line from certain areas within Baxley.

3.9.4 Impact Assessment—No-Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on visual resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

[56] The stack height would be finalized during the permitting process.

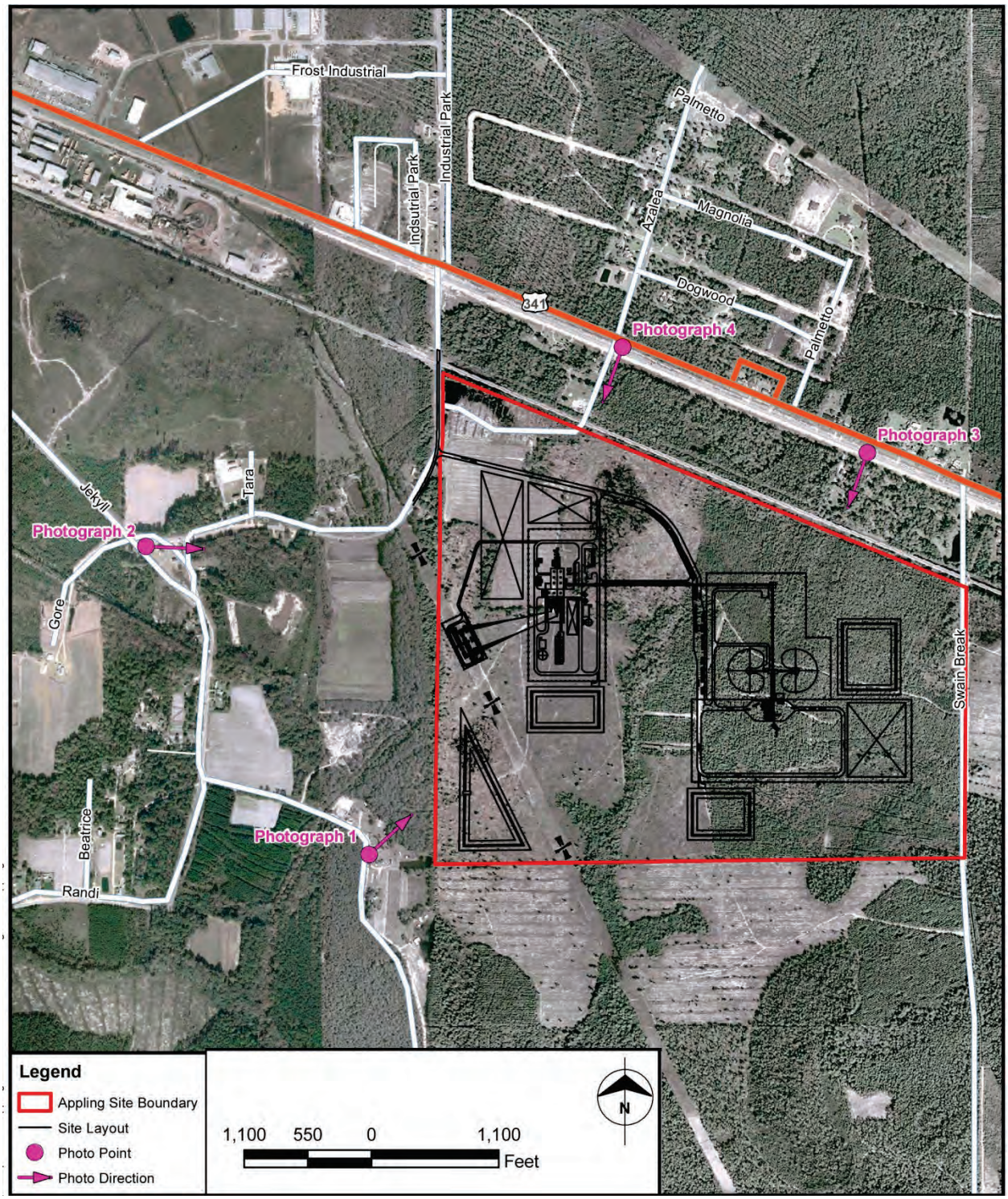


Figure 3-41. Alternate Site Photo Points.
Source: Burns and McDonnell 2010

Photograph 1-1 View towards Site from Residence on Hundreds Road

Photograph 1-2 View towards Site from Church on Hundreds Road

Photograph 1-3 View towards Site from U.S. 341 near Swain Break Road

Photograph 1-4 View towards Site from Intersection of U.S. 341 and Azalea Avenue

3.10 TRANSPORTATION

3.10.1 Affected Environment - Proposal

Warrenton is located approximately eight miles south of Interstate 20 (I-20), approximately 100 miles east of Atlanta, and 40 miles west of Augusta. I-20 is connected to Warrenton by both US 278 and GA 80 (Figure 1-1). Posted speed limits on the highways range from 35 miles per hour within the limits of Warrenton to 70 miles per hour on the interstate system.

Highway classifications and design level of service (LOS, see text box), as recorded by the GDOT, are listed in Table 3-37 for those highways that are expected to serve as travel ways for vehicles associated with the facility (Burns & McDonnell 2009b, p. 3-44).

Level of Service (LOS) is a qualitative rating of a road's effectiveness relative to the service it renders to its users (from A-best to F-worst). LOS is measured in terms of a number of factors, such as operating speed, travel time, traffic interruptions, freedom to maneuver and pass, driving safety, comfort, and convenience.

Source: Georgia Department of Transportation 2009b

Table 3-37. Roadway Classifications and Design Level of Service

Highway	Classification	Design Level of Service
State Route 16	Rural Minor Arterial	B
State Route 171	Rural Major Collector	C
State Route 80 (North of GA 12/US 278)	Rural Major Connector	C
State Route 80 (South of GA 12/US 278)	Rural Minor Arterial	B
State Route 12/US 278	Rural Minor Arterial	B
Interstate 20	Rural Interstate	B
East Warrenton Road	Rural Local Road	C

Source: Georgia Department of Transportation 2008.
Georgia Department of Transportation, Chapter 6

Existing vehicular traffic in the form of Average Annual Daily Traffic (AADT) volumes were obtained from the GDOT State traffic and report statistics system (STARS) on May 8, 2010. AADT represents the total estimated traffic in a given year divided by 365. AADT volumes for a number of locations near Warrenton are summarized in Table 3-38. Many of these AADT volumes are GDOT estimates and not based on actual counts (at where the % Trucks is shown, the AADT is based on an actual count; where the % Trucks is "Not estimated" the AADT is an estimated.

Table 3-38. Traffic Counts for Key Routes Near Proposal (2008)

Route/Street	AADT	% Trucks
GA 12 (North of Main St.)	2,050	16.0
GA 12 (South of Main St.)	3,900	Not estimated
Main Street (East of GA 12)	4,120	Not estimated
GA 16 (West of GA 12)	4,900	Not estimated
Macon Highway (West of GA 12)	1,120	Not estimated
GA 12 (East of GA 16)	6,060	21.0
GA 171 (South of GA 12)	820	Not estimated
Gibson Street (North of GA 12)	1,320	Not estimated
GA 12 (East of GA 171)	4,340	Not estimated
GA 80 (North of US 278/GA 12)	5,190 (3,060 in 2009)	Not estimated
GA 80 (South of US 278/GA 12)	1,610	Not estimated
GA 12 (East of GA 80)	4,380	Not estimated
Main Street (West of GA 12)	4,110	Not estimated
US 278 (East of GA 12)	4,120	Not estimated
Washington Highway (North of US 278)	3,190	Not estimated

Source: Georgia Department of Transportation 2008.

The intersections of GA 12 with Main Street (GA 12/US 278), GA 171 with Legion Drive (GA 12), and GA 80 with Legion Drive (GA 12) are all two-way stop controlled intersections. The intersection of GA 16 with Legion Drive is an all-way stop controlled intersection and the intersection of Legion Drive (GA 12) with Thomson Highway N.E. (US 278) is a signalized intersection.

Railroad access is available from the existing Norfolk Southern line running along the western edge of the Proposal site. Intermodal service is available in Atlanta, approximately 120 miles away (Burns & McDonnell 2009b, p. 3-45 to 3-46).

3.10.2 Affected Environment – Alternate

Two major roadways pass through Baxley, which is just west of the alternate site: US 341/GA 27, just north of the site; and US 1/GA 4, which intersects US 341/GA 27 in Baxley. US 341/GA 27 is a four-lane highway, with 2008 AADTs ranging from 4,100 on the east side of Baxley to 10,830 on the west. AADTs on US 1/GA 4 ranged from 6,950 just north of Baxley to 15,450 in the center of town (Table 3-39) (Georgia Department of Transportation 2008).

Table 3-39. Traffic counts for Key Routes Near Alternate Site (2008).

Route/Street	2008	
	AADT	% Trucks
US 341/GA 27 (West of US 1)	10,830	Not estimated
US 341/GA 27 (East of US 1)	10,200	Not estimated
US 1 (South of US 341)	11,860	12.0
US 1 (North of US 341)	15,480	Not estimated
US 341/GA 27 (East of Industrial Park Dr.)	4,100	Not estimated
GA 144 (West of Industrial Park Dr.)	4,650	Not estimated
GA 144 (East of Industrial Park Dr.)	2,140	Not estimated

Source: Georgia Department of Transportation 2008.

US 1 and US 341 both provide access to the Interstate highway system. I-16, located approximately 45 miles to the north of Baxley is connected to Baxley by US 1, while I-95, located approximately 65 miles to the east of Baxley is connected to Baxley by US 341.

The City of Baxley and the County of Appling roadway network would be used to deliver construction equipment, access for employees, and deliveries during construction and operation.

The following intersections of state routes would be affected by the addition of construction traffic to the existing roadway network, and ultimately the addition of permanent employees of the Alternative Project:

- US 341/ GA 27 with US 1/ GA 4
- US 341/ GA 27 with MLK Jr. Avenue
- US 341/ GA 27 with Hundreds Road

The intersections of US 341/GA 27 with US 1/GA 4 and US 341/ GA 27 with MLK Jr. Avenue are both signalized intersections, while US 341/GA 27 with Industrial Park Drive is a two-way stop controlled intersection with US 341/GA 27 being free flowing.

All existing roads that are expected to be utilized by the Alternate are paved with asphalt, including US 341/GA 27, US 1/GA 4, GA 144, GA 15, Industrial Park Drive and Hundreds Road.

While Oglethorpe currently does not anticipate using rail at the Alternate site, it is available from the existing Norfolk Southern line running at the northern side of the site.

Transportation during construction and daily operations would be similar for the Alternate site.

3.10.3 Environmental Consequences

3.10.3.1 Identification of Issues

Transportation issues raised during scoping related to this Proposal include the following:

- Potential impacts on traffic flow and safety from transportation of plant components, equipment, and construction materials to the site.
- Effect of increased traffic created by the commuting workforce during construction.
- Increased accident risk from delivery trucks.

3.10.3.2 Impact Assessment - Proposal

Impact Assessment Methods

Impacts to transportation were assessed by comparing projected additional travel demand due to project activities to existing daily traffic counts. Construction labor and operational staff projections for the Proposal were used as a basis for identifying impacts that may occur during plant construction and operations.

Impact assessment methods are directly tied to applicable regulations or standards and vary according to the individual issue. Those standards included the Highway Capacity Manual, 2000 Edition, with analysis being done using the Highway Capacity Software. Impacts related to increased construction traffic (both for equipment deliveries and commuting workers) were assessed based on existing and projected traffic and roadway capacities.

