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September 1, 2023

VIA ELECTRONIC FILING

Ms. A. Shonta Dunston
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

RE: Duke Energy Progress, LLC's Notification to the North Carolina Utilities Commission of Preliminary Plans to Construct an Electric Generating Facility in Person County, North Carolina
Docket No. E-2, Sub 1318

Dear Ms. Dunston:

Enclosed for filing with the North Carolina Utilities Commission ("Commission") in the above-referenced proceeding is Duke Energy Progress, LLC's ("DEP" or the "Company") *Preliminary Plans to Construct an Electric Generating Facility in Person County, North Carolina* ("Preliminary Plan"). The Preliminary Plan is being filed today pursuant to Commission Rule R8-61(a), in advance of DEP filing an application for a certificate of public convenience and necessity ("CPCN") to construct an approximately 1,360 megawatt advanced-class combined-cycle gas turbine ("CCGT") unit with selective catalytic reduction at the site of its existing Roxboro Steam Plant in Semora, North Carolina ("Person County Energy Complex"). Consistent with Rule R8-61, DEP is providing this Preliminary Plan to the North Carolina Department of Environmental Quality (as the successor to the North Carolina Department of the Environment and Natural Resources). This Preliminary Plan notification is being submitted at least 120 days prior to the date on which DEP will file with the Commission a CPCN application to construct the generating facility. DEP will submit the $250 filing fee when the Company's CPCN application is submitted.

DEP's and Duke Energy Carolinas, LLC's ("DEC") (collectively, the "Companies") 2023-2024 Carbon Plan and Integrated Resource Plan ("CPIRP" or "the Plan"), as filed with the Commission on August 17, 2023, in Docket No. E-100, Sub 190, identifies the planned Person County Energy Complex CCGT as needed to reliably serve DEP customers and to enable the continued orderly retirement of the Companies' remaining coal-fueled generation in North Carolina and to achieve the requirements of

N.C. Gen. Stat. § 62-110.9. As part of the CPIRP Execution Plan, the Companies are planning to place the Person County Energy Complex in-service in 2028-2029 to support the orderly retirement of Roxboro Units 1 and 2 by January 1, 2029. The need for new dispatchable gas generation to enable these coal unit retirements and reliably progress the energy transition is also consistent with the Commission's findings and adoption of initial reasonable steps to execute the Commission's initial Carbon Plan, as approved in the December 30, 2022, *Order Adopting Initial Carbon Plan and Providing Direction for Future Planning,* issued in Docket No. E-100, Sub 179.

The confidential redacted portions of this filing contain commercially sensitive information that should be protected from public disclosure. The information designated herein as confidential qualifies as "trade secrets" under N.C. Gen. Stat. § 66-152(3). If this information were to be publicly disclosed, it would allow competitors, vendors, and other market participants to gain an undue advantage, which may ultimately result in harm and higher cost to customers. Pursuant to N.C. Gen. Stat. § 132-1.2, the Company requests that the information marked "Confidential" be protected from public disclosure. The Company is contemporaneously filing with the Commission all information designated as confidential under seal and will make the information available to other parties to this docket pursuant to an appropriate nondisclosure agreement.

Please feel free to contact me should you have any questions. Thank you for your assistance in this matter.

Sincerely,

Jason Higginbotham

Jason A. Higginbotham

Enclosure

cc: Christopher J. Ayers, Executive Director, Public Staff
Lucy Edmondson, Chief Counsel, Public Staff
Robert Josey, Staff Attorney, Public Staff

NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-2, SUB 1318
PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

PERSON COUNTY ENERGY COMPLEX
COMBINED-CYCLE COMBUSTION TURBINE ADDITION PROJECT

Exhibit 1: Site Information

September 1, 2023

DUKE ENERGY PROGRESS

PERSON COUNTY ENERGY COMPLEX
COMBINED CYCLE ADDITION PROJECT
Exhibit 1: Site Information

REFERENCES

LIST OF FIGURES WITHIN DOCUMENT

LIST OF TABLES WITHIN DOCUMENT

INTRODUCTION

Duke Energy Progress, LLC ("DEP"), requests certification to construct one 1,360-megawatt ("MW") advanced-class combined-cycle gas turbine ("CCGT") unit with selective catalytic reduction at the site of its existing Roxboro Steam Plant in Semora, North Carolina ("Roxboro Plant"). The CCGT will consist of two gas turbine generators and one steam turbine generator. Semora is an unincorporated community in Person County that is approximately 11.5 miles northwest of Roxboro, NC, which is the county seat of Person County.

This exhibit provides site and permitting information related to the construction of the proposed unit and related upgrades to on-site transmission facilities, pursuant to North Carolina Utilities Commission ("NCUC") Rule R8-61. All descriptions, illustrations, and information provided herein are based on preliminary engineering and studies, using the most reliable information available to date. The following information is included in this exhibit:

- Facility Layout Map
- Site Location and Address
- Site Ownership
- Site Description
- Site Selection
- Site Analysis
- Site Study Status
- Natural Gas Supply
- Transmission
- Unit Capacity

PRELIMINARY PLANS AND EXHIBITS

1.0 SITE INFORMATION

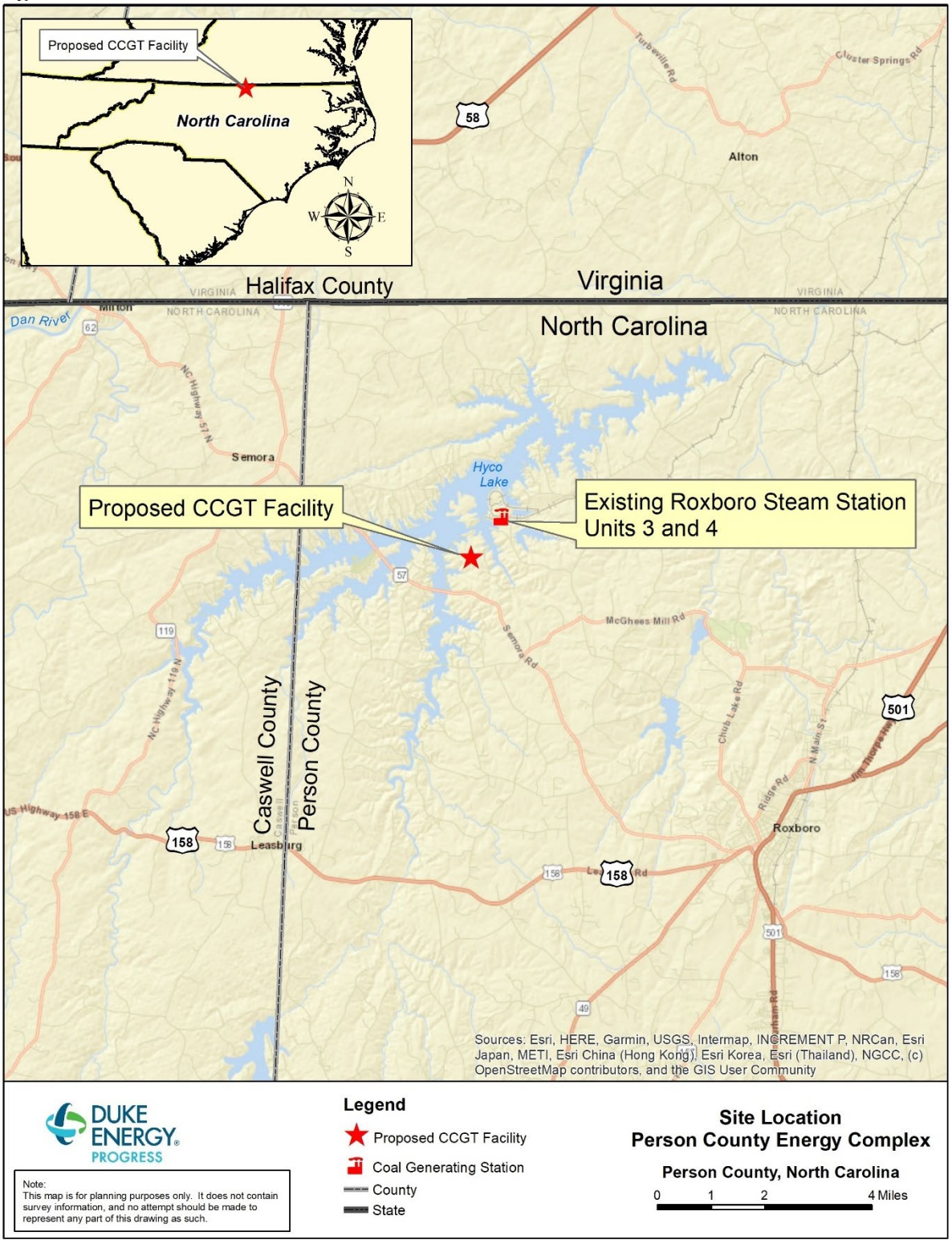
DEP, through its shared services company, Duke Energy Business Services, LLC, contracted with Burns & McDonnell to advise on supplemental engineering issues. DEP further engaged WSP USA Environment and Infrastructure, Inc., for studies on wetlands and soil suitability and All4 Environmental Consulting Services for air permitting analyses. DEP also retained Environmental Resources Management ("ERM") for cultural resource investigations. Finally, DEP contracted with Pike Engineering, LLC ("Pike"), to perform research and conduct studies of local population, area development, visual and auditory resources, aesthetic and cultural resources, and aviation. Pike then contracted with Brockington & Associates, Inc. ("Brockington") for additional aesthetic and cultural resource research and with Stewart Acoustical Consultants ("Stewart") to conduct studies related to auditory resources of the proposed generating facility.

1.1 Site Location, Address, and Ownership

DEP proposes to permanently retire coal-fired Units 1 and 2 at Roxboro Plant and replace them with one CCGT unit (the CCGT unit and its associated facilities will be herein referred to as the "Proposed Facility"). The remaining coal-fired Units 3 and 4 and the proposed CCGT unit will collectively be known as the Person County Energy Complex ("PCEC"). The PCEC will be owned by DEP and located on DEP-owned property adjacent to the current Roxboro Plant in northeastern Person County. The PCEC's E911 street address will be 1700 Dunnaway Rd, Semora, NC 27343; its approximate global positioning system coordinates at its approximate center will be 79° 5' 1.807" west and 36° 28' 22.405" north.

Figure 1.1-1 shows the location of the PCEC.

Figure 1.1-1. Site Location



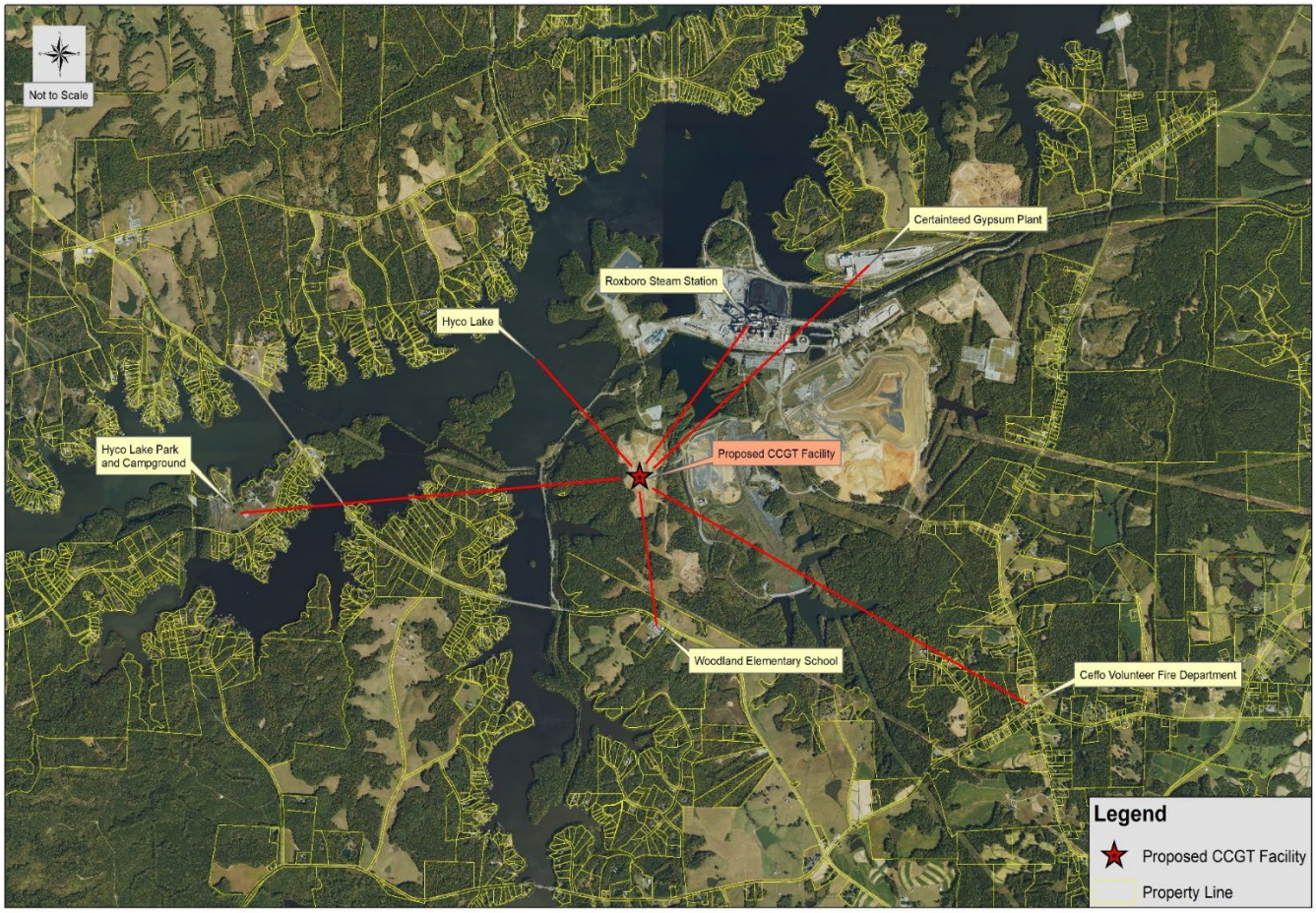
County Boundary Sources: Esri; U.S. Dept, of Commerce, Census Bureau; NOAA; National Ocean Service; National Geodetic Survey

The Roxboro Plant is a four-unit, coal-fired 2,422 MW generating facility. It is one of the largest power plants in the United States and has been operating commercially since 1966. DEP's property surrounding the Roxboro Plant includes extensive forested areas. Outside the DEP-owned property, scattered wooded areas are interspersed with agricultural pastures and Hyco Lake. Lakeside residential developments and recreational land uses are predominant. Terrain in the vicinity is gently rolling and scenic with forests, fields, and views of Hyco Lake.

The immediate area's industrial development is limited to CertainTeed Gypsum (approximately 0.76 miles east). Nearby dining includes Buoy's Bar and Grill (about 1.5 miles west) and Concord Grill (about 2.25 miles southeast); recreational accommodations and facilities include Hyco Lake Park & Campground (about 2 miles west). Zion Level Missionary Baptist Church and cemetery are approximately 1.5 miles northwest. To the southeast are Ceffo Volunteer Fire Department (2.5 miles) and Concord Church of Roxboro and cemetery (about 2.25 miles). Woodland Elementary School is approximately 0.8 miles south.

Figure 1.1-2 shows the locations of some of the nearby commercial and industrial developments, Woodland Elementary School, and other points of interest.

Figure 1.1-2. Land Use



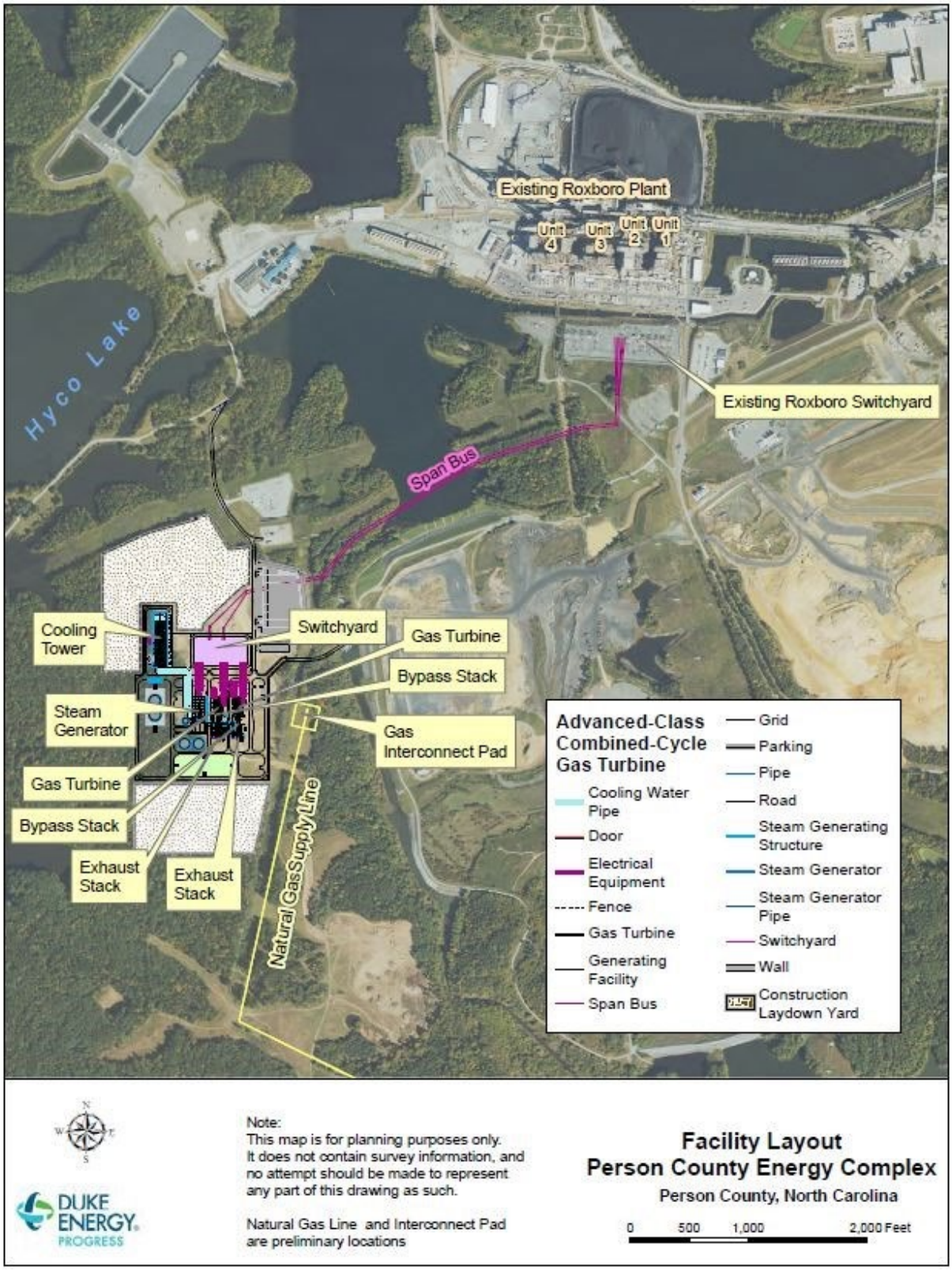
Map Sources: USDA Orthoimagery 2022; Person Co. GIS 2023

1.2 Site Description

The Roxboro Plant is encompassed by a 6,923-acre parcel of land. In proximity to the Roxboro Plant there is an electrical substation, transmission lines, the associated balance of the Roxboro Plant's facilities, buffer lands, and forested areas. The footprint of the Proposed Facility will cover approximately 28 acres of undeveloped land.

Figure 1.2 provides an overall view of the Proposed Facility.

Figure 1.2 Facility Layout



Map Sources: USDA Orthoimagery 2022

1.3 Site Selection

1.3.1 Siting Criteria

The 2022 DEP and Duke Energy Carolinas, LLC ("DEC") proposed Carbon Plan ("Carbon Plan") identified a need for additional generation, including approximately 1,200 MW of combined-cycle gas generation in the 2028-2029 timeframe, and the NCUC found in its December 30, 2022, *Order Adopting Initial Carbon Plan and Providing Direction for Future Planning*, in Docket No. E-100, Sub 179 ("Carbon Plan Order"), that planning for up to 1,200 MW of incremental combined-cycle gas generation is a reasonable step.[1] DEP evaluated site locations using the following factors: transmission capacity, natural gas capacity, fuel oil/water availability, long-term future generation needs, operational synergies, rail access, land availability, and projected retirement dates of existing units.

Criteria used to inform site selection are presented in Table 1.3.1, below.

[1] Carbon Plan Order at 79.

[BEGIN CONFIDENTIAL]

Table 1.3.1. Site Selection Criteria

Criteria	Reason
Transmission Capacity	[redacted]
Natural Gas Capacity	[redacted]
Fuel Oil/Water Availability	[redacted]
Long-Term Future Generation Needs	[redacted]
Operational Synergies	[redacted]
Rail Access	[redacted]
Land Availability	[redacted]
Projected Retirement Dates	[redacted]

[END CONFIDENTIAL]

1.3.2 Siting Results

DEP considered all its generation sites with planned unit retirement dates that aligned with planning need for new combined-cycle gas generation in the 2028-2029 timeframe. Existing generation sites with planned unit retirement dates were considered (as opposed to greenfield locations) because the study process and the construction of new infrastructure—especially transmission facilities—necessary to support a new CCGT at a greenfield location would have prolonged deployment of the unit beyond the identified planning need. Listed below are the possible sites identified, based upon the criteria described in Table 1.3.1-1.

- Roxboro Units 1 & 2 (Person County, NC)
- Roxboro Units 3 & 4 (Person County, NC)
- Mayo Unit 1 (Person County, NC)

1.3.3 Recommendation

The Roxboro Plant location had the most positive attributes of all sites evaluated. The targeted retirement date for the Roxboro Plant's Units 1 and 2 most closely aligned with the targeted approximate in-service date of the proposed CCGT. Based on a comprehensive site assessment, DEP found no major obstacles to adding a CCGT unit at the Roxboro Plant, and subsequent detailed field work substantiated the preliminary evaluation. The Roxboro Plant location was also closer to existing natural gas facilities than the Mayo location, which means it will be less costly to install natural gas facilities necessary to deliver gas to the Roxboro location than the Mayo location.

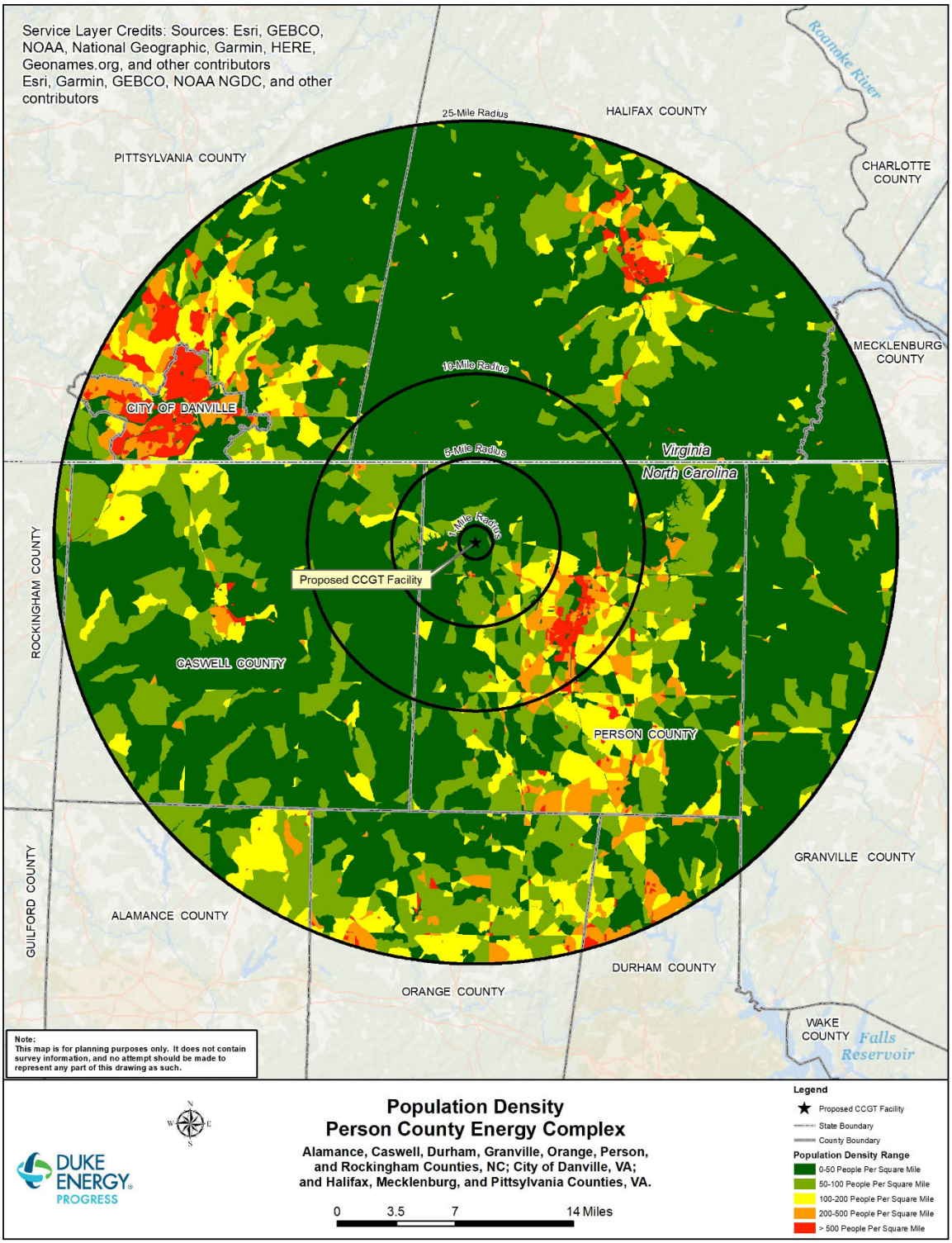
1.4 Site Characteristics

1.4.1 Local Population

According to the U.S. Census Bureau ("USCB"), Person County's April 1, 2020, population was 39,097 (UCSB 2020b); and Roxboro, the county seat, had 8,134 inhabitants (USCB 2020c). The closest city to the Roxboro Plant is Danville, Virginia ("VA"), which has a population of 42,590 (USCB 2020a). Roxboro is the only municipality in Person County.

Within a 25-mile radius of the Proposed Facility, the population is about 182,300 (USCB 2020d). Figure 1.4.1 shows population density in proximity to the Proposed Facility.

Figure 1.4.1. Population Density



Map Sources: Esri, U.S. Dept. of Commerce, U.S. Census Bureau, DOC, NOAA, National Ocean Service, National Geodetic Survey, US 2020 Census Redistricting Blocks (P.L. 94-171).

1.4.2 Area Development

1.4.2.1 Existing

The area of Person County surrounding the PCEC is predominantly rural, with single-family neighborhoods clustered around 3,750-acre Hyco Lake.

There are a few areas dedicated to recreation in proximity to the PCEC. About two miles west, Hyco Lake Park and Campground offers six boat ramps, nature trails, picnic shelters, a natural learning area, a Kraken disc-golf course, primitive and RV campsites, and a few small cottages.

Using field reconnaissance, digital data from Person County, and desktop analysis (which utilizes current aerial photography along with county tax parcel and other digital data), Pike located approximately 430 single-family residences, two churches, three cemeteries, one school, and three communication towers within two miles of the PCEC.

DEP considered various environmental justice aspects of the location of the PCEC and undertook a variety of actions to engage with the community and to discuss mitigation of community impact. Those actions included, but were not limited to, using a three-mile proximity screening radius (notwithstanding that a one-mile radius is standard) and confirming that no areas of subsidized housing were located within that radius. DEP representatives also communicated and engaged with representatives for the Person County Commission, the Person County Economic Development Committee, Piedmont Community College, and residents along Dunnaway Road and near Shore Drive. DEP also considered certain non-DEP projects and activities that could create cumulative impacts to the community and identified known areas, structures, and features of significance to the surrounding community. Through these efforts, DEP did not identify anything that would indicate construction and operation of the PCEC at the site of the existing Roxboro

Steam Plant would be problematic from an environmental justice perspective.

1.4.2.2 Future

A DEP representative met with Person County's Planning Director on April 14, 2023, to discuss area development within five miles of the PCEC. The Peninsula at Hyco Lake, approved by the Person County Commissioners in 2018, includes 192 lots on more than 440 acres and 3.5 miles of shoreline (The Peninsula 2017). Phase 1 (with 168 residential lots) has an entry road underway, but there is no specific information available on lot construction (Appendix D). Person County representatives were not aware of any development plans by federal entities.

The PCEC is consistent with the land-use policy goals of Person County and the City of Roxboro. In November 2021, Person County and the City of Roxboro adopted a Joint Comprehensive Land Use Plan ("Plan")—the result of a year-long process involving City and County staff and a steering committee with equal representation from both jurisdictions. The public was invited to participate early in the process by completing a community survey and attending (in person or online) three public meetings to discuss topic areas important to developing the Plan: Economic Development, Agriculture and Natural Resources, and Growth and Development (Person County & City of Roxboro 2021).

After reviewing background research and survey results, the Steering Committee developed four guiding principles for the draft vision of future growth and development in Person County and Roxboro. Using those guiding principles, the Committee drafted a future land use map and implementation strategies. In May of 2021, the public was presented an opportunity to review and comment on the draft guiding principles, future land use map, and implementation strategies during a public meeting. The Steering Committee's final draft of the Plan was approved by the County

Board of Commissioners and the Roxboro City Council in November 2021 (Person & Roxboro 2021).

Each guiding principle set forth in the Plan is broken out into several granular "objectives." The Plan contains a detailed discussion regarding how each objective will be achieved. Guiding Principle 2 of the Plan is titled "Facilitating Sustainable Economic Growth," and it is broken out into nine objectives. Objective number 8 is titled "[s]upport the reuse and repurposing of the County's major energy infrastructure sites." The Plan's detailed discussion related to this objective is as follows:

> For many years, a significant portion of the local employment base has been centered on energy production, with major coal-fired power plants located on Hyco Lake and Mayo Lake. These assets not only provided employment opportunities for residents and contributed to the local tax base, but also provided a source of reliable and redundant energy supply for major industrial users in the community. It is anticipated that, as the energy industry continues its transition away from coal, these two major power production sites could be taken off-line in the foreseeable future. The City and County should work to advocate for the reuse of one or both of these sites to be redeveloped with a new energy generating plant to both take advantage of the required water resources that exist, as well as to provide a reliable local energy source to help support industrial development in the community.

Construction of the Proposed Facility fits squarely within this objective articulated by Person County and the City of Roxboro.

1.4.3 Visual and Auditory

1.4.3.1 Visual

The degree of visual impact that the Proposed Facility will have on an existing feature (e.g., scenic vista, cultural resource) is directly related to the visual contrast between the Proposed Facility and the scenic quality of the existing area or region (i.e., the higher the scenic quality, the greater the potential for adverse visual impacts and vice versa). Scenic quality is derived from the interrelationship of multiple factors including landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.

Topographic conditions for the area surrounding the Proposed Facility are typical of those within the Southern Piedmont Physiographic Province, primarily consisting of rolling to hilly terrain. Opportunities for scenic vistas are somewhat limited because there are only a few topographical high points, upon which there are agricultural fields and pastureland (allowing for moderately distant views). These are found generally along Highway 57/Semora Road (which runs southeast to northwest and crosses Hyco Lake) and McGhees Mill Road (which travels southeast to northeast and also crosses Hyco Lake).

Hyco Lake probably offers the most scenic vistas in the area surrounding the Proposed Facility (i.e., for boaters) because of its size and length. The overall project area for the Proposed Facility is largely forested in its southwestern and northeastern quadrants and those quadrants therefore do not offer many opportunities for scenic vistas.

The area surrounding the Proposed Facility is mostly forested with some agriculture and pastureland and scattered rural residences. It generally lacks a great deal of diversity in land use, with the major exceptions being the Roxboro Plant, CertainTeed Gypsum's plant (highly developed), and residential subdivisions near Hyco Lake. Historic resources, such as plantation homes and historic markers, can be discovered along rural tree-lined roads that are intermixed with occasional

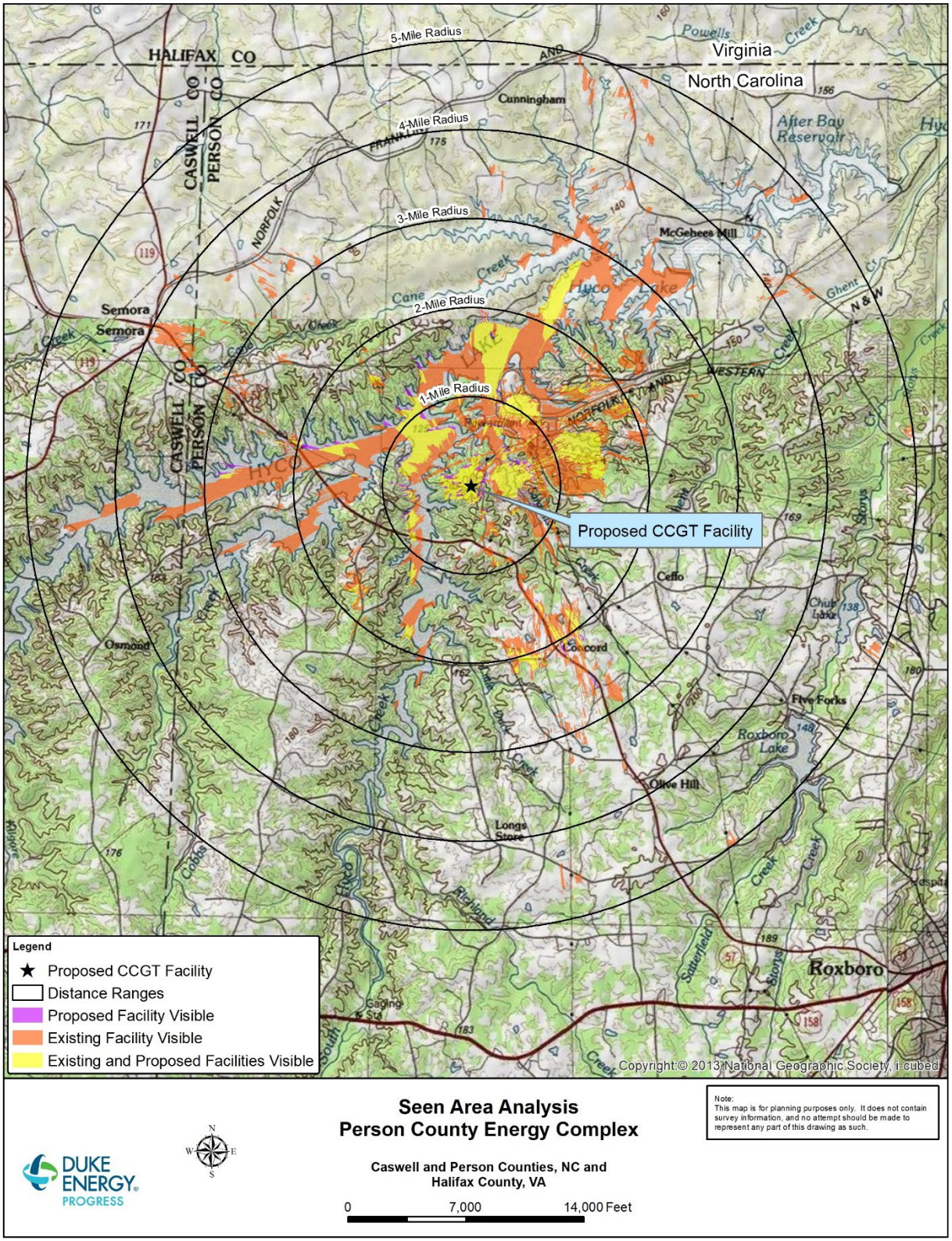
pockets of pasture.

During a probable visual effects field study, Pike identified existing residential properties and public roadways as cultural resources with the potential to be most affected by views of the Proposed Facility.

Figure 1.4.3.1-1 shows areas within five miles of the Proposed Facility that have views of the existing Roxboro Plant stacks only, areas with a view of the Proposed Facility only, and areas predicted to have views of both.

Table 1.4.3.1 displays the results of the Seen Area Analysis and Predicted Visual Effects. The data confirms that the Proposed Facility may be visible from only a minor portion of the surrounding area because of visual obstructions from hills and mature forest cover. Of the total area within five miles of the Proposed Facility (78.54 square miles), the Proposed Facility will be visible in areas totaling only 0.98 square miles (1.25% of the total area) outside the DEP-owned property on which the Proposed Facility will be built and which is generally inaccessible to the public. Pike further predicts that outside of DEP-owned property, the Proposed Facility will be visible from only 0.10 square miles that do not already have a view of the Roxboro Plant (0.13% of the total area). Most of the areas that will have a view of the Proposed Facility are located along the edge of Hyco Lake.

Figure 1.4.3.1-1 Seen Area Analysis



Map Sources: Map Courtesy of the U.S. Geological Survey; Pike Field Reconnaissance 2023, USGS NED 2023, USDA Orthoimagery 2022

Table 1.4.3.1 Seen Area Analysis and Predicted Visual Effects

Visual Effects Probability	View Distance Range from Future Plants (miles)	Total Area (sq. mi.)	Probable Total Area with a View of Only the Existing Plants (sq. mi.) [1]	Probable Total Area with a View of Only the Future Plants (sq. mi.) [1]	Probable Total Area with a View of Both the Existing and Future Plants (sq. mi.) [1]	Probable View Area % of Total Area Where Additional Visual Effects Probability Could Occur [1, 2]
Very High	0.0 - 0.5	0.79	0.01	0.00	0.00	0.00%
High	0.5 - 1.0	2.36	0.29	0.02	0.22	0.85%
Moderate-High	1.0 - 1.5	3.93	0.61	0.02	0.16	0.51%
Moderate	1.5 - 2.0	5.50	0.77	0.03	0.32	0.55%
Low-Moderate	2.0 - 3.0	15.71	0.87	0.03	0.18	0.19%
Low	3.0 - 4.0	21.99	0.62	0.00	0.00	0.00%
Very Low	4.0 - 5.0	28.27	0.22	0.00	0.00	0.00%
Totals	**Totals**	**78.54**	**3.39**	**0.10**	**0.88**	**0.13%**

[1] Visibility not calculated within DEP-owned property.
[2] Areas with additional visual effects are those without a previous view of the existing Roxboro Plant.

***Very High*:** Plant element(s) will dominate the view because of proximity to the viewpoint and/or the number of elements viewed; because their setting in the landscape commands strong visual attention; or a combination of these factors. Natural landscape elements will be dominated by plant elements.

***High*:** Plant element(s) will be dominant in the view because of their perceived size from the viewpoint or the number of elements viewed; because their setting in the landscape commands strong visual attention; or a combination of these factors. Natural landscape elements will continue to be a moderate influence in the viewshed.

***Moderate-High*:** Plant element(s) will command strong visual attention in the viewshed but will be somewhat mitigated by the influence of the ambient landscape character.

Moderate*:* Plant element(s), though easily recognizable, will be visually subordinate to the ambient landscape character.

Low-Moderate: Plant element(s) will be easily recognized in the ambient landscape setting but command only casual attention in the view.

Low: Plant element(s) will be dominated by the ambient landscape character.

Very Low: Plant element(s) will be totally subordinate to the broader landscape setting and may not command attention from casual viewers.

The visual effects that will result from building the Proposed Facility will be influenced by several factors, including the following:

- The distance between the viewer and the Proposed Facility
- The elements of the Proposed Facility seen (i.e., the emission stack or the entire facility)
- The backgrounds of visible structures (i.e., whether visible structures are seen against backdrops such as vegetation, terrain, or man-made elements, or silhouetted against the skyline)
- The presence or absence of foreground and mid-ground vegetation or man-made elements in the view
- The overall scenic condition (landscape content and quality) of the area from which the facility is viewed.

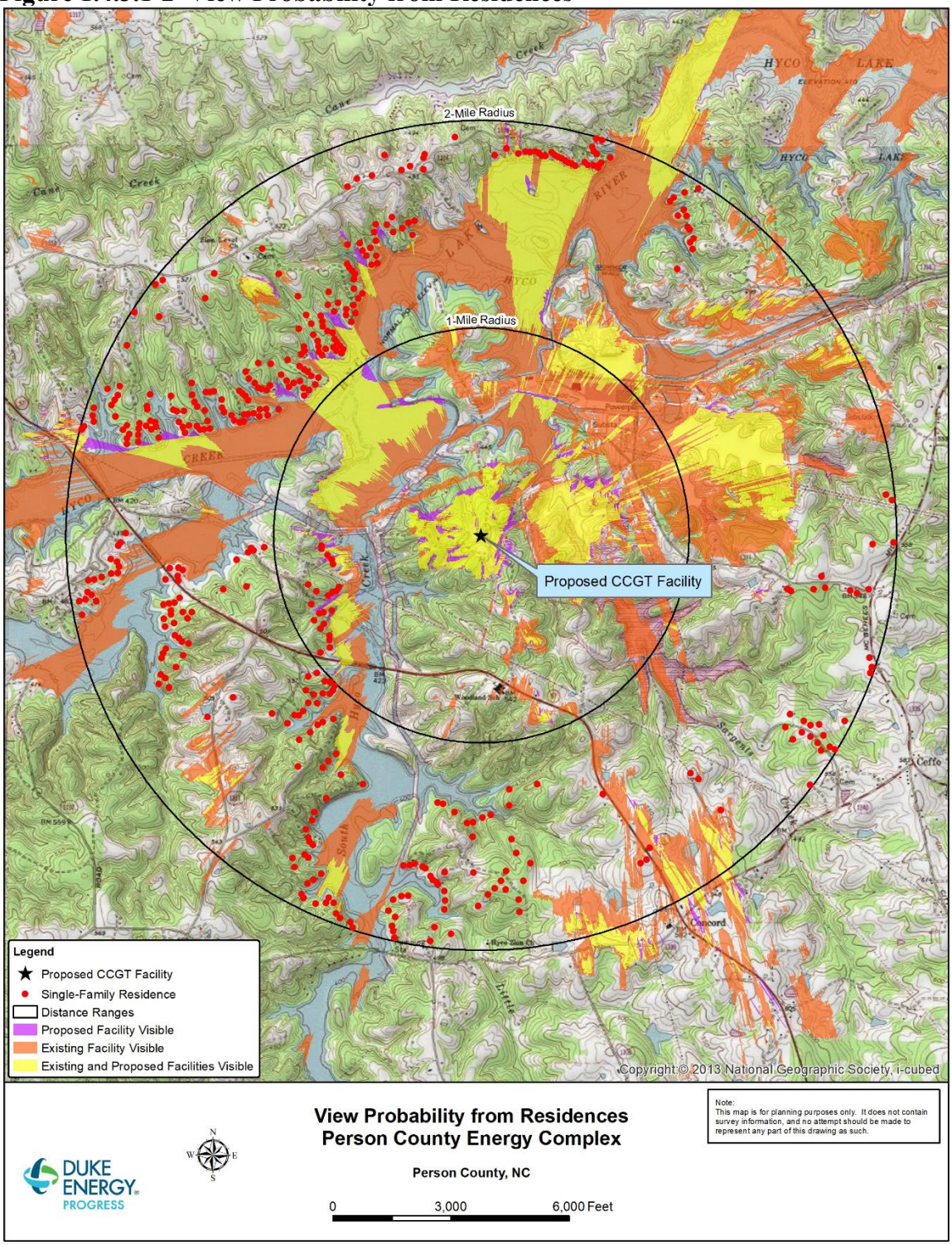
Pike correlated the data derived from the Seen Area Analysis and Predicted Visual Effects to probable visual effects ranging from Very High to Very Low in Table 1.4.3.1.

Using the distance from the viewer to the Proposed Facility, Pike ranked the visual effects that the Proposed Facility may cause. The ranking represents a worst-case scenario; Pike made no attempt to reduce the predicted visual effects probability that will inevitably occur when foreground and mid-ground vegetation or backdrops are present. Also, Pike made no attempts to mitigate (1) predicted view ranking based on existing modifications to natural landscape settings; or (2) the fact that only minor plant features may be seen from an area having a probable view. For example, even if only the top segments of the Proposed Facility's stack (the tallest structure) could be seen from half a mile away, the view effect was ranked as Very High.

Visibility from Residences

Pike conducted an extensive field investigation to determine the Proposed Facility's probable visual effects on residential properties within visual proximity. Initial investigations showed that some residential areas along Hyco Lake will have potential views of the Proposed Facility. More specifically, approximately 64 residences on the edge of the lake that are to the north, west, and southwest of the Proposed Facility will have potential views of the Proposed Facility. Pike determined that a combination of vegetation and terrain sufficiently screened other surrounding areas from the PCEC.

Figure 1.4.3.1-2 View Probability from Residences

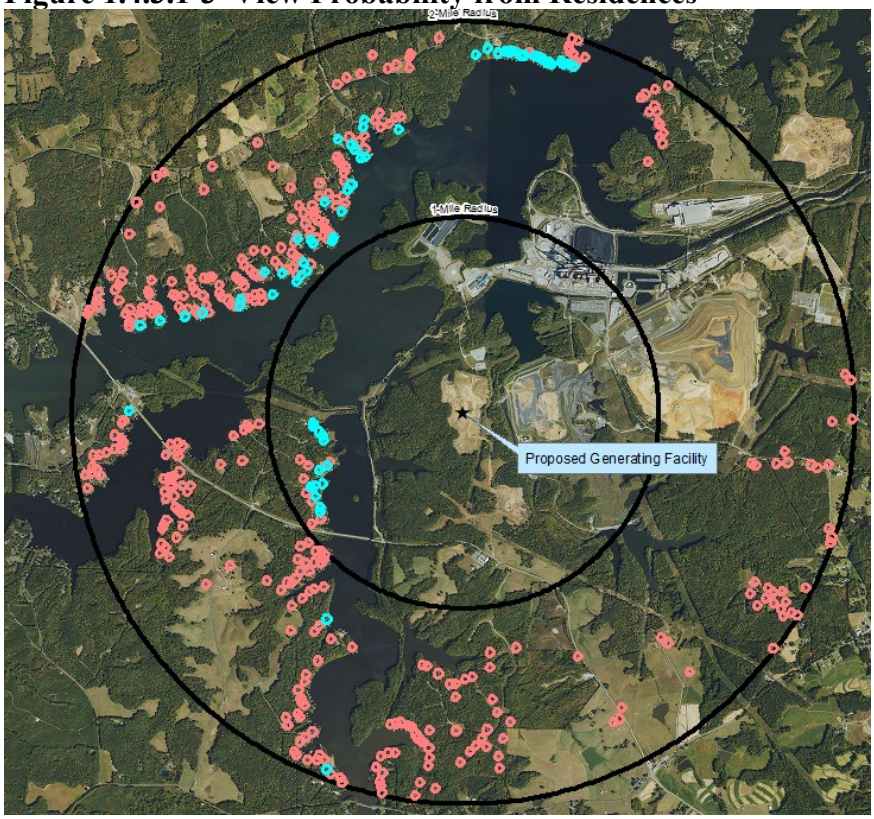


Map Sources: Courtesy of the USGS; Pike Field Reconnaissance 2023, USGS NED 2023, USDA Orthoimagery 2022

The residences noted in Figure 1.4.3.1-2 may have a slight view of the tallest parts of the Proposed Facility (e.g., the exhaust stack and turbine building) on the horizon because there are no significant visual obstructions (e.g., tree cover) between those residences and the Proposed Facility (Figure 1.4.3.1-2). Nevertheless, the visual quality of the area should not be negatively impacted because the distances between the Proposed Facility and the closest residences (between 0.7 and 2 miles) will render the stacks visually inferior to the surrounding environment, which already includes some views of the Roxboro Plant's stacks and electrical transmission lines.

In the Close-Up of View Probability from Residences in Figure 1.4.3.1-3, the cyan dots represent residences that will have a potential view of the proposed addition or a view of the existing plant plus the proposed addition. The red dots represent residences that do not currently have a view of the Roxboro Plant and that will not have a view of the Proposed Facility.

Figure 1.4.3.1-3 View Probability from Residences



Map Source: Pike Field Reconnaissance 2023, USGS NED 2023, USDA Orthoimagery 2022

Visibility from Public Roads

The Roxboro Plant property is surrounded by three arterial or collector roads, including Semora Road (NC 57) to the southeast, Concord-Ceffo Road to the south, and McGhees Mill Road to the east. Zion Level Church Road runs north of the plant and Hyco Lake and serves multiple residential developments on the north shore of the lake.

Only three primary roadways within the area will have a potential view of the Proposed Facility from any portion of the road. Semora Road is one of those roadways; and Concord Church Road and Concord-Ceffo Road may each have views near their intersections with Semora Road, approximately 2 miles from the proposed plant. Wagstaff Road, a secondary road, will have a potential but brief view from a location more than 1.5 miles to the southwest of the Proposed Facility. Several residential streets on the north side of Hyco Lake (Bolton Road, Rainey

Bridge Road, Phifer Lane, Coon Ridge Trail, and Pine Borough East Road) may have limited views of the Proposed Facility. Daisy Thompson Road serves three houses; its potential view is from almost 2 miles south of the Proposed Facility. State Road 1316 serves as access to the CertainTeed Gypsum plant, which is just north and adjacent to the Roxboro Plant. This road will have several limited views of the Proposed Facility in addition to its views of the Roxboro Plant. In all the cases discussed in this paragraph, any views of the tallest parts of the Proposed Facility's stacks and turbine building will be slight because of distance and evident only momentarily to passing motorists, if at all.

1.4.3.2 Auditory

The U.S. Occupational Safety and Health Administration ("OSHA") defines noise as follows:

> Noise and vibration are both fluctuations in the pressure of air (or other media) which affect the human body. Vibrations that are detected by the human ear are classified as sound. We use the term 'noise' to indicate unwanted sound (OSHA 2023).

Sound pressure levels are measured by sound level meters (receptors or monitors) in decibels ("dB"). To account for the relative loudness registered by the human ear (which is less sensitive to low audio frequencies), A-weighting is applied to the dB reading, and the decibel measurements are given as dBA. The background noise in a quiet classroom or worship space would be about 30-35 dBA, whereas a normal conversation level would be about 60 dBA from three feet away. An outdoor condensing fan about 20 feet away could be 50-55 dBA, but a loud siren might be 120 dBA at closer distances (Yale 2023).

Sound levels in most non-urban North Carolina residential communities are in the range of 40-50 dBA. Rural residential communities can be below 40 dBA, especially in less densely populated

areas; urban settings are often above 50dBA, especially near highways.

Each change of 10 dB indicates that ten times as much sound is present, and doubling sound energy causes an increase of 3 dB. A 3-dB change in sound level means twice (or half) as much sound energy, but to the human ear, this is barely noticeable unless the frequency content or duration changes. A person perceives a 10 dB-change in sound level as twice as loud.

Sound levels are significantly reduced on sunny afternoons, when air near the ground is warmer than air higher in the sky, and the sound curves upward. Generally, the loudest time for sound beyond the first few hundred feet is at sunset until an hour or so after sunrise. Sound levels can be significantly reduced upwind from a source and increase downwind from a source. Trees can provide limited sound reductions over distances of about 300 feet, depending on the season and the density of trees. Over short distances, trees do not provide significant acoustical absorption.

Noise impacts on a community are evaluated by quantifying the existing noise levels and comparing them with the noise levels that would be caused by a proposed noise source, type of noise (speech, music, tonal), time of day, and many other factors. Where noise from a proposed source does not add more than 3 or 4 dB, the impact will not be clearly noticeable. Significant increases (greater than 5 dBA) over existing noise levels are considered to be a significant impact.

1.4.3.2.1 Existing Community Noise Levels

Stewart Acoustical Consultants measured sounds at strategic points (using noise-sensitive receptors) to document existing noise levels along the perimeter of the Roxboro Plant (Figure 1.4.3.2.1-1). These points were at residences north of the Proposed Facility on Rock Point Drive and Beaver Dam Road; a residence west of the Proposed Facility on Warren Lane (the was the closest site to the future facility); Woodland Elementary

School, south of the site on Highway 57; and at two points near the CertainTeed Gypsum plant on Roy Carver Road, just north of the CertainTeed plant. Long-term noise monitors were placed on Roxboro Plant Road, west of the Proposed Facility, and at the north end of the coal train loop.

Figure 1.4.3.2.1 Noise-Sensitive Receptor and Long-Term Noise Monitor Locations

Map Source: Stewart Acoustical Consulting (Appendix A)

Ambient daytime noise levels at Monitor 1 were heavily influenced by traffic on Roxboro Plant Road. Maximum vehicular sound levels from Highway 57 reached 75 dBA, with noise quickly rising with a vehicle's approach and subsiding once the vehicle had passed; power boat engine noise was almost 65 dBA but persisted longer than the noise of vehicles. Noise levels of birds chirping were in the 55-60 dBA range, which persisted longer than those of passing vehicles.

The primary noise for Monitor 2 was train coupling, with sound levels up to 75 dBA. Other noises from this site were the clanking of dozer and front-end-loader tracks and backup alarms (up to 56 dBA). Night noise levels did not differ significantly

from those during the day. Noises that were unrelated to Roxboro Plant were aircraft (up to 62 dBA), road vehicles (57-64 dBA), and birds.

1.4.3.2.2 Estimated Sound Levels of the PCEC

Sound power levels are a measure of how much sound energy is being radiated per second into the air, similar to how watts measure electricity in a light bulb. With light, the brightness of the light source depends largely on how far the light source is from the receiving location, the reflectivity of the surroundings, and any objects creating shadows. The loudness of sound (sound pressure level, or sound level for short) generated by the sound power source similarly depends on how far from the source the listener is, density of the ground, topography, and other factors such as blockage by buildings. To understand how much sound is being introduced into a location, one can compare the sound power of an existing source to that of a proposed source.

To estimate future sound levels for the PCEC, Stewart created a SoundPLAN computer model using sound information of anticipated similar combustion turbines as well as field measurements of the existing coal-fired units. The results varied by location, but no sound levels were more than 55 dBA at any adjoining property lines with all of the PCEC's generating units (gas- and coal-fired) operating. Sound level increases to the closest neighbors were just over 4 dBA when compared to similar full-power generation levels with coal-car shaker noise (existing versus future), and Stewart deemed them to be not clearly noticeable.

Table 1.4.3.2.2 Receptor Noise Levels for Measured, Existing, and Future Maximum Capacity

ID	Location	Measured L_{Aeq*}	Existing Max Steam + Shaker SoundPLAN L_{Aeq*}	Future Max Steam + Shaker +CT SoundPLAN L_{Aeq+}	Increase
1	South Point Trail	41.8	46.5	44.9	No
2	Beaver Dam Road	44.1	45.5	45	No
3	Warren Lane	34.8	43.2	47.3	4.1 dBA
4	Woodland Elementary School	58.5	42.7	47.8	No, because of existing traffic on Hwy 57
5	CertainTeed Plant	59.5	57.2	54.8	No
2	Beaver Dam Road	42.1	45.5	45	No
3	Warren Lane	38.1	43.2	47.3	4.1 dBA

*Equivalent Continuous Level (a measure of the average sound energy over a given time)

1.4.3.2.3 Anticipated Effects

Residences on Warren Lane, directly west of the Proposed Facility, will be the homes most affected by increased sound levels. However, the anticipated sound level increases at these residences will be only 4.1 dBA more than the Roxboro Plant's current full-power generation levels with coal-car shaker noise. When the PCEC operates at a power output lower than its full capacity, the sound levels will be lower.

The PCEC will result in higher sound levels at Woodland Elementary School, businesses Pointer & Associates and West & Woodall Real Estate, and the residence at 100 Spinnaker Lane. However, because they are all close to Highway 57, which produces significant vehicle noise, they will not experience a large overall increase in their total environmental noise.

Locations north and east of the Roxboro Plant will experience a noise decrease once Units 1 and 2 are permanently retired. The environmental noise at the CertainTeed plant will be 2.5 dB lower and the residence on Rock Pointe Drive will

experience a 1.5 dB noise decrease when Units 1 and 2 have been retired.

Beaver Dam Road residences will experience no noise increase from the PCEC, nor will locations north and east of the existing plant. As expected, locations west and south of the PCEC will experience a noise increase.

For more detailed information on sound levels and potential impacts, including more figures, tables, and graphs, see Appendix A.

1.4.4 Aesthetic/Cultural Resources

The federal government's official list of cultural resources, which includes districts, archaeological sites, aboveground sites (buildings), and objects deemed worthy of preservation, is the National Register of Historic Places ("NRHP"). The NRHP was established with the passage of the National Historic Preservation Act ("NHPA") of 1966, as amended, and traditionally uses four classifications for cultural resources: NRHP Listed, NRHP Eligible, Potentially Eligible, and Not Eligible. Cultural resources consist of historic and archaeological resources (U.S. Department of Agriculture ("USDA") 2015, U.S. Department of the Interior 1983). Section 106 of the NHPA, 16 United States Code 470, requires federal agencies to consider the effects of their undertakings on properties listed in or eligible for listing on the NRHP. Such undertakings can include issuing Certificates or Authorizations.

Environmental Resource Management

DEP contracted with ERM for a Phase 1 survey to identify historic architectural resources that might be affected by the PCEC. ERM evaluated the Area of Potential Effects ("APE")—a 107.22-acre area surrounding the Proposed Facility—plus a potential viewshed area with a 0.5-mile-radius from the Proposed Facility (assuming that any proposed aboveground construction will be less than 200 feet high). From January 10 through 12, 2023, ERM conducted an

architectural literature review and windshield reconnaissance for the Proposed Facility.

Brockington and Associates

Pike contracted with Brockington to conduct a literature review and windshield reconnaissance using a larger APE within a two-mile radius of the Proposed Facility. The assumption of a maximum structure height for the new facility remained 200 feet. Brockington's windshield reconnaissance took place on March 27 and March 28, 2023.

Both surveys were due-diligence efforts to ensure that any potentially significant cultural resources would be considered in siting the Proposed Facility. This effort does not constitute fulfilment of more intensive studies that would be required under Section 106 of the NHPA, should that law become applicable for this project.

1.4.4.1 Architectural Resources

Before beginning fieldwork, ERM and Brockington each reviewed all previously recorded above-ground resources on file through HPOWEB, the North Carolina State Historic Preservation Office's "(NCSHPO") repository of recorded architectural property data. This data includes NRHP-listed properties, resources recorded during Section 106 investigations, determinations of eligibility, properties placed on the state Study List for further research, and resources recorded through surveys for counties and municipalities.

No surveys of historic resources within the search area had been previously conducted, but both researchers discovered that one historic resource within a half-mile of the Proposed Facility's footprint was recorded and listed on the NRHP (Figure 1.4.4.1-1).

The House on Wagstaff Farm, an early nineteenth-century hall-and-parlor one-story dwelling, has a side-gabled, 5-V agricultural metal roof, fieldstone foundation, and exterior rubble stone chimneys with brick

stacks on the west and east elevations. It is on the northeast side of NC Route 57/Semora Road, about 0.5 miles southeast of the Proposed Facility's footprint. It was listed on the NRHP in 2006 under Criterion C because, the historian wrote, it "conveys to a remarkable degree its original construction, plan, and details of transitional Georgian-Federal styling" and "retains its agrarian rural setting." (Appendix B-2, ERM Phase 1 Architectural Survey 2023).

Figure 1.4.4.1-1 The House on Wagstaff Farm

Brockington's larger APE yielded another extant NRHP-listed architectural resource—Burleigh, the McGehee-Phifer Plantation, an early nineteenth-century, late Georgian vernacular residential farm associated with Federal and Greek Revival architecture. Brockington's associates were only able to view the house from a distance.

Figure 1.4.4.1-2 Burleigh/McGehee-Phifer Plantation

Photo Source: Brockington Associates (Appendix B-1)

Table 1.4.4.1-1 lists previously recorded architectural resources within two miles of the Proposed Facility, including three identified as part of the ERM reconnaissance.

Table 1.4.4.1-1 Previously Recorded Architectural Resources in the Study Area

Name	Description	Identification/ Year	Reconnaissance Notes	Reconnaissance NRHP Assessment
Burleigh/McGehee-Phifer Plantation	Early 19th century late-Georgian house	NRHP Listed 1980	Extant	NRHP Listed
House on Dunnaway Road	Two-story Greek Revival	N/A	Not Extant	N/A
Wagstaff Barn	Early 19th century barn	N/A	Extant	Potentially Eligible
House on Wagstaff Farm	c.1890, Early 19th century Georgian, single-pile frame house	NRHP Listed 2006	Extant	NRHP Listed
Woodland Elementary School	c. 1930	Ineligible (NCSHPO determination pending)	Extant	Ineligible
House	c.1966, Ranch dwelling	Ineligible (NCSHPO determination pending)	Extant	Ineligible
House	c.1969, Ranch dwelling	Ineligible (NCSHPO determination pending)	Extant	Ineligible

Table 1.4.4.1-2 lists new potentially eligible architectural resources identified as part of the Brockington reconnaissance.

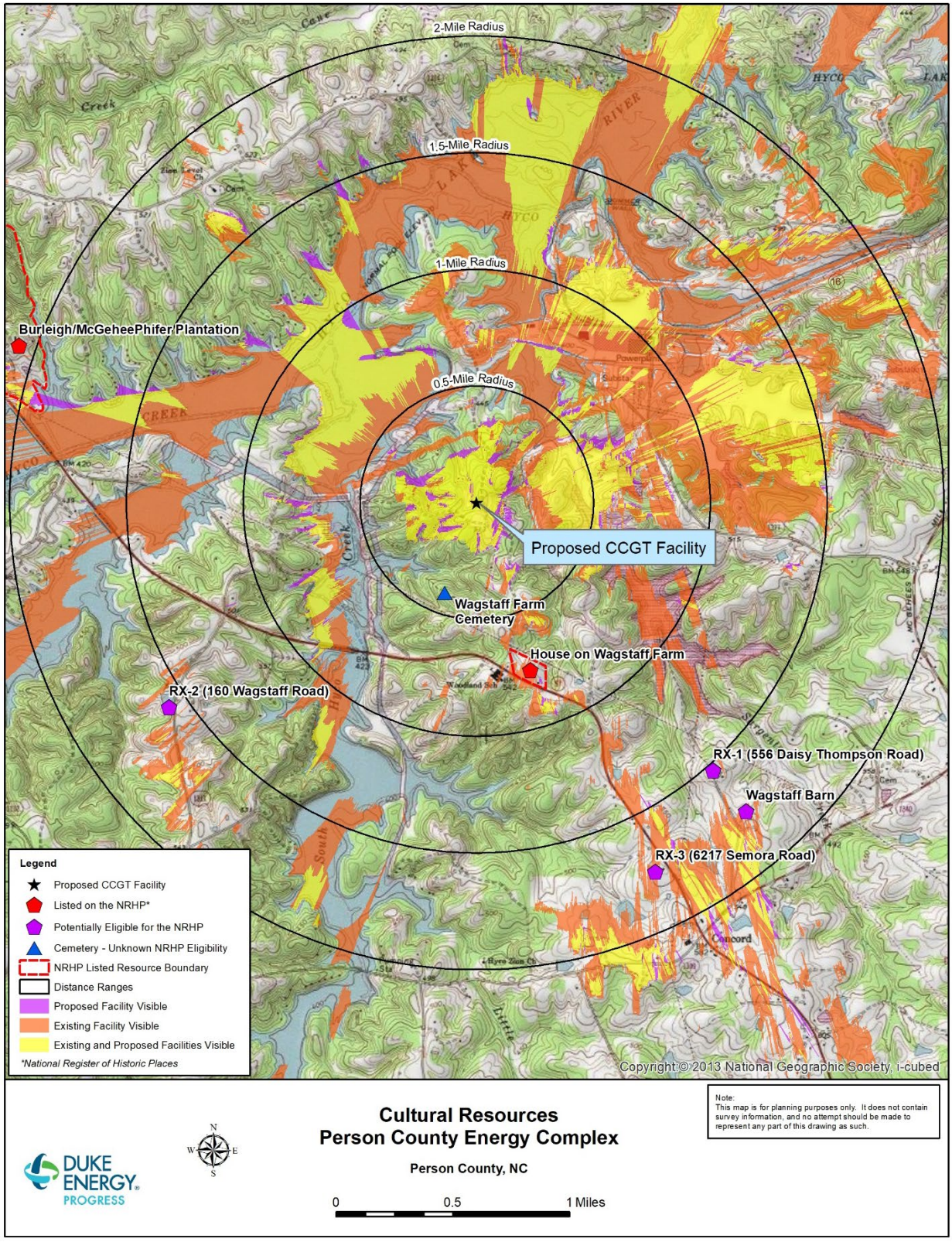
Table 1.4.4.1-2 Potentially Eligible Architectural Resources Identified in 2023 Reconnaissance

Site ID	Location	Description	Reconnaissance NRHP Assessment
RX-1	556 Daisy Thompson Road	c. 1910 Two-Story Pyramidal Farmhouse	Potentially Eligible
RX-2	160 Wagstaff Road	19th Century Single-Story Log cabin	Potentially Eligible
RX-3	6217 Semora Road	c. 1910 Two-Story Farmhouse	Potentially Eligible

Figure 1.4.4.1-3 shows the locations of previously listed architectural resources as well as those identified in the ERM and

Brockington surveys. Photographs of the architectural resources can be viewed in Appendices B-1 and B-2.

Figure 1.4.4.1-3 Visibility from Cultural Resources



Map Sources: Courtesy of the USGS; USGS NED 2023, USDA Orthoimagery 2022; Brockington and Associates 2023, ERM 2023

1.4.4.2 Archaeological Resources

To understand the effects of history, geology, soils, and climate on types, locations, and conditions of archaeological resources, see Appendix B-3 (Phase 1 Archaeological Survey, Roxboro Plant) and Appendix B-4 (Examination and Delineation of a Previously Unrecorded Suspected Cemetery on the Roxboro Plant Property).

In late 2022 workers searching for potential borrow-area sites came upon a location approximately 0.4 miles south of the Proposed Facility with several upright native fieldstones arranged in conspicuous rows. They reported the discovery and DEP subsequently contracted with ERM to examine and delineate the area for a possible cemetery. DEP did this to ensure compliance with North Carolina Gen. Stat. §§ 14–148 and 14-149, which generally prohibit defacing or desecrating human grave sites.

ERM consulted multiple online cemetery databases but found no record of a cemetery in this location. Historic maps and aerial photographs from the United States Post Office ("USPO"), the USDA, the United States Geological Survey ("USGS") and NETRonline (a search engine for environmental and property data, public records, and historic aerials) also did not contain a record of a cemetery in this location. A 1938 Person County highway map (North Carolina State Highway and Public Works Commission 1938) does show a cemetery on the north side of what is now Semora Road, across from the current Woodland Elementary School. The cemetery is not associated with a church. None of the available maps show residences near the cemetery.

The part of Semora Road west of Woodland School was constructed sometime between 1928 and 1938. Before that, a road ran north from Concord Church to Woodland School and then continued north to a dead end at Hyco Creek. On both a 1919 rural delivery map (USPO 1919) and a 1928 soil map (USDA 1928), two structures are shown across Semora Road from where Woodland School is now.

The cemetery could be associated with the NRHP-listed House on Wagstaff Farm (see previous Section 1.4.4.1, Architectural Resources). According to Wagstaff family descendants, no family ancestors were known to reside in the House (Phillips 2005). It may have been occupied by tenants for extended periods of time—tenants who would probably have needed a family burial place. Person County had a large African American population (42% in 1900); it is therefore possible that the House could have been associated with the African American community, which commonly used uninscribed markers.

ERM archaeologists conducted field investigations at the site on December 6 and 7, 2022. After mapping the two rows of suspected markers, which were aligned generally east-west, ERM used a blunt-tipped metal probe to penetrate the soil around the markers and then passed a metal detector over each suspected grave site and around the cemetery site area. Results of the systematic probing were inconclusive, but metal detectors revealed a possible border of scattered ferrous metal around the stone markers.

ERM requested a North Carolina state cultural resources trinomial number for the cemetery, and the Office of State Archaeology ("OSA") issued a number for what is now called the Wagstaff Farm Cemetery. ERM believes that the cemetery likely contains human interments and should be protected and avoided, if possible. For more information about this resource, see Appendix B-4.

DEP also contracted with ERM for a Phase 1 survey to identify historic archaeological resources that might be affected by the PCEC.

On January 3, 2023, ERM staff conducted a desktop review of the North Carolina OSA database for information about any previously known surveys, archaeological sites, and cemeteries within one mile of the Proposed Facility. They discovered that, although two archaeological sites with prehistoric and historic artifact scatter within the one-mile buffer

area had been recorded, their eligibility for NRHP had not been evaluated; and they were eventually inundated by the creation of Hyco Lake.

