NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-7, SUB 1330
PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

BUCK ENERGY COMPLEX SIMPLE-CYCLE GAS COMBUSTION TURBINE ADDITION PROJECT

Exhibit 1: Site Information

July 24, 2025

DUKE ENERGY
CAROLINAS

BUCK ENERGY COMPLEX SIMPLE-CYCLE ADDITION PROJECT

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INTRODUCTION

REFERENCES

APPENDIX A	Buck Steam Station Combustion Turbine Plant Addition CPCN Noise Impact Study
APPENDIX B	Literature Review and Windshield Study of a Proposed Generation Facility at Duke Energy's Buck Power Plant
APPENDIX C	Natural Resource Assessment and Aquatic Resources Delineation

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INTRODUCTION

Duke Energy Carolinas, LLC ("DEC" or the "Company"), plans to request certification to construct two advanced-class-technology simple-cycle gas combustion turbine ("CT") units, each with an estimated nominal capacity of 425 megawatts ("MW"), at DEC's Buck Combined Cycle ("CC") Station in Rowan County, North Carolina ("NC"). With the addition of the two CTs to the existing 620 MW 2x1 CC, the station will be known as the Buck Energy Complex. The proposed CTs will be constructed adjacent to the existing CC facility and are planned to achieve commercial operation in Q4 2029. This document will refer to the proposed CTs and their associated facilities as the "Proposed Facility."

This Exhibit provides site and permitting information pertinent to the construction of the Proposed Facility and related upgrades to on-site transmission facilities, pursuant to North Carolina Utilities Commission ("Commission") 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 information below 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

1.0 SITE INFORMATION

DEC, through its shared services company, Duke Energy Business Services, LLC, contracted with Pike Engineering, LLC ("Pike"), to perform research and conduct studies of local population, area development, visual and acoustical resources, aesthetic and cultural resources, and aviation. Pike then contracted with Brockington & Associates, Inc. ("Brockington"), for cultural resource research and with Stewart Acoustical Consultants ("Stewart") to conduct studies related to potential auditory impacts of the Proposed Facility. DEC also contracted with Burns & McDonnell for advice and assistance in developing supplemental engineering deliverables.

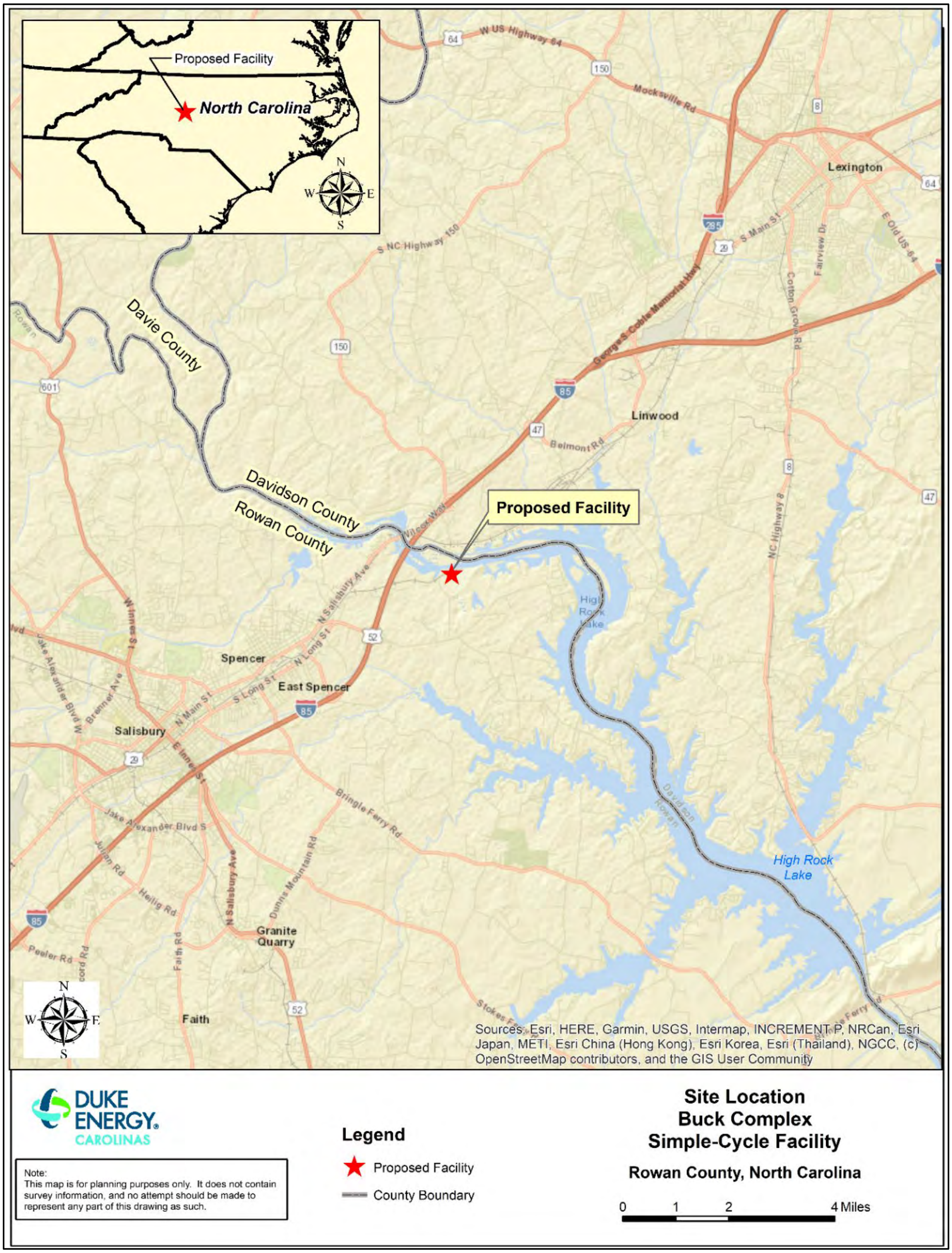
1.1 Site Location, Address, and Ownership

DEC's Buck CC Station occupies about 640 acres of land off State Road 2176, also called Dukeville Road, approximately three miles east of Spencer, NC. Nearby communities include Salisbury (approximately seven miles southwest) and Lexington (about 10 miles northeast).

The Proposed Facility will be owned by DEC and located on DEC-owned property at the Company's existing Buck CC Station in Rowan County, about 0.25 miles north of the Buck CC facility, which began commercial operation in November 2011. The E911 street address of the Proposed Facility will be 1555 Dukeville Road, Salisbury, NC 28146; its approximate global positioning system ("GPS") coordinates at its approximate center will be 34° 26' 42.1628" - 82° 39' 45.9312''.

Figure 1.1-1 shows the location of the Proposed Facility.

<u>Figure 1.1-1. Site Location</u>



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

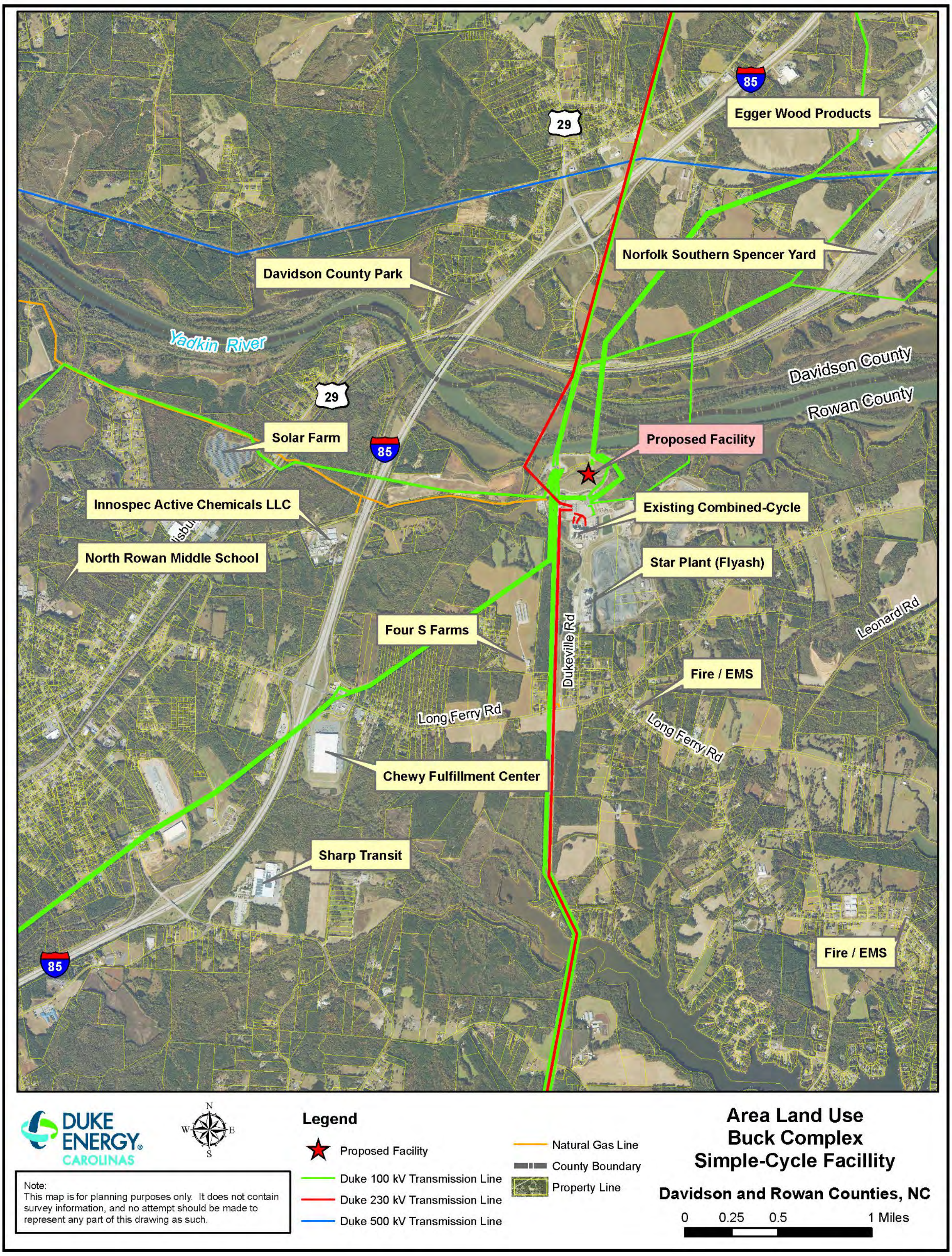
A significant portion of the Buck CC Station is occupied by existing plant systems—combustion turbines, heat recovery steam generators, cooling towers, laydown areas, sediment basins, switchyards, ash basins, etc. Much of the property is forested, and part of it borders the Yadkin River.

Most of the land within one mile of the Proposed Facility is owned by DEC, but there are residences along Dukeville, Leonard, and Stoner Morgan Roads; Viola, Ruffin Graham, and Jacobs Lambe Lanes, and Seven Oaks Drive.

At the intersection of Buck Steam Station and Dukeville Roads, about 0.7 mile south of the Proposed Facility, is the Buck STAR plant, which changes the chemical composition of coal ash, reducing its carbon level to below 1% and thus making it suitable for use in concrete-based construction materials (Advanced Technology 2020). DEC owns the STAR plant, but it is operated by Heidelberg Materials (Heidelberg 2023).

Figure 1.1-2 shows the locations of the STAR plant, the existing CC facility, some of the area businesses, schools, parks, and other places of interest.

Figure 1.1-2. Land Use



1.2 Site Description

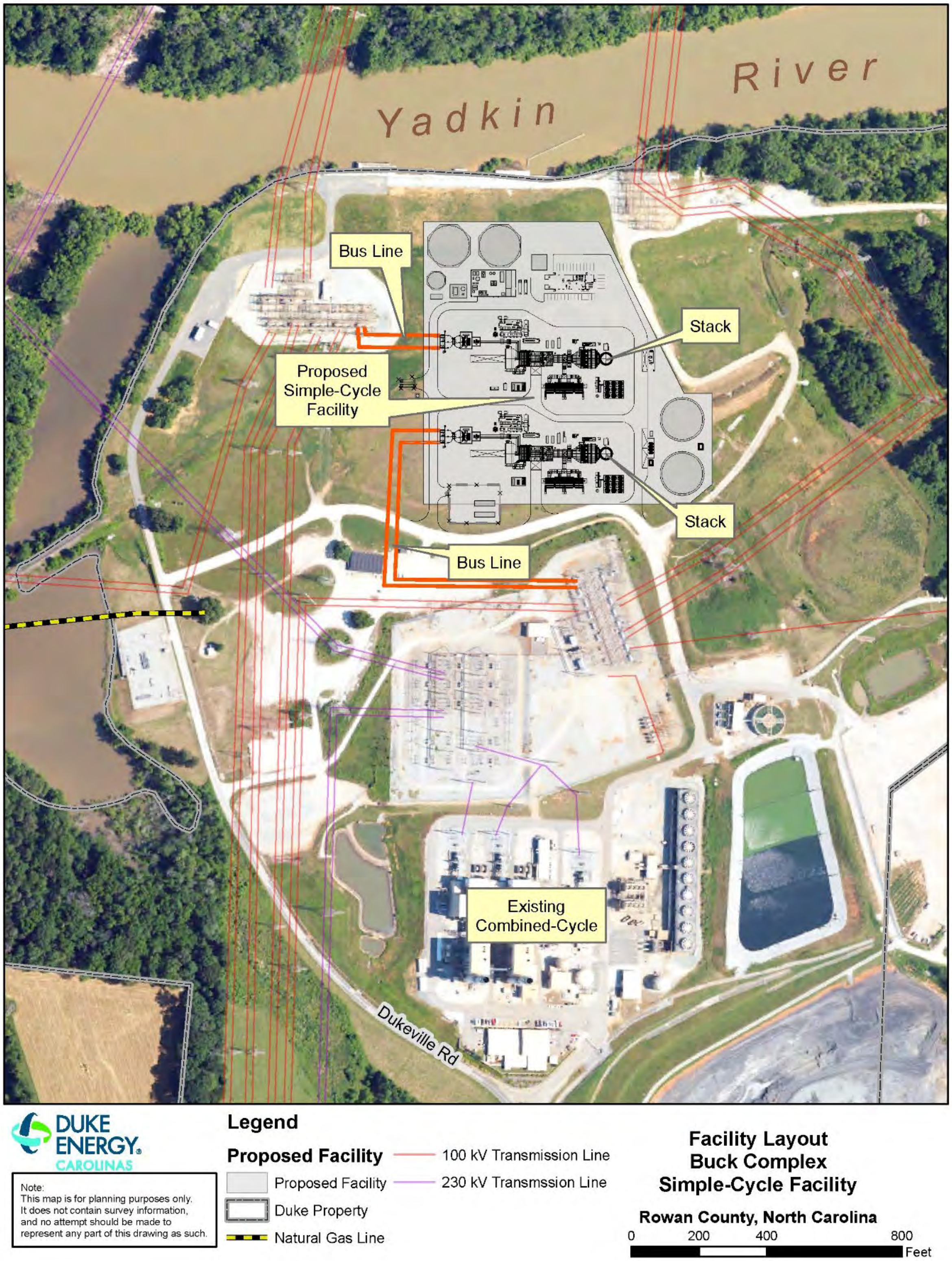
The Proposed Facility will be constructed in the northern portion of the 640-acre Buck CC Station. Directly south are the 620-MW Buck CC Station and its associated facilities. Directly north are the remnants of the coal-fired Buck Steam Station. It ceased operations in 2013, and in 2018 its buildings were imploded.

The Proposed Facility will be built on the site that once held Buck Steam Station's coal pile. Northwest of the Proposed Facility is the Buck Steam 100 kV Switchyard. To the northeast is the Buck Steam Plant Switchyard (Decommissioned). Buck Tie Station and the CC Wastewater Retention Basin are both south of the Proposed Facility.

The STAR Southeast Fly ash facility is south of the existing CC facility. Multiple 100 kV and 230 kV transmission lines encircle the site of the Proposed Facility, and a natural gas pipeline delivers gas to the site.

The Proposed Facility will occupy approximately 20 acres of land. Figure 1.2 provides an overall view of the Proposed Facility.

Figure 1.2. Facility Layout



1.3 Site Selection

1.3.1 Siting Criteria

DEC's and Duke Energy Progress LLC's ("DEP" and together with DEC, the "Companies") 2023-2024 Carbon Plan and Integrated Resource Plan ("CPIRP" or the "Plan"), including the initial Plan filed with the Commission on August 17, 2023, in Docket No. E-100, Sub 190, and the Supplemental Planning Analysis filed in the same docket on January 31, 2024, identified a planning need for a total of five CTs, including the Proposed Facility, to achieve commercial operation by 2031. The CPIRP modeling and Near-Term Action Plan identified the Company's plan for the Proposed Facility (CTs 3 & 4) to achieve commercial operation by 2030. On July 22, 2024, in Docket No. E-100, Sub 190, the Companies filed an Amended Agreement and Stipulation of Settlement between the Companies, the Public Staff – North Carolina Utilities Commission, Walmart, Inc., and the Carolinas Clean Energy Business Association ("CPIRP Stipulation") in which the Stipulating Parties agreed that the Commission should select 900 MW of new CT capacity incremental to the CT capacity approved in the Commission's December 30, 2022 *Order Adopting Initial Carbon Plan and Providing Direction for Future Planning*, issued in Docket No. E-100, Sub 179, for a total of two new CTs (CTs 3&4) to be placed in service by 2030.

On November 1, 2024, the Commission issued its *Order Accepting Stipulation, Granting Partial Waiver of Commission Rule R8-60A(d)(4), and Providing Further Direction for Future Planning* in Docket No. E-100, Sub 190, in which the Commission directed the Companies to proceed with planning for the new natural gas resources recommended for selection in the CPIRP Stipulation. The Proposed Facility will provide the Commission-authorized incremental capacity and add approximately 850 MW of incremental generation to meet projected load growth, providing a foundation of capacity to enable future coal retirements, resource adequacy to the DEC system, and voltage support for the Greater Piedmont Triad area in the DEC northern region.

Given the required timeline to bring gas resources online to meet the needs forecasted in the CPIRP, the Company assembled a cross-functional team to provide information about and to evaluate the various sites for new CT generating facilities. This group included representatives from internal organizations such as Generation Strategy, Fuel Strategy, Transmission, Community Relations, Environmental, Environmental Justice, IRP, Regulatory Affairs, Project Management and Construction, Coal Combustion Products, and Infrastructure Engagement. The team implemented a weighted site-scoring process to evaluate potential sites using the following eight factors: gas infrastructure, transmission capability, water supply, available land, community and environmental justice, air permitting, environmental, and operations (referred to internally as "Regulated and Renewable Energy"). The team also analyzed other factors that would influence ultimate site selection such as rail access or overall executability.

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

Table 1.3.1. Site Selection Criteria

Criteria	Reason
Gas Infrastructure	Available natural gas capacity or nearby existing natural gas infrastructure can provide significant synergistic opportunities.
Transmission Capability	The site will need to receive an Interconnection Agreement to connect to the grid, by submitting an application into the Definitive Interconnection System Impact Study cluster study process.
Water Supply	Available water infrastructure provides cost-savings opportunities for long-term operation.
Available Land	DEC needs adequate land for the site and construction activities.
Community & Environmental Justice	DEC is committed to applying fair treatment to all segments of a population while supporting local communities.
Air Permitting	DEC must be able to procure an air permit for the site.
Environmental	DEP will review the site for potential environmental impacts and take actions to minimize them whenever possible.
Operations / Regulated and Renewable Energy (RRE)	Existing sites have personnel with a good understanding of the operation and maintenance of gas turbines, which may require fewer additional employees.
Rail Access	Rail access provides cost savings for large equipment deliveries

1.3.2 Siting Assessment and Results

The Company's preliminary screen of potential sites included the following sites: Belews Creek ("Belews"), Buck CC Station ("Buck"), Dan River, Marshall, Rockingham, W.S. Lee, and the Anderson site (which is a greenfield site).

As part of its preliminary screening process, the Company considered the site selection criteria described above and additional criteria in assessing the feasibility of constructing the

Proposed Facility at a potential greenfield site. Timing to achieve site control to enter a site into the Definitive Interconnection System Impact Study ("DISIS") and the timing to achieve commercial operation to meet the identified need are important considerations that affected the feasibility of potential greenfield sites. As part of this preliminary screening process, the Company identified that the Anderson site in Anderson, South Carolina, could potentially be feasible to enter DISIS and meet the targeted commercial operation date. However, based on the Company's preliminary site assessment, the Anderson site did not score as highly as other sites analyzed. The Companies also determined that the Anderson site is better suited for construction of a CC facility than CTs.

The Marshall site was also excluded from further consideration through the Company's preliminary analysis as the Company determined that Marshall is better suited for construction of a CC facility than CTs. The Marshall site's coal-fired Units 3 and 4 are scheduled to be retired in 2032 and have an approximate capacity of 1,318 MW, which more closely aligns with a CC facility's estimated capacity than two CTs.

<u>DEC Site Scoring</u>: Listed below are total scores for the potential sites identified in the Company's preliminary site screen (on a 1-10 scale). The Buck and Belews sites were the highest scoring CT sites with the most favorable development and construction attributes and were therefore identified for further evaluation and analysis.