Impact Assessment

Impacts to transportation were based on a comparison between projected additional travel demand due to Proposal activities and existing daily traffic counts.

Proposal

Oglethorpe will use existing roads for access to the sites. No significant upgrades to major off-site roads are anticipated.

Construction Impacts

Construction of the Proposal is expected to last for approximately 36 months, with the size of the labor force gradually ramping up to a peak of approximately 600 workers, lasting two to three months, then gradually tapering off.

Construction traffic will include all craft labor, construction management staff, contractors, contractor equipment, vendors, and material and equipment deliveries. This study assumes that a nominal level (15 percent) of car pooling would occur. Using this assumption, during the peak construction period approximately 425 additional vehicles per day would converge on the site at the beginning of the work day and emerge from the site at the end of the work day. The majority of these workers would be expected to be coming from the Augusta area. The most direct route from the Augusta area to the site is from westbound I-20 to southbound GA 80 to westbound US 278/VFW Road to eastbound East Warrenton Road. If three-fourths of the construction workers take this route, there would be approximately 300 additional vehicles on these roadways during the peak-hour peak-construction periods.

At the time of this study, construction delivery plans have not been finalized; however, the majority of bulk supplies and heavy equipment are expected to be delivered by truck. Typical construction truck traffic would consist of 15 to 25 trucks per day. Special deliveries for such items as structural steel and concrete would occasionally exceed 50 deliveries on a given day; however, such truck deliveries during the day should not coincide with the early morning or late afternoon labor vehicle traffic. In most cases, material delivery traffic would be of lesser impact as they are typically spread throughout the work day. Rail access is available to the site and could be utilized depending on the need to do so. In the immediate vicinity of the Proposal, both East Warrenton Road and VFW Road are crossed by the rail line.

Construction of the plant would require improving East Warrenton Road from the plant construction entrance to VFW (or Legion) Road. These improvements are not needed for reasons of capacity, but rather for safety, as the existing East Warrenton Road is a narrow two-lane road with no shoulders. No improvements are anticipated for areas located elsewhere in the study area.

According to 2008 Georgia Department of Transportation traffic data, GA 12 in the vicinity of the site location was used by approximately 4,120 vehicles per day on an annual average basis. The Traffic Volume Map also indicated GA 12 experienced a

decrease of approximately 1.53 percent per year in average daily traffic since 2006. In order to estimate the amount of baseline daily traffic during 2012, when construction employment is estimated to peak, rather than utilize a negative growth rate, an annual growth rate of zero percent was used to maintain the existing levels of traffic utilizing the roadway. In 2012, the estimated annual average daily traffic on GA 12 in the area of the site would be 4,120 vehicles, excluding construction traffic related to the Proposal.

Because the majority of the workers would be coming from the Augusta, Georgia region and many area jobs are located outside of Warrenton, traffic arriving at the Proposal could be driving opposite much of the peak hour traffic. Typical roadways of similar classification to GA 12 have a design capacity greater than 10,000 vehicles per day. The majority of transportation system impacts would be of relatively short duration.

Currently, GA 12 is classified at LOS B or C, depending on the segment of highway. Even with the combined 2012 projected traffic volumes and the estimated daily construction worker traffic, the maximum usage of GA 12 would both be far below its design capacities. During the construction phase of the Proposal, additional traffic flows would occur as equipment and construction supplies are delivered to the site.

Even with the existing dedicated left-turn lanes on GA 12 at the intersection with VFW Road, the level of service at this intersection would worsen during peak hour traffic periods at the height of the construction activities anticipated to be in 2012. Oglethorpe is meeting with Warren County staff to determine if a temporary traffic signal at US278/GA 12 would be the appropriate solution.

GA 80 is likely to be heavily used during construction, as it would be the route workers from Augusta would most likely take to get from I-20 to the site. There is likely to be a noticeable increase in traffic through Camak during construction.

According to the Georgia Department of Transportation STARS Database, GA-80 has an AADT of 1,830 immediately north of Camak, and an AADT 3,060 immediately south of Camak. In rural areas such as Camak, the percentage of the AADT that compromises the peak hour is 10% (Transportation Research Board 2000, p. 8-9). This correlates to an estimated peak hour volume on GA-80 between 183 and 306 vehicles per hour in both lanes. A two-lane highway such as GA-80 has a theoretical capacity of 1,700 vehicles per hour, per lane of travel or 3,400 vehicles per hour for both lanes under ideal conditions (Transportation Research Board 2000). Assuming a worst case volume of 306 vehicles per hour this would compromise approximately 9% of the road's capacity.

Additionally according to the GDOT Design Policy Manual (Georgia Department of Transportation 2010, p. 13-20), two-lane roadways are generally acceptable only if the

peak hour traffic is less than 800 vehicles per hour in either direction. As documented by the data obtained from the GDOT STAR database, the existing traffic counts are significantly less than 800 vehicles per hour in either direction and are in fact at worse no more than 306 vehicles per hour in both directions combined, far less than the capacity of such a road. As noted above, if approximately three-fourths of the construction traffic uses GA 80, this would add approximately 300 vehicles during peak hours, in one lane. This additional traffic combined with peak hour traffic would still be well within the generally acceptable range according to the GDOT Design Policy Manual.

Operational Impacts

Traffic associated with operation of the biomass facility will include traffic from fuel delivery and operation staff. The expected fuel delivery is approximately 160 trucks per day. Fuel delivery truck traffic is expected to operate primarily during daylight hours. The operational staff on site will account for approximately 40 vehicles per day. Additional truck traffic will be used for the disposal of waste to nearby permitted landfills.

The Proposal would have a permanent operating work force of approximately 44 total employees with the maximum expected in any one shift to be 16 employees. The facility would be staffed 24 hours each day; however, during the night, the staff would be smaller than daytime operation staff. While other area roadways would be used to varying degrees, virtually all arriving and departing employees would use some part of GA 12 and East Warrenton Road. The traffic-related impacts at the site would peak during shift change. The traffic impact of the addition of 16 trips to the roadway network during the peak hours would be negligible (Burns and McDonnell 2009b, p. 4-84).

The plant would have the capacity to unload up to 800 tons of fuel per hour with the average truck delivery being 25 tons and the majority of the deliveries being made 10 hours per day and potentially between 6am and 10pm. This results in a maximum possible number of trucks arriving at the site to be 32 trucks per hour, with the average being 16 trucks per hour. These trucks would arrive over a 10 hour period during the day; however, they would not typically be expected to arrive during the peak morning or peak evening hours. As such the peak morning and evening hours consisting of baseline traffic with plant employees would produce traffic volumes greater than off peak hours with the addition of up to 32 delivery trucks. For this reason, no detailed analysis was performed during the non-peak hours.

3.10.3.3 Measures Incorporated into the Proposal to Reduce Impacts and Potential Additional Mitigation

The Proposal includes the following measures to reduce or prevent potential adverse environmental impacts to traffic and transportation:

- Safety improvements to a portion of East Warrenton Road, including widening and repaving of the existing roadway.
- Coordination with the GDOT and local officials.
- Proper design of plant facilities.
- Delivery of oversized construction materials during non-peak hours.
- Delivery of most of fuel during nonpeak hours.
- Oglethorpe is consulting with Warren County staff to determine if a temporary traffic signal at US 278/GA 12 would be appropriate during construction.

3.10.3.4 Impact Assessment —Alternate

Year 2009 Existing Conditions

Roadway geometry, including number of lanes and other physical features, was determined from 2009 aerial photography. Table 3-40 contains the existing operating conditions during both the peak morning hour and peak evening hours at each intersection. As shown in Table 3-40, all intersections currently operate at LOS C or better.

Table 3-40. Baseline Intersection Operating Conditions, Alternate.

Intersection	Traffic Control	AM Peak Hour			PM Peak Hour		
		v/c Ratio	Delay (sec/veh)	LOS	v/c Ratio	Delay (sec/veh)	LOS
US 341 w/US 1/GA 4	Signalized	0.87	31.3	C	0.85	26.6	C
US 341 w/MLK Jr. Ave.	Signalized	0.34	13.5	B	0.34	14.3	B
US 341 w/Industrial Park Dr.	Two-way stop	0.18	12.5	B	0.15	11.7	B

Year 2012 No-Build Operating Conditions

The year 2012 No-Build scenario was included to analyze the baseline 2012 operating conditions during both the peak morning hour and peak evening hours at each intersection under the no-build condition, i.e. without the Appling biomass plant being constructed.

Table 3-41. No-Build Intersection Operating Conditions, Alternate.

Intersection	Traffic Control	AM Peak Hour			PM Peak Hour		
		v/c Ratio	Delay (sec/veh)	LOS	v/c Ratio	Delay (sec/veh)	LOS
US 341 w/US 1/S.R. 4	Signalized	0.89	33.2	C	0.88	31.7	C
US 341 w/MLK Jr. Ave.	Signalized	0.33	13.5	B	0.35	14.2	B
US 341 w/Industrial Park Dr.	Two-way stop	0.16	12.6	B	0.15	11.5	B

As shown in Table 3-41, all intersections are expected to operate at LOS C or better in year 2012.

Year 2012 Build Operating Conditions

The third scenario considered was year 2012 traffic volumes with the addition of anticipated construction traffic. This condition utilizes the existing roadway geometry and the 2012 projected traffic volumes combined with the estimated peak hour construction traffic. Table 3-42 contains the projected year 2012 operating conditions during both the peak morning hour and peak evening hours at each intersection under the build condition.

Table 3-42. Build Intersection Operating Conditions, Alternate.

Intersection	Traffic Control	AM Peak Hour			PM Peak Hour		
		v/c Ratio	Delay (sec/veh)	LOS	v/c Ratio	Delay (sec/veh)	LOS
US 341 w/US 1/S.R. 4	Signalized	0.91	33.1	C	0.86	31.1	C
US 341 w/MLK Jr. Ave.	Signalized	0.35	13.5	B	0.36	14.3	B
US 341 w/Industrial Park Dr.	Two-way stop	1.03	> 50	F	0.48	13.1	B

During the construction years it is expected that many of the construction workers and deliveries would arrive and leave by US 341 east. This would result in a large number of left turning vehicles onto Hundreds Road (Industrial Park Drive) which results in traffic along the southbound and northbound approaches to encounter delay that would not

normally be present. As shown in Table 3-42, this intersection is expected to operate at a LOS of F during the peak morning hour.

Post-Construction Operating Conditions

Post-construction conditions were analyzed to consider the impact that traffic generated by the facility would have on the local roadway network after construction activities are concluded. The facility is expected to employee 44 total employees, with the work shifts split over two 12-hour shifts per day, seven days per week. The maximum number of employees during any one shift is anticipated to be 16 employees. For this analysis scenario, the 2009 existing traffic volumes were escalated to year 2014 with the addition of approximately 16 trips. Traffic escalations are based on recent historic population and traffic growth rates. Table 3-43 contains the projected year 2014 operating conditions during both the peak morning hour and peak evening hours at each intersection under the post-construction condition.