Subsequently, ERM conducted archaeological investigations of the area from January 10 through January 12 of 2023. The site is partially forested with high, large ridges that are narrow and long. The east half of the area had been previously cleared for construction of multiple drainage control ponds. Some of the area had been recently cleared and graded, and mounds of dirt had been brought in for construction activities.

ERM scientists were able to perform 182 shovel tests in the area, but they also documented 187 "no dig" locations (mostly because of the area's steep topography, but also because of standing water and saturated soils in much of the previously cleared areas). However, ERM did discover an isolated prehistoric lithic artifact on a high ridgetop about 0.25 miles east of an ephemeral drainage that flows into Hyco Lake. No artifact was found on the surface; one prehistoric primary flake was found 0-10 centimeters below surface. Its raw material is Wolf Den Mountain Rhyolite, common throughout the piedmont of the Carolinas. No features or fire-cracked rock were noted.

The artifact has no discernable cultural period association and was found within the upper deflated stratum; site delineation suggests that cultural remains are limited and have probably eroded off the landform. For these reasons, ERM recommends that the site is not NRHP-eligible and no further archaeological work is needed.

1.4.5 Geology

The study area for the geological assessment is a 28-acre site southwest of the Roxboro Plant and approximately 0.16 miles west of Hyco Lake (where the Proposed Facility will be constructed). The study area is immediately adjacent to DEP's existing 230-kV and 115-kV transmission line rights-of-way, as well as a 22.86/13.2-kV distribution line right-of-way. The study area is located entirely on DEP-owned property.

1.4.5.1 Geology and Geologic History

The eastern United States and North Carolina consist of three major physiographic regions: the Blue Ridge Mountain region, the Piedmont region, and the Coastal Plain region. The PCEC will be in the Piedmont region, which extends from New Jersey to central Alabama and sits between the Atlantic Coastal Plain and the Blue Ridge/Appalachian Mountains. This approximately 80,000-square-mile region is characterized by gently rolling, undulating hills with broad, semi-dissected valleys; and surface relief typically varies from 200 to 1,500 feet above sea level. In North Carolina, the Piedmont occupies about 45% of the area of the state. The study area is centered at approximately 500 feet above sea level.

The geology of the region is complex. During the earliest Paleozoic Era (541-252 million years ago ("MYA")), North America was situated near the equator, and the current-day Appalachian region was submerged beneath shallow seas. During this time, terrigenous (i.e., material eroded from the land) and carbonate (i.e., material formed primarily of calcium carbonate) sediment was deposited, and it later transformed into extensive layers of sedimentary and carbonate rock through lithification.

The first significant mountain-building event (orogeny) occurred around 440-480 MYA, and the early Appalachian Mountain chain began to form. During this and subsequent mountain-building events, the Appalachian region was folded, faulted, intruded by magma, sheared, uplifted, and metamorphosed. Both the Blue Ridge and Piedmont regions were transported over 100 miles west, transforming into a series of folded, thrusted crustal sheets.

As a result of continental collision, rocks were accreted (i.e., gradually accumulated) onto the present-day North American continent as a patchwork of volcanic islands and fragments of land and former ocean-

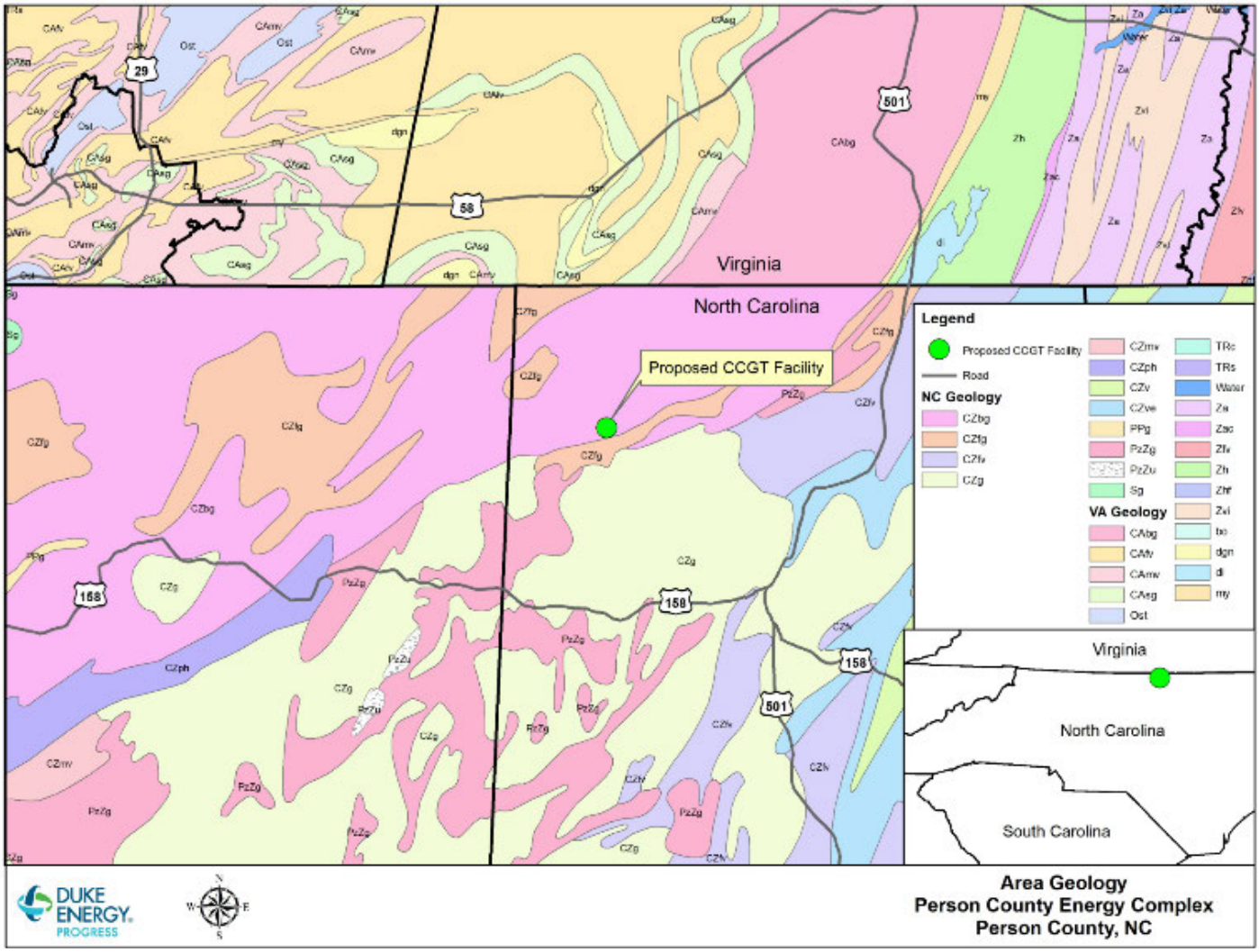
bottom sediments. This led to the formation of distinct geologic belts, or terranes, that currently trend northeast-southwestward (Hibbard et al. 2002; Secor et al., 1983). The study area is located within the Charlotte and Milton terranes or belts, within the Northern Inner Piedmont zone (Figure 1.4.5.1 (NCDEQ 2023; NCGS 1985)).

The Charlotte and Milton terranes consist of mostly equigranular and megacrystic, abundant biotite gneiss and schist (Cambrian/Late Proterozoic). These metamorphic rocks include gneiss, schist, amphibolite, potassic feldspar and garnet, with small amounts of granite (NCGS 1985). The rocks range in age from about 550 to 650 million years old. They were part of a large chain of ancient volcanic islands that formed off the coast of the ancient continent called Gondwana (NCDEQ 2023).

The Charlotte and Milton terranes of the area surrounding the PCEC are underlain inequigranular potassic feldspar and garnet, interlayered and gradational with calc-silicate rock, sillimanite mica schist, mica schist, and amphibolite (Rock Unit CZbg) (NCDEQ 2023; NCGS 1985). Immediately east of the site, the Charlotte-Milton terranes are underlain by felsic mica gneiss, interlayered with biotite and horneblende gneiss and schist rocks (Rock Unit CZfg) (NCDEQ 2023).

The Carolina Slate Terrane is found just east of the site and to its southeast. It is megacrystic, and well foliated, and locally it contains hornblende. The formation is metamorphosed granitic rock (Rock Unit CZg) (NCDEQ 2023, NCGS 2009).

Figure 1.4.5.1 Area Geology



Map Sources: Area Geology Courtesy of United States Geological Surveys of NC and VA 2023; Esri; TomTom NA, Inc.; i-cubed; County Boundary Sources: Esri; U.S. Dept, of Commerce, Census Bureau; NOAA; National Ocean Service; National Geodetic Survey

1.4.5.2 Dominant Soil Types

As in the majority of the Northern Inner Piedmont, the shallow subsurface material consists of thick saprolite (residual soil) units (15-30 meters) overlaying fractured rock. Saprolite consists mostly of red to brown, clayey subsoils. Based on the soil data (Natural Resource Conservation Service ("NRCS") 2023), the Proposed Facility's foundation material within the shallow subsurface consists primarily of soils within the Siloam soil series (Figure 1.4.5.2). This site has undergone a series of ground disturbances over the last several decades.

The approximately 28-acre study area consists of Siloam loam (SmF), accounting for 63% of the profile, along with Siloam loam (SmB) at 37% of the profile (Figure 1.4.5.2). Siloam loam series are at 2-8 and 15-45% slopes. The series occurs at elevations of 700 to 2,000 feet, typically at hillslope landforms. They are not prime farmland soils. These series, consisting of a profile of fine sandy loam, sand clay loam, and weathered bedrock, are well drained with no frequency of flooding or ponding; and their typical depth to water table is more than 80 inches (NRCS 2023). The series are derived from saprolite from diorite, and/or gabbro, and/or diabase, and/or gneiss. The typical soil profile of the Siloam loam series is included in Table 1.4.5.2-1).

Table 1.4.5.2-1 Typical Subsurface Soil Profiles of the Site

Siloam Loam (SmF)		Siloam Loam (SmB)	
Depth (inches)	**Description**	**Depth (inches)**	**Description**
0-8	fine sandy loam	0-8	fine sandy loam
8-15	sandy clay loam	8-15	sandy clay loam
15-26	weathered bedrock	15-26	weathered bedrock
26-80	unweathered bedrock	26-80	unweathered bedrock

(Source: NRCS 2023)

DEP will assess any settlement and proper foundation support matters using site-specific geotechnical exploration. Potential settlement of project structures and appropriate foundation support of infrastructure under static and dynamic (e.g., earthquake, machinery, etc.) loading will

be addressed as part of the preliminary and final design of the project structures.

Figure 1.4.5.2 NRCS Soil Survey of Person County

DAM	Dam
HaC	Halifax sandy loam, 6 to 10 percent slopes
OnA	Orange loam, 0 to 2 percent slopes
RaB	Rasalo fine sandy loam, 2 to 6 percent slopes
RaC	Rasalo fine sandy loam, 6 to 10 percent slopes
SmB	Siloam loam, 2 to 8 percent slopes
SmD	Siloam loam, 8 to 15 percent slopes
SmF	Siloam loam, 15 to 45 percent slopes
UdB	Udorthents, loamy, gently sloping
Ur	Urban land
W	Water

Map Sources: Soil Survey Geographic Database (SSURGO) 2023, NRCS, USDA Orthoimagery 2022

1.4.6 Ecology

The ecological study area for the Proposed Facility includes a 28-acre tract where it and its associated components (e.g., construction lay-down area, switchyard, administration building) will be located. The eastern portion of the site is significantly disturbed from past and current activities associated with the Roxboro Plant. The area is surrounded by areas of mixed hardwood-pine woodland, Hyco Lake, transmission line corridors, and other disturbed areas associated with the generation station.

1.4.6.1 Terrestrial Resources

1.4.6.1.1 Botanical

Based upon the Classification of the Natural Communities of North Carolina - Fourth Approximation (Schafale 2012), most of the proposed site can be classified as Mesic Mixed Hardwood (Piedmont Subtype). The proposed project is in uplands surrounded by existing facility infrastructure (e.g., facility access roads and transmission line rights-of-way). These wooded-area remnants and adjacent areas are described below based on known site information and field assessments.

Mesic Mixed Hardwood Forest (Piedmont Subtype)

This community is comprised of mature woody, herbaceous, and vine species including black oak (*Quercus velutina*), northern red oak (*Q. rubra*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), American beech (*Fagus grandifolia*), loblolly pine (*Pinus taeda*), shortleaf pine (*P. echinata*), mockernut hickory (*Carya tomentosa*), sweetgum (*Liquidambar styraciflua*), tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubra*), American holly (*Ilex opaca*), black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), redcedar (*Juniperus virginiana*), greenbrier (*Smilax spp.*), Japanese honeysuckle

(*Lonicera japonica*), crossvine (*Bignonia capreolata*), spotted pipsissewa (*Chimaphila maculata*), Christmas fern (*Polystichum acrostichoides*), ebony spleenwort (*Asplenium platyneuron*), and arrow-leaved heartleaf (*Hexastylis arifolia*). This area will be permanently affected by the Proposed Facility.

Utility Line Rights-of-Way

The Proposed Facility's project area is also immediately adjacent to DEP's existing 230-kV and 115-kV transmission line rights-of-way. These routinely managed corridors, maintained in an early-successional stage, are dominated by grasses, forbs, and woody plants, such as dense broomsedge (*Andropogon virginicus*), broad-leaved panic grass (*Dichanthelium latifolium*), dogfennel (*Eupatorium capillifolium*), fleabane species (*Erigeron spp.*), goldenrod species (*Solidago spp.*), Japanese honeysuckle, greenbriar, and blackberry (*Rubus allegheniensis*). Sweetgum, red maple, shortleaf pine and redcedar saplings can also be present, based on the timing of the maintenance cycle. These transmission line corridors will not be affected by the Proposed Facility.

Wetlands and Jurisdictional Waters of the U.S.

DEP biologists conducted a reconnaissance-level survey of the Proposed Facility area for wetlands and jurisdictional waters of the United States under Section 404 of the Clean Water Act. The area was examined according to the methodology described in the U.S. Army Corps of Engineers ("USACE") 1987 Wetland Delineation Manual, USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory regime, and the North Carolina Division of Water Resources Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11), as well as review of the U.S. Fish and

Wildlife Service's ("USFWS") National Wetland Inventory database.

A series of drainageways empties into Hyco Lake, at the extreme outer edge of the Proposed Facility's footprint (i.e., head slope or drainageway head). However, these drainageways are within an upland context and have no indicators of channeled ephemeral or perennial flow. Based on the existing information and the survey, no wetlands or waters of the U.S. will be affected by the Proposed Facility.

Federally Protected Plant Species

DEP reviewed a list of federally protected plant species for Person County and the study area (USFWS 2023) as well as DEP's own Natural Resource GIS Viewer database, which includes known element occurrences and critical habitat of federal and state protected species. DEP has also conducted field assessments regarding listed species in the study area over the last several years. Neither the database review nor the site assessments revealed known occurrences of federal or state-protected species within the study area.

A review of the USFWS's Information for Planning and Consultation ("IPaC") tool indicated no protected or proposed federally protected plant species within the general study area and Person County.

1.4.6.1.2 Wildlife

Terrestrial communities in the study area are comprised primarily of small, forested habitats and transmission line corridors that support a diverse number of wildlife species. Representative mammal, bird, reptile, and amphibian species common to these habitats are listed below. Individual species and/or evidence of

species (tracks, scat, sightings) observed during field assessments are indicated with an asterisk (*). DEP obtained information about wildlife species that typically use these habitats in the Southern Outer Piedmont ecoregion from relevant literature, mainly Biodiversity of the Southeastern United States, Upland Terrestrial Communities (Martin et al. 1993).

Common mammal species in these habitats include eastern cottontail (*Sylvilagus floridanus*); gray squirrel (*Sciurus carolinensis*)*; various vole, rat, and mice species; Eastern red bat (*Lasiurus borealis*); big brown bat (*Eptesicus fuscus*); raccoon (*Procyon lotor*)*; Virginia opossum (*Didelphis virginiana*); groundhog (*Marmota monax*); white-tailed deer (*Odocoileus virginianus*)*; gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), and coyote (*Canis latrans*).

Bird species that commonly use these habitats include American crow (*Corvus brachyrhynchos*)*, blue jay (*Cyanocitta cristata*)*, Carolina chickadee (*Poecile carolinensis*)*, American robin (*Turdus migratorius*)*, brown thrasher (*Toxostoma rufum*)*, northern mockingbird (*Mimus polyglottos*)*, Carolina wren (*Thryothorus ludovicianus*)*, red-eyed vireo (*Vireo olivaceus*)*, summer tanager (*Piranga rubra*)*, white-breasted nuthatch (*Sitta carolinensis*), brown-headed nuthatch (*S. pusilla*)*, red-bellied woodpecker (Melanerpes carolinus)*, downy woodpecker (*Picoides pubescens*)*, pine warbler (*Setophaga pinus*)*, northern cardinal (*Cardinalis cardinalis*)*, song sparrow (*Melopiza melodia*), field sparrow (*Spizella pusilla*)*, and white-throated sparrow (*Zonotrichia albicollis*)*. Raptors in the study area include red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*)*; barred owl (*Strix varia*), black vulture (*Coragyps atratus*)*, turkey vulture (*Cathartes aura*)*, and an occasional bald eagle (*Haliaeetus leucocephalus*).

DEP's field investigations and database reviews indicate that there are no known bald eagle nests within at least 10 miles of the Proposed Facility; thus, DEP expects no construction or operational impacts to an active nest or the associated eagles.

Reptile and amphibian species that may use the associated terrestrial communities include the eastern black rat snake (*Pantherophis alleghaniensis*), eastern corn snake (*P. guttatus*), copperhead (*Agkistrodon contortrix*), eastern fence lizard (*Sceloporus undulatus*), five-lined skink (*Plestiodon fasciatus*), eastern box turtle (*Terrapene carolina carolina)*,* spotted salamander (*Ambystoma maculatum*), slimy salamander (*Plethodon glutinosus*), American toad (*Anaxyrus americanus*), Fowler's toad (*A. fowleri*), gray treefrog (*Hyla versicolor*), and spring peeper (*Pseudacris crucifer*).

Before constructing the Proposed Facility, DEP will need to remove an estimated 36 acres of mixed hardwood forest on the site to account for the Proposed Facility, its switchyard, construction laydown areas, buffer lands, etc. This will displace the wildlife in that area, which is expected to move to adjacent undeveloped forested areas during construction. Since the proposed project footprint is small and localized, construction activities should not impact the diversity or number of species in the area or interfere with the movement of resident or migratory species. DEP does not anticipate that daily facility operations, including noise from equipment and vehicle traffic, will affect wildlife beyond the Proposed Facility's footprint.

Additional information on wildlife at the Proposed Facility can be found in Appendix C-1.

Federally Protected Animal Species

DEP's review of the USFWS IPaC tool revealed three federally protected or proposed protected wildlife species within the general study area and Person County. These include the tri-colored bat (*Perimyotis subflavus*), little brown bat (*Myotis lucifugus*), and monarch butterfly (*Danaus plexippus*).

The tricolored bat (Proposed Endangered) is a small insectivorous bat with unique tricolored fur that often appears yellowish to nearly orange. This once-common species is wide-ranging across the eastern and central United States and portions of southern Canada, Mexico, and Central America. In winter, tricolored bats are often found in caves and abandoned mines, although in the southern United States, where caves are sparse, they often roost in road culverts, where they exhibit shorter torpor bouts and forage during warm nights.

In spring, summer, and fall, tricolored bats may roost in forested habitats, primarily among leaves of live or recently dead deciduous hardwood trees. They may also be found in pine trees—and occasionally even in human structures. Tricolored bats face extinction primarily because of the range-wide impacts of white-nose syndrome, a deadly disease that affects cave-dwelling bats across the continent. The USFWS has proposed that the species be listed as endangered by the fourth quarter of 2023.

The project study area and the site of the Proposed Facility include potential habitat (forest and woodland) for the species. Since the mixed hardwood-pine forest on that site will be cleared, DEP will use acoustic monitoring to assess whether any tricolored bats are present. If the species is present, DEP will coordinate with the USFWS-Raleigh Ecological Field Office to determine how the Endangered Species Act Section 10 will be implemented.

The little brown bat (proposed to be listed in September 2023, with a final listing in September 2024) is a small insectivorous bat. The once-common species is wide-ranging across the eastern, central, and western United States, including the Piedmont of North Carolina.

Little brown bats use a wide range of habitats and often avail themselves of human-made structures for resting and maternity sites. In winter, they typically roost in caves and mines. They can also be found in trees, artificial structures, and bat houses; under rocks; and in piles of wood during the summer. Foraging habitat requirements are generalized, primarily over streams and other bodies of water, along the margins of lakes and streams, or in woodlands near water. Winter hibernation sites like caves, tunnels, and abandoned mines generally have a relatively stable temperature of about 2° to 12° Celsius. Maternity colonies are commonly found in warm sites within buildings, such as attics, bat houses, other human structures, and infrequently, in hollow trees.

During the spring, summer, and fall, little brown bats are found in forested habitats where they can roost in trees. Like tricolored bats, these bats face extinction primarily from white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent; but they also are in peril from climate change and habitat loss. Potential habitat (forest and woodland) for the species is found in the study area, specifically in the vicinity of the Proposed Facility. Since the Proposed Facility's footprint will be cleared of mixed hardwoods and pines, DEP will use acoustic monitoring to assess the habitat for the presence or absence of the species. If the species is found to be present, DEP will consult with the USFWS-Raleigh Ecological Field Office for Endangered Species Act Section 10 implementation.

With bright orange wings surrounded by a black border and covered with black veins, the monarch butterfly (Candidate Species, with a proposed listing date of November 2023) is large and conspicuous. In breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias spp*.), and larvae emerge after two to five days. Multiple generations of monarchs are produced during breeding season.

In many regions, monarchs breed year-round. Individual monarchs in temperate climates, such as eastern and western North America (including the Piedmont of North Carolina), undertake long-distance migration and live for several months. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites in Mexico. Habitat for this species is not found in the proposed project footprint; but marginal habitat (nectar-bearing plants) exists within the immediately adjacent transmission line corridor.

DEP is a partner within the nationwide Monarch Candidate Conservation Agreement with Assurances, and its transmission rights-of-way are managed in a way that is beneficial to the species and associated habitat. The adjacent transmission line rights-of-way will not be affected by the Proposed Facility, and the current Integrated Vegetational Management practices will not be altered because of the project. Thus, this species will not be affected by the project.

On August 1, 2023, DEP sent a consultation letter to the USFWS (Eastern NC) to request guidance concerning potential tree work within the area including Tricolored and Little Brown Bat habitat (Appendix C-2). As of the date of this filing, there has been no response. DEP anticipates that neither constructing nor operating the Proposed Facility will significantly affect federal- and state-listed species or overall botanical resources of the area.

1.4.6.2 Aquatic Resources

DEP has identified no wetlands or jurisdictional waters of the United States within the Proposed Facility's footprint. There are no federally protected aquatic species or critical habitats identified within nearby waterbodies, such as Hyco Lake.

DEP will minimize potential construction-related effects related to runoff from the site by implementing best management practices under an approved, comprehensive erosion-control plan to protect water quality and nearby aquatic resources of Hyco Lake. Constructing the Proposed Facility is not expected to adversely affect aquatic resources such as macroinvertebrates, freshwater mussels, or fish communities.

Hyco Lake will be the source of water for plant testing and operations. No thermal issues will be associated with discharge from the Proposed Facility, and thus operations of the facility are not expected to affect aquatic resources adversely.

DEP will treat low-volume wastewater streams and discharge them through an outfall to Hyco Lake. Oil-water separators will be built according to DEP-approved designs. Turbine water wash and wastewater will be contained for off-site disposal. Oil-filled transformer containment will be designed to contain the oil and the firefighting water that would be used in the event of a transformer failure and/or fire.

Based on existing information and site assessments, no aquatic species will be affected by construction or operation of the Proposed Facility.

1.4.7 Meteorology

1.4.7.1 Climatology

Person County is north of Durham, NC, southeast of Danville, VA, and south of South Boston, VA. In the northern half of the county are both Hyco Lake and Mayo Lake. The local subbasin for Hyco Lake is oriented southwest to northeast (Figure 1.1-1). The Hyco River and Mayo Creek stream flows merge about one mile north-northeast of Mayo, NC, and continue downstream to the eastern end of Virginia's Dan River, joining the Roanoke River (John H. Kerr Reservoir) at Staunton River State Park north of Buffalo Springs, Virginia (Google Maps 2023).

DEP's Roxboro Plant is approximately 44 miles northwest of the National Weather Service's ("NWS") surface observation site for Raleigh, NC (Raleigh-Durham International Airport at Morrisville, NC ("KRDU")), and about 54 miles northeast of the NWS surface observation site at Greensboro, NC (Piedmont-Triad International Airport ("KGSO")). Person County Airport (Raleigh Regional Airport at Person County ("KTDF")) is about 14 miles southeast of Hyco Lake, just west of Timberlake, NC (Google Maps 2023).

Person County abuts the North Carolina-Virginia border in central North Carolina's northern Piedmont. Land use in the area is mainly forest and agricultural, although residential uses are gradually increasing. The northern Piedmont's terrain consists of rolling hills between the Blue Ridge Mountains in the Appalachian chain to the west and the Atlantic coast to the east. The mountains provide the region with partial protection from cold air masses in the winter, although there are a few days when temperatures drop below 20°F. The climate is mild, with a normal daily maximum temperature of 69.8 - 72°F annually and a normal daily minimum of 47.5 - 50.5°F, based on NWS historical records from the Greensboro (GSO) and Raleigh (RDU) airport surface observation sites. The first freezing temperatures (32°F or less) typically begin in late October, and the last occurrence is usually in early April. Humid, tropical

air is common over central and eastern North Carolina in the summer, with maximum daily temperatures at or above 90°F on about 25% of summer days (NOAA/NCEI (Raleigh/Durham) 2023, NOAA/NCEI (Greensboro) 2023).

The region's monthly rainfall is typically between 2 and 4 inches, with higher typical monthly amounts from July to September, ranging from 4.1 to 5.2 inches. The region's annual rainfall totals are 43 to 46 inches. The maximum monthly rainfall records range from 21.79 inches (September 1999) at Raleigh to 13.26 inches (September 1947) at Greensboro. Soil moisture can decrease in the growing season during dry periods between rainfall in the spring and summer (NOAA/NCEI (Raleigh/Durham) 2023, NOAA/NCEI (Greensboro) 2023). For example, below-normal rainfall in the summer of 1999 was followed by a wet autumn, with rainfall from both Hurricane Floyd and Tropical Storm Dennis in September 1999 (NOAA/NWS – Newport/Morehead City, NC (MHX) 2023). From May to August 1999, RDU received only 48% of its normal rainfall (7.94 inches, versus a normal of 16.6 inches) (NOAA/NCEI (Raleigh/Durham) 2023, NOAA/NCEI (Greensboro) 2023).

Thunderstorms provide most summertime rainfall. Tropical systems impact the area mostly through rain, with winds decreasing as storms move inland. Although the area's mean monthly wind speeds range between five and nine miles per hour ("mph"), brief high winds and hail can occur, usually with thunderstorms. Wintery precipitation, commonly associated with northeast and easterly winds, as well as winds from the south and southwest (NOAA/NCEI (Raleigh/Durham) 2023, NOAA/NCEI (Greensboro) 2023), occurs each year but excessive snow accumulations are rare.

Prevailing winds in Person County come from the southwest (SW) and south-southwest (SSW), with next highest frequencies from the north, northeast, and south sectors. Least frequent wind directions are from the

southeast quadrant (ESE - SE). The historical two-minute averaged peak (i.e., sustained) windspeed observed at the Person County Airport was 33.1 mph on March 8, 2008 (NOAA/DOD/FAA/US Navy 1998). Higher sustained windspeeds have been observed across the region: 55.2 and 63.3 mph at the NWS KRDU and KGSO stations, respectively.

Figures 1.4.7.1-1, 1.4.7.1-2, and 1.4.7.1-3 show wind roses from the NC State Climatology Office for Raleigh-Durham International Airport (KRDU), Person County Airport (KTDF), and Greensboro's Piedmont Triad International Airport (KGSO) (North Carolina State Climatology Office 2023).

Figure 1.4.7.1-1 Wind Rose for KRDU

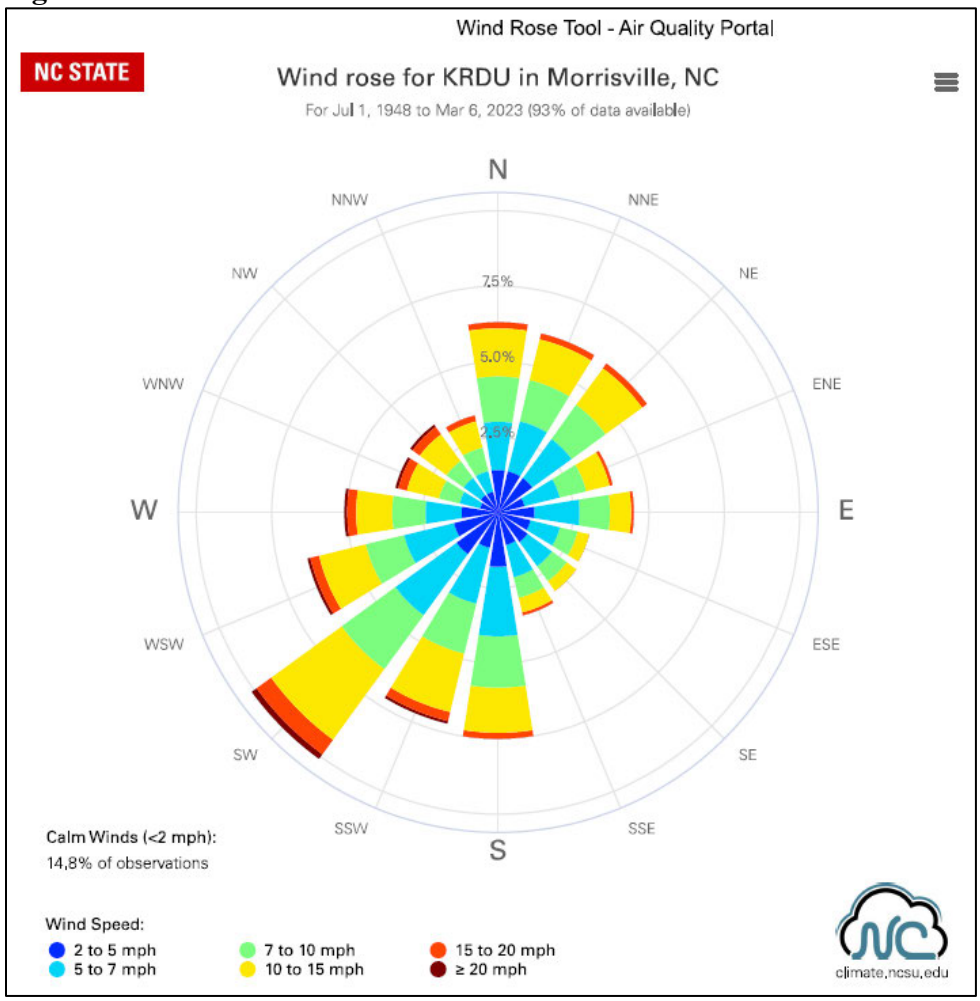


Figure 1.4.7.1-2 Wind Rose for KTDF

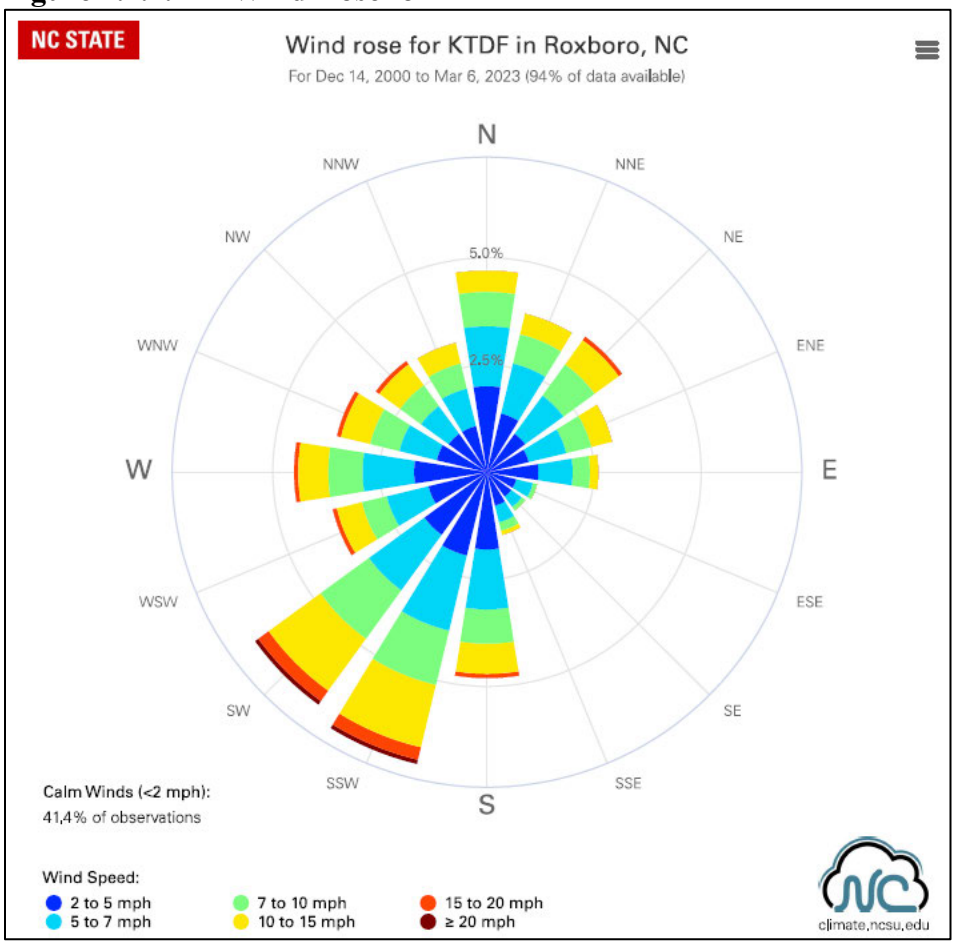


Figure 1.4.7.1-3 Wind Rose for KGSO

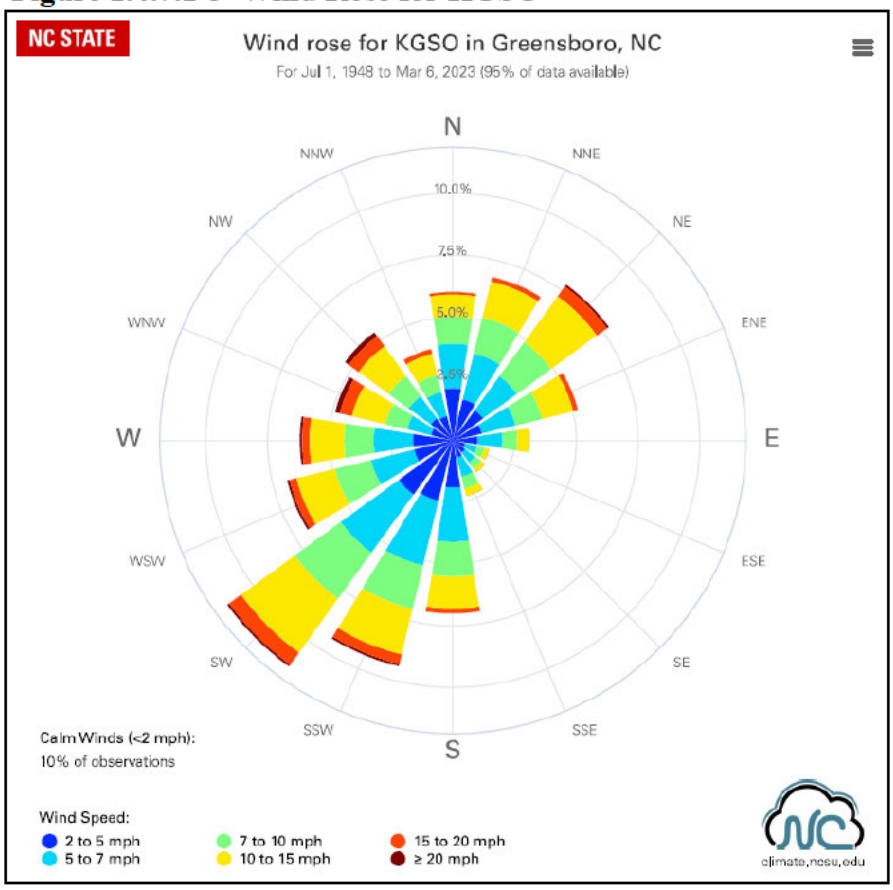


Table 1.4.7.1-1 lists maximum wind speeds and associated date/time and wind direction during the observation period for each site (e.g., 63.3 mph at KGSO) (NCSU 2023).

Table 1.4.7.1-1 Historical Two-Minute Averaged Peak Windspeeds

NWS Airport Observation Site	Data Period	Two-Minute Avg. Peak Windspeed	Wind Direction (from)	Date
KTDF Person County	December 14, 2000 – March 6, 2023	33.1 mph	SSW	March 8, 2008 11:40 a m.
KRDU Raleigh-Durham International	July 1, 1948 – March 6, 2023	55. 2mph	NW	Oct. 15, 1984 2 p.m.
KGSO Piedmont Triad International	July 1, 1948 – March 6, 2023	63.3 mph	S	June 23, 1961 1 a m.

(Sources: NCSU 2023, NOAA/DOD/FAA/US Navy 1998)

Table 1.4.7.1-2 provides a brief overview of the region's climatological extremes for highest and lowest daily temperatures, maximum three-second gusts, maximum precipitation, maximum snow depth and 24-hour snowfall, based on the period of record from NOAA/National Center for Environmental Information (NOAA/NCEI (Raleigh/Durham) 2023, NOAA/NCEI (Greensboro) 2023).

Table 1.4.7.1-2. Historical Climatological Extremes for NWS KRDU and KGSO

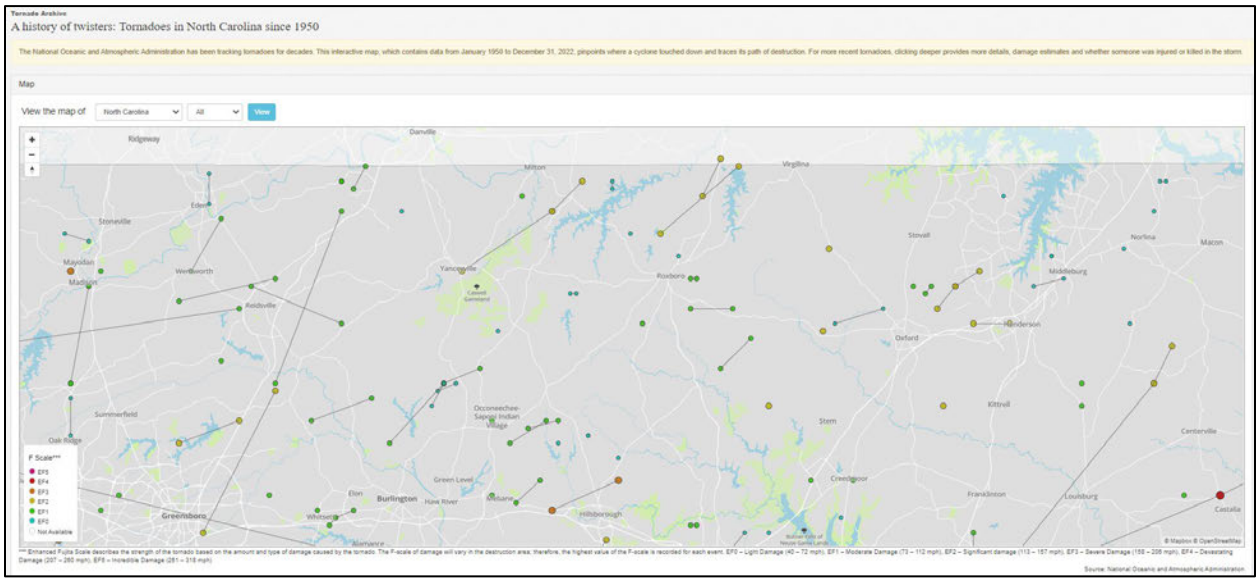
Description	Extreme Value	Date	NWS Station
Highest Daily Maximum Temperature (°F)	105 103	July 2012 August 1988	RDU GSO
Lowest Daily Minimum Temperature (°F)	-9 -8	January 1985	RDU GSO
Maximum 3-Second Gust (mph)/ Wind Direction	86 (220 degrees) 82 (260 degrees	January 2014 May 2000	RDU GSO
Maximum 24-Hour Precipitation (inches)	6.47 7.49	October 2016 September 1947	RDU GSO
Maximum Snow Depth (inches)	20 15	January 2000 January 1966	RDU GSO
Maximum 24-Hour Snowfall (inches)	17.9 14.3	January 2000 December 1930	RDU GSO

(Sources: NOAA/NCEI Raleigh/Durham, 2023; NOAA/NCEI Greensboro, 2023)

Tornado activity in North Carolina historically increases in spring months (April - May) with a smaller peak again in autumn (August - October). This is because strong low-pressure systems and their cold fronts are more likely to produce severe thunderstorms, and the autumn hurricane season has thunderstorms and tornadoes embedded in rainbands of tropical systems. A few EF0, EF1, and EF2 tornadoes have occurred near Hyco Lake in Person County, NC (Figure 1.4.7.1-4), but they occur more frequently in the eastern North Carolina sandhills and coastal plain than in the north Central Piedmont. The closest EF3 tornado occurred on November 23, 1992, near Hillsborough, NC, approximately 25 miles south of Hyco Lake. An EF4 tornado originated east of the Raleigh-Durham International Airport (about 45 miles southeast of the Proposed Facility, in the William B. Umstead State Park) and tracked northeast to the vicinity

of Castalia, NC, (approximately 63 miles southeast of Hyco Lake) on the night of November 27-28, 1988. The EF4 tornado continued to the northeast side of Pleasant Grove, NC, before dissipating (~92 miles east of Hyco Lake). This EF4 tornado had a path length of 83 miles and affected 4 counties (Google Maps 2023, Citizen Times 2023, CBS17.COM 2021, NCEI 2023, NCSU 2023b).

Figure 1.4.7.1-4 Tornados in North Carolina since 1950



1.4.7.2 Air Quality

The U.S. Environmental Protection Agency ("USEPA") has established National Ambient Air Quality Standards ("NAAQS"), and the N.C. Department of Environmental Quality ("NCDEQ") has adopted them. These standards, outlined in Title 15A of the North Carolina Administrative Code, Chapter 2D (Air Pollution Control Requirements), § .0400, establish certain maximum limits on parameters of air quality considered desirable for the preservation and enhancement of North Carolina's air resources.

The six criteria air pollutants regulated by the NCDEQ through NAAQS include the following:

- Ozone
- Particulate Matter
- Carbon Monoxide
- Sulfur Dioxide
- Nitrogen Dioxide, and
- Lead.

The entire state of North Carolina has reached attainment and continues to satisfy the attainment criteria for each of the six listed pollutants. In the past, portions of North Carolina (e.g., the Charlotte metropolitan area) have experienced intermittent non-attainment designations for ozone; but this is not uncommon in larger cities during the warmest periods of the year. In summer, ground-level ozone limits may be exceeded in metropolitan areas and large suburbs because increased chemical reactions between vehicle emissions and ultraviolet radiation and sunlight can cause (temporarily) increased ozone levels.

Operations at the PCEC will be permitted as part of the Roxboro Plant. DEP expects the air permit application to be submitted in early 2024. Should potential emissions from the equipment exceed significant emission rates, the facility would be permitted as a "major" modification for the purposes of Prevention of Significant Deterioration ("PSD") permitting. As part of the permitting process, the facility would then be required to evaluate Best Available Control Technology and perform a dispersion modeling analysis. If emission increases due to the project are less than PSD significant emission rates, the project will be permitted through the NCDEQ's Division of Air Quality ("DAQ") significant permit modification process. DEP will use Continuous Emissions Monitoring Systems to ensure compliance with the New Source Performance Standards and allowance trading programs such as the Cross-State Air Pollution Rule.

During construction, the primary air quality issue will be fugitive dust—dust from non-point sources, such as earthwork and construction traffic on unpaved roads. DEP will use water trucks to suppress dust as required. Fugitive dust impact is expected to be equivalent to a normal construction project of this magnitude.

Other potential sources of pollutants during construction are mobile internal combustion engines (e.g., earth-moving equipment and cranes), temporary sources (e.g., portable generators and air compressors), and increased vehicle traffic by construction workers. Emissions from these sources should have little impact. Any emissions from sources during construction will be addressed through the North Carolina DAQ's air quality permit application process.

The US EPA's recently proposed changes to Clean Air Act ("CAA") Section 111 – which would impose more stringent emissions limitations on new and existing natural gas units than the current rules – could impact the PCEC if Section 111 is finalized in its current proposed form. DEP has reviewed and commented on the CAA Section 111 Proposed Rule and continues to monitor its development.

1.4.8 Seismology

1.4.8.1 Seismic Character and Seismic Hazards

Earthquakes that originate in North Carolina are primarily intraplate earthquakes (i.e., earthquakes that occur in the interior of a tectonic plate). In most cases, they occur along existing structural faults. The orientation of these tectonic plates within current stress fields in the southeast is northeast-southwest. The eastern United States has a low relative recurrence interval for strong earthquakes, but its rigid and largely intact basement rock enables seismic energy to travel significant distances. Because the types and conditions of local and regional geology play a significant role in earthquake attenuation, even structures in areas of low

seismicity should be designed to withstand surface movements.

Tectonism describes the movement of tectonic plates that causes earthquakes, faults, volcanoes, uplift, subsidence, or any combinations thereof. Because earthquakes that are felt in North Carolina typically result from regional tectonism, they are not associated with tectonic plate movement and the significant changes and loss of property that can accompany these seismic events.

Intraplate earthquakes, however, are not well understood, and the hazards associated with them are difficult to quantify. A seismic hazard is the probability that an earthquake will generate an amount of ground motion exceeding a specified reference level in a certain time, generally 50 years. Although intraplate earthquakes are typically low in magnitude ("M") on the Richter Scale (a base-10 logarithmic numeric scale used to express the magnitude of an earthquake based on seismograph oscillations), there have been several major intraplate earthquakes that have affected the central and eastern United States. Examples include the Mineral, Virginia, earthquake in 2011; the Charleston, South Carolina, earthquake in 1886; and the New Madrid, Missouri, earthquakes in 1811 and 1812.

The seismic hazard for a particular site or location is based on the following:

- the magnitude of and distance from the potential earthquake,
- the frequency with which those potential earthquakes are likely to occur, and
- the amount of shaking that is expected to occur because of those earthquakes.

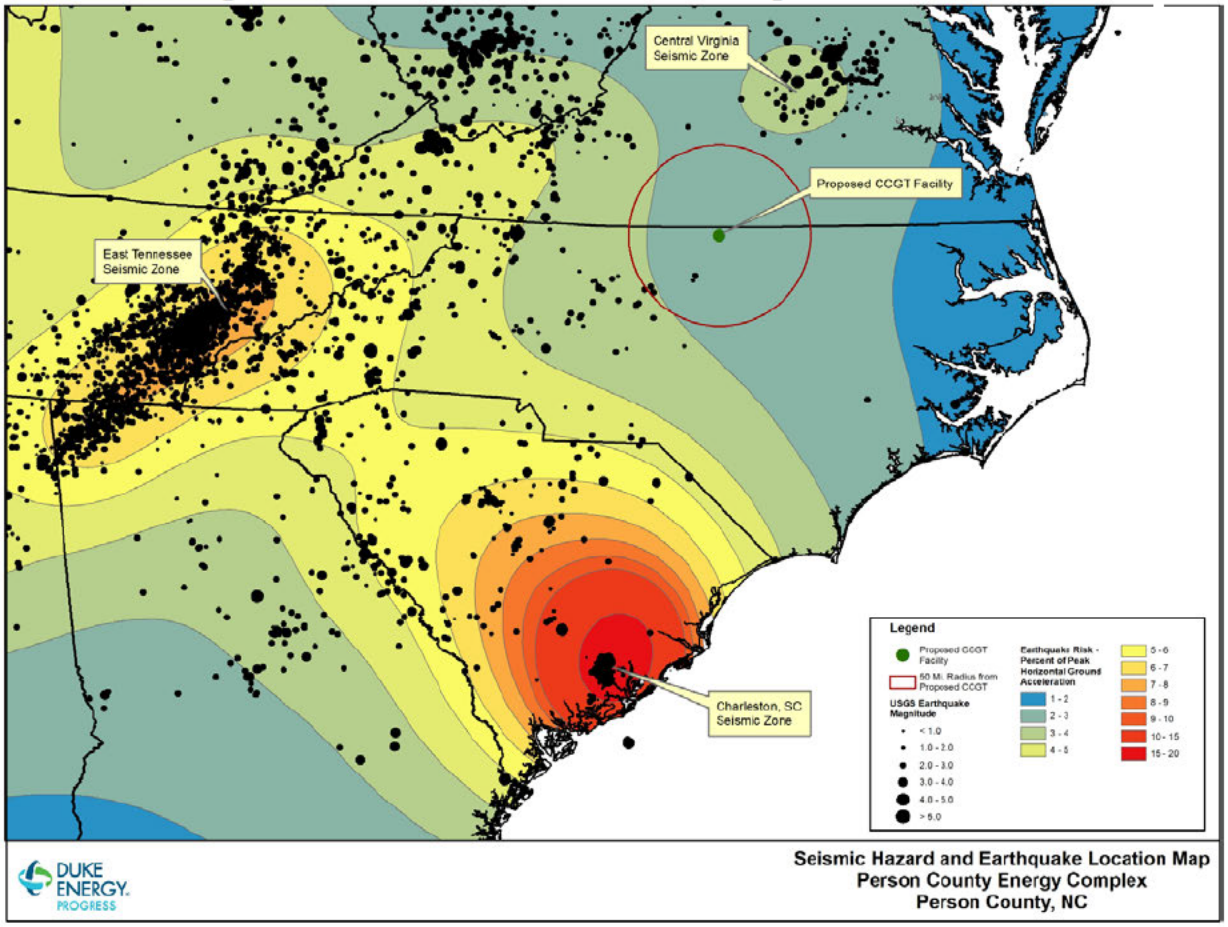
Peak Ground Acceleration ("PGA") for the area surrounding the Proposed Facility was estimated using the USGS National Seismic Hazard Mapping database (2018). The study area has 10 to 14% (as expressed as a fraction of standard gravity) of exceedance in 50 years (USGS 2014). Figure 1.4.8.1-1 shows the location of the site, the 2% probability of

exceedance in 50 years, PGA contours, regional earthquake source information, and the 50-mile radius from the proposed project site.

The probability of an earthquake with a magnitude of greater than 5.0 on the Richter Scale within 100 years and within 30 miles of the Proposed Facility is very small (0.02-0.03%) (USGS 2014). The seismic hazard map shows peak ground accelerations having a 2-3% probability of being exceeded in 50 years for a firm rock site. The map is based on the most recent USGS models for the conterminous U.S. (2018), Hawaii (1998), and Alaska (2007). The models, based on seismicity and fault-slip rates, consider the frequency of earthquakes of various magnitudes.

Induced seismicity has increased in frequency over recent years in the eastern United States, and it has been linked to an increase in wastewater injection into deep wells. These activities are not accounted for in the estimated hazards presented above. The Proposed Facility will be in an area of relatively low potential seismic activity, and it overlies stable basement rock. As a result, it should perform satisfactorily in the event of an earthquake if appropriate considerations are made during preliminary and final design.

Figure 1.4.8.1. Seismic Hazard and Earthquake Locations



Map Sources: Seismic Hazard and Earthquake Locations Map Courtesy of the U.S. Geological Survey; County Boundary Sources: Esri; U.S. Dept, of Commerce, Census Bureau; NOAA; National Ocean Service; National Geodetic Survey

1.4.8.2 Seismic Zones and Magnitude

The central and eastern United States have three major seismic zones: (1) the Charleston, South Carolina, seismic zone; (2) the East Tennessee seismic zone; and (3) the Central Virginia seismic zone (Figure 1.4.8.1-1). These zones are located approximately 334, 343, and 165 miles from the Proposed Facility, respectively. Figure 1.4.8.1-1 delineates these three zones; and the clusters of various-sized black circles represent the locations of previous earthquakes and their respective magnitudes on the Richter Scale.

The magnitude of an earthquake can be expressed as the amount of energy released, measured in gigajoules. For example, an earthquake with a magnitude of 5.0 is equivalent to a release of 2,000 gigajoules of energy. An earthquake with a magnitude of 2.5 to 5.4 causes minor damage. There are around 30,000 of these worldwide each year. An earthquake with a magnitude of 8.0 is considered a great earthquake; it can demolish communities near the epicenter. There are, on average, less than five great earthquakes per year world-wide.

The closest recorded earthquake with a magnitude greater than 4.0 that originated in North Carolina occurred in 1916 near Skyland, Buncombe County—205 miles west of the proposed Person County Energy Complex. Estimated at 5.2 M, this earthquake was most likely associated with the East Tennessee seismic zone. In more recent history, the largest earthquake felt in North Carolina originated near Richmond, Virginia, in 2011. It was associated with the Central Virginia seismic zone and registered as a 5.8 M on the Richter Scale. Both the Charleston and East Tennessee seismic zones are considered areas of high seismic hazard by the USGS.

It is likely that the East Tennessee seismic zone presents the greatest known risk to the site area, but that risk is considered small. The facility's structures will be designed in accordance with the applicable seismic code, using ground motion data consistent with the required

loading.

1.4.9 Water Supply

The Proposed Facility is located within the lower portion of the Roanoke River Basin (HUC 0301044). According to the NC Division of Water Quality's 2018 Roanoke River Basin Restoration Priorities Plan (NCDEQ 2009), the land cover for this hydrologic unit code is mostly forested (57.2%), with significant areas of agricultural land (19.2%) and developed lands (5.01%). Agricultural lands are spread across the landscape and the largest developed areas, including Roxboro, Semora, and Timberlake.

The study area is located within the Storys Creek Water Supply Watershed, a NCDEQ-protected area. The Storys Creek Watershed is classified as a Water Supply ("WS")-II watershed because it is a source of water for drinking, culinary, or food processing purposes where a WS-I classification is not feasible. WS-II waters are generally in predominantly undeveloped watersheds, and all WS-II waters are High Quality Waters by supplemental classification.

These waters are also protected for Class C uses—propagating aquatic life, survival and maintenance of biological integrity (including fishing and fish), wildlife, secondary contact recreation, and agriculture. Secondary contact recreation is considered wading, boating, and other uses not involving human body contact with water, or activities involving human body contact with water that occur only on an infrequent, unorganized, or incidental basis.

The Proposed Project's footprint is less than 0.5 miles from Hyco Lake.

1.4.10 Aviation

Title 14, Code of Federal Regulations, Part 77 (Safe, Efficient Use, and Preservation of the Navigable Airspace) establishes standards for protecting navigable airspace and sets forth requirements for Federal Aviation Administration ("FAA") notification of proposed construction that could potentially affect the navigable airspace.

Specifically, the notification "triggers" set out in Part 77 that are, or possibly could be, applicable to construction of the Proposed Facility include the following:

- If requested by the FAA, or if any of the following types of construction or alteration are proposed, a notice must be filed with the FAA of:
  a) Any construction or alteration that is more than 200 feet above ground line at its site
  b) Any construction or alteration that exceeds an imaginary surface extending outward and upward from the aviation facility at any of the following slopes:
     i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport listed in 14 CFR § 77.9(d), with its longest runway more than 3,200 feet in actual length, excluding heliports.
     ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport listed 14 CFR § 77.9(d) with its longest runway no more than 3,200 feet in actual length, excluding heliports.
     iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport listed 14 CFR § 77.9(d).

(14 CFR § 77.9(b)).

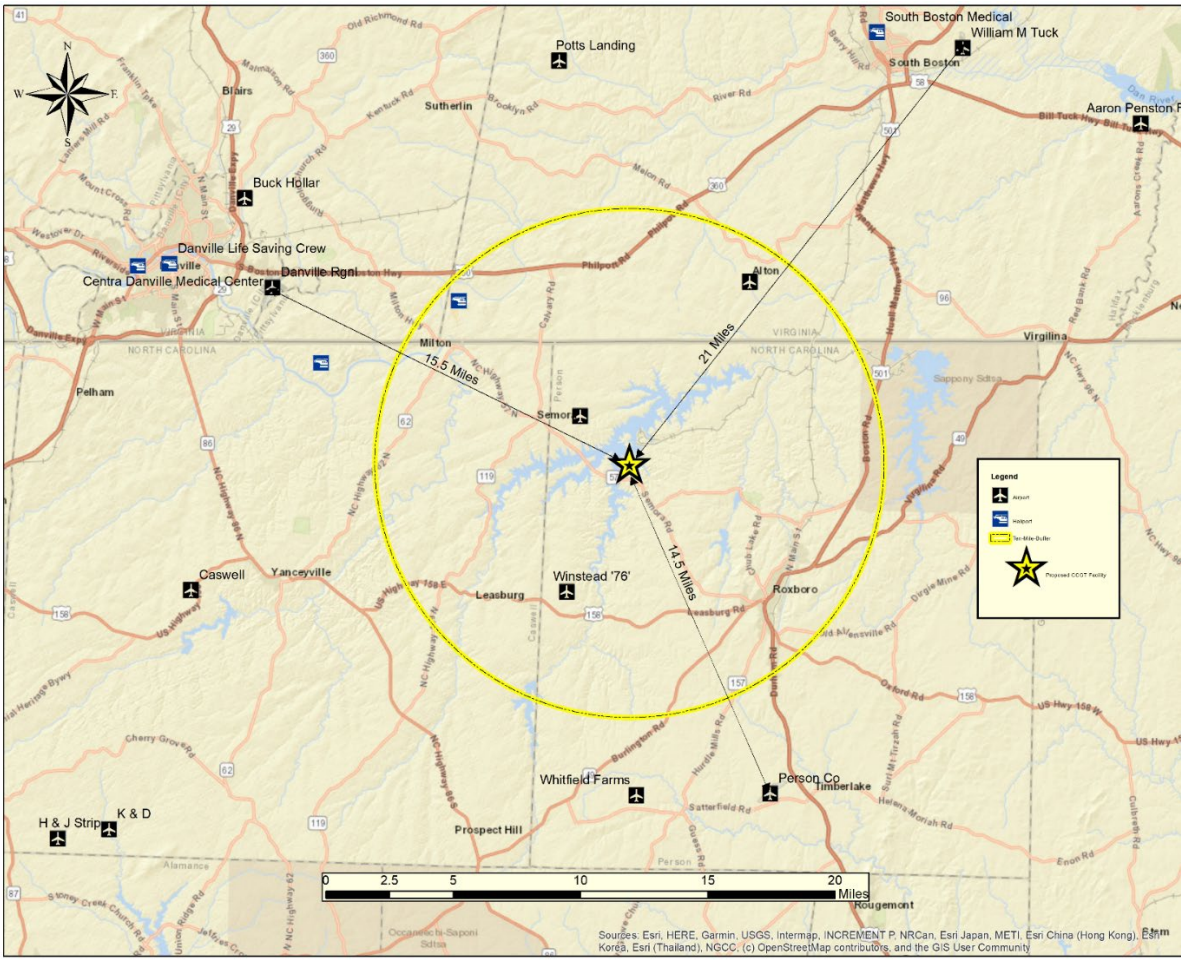
14 CFR § 77.13(a) further includes the following as a supplemental notice requirement:

> Any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used and any permanent or temporary apparatus.

With these notification triggers and supplemental standards in mind, Pike reviewed the Cincinnati Sectional Aeronautical Chart and the FAA Airport

Database published by the U.S Department of Transportation, Federal Aviation–Aeronautical Information Services (08/06/2019) to determine the location of any aviation facilities within 10 miles of the Proposed Facility (see Figure 1.4.10-1).

Figure 1.4.10-1 Airfield Locations



Map Sources: FAA 2023, Air Traffic Organization, Mission Support Services, Aeronautical Information Services, SkyVector

Within 10 miles of the project site are three private airports and one private heliport:

- Holeman Field Airport (NC40), 734 Fox Lair Trail, Semora, NC 27343
- Vaughan Airport (00VA), 2045 Snow Hill Road, Alton, VA 24520
- Winstead '76' Airport (68NC), Route 1, Box 104J, Leesburg, NC 27291
- O'Gara Tech Training Facility Heliport (VA40), 1120 Euro Rally Road, Alton, VA 24520

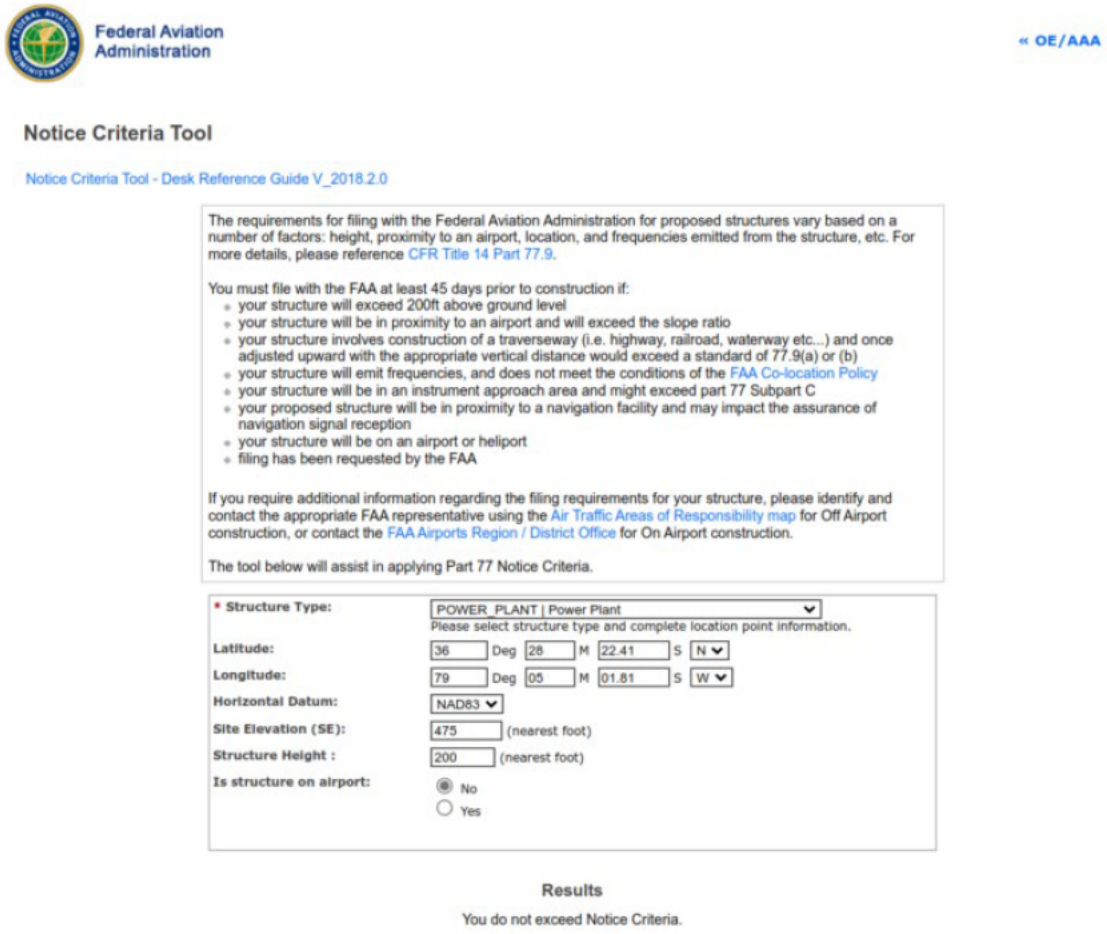
The closest public airports are the following:

- Raleigh Regional Airport at Person County (KTDF), 385 Montgomery Dr, Timberlake, NC 27583; about 14.4 miles south-southeast of the site
- William M. Tuck Airport (W78), 1145 Tuck Airport Rd, South Boston, VA 24592; about 21 miles northeast of the site
- Danville Regional Airport (KDAN), 424 Airport Drive, Danville, VA 24540; 15.5 miles northwest of the site

Pike entered proposed plant coordinates (latitude/longitude), plant grade elevation, and maximum possible stack height (200 feet) into the online FAA Notification Criteria Tool. The tool indicated that FAA notification would not be required. Based on Pike's review of the information above, distances to the airfields and preliminary engineering of the proposed Person County facility additions, and the results of the online tool, no FAA notification is required. If the height of the stack (or any other part of the facility) exceeds 200 feet above ground level, DEP will be required to submit a notice to the FAA.

Figure 1.4.10-2 shows the completed FAA Notice Criteria Tool.

Figure 1.4.10-2 FAA Notice Criteria Tool



Federal Aviation Administration

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

* Structure Type:	POWER_PLANT | Power Plant Please select structure type and complete location point information.
Latitude:	36 Deg 28 M 22.41 S N
Longitude:	79 Deg 05 M 01.81 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	475 (nearest foot)
Structure Height :	200 (nearest foot)
Is structure on airport:	(•) No ( ) Yes

Results

You do not exceed Notice Criteria.

1.5 Site Study Status

All necessary studies have been conducted.

1.6 Natural Gas Supply

[BEGIN CONFIDENTIAL]

[redacted]

[redacted]

[END CONFIDENTIAL]

1.7 Transmission

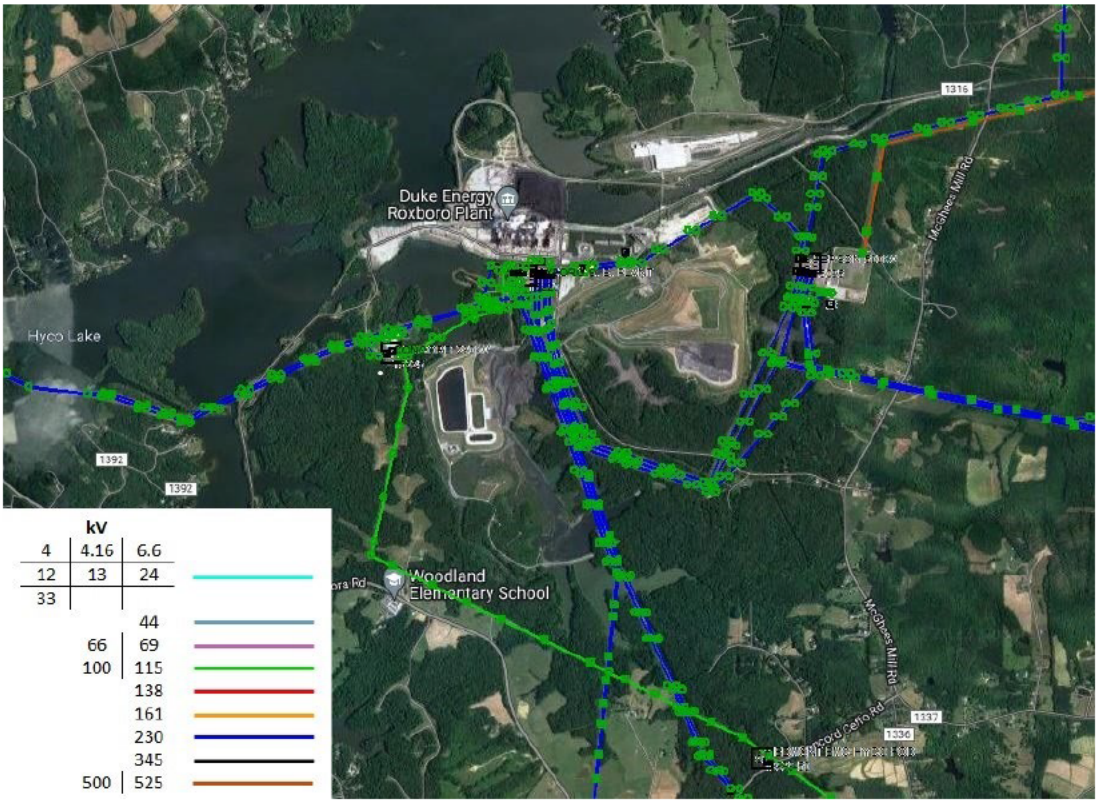
Figure 1.2, which shows the location of the existing Roxboro Plant electrical substation, also shows that one proposed gas turbine generator and the steam turbine generator will supply, each through its own breaker, a 230 kV 0.88-mile span bus line that will be connected to the Roxboro 230-kV switchyard adjacent to the Roxboro Plant. The second gas turbine generator will supply, through a breaker, an additional 230-kV 0.88-mile span bus line that will also be connected to the Roxboro 230-kV switchyard adjacent to the Roxboro Plant.