- Belews Creek Steam Plant Site (Belews Creek, NC) 6.8
- Buck Gas Facility (Salisbury, NC) 6.8
- WS Lee (Belton, SC) 6.6
- Marshall (no retire) (Terrell, NC) 6.3
- Anderson (Anderson, SC) 6.3
- Rockingham (Reidsville, NC) 6.1
- Dan River (Eden, NC) 5.5

A primary consideration informing the Company's further evaluation of the Buck and Belews site was the feasibility of completing the generator interconnection process to achieve the 2030 in-service-date ("ISD") identified for CTs 3&4 in the CPIRP. The Company entered both the Buck site and Belews site into the 2024 DEC DISIS cluster to be studied for interconnection. The

2024 DISIS Phase I study Report, issued in December 2024, estimated that upgrades necessary to interconnect CTs 3&4 at both Buck and Belews site could not be completed by the targeted 2030 ISD. The 2024 DISIS Phase II study was subsequently issued in May 2025 and favorably updated the timing for Buck CTs' transmission upgrades to be completed in 2030, while estimated transmission upgrade costs assigned to the Buck CTs interconnection customer were reduced. In contrast, the Phase II DISIS study report for Belews showed an increase in transmission upgrades costs and no improvement in the timing for constructing the upgrades necessary to support constructing the CTs at Belews Creek on a schedule that would facilitate interconnection by the 2030 ISD identified in the CPIRP.

The key siting considerations that the Companies took into account to support selection of the Buck site to construct the Proposed Facility include:

Transmission Capability: The most current 2024 Phase II DISIS study identifies that the Buck CTs can be interconnected by 2030 and the assigned interconnection facilities and network upgrade costs to interconnect the Proposed Facility are approximately $28 million.

Gas Infrastructure: Buck currently has natural gas service onsite to fuel the operating Buck CC facility at the site. Limited incremental natural gas facilities will be needed to support the new CTs.

Water Supply and Available Land: Buck has favorable water attributes that would support two new CTs. Specifically, there is sufficient water supply for two CTs provided by the Yadkin River. Buck also has suitable Company-owned land to support the new generation. There is existing infrastructure on site currently utilized by the existing CC facility that the Proposed Facility could also utilize.

Community and Environmental Justice: The Company assessed the Buck site using available federal and state mapping tools. Initial screening indicates that building CTs on the site would have low impacts on minority populations, low-income populations, and/or Indian tribes and indigenous communities.

Air Permitting: These CTs will be the most efficient CT technology currently available, and the Company reasonably expects to obtain the permitting necessary for operation of the Proposed Facility.

Environmental Constraints: The Company's evaluations do not show any environmental constraints that would preclude constructing or operating the Proposed Facility at the Buck CC

Station. Additionally, the Company's RRE organization has not identified any environmentally related operational issues. The Proposed Facility will be planned and constructed to comply with applicable building codes including ensuring that the elevation of the Proposed Facility exceeds applicable floodplain and elevation requirements.

Operations: The Proposed Facility will be constructed near the existing CC facility at the Buck CC Station. This will provide synergistic opportunities that can reduce costs. Specifically, due to its proximity to the existing Buck CC facility, the Proposed Facility will require fewer full-time employees to operate than it would if it were constructed at a greenfield location.

Other Factors: Buck has rail access, which will reduce costs for large equipment deliveries such as turbines and transformers.

Summary and Conclusion: The Company's site selection criteria list above, including readily available gas supply, synergistic opportunities with the onsite CC facility, reasonable estimated costs for transmission interconnection and, most critically, the ability to have the necessary transmission upgrades complete in time to support the ISD, all favor locating the Proposed Facility at Buck. The Belews site had some favorable attributes, as reflected in the quantitative site scoring, but the timing for achieving interconnection, as identified in the 2024 DISIS Phase I and II studies makes Belews Creek unable to support the 2030 ISD identified as needed for CTs 3&4.

1.3.3 Recommendation

Buck has the most positive attributes of all sites evaluated. The recommendation is to locate the Proposed Facility at Buck adjacent to the existing CC plant.

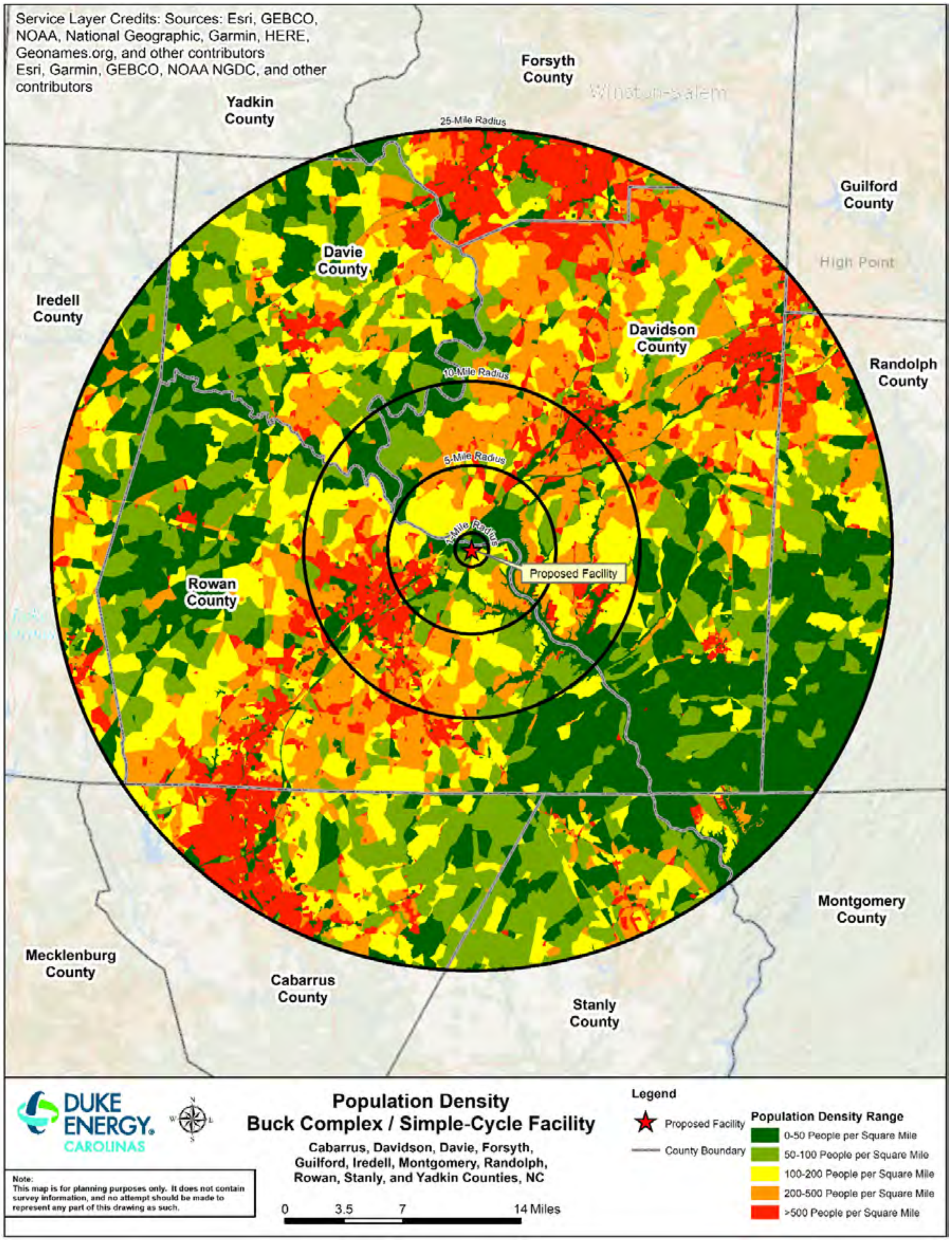
1.4 Site Characteristics

1.4.1 Local Population

According to the U.S. Census Bureau ("USCB"), Rowan County's April 1, 2020, population was 146,875; and the City of Salisbury had 35,540 inhabitants. Spencer's 2020 population was 3,308; and East Spencer's was 1,575 (USCB 2025). The closest large city is Charlotte, NC, with a 2020 population of 874,579 (USCB 2025).

Within a 25-mile radius of the Proposed Facility, the population is about 606,400. Figure 1.4.1 shows the population density within that 25-mile radius.

Figure 1.4.1. Population Density



1.4.2 Area Development

1.4.2.1 Existing

The primary nearby land uses are residential, agricultural, and commercial/industrial. Dukeville, Long Ferry, and Leonard Roads are lined with homes.

About 0.8 miles south-southwest of the Proposed Facility are the poultry houses of Four S Farms, LLC. This agricultural enterprise also grows corn, wheat, and soybeans at this location on Stoner Morgan Road. A considerable part of the operation is within one mile of the Proposed Facility.

Across the Yadkin River and about 1.5 miles to the northeast is one entrance to the Norfolk Southern Spencer Yard, a railway classification/hump yard that was mostly shut down in 2020 during the COVID pandemic. About 2.75 miles northeast is Egger Wood Products, the first North American facility of an Austrian company that makes wood-based panel products.

Approximately 1.4 miles west of the Proposed Facility and on the west side of I-85 is Innospec Active Chemicals, which produces ingredients for personal care products, such as emollients, surfactants, and conditioning agents (About Us 2024). A solar farm is on Highway 29, about 1.9 miles west of the Proposed Facility.

A portion of U.S. Interstate 85 East is about one mile from the Proposed Facility. I-85 Exit 81 (Long Ferry Road) is the nearest interstate exit, about 1.8 miles southwest. Just along Long Ferry Road are a BP gas station, an Exxon station, and an electric substation, all about 1.8 miles southwest of the Proposed Facility. On the far side of Long Ferry Road is the Maintenance Facility for Sharp Transit, a dedicated Aldi hauler.

A large Chewy Fulfillment center is along Front Creek Road, approximately two miles south-southwest of the Proposed Facility. Bethel United Methodist Church is approximately 1.1 miles due south at the corner of Long Ferry and Dukeville Roads. The primary nearby land uses are residential, agricultural, and commercial/industrial, particularly along Long Ferry Road.

The Company considered various aspects of the location of the Buck CT project 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 one-mile proximity screening radius and confirming that no areas of public or subsidized housing were located within that radius (Closest subsidized housing is approximately 3.2 miles from the project site). Based on the NC DEQ's Community Mapping tool, the site is not within NC DEQ's Potentially underserved Block Groups 2024.

Prior to the submission of its preliminary plans for the Proposed Facility, Company representatives engaged with various representatives and local government leaders from Rowan and Mecklenburg Counties, the Cities of Charlotte and Salisbury, and the Towns of Granite Quarry and Spencer. In addition, the Company met and had discussion with the Rowan County Economic Development Council, and a local resident along Dukeville Road.

The Company plans to host open houses for the public later in 2025, which will target residents and businesses located within two miles from the site boundary. In addition, the Company will discuss the Proposed Facility with neighboring communities and local government leaders. The Company will also host a website with project information and a mechanism for two-way engagement through email and other methods.

The Company considered certain DEC and non-DEC 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, DEC did not discover anything that would indicate construction and operation of the Proposed Facility at the site of the Buck CC Station would be problematic from an environmental justice perspective.

1.4.2.2 Future

Several industrial expansions and/or new construction projects are planned for the nearby areas.

A "Long Ferry Road Corridor Study" was commissioned by Rowan County Land Use Planning and approved by the Rowan County Commission in December of 2023 (WSP USA 2023). The stated purpose of the study was the following:

> The objective of this corridor study is to evaluate increases in vehicular and truck traffic and access to several prospective non-residential properties. The corridor plan along this 2.8 mile section of Long Ferry Road will help determine transportation mitigation improvements to support existing conditions, future development, and the overall street network.

The Long Ferry Road-Dukeville Road intersection is one of eight identified as in the corridor study area. Of particular interest are the concept maps included in the study's appendix, which show a "Red Rocks Site" on both the north and south sides of Long Ferry Road and stretching from Stoner Morgan Road almost to Dukeville Road. Red Rocks Development's overall site plan indicates that its build-to-suit Carlton Farms Industrial Park will include six lots totaling about 384 acres. The original plan was approved by the Rowan County Board of Commissioners in 2022. At its August 2024 meeting, the Board of Commissioners approved an amendment to the Red Rocks original use request (from manufacturing, transportation, and wholesale trade sectors) to permit data centers in the development. After discussing concerns about the "tremendous amount of power" that data centers require and the "significant degree of noise" that the centers could generate, the Board of Commissioners approved the request with conditions.

A few of the other nearby large-scale industrial sites currently advertised online are Long Ferry Logistics Center, Innovation Logistics Center, Mid-South Industrial Park, Rusher Farms, and the Lambe-Fischer Site.

After reasonable search, Pike did not identify any other federal, state, local government, or private entity development plans other than the ones described herein.

1.4.3 Visibility and Auditory

1.4.3.1 Visibility

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.

During a probable visual effects field study, Pike identified residential properties and public roadways as 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 may have views of the existing Buck CC Facility only, areas with a view of the Proposed Facility only, and areas predicted to have views of both.

Table 1.4.3.1-1 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 area topography, tree-covered areas, and large industrial and commercial buildings in this section of Rowan and Davidson Counties.

Pike predicts that within a five-mile radius (78.55 square miles), the Proposed Facility will be visible in areas totaling only 0.55 square miles (0.70% of the total area) outside the DEC-owned property on which the Proposed Facility will be built (which is generally inaccessible to the public). Pike further predicts that outside of DEC-owned property, the Proposed Facility will be visible from only 0.36 square miles that do not already have a view of the existing CC plant. Most of the areas with an expected view of the Proposed Facility (or of merely the tops of the 160-foot-high stacks) are on or near the edge of the Yadkin River, in the vicinity of electrical transmission line rights-of-way associated with the Buck CC Station, or within the Norfolk Southern Spencer Yard northeast of the Proposed Facility.

Figure 1.4.3.1-1. Seen Area Analysis

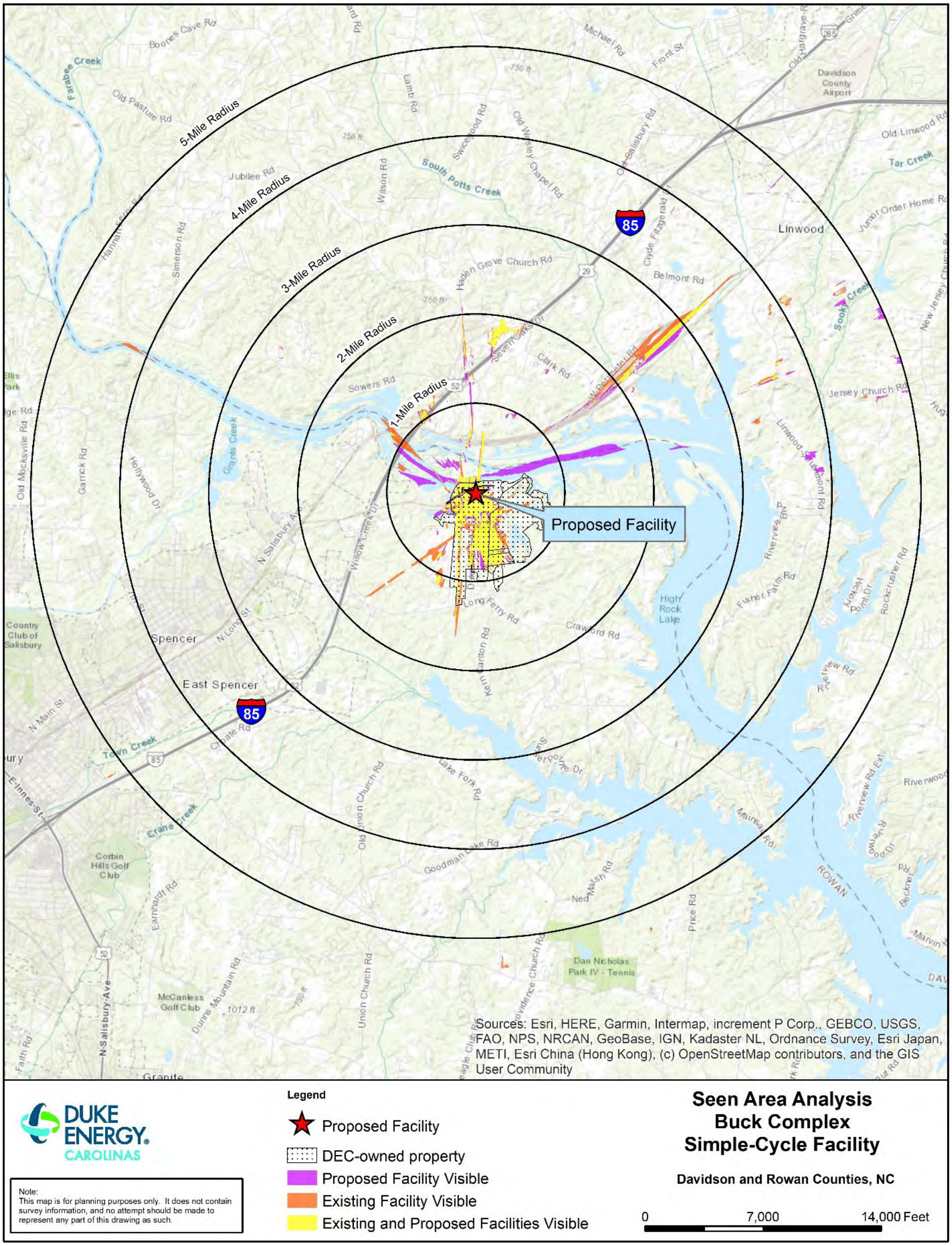


Table 1.4.3.1-1. Seen Area Analysis and Predicted Visual Effects

Visual Effects Probability	View Distance Range from Proposed Facility (miles)	Total Area (sq. mi.)	Probable Area with a View of Only the Existing Facility (sq. mi.) [1]	Probable Area with a View of Only the Proposed Facility (sq. mi.) [1]	Probable Area with a View of Both the Existing Facility and Proposed Facility (sq. mi.) [1]	Probable View Area % of Total Area Where Additional Visual Effects Could Occur[1, 2]
Very High	0.0 - 0.5	0.79	0.01	0.06	0.03	7.59%
High	0.5 - 1.0	2.36	0.05	0.10	0.02	4.24%
Moderate-High	1.0 - 1.5	3.93	0.05	0.06	0.02	1.53%
Moderate	1.5 - 2.0	5.50	0.02	0.05	0.05	0.91%
Low-Moderate	2.0 - 3.0	15.71	0.06	0.04	0.04	0.25%
Low	3.0 - 4.0	21.99	0.03	0.02	0.02	0.09%
Very Low	4.0 - 5.0	28.27	0.02	0.03	0.01	0.11%
Totals	**Totals**	**78.55**	**0.24**	**0.36**	**0.19**	

[1] Visibility not calculated within DEC-owned property.
[2] Areas with additional visual effects are those without a previous view of the existing Buck Combined Cycle Facility.

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, and
- The overall scenic condition (landscape content and quality) of the area from which the facility is viewed.

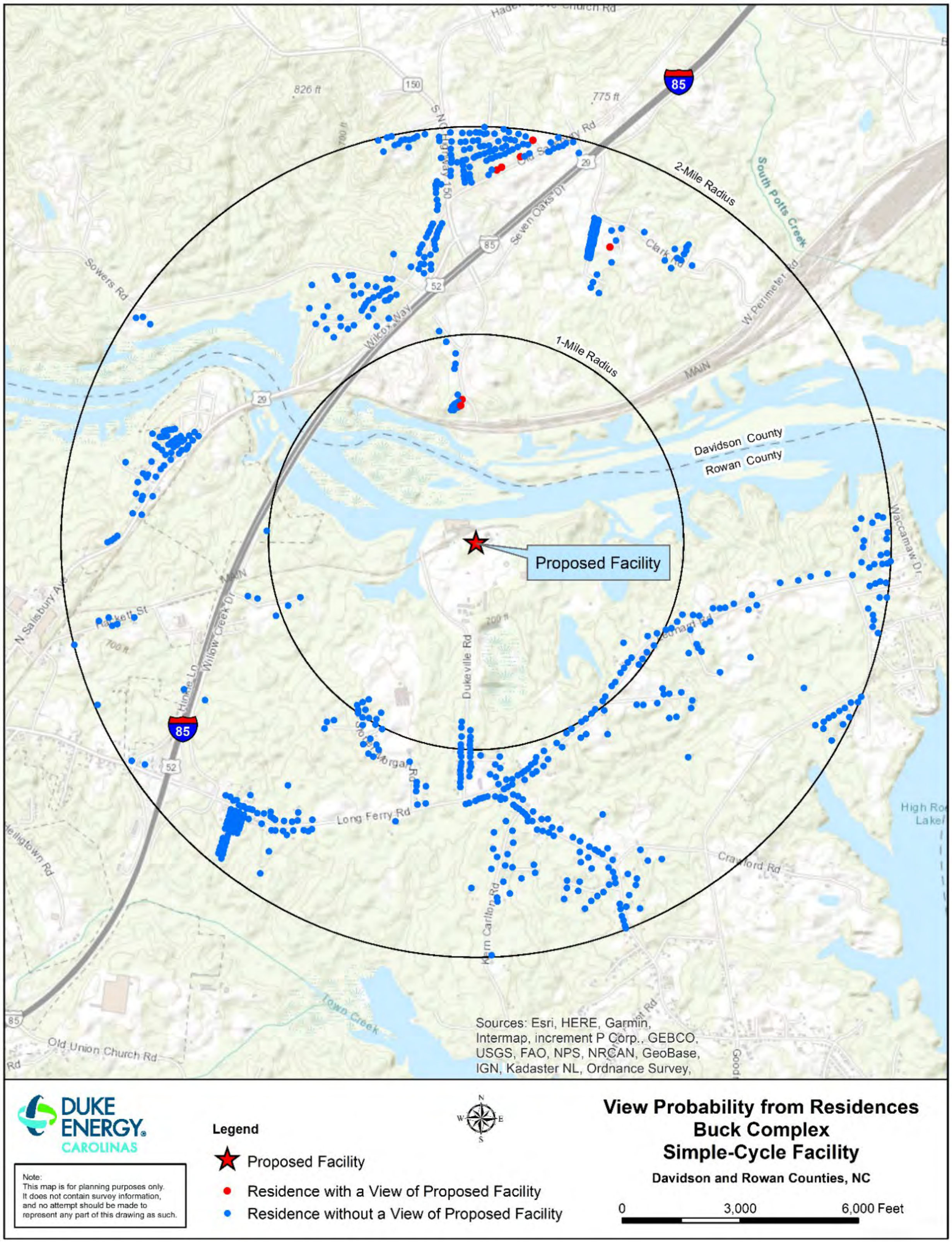
Pike correlated the data derived from the Seen Area Analysis and Predicted Visual Effects to probable visual effects ranging from Very High to Very Low in Table 1.4.3.1-1.