Table 3-43. Post-Construction Intersection Operating Conditions, Alternate

Intersection	Traffic Control	AM Peak Hour			PM Peak Hour		
		v/c Ratio	Delay (sec/veh)	LOS	v/c Ratio	Delay (sec/veh)	LOS
US 341 w/US 1/S.R. 4	Signalized	0.90	34.6	C	0.92	34.6	C
US 341 w/MLK Jr. Ave.	Signalized	0.36	13.6	B	0.37	14.4	B
US 341 w/Industrial Park Dr.	TWSC	0.29	17.6	C	0.15	10.7	B

As shown in Table 3-43, all intersections are expected to operate at LOS C or better in year 2014.

Recommendations

US 341 with Industrial Park Dr. (Hundreds Rd.)

As detailed earlier, under the build scenario, the intersection of US 341 with Industrial Park Drive is expected to operate at a LOS F during the peak morning hour. The cause of the poor level of service is attributed to the heavy volume of left turning vehicles onto Hundreds Road which creates delay to vehicles attempting to turn left from southbound Industrial Park Drive. Two potential mitigation measures exist that would work to help alleviate this. The first method would be to implement staggered start and end times for work shifts over a period of 2 hours which would lower the volume of traffic on the roadway. This is anticipated to improve the operating Level of Service (LOS) from level F, to Level D. The second method would be to install a temporary traffic signal. A temporary traffic signal utilizes wood mounting poles with signals mounted on span wires that cross the highway. The temporary traffic signal would be removed at constructions end. This is anticipated to improve the operating Level of Service (LOS) from level F, to Level B (Table 3-44).

Table 3-44 Post-Construction Intersection Operating Conditions with Staggered Start Times, Alternate

Intersection	Traffic Control	AM Peak Hour			PM Peak Hour		
		v/c Ratio	Delay (sec/veh)	LOS	v/c Ratio	Delay (sec/veh)	LOS
US 341 w/Industrial Park Dr.	TWSC	0.50	33.9	D	0.30	11.4	B

v/c = volume/capacity
Source: Burns and McDonnell 2010

As shown in Table 3-44, through the implementation of a staggered start time the intersection operating condition is improved from a LOS F to a LOS D during the peak morning hours and from a LOS C to a LOS B during the peak evening hours. Additionally it is recommended that a northbound right-turn lane be constructed on the Hundreds Road approach to allow for the heavy volume of right turning vehicles to exit the site during the peak evening hour.

Hundreds Rd. (Industrial Park Dr.)

Hundreds Road (Industrial Park Drive) will be the primary entrance into the proposed facility. In its current state, Hundreds Road is a narrow paved roadway with no paved shoulders. Since this roadway is expected to handle a large volume of vehicles during construction and ultimately will serve deliveries of biomass products, it is recommended that Hundreds Road be widened from US 341 Road to the facility entrance. This widening should allow for a minimum of 12-foot driving lanes and a minimum of an 8-foot stabilized shoulder.

3.10.4 Environmental Consequences—No-Action Alternative

No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on transportation at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.11 HISTORIC/CULTURAL PROPERTIES

Cultural resources are defined as sites, features, structures, or objects that may have significant archaeological or historic value. They can be properties that play a significant and traditional role in a community's historically based beliefs, customs, and/or practices. Cultural resources can encompass a wide range of settings from prehistoric campsites to farmsteads constructed in the recent past, but at least 50 years old.

Identification of Areas of Potential Effects (APE)

The Section 106 regulations (see sidebar) require the responsible federal agency to identify the area in which the undertaking may directly or indirectly alter the character or use of historic properties, if such properties exist.[57] This APE defines the geographic scope of the agency's subsequent identification and assessment activities. In consultation with the Georgia State Historic Preservation Office (SHPO), RUS defined the APE for the Proposal as the 343-acre Proposal site. The entire area of the Alternate site was also defined as the APE.

Sections 106 and 110 of the National Historic Preservation Act of 1966 provide the framework for federal review and protection of cultural resources, ensuring that they are considered during federal project planning and execution. The implementing regulations for the Section 106 process **(Section 106 regulations)** have been developed by the Advisory Council on Historic Preservation (ACHP) (36 CFR Part 800). The Secretary of the Interior maintains a **National Register of Historic Places (NRHP)** and establishes criteria for inclusion in the NRHP (36 CFR Part 60). **Cultural resources** may be considered "historic properties" for the purpose of consideration by a federal undertaking if they meet **NRHP criteria**. The implementing regulations define an **undertaking** as "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency." **Historic properties** may be those that are formally placed in the NRHP by the Secretary of the Interior, those that meet the criteria and are determined eligible for inclusion, and those that are yet undiscovered and may meet eligibility criteria.

The National Historic Preservation Act is Public Law (P.L.) 89-655 and is codified at Title 16 of the United States Code (16 USC) §470.

[57] 36 C.F.R. §§ 800.4(a)(1), 800.16(d)

NRHP Criteria

Historic properties" may be "districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association." For NRHP eligibility, a historic property must also possess one or more of the following characteristics:

- Associated with significant historic events.
- Associated with the life of a significant historic person.
- Embodies the distinctive characteristics of a type, period, or method of construction, or has high artistic or craftsmanship values.
- Has yielded or may yield information important to history or prehistory.

3.11.1 Affected Environment – Proposal

Humans have lived in Georgia for approximately 10,000 years and possibly longer. When Europeans arrived in what is now Warren County, it was occupied by the Muskogee (Creek) tribe and possibly by the Cherokee tribe (Oglethorpe Power Corporation 2009e, p. 3-3) Warren County became Georgia's 20th county in 1793 and Warrenton was incorporated in 1810 (Oglethorpe Power Corporation 2009e, p. 3-10).

Oglethorpe conducted a Phase I survey in May 2009 over the entire Area of Potential Effect (APE), using the methods outlined in Georgia Standards and Guidelines for Archaeological Surveys (Oglethorpe Power Corporation 2009e, p. 5-1). Oglethorpe also evaluated two structures on the site. A Phase I archaeological survey is "a systematic, detailed examination of an area designed to gather information about archaeological sites. The goal of an archaeological survey is to identify all archaeological sites within the area of potential effects," and, for federal agencies, "to evaluate those archaeological sites against the criteria for inclusion in the National Register of Historic Places" (Georgia Council of Professional Archaeologists n.d., p. 2) The Phase I survey was done by walking the site and observing the ground surface along parallel lines spaced at 30 meters over the entire site. Holes are dug 30 to 40 centimeters deep (shovel tests) at intervals of 30 to 90 meters, depending on surface visibility, along each line.

Table 3-45 summarizes the findings of the Phase I archaeological survey. Oglethorpe's contractor recorded four sites with multiple artifacts and seven isolated findings. An isolated finding consists of two or fewer artifacts within 30 meters, and by definition is not eligible for the NRHP (Georgia Council of Professional Archaeologists n.d., p. 3). None of the four sites met the NRHP criteria.

There are no NRHP listed sites or structures within the APE. One NRHP site is located within one mile of the APE, the Warrenton Gymnasium-Auditorium, located in the town

of Warrenton which is approximately 0.95 mile from the site (Oglethorpe Power Corporation 2009e, p. 2-1).

During the Phase I archaeological survey, Oglethorpe's contractor reported two former and one existing house location. The surveyors determined that the existing structure is not eligible for the NRHP (Table 3-45).

Table 3-45. Summary of Archaeological Findings, Proposal Site.

Find Type	Cultural Affiliation	Artifacts	Description	NRHP Status
Multi-component site	Historic, late 19th to early 20th century, and unknown prehistoric	Whiteware, wire nails, metal, battery core, stoneware, container glass, flat glass, brick fragments, prehistoric flakes.	Historic house location; no standing house; brick and mortar rubble pile. Prehistoric light lithic scatter	Not eligible
Multi-component site.	Historic, late 19th to early 20th century, and unknown prehistoric	Whiteware, metal, plow blade, stoneware, container glass, flat glass, brick fragments one chert biface (two-sided stone tool) mid-section.	Historic house location; no standing house; brick and mortar rubble pile. One prehistoric artifact.	Not eligible
Multi-component site.	Unknown prehistoric.	Stone flakes, very small pottery sherds, burned earth.	Light lithic scatter with possible fire pit features	Not eligible
Multi-component site.	Historic, late 19th to early 20th century.	Stoneware, whiteware, container glass, flat glass, shell casing.	House in very poor condition, with galvanized steel roof and clapboard siding. Appears to have been used for storing hay.	Not eligible
Isolated find.	Historic	Whiteware	Single piece of whiteware.	Not eligible
Isolated find.	Prehistoric	Chert flake.	Single chert flake.	Not eligible
Isolated find.	Historic	Whiteware.	Single piece.	Not eligible
Isolated find.	Prehistoric	Chert flake.	Single chert flake.	Not eligible
Isolated find.	Prehistoric	Quartzite biface fragment.	A single biface fragment, and two more within approximately 40 meters.	Not eligible
Isolated find.	Historic	Container glass	Two pieces.	Not eligible
Isolated find.	Historic	Stoneware	One piece.	Not eligible

Source: Oglethorpe Power Corporation 2009e

3.11.2 Affected Environment – Alternate

A contractor with Oglethorpe conducted a Phase I survey on May 7 and 8, 2009 over the entire APE, using the methods outlined in Georgia Standards and Guidelines for Archaeological Surveys (Burns & McDonnell 2009a, p. 2-1). See Section 3.11.1 for a description of a Phase I survey.

During the Phase I archaeological survey, Oglethorpe's contractor reported one historic farmstead that has been bulldozed, as discussed in Section 3.11.1.2. The surveyors determined that the existing structure is not eligible for the NRHP (Table 3-45).

The nearest NRHP listed sites to the alternate site are in Baxley, and all are more than 2 miles from the alternate site (NPS 2010).

3.11.3 Tribal Consultation

RUS contacted Native American Indian Tribes with potential interest in the Proposal area. Oglethorpe's contractor conducted follow-up phone calls with Tribal Historic Preservation Officers and other tribal officials to determine their interest. None of the tribes contacted by either RUS or Oglethorpe have indicated an interest in the Proposal. Copies of the coordination letters and telephone follow-up memos are included in the Scoping Reports in Appendix B.

3.11.4 Environmental Consequences

No impacts to cultural resources are expected, as no eligible or potentially eligible cultural resources were found during the investigations at either site. There are no NRHP sites within the APE for either site.

If a previously unknown cultural resource is encountered during construction, all work within 200 feet of the discovery that might adversely affect the cultural resource would cease until Oglethorpe and RUS, in consultation with the appropriate parties, could evaluate the discovery.

If construction personnel discover what they believe to be human remains, construction would cease within 200 feet of the discovery and the construction or environmental inspector notified of the find. The inspector would notify the cultural resources field director or cultural resources monitor of the discovery and RUS and would secure the area of the apparent human remains to ensure no further disturbance or removal of those remains and associated material occurs.

3.11.5 No-Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on cultural resources at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.12 PUBLIC HEALTH AND SAFETY

Health issues related to air pollutants were discussed in Section 3.1 and safety issues related to increased traffic were addressed in Section 3.10. The focus of this section is hazardous materials and the management of ash waste.

Environmental Site Assessment

ASTM International describes the purpose of Standard E1527-05 as follows:

The purpose of this practice is to define good commercial and customary practice in the United States of America for conducting an environmental site assessment of a parcel of commercial real estate with respect to the range of contaminants within the scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. 9601) and petroleum products. As such, this practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on CERCLA liability (hereinafter, the "landowner liability protections," or "LLPs"): that is, the practice that constitutes "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined at 42 U.S.C. 9601(35)(B).