Several 230-kV breakers in the Roxboro switchyard are required to complete the breaker-and-a-half scheme to create the PCEC's point of interconnection. The routing of the two new span bus lines will require relocating two existing 230-kV transmission lines to prevent line crossings and open a location for the points of interconnection.

DEP has filed a Generation Replacement Request ("GRR") under the Companies' Large Generator Interconnection Process to conduct studies for interconnection of the Proposed Facility (replacing ~1,050 MW of Roxboro Units 1 and 2) and has also submitted an interconnection request in the 2023 Definitive Interconnection System Impact Study (DISIS) to support the additional generation exceeding the retiring capacity being studied in the GRR process. The GRR System Impact Study results are expected in the fall of 2023, and the Facility Study results are expected in early 2024. The final design will be determined after the studies have been completed.

The transmission lines currently emanating from the Roxboro Plant can be seen on Figure 1.7.

Figure 1.7. Transmission Line Routes Emanating from the PCEC



1.8 Unit Capacity

The projected net capacity of the Proposed Facility at 20° F is 1,360 MW and 1,390 gross MW in alternating current. The projected nameplate capacity of the

Proposed Facility at 20° is 1,390 MW in alternating current subject to final determination.

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DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX A

PERSON COUNTY ENERGY COMPLEX COMBINED-CYCLE GAS TURBINE ADDITION PROJECT NOISE IMPACT STUDY

Person County Energy Complex Combined-Cycle Gas Turbine Addition Project Noise Impact Study

Prepared for

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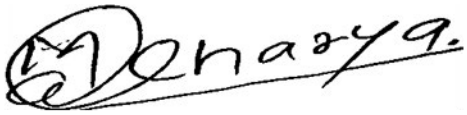

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Executive Summary

Existing Roxboro Steam

The existing Steam Station is located at 1700 Dunnaway Rd, Semora, North Carolina and has four coal-fired steam plants. The faceplate power generating capacity of the plants in megawatts (MW) are Unit 1-411 MW; Unit 2-657 MW; Unit 3-745 MW and Unit 4-745 MW. The plants operate based on energy load requirements. Thus, as few as one or as many as four plant units may be in operation. Plant units 3 and 4 are further separated into two independent subunits, i.e., subunits 3A, 3B, 4A and 4B. Subunits 3A, 3B, 4A and 4B can run independently from each other at half the capacity (350 MW).

Proposed Project

The proposed project will be to shut down coal-fired Units 1 and 2 permanently leaving Units 3 and 4 still running and construct a 2x1 combined-cycle combustion turbine ("CCGT") with heat recovery generators and steam turbine generators. The new system according to Duke Energy will have a total capacity of 1360 MW. It is in the southwest area of the property.

Existing Community Noise Levels

Noise measurements were performed north, west, and southwest of the Duke Energy Steam plant and future Combustion Turbine plant property lines to document the ambient noise levels at the nearest noise sensitive receptors. Two long term monitors were set up that measured noise continuously for over 40 hours, and two-minute duration handheld measurements were obtained. Measurement locations are indicated in Figure 1. Measurement results are documented in figures 3, 4, 5 and 6 and Appendix A, tables A1, A2 and A3. The L_{dn}'s for 24-hour noise monitors were L_{dn} 54.8 for monitor 1 and L_{dn} 61.8 for monitor 2. The loudest hourly L_{Aeq} (no penalty) for monitor 1 was 54.3 dBA on April 13 at 6 AM and for monitor 2 was 64.1 dBA on April 13 at midnight.

Noise Criteria

Based on review of available noise ordinances in Person and Caswell Counties, where we found a limit set for wind power and from our own experience, we are also limiting levels from Duke Power at their residential property lines to L_{Aeq} 55 dBA as criteria for considering an impact. The EPA document "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety" provides outdoor activity interference and annoyance effect of $L_{dn} \leq 55$ dBA for outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use and $L_{Aeq} \leq 55$ dBA for outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.

Impact of Future Project to Community

A SoundPLAN computer model was created using sound information of anticipated similar combustion turbines and measurements in the field of the existing coal-fired plant.

Future sound levels and resulting changes vary by location, but sound levels are not more than 55 dBA with all CCGT's and steam plants 3 and 4 operating at any adjoining property lines. Increases at nearest neighbors to future plants are less than 4 dBA when comparing similar full power generation levels with coal car shaker noise (existing versus future) and thus not considered clearly noticeable.

Introduction

This report provides an evaluation of the potential noise impacts of proposed modifications to the Roxboro Steam Station in Semora, North Carolina. The modifications to be performed will be to shut down two coal-fired units and include a CCGT on the southwest portion of the property.

The noise impact evaluation is based on a comparison of the anticipated noise levels from the Roxboro Plant and CCGT with the County of Person and City of Roxboro Noise Ordinance and the existing ambient noise conditions.

Background on Sound and Sound Levels

Sound is produced by minute fluctuation in air pressure. Sound strength, whether pressure or power, is measured in decibels (dB), expressing the ratio of any two "power-like" quantities as a logarithmic ratio. 20 µPa is the reference for 0dB, making pressure of 1 Pascal (Pa) is equivalent to 94dB sound pressure level. Each change of 10 dB indicates 10 times as much sound present; doubling of sound energy results in an increase of 3 dB. The human hearing does not respond proportionately to the increase in energy of sound. A 3 dB change in sound level means twice or half as much sound energy, but to humans is just barely noticeable unless the frequency content or duration changes. A 5-6 dB change is three to four times as much sound energy and is noticeable to humans. A human perceives a 10 dB change in sound level as twice as loud.

The human hearing system does not respond to very low- or high-pitched sounds as well as those sounds in the speech range especially for lower amplitudes. A series of frequency weighting filters was developed to better report human reaction to sound amplitudes based on frequency content. Because ambient noise levels tend to be lower in amplitude, the most frequently used frequency filter to evaluate environmental noise is the A-weighting filter. When an A weighting filter is used, we usually report the results labeled as dBA.

Typical speech at 1 meter is around 60 dBA, typical office ventilation sound 35-45 dBA, and most North Carolina residential communities are in the range of 40-50 dBA. Typically, rural residential communities can be below 40 dBA, especially in less densely populated areas. More urban settings are often above 50dBA, especially near highways.

If there are instantaneous events, maximum noise levels are often used instead. Instantaneous sound levels are measured with "fast" or "slow" time weighting. Fast corresponds to a 125-millisecond time constant. Slow corresponds to a 1-second time constant. The slow time weighting was developed to better mimic a human ear's reaction to changes in sound pressure level. The fast response can be used levels are changing rapidly. To evaluate environmental noise sound levels are averaged over a period of time.

Sound is often reported as an average sound level over a specific period of time. The equivalent sound level, L_{Aeq}, is the level of a constant sound which has the same sound energy as does the time-varying sound over the same period-of-time. The time interval over which the measurement is taken should always be specified. Typically, this is done in one-hour increments for environmental sound.

The Community Noise Equivalent Level (CNEL) is defined as the equivalent sound level during a 24-hour day and calculated by adding the sound energy during the daytime (0700 to 1900 hours) to 3 times the sound energy during the evening hours (1900 to 2200) to 10 times the sound energy during the nighttime (2200 to 0700 hours). This is equivalent to a 3 dBA amount added in the evening and a 10 dBA amount added at night to better adjust reflect higher annoyance levels during these times.

The Day Night Level (DNL or L_{dn}) is defined as the equivalent sound level during a 24-hour day and calculated by adding the sound energy during the daytime and evening (0700 to 2200 hours) to 10 times the sound energy during the nighttime (2200 to 0700 hours). This is equivalent to a 10 dBA amount added at night, to better adjust reflect higher annoyance levels during these times.

Sound can also be described with specific percentages of a period of time to better document human reactions. Percentiles allow the consultant to document both the instantaneous noise events, as well as the consistent ambient noise levels. 1, and 10% levels (sound exceeded 1 and 10 % of the time) are used to indicate higher intermittent levels from the average value and 90% or 99% (sound exceeded 90 and 99% of the time) are used to indicate the steady part of the sound. "Fast" or "slow" response is chosen as part of all these measurements. These measurements are labeled L% so the level exceeded 90% of the time would be labeled L90.

Sound is determined by evaluating contributions from the sources, the effects of the path, and the location of the receivers. As the point source propagates over distance, the energy is distributed over a larger surface area. This corresponds to 6dB per doubling of distance. This is derived from the inverse square law which applies to sound (intensity) and light and gravity as well. Interaction with soft ground can further reduce the sound level when the sound travels from a source to a receiver close to the ground. When the sound path propagates high above the ground there is less ground absorption impacting the energy reduction. Over long distances, atmospheric absorption reduces sound (primarily at the higher frequencies). Beyond 1000 feet or so this effect overcomes the inverse square effect at higher frequencies, thus higher frequencies are typically not significant at long distances. The presence of changes in topography can create shadow zones where sound from a sound source is attenuated because the line of sight is blocked. The extent of the effect depends on how well the source is blocked and the size of the blocking object or terrain. It also depends on how close the source or receiver is to the element creating the shadow.

Sound levels are significantly reduced on sunny afternoons when air near the ground is warmer than air higher in the sky and the sound curves upward. Generally, the loudest time for sound beyond the first few hundred feet is at sunset until an hour or so after sunrise. During this period, sound that starts upward will curve back downward, often not passing through sound reducing components such as the ground. Sound levels can be significantly reduced upwind from a source and increase downwind from a source. Trees can provide limited sound reduction over distances of approximately 300 feet. This is also dependent on the season and density of trees. Over short distances, the trees do not provide enough acoustical absorption to be significant. Over long distances sound can pass over the top of the trees due to the atmospheric curvature effect, limiting the sound reduction benefit.

Existing Roxboro Steam Station

The existing Roxboro Steam Station is located at 1700 Dunnaway Rd, Semora, North Carolina. Semora is an unincorporated community in Caswell County with some parts in Person County, North Carolina. The existing station has four coal-fired steam plants. The faceplate power generating capacity of the plants in megawatts (MW) are Unit 1-411 MW; Unit 2-657 MW; Unit 3-745 MW and Unit 4-745 MW. The plants operate based on energy load requirements. Thus, as few as one plant may be in operation and as many as all four plants may be in operation. Plant units 3 and 4 are further separated into two independent subunits, i.e., subunits 3A, 3B, 4A and 4B. Subunits 3A, 3B, 4A and 4B can run independently from each other at half the capacity (350 MW). During the site visit dates of April 12, 13 and 14, 2023, plant units 1 and 3B were operating.

Proposed Project

The proposed project will be to shut down coal-fired Units 1 and 2 permanently and construct a 2x1 combined-cycle plant, consisting of two advanced-class gas turbines, two heat recovery steam generators, and a steam turbine. The new system according to Duke Energy will have a total capacity of 1360 MW. The turbines have not yet been selected. However, as part of the project, the manufacturer will be required to limit the noise generated by each turbine to an average sound power level of 117 dBA during operation. The new combustion turbine plant will be in the southwest area of the property. Figure 1 shows the location.

Figure 1. Location of Future Roxboro CCGT

Noise Sensitive Receptors

Since the new combustion turbines will be operating on the southwest part of the property, Noise Sensitive Receptors in this area were evaluated. The Noise Sensitive Receptors evaluated are indicated in Figure 2 below. Receptor 1 is a residence to the north of the project site on Rock Point Drive. Receptor 2 is also a residence north of the project site on Beaver Dam Road. Receptor 3 is a residence west of the project site and the closest Noise Sensitive Receptor to the future combustion turbine plant. Receptor 4 is Woodland Elementary school located south of the project. Receptor 5 is the CertainTeed plant. The CertainTeed plant was chosen as a receptor to determine what type of environmental noise it contributes. Receptor 6 is on Roy Carver Road, just north of the CertainTeed plant.

In addition to the Roxboro Steam Plant, noise sources contributing to the existing ambient noise level include traffic on Roxboro Plant Road and Hwy 57. Power boat activity on Hyco Lake will impact the ambient noise level at Receptors 1, 2, and 3 primarily during the daytime. Figure 2 below identifies the Noise Sensitive Receptors.

Figure 2. Noise Sensitive Receptors

Ambient Noise Measurements

The existing ambient noise levels were measured along the perimeter of the Duke Energy Roxboro Steam Plant. Ambient noise levels will vary with time of day, time of year, atmospheric conditions, and plant operating conditions. Measurements were performed on April 12th, 13th, and 14th, 2023 for long term monitor locations 1 and 2. Noise measurements were obtained long enough data to record typical variations under current operating conditions. Long term monitors were manufactured by NTI Audio, model XL2. Serial numbers for Monitors 1 and 2 are A2A-18143-E0 and A2A-19429-E0, respectively.

Atmospheric conditions varied over the measurement period. Table 1 provides the weather during April 12 through 14 for Roxboro, NC. Roxboro is located 10 miles to the southeast of the Roxboro steam plant.

Table 1. Weather Conditions during Environmental Noise Measurements

Date:	**April 12**				**April 13**				**April 14**			
Time:	12 AM	6 AM	12 PM	6 PM	12 AM	6 AM	12 PM	6 PM	12 AM	6 AM	12 PM	6 PM
Hi Temp (F):	55	75	82	77	61	75	82	79	64	72	79	66
Low Temp (F):	48	48	79	61	52	52	81	66	61	63	70	64
Wind Speed (MPH):	5	4	8	5	6	7	8	7	3	3	4	4
Wind Direction:	WSW	WSW	W	WSW	WSW	WSW	WSW	S	S	E	N	NW
Humidity (%):	61	52	26	40	58	55	33	47	77	86	73	92

The sound was measured in octave bands as well as the overall A-weighted level. Statistical sampling was used to see the variation within each measurement period. A summary of the ambient noise measurements is reported in Table 2 below. Detailed overall hourly noise levels are reported in the Appendix. Figure A1 and A3 in the Appendix provides for the time histories of L_{ASmax} and L_{Aeq} for monitors 1 and 2, respectively. Figure A2 and A4 provides the statistical values over 1-hour time increments for L_{10}, L_{50}, L_{90}.

Table 2. Long-Term Measurements Summary

Location	**L_{dn} 24-hour period**	**Loudest Hourly Leq and Time of Occurrence**	**Quietest Hourly Leq and Time of Occurrence**
Long Term Measurement 1	L_{dn} 54.8, 10:00 PM, 4-12-2023 to 10:00 PM, 4-13-2023	L_{Aeq} 54.3 dBA @ 6:00 AM, 4-13-2023	L_{Aeq} 30.4 dBA @ 12:00 AM 4-13-2023
Long Term Measurement 2	L_{dn} 61.8, 10:00 PM, 4-12-2023 to 10:00 PM, 4-13-2023	L_{Aeq} 64.1 dBA @ 12:00 AM, 4-13-2023	L_{Aeq} 38.5 dBA @ 12:00 PM, 4-13-2023

Referring to Figure 2, Long-Term Monitor 1 is located directly west of the future combustion turbine plant near Roxboro Plant Road. Ambient daytime noise levels at monitor 1 were controlled by traffic on Roxboro Plant Road. The maximum vehicle sound levels reached 75 dBA. Vehicle noise levels quickly rose as the vehicle approached and subsided once the vehicle passed.

Other noise events heard were birds chirping, geese honking, insects, power boat engines, and an occasional propeller aircraft. The noise levels of birds chirping were in the 55-60 dBA range but persisted longer than cars passing. The maximum power boat engine noise was near 65 dBA and gradually increased and decreased compared to the automobiles due to the watercraft traveling at a slower speed. Insects were primarily heard starting in early evening. The nearest residential neighbors to monitor 1 are across the water 900 feet to the west. The quietest hour Leq was 30.4 dBA. Despite the traffic, the L_{dn} was 54.8 dBA and loudest hour L_{Aeq} was 54.3 dBA. Late night and very early morning hours had lower levels due to reduced road traffic noise on Roxboro Plant Road.

Monitor 2 is located at the north end of the coal train loop for the Roxboro steam plant. Train coupling is the primary noise. Train coupling noise was up to 75 dBA. Other plant noise heard was dozer/front end loader tracks clanking and their backup alarms. Dozer tracks and backup alarms were up to 56 dBA. An intercom/outdoor paging system could be heard also. Nighttime noise levels did not change significantly from daytime. This may be due to work activities at the Roxboro plant being around the clock continuous.

Monitor 2 noises measured that were not steam-plant related were aircraft, road vehicles and birds. Both jet and propeller aircraft could be heard at noise levels up to 62 dBA. Road vehicles were about 57-64 dBA. The nearest residential neighbors to monitor 2 are across the water to the north 2,770 feet and to the east at 2,000 feet. The quietest hour Leq was 38.5 dBA. The loudest hour was 64.1 dBA and the L_{dn} was 61.8 dBA. Levels reaching neighbors would be noticeably less since the tracks were near to the monitors.

Noise Criteria

The City of Semora, NC, is partially in Person and Caswell County.

The Caswell County Code of Ordinances, Article II, section 22-35, parts (a) and (b) are given below. It does not provide any noise limits.

(a) The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this subsection, except where the context clearly indicates a different meaning:

Noise means any sound which annoys or disturbs humans or is unwanted or which causes or tends to cause an adverse psychological effect on human beings.

Noise disturbance includes any sound which endangers or injures the health of humans or disturbs a reasonable person of normal sensitivities.

(b) The use or maintenance of the following items or activities are prohibited if they create a noise or noise disturbance:

(1) Radios, television sets, musical instruments;

(2) Loudspeakers;

(3) Animals;

(4) Loading operations;

(5) Construction between the hours of 9:00 p.m. and 7:00 a.m.;

(6) Horns and signaling devices.

The Person County North Caroline Code of Ordinances does not provide noise level limits in terms of a measurable metric. It states:

> "It shall be unlawful for any person, or group of persons, regardless of number, to willfully make, continue, or cause to be made or continue, or assist in making or continuing, any loud, raucous and disturbing noise. For the purposes of this ordinance, such noise shall mean any sound which, because of its volume level, duration, and character, (i) annoys, disturbs, injures, or endangers the comfort, health, peace or safety of reasonable persons of ordinary sensibilities within Person County, or (ii) interferes seriously with neighboring residents' reasonable use and enjoyments of their properties."

From the Roxboro Unified Development Code (UDC), section 7.46.5 for Windfarm Noise it is stated:

> "Audible sound from a Wind Turbine shall not exceed fifty-five (55) dBA, as measured at any off-site occupied building of a Non-Participating Landowner."

From Roxboro UDC section 9.46.3 for Screening of Utilities and Mechanical Equipment it is stated:

> Locate noise-generating equipment to mitigate the impact on adjacent properties and public rights-of-way. Equipment that generates more than 60 decibels shall not be located next to a residential development or must incorporate mufflers or other noise-reducing equipment."

Noise impacts on a community are based on the amount of increase in noise levels compared to other existing noise sources present in the community (including existing noise from the noise producer who is adding a noise source), the general level of the noise source, and many other factors (nature of the source – speech or music, impulsive, tonal, time of day, periodic nature, whether neighbors are already concerned, or are supportive of the noise producer to name a few). Where noise levels from the plant are not increasing more than 3 or 4 dB the impact will not be clearly noticeable. Where noise levels from the plant will increase by 5 or more decibels, then the other community noise sources present are a more significant factor as is the overall sound level. In the end, individual responses will vary to a new noise source. We can only provide an opinion of what the reaction may be based on the character, frequency, and level of existing noise sources versus the new noise source and its overall level.

Since the municipal code limits wind farms to 55 dBA at non-participating buildings, and mechanical equipment is limited to 60 dBA, this report has used 55 dBA L_{Aeq}, the stricter of the two requirements, as the Threshold of Significant Impact. Significant increases (greater than 5 dBA) over existing noise levels from all sources are also considered a significant impact.

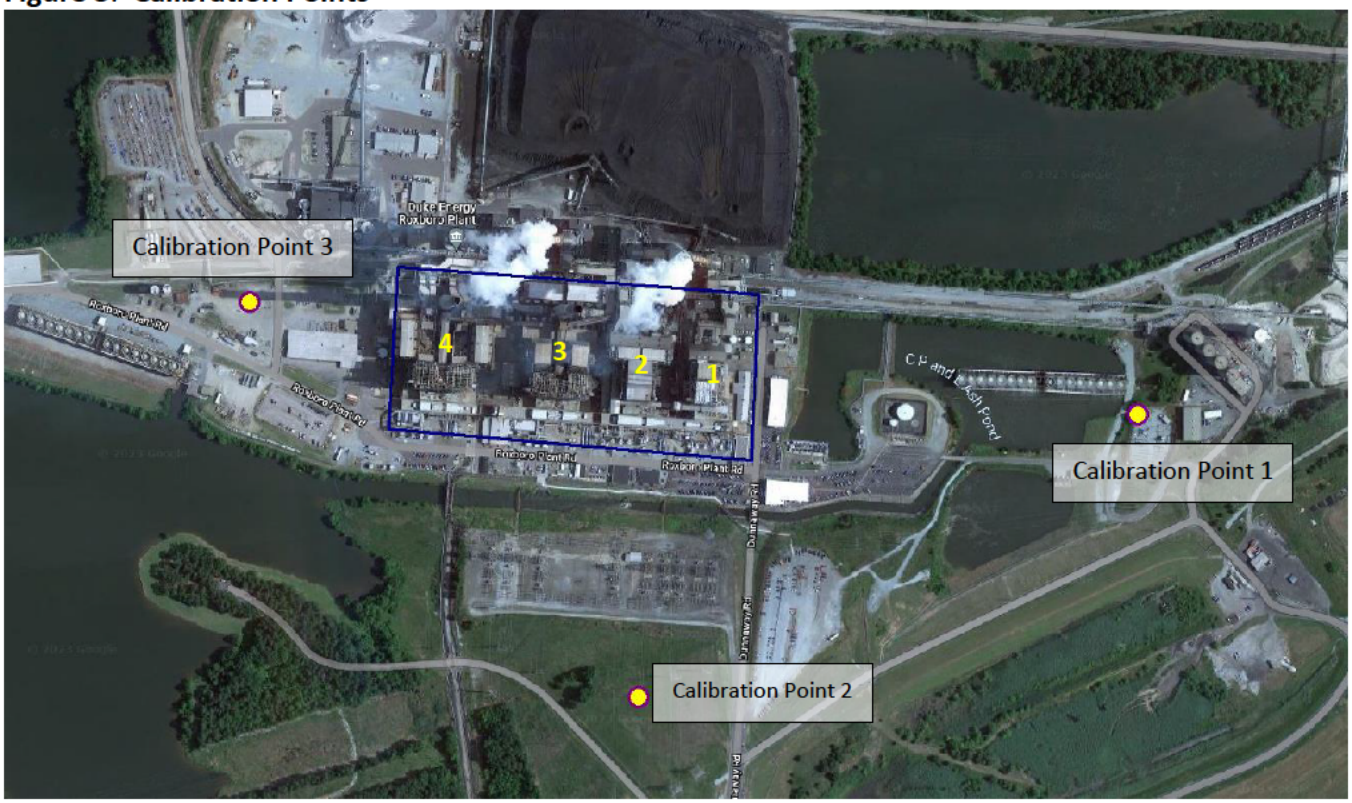
Sound Power Estimation

Sound Power Estimation for the Existing Coal-Fired Plant (Units 1-4)

The maximum noise condition of the existing coal-fired plant occurs when all four units are at maximum capacity. The maximum generating capacity of the plants on the nameplate is 2558 MW. We were provided slightly different numbers for power generation as Unit 1 with 380 MW, Unit 2 with 670 MW, and Units 3 and 4 producing 700 MW each for a total of 2,450 MW. On April 14th, Unit 1 produced 380 MW and Unit 3B 350 MW (dual unit – one boiler operating). We needed to determine the sound power of these operating units, then we could scale the sound power to an estimated overall sound power with all four units running at maximum capacity.

To determine the sound power of Units 1 and 3B, we needed sound pressure level measurements at known distances from the operating units or their individual noise radiating pieces of equipment. This is an open plant design with a significant number of exposed sound-radiating pieces of equipment. Fortunately, we were able to get some distance from the units and still measure sound levels well above the background noise of any other sources. This allowed us to get a very accurate overall sound power of the equipment that was operating without having to measure the many smaller pieces of equipment. We were able to obtain 3 calibration points at locations shown in Figure 6 below, which were all at different directions and distances. The most useful was calibration point 2, as it is nearly equidistant from all units. We modeled the noise source in SoundPLAN and then calibrated the sound power radiating from the two operating units such that the sound level in the model matched the sound levels we measured in the field at the calibration points.

Figure 3. Calibration Points



The total sound power level (Lw) of these two units was calculated to be **131.4 dBA**. This is typical of what we would expect for units of this type, very reasonable.

Existing Sound Power (all units running) - Next, the Lw (sound power level) has been corrected to all four units are operating at total capacity, with Units 3 and 4 producing 700 MW each, Unit 2 generating 670 MW, and Unit 1 producing 380 MW. The simplest scaling method, given most of the equipment has dual boilers or single boilers at 350-380 MW, was to scale the acoustic energy based on the increase in power (MW). In acoustics, this is done by using a power like scaling of 10 LOG ($MW_{(all\ units\ running)}/MW_{(units\ 1\ and\ 3b)}$) or +5.26 dBA. This is a reasonable assumption and is the best we can do without measuring each unit when it is operating. Thus, the total sound power with all four units running is **136.6 dBA**.

Future Sound Power (Units 3 and 4) - From this we then needed to estimate the future sound power of this equipment once Units 1 and 2 are offline for the future condition. To do this, we similarly performed a 10 LOG ($MW_{(units\ 3\ and\ 4)}/MW_{(all\ units\ running)}$) which results in -2.43 dBA change and total sound power of **134.2 dBA**. The footprint of our future condition model source was also reduced to match the footprint of units 3 and 4.

Thus, it is important to note that the change in noise level of the coal-fired plants is estimated to be only -2.4 dBA. If for some reason units 3 and 4 are significantly quieter than units 1 and 2 (which we did not observe for 3b versus 1), the reduction could be more.

Coal and Limestone Rail-Car Shakers

Figure 4. Shaker Locations

There were no deliveries of coal during our visits or the monitoring. We did have one limestone delivery during the monitoring period. Levels were not noticeable above plant noise for this delivery at the nearest monitoring location. We have historical data for this kind of source that we relied on. Only one shaker will operate at a time, so we chose to represent the sound from the coal-car shaker location. Available public resources indicate sound powers (calculated from known distances and sound pressure levels in some cases) for this type of shaker (open) range from 122-129 dBA. Other kinds that rotate the entire unit are less. Our own measurements at Lee County Steam Station (when it was still operating) and the Asheville plant had sound power levels of 134-137 dBA. We chose to estimate the sound power (Lw) at **129.2 dBA** using data collected from Marshall Steam Station in Catawba County. This is approximately in the middle of this range.

The number of trains per year was estimated using the information from personnel at Duke Energy to be 240. Each train takes 3.5 hrs. to unload. This is thus 840 hours a year out of a total of 8760 hours in the year or 9.6% of the year. This is significant. We chose to show the sound levels with the coal car shaker as a result in evaluating impact of this CCGT addition.

Estimation of Sound Power Levels for the New CCGT plant.

Burns and McDonnell (B&M) produced a basic noise study of the future plant that provided a table of sound power levels for most sources, and the interior sound pressure level for buildings with an STC rating of the construction provided (attachment 1 – p.5). We created a library of sources for use in our model from this table. We had to guestimate the construction to ensure controlled to the stated 85 dBA at 3 ft. It should be noted it took 14 ga steel to do that, as lighter construction let too much low frequency energy radiate from the building. Using the provided site plan contained in that report (Figure 2.1) and other project maps provided by Duke Energy, we located these sources on a site plan. For the buildings we estimated the height from 3d views provided of the buildings.

We made some different decisions about ground absorption than B&M (we have treated water surfaces and hard surfaces different than natural areas) and we may have a different topography that we used (we did our best to level the site based on the range of the levels of the natural site). That said, we have good agreement with their data when we compare noise contours close to the site layout. We assumed the roofs to be radiating the same as the walls. It is not clear whether B&M modeled the roof as radiating or not. Our levels at a distance from just the Combustion Turbine plant are higher than the B&M (+6.5 dB at the critical receiver). The buildings are more important than the Cooling towers because atmospheric absorption reduces cooling tower noise quite well. 2-3 dBA of the increase is from the reflective water and plant surface. 0-2 dBA may be from topography differences. The rest (2-4.5 dBA) may be due to differences in how the buildings were modeled. One likely difference is the amount of lower frequency noise radiating from the building (which is less influenced by ground, topography, and air absorption effects). Another difference could be how/if the roof radiated noise. Up close, near the site, there is no difference in our contours.

The color-coded figure that follows shows the contributions of the various noise sources. Please note how the spectrum and level of the building sources is different, as the B&M results were based on an interior sound pressure level and an unspecified STC 32 construction, and not presented as total sound

power. For ease of ranking sources, we have shown this total sound power for each surface of each building.

Their total sound power with all equipment including the buildings is **124.0 dBA**. The 8-cell cooling tower has a sound power of **119.9 dBA** – 39% of the total sound power.> The sound power of the CCGT, BFP (2), and STG buildings is **119.3 dBA** (about half from the roofs), 34% of the total sound power. The balance of equipment makes up the remaining 27% **(118.4 dBA)**. Again, notice the red from the buildings in the lower frequencies. This propagates further than the cooling towers.

Table 3 – B&M Estimated Sound Power Levels of Proposed CCGT Addition Equipment

Sound power levels of future CCGT plant addition major noise sources									
Name	63.0	125.0	250.0	500.0	1000.0	2000.0	4000.0	8000.0	A-weighted overall level
037 Cooling Tower	95.8	103.9	108.4	109.8	113.0	113.2	114.0	110.9	119.9
STG BLDG-Roof 01	107.4	109.5	104.0	96.4	82.6	68.8	51.6	28.5	112.8
CCGT BLDG-Roof 01	109.4	108.5	102.0	96.4	85.6	72.8	58.6	34.5	112.7
STG BLDG-Facade 02	102.9	105.0	99.5	91.9	78.1	64.3	47.1	24.0	108.3
STG BLDG-Facade 04	102.9	105.0	99.5	91.9	78.1	64.3	47.1	24.0	108.3
CCGT BLDG-Facade 01	104.3	103.4	96.9	91.3	80.5	67.7	53.5	29.4	107.6
CCGT BLDG-Facade 03	104.3	103.4	96.9	91.3	80.5	67.7	53.5	29.4	107.6
045 Generator Step Up	77.8	91.9	99.4	104.8	92.0	88.2	81.0	73.9	106.3
045 Generator Step Up	77.8	91.9	99.4	104.8	92.0	88.2	81.0	73.9	106.3
045 Generator Step Up (@STG BLDG)	77.8	91.9	99.4	104.8	92.0	88.2	81.0	73.9	106.3
025 Gas Turbine Air Inlet 1	78.8	84.9	85.4	86.8	91.0	97.2	105.0	93.9	106.2
025 Gas Turbine Inlet Face 2	78.8	84.9	85.4	86.8	91.0	97.2	105.0	93.9	106.2
001 HRSG Upstream	103.8	92.9	84.4	80.8	78.0	96.2	92.0	79.9	105.7
001 HRSG 2 Upstream	103.8	92.9	84.4	80.8	78.0	96.2	92.0	79.9	105.7
002 HRSG 1 Stack	85.8	85.9	85.4	83.8	100.0	103.2	96.0	85.9	105.7
002 HRSG 2 Stack	85.8	85.9	85.4	83.8	100.0	103.2	96.0	85.9	105.7
025 Gas Turbine Air Inlet House	71.8	82.9	90.4	88.8	88.0	103.2	100.0	81.9	105.3
025 Gas Turbine Air Inlet House 2	71.8	82.9	90.4	88.8	88.0	103.2	100.0	81.9	105.3
STG BLDG-Facade 01	99.8	101.9	96.4	88.8	75.0	61.2	44.0	20.9	105.2
STG BLDG-Facade 03	99.8	101.9	96.4	88.8	75.0	61.2	44.0	20.9	105.2
007 HRSG Blowdown Tank Sump and Pumps	66.8	84.9	96.4	98.8	99.0	96.2	92.0	67.9	104.1
007 HRSG Blowdown Tank Drain Sump and Pumps	66.8	84.9	96.4	98.8	99.0	96.2	92.0	67.9	104.1
CCGT BLDG-Facade 02	100.4	99.5	93.0	87.4	76.6	63.8	49.6	25.5	103.8
CCGT BLDG-Facade 04	100.4	99.5	93.0	87.4	76.6	63.8	49.6	25.5	103.8
001 HRG Transistion	83.8	83.9	83.4	81.8	98.0	101.2	94.0	83.9	103.6
001 HRSG 2 Transition	83.8	83.9	83.4	81.8	98.0	101.2	94.0	83.9	103.6
019 GT4s Cooler 1	82.8	91.9	96.4	96.8	98.0	93.2	87.0	78.9	103.0
019 GT4s Cooler	82.8	91.9	96.4	96.8	98.0	93.2	87.0	78.9	103.0
BFP BLDG 1-Roof 01	98.7	97.8	93.3	89.7	88.9	74.1	53.9	25.8	102.6
011 Ammonia Control Flow Unit	78.8	82.9	90.4	92.8	95.0	95.2	94.0	87.9	101.1
011 Ammonia Control Flow Unit	78.8	82.9	90.4	92.8	95.0	95.2	94.0	87.9	101.1
013 Enhanced Cooling Air Pumps	52.8	72.9	80.4	87.8	97.0	96.2	92.0	77.9	100.6
046 Auxiliary Transformer 1	68.8	82.9	87.4	98.8	94.0	85.2	80.0	71.9	100.5
046 Auxiliary Transformer 2	68.8	82.9	87.4	98.8	94.0	85.2	80.0	71.9	100.5
BFP BLDG 2-Roof 01	96.4	95.5	91.0	87.4	86.6	71.8	51.6	23.5	100.3
002 HRSG 1 Stack Exit	96.8	94.9	88.4	83.8	82.0	81.2	77.0	54.9	100.3
002 HRSG 2 Stack Exit	96.8	94.9	88.4	83.8	82.0	81.2	77.0	54.9	100.3
012 Duct Burner Skid	76.8	88.9	88.4	83.8	89.0	94.2	95.0	89.9	99.7
012 Duct Burner Skid 2	76.8	88.9	88.4	83.8	89.0	94.2	95.0	89.9	99.7
006 HRSG Blow down tank 1	61.8	79.9	91.4	93.8	94.0	91.2	87.0	62.9	99.1
006 HRSG Blowdown tank 2	61.8	79.9	91.4	93.8	94.0	91.2	87.0	62.9	99.1
BFP BLDG 1-Facade 02	94.4	93.5	89.0	85.4	84.6	69.8	49.6	21.5	98.3
BFP BLDG 1-Facade 04	94.4	93.5	89.0	85.4	84.6	69.8	49.6	21.5	98.3
BFP BLDG 1-Facade 01	93.3	92.4	87.9	84.3	83.5	68.7	48.5	20.4	97.2
BFP BLDG 1-Facade 03	93.3	92.4	87.9	84.3	83.5	68.7	48.5	20.4	97.2
013 Cooling Air Cooler Pump	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
016 Cooling Air Skid	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
016 Cooling Air Skid	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
016 Cooling Air Skid Pump 1	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
052 GT2C Cooler	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
052 GT2C Cooler 2	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
079 Fuel Pump 2	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
079 Fuel Oil Forwarding Pump 1	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
079 Fuel Oil Forwarding Pump 3	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
079 Fuel Oil Forwarding Pump 4	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
BFP BLDG 2-Facade 02	92.5	91.6	87.1	83.5	82.7	67.9	47.7	19.6	96.4
BFP BLDG 2-Facade 04	92.5	91.6	87.1	83.5	82.7	67.9	47.7	19.6	96.4
001-HRSG 1 Downstream	94.8	82.9	74.4	68.8	67.0	84.2	79.0	66.9	96.2
001 HRSG 2 Downstream	94.8	82.9	74.4	68.8	67.0	84.2	79.0	66.9	96.2
BFP BLDG 2-Facade 01	91.9	91.0	86.5	82.9	82.1	67.3	47.1	19.0	95.8
BFP BLDG 2-Facade 03	91.9	91.0	86.5	82.9	82.1	67.3	47.1	19.0	95.8

Predicted Noise Levels from Plant

The noise contour for the maximum power output (2380 MW) operating condition for the existing Roxboro steam plant (including coal car shaker) is shown in Figure 5. The noise contour of the future CCGT operating and with Units 3 and 4 operating at their maximum capacity (1400 MW) with the coal-car shaker is shown in Figure 6.

The noise level difference between the future CCGT with coal-fired steam plant (remaining units 3 and 4) at maximum operating condition and coal car shaking minus the current steam plant maximum operating condition with coal car shaking is shown in Figure 7. From the Noise Criteria section, noise level increases of 3-4 dB over the current steam plant will not be clearly noticeable. At an increase of noise from the power plants of 5 or more decibels, then other community noise sources present are a more significant factor as is the overall sound level.

Figure 8 provides the existing Roxboro steam plant at maximum output (2380 MW) with no coal car shaking. As stated in the body of the report, the rail car shaker is a part of the maximum noise condition that will be experienced and thus is included in making comparisons between future and existing conditions. However, it is not a dominant noise source for the plant, as can be seen in comparing Figure 8 and Figure 5.

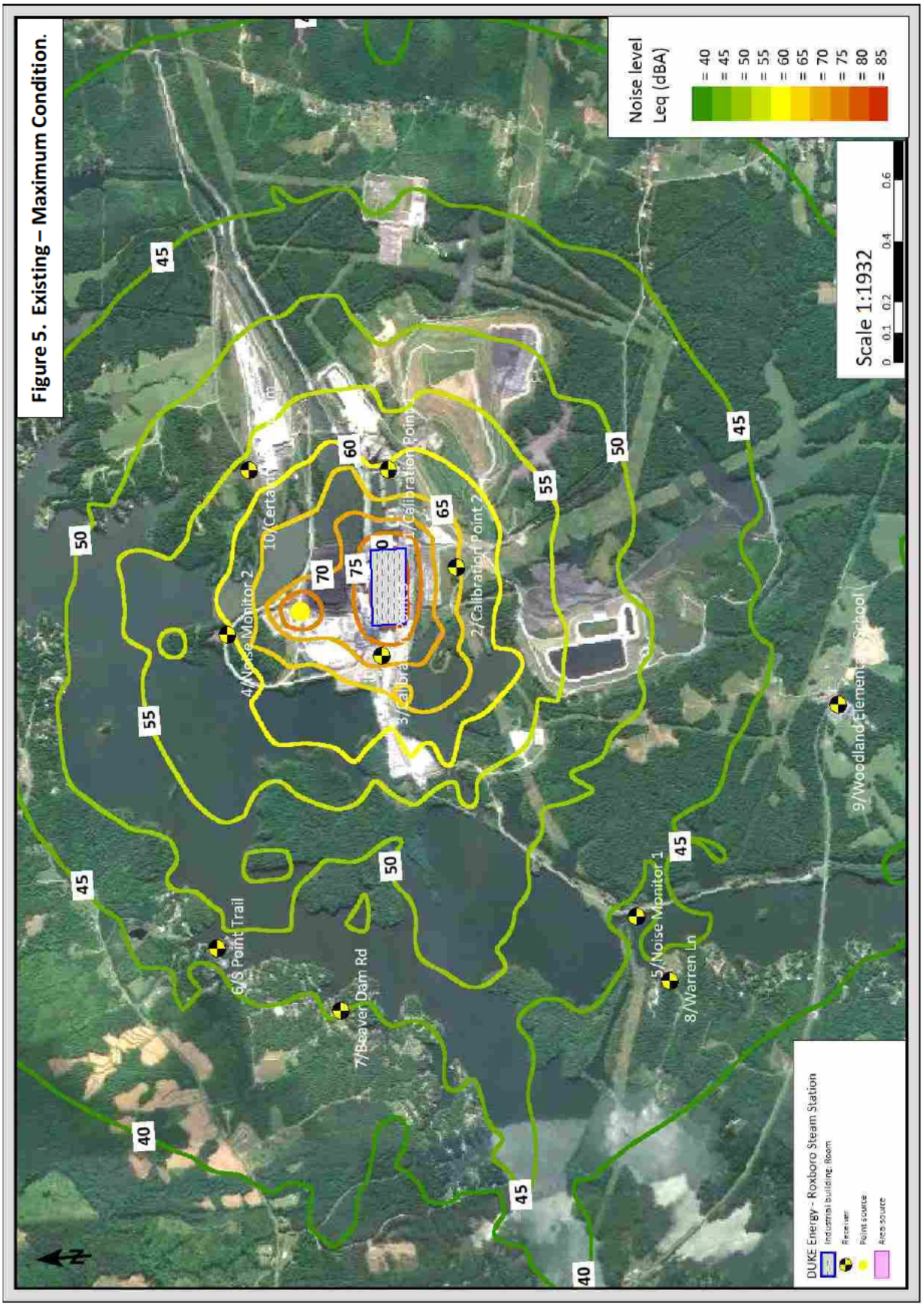
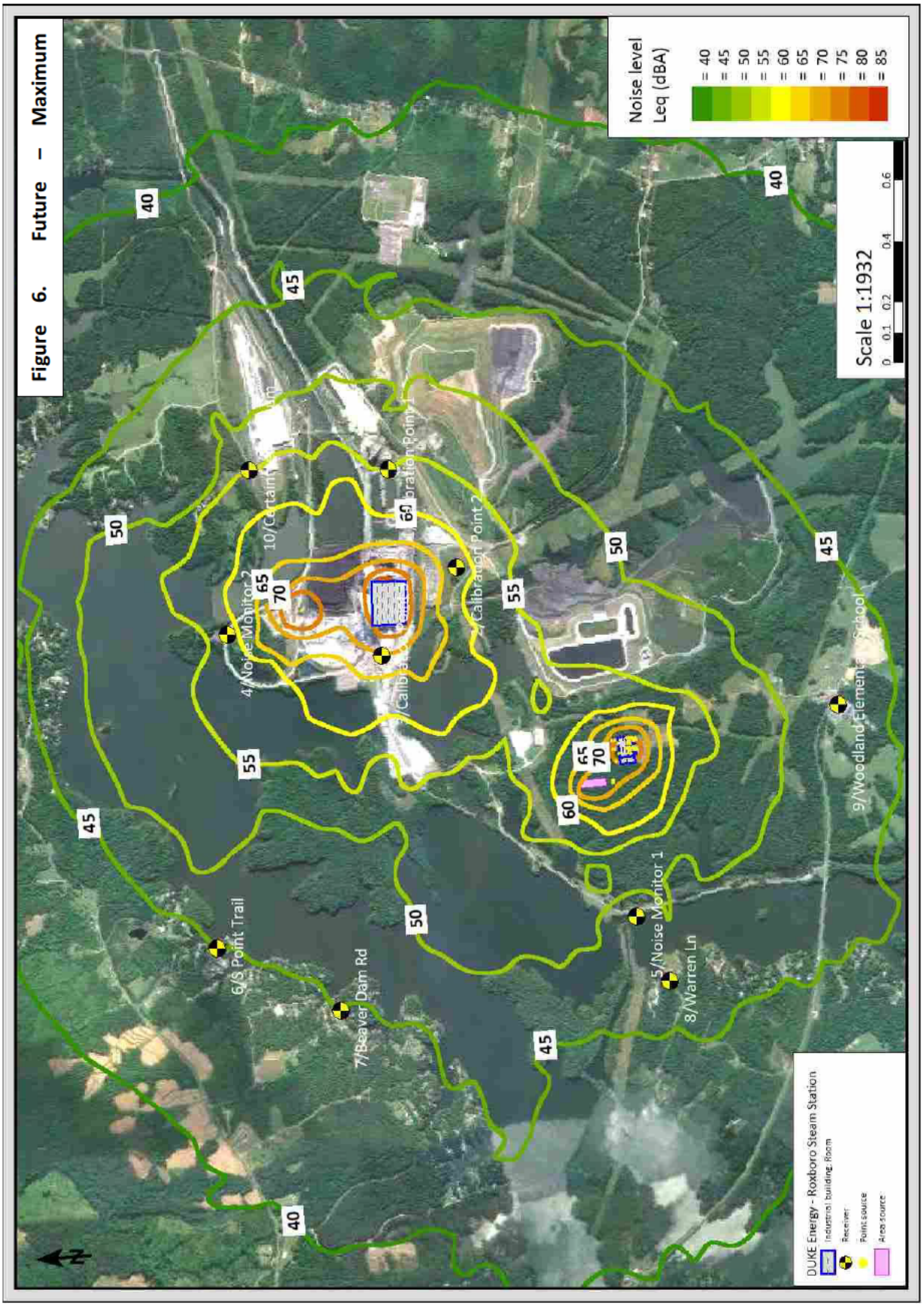
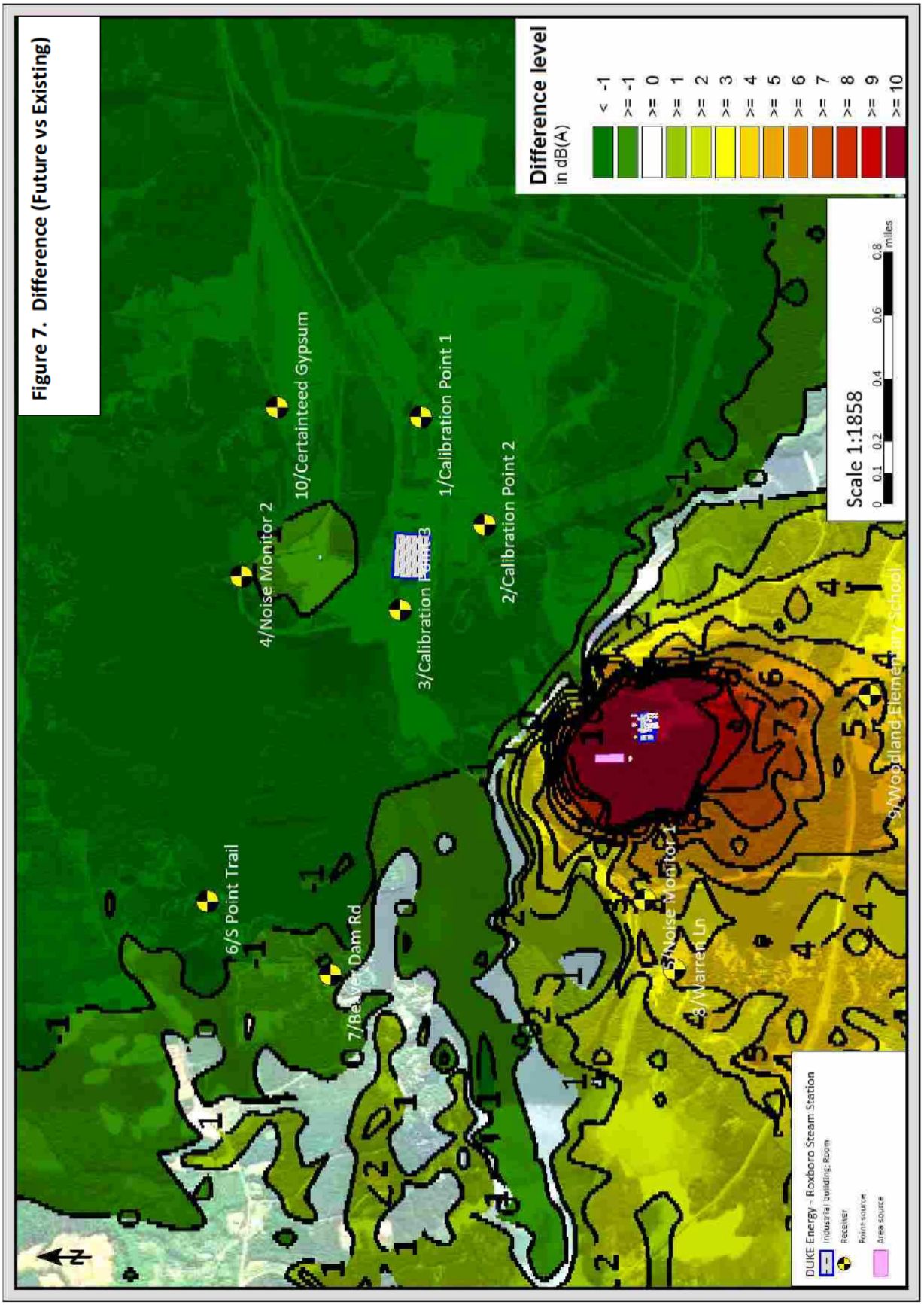
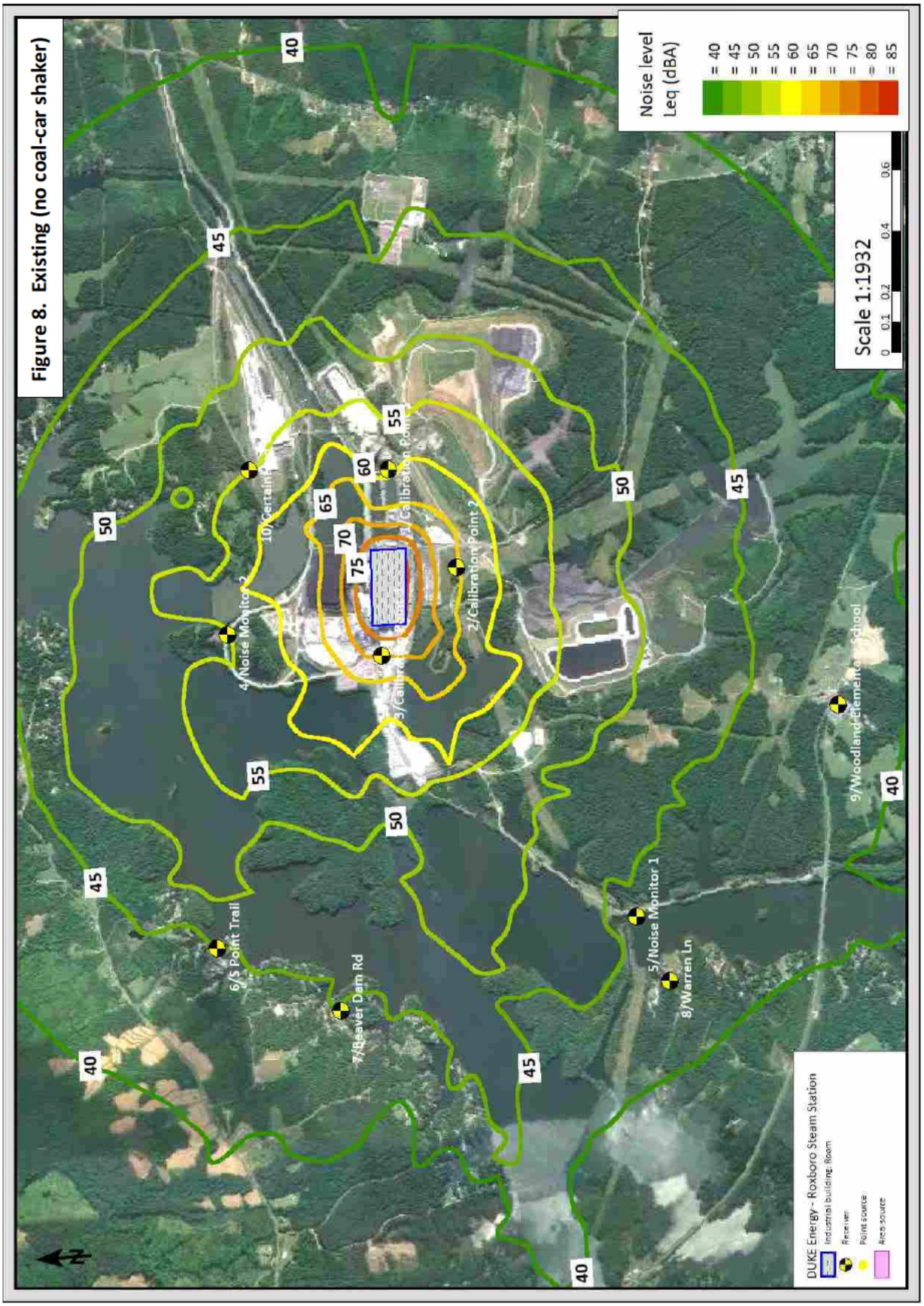


Figure 5. Existing – Maximum Condition.







Noise Impact Evaluation

Table 4 shows the measured noise levels at noise receptors and those calculated at SoundPLAN for existing conditions with the steam plant at maximum operating condition (2380 MW) and at the maximum operating condition for the future CCGT and steam plant.

Table 4. Noise Levels at Receptors for Measured, Existing Maximum Capacity, Future Maximum Capacity.

Loc ID	Location	Measured L_{Aeq}	Existing Max Steam + Shaker SoundPLAN L_{Aeq}	Future Max Steam + Shaker +CCGT SoundPLAN L_{Aeq}	Increase
1	South Point Trail	41.8	46.5	44.9	No
2	Beaver Dam Road	44.1	45.5	45	No
3	Warren Lane	34.8	43.2	47.3	4.1 dBA
4	Woodland Elementary School	58.5	42.7	47.8	No, because of existing traffic on Hwy 57
5	CertainTeed Plant	59.5	57.2	54.8	No
2	Beaver Dam Road	42.1	45.5	45	No
3	Warren Lane	38.1	43.2	47.3	4.1 dBA

The residences on Warren Lane, which is directly west of the new CCGT plant will be the residences most affected by the addition of the new CCGT plant. However, increases are only 3.9 dBA from what they experience now when in full operation and levels are below 50 dBA. Residences on Spinnaker Lane will also be affected to a lesser extent. The results presented in Table 4 are for the CCGT plant operating at maximum capability. The CCGT plant operating at lower power output will have lower sound power, and lower sound levels.

Near Hwy 57 (Semora Rd), Woodland Elementary School, businesses Pointer & Associates and West & Woodall Real Estate, and residence at 100 Spinnaker Lane will have higher sound levels with the future CCGT plant than currently exists with the Roxboro steam plant. However, due to Hwy 57 producing significant vehicle noise, the school, businesses, and residents being close to Hwy 57 will not experience a large overall increase in their total environmental noise.

The locations to the north and east of the current steam plant will experience a noise decrease when steam plants 1 and 2 are permanently retired. The environmental noise at the CertainTeed plant will experience a 2.5 dB lower noise level when steam plants 1 and 2 are retired. The residence on Rock Pointe Drive will experience a 1.5 dB noise decrease with the retirement of steam plants 1 and 2.

Beaver Dam Road residences are located such that they will experience no noise increase when the CCGT is operating, and steam plants 1 and 2 are retired. As expected, locations north and east of the current steam station will experience a noise reduction when the CCGT plant starts to operate and steam plants 1 and 2 are Also retired. Also, as expected, locations west and south of the future CCGT plant will experience a noise increase.

Sound levels are not more than 55 dBA with all CCGT's operating at any adjoining property lines. Increases at nearest neighbors to future plants are less than 4 dBA when comparing similar full power generation levels with coal car shaker noise (existing versus future) and thus not considered clearly noticeable.

Appendix A – Detailed Sound Measurements

Table A1. Noise sensitive receptor sound measurements obtained Friday, April 13 and 14, 2023.

Loc ID	Location	GPS N	GPS W	File	L_{Aeq}	L_{ASmax}	L_{10}	L_{50}	L_{90}
1	Rock Pointe Drive	36.492379°	-79.093334°	014	41.8	49.7	44.2	40.2	38.1
2	Beaver Dam Road	36.486644°	-79.097694°	015	44.1	54.2	47.7	39.5	35.8
3	Warren Lane	36.470932°	-79.097085°	016	34.8	39.4	35.8	34.5	33.7
4	Woodland Elementary School	36.462090°	-79.081344°	017	58.5	69.4	63.8	51.8	38.3
5	CertainTeed Plant	36.489004°	-79.065130°	018	59.5	60.6	60.1	59.4	59.0
6	Roy Carver Road	36.490150°	-79.061128°	019	47.4	48.7	48.1	47.3	46.3
2	Beaver Dam Road	36.486644°	-79.097694°	027	42.1	51.7	46.5	37.5	35.4
3	Warren Lane	36.470932°	-79.097085°	028	38.1	43.7	40.4	37.9	33.8

Table A2. Noise Monitor 1, Location GPS N 36.472229°, GPS W -79.093069°, April 12, 13 and 14, 2023, A-weighted (dBA)

Type	Start	Duration	LASmax	LAeq	L_{10}	L_{50}	L_{90}
60'	2023-04-12 12:00:00	0:48:00	73.1	50.2	49.1	36.4	29.6
60'	2023-04-12 13:00:00	1:00:00	77.2	51.5	49.0	33.0	28.8
60'	2023-04-12 14:00:00	1:00:00	79.0	52.5	49.6	35.3	30.5
60'	2023-04-12 15:00:00	1:00:00	74.6	51.4	47.8	36.9	32.0
60'	2023-04-12 16:00:00	1:00:00	75.2	49.4	44.2	36.0	31.6
60'	2023-04-12 17:00:00	1:00:00	76.1	51.7	47.9	38.3	34.2
60'	2023-04-12 18:00:00	1:00:00	76.0	51.5	48.9	38.5	34.4
60'	2023-04-12 19:00:00	1:00:00	66.2	46.1	48.5	38.6	32.9
60'	2023-04-12 20:00:00	1:00:00	63.4	44.6	46.9	41.1	37.2
60'	2023-04-12 21:00:00	1:00:00	57.1	41.8	43.6	35.9	30.5
60'	2023-04-12 22:00:00	1:00:00	51.2	36.4	39.7	32.4	25.8
60'	2023-04-12 23:00:00	1:00:00	54.5	36.2	38.3	28.3	21.9
60'	2023-04-13 00:00:00	1:00:00	50.1	30.4	33.6	23.7	21.3
60'	2023-04-13 01:00:00	1:00:00	52.7	32.3	34.8	25.6	21.3
60'	2023-04-13 02:00:00	1:00:00	48.9	30.7	33.4	22.9	20.8
60'	2023-04-13 03:00:00	1:00:00	64.8	36.6	36.1	23.8	20.5
60'	2023-04-13 04:00:00	1:00:00	71.8	45.3	40.1	32.8	25.8
60'	2023-04-13 05:00:00	1:00:00	73.3	53.6	52.0	40.1	31.1
60'	2023-04-13 06:00:00	1:00:00	74.9	54.3	53.3	45.4	40.2
60'	2023-04-13 07:00:00	1:00:00	69.4	49.7	48.3	43.9	40.5
60'	2023-04-13 08:00:00	1:00:00	73.3	48.3	46.5	41.6	38.2
60'	2023-04-13 09:00:00	1:00:00	77.6	51.1	50.1	39.5	35.5
60'	2023-04-13 10:00:00	1:00:00	76.4	52.2	48.5	40.9	35.1
60'	2023-04-13 11:00:00	1:00:00	81.8	53.9	47.2	42.6	39.6
60'	2023-04-13 12:00:00	1:00:00	74.0	51.5	47.9	40.3	31.2
60'	2023-04-13 13:00:00	1:00:00	73.9	48.2	48.2	37.7	31.5
60'	2023-04-13 14:00:00	1:00:00	73.8	49.2	47.1	37.6	32.5
60'	2023-04-13 15:00:00	1:00:00	69.7	49.7	50.0	38.2	33.7
60'	2023-04-13 16:00:00	1:00:00	75.5	50.8	48.4	38.4	34.4
60'	2023-04-13 17:00:00	1:00:00	72.3	49.7	49.2	41.4	37.5
60'	2023-04-13 18:00:00	1:00:00	78.4	52.5	48.8	42.5	38.4
60'	2023-04-13 19:00:00	1:00:00	64.7	45.2	46.8	40.3	36.7
60'	2023-04-13 20:00:00	1:00:00	64.9	44.3	46.7	41.2	35.3
60'	2023-04-13 21:00:00	1:00:00	60.8	43.0	45.4	40.6	31.5
60'	2023-04-13 22:00:00	1:00:00	48.8	35.2	38.6	32.2	27.1
60'	2023-04-13 23:00:00	1:00:00	46.2	33.9	36.7	32.3	28.3
60'	2023-04-14 00:00:00	1:00:00	45.4	31.8	33.5	29.4	23.7
60'	2023-04-14 01:00:00	1:00:00	53.4	32.0	30.7	24.0	21.4
60'	2023-04-14 02:00:00	1:00:00	51.6	29.4	32.3	22.7	20.5
60'	2023-04-14 03:00:00	1:00:00	66.3	37.0	33.7	26.1	21.9
60'	2023-04-14 04:00:00	0:46:06	57.6	35.5	33.6	24.8	21.9

Figure A1. Monitor 1 - L_{Aeq} and L_{ASmax} Time Histories West of New CCGT Site.

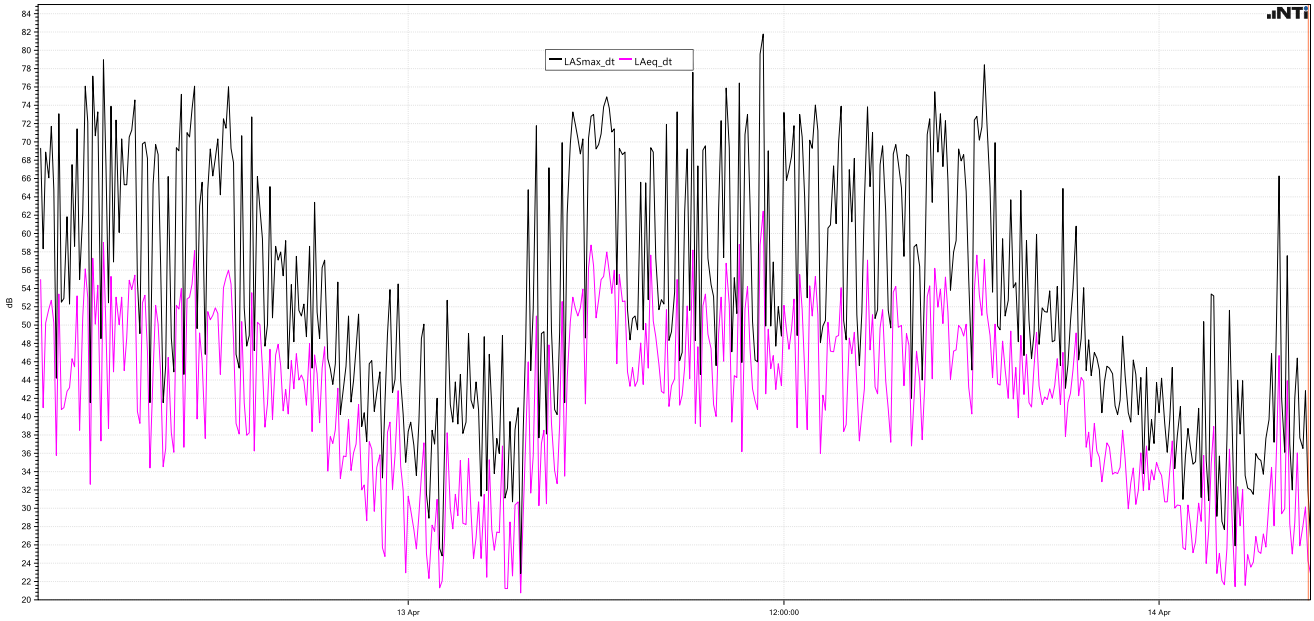


Figure A2. Monitor 1 - L_{10}, L_{50} and L_{90} Time Histories West of New CCGT site.

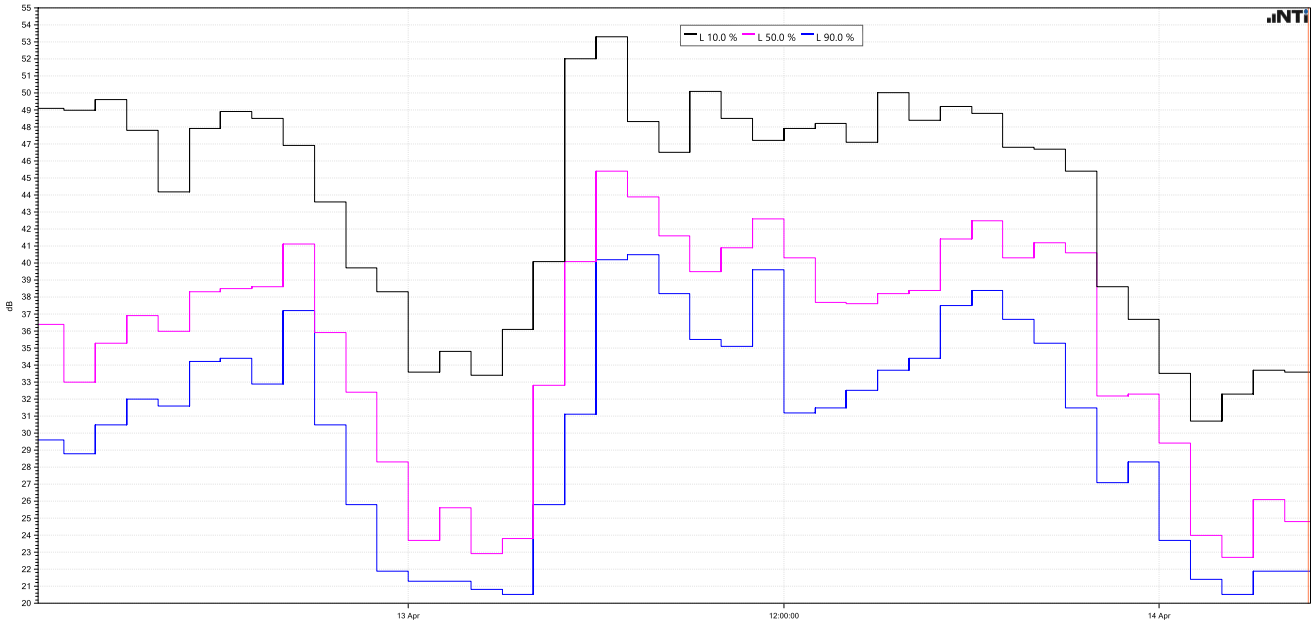


Figure A1 provides the time history for L_{ASmax} and L_{Aeq}. Figure A2 provides the statistical values over 1-hour time increments for L_{10}, L_{50}, and L_{90}.

Table A3. Noise Monitor 2, Location GPS N 36.491038°, GPS W -79.074937°, April 12, 13 and 14, 2023, A-weighted (dBA)

Type	Start	Duration	L_{ASmax}	L_{Aeq}	L_{10}	L_{50}	L_{90}
60'	2023-04-12 16:00:00	0:44:08	86.7	55.6	45.8	37.3	34.9
60'	2023-04-12 17:00:00	1:00:00	66.5	41.9	39.4	36.7	35.3
60'	2023-04-12 18:00:00	1:00:00	62.4	41.3	42.2	38.9	37.6
60'	2023-04-12 19:00:00	1:00:00	52.9	41.6	43.7	40.8	38.6
60'	2023-04-12 20:00:00	1:00:00	60.6	47.5	49.3	46.0	42.8
60'	2023-04-12 21:00:00	1:00:00	60.9	48.3	48.6	47.6	46.1
60'	2023-04-12 22:00:00	1:00:00	63.5	49.9	53.5	46.8	44.4
60'	2023-04-12 23:00:00	1:00:00	65.5	48.8	51.5	45.6	44.7
60'	2023-04-13 00:00:00	1:00:00	82.3	64.1	57.2	45.5	44.4
60'	2023-04-13 01:00:00	1:00:00	78.8	56.3	60.6	45.8	44.3
60'	2023-04-13 02:00:00	1:00:00	67.5	49.8	50.7	47.1	45.5
60'	2023-04-13 03:00:00	1:00:00	54.5	48.6	50.4	48.2	46.4
60'	2023-04-13 04:00:00	1:00:00	61.7	49.8	52.3	48.4	46.4
60'	2023-04-13 05:00:00	1:00:00	62.1	47.7	49.7	45.4	43.8
60'	2023-04-13 06:00:00	1:00:00	64.9	48.1	50.3	45.0	42.3
60'	2023-04-13 07:00:00	1:00:00	58.4	44.4	46.6	42.2	40.2
60'	2023-04-13 08:00:00	1:00:00	64.9	47.9	47.7	40.0	38.2
60'	2023-04-13 09:00:00	1:00:00	54.4	40.0	42.2	38.2	36.5
60'	2023-04-13 10:00:00	1:00:00	64.7	46.6	47.7	39.1	35.9
60'	2023-04-13 11:00:00	1:00:00	64.3	42.0	44.1	36.4	34.7
60'	2023-04-13 12:00:00	1:00:00	56.6	38.5	39.7	35.6	34.1
60'	2023-04-13 13:00:00	1:00:00	63.8	46.9	45.5	40.2	36.9
60'	2023-04-13 14:00:00	1:00:00	63.2	43.7	45.2	41.3	39.6
60'	2023-04-13 15:00:00	1:00:00	59.9	44.3	46.1	41.8	39.6
60'	2023-04-13 16:00:00	1:00:00	53.5	41.9	43.0	40.7	38.8
60'	2023-04-13 17:00:00	1:00:00	61.2	43.2	44.1	41.2	39.8
60'	2023-04-13 18:00:00	1:00:00	59.3	42.0	42.8	41.1	39.8
60'	2023-04-13 19:00:00	1:00:00	53.1	43.5	46.0	42.3	40.1
60'	2023-04-13 20:00:00	1:00:00	60.9	47.7	49.2	46.6	45.5
60'	2023-04-13 21:00:00	1:00:00	52.4	46.3	47.4	46.0	45.1
60'	2023-04-13 22:00:00	1:00:00	59.2	45.3	46.3	44.7	43.6
60'	2023-04-13 23:00:00	1:00:00	60.0	46.5	48.9	44.5	42.9
60'	2023-04-14 00:00:00	1:00:00	56.9	43.0	45.0	42.3	41.2
60'	2023-04-14 01:00:00	1:00:00	46.9	42.2	43.5	41.9	41.0
60'	2023-04-14 02:00:00	1:00:00	56.1	42.5	43.5	42.2	41.0
60'	2023-04-14 03:00:00	1:00:00	52.2	43.6	44.3	43.3	42.4
60'	2023-04-14 04:00:00	1:00:00	55.4	43.9	46.3	43.0	40.3
60'	2023-04-14 05:00:00	1:00:00	54.1	40.2	42.9	38.4	35.1
60'	2023-04-14 06:00:00	1:00:00	65.7	47.3	50.9	43.6	38.4
60'	2023-04-14 07:00:00	1:00:00	63.0	46.2	49.1	41.8	37.4
60'	2023-04-14 08:00:00	1:00:00	64.6	46.5	50.2	38.8	35.7
60'	2023-04-14 09:00:00	1:00:00	65.7	46.9	47.3	38.2	35.2
60'	2023-04-14 10:00:00	1:00:00	86.0	58.0	57.6	48.3	40.2
60'	2023-04-14 11:00:00	1:00:00	67.1	49.4	51.1	45.3	38.3
60'	2023-04-14 12:00:00	1:00:00	68.5	47.8	49.5	39.6	34.6
60'	2023-04-14 13:00:00	0:32:39	68.1	48.9	51.4	38.6	35.2

Figure A3 provides the time history for L_{ASmax} and L_{Aeq}. Figure A4 provides the statistical values over 1-hour time increments for L_{10}, L_{50}, and L_{90}.