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. For this ranking, Pike made no attempts to minimize 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.

<u>Visibility from Residences</u>

Pike conducted an extensive field investigation and used computer modeling to determine the Proposed Facility's probable visual effects on residential properties within two miles. Approximately seven residences within two miles will have potential views of the Proposed Facility. Computer modeling shows that a combination of vegetation, tall buildings, and terrain should sufficiently screen other surrounding areas.

Figure 1.4.3.1-2. View Probability from Residences



The red dots in Figure 1.4.3.1-2 indicate the seven residences that may have some degree of visibility of the Proposed Facility. Some views may be slight (e.g., the tops of the exhaust stacks on the horizon) if there are significant visual obstructions (e.g., topography and/or tree cover) between them and the Proposed Facility.

Just over one-half mile north, across the Yadkin River, two homes on Seven Oaks Drive have a view of the existing CC facility. These homes may also have a view of the Proposed Facility. However, any views from these two residences will be diminished because of transmission structures, trees, and other vegetation in the foreground.

Approximately 1.5 miles northeast of the Proposed Facility, along Windy Hill Drive, one home may have a slight view looking along a right-of-way with two electric transmission lines running in a southwesterly direction. Three residences on Old Salisbury Road, approximately 1.8 miles to the north, may have a slight view of the proposed stacks, although several electric transmission lines in the immediate foreground will obscure that view. Just under two miles to the north of the Proposed Facility, one home along Lakeview Church Road may have a slight view of the proposed stacks. Two electric transmission lines adjacent to this house, running in a southerly direction, should obscure this view. Field reconnaissance showed that the Windy Hill Drive house is the only one of the seven residences discussed that does not already have a view of the existing Buck CC plant.

Visibility from Public Roads

The Proposed Facility can be accessed by Buck Station Road or Dukeville Road. Both side roads intersect with Long Ferry Road, which runs west to east approximately 1.2 miles south of the plant site. Major roads include Interstate 85 (“I-85”) and US Hwy 29, which run parallel or together in a northeasterly to southwesterly direction, bisecting the study area. Secondary roads in Davidson County include NC Hwy 150, Old Salisbury Road, and Linwood Southmont Road. Rowan County secondary roads in the area include Leonard Road, Old Union Church Road, and Bringle Ferry Road. Many secondary roads and residential streets serve the Towns of Spencer and East Spencer, about three-fourths miles to the west and just over two miles to the southwest of the Proposed Facility, respectively.

Pike scrutinized all computer modeling that indicated potential visibility for roads, listing the results in Table 1.4.3.1-2. Figure 1.4.3.1-3 includes numbers corresponding to Viewpoints 1 through 6 below. The map’s numbers show the approximate locations of the viewpoints described.

1. Just north of the Proposed Facility, Seven Oaks Drive runs north and then parallels I-85. Several sections along the road may have a view of the Proposed Facility, although several electric transmission lines running north and south may obscure that view as well as the view of the existing Buck CC plant.

2. Dukeville Road serves a residential neighborhood and is one of two access roads to the plant site, running north from its junction with Long Ferry Road into the Buck CC Station. The view of the Proposed Plant for motorists moving north will be obscured by the Buck CC plant and other ancillary facilities and buildings.

3. Running northeast to southwest, I-85 bisects the study area. Southbound motorists will have views of the Proposed Facility from several locations, although the high speed of most drivers, distance to the plant, wooded areas, electric transmission lines, and the Buck CC plant will obscure visibility and most likely allow views of the top of the stacks only.

4. Wil-Cox Way (US 29) is a frontage road along the northern edge of I-85. Motorists travelling south will have views of the Proposed Facility in several places, although visibility will be obscured and likely allow views of only the tops of the stacks for the same reasons listed for I-85.

5. Directly north of the plant property, NC Hwy 150 runs in a north to south direction and crosses I-85. Several sites, mostly about 1.5 miles from the Proposed Facility, may allow motorists driving south to see only the tops of the stacks. Transmission towers, tall trees, and the 1.5-mile distance to the plant will provide some screening.

6. On the north side of I-85, Old Salisbury Road runs northeast to southwest. Motorists driving southwest may have views of the tops of the stacks in several places, but those views will be from nearly two miles. For the casual observer, the distance to the plant along with numerous electric transmission towers, topography, and trees may render the Proposed Facility not visible.

Other roads listed in Table 1.4.2.1-2 may have potential views of the Proposed Facility, but view distances along these roads are less than 300 feet. Motorists travelling at posted speed limits would have only brief views of the plant site, lasting at the most only five or six seconds.

Several other roads within three to five miles of the Proposed Facility could have brief views of the tops of the stacks, but because of the distance, tree cover, topography, and the presence of the Buck CC Facility, the casual observer will probably not notice the Proposed Facility.

Figure 1.4.3.1-3. View Probability from Roads

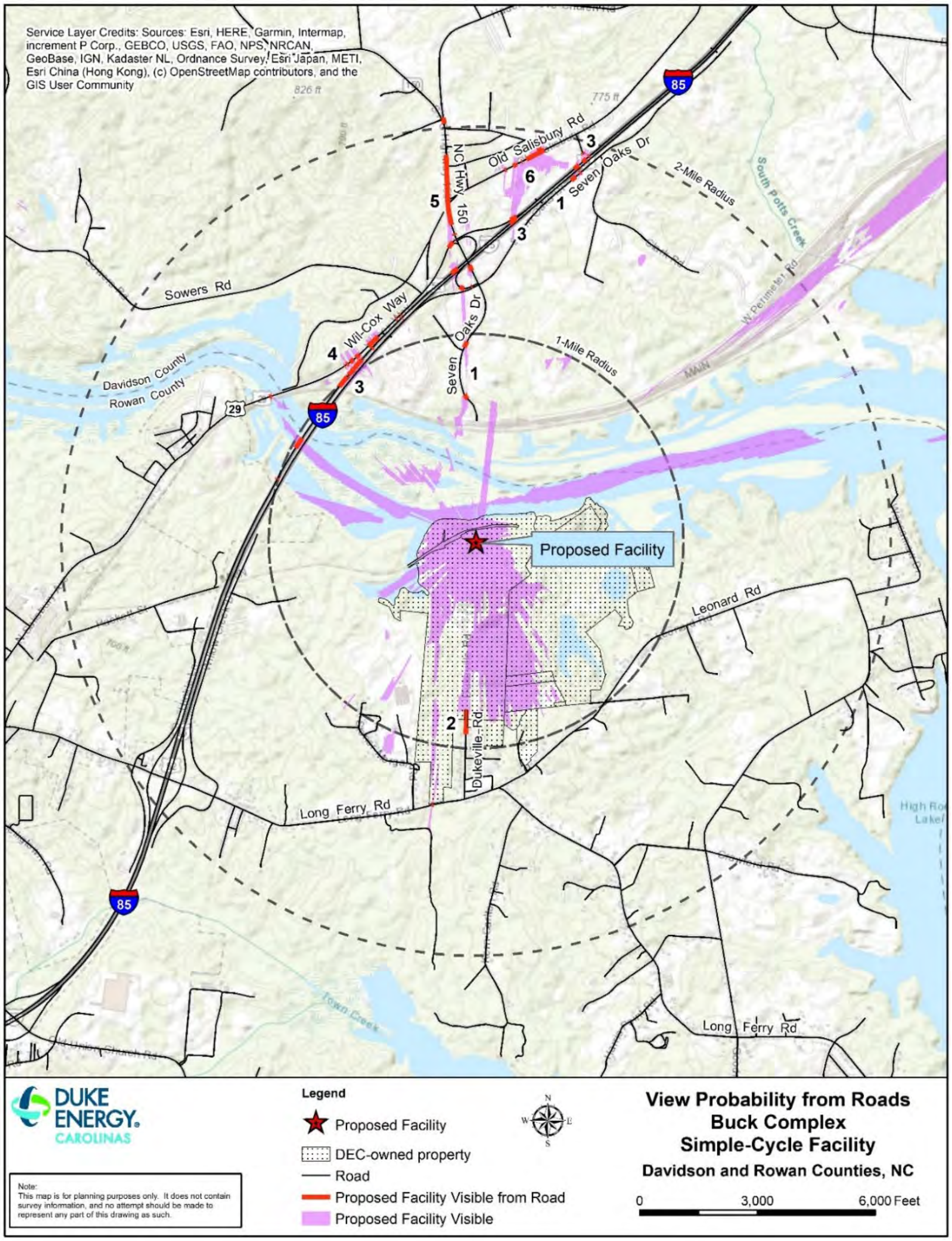


Table 1.4.3.1-2. Visibility from Roads within One Mile of Proposed Facility

Road Name	Map Number	Length along Road (feet)	Distance from Proposed Facility (miles)	Direction(s)
Seven Oaks Drive	1	491	0.7	N
Dukeville Road	2	636	0.8	S
Interstate 85 South	3	2035	1.0	NW, N, NE
Wil-Cox Way (US Hwy 29)	4	938	1.1	NW
Interstate 85 North On Ramp		160	1.2	N
US Highway 29		51	1.2	NW
Long Ferry Road		58	1.3	S
North Carolina Highway 150	5	1996	1.3	N
Interstate 85 South Off Ramp		179	1.6	N
Old Salisbury Road	6	717	1.8	N
Lakeview Church Road		295	1.9	N
Sigmon Road		48	1.9	NE
Haden Grove Church Road		158	2.0	N

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 reported 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. The sound of an HVAC outdoor condensing fan about 20 feet away could be 50-55 dBA, but a loud siren might be 120 dBA at shorter distances (Yale 2023).

An increase of 10 dB indicates that ten times as much sound energy is present. To the human ear, this sounds like a doubling of the sound level. 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 increase 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. The loudest time for sound beyond the first few hundred feet is usually from 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 acoustic absorption.

Acoustic consultants evaluate noise impacts on a community by quantifying the existing ambient 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 other factors. If noise from a proposed source does not add more than 3 or 4 dB to existing levels, the impact will not be clearly noticeable. Increases greater than 5 dBA over existing noise levels are considered a significant impact.

Local Noise Ordinances

The City of Salisbury's Code of Ordinances does not address noise limits in terms of measurable metrics, nor do those of the nearby towns of Spencer or East Spencer. Rowan County's Code of Ordinances, however, includes the following in its Chapter 21 (Zoning): Article X (Nuisances, §21-241 Noise):

> (b) Applicability. Regardless of zoning district, all existing uses in the mining and manufacturing division of the Standard Industrial Classification (SIC) and those seeking conditional use approval in the transportation, communications, electric, gas, sanitary services and services divisions of section 21-113, the table of uses, shall be subject to the decibel based standards of this section.

Table 1.4.3.2. Rowan County Maximum Permitted Noise Levels

Hours of the Day	Maximum Sound Level (dBA)
7:00am to 11:00pm	70 dBA
11:00pm to 7:00am	65 dBA

The ordinance also specifies that any sound level meter used to enforce the ordinance must comply with ANSI S1.4-1983 requirements or its latest approved version, and use calibration and measurement procedures specified in the "Technical Documentation Manual for the 2237 Controller, Integrating Sound Level Meter" with the A-weighting scale set on slow response for a preset period of eight (8) minutes.

Subsection (d) directs that the maximum permitted noise levels at the "apparent" property line of the noise producer should not exceed the noise levels in the chart during the given time periods.

The Proposed Facility will be located entirely within Rowan County. However, Davidson County is just across the Yadkin River, approximately 0.4 miles from the Proposed Facility. Like the City of Salisbury and the towns of Spencer and East Spencer, Davidson County has no noise ordinances with specific documentable metrics.

For the purposes of this analysis, Stewart proposed the following:

- The Threshold of Significant Impact should not exceed 55 dBA Leq at any Noise-Sensitive Receptor.
- If noise modeling projects a Leq 5 dBA increase above the lowest measured ambient noise level, this will be considered a Significant Impact for similar receptor locations.

1.4.3.2.1 Existing Community Noise Levels

Individual responses to a new noise source will vary. Before analyzing the impact of a new noise source, it is important to identify Noise-Sensitive Receptors--nearby places or land uses that might be especially sensitive to noise. Residences, churches, schools, hospitals, and libraries are a few examples of Noise-Sensitive Receptors.

To document existing noise levels along the perimeter of the Proposed Facility, Stewart Acoustical Consultants measured sounds at five Noise-Sensitive Receptors, all of which are residences. Four of those residences are in Rowan County, and the fifth is in Davidson County.

Stewart also placed three long-term noise monitors: two to the south and one to the east of the Proposed Facility.

The measurement positions ("MPs") of each Noise-Sensitive Receptor are represented by green dots in Figure 1.4.3.2.1. Locations of the Long-Term Monitors are represented on Figure 1.4.3.2.1 by pink triangles

Figure 1.4.3.2.1. Noise Sensitive Receptor and Noise Monitor Locations

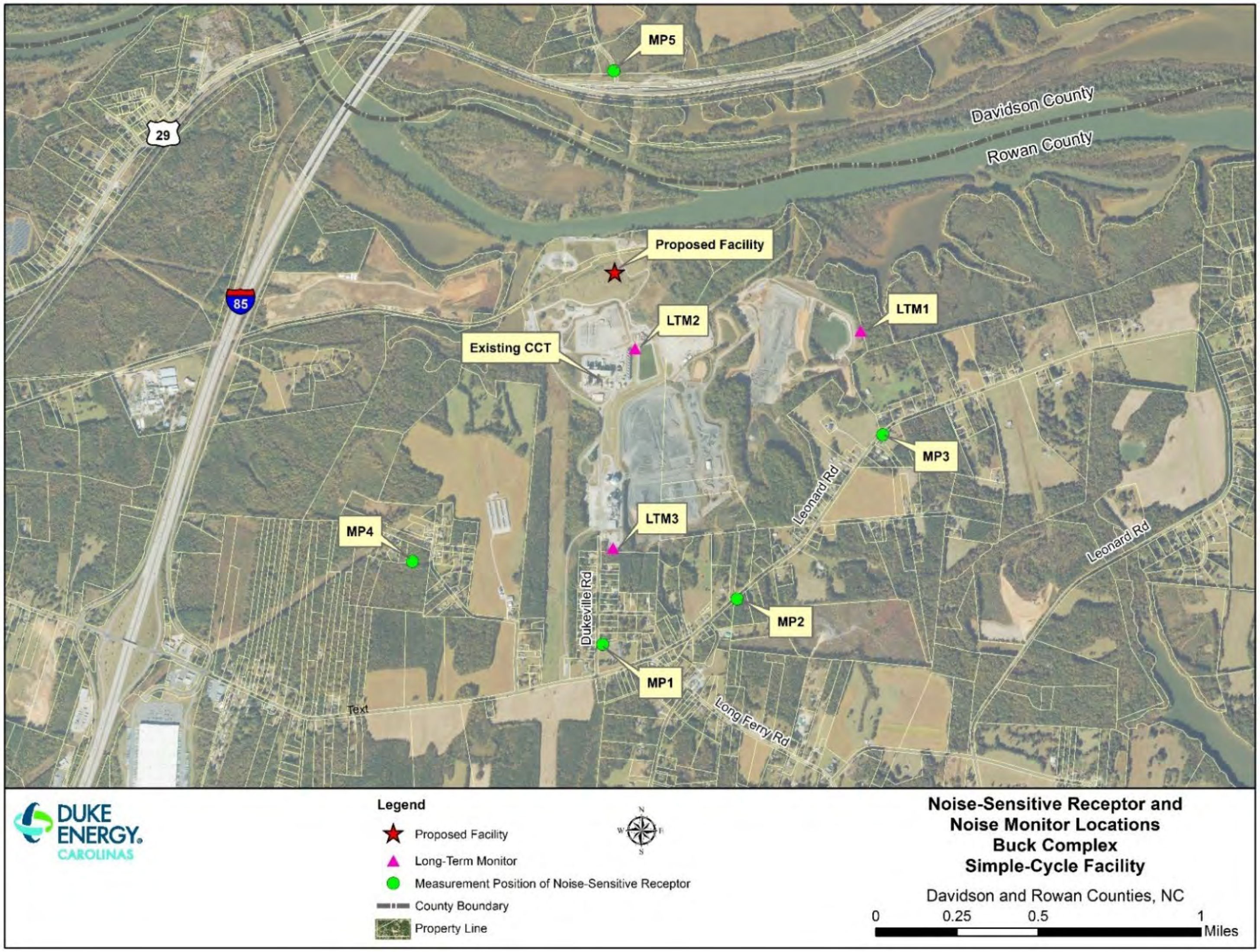


Table 1.4.3.2.1-1 provides the address, description, and direction from the Proposed Facility of each Receptor, and Table 1.4.3.2.1-2 provides general information for the three long-term monitors.

Table 1.4.3.2.1-1. Noise-Sensitive Receptors near the Proposed Facility

Measurement Point (MP) ID	Location	GPS North	GPS West
MP1	Dukeville Road	35.695733°	-80.375190°
MP2	Leonard Rd	35.697846°	-80.367863°
MP3	Leonard Rd	35.705277°	-80.360011°
MP4	New Jersey Dr	35.699319°	-80.385663°
MP5	Seven Oaks Dr	35.721350°	-80.375004°

Table 1.4.3.2.1-2. Long-Term Monitors near the Proposed Facility

Number	Description	Direction from Proposed Facility
Long-Term Monitor 1	Ash Pond	East
Long-Term Monitor 2	Berm	South
Long-Term Monitor 3	STAR Plant	South

Stewart collected noise data from the existing CC station and the STAR plant when all units were online and functioning at full capacity and then calculated the sound power level (“Lw”) for that condition. The estimated combined sound power was 125 dBA.

1.4.3.2.2. Estimated Sound Levels of the Proposed Facility

The amplitude of sound (sound pressure level, or sound level for short) is impacted by how far from the source the listener is, density of the ground, topography, and other factors, such as blockage by buildings. To understand the amount of sound that 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 of the Proposed Facility and the surrounding area, Stewart used SoundPLAN, a special software suite that models noise situations encompassing traffic noise, occupational noise indoors and outdoors, industrial noise, and aircraft noise to create a computer model that predicts noise levels at the Proposed Facility and its surrounding area. SoundPLAN predicts outdoor environmental noise levels based on the international standard ISO 9613-2, which outlines the methods for calculating sound attenuation during outdoor propagation. The model incorporated various factors, including terrain elevations, ground absorption, and nearby building structures.

SoundPLAN requires input of both current and projected noise levels to predict total future noise levels. Because DEC expects that much of the Proposed Facility's equipment will be comparable to the equipment planned for DEC's Marshall Energy Complex Simple-Cycle Gas Combustion Turbine Addition, Stewart was able to use equipment sound data provided by Burns and McDonnell for the Marshall project as the sound source for the Proposed Facility's computer model.

To properly evaluate the existing ambient noise levels at the Noise Sensitive Receptors, all major noise sources must be included in the model. Stewart also considered the quietest regularly occurring noise levels to show correct total existing and future noise levels. Major noise sources included in the model (besides the existing CC facility and the Proposed Facility) are Norfolk Southern railroad and Interstate Highway 85. Stewart acquired highway noise data from the North Carolina Department of Transportation website and railroad noise information from the U.S. Department of Transportation's Federal Railroad Administration Crossing Inventory for the two closest crossings.

Appendix A contains detailed information about the instruments used to measure ambient noises, the dates and times of day of the measurements, weather conditions, and operating conditions of the surrounding manufacturing facilities, as well as the measurements from each monitor. Appendix A also includes sound power levels for the existing CC facility, the STAR plant, and predicted noise levels from the Proposed Facility.

Figure 1.4.3.2.2 highlights noise contours that show the calculated future condition of the Proposed Facility, the CC facility, the STAR plant, and ambient noise, and Table 1.4.3.2.2 shows the noise levels of each facility both separately and in combination.