The purpose of the ESA is to identify "recognized environmental conditions," which ASTM International defines as follows: The term recognized environmental conditions means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis are not recognized environmental conditions (ASTM International, 2010).

Source: ASTM International 2010

EPA considers this standard to meet its requirements for "all appropriate inquiry" necessary to meet innocent landowner requirements under CERCLA. "All appropriate inquiry" refers to the requirements for assessing the environmental conditions of a property prior to its acquisition.

Source: (EPA 2009b

3.12.1 Affected Environment – Proposal

3.12.1.1 Hazardous Materials

In 2008, Oglethorpe's contractor conducted a Phase I Environmental Site Assessment (ESA) at the 343-acre Proposal site, in accordance with ASTM International Standard E1527-05, *Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process* (see sidebar) (KCI Technologies, Inc. 2008a, p. 1).

The ESA did not identify any recognized environmental conditions (see sidebar). The ESA found evidence of de minimis conditions, as follows: three abandoned vehicles; stored/abandoned farm equipment; a former residence in serious disrepair; several disposal sites of miscellaneous solid waste, including construction debris, tires, rusted drums, rusted cans and glass. KCI noted no signs of spills or stressed vegetation associated with any of these features. The ESA noted that fertilizers, herbicides and insecticides were most likely used on the Proposal site; however, no signs of improper storage or disposal were noted (KCI Technologies, Inc. 2008a, p. iii).

3.12.2 Affected Environment – Alternate

3.12.2.1 Hazardous Materials

In 2008, Oglethorpe's contractor conducted a Phase I ESA at the 345-acre Alternate site, in accordance with ASTM International Standard E1527-05, *Standard Practice for Environmental Site Assessment: Phase I Environmental Site Assessment Process* (KCI Technologies, Inc. 2008c, p. 1).

The ESA did not identify any recognized environmental conditions. The ESA found evidence of de minimis conditions, as follows: a former demolished residence (discussed in

Section 3.11); logging; and fertilizers, herbicides and insecticides were most likely used on the Alternate site; however, no signs of improper storage or disposal were noted. KCI noted no signs of spills or stressed vegetation associated with any of these features. (KCI Technologies, Inc. 2008a, p. iii).

3.12.3 Environmental Consequences: Ash Management - Proposal

The major solid wastes the biomass plant will generate are baghouse dust, bottom ash and filters, at a maximum rate of 40 tons (two to three truck) per day. Approximately 9,964 tons of bottom and fly ash would be generated per year. Other waste generated during construction and operation, except any regulated hazardous waste that may be generated, will be picked up by a licensed waste hauler and taken to a permitted sanitary landfill (Burns & McDonnell 2010b, p. 4-107). There are three landfills with capacity within 50 miles that could accept the waste, one each in Richmond, Washington and Jefferson Counties (Oglethorpe Power Corporation 2010b).

Georgia's classification of fly ash and bottom ash as solid waste is consistent with federal regulations, which specifically classifies these materials as solid waste and exempt from classification as hazardous waste. These wastes are also not considered toxic wastes as defined in the Toxic Substances Control Act. Other waste generated during construction and operation, except any regulated hazardous waste that may be generated, would be disposed of by a licensed solid waste hauler and taken to a permitted sanitary landfill.

Wood ash is composed of elements needed for tree growth, and is generally considered suitable for soil amendment. Its chemical composition and pH are similar to that of limestone, although more variable. Calcium is the most abundant element, making up about 15 percent of typical wood ash. Other elements that may be more than one percent of the ash, depending on the trees burned and combustion process, are potassium, aluminum, magnesium, iron, phosphorus, sulfur, and manganese. Other elements that may be present in wood ash are in low concentration and include zinc, boron, copper, lead, and chromium. Metals of health concern, such as arsenic, cadmium, chromium, lead, and mercury, can be present in trace amounts in wood ash (Risse and Gaskin 2002, Misra et al. 1993).

The Warren County site has three different potential sources of solid waste disposal within a 30-45 mile radius of the site: Richmond County Deans Bridge Road Phase III Landfill, Jefferson County Landfill, and Washington County Landfill. The estimated fill dates vary from 2053 to 2107, so there should be sufficient capacity at any of the three landfills to handle the volumes of ash generated by the new facility as reflected in Table 3-46. The Richmond County landfill is the most recent of the three, having been designed and constructed within the last five years (Table 3-46).

Table 3-46 Proposal Site: Available Subtitle D Solid Waste Landfills

	Richmond County Municipal Solid Waste Landfill (MSWL)	Washington County Public MSWL	Jefferson County Public MSWL
Landfill Location	4330 Deans Bridge Road Blythe, GA	Kaolin Rd S # 3 Sandersville, GA 31082	County Road 138 West of US Hwy 1 Louisville, GA 30434
	approximately 38 miles from site	approximately 46 miles from site	approximately 28 miles from site
Capacity Information	Design/permit capacity: *54,180,000 CY*	Design/permit capacity: *2,303,290 CY*	Design/permit capacity: *2,109,755 CY*
	Remaining capacity: *51,536,579 CY*	Remaining capacity: *1,260,561 CY*	Remaining capacity: *1,360,373 CY*
	Rate of fill: *1,634 CYD rate of fill* (1,144 average daily tons)	Rate of fill: *108 CYD rate of fill* (49 average daily tons)	Rate of fill: *48 CYD rate of fill* (24 average daily tons)
	Fill date estimated: *6/25/2107*	Fill date estimated: *7/25/2053*	Fill date estimated: *3/5/2099*

3.12.4 Environmental Consequences: Ash Management - Alternate

The major waste streams that would be generated during plant operation include baghouse dust, bottom ash, fly ash and filters. The biomass plant is expected to generate two to three truckloads per day of fly ash that will require disposal in a Subtitle D municipal solid waste landfill. Other waste generated during construction and operation, except any regulated hazardous waste that may be generated, would be picked up by a licensed waste hauler and taken to a permitted sanitary landfill (Burns and McDonnell 2010e, p. 1-47).

The Appling County site has four different potential options for waste disposal, ranging from 30-76 miles from the alternative biomass facility location: Telfair County Landfill, Toombs County Landfill, Broadhurst Environmental Landfill in Wayne County and Atkinson County Landfill. Although the Atkinson County Landfill is the furthest away, estimated at 75 miles from the site, it has a full capacity date of 2044. All three of the other options -- Telfair, Toombs and Broadhurst -- are expected to reach capacity within the next 10-15 years (Table 3-47).

Table 3-47. Alternate: Available Subtitle D Solid Waste Landfills.

Landfill Name	Location	Capacity Information			
		Design/ Permit Capacity	Remaining Capacity	Rate of Fill	Fill Date Estimated
Telfair County Public Municipal Solid Waste Landfill (MSWL)	County Road 144 MSWL McRae, GA 31055 Approx. 52 miles from site; 9 miles south of McRae	2,099,223 CY	488,086 CY	140 CYD (70 avg daily tons)	1/7/2020
Toombs County Public MSWL	Lyons- Center Road Lyons, GA 30436 Approx. 30 miles from site	3,138,000 CY	1,533,271 CY	300 CYD (150 avg daily tons)	9/4/2025
Atkinson County Public MSWL	64 Arthur Davis Jr. Dr. (GA50) Willacoochee, GA 31642 Approx. 76 miles from site	4,180,000 CY	3,278,259 CY	351 CYD (221 avg daily tons)	9/13/2044
Broadhurst Environmental Landfill Private MSWL	SW of Broadhurst Broadhurst, GA 31560 Approx. 36 miles from site	16,300,000 CY	9,315,051 CY	2,637 CYD (2,848 avg daily tons)	10/16/2019

3.12.5 No Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no effects on public health and safety at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.

3.13 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Table 3-48 and Table 3-49 summarize social and economic data for both Warren and Appling Counties. The same data for the entire State of Georgia and for the U.S. are included for comparison. These tables are based on similar data tables called QuickFacts that the US Census Bureau prepares. Note that the data is from various years, from 1999 to 2009. The tables use the latest available data for each category. Some is recent, and some has not been collected since the 2000 census. These tables are referenced in the discussion throughout this section. Note that some of the numbers in Table 3-48 and Table 3-49 have been rounded for ease of reading, and don't always

exactly match the data in other tables in this section, which has not always been rounded.

Table 3-48. Summary Demographic Data.

People QuickFacts	Warren County	Appling County	Georgia	USA
Population, 2009 estimate	5,800	18,000	9.8 million	307 million
Population, percent change, April 1, 2000 to July 1, 2009	-9%	3.4%	20%	9%
Persons under 18 years old, percent, 2008	24%	26%	26%	24%
Persons 65 years old and over, percent, 2008	17%	12%	10%	13%
Persons 18 to 64 years old, percent, 2008	59%	62%	64%	63%
White persons (white-only), percent, 2008	43%	80%	65%	80%
Black persons (black-only), percent, 2008	56%	19%	30%	13%
Amer. Indian and AK Native persons, percent, 2008	<1%	<1%	<1%	1%
Asian persons, percent, 2008	<1%	<1%	3%	5%
Persons of Hispanic or Latino origin, percent (any race), 2008	1%	7%	8%	15%
White persons not Hispanic, percent, 2008	42%	73%	58%	66%
Living in same house in 1995 and 2000, pct 5 yrs old & over	67%	65%	49%	54%
Foreign born persons, percent, 2000	<1%	3%	7%	11%
Language other than English spoken at home,pct, 2000	3%	6%	10%	18%
High school graduates, percent of persons age 25+, 2000	57%	67%	79%	80%
Bachelor's degree or higher, pct of persons age 25+, 2000	8%	8%	24%	24%
Mean travel time to work (minutes), workers age 16+, 2000	28	24	28	25
Housing units, 2008	2,800	8,000	4 million	129 million
Homeownership rate, 2000	77%	79%	67%	66%
Housing units in multi-unit structures, percent, 2000	8%	5%	21%	26%
Median value of owner-occupied housing units, 2000	$48,700	$63,700	$111,200	$119,600
Households, 2000	2,435	6,606	3 million	105 million
Persons per household, 2000	2.6	2.6	2.6	2.6
Median household income, 2008	$32,439	$34,654	$50,834	$52,029
Per capita money income, 1999	$14,022	$15,044	$21,154	$21,587
Persons below poverty level, percent, 2008	26%	20%	15%	13%

Source: US Census Bureau 2010b

Table 3-49. Economy and Geography Summary.