Figure A3. Monitor 2 - L_{Aeq} and L_{Asmax} Time Histories North of Coal Rail Track Loop

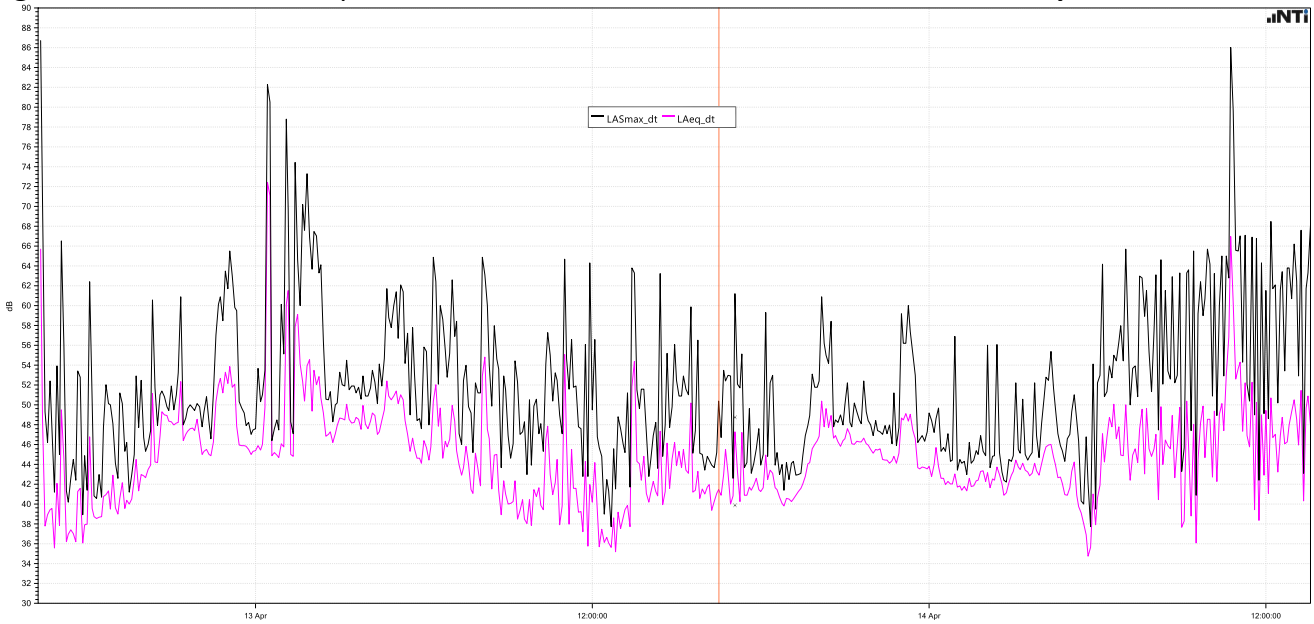
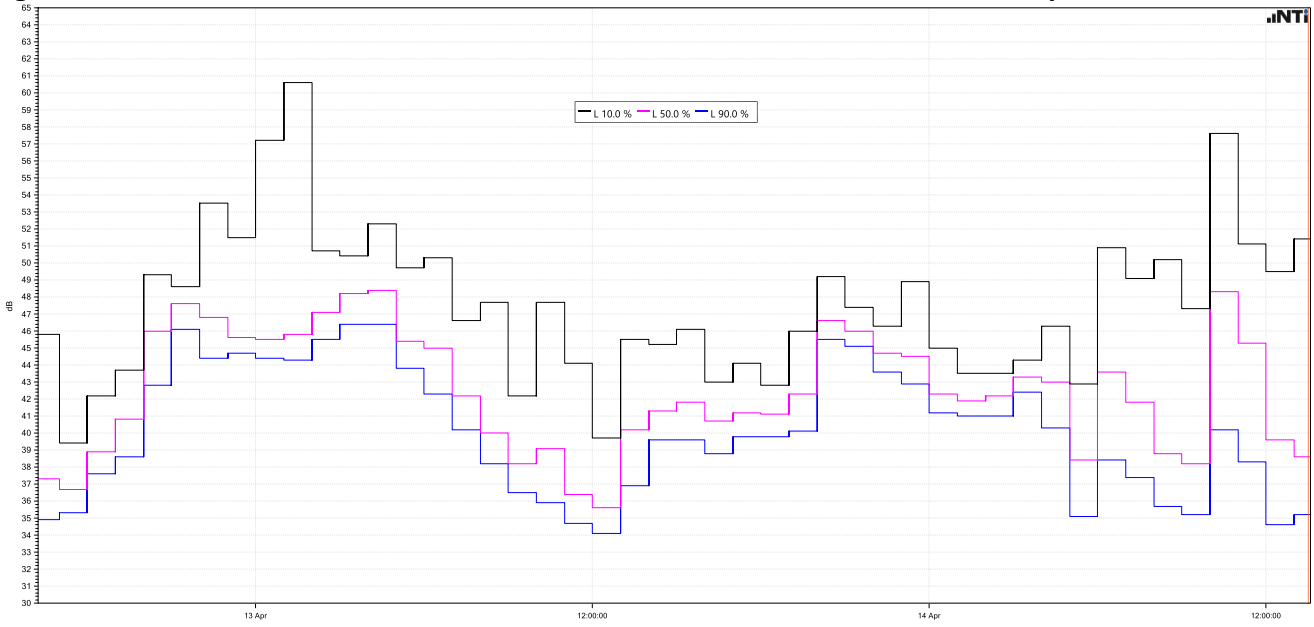


Figure A4. Monitor 2 - L_{10}, L_{50} and L_{90} time histories North of Coal Rail Track Loop .



DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-1

BROCKINGTON'S WINDSHIELD RECONNAISSANCE OF THE ROXBORO PLANT

Brockington
CULTURAL RESOURCES CONSULTING

Mr. Henry Jenkins
Pike Engineering
123 North White Street
Fort Mill, SC 29715

July 5, 2023

Re: Windshield Reconnaissance of the Duke Roxboro Plant, Person County, North Carolina

Dear Mr. Jenkins:

On March 14, 2023, Pike Engineering contracted with Brockington and Associates, Inc. (Brockington) to conduct an architectural literature review and windshield reconnaissance for new project construction at Duke Energy's Roxboro Plant in Person County, North Carolina. The study area is in northeastern Person County and consists of approximately 8,042.2 acres. This investigation is a due-diligence effort designed for planning purposes in sitting the plant so that any potentially significant cultural resources may be considered during the sitting process. This level of effort does not constitute fulfillment of more intensive studies that would be required under Section 106 of the National Historic Preservation Act (NHPA), should that law become applicable in this project.

North Carolina State Historic Preservation Office HPOWEB Research for Known Cultural Resources

Historic Architecture

This research included a review of all previously recorded above-ground resources on file through the HPO Web, the North Carolina State Historic Preservation Office (NCSHPO) repository of recorded architectural property data. This data includes the National Register of Historic Places (NRHP) listed properties, resources recorded during Section 106 investigations, determinations of eligibility (DOEs), properties placed on the state Study List for further research, and resources recorded through surveys for counties and municipalities. NCSHPO records identify a total of seven previously recorded architectural resources in the study area. These include two NRHP listed resources: Burleigh or the McGehee-Phifer Plantation (PR0011), a House on Wagstaff Farm (PR0295), one non-extant NRHP listed resource: House on Dunnaway Road (PR0050), one potentially eligible previously recorded resource: Wagstaff Barn (PR0124) and three not eligible resources: Woodland Elementary School (PR0549), single ranch dwelling (PR0833), and additional single ranch dwelling (PR0834). Due to vegetation, PR0011, PR0833, and PR0834 were not visible from the public right-of-way. Of note, three of the resources (PR0549, PR0833, and PR0834) were recently recorded for proposed construction work at Duke Energy's Roxboro Plant and are not yet in the HPO Web (Langmyer et al. 2023). These resources were recommended as ineligible for the NRHP, and the NCSHPO has not yet rendered a formal opinion. Table 1 itemizes the known recorded architectural resources.

We also considered any locally significant properties that may not be formally listed with the state. We also reviewed relevant county planning documents, but no additional resources beyond those itemized in the SHPO records (Table 1) were identified. Prior to the windshield survey, we also reviewed historic maps and aerials to obtain locations of potential historic properties and guide our field effort.

Table 1. Previously Recorded Architectural Resources (n=71) in the Study Area.

Site ID	Name	Description	Identification/ Year	Reconnaissance Notes	Reconnaissance NRHP Assessment
PR0011	Burleigh/McGehee-Phifer Plantation	Early 19th-century late Georgian house	NRHP Listed 1980	Extant	NRHP Listed
PR0050	House on Dunnaway Road	No Longer Extant; Two-story Greek Revival	N/A	Not Extant	N/A
PR0124	Wagstaff Barn	Early 19th-century barn	N/A	Extant	Potentially Eligible
PR0295	House on Wagstaff Farm	ca. 1890, Early 19th century Georgian, single-pile frame house	NRHP Listed 2006	Extant	NRHP Listed
PR0549	Woodland Elementary School	ca. 1930	Ineligible (SHPO determination pending)	Extant	Ineligible
PR0833	House	ca. 1966, Ranch dwelling	Ineligible (SHPO determination pending)	Extant	Ineligible
PR0834	House	ca. 1969, Ranch dwelling	Ineligible (SHPO determination pending)	Extant	Ineligible

Windshield Reconnaissance for Historic Architecture

On March 27 – 28, 2023, the project historian conducted a windshield reconnaissance of the Roxboro study area. As outlined in National Register Bulletin #24, a windshield reconnaissance-level survey is useful in ascertaining "a general picture of the distribution of different types and styles [of architectural resources], and of the character of different neighborhoods" (Parker 1985:35-36). Windshield surveys are also useful for making preliminary assessments of eligibility based on the architectural integrity of properties, but not in ascertaining the historical associations a property might possess.

The reconnaissance consisted of a vehicular inspection of architectural resources visible from all publicly accessible roads within the study area. When a comparison of current

and historic topographic or aerial maps indicated properties located along private roads or abandoned and existing field roads, we supplemented our work through a review of aerial photography or online tax records if possible. In general, winter vegetation enabled good visibility to most properties, although some private properties distanced from roadways were not visible. The purpose of our windshield reconnaissance was to:

1. Evaluate all previously recorded architectural resources (if any);
2. Locate/assess architectural resources not previously recorded and that appear to meet the minimum fifty-year age requirement for the NRHP, and
3. Identify potentially eligible NRHP properties and mark in the GIS data set.

In general, our windshield survey employed the following approach to assessing previously recorded properties for the NRHP. Properties that do not have a formal determination of eligibility on file with the NCSHPO were liberally assessed as eligible as they may have significant local historical associations beyond the purview of this study. However, properties with substantial and irreversible architectural alterations were assessed as not eligible. Properties not visible from the public right-of-way or those with moderate alterations were assessed as potentially eligible. Those with recent formal evaluations retain the official NCSHPO determination of eligibility.

Any newly identified properties were assessed based on a review of their architectural integrity as visible from the public right-of-way, any historical associations uncovered during the literature review, and in consideration of any recent NCSHPO determinations for comparable types of architecture. Finally, photographs were taken of previously recorded and newly identified resources where practicable. Photographs are provided in Attachments A and B. Resources that could not be photographed due to visibility or safety reasons are noted in the GIS dataset.

The Roxboro study area is in northeastern Person County near the communities of Semora to the north and Concord to the south with arterial roads, including Zion Level Church Road, Semora Road (NC 57), Phifer Lane, Concord Church Road, Daisy Thompson Road, and Dunnaway Road. NC57 bisects the northeastern periphery of the study area near the Burleigh/McGehee-Phifer Plantation (PR0011). There are numerous other smaller neighborhood roads, including those surrounding portions of Hyco Lake. Historic aerials indicate broader agricultural land usage in the study area until the creation of Hyco Lake in the early 1960s, which covers 3,750 acres. Since that time, the area has transitioned to smaller farms and pasturage, though some large tracts still exist. The study area is largely agricultural with some residential, along with few examples of industrial or commercial development. One notable exception is the Roxboro (Hyco) Plant in the southeastern quadrant of the study area.

The study area contains numerous resources that are at least 50 years of age, but the vast majority have been modified by non-historic materials and/or incompatible alterations. The oldest building stock is a series of log cabins that are sporadically placed throughout the study area. Each of these cabins is severally dilapidated and is no longer eligible for the NRHP. There is also a moderate degree of early- to mid-twentieth-century style houses, including Minimal Traditional and Ranch. Many of the ranch houses retain much of their

architectural integrity; however, none appear to exhibit expressive ranch features beyond their basic linear form. Some of the best examples were captured during a 2023 ERM survey (Langmyers et al. 2023) conducted for Duke Energy's proposed construction work at the Roxboro Plant, and these were recommended not eligible for the NRHP. The most recent resources (post-1967) are largely concentrated along the shores of Hyco Lake and dedicated subdivisions stemming from arterial roadways. Others are dispersed throughout the study area where farmland has been subdivided over time.

The study area includes the Burleigh/McGehee-Phifer Plantation (PR011), which includes a late Georgian, vernacular residential form that is associated with the Federal and Greek Revival (Brown et al. 1979). After our visual reconnaissance, we concur with this recommendation. We also reviewed the study area for any potential historic districts, but no cohesive collection of architecture was identified.

There is one modern church congregation within the study area. This includes the Zion Level Baptist Church. The Church has an associated ineligible cemetery, and no other cemeteries were visible from the public roadways except for the one cemetery directly associated with the existing church. The church does not meet the minimum age requirement for NRHP consideration.

There are seven previously recorded architectural properties within the study area. The two NRHP-listed properties (PR0011 "Burleigh/McGehee-Phifer Plantation" and PR0295 "House on Wagstaff Farm") are eligible under Criterion C. Resource PR0011 was not visible from the public right-of-way. Three of the previously recorded properties were recently recorded and evaluated as not eligible for the NRHP; these have not been formally reviewed by the SHPO, but we concur with those recommendations. Table 1 provides additional detail on each of the properties. Attachment A provides photographs.

During the reconnaissance, Brockington identified three additional resources that appear to 1) retain sufficient architectural integrity and 2) possess architectural significance to be potentially eligible for the NRHP. This includes three residential structures within the project area. Table 2 itemizes the resources and Attachment B provides photographs.

Table 2. Potentially Eligible Architectural Resources Identified During the Reconnaissance.

Site ID	Location	Description	Reconnaissance NRHP Assessment
RX-1	556 Daisy Thompson Road	c1910 two-story pyramidal farmhouse	Potentially Eligible
RX-2	160 Wagstaff Road	19th c. single-story log cabin	Potentially Eligible
RX-3	6217 Semora Road	c1910 two-story farmhouse	Potentially Eligible

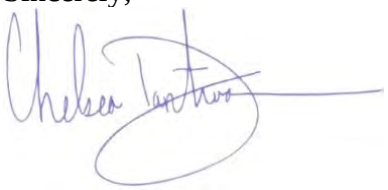
Where possible, architectural properties identified as listed, eligible, or potentially eligible for the NRHP should be avoided and visual effects considered during project planning.

Finally, we observed numerous other properties that appear to be 50 years old (thus, meeting the minimal standard for NRHP eligibility consideration) distributed throughout the study area; these are properties that would be recorded by an architectural historian to satisfy NHPA Section 106 if that regulatory compliance is required. These properties might possess

historical significance that could only be determined through more detailed archival research for eligibility under Criterion C for the NRHP. We did not attempt to plot each of these resources in our GIS dataset.

The attached Resources Map (Figure 1) details the findings from the windshield reconnaissance. The projection used to develop the map and shapefiles was NAD 1927 UTM Zone 17. Should you have any questions about the GIS data or property recommendations, please do not hesitate to send me an email (chelseadantuma@brockingtoncrm.com) or call 843-881-3128.

Sincerely,



Chelsea Dantuma, MCP
Architectural Historian/Project Manager

References Cited

Brown, Charlotte V., and Jim Sumner
1979 *National Register of Historic Places Inventory-Nomination Form for Burleigh/McGehee-Phifer Plantation*. Prepared by the Archaeology and Historic Preservation N.C. Division of Archives and History, Raleigh, North Carolina.

Langmyers, Michael, Mary Beth Derrick, Emily Dodson, Annika Liger, Larissa Thomas, and Jeffrey Holland
2023 *Phase I Historic Architectural Survey, Roxboro Project, Person County, North Carolina*. Prepared for Duke Energy, LLC., Charlotte, North Carolina, by ERM International Group Limited, Duluth, Georgia.

Parker, Patricia L.
1985 *Guidelines for Local Surveys: A Basis for Preservation Planning*. National Register Bulletin #24. National Park Service, Washington, D.C.

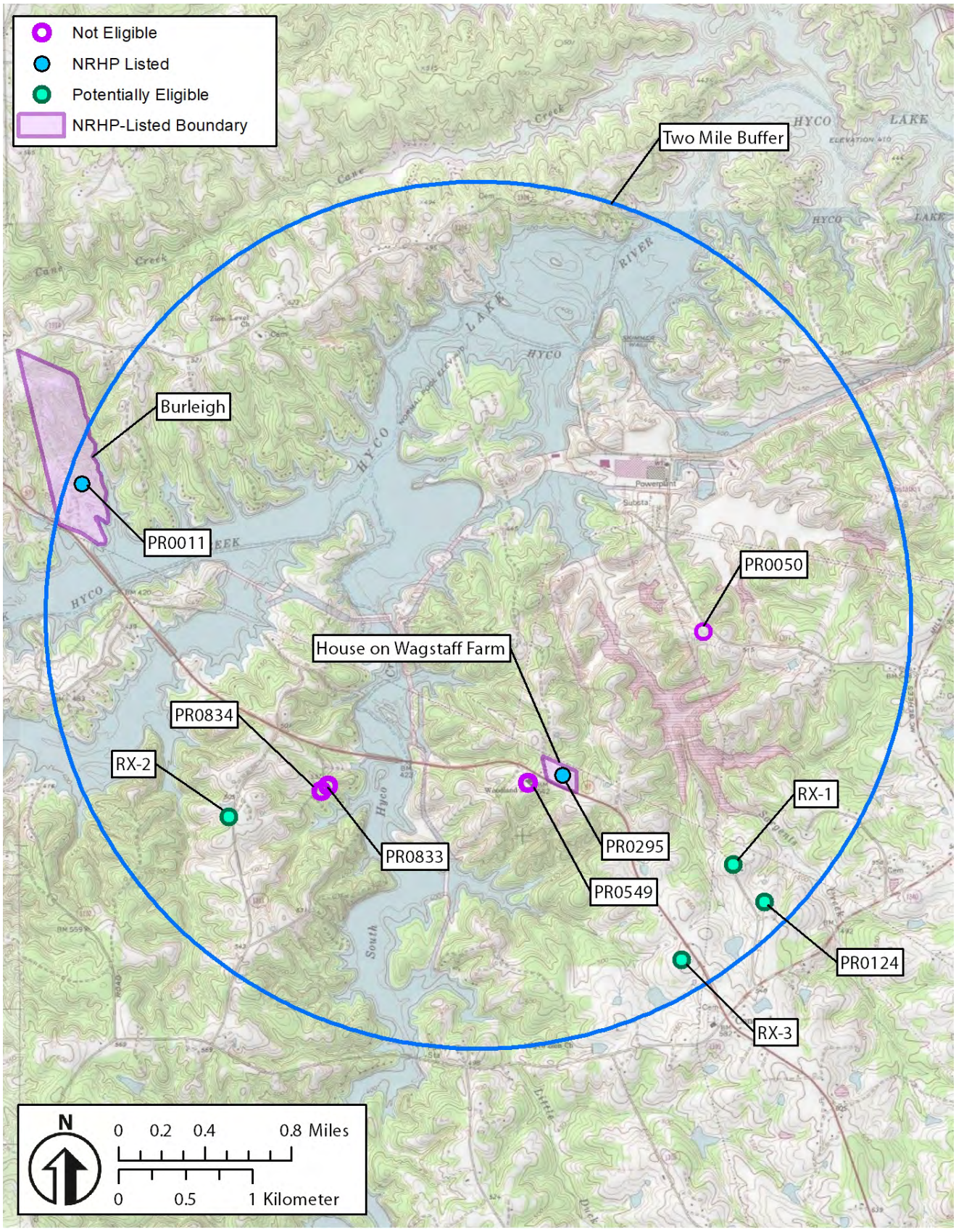


Figure 1. Roxboro Plant Resources Map (see GIS data for additional detail).

DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-2

ERM'S PHASE 1 ARCHITECTURAL SURVEY, ROXBORO PROJECT

Phase I Historic Architectural Survey

Roxboro Project,
Person County, North Carolina

9 March 202323

Project No.: 0672318

Document details	The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.
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Client Name	Duke Energy

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9 March 2023

Phase I Historic Architectural Survey

Roxboro Project, Person County, North Carolina

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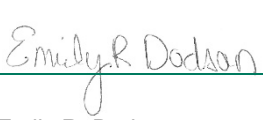

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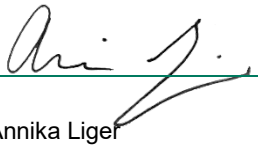

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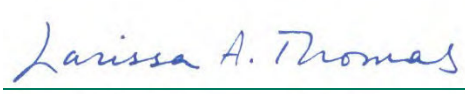

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ABSTRACT

On January 10 through 12, 2023, Environmental Resources Management (ERM) conducted Phase I historic architectural investigations on behalf of Duke Energy, LLC (Duke) in association with the Duke Roxboro Project (Project) in Person County, North Carolina. Subject to authorization by the Federal Energy Regulatory Commission, Duke proposes to construct and operate an energy facility off Hyco Lake. Duke plans to construct a series of gas turbines, steam tubing, an electrical switch yard, cooling towers, office spaces, maintenance buildings, transmission generator tie lines, parking areas, and two construction laydown areas, one to the north and one to the south within the Project area. The Steam Station will co-locate to existing transmission lines and connect to an existing switchyard to the northeast.

This report presents the results of a Phase I survey to inventory historic architectural resources that could be affected by the Project. The proposed Project site consists of approximately 107.22 acres. The Area of Potential Effects (APE) for architectural resources is defined as the Project site, plus a potential viewshed area defined as a 0.5-mile radius from the Project area, assuming proposed aboveground construction will be less than 200 feet high. Project design has yet to be finalized, and stack height will depend on the results of air modeling, but the two proposed stacks are currently estimated to be 180 feet, and they will be the tallest components of the facility. Previously recorded and newly identified historic structures within the Project's APE that appear to be 50 years old or older were surveyed.

The field survey did not identify any historic properties within the Project's direct APE. Four historic architectural resources were identified within the APE for visual effects. ERM recommends three resources as ineligible for listing on the National Register of Historic Places (NRHP), while the fourth is previously listed on the NRHP. Visual assessment of the surveyed resources shows that the towers of the existing Duke Infrastructure are visible approximately 0.6 mile northeast of the proposed Steam Station; however, these existing towers appear to be over 200 feet tall. Only the two tallest towers are visible from this distance as well; the other four smaller towers, closer to 200 feet, are not visible from any surveyed resources. Since the construction of the Project is currently proposed to be less than 200 feet in height, ERM recommends that the Project would have no effect on any architectural resources covered within this report.

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Acronyms and Abbreviations

Name	Description
APE	Area of Potential Effects
ERM	Environmental Resources Management
FERC	Federal Energy Regulatory Commission
GPS	Global Positioning System
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
NCHPO	North Carolina Historic Preservation Office
USGS	United States Geological Survey

1. INTRODUCTION

1.1 Overview

On January 10 through 12, 2023, Environmental Resources Management (ERM) conducted Phase I historic architectural investigations on behalf of Duke Energy, LLC (Duke) in association with the Duke Roxboro Project (Project) in Person County, North Carolina (Figures 1.1-1 and 1.1-2). Subject to authorization by the Federal Energy Regulatory Commission (FERC), Duke proposes to construct and operate an energy facility off Hyco Lake. Duke plans to construct a series of gas turbines, steam tubing, an electrical switch yard, cooling towers, office spaces, maintenance buildings, transmission generator tie lines, parking areas, and two construction laydown areas, one to the north and one to the south within the Project area. The Steam Station will co-locate to existing transmission lines and connect to an existing switchyard to the northeast.

This report presents the results of a Phase I survey to inventory historic architectural resources that could be affected by the Project. The proposed Project site consists of approximately 107.22 acres. An Area of Potential Effects (APE) is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 C.F.R. § 800.16[d]). The APE for architectural resources is defined as the Project site, plus a viewshed area defined as a 0.5-mile radius from the Project area, assuming proposed aboveground construction will be less than 200 feet high. Project design has yet to be finalized, and stack height will depend on the results of air modeling, but the two proposed stacks are currently estimated to be 180 feet, and they will be the tallest components of the facility. Previously recorded and newly identified historic structures within the Project's APE that appear to be 50 years old or older were surveyed.

Section 106 of the National Historic Preservation Act (NHPA), 16 United States Code (USC) 470, requires federal agencies to take into account the effects of their undertakings (including the issuance of Certificates or Authorizations) on properties listed in, or eligible for, listing in the National Register of Historic Places (NRHP). ERM is conducting Phase I surveys to collect information on architectural resources that could be affected by the Project in support of the Section 106 consultation process. The results of ERM's archaeological survey are presented in a separate technical report (Brignac et al. 2023).

1.2 Management Recommendations

ERM did not identify any historic properties within the proposed Project's direct area of impact. However, four historic architectural resources were identified within the APE for visual effects. ERM recommends three of these resources as ineligible for listing on the National Register of Historic Places (NRHP), while the fourth, PR0295 (NRHP 06000229), is previously listed on the NRHP under Criterion C. ERM recommends that due to the distance of that resource to the Project with intervening tree cover, and existing transmission lines in the viewshed, the Project would have no effect on PR0295/NRHP 06000229. The existing Duke infrastructure includes towers that appear to be over 200 feet tall as well as four smaller towers, closer to 200 feet in height, which provide a guide for what might be visible from the resource. The four roughly 200-foot-tall towers are not visible from PR0295/NRHP 06000229, nor from any of the surveyed resources. From this, ERM recommends that there would be no effect to PR0295/NRHP 06000229 given the current proposed construction plans. Therefore, ERM recommends that the work proposed by Duke be allowed to proceed as planned without further consideration of architectural resources.

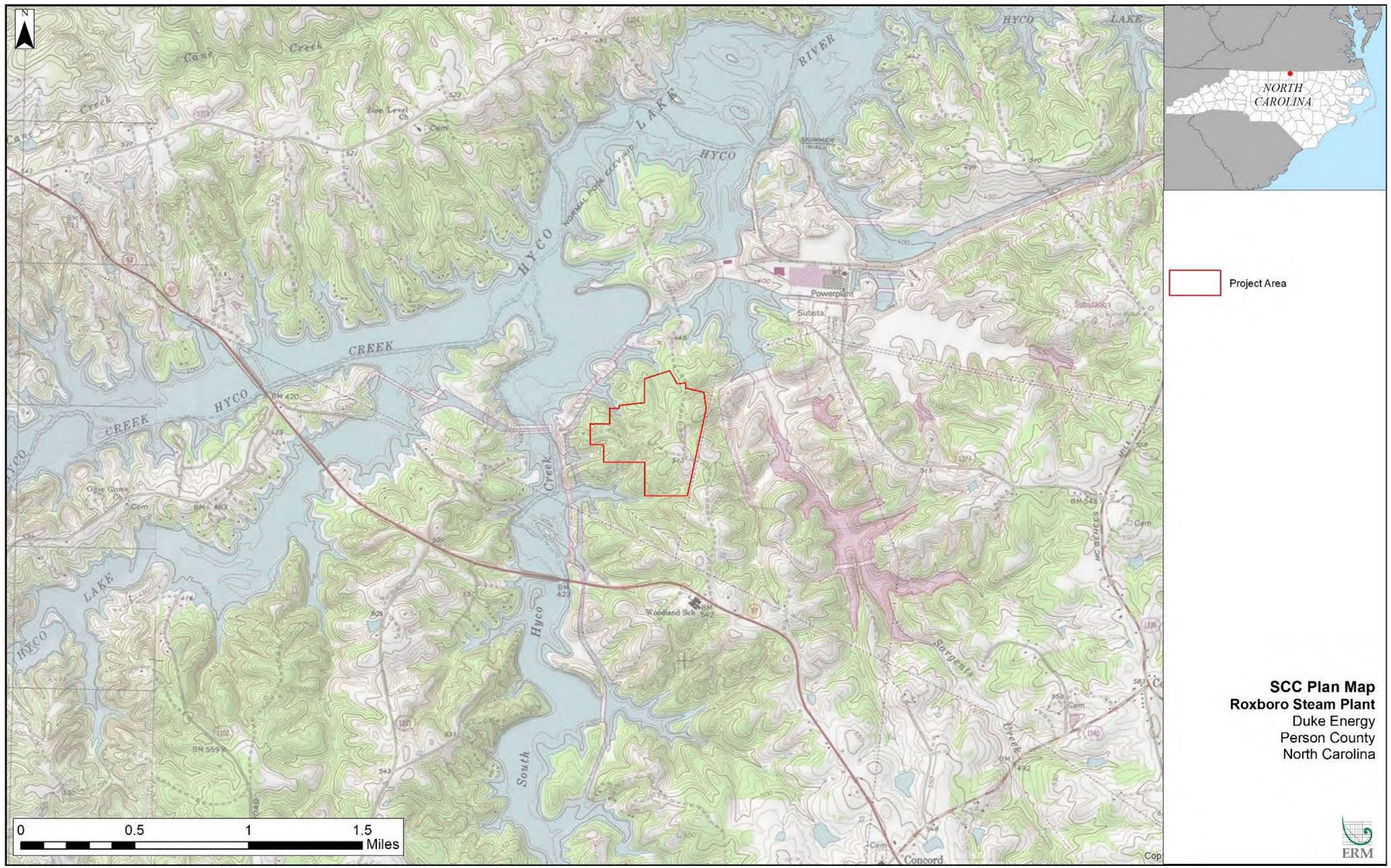

Figure 1.1-1: Project Topographic Overview

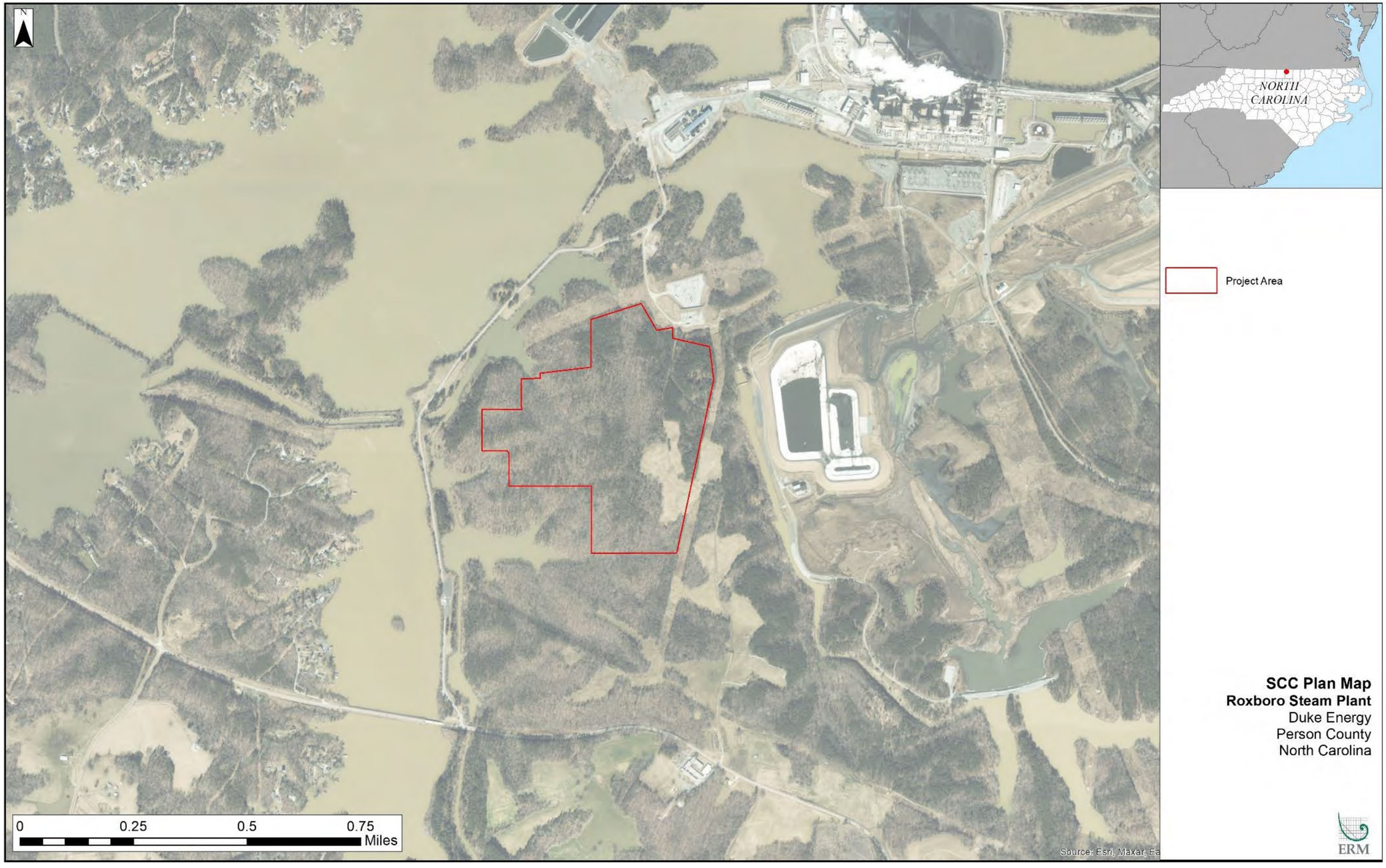

Figure 1.1-2: Project Aerial Overview.

2. HISTORIC CONTEXT

This chapter is designed to give a brief historical context of the Project area.

2.1 Historical Development of Person County

Orange County was created from the western part of Granville County in 1752 and included what is now Person County. However, significant settlement of the North Carolina backcountry did not occur until after the Cherokee were defeated during the French and Indian War in the early 1760s. In the late 1760s Hillsborough, the seat of Orange County, was a center in the Regulator Movement. Settlers in the backcountry above the Fall Line protested that their colony's system of taxation was unfair, with the less productive land in the western and Mountain regions being taxed at the same rate as the more fertile, level soil of the Coastal Plain. Such grievances contributed to feelings of sectional discrimination and a deep distrust of the authorities based in eastern North Carolina. These feelings were exacerbated by the new royal governor, William Tryon, who arrived in North Carolina in 1764 and initiated the building of an elaborate governor's mansion in New Bern at public expense. After a series of mob actions against public officials, Governor Tryon led the militia in a clash with the Regulators' at the Battle of Alamance (in present-day Burlington in Guilford County). The Regulator leaders who swore allegiance to the royal government were pardoned, but many refused and moved westward over the Appalachians into the territory that would become Tennessee (Lassiter and Lassiter 2004:26; Lewis 2018; Powell 2006).

Caswell County was created from the northern portion of Orange County in 1777, and Person County was created from the eastern half of Caswell County in 1791 (USGenNet 2023). Early settlers to the area were of English, Scots Irish, and German descent and primarily came from other colonies, including neighboring Virginia, as well as Maryland, New Jersey, and Pennsylvania (Forstall 1996; Phillips 2005). At the first federal census of the county in 1800, there were just 6,402 residents. That number increased to just over 10,000 by 1830, but then remained steady until after the Civil War. The county seat of Roxboro was not incorporated until 1855 (Forstall 1996; Marzzocchi 2006).

Agriculture was the foundation of Person County's economy from its first settlement. Farmers practiced mixed husbandry that included corn, oats, wheat, tobacco, cotton, fruits, and vegetables, along with livestock that included cattle, hogs, and sheep (Jurney et al. 1931). During this early period of settlement and focus on agriculture, the House on Wagstaff Farm (PRO295) was built south of the Project area, along modern-day Semora Road (Phillips 2006). The county ranked fourth in the state in tobacco production in 1850 with 1.5 million pounds marketed. Only a small amount of cotton was raised that year. Tobacco increased in importance in the second half of the nineteenth century. In 1860, over 2.7 million pounds of tobacco were reported. Tobacco is a labor-intensive crop, and Person County had a large enslaved African and African American population to work the fields. Indeed, roughly 45 percent of the total population before the American Civil War consisted of Black enslaved persons. The county also had a fairly large, for the time, free Black population of about 300 residents (DeBow 1853; Kennedy 1864a, 1864b; Walker 1872a, 1872b).

After the Civil War, tobacco production continued to increase at a moderate pace to nearly 7.5 million pounds in 1924. In 1931, nearly two-thirds of all tobacco produced in Person County was sold out of Roxboro (Jurney et al. 1931). Tobacco was the only strictly cash crop, with other produce raised for animals and home consumption, with surpluses sold on the market. Corn dominated grain production, with wheat and oats decreasing in importance by the early twentieth century. Orchards were commonplace by 1924. Most farmers kept a small number of cattle, hogs, and chickens, as well as a dairy cow or two. There were three dairies in the county in 1931 that sold their products in Roxboro. Like many areas of the South after the Civil War, tenancy increased during the late nineteenth and early twentieth centuries. In 1880, 62 percent of the county's farm operators owned their farms; by 1925, just

38 percent were owners. Farm size decreased during that period from 168 acres to 76 acres, as large farms worked by slaves were broken into smaller farms operated by tenants (Jurney et al. 1931; U.S. Census Bureau 1883).

Very little industry developed in Person County. Cotton goods were manufactured at Roxboro and other nearby small towns. Other small towns in the county are primarily trade centers connected by the railroad. The construction of the Norfolk & Western Railway from Lynchburg, Virginia to Durham, North Carolina in 1890 and the Southern Railway in 1892 opened up the lumber business, but the profitable timber was largely cut over by 1905 (Jurney et al. 1931). The railroad system was so pervasive in Person County, that in the 1930s, there was at least one railroad station every 13 miles (Jurney et.al. 1931).

In the 1950s and 60s, Person County and Roxboro remained relatively rural. The population declined post World War II in both Person County and Roxboro to roughly 24,000 residents in Person County, 4,000 of whom lived in Roxboro (U.S. Census Bureau 1950). In the 1960s, the Carolina Power and Light Company built Lake Hyco, attracting development to its shores (Welcome to Lake Hyco 2021). In 2021, the population of Person County was approximately 39,000 people, roughly 8,000 of whom live in Roxboro (U.S. Census Bureau 2021a). Employment has shifted dramatically, and agriculture is no longer one of the top businesses in Person County; instead, the two largest industries are health care and social assistance and manufacturing (U.S. Census Bureau 2021b). Many of the large manufacturers in Person County are based around agricultural goods, including the economic staples of tobacco and cotton (Person County Economic Development 2023).

2.2 History of the Project Vicinity

There are not many detailed maps of Person County or the Project area from the eighteenth and nineteenth centuries. Until recent times, the county was largely rural and dominated by agriculture (see Section 2.1). During this early period of settlement and focus on agriculture, the NRHP-listed House on Wagstaff Farm (PRO295) was built approximately 0.5 mile south of the Project area, along modern-day State Route (SR) 57/Semora Road (Phillips 2006). At the time the House on Wagstaff Farm was built, Hyco Lake did not exist, and the area would have consisted largely of farmland, forests, rivers, and streams.

One of the earliest maps of the area is a 1910s Rural Delivery map (U.S. Postal Service ca. 1910s) which shows the precursors to several modern-day roads in the vicinity of the Project area including Concord Ceffo Road, parts of SR 57/Semora Road, and Dunnaway Road (Figure 2.2-1). The House on Wagstaff Farm is depicted as a structure along SR 57/Semora Road. Additionally, one structure appears to be located near the south end of the Project area. Several other structures were located to the north of the Project area where Roxboro Plant Road is now. The structure in the Project area is also shown on a 1928 soil survey map and may have been extant as late as 1955. A 1955 aerial photograph shows that an area in the southeastern part of the Project tract was cleared and terraced (U.S. Department of Agriculture 1928; NETRonline 2023).

Woodland Elementary School, located about 0.5 miles south of the Project area on Semora Road, was built in 1950 to serve the local population. It was expanded in the 1960s and again in 2000, but most of the building is original, and it is the oldest still operational elementary school in Person County (Smith Sinnett Architecture 2018). By 1964, the land was being cleared for Hyco Lake, and the house in the Project area had been demolished. A 1968 U.S. Geological Survey (USGS) topographic map that was revised in 1994 (USGS 1994) shows the area just after the completion of Hyco Lake and the powerplant (Figure 2.2-2). The revisions in purple show the expansion of the plant and additional roads and impoundments around the lake. No structures are shown in the Project area, which was mostly wooded except the cleared area in the southeast part of the Project tract, which was timbered and terraced in the 1950s (NETRonline 2023).

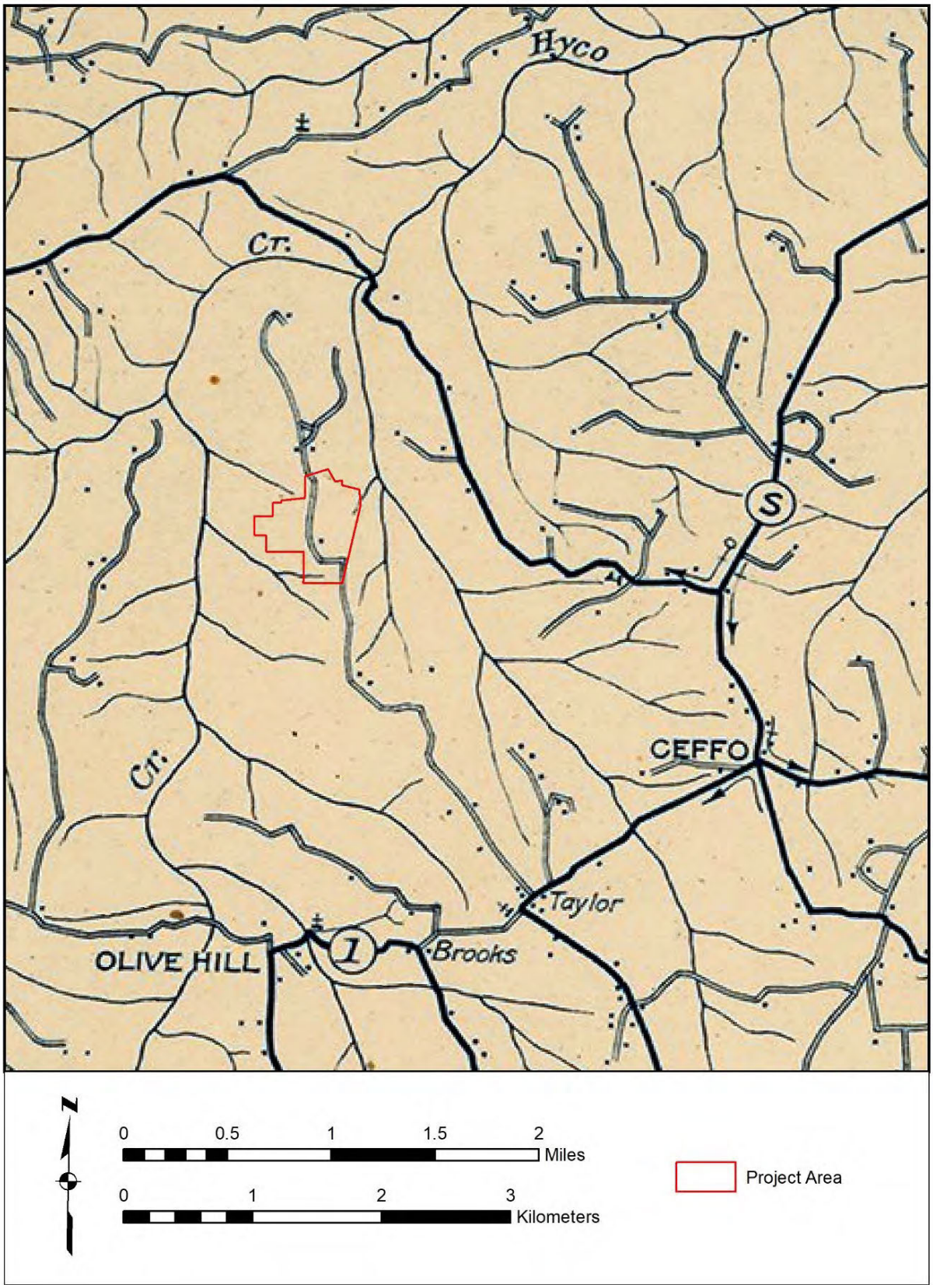

Figure 2.2-1: Post Office Route Map Showing the Project Vicinity in 1910

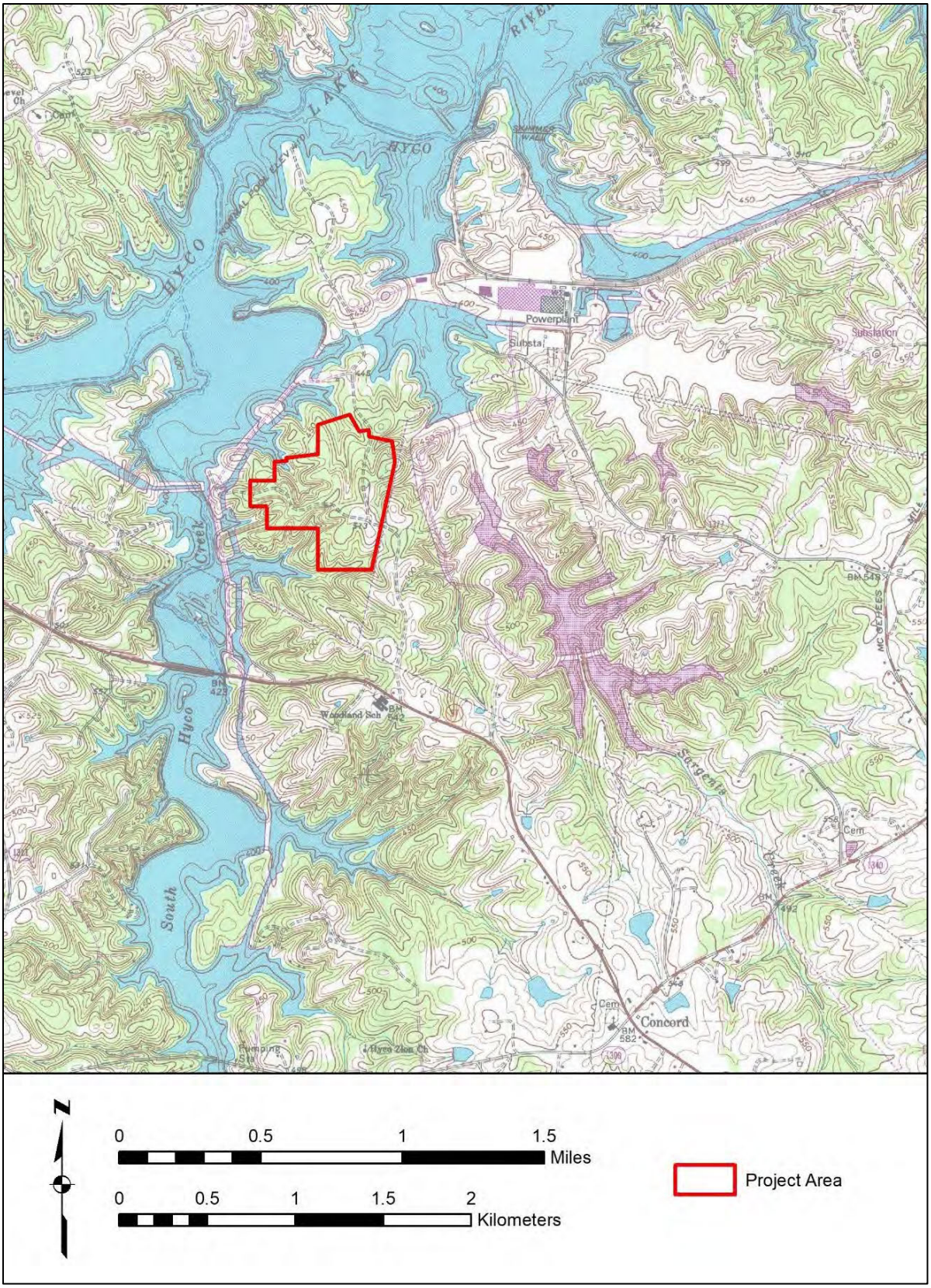

Figure 2.2-2: USGS Map of Showing the Project Vicinity in 1994

3. METHODS

The primary objectives of the investigation were to determine whether the area to be affected by the proposed Project contains any historic architectural resources and if those resources are potentially eligible for listing on the NRHP. All work was conducted in accordance with the North Carolina Historic Preservation Office (NCHPO) *Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina* (NCHPO 2023), and the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* [48 Federal Register 44716-44740] (National Park Service [NPS] 1983).

3.1 Background Research

On January 10 through 12, 2023, ERM cultural resources staff conducted background research online using the North Carolina State Historic Preservation Office Online Mapping System for information regarding previously identified historic resources within 0.5 mile (0.8 kilometer [km]) of the Project (NCHPO 2023). In addition, USGS topographic quadrangles, historical plat maps, aerial photographs, and soils data were consulted and reviewed in order to assess the portions of the Project area that may possess a higher potential for containing previously unidentified archaeological sites.

3.2 Field Survey Methods

An APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 C.F.R. § 800.16[d]). The APE for the current Project includes the Project footprint where direct effects are possible, plus surrounding areas that might be indirectly affected by the proposed undertaking due to viewshed changes within line-of-sight of construction activities or clearing of vegetation. The proposed Project site consists of approximately 107.22 acres. For the purpose of the historic resource survey, the area of potential viewshed effects was defined as a 0.5-mile radius surrounding the Project area, based on an assumption that the proposed aboveground construction will be less than 200 feet high. Project design has yet to be finalized, and stack height will depend on the results of air modeling, but the two proposed stacks are currently estimated to be 180 feet, and they will be the tallest components of the facility.

ERM examined the APE for properties 50 years or older. Each resource was photographed and marked on the applicable USGS quadrangle map. Digital photographs were taken to record the structures' overall appearance and details. Sketch maps were drawn depicting the relationship of dwellings to outbuildings and associated landscape features. Additional information on the structures' appearance and integrity was recorded to assist in making recommendations of NRHP eligibility. Four historic architectural resources was identified during the field investigations. During the survey, the principal of the Woodland Elementary School requested that no photographs be taken. For that resource, aerial imagery, county assessor records, and digital means of viewing the school were used to compensate for lack of survey photos.

3.3 NRHP Eligibility Criteria

Sufficient information was collected to make recommendations regarding potential eligibility for listing on the NRHP for each resource addressed during this study. According to 36 CFR 60.4 (Andrus and Shrimpton 2002), cultural resources eligible for listing on the NRHP are defined as buildings, structures, objects, sites, and districts that have "integrity" and that meet one or more of the criteria outlined below. Criterion D is typically relevant to archaeological sites. Historic resources are generally evaluated in relation to Criteria A, B, and C. Criterion C is typically applicable to architectural resources but also may be relevant in the case of resources that are associated with landscape architecture (like cemeteries or battlefields) or engineering (like bridges, railroads, and mines).

- Criterion A (Event). Association with one or more events that have made a significant contribution to the broad patterns of national, state, or local history.
- Criterion B (Person). Association with the lives of persons significant in the past.
- Criterion C (Design/Construction). Embodiment of distinctive characteristics of a type, period, or method of construction; or representation of the work of a master; or possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D (Information Potential). Properties that yield, or are likely to yield, information important in prehistory or history. Criterion D is most often (but not exclusively) associated with archaeological resources. To be considered eligible under Criterion D, sites must be associated with specific or general patterns in the development of the region. Therefore, sites become significant when they are seen within the larger framework of local or regional development.

“Integrity” is perhaps the paramount qualification of NRHP eligibility, and can be related to any or all of the following (Andrus and Shrimpton 2002):

- Location: the place where the historic property (or properties) was/were constructed or where the historic event(s) occurred;
- Design: the combination of elements that create the form, plan, space, structure, and style of a property (or properties);
- Setting: the physical environment of the historic property (or properties);
- Materials: the physical elements that were combined to create the property (or properties) during the associated period of significance;
- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
- Feeling: the property’s (or properties’) expression of the aesthetic or historic sense of the period of significance; and
- Association: the direct link between the important historic event(s) or person(s) and the historic property (or properties).

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP (Andrus and Shrimpton 2002). However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- Consideration A: A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- Consideration B: A building or structure removed from its original location, but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- Consideration C: A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his or her productive life; or

- Consideration D: A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- Consideration E: A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- Consideration F: A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- Consideration G: A property achieving significance within the past 50 years if it is of exceptional importance.

Each identified resource was evaluated in relation to these criteria and considerations.

4. SURVEY RESULTS

On January 10 through 12, 2023, ERM conducted Phase I historic architectural investigations in the Project area located in Person County, North Carolina. A discussion of previously reported surveys and resources, followed by summary descriptions of the Project area, survey coverage, and findings are provided in the sections below.

4.1 Previous Investigations

A literature review of previously recorded resources was conducted prior to fieldwork. ERM consulted the North Carolina Department of Natural and Cultural Resources online mapping system in January 2023. Two previous archaeological surveys had been conducted within a half mile of the Project, but no surveys of historic resources had been conducted within the search area. One historic resource has been recorded within a half mile of the Project footprint (Table 4.1-1). This resource was previously listed on the NRHP under Criterion C. The location of this resource is depicted in Figure 4.1-1, and it is discussed in Section 4.2 below.

Table 4.1-1: Previously Recorded Resources within 0.5 Miles of Project

Resource Number	Description	NRHP Eligibility
PR0295/NRHP 06000229[a]	House on Wagstaff Farm, ca. 1890	NRHP Listed

[a] *Site located in the APE*

4.2 Current Survey Findings

ERM surveyed a total of three new historic resources and one previously surveyed historic resource in the APE during the current field effort (Table 4.2-1 and Figure 4.2-1). All resources were photographed from public right-of-way unless otherwise noted. The three newly recorded resources are recommended ineligible for listing on the NRHP while the previously surveyed resource is listed in the NRHP. Details on the resource can be found in the section below.

Table 4.2-1: Summary of Historic Resources in the APE

Resource Number	Description	NRHP Recommendation
PR0295/NRHP 06000229	House on Wagstaff Farm, ca. 1890	Listed
PR0549	Woodland Elementary School, ca. 1930	Ineligible
PR0833	Ranch dwelling, ca. 1966	Ineligible
PR0834	Ranch dwelling, ca. 1969	Ineligible

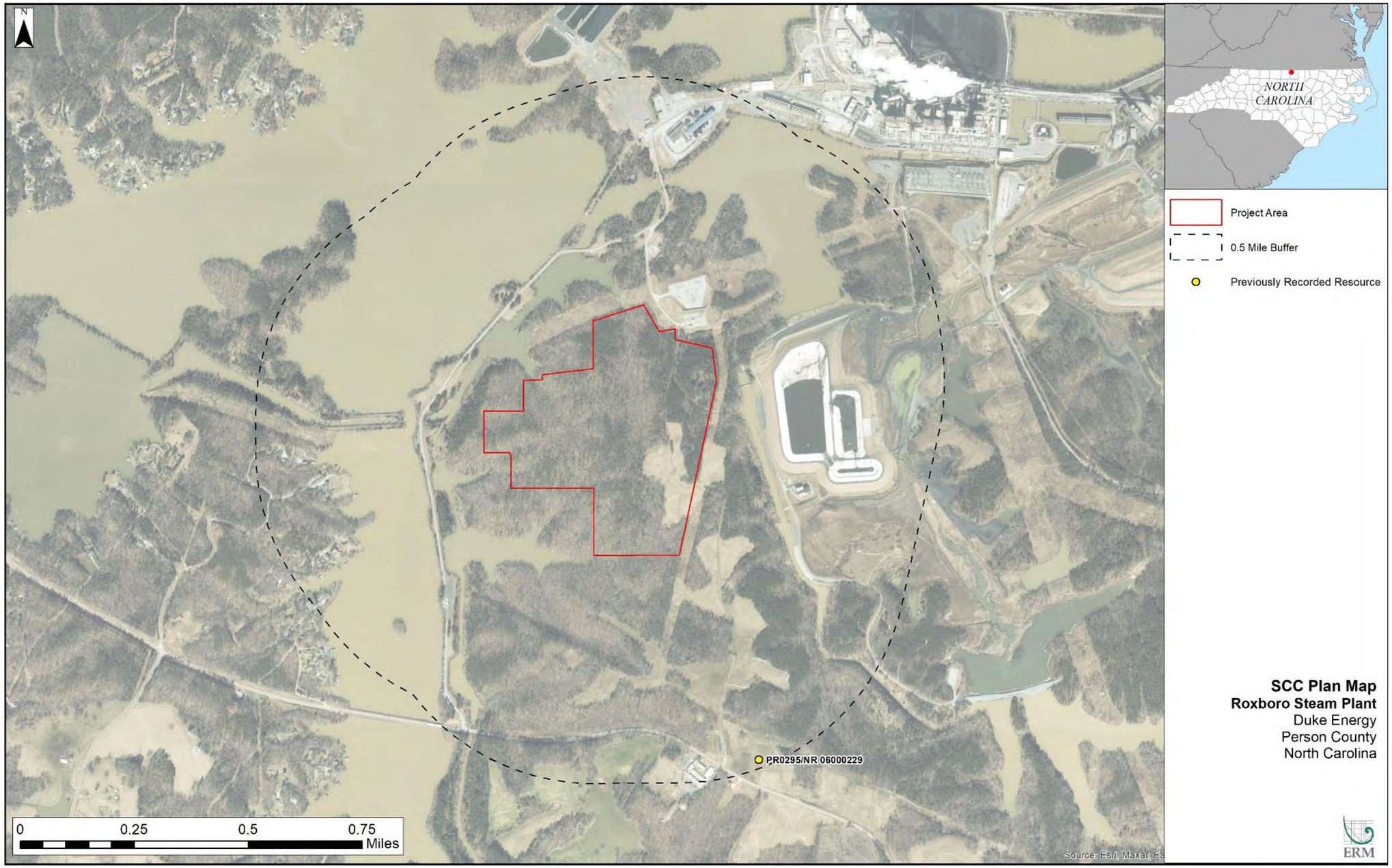

Figure 4.1-1: Previously Recorded Resources within 0.5 Mile of the Project, Aerial View

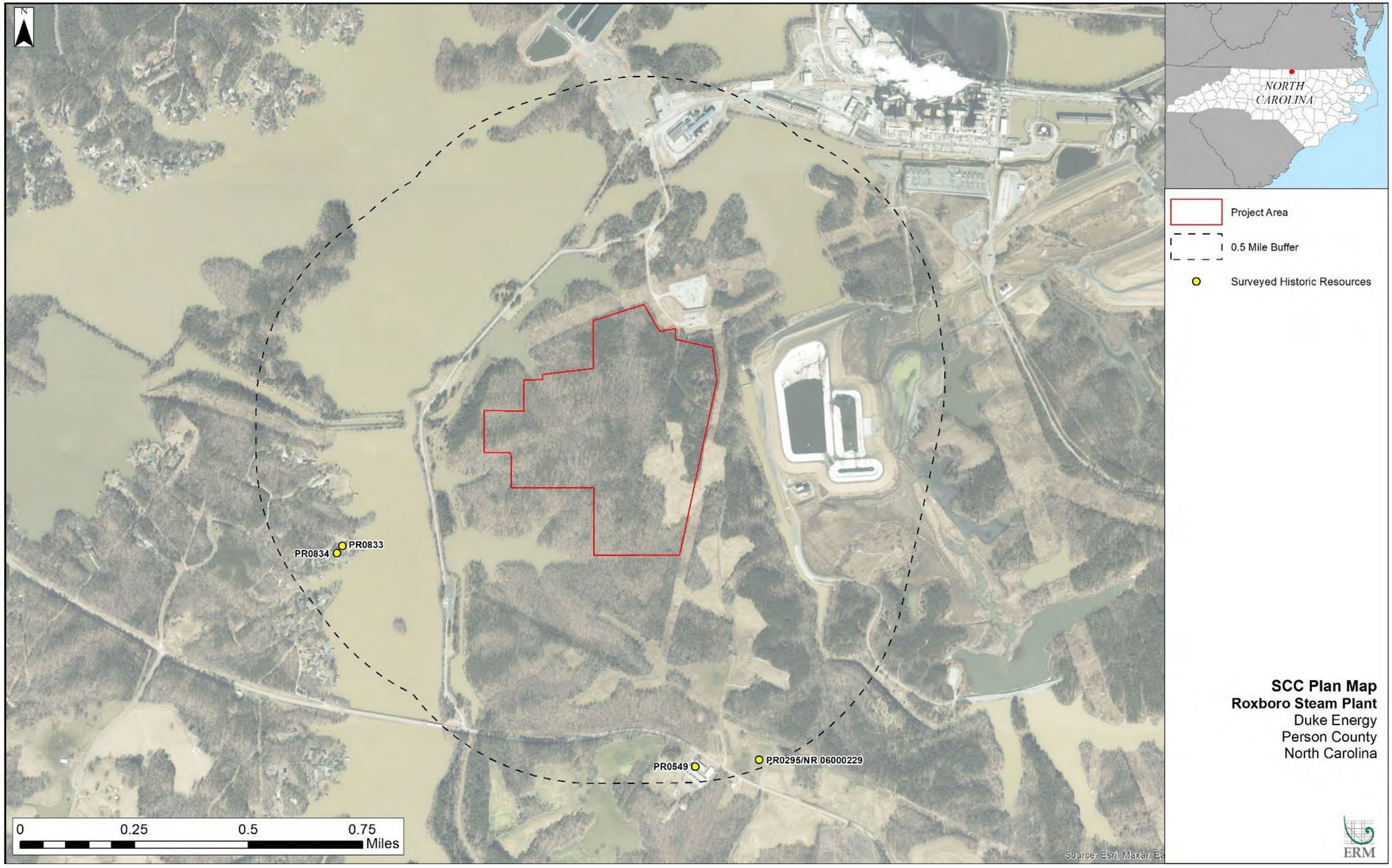

Figure 4.2-1: Previously and Newly Recorded Resources within the Project APE, Aerial View

4.2.1 PR0295/NRHP 06000229 - House on Wagstaff Farm

PR0295/NRHP 06000229 is located on the northeast side of Semora Road/NC Route 57 in Semora, approximately 0.48 mile to the southeast of the proposed Project boundary (see Figure 4.2-1). The surrounding area is mostly rural and consists of pastures and other agricultural land. A modern dwelling and twentieth-century school, Woodland Elementary, are the only structures in the general area, and are located to the southwest of the resource.

PR0295 consists of a single dwelling known as the House on Wagstaff Farm (Figure 4.2-2). The resource was previously recorded by Laura A. W. Phillips and listed on the NRHP as NRHP 06000229 in 2006. Phillips described the Georgian-Federal styled hall-and-parlor dwelling as an early-nineteenth century, one-story with attic, single-pile, heavy timber framed structure. It had a side-gabled, 5-V agricultural metal roof with boxed and molded front and rear cornices, weatherboard siding, and a fieldstone foundation. The dwelling featured two exterior-end rubble-stone chimneys with brick stacks on the west and east elevations. The western chimney was single-shouldered, while the eastern chimney was double-shouldered. The worn, replacement weatherboard siding dated from the late nineteenth century, but the original molded weatherboards were still visible at the rear of the house. The windows on the main portion had some of the original molded window casings, but were either empty or filled with twentieth-century sashes of various configurations. The main entrance was accessed through a front-porch with a shed 5-V agricultural metal roof, wooden posts, a largely missing wood floor, and a stone perimeter base. The rear elevation included a shed room that was accessed via a twentieth-century batten door on the east elevation and featured a single six-light and vacant windows (Phillips 2006). ERM architectural historians visited the resource in January of 2023 and noted that the shed-roofed porch is no longer extant (Figure 4.2-3). According to aerial imagery, it was removed between 2013 and 2014 (NETROnline 2023; Person County Tax Parcel Viewer 2023). No other changes were noted since the original survey, although it appears that overall condition of the dwelling is deteriorating.

At the time of Phillips' survey, a tobacco barn and cattle corral were located at the western edge of the property. The late-nineteenth/early-twentieth century tobacco barn had a gabled, metal roof and was constructed of diamond-notched logs. Metal-sheathed pent roofs supported on wood struts at varying heights protected the walls on all four sides, and the upper gable ends were covered in weatherboard siding. The barn had no windows, but was accessed through a batten door on the west elevation. A metal shed addition was located on the south elevation. The mid-to-late-twentieth century cattle corral was located to the north of the tobacco barn, and consisted of heavy wood posts with horizontal board rails. An inclined cattle chute was located at the southwest corner (Phillips 2006). When ERM surveyed the property in 2023, the tobacco barn and cattle corral were no longer extant. According to historic aerials, the tobacco barn was demolished in 2019 or 2020 (NETROnline 2023).

NRHP Assessment: PR0295/NRHP 06000229 was listed on the NRHP in 2006 under Criterion C as the resource "conveys to a remarkable degree its original construction, plan, and details of transitional Georgian-Federal styling that dates from its early nineteenth-century construction" and "retains its agrarian rural setting" (Phillips 2006). Both the tobacco barn and cattle corral were described as non-contributing structures, as they were not built during the dwelling's period of significance. ERM agrees with the NRHP listing, as the dwelling is a distinct and rare example of its type in the county. Although the tobacco barn and cattle corral are no longer extant, because they were deemed non-contributing to the resource, their removal does not diminish the resource's integrity as to change its eligibility for the NRHP.