Figure 1.4.3.2.2. Noise Contours for Calculated Future Condition with Proposed Facility, CC, STAR Plant, Ambient Noise*

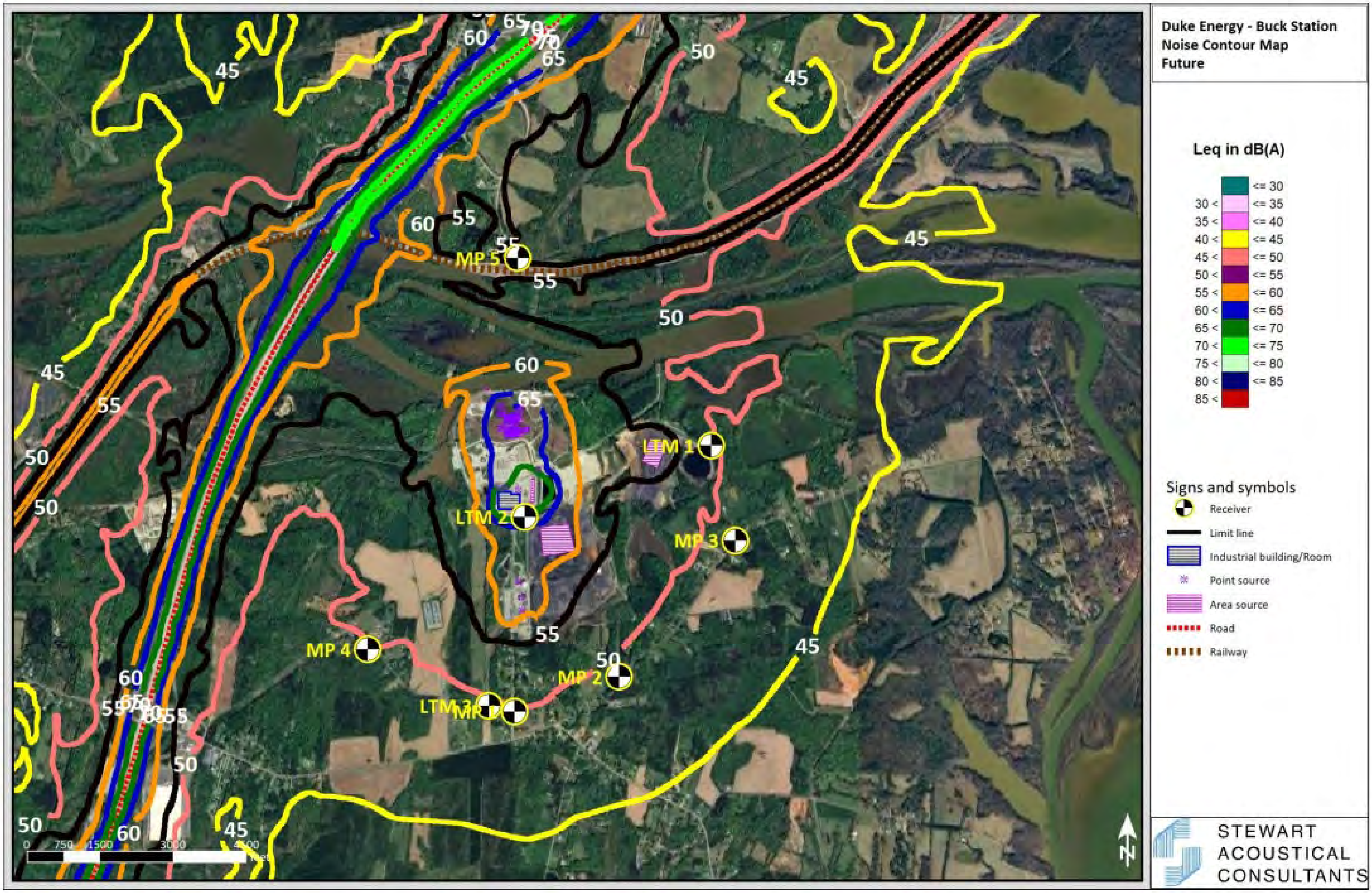


*Figure Provided by Stewart Acoustical Consultants

Table 1.4.3.2.2. Noise Levels at Noise-Sensitive Receptors*

LOCATION	RECEPTOR or LTM (dBA)					
	1	2	3	4	5	LTM 1
Existing: CC + STAR Plant LA_{eq}	48	47	45	47	51	48
Future: Proposed Facility + CC + STAR Plant LA_{eq})	49	48	48	49	53	50
Future: Proposed Facility + CC + STAR (only from DEC Facility) LA_{eq}	48	47	47	46	49	49
Assumed Ambient Sound Level LA_{eq}	40	40	40	40	40	40
Above 55 dBA Threshold?	No	No	No	No	No	No
Increase above Existing CC or Presumed Ambient (dBA)	1	1	2	1	2	2
Exceeds +5 dBA Increase in Noise Threshold?	No	No	No	No	No	No

*Predicted differences in noise levels between current and future conditions, considering noise from Buck CC facility, existing ambient noise sources, assumed ambient noise standard, and noise from I-85 and Spencer Yard.

1.4.3.2.3 Anticipated Effects

Stewart evaluated the noise impact that the Proposed Facility will have on nearby areas. Based on the established criteria, Stewart predicts that the Proposed Facility will have no significant impact on current noise levels at adjacent properties. Models using the Proposed Facility's anticipated noise levels plus those of the STAR system and the existing CC facility show that no evaluated noise-sensitive receptors exceed the Threshold of Significant Impact (Leq of 55 dBA), nor do any exceed 5 dB above the Noise Standard and existing train and traffic noise. Similarly, Figure 1.4.3.2.2 shows increases are well below 5 dBA at the closest property lines and less than 2 dBA over most of the map except those closest locations. Thus, the project is anticipated to operate clearly below the established Threshold of Significant Impact in this area.

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 Company has been generating power in Rowan County for almost a century. When Buck Steam Station began operating in 1926, it was the first large-capacity coal generating plant in the Carolinas. The Buck property eventually included the coal-fired steam station, company housing for employees ("Dukeville Village"), a large area for coal storage, and other support facilities, such as rail spurs, substations, transformer yards, parking lots, and roads. The employee housing area south of the coal storage was demolished in the mid-to late-twentieth century before the ash basin was constructed. A new natural gas plant, the Buck CC Station, opened on-site in 2011. The coal-fired steam plant was demolished in 2018, and the former coal storage area was cleared and remediated. Ash basin excavation and clearing ensued in 2020, and the area has since been graded and filled. In the hundred or so years since construction for the original coal-fired plant began, the environs have changed markedly.

In September 2024, Pike contracted with Brockington and Associates, Inc. ("Brockington"), to conduct a literature review and windshield reconnaissance for the Proposed Facility. This investigation is a due-diligence effort designed for planning purposes so that any potentially significant cultural resources may be considered in advance of construction. This level of effort does not constitute fulfilment 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.

The federal government's official list of cultural resources, which includes districts, archaeological sites, above-ground sites (buildings), and objects deemed worthy of preservation, is the National Register of Historic Places ("NRHP"). The NRHP, established with the passage of the National Historic Preservation Act ("NHPA") of 1966, as amended, 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 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.

Before beginning field work, Brockington visited the North Carolina State Historic Preservation Office ("SHPO") and Office of State Archaeology ("OSA") in Raleigh to collect data for previously recorded cultural resources, investigations, archaeological sites, and historic architectural resources. This data includes information about 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. Brockington also searched county planning documents for any significant local properties that might not be formally listed with the state.

Brockington limited its research to an Area of Potential Effect ("APE"), defined by the NHPA 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 CFR 800.16[d]). For this cultural resource study, the APE is a circle with a radius extending two miles outward from the Proposed Facility.

Thirteen noted environmental review efforts (Section 106 or due diligence) have been conducted within the two-mile APE. Ten of the environmental review reports cross-reference or accompany the 13 previous investigations, but three have not been digitized in the OSA Geographic Information Systems ("GIS") files. 53 of 54 archaeological sites within the study area are either not eligible for the NRHP or are unassessed. Twenty sites of undetermined status would need field verification or revisits for eligibility determination; however, none of these are within the APE. Site DV654, also known as Camp Yadkin (approximately one mile northeast of the Proposed Facility), has been determined eligible for the NRHP.

1.4.4.1 Archaeological Resources

No previously recorded archaeological sites are within the limits of disturbance ("LOD") of the Proposed Facility, although five archaeological sites are within 0.6 miles. Three of those sites are precontact lithic scatter, one is precontact lithic scatter and historic artifact scatter, and one is precontact and historic with above-ground remains. Three sites have not been assessed for NRHP eligibility, and two have been determined not eligible for the NRHP.

1.4.4.2 Architectural Resources

Brockington reviewed HPOWEB (the North Carolina SHPO's GIS data website for information about historic architectural resources), NRHP-listed properties, and the Rowan County and Davidson County Historic Resources Commissions ("HRCs"), which include listing and mapping for local historic landmarks, districts, and points of interest. Most of the previously recorded resources are located within the NRHP-eligible district or are individual resources. Within the two-mile APE, NC SHPO records identify one NRHP-eligible district, one Study-Listed district, one NRHP-eligible historic resource, five Study-Listed individual historic resources (two of which are "gone" or "destroyed"), and seven unassessed historic resources, as shown in Table 1.4.4 below.

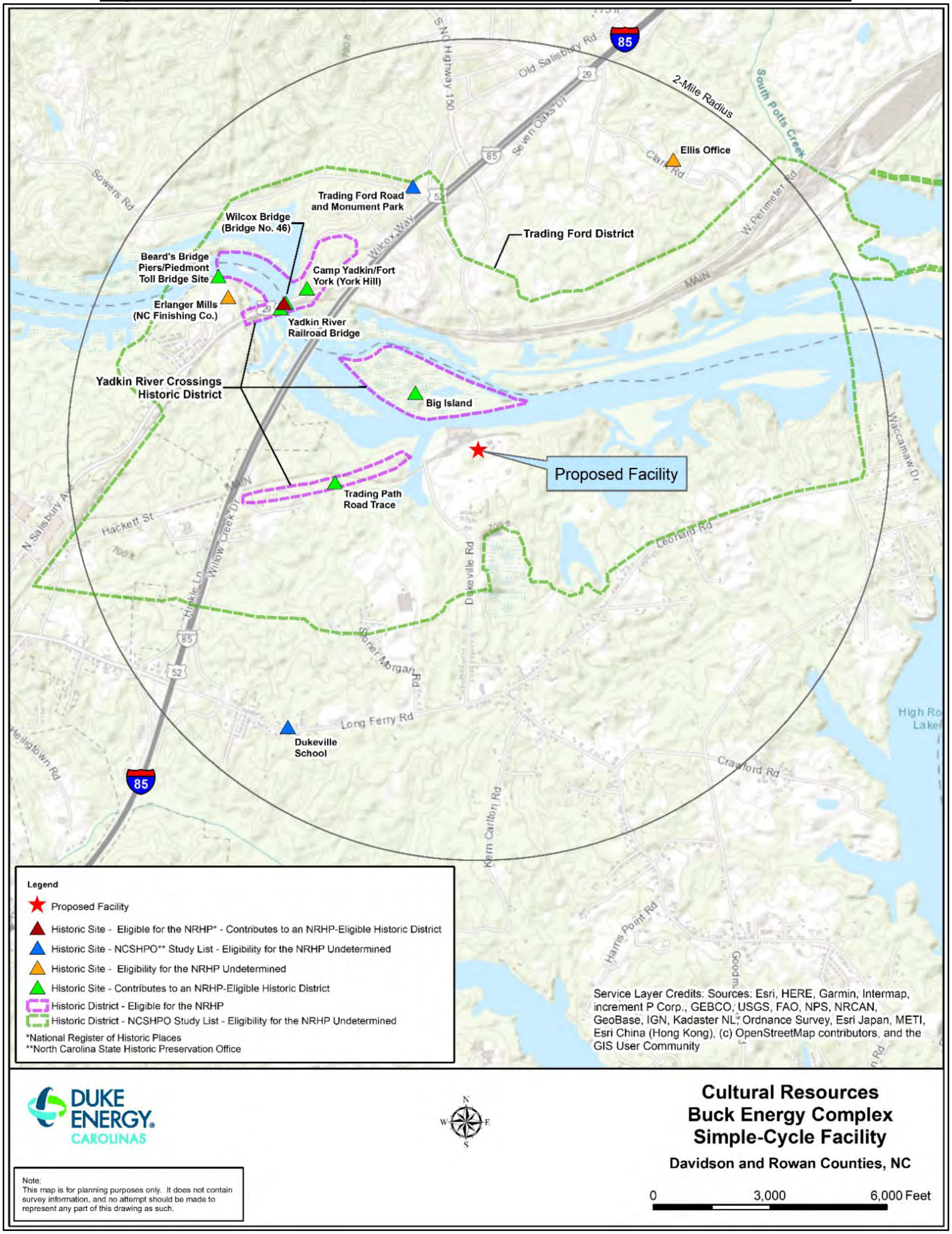
Table 1.4.4 also lists and describes previously recorded historic resources within the APE, and Figure 1.4.4.1 shows their locations.

<u>Table 1.4.4. Previously Recorded Historic Resources within the APE</u>

Site ID	Property Name	Description	NRHP Status
Historic Districts			
N/A	Yadkin River Crossings	1770-1953 district significant in areas of Transportation and Military History	Determined Eligible
N/A	Trading Ford	No information	Study List
Individual Resources			
DV0320	Ellis Office	No information	Unassessed
DV0321	Clark Homeplace	c. 1930 2-story double-pile frame Victorian house w/ wraparound 1-story porch, cross gable slate roof and outbuildings	Unassessed/Gone
DV0698	Bridge No. 46 (US 29/70 bridge	No information	Individually Not Eligible/Contributing to Yadkin River Crossings Historic District
DV1058	Trading Ford Road and Monument Park	1953 steel stringer bridge	Study List
RW0691	Erlanger Mills (NC Finishing Co.)	No information	Unassessed
RW0765	Wilcox Bridge (Bridge No. 46, Yadkin River Bridge)	1922 technologically significant, reinforced concrete, open spandrel arch (DOT 790046)	Determined Eligible/ Contributing to Yadkin River Crossings Historic District
RW0901	Dukeville School	No information	Study List
RW0934	Yadkin River Railroad Bridge	1907 & 1919 riveted steel deck truss bridges	Unassessed

Site ID	Property Name	Description	NRHP Status
RW1579	Yadkin Trading Ford and Ferry	No information	Study List/Gone
RW1580	Greene’s Crossing at Trading Ford & military camps	No information	Study List/Destroyed
RW1581	Camp Yadkin/Fort York (York Hill)	No information	Study List/Contributing to Yadkin River Crossings Historic District
N/A	Big Island	No information	Unassessed/Contributing to Yadkin River Crossings Historic District
N/A	Trading Path Road Trace	0.8-mile trace of 17th century roadbed	Unassessed/Contributing to Yadkin River Crossings Historic District
N/A	Beard’s Bridge Piers/ Piedmont Toll Bridge Site	1900 metal truss bridge built on stone piers of c. 1820 bridge; Piedmont Toll Bridge removed in 1920s; stone piers still extant	Unassessed/Contributing to Yadkin River Crossings Historic District

Figure 1.4.4-1. Previously Recorded Historic Resources within the APE



The Proposed Facility will be located within a “Trading Ford District” that was identified during 2003 Section 106 consultation efforts for multiple area projects. The Trading Ford District was placed on the North Carolina State Study List, which allows properties to be further investigated for potential eligibility for the NRHP. The Trading Ford District remains on the North Carolina Study List, but it is not currently considered an eligible district.

During the same Section 106 process, NC SHPO identified an NRHP-eligible Yadkin River Crossings District. It is made up of three noncontiguous properties that are 0.18 miles north, 0.31 miles west, and 1.01 miles northwest of the Proposed Facility (Figure 1.4.4-1).

1.4.4.3. Cultural Resources within the Project Tract

Although no archaeological sites have been recorded within the project tract, two previous archaeological investigations have been conducted nearby within the Buck CC Station property. Garrow and Associates, Inc., conducted a 2000 investigation ahead of proposed plant and fuel tank construction. At that time, investigators reported that the tract had been “subjected to moderate to severe erosion and other disturbances” (Pickett, Nichols, and Idol 2000). No above-ground historic resources were found, but one archaeological site (RW208) was identified. This was a precontact site determined not eligible for the NRHP.

Brockington conducted a 2007 cultural resources investigation as part of planning for for the then-proposed Buck CC project (Friedemann and Stallings 2007). Investigators found a substantial amount of surface and subsurface soil disturbance in the project tract attributable to construction of the coal-fired Buck Steam Station in the 1920s. Because of these previous disturbances, the probability of recovering contextually intact archaeological deposits is low. Brockington’s previous report also addressed potential visual impacts to the NRHP eligibility of the Yadkin River Crossings Historic District. Because the District was developed within the viewshed of industrial facilities (generating stations, coal piles, ash basins, substations, and other large above-ground components), Brockington recommended as part of its 2007 investigation that the Buck CC project would not adversely affect NRHP eligibility.

Previous cultural investigations on the DEC property illustrated ground disturbances, eroded topsoil, and exposed surface clay that limited the potential for finding intact archaeological sites (Appendix B). The Proposed Facility will be constructed in areas previously disturbed through construction and demolition of the coal-fired plant as well as the coal storage area.

The project tract and the power plant property have changed significantly since initial construction in the 1920s. Current aerial photography in Figure 1.4.4-2 indicates that the area contains mostly clay and grass and that the likelihood of any remaining undisturbed ground is low.

Figure 1.4.4-2. Aerial Image Showing Study Area in 2023 (Google Earth 2024)

To see historic photographs of the site and read more detailed information, please see Appendix B.

1.4.5. Geology

The study area for the geological assessment is an approximately 26-acre site just north of the existing Buck CC Station and six miles northeast of the City of Salisbury in Rowan County, North Carolina. The Proposed Facility is located entirely on Duke Energy-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 Mountains, the Piedmont, and the Coastal Plains. The Proposed Facility 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 region occupies about 45% of the state's area. The Buck study area is centered at approximately 650 feet above sea level.

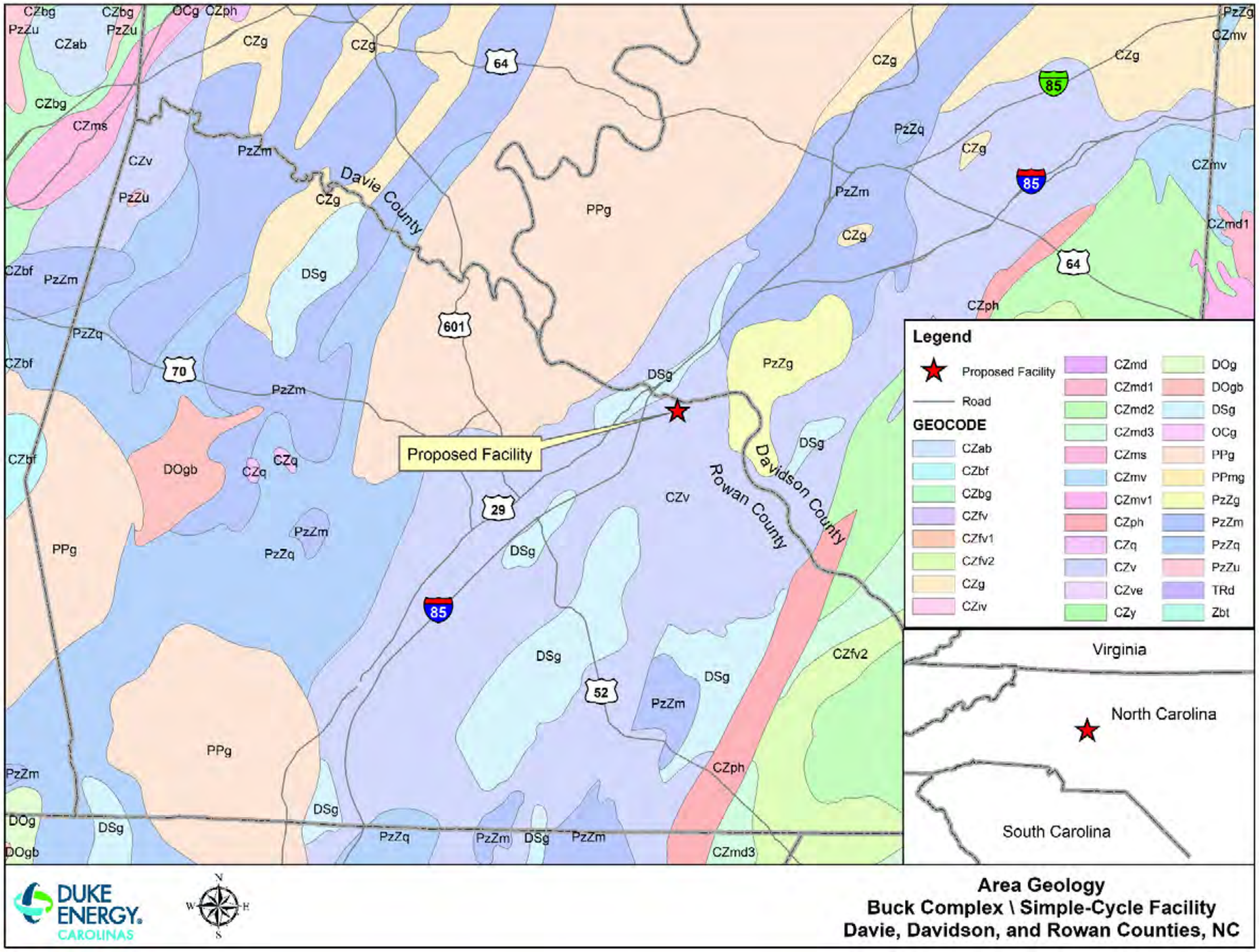
The geology of the region is complex. During the earliest Paleozoic Era (541-252 million years ago ("MYA")), North America was situated near the equator, and the current-day Appalachian region was submerged beneath shallow seas. During this time, terrigenous (i.e., material eroded from the land) and 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). The study area lies within the Spring Hope terrane or belt (CZv), within the Northern Inner Piedmont zone (Figure 1.4.5.1 (NCDEQ 2024; NCGS 1985)).

The Spring Hope terrane consists of metamorphic, metavolcanic rocks of mixed fine- to medium-grained rocks of felsic, mafic, or intermediate composition together with volcaniclastic metasedimentary rocks. These rocks include phyllite, schist, gneiss, greenstone amphibolite, and metagraywacke (NCGS 1985).

Figure 1.4.5.1. Area Geology



1.4.5.2 Dominant Soil Types

As in most 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 Natural Resource Conservation Service ("NRCS") 2024 soil data (USDA 2024), the Proposed Facility's foundation material within the shallow subsurface consists of soils of the Udorthents map unit (Ud) (Figure 1.4.5.2). This site has undergone a series of ground disturbances over the last several decades because of activities associated with the Buck generating facilities and operations.