Business QuickFacts	Warren County	Appling County	Georgia	USA
Private nonfarm establishments, 2007	93	405	231,810	7.7 million
Private nonfarm employment, 2007	809	5,605	3.6 million	120 million
Private nonfarm employment, percent change 2000-2007	-42%	19%	5%	6%
Nonemployer establishments, 2007	297	1,144	738,158	21.7 million
Total number of firms, 2002	283	1,229	674,521	23 million
Black-owned firms, percent, 2002	< 100 firms	< 100 firms	13%	5%
Hispanic-owned firms, percent, 2002	< 100 firms	< 100 firms	3%	7%
Women-owned firms, percent, 2002	< 100 firms	17%	29%	28%
Manufacturers' shipments, 2002 ($1000)	73,281	333,136	126 million	3.9 billion
Manufacturers' shipments, 2002 ($1000), per capita	12,733	18,496	12,835	12,756
Wholesale trade sales, 2002 ($1000)	Suppressed	33,201	201 million	4.6 billion
Wholesale trade sales, 2002 ($1000), per capita		1,843	20,459	15,097
Retail sales, 2002 ($1000)	16,693	119,636	90 million	30 billion
Retail sales per capita, 2002	$2,667	$6,782	$10,551	$10,616
Accommodation and foodservices sales, 2002 ($1000)	Suppressed	17,016	12.6 million	449 million
Building permits, 2008	0	5	35,368	905,359
Building permits, 2008, per 10,000 population	0	2.8	36	29
Federal spending, 2008	61,991	150,556	74 million	2.8 billion
Federal spending, 2008, per capita	$10.77	$8.36	$7.55	$9.03
Geography QuickFacts	**Warren County**	**Appling County**	**Georgia**	**USA**
Land area, 2000 (square miles)	285	508	57,906	3,537,438
Persons per square mile, 2000	22	34	141	80

Source: US Census Bureau 2010b

3.13.1 Affected Environment - Proposal

3.13.1.1 Area of Influence

The area of influence for the Proposal is Warren County, with particular influence on the nearby City of Warrenton.

3.13.1.2 Population and Demographics

Warren County is rural county with an average of 22 persons per square mile in 2000, compared with an average of 141 persons per square mile for the state as a whole. The largest town, Warrenton, had less than 2,000 inhabitants in 2008, and the entire county population is less than 6,000 persons. While the population of the state has increased dramatically since 1990, the population of the City of Warrenton has gradually declined. Warren County population increased from 1990 to 2000, and then dropped by 2009. The population in 2009 of Warren County was less than the 1990 population (Table 3-50).

Table 3-50. Proposal Area Population and Trends.

Unit	Census Population 1990	Census Population 2000	Estimated Population 2008/2009[1]	% Change	
				1990 - 2000	2000- 2009 or 2000-2008
Warren County	6,078	6,336	5,755	4.2	-9.2
City of Warrenton	2,056	2,013	1,926	-2.1	-4.3
Georgia	6.48 million	8.19 million	9.83 million	26.4	20.1

[1]*Warren County and Georgia estimates are for 2009; City of Warrenton is for 2008.*
Source: US Census Bureau 2010a

Compared to the U.S. as a whole in 2008, Warren County had approximately the same percent of persons under 18, but a lower percent in the 18 to 64 age group, and a higher percent in the over 65 age group (Table 3-48 and Table 3-49). This lower percent in the working-age group suggests that people are leaving the county in search of jobs. Table 3-51 is age distribution data from the 2000 census and includes the City of Warrenton, which has a lower percent in the 18 to 64 group than Warren County.

Table 3-51. Proposal Area 2000 Population Age Distribution.

Unit	Percent Population Under 18 Years	Percent Population 18-64 Years	Percent Population 65 Years and Over
Warren County	26	58	16
City of Warrenton	29	56	15
Georgia	26	64	10

Source: US Census Bureau 2000

Educational attainment in Warren County and the City of Warrenton is well below that of the rest of Georgia and the U.S. (Table 3-48 and Table 3-52).

Table 3-52. Proposal Area 2000 Educational Attainment.

Unit	Percent high school graduate or higher (in 25 years and over population)	Percent bachelor's degree or higher (in 25 years and over population)
Warren County	57	8
City of Warrenton	57	13
Georgia	79	24

Source: US Census Bureau 2000

Median household income levels in the Proposal area were well below and poverty rates were above those of Georgia and the U.S. in both 1999 and 2008 (Table 3-48 and Table 3-53 and Figure 3-42). While poverty is more prevalent in the southern and the rural part of the state in 1999, Warren County had the fourth-highest percent of families below the poverty level among the 159 Georgia counties. Poverty levels were greater in Clay, Hancock and Crisp Counties (US Census Bureau 2000). In 2008, there were at least 7 counties with higher percentages of poverty (US Census Bureau 2009).

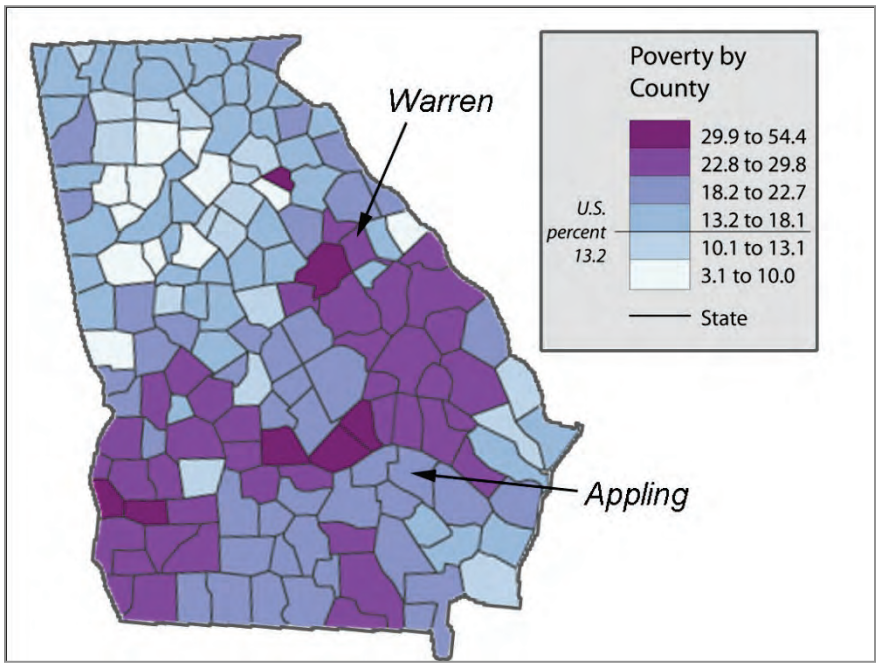


Figure 3-42. Poverty by County in Georgia, 2008.

Table 3-53. Proposal Area 1999 Income.

Unit	Median household income 1999	Per capita income 1999	Percent of families below poverty level 1999	Percent of individuals below poverty level 1999
Warren County	27,366	14,022	24.1	27.0
City of Warrenton	18,750	12,778	30.7	36.0
Georgia	42,433	21,154	9.9	13.0

Source: US Census Bureau 2000

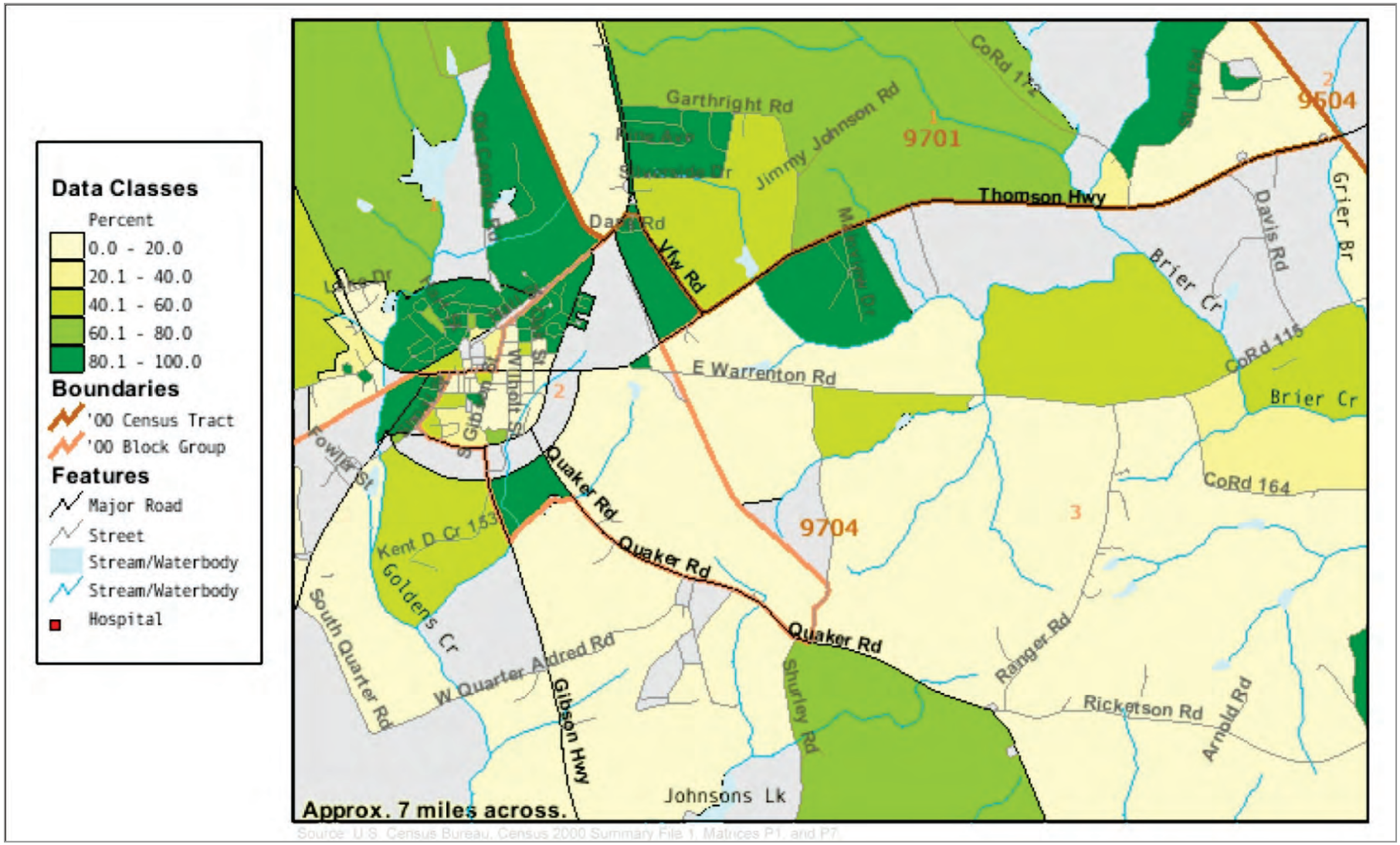


Figure 3-43. Percent of Persons Who Are Black or African American Alone: Warrenton and Warren County 2000

In 2008, 99 percent of the population of Warren County was white-only or black-only, with 56 percent black-only (Table 3-48). This percentage is similar to the 2000 census percentage, for which census block data are available (Figure 3-43).

3.13.1.3 Housing

Housing information from the 2000 census is summarized in Table 3-48. Compared to Georgia or the U.S. as a whole, Warren County has a higher percentage of home ownership and a lower percentage of persons living in multi-unit structures.

3.13.1.4 Economic Base

Economic data are summarized in Table 3-49. While per capita manufacturers' shipments for Warren County are similar to the state as a whole, the number of wholesale traders and businesses in accommodations and food service are so small that the data are suppressed to protect confidentiality. Retail sales per capita are well below the state as a whole, and there were no building permits issued in 2008. A large portion of Warren County residents are employed in the fields of manufacturing, educational, and health and social service. Unemployment was at or above 10 percent in six of 12 years from 1999 to 2010, reaching a high of 17.8 percent in 2009 (Bureau of Labor Statistics 2011).