Assessment of Effects: PR0295/NRHP 06000229 is located approximately 0.48 mile southeast of the proposed Project area, near the maximum estimated extent of the visual APE. In the 0.48 mile between NRHP 06000229 and the Project area, approximately two thirds of the distance is occupied by dense woodlands in three clusters. Currently, existing Duke Steam Plant is located approximately 0.60 mile

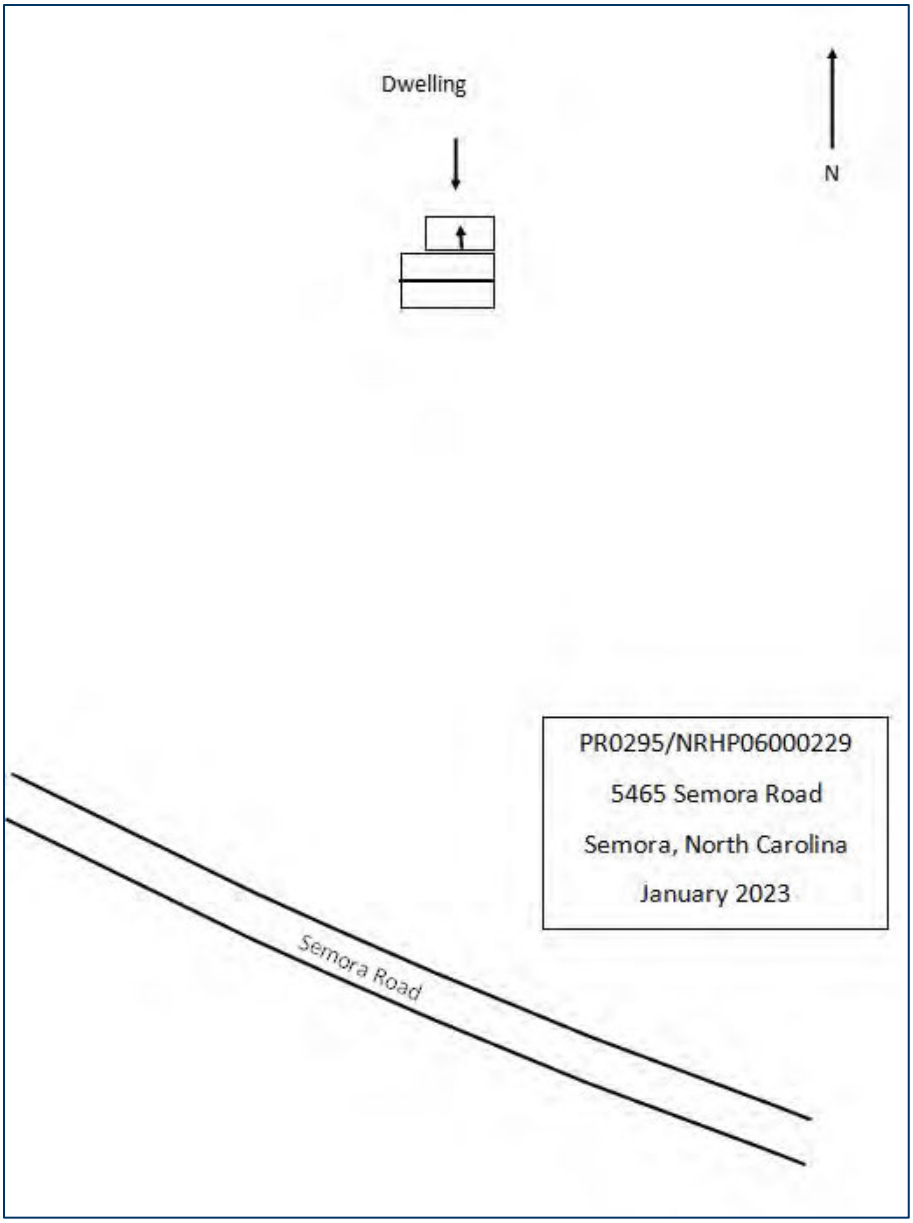

Figure 4.2-2: PR0295/NRHP 06000229, Sketch Map

northeast of the proposed Roxboro Project and 1.4 mile from PR0295/NRHP 06000229. Although the existing Duke Steam Plant is an additional roughly 0.8 mile farther north than the proposed Roxboro Project, vantage points at a half mile distance from the plant provides a close representation of what would be visible of the proposed Project from PR0295/NRHP 06000229. From vantage points at that distance with intervening forest cover, parts of the existing plant at similar height to the proposed Project's tallest components would not be visible. Likewise, the taller components of the existing plant help scale the proposed stacks, which would be the tallest components of the Project and are estimated to be no taller than 200 feet. Figure 4.2-4 shows that the existing Steam Plant towers are visible to the northeast from PR0295/NRHP 06000229. However, if the proposed construction is 200 feet or less, it is likely that there will be no visual impact to PR0295/NRHP 06000229. Based on the current proposed heights of the Project components being less than 200 feet, ERM recommends that the proposed Project will have **No Effect** on PR0295/NRHP06000229.

Figure 4.2-3: PR0295/NRHP 06000229, South Elevation, View to the North

Figure 4.2-4: PR0295/NRHP 06000229, View North toward Existing Duke Steam Plant

4.2.2 PR0549 - Woodland Elementary School

PR0549 is a newly recorded resource located at 7391 Semora Road (State Route 57) in Semora, North Carolina. It is situated on the southwest side of Semora Road in a low-density residential area. The surrounding environment is rural, and includes dense woodlands to the north, west, and south, and open agricultural land to the east. The resource is approximately 0.46 mile south-southeast of the proposed Project area (see Figure 4.2-1). While the survey team was in the field taking pictures of PR0549 from the public right-of-way, the principal of the school told the surveyors that photos of the school property were not allowed. Therefore, all assessments and descriptions of the school were made by reviewing historic aerial imagery, Google Earth aerial and street imagery, Person County record cards and GIS maps, as well as USGS topographic maps.

PR0549, also known as the Woodland Elementary school, was constructed ca. 1930 with multiple additions constructed between 1955 and 2006, and four modern outbuildings to the northwest and southwest of PR0549 (Person County Tax Parcel Viewer 2023; NETROnline 2023). The oldest sections of the school from ca. 1930 are the two rectangular wings at the rear of the school that run from northwest to southeast (Figure 4.2-5). Due to the orientation of the school, these wings are only visible in aerial imagery, and appear to have been originally connected by three passages between the two structures. The two rectangles were offset from one another, with the front section extending farther to the southeast, while the rear section extended farther to the northwest. Between 1955 and 1964, the north and northwest ell of the school was added, extending the original front block to match the northwest length of the rear block (NETROnline 2023). This addition is split into three sections, two to the northwest and one to the northeast, connected to the farthest northwest block to create an ell. The structures from this first addition, and a corner of the original rear section, were observed when ERM architectural historians visited the site in 2023. They are all brick structures with flat roofs, and the southernmost added block features large windows set in a grid pattern, and a large, internal brick chimney that extends two-stories in height, while the northern block includes a smaller section of grid-based windows and a section of awning windows. The northeast block of this addition has a large shrub obscuring the northwest corner of the school; however, the remainder of this section includes large rectangular awning windows, and a one-story porch with a recessed entrance through a set of two doors. The porch has a poured concrete and brick staircase with metal handrails leading up to this entrance. The additions from ca. 1960 appear to be in good condition.

An additional rear addition was added to the southeast corner of the school, attached to the southeast elevation of the original rear block and the southwest elevation of the original front block between 1964 and 1982 (NETROnline 2023). This section is only visible in aerial imagery, due to the addition's location. This addition is an irregularly shaped rectangular block, which appears to have a flat roof. Other details about the addition cannot be determined from the public right-of-way. The final additional was added between 1999 and 2006 and constructed northeast of the original wings, and just southwest of the northeast block of the phase one addition from ca. 1960 (NETROnline 2023). This rectangular block features a flat roof, brick veneer with decorative courses, and a poured concrete foundation. The northeast elevation features a sliding window with 9-panes, and the northwest elevation contains four entrances, three of which have metal awnings. There are also two windows near the southwest end of the northwest elevation, which mimics the fenestration on the north elevation. This addition is in excellent condition. Overall, the school appears to have matching metal roofing across the entire building except for this most recent addition, which appears to have an asphalt flat roof. The school overall is in excellent condition.

The four modern outbuildings are located southwest, and northwest of the school, and include two sheds, a playground, a water tower, and a radio tower. The first shed to the southwest was constructed between 1982 and 1999 and has a gable roof. This shed is only visible in aerial imagery (Shed 1). The shed to the

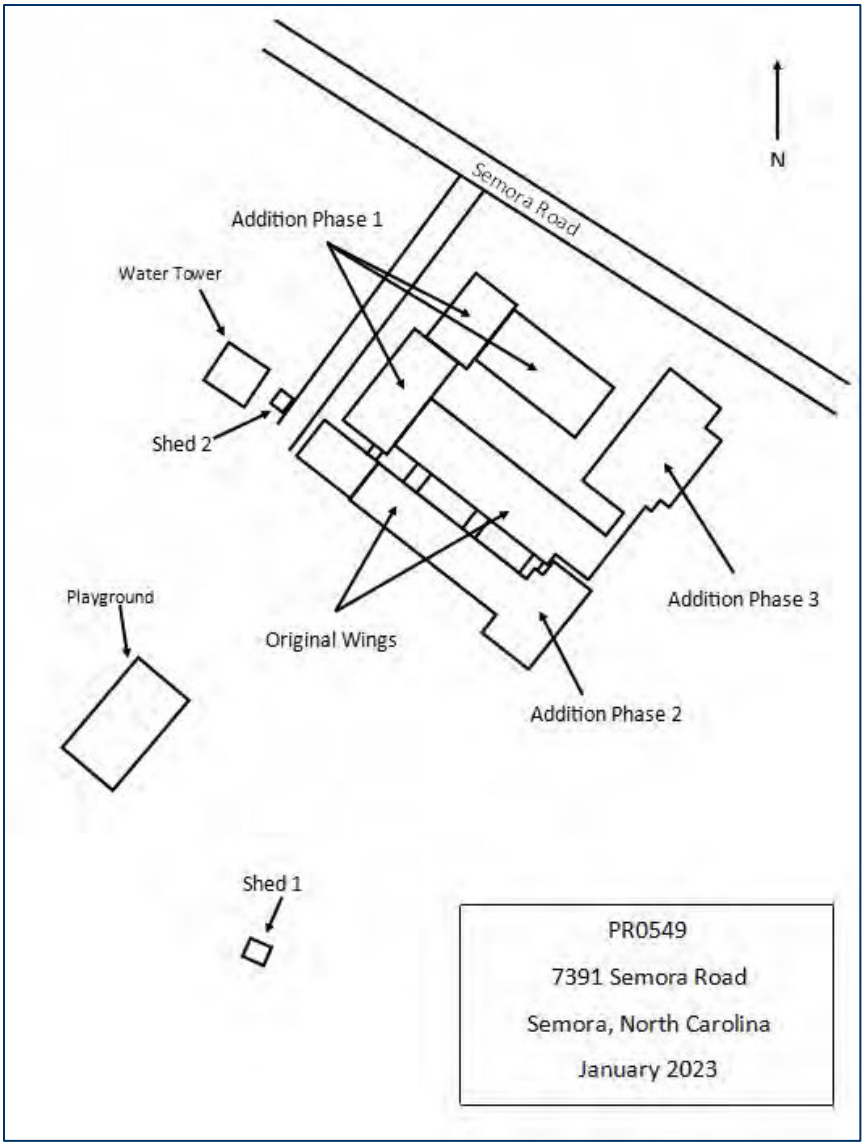

Figure 4.2-5: PR0549, Sketch Map

northwest was constructed between 2006 and 2008 (Shed 2). It has a flat roof with a vent and a brick veneer. Two entrances are located on the northeast elevation, but no other details can be determined from the right-of-way. This shed appears to be in good condition. Directly behind this shed is a water tower, constructed between 1964 and 1982. It is a truss structure with a four-point base. The water tank at the top of the tower is a metal structure with a rounded base and a conical roof, connected to a central pipe that runs down into the ground at the tower's base. The playground was constructed between 2006 and 2008, and includes various structures that can be used by children. The playground is not visible from public right-of-way.

NRHP Assessment: Although the age of the oldest parts of the school are somewhat unusual both for the area and the type of structure, the number and size of the modifications have drastically changed the design, materials, workmanship, and setting of the resource. Given the loss of integrity, ERM recommends PR0549 ineligible under NRHP Criterion C. Historical research into the proposed Project area did not identify any significant events or persons associated with the resource, therefore ERM also recommends that it is ineligible under NRHP Criteria A and B.

4.2.3 PR0833

PR0833 is located at 126 Wildwood Road (State Route 1392) in Semora, North Carolina. It is on the end of Wildwood Road in a medium density residential area. The parcel abuts Hyco Creek to the east and has a private dock located approximately 204 feet east of the dwelling. The surrounding area includes Hyco Creek and wooded residential lots to the north, south, and west. The resource is approximately 0.39 mile southwest of the proposed Project area (see Figure 4.2-1).

PR0833 includes a one-story, ca. 1966 Ranch style dwelling according to the Person County Auditor, with modifications to fit the use as a lakeside dwelling, a contemporary dock, and three modern outbuildings (Figure 4.2-6; Person County Tax Parcel Viewer 2023). According to historic aerials, the dwelling was constructed between 1964 and 1982, which is consistent with the ca. 1966 date from the county auditor (Person County Auditor 2023; NETROnline 2023). The dwelling features a cross-gabled, asphalt shingle roof and replacement vinyl siding (Figure 4.2-7). The dwelling also has additions to the southeast elevation, including the large gable extension with multiple large, fixed windows and the wrap around wood porch on the first story. Although the dwelling is only one-story tall, it has a sub-story walk-out basement level that is accessible from the northeast and southeast elevations. Multiple types of windows are visible throughout the dwelling, including large, fixed, vinyl single-pane windows, and vinyl six-over-six and eight-over-eight arrangements that have fixed shutters. Additionally, there are balconies on the northeast and southeast elevations, and a pair of sliding glass doors flanked by fixed shutters is located on the northeast balcony. The primary entrance also appears to be on the northeast elevation and consists of a wooden door with an aluminum storm door and fixed shutters (Figure 4.2-8). There are additional entrances located on the southeast elevation, including at least one pair of sliding glass doors with fixed shutters on the basement and first stories (Figure 4.2-9). An internal brick chimney with two metal flues and one metal chimney cap is located near the central roof ridge, near the area where the cross-gable roof intersects. Overall, the dwelling is in good condition.

The three modern outbuildings are located north and northwest of the dwelling and are only visible in aerial imagery due to their locations and the dense tree cover. All three appear to be gabled sheds and were constructed ca. 1980 or later. The shed immediately north of the dwelling (Shed 1) was constructed between 1999 and 2006 (NETROnline 2023). The larger shed to the northwest was built between 1964 and 1982, and a shed roofed addition was added between 1999 and 2006 (Shed 2; NETROnline 2023). The final shed (Shed 3), which is approximately 10 feet west of the second shed, was constructed between 2009 and 2012 (NETROnline 2023). From aerial imagery the sheds appear to be in good condition. Photographs of the boat dock were not available at the time of the survey due to safety concerns around the lake. Historic aerial photographs indicate that the boat dock was constructed at the same time at the primary resource (NETROnline 2023). Current aerial photographs show the dock as having a two gable roof sections, each clad with asphalt shingles and separated by open wood board docking. This open portion of the dock connects to the land and has an additional length on the farthest northeast elevation.

NRHP Assessment: The ca. 1966 dwelling is a heavily modified Ranch style dwelling divergent from a more common form of the Ranch style. This divergence comes from the open access basement from the southeast elevation and the large gable end addition on the southeast elevation towards the lake. This addition has changed the form and overall design of the dwelling to diminish elements of the Ranch style. Furthermore, the dwelling features multiple vinyl replacement materials, including replacement siding, windows, and shutters. The major additions added to the dwelling paired with the frequent use of replacement materials and modern outbuildings, diminishes the property's overall integrity of design, materials, workmanship, feeling, and association. Additionally, with the large residential developments in the surrounding areas constructed after PR0833, the setting and feeling of the historic neighborhood has also decreased, impacting the dwelling's integrity in these categories as well. For these reasons, ERM

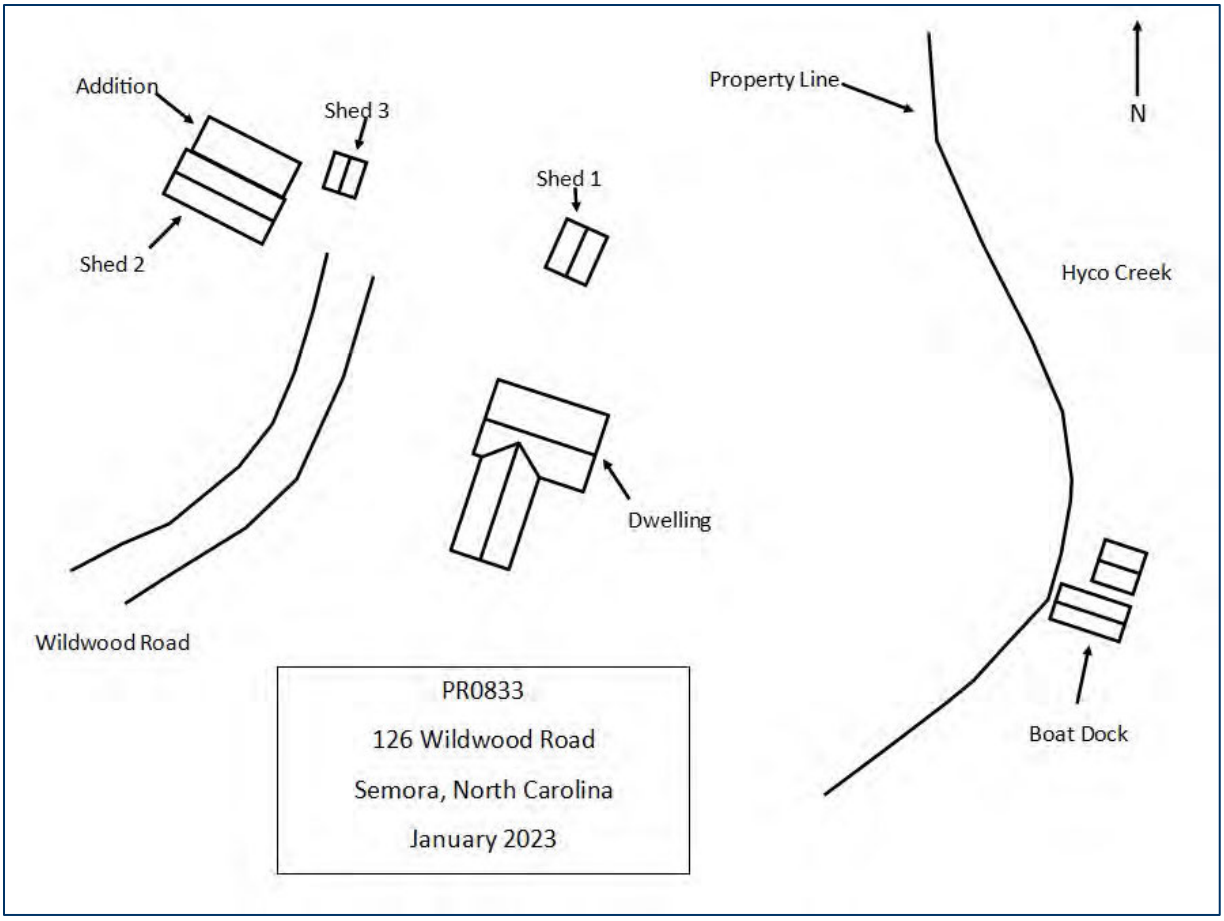

Figure 4.2-6: PR0833, Sketch Map

recommends that PR0833 is not eligible for listing in the NRHP under Criterion C. Historical research into the proposed Project area did not identify any significant events or persons associated with the resource, therefore ERM recommends PR0833 ineligible under NRHP Criteria A or B.

Figure 4.2-7: PR0833, Northwest Elevation, View to the Southeast

Figure 4.2-8: PR0833, Northeast Elevation, View to South

Figure 4.2-9: PR0833, Southeast Elevation, View to the West

4.2.4 PR0834

PR0834 is located at 120 Wildwood Road (State Route 1392) in Semora, North Carolina. The dwelling is at the end of Wildwood Road in a medium density residential area. The surrounding area includes Hyco Creek to the northeast, east, and south, with wooded residential lots in all other directions. The parcel abuts Hyco Creek and has a private boat dock located approximately 109 feet southeast of the dwelling. The resource is approximately 0.40 mile southwest of the proposed Project area (see Figure 4.2-1).

PR0834 includes a modified, one-story, ca. 1969 Ranch style dwelling (Figure 4.2-10; Person County Tax Parcel Viewer 2023; NETROnline 2023). According to historic aerials, the dwelling was constructed between 1964 and 1882, which is consistent with the ca. 1969 date from the county auditor (SPerson County Auditor 2023; NETROnline 2023). The main block of the dwelling features a cross gable, asphalt shingle roof and brick veneer (Figure 4.2-11). Aerial imagery shows that part of the roof on the north wing of the home was replaced sometime between 2020 and 2023 (Google Earth 2023). The dwelling features a raised basement accessible from the southeast elevation. The windows are all replacement, double-hung vinyl, one-over-one arrangements, all of which have fixed vinyl shutters. An interior brick chimney is located near the apex of the cross-gable roof. The primary entrance is recessed, located on the northeast elevation, and is clad in T1-11 siding. The doorway has an interior vinyl wrapped door and an exterior aluminum storm door and is covered by the eaves of the roof. Leading up to the doorway is a poured concrete walkway, with poured concrete over a step of rowlock bricks. A secondary entrance is located on the southeastern elevation through a vinyl door with three fixed lights and an aluminum storm door, with an additional entrance on the balcony directly above (Figure 4.2-12). The balcony located on the northeast corner on the primary level of the dwelling is screened and has a pair of sliding glass doors. The dwelling has one major addition, a two-car garage that was built between 2008 and 2009 (NETROnline 2023). It is connected to the main block directly, creating another crossing gable. The

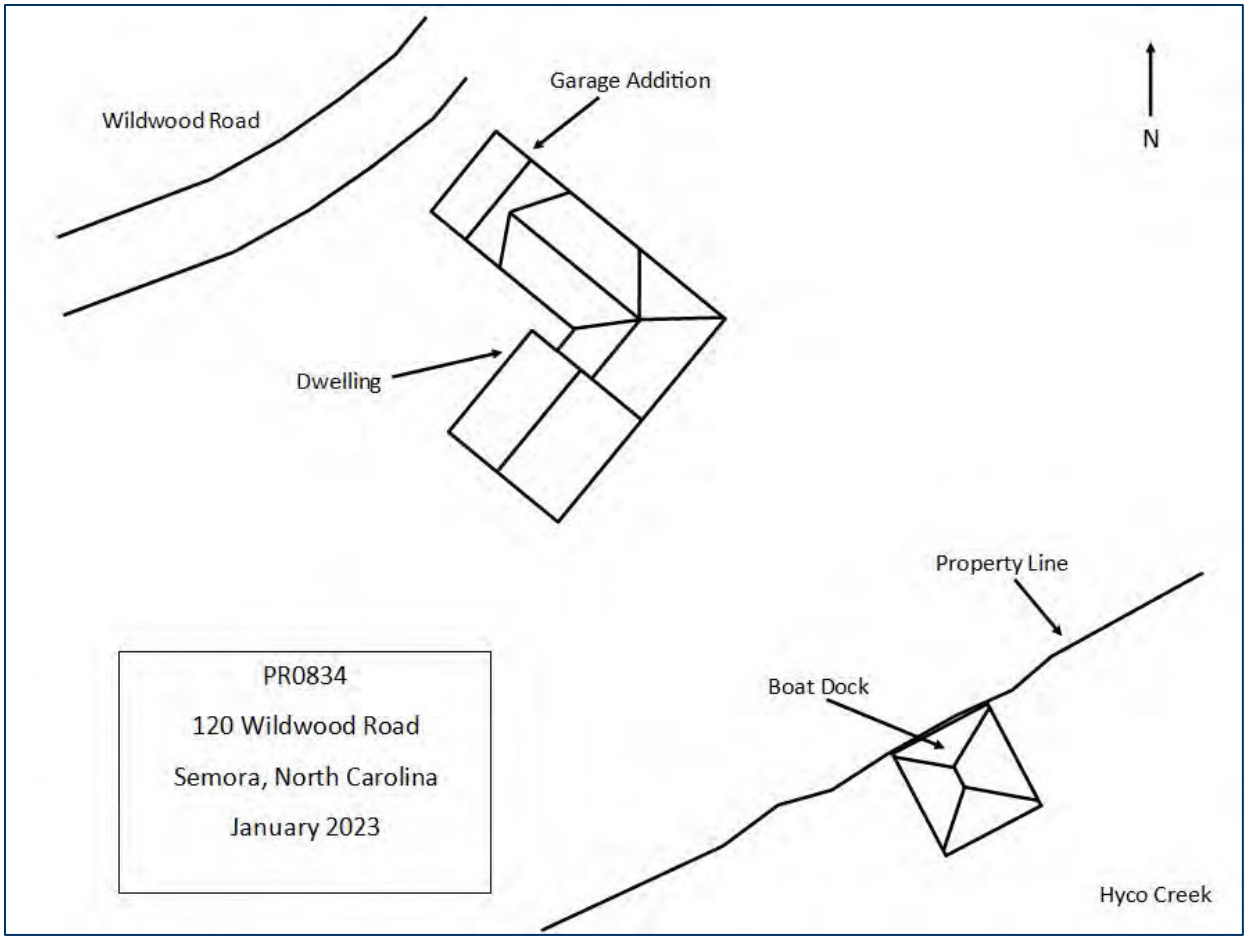

Figure 4.2-10: PR0834, Sketch Map

garage is front gabled, with an asphalt shingle roof, a concrete block frame covered in T1-11 siding, and a continuous concrete block foundation (Figure 4.2-13). The dwelling and garage are in good condition.

Photographs of the boat dock were not available at the time of the survey due to safety concerns around the lake. Historic aerial photographs indicate that the boat dock was constructed at the same time at the primary resource (NETROnline 2023). Current aerial photographs show the dock as having a hipped roof clad with asphalt shingles with an open wood dock off the northeast elevation.

NRHP Assessment: PR0834 includes a heavily modified Ranch style dwelling built ca. 1969. PR0834 does not possess any architectural elements that have high artistic value, represents the work of a master, nor is an outstanding example of the Ranch style. In addition, the dwelling has replacement materials, including vinyl windows and T1-11 siding, as well as a major addition on the north elevation. For these reasons, ERM recommends PR0834 ineligible under NRHP Criterion C. Historical research into the proposed Project area did not identify any important events or persons associated with the resource, thus PR0834 is also recommended ineligible under NRHP Criteria A and B.

Figure 4.2-11: PR0834, Northwest and Southwest Elevations, View to the East

Figure 4.2-12: PR0834, Southeast Elevation, View to the Northwest

Figure 4.2-13: PR0834, Garage, Southwest Elevation, View to the North

5. CONCLUSION

On January 10 through 12, 2023, ERM conducted Phase I historic architectural investigation on behalf of Duke in association with the Duke Roxboro Project in Person County, North Carolina. Duke is conducting the work subject to FERC permitting, with plans to construct and operate an energy facility connected to an existing steam plant on Hyco Lake in Semora, outside of Roxboro. Duke will construct a series of gas turbines, steam tubing, an electrical switch yard, cooling towers, office spaces, maintenance buildings, transmission generator tie lines, parking areas, and two construction laydown areas, one to the north and one to the south within the Project area. The Steam Station will co-locate to existing power lines and connect to an existing switchyard to the northeast.

This report presents the results of a Phase I survey to inventory historic architectural resources that could be affected by the Project. The proposed Project site consists of approximately 107.22 acres. The APE for architectural resources is defined as the Project site, plus a viewshed area estimated to extend 0.5 mile from the Project area, based on proposed aboveground construction being less than 200-feet in height.

The field survey did not identify any historic properties within the Project's direct APE. Four architectural resources were identified within the APE for visual effects. ERM recommends three resources as ineligible for listing on the NRHP, while the fourth is previously listed on the NRHP. Visual assessment of the surveyed resources shows that nothing 200 feet tall or less on the Project site would be visible from any architectural resources covered in the survey. ERM recommends that there would be no effect on any architectural resources due to distance, tree coverage, and the proposed maximum construction height being less than 200 feet. Because the Project would have no effect on PR0295/NRHP 06000229, ERM recommends that the Project be allowed to proceed as planned without further consideration of historic resources.

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APPENDIX A RESUMES OF KEY PERSONNEL

MICHAEL B. LANGMYER, MHP

Consultant II, Architectural Historian

Mr. Langmyer meets the Secretary of the Interior's qualification standards [36 CFR61] as an Architectural Historian. He is also certified in the States of Kentucky by the Kentucky Heritage Council (KHC) as a qualified architectural historian and Ohio by the Ohio Department of Transportation (ODOT) as a qualified architectural historian. Mr. Langmyer has experience as a lead architectural field technician and author, Auto CAD draftsman for historic buildings and bridges, and as a historic preservation specialist with a detailed knowledge in the technical aspects of National Register of Historic Places (NRHP). Mr. Langmyer has worked on numerous architectural history investigations throughout the eastern and central United States, including Alabama, Arkansas, Georgia, Indiana, Kansas, Kentucky, Michigan, Mississippi, Missouri, New Hampshire, New York, Ohio, Oklahoma, South Dakota, Tennessee, Texas, Virginia, and West Virginia.

Experience: Over 3 years of experience in the field of Cultural Resource Management and over 8 years of experience in the field of Historic Preservation.

LinkedIn: https://www.linkedin.com/in/michael-langmyer-mhp-ab0369106/

Email: Michael.Langmyer@erm.com

Education

- M.H.P., Historic Preservation, University of Kentucky, 2018.
- B.A., Historic Preservation, Shepherd University, 2016

Languages

- English, native speaker

Fields of Competence

- Architectural surveys and evaluations
- Historic documentary research
- National Register of Historic Places eligibility evaluation and assessments for historic resources
- Compliance with state, and federal cultural resource regulations, including guidelines set by State Historic Preservation Offices and the National Historic Preservation Act
- Geographic Information Systems (GIS)
- Cultural Resource Survey and Reporting for Federal and State Agencies
- AutoCAD Drawing
- Architectural photography
- Section 106 and Section 110

Key Industry Sectors

- Oil and gas
- Solar Energy
- DOT
- Military

Honours and Awards

- 2018: The Dean's Award, College of Design Honours, University of Kentucky, Lexington, Kentucky
- 2017: The Historic Preservation Chair's Award, College of Design Honours, University of Kentucky, Lexington, Kentucky.
- 2016: Certificate of National Service Recipient, Preserve West Virginia, AmeriCorps, Washington D.C.

Publications

- 2018: *Thoughtfully Evaluating Integrity: Evaluating Two African American Communities in the Bluegrass* (published master's thesis). University of Kentucky, Lexington, Kentucky.
- 2016: *Entler Hotel, Restoration.* Online publication, Historic Shepherdstown Museum, Shepherdstown, West Virginia.

Key Projects

Technology, Data Center, South Carolina, U.S.A., 2023
Mr. Langmyer completed a desktop review of the proposed location of the York and Rock Hill Sites to review and assess any cultural resources identified within 1-mile of the proposed site. Background research was completed on the state archaeological and architectural mapping service to identify all previously surveyed sites and resources. The findings indicated that the project would pose no impact by the project.

Energy Client, Electric Power, Virginia, U.S.A., 2022-2023
Mr. Langmyer assisted with the SSC Application process for the selection of a route connecting the White Oak Substation to an existing line. The proposed Project is needed to provide a greater amount of electricity to the area due to increased demand through overall use. Mr. langmyer assisted with tabulating data, creating cultural data through GIS, and placing KOPs for the field crew to document previously recorded resources within up to 1.5-mi. KOP photographs were then used to create visual simulations of the proposed project which was attached to the pre-application report. Mr. Langmyer also authored the cultural resource sections within the SSC Application, DEQ Supplement, and completed the pre-application appendix attached to the SSC Application.

Energy Client, Solar Power, Virginia, U.S.A., 2022
Mr. Langmyer was the lead field architectural historian for the completion of this Solar Energy Project. The field effort used DSLR cameras to capture high quality images of 19 historic resources within the project's APE. The photographs were then QA/QC'ed by Mr. Langmyer and uploaded for use within the Phase I Report. A combination of field evaluations and research was used to create the report displaying the findings of the survey with recommendations for eligibility.

Energy Client, Pipeline, Ohio, U.S.A., 2022
Mr. Langmyer was the lead report architectural historian for the Phase I Cultural Resource Survey. The cultural survey identified six historic resources within the APE. None of the six resources were recommended eligible for listing in the NRHP due to a lack of significance and/or integrity. Research for the project included an evaluation of historic maps, aerials, and property records. A combination of field evaluations and research was used to create a report displaying the findings of the survey with recommendations for the completion of the Section 106 process.

Energy Client, Pipeline, Tennessee, U.S.A., 2022
Mr. Langmyer acted as architectural historian for the Phase I survey in Fayette and Haywood Counties, Tennessee. The project surveyed 11 buildings found adjacent to the project area. None were found to be eligible for listing in the NRHP. The history/architecture survey consisted of reidentifying previously recorded architecture resources, identifying those 50 years old or greater, documenting resources through photography, and conducting additional research of property records, historical maps, and aerial photographs. From this, a repot was created displaying the findings of the analysis with recommendations for the completion of the Section 106 process.

Military Client, Coast Guard, New York, U.S.A., 2021
Mr. Langmyer acted as architectural historian for the survey of five United States Coast Guard (USCG) facilities in New York and Connecticut. Each facility received an individual evaluation of their NRHP eligibility. Two Stations were recommended eligible for listing as a historic district under Criterion C. Two lighthouses were previously listed in the NRHP. Three Stations were recommended not eligible, either as a historic district or for individual listings. From this, five individual reports were drafted for each of the five USCG stations along with photographs and maps.

Government Client, Department of Transportation, Oklahoma, U.S.A., 2021
Mr. Langmyer completed an architectural survey of a section of Oklahoma Route 9 in Carnegie, Caddo and Kiowa Counties, Oklahoma. The survey consisted of identifying buildings 45 years old or greater, documenting resources through photography, and conducting additional research of property records, historical maps, and aerial photographs for buildings located within the APE. The APE for this project was determined to include a 150-ft viewshed as measured from the project centerline. A total of 11 structures over 45 years old were identified within the APE. One structure was recommended eligible under Criterion A and C for its historic association to the WPA and as a local example of WPA construction techniques and style. The remaining structures were recommended as ineligible for listing to the NRHP.

Mary Beth Derrick

Architectural Historian

Ms. Derrick meets the Secretary of the Interior's qualification standards [36 CFR61] for Architectural Historian. She has survey experience in West Virginia, Virginia, North Carolina, South Carolina, Georgia, Pennsylvania, Wisconsin, North Dakota, Alaska, Ohio, and Louisiana. Mary Beth has extensive experience in conducting historic research and fieldwork for Federal and state agencies, which has led to the completion of historic site inventory forms, historic structure reports, condition assessments, and mitigation plans.

Mary Beth also has an educational background in history and art history. She has had experience in museum exhibits, surveys at the local and state level, photo simulations, ArcGIS, and measured-drawings.

Experience: Over 5 years of experience in the field of Cultural Resource Management.
LinkedIn: https://www.linkedin.com/in/mary-beth-derrick-a5920b121/
Email: marybeth.derrick@erm.com

Professional Affiliations & Registrations

- Society of Architectural Historians
- The Vernacular Architecture Forum

Fields of Competence

- Architectural surveys and evaluations
- Historic documentary research
- National Register of Historic Places eligibility evaluation and assessments for historic resources
- Compliance with state, and federal cultural resource regulations, including guidelines set forth by various State Historic Preservation Offices, the National Historic Preservation Act and the National Environmental Policy Act
- Historic Structure Reports
- Geographic Information Systems (GIS)
- Cultural Resource Survey and Reporting for Federal Agencies including FERC, FCC, and USACE
- Measured Drawings
- Photo Simulations
- Section 106

Education

- M.A., Architectural History, University of Virginia, 2016
- Certificate in Historic Preservation, University of Virginia, 2016
- B.A., History, University of South Carolina, 2013
- B.A., Art History, University of South Carolina, 2013

Languages

- English, native speaker

Key Industry Sectors

- Power generation and transmission
- Oil and gas
- Wind Energy

Publications

- 2016 *William Jay and the South Carolina Academy of Fine Arts* (Online published master's thesis). University of Virginia, Charlottesville, Virginia.

Key Projects

Energy Client, Wind and Electric Energy, Virginia, U.S.A., 2021- present

Acted as principal investigator and lead architectural historian for the onshore portion of an electric transmission line associated with an offshore wind farm. Duties included the preparation of the pre-application report, overseeing the historic resource field survey, and compiling a reconnaissance level report for over 300 architectural resources.

Energy Client, Wind Energy, Massachusetts, U.S.A., 2020-2021

Acted as a cultural resource specialist supporting the Bureau of Ocean Energy Management by aiding in the Section 106 consultation process for a wind energy project. Tasks included contributions to the Finding of Adverse Effects document, Memorandum of Agreement, drafting materials for consultation meetings, compiling meeting summaries, and assisting with any other tasks, as needed.

Energy Client, Pipeline , Ohio, U.S.A., 2019-present

Acted as lead architectural historian for natural gas pipeline maintenance project throughout Ohio. This included technical report preparation and writing, as well as completing Ohio I-forms for all architectural resources.

Energy Client, Pipeline, North Dakota, U.S.A., 2019-2021

Acted as principal investigator for a pipeline and two compressor sites by conducting a Class III intensive cultural resource survey and report for architectural resources in the project APE. Key tasks included researching historic sites, completing field surveys, photo documentation, and assessing historic structures for NRHP eligibility.

Energy Client, Pipeline, Wisconsin, U.S.A., 2019-present

Acted as principal investigator for an approximately 50-mile oil pipeline in northern Wisconsin, which included a reconnaissance and intensive level survey and associated report for architectural resources in the project APE.

Manufacturing Client, Refinery, Louisiana, U.S.A., 2020

Acted as lead architectural historian for a reconnaissance-level survey and report of an expansion of an existing refinery. This involved researching the refinery, and completing a field survey of the refinery and surrounding structures, photo documentation, and writing a reconnaissance-level description with National Register of Historic Places assessments and assessment of effects.

Manufacturing Client, Refinery, Alaska, U.S.A., 2019

Acted as lead architectural historian for an intensive-level survey and report of a modification of an existing refinery. This involved researching the historic property, completing a field survey, intensive photo documentation, and writing an intensive-level description with a National Register of Historic Places assessment and assessment of effects.

Energy Client, Pipeline, Louisiana, U.S.A., 2019

Acted as lead architectural historian for three compressor sites and a 300-mile pipeline, which included researching historic sites, completing field surveys, assessing historic structures for their NRHP eligibility, and evaluating the project's APE. Suggested possible changes to compressor station location to minimize possible project effects. Completed Louisiana Historic resource inventory forms and wrote the architectural resource survey report.

Energy Client, Pipeline, West Virginia, Virginia, North Carolina, U.S.A., 2016-2020

Conducted field surveys as architectural historian field lead and assessed previously-listed and unlisted historic structures within the project's APE and proposed compressor stations. Evaluated the viewshed of historic structures toward the proposed project. Determined the project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places, completed West Virginia Historic Property Inventory forms, input data into Virginia Cultural Resources Information System, and completed North Carolina Historic Preservation Office Survey Database entries. Worked on historic structure reports, assessment of effects, and treatment plans for cultural resources to mitigate project effects. Worked on project components being permitted by FERC and FCC. Consulted with state SHPOs and consulting parties, as appropriate.

Energy Client, Wind Energy, Pennsylvania, U.S.A., 2018-2020

Acted as architectural historian field lead that involved field surveys and assessments of previously-listed and unlisted historic structures within the project's area of potential effect. Evaluated the project's impact on the structures and historic districts and contributed to the historic structures report.

Energy Client, Electric Power, Virginia, U.S.A., 2017-2019

Took high-resolution photo simulations of areas that could be affected by the proposed project and wrote assessments of previously recorded historic resources in the area. Wrote architectural descriptions for the final reports, assessed architectural resources' eligibility for inclusion in the National Register of Historic places, and determined the project's impact on the historic resource.

Energy Client, Electric Power, Michigan, U.S.A., 2018-2019

Acted as lead architectural historian, completed previously-recorded resource search at the Michigan State Historic Preservation Office in Lansing, assessed historic structures, and evaluated the project's area of potential effect (APE). Determined resources' eligibility for inclusion on the National Register of Historic Places, and completed Michigan History/Architectural Survey site forms and associated survey report.

Energy Client, Electric Power, West Virginia, U.S.A., 2018

Conducted field surveys and historic structure assessments of structures 45 years and older in the project's area of potential effect. Contributed to the history and architectural descriptions in the final historic structures reports. Determined resources' eligibility for inclusion on the National Register of Historic Places, and completed West Virginia Historic Property Inventory forms.

Emily Dodson

Consultant I, Architectural Historian

Mrs. Dodson has survey experience in Virginia, West Virginia, Ohio, South and North Dakota, as well as experience in background research on historic structures throughout the United States. She has experience in conducting historic research and fieldwork for Federal and state agencies, which has led to the completion of historic site inventory forms and historic structure reports.

Experience: About 2 years' experience in architectural history consultation

LinkedIn: https://www.linkedin.com/in/emily-dodson-71b360158/

Email: emily.dodson@erm.com

Education

- M.F.A. Architectural History, Savannah College of Art & Design, United States, 2017-2019.
- B.A. History/Museum Studies, Public History concentration, United States, 2013-2017.

Professional Affiliations and Registrations

- Society of Architectural Historians
- Vernacular Architecture Forum
- Phi Alpha Theta
- Tennessee Association of Museums

Languages

- English, native speaker

Fields of Competence

- Architectural surveys and evaluations
- Historic documentary research
- National Register of Historic Places eligibility evaluation and assessments for historic resources
- Historic structures reports
- Compliance with state and federal cultural resource regulations, including guidelines set forth by various State Historic Preservation Offices, the National Historic Preservation Act, and the National Environmental Policy Act
- Historic Structures Reports
- Section 106
- Technical report writing for compliance projects
- Geographic Information Systems (GIS)
- Photo Simulations
- Photography
- Office suite
- InDesign, Illustrator

Key Industry Sectors

- Power generation and transmission
- Oil and gas
- Wind Energy
- Solar power

Key Projects

Energy Client, Pipeline, Virginia, U.S.A. 2022
Acted as lead architectural historian for a reconnaissance-level survey and report for repairs and expansion of an existing pipeline and compressor stations. Evaluated the viewshed of historic structures toward the proposed Project. Worked on historic structure descriptions, determined the Project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places.

Technology Services Client, Virginia, U.S.A. 2022-present
Acted as lead architectural historian for a reconnaissance-level field survey and assessed previously recorded and newly recorded historic structures within the Project's APE. Evaluated the viewshed of historic structures toward the proposed project. Assisted in the assessing the historic structures' eligibility for inclusion in the National Register of Historic Places and the project's impact on the resources. Entered information from field surveys into Virginia's Department of Historic Resources Cultural Resources Information System (V-CRIS).

Energy Client, Pipeline, Virginia, U.S.A. 2021-2022
Acted as lead architectural historian for a reconnaissance-level survey and report for repairs and expansion of an existing pipeline and compressor stations. Evaluated the viewshed of historic structures toward the proposed Project. Worked on historic structure reports, determined the Project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places.

Energy Client, Pipeline, South Dakota, U.S.A. 2022
Acted as lead architectural historian for an intensive survey and report for modifications to an existing pipeline and compressor stations. Evaluated the viewshed of historic structures toward the proposed Project. Worked on historic structure reports, determined the Project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places, and assessments of effects. Input data into North Dakota's Architectural Forms and conducted background research.

Energy Clients, Solar, Virginia, U.S.A. 2022
Acted as lead architectural historian for an intensive survey and report for new construction of solar facilities. Evaluated the viewshed of historic structures toward the proposed Project. Worked on historic structure reports, determined the Project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places, and assessments of effects.

Energy Client, Pipeline, North Dakota, U.S.A. 2021
Acted as lead architectural historian for an intensive survey and report for modifications to an existing pipeline and compressor stations. Evaluated the viewshed of historic structures toward the proposed Project. Worked on historic structure reports, determined the Project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places, and assessments of effects. Input data into North Dakota's Architectural Forms and conducted background research.

Energy Client, Pipeline, Ohio, U.S.A. 2021
Worked on historic structure reports, determined the Project's impact on the historic resources, their eligibility for inclusion in the National Register of Historic Places. Entered information from field surveys into Ohio's Historic Inventory system and consulted in Ohio SHPO on the proper submittal procedure.

Energy Client, Pipeline, West Virginia, U.S.A. 2021
Assessed previously recorded and newly recorded structures within the project's APE. Evaluated the viewshed of historic structures toward the proposed project. Wrote reconnaissance-level descriptions with National Register of Historic Places assessments. Consulted with state SHPOs, as appropriate.

Energy Client, Wind Energy, Virginia, U.S.A. 2021
Acted as part of the survey team for a reconnaissance-level survey for a projected transmission line. This included completed background research on listed, eligible, and newly of-age resources, recording resources, and photo documentation. On the team writing the reconnaissance-level description with the National Register of Historic Places assessments for the report.

Annika Liger

Consultant II, Scientist

Annika meets the Federal qualifications [36 CFR Part 61] for Historian. She has a Master's degree in History of Welfare and Medicine in Society. She also holds Bachelor's degrees in Anthropology, where she primarily focused on cultural and applied anthropology, and History. She has extensive experience conducting socioeconomic and historical research, analyzing primary and secondary sources, and writing and editing papers and proposals. Recent projects primarily include assisting clients with National Environmental Policy Act (NEPA) compliance and socioeconomic and environmental justice research and reporting.

Experience: Two years' experience in impact assessment working for ERM

Email: annika.liger@erm.com

LinkedIn: linkedin.com/in/annikaliger

Education

- M.A. History of Welfare and Medicine in Society, University College Dublin, Ireland, 2019
- B.S. Anthropology, College of Charleston, USA, 2017
- B.A. History, College of Charleston, USA, 2017

Languages

- English, native speaker
- German, working knowledge

Fields of Competence

- Socioeconomic research
- Section 106 and NEPA compliance
- Environmental Justice
- Archival research
- Historic documentary research
- Tribal consultation with federally recognized Tribes throughout the United States

Key Industry Sectors

- Technology, media and telecommunications
- Oil and Gas
- Mining

Honors and Awards

- School of Humanities and Social Sciences (HSS) Scholar, Anthropology Department, College of Charleston, 2017

Publications and Presentations

- Cara Delay and Annika Liger. *Bad Mothers and Dirty Lousers: Representing Abortionists in Post-Independence Ireland* in Journal of Social History. Vol. 54, no. 1, Fall 2020: 286-305

- Annika Liger. 2017. *Attitudes towards Abortionists in Mid-Twentieth Century Ireland.* Southeastern Women's Studies Association (SEWSA) conference, GA.

Key Projects

Socioeconomic and Environmental Justice Baseline Report Writing
Energy Clients
2021-Present; Compiles, analyzes, and qualitatively interprets data for socioeconomic and environmental justice reports. This includes utilizing census data, the EPA's Environmental Justice Screening and Mapping Tool, and conducting research to provide qualitative context. Maintains a database of Environmental Justice trends in the oil and gas industry.

Socioeconomic Baseline Report Writing
Mining Clients
2021; Compiled, analyzed, and qualitatively interpreted data for socioeconomic and environmental justice reports for various clients. This includes utilizing census data, the EPA's Environmental Justice Screening and Mapping Tool, and conducting research to provide qualitative context.

Report Editing
2022-Present; Edits EA&MPs, EMPs, EISs, and related documents for energy clients, including offshore wind and oil and gas clients, and conducts desktop research for the reports.

NEPA Compliance Services
Telecommunications Clients
2021-Present; Historian and cultural resources team coordinator for nationwide NEPA compliance programs for clients building satellite access nodes. Other duties include cultural resource research, historical research, writing reports, tribal consultation, and public outreach.

NEPA Compliance Services
Telecommunications Client, Cellular
2020-2022; Historian and tribal consultation specialist for nationwide NEPA compliance program for a client building cell towers. Primarily accountable for maintaining and tracking ERM's tribal databases, which identified tribes interested in consultation and their preferences, requirements, and responses for each project. Other duties included cultural resource research, writing reports, and public outreach.

Storm Water Compliance Support
2020-Present; Conducts quarterly visual storm water assessments and visual site inspections for multiple clients. Key tasks include identifying corrective actions and data collection.

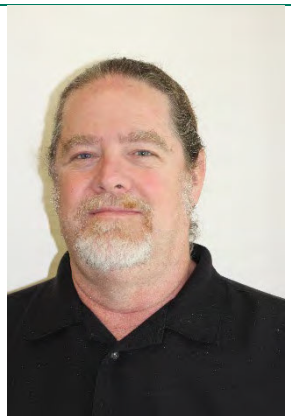
Key Projects Prior to Joining ERM

"'I am dying for a bit of nourishment'": Food, Power, and the Control of Diet in Ireland's Female Convict Prisons, c. 1878-1908"
(Master's Thesis)
This project involved extensive use of primary source documents from the National Archives of Ireland in Dublin, Ireland. A secondary source review was also conducted and a portion of the paper presented at the 2019 University College Dublin School of History Graduate Conference.

Jeffrey L. Holland

Historian

Mr. Holland has over 30 years of experience on Cultural Resources Management projects throughout the eastern United States, the Midwest, and Texas. He has conducted historical research and documentation for National Register properties and districts, HABS/HAER recordation, Assessments of Effects reports, and cultural resources survey, testing, and data recovery projects. He has also authored popular histories for major industrial facilities and summaries of archaeological projects for public education. Mr. Holland's specialties include slavery, African American history, nineteenth century agriculture, the Civil War, and the history of military installations, utilities, and infrastructure in the twentieth century.



Experience: 30+ years' experience in Section 106, NEPA, and Historic Preservation Planning for government, energy, and industrial sectors

Email: jeffrey.holland@erm.com

LinkedIn: https://www.linkedin.com/in/jeff-holland-54993548/

Education

- M.A., History (with Historical Archaeology Apprenticeship), College of William & Mary, 1995
- B.A., History, Davidson College, 1984

Fields of Competence

- Historical research, documentation, and assessment of NRHP properties
- NEPA, Section 106
- Historic preservation planning
- Genealogical research
- Cemetery relocation
- Historical archaeology

Languages

- English, native speaker

Key Industry Sectors

- Energy
- Military
- Utilities
- Transportation

Publications

- Holland, Jeffrey. 2007. Landownership and Hardship: Interpreting the Landscape of an African-American Community in Eastern Gwinnett County, Georgia. *Early Georgia* 35(2).
- Holland, Jeffrey. 2006. *Under One Roof: The Story of Air Force Plant 6.* Aeronautical System Center, Acquisition Environmental, Safety, & Health Division, Wright-Patterson Air Force Base, Ohio.
- Garrow, Patrick H., and Jeffrey L. Holland. 2005. Camp Lincoln and the Army of Southeastern Missouri. *Missouri Archaeologist* 66 (Dec):93–118
- Pietak, Lynn Marie, and Jeffrey L. Holland. 2003. Excavations at the Colclough Farmstead: Exploring Rural Life in Nineteenth and Twentieth Century Northeastern Mississippi. *Mississippi Archaeology* 37(2):165–218.

Key Projects at ERM

Government Agency, NRHP Evaluation of Low-Head Dams, 2021
Developed a historic context and prepared an NRHP Evaluation of four dams constructed in 1927 on the Grand River in Grand Rapids, Michigan. The evaluation recommended that the dams were eligible for the NRHP under Criterion A for their role in city planning and the development of the riverfront as a focal point of downtown development. The SHPO concurred with the evaluation and the assessment of adverse effect.

Government Agency, Superfund Site, 2020
Prepared an Assessment of Effects Memorandum regarding the effects of proposed remedial actions at a National Priorities List site in Massachusetts on a historic canal that abuts the Project area. The memorandum recommended that the removal of contaminated material from the berm of the canal would result in the loss of a portion of the NRHP-listed canal property, but that the effect would not be adverse due to the existence of better preserved sections of the canal that maintained the property's integrity.

Energy Client, Pipeline Project, 2015–2019
Conducted cultural resource investigations as part of the permitting of a 600-mile natural gas pipeline in three states. Prepared historical contexts, conducted research on properties, assessed effects of project on resources, prepared mitigation plans for NRHP-eligible properties. Federal Energy Regulatory Commission issued Programmatic Agreement approving implementation of mitigative measures to complete compliance with Section 106 of the National Historic Preservation Act.

Energy Client, Wind Energy Project, 2019–2020
Prepared a Cumulative Visual Effects Assessment for a proposed off-shore wind energy installation of 800-megawatts in the waters of Rhode Island and Massachusetts. The analysis incorporated 17 lease areas and 761 wind generating turbines from the proposed project and reasonable foreseeable future projects. The assessment focused on three historic properties, including a Traditional Cultural Property and a National Historic Landmark.

Energy Client, Wind Energy Project, 2017–2019
Developed context and assessed historic significance for resources in three county area of northeast Pennsylvania that might be affected by a series of proposed wind turbines sites. The context addressed thematic resource types of primary significance in the region including coal industry related sites, railroads, and agricultural properties.

Energy Client, NRHP Evaluation of LNG Terminal, 2019
Developed context and assessed historical significance of an LNG terminal in Alaska completed in 1969 that was the first to export LNG from the United States. The research addressed the process involved in liquefying natural gas and changes to the plant over time. The plant was recommended as eligible for the NRHP.

Energy Client, NRHP Evaluation of Abandoned Pipeline, 2018
Served as author of reports for four western states assessing the historical significance of a 700-mile former oil pipeline converted to natural gas that was slated for abandonment. The assessment was conducted in accordance with a Notice of Exemption issued by the Advisory Council on Historic Preservation regarding abandoned historic natural gas pipelines.

Manufacturing Client, NRHP Evaluation of Historic Orchard Property, 2018
Conducted historical research and produced historical context for historic apple orchard and other historic properties in Jefferson County, West Virginia. Assessed significance of properties and potential direct and visual effects of a fiber manufacturing facility.

Key Projects Prior to Joining ERM

Energy Client, NRHP Documentation, 2014
Researched the ownership history and development of the William Evans farmhouse and associated buildings using county records, historical maps, census returns, and other primary and secondary sources as part of a Memorandum of Agreement to mitigate the effects of a transmission line with a permanent archival record of the property

Government Agency, Nuclear Power Program History, 2013
Conducted historical research using documents from the agency's corporate libraries, records in the National Archives, contemporary newspaper articles, and secondary sources on the nuclear power industry to produce a fully-referenced, illustrated history of what was for many years the nation's largest nuclear power program. The agency commissioned this historical overview of its nuclear power program to provide a concise reference for the agency.

Government Agency, HABS Documentation, 2012
Examined project records and historic photographs, along with other primary and secondary sources to establish the history of the former project offices of the Falcon Dam Project on the Rio Grande, constructed in 1951.

Government Agency, NRHP Assessment, Levees and Water Control Features, 2010–2011
Researched the records of the U.S. Boundary and Waters Commission and the Bureau of Reclamation to assess the significance of two levees constructed on the Rio Grande to control flooding. The levees interfaced with irrigation systems constructed prior to the levees, which also had historic features.

Government Agency, Oral History Documentation of Federal Housing Project, 2009
Conducted historical research on two housing projects slated for demolition using records at the local historical societies and libraries. Current residents of the developments were interviewed about their experiences in public housing. The documentation was part of a recordation of the two facilities intended to produce a comprehensive history of the public housing prior to the sale of the properties by the city.

Energy Client, Pipeline Project, 2008
Produced statewide contexts for five states, as well as more specific histories for dozens of counties and parishes along a 507-mile natural gas transmission pipeline in the southeast U.S. Historical research was also conducted on identified architectural resources to aid the assessment of their NRHP significance. The project was conducted on a short time schedule.

Military Agency, Air Force Facility History, 2006
Served as Historian and Author for the production of a pictorial history of Air Force Plant 6, an aircraft assembly plant operated by Bell Aircraft Company during World War II and later by Lockheed Aeronautics Company and its successors. The book is a fully-illustrated, perfect-bound history of the plant intended for a general audience and was distributed to libraries, government agencies, and other interested organizations.

Energy Client, NRHP Assessment of Hydroelectric Power System, 2004
This project involved a review of historical documents related to the design and construction of 11 dams and powerhouses along two major rivers in North and South Carolina. Published histories, company documents, contemporary accounts were consulted, and similar large-scale power and flood-control projects in the Southeast and in the United States were studied to assess the significance of a series pf projects that spanned two states and included multiple facilities along an entire river system.

Military Agency, Context and NRHP Assessment of Korean War and Cold War Structures, 2003
Conducted background research to develop historic contexts to aid in the interpretation and assessment of BASOPS structures from the Korean War and Cold War periods at Fort Bliss and Briggs Army Airfield, Texas. The assessment of the facilities required the application of NRHP guidelines for properties of exceptional significance but less than 50 years old.

Larissa A. Thomas, Ph.D.

Senior Archaeologist

Larissa Thomas is a Consultant within ERM based in a satellite office in Lamoine, Maine, and attached to the cultural resources field services group based in Duluth, Georgia. Dr. Thomas is a senior cultural resources professional who has been working as an archaeologist since 1991 and specializes in archaeological investigations, permitting, project management, and contract management. Trained as a prehistorian, her expertise also extends to the areas of history, historic architecture, and cemetery investigations. Dr. Thomas has authored countless peer-reviewed publications and technical reports, and has held several faculty positions during her career.

Experience: 27 years' experience in archaeology and cultural resource consulting

Email: larissa.thomas@erm.com

Education

- Ph.D., Anthropology,
  Binghamton University, USA, 1997
- M.A., Anthropology,
  State University of New York at Binghamton, USA, 1994
- B.A., Anthropology and English,
  Wake Forest University, USA, 1991

Professional Affiliations and Registrations

- Register of Professional Archaeologists, 1999–present

Languages

- English, native speaker

Fields of Competence

- Prehistoric archaeology – Southeast and Midwest
- Cemetery investigations
- Historical archaeology
- Historic architecture
- Historic research

Key Industry Sectors

- Oil & Gas
- Power

Key Projects

Energy Client, Pipeline Project, 2014—2018
600-mile pipeline in West Virginia, Virginia, North Carolina. Cultural resource specialist who prepared the prehistoric and environmental contexts and conducted the technical review for all of the cultural resource survey, Phase II testing, assessment of effects, and mitigation/avoidance plan reports.

Energy Client, Supply Header Project, 2014—2018
Approximately 40 miles of pipeline and ancillary facilities in Pennsylvania and West Virginia. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for all of the cultural resource reports.

Energy Client, Pipeline Project, 2014—2017
Approximately 165 miles of pipeline in West Virginia. Cultural resource specialist who prepared the prehistoric and environmental contexts and conducted the technical review for all of the cultural resource survey and assessment of effects reports.

Energy Client, Transmission Line Project, 2017
Six transmission line alternatives in Fairfax County, Virginia. Cultural resource specialist who prepared sections of the routing study, SCC application, and pre-application analysis, and conducted the technical review for the cultural resource investigations conducted for a proposed line to be sited in northern Virginia.

Energy Client, Transmission Line Project, 2017
17-mile transmission line in Halifax County, North Carolina. Cultural resource specialist who wrote portions of the historic architectural findings, and conducted the technical review for the archaeology and historic architectural reports.

Energy Client, Pipeline Project, 2015—2017
Three natural gas compressor stations in Kentucky, Tennessee, and Mississippi. Cultural resource specialist who prepared portions of the reports and conducted the technical review for all of the cultural resource survey reports.

Energy Client, Pipeline Project, 2015–2016
26-miles of pipeline as well other facilities in Plaquemines Parish, Louisiana. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for all of the cultural resource survey reports.

Energy Client, Transmission Line Project, 2015
2.5 miles of transmission line alternatives in Luzerne County, Pennsylvania. Cultural resource task manager responsible for collecting data on recorded archaeological and historic resources, overseeing the archaeological and historic resource field survey, and authoring the technical report.

Energy Client, Pipeline Project, 2015
205-mile natural gas pipeline in Culberson, El Paso, Hudspeth, Pecos, and Reeves Counties, Texas: Cultural resource specialist who prepared the prehistoric and historic contexts and conducted the technical review for four separate cultural resource reports.

Energy Client, Texas LNG Project, 2015
LNG facility on a 625-acre tract in Cameron County, Texas: Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for the archaeological survey and testing report and mitigation plan.

Energy Client, Transmission Line Project, 2014–2015
Five transmission line alternatives in extending nearly 40 miles across northern Virginia. Cultural resource task manager responsible for collecting data on recorded archaeological and historic resources, overseeing the historic architectural field

effort, conducting the assessment of impacts, and serving as the lead author on the pre-application analysis report and preparing sections of the routing study and SCC application.

Energy Client, LNG Terminal and Pipeline Laterals, 2014–2016
42 miles of pipelines and other facilities in Cameron Parish, Louisiana. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for all of the cultural resource survey reports.

Energy Client, Pipeline Project, 2014
4-mile pipeline abandonment and replacement in Hempstead and Howard counties, Arkansas. Cultural resource specialist who conducted the historic resources assessment and prepared prehistoric context, historic context, and historic resource findings sections of the cultural resource survey report.

Energy Client, Pipeline Project, 2013–2014
80-mile pipeline in Mississippi, Tennessee, and Arkansas. Cultural resource specialist who conducted artifact analysis, prepared site forms, and prepared prehistoric and historic background for three reports prior to project's suspension.

Energy Client, Pipeline Replacement Project, 2013
One-mile pipeline replacement in Independence County, Arkansas. Principal investigator who directed the archaeological and historic resources survey and prepared the cultural resource survey report.

Energy Client Project, 2013–2014
Eight transmission line alternatives in northern Virginia. Cultural resource specialist who prepared sections of routing study.

Energy Client Pipeline, 2013
9-mile pipeline in St. John the Baptist and St. Charles parishes, Louisiana. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for the cultural resource survey report.

Key Projects Prior to Joining ERM

Energy Client, Liquefaction and Pipeline Project, 2012–2013
18 miles of natural gas pipeline, 288 acres for the liquefaction facility, four compressor station sites, 10 meter stations, and a 21-acre contractor yard in Louisiana and Mississippi. Cultural resources task manager for a FERC regulated LNG terminal and pipeline project in Louisiana and Mississippi, intended to facilitate export of domestically produced natural gas from a facility currently designed for imports. Role entailed the initial SHPO and Native American consultation, oversight of the cultural resource survey teams, documentation of a compressor station upgrade in Mississippi, coauthoring the Phase I report for the 288-acre liquefaction facility site in Calcasieu Parish, Louisiana, conducting the quality assurance technical reviews for all four Phase I reports, and preparation of Resource Report 4 and the unanticipated discoveries plans for the FERC filings.

Energy Client Cameron LNG Pipeline Expansion and Liquefaction and Pipeline Project, 2012–2013
21 miles of natural gas pipeline, 503 acres for the liquefaction facility, and 46 acres for a compressor station and contractor yard in Beauregard, Calcasieu, and Cameron Parishes, Louisiana. Cultural resources task manager for a FERC regulated LNG terminal and pipeline intended to facilitate export of domestically produced natural gas from a facility currently designed for imports. Role entailed conducting the initial SHPO and Native American consultation, oversight of the cultural resource survey teams, serving as lead author of the two Phase I survey reports prepared for the liquefaction facility site and pipeline, and writing Resource Report 4 and the unanticipated discoveries plans for the FERC filings.

Energy Client, Expansion Pipeline Project, 2012–2013
16-miles of natural gas pipeline in Washington and Smyth Counties, Virginia and Sullivan County, Tennessee. Cultural resources task manager charged with managing the cultural resource team, conducting initial consultation with state historic preservation offices, Tennessee Valley Authority, and Indian tribes, and preparing FERC resource report sections.

Energy Client, Transmission Line Project, 2011
55-mile electric transmission line in Burke, Jefferson, McDuffie, and Warren Counties, Georgia, which included a portion on a nuclear generating facility. Cultural resources task manager who directed the Phase I cultural resource survey and conducted the quality assurance technical review of the survey report.

Energy Client, Pipeline Project, 2011–2012
141-mile petroleum products pipeline extending from St. Charles Parish, Louisiana to Covington County, Mississippi. Cultural resource specialist whose work included initial consultation with both SHPO, preparation of prehistoric culture histories and environmental background sections for both Phase I reports, conducting the quality assurance technical reviews for the reports, and correspondence with contacts for the three USACE districts on the Phase I and addendum reports.

Energy Client, Pipeline Project, 2011–2012
570-mile natural gas liquids pipeline extends from Midland County to Jackson County, Texas. Different reports were prepared for the two USACE districts traversed by the project. Cultural resource specialist whose involvement included writing prehistoric culture histories and environmental background sections for both Phase I reports and conducting the quality assurance technical reviews.

Energy Client Project, 2009–2011
175-mile natural gas pipeline that extends from Panola County, Texas, to Richland Parish, Louisiana. The Phase I cultural resource investigations included archaeological and historic structure surveys, Phase II archaeological testing, and investigation of a cemetery that had been impacted by an unscrupulous landowner. Cultural resource specialist whose involvement included writing a public-oriented brochure detailing the history of the cemetery and its role in local history, and conducting the quality assurance technical reviews for the Phase I and addendum reports.

Energy Client, Transmission Ruston Storage Compressor Replacement Project, 2011
Principal Investigator and report author for the Phase I cultural resource survey of a 30-acre compressor station site and associated access road in Lincoln Parish, Louisiana.

Energy Client, Transmission Line Project, 2010
6.5-mile electric transmission line in Winston County, Alabama. Project manager and principal investigator who conducted the historic architectural assessment, and served as lead author on the report.

Energy Client, Transmission Line Project, 2010
8-mile electric transmission line in Wheeler and Telfair Counties, Georgia. Project manager and principal investigator who conducted the historic architectural assessment, and was the lead author for the Phase I report.

Energy Client, Transmission Alto Compressor Station Project, 2009
Natural gas compressor station in Richland Parish, Louisiana. Cultural resource specialist who conducted the historic architectural assessment, documented a historic cotton gin complex in the Area of Potential Effects, and coauthored the report.

Energy Client, Pipeline Project, 2007–2008
507-mile natural gas pipeline beginning in southeastern Oklahoma, traversing Texas, Louisiana, Mississippi, and terminating in southwestern Alabama. Cultural resource specialist whose involvement included SHPO and Native American consultation, preparing prehistoric culture histories and environmental context for all of the Phase I reports, and conducting the quality assurance technical reviews for the Phase I reports and numerous addendum reports.

Energy Client, Transmission Line Project, 2002, 2005, and 2009
The Tennessee River crossing for a transmission line replacement in Jackson County, Alabama. Project manager for an undertaking involving replacement of a segment of electric transmission line in where it crosses the Tennessee River; cultural resource investigations included archaeological survey, archaeological test excavations to determine a location for the structure on the island with the least likelihood of impacting significant portions of a known archaeological site with Native American burials, and archaeological monitoring during construction of the footings for the transmission line structure. Dr. Thomas' involvement in the cultural resource compliance on the project included managing all phases of the project, co-authoring the report of survey and excavation findings, and assisting client through the course of the project by offering recommendations for ways to work within engineering constraints and still avoid adverse effects to a significant archaeological site.

Energy Client, Transmission Line Project, 2005
4-mile electric transmission line in DeSoto County, Mississippi. Project manager and co-author of the Phase I survey report.

Energy Client, Transmission Line Project, 2005
5-mile electric transmission line in Polk County, Tennessee. Project manager who obtained an Archaeological Resources Protection Act (ARPA) permit from the U.S. Forest Service, conducted the quality assurance technical review for the Phase I report, and assisted client with project planning.

Energy Client, Transmission Line Project, 2005
12.5-mile electric transmission line in Cherokee and Clay Counties, North Carolina. Project manager and co-author of the Phase I survey report.

Energy Client, Lateral Pipeline Project, 2005
30-mile natural gas pipeline in Tazewell and Smyth Counties, Virginia. Project manager who co-authored the Phase I report and several addendum reports for access roads and ancillary facilities, and prepared other project documentation such as FERC resource report sections and an unanticipated discoveries plan, in addition to meeting with State Historic Preservation Office staff to resolve issues related to historic resources in the Area of Potential Effects.

Energy Client, Transmission Line Project, 2005
7-mile electric transmission line in Choctaw County, Mississippi. Project manager and lead author on the Phase I survey report.

Energy Client, Transmission Line Routing Project, 2005
Principal investigator for a cultural resource literature review of a 93-square-mile area that would contain a 20-mile electric transmission line in McDuffie, Columbia, and Richmond Counties, Georgia. Work included collecting all of the data on archaeological sites and historic resources and presenting the information to client in a report of findings to assist them in routing the line to minimize cultural resource impacts.

Energy Client, Pipeline Project, 2003–2004
Phase II test excavations and Phase III data recovery excavations at three archaeological sites in Washington and Smyth Counties, Virginia and Jackson County, Tennessee. Dr. Thomas served as cultural resource specialist whose work included assisting with the archaeological fieldwork during the

Virginia excavations, conducting archaeobotanical analysis of plant remains, conducting the quality assurance technical review for the Phase III reports, preparing a popular brochure presenting the findings for the sites in Virginia, and authoring addendum reports for access roads and ancillary facilities.