The Udorthents map unit is found in moderately to well-drained, nearly level or gently sloping areas that are covered with loamy, human-transported fill material (Figure 1.4.5.2). The depth-to-water table is more than 80 inches. This soil map unit designation is not of prime farmland importance. The fill materials have been spread over the surface of the original soil or spread over original soil that has been cut away or displaced. The typical soil profile of the Udorthents map unit soil is included in Table 1.4.5.2 (USDA 2024).

Table 1.4.5.2. Typical Subsurface Soil Profile of the Site*

Udorthents Map Unit (Ud)	
Depth (Inches)	0 - 80
Description	Sandy Clay Loam

*USDA 2024

The Company 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 Davidson and Rowan Counties

ArA	Armenia loam, 0 to 2 percent slopes, frequently flooded
CcB	Cecil sandy loam, 2 to 8 percent slopes
CcC	Cecil sandy loam, 8 to 15 percent slopes
CcD	Cecil sandy loam, 8 to 15 percent slopes
CeB2	Cecil sandy clay loam, 2 to 8 percent slopes, moderately eroded
CeC2	Cecil sandy clay loam, 8 to 15 percent slopes, moderately eroded
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded
DAM	Dam
DdB	Davidson loam, 2 to 8 percent slopes
DdD	Davidson loam, 8 to 15 percent slopes
DdE	Davidson loam, 15 to 25 percent slopes
EnB	Enon fine sandy loam, 2 to 8 percent slopes
EnC	Enon fine sandy loam, 8 to 15 percent slopes
EnD	Enon fine sandy loam, 8 to 15 percent slopes
IrB	Iredell loam, 1 to 6 percent slopes
LdB2	Lloyd clay loam, 2 to 8 percent slopes, moderately eroded
LdC2	Lloyd clay loam, 8 to 15 percent slopes, moderately eroded
MeB	Mecklenburg loam, 2 to 8 percent slopes
MeB2	Mecklenburg clay loam, 2 to 8 percent slopes, moderately eroded
MeC2	Mecklenburg clay loam, 8 to 15 percent slopes, moderately eroded
MeD	Mecklenburg loam, 8 to 15 percent slopes
PaD	Pacolet sandy loam, 15 to 25 percent slopes
PaE	Pacolet sandy loam, 25 to 45 percent slopes
PaF	Pacolet sandy loam, 25 to 45 percent slopes
PcC2	Pacolet sandy clay loam, 8 to 15 percent slopes, moderately eroded
PxD	Poindexter-Rowan complex, 15 to 25 percent slopes
Ud	Udorthents, loamy
Ur	Urban land
VnB2	Vance sandy clay loam, 2 to 8 percent slopes, moderately eroded
W	Water
WaA	Warne loam, 0 to 2 percent slopes, occasionally flooded

1.4.6 Ecology

The ecological study area for the Proposed Facility is on DEC-owned land within the 640-acre Buck CC Station property. The Proposed Facility and its associated components (e.g., construction lay-down area, switchyard, etc.) will occupy about 67 acres which contain several different vegetation communities, including maintained and unmaintained open areas, scrub/shrub, forested areas, transmission right-of-way, wetlands, and potential stormwater features.

Pike conducted a Natural Resources Assessment ("NRA") of the properties, which includes an office review of natural resource databases, federal-listed species data, and field surveys to determine the extent of jurisdictional aquatic resources and the presence or absence of suitable habitat and occurrences of federal-listed species.

Species with the federal classification of endangered, threatened, proposed endangered or proposed threatened, and final (or proposed) designated critical habitat are protected under the Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 et seq. No activity can be authorized by a federal permit or action if the continued existence of a federally listed species would be jeopardized, or its critical habitat destroyed or adversely modified by the proposed activity or action.

Pike used the U.S. Fish and Wildlife ("USFWS") Information Planning and Conservation System ("IPaC") tool to identify federally protected species that may occur within the study area and generate a species list for the Proposed Facility (Appendix C, USFWS Species List). The IPaC report identifies one Endangered species, one Proposed Endangered species, and one proposed Threatened species that may occur within the study area. The IPaC report identified no Designated or Proposed Critical Habitats within the study area.

Table 1.4.6. Threatened and Endangered Species that May Occur within Study Area

Listed Species	Protected Status (T, E, P, C)	USFWS Optimal Survey Window[1]	USFWS-Recommended Tree-Clearing Moratorium[2]
Tricolored Bat (*Perimyotis subflavus*)	P	N/A	April 1 – October 15
Monarch Butterfly (*Danaus plexippus*)	P	N/A	N/A
Schweinitz's Sunflower (*Helianthus schweinitzii*)	E	Late August - October	N/A

E **Federally Endangered**
P **Proposed for Listing in Federal Register**

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 (Shafale, 2012), forested portions of the site can be characterized as Mesic Mixed Hardwood (Piedmont Subtype). These mesic mixed communities include tulip poplar (*Liriodendron tulipifera*), willow oak (*Quercus phellos*), winged elm (*Ulmus alata*), and red maple (*Acer rubrum*).

Maintained open areas consist of various turfgrasses with or without typical turfgrass weeds, such as dandelion (*Taraxacum sp.*), wild strawberry (*Fragaria sp.*), and clover (*Trifolium spp.*).

Unmaintained open areas include a turfgrass base that has been heavily filled in with other species, such as common mullein (*Verbascum thapsus*), Johnsongrass (*Sorghum halepense*), ragweed (*Ambrosia artemisifolia), and* broomsedge (*Andropogon virginicus*).

Within the scrub/shrub and transmission right-of-way areas are kudzu (*Pueraria spp.*), blackberry (*Rubus spp.*), pokeweed (*Phytolacca americana*), broomsedge, Johnsongrass, multiflora rose (*Rosa Multiflora*), and goldenrod (*Solidago sp.*). Additional tree sapling species include winged elm and sweetgum (*Liquidambar styraciflua*).

Federally Protected Plant Species

The USFWS Information Planning and Conservation System ("IPaC") lists the Schweinitz's Sunflower (*Helianthus schweinitzii*) as endangered. Schweinitz's Sunflower requires disturbance (blowdowns, storm, or fire) to create open areas for full sunlight, but may also grow in open stands of trees with minimal shade. Soils may be either shallow, sandy with high gravel content, or a clayey hardpan. The sunflower may prefer soils derived from basic material (Krings, Goyette, Suiter, & Samuels, 2021).

Areas of open habitat within the existing right-of-way and scrub/shrub areas contain marginally suitable habitat for Schweinitz's Sunflower, specifically those areas with lower density of competing species. Pike did not observe any varieties of Helianthus during the field evaluation. Even though marginally suitable habitat is present, the field evaluation yielded negative survey results, so Pike believes there will be no effects to this species.

1.4.6.1.2 Wildlife

Any of the species listed below that are followed by an asterisk (*) are species which were observed by Pike during field review.

Common mammal species within the 67-acre study area include eastern cottontail rabbit (*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*).

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*).

<u>Federally Protected Animal Species</u>

According to the USFWS Information for Planning and Conservation System ("IPaC"), the study area has the potential for one Proposed Endangered species (Tricolored Bat), and one Proposed Threatened species (Monarch Butterfly).

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 Spanish moss and 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 had proposed that the species be listed as endangered by the fourth quarter of 2023; but reviews of that proposal continue.

Notably, the tricolored bat has been found capable of roosting in trees measuring four inches diameter base height, in limb scars, and in leaves. Because of its very generalized habitat requirements and widespread roosting habitat, USFWS has established a recommended tree-clearing moratorium period from April 1st to October 15th (subject to modification by USFWS, and location-dependent), during the bat's active period (U.S. Fish & Wildlife Service, 2024).

A few areas within the study area contain trees in all states of maturity that could provide potentially suitable habitat for the species. Surveys for presence or absence of bat species typically require specialized equipment used by qualified individuals, so a comprehensive survey was not conducted. If the species is uplisted to Endangered or if disturbance of potentially suitable habitat (such as tree-clearing) is proposed, DEC will arrange for targeted surveys and/or coordinate with USFWS, as required.

The **monarch butterfly** (Proposed Threatened), with bright orange wings surrounded by a black border and covered with black veins, is large and conspicuous. Monarchs reach approximately three to four inches in width and length. Monarchs undergo a complete metamorphosis, from egg, to larva (caterpillar), to pupa (chrysalis), and then to adult (butterfly).

In breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias spp*.). Larvae emerge after three to five days and then feed on the milkweed leaves. 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, 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 early spring, monarchs mate at their overwintering sites and then disperse.

Potentially suitable habitat is present within unmanaged grassland and prairie areas of the project study area ("PSA") (i.e., early successional growth areas and areas generally maintained in herbaceous conditions with minimal management).

DEC participates in a nationwide Candidate Conservation Agreement ("CCA") for the monarch butterfly on Energy and Transportation lands—an integrated agreement that consists of assurances and a CCA for the species. DEC surveys for the presence of the species or suitable habitat, reduces development impacts, uses native plants in revegetation and stabilization practices, and implements a management plan that targets benefits to wildlife species requiring early successional habitats (habitats typical of transmission line ROWs). DEC assisted in the development of the Nationwide Monarch Butterfly CCA in collaboration with numerous other federal and state agencies and utilities. A copy of the CCA is available upon request.

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. DEC's continued participation in the CCA and minimization of disturbance in the area surrounding the Proposed Facility to the greatest extent practicable should ensure only de-minimis effects to the species. Should the species become uplisted to Threatened status, additional targeted surveys for the species may be necessary, and coordination with USFWS may be required.

Table 1.4.6.1-1 summarizes the habitat and species survey results for species identified as potentially occurring within the PSA.

Table 1.4.6.1. Habitat and Species Survey Results

Listed Species	Designated Critical Habitat? (Y, N)	PSA Inside Designated Critical Habitat? (Y, N, N/A)	Suitable Habitat Present in PSA? (Y/N)	Species Identified in PSA? (Y, N, N/A)
Tricolored Bat	N	N/A	Y	N/A*
Monarch Butterfly	Y	N	Y	N
Schweinitz's Sunflower	N	N/A	Y	N

*Pike did not perform targeted surveys for this species.

1.4.6.2 Aquatic Resources

Wetlands and Jurisdictional Waters of the U.S.

The U.S. Army Corps of Engineers ("USACE") and the U.S. Environmental Protection Agency ("USEPA") describe wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 C.F.R. § 328.3 and 40 C.F.R. § 230.3, respectively). From this regulatory definition, USACE developed a three-parameter approach (i.e., vegetation, soils, and hydrology) to identify and delineate wetlands for purposes of Section 404 of the Federal Clean Water Act, 33 U.S.C. § 1251 et seq. ("CWA") and Section 10 of the Rivers and Harbors Act ("RHA") (33 U.S.C. § 403). This approach requires positive verification of the presence of wetland hydrology, hydrophytic vegetation, and hydric soils as precursors for an area to be determined a wetland.

Pike conducted a delineation of wetlands and other surface waters within the study area to identify aquatic features that may be subject to the jurisdiction of USACE as "Waters of the United States" (also known as "waters of the U.S.", or "WOTUS"), in accordance with the CWA and Section 10 of the Rivers and Harbors Act ("RHA") of 1899, 33 U.S.C. 401 § 403. "Waters of the United States" is a threshold term used in the CWA and establishes the geographic scope of federal jurisdiction under the Act. Sections 404 and 401 of the CWA regulate the discharge of dredged or fill material into WOTUS; therefore, aquatic resources assessed as meeting the definition of WOTUS are subject to the regulations and permitting requirements set forth within the Act.

USACE is the permitting authority for implementation of the CWA and administers the permitting program that regulates permanent or temporary discharges of dredged or fill materials into WOTUS (U.S. Environmental Protection Agency, 2023). Section 404 of the CWA authorizes the USACE to regulate, which includes permitting, temporary and permanent discharges of dredged or fill material into WOTUS.

To assist with determining the potential jurisdictional status of aquatic features identified onsite, particularly the stormwater features and isolated wetland, Pike searched publicly available records for applicable permit history to determine if the features were constructed under previously permitted site work.

Pike's November 2024 field evaluation was conducted using methods consistent with those described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE, 2012) and *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987). Where differences occur in the two documents, the regional supplement takes precedence over the 1987 manual for applications in the Eastern Mountains and Piedmont region.

The North Carolina Department of Environmental Quality ("NCDEQ") Division of Water Resources ("DWR") stream evaluation methods described in Methodology for Identification of Intermittent and Perennial Streams and Their Origins (Version 4.11), effective September 1, 2010, were used to conduct stream flow regime assessments of tributaries identified within the study area. This approach evaluates bed and bank formation, indicators of an Ordinary High Water Mark ("OHWM"), and characteristics of geomorphology, hydrology, and biology.

Pike used sequentially numbered pink and yellow flagging to identify wetland boundaries. Pink flags denoted potential stormwater features that exhibit wetland characteristics, and yellow flags were used for wetlands.

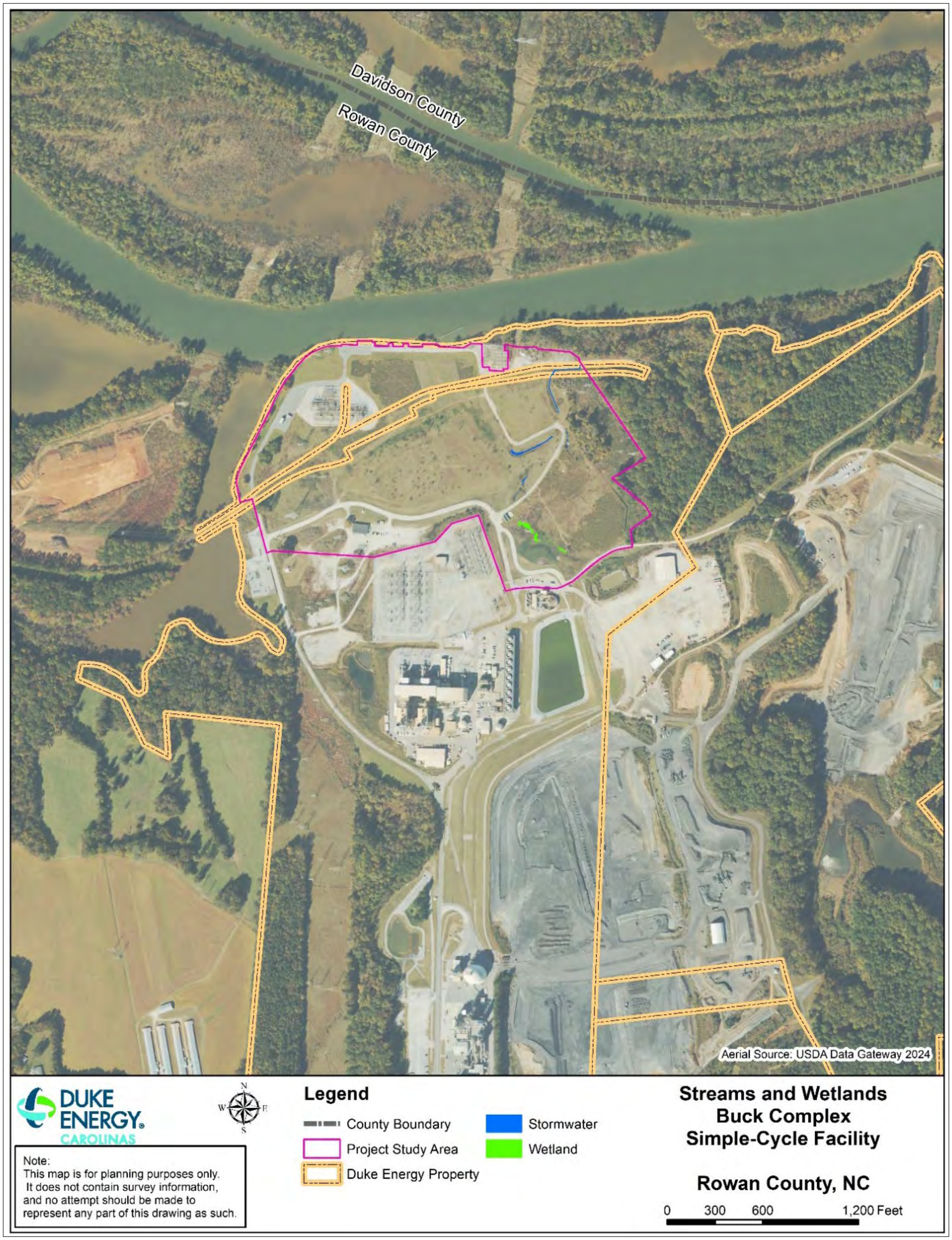
One wetland of approximately 0.09 acres occurs primarily in a valley. Pike believes that the connection between Potentially Isolated Wetland 1 and downstream waters has been severed. As such, the wetland may be considered isolated. Table 1.4.6-2 below shows the wetland's unique field identification used during the survey and further defines it.

Figure 1.4.6.2 shows the locations of wetlands, streams, and potential stormwater features. For more information, photographs, and figures concerning streams and wetlands, see Appendix C.

Table 1.4.6.2. Wetland Identified within the Study Area

Wetland ID	Approximate Size (Acres)	Wetland Type	Latitude	Longitude
Potentially Isolated Wetland 1	0.092	Palustrine Emergent	36.7106409°N	-80.3735037°W
TOTAL	**0.092 acres**			

Figure 1.4.6.2. Streams and Wetlands



Potential Stormwater Features

Multiple features in the drainage area in the eastern portion of the study area appear to have been designed as part of a stormwater treatment system. These features have begun to naturalize into wetlands and currently meet wetland criteria; however, they also display evidence that suggests their intended use was for stormwater management (e.g., rock check dams, rip-rap lined channels, and erosion control matting).

National Pollutant Discharge Elimination System

The NCDEQ Division of Energy, Mineral, and Land Resources issued a National Pollutant Discharge Elimination System ("NPDES") permit to Duke Energy Carolinas, LLC, on August 1, 2018, for the discharge of stormwater from the Buck Steam Station site (NPDES No. NCS000578). The NPDES permit identifies the location of stormwater outfalls and provides a description of their associated drainage areas. The eastern portion of the study area, where Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4 are located, lies within drainage area 56. Drainage area 56 also contained the main fuel oil storage tank, the combustion turbine area, multiple tanker truck unloading stations, above-ground ash sluice lines, and above-ground fuel oil piping. DEC installed multiple stormwater structures, including concrete channels, yard inlets, and underground storage tanks to collect stormwater runoff and contain any potential releases from the fuel tank and combustion turbine areas.

In 2023, DEC submitted a request to rescind the NPDES Stormwater Permit NCS000578 and modify NPDES Stormwater Permit NCS000554, which was issued to address the stormwater outfalls associated with the new Buck CC Plant. The permit modification request includes a summary of Best Management Practices ("BMPs") associated with the Buck CC Plant. One example is a 0.83-acre stormwater retention pond located just south of the PSA. Discharge from this pond is controlled manually, and its travel path is identified as entering a grassed swale that flows generally north-northeastward within Drainage Area 56 to ultimately discharge on the banks of the Yadkin River, which aligns with the locations of Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4.

Records indicate that Ms. Joyce Thames of USACE issued a Preliminary Jurisdictional Determination ("PJD") for the larger Buck Steam Station site on January 8, 2016. Notably, none of the identified Potential Stormwater Features or Isolated Wetland appear on the PJD.

Pike believes this permit history shows that Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4 are examples of the BMPs implemented under the NPDES permit for the site and that they may therefore be considered non-jurisdictional under the CWA. In light of this, the features would not qualify as regulated WOTUS under the CWA's current definition and would not require a CWA permit to be impacted.

1.4.7 Meteorology

1.4.7.1 Climatology

The Proposed Facility is in the central Piedmont of North Carolina, adjacent to the Yadkin River in Rowan County. Piedmont terrain is characterized by gently rolling hills interspersed with several ranges of steep hills across the region. The Piedmont lies between the two other principal physiographic divisions of North Carolina, the Mountains to the west and the Coastal Plain to the east.

Proximity to both the mountains and the Atlantic Ocean plays an important role in the seasonal climatology of the central Piedmont of North Carolina. The National Weather Service reporting station at Charlotte, NC ("KCLT"), approximately 50 miles to the southwest, is representative of the climate conditions at the Proposed Facility site.

This region traditionally features a temperate climate in the winter. The proximity of the Atlantic Ocean provides some moderating effects, and the Appalachian Mountains block any direct impact from Arctic air masses approaching from the north and west. In rare instances, however, this location can still be subjected to extreme cold. The record low at KCLT, -5 F, has occurred twice, most recently on January 21, 1985. Typical winter minimums for the area are much milder: the normal daily minimum in January (the coldest month of the year) is 31.7 F, while the 2006-2020 average normal high is 52.6 F (US Climate 2025).

Winter precipitation events are typically either migratory low-pressure systems which move northeast from the Gulf of Mexico and cross the region from southwest to northeast or low-pressure systems that form off the Carolinas' coast and move off to the northeast. Fronts crossing the region from the northwest are also common in winter, but these typically provide much less rainfall because the mountains block a portion of the moisture from reaching the lee side. Rain is the dominant precipitation in the winter, averaging about 3.61 inches per month at KCLT from December to February (US Climate 2025).

Snowfall can occur between November and March, but the average annual snowfall at KCLT is only 3.2 inches per year. In fact, this region averages only about one day of snowfall greater than 1 inch every year. Heavy snowfalls are possible but rare. The heaviest 24-hour snowfall at KCLT was 12.1 inches in January of 1988 (NOAA/NCEI 2025).