3.13.1.5 Public Services

There are three law enforcement offices within Warren County: the Warren County Sheriff's Department, Warrenton Police Department, and the Georgia State Patrol. The Sheriff's Department is located in Warrenton, and provides police protection for the unincorporated areas of Warren County and for the communities of Camak and Norwood. The Warrenton Police Department provides services within the city limits of Warrenton. Fire and Rescue services operate out of the Emergency Operations Center (EOC) in Warrenton. There are seven fire stations located in the county, with one fire station located in each community and four remaining stations located in unincorporated areas of the county. The City of Warrenton also operates a fire department within its city limits. Response times for fire services across the county range between 12 and 15 minutes.

Medical and emergency services in Warren County are provided by the Warrenton Medical Center, Warren County Public Health Department, and the Warren County Emergency Management Agency (EMA). These entities are located in the community of Warrenton (Burns & McDonnell 2009b, p. 3-56).

3.13.2 Affected Environment - Alternate

3.13.2.1 Area of Influence

The area of influence for the Alternate site is Appling County, with particular emphasis on the nearby City of Baxley.

3.13.2.2 Population and Demographics

Appling County is rural county with an average of 34 persons per square mile in 2000, compared with an average of 141 persons per square mile for the state as a whole. The largest town, Baxley, had less than 4,600 inhabitants in 2008, and the entire county population is less than 18,100 persons. While the population of the state has increased dramatically since 1990, the population of the City of Baxley has gradually increased. Appling County population has been increasing since 1990 to 2009. The population in 2009 of Appling County was greater than the 1990 population (Table 3-54).

Table 3-54. Alternate Area Population and Trends.

Unit	Census population 1990	Census population 2000	Estimated population 2009/2008[1]	% Change	
				1990 - 2000	2000- 2009 or 2000-2008
Appling County	15,744	17,419	18,011	10.6	3.4
City of Baxley	3,841	4,150	4552	8.0	9.7
Georgia	6,478,216	8,186,453	9,829,211	26.4	20.1

[1] *Appling County and Georgia estimates are for 2009; City of Baxley is for 2008.*
Source: US Census Bureau 2010a

Compared to the U.S. as a whole in 2008, Appling County had approximately the same percent of persons under 18, in the 18 to 64 age group, and the over 65 age group (Table 3-48 and Table 3-55). This higher percent in the working-age group suggests that people are staying in the county working their current jobs or they are in search of jobs within the county. Table 3-55 is age distribution data from the 2000 census and includes the City of Baxley, which has a lower percent in the 18 to 64 group than Appling County.

Table 3-55. Alternate Area 2000 Population Age Distribution.

Unit	Percent population under 18 years	Percent population 18-64 years	Percent population 65 years and over
Appling County	27	61	12
City of Baxley	28	58	15
Georgia	26	64	10

Source: US Census Bureau 2000

Educational attainment in Appling County and the City of Baxley is well below that of the rest of Georgia and the U.S. (Table 3-48 and Table 3-56).

Table 3-56. Alternate Area 2000 Educational Attainment.

Unit	Percent high school graduate or higher (in 25 years and over population)	Percent bachelor's degree or higher (in 25 years and over population)
Appling County	67	8.4
City of Baxley	65	8.1
Georgia	79	24

Source: US Census Bureau 2000

Median household income levels in the Appling County area were well below and poverty rates were above those of Georgia and the U.S. in both 1999 and 2008 (Table 3-48 and Table 3-57) (Figure 3-42).

Table 3-57. Alternate Area 2000 Income.

Unit	Median household income 1999	Per capita income 1999	Percent of families below poverty level 1999	Percent of individuals below poverty level 1999
Appling County	30,266	15,044	14.9	18.6
City of Baxley	24,441	14,321	21.6	24.4
Georgia	42,433	21,154	9.9	13.0

Source: US Census Bureau 2000

In 2008, 99 percent of the population of Appling County was white-only or black-only, with 19 percent black-only (Table 3-48). Census block data from the 2000 census are shown in Figure 3-44.

3.13.2.3 Housing

Housing information from the 2000 census is summarized in Table 3-48. Compared to Georgia or the U.S. as a whole, Appling County has a higher percentage of home ownership and a lower percentage of persons living in multi-unit structures.

3.13.2.4 Economic Base

Economic data are summarized in Table 3-49. Per capita manufacturers' shipments for Appling County are higher to the state as a whole. Retail sales per capita are below the state as a whole, and there were only five building permits issued in 2008 (Table 3-49). A large portion of Appling County residents are employed in manufacturing, retail trade, educational, health and social service, and construction (Burns & McDonnell 2010d, p. 3-33 and 3-34). Unemployment was below 10 percent from 1999 to 2009; however, in 2010, unemployment was 10.7 percent (Bureau of Labor Statistics 2011).

3.13.2.5 Public Services

There are three law enforcement offices within Appling County: the Appling County Sheriff's Department, Baxley Police Department, and the Graham Police Department. The Sheriff's Department is located in Baxley, and has jurisdiction in all of Appling County, including the three municipalities (Baxley, Graham, and Surrency), although its primary focus is in the unincorporated areas of the county. The Baxley Police Department provides services within the city limits of Baxley, and the Graham Police Department provides services within its city limits. There are 10 organized fire departments located in the county, all of which are fully volunteer departments. The Appling County E-911 Center, located in Baxley, receives calls for all fire departments in the county and serves as the central dispatch location. There is a fire department located in each community of Baxley, Graham, Surrency, and Plant hatch Nuclear Power Generating Plant and six remaining departments located in unincorporated areas of the county. Response times for fire services across the county range between 5 and 10 minutes (Burns & McDonnell 2010d, p. 3-55 and 3-56).

Medical and emergency services in Appling County are provided by the Appling County Emergency Ambulance Service and the Emergency Management Agency (EMA). These entities are located in the community of Baxley (Burns & McDonnell 2010d, p. 3-56).

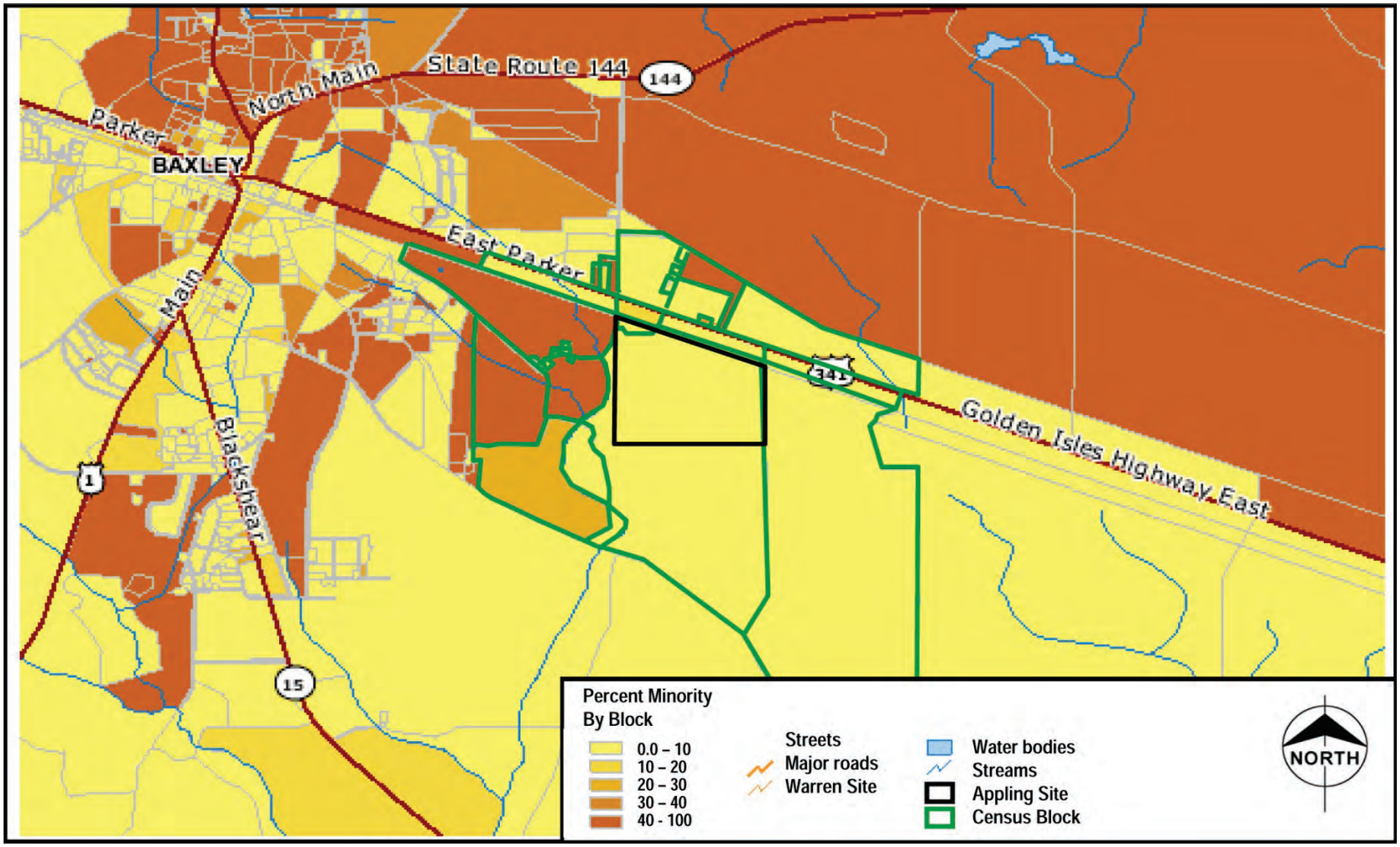


Figure 3-44. Census Blocks with Percentages of Minority Residents: Baxley and Appling County

Source: U.S. Environmental Protection Agency, Environmental Justice Geographic Assessment Tool

3.13.3 Environmental Consequences—Proposal

3.13.3.1 Socioeconomics

Primary issues are effects on economic activity as measured by changes in employment and earnings, changes in populations, and the demand for housing and community services.

These issues were raised by resource agencies or the public during scoping or were identified during EIS development:

- Relocation of workers and their families to the local community.
- Effects on community resources as a result of temporary or long-term population increases.
- Availability of temporary housing during construction.
- Impacts on local housing availability during operation.
- Creation of temporary construction employment opportunities.
- Creation of long-term operation employment opportunities.
- Generation of indirect employment opportunities in the forestry industry.
- Creation of opportunities to earn higher wages.
- Reduction in unemployment levels.
- Residual income created as a result of expenditures by workers within the local community.
- Creation of additional governmental revenues in the form of property taxes and fees.

Proposal

Constructing the Proposal would cost approximately $86 million (labor costs only), and would require as many as 600 workers during peak periods (approximately 2-3 months) out of a 36-month construction schedule. The Proposal would require a full time operating staff of 44 employees.

Population

Residents within 60 or more miles can be expected to take advantage of employment opportunities during construction. Based upon experience with similar projects provided by Oglethorpe, it was assumed that approximately 15 percent of the construction work force (including weekly commuters) would come from within the 60-mile region.

During plant operation, 50 percent of the work force is expected to come from existing households in the 60-mile region. Another 10 percent are expected to commute from outside of these areas, primarily from the western part of Augusta. The remaining

employment opportunities during plant operation are expected to be filled by non-local workers that would relocate for the job and become permanent residents (within 60 miles of the Proposal).