Energy Client, Transmission Line Survey, 2000
16 miles of proposed transmission line in Perry County, Tennessee. Principal investigator who led the archaeological survey and was the lead author of the Phase I report.

Energy Client, Transmission Line Survey, 1999
14 miles of proposed transmission line in Madison County, Tennessee. Principal investigator who led the archaeological survey and was the lead author of the Phase I report.

Publications

Thomas, Larissa A.
2001 The Gender Division of Labor in Mississippian Households: Its Role in Shaping Production for Exchange. In *Archaeological Studies of Gender in the Southeast*, edited by Jane Eastman and Christopher Rodning, pp. 27–56. University of Florida Press.

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1998 The Effect of Community Size on Subsistence Practices at Mississippian Sites in Southern Illinois. *Journal of the Steward Anthropological Society* 26:129–156.

1996 A Study of Shell Beads and Their Social Context in the Mississippian Period: A Case from the Carolina Piedmont and Mountains. *Southeastern Archaeology* 15:29–46.

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APPENDIX B-3

PHASE 1 ARCHAEOLOGICAL SURVEY, ROXBORO PLANT

Duke Roxboro Steam Plant

Phase I Archaeological Survey

9 March 2023

Project No.: 0672318

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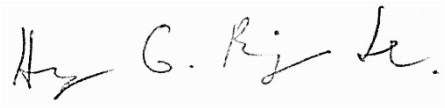
Duke Roxboro Steam Plant

Phase I Archaeological Survey



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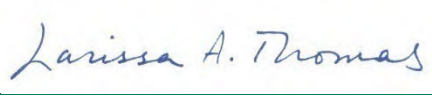

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ABSTRACT

On January 10 through 12, 2023, Environmental Resources Management (ERM) conducted a Phase I archaeological survey on behalf of Duke Energy, LLC (Duke) in association with the Duke Roxboro Project (Project) in Person County, North Carolina. The proposed Project site consists of approximately 107.22 acres. The Area of Potential Effects (APE) for archaeological resources is limited to the Project area only, as no ground disturbance is expected beyond that boundary.

The Project is subject to authorization by the Federal Energy Regulatory Commission. Duke proposes to construct and operate an energy facility off Hyco Lake. Duke plans to construct a series of gas turbines, steam tubing, an electrical switch yard, cooling towers, office spaces, maintenance buildings, transmission generator tie lines, parking areas, and two construction laydown areas, one to the north and one to the south within the Project area. The Steam Station will co-locate to existing transmission lines and connect to an existing switchyard to the northeast.

No previously recorded archaeological sites were identified within the Project area. One newly recorded archaeological resource (31PR172) was identified within the Project area. Site 31PR172 is an isolated find with very little research value. Therefore, ERM recommends that the Project be allowed to proceed without further archaeological resource consultation.

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Acronyms and Abbreviations

Name	Description
AMSL	Above Mean Sea Level
APE	Area of Potential Effects
B.P.	Before Present
cmbs	Centimeters below surface
Duke	Duke Energy
ERM	Environmental Resources Management
F	Fahrenheit
FERC	Federal Energy Regulatory Commission
GPS	Global Positioning System
NRHP	National Register of Historic Places
OSA	Office of State Archaeology
OSARC	Office of State Archaeology Research Center
PVT	Piedmont Village Tradition
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
NRCS	Natural Resources Conservation Service
USDA	United States Department of Agriculture

1. INTRODUCTION

1.1 Overview

This document presents the results of a Phase I archaeological survey that Environmental Resources Management (ERM) conducted from January 10–12, 2023. The Project area includes a 107.6-acre tract of land north of Roxboro, in Person County, North Carolina. The work is associated with the Duke Energy (Duke) Steam Plant project (Project). ERM is assisting Duke with regulatory requirements related to their expansion of the plant in support of their North Carolina Utility Commission approved Carbon Plan.

The Project is subject to authorization by the Federal Energy Regulatory Commission (FERC). Duke proposes to construct and operate an energy facility off Hyco Lake. Duke plans to construct a series of gas turbines, steam tubing, an electrical switch yard, cooling towers, office spaces, maintenance buildings, transmission generator tie lines, parking areas, and two construction laydown areas, one to the north and one to the south within the Project area. The Steam Station will co-locate to existing transmission lines and connect to an existing switchyard to the northeast.

Section 106 of the National Historic Preservation Act (NHPA), 16 United States Code (USC) 470, requires federal agencies to take into account the effects of their undertakings (including the issuance of Certificates or Authorizations) on properties listed in, or eligible for, listing in the National Register of Historic Places (NRHP). ERM is conducting Phase I surveys to collect information on architectural resources that could be affected by the Project in support of the Section 106 consultation process.

This report presents the findings from the archaeological survey of the Project's Area of Potential Effects (APE). An APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 C.F.R. § 800.16[d]). The APE for archaeological resources is limited to the Project area only, as no ground disturbance is expected beyond that boundary. ERM also carried out a survey of historic architectural resources that could be affected by the Project. The findings of the historic architectural survey are provided in a separate technical report (Langmyer et al. 2023).

1.2 Management Recommendations

Based on a literature review, no previously recorded archaeological sites were identified within the Project area. One newly recorded archaeological resource (31PR172) was identified within the Project area as a result of ERM's survey. As it is an isolated find, it is the opinion of ERM that 31PR172 has very little research value, and that the Project should be allowed to proceed without further consideration of archaeological resources.

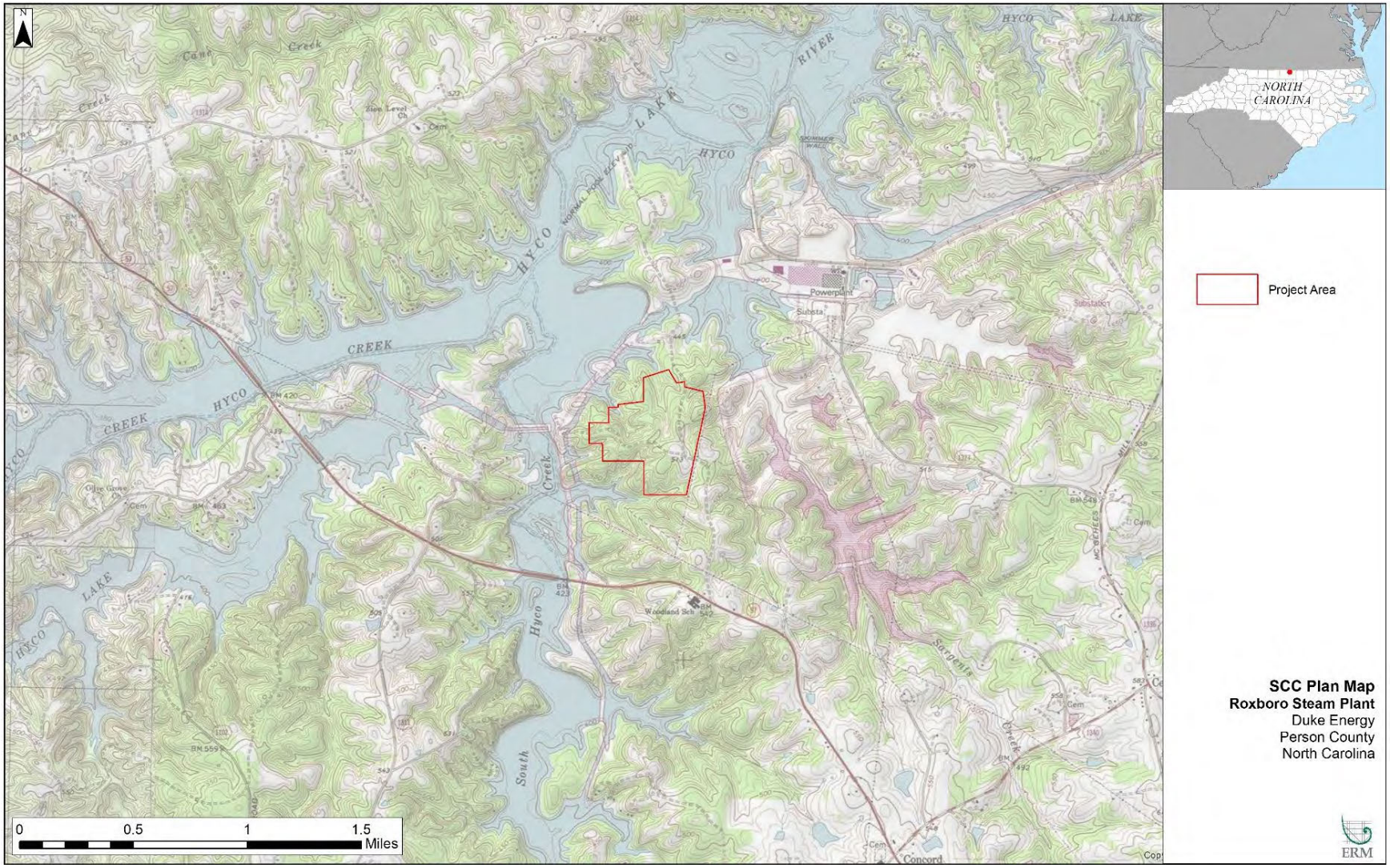

Figure 1.1-1: Project Overview

2. ENVIRONMENTAL SETTING

The Project is located near Hyco Lake in Person County, North Carolina. The Project area is primarily forested, but a large portion within the east half has been recently cleared and graded.

2.1 Physiography and Geology

The Project area is within the Piedmont physiographic province in Person County, North Carolina. Specifically, it is situated within the Northern Inner Piedmont sub-province, which is characterized by hills and rugged terrain with elevations of 200–1,000 feet above mean sea level (AMSL) and monadnocks reaching elevations of 2,000 feet. Geologically, the Project area is located in the Raleigh Belt, which is characterized by metamorphic rocks, and bedrock locally consists of biotite gneiss and schist (Burt et al. 1985).

2.2 Soils

The United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) mapped soils in the Project area are listed below in Table 2.2-1 and depicted in Figure 2.2-1.

Table 2.2-1: Soils in the Project Area

Soil Type	Description
Siloam loam (SmF)	Shallow, well drained soils, formed from saprolite derived from diorite and/or gabbro and/or diabase and/or gneiss
Udorthents (UdB)	Very deep, well drained soils on hillslopes, formed from loamy and clayey human-transported material derived from igneous, metamorphic, and sedimentary rock

Source: USDA-NRCS 2023

2.3 Climate

North Carolina has a humid, subtropical climate, with a great deal of local and regional variability in terms of temperature and rainfall. The Northern Inner Piedmont is colder and snowier than the other North Carolina Piedmont sub-provinces and therefore has a shorter growing season (Griffith et al. 2002). In the Project area within Person County, the average winter low temperature is 27 degrees Fahrenheit (F), and the average summer high temperature is 89 degrees F. The average seasonal snowfall is 6 inches, and the average annual rainfall is 46 inches (Best Places 2022).

2.4 Paleoenvironment

Because human occupation of the North American continent spans two geological epochs, and because human/environmental interaction has been shown to be critical to an overall understanding of cultural adaptations, it is necessary to consider changes that occurred in climatic and ecological conditions during this time. The occupation of the New World is known to have occurred from the latter part of the Pleistocene (glacial) epoch into the Holocene (recent) epoch, spanning at least 12,000 years. The transition between these epochs itself is particularly important because it is at this temporal threshold that some of the most dramatic changes in environmental and ecological conditions occurred. These changes played a key role influencing culture change among Paleoindian populations and eliciting the technological and socioeconomic responses that came to characterize the Archaic period. Late Pleistocene climatic conditions created a different biotic environment in North Carolina than that known in the historic period. Boreal forests and woodlands dominated by spruce and jack pine covered much of the state, including the Coastal Plain, slowly transitioning to a mixed conifer-northern hardwoods vegetation

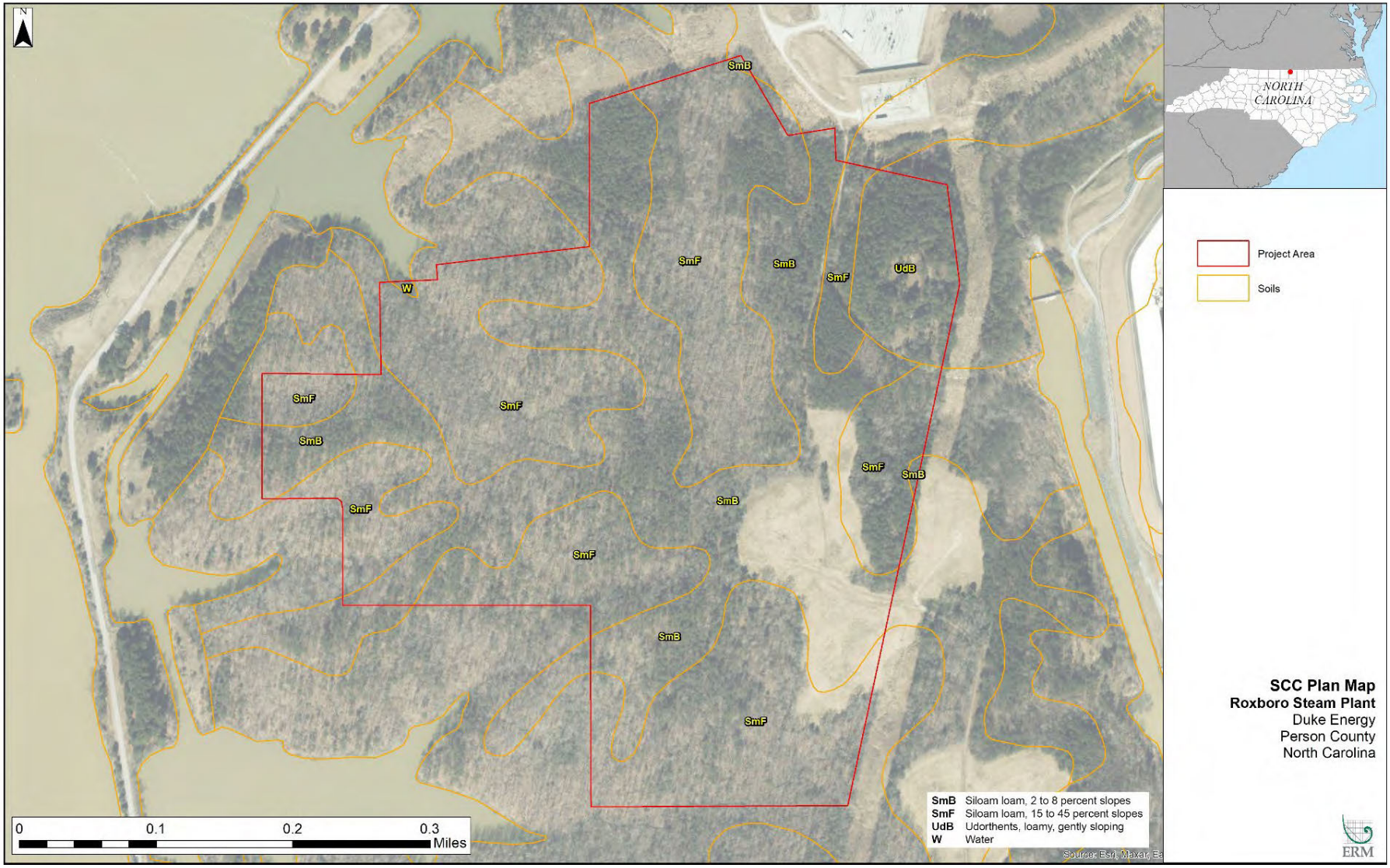

Figure 2.2-1: Overview of Soils Within the Project Area

over the next several millennia as the glacial ice retreated northward. Mesic hardwood forests of beech, hickory, oak, birch, sugar maple, black walnut, hazelnut and elm became established towards the end of the Pleistocene, with modern forest communities in place around 9,000 before present (B.P.) (Beyer 1991; Boyd 2003; Christensen 2000; Delcourt and Delcourt 1981, 1983, 1993; Watts 1980; Wesler et al. 1981; Whitehead 1973; Wright 1981). It is probable that overall regional plant and animal communities were more complex and "disharmonious" during the Pleistocene than at present and were less homogeneous than the modern eastern woodlands, with a combination of modern and currently extinct species in patchy microenvironments (Graham and Lundelius 1984; Kelly and Todd 1988:232). The individual character of local floral communities would have depended on drainage, soils, and elevation, among other factors. The climate was probably characterized by significantly less seasonal variation in temperatures, relatively cool summers and mild winters, and overall cooler and drier conditions than are evident in the region today. The cooler conditions resulted in decreased evaporation and, in areas where drainage was restricted by topography, could have resulted in the development of wetlands in settings where they are currently not found (Delcourt and Delcourt 1981, 1993; Whitehead 1973; Wright 1981).

At 12,000 B.P., North Carolina's coastline was 15–60 miles offshore from its present location. During the Late Pleistocene, the coast was characterized by cliff-banked beaches, poorly developed salt marshes and mud flats, and estuaries that were shorter but broader than in later times. Inland valleys were broad and featured spruce parkland vegetation, whereas interior uplands in the Coastal Plain contained more pine. As the glaciers melted and sea levels rose, the shoreline moved towards its modern position. The rate of sea level rise decreased substantially at around 5,000 B.P., and by 3,500 B.P., the shoreline approached its current location, although sea level has risen a small amount gradually since then. With sea level rise, the lower courses of Coastal Plain river valleys were drowned, creating estuaries within the tidewater zone. A complex series of relict river channels has been identified offshore in North Carolina, providing evidence of North Carolina's Pleistocene geography, which included an expanded Coastal Plain (Barber 1979:117–142; Boss et al. 2002; Browder and McNinch 2006; Christensen 2000:399; Clark and Miller 1912:27).

The ecological changes of the Pleistocene-Holocene transition also contributed to the extinction of numerous species, including many species of megafauna. Meltzer and Mead (1983) suggest that by 10,000 B.P., as many as 35 different genera of mammals may have already vanished from North America. Other environmental changes also were affecting animal populations. For example, with sea level rise, there was an increase in the number of poorly drained, swampy environments, which were attractive to game animals such as white-tailed deer. The modern faunal and floral communities of the region were becoming established as early as 12,500 B.P. (Christensen 2000:399; Delcourt and Delcourt 1985; Dent 1995:131; Wright 1981). Once sea level stabilized, anadromous fish arrived in the inner Coastal Plain in considerable numbers around 3800 B.P. The rise in sea level eventually pushed the salinity cline further upstream, forcing freshwater spawning fish to travel farther upstream to spawn, and fostering extensive seasonal fish runs (Gardner 1982). Estuaries expanded, and oyster beds became established in the region around 3200 B.P. Crabs and other species of shellfish also became more abundant around the region during the Late Archaic cultural period (ca. 5000–3000 B.P.) as the shoreline stabilized (Blanton et al. 2004:70; Gardner 1976, 1982; Potter 1982).

A climatic event known as the Sub-Atlantic episode (beginning ca. 3000–2500 B.P.) roughly coincided with the inception of the Early Woodland cultural period, bringing relatively stable and moister conditions that have persisted into modern times. From this point, vegetational communities known from the earliest historic period became established across North Carolina (Elias and Mock 2013; Webb and Bryson 1972).

2.5 Contemporary Flora and Fauna

One prism through which to view the ecology of the Project region is provided by the Environmental Protection Agency's ecoregion model, which takes into account aspects of geology, soils, topography, climate, and biotic communities to characterize the varied environmental geography of the United States in terms of regions defined to different scales of local specificity. The Project falls within the Northern Inner Piedmont (45e) Level IV ecoregion of the Piedmont (45) Level III ecoregion (Griffith et al. 2002). According to Griffith et al., the Piedmont region is,

> "a complex mosaic of Precambrian and Paleozoic metamorphic and igneous rocks with moderately dissected irregular plains and some hills. Once largely cultivated, much of this region is in planted pine or has reverted to successional pine and hardwood woodlands. The historic oak-hickory-pine forest was dominated by white oak (*Quercus alba*), southern red oak (*Quercus falcata*), post oak (*Quercus stellata*), and hickory (*Carya* spp.), with shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), and to the north and west, Virginia pine (*Pinus virginiana*). The soils tend to be finer-textured than in coastal plain regions."

Dominant land uses in the region are forestry and agricultural activity (Woods et al. 1999:4–5).

A discussion of the specific faunas associated with North Carolina's Northern Inner Piedmont ecosystems is beyond the scope of this report. In general, the region once was teeming with land mammals, including white-tailed deer, opossum, beaver, coyote, fox squirrel, and bobcat. Land use changes—particularly related to agricultural conversion, monoculture forestry, and urban and suburban development—have resulted in extensive habitat loss, and many of these species are seldom seen today. North Carolina's Piedmont is also home to a wide array of avian species—some year-round and some migratory visitors, including waterfowl, song birds, and important game species like the wild turkey. A number of turtles, snakes, frogs, and salamanders are found in various settings across the Piedmont. A wide range of fish species once were common, as were mollusks (Beane and Braswell 2011; Beane et al. 2010; Dorcas 2004; Dorcas et al. 2007; North Carolina Division of Parks and Recreation; North Carolina Wildlife Resources Commission; NCPedia n.d.).

3. CULTURAL PERSPECTIVE

The prehistory of North Carolina begins sometime before 11,000 B.P. and traditionally ends at 400 B.P., around the time of first permanent European settlement. This span is divided into a number of developmental stages. Each stage is characterized by its own settlement patterns, subsistence strategies, technology, and diagnostic artifacts, and is divided into distinctive, temporal periods. Remnants of these temporal periods are left in the form of archaeological deposits. Primarily by identifying various artifact stylistic traits, archaeologists have divided the occupation of the region into general stages, or periods: the Paleoindian period (12,000–10,000 B.P.), the Archaic period (10,000–3,000 B.P.), the Woodland period (3,000–1,000 B.P.), and the Late Prehistoric period (1,000–400 B.P.). The Historic period begins with the arrival of the De Soto expedition in western North Carolina in the in the spring of 1540, but settlement of Euro-Americans in the study region would not come for another hundred years through English explorers, traders, and settlers from Tidewater Virginia.

3.1 Paleoindian Period (12,000–10,000 B.P.)

The Paleoindian period marks the beginning of human occupation in the New World. Exactly when the first human populations permanently settled the western hemisphere is uncertain; most Americanist archaeologists believe it was sometime between 20,000 and 14,000 years ago, during the last stages of the Pleistocene glaciation. The earliest securely dated Paleoindian site is in Monte Verde, Chile, where dates as early as ca. 13,800 B.P. have been obtained, predating Clovis sites in North America that were long believed to be the earliest occupations on the continent (Dillehay 1989). However, investigations at the Cactus Hill site in Sussex County, Virginia, and the Topper site near Allendale, South Carolina, suggest that humans also may have been in the mid-Atlantic and southeastern United States prior to the advent of Clovis culture—around 18,000 years ago in the case of Cactus Hill (Goodyear 1999; McAvoy and McAvoy 1997). Although some archaeologists continue to view Clovis as the earliest confirmed cultural tradition in the United States, recent work at those sites and others have led some to call for a prehistoric cultural chronology that includes a pre-Clovis classification (e.g., Goodyear 1999).

The Paleoindian lithic tool kit was based on a highly refined flake and blade technology. Examples of Paleoindian lithic tool types include unspecialized flake tools, formal side and end scrapers, gravers, denticulates, specialized hafted unifacial knives, large bifacial knives, and specialized lanceolate projectile points, which were sometimes “fluted.” The best known of these is the Clovis point, the earliest recognized projectile point type in the western hemisphere (dating 11,800–11,000 B.P.). Clovis variants have been found from Canada to the southern tip of South America. Formal variation in projectile point morphology began to emerge in regions of the Southeast by about 11,000 B.P., probably due to restricted movement within regions and the formation of loosely defined social networks tied to habitual use areas (Anderson 1995; Anderson et al. 1992). These new regionalized projectile point forms include the Redstone, with a more tapered distal end creating a triangular shape, Cumberland, Suwannee, and Simpson types—all of which are narrowed at the base, as well as the Dalton and Hardaway types from the Late Paleoindian period with fluting reduced to thinning and grinding. Among the middle Paleoindian point types, Redstone appears to be the most common in the Coastal Plain (Anderson et al. 1990; Daniel and Moore 2011:3-17; Justice 1987:17–43; McAvoy 1979, 1992:38).

A significant wood, bone, and antler technology was likely present as well. These organic items do not preserve well and are rarely found in archaeological contexts. However, at submerged sites where they have been preserved, primarily in Florida, it is clear that organic media were very important. These materials were manufactured into projectile points, foreshafts, leisters, awls, and needles, to name just a few tool categories (Milanich and Fairbanks 1980: Figures 3, 5, and 6).

Original views of the Paleoindian subsistence economy were based on observations from a series of sites in the western United States where Paleoindian artifacts, particularly large, lanceolate, fluted points, were

recovered in direct association with the remains of several species of now extinct Pleistocene megafauna. Initial interpretations of Paleoindian subsistence suggested that these early inhabitants focused primarily on hunting large mammals such as mammoth, mastodon, bison, ground sloth, and other game. Paleoindian artifacts have been found in direct association with Pleistocene fauna at a number of sites in the Southeast, such as the Coats-Hines site in Tennessee, where mastodon remains were found in association with Paleoindian artifacts (Breitburg et al. 1996; Deter-Wolf et al. 2011), and the Alexon site in Florida, where a *Bison antiquus* skull was discovered with a projectile point embedded in the forehead (Webb et al. 1984). A large number of worked mammoth and mastodon bones also have been recovered from underwater contexts in Florida sinkholes (Dunbar and Webb 1996). However, for Paleoindian groups in the East, large game animals probably were exploited as part of a broad-based subsistence economy. At the Kimmswick rockshelter site in eastern Missouri, where faunal remains were well preserved, Clovis points and lithic debitage were documented in direct association with mastodon, as well as a variety of other species, including white-tailed deer, various small mammals, amphibians, and turtles (Graham et al. 1981). Likewise, Paleoindian contexts at sites like Meadowcroft Rockshelter in western Pennsylvania, Big Eddy in southwest Missouri, and Dust Cave in northwest Alabama have yielded archaeobotanical remains including a variety of leafy plants, seeds, nuts, and berries exploited as part of a broad spectrum hunting and gathering adaptation (Cushman 1982; Lopinot et al. 2000; Walker et al. 2001). The stratified Shawnee Minisink site in the Upper Delaware River Valley of eastern Pennsylvania had hearths associated with the Paleoindian component radiocarbon dated to 10,590±300 and 10,750±600 B.P. (McNett 1985:6). The Paleoindian component also yielded more than 76 seeds from at least ten different plant species as well as fish bones (Dent and Kauffman 1985:67, 73). There is now little doubt that Paleoindians utilized a diverse array of faunal and floral resources.

Several models of early Paleoindian settlement patterning have been proposed (see Anderson et al. 1992 for an overview). Some are concerned with Paleoindians in general (Anderson 1990; Kelly and Todd 1988; Martin 1973), and others with regional trends (Anderson 1995; Gardner 1983; Morse and Morse 1983). Most are mechanistic models that portray specific economic strategies as primary reasons for how Paleoindians settled upon and utilized the landscape. Each is slightly different in its focus, with primacy placed on one of three major influences: (1) the need to maintain access to prominent, high-quality raw material sources (e.g., Gardner 1983); (2) a preference for exploiting specific habitual use zones and staging areas (e.g., Anderson 1995); or (3) a nomadic or seminomadic existence dictated to a large degree by the movements and availability of large game (e.g., Kelly and Todd 1988). The models share a number of assumptions about Paleoindian lifeways. The general consensus among archaeologists is that Paleoindian bands were composed of four or five extended families and numbered 25–50 individuals. Marriage was almost certainly exogamous and residence was likely extralocal. Primary social groups very likely met at predetermined locations with other groups at specific times of the year to cooperate in large-scale food acquisition (nut harvesting, fishing, shellfish gathering, etc.) and/or lithic resource extraction, as well as to exchange information, renew or create alliances, fulfill social obligations, find mates, and perform rituals. Some large Paleoindian sites in New England and Nova Scotia have been interpreted as aggregation sites and/or locations repeatedly visited based on the presence of several concentrated artifact loci. Bull Brook in Massachusetts is perhaps the best known of such sites. It consisted of a circular pattern of 36 loci that may have derived from multiple groups gathering at the site seasonally (Byers 1954; Robinson et al. 2009). For most of the year, however, primary Paleoindian bands appear to have dispersed into loosely defined habitual use areas. They probably exploited a wide variety of economic resources, moving often to take advantage of seasonal resources. It is also possible that they periodically established logistical base camps and used them as staging areas for special activity forays. Based on sites like Thunderbird and Fifty in the Flint Run Complex of Virginia's Shenandoah Valley, which were situated in an area where good lithic raw material was available, Gardner (1977) advanced the "Flint Run Lithic Deterministic" model of Paleoindian settlement, where the movements of small groups of Native Americans across the landscape were made to take advantage of important lithic sources (Anderson and

Sassaman 1996). The Flint Run Complex included quarries, reduction sites, base camps, and maintenance camps.

In North Carolina, evidence for Paleoindian occupation primarily comes from isolated surface finds (Daniel and Moore 2011:3-1; Perkinson 1971, 1973, Ward and Davis 1999:29). Concentrations of projectile points suggest a more intensive occupation of the northern Piedmont in North Carolina than other parts of the state (Ward and Davis 1999:31). By way of comparison, North Carolina's Coastal Plain region has yielded 9.77 points per 10,000 km^2 compared with 28.88 points per 10,000 km^2 for the Piedmont (Daniel and Moore 2011:3-3).

Even a site like Pasquotank, located in the vicinity of the Great Dismal Swamp, northwest of Elizabeth City in Pasquotank County, which has yielded a relatively dense Paleoindian assemblage, consists of a surface scatter intermingled with materials from later components (Daniel et al. 2007). The Pasquotank site has provided valuable information about Paleoindian population movements with respect to lithic raw material sources. Specifically, Paleoindian artifacts documented the use of a fine-grained rhyolitic tuff, whose nearest source was either the Eastern Slate Belt approximately 140 km to the west or more likely the Carolina Slate Belt at least 200 km away, and chert likely from the Williamson site in Virginia, some 140 km to the northwest (Daniel and Moore 2011:3-4; Daniel et al. 2007:74–76). Despite the dearth of stratigraphically intact Paleoindian sites in North Carolina, such remains have been recovered from locations in nearby regions; examples include the Thunderbird, Williamson, Fifty, and Topper sites (Gardner 1974, 1977; Goodyear and Steffy 2003; McAvoy and McAvoy 2003; McCary 1975). The Williamson site in Dinwiddie County in southern Virginia displayed evidence of intensive use, producing over 175 fluted points and over 2,000 side- and end scrapers (McAvoy 1992; McCary 1975). The Thunderbird site near Front Royal in northern Virginia is noteworthy for the discovery of postmolds defining some type of structure dating to the middle of the Paleoindian period (Gardner 1983). The Topper site, located on the South Carolina side of the Savannah River near an Allendale Coastal Plain chert source, exposed an intact Clovis level dated to 13,200±1300 cal B.P. (Goodyear and Steffy 2003; Waters et al. 2009). The integrity of the buried Clovis component has been documented through spatial analysis and refit studies (Miller 2007). The large block excavations at the site have produced bifaces, fluted-point preforms, fluted points, an extensive unifacial tool collection with macroblades, denticulates, and scrapers, and large quantities of debitage. The in situ assemblage of lithic reduction debris has helped shed light on Clovis biface manufacturing technology (Smallwood 2010).

One intact site in North Carolina dates to the terminal Paleoindian period. The Hardaway site is located in the Piedmont in Stanly County, on the Yadkin River (Coe 1964:56). The type site for the Hardaway point contained a sealed component with numerous examples of the transitional Hardaway and Hardaway-Dalton points, whose morphology displayed basal thinning in lieu of earlier fluting. The appearance of side notching in some specimens anticipates the proliferation of notched forms in the Archaic period (Coe 1964:59–68). The change in lithic technology used by terminal Paleoindian groups has been interpreted as a response to the changing environment and resources available at the beginning of the Holocene. The end of the Paleoindian period is associated with the end of the Wisconsin glacial stage, when new settlement and subsistence patterns emerged with new regional technologies geared towards coping with the new conditions. These trends are associated with the subsequent Archaic culture period.

3.2 Archaic Period (10,000–3,000 B.P.)

The transition from Paleoindian to Archaic in North Carolina is estimated to have taken place around 10,000 B.P. This was a time of rapid changes in environmental conditions that were nearing completion by 8000 B.P. The environmental changes coincided with the extinction of Pleistocene megafauna. With sea level rise, there was an increase in the number of poorly drained, swampy environments, which were attractive to game animals such as white-tailed deer, and thus to human hunters as well (Christensen 2000:399; Delcourt and Delcourt 1985; Ward and Davis 1999:2; Wright 1981). Changes were made to

utilitarian technology in response to the new environmental conditions. A tripartite scheme dividing the Archaic period into Early, Middle, and Late subperiods is traditionally used to demarcate some of the important developments of this time. It should be emphasized, however, that these subdivisions are heuristic devices; changes were gradual and non-uniform from one area to the next.

Early excavations at buried floodplain sites like Gaston (31HX7) in Halifax County, Doerschuk (31MG22) in Montgomery County, and at the Lowder's Ferry (31ST7) and Hardaway (31ST4) sites in Stanly County, provided stratified Archaic deposits in North Carolina's Piedmont. The cultural sequence developed from these sites still serve as the chronology for the Archaic period in North Carolina and much of the eastern United States. The projectile point traditions developed from these sites in the Piedmont of North Carolina are as follows, Hardaway, Palmer, and Kirk corner notched points date to the Early Archaic, Kirk stemmed, Stanly, Morrow Mountain, Guilford, and Halifax points date to the Middle Archaic, and Small Savannah River points date to the Late Archaic (Coe 1964:121).

3.2.1 Early Archaic (10,000–8,000 B.P.)

The Early Archaic period is marked by the end of Pleistocene climatic conditions and follows the extinction of numerous large animals. It is generally viewed as the period when native populations began to adapt to the new environment created by Holocene climatic conditions—conditions very similar to those of today. The Early Archaic in the Piedmont has been divided into two parts, the Palmer phase (10000–9000 B.P.) and the Kirk phase (9000–8000 B.P.).

During the Early Archaic, low regional population densities with a high degree of group mobility are inferred (Claggett and Cable 1982). Characteristics observed for Early Archaic sites across the Southeast include a notable increase in site size and frequency and tremendous variation in site size, content, and function. Ward (1983:65) has interpreted this diversity as evidence of an ever-increasing adaptive radiation and specialization in a varied post-Pleistocene environment.

The Early Archaic lifeway is represented by social, settlement, and subsistence strategies designed to take advantage of the biotic diversity of the early Holocene environment, and also to cope with movement restrictions placed upon some Early Archaic populations because of increased population. Environmental conditions were approaching those that the first Europeans encountered in the sixteenth century. Hardwood primary forests and extensive palustrine swamps provided large and small game as well as a variety of plants for medicine, subsistence, clothing, and shelter. Rivers were used as travel corridors and provided fresh water, fish, and shellfish. The only areas of low productivity would have been the pine stands that began to emerge in the uplands by about 6000 B.P. (Delcourt and Delcourt 1985). At sites like Shawnee Minisink in Pennsylvania, comparing the Paleoindian component with the subsequent Archaic occupation reveals continuity in human adaptations, with gradual intensification of local resource use and broadening of diet breadth over time (McNett 1985). Few Archaic-period plant remains are preserved in the sandy, acidic soils of North Carolina's Coastal Plain; but at the Barber Creek site, hickory nutshell in the Early Archaic (Kirk) component was radiocarbon dated 8940±70 B.P. (Daniel 2002:10).

Adaptations to the emerging Holocene environmental conditions included a toolkit with new projectile point forms as well as a variety of other tools. Given the dearth of sealed, datable Archaic contexts in the North Carolina Piedmont, the Early Archaic chronology presented here draws on the Piedmont sequence defined by Coe (1964). Diagnostic artifacts of the Palmer phase of the Early Archaic period (ca. 10,000–9000 B.P.) include Palmer, Kirk corner notched, and later stemmed points, as well as hafted endscrapers (Coe 1964). Another Early Archaic period point form in the region that dates to the early part of the period is Big Sandy side notched (Tuck 1974:75). Kirk phase settlement is characterized by numerous small sites in all environmental zones and suggests an extremely mobile population and a broad spectrum adaptive strategy (Purrington 1983:113). This later Early Archaic tradition (ca. 9000–8000 B.P.) includes bifurcate forms such as LeCroy, St. Albans, and Kanawha types (Claggett and Cable 1982; Oliver 1985).

Some researchers (e.g., Chapman 1985; Egloff and McAvoy 1990) see bifurcate projectile points like St. Albans and Kanawha as roughly contemporaneous with Kirk Stemmed points in the latter portion of the Early Archaic. Ground cobbles and manos have been found in Early Archaic contexts (Claggett and Cable 1982:37), suggesting processing of plant foods with material culture that would be more difficult to transport than a biface. Such finds in Early Archaic contexts remain rare (Daniel 1996), but hint at a more settled lifestyle. Despite the proliferation of discrete projectile point forms, compared with the small number of widely shared forms in the Paleoindian period, Early Archaic projectile point types such as the Palmer-Kirk series and bifurcate styles were widely distributed across large geographies in the Southeast and Mid-Atlantic. This suggests that territories were relatively large and/or that the exchange of information, ideas, and material culture took place frequently and over great distances.

Although continuity is observed in lifeways from the Paleoindian period, the Early Archaic is characterized by an increase in the number and diversity of archaeological sites (Anderson and Sassaman 1996; Custer 1990). As population apparently increased dramatically, the social landscape became more complex. Several models of Early Archaic social organization have been proposed for the Southeast (Anderson et al. 1992: Part II; Anderson and Hanson 1988). One model hypothesizes that Early Archaic societies in eastern sections of the Mid-Atlantic and Southeast were organized into band-sized communities (population 25–50) whose main territory surrounded a segment of a major river (Anderson and Hanson 1988). These bands are postulated to have been organized into larger “macrobands” that gathered on special occasions for community food harvesting, rituals, and the exchange of mates and information. These activities probably took place at or near the heads of rivers or at the mouth of the rivers on the coast. The similarity in certain tool forms throughout and across drainages—projectile points, for example—and the apparent movement of raw materials over long distances are cited to support this argument.

Daniel (1996, 1998, 2001) counters that lithic source areas—not river basins—were key elements determining the seasonal movements of Early Archaic populations. For example, rhyolites from the Uwharrie Mountains of North Carolina’s southern Piedmont are found among Early Archaic assemblages across the Piedmont and interior Coastal Plain, spanning drainage divides, and suggesting large group territories involved in seasonal movements that were not restricted to individual river valleys (Daniel 2001:240–248). The Hardaway site played an important role in Early Archaic lithic procurement, serving as a quarry-related base camp along the Yadkin River, occupied by people exploiting the Uwharrie Mountain quarries (Daniel 1998, 2001:249). Daniel (2001:252–253) argues that a single Early Archaic social group occupied the central portion of North Carolina and northern South Carolina, and that they interacted with another social group in southern South Carolina and the northern portion of Georgia’s Coastal Plain, exchanging rhyolite from the Uwharrie Mountains and Allendale chert from sources along the Savannah River. Daniel argues that these groups moved between the Piedmont and Coastal Plain in response to seasonal availability of key resources under early Holocene conditions of greater seasonal climate extremes. He suggests that base camps were established in the interior Coastal Plain to target aggregated deer populations in the late fall and winter, while greater mobility and more temporary camps were employed through the rest of the year (Daniel 2001:254).

The lack of well-preserved remains limits our understanding of social and ritual practices, but the rare discovery of a cremation burial with a St. Albans bifurcate projectile point at the Slade site on the Nottoway River, to the north in Virginia, provides an early glimpse of mortuary practices in the region (Egloff and McAvoy 1990:70).

3.2.2 Middle Archaic (8,000–5,000 B.P.)

The Middle Archaic can be distinguished from the Early Archaic by the more frequent recovery of groundstone artifacts and a less diverse chipped stone tool kit. Diagnostic bifaces that were made during this period include Stanly, Morrow Mountain, Guilford, and Halifax types (Coe 1964; Blanton and

Sassaman 1989; McAvoy and McAvoy 1997; Phelps 1983). It is assumed that population density increased during the Middle Archaic period, but small hunting and gathering bands probably still formed the primary social and economic units. Larger sites tend to occur near major drainages, at least in the Piedmont (Coe 1964), but occupations also appear near upland watercourses (Gunn and Foss 1992), and numerous small, dispersed upland scatters are also characteristic of this time period. To the east of the Project, sizable Middle Archaic base camp components with hearth features were excavated at the Gaston site on the Roanoke River at the Fall Line. These components were associated with Halifax points and stone mortars, and Guilford points and Guilford chipped stone axes, respectively (Coe 1964:94–119). Utilizing Morrow Mountain point frequencies in South Carolina as a population indicator, Sassaman and Anderson (1994:176) found that the greatest Middle Archaic concentration of population was in the Piedmont region.

Across the Mid-Atlantic, as the warmer, wetter, and more seasonal climate of the Middle Holocene interval became established, subsistence practices shifted towards a more diversified and seasonally targeted strategy that focused on exploitation of white-tailed deer, as well as small mammals, turkey, waterfowl, fish, shellfish, and nuts, which appear to have become a more important part of the diet (Custer 1989; Egloff and McAvoy 1990). Middle Archaic occupations represent significant changes in Early Holocene adaptations, involving exploitation of a wider range of environments and resources and new additions to tool kits such as drills and groundstone items. For example, the use of netsinkers and fish hooks indicates the more intensive use of riverine environments for fishing. Grinding stones and nutting stones reflect greater involvement in collecting and processing plant foods like seeds and nuts. Celts and adzes indicate the growing importance of woodworking, and atlatl weights signify new projectile technology. In the case of Middle Archaic chipped stone tools, including hafted bifaces, the majority were produced from locally available stone rather than high-quality cryptocrystalline materials as had been the case in Paleoindian and Early Archaic times, perhaps suggesting increased population circumscription (Blanton and Robinson 1990; Blanton and Sassaman 1989; Custer 1990; Sassaman 1993; Stevens 1991).

In terms of social organization, small hunting and gathering bands of 25–50 people probably still formed the primary social and economic units. Residences were moved frequently, and social groups likely consisted of small, coresidential units. Long-term investments and social obligations were probably kept to a minimum, ensuring that there were very few restrictions on group movement or fissioning (Custer 1989; Sassaman 1993).

3.2.3 Late Archaic (5,000–3,000 B.P.)

The advent of the Late Archaic period is traditionally defined by the introduction of large, stemmed hafted bifaces that were produced by groups living throughout the eastern United States. In North Carolina, broad-bladed, square-stemmed Savannah River points are representative of this period (Coe 1964). Some suggest that Savannah River points were more like portable cores from which tools with a variety of functional uses could be manufactured, including spear points (Sassaman et al. 1990:320). This notion is consistent with the viewpoint that Late Archaic populations, being less mobile and more circumscribed by surrounding groups, needed to extend the use lives of stone tools (Parry and Kelly 1987). Other Late Archaic artifacts, most often seen at sites near the Fall Line and to the west, include sherds from soapstone bowls and grooved polished stone axes (e.g., Coe 1964:113–114).

In addition to stemmed projectile points, another diagnostic artifact appears during the Late Archaic on the coast, representing a revolutionary innovation in prehistoric technology. Although not yet dated in North Carolina, Stallings Island fiber-tempered pottery appeared in South Carolina at approximately 2500 B.C. and persisted to at least 1100 B.C. (Herbert 2002:295–296, 2011; Phelps 1983; Sassaman 1993). Some dates from the southern coast of North Carolina suggest that this region may have been one of the early locations for the adoption of ceramic technology (Jones et al. 1997; Sanborn and Abbott

1999:15). On the North Carolina coast, any ceramics displaying voids in the paste from the oxidation of fiber (presumably Spanish moss) are considered to be fiber-tempered and are classified as Stallings Island. Although a wide variety of drag-and-jab punctuate decorative patterns characterize classic period Stallings styles in the Savannah River Valley and along the central South Carolina coast, contemporary fiber-tempered ceramics in North Carolina are most often plain with smoothed surfaces. Stallings Island is the earliest occurring pottery north of the Rio Grande, and it is found from the Altamaha River in south Georgia to the Chowan River in North Carolina. Stallings Island pottery is found as far inland as the Sandhills (Culpepper et al. 2000; Herbert 1999:43, 2002:295–296, 2011; Ward and Davis 1999:199). Despite this vast geographic range, the frequency of Stallings Island in North Carolina is relatively low, and the distribution drops off with distance from the core area in the middle Savannah River valley of South Carolina (Herbert 2009:116, 148–150, 2011:4-1; Phelps 1983:26–28, Figure 1.4).

Late Archaic populations continued the broad spectrum hunting and gathering that had characterized the previous 5,000 years of Archaic subsistence. In the Midcontinent, the first archaeological evidence of plant domestication emerges in the Late Archaic with cultigens such as goosefoot or lambsquarter (*Chenopodium* spp.), sumpweed or marshelder (*Iva annua*), sunflower (*Helianthus annuus*) and native squash or gourd (*Curcurbita pepo*) documented for the period (Fritz 1990; Smith and Yarnell 2009). Preservation issues limit archaeobotanical recovery at many sites, so it is unclear when the beginnings of horticulture took place on the Coast. However, the appearance of pottery suggests a possible shift in subsistence practices, with ceramic vessels offering a more convenient means of boiling or simmering certain cooking foods.

Coastal groups during the Late Archaic are thought to have been fairly sedentary (DePratter 1979; Trinkley 1980). There appears to have been an intensified emphasis on riverine resources, especially anadromous fish (Sassaman et al. 1990; Stevens 1991). Base camps were often situated on terraces of major rivers in order to exploit the resources found there. These sites also may have been occupied for longer periods of time than in earlier eras, possibly because the climate had become more temperate and resource availability more predictable. Late Archaic populations maintained permanent residences in the littoral zone and made forays into estuarine and interior settings for specific needs. The permanent settlements on the Coast include shell rings and amorphous shell mounds thought to represent base camps. Interior sites on the Coastal Plain likely served short-term specialized functions. These occupations were generally small and ephemeral; the cultural deposits reflect the specific nature of the occupation, such as a hunting camp (Phelps 1983; Trinkley 1980). Late Archaic sites in the North Carolina Piedmont are as abundant in the uplands as in floodplain locations, although upland sites may be more visible archaeologically due to erosion and plowing. Some evidence suggests that upland sites do not possess the range of artifact classes present in river floodplain sites, meaning that activities that occurred in upland locations were a subset of a larger range of activities that occurred in floodplain locations. Large Late Archaic sites in river floodplains, such as the Gaston, Doerschuk, and Lowder's Ferry sites, have characteristics of intensive occupations in the form of occupational middens, high feature density, and circular pit hearths (Coe 1964:119).

After the earliest appearance of Stallings Island pottery around 2500 B.C., Thom's Creek sand-tempered ware with reed-punctate and plain surface treatments appeared around 2000 B.C. on the coast in South Carolina and spread north to the Neuse River, but not beyond (Anderson et al. 1982: 263–264; Cable et al. 1998; DePratter 1979; Herbert 1999:43, 2002:296, 2011:4-2; Phelps 1968; Trinkley 1980; Waring and Holder 1968). The fine sand-tempered or temperless Thom's Creek wares are thought to have emerged from Stallings Island, as the punctate varieties appear to represent a continuation of Stallings Island decorative styles. The series displays an innovation over the slab-built Stallings Island wares: it was coil built and features thin-walled conical-based vessels that apparently were used as cooking vessels, placed over direct heat. Thom's Creek persisted up to 1200 B.C. and is restricted to the coastal margin, rarely further north than Onslow County (Herbert 2002:296, 2009:19, 155–157, 2011:4-2).

3.3 Woodland Period (3,000–1,000 B.P.)

The Woodland period for the Southeast and Mid-Atlantic has traditionally been defined by the appearance of ceramics in the archaeological record, which has been dated around 1000 B.C. in most interior areas. The discovery of ceramic production on the coast from Georgia to North Carolina, beginning with Stallings Island around 2500 B.C., complicated the archaeological picture and highlighted the differences in prehistoric developments from one region to the next. Joseph Herbert (e.g., 2009:1–2) places the Early Woodland at 2200 B.C., with the appearance of Stallings Island ceramics in North Carolina, on the basis of the original conception of the Woodland period being defined by ceramic technology. Many other researchers consider the innovation of Stallings Island pottery on the Atlantic Coast to be a unique, early regional development within the Late Archaic period, defined as a temporal span in which most people across the Southeast had not yet adopted ceramic technology. Labels are somewhat arbitrary and depend on the degree to which one privileges chronology, cultural patterns, and regional variability, and one's scale of analysis. Maintaining relatively consistent temporal periods in neighboring regions facilitates comparison of contemporary prehistoric lifeways in different locations. For the purposes of this report, the chronology accepted by scholars across the broader region is retained, and Stallings Island is viewed as a Late Archaic development rather than a precocious Woodland development within a cultural landscape in which contemporary interior groups held on to Late Archaic lifestyles.

Whereas early ceramics were thick-walled and of slab construction, coil building using paddles and anvils was adopted in the Early Woodland, facilitating the creation of stronger, thin-walled vessels, fired at higher temperatures and fashioned into a wider range of shapes, including conoidal pots that became the common vessel form for cooking directly over heat. Whereas the first generation of ceramics was made with fiber temper (probably Spanish moss), the second generation was made with quartz sand as temper (Herbert 2009:2).

In the Midcontinent, a dramatic increase in the number of starchy and oily seed domesticates has been documented for Woodland (post-1050 B.C.) contexts (Cowan et al. 1981; Fritz 1990; Gremillion 1996; Smith and Yarnell 2009). Increasing dependence on horticulture is then seen over the course of the Woodland period. It is generally believed that horticulture was adopted as part of a mixed economy that continued to prioritize the collection of wild plant and animal foods, with greater investment in agriculture emerging during the Late Woodland, a time of dramatic population growth and sociopolitical transformation. One subsistence model proposed for Woodland cultures in the Wilmington-New River area posits episodic retreats to the coast to collect shellfish during periods of poor agricultural productivity (Loftfield 1988). Such regional movement and flexibility in subsistence strategies has been argued as a means for prehistoric groups in the region to adjust to short-term drought cycles as well as longer-term environmental changes tied to climate patterns (Gunn 2002).

Although we know relatively little about their origins during the Early Woodland period, cultures throughout most of the Piedmont steadily evolved along an unbroken continuum from about A.D. 1000 until the time of first contacts with Europeans. Researchers have drawn connections between the material culture of this period and historically known Siouan-speaking tribes in this region (Davis and Ward 1991; Ward and Davis 1999:99). The "Piedmont Village Tradition" has been defined as an archaeological construct to describe the material signature of the native peoples who inhabited all but the southernmost portion of the North Carolina Piedmont (Ward 1983; Ward and Davis 1999:78–79). The Piedmont Village Tradition (PVT) is characterized by egalitarian village communities closely tied to specific localities within the Piedmont landscape. Subsistence for these groups seems to have remained evenly balanced between crop production and wild plant and animal resources throughout the Woodland period. Most people lived in sedentary villages and population appears to have grown over time (Ward and Davis 1999:76–137). Ceramics and the remains of post-in-ground houses have been found at Piedmont archaeological sites dating to the Woodland period. Social distinctions were based primarily on age and

sex (Thomas 1996). Egalitarian Woodland societies were woven together by kinship, and leadership roles were achieved rather than ascribed. During this time, the bow and arrow completely replaced the atlatl. Through the period, as the regional landscape became more densely settled, conflict increased, and palisaded villages appeared as communities felt the need for greater security against attacks (Davis and Ward 1989:48).

Only in the Southern Piedmont does the PVT give way to a distinct cultural pattern, where archaeological evidence of the South Appalachian Mississippian tradition is found south of the Uwharrie Mountains, particularly along the Yadkin-Pee Dee River Valley. The Mississippian influence in the Southern Piedmont is seen in site hierarchies centered around earthen mounds at sites like Town Creek, likely reflecting chiefdom style polities such as those described in historic accounts from the sixteenth century (Coe 1995; Ward and Davis 1999:119–134).

As is the case for the Archaic period, the Woodland period is traditionally divided into three subperiods. This division of eras is defined by culture phases that are based almost exclusively on projectile point types and ceramic styles. The phases associated with the Piedmont region of North Carolina are discussed below.

3.3.1 Early Woodland (3,000–2,350 B.P.)

The stratigraphic and stylistic relationships among various ceramic types during the first half of the Woodland period are still unclear. Badin, Yadkin, Vincent, and Clements series ceramics are guides to occupations of the Piedmont during this time.

The Badin phase is named for the small Stanly County town. Near Badin, at the Doerschuk site, the Badin ceramic series was found in a soil zone overlying the Late Archaic Savannah River level. Badin vessels, well-made and tempered with sand, were simple in form, consisting of straight-sided jars with conical bottoms. Vessels were stamped with cord-wrapped and fabric-wrapped paddles. Badin ceramics appear to be related to the Early Woodland Deep Creek wares of North Carolina's coastal region.

In addition to the abrupt introduction of ceramics, an entirely different form of projectile point was thought to be associated with the Badin Phase. The large Savannah River stemmed points of the Late Archaic evolved into the Small Savannah River stemmed type of the Early Woodland, which was followed by Gypsy Stemmed, which was even smaller and made of a wider range of raw materials. Gypsy points were found at the Gaston site along with Badin pottery (the earliest series in the Piedmont and likely contemporary with Thom's Creek) and Badin triangular projectile points. Large Badin triangular points evolved into smaller forms through the Woodland period. The Yadkin triangular and Yadkin Eared forms, for instance, appear late in the Early Woodland and continue into later times (Herbert 2002:300–301; Oliver 1985:204). Based primarily on radiocarbon dates for the succeeding Yadkin phase, archaeologists think that the Badin phase must date to around 500 B.C.

Overall, we know very little about aboriginal lifestyles during the Badin phase. Probably very little changed from the Late Archaic period except for the gradual incorporation of the bow and arrow and ceramic containers. Technology was still primarily adapted to a hunting-and-gathering way of life.

3.3.2 Middle Woodland (2,350–1,600 B.P.)

The Middle Woodland in much of the Southeast and Mid-Atlantic is generally characterized as a time when the archaeological record provides evidence of increased sedentism, regionalization, expansion of exchange networks, incipient social stratification, and a diversified economy with gradually increasing involvement in horticulture. Steady population growth is evidenced in the archaeological record for the Middle Woodland. Closer to the coast, Phelps (1983:33) notes a concentration of sites along major trunk streams and coastal estuaries during the Middle Woodland, with smaller drainages being abandoned.

The Yadkin ceramic series, which is thought to follow after Badin ceramics, was also defined at the Doerschuk site. Yadkin is similar to Badin except that it is tempered with crushed quartz. Cord-wrapped and fabric-wrapped surfaces persist, but new kinds of surface treatments—check stamping, linear check stamping, and simple stamping made with carved wooden paddles—were added. These treatments tie Yadkin phase pottery to the Early Woodland Deptford wares common in Georgia and South Carolina (Herbert 2002:299, 2011:4–9; Ward and Davis 1999:83–84). Ceramics with crushed stone temper are very rare east of the Sandhills (Herbert 2002:299). Yadkin projectile points are typically large triangular forms that resemble Badin points but are more finely flaked.

Radiocarbon dates for Yadkin and Yadkin-like ceramics generally fall between 290 B.C. and A.D. 60, so it is unclear whether Badin ceramics predate Yadkin in all areas of the Piedmont. Some Yadkin sites may have been occupied for relatively long periods of time and lasted until the latter part of the phase, around A.D. 500.

By the end of the Middle Woodland period, each of North Carolina's physiographic provinces had developed into a distinct culture area (Herbert 2009; Phelps 1983; Ward and Davis 1999:4).

3.3.3 Late Woodland (1,600–600 B.P.)

In most areas, the Late Woodland is characterized by settlements occupied on a more permanent basis, with most of the population concentrated in larger settlements; overall population appears to have increased. In the eastern Piedmont, large villages were situated along major rivers and estuaries where anadromous fish and shellfish seem to have been heavily exploited. For example, the Gaston site just above the Fall Line near Roanoke Rapids was a large palisaded village at that time; excavations revealed house patterns, hundreds of pit features, and human and dog burials (Coe 1964:107). Elsewhere, Late Woodland societies appear to have experienced a number of changes involving increased sedentism, investment in agriculture, territoriality, tribalization, regional exchange, and ceremonial expression (Herbert 2002:293, 311, 2009:3–4; Phelps 1983:39). Although people of the northern Piedmont interacted with Mississippian groups to the west and south in the context of exchange and other relations, they never fully adopted the cultural practices and sociopolitical structure of neighboring chiefdom-based Mississippian societies (Irwin et al. 1999:59; Ward and Davis 1999:210).

The PVT is the archaeological culture that encompassed several hundred communities that existed in the Piedmont of central-northern North Carolina and southern Virginia over the period of A.D. 200–1750. During this time, this tradition, characteristic of the Late Woodland period across the Southeast, saw shifts toward the nucleation of settlements in floodplain locations, construction of circular, wooden-post houses, pursuit of a mixed subsistence strategy of agriculture and foraging, and the use of technological innovations such as the bow and arrow and pottery (Ward and Davis 1999).

Although PVT population trends have not been studied directly, some inferences must be considered when discussing settlement patterns and ecology. In the Dan River Valley, settlement densities suggest a much larger resident population during the Late Precontact period compared to other valleys (Ward and Davis 1999:105). The Yadkin Valley shows the most variability in settlement size, either indicating distinct community size differences or differing degrees of reoccupation at particular locations (Jones et al. 2012; Rogers 1995). Woodall (1984) hypothesizes that much of this variability is due to the increased pressure on food resources after coalescence, which eventually caused community fragmentation.

Excavated PVT sites across the four valleys show evidence of mixed subsistence, utilizing both agriculture and foraging (Dickens et al. 1987; Mikell 1987; Ward and Davis 1993; Woodall 1984,1990). At settlements in the Dan River Valley, particularly Lower Saratown, Powerplant, and William Kluttz, maize contributes over 60 percent of the total weight of botanical remains recovered (Ward and Davis 1993:213, 249–255, 314). This suggests that communities there relied more heavily on maize agriculture for their diet than on foraging.

Evidence of social ranking is rare across PVT sites. Simpkins (1985) suggests that the clustering of variably sized settlements along the Dan River could indicate social ranking, but this is by no means conclusive.

Evidence for interaction between PVT communities and groups outside the Piedmont is common at many sites after A.D. 1000. In the Yadkin Valley, evidence is primarily from the aforementioned Porter and T. Jones sites (Woodall 1999, 2009). In the Dan River Valley, many of the earlier Dan River phase sites have marine shells that suggest interactions with coastal groups, and gorgets at later Saratown phase sites also suggest interaction with groups in Appalachian Summit area (Thomas 1996; Ward and Davis 1993:419–421).

The PVT can be chronologically divided into a number of phases distinguished by ceramic style and location. It begins with the Uwharrie phase (A.D. 800–1200), which, although concentrated in the southern Piedmont, is found throughout central North Carolina. Although relatively small, Uwharrie villages were more sedentary than during the preceding Woodland periods. Increased reliance on domesticated plant foods is reflected in the archaeobotanical record, the presence of large subterranean storage facilities, and the phase's typical large conical jars. Hunting, gathering, and fishing were still the mainstays of Uwharrie subsistence, but garden crops, including corn, became important, particularly towards the end of the Uwharrie phase. Uwharrie pottery continued in the same basic tradition as the Badin, Yadkin, Vincent, and Clements styles, although vessel surfaces were finished with a coarse, net-like material and Uwharrie potters began to decorate their pots with crudely incised parallel lines. Burials, placed in simple oval pits, were sometimes adorned with shell beads and other ornaments, and placed in cemetery-like areas away from the main habitation area. From this widespread pattern of Uwharrie adaptation emerged the riverine-focused, nucleated settlements that characterized the last half of the PVT. The Project area falls within the Dan River Valley and so the relevant phase chronology for that region is continued below.

The Dan River phase (A.D. 1000–1450) is focused in the northern Piedmont. It encompasses the Dan River Valley, and appeared roughly at the same time as the Haw River phase (A.D. 1000–1400) in the eastern Piedmont, which includes the Haw and Eno river valleys. Most Dan River phase settlements were small dispersed households and associated features were strung out parallel to the river bank. Large storage pits contained a wide variety of plant and animal remains, while evidence of maize was recovered from almost every pit feature. Beans, sunflower seeds, and maize clearly indicate the importance of agriculture after A.D. 1000. During the last half of the Dan River phase, settlement size and density increased dramatically. Many of these larger and more numerous settlements were located along the banks of the Smith and Mayo rivers in southern Virginia, as well as along the Dan River in North Carolina. Circular, stockaded villages from 1–2 acres in extent contained 15 to 20 households with associated storage pits, hearths, and burials. These encircled open central plazas. Late Dan River phase villages were located on wide alluvial terraces of the Dan River and its major tributaries.

Following the Dan River phase in the north is the Early Saratown Phase (A.D. 1450–1600), which saw a similar nucleation of settlements (Davis and Ward 1991). The phase was defined from excavations at the Early Upper Saratown, one of the most intensively occupied sites in the Dan River valley. Burials at the Early Upper Saratown site contained a rich array of grave goods, in stark contrast to the earlier Dan River phase. Shaft-and-chamber burials were accompanied by the most offerings, including hundreds of bone and shell beads, bone awls, shell hair pins, serrated mussel shells, three "rattlesnake" or "Citico"-style gorgets, and a single pottery vessel. Contact with a copper bar gorget preserved a piece of pine bark covering one burial.

Compared with the earlier Dan River phase remains, the Early Saratown phase had a much broader-based subsistence. A wide range of resources from a variety of habitats sustained Early Saratown people. The size and intensity of the Early Upper Saratown site occupation suggest that the increased

reliance on agriculture that began during the preceding Dan River phase reached its peak just before contact with the first Europeans.

3.4 Contact Period (600–250 B.P.)

The end of the Late Woodland period is referred to as the Protohistoric period, which began in the sixteenth century with initial European contact and exploration, followed by attempts to establish permanent settlements.

Cultural patterns observed in the Late Woodland archaeological record continued into the Protohistoric period, with the addition of European trade goods in the material assemblage. Based on historic-period accounts, it is known that native groups in the Project region were organized as ranked, kin-based societies; they lived in semi-permanent villages, where they maintained garden plots as well as fishing, hunting, and collecting a variety of wild foods. Chiefly descent was reckoned through matrilineage, and polygyny was practiced (Swanton 1946). These cultural patterns began to change as a product of engagement with European colonists.

The aboriginal demand for trade goods was sustained by the European demand for deerskins. It was the deerskin trade, in combination with disease, slavery, and war that marked the beginning of the massive depopulation of native Piedmont groups. What tribal remnants that survived were forced to move and form new social and political entities as more traders and settlers moved farther into the Piedmont from Virginia and South Carolina. By the early 1700s, most of the Carolina Piedmont was vacated by native populations (Davis 2002; Ward and Davis 1991).

The Project vicinity in the Contact period was something of a borderland between native polities to the east that were more engaged with Europeans and those to the west where a permanent European presence had not yet been established. The ancestors of the historically known Sara Indians are thought to have occupied the Dan River and its tributaries since at least A.D. 1000 with the appearance of the Dan River phase, and their presence in the region continued until the end of the seventeenth century (Davis 2002; Davis and Ward 1991; Eastman 1999). Longstanding social and political alliances influenced the Sara Indians' engagement with Europeans and native intermediaries during the seventeenth century.

The archaeological record of the Siouan speaking Sara Indians in the Contact period is known through excavations at the Lower Saratown site located along the Dan River (Ward and Davis 1993), where the first appearance of European trade goods in the northern Piedmont is documented, and Upper Saratown, a village located along Dan River near its confluence with Town Fork Creek (Eastman 1999; Ward and Davis 1999). Two occupations were documented at Lower Saratown, one associated with the Dan River phase (A.D. 1200–1450), and one associated with the Middle Saratown phase, dating (A.D. 1620–1670). The Middle Saratown phase occupation contained a palisade, numerous pit features containing food refuse, and two circular house patterns of concentric posts. Oldtown series ceramics display continuities with earlier Dan River series wares, with smoothed or burnished surface treatments and less commonly net-impressed, cob-impressed, or stamped surfaces. Small triangular arrow points continued to be the main diagnostic chipped stone tool at this time. European trade goods found in the Middle Saratown phase component include glass bead and brass ornaments.

Prior to 1670, the Sara appear to have had few direct interactions with Europeans. At the end of Middle Saratown phase, things changed. Evidence from Upper Saratown reveals that the volume of English-made goods in the material lives of the Sara increased dramatically in the Late Saratown phase (A.D. 1670–1710), and somewhere in this timeframe, European diseases devastated the population (Davis 2002).

The Upper Saratown site, located along Dan River near its confluence with Town Fork Creek, provides the most complete archaeological record of Late Saratown village life (Eastman 1999; Ward and Davis 1999). Upper Saratown contained post patterns for a palisade and circular houses in a compact settlement, and there were earth ovens and numerous large, deep, circular storage pits, usually over a meter in diameter. Pit features yielded a wealth of food remains and other domestic refuse that shed light on subsistence practices during the Late Saratown phase. Hunting focused on deer and other animals continued in the manner seen in earlier times, with no evidence that husbandry of European animals played a role in the economy. A mix of wild and domesticated food plants were recovered, such as maize, beans, squash, gourds, and peaches (a quickly adopted European introduction), along with other wild resources such as hickory nuts, acorns, chestnuts, walnuts, and hazelnuts and wild native fruit such as maypops, persimmon, grape, and raspberry (VanDerwarker et al. 2006).

Evidence from mortuary remains shines a light on the societal upheaval that took place during the Late Saratown phase. Grave goods in Late Saratown burials within house floors and in the surrounding vicinity include numerous European-made ornaments, particularly glass beads and copper bells. At first, interments matched earlier forms, but toward the end of the phase, separate cemetery areas were established away from the village areas where numerous shallow burial pits contained interments with very few associated artifacts. Most of the dead from the burials at this time were subadults, suggesting that the deaths were associated with one or more epidemics. The change in funerary practices may reflect an awareness of the contagiousness of European diseases and an effort to separate the interments from the living areas of the village (Ward and Davis 1999). It has been observed that the European artifacts recovered from Upper Saratown included very few tools and weapons, suggesting that the Sara were receiving their trade goods through middlemen like the Occaneechi, whose principal town on the Roanoke River gave them more direct geographic access to European traders in the seventeenth century (Dickens et al. 1987; Ward and Davis 1988, 1999). The Occaneechi cultivated relations with the English and came to play a pivotal role in the deerskin trade, a role they defended with intimidation and warfare against rival tribes. The Occaneechi were eventually betrayed by their English allies and forced to abandon their island stronghold on the Roanoke. They fled south and established Occaneechi Town on the Eno River in the Neuse basin, which has been excavated as the Fredericks site, providing insight into Occaneechi survival in the eighteenth century (Ward and Davis 1988).

Oldtown series pottery continued in Late Saratown assemblages. Most of the vessels are large cooking or storage jars, most commonly with smoothed and burnished surfaces, but also net impressions. Serving vessels such as hemispherical and cazuela bowls also are found, often decorated with incised lines and punctations. Towards the end of the Late Saratown phase near the end of the seventeenth century, ceramic evidence suggests that remnants of various tribes with distinctive pottery traditions may have joined the Sara, forming loosely organized refugee communities comprised of widely dispersed households (Ward and Davis 1999).

3.5 Historical Development of Person County

Orange County was created from the western part of Granville County in 1752 and included what is now Person County. However, significant settlement of the North Carolina backcountry did not occur until after the Cherokee were defeated during the French and Indian War in the early 1760s. In the late 1760s, Hillsborough, the seat of Orange County, was a center in the Regulator Movement. Settlers in the backcountry above the Fall Line protested that their colony's system of taxation was unfair, with the less productive land in the western and Mountain regions being taxed at the same rate as the more fertile, level soil of the Coastal Plain. Such grievances contributed to feelings of sectional discrimination and a deep distrust of the authorities based in eastern North Carolina. These feelings were exacerbated by the new royal governor, William Tryon, who arrived in North Carolina in 1764 and initiated the building of an elaborate governor's mansion in New Bern at public expense. After a series of mob actions against public

officials, Governor Tryon led the militia in a clash with the Regulators' at the Battle of Alamance (in present-day Burlington in Guilford County). The Regulator leaders who swore allegiance to the royal government were pardoned, but many refused and moved westward over the Appalachians into the territory that would become Tennessee (Lassiter and Lassiter 2004:26; Lewis 2018; Powell 2006).