Sleet and freezing rain are also a winter risk for this region. A phenomenon called “cold air damming” (“CAD”) commonly occurs when cold, dense air banks against the Appalachian Mountains during times of high pressure to the north of the region. This causes cold air to become trapped at the earth’s surface, which can cause freezing rain or sleet if precipitation occurs. CAD events can occur any time of the year but are most frequent in fall and winter. In some instances, this setup can lead to significant ice storms for the region, such as the major ice storms experienced across the region in 2002 and 2005.

Sub-tropical “Bermuda” high pressure systems dominate the weather in summer, causing a maritime tropical climate characterized by warm, humid days and convectively driven precipitation events. The normal July daily minimum temperature is 70 F, and the normal July daily maximum temperature is 90.8 F. Daytime maximum temperatures can reach or exceed 100 F, though this is relatively uncommon. The record high of 104 F was most recently reached in July 2012. About 49 days per year reach or exceed 90 F (Charlotte 2025).

Summer precipitation is typically driven by air mass thunderstorms caused by diurnal heating. Showers and thunderstorms often form in the mountains and foothills just west of the site in the afternoon and move into the region in the late afternoon and evening. KCLT averages 46 thunderstorm days annually, with 70% of these occurring between May and August. June, July and August each average about 3.93 inches of precipitation per month. (NCDC 2025).

Spring and autumn are transitional seasons. Spring is characterized by warming temperatures and a transition from winter stratiform rainfall events to summer events driven by convection. Autumn is characterized by the breakdown of the Bermuda high pressure system and an increasing frequency of cold fronts and intrusions of cool air masses.

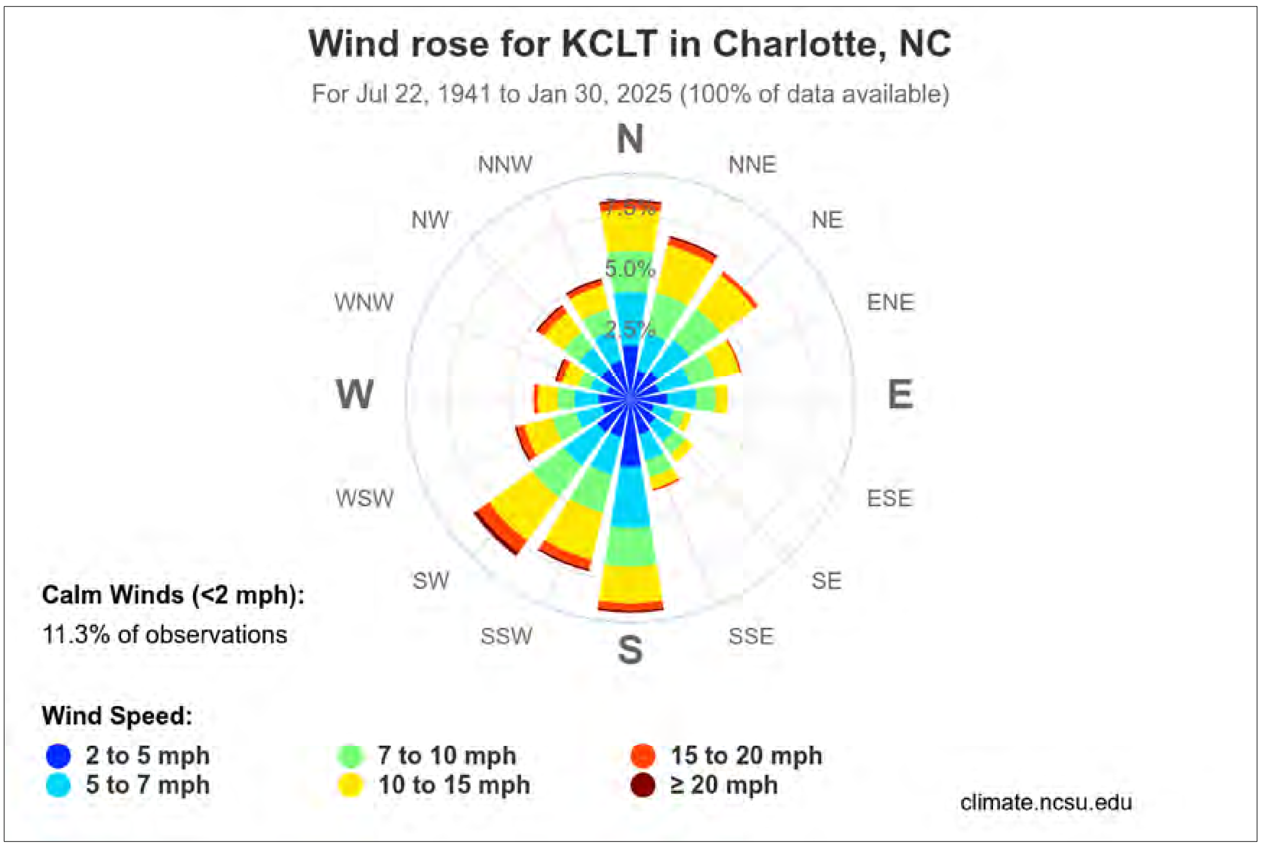
Tornadoes have been recorded in all four seasons across the Carolinas. Spring is the typical peak, although a secondary peak associated with tropical systems and stronger cold fronts occurs in the fall. As a state, North Carolina averages around 30 tornadoes per year. Around 12% of all tornadoes observed since 2004 in North Carolina have been F2/EF2 or higher (Severe Storm Reports 2025).

Annual precipitation in the region is relatively constant year-round. August is the wettest month of the year (4.42 inches), and October is typically the driest (3.25 inches). The months of September through November can be dry compared to the rest of the year if there is a dearth of tropical storms. The annual normal precipitation at KCLT is 44.9 inches (US Climate 2025).

The air dispersion of pollutants in the region is a product of the overall weather pattern combined with the impacts of being near the Appalachian Mountains. Given the right pattern, the mountains can enhance sinking air across the Piedmont, leading to stagnant conditions, mostly in the summer and fall.

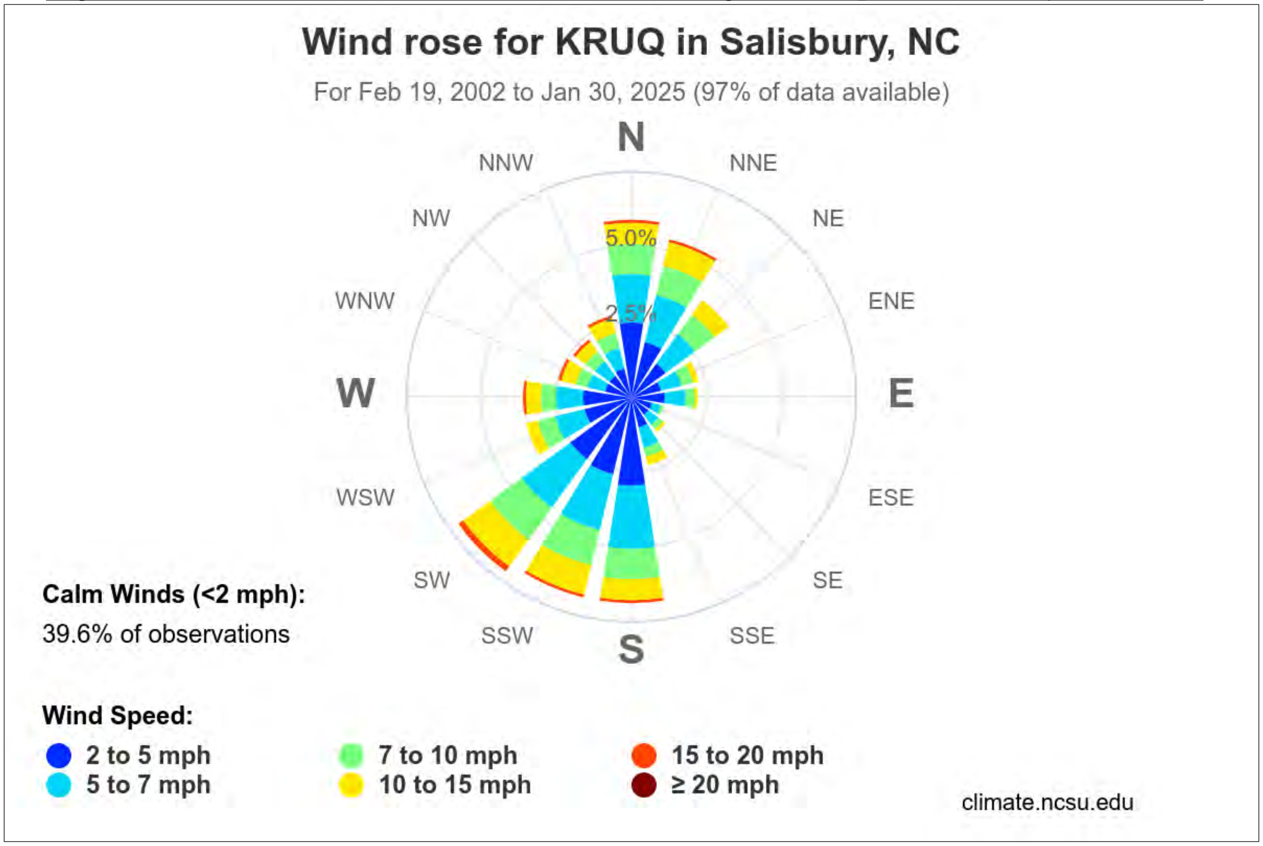
In terms of plume transport, winds at KCLT (10-meter level) since 2000 are most frequently from the north and south sectors. A wind rose (a graphic tool used to show wind speed and direction for a particular location over a specified period) for KCLT is provided in Figure 1.4.7.1- (Wind Rose Tool 2025). Figure 1.4.7.1-2 is a wind rose for KRUQ (Mid-Carolinas Regional Airport) in Salisbury, NC, which shows wind conditions similar to those at KCLT.

Figure 1.4.7.1-1. Wind Rose for Charlotte-Douglas Regional Airport (KCLT)*



*NCSU 2025

Figure 1.4.7.1-2. Wind Rose for Mid-Carolina Regional Airport, Salisbury (KRUQ)*



*NCSU 2025

Table 1.4.7.1. Historical Climatological Extremes for KCLT*

Description	Extreme Value	Date
Highest Daily Maximum Temperature (F)	104	July 2012
Lowest Daily Minimum Temperature (F)	-5	January 1985
Maximum 3-Second Gust (mph)	68	April 2018
Maximum 24-Hour Precipitation	8.19	August 2008
Maximum 24-hour Snowfall (inches	12.1	January 1988

*NOAA/NCEI 2025

1.4.7.2 Air Quality

The Clean Air Act ("CAA") requires the U.S. Environmental Protection Agency ("USEPA") to establish National Ambient Air Quality Standards ("NAAQS") for six commonly found air pollutants (also called "criteria air pollutants"), 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, including the Buck site) 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 Proposed Facility will be permitted as part of the project. DEC expects the air permit application to be submitted in late 2025. 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. DEC 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. DEC 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.

Clean Air Act ("CAA") Section 111 Regulations

Clean Air Act ("CAA") Section 111(b) regulates emissions from new stationary sources such as the Proposed Facility. In May 2024, the U.S. Environmental Protection Agency ("EPA") issued a Final Rule under CAA Section 111 ("May 2024 Final Rule"), which established greenhouse gas emissions limits for new natural gas generating facilities.[1] Under the May 2024 Final Rule, new natural gas-fueled generating facilities with capacity factors greater than 40% (base-load subcategory) are subject to the most stringent emissions standards which are implemented in two phases, with Phase 1 upon start-up of the facility and Phase 2 beginning January 1, 2032. New natural gas-fueled CC generating resources that operate at capacity factors greater than 20% but less than or equal to 40% (intermediate-load subcategory) would be subject to less stringent emissions standards, and resources with capacity factors less than 20% (low-load subcategory) are subject to the least restrictive emissions standards. The advanced-class turbines that DEC proposes to construct will be able to meet the May 2024 Final Rule Phase 1 emissions standards imposed on intermediate-load facilities of 1,170 lb. CO2/MWh and DEC plans to operate the Proposed Facility as an intermediate-load subcategory facility.

On June 17, 2025, EPA published in the Federal Register a rule ("June 2025 Proposed Rule") proposing to repeal the May 2024 Final Rule for CO_2 emissions from existing coal generating units and new natural gas-fired power plants such as the Proposed Facility.

[1] New Source Performance Standards for Greenhouse Gas Emissions from New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule, 89 Fed. Reg. 39,798 (May 9, 2024).

EPA also provided for comment an alternative proposal under which the agency would preserve the previous Final Rule's threshold finding that the power sector's GHG emissions should be regulated. Under this alternative, most of the previous Final Rule would be repealed, leaving in place only the Phase 1 efficiency-based requirements for new natural gas combustion turbines, with which the Proposed Facility's advanced class turbines would be able to comply. EPA is soliciting comments on both proposals, which must be submitted to the agency by August 7, 2025. EPA has indicated that it expects to issue a final rule by the end of 2025.

Due to the development of the June 2025 Proposed Rule, DEC plans to comply with the Phase 1 May 2024 Final Rule (assuming the allowable intermediate-load rolling annual average remains at 1,170 lb./MWh (gross) or is increased) and will continue to assess its most cost-effective path to compliance with applicable CAA Section 111 regulations and plan to update the Commission at the time the Company files its application for a certificate of public convenience and necessity.

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. Their orientation within the current-day stress fields of 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 plays 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 number of combinations thereof. Because earthquakes that are felt in North Carolina are typically the result of regional tectonism, they are not associated with tectonic plate movement or 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 the 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:

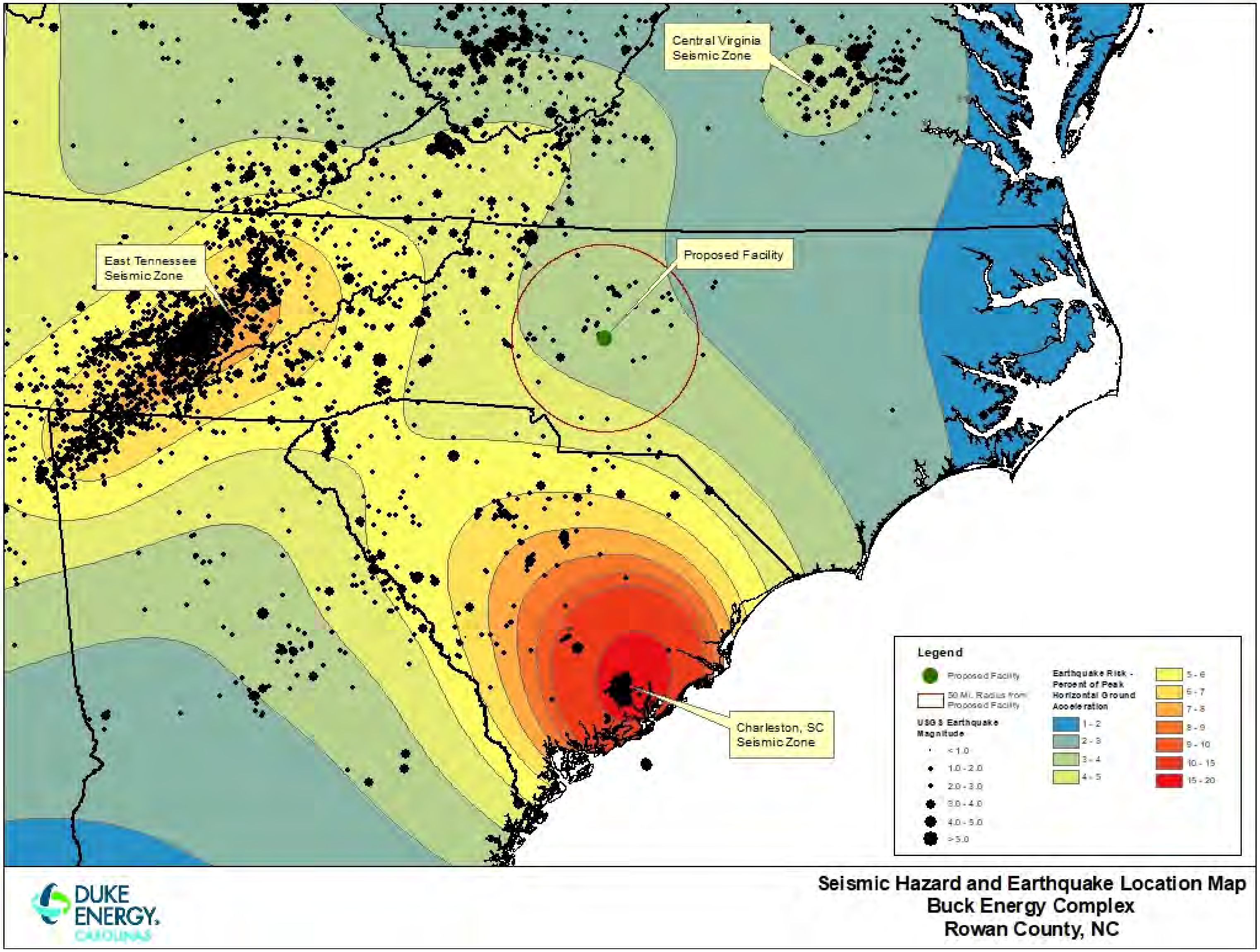
- the magnitude of and distance from the potential earthquake,
- the frequency with which those potential earthquakes are likely to occur, and
- the amount of shaking that is expected to occur because of those earthquakes.

Peak Ground Acceleration ("PGA") for the area surrounding the Proposed Facility was estimated using the U.S. Geologic Survey ("USGS") National Seismic Hazard Mapping database (2018). Figure 1.4.8.1 depicts the location of the Proposed Facility, the 3-4% probability of exceedance in 50 years, PGA contours, regional earthquake source information, and the 50-mile radius from the Proposed Facility.

The probability for an earthquake with a magnitude of greater than 5.0 on the Richter Scale within 100 years and within 30 miles of the study area is very small (0.02-0.03%) (American Geosciences Institute 2024; USGS 2014). The seismic hazard map shows peak ground accelerations having a 3-4% 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 are based on seismicity and fault-slip rates and 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



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). These zones are located approximately 250, 245, and 245 miles from the Proposed Facility, respectively. Figure 1.4.8.1 delineates these three zones, and the clusters of various-sized black circles on the figure 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 the release of 2,000 gigajoules of energy. An earthquake with a magnitude of 2.5 to 5.4 causes minor damage. Around 30,000 of these occur each year, world-wide. An earthquake with a magnitude of 8.0 is considered a great earthquake; it can destroy communities near its epicenter. On average, there are fewer than five great earthquakes per year in the world.

The closest recorded earthquake with a magnitude of more than 4.0 near the study area took place in 2020 near Sparta, Alleghany County, North Carolina—80 miles northwest of the Proposed Facility. Estimated at 5.1 M, this earthquake was most likely associated with faulting east of the New Madrid seismic zone (USGS 2022). In 2024 another earthquake (estimated at 2.3 M) centered in Sparta, North Carolina.

The largest earthquake that was felt in North Carolina originated near Richmond, Virginia in 2011. This earthquake was associated with the Central Virginia Seismic Zone, and it registered 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 greater-known risk to the region because of its relative proximity, but that risk is considered small. The Proposed 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 will be located within the Yadkin-Pee Dee River Basin, specifically the Lower Yadkin Pee-Dee River Basin (Hydrologic Unit Code (HUC) 03040103) (NCDEQ 2009). The basin includes the Yadkin River as well as the lower portion of High Rock Lake and all of Badin Lake; it accounts for 17% of the basin's area at 1,190 square miles (NCDEQ 2009). The Proposed Facility will be located adjacent to the upper portion of High Rock Lake.

High Rock Lake, the second largest hydroelectric reservoir in North Carolina at 15,180 acres, is under the jurisdiction of Cube Hydro Carolinas and the Federal Energy Regulatory Commission. It is used as a cooling water source for the Buck CC Station. According to the Yadkin Pee-Dee River Basin Restoration Priorities report (NCDEQ 2009), the land cover for this hydrologic unit code is mostly forested (57%), with significant areas of agricultural land (27%) and developed land (13%). Agricultural lands are spread-out across the landscape; the larger developed areas include Salisbury, Lexington, Spencer, and Thomasville.

High Rock Lake is classified as Class C water by the NCDEQ. Class C waters are protected for uses such as fishing, wildlife, agriculture, and secondary contact such as wading and boating (NCDEQ 2024). High Rock Lake also has a Chlorophyll-a site-specific standard since it is not fully supporting its Class C designated uses. The upper portions of High Rock Lake and the Yadkin River adjacent to the existing Buck Combined-Cyle facility are classified as Water Supply-V (“WS-V”) (NCDEQ 2024). Waters protected as WS-V are generally the following:

- upstream and draining to Class WS-IV waters,
- water used by industry to supply their employees with drinking water, or
- waters formerly used as drinking water (NCDEQ 2024).

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 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.