It is commonly accepted among construction industry professionals that the “local” population for peak construction refers to individuals that would travel from within 60 miles of the job site while the “weekly commuter” population for peak construction refers to current residents that would travel to the job site from a distance greater than 60 miles, returning home only during the weekends. Therefore, current residents may travel from the Augusta-Richmond County, GA-SC metropolitan statistical area (MSA) because this area is within 60 miles of the Proposal.

Similarly, the “local” population for the operating workforce refers to current residents that would travel from within 25 miles of the job site while the ”daily commuter” population refers to current residents that would travel a distance greater than 25 miles and less than 60 miles to the job site. “Locals and commuters” in either construction or in operation, would not contribute to the overall population impact to the area.

The population increase associated with the Proposal’s construction and operation has an effect on the facilities and services in the communities where they locate. Monetary adjustments would also occur in the area of public revenues and expenditures as the influx of population expands the tax base and simultaneously requires additional community services.

Critical to the assessment of concurrent socioeconomic adjustments is the establishment of residential distribution patterns of the new population. The method used to estimate this distribution is called a gravity model. This model is based on the populations of the municipalities in the area, as well as the commuting distance (miles) from the municipality to the job site

The population distribution between surrounding communities and the Proposal was based on the current populations of the municipalities as well as the commuting distance (miles) from the municipality to the Proposal. Due to proximity, the entire Augusta-Richmond County, GA-SC MSA and the neighboring town of Thomson, GA, with a 2007 population of over 500,000, were considered as contributing to the available work force and as available for housing new workers locating in the area. When applied to the peak construction employment and population levels associated with the Proposal, it was determined that the Augusta-Richmond County, GA-SC MSA would likely receive approximately 77.9 percent (397 people) of the new population, Warren County, including the towns of Warrenton, Camak, and Norwood, would likely receive approximately 17.9 percent (91 people), and Thomson, GA would likely receive 4.2 percent (21 people). Due to the relatively small anticipated population increases projected for the surrounding communities based on the temporary construction period and the post-construction permanent employees, it is currently not expected that the

community should experience any undue strain on its existing community facilities (i.e. schools, parks, retail establishments, etc.).

Housing

Construction Housing

The direct construction employment level would have a measurable impact on the availability of temporary housing in the study area. A peak employment level of approximately 600 workers is expected during the construction phase. This assessment assumes that construction workers obtained from outside a 60-mile radius of the Proposal should account for approximately 85 percent of the peak construction workforce. Many of these workers would seek temporary housing for varying time periods based on their individual roles in the Proposal.

Warren County has a limited quantity of housing units available for use by construction workers relocating to the area on a temporary basis. Based on a 2009 internet search and telephone inquiries, Warren County has approximately 35 hotel/motel rooms, 17 spaces in recreational vehicle (RV) parks, and no bed and breakfast rooms (Burns and McDonnell 2010, p. 3-28). Short-term housing is likely to experience the largest increase in demand due to the transient nature of construction workers and their limited duration at the site. This is principal reason why the Augusta area, with its substantially greater temporary housing opportunities, would likely house the majority of new workers.

Operation Housing

When completed, the Proposal would have a permanent operating work force of approximately 44 people. This report assumes that 40 percent of the operators and station management positions would be imported from outside the area because of the need for experienced people in the start up and operation of a new biomass facility.

Obviously, the local area residents employed at the Proposal would not account for any of the anticipated total impacts on local housing availability. Additionally, the projected commuters from the nearby communities would also not impact housing availability. The same modeling methodology that was utilized to project construction-related housing impacts was employed to project operation-related housing impacts. Because of the expected limited supply of qualified permanent operating work force resources available in Warren County; it was assumed that approximately 40 percent of the initial operational workforce would consist of non-local workers. Based on the results of the gravity model, these non-local workers are expected to locate predominantly in the Augusta-Richmond County, GA-SC MSA and commute to the site, and therefore are expected to pose minimal impacts to the local housing market. It is expected that approximately five new operational workers would relocate to Warren County. It is anticipated that the housing supply in Warren County would be sufficient to meet this demand.

Employment

Construction Employment

A peak direct employment level of 600 workers is expected during the peak construction year (2013) of the Proposal. The peak number of construction workers would only remain on site for a short duration (approximately 2-3 months), relative to the duration of the entire project. The direct construction employment level would encourage various levels of indirect and residual (spin-off) employment. The multipliers used to project additional indirect employment associated with new temporary jobs (such as in construction activity) are subject to many variables. According to the Construction Worker Profile (1975) and the Socioeconomic Impacts of Power Plants (1982), family members of construction workers often seek secondary type employment. Therefore, new construction workers bring with them an additional supply of secondary workers.

Operation Employment

When completed, the project would have a permanent operating workforce of approximately 44 people, 18 of which are expected to be newcomers (i.e. non-locals) which would relocate to within a 60 mile radius of Warren County. It is expected that approximately five new operational workers would relocate to Warren County. Workers from the study area would not create any additional demands on their communities. Recruiting of the permanent plant operation personnel would begin in mid 2013, and all are expected to be employed by the end of 2013.

Income

Construction Income

The direct construction income level would create additional indirect and residual (spin-off) income when the workers spend the money they earn on goods and services within the community. Data obtained from the Bureau of Economic Analysis provides the regional income multiplier for Warren County (Table 3-58).

Table 3-58 Regional Income Multiplier: Construction (Proposal)

Industry	Income Multiplier
Construction	0.24

Source: Bureau of Economic Analysis, 2006 RIMS II Multipliers

The average annual income for the 600 construction workers present at the site during peak construction activity is estimated to be $60,000 excluding benefits, per diems, bonuses, overtime and travel pay. This direct income should produce additional indirect income over the construction life of the project. Much of this short-term indirect income

can be expected to result from direct income spent on lodging and food in the community. Based on the residential distribution models used to determine the likely distribution of construction workers, the direct and indirect income for Warren County is presented in Table 3-59.

Table 3-59 Projected Income: Peak Construction (Proposal)

	Warren County
Peak Construction Employment	91.5
Projected Construction Worker Income (Three Month Earnings)	$1,372,482
Projected Indirect Income Impact (Three Month Earnings)	$329,396
Peak Income Impact (3-Month Earnings)	***$1,701,878***

Source: Bureau of Economic Analysis, 2006 RIMS II Multipliers

The impacts presented in Table 3-59 represent the impacts which would occur during peak construction activity, assuming peak construction lasts three months. The income impacts would follow a similar profile as the construction workforce profile during the 36-month construction period.

Operation Income

When completed, the project would have a permanent operating workforce of approximately 44 people, approximately five of which would be newcomers (i.e. non-locals) expected to relocate to Warren County. Local residents (those from within the study area) would not add to the demand for local services or infrastructure; however, their income would contribute to the local economy. Likewise, commuters from outside the study area would not contribute to any demands, but would contribute to their local economy. The direct income would produce additional indirect income for the life of the project. Data obtained from the Bureau of Economic Analysis provides the regional income multiplier for Warren County (Table 3-60).

Table 3-60 Regional Income Multiplier: Operation (Proposal)

Industry	Income Multiplier
Utilities	0.19

Source: Bureau of Economic Analysis, 2006 Regional Input-Output Modeling System (RIMS II) Multipliers

The average annual wage for the operational employees is estimated at $72,500 excluding benefits, bonuses, and overtime. Table 3-61 shows the projected direct and indirect income that is expected from the operation of the Proposal. This income would continue for the life of the project.

Table 3-61 Projected Income: Operation (Proposal)

	Warren County
Operational Employment	5.4
Projected Operational Worker Income (Annual Dollars)	$390,585
Projected Indirect Income Impact (Annual Dollars)	$74,211
Total Income Impact (Annual Dollars)	***$464,796***

Source: Bureau of Economic Analysis, 2006 RIMS II Multipliers

Public Finance

In addition to direct and indirect income for construction and operation activities, the Proposal would also create additional governmental revenues in the form of property taxes and fees which are usual and customary for facilities of this nature. Table 3-62 presents the 2009 schedule of tax levy of Warren County by taxing authority, which is expected to apply to the Proposal in the event that common development incentives, such as tax breaks in return for job creation with Warren County, are not instituted.

As an incentive to locate the biomass facility in Warren County, the Warren County Development Authority made available to Oglethorpe revenue bond financing for the construction of the facility. Under the financing arrangement, the Authority will own the land, building, equipment, and other property purchased for the generating facility with the bond proceeds and will lease the property to Oglethorpe under a 20-year lease with an option to purchase the property at the end of the lease for a nominal amount.

Table 3-62 Warren County Tax Levy Schedule

Taxation Authority	Levy
State of Georgia	0.025%
Warren County	1.225%
School District	1.640%
School Bond	0.250%
Total Levy (Percent of Assessed Value)	***3.14%***

Source: Warren County Assessor

The Authority uses the lease payments to pay the interest associated with the bond issue and indebtedness. Although the Authority's fee interest in the property is not be subject to ad valorem tax, Oglethorpe's leasehold interest in both the real and personal property is subject to tax beginning in the first calendar year after the facility is placed in commercial operation. In addition to the ad valorem taxes Oglethorpe will pay on the leasehold interest, Oglethorpe will also make a supplemental payment to the county and will pay fees to the Development Authority. The total ad valorem taxes and fees that Oglethorpe will pay under this arrangement are lower than they would otherwise be if Oglethorpe retained the fee interest in the property, but Oglethorpe nevertheless expects to pay over $25 million through 2034 under this arrangement.

3.13.3.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* requires that federal agencies consider "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Proposal

As shown in Table 3-48, black persons have a higher representation in the Warren County population (56 percent) than they do in the State of Georgia (30 percent) or the U.S. as a whole (13 percent). As shown in Figure 3-43, some census blocks in the vicinity of the Proposal have very high percentages of black persons (80 to 100 percent). In census blocks in the immediate vicinity of the Proposal site, where visual and noise impacts to residents would be largest, the percent of black persons is relatively very low (0 to 20 percent), except for one block to the northeast of the site where the percent of black person is 40 to 60 percent. Of the residents that are

relatively close to the Proposal site, there are more residents in this block with 40 to 60 percent black persons than in the other blocks (Figures 3-35 and 3-43).

Poverty data are not available on as detailed a scale as data on race. The smallest unit for which poverty data are available is the census tract, and there are only three census tracts in all of Warren County. Poverty data are available for the county, and for the three largest towns, Warrenton, Camak and Norwood, which together make up approximately 41 percent of the Warren County population. From the 2000 census data, the percent of individuals living below in poverty level in Warren County (population approximately 6,200) was 27 percent, in Warrenton (population approximately 2,000) it was 36 percent, in Norwood (population approximately 300) it was 21 percent and in Camak (population approximately 200) it was 19 percent. By subtraction, the percent of individuals living below the poverty level in Warren County outside these communities was 23 percent. While this is below the county and Warrenton levels, it is still well above the statewide 13 percent of individuals below the poverty level.

As a result of the location of the Proposal in an area with both minority and low income populations above that of the state as a whole, this area has been identified as a potential environmental justice concern. However, impacts to this community as a result of the project are minimal. The Proposal has been located at the site because it is adjacent to an industrial park and transmission is available. In addition, no residents are being displaced. Impacts as a result of the project would include air emissions from wood combustion, increased traffic from construction and operational personnel, minimal visual impacts, short-term noise impacts during steam blows, and minimal noise impacts as a result of facility operation.