Caswell County was created from the northern portion of Orange County in 1777, and Person County was created from the eastern half of Caswell County in 1791 (USGenNet 2023). Early settlers to the area were of English, Scots Irish, and German descent and primarily came from other colonies, including neighboring Virginia, as well as Maryland, New Jersey, and Pennsylvania (Forstall 1996; Phillips 2006). At the first federal census of the county in 1800, there were just 6,402 residents. That number increased to just over 10,000 by 1830, but then remained steady until after the Civil War. The county seat of Roxboro was not incorporated until 1855 (Forstall 1996; Mazzocchi 2006).

Agriculture was the foundation of Person County's economy from its first settlement. Farmers practiced mixed husbandry that included corn, oats, wheat, tobacco, cotton, fruits, and vegetables, along with livestock that included cattle, hogs, and sheep (Jurney et al. 1931). During this early period of settlement and focus on agriculture, the House on Wagstaff Farm (PRO295) was built south of the Project area, along modern-day Semora Road (Phillips 2006). The county ranked fourth in the state in tobacco production in 1850 with 1.5 million pounds marketed. Only a small amount of cotton was raised that year. Tobacco increased in importance in the second half of the nineteenth century. In 1860, over 2.7 million pounds of tobacco were reported. Tobacco is a labor-intensive crop, and Person County had a large enslaved African and African American population to work the fields. Indeed, roughly 45 percent of the total population before the American Civil War consisted of Black enslaved persons. The county also had a fairly large, for the time, free Black population of about 300 residents (DeBow 1853; Kennedy 1864a, 1864b; Walker 1872a, 1872b).

After the Civil War, tobacco production continued to increase at a moderate pace to nearly 7.5 million pounds in 1924. In 1931, nearly two-thirds of all tobacco produced in Person County was sold out of Roxboro (Jurney et al. 1931). Tobacco was the only strictly cash crop, with other produce raised for animals and home consumption, with surpluses sold on the market. Corn dominated grain production, with wheat and oats decreasing in importance by the early twentieth century. Orchards were commonplace by 1924. Most farmers kept a small number of cattle, hogs, and chickens, as well as a dairy cow or two. There were three dairies in the county in 1931 that sold their products in Roxboro. Like many areas of the South after the Civil War, tenancy increased during the late nineteenth and early twentieth centuries. In 1880, 62 percent of the county's farm operators owned their farms; by 1925, just 38 percent were owners. Farm size decreased during that period from 168 acres to 76 acres, as large farms worked by slaves were broken into smaller farms operated by tenants (Jurney et al. 1931; U.S. Census Bureau 1883).

Very little industry developed in Person County. Cotton goods were manufactured at Roxboro and other nearby small towns. Other small towns in the county are primarily trade centers connected by the railroad. The construction of the Norfolk & Western Railway from Lynchburg, Virginia to Durham, North Carolina in 1890 and the Southern Railway in 1892 opened up the lumber business, but the profitable timber was largely cut over by 1905 (Jurney et al. 1931). The railroad system was so pervasive in Person County, that in the 1930s, there was at least one railroad station every 13 miles (Jurney et.al. 1931).

In the 1950s and 60s, Person County and Roxboro remained relatively rural. The population declined post World War II in both Person County and Roxboro to roughly 24,000 residents in Person County, 4,000 of whom lived in Roxboro (U.S. Census Bureau 1950). In the 1960s, the Carolina Power and Light Company built Lake Hyco, attracting development to its shores (Welcome to Lake Hyco 2021). In 2021, the population of Person County was approximately 39,000 people, roughly 8,000 of whom live in Roxboro (U.S. Census Bureau 2021a). Employment has shifted dramatically, and agriculture is no longer

one of the top businesses in Person County; instead, the two largest industries are health care and social assistance and manufacturing (U.S. Census Bureau 2021b). Many of the large manufacturers in Person County are based around agricultural goods, including the economic staples of tobacco and cotton (Person County Economic Development 2023).

3.6 History of the Project Vicinity

There are not many detailed maps of Person County or the Project area from the eighteenth and nineteenth centuries. Until recent times, the county was largely rural and dominated by agriculture (see Section 2.1). The NRHP-listed House on Wagstaff Farm (PRO295) was built approximately 0.5 mile south of the Project area in the late nineteenth century, along modern-day State Route (SR) 57/Semora Road (Phillips 2006). At the time the House on Wagstaff Farm was built, Hyco Lake did not exist, and the area was sparsely populated, and would have consisted largely of farmland, forests, rivers, and streams.

One of the earliest maps of the area is a 1910s Rural Delivery map (U.S. Postal Service ca. 1910s), which shows the precursors to several modern-day roads in the vicinity of the Project area including Concord Ceffo Road, parts of SR 57/Semora Road, and Dunnaway Road (Figure 3.6-1). The House on Wagstaff Farm is depicted as a structure along SR 57/Semora Road. Additionally, one structure appears to be located near the south end of the Project area. Several other structures were located to the north of the Project area where Roxboro Plant Road is now. The structure in the Project area is also shown on a 1928 soil survey map and may have been extant as late as 1955. A 1955 aerial photograph shows that an area in the southeastern part of the Project tract was cleared and terraced (U.S. Department of Agriculture 1928; NETRonline 2023).

Woodland Elementary School, located about 0.5 mile south of the Project area on Semora Road, was built in 1950 to serve the local population. It was expanded in the 1960s and again in 2000, but most of the building is original, and it is the oldest still operational elementary school in Person County (Smith Sinnett Architecture 2018). By 1964, the land was being cleared for Hyco Lake, and the house in the Project area had been demolished. A 1968 topographic map that was revised in 1994 (USGS 1994) shows the area just after the completion of Hyco Lake and the power plant (Figure 3.6-2). The revisions in purple show the expansion of the plant and additional roads and impoundments around the lake. No structures are shown in the Project area, which was mostly wooded except the cleared area in the southeast part of the Project tract, which was timbered and terraced in the 1950s (NETRonline 2023).

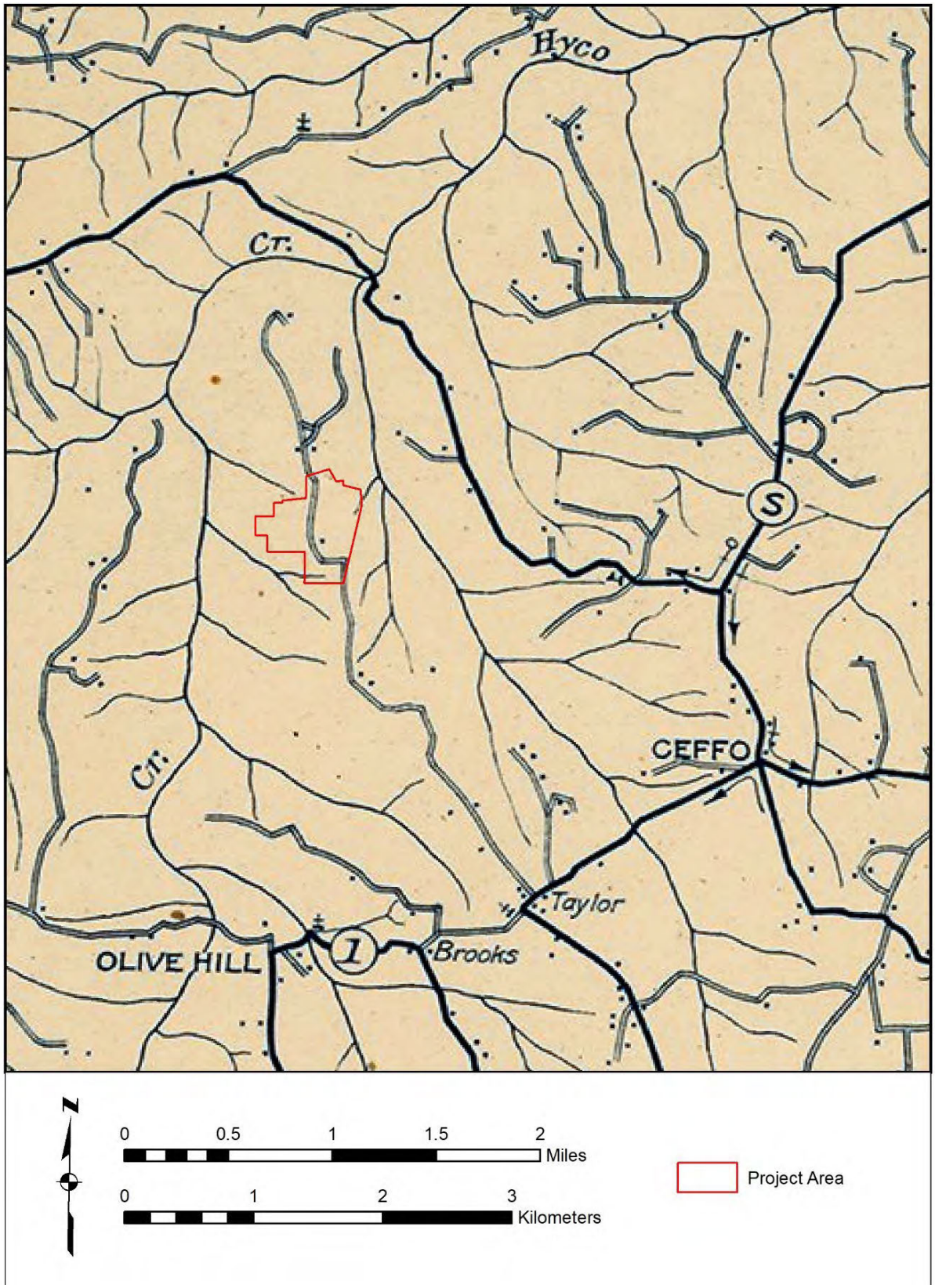

Figure 3.6-1: Post Office Route Map Showing the Project Vicinity in 1910

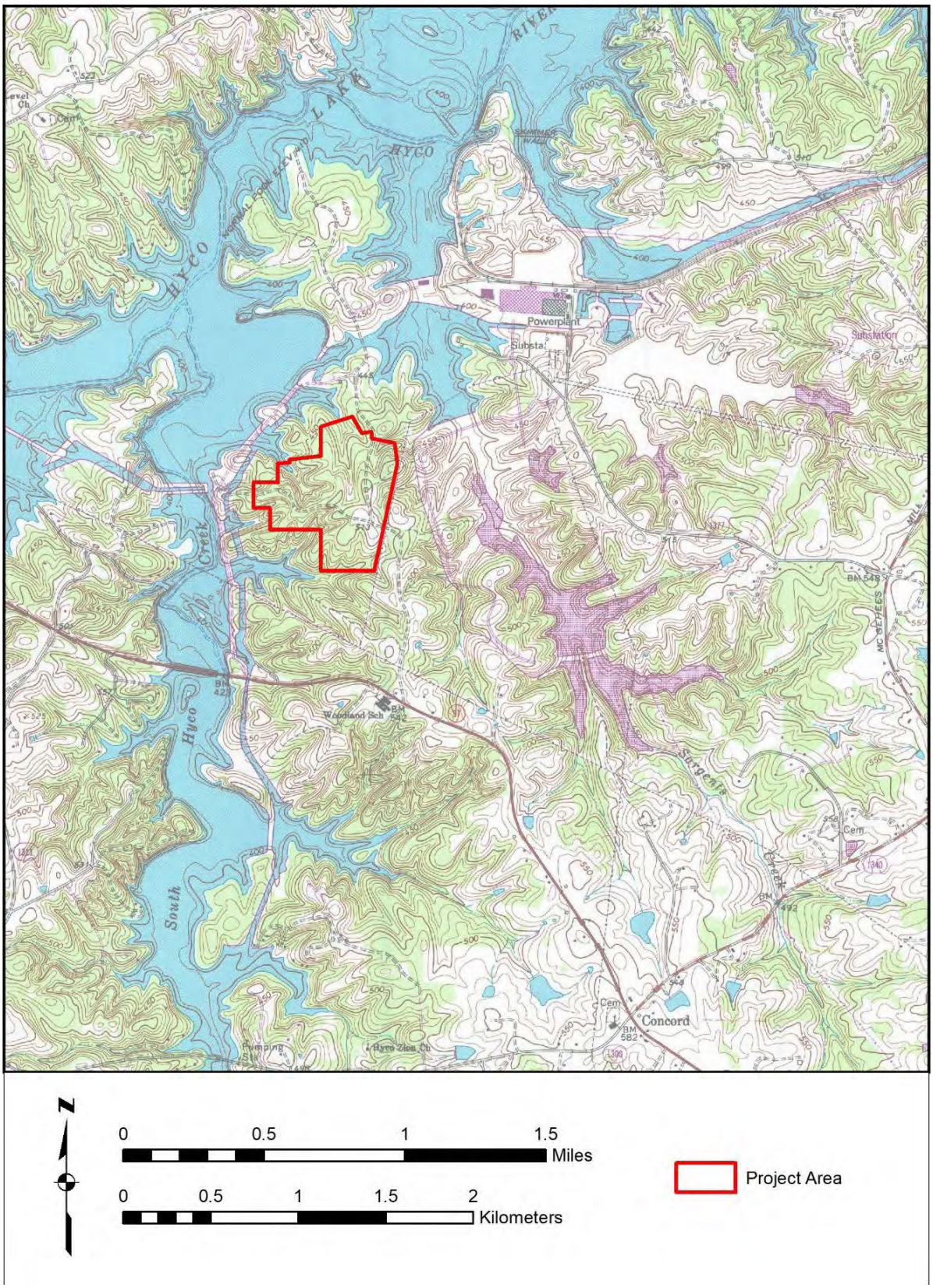

Figure 3.6-2: USGS Map of Showing the Project Vicinity in 1994

4. METHODS

The primary objectives of the investigation were to determine whether the area to be affected by the proposed Project contains any significant archaeological resources. The work was conducted in accordance with the North Carolina Office of State Archaeology (OSA) *Archaeological Investigation Standards and Guidelines for Background Research, Field Methodologies, Technical Reports, and Curation* (2017), and the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* [48 Federal Register 44716-44740] (National Park Service [NPS] 1983).

4.1 Literature and Records Search

On January 3, 2023, ERM cultural resources staff conducted a desktop review using the North Carolina State Historic Preservation Office (OSA) database. The goal was to determine the number, nature, and location of previously conducted surveys, known archaeological sites, and cemeteries that occur within 1 mile (1.6 km) of the Project area.

4.2 Archaeological Field Methods

The survey area was navigated using a handheld global positioning system (GPS) unit. Survey data was recorded through standardized digital forms and the field director's daily log. Field notes, maps, photographs, and other technical materials generated as a result of this survey will be stored on ERM's secure server.

Standard archaeological survey methods were used during the field study; they included a combination of surface inspection and shovel testing techniques. The entire survey area was visually inspected, and, where appropriate, subsurface shovel testing was conducted.

In locations where surface visibility was less than 50 percent, shovel testing was conducted along transects at 30-m intervals. All shovel tests were approximately 30 centimeters (cm) in diameter and excavated to a minimum of 10 cm into the subsoil. All excavated soils from shovel tests were screened through ¼-inch hardware mesh. In the location of the one positive shovel test, site boundaries were delineated by excavating radial shovel tests at 5- to 10-m intervals outward until two consecutive shovel tests were negative for cultural material, or a natural feature (slope, wetland, disturbed area) precluded the excavation of additional shovel tests.

Survey of existing roadways and active heavy machinery construction zones was limited to pedestrian survey for safety reasons. No intact archaeological deposits are expected in such areas. Pedestrian survey with visual inspection was also utilized to survey areas with surface visibility greater than 50 percent, areas with visual evidence of subsurface disturbance, areas with standing water, and areas of slope. These locations were marked as "no digs" along the transects and field conditions were photographed.

4.3 Laboratory Methods and Curation

The one artifact recovered during the survey was returned to the ERM archaeological laboratory in Duluth, Georgia. It was accessioned, washed, and analyzed. It is a piece of lithic debitage that was classified according to stage in the lithic reduction sequence and raw material was typed based on visible attributes.

The field notes, maps, photographs, and other technical materials generated as a result of this survey will be stored at the ERM office in Duluth, Georgia. The one recovered artifact will also be temporarily curated in the ERM archaeological laboratory of the field office in Duluth, Georgia. Given that the survey was conducted exclusively on private land, the artifact will be returned to the landowner upon receipt of

regulatory concurrence with findings. If the landowner does not wish to have the artifact returned, ERM will acquire a gift agreement form signed by the landowner, conveying legal title of the collection, without condition or restriction, to the North Carolina State Office of State Archaeology Research Center (OSARC). This form will also convey the year collected, the institution responsible for collecting the materials, and that the collection will be deposited in the OSARC Repository in perpetuity. ERM will then procure a curation agreement and the necessary accession numbers for the site assemblage for permanent curation with the OSARC Repository, and will provide a complete collection for long-term curation, in accordance with the collection submission guidelines of the *Archaeological Investigation Standards and Guidelines for Background Research, Field Methodologies, Technical Reports, and Curation* (North Carolina OSA 2017).

4.4 NRHP Eligibility Criteria

Sufficient information was collected to make recommendations regarding potential eligibility for listing on the National Register of Historic Places (NRHP) for each archaeological resource addressed during this study. According to 36 CFR 60.4 (Andrus and Shrimpton 2002), cultural resources eligible for listing on the NRHP are defined as buildings, structures, objects, sites, and districts that have “integrity” and that meet one or more of the criteria outlined below. Criterion D is typically relevant to archaeological sites. Criteria A and B may be relevant in the case of historic-period archaeological sites. Criterion C is typically applicable to architectural resources but also may be relevant in the case of archaeological resources that are associated with landscape architecture (like cemeteries) or have engineering elements (like railroads or mines).

- Criterion A (Event). Association with one or more events that have made a significant contribution to the broad patterns of national, state, or local history.
- Criterion B (Person). Association with the lives of persons significant in the past.
- Criterion C (Design/Construction). Embodiment of distinctive characteristics of a type, period, or method of construction; or representation of the work of a master; or possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D (Information Potential). Properties that yield, or are likely to yield, information important in prehistory or history. Criterion D is most often (but not exclusively) associated with archaeological resources. To be considered eligible under Criterion D, sites must be associated with specific or general patterns in the development of the region. Therefore, sites become significant when they are seen within the larger framework of local or regional development.

“Integrity” is perhaps the paramount qualification of NRHP eligibility, and can be related to any or all of the following (Andrus and Shrimpton 2002):

- Location: the place where the historic property (or properties) was/were constructed or where the historic event(s) occurred;
- Design: the combination of elements that create the form, plan, space, structure, and style of a property (or properties);
- Setting: the physical environment of the historic property (or properties);
- Materials: the physical elements that were combined to create the property (or properties) during the associated period of significance;
- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;

- Feeling: the property's (or properties') expression of the aesthetic or historic sense of the period of significance; and
- Association: the direct link between the important historic event(s) or person(s) and the historic property (or properties).

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP (Andrus and Shrimpton 2002). However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- Consideration A: A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- Consideration B: A building or structure removed from its original location, but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- Consideration C: A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his or her productive life; or
- Consideration D: A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- Consideration E: A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- Consideration F: A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- Consideration G: A property achieving significance within the past 50 years if it is of exceptional importance.

Isolated find 31PR172 was evaluated in relation to these criteria and considerations.

5. ARCHAEOLOGICAL SURVEY RESULTS

From January 10–12, 2023, ERM conducted Phase I archaeological investigations at the Project area located in Person County, North Carolina. One archaeological resource (31PR172) was identified during field investigations. The survey coverage and findings are detailed below.

5.1 Project Components and Survey Coverage

The Project area encompassed a 107.6-acre tract on the south side of Hyco Lake, west of the existing Duke Steam Plant in Person County, North Carolina. As discussed in Chapter 2, the Project area is partially forested with high, large ridges that are narrow and long. The entire east half of the Project area has been previously cleared with multiple drainage control ponds constructed. Some of this area has also been recently cleared and graded with mounds of fill dirt having been brought in for current construction activities.

A total of 182 shovel tests were excavated within the Project area, while 187 “no dig” locations were documented (Figure 5.1-1). The majority of “no digs” were due to the steep topography within the survey area. Some were due to standing water and saturated soils, which were present in much of the previously cleared areas. Figures 5.1-2 through 5.1-7 show different aspects of the terrain and land use conditions within the Project area.

The soil stratigraphy was uniform across the entire Project area. Typical shovel test profiles were as follows:

- Stratum I - 0–15 centimeters below surface (cmbs) 10YR 4/4 loamy sand
- Stratum II -15–35 10YR 4/6 sandy clay loam.

Examples of observed soil profiles can be seen in Figures 5.1-8 and 5.1-9. The soils were deflated from erosion due to logging and other clearing activities.

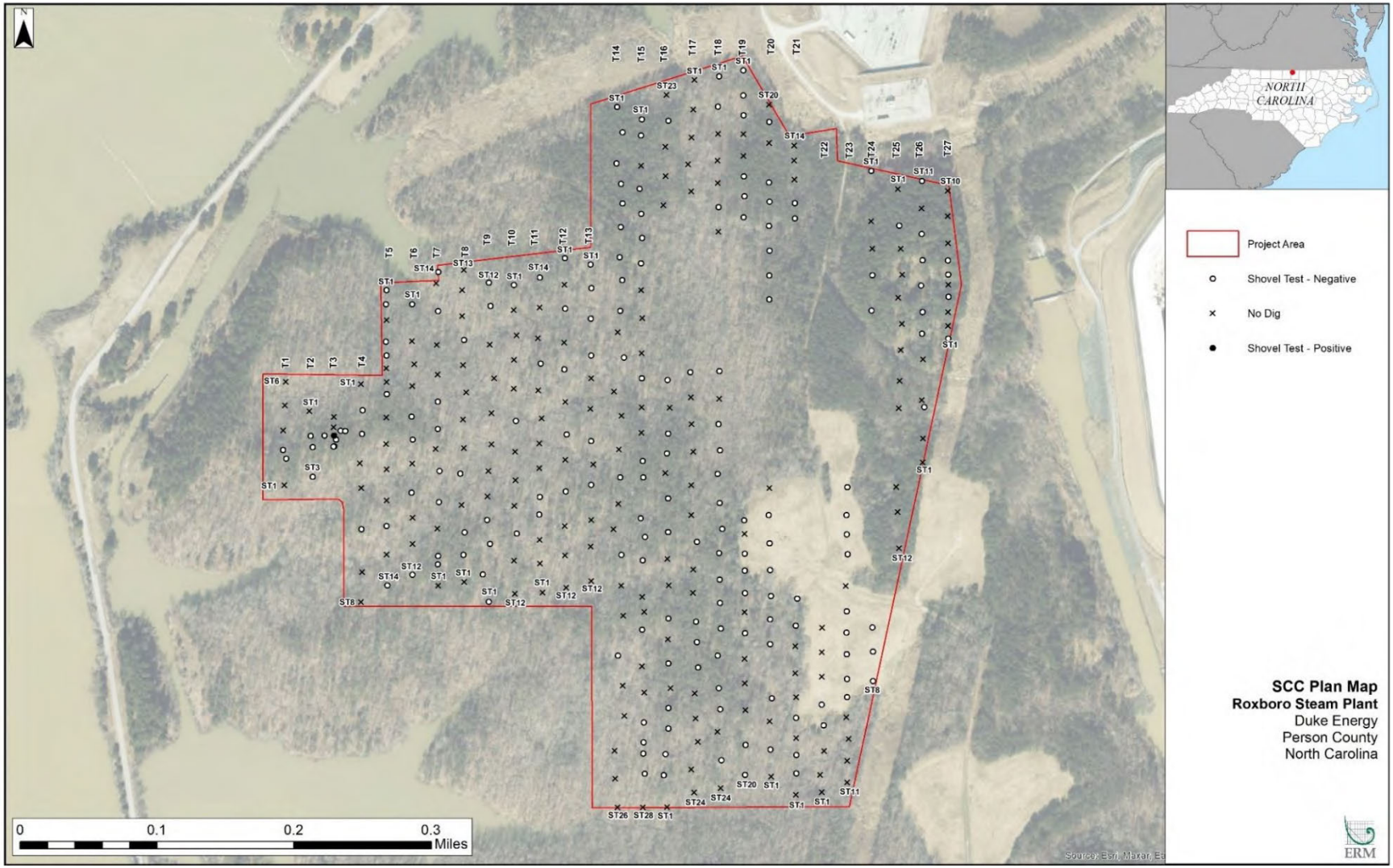

Figure 5.1-1: Shovel Test Locations Within the Project Area

Figure 5.1-2: Example of Slope within Project Area

Figure 5.1-3: Typical Ridge Top within Project Area

Figure 5.1-4: Typical Drainage within Project Area

Figure 5.1-5: Drainage Control Pond and Mounded Fill within Project Area

Figure 5.1-6: Previously Cleared Area within Project Area

Figure 5.1-7: Construction Activities within Project Area

Figure 5.1-8: Typical Shovel Test Profile

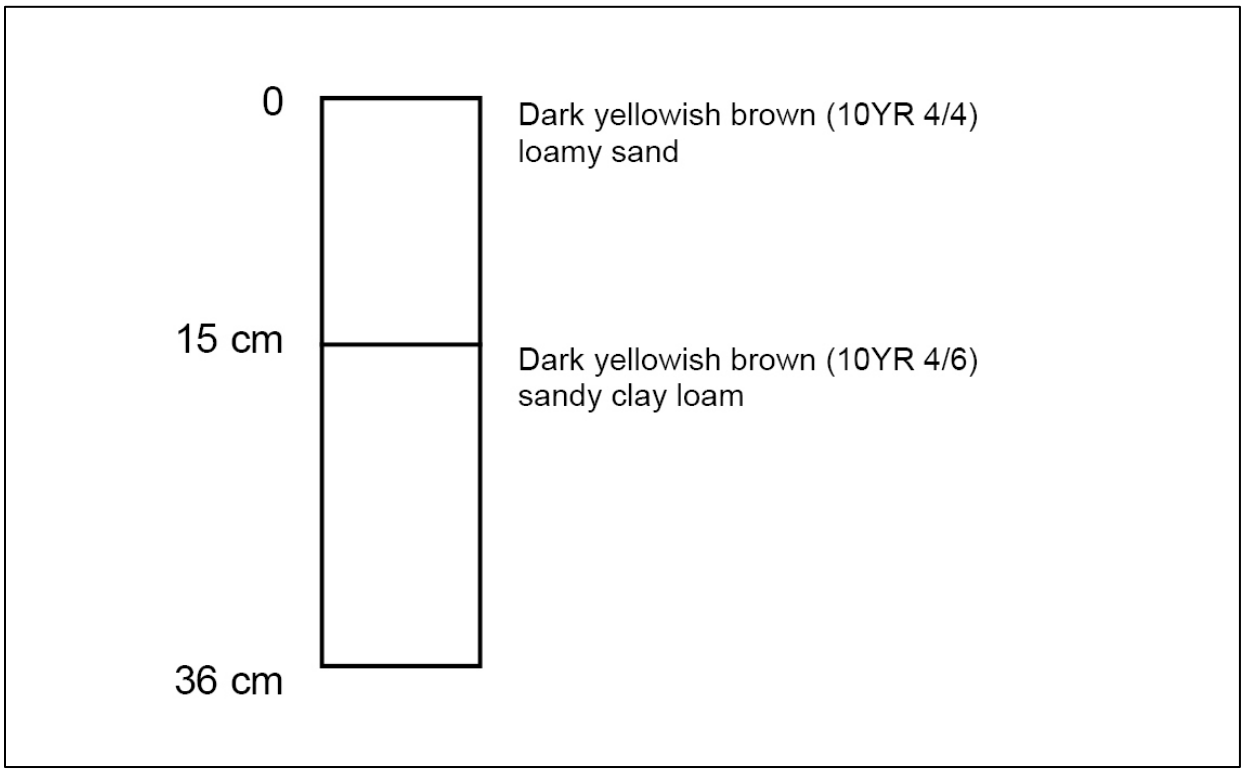

Figure 5.1-9: Typical Shovel Test Profile

5.2 Previous Investigations

As mentioned in Section 4.1, a literature review was conducted by the North Carolina OSA prior to beginning fieldwork. A total of two previously recorded archaeological sites and one historic cemetery were identified within a 1-mile buffer of the Project area (Table 5.2-1; Figure 5.2-1). None of these resources has been evaluated for NRHP eligibility. The two sites have been inundated by the creation of Hyco Lake. The cemetery location was investigated by ERM on behalf of Duke to evaluate the suspected presence of burials so that the area could be protected if warranted.

Table 5.2-1: Previously Recorded Sites within 1.0 Mile of Project Area

Site Number	Site Type	NRHP Eligibility
31PR1	Prehistoric artifact scatter	Unassessed
31PR4	Historic artifact scatter	Unassessed
31PR173	Historic period cemetery	Unassessed

5.3 Current Survey Findings

As stated previously, no previously recorded archaeological sites occur within the survey area and one new isolated find of prehistoric lithic debitage was recorded. Site 31PR172 is discussed below.

5.3.1 31PR172

USGS quadrangle: Olive Hill, NC (1994)	**NRHP eligibility:** Ineligible
UTM coordinates: Zone 17, 671148E 4038101N	**Estimated site size:** 10 x 10 m
Total shovel tests: 7	**Landform:** Hill or Ridgetop
Positive shovel tests: 1	**Ground cover:** Mixed hardwoods
Maximum artifact depth: 10 cm	**Prehistoric artifacts:** 1
Component: Prehistoric Unknown	**Historic artifacts:** 0
Site type: Isolated Find	**Total artifacts:** 1

Site 31PR172 is an prehistoric isolated find situated on the crest of a high ridgetop about 0.25 miles east of an ephemeral drainage that flows into Hyco Lake. The site is within a forested area with no ground surface visibility. Observed disturbances derive from logging activities. The site is immediately adjacent to an old logging road. The site location can be seen in Figures 5.3-1 and 5.3-2.

No artifacts were found on the surface. One of the seven shovel tests excavated yielded cultural material (see Figure 5.1-1). The subsurface assemblage consists of one prehistoric primary flake recovered between 0–10 cm below surface. The raw material used is Wolf Den Mountain Rhyolite, common throughout the Piedmont of North Carolina and in South Carolina. No features or fire-cracked rock were noted.

Based on data provided by the U.S. Department of Agriculture's National Cooperative Soil Survey, the soils at 31PR172 are classified as Siloam loam. A typical shovel test displayed two strata. Stratum I was a dark grayish brown (10YR 4/4) loamy sand from 0–15 cm below surface, underlain by Stratum II, which was a dark yellowish brown (10YR 4/6) sandy clay loam from 15–35 cm.

The remains at 31PR172 represents a single prehistoric lithic artifact with no discernable cultural period association. The artifact was recovered within the upper deflated stratum. Site delineation suggests that the cultural remains are limited and have likely eroded off the landform. ERM recommends the site as not eligible for the NRHP, and no further work is recommended.

Figure 5.2-1: Previously Recorded Sites within a Mile of the Project and Newly Recorded Isolated Find

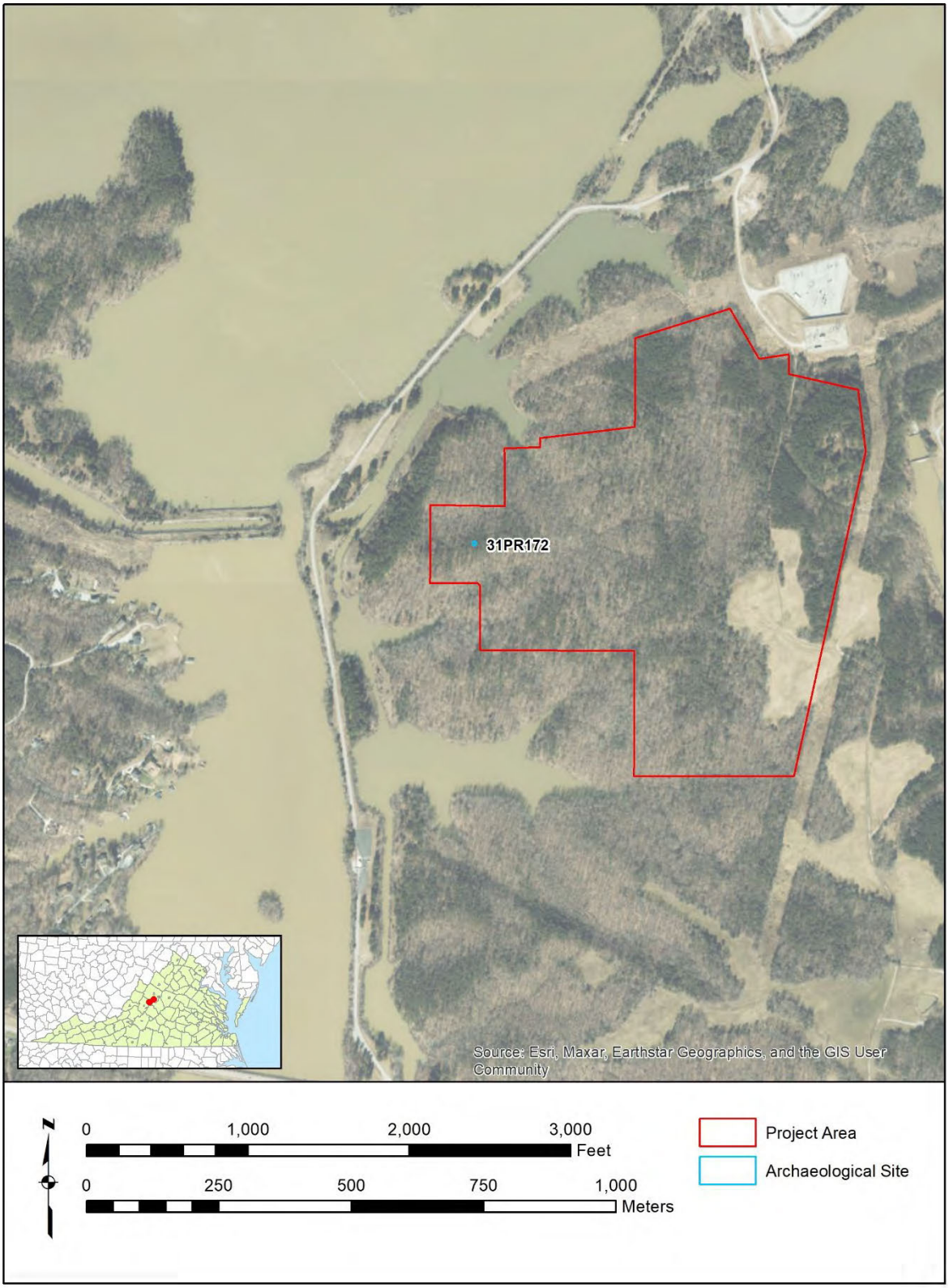

Figure 5.3-1: Aerial View Map of Site 31PR172, Facing East

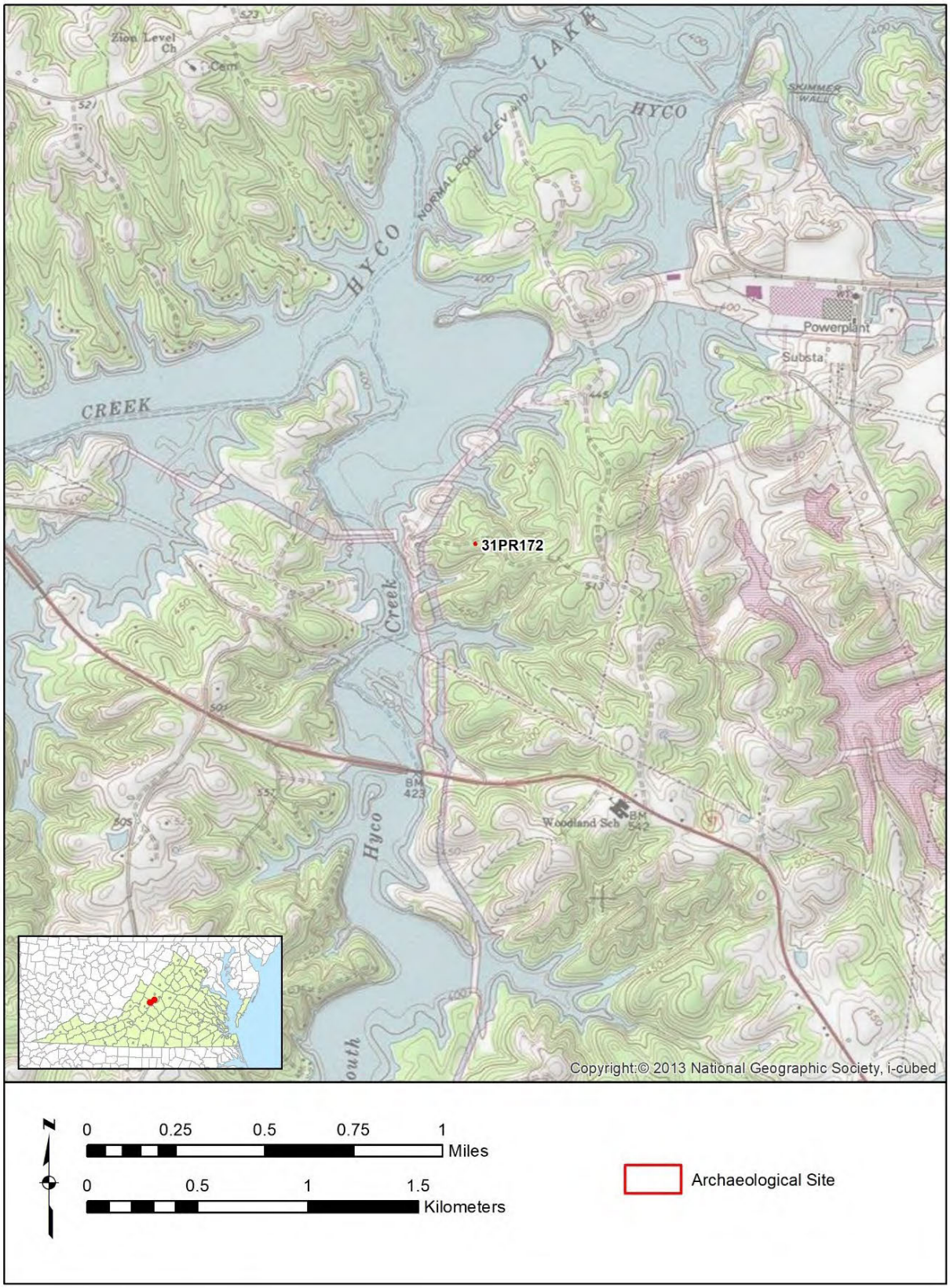

Figure 5.3-2: Topographic View Map of Site 31PR172, Facing East

Figure 5.3-3: Overview of Site 31PR172, Facing East

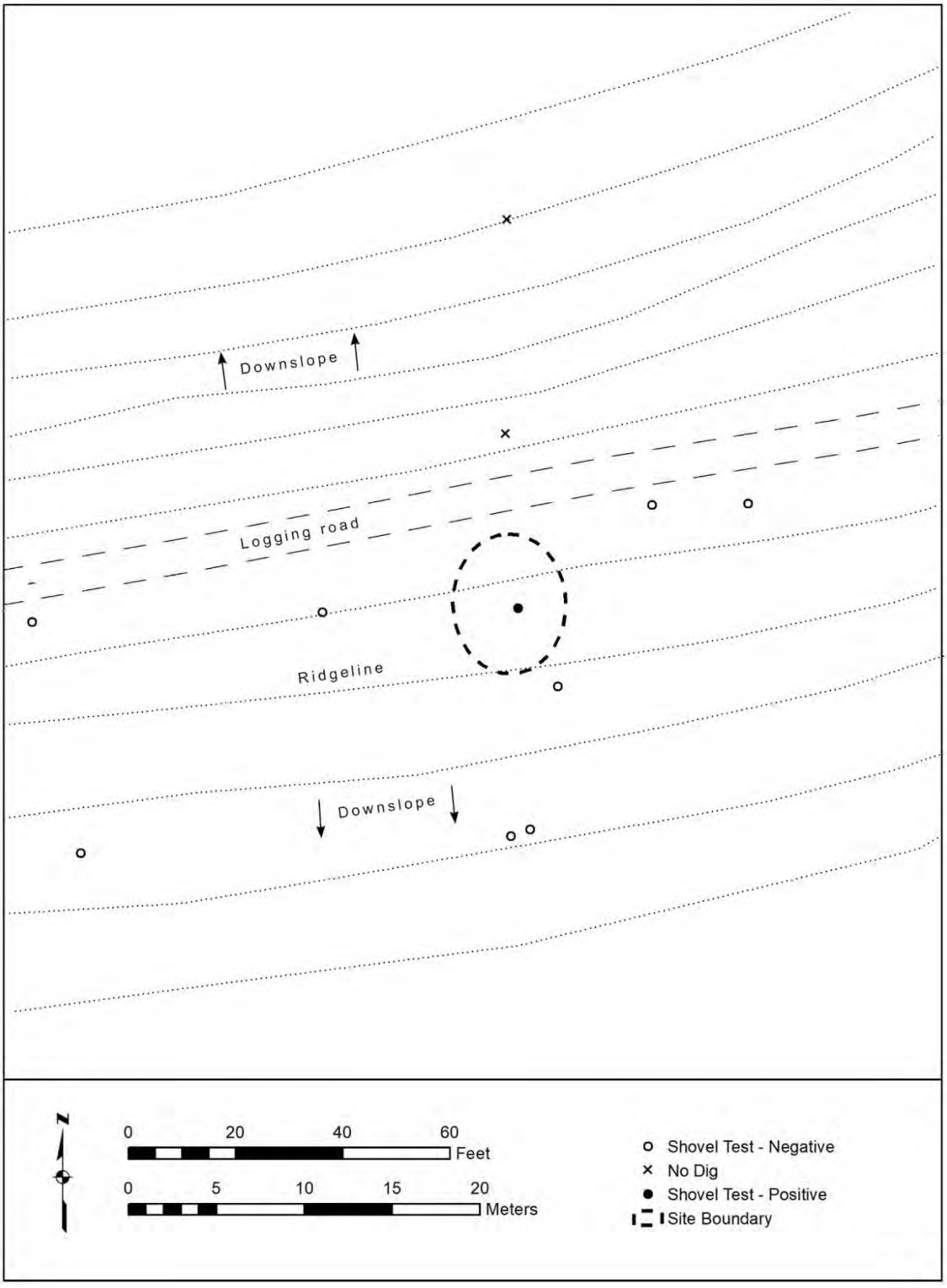

Figure 5.3-4: Site Map of 31PR172

6. CONCLUSION

ERM conducted Phase I archaeological investigations for the Duke Energy Steam Plant expansion in Person County, North Carolina. The 107.6-acre tract is to be used for a proposed combined cycle power plant as part of their Duke's North Carolina Utility Commission approved Carbon Plan. Fieldwork was conducted in January 2023.

No previously recorded archaeological sites were identified within the Project area; however, one new isolated find (31PR172) was documented toward the west end of the survey area. Site 31PR172 is recommended ineligible for the NRHP. Consequently, it is ERM's opinion that the proposed undertaking should be allowed to proceed as currently planned without further archaeological resource consultation.

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Ward, H. Trawick, and R.P. Stephen Davis
1988 Archaeology of the Historic Occaneechi Indians. *Southern Indian Studies* 36–37.

1991 The Impact of Old World Diseases on the Native Inhabitants of the North Carolina Piedmont. *Archaeology of Eastern North America* 19:171–181.

1993 *Indian Communities on the Carolina Piedmont A.D.1000 to 1700.* Monograph No. 2, Research Laboratories of Anthropology, University of North Carolina at Chapel Hill.

1999 *Time Before History: The Archaeology of North Carolina*. The University of North Carolina Press, Chapel Hill.

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1990 *Archaeological Investigations in the Yadkin River Valley, 1984-87*. North Carolina Archaeological Council Publication No. 25. North Carolina Department of Natural and Cultural Resources, Raleigh.

1999 Mississippian Expansion on the Eastern Frontier: One Strategy in the North Carolina Piedmont. *Archaeology of Eastern North America* 27:55–70.

2009 The T. Jones Site: Ecology and Agency in the Upper Yadkin Valley of North Carolina. *North Carolina Archaeology* 58:1–58.

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1981 Vegetation East of the Rocky Mountains 18,000 Years Ago. *Quaternary Research* 15:113–125.

Harry G. Brignac Jr., MA

Archaeologist I
Cultural Resources Field Services

Mr. Brignac has been working in the environmental industry since 2003 and as a project archaeologist since 2009. Over the years, Harry has worked on State and Federal lands, such as, National forests and military bases, as well as, private lands, in relation to natural gas facilities, pipelines, cellphone towers, private ventures, etc. His wide array of experiences, includes working in the Mid-Atlantic, Southeastern, Mid-Western and Western United States. He has been involved in and/or has directed many archaeological projects from Phase I surveys to Phase III mitigations. Mr. Brignac has also conducted monitoring for cultural deposits on seismic surveys, and quality control for oil spill cleanup operations.

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Experience: 15+ years of experience in the field of Cultural Resource Management for government, energy, industrial, and private sectors.

Email: harry.brignac@erm.com

Education

- M.A., Anthropology,
  Louisiana State University, USA, 2010
- B.A., Anthropology,
  Louisiana State University, USA, 2003

Professional Affiliations & Registrations

- Register of Professional Archaeologists,
  2011-present
- Southeastern Archaeological Conference,
  2003-present
- Louisiana Archaeological Society,
  2001-present

Languages

- English, native speaker

Fields of Competence

- Prehistoric archaeology of the Southeastern United States (Archaic)
- Cemetery investigations
- Prehistoric lithics
- Cultural Resource Management
- GPS, GIS, Computer-aided mapping, database management, statistical analysis
- Archaeological survey, testing, and data recovery

Key Industry Sectors

- Energy
- Utilities
- Public and private land development
- Transportation
- Military

Key Projects at ERM

Energy Client, Pipeline Project, 2019-Present
LNG facility and 485-miles of natural gas pipeline corridor in Louisiana: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources surveys.

Energy Client, Pipeline Project, 2014-2019
LNG facility and 42-miles of natural gas pipeline corridor in Cameron Parish, Louisiana: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources surveys. Served as the primary report author for all technical reports.

Energy Client, Pipeline Project, 2018
460-mile natural gas pipeline in Oklahoma and Texas: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources surveys.

Energy Client, Pipeline Project, 2014-2017
Approximately 165 miles of pipeline in West Virginia: Project Manager responsible for managing the Phase I cultural resources surveys.

Energy Client, Pipeline Project, 2016
95-mile natural gas pipeline in Louisiana: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources surveys. Served as the primary report author for all technical reports.

Energy Client, Pretreatment Dredged Material Placement Area Project, 2016
Facility on a 223.4 acre tract in Texas: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources surveys. Served as a co-author for all technical reports.

Energy Client, Pipeline Project, 2015-2016
26-miles of pipeline as well as other facilities in Plaquemines Parish, Louisiana: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources surveys. Served as a co-author for all technical reports.

Energy Client, Wind Energy Project, 2015
A 72 turbine wind project in West Virginia: Project Manager/Field Director responsible for managing and coordinating the Phase I archaeological survey.

Energy Client, Pipeline Project, 2015
205-mile natural gas pipeline in west Texas: Field Director responsible for coordinating the Phase I cultural resources surveys.

Key Projects before Joining ERM

Transportation Client, Mitigation of Cultural Resources, 2014
Phase III cultural resources investigations at two Late Archaic prehistoric sites in Arkansas: Field Director responsible for managing the Phase III cultural resource excavations.

Energy Client, Environmental Mitigation, 2013
Continued cleanup of an oil spill: Coastal Protection and Restoration Authority monitor responsible for monitored quality control for removal of excess oil from beaches and marshes in Louisiana.

Government Agency, National Forest Cultural Resource Projects, 2010-2013
Multiple small and large acreage block surveys in Louisiana: Project Manager/Field Director responsible for managing and coordinating the Phase I cultural resources survey (including archaeological and historic structure investigations). Served as the primary report author for all technical reports and addenda.

Energy Client, Seismic Survey, 2012
3D seismic survey in Mississippi: Field Director responsible managing and coordinating all cultural resources monitoring.

Kara Wallace, M.A.

Archaeologist, Consultant I

Ms. Wallace has survey experience in Florida, Mississippi, New York, South Dakota, Virginia, and Peru. She has experience in conducting fieldwork for Federal and state agencies, which has led to the completion of cultural resources survey reports and published academic papers related to the prehistoric Southeast.

Experience: Less than 1 years' experience in archaeological consultation.

LinkedIn: https://www.linkedin.com/in/kara-wallace-590794252/

Email: kara.wallace@erm.com

Education

- M.A. Anthropology/Historical Archaeology, University of West Florida, United States, 2022.
- B.A. Anthropology, minor in Art History, University of Minnesota: Twin Cities, United States, 2015.

Languages

- English, native speaker

Fields of Competence

- Archaeological surveys and evaluations
- National Register of Historic Places eligibility evaluation and assessments for cultural resources
- Archaeological survey reports
- Compliance with state and federal cultural resource regulations, including guidelines set forth by various State Historic Preservation Offices, the National Historic Preservation Act, and the National Environmental Policy Act
- Section 106
- Technical report writing for compliance projects

Key Industry Sectors

- Power generation and transmission
- Solar
- Oil and gas
- Utilities

Publications

- 2022 *The Butcherpen Mound Complex (8SR29): Tracking Local Cultural Transitions Through Spatial Distribution Patterning on a Dynamic Coastal Landscape in Northwest Florida* (Online published Master's thesis). University of West Florida, Pensacola, Florida.

Key Projects

Energy Client, Pipeline, South Dakota, U.S.A. 2022-present
Field technician for pedestrian survey and Phase I archaeological survey of six-mile pipeline, additional workspaces, and farm taps for proposed pipeline expansion. Aided in testing and documenting three previously unrecorded prehistoric archaeological sites within project area.

Energy Client, Pipeline, Ohio, U.S.A. 2022-present
Co-author on Phase I archaeological survey report determined the Project's impact on historic resources and their eligibility for inclusion in the National Register of Historic Places.

Energy Client, Solar Farms, Virginia, U.S.A. 2022-present
Field technician for Phase I archaeological survey for two proposed solar farm projects, surveying over 1,600 acres. Assisted in writing management summary reports.

Key Projects before joining ERM

National Parks Service, Florida, U.S.A. 2019-2021
Acted as Graduate Supervisor/Field Director for Phase I and Phase II archaeological surveys of prehistoric mound site in Gulf Breeze, FL, for two summer field school sessions. Worked on survey reports for 2019 and 2021 field work that updated the cultural affiliation and preservation recommendations submitted to NPS. Graduate thesis published from this field work.

National Parks Service, Mississippi, U.S.A. 2017
Field technician for Phase I archaeological survey of Bienville National Forest. Assisted in shovel testing and mapping of test locations for survey report.

Lighthouse Archaeological Maritime Program, Inc., Florida, U.S.A. 2017
Worked as student diver and volunteer field technician on underwater Phase III archaeological survey of the Anniversary Wreck in St. Augustine, Florida. Assisted in organization and preservation of historical documents and academic papers related to Florida maritime history.

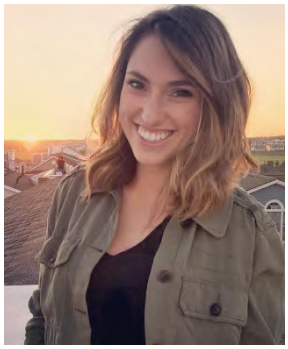
Sylvester Manor Educational Farm, New York, U.S.A, 2014
Student field technician for Phase II archaeological survey and GPR survey of historical properties in Shelter Island, NY. This included mapping and shovel testing of cultural resources in the formal gardens of Sylvester Manor and assisting a remote survey of a historic African American cemetery to determine site boundaries and update property details on the National Register of Historic Places.

Instituto de Estudios Peruanos, Lima, Peru, 2013
Student field technician in Phase III archaeological survey of precolumbian village site. Documented and prepared cultural resources and human remains for registration and curation at the Instituto de Estudios Peruanos.

Haley Hoffman, MA

Consultant I, Scientist
Archaeologist

Haley has five years of experience as an archaeologist working in the cultural resources industry as well as one and a half years of experience in environmental consulting. She has a Bachelor's degree in Anthropology from George Mason University and a Master's degree in Archaeology from the College of William and Mary. She has worked on renewable energy projects, primarily solar, in Pennsylvania, Virginia, Maryland, North Carolina, South Carolina, Florida, Louisiana, Alabama, Mississippi, Tennessee, Kentucky, Michigan, Minnesota, Illinois, Indiana, Oregon, Washington, Arizona, Texas and Colorado. She has also aided in wetland delineations, stormwater events, and visual constraints analysis. She currently lives in southern Virginia and reports to the Richmond office.



Experience:
5 years' experience in Cultural Resources
1 1/2-years experience in Environmental Consulting

LinkedIn: https://www.linkedin.com/in/haley-hoffman-9814bbb5

Email: haley.hoffman@erm.com

Education

- **Master of Arts (MA)**, Historical Archaeology, College of William and Mary, USA, 2020
- **Bachelor of Arts (BA)**, Anthropology, George Mason University, USA, 2017

Languages

- English, native speaker

Fields of Competence

- Historic Preservation
- Report/Proposal Writing
- Archaeological Excavation
- Artifact Identification and Analysis
- ArcGIS

Key Industry Sectors

- Cultural Resources
- Natural Resources
- Environmental Consulting (Renewable Energy)

Publications

"Eyreville: Archaeology of the second generation," The Material World of Eyre Hall: Tracing four centuries of Virginia history through the landscape, buildings, objects, and stories of an Eastern Shore Family. Published 2021.

Key Projects

BESS Projects, Energy Clients
Archaeologist for a nation-wide NEPA compliance program. Project locations include: Virginia, Pennsylvania, Texas, California, Oregon.

Solar Projects, Energy Clients
Archaeologist for a nation-wide NEPA compliance program. Project locations include: Virginia, Ohio, Pennsylvania, North Carolina, Illinois, Indiana, Texas, Mississippi, Louisiana, Missouri, Colorado, and Oregon.

Telecommunications Project, Telecommunications Client
Archaeologist for a nation-wide NEPA compliance program.

Key Projects Prior to Joining ERM

Various Solar and Wind Projects with Confidential Clients
Performed cultural resource research and report writing for solar projects in Pennsylvania, Virginia, North Carolina, South Carolina, Florida, Louisiana, Kentucky, Michigan, Illinois, Indiana, Texas and Colorado.

Larissa A. Thomas, Ph.D.

Senior Archaeologist

Larissa Thomas is a Consultant within ERM based in a satellite office in Lamoine, Maine, and attached to the cultural resources field services group based in Duluth, Georgia. Dr. Thomas is a senior cultural resources professional who has been working as an archaeologist since 1991 and specializes in archaeological investigations, permitting, project management, and contract management. Trained as a prehistorian, her expertise also extends to the areas of history, historic architecture, and cemetery investigations. Dr. Thomas has authored countless peer-reviewed publications and technical reports, and has held several faculty positions during her career.

Experience: 27 years' experience in archaeology and cultural resource consulting

Email: larissa.thomas@erm.com

Education

- Ph.D., Anthropology,
  Binghamton University, USA, 1997
- M.A., Anthropology,
  State University of New York at Binghamton, USA, 1994
- B.A., Anthropology and English,
  Wake Forest University, USA, 1991

Professional Affiliations and Registrations

- Register of Professional Archaeologists, 1999–present

Languages

- English, native speaker

Fields of Competence

- Prehistoric archaeology – Southeast and Midwest
- Cemetery investigations
- Historical archaeology
- Historic architecture
- Historic research

Key Industry Sectors

- Oil & Gas
- Power

Key Projects

Energy Client, Pipeline Project, 2014—2018
600-mile pipeline in West Virginia, Virginia, North Carolina. Cultural resource specialist who prepared the prehistoric and environmental contexts and conducted the technical review for all of the cultural resource survey, Phase II testing, assessment of effects, and mitigation/avoidance plan reports.

Energy Client, Supply Header Project, 2014—2018
Approximately 40 miles of pipeline and ancillary facilities in Pennsylvania and West Virginia. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for all of the cultural resource reports.

Energy Client, Pipeline Project, 2014—2017
Approximately 165 miles of pipeline in West Virginia. Cultural resource specialist who prepared the prehistoric and environmental contexts and conducted the technical review for all of the cultural resource survey and assessment of effects reports.

Energy Client, Transmission Line Project, 2017
Six transmission line alternatives in Fairfax County, Virginia. Cultural resource specialist who prepared sections of the routing study, SCC application, and pre-application analysis, and conducted the technical review for the cultural resource investigations conducted for a proposed line to be sited in northern Virginia.

Energy Client, Transmission Line Project, 2017
17-mile transmission line in Halifax County, North Carolina. Cultural resource specialist who wrote portions of the historic architectural findings, and conducted the technical review for the archaeology and historic architectural reports.

Energy Client, Pipeline Project, 2015—2017
Three natural gas compressor stations in Kentucky, Tennessee, and Mississippi. Cultural resource specialist who prepared portions of the reports and conducted the technical review for all of the cultural resource survey reports.

Energy Client, Pipeline Project, 2015–2016
26-miles of pipeline as well other facilities in Plaquemines Parish, Louisiana. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for all of the cultural resource survey reports.

Energy Client, Transmission Line Project, 2015
2.5 miles of transmission line alternatives in Luzerne County, Pennsylvania. Cultural resource task manager responsible for collecting data on recorded archaeological and historic resources, overseeing the archaeological and historic resource field survey, and authoring the technical report.

Energy Client, Pipeline Project, 2015
205-mile natural gas pipeline in Culberson, El Paso, Hudspeth, Pecos, and Reeves Counties, Texas: Cultural resource specialist who prepared the prehistoric and historic contexts and conducted the technical review for four separate cultural resource reports.

Energy Client, Texas LNG Project, 2015
LNG facility on a 625-acre tract in Cameron County, Texas: Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for the archaeological survey and testing report and mitigation plan.

Energy Client, Transmission Line Project, 2014–2015
Five transmission line alternatives in extending nearly 40 miles across northern Virginia. Cultural resource task manager responsible for collecting data on recorded archaeological and historic resources, overseeing the historic architectural field

effort, conducting the assessment of impacts, and serving as the lead author on the pre-application analysis report and preparing sections of the routing study and SCC application.

Energy Client, LNG Terminal and Pipeline Laterals, 2014–2016
42 miles of pipelines and other facilities in Cameron Parish, Louisiana. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for all of the cultural resource survey reports.

Energy Client, Pipeline Project, 2014
4-mile pipeline abandonment and replacement in Hempstead and Howard counties, Arkansas. Cultural resource specialist who conducted the historic resources assessment and prepared prehistoric context, historic context, and historic resource findings sections of the cultural resource survey report.

Energy Client, Pipeline Project, 2013–2014
80-mile pipeline in Mississippi, Tennessee, and Arkansas. Cultural resource specialist who conducted artifact analysis, prepared site forms, and prepared prehistoric and historic background for three reports prior to project's suspension.

Energy Client, Pipeline Replacement Project, 2013
One-mile pipeline replacement in Independence County, Arkansas. Principal investigator who directed the archaeological and historic resources survey and prepared the cultural resource survey report.

Energy Client Project, 2013–2014
Eight transmission line alternatives in northern Virginia. Cultural resource specialist who prepared sections of routing study.

Energy Client Pipeline, 2013
9-mile pipeline in St. John the Baptist and St. Charles parishes, Louisiana. Cultural resource specialist who prepared the prehistoric, historic, and environmental contexts and conducted the technical review for the cultural resource survey report.

Key Projects Prior to Joining ERM

Energy Client, Liquefaction and Pipeline Project, 2012–2013
18 miles of natural gas pipeline, 288 acres for the liquefaction facility, four compressor station sites, 10 meter stations, and a 21-acre contractor yard in Louisiana and Mississippi. Cultural resources task manager for a FERC regulated LNG terminal and pipeline project in Louisiana and Mississippi, intended to facilitate export of domestically produced natural gas from a facility currently designed for imports. Role entailed the initial SHPO and Native American consultation, oversight of the cultural resource survey teams, documentation of a compressor station upgrade in Mississippi, coauthoring the Phase I report for the 288-acre liquefaction facility site in Calcasieu Parish, Louisiana, conducting the quality assurance technical reviews for all four Phase I reports, and preparation of Resource Report 4 and the unanticipated discoveries plans for the FERC filings.

Energy Client Cameron LNG Pipeline Expansion and Liquefaction and Pipeline Project, 2012–2013
21 miles of natural gas pipeline, 503 acres for the liquefaction facility, and 46 acres for a compressor station and contractor yard in Beauregard, Calcasieu, and Cameron Parishes, Louisiana. Cultural resources task manager for a FERC regulated LNG terminal and pipeline intended to facilitate export of domestically produced natural gas from a facility currently designed for imports. Role entailed conducting the initial SHPO and Native American consultation, oversight of the cultural resource survey teams, serving as lead author of the two Phase I survey reports prepared for the liquefaction facility site and pipeline, and writing Resource Report 4 and the unanticipated discoveries plans for the FERC filings.

Energy Client, Expansion Pipeline Project, 2012–2013
16-miles of natural gas pipeline in Washington and Smyth Counties, Virginia and Sullivan County, Tennessee. Cultural resources task manager charged with managing the cultural resource team, conducting initial consultation with state historic preservation offices, Tennessee Valley Authority, and Indian tribes, and preparing FERC resource report sections.

Energy Client, Transmission Line Project, 2011
55-mile electric transmission line in Burke, Jefferson, McDuffie, and Warren Counties, Georgia, which included a portion on a nuclear generating facility. Cultural resources task manager who directed the Phase I cultural resource survey and conducted the quality assurance technical review of the survey report.

Energy Client, Pipeline Project, 2011–2012
141-mile petroleum products pipeline extending from St. Charles Parish, Louisiana to Covington County, Mississippi. Cultural resource specialist whose work included initial consultation with both SHPO, preparation of prehistoric culture histories and environmental background sections for both Phase I reports, conducting the quality assurance technical reviews for the reports, and correspondence with contacts for the three USACE districts on the Phase I and addendum reports.

Energy Client, Pipeline Project, 2011–2012
570-mile natural gas liquids pipeline extends from Midland County to Jackson County, Texas. Different reports were prepared for the two USACE districts traversed by the project. Cultural resource specialist whose involvement included writing prehistoric culture histories and environmental background sections for both Phase I reports and conducting the quality assurance technical reviews.

Energy Client Project, 2009–2011
175-mile natural gas pipeline that extends from Panola County, Texas, to Richland Parish, Louisiana. The Phase I cultural resource investigations included archaeological and historic structure surveys, Phase II archaeological testing, and investigation of a cemetery that had been impacted by an unscrupulous landowner. Cultural resource specialist whose involvement included writing a public-oriented brochure detailing the history of the cemetery and its role in local history, and conducting the quality assurance technical reviews for the Phase I and addendum reports.

Energy Client, Transmission Ruston Storage Compressor Replacement Project, 2011
Principal Investigator and report author for the Phase I cultural resource survey of a 30-acre compressor station site and associated access road in Lincoln Parish, Louisiana.

Energy Client, Transmission Line Project, 2010
6.5-mile electric transmission line in Winston County, Alabama. Project manager and principal investigator who conducted the historic architectural assessment, and served as lead author on the report.

Energy Client, Transmission Line Project, 2010
8-mile electric transmission line in Wheeler and Telfair Counties, Georgia. Project manager and principal investigator who conducted the historic architectural assessment, and was the lead author for the Phase I report.

Energy Client, Transmission Alto Compressor Station Project, 2009
Natural gas compressor station in Richland Parish, Louisiana. Cultural resource specialist who conducted the historic architectural assessment, documented a historic cotton gin complex in the Area of Potential Effects, and coauthored the report.

Energy Client, Pipeline Project, 2007–2008
507-mile natural gas pipeline beginning in southeastern Oklahoma, traversing Texas, Louisiana, Mississippi, and terminating in southwestern Alabama. Cultural resource specialist whose involvement included SHPO and Native American consultation, preparing prehistoric culture histories and environmental context for all of the Phase I reports, and conducting the quality assurance technical reviews for the Phase I reports and numerous addendum reports.

Energy Client, Transmission Line Project, 2002, 2005, and 2009
The Tennessee River crossing for a transmission line replacement in Jackson County, Alabama. Project manager for an undertaking involving replacement of a segment of electric transmission line in where it crosses the Tennessee River; cultural resource investigations included archaeological survey, archaeological test excavations to determine a location for the structure on the island with the least likelihood of impacting significant portions of a known archaeological site with Native American burials, and archaeological monitoring during construction of the footings for the transmission line structure. Dr. Thomas' involvement in the cultural resource compliance on the project included managing all phases of the project, co-authoring the report of survey and excavation findings, and assisting client through the course of the project by offering recommendations for ways to work within engineering constraints and still avoid adverse effects to a significant archaeological site.

Energy Client, Transmission Line Project, 2005
4-mile electric transmission line in DeSoto County, Mississippi. Project manager and co-author of the Phase I survey report.

Energy Client, Transmission Line Project, 2005
5-mile electric transmission line in Polk County, Tennessee. Project manager who obtained an Archaeological Resources Protection Act (ARPA) permit from the U.S. Forest Service, conducted the quality assurance technical review for the Phase I report, and assisted client with project planning.

Energy Client, Transmission Line Project, 2005
12.5-mile electric transmission line in Cherokee and Clay Counties, North Carolina. Project manager and co-author of the Phase I survey report.

Energy Client, Lateral Pipeline Project, 2005
30-mile natural gas pipeline in Tazewell and Smyth Counties, Virginia. Project manager who co-authored the Phase I report and several addendum reports for access roads and ancillary facilities, and prepared other project documentation such as FERC resource report sections and an unanticipated discoveries plan, in addition to meeting with State Historic Preservation Office staff to resolve issues related to historic resources in the Area of Potential Effects.

Energy Client, Transmission Line Project, 2005
7-mile electric transmission line in Choctaw County, Mississippi. Project manager and lead author on the Phase I survey report.

Energy Client, Transmission Line Routing Project, 2005
Principal investigator for a cultural resource literature review of a 93-square-mile area that would contain a 20-mile electric transmission line in McDuffie, Columbia, and Richmond Counties, Georgia. Work included collecting all of the data on archaeological sites and historic resources and presenting the information to client in a report of findings to assist them in routing the line to minimize cultural resource impacts.

Energy Client, Pipeline Project, 2003–2004
Phase II test excavations and Phase III data recovery excavations at three archaeological sites in Washington and Smyth Counties, Virginia and Jackson County, Tennessee. Dr. Thomas served as cultural resource specialist whose work included assisting with the archaeological fieldwork during the

Virginia excavations, conducting archaeobotanical analysis of plant remains, conducting the quality assurance technical review for the Phase III reports, preparing a popular brochure presenting the findings for the sites in Virginia, and authoring addendum reports for access roads and ancillary facilities.

Energy Client, Transmission Line Survey, 2000
16 miles of proposed transmission line in Perry County, Tennessee. Principal investigator who led the archaeological survey and was the lead author of the Phase I report.

Energy Client, Transmission Line Survey, 1999
14 miles of proposed transmission line in Madison County, Tennessee. Principal investigator who led the archaeological survey and was the lead author of the Phase I report.

Publications

Thomas, Larissa A.
2001 The Gender Division of Labor in Mississippian Households: Its Role in Shaping Production for Exchange. In *Archaeological Studies of Gender in the Southeast*, edited by Jane Eastman and Christopher Rodning, pp. 27–56. University of Florida Press.

2000 Women in Native American Iconography. In *Interpretations of Native North American Life: Material Contributions to Ethnohistory,* edited by Michael S. Nassaney and Eric S. Johnson, pp. 321–357. University of Florida Press.

1998 The Effect of Community Size on Subsistence Practices at Mississippian Sites in Southern Illinois. *Journal of the Steward Anthropological Society* 26:129–156.

1996 A Study of Shell Beads and Their Social Context in the Mississippian Period: A Case from the Carolina Piedmont and Mountains. *Southeastern Archaeology* 15:29–46.

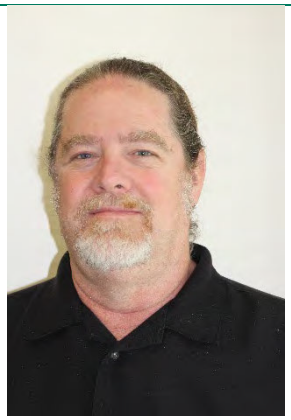
Thomas, Larissa A. and Jack H. Ray
2002 Exchange at the Dahlman Site (23LA259), A Late Prehistoric Neosho Phase Settlement in Southwest Missouri. *Plains Anthropologist* 47:207–229.

Thomas, Brian W. and Larissa A. Thomas
2004Gender and the Presentation of Self: An Example from the Hermitage. In *Engendering African American Archaeology: A Southern Perspective,* edited by Gillian E. Galle and Amy L. Young, pp. 101–131. University of Tennessee Press.