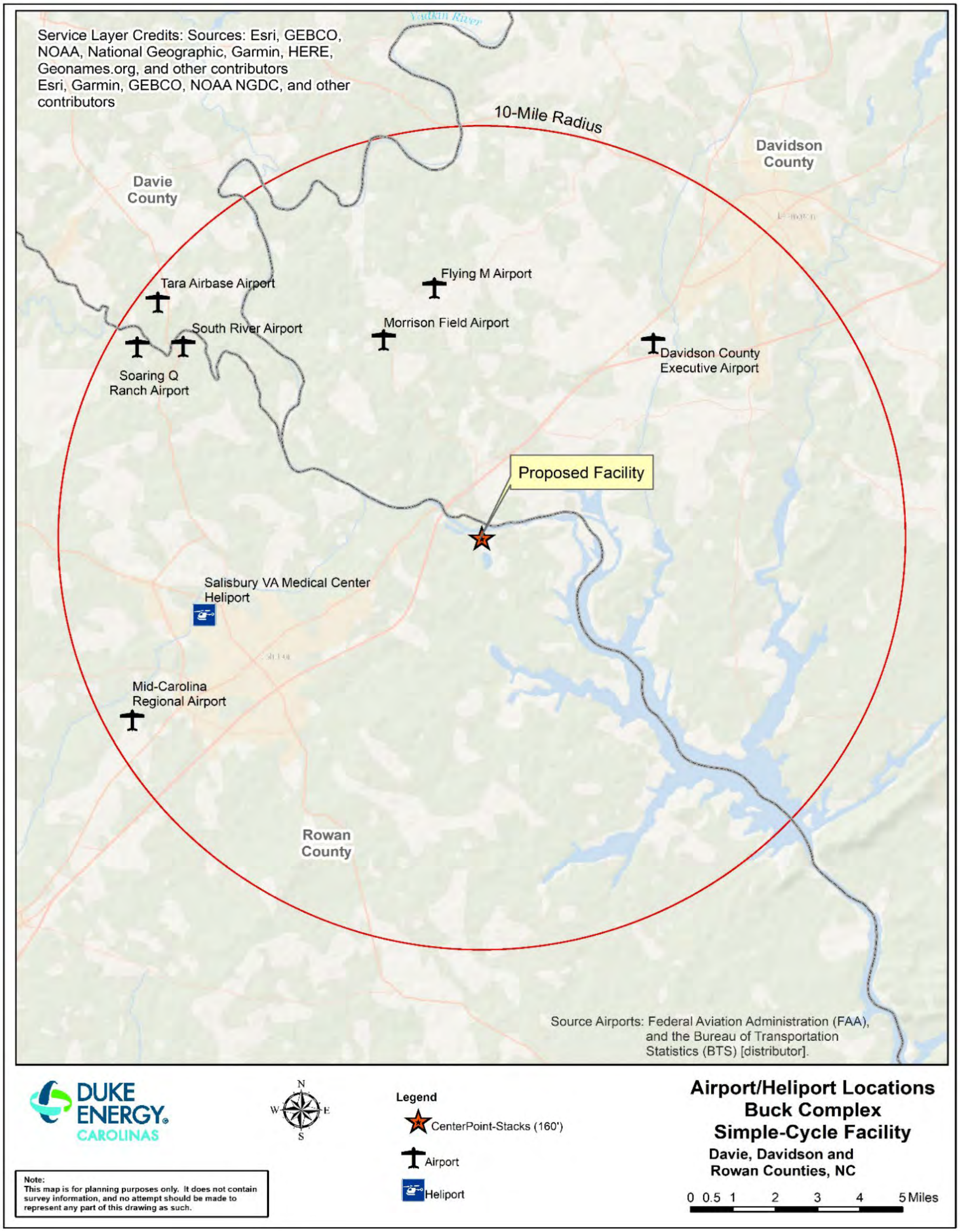
ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport listed in 14 CFR § 77.9(d), with its longest runway more than 3,200 feet in actual length, excluding heliports.

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 in 14 CFR § 77.9(d).

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 Atlanta Sectional Aeronautical Chart (03/12/2025) 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. The locations of nearby airfields are shown on Figure 1.4.10-1.

Figure. 1.4.10-1: Airport and Heliport Locations



Eight publicly-owned and private airfields are within 10 miles of the Proposed Facility. The five private airfields are the following:

- Flying M Airport (2NC6), 101 Flying M Lane, Lexington, NC 27292;
- Morrison Field Airport (48NC), 323 Morrison Drive, Lexington, NC 27295;
- Soaring Q Ranch Airport (NR70), 940 Potneck Road, Salisbury, NC 28147;
- South River Airport (NC93), 8660 U.S. 601, Salisbury, NC 28147; and
- Tara Airbase Airport (5NC1), 227 Riverdale Road, Mocksville, NC 27028.

The publicly owned airports are the following:

- Davidson County Executive Airport (KEXX), Owned by Davidson County Airport Authority, 1673 Aviation Way, Lexington, NC 27292;
- Mid-Carolina Regional Airport (KRUQ), Owned by Rowan County, 3670 Airport Loop, Salisbury, NC 28147; and
- Salisbury VA Medical Center Heliport (NC46), Owned by V.A. Medical Center, 5807 Farm Pond Lane, Apt. D, Charlotte NC 28212

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 Facility, 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, DEC 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:	35 Deg 42 M 42.78 S N
Longitude:	80 Deg 22 M 29.28 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	648 (nearest foot)
Structure Height :	160 (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

Piedmont Natural Gas ("PNG") is a franchised natural gas local distribution company regulated by the Commission and a wholly owned subsidiary of Duke Energy Corporation. PNG currently redelivers natural gas supply to the Buck CC Station to fuel the existing CC facility.

PNG has identified the need to construct incremental natural gas facilities to support the incremental natural gas supply that will be utilized by the Proposed Facility. The Proposed Facility's natural gas supply will be sourced from the Transcontinental Gas Pipe Line Company, LLC ("Transco") pipeline and delivered to the site by PNG. PNG will also construct an additional dedicated metering and regulation station for the Proposed Facility, which will be located adjacent to or within the existing CC facility's gas yard.

Like other DEC combustion turbines, the Proposed Facility will not have interstate firm transportation ("FT") service earmarked for it. However, it could use portfolio Transco FT service if it is not being utilized by a more efficient CC facility. Thus, most of the time, the Proposed Facility will procure Transco Zone 5 delivered gas supply as required. Additionally, the Proposed Facility will have diesel dual-fuel capability and on-site backup that can be relied upon for generation purposes if gas supply is curtailed or is uneconomic relative to diesel. DEC will provide an update on its progress of securing firm natural gas supply capacity for the Proposed Facility in its forthcoming CPCN application.

1.7 Transmission

Figure 1.2, which shows the locations of the existing 100 kV Buck Tie electrical switchyard and the existing 100 kV Buck Steam electrical switchyard, also shows that each proposed gas turbine generator will supply power through its own 100 kV breaker by way of a short bus line. An existing 100kV double circuit line (Oval B/W 100kV line) connecting Buck Tie to Buck Steam will be removed. One gas turbine will be connected to the existing 100 kV Buck Tie electrical switchyard at the old Oval 100kV line terminal. The other gas turbine will connect to the existing Buck Steam electrical switchyard at the old Oval 100kV line terminal.

DEC will determine specifics and necessary network upgrades during the DISIS study process. DEC received favorable results from the DISIS Phase II study in May 2025, which helped confirm site selection as discussed above. The necessary transmission scope will be further refined through either further DISIS studies which is the Company expects to occur in late 2025 or early 2026. The final design will be determined after all the studies have been completed.

The transmission lines currently emanating from the Buck site can be seen on Figure 1.1-2.

1.8 Unit Capacity

The estimated net nominal capacity of the Proposed Facility is 850 MW and 900 gross MW in alternating current. The projected nameplate capacity of the Proposed Facility is 900 MW in alternating current subject to final determination.

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DUKE ENERGY CAROLINAS, LLC
BUCK ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX A

BUCK STEAM STATION COMBUSTION TURBINE ADDITION CPCN
NOISE IMPACT STUDY

Buck Steam Station Combustion Turbine Plant Addition
CPCN Noise Impact Study

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Executive Summary

Existing Buck Steam Station

The original Buck Steam Station was a 369MW coal-fired electrical power plant owned by Duke Energy. The coal-fired plants are no longer in operation. There are currently two natural gas-fired combustion turbines, two heat recovery steam generators, and a steam turbine-generator set that provides 620MW of power. The facility is located at 1555 Dukeville Road in Salisbury, North Carolina. The plants operate based on energy load requirements. Thus, the percent load and total number of plants vary over time. This report models the existing plant and the Project at full capacity to evaluate the noise in its worst-case scenario.

Proposed Project

The proposed Project will be to permanently construct two 400MW gas turbines on the north part of the existing plant property.

Existing Ambient Noise Level Measurements

Noise measurements were conducted at the Duke Energy Steam Plant and near the property line of the future Combustion Turbine Plant to assess ambient noise levels at the nearest noise-sensitive receptors. Three long-term monitors were installed to continuously measure noise for over 60 hours. Additionally, five short-term measurements were taken at locations 1 to 5 to capture ambient noise levels. Long-term measurements at locations 1, 2, and 3 were performed to help calibrate the sound model. The specific measurement locations are illustrated in Figure 2. The results of these measurements are documented in Table 3 and Appendix A.

Noise Criteria

Chapter 21 “Zoning”, Article X “Nuisances”, section 21-241 “Noise” of the County of Rowan Code of Ordinances defines the noise restrictions for the County.

Chapter 14, “Nuisances,” Article III, “Noise,” defines the noise policies for the City of Salisbury, North Carolina, but does not provide specific metrics to evaluate noise limits.

One of the noise receptors is located in Davidson County, North Carolina. The Davidson County Code of Ordinances provides noise limits; if these limits were reached, complaints from the community may be possible.

For these reasons, two Thresholds of Significant Impact were used for this report. An anticipated noise level of any hourly Leq 55 dBA due to the operations of the Project, or an anticipated increase of more than 5 dBA in the established Noise Standard based on hourly L_{eq} existing ambient noise measurement and Interstate I-85 and the Norfolk-Southern railway.

Impact of Future Project on Community

A SoundPLAN computer model was created using sound information of the proposed Combustion Turbines and measurements that were performed on the existing natural gas-fueled Plant and STAR System. A presumed Noise Standard to account for ambient noise in the community, I-85 and the railway were also included in the model.

Introduction

This report provides an evaluation of the potential noise impacts of proposed modifications to the Buck Steam Station located at 1555 Dukeville Road in Salisbury, North Carolina. The modifications to be performed will be to include two combustion turbines (CT) to the north of the existing facility.

The noise impact evaluation is based on a comparison of the anticipated noise levels from the existing Power Station and proposed CT plant with the proposed Threshold of Significant Impact and the existing ambient noise.

Background on Sound and Sound Levels

A summary of the methods used to evaluate noise impact on the surrounding community and the noise metrics used to discuss this impact within this report is included in Appendix B, "General Discussion on Sound and Noise."

Existing Buck Steam Station

The original Buck Steam Station was a 369-megawatt coal-fired power station. The coal-fired power plants have been shut down, and the station now has two natural gas-fired combustion turbines, two heat recovery steam generators, and a steam turbine-generator set that provide a total of 620 Megawatts of power. The facility is located at 1555 Dukeville Road in Salisbury, North Carolina. The plants operate based on energy load requirements. Thus, the percent load and total number of plants in operation will vary over time.

Noise levels of the various components of the Power Station were measured to be included within a computer model.

Proposed Project

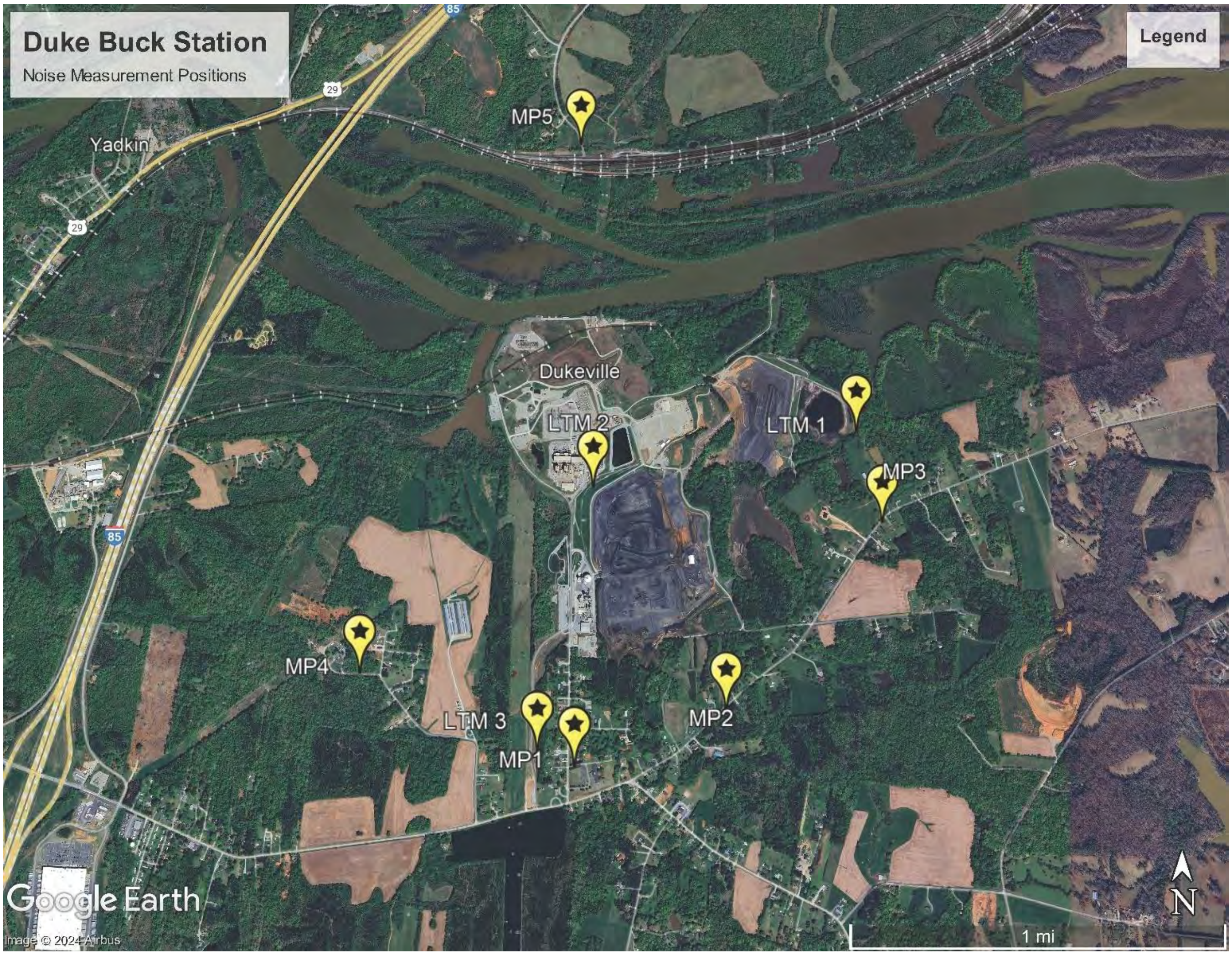
The proposed Project will be to construct two 400-megawatt gas turbines on the north part of the property. The turbines have not yet been selected. However, as part of the Project, the manufacturer will be required to limit the noise generated by each turbine to an average sound power level of the equipment included in the Burns and McDonnell evaluating noise report for the Marshall Steam Station dated December 15, 2022, during operation. This information was included in the acoustical computer model and are reported in Table 4. Figure 1 shows the location of the proposed gas turbines.

Figure 1. Location of Future Buck Steam Station Combustion Turbines

Noise Sensitive Receptors

Since the new combustion turbines will be operating on the north part of the Duke property, noise-sensitive receptors in this area were evaluated. The noise-sensitive receptors that were evaluated are indicated in Figure 2 below with the designation MP. All noise-sensitive receptors evaluated are single-family residences.

Figure 2. Noise Sensitive Receptors and Noise Monitor Locations



LTM – Long Term Monitor

MP – (Short Term) Measurement Position

Ambient Noise Measurements

Ambient noise levels were measured along the perimeter of the Buck Steam Station. These levels can vary based on the time of day, time of year, atmospheric conditions, and the Plant's operating conditions. Measurements were conducted from November 12 to November 15, 2024, at long-term monitoring locations 1, 2, and 3. The long-term monitors used were manufactured by NTI Audio, specifically models XL2 and XL3. The serial numbers for Monitors 1, 2, and 3 are A3A-01292-F0, A2A-19429-E0, and A2A-18143-E0. The meters were calibrated before taking measurements with Brüel & Kjær 4231 S.No. 3021894.

Atmospheric conditions varied over the measurement period. Tables 1 and 2 present the weather conditions during the measurements.

Table 1. Weather conditions during environmental noise measurements in November

Date:	November 11				November 12				November 13			
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
High Temp (F):	54	61	72	64	55	64	68	59	50	52	57	50
Low Temp (F):	52	54	63	54	46	48	59	50	41	41	50	43
Wind Speed (MPH):	0	2.5	4.4	0.6	1.9	2.5	3.7	3.1	4.4	5	4.4	1.2
Wind Direction:	-	S	SSW	W	N	N	NNE	NE	NE	NE	E	NE
Humidity (%):	100	100	89	100	92	70	40	54	60	56	39	62

Table 2. Weather conditions during environmental noise measurements

Date:	November 14				November 15			
Time:	12 AM	6 AM	12 PM	6 PM	12 AM	6 AM	12 PM	6 PM
High Temp (F):	43	46	46	45	46	61	64	55
Low Temp (F):	41	43	43	43	41	39	57	46
Wind Speed (MPH):	1.2	5	3.7	1.2	0.6	1.2	3.7	1.2
Wind Direction:	NE	E	NE	NNE	N	NNW	NNW	NW
Humidity (%):	81	100	100	100	100	90	52	80

The sound and the overall A-weighted levels were measured in octave bands. Statistical sampling was utilized to assess the variation within each measurement period. Table 3 below summarizes the ambient noise measurements, while detailed noise level measurements can be found in the Appendix. Figure 2 illustrates the locations of the noise measurements.

Table 3. Long Term Sound Measurements Summary

Location	L_{dn} 24-hour period	Loudest Leq and Time of Occurrence	Quietest Hourly Leq and Time of Occurrence
Long-Term Measurement 1	L_{dn} 51.7, 12:00 pm, 11-12-2024 to 11:00 am, 11-13-2024. L_{dn} 54.0, 12:00 pm, 11-13-2024 to 11:00 am, 11-14-2024.	L_{Aeq} 62 dBA, (1-hour) @ 2:00 pm, 11-14-2024	L_{Aeq} 39 dBA @ 00:00 AM (Midnight) 11-15-2024
Long-Term Measurement 2	L_{dn} 70.6, 15:00 pm, 11-12-2024 to 14:00 pm, 11-13-2024. L_{dn} 70.0, 15:00 pm, 11-13-2024 to 14:00 pm, 11-14-2024.	L_{Aeq} 65 dBA @ 8:00 AM, 11-15-2024	L_{Aeq} 61 dBA @ 3:00 pm, 11-13-2024
Long-Term Measurement 3	L_{dn} 62.7, 17:00 pm, 11-12-2024 to 16:00 pm, 11-13-2024. L_{dn} 63.7, 17:00 pm, 11-13-2024 to 16:00 pm, 11-14-2024.	L_{Aeq} 64 dBA @ 6:00 am, 11-14-2024,	L_{Aeq} 39 dBA @ 1:00 AM, 11-14-2024

Table 4. Short Term Sound Measurements Summary

Loc ID	Location	GPS N	GPS W	Measurement Start time	Duration (hh: mm: ss)	L_{Aeq}
MP1	Dukeville Road	35.695733°	-80.375190°	04:27 pm	00:01:06	55
MP2	Leonard Rd	35.697846°	-80.367863°	04:33 pm	00:01:54	57
MP3	Leonard Rd	35.705277°	-80.360011°	04:37 pm	00:03:04	37
MP4	New Jersey Dr	35.699319°	-80.385663°	04:47 pm	00:03:47	43
MP5	7 Oaks Dr	35.721350°	-80.375004°	05:10 pm	00:05:15	50

Long Term Monitor 1 (LTM 1), shown in Figure 2, is situated at the east property line of the future combustion turbine plant near Buck Ash Pond. Ambient noise levels at this monitor were predominantly influenced by noise from the existing Plant and the Staged Turbulent Air Reactor (STAR) system. Mobile vehicles operating near the ash pond also contributed to daytime sound levels. Apart from occasional noises from birds, insects, and airplanes, the overall noise environment was mainly controlled by the power plant. The quietest hour Leq recorded was 39 dBA at midnight on November 15, 2024. Most of the quiet period during the night recorded sound levels in the mid-40s. This location is in proximity to a few residents. The Day-Night Average Sound Level (Ldn) was 51.7 from noon on November 13 to 12:00 pm on November 14 and 54.0 from 12:00 pm, 11-13-2024 to 11:00 am, 11-14-2024. The loudest hour Leq was 62 dBA at 2:00 pm on November 14, 2024.

Monitor 2 (LTM 2) is located on the berm, approximately 500 feet from the Plant. This position was selected to assess the variation of overall power plant noise and to calibrate the computer noise model. Due to its proximity to the Plant, the noise field at LTM 2 is entirely dominated by plant noise. The quietest hour Leq was 61 dBA, while the loudest hour recorded was 64 dBA. The noise levels showed minimal variation throughout the measurement period. The Ldn was recorded at 70.6 from 3:00 pm, 11-12-2024, to 2:00 pm, 11-13-2024. And 70.0, from 3:00 pm, 11-13-2024 to 2:00 pm 11-14-2024.

Monitor 3 (LTM 3) is located near Buck Station Road, along the south property line of the STAR system at the Southeast Fly Ash (SEFA) facility. There was significant traffic on Buck Station Road, primarily from trucks transporting coal ash. The maximum sound levels from these vehicles reached over 80 dBA. Other noise events included birds chirping and insects buzzing. The quietest hour Leq was 39 dBA at 1:00 am on November 14, while the loudest hour recorded was 64 dBA at 6:00 am on the same day. The Ldn recorded was 62.7 at 5:00 pm on 11-12-2024 to 4:00 pm on 11-13-2024. Ldn 63.7 at 5:00 pm on 11-13-2024 to 4:00 pm on 11-14-2024. The average A-weighted sound levels during most nights varied between the mid-40s to mid-50s, increasing to the mid-50s to mid-60s during the daytime. Several residential houses are located near this measurement location.