The Proposal would not have high adverse impacts on any populations. Furthermore, mitigation measures would be taken to reduce adverse impacts. In addition, the Proposal would provide offsetting economic and social benefits to the affected populations.

3.13.4 Environmental Consequences—Alternate

This section discusses social and economic impacts from the Alternate. Constructing the Alternate would cost approximately $86 million (labor costs only), and would require as many as 600 workers during peak periods (approximately 2-3 months) out of a 36-month construction schedule. The Alternate would require a full time operating staff of 44 employees.

3.13.4.1 Socio-economics

Residents within 60 or more miles can be expected to take advantage of employment opportunities during construction. Based upon experience with similar projects provided by Oglethorpe, it was assumed that approximately 15 percent of the construction work force (including weekly commuters) would come from within the 60-mile region.

During plant operation, 50 percent of the work force is expected to come from existing households in the 60-mile region. Another 10 percent are expected to commute from outside of these areas, primarily from the western part of Savannah. The remaining employment opportunities during plant operation are expected to be filled by non-local workers that would relocate for the job and become permanent residents (within 60 miles of the Alternate site).

It is commonly accepted among construction industry professionals that the “local” population for peak construction refers to individuals that would travel from within 60 miles of the job site while the “weekly commuter” population for peak construction refers to current residents that would travel to the job site from a distance greater than 60 miles, returning home only during the weekends. Therefore, current residents may travel from the Savannah, GA MSA because this area is within 60 miles of the Alternate site.

Similarly, the ”local” population for the operating workforce refers to current residents that would travel from within 25 miles of the job site while the ”daily commuter” population refers to current residents that would travel a distance greater than 25 miles and less than 60 miles to the job site. “Locals and commuters” in either construction or in operation, would not contribute to the overall population impact to the area.

The population increase associated with the Alternate’s construction and operation has an effect on the facilities and services in the communities where they locate. Monetary adjustments would also occur in the area of public revenues and expenditures as the influx of population expands the tax base and simultaneously requires additional community services.

The population distribution between surrounding communities and the Alternate site was based on the current populations of the municipalities as well as the commuting distance (miles) from the municipality to the Alternate site. Due to proximity, the entire Savannah, GA MSA (with a 2007 estimated population of 329,329) and the neighboring town of Jesup, GA (population approximately 10,000) were considered as contributing to the available work force and as available for housing new workers locating in the area. When applied to the peak construction employment and population levels associated with the Alternate, it was determined that the Savannah, GA MSA would likely receive approximately 57.4 percent (293 people) of the new population, Appling County, including the towns of Baxley and Surrency, would likely receive approximately 38.5 percent (196.5 people), and Jesup, GA would likely receive 4.0 percent (20.5 people). Due to the relatively small anticipated population increases projected for the surrounding communities based on the temporary construction period and the post-construction permanent employees, it is currently not expected that the community

should experience any undue strain on its existing community facilities (i.e. schools, parks, retail establishments, etc.).

Housing

Construction Housing

The direct construction employment level would have a measurable impact on the availability of temporary housing in the study area. A peak employment level of approximately 600 workers is expected during the construction phase. This assessment assumes that construction workers obtained from outside a 60-mile radius of the Alternate site should account for approximately 85 percent of the peak construction workforce. Many of these workers would seek temporary housing for varying time periods.

Appling County has a limited quantity of housing units available for use by construction workers relocating to the area on a temporary basis. Based on a 2009 internet search and telephone inquiries, Appling County has approximately 161 hotel/motel rooms, no spaces in recreational vehicle (RV) parks, and no bed and breakfast rooms (Burns and McDonnell 2010c, p. 3-32). Short-term housing is likely to experience the largest increase in demand due to the transient nature of construction workers and their limited duration at the site. This is a principal reason why the Savannah area, with its substantially greater temporary housing opportunities, would likely house the majority of new workers.

Operation Housing

When completed, the Alternate would have a permanent operating work force of approximately 44 people. This report assumes that 40 percent of the operators and station management positions would be imported from outside the area because of the need for experienced people in the start up and operation of a new biomass facility.

Obviously, the local area residents employed at the Alternate would not account for any of the anticipated total impacts on local housing availability. Additionally, the projected commuters from the nearby communities would also not impact housing availability. The same modeling methodology that was utilized to project construction-related housing impacts was employed to project operation-related housing impacts. Because of the expected limited supply of qualified permanent operating work force resources available in Appling County, it was assumed that approximately 40 percent of the initial operational workforce would consist of non-local workers. Based on the results of the gravity model, these non-local workers are expected to locate predominantly in the Savannah, GA MSA and commute to the site, and therefore are expected to pose minimal impacts to the local housing market. It is expected that 9.1 new operational workers would relocate to Appling County. It is anticipated that the housing supply in Appling County would be sufficient to meet this demand.

Employment

Construction Employment

A peak direct employment level of 600 workers is expected during the peak construction year (2013) of the project. The peak number of construction workers would only remain on site for a short duration (approximately 2-3 months), relative to the duration of the entire project. The direct construction employment level would encourage various levels of indirect and residual (spin-off) employment. The multipliers used to project additional indirect employment associated with new temporary jobs (such as in construction activity) are subject to many variables. According to the Construction Worker Profile (1975) and the Socioeconomic Impacts of Power Plants (1982), family members of construction workers often seek secondary type employment. Therefore, new construction workers bring with them an additional supply of secondary workers.

Operation Employment

When completed, the project would have a permanent operating workforce of approximately 44 people, 18 of which are expected to be newcomers (i.e. non-locals) who would relocate to within a 60 mile radius of Appling County. It is expected that 9.1 new operational workers would relocate to Appling County. Workers from the study area would not create any additional demands on their communities. Recruiting of the permanent plant operation personnel would begin in mid 2013, and all are expected to be employed by the end of 2013.

Income

Construction Income

The direct construction income level would create additional indirect and residual (spin-off) income when the workers spend the money they earn on goods and services within the community. Data obtained from the Bureau of Economic Analysis provides the regional income multiplier for Appling County (Table 3-63).

Table 3-63. Regional Income Multiplier: Construction (Alternate)

Industry	Income Multiplier
Construction	0.27

Source: Bureau of Economic Analysis, 2006 RIMS II Multipliers

The average annual income for the 600 construction workers present at the site during peak construction activity is estimated to be $60,000 excluding benefits, per diems, bonuses, overtime and travel pay. This direct income should produce additional indirect income over the construction life of the project. Much of this short-term indirect

income can be expected to result from direct income spent on lodging and food in the community. Based on the residential distribution models used to determine the likely distribution of construction workers, the direct and indirect income for Appling County is presented in Table 3-64.

Table 3-64. Projected Income: Peak Construction (Alternate).

	Appling County
Peak Construction Employment	196.5
Projected Construction Worker Income (Three-Month Earnings)	$2,947,884
Projected Indirect Income Impact (Three-Month Earnings)	$808,605
Total Income Impact (3-Month Earnings)	***$3,756,488***

Source: Bureau of Economic Analysis2006

The impacts presented in Table 3-64 represent the impacts which would occur during peak construction activity, assuming peak construction lasts three months. The income impacts would follow a similar profile as the construction workforce profile during the 36-month construction period.

Operation Income

When completed, the project would have a permanent operating workforce of approximately 44 people, 9.1 of which would be newcomers (i.e. non-locals) expected to relocate to Appling County. Local residents (those from within the study area) would not add to the demand for local services or infrastructure; however, their income would contribute to the local economy. Likewise, commuters from outside the study area would not contribute to any demands, but would contribute to their local economy. The direct income would produce additional indirect income for the life of the project. Data obtained from the Bureau of Economic Analysis provides the regional income multiplier for Appling County (Table 3-65).

Table 3-65. Regional Income Multiplier: Operation (Alternate).

Industry	Income Multiplier
Utilities	0.53

Source: Bureau of Economic Analysis 2006

The average annual wage for the operational employees is estimated at $72,500 excluding benefits, bonuses, and overtime. Table 3-66 shows the projected direct and indirect income that is expected from the operation of the Alternate. This income would continue for the life of the project.

Table 3-66. Projected Income: Operation (Alternate).

	Appling County
Operational Employment	9.1
Projected Operational Worker Income (Annual Dollars)	$662,679
Projected Indirect Income Impact (Annual Dollars)	$350,160
Total Income Impact (Annual Dollars)	***$1,012,838***

Source: Bureau of Economic Analysis, 2006 RIMS II Multipliers

Public Finance

In addition to direct and indirect income for construction and operation activities, the Alternate would also create additional governmental revenues in the form of property taxes and fees which are usual and customary for facilities of this nature. Table 3-67 presents the 2009 schedule of tax levy of Appling County by taxing authority, which is expected to apply to the Alternate in the event that common development incentives, such as tax breaks in return for job creation within Appling County, are not instituted.

Table 3-67. Appling County Tax Levy Schedule

Taxation Authority	Levy
State of Georgia	0.025%
Appling County	1.295%
School District	1.467%
School Bond	0.047%
Total Levy (Percent of Assessed Value)	***2.834%***

Source: Appling County Assessor

Appling County applies the tax levy schedule to the assessed value of the subject property being taxed. According to the Appling County Assessor property classified as industrial, such as that of the Plant, is assessed at 40 percent of its value. Therefore, the $430.9 Million installed cost of the Plant could generate approximately $4.9 Million in property tax revenue for Appling County.

3.13.4.2 Environmental Justice

As shown in Table 3-48, black persons have a lower representation in the Appling County population (19 percent) than they do in the State of Georgia (30 percent). Based on the comparison of the minority populations by census tract (Figure 3-44) and the locations of residences near the Alternate site (Figure 3-36), it appears that the residences immediately north, east, and south of the site would be occupied mainly by white persons and the residences near the west part of the site would be occupied mainly by black persons.

As discussed with the Proposal, poverty data are not available on as detailed a scale as data on race. The percent of individuals living below the poverty level in Appling County, based on 2000 census information, was 18.6, compared to 13.0 percent for the State of Georgia.

As a result of the location of the Alternate in a minority community, this area has been identified as a potential environmental justice concern. Alternate has been located at the site because it is in an area with existing industrial development and transmission is available. In addition, no residents are being displaced. Impacts as a result of the project would include air emissions from wood combustion, increased traffic from construction and operational personnel, minimal visual impacts, short-term noise impacts during steam blows, and minimal noise impacts as a result of facility operation.

The Alternate would not have high adverse impacts on any population, including minority and low income populations.

The Alternate would not have high adverse impacts on any populations and it is expected that the minority and low income populations would not be disproportionately adversely impacted by the Alternate. Adverse impacts to minority and low-income persons would be similar to impacts to the overall population. Furthermore, mitigation measures would be taken to reduce adverse impacts. In addition, the Alternate would provide offsetting economic and social benefits to the affected populations.

3.13.5 Environmental Consequences—No-Action Alternative

The no action alternative would result in no impacts to the environment at the Warren County and Appling County site or their surroundings. The Proposal and Alternate site would not be constructed or operated, and therefore, under the no action alternative, there would be no socio-economic effects at these sites.

However, because neither the Proposal nor the Alternate would be constructed, the power demand would likely be met by construction of some other non-renewable power generation facility, such as coal, nuclear or natural gas.