Jeffrey L. Holland

Historian

Mr. Holland has over 30 years of experience on Cultural Resources Management projects throughout the eastern United States, the Midwest, and Texas. He has conducted historical research and documentation for National Register properties and districts, HABS/HAER recordation, Assessments of Effects reports, and cultural resources survey, testing, and data recovery projects. He has also authored popular histories for major industrial facilities and summaries of archaeological projects for public education. Mr. Holland's specialties include slavery, African American history, nineteenth century agriculture, the Civil War, and the history of military installations, utilities, and infrastructure in the twentieth century.



Experience: 30+ years' experience in Section 106, NEPA, and Historic Preservation Planning for government, energy, and industrial sectors

Email: jeffrey.holland@erm.com

LinkedIn: https://www.linkedin.com/in/jeff-holland-54993548/

Education

- M.A., History (with Historical Archaeology Apprenticeship), College of William & Mary, 1995
- B.A., History, Davidson College, 1984

Fields of Competence

- Historical research, documentation, and assessment of NRHP properties
- NEPA, Section 106
- Historic preservation planning
- Genealogical research
- Cemetery relocation
- Historical archaeology

Languages

- English, native speaker

Key Industry Sectors

- Energy
- Military
- Utilities
- Transportation

Publications

- Holland, Jeffrey. 2007. Landownership and Hardship: Interpreting the Landscape of an African-American Community in Eastern Gwinnett County, Georgia. *Early Georgia* 35(2).
- Holland, Jeffrey. 2006. *Under One Roof: The Story of Air Force Plant 6.* Aeronautical System Center, Acquisition Environmental, Safety, & Health Division, Wright-Patterson Air Force Base, Ohio.
- Garrow, Patrick H., and Jeffrey L. Holland. 2005. Camp Lincoln and the Army of Southeastern Missouri. *Missouri Archaeologist* 66 (Dec):93–118
- Pietak, Lynn Marie, and Jeffrey L. Holland. 2003. Excavations at the Colclough Farmstead: Exploring Rural Life in Nineteenth and Twentieth Century Northeastern Mississippi. *Mississippi Archaeology* 37(2):165–218.

Key Projects at ERM

Government Agency, NRHP Evaluation of Low-Head Dams, 2021
Developed a historic context and prepared an NRHP Evaluation of four dams constructed in 1927 on the Grand River in Grand Rapids, Michigan. The evaluation recommended that the dams were eligible for the NRHP under Criterion A for their role in city planning and the development of the riverfront as a focal point of downtown development. The SHPO concurred with the evaluation and the assessment of adverse effect.

Government Agency, Superfund Site, 2020
Prepared an Assessment of Effects Memorandum regarding the effects of proposed remedial actions at a National Priorities List site in Massachusetts on a historic canal that abuts the Project area. The memorandum recommended that the removal of contaminated material from the berm of the canal would result in the loss of a portion of the NRHP-listed canal property, but that the effect would not be adverse due to the existence of better preserved sections of the canal that maintained the property's integrity.

Energy Client, Pipeline Project, 2015–2019
Conducted cultural resource investigations as part of the permitting of a 600-mile natural gas pipeline in three states. Prepared historical contexts, conducted research on properties, assessed effects of project on resources, prepared mitigation plans for NRHP-eligible properties. Federal Energy Regulatory Commission issued Programmatic Agreement approving implementation of mitigative measures to complete compliance with Section 106 of the National Historic Preservation Act.

Energy Client, Wind Energy Project, 2019–2020
Prepared a Cumulative Visual Effects Assessment for a proposed off-shore wind energy installation of 800-megawatts in the waters of Rhode Island and Massachusetts. The analysis incorporated 17 lease areas and 761 wind generating turbines from the proposed project and reasonable foreseeable future projects. The assessment focused on three historic properties, including a Traditional Cultural Property and a National Historic Landmark.

Energy Client, Wind Energy Project, 2017–2019
Developed context and assessed historic significance for resources in three county area of northeast Pennsylvania that might be affected by a series of proposed wind turbines sites. The context addressed thematic resource types of primary significance in the region including coal industry related sites, railroads, and agricultural properties.

Energy Client, NRHP Evaluation of LNG Terminal, 2019
Developed context and assessed historical significance of an LNG terminal in Alaska completed in 1969 that was the first to export LNG from the United States. The research addressed the process involved in liquefying natural gas and changes to the plant over time. The plant was recommended as eligible for the NRHP.

Energy Client, NRHP Evaluation of Abandoned Pipeline, 2018
Served as author of reports for four western states assessing the historical significance of a 700-mile former oil pipeline converted to natural gas that was slated for abandonment. The assessment was conducted in accordance with a Notice of Exemption issued by the Advisory Council on Historic Preservation regarding abandoned historic natural gas pipelines.

Manufacturing Client, NRHP Evaluation of Historic Orchard Property, 2018
Conducted historical research and produced historical context for historic apple orchard and other historic properties in Jefferson County, West Virginia. Assessed significance of properties and potential direct and visual effects of a fiber manufacturing facility.

Key Projects Prior to Joining ERM

Energy Client, NRHP Documentation, 2014
Researched the ownership history and development of the William Evans farmhouse and associated buildings using county records, historical maps, census returns, and other primary and secondary sources as part of a Memorandum of Agreement to mitigate the effects of a transmission line with a permanent archival record of the property

Government Agency, Nuclear Power Program History, 2013
Conducted historical research using documents from the agency's corporate libraries, records in the National Archives, contemporary newspaper articles, and secondary sources on the nuclear power industry to produce a fully-referenced, illustrated history of what was for many years the nation's largest nuclear power program. The agency commissioned this historical overview of its nuclear power program to provide a concise reference for the agency.

Government Agency, HABS Documentation, 2012
Examined project records and historic photographs, along with other primary and secondary sources to establish the history of the former project offices of the Falcon Dam Project on the Rio Grande, constructed in 1951.

Government Agency, NRHP Assessment, Levees and Water Control Features, 2010–2011
Researched the records of the U.S. Boundary and Waters Commission and the Bureau of Reclamation to assess the significance of two levees constructed on the Rio Grande to control flooding. The levees interfaced with irrigation systems constructed prior to the levees, which also had historic features.

Government Agency, Oral History Documentation of Federal Housing Project, 2009
Conducted historical research on two housing projects slated for demolition using records at the local historical societies and libraries. Current residents of the developments were interviewed about their experiences in public housing. The documentation was part of a recordation of the two facilities intended to produce a comprehensive history of the public housing prior to the sale of the properties by the city.

Energy Client, Pipeline Project, 2008
Produced statewide contexts for five states, as well as more specific histories for dozens of counties and parishes along a 507-mile natural gas transmission pipeline in the southeast U.S. Historical research was also conducted on identified architectural resources to aid the assessment of their NRHP significance. The project was conducted on a short time schedule.

Military Agency, Air Force Facility History, 2006
Served as Historian and Author for the production of a pictorial history of Air Force Plant 6, an aircraft assembly plant operated by Bell Aircraft Company during World War II and later by Lockheed Aeronautics Company and its successors. The book is a fully-illustrated, perfect-bound history of the plant intended for a general audience and was distributed to libraries, government agencies, and other interested organizations.

Energy Client, NRHP Assessment of Hydroelectric Power System, 2004
This project involved a review of historical documents related to the design and construction of 11 dams and powerhouses along two major rivers in North and South Carolina. Published histories, company documents, contemporary accounts were consulted, and similar large-scale power and flood-control projects in the Southeast and in the United States were studied to assess the significance of a series pf projects that spanned two states and included multiple facilities along an entire river system.

Military Agency, Context and NRHP Assessment of Korean War and Cold War Structures, 2003
Conducted background research to develop historic contexts to aid in the interpretation and assessment of BASOPS structures from the Korean War and Cold War periods at Fort Bliss and Briggs Army Airfield, Texas. The assessment of the facilities required the application of NRHP guidelines for properties of exceptional significance but less than 50 years old.

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Panama
Peru
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Russia
Singapore
South Africa
South Korea
Spain
Sweden
Switzerland
Taiwan
Thailand
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UK
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Vietnam

ERM
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Duluth, Georgia, USA 30096

T: 678-781-1370

www.erm.com

DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-4

EXAMINATION AND DELINEATION OF A PREVIOUSLY UNRECORDED SUSPECTED CEMETERY ON THE ROXBORO PLANT PROPERTY

ERM

3300 Breckinridge Boulevard
Suite 300
Duluth, GA 30096

Telephone: +1 678 781-1370
Fax: + 678-781-4470

www.erm.com

February 6, 2023

Scott T. Fletcher, CWB
Manager, Natural Resources
Duke Energy
13339 Hagers Ferry Road (MG03A3)
Huntersville, NC 28078

Subject: Examination and Delineation of a Previously Unrecorded Suspected Cemetery on the Roxboro Steam Plant Property in Semora, Person County, North Carolina

Dear Mr. Fletecher:

Environmental Resources Management (ERM) has completed examinations and delineation activities at a previously unrecorded suspected cemetery (Figures 1 and 2). This location was identified by on-site personnel while performing borrow area exploration activities at the Roxboro Steam Plant Property (Property or Site). The cemetery contained several upright native field stones arranged in conspicuous rows. These studies were undertaken as a due diligence effort to avoid impacts to potential graves containing human remains per the request of Duke Energy Carolinas, LLC (Duke Energy), to comply with North Carolina General Statutes § 14-148 and § 14-149, concerning defacing or desecration of grave sites. No consultation is required with the State Historic Preservation Officer as there is no Section 106 undertaking. The following sections outline the historical research, field activities, and conclusions deriving from this effort. Field data and digital photographs will be curated in ERM's secure server.

Historic Background

There is no record of a cemetery in this location in available online cemetery databases (Cemetery Census 2016; Find A Grave 2022; Person County Cemeteries 2022; Billion Graves 2022); nor does it appear on historical maps (U.S. Post Office Department 1919; U.S. Department of Agriculture [USDA] 1928; U.S. Geological Survey [USGS] 1968) or historic aerial photographs (NETRonline 2022). A highway map of Person County from 1938 (North Carolina State Highway and Public Works Commission [NCSHPWC] 1938) does show a cemetery on the north side of what is now Semora Road that appears to be located across from the current Woodland Elementary School (Figure 3). The cemetery is not associated with a church. The school first appears on a highway map and a topographic map from 1968 (North Carolina State Highway Commission 1968).

None of the available maps show any residences in the vicinity of the cemetery. The portion of Semora Road west of Woodland School was constructed sometime between 1928 and 1938. Prior to that, a road ran north from Concord Church to the location of Woodland School then continued north to a dead end at Hyco Creek. Two structures are shown across Semora Road from where Woodland School is now located on the 1919 rural delivery map (U.S. Post Office Department 1919) and the 1928 soil map (USDA 1928). The two structures can be seen in Figure 4.

The cemetery may be associated with what is now Wagstaff Farms. A house on this property dating to the early nineteenth century is located about 800 meters (m) southeast of the cemetery. The house, known as the House on Wagstaff Farm, was listed in the National Register of Historic Places (NRHP) in 2006. At that time, the house was situated on a 600-acre property gifted to brothers Lindsay T. Wagstaff and Kenneth Wagstaff from their aunt and uncle, Ruth Hester Satterfield and J. Burton Satterfield in 1964. The property constituted all of the property in Cunningham Township owned by Ruth Hester Satterfield at that time. She had inherited the land from her father, John Holeman Hester in 1936. J. H. Hester's will described the land as "all the lands I own on the east side of South Hyco Creek in Cunningham Township." J. H. Hester reportedly acquired the land from his father, Andrew Jackson Hester, who died in 1912 (Phillips 2005).

According to the Wagstaff family, neither the Wagstaffs nor the Hesters resided in the house (Phillips 2005). If this is true, it was likely occupied by tenants, who paid rent to farm a specified number of acres of land. The same tenant families may have occupied the house for long periods of time, which would have meant that a family burial place may have been needed. Person County also had a large black population (42 percent in 1900), and the cemetery could be associated with the African American community. It is common for cemeteries in minority communities to have uninscribed markers and for them to be neglected or abandoned over time (Brown-Gorham 2019).

Hyco Lake was constructed in the early 1960s by Carolina Power and Light (now Duke Energy Progress) to provide cooling water for their coal-fired power plant. Land for Hyco Lake was purchased between 1962 and 1965, and the Roxboro Steam Electric Plant was completed in 1966 (Walker 2020).

Field Investigations

On December 6 and 7, 2022, ERM archaeologists Kara Wallace and David Penland conducted field investigations at the previously unrecorded cemetery site. The ground surface was first cleared of leaf litter with hand rakes and the suspected markers were mapped. Then, a blunt-tipped metal probe, ½ inch in diameter, was used to penetrate the soil around the markers at each suspected grave site to determine whether a grave shaft was present, and, if so, its dimensions. A White's XLT Spectrum metal detector was then passed over each suspected grave site and around the cemetery site area to see if there was any presence of metal buried in the cemetery, and, if so, what the composition may be.

The cemetery site is situated on the western downslope of a finger of land on the southeastern side of the Hyco Lake that is a mix of pine and hardwood forest. The understory growth was sparse and included species of greenbrier, young hardwoods, and shrubs (Figure 5). There is an existing barbed wire fence that runs through the cemetery location from southeast to northwest and an existing two track trail that runs along the northeastern edge of the visible markers from the cleared top of the hill. The suspected markers are arranged in two rows aligned generally in an east-west direction (Figures 6, 7, and 8). There was one additional possible marker that was not aligned to the rows, located approximately 3 m west of the second row (Figure 9). None of the stones at the site bore any markings, nor did they seem to be artificially shaped. All stones were of varying shapes and dimensions. Some of the stones were embedded at ground surface level and were not initially visible above the leaf litter (Figure 10). Additionally, there was one depression located along the second row of markers that did not have any associated stones, but there was a large tree growing in the vicinity (see Figure 11). Additional investigation of the area surrounding the evident markers to a radius of 75 feet revealed no more stones in artificial configuration, nor any visible depressions.

Implementation of systematic probing proved to be inconclusive. Soils in the site area are classified as Siloam loam (SmB and SmF) with subsoil appearing between 20 and 40 centimeters (cm) below surface (USDA NRCS 2022). When using the soil probe, the field team found that there was inconsistent

resistance in the suspected grave sites with no clear voids that would indicate the presence of collapsed coffins. The higher resistance at the bottom of each soil probe was suspected to be subsoil as it was consistent with the expected depths of subsoil (sandy clay loam) for this soil profile. Four approximately 75-foot soil prob transects were laid in cardinal directions from the known stone markers and were probed every 2 feet to test for the presence of unmarked grave sites. Due to the inconsistent resistance of the soil, the results of the soil probe survey along the transects was also inconclusive.

Metal detecting was used as a secondary method to identify potential graves as well as subsurface features that may aid in dating the cemetery. A White's XLT Spectrum metal detector was first swept over the suspected grave sites marked by stones, with positive hits being recorded on a sketch map made of the above ground features of the cemetery (Figure 11). Metal detecting around the first row of suspected graves revealed a possible border of scattered ferrous metal around the stone markers. There was also a reading of ferrous metal along the northern edge of one of the suspected graves and three non-ferrous metal hits within three of the suspected graves on the northern section of the cemetery. Interestingly, there were several suspected graves in the southern area that were negative for the presence of metals. Additionally, there were no positive hits with the metal detector outside of the suspected grave sites that were marked with stones, although incoming rain cut the metal detecting survey short, and it was largely limited to the southern and eastern areas of the 75-foot radius.

There are no other identified surface features located in the vicinity of the cemetery as the cemetery is currently located on a remote finger of land that has no identified previous development. The nearest historic property is the House on Wagstaff Farm, which is currently listed on the NRHP, located approximately 800 m southeast from the cemetery site. It is not conclusive whether the cemetery is associated with this historic property, as the cemetery is not identified on any historic maps, but its proximity may provide some historic context for historic land use in this portion of Person County.

The stones in the suspected cemetery area are obviously deliberately arranged; however, they all are field stones and vary greatly in size, shape, and the height to which they extend from the ground surface. From visual inspection it appears that there are headstones that mark 11 grave locations, three of which had clear associated depressions. Nine of these grave locations also have an associated footstone of variable distance from the headstone, suggesting possibly both adult and child internments. As mentioned above, there is one fieldstone that could be a headstone for a possible grave location that is not in line with the two rows. There was not an identified footstone or visible depression associated with this marker as there was deadfall across the area that obscured any additional surface features. Therefore, this stone is marked as a possible grave location. There were no other visible markers identified when clearing away the leaf litter from the two identified rows. Given the sensitive nature of human burials, and the lack of conclusive evidence from the field survey in the area around the visible stone markers, ERM recommends that and area encompassing the stone markers and extending to a 75-foot radius from the outermost stone markers be avoided and protected with permanent fencing (Figure 12). In addition, an Unanticipated Discovery Plan (UDP) should be drawn up to address actions to be taken in the event that evidence of human remains is encountered.

Conclusion

In accordance with the North Carolina Office of State Archaeology (OSA) *Archaeological Investigation Standards and Guidelines for Background Research, Field Methodologies, Technical Reports, and Curation* (2017), ERM requested a North Carolina state cultural resources trinomial number for the cemetery. The OSA issued the number 31PR173 for the cemetery site being called the Wagstaff Farm Cemetery. It is the opinion of ERM that the suspected cemetery, site 31PR173, located on the Roxboro Steam Plant property likely contains human internments, and should be protected and avoided, if

possible. If this is not possible, further subsurface archaeological investigation should be undertaken to determine the true nature and extent of the site. This would include a creation of a UDP to provide an appropriate procedure to be followed in the event that evidence of human remains is revealed.

If you have any questions, please contact me at (770) 601-0357 or price.laird@erm.com.

Sincerely,

Price K. Laird, RPA
Senior Archaeologist, ERM

Kara J. Wallace, MA
Archaeologist, ERM

cc: Emily Laird ERM
Chip Day, ERM

Enclosures: Figures 1–12

References Cited

Billion Graves
2022 Cemetery Search, Person County, North Carolina. https://billiongraves.com/search/cemetery. Accessed November 30, 2022.

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Resources.

North Carolina State Highway and Public Works Commission (NCSHPWC)
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North Carolina State Highway Commission (NCSHC)
1968 Person County, North Carolina. NCSHC, Planning and Research Department in cooperation with the U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads.

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1994 Olive Hill Quadrangle, 7.5-minute series. USGS, Washington, D.C.

U.S. Post Office Department
1919 Rural Delivery Routes, Person County, North Carolina. U.S. Post Office Department, Washington, D.C.

Walker, Norwood
2020 Hyco Lake History: A Brief Tale. Hyco Lake Magazine. https://hycolakemagazine.com/hyco-lake-history/. Accessed November 30, 2022.

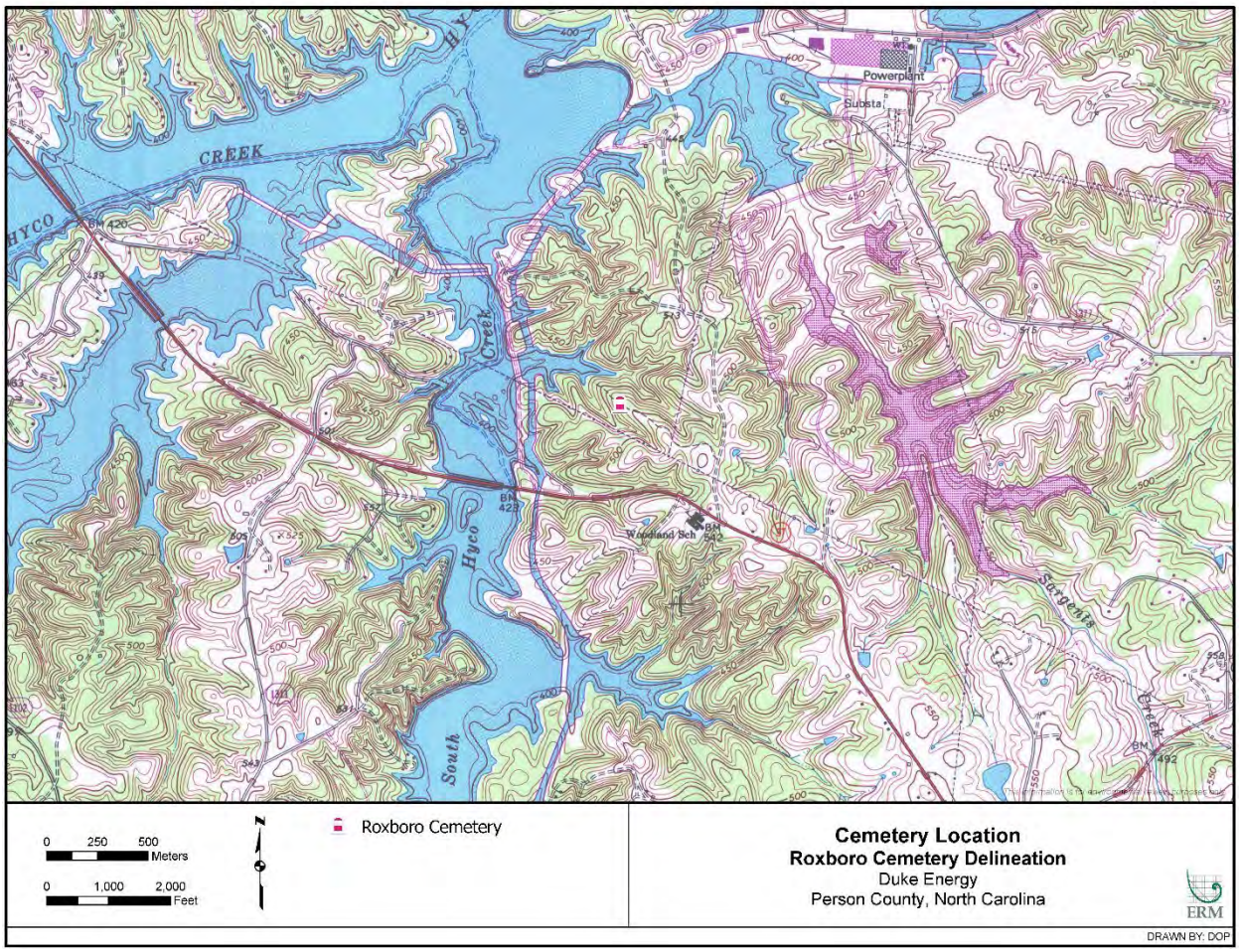

Figure 1. Overview of the Site 31PR173 Location.

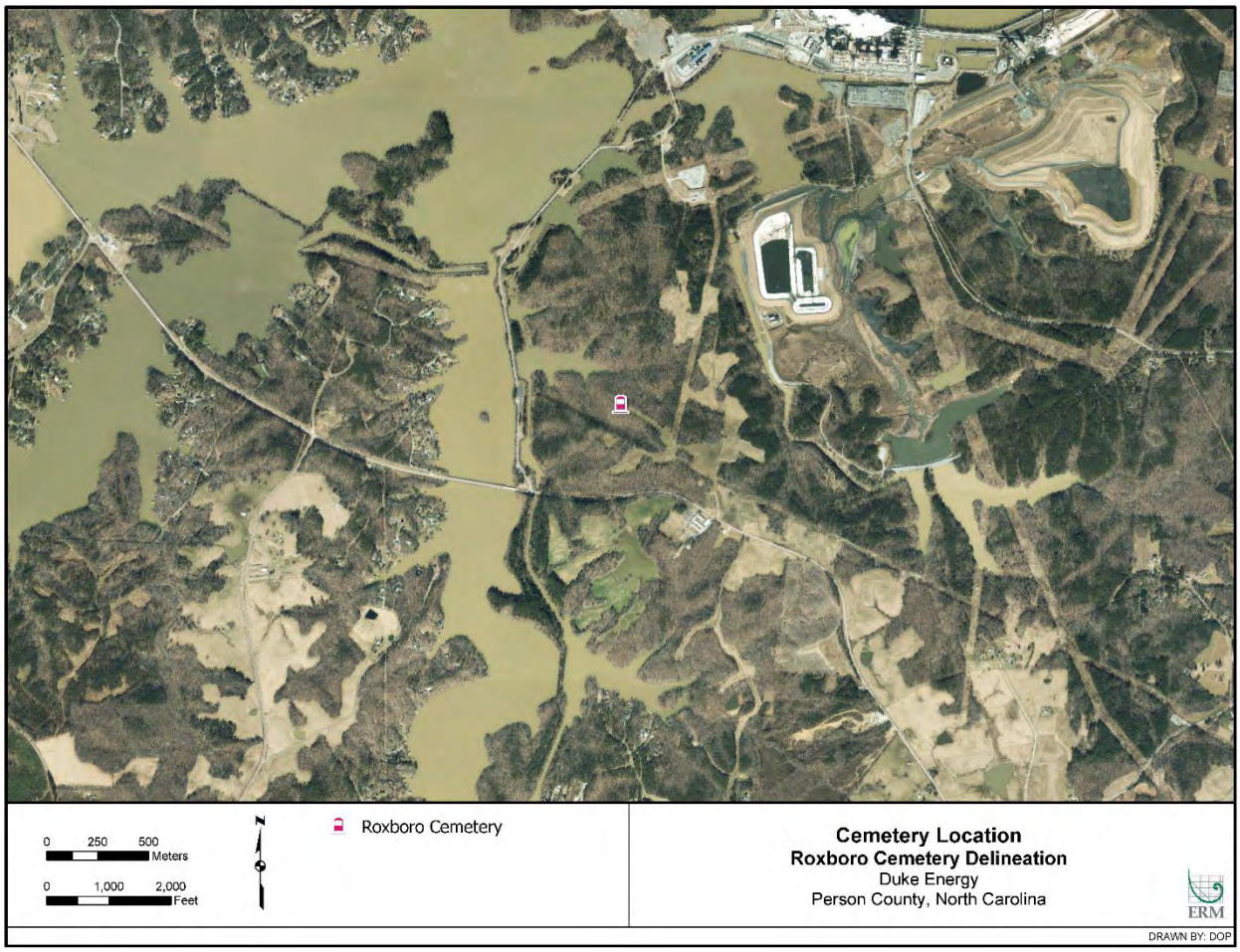

Figure 2. Aerial Photograph (2021) Showing Location of Site 31PR173.

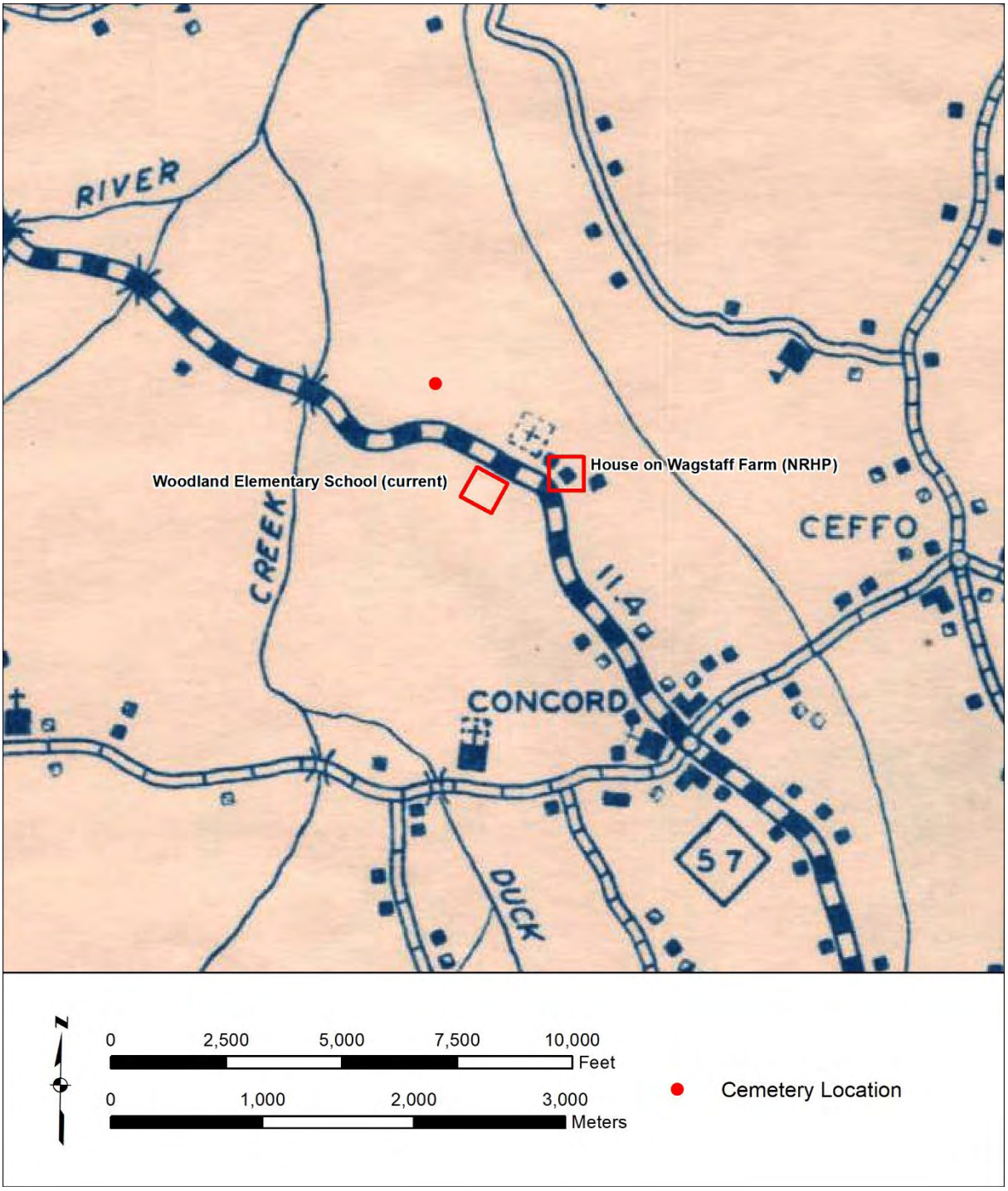

Figure 3: Highway Map of Person County in 1938 Showing a Cemetery on Semora Road Southeast of Site 31PR173.

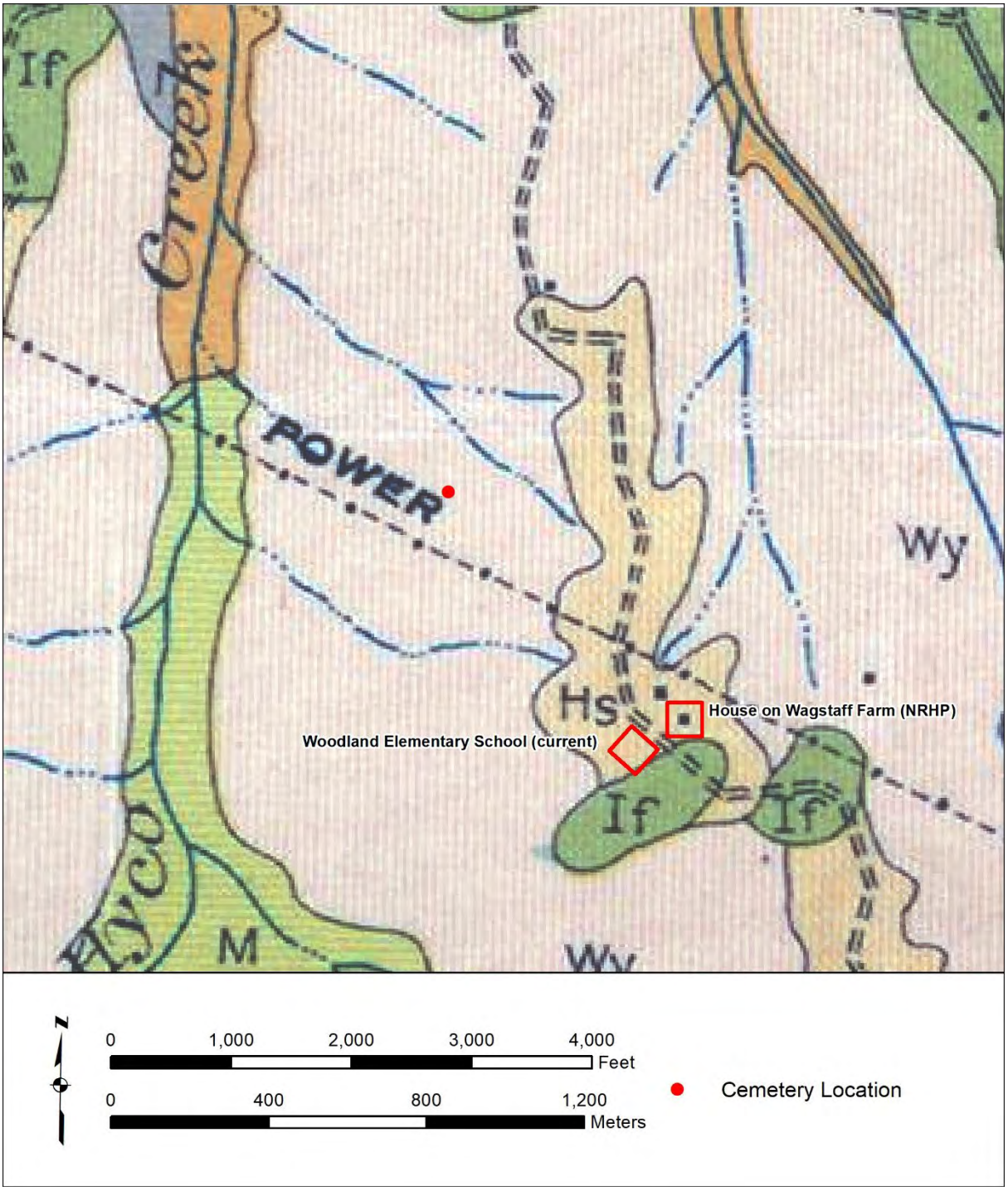

Figure 4: Soil Map of Person County in 1928 Showing Location of Structures on Semora Road.

Figure 5. General View of Site 31PR173, Showing Pin Flags Placed at Markers, Facing Southwest.

Figure 6. View of Main Cluster of Stone Markers, With Pin Flags Placed at Markers, Facing Southwest.

Figure 7. View of Southern Cluster of Stone Markers, With Pin Flags Placed at Markers, Facing Northwest.

Figure 8. View of Visible Headstone and Footstone Orientation in Main Cluster of Markers, Facing West.

Figure 9. View of Stone Marker at Possible Grave Location, Facing East.

Figure 10. View of Embedded Stone Marker in Southern Cluster of Markers, Facing West.

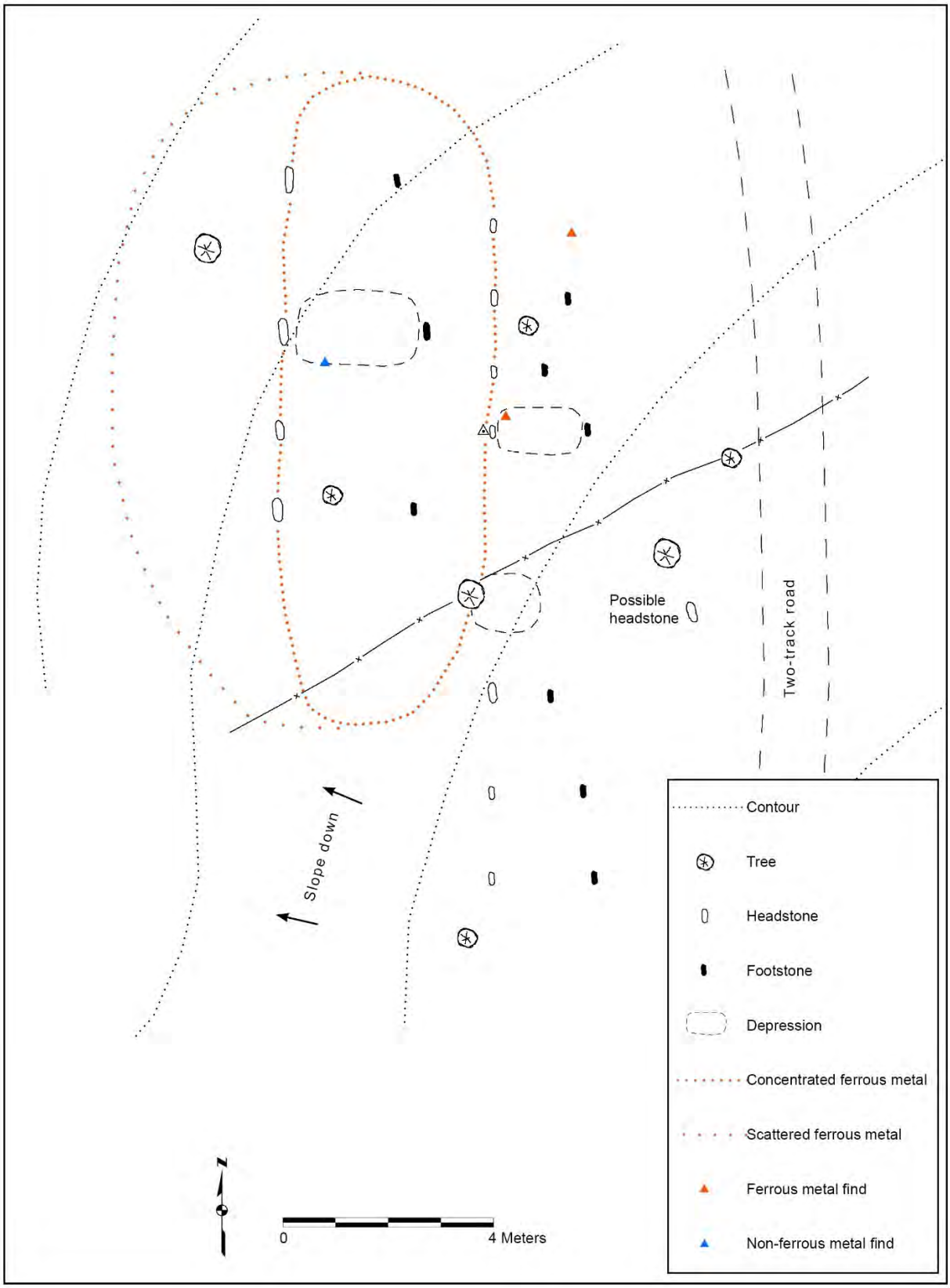

Figure 11. Sketch Map of Site 31PR173.

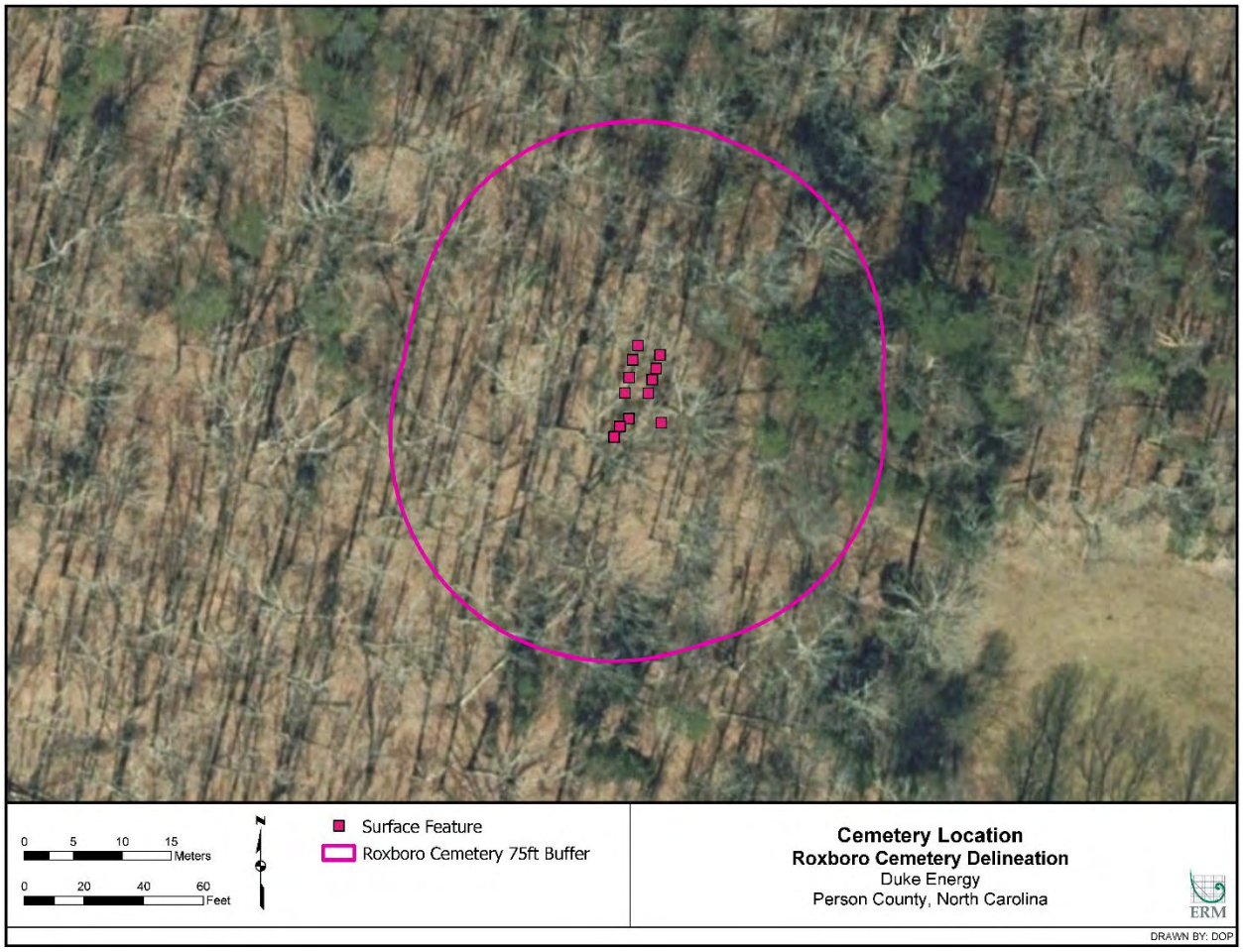

Figure 12. 75-foot Avoidance Buffer Around Site 31PR173.

DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-5

NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICE CONSULTATION

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

June 21, 2023

Price Laird
Environmental Resources Management
3300 Breckenridge Boulevard, Suite 300
Duluth, GA 30096

price.laird@erm.com

Re: Construct new energy facility, Roxboro Steam Plant, Person County, ER 23-1034

Dear Mr. Laird:

Thank you for your email of April 24, 2023, transmitting the Historic Structure Survey Report (HSSR), "Phase I Historic Architectural Survey, Roxboro Project, Person County, North Carolina," and the Archaeological Survey Report, "Duke Energy Roxboro Steam Plant Project Duke Energy Carolinas, LLC (Duke Energy) Phase I Archaeological Survey", prepared by ERM for Duke Energy. We have reviewed both reports and offer the following comments.

After reviewing the HSSR, we concur with the report's findings that the National Register-listed House on Wagstaff Farm (PR0295), remains eligible for the Register despite notable deterioration since its 2006 listing.

We further concur with the report's findings that two Ranch houses, identified as PR0833 and PR0834, are not eligible for the National Register of Historic Places for the reasons cited in the report.

We cannot concur with the report's conclusion that Woodland Elementary School (PR0549) is not eligible for the National Register of Historic Places because the report did not provide enough information. During field work, the school's principal asked the investigators to refrain from photography, so the investigators relied on Google Streetview and aerial photos to support the report's conclusions. The report included none of the images the investigators cited in their conclusions. When the reviewer used Google Streetview in an effort to expedite concurrence, the reviewer could not see any portions of the oldest parts of the building. When evaluating a school during the school year, the investigators should contact the principal for an appointment to take photographs and be prepared to visit the school after the school day has ended or on a weekend.

Furthermore, the report provided no context about other historic schools in Person County. What other 1930s or 1950s (depending on the school's construction date) schools remain in the county? The report did not cite any historical sources of information about the school's history or construction except for aerial photography. In the school's evaluation, the construction date is given as circa 1930 with later additions, but in the initial history presented on page 5, the construction date is 1950.

For the HPO to concur with the report's findings regarding Woodland Elementary School, we require supporting photography, a basic history, and summary of school building in the county and the remaining stock of school building in the county and including citations of primary and secondary sources regarding the school's history.

Finally, please note that the construction date for the House on Wagstaff Farm is incorrect in both tables on page 11.

Please address the issues listed above and provide a digital copy of the revised HSSR to us for review and comment. Once approved, any deliverables changed to reflect the HPOs recommended revisions must be submitted for filing before a final determination of effects letter will be issued. Contact Katie Harville, Environmental Review Specialist, with questions regarding deliverables.

Thank you for your submission of the Phase I archaeological survey report for the above referenced project. However, we did not receive the digital copy of the report or of the site form associated with this survey. Please provide:

- One (1) digital copy of the archaeological survey report, on CD, as a separate PDF file from other submission documents.
- one (1) digital copy of each NC Site Form, with accompanying site maps, for each site that was recorded as part of the archaeological investigation. Preferably on CD.

The review process cannot proceed without these items. As a reminder, the Office of State Archaeology considers isolated finds as sites. Site maps should show site boundaries, shovel test locations, features (if present), and relevant landmarks. Submissions should be sent to:

By US Postal Service:
Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

By FedEx, UPS, or courier:
Renee Gledhill-Earley
State Historic Preservation Office
109 East Jones Street, Room 258
Raleigh, NC 27601

Additional information on the Office of State Archaeology's standards and guidelines for archaeological investigations can be found on our website at: https://archaeology.ncdcr.gov/programs/forms.

We are still reviewing "Examination and Delineation of a Previously Unrecorded Suspected Cemetery on the Roxboro Steam Plant Property in Semora, Person County, North Carolina," and will return our comments as soon as possible.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

cc: Emily Laird, ERM emily.laird@erm.com

DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX C-1

PERSON COUNTY COMBINED-CYCLE ADDITION NATURAL RESOURCES REPORT

Duke Energy Corporation
13339 Hagers Ferry Road, MG03A3
Huntersville, NC 28078

Person County Advance Combined Cycle Gas Turbine
Roxboro Energy Complex
Natural Resources Site Assessment Report

To: Todd Shuping, PMC, Duke Energy Business Services
From: Scott T. Fletcher, Manger of Natural Resources, EHS, Duke Energy Business Services
CC:
Date: 03/03/2023, updated 07/22/2023
Location: Roxboro Energy Complex, Proposed Person County Combined Cycle, Gas Turbine site. 1700 Dunnaway Road, Semora, NC 27343
Subject: Natural Resources Reconnaissance and Assessment

1.0 PROJECT DESCRIPTION

Duke Energy Progress, LLC (DEP) is planning to construct an advanced class combined-cycle gas turbine (CCGT) unit at the existing Person County generating site, the Roxboro Plant in Semora, NC. (see figure below). The natural resources assessment study area for the Person County CCGT includes a 28-acre tract where the proposed facility and its associated components (e.g., construction lay-down area, switchyard, administration building) will be located. Approximately 50 percent of the site (estimated 12-acres) is significantly disturbed from past and current activities associated with the Roxboro Energy Complex. The area is surrounded by areas of mixed hardwood-pine woodland, Hyco Lake, transmission line corridors, and other disturbed areas associated with the generation station. Regarding this proposed generation facility, Duke Energy Business Services (DEBS), Environmental, Health & Safety (EHS)-Natural Resources reviewed existing information, conducted a desktop analysis, and subsequently conducted a natural resource assessment of the site.

2.0 METHODS

DEBS-Natural Resource scientists performed a desktop review of publicly available and project-area company data, use of the USFWS IPaC (Information, Planning, and Consultation) tool, reviewed up-to-date in-house

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databases and the EHS GIS Natural Resource Viewer, and conducted on-site assessments that included an assessment for federally and state protected species, and natural and vegetation communities. DEBS scientists also conducted a reconnaissance-level survey of the proposed project area or wetlands and jurisdictional waters of the United States under Section 404 of the Clean Water Act (CWA). DEBS used the methodology described in the U.S. Army Corps of Engineers (USACE)1987 Wetland Delineation Manual, USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory regime, and the North Carolina Division of Water Resources (NCDWR) Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11) to examine the area and to review the USFWS's National Wetland Inventory (NWI) database. Existing vegetative communities are described based on the Classification of the Natural Communities of North Carolina - Fourth Approximation (Schafale 2012).

3.0 FINDS AND RESULTS

Botanical Resources

Based upon the Classification of the Natural Communities of North Carolina - Fourth Approximation (Schafale 2012), approximately 12-acres, of the total of 28-acre footprint of the proposed site, can be classified as Mesic Mixed Hardwood (Piedmont Subtype) (see Attachment A-Site Photographs). The proposed project is within upland terrain surrounded by existing cleared land, and facility infrastructure (e.g., facility access roads and transmission line rights-of-way). These wooded-area remnants and adjacent areas are described below based on known site information and field assessments. This community is comprised of mature woody, herbaceous, and vine species including black oak (Quercus velutina), northern red oak (Q. rubra), scarlet oak (Q. coccinea), white oak (Q. alba), American beech (Fagus grandifolia), shortleaf pine (P. echinata), mockernut hickory (Carya tomentosa), sweetgum (Liquidambar styraciflua), tulip poplar (Liriodendron tulipifera), red maple (Acer rubra), American holly (Ilex opaca), black cherry (Prunus serotina), flowering dogwood (Cornus florida), redcedar (Juniperus virginiana), greenbrier (Smilax spp.), Japanese honeysuckle (Lonicera japonica), crossvine (Bignonia capreolata), spotted pipsissewa (Chimaphila maculata), Christmas fern (Polystichum acrostichoides), ebony spleenwort (Asplenium platyneuron), and arrow-leaved heartleaf (Hexastylis arifolia). This forested area will be permanently affected by the proposed project construction.

The project area is also immediately adjacent to DEPs existing 230kV and 115kV transmission line rights-of-way (See Attachment A). These routinely managed corridors, maintained in an early-successional stage, are dominated by grasses, forbs, and woody plants, such as dense broomsedge (Andropogon virginicus), broad-leaved panic grass (Dichanthelium latifolium), dogfennel (Eupatorium capillifolium), fleabane species (Erigeron spp.), goldenrod species (Solidago spp.), Japanese honeysuckle, greenbriar, and blackberry (Rubus allegheniensis). Sweetgum, red maple, shortleaf pine and red cedar saplings can also be present, based on the timing of the maintenance cycle. These transmission line corridors will not be affected by the proposed project.

Wetlands and Jurisdictional Waters of the U.S.

DEBs biologists conducted a reconnaissance-level survey of the proposed project area for wetlands and jurisdictional waters of the United States under Section 404 of the Clean Water Act (CWA). The area was examined according to the methodology described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory regime, and the North Carolina Division of Water Resources (NCDWR) Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11), as well as review of the U.S. Fish and Wildlife Service's (USFW) National Wetland Inventory (NWI) database. Based on the existing information and the survey, no wetlands or Waters of the U.S. will be affected by the proposed facility. There are a series of drainageways that drain in the direction into Hyco Lake, at the extreme outer edge of the proposed project footprint (i.e., head slope or drainageway head). However, these drainageways are within an upland context and have no indicators of channeled ephemeral or perennial flow.

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Listed and Protected Plant Resources

DEBs reviewed a list of federally protected plant species for Person County and the study area (USFWS 2023)(Attachment B) as well as the company's own Natural Resource GIS Viewer database, which includes known element occurrences and critical habitat of federal and state protected species. DEBs has also conducted field assessments regarding listed species in the study area over the last several years. Neither the data base review nor the site assessments revealed known occurrences of federal or state protected species within the study area and the project footprint. A review of the USFWS's IPaC tool indicated no protected or proposed protected federally plant species within the general study area and Person County. Therefore, no listed plants or associated communities will be impacted by the proposed project. DEBs anticipates that neither constructing nor operating the proposed facility will significantly affect federal- and state-listed plant species or overall botanical resources of the area.

Wildlife Resources

Terrestrial communities in the study area (i.e., project footprint) are comprised primarily of small, forested habitats and transmission line corridors that support a diverse number of wildlife species. Representative mammal, bird, reptile, and amphibian species common to these habitats are listed below. Individual species and/or evidence of species (tracks, scat, sightings) observed during field assessments are indicated with an asterisk (*). DEBs obtained information about wildlife species that typically use these habitats in the Southern Outer Piedmont ecoregion from relevant literature, mainly the Biodiversity of the Southeastern United States, Upland Terrestrial Communities (Martin et al. 1993).

Common mammal species in these habitats include eastern cottontail (Sylvilagus floridanus), gray squirrel (Sciurus carolinensis)*, various vole, rat, and mice species, Eastern red bat (Lasiurus borealis), big brown bat (Eptesicus fuscus), raccoon (Procyon lotor)*, Virginia opossum (Didelphis virginiana), groundhog (Marmota monax), white-tailed deer (Odocoileus virginianus)*, gray fox (Urocyon cinereoargenteus), red fox (Vulpes vulpes), and coyote (Canis latrans)*.

Bird species that commonly use these habitats (i.e., permanent residents and seasonal residents) include wild turkey (Meleagris gallopavo)*, American crow (Corvus brachyrhynchos)*, blue jay (Cyanocitta cristata)*, Carolina chickadee (Poecile carolinensis)*, American robin (Turdus migratorius)*, brown thrasher (Toxostoma rufum)*, northern mockingbird (Mimus polyglottos)*, Carolina wren (Thryothorus ludovicianus)*, red-eyed vireo (Vireo olivaceus)*, summer tanager (Piranga rubra)*, white-breasted nuthatch (Sitta carolinensis), brown-headed nuthatch (S. pusilla)*, red-bellied woodpecker (Melanerpes carolinus)*, downy woodpecker (Picoides pubescens)*, pine warbler (Setophaga pinus)*, northern cardinal (Cardinalis cardinalis)*, song sparrow (Melopiza melodia), field sparrow (Spizella pusilla)*, and white-throated sparrow (Zonotrichia albicollis)*. Raptors in the study area include red-shouldered hawk (Buteo lineatus), red-tailed hawk (Buteo jamaicensis)*, barred owl (Strix varia), black vulture (Coragyps atratus)*, turkey vulture (Cathartes aura)*, and an occasional bald eagle (Haliaeetus leucocephalus). There are no known bald eagle nests within at least 10 miles of the proposed facility; thus, DEBs anticipates no construction or operational impacts to an active nest or the associated eagles.

Reptile and amphibian species that may use the associated terrestrial communities include the eastern black rat snake (Pantherophis alleghaniensis), eastern corn snake (P. guttatus), copperhead (Agkistrodon contortrix), eastern fence lizard (Sceloporus undulatus)*, five-lined skink (Plestiodon fasciatus), eastern box turtle (Terrapene carolina carolina)*, spotted salamander (Ambystoma maculatum), slimy salamander (Plethodon glutinosus), American toad (Anaxyrus americanus), Fowler's toad (A. fowleri), gray treefrog (Hyla versicolor), and spring peeper (Pseudacris crucifer).

Before constructing the proposed facility, DEP will need to remove approximately 12-acres of mixed hardwood forest area on the site, which will displace the remaining wildlife. Timber clearing of this area will be conducted from October 15-March 31. During the construction phase, wildlife is expected to move to adjacent undeveloped forested areas. Since the proposed project footprint is small and localized, construction activities should not impact the diversity or number of species or interfere with the movement of resident or migratory species. DEP

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does not anticipate that daily facility operations, including noise from equipment and vehicle traffic, will affect wildlife beyond the proposed facility's footprint.

Listed and Protected Wildlife Resources

DEB's review of the USFWS IPaC tool revealed three federally protected or proposed protected wildlife species within the general study area and Person County. These include the tricolored bat (Perimyotis subflavus), little brown bat (Myotis lucifugus), and monarch butterfly (Danaus plexippus).

The tricolored bat (Proposed Endangered with Final Listing in September 2023) is a small insectivorous bat with unique tricolored fur that often appears yellowish to nearly orange. This once-common species is wide-ranging across the eastern and central United States and portions of southern Canada, Mexico, and Central America. In winter, tricolored bats are often found in caves and abandoned mines, although in the southern United States, where caves are sparse, they often roost in road culverts, where they exhibit shorter torpor bouts and forage during warm nights. In spring, summer, and fall, tricolored bats may roost in forested habitats, primarily among leaves of live or recently dead deciduous hardwood trees. They may also be found in pine trees and occasionally even in human structures. Tricolored bats face extinction primarily because of the range-wide impacts of white-nose syndrome, a deadly disease that affects cave-dwelling bats across the continent. The

The project study area and the site of the proposed facility include potential habitat (forest and woodland) for the species. Since approximately 12-acres of mixed hardwood-pine forest will be cleared, DEP will only cut and clear the forested habitat from October 15-March 31, to protect roosting and maternity roosting tricolored bats. DEP will coordinate with the USFWS-Raleigh Ecological Field Office to determine how the Endangered Species Act Section 10 will be implemented.

The little brown bat (proposed to be listed in September 2023, with a final listing in September 2024) is a small insectivorous bat. The once-common species is wide-ranging across the eastern, central, and western United States, including the Piedmont of North Carolina. Little brown bats use a wide range of habitats and often avail themselves of human-made structures for resting and maternity sites. In winter, they typically roost in caves and mines. They can also be found in trees, artificial structures, and bat houses; under rocks; and in piles of wood in summer. Foraging habitat requirements are generalized, primarily over streams and other bodies of water, along the margins of lakes and streams, or in woodlands near water. Winter hibernation sites like caves, tunnels and abandoned mines generally have a relatively stable temperature of about 2° to 12° Celsius. Maternity colonies are commonly in warm sites within buildings, such as attics, bat houses, other human structures, and infrequently, in hollow trees. During the spring, summer, and fall, little brown bats are found in forested habitats where they can roost in trees. Like the tricolored bat, these bats face extinction primarily from white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent; but they also are in peril from climate change and habitat loss.

Potential roosting habitat (forest and woodland) for the species is found in the study area, specifically in the vicinity of the proposed facility. Since the proposed project's footprint will be cleared of mixed hardwoods and pines, DEP will only cut and clear the forested habitat from October 15-March 31, to protect roosting and maternity roosting bats. DEP will coordinate with the USFWS-Raleigh Ecological Field Office to determine how the Endangered Species Act Section 10 will be implemented.

The monarch butterfly (Candidate Species, with a proposed listing date of November 2023) is large and conspicuous. In breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily Asclepias spp.), and larvae emerge after two to five days. Multiple generations of monarchs are produced during breeding season. In many regions, monarchs breed year-round. Individual monarchs in temperate climates, such as eastern and western North America (including the Piedmont of North Carolina), undertake long-distance migration and live for several months. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites in Mexico. Habitat for this species is not found in the proposed project footprint; but marginal habitat (nectar-bearing plants) exists within the immediately adjacent transmission line corridor. DEP is a partner within the nationwide Monarch Candidate Conservation Agreement with

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Assurances (CCAA), and its transmission rights-of-way are managed in a way that is beneficial to the species and associated habitat. The adjacent transmission line rights-of-way will not be affected by the proposed facility, and

the current Integrated Vegetational Management practices will not be altered because of the project. Thus, this species will not be affected by the project.

4.0 RECOMMENDATIONS

The natural resources assessment, study area for the Person County advanced-class combined cycle dual-fuel unit additions includes a 28-acre tract where the proposed facility and its associated components (e.g., construction lay-down area, switchyard, administration building) will be located. Approximately 50 percent of the site is significantly disturbed (and cleared) from past and current activities associated with the Roxboro Energy Complex. The area is surrounded by areas of mixed hardwood-pine woodland, Hyco Lake, transmission line corridors, and other disturbed areas associated with the generation station.

The project study area and the site of the proposed facility include potential habitat (forest and woodland) for the species. Since approximately 12-acres of mixed hardwood-pine forest will be cleared, DEP will only cut and clear the forested habitat from October 15-March 31, to protect roosting and maternity roosting tricolored, and little brown bats, as well as nesting migratory birds. DEP will coordinate with the USFWS-Raleigh Ecological Field Office to determine how the Endangered Species Act Section 10 will be implemented.

DEP is a partner within the nationwide Monarch Candidate Conservation Agreement with Assurances (CCAA), and its transmission rights-of-way are managed in a way that is beneficial to the species and associated habitat. The adjacent transmission line rights-of-way will not be affected by the proposed facility, and the current Integrated Vegetational Management practices will not be altered because of the project. However, it is recommended that DEP into the facility transmission line corridors into the annual monitoring program with the CCAA.

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ATTACHMENT A

SITE PHOTOGRAPHS

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Photograph 1. View looking west across proposed Person County CCGT footprint.

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Photograph 2. View looking south across proposed Person County CCGT footprint.

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Photograph 3. View along western edge of proposed Person County CCGT footprint-within the Mixed Hardwood-Pine Forest.

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Photograph 4. View along the existing 115kV Transmission Line Corridor (Concord-Roxboro) adjacent to the proposed Person County CCGT footprint.

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ATTACHMENT B

USFWS IPaC RESOURCE LIST

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IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

Roxboro combined cycle generating station

LOCATION

Person County, North Carolina

DESCRIPTION

Some(Permitting and construction of the new Roxboro combined cycle generating station)

Duke Energy Corporation
13339 Hagers Ferry Road, MG03A3
Huntersville, NC 28078

Local office

Raleigh Ecological Services Field Office

(919) 856-4520
(919) 856-4556

MAILING ADDRESS
Post Office Box 33726
Raleigh, NC 27636-3726

PHYSICAL ADDRESS
551 Pylon Drive, Suite F
Raleigh, NC 27606-1487

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DUKE ENERGY®

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of

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Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* Wherever found No critical habitat has been designated for this species https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* Wherever found No critical habitat has been designated for this species https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list,click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX C-2

U.S. FISH & WILDLIFE SERVICE CONSULTATION

Duke Energy Corporation
McGuire Environmental Center
MG03A3
13339 Hagers Ferry Road
Huntersville, NC 28078

August 1, 2023

Via Electronic Mail

Ms. Kathy Matthews
Fish and Wildlife Biologist
US Fish and Wildlife Service-Eastern NC
551 Pylon Drive
Suite F
Raleigh, NC 27606-1487

Subject: Federally Listed Species Coordination for the Duke Energy Progress, Proposed Person County Combined Cycle Combustion Turbine Project

Dear Ms. Matthews:

Duke Energy Progress (DEP) proposes to retire coal-fired Units 1 and 2 at the Roxboro Plant permanently and replace them with one Combined Cycle Combustion Turbine (CCGT) unit. Together, the remaining coal-fired Units 3 and 4 and the proposed CCGT unit will be known as the Person County Energy Complex. The Person County Energy Complex will be owned by DEP and located on DEP-owned property adjacent to the current Roxboro Plant in northeastern Person County. The proposed facility's address will be:

- 1700 Dunnaway Rd, Semora, NC 27343; its approximate global positioning system ("GPS") coordinates are 79°5'1.807" west and 36°28'22.405" north (see Attachment A- Figure 1).

The existing Roxboro Plant encompasses about 6,923 acres of land, a portion of which is occupied by four existing coal-fired units, an electrical substation, transmission lines, the associated balance of plant facilities, buffer lands, and forested areas. The footprint of the proposed CCGT covers both undeveloped land, with 50 percent consisting of previously cleared land and another 50 percent consisting of mixed hardwood-pine woodland. Based upon the Classification of the Natural Communities of North Carolina - Fourth Approximation a portion of the proposed site can be classified as Mesic Mixed Hardwood (Piedmont Subtype). The proposed project is within uplands surrounded by existing facility infrastructure (e.g., facility access roads and transmission line rights-of-way). Project construction (starting in 2026) will entail the cutting and clearing of this 36-acre mixed hardwood woodland.

A review of the USFWS's Information for Planning and Consultation (IPaC) tool (as well as several recent field surveys) indicated no protected or proposed federally protected plant species within the general study area and Person County. DEP's review of the IPaC tool revealed three federally protected or proposed protected wildlife species within the general study area and Person County. These include the tricolored bat (Perimyotis subflavus), little brown bat (Myotis lucifugus), and monarch butterfly (Danaus plexippus). Based on the IPaC Biological Analysis (BA) (see enclosed), the Monarch will have a NLAA determination (due to no impacts on the adjacent transmission line ROWs) and the tricolored bat will have a LAA determination (due the timber cutting). As mentioned in the BA, DEP plans to cut the timber between October-March 31 to avoid impacts to roosting bats. Furthermore, no bald eagle nests are documented within several miles of the existing and proposed facility.

With this information, DEP is seeking your recommendations and guidance, considering the tree cutting work within this area including Tricolored and Little Brown Bat habitat. As information, our Natural Resources group has conducted awareness training (including a new computer-based training module) with our transmission, distribution, hydroelectric, generation stations, and pipeline departments, regarding endangered species, listed bats, and the necessary best management practices and consultation requirements.

DUKE ENERGY PROGRESS, LLC
PERSON COUNTY ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX D

PERSON COUNTY PLANNING & ZONING DIRECTOR COMMUNICATION

From: Chris Bowley <cbowley@personcountync.gov>
Sent: Monday, May 1, 2023 1:40 PM
To: Shuping, Todd <Todd.Shuping@duke-energy.com>
Cc: Evans, Tanya O <Tanya.Evans@duke-energy.com>
Subject: [EXTERNAL] RE: EXTERNAL: Person County Future Development

Hello, Todd. You are correct and we discussed the Polywood plant expansion (underway) that Duke is working with Polywood with for a substation. That project is over 8 miles to the east. There is nothing at the Mega Park that I know of. The Peninsula Hyco Lake, 168 residential homes in Phase I, is underway for an entry road, but no word on lot construction. The site plan is attached.

If you need anything additional, please let me know.

Thanks,

Chris Bowley, AICP
Planning & Zoning Director
Person County Planning Department
325 S. Morgan Street, Suite B
Roxboro, NC 27573
Ph: 336.597.7423 ext. 3423
cbowley@personcountync.gov

NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-2, SUB 1318
PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

PERSON COUNTY ENERGY COMPLEX
COMBINED-CYCLE COMBUSTION TURBINE ADDITION PROJECT

Exhibit 2: Permitting

September 1, 2023

DUKE ENERGY® PROGRESS

INTRODUCTION

Duke Energy Progress, LLC ("DEP"), requests certification to construct an advanced-class combined-cycle gas combustion turbine ("CCGT") facility at its existing Roxboro Plant, located in Person County, North Carolina (the "Person County Energy Complex"). This exhibit provides preliminary permitting information for constructing the new CCGT and for related upgrades to on-site transmission facilities, pursuant to North Carolina Utilities Commission Rule R8-61. All descriptions and information provided herein are based on preliminary engineering and studies, using the most reliable information available to date.

The Person County Energy Complex will be constructed and operated in accordance with Duke Energy Business Services, LLC's ("DEBS") environmental compliance standards. These standards include adherence to the Duke Energy Environmental, Health, and Safety Management System and the Duke Energy Environmental Compliance Manual ("ECM"). The ECM requires that every teammate at Duke Energy:

- Act with integrity,
- Promote event-free operations, and
- Ensure regulatory compliance in every aspect of our business.

These standards and compliance principles also include proper implementation of the environmental permits and approvals noted below.

I. Permit Matrix

Air emission objectives are contingent upon the final air permit, which must be issued by the North Carolina Department of Air Quality ("NCDAQ") prior to the start of construction.

The air permit will comply with Prevention of Significant Deterioration regulations. The stack will be equipped with NOx, CO, and diluent continuous emissions monitoring systems and certified fuel-flow meters to determine compliance against the allowed "cap" of emissions.

A comprehensive matrix of environmental permits and approvals that may be required is found in the following table.

Environmental Permits/Approvals

Permit	**Agency**
Construction Permits	Person County
Temporary Buildings	Person County
Permanent Buildings	Person County
Section 404 Clean Water Act	U.S. Army Corps of Engineers
Section 401 Clean Water Act	North Carolina Department of Environmental Quality ("NCDEQ")
Rare Threatened & Endangered Species (RTE) Concurrence	U.S. Fish and Wildlife Service
Wastewater POTW	Person County
(Construction) Stormwater/Erosion and Sediment Controls	North Carolina Department of Environmental Quality, Division of Energy, Mineral, and Land Resources
(Post-Construction) Stormwater	Person County
Air Permit	NCDAQ
FAA	Federal Aviation Administration
SPCC	NCDEQ
Potable Water	Person County
Watershed	Person County
Cultural Resources Clearance	NC State Historic Preservation Office
Stream Buffer Variance	Person County

II. Permitting Status

DEBS has completed preliminary site studies but has not yet filed for any permits. The air permit generally has the longest lead time. Site studies did not identify any significant cultural, wetland, or rare and endangered species issues. Concurrence with the appropriate agencies will be required prior to starting construction. Construction and building permits, as required, will be obtained from Person County.

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PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

PERSON COUNTY ENERGY COMPLEX
COMBINED-CYCLE COMBUSTION TURBINE ADDITION PROJECT

Exhibit 3: Schedule

September 1, 2023

The project schedule will support completion of permitting, construction, commissioning, and testing for late 2028 Commercial Operation.

[BEGIN CONFIDENTIAL]

[END CONFIDENTIAL]