Short-term measurements were conducted on November 12, 2024, at five positions (MP1-MP5) selected for their proximity to the power plant. Tables 4 and 7 provide detailed information, including GPS locations, measurement start times, durations, and metrics.

Measurement Position 1 (MP1) is located near the STAR system facility, where the primary noise sources are the STAR system and traffic from Leonard Road. The occasional bell ringing from a nearby church adds to the ambient noise.

Positions MP2 and MP3 are both situated along Leonard Road within residential communities. The main noise sources at these locations are comprised of traffic, birds, insects, and human activity.

Measurement Position 4 (MP4) is found on New Jersey Drive within a residential community where the primary noise sources include insects, birds, and distant traffic, resulting in a relatively quiet environment.

Measurement Position 5 (MP5) is positioned north of the power plant, nestled between the Yadkin River and Highway 85. This position is located in Linwood, an unincorporated community in Davidson County, North Carolina. This location is close to the railway track, with the main noise generated by Highway 85 and some distant sounds from the power plant. Occasionally, loud noises from passing trains can create significant disturbances at this position, impacting MP5 and its surrounding areas.

Noise Criteria

The County of Rowan north Carolina defies the noise limits in Section 21-241 “Noise” of Chapter 21 “Zoning”, Article X “Nuissances”. 21-241 (d) states “The maximum permitted sound levels for the uses prescribed in subsection (b) shall be obtained at theapparent property line of the noise producer/source and not be in excess of the following decibels during the given time periods.” The limits are 70 decibels between 7:00 a.m. and 65 decibels between the hours of 11:00 p.m. and 7:00 a.m.

Point (c) documents the measurement procedure. “The sound level meter used in the enforcement of this section shall be comply with ANSI S1.4-1983 requirements or the lastest approved version…using the A-weighting scale set on the slow response for a preset period of time of eight minutes.”

The City of Salisbury, North Carolina Code of Ordinances, Chapter 14 “Nuisances” Section 14-53 “Engine Exhaust” limits noise from stationary internal combustion engines:

“The discharge into the open air of the exhaust of any steam engine, stationary internal combustion engine, motor vehicle or motor boat engine, except through a muffler or other device which will effectively prevent loud or explosive noises therefrom, shall be deemed to be unlawful and a violation of the provisions of this article.”

The City of Salisbury, North Carolina Code of Ordinances, Noise section does not provide limits in terms of a measurable metric.

MP5 is located in Davidson County, North Carolina. The Davidson County Code of Ordinances provides noise limits for permits for “…the health, welfare, and safety of those attending mass gatherings and of other persons who may be affected by mass gatherings.” Section 93.22 “Necessary Facilities and Services”, Point (S) limits “…amplifying equipment…to no more than 70 dB…”. There are no other references to noise limits in the Code of Ordinances.

In the absence of a specific documentable metric within the City of Salisbury, and the Davidson County Code of Ordinances, this report uses an alternate, more stringent Threshold of Significant Impact. Noise impacts on a community can be evaluated based on the increase in noise levels compared to the existing ambient noise and other factors such as the nature of the source, such as speech or music, impulsive, tonal, time of day, or periodic nature. When combined community and Project Noise levels absent of tone are not increased more than 3 or 4 dB, the impact is generally considered not to be noticeable to the community. Where noise levels from the Project will increase by 5 or more decibels than the ambient noise (including existing plant noise), it is generally considered to be clearly noticeable and have a significant impact. In the end, individual responses will vary to a new noise source. For the purposes of this analysis, this report uses the Threshold of Significant Impact of not exceeding 55 dBA Leq at any Noise Sensitive Receptor. Additionally, an increase of Leq 5 dBA above the established Noise Standard or existing ambient noise level by the Project is considered a Significant Impact.

The quietest measured hourly L_{eq} measured was at LTM1 at midnight on November 15, 2024. Most noise during the quiet overnight hours was 41-43 dBA. A Noise Standard of 40 dBA was used to represent the general minimum ambient noise in the model.

Sound Power Estimation

Sound Power Estimation for the Existing CCGT Plant and STAR System

The total energy generating capacity of the plant is 620 MW. During the day of the noise data collection, all units were online and functioning at full capacity. This information was provided and confirmed by Dale "Opie" Wooten, CSP, Leas EHS-Buck Station.

The shielding provided by the north side of the facility, which is enclosed, and the semi-open noise transmitting characteristic of the other three sides was incorporated in the model. The noise level from the plant on the semi-open sides was recorded in direct line of sight to the equipment. We collected three calibration points at the locations shown in Figure 3, all oriented in different directions and at varying distances.

The noise source was modeled on these three sides and calibrated so the sound level in the model closely matched the sound levels measured in the field at the calibration points.

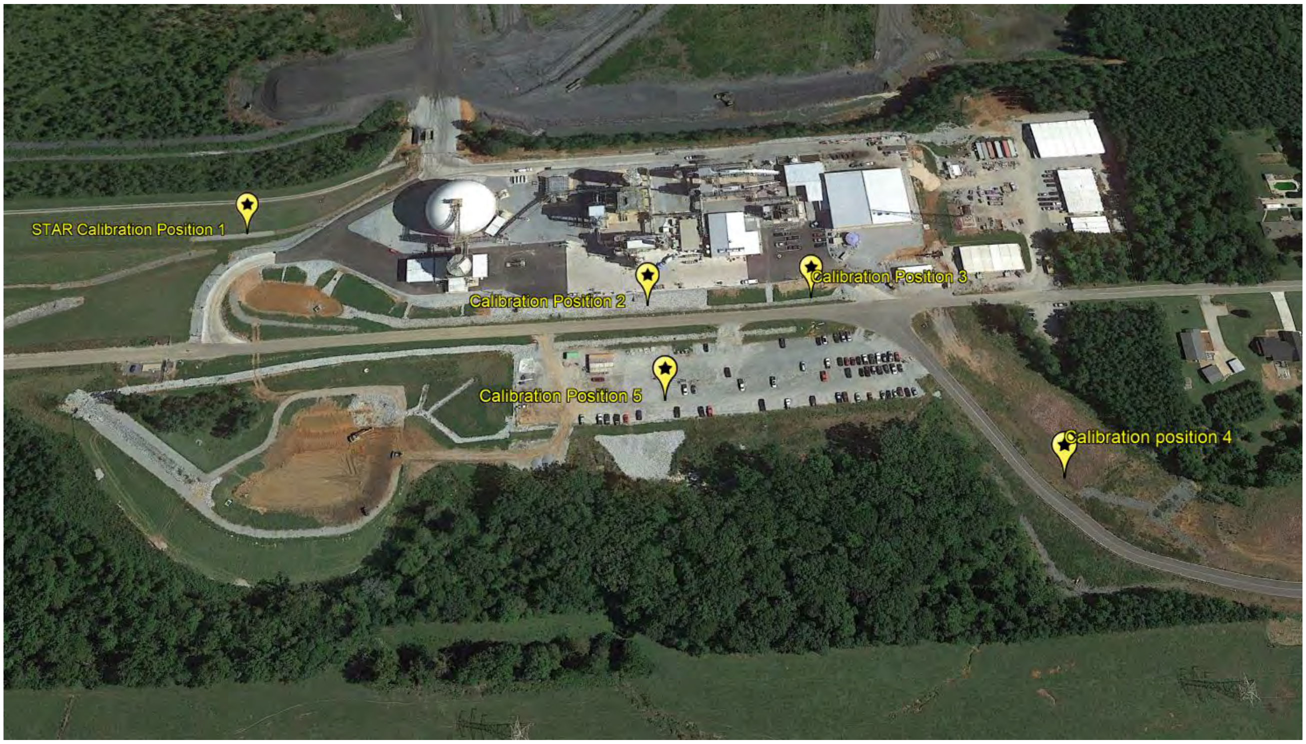
For the north side, near-field measurements were performed at the transformers (refer to Figure 3, labeled as T1, T2, and T3), near an open door on the north side, the cooling towers, and the pumps. These sources were placed and calibrated in the model. Sound levels obtained from long-term monitoring (LTM 2) were also evaluated to further check and refine the computer noise model of the existing CCGT plant.

Figure 3 provides an aerial view of the Duke Energy Buck Steam Station, indicating the short-term noise measurement locations of the noise-generating equipment. The noise levels for these measurements were influenced by the specific equipment being assessed.

Figure 3. Near Field Noise Measurement & Noise Model Calibration Positions at CCGT Plant

Sources that propagate from a large area were modeled as area sources with measured dimensions placed in the model and sources that are emanating acoustically from a single point were modeled as point sources. The model was calibrated using the sound power of the equipment to match the measurements (primarily a function of distance, but also of nearby reflections, air absorption, ground impedance). To accurately illustrate this sound propagation from the sources, the reflective surface of the parking lot, hard building surfaces at the CCGT Plant, and the buildings that act as barriers, are included in the sound power level calculations.

Figure 4. Near Field Noise Measurement & Noise Model Calibration Positions at STAR System



A similar approach was taken to calibrate the noise generated by the STAR system located near the combined cycle plant. Noise measurements were made at five selected calibration positions, illustrated in Figure 4. For modeling purposes, the facility was divided into three noise source zones (modeled as three point sources) generating a suitable noise propagation model of the STAR system plant. The measured sound levels at the 5 positions were used to calibrate the sound power level for each zone. Depending on the calibration position, more than one source may influence the overall and 3rd octave frequency sound power levels. Thus, using an ordered iterative process, sound power levels were calibrated to the measured data by making appropriate adjustments of the point source for each source zone until the sound levels in the model aligned closely with the measured levels at all five calibration locations.

The overall computer model of the existing facility was further verified using sound level data from long-term monitoring at locations 1 and 3 during an evening with favorable sound propagation conditions when both the CCGT and STAR facilities were operating at full capacity.

Existing sound power (both CCGT and STAR System)

The sound power level (Lw) was calculated for the current condition, taking into account that both the CCGT and STAR facilities were operating at their full capacity. The estimated combined sound power is 125 dBA. The spectral content of this sound power has a strong component of higher frequency noise, which dissipates more quickly with distance due to air absorption.

Estimation of Sound Power Levels for the New CPCN Plant

Burns and McDonnell (B&M) produced a noise study of proposed improvements at the Duke Energy Marshall Steam Station facility dated December 15, 2022. As part of the Project, the noise levels of the equipment will be limited to the noise levels documented in the B&M report. The table of sound power levels is reported in Table 7 below. The noise sources identified in Table 7 were included in the computer model using the site plan identified in Figure 1. Future grading conditions were also provided by Duke Energy and incorporated into the acoustical model.

The future Plant's total sound power (Lw) with all equipment running is 123 dBA. Without the two stack exits (each at 117 dBA, together at 120 dBA), the remaining sound energy from all the other equipment has a sound power (Lw) of 120 dBA. This noise level generated by the Project is controlled by lower frequency sound which is attenuated by air absorption over distance less than higher frequency sounds.

The color-coded Tables 6 and 7 show the sound power contributions of the existing CCGT and the new CPCN plant, respectively.

Table 5. Estimated Sound Power Levels of Existing Facility

Sound power levels of Existing Plant									
Name	**63.0**	**125.0**	**250.0**	**500.0**	**1000.0**	**2000.0**	**4000.0**	**8000.0**	**A-weighted overall level**
Cooling Tower	99.1	108	110	113.5	113.8	114.2	115.7	112.9	121.7
STAR_Source 2_Middle	88.5	103	110	110.5	105.7	104.7	104.5	104	116.8
STAR_Source 1_West	84.1	95.1	105	109.7	106.7	104.1	100	99.2	116.4
Turbines and Penthouse-West Facade	89.1	98.3	103	105.4	101.4	99.9	91.2	84	112.9
Turbines and Penthouse-South Facade	88.6	91.9	105	107.7	106.7	102.8	92.6	81.5	112.2
Turbines and Penthouse-East Facade	88	92	103	105.6	103.5	100.4	90.9	82.2	111.6
Dozer 1	82	102	103	102	104	103	94	94	110
Dozer 2	82	102	103	102	104	103	94	94	110
STAR_Source 3_East	85	97.7	104	105.8	101	100.8	96.7	88	109.9
Turbines and Penthouse-North Facade 2	70.8	79.5	81.9	86.3	92.8	95.8	93.6	78.8	99.4
Turbines and Penthouse-North Facade 1	70.8	79.5	81.9	86.3	92.8	95.8	93.6	78.8	99.4
Turbines and Penthouse-North Facade 3	70.8	79.5	81.9	86.3	92.8	95.8	93.6	78.8	99.4
Transformer 1	69.5	80.5	81.5	85.4	83	81.5	77.4	67.3	90.1
Transformer 2	69.5	80.5	81.5	85.4	83	81.5	77.4	67.3	90.1
Transformer 3	69.5	80.5	81.5	85.4	83	81.5	77.4	67.3	90.1
Clarifier Building Motor	69.2	75.9	79.1	80.9	81.4	80.2	76	66.8	87.3
Riverside Motor	57.5	65	75	76.2	77.1	73.8	69.9	64	82.2

Table 6. B&M Estimated Sound Power Levels of Proposed CPCN Addition Equipment

Sound power levels of future CT 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
003 GT Stack Exit 2	106	112	113	107	97	96.2	96	93.9	116.8
005 Stack Exit 1	106	112	113	107	97	96.2	96	93.9	116.8
001 GT Turbine Compartment	76.8	84.9	86.4	93.8	97	102.2	107	92.9	108.9
001 GT Turbine Compartment 2	76.8	84.9	86.4	93.8	97	102.2	107	92.9	108.9
012 Cooling Module	72.8	96.9	96.4	101	104	95.2	90	89.9	107.1
012 GT Cooling Module	72.8	96.9	96.4	101	104	95.2	90	89.9	107.1
004 Tempering Air Inlet 1	105	95.9	71.4	72.8	77	81.2	85	93.9	106.5
004 Tempering Air Inlet 2	105	95.9	71.4	72.8	77	81.2	85	93.9	106.5
021 GT Air Inlet Face 1	78.8	84.9	85.4	86.8	91	97.2	105	93.9	106.2
021 GT Air Inlet Face 2	78.8	84.9	85.4	86.8	91	97.2	105	93.9	106.2
001 GT Generator 1	78.8	90.9	87.4	98.8	100	101.2	96	82.9	105.7
001 GT Generator 2	78.8	90.9	87.4	98.8	100	101.2	96	82.9	105.7
021 GT Air Inlet Housing 1	71.8	82.9	90.4	88.8	88	103.2	100	81.9	105.3
021 GT Air Inlet Housing 2	71.8	82.9	90.4	88.8	88	103.2	100	81.9	105.3
GAS PIPING (only 1 - cannot locate)	70.8	80.9	84.4	91.8	100	101.2	99	81.9	105.2
007 Lube Oil Module 1	77.8	83.9	90.4	94.8	97	98.2	99	88.9	103.9
007 Lube Oil Module 2	77.8	83.9	90.4	94.8	97	98.2	99	88.9	103.9
004 GT Inlet Fan 3	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
004 GT Inlet Vent Fan 4	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
004 GT Inlet Vent Fan 5	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
004 GT Inlet Vent Fan 6	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
004 GT Inlet Vent Fan 7	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
004 GT Turbine Inlet Fan 2	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
004 GT Vent Fan 1	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
GT Turbine Vent Fan	75.8	93.9	92.4	94.8	95	95.2	99	93.9	103.8
021 GT Inlet Plenum 1	73.8	82.9	85.4	91.8	98	98	95	90	102.8
021 GT Inlet Plenum 2	73.8	82.9	85.4	91.8	98	98	95	90	102.8
015 GSU Transformer 1	73.8	87.9	95.4	101	88	84.2	77	69.9	102.3
015 GSU Transformer 2	73.8	87.9	95.4	101	88	84.2	77	69.9	102.3
025 Ammonia Skid 1	78.8	82.9	90.4	92.8	95	95.2	94	87.9	101.1
025 Ammonia Skid 2	78.8	82.9	90.4	92.8	95	95.2	94	87.9	101.1
056 Compressed Air Skid	52.8	72.9	80.4	87.8	97	96.2	92	77.9	100.6
001 GT Turbine Exhaust Diffuser 1	91.8	88.9	90.4	88.8	92	95.2	87	71.9	99.8
001 GT Turbine Exhaust Diffuser 2	91.8	88.9	90.4	88.8	92	95.2	87	71.9	99.8
004 Tempering Air Manifold 1	91.8	75.9	71.4	76.8	77	94.2	94	71.9	98.5
004 Tempering Air Manifold 2	91.8	75.9	71.4	76.8	77	94.2	94	71.9	98.5
011 Closed Cool Water Pump 1 of 2	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
011 Closed Cool Water Pump 2 of 2	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
031 Liquid Fuel and Water Injection Filter Skid 1	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
031 Liquid Fuel and Water Injection Filter Skid 2	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
047 Liquid Fuel Pump Skid 1	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
047 Liquid Fuel Pump Skid 2	68.8	80.9	88.4	90.8	91	88.2	89	83.9	97
063 Fuel Oil Heater 1	77.8	85.9	88.4	90.8	90	84.2	80	73.9	95.7
063 Fuel Oil Heater 2	77.8	85.9	88.4	90.8	90	84.2	80	73.9	95.7
024 Fuel Gas Meter 1	73.8	72.9	72.4	76.8	86	89.2	92	87.9	95.5
024 Fuel Gas Meter 2	73.8	72.9	72.4	76.8	86	89.2	92	87.9	95.5
062 Fuel Gas Filter 1	73.8	72.9	72.4	76.8	86	89.2	92	87.9	95.5
062 Fuel Gas Filter 2	73.8	72.9	72.4	76.8	86	89.2	92	87.9	95.5
FUEL GAS REGULATING SKID VALVE	73.8	72.9	72.4	76.8	86	89.2	92	87.9	95.5
063 Heater Skid 1	74.8	82.9	85.4	87.8	87	81.2	77	70.9	92.7
063 Heater Skid 2	74.8	82.9	85.4	87.8	87	81.2	77	70.9	92.7
057 Air Dryer (Dry Air Receiver)	68.8	82.9	85.4	86.8	79	70.2	70	67.9	90.5
037 Auxiliary Transformer 1	58.8	72.9	77.4	88.8	84	75.2	70	61.9	90.5
037 Auxiliary Transformer 2	58.8	72.9	77.4	88.8	84	75.2	70	61.9	90.5
046 Excitation Transformer 1	58.8	72.9	77.4	88.8	84	75.2	70	61.9	90.5
046 Excitation Transformer 2	58.8	72.9	77.4	88.8	84	75.2	70	61.9	90.5
003 SCR CO 1	84.8	71.9	59.4	57.8	56	60.2	51	27.9	90.2
003 SCR CO 2	84.8	71.9	59.4	57.8	56	60.2	51	27.9	90.2
004 Tempering Air Horizontal Duct 1	82.8	71.9	62.4	67.8	68	85.2	85	62.9	89.6
004 Tempering Air Horizontal Duct 2	82.8	71.9	62.4	67.8	68	85.2	85	62.9	89.6
003 SCR Temp Air Duct	79.8	66.9	54.4	53.8	51	55.2	46	25.9	85.2
003 SCR Temp Air Duct	79.8	66.9	54.4	53.8	51	55.2	46	25.9	85.2
Water Treatment BLDG-Roof 01	80.4	81.5	75	59.4	39.6	20.8	16.6	6.5	84.9
005 GT Stack Casing 1	79.8	70.9	61.4	50.8	48	39.2	50	33.9	83.5
005 Stack Casing 2	79.8	70.9	61.4	50.8	48	39.2	50	33.9	83.5
003 SCR Inlet Duct 1	77.8	64.9	52.4	57.8	64	55.2	46	24.9	83.3
003 SCR Inlet Duct 2	77.8	64.9	52.4	57.8	64	55.2	46	24.9	83.3
Water Treatment BLDG-Facade 02	77.8	78.9	72.4	56.8	37	18.2	14	3.9	82.3
Water Treatment BLDG-Facade 04	77.8	78.9	72.4	56.8	37	18.2	14	3.9	82.3
003 SCR Inlet Diffuser Duct	73.8	67.9	60.4	65.8	71	63.2	55	37.9	82.2
003 SCR Inlet Diffuser Duct	73.8	67.9	60.4	65.8	71	63.2	55	37.9	82.2
Water Treatment BLDG-Facade 01	76.5	77.6	71.1	55.5	35.7	16.9	12.7	2.6	81
Water Treatment BLDG-Facade 03	76.5	77.6	71.1	55.5	35.7	16.9	12.7	2.6	81
003 SCR Breech 1	75.8	61.9	53.4	57.8	63	50.2	46	29.9	79
003 SCR Breech 2	75.8	61.9	53.4	57.8	63	50.2	46	29.9	79
004 Tempering Air Outlet Duct 1	69.8	56.9	27.4	28.8	31	38.2	36	39.9	72.8
004 Tempering Air Outlet Duct 2	69.8	56.9	27.4	28.8	31	38.2	36	39.9	72.8

Estimation of Major Community Noise Sources and General Background Noise

To properly evaluate the existing ambient noise levels at the Noise Sensitive Receptors, all major noise sources must be included in the model. In addition, the quietest regularly occurring noise levels (the Noise Standard) have been considered in the model to facilitate showing correct total existing and future (existing plus the new CPCN plant) noise levels. In addition to the existing plant and the Project, other major noise sources included in the model are the Norfolk Southern railroad and I-85 interstate highway. Other secondary roads, manufacturing facilities, Norfolk Southern railroad yard were not modeled as the major noise sources of the railroad and interstate sufficiently describe the existing noise levels.

The highway noise data was acquired from the NCDOT website, which reported 77500 AADT (Annual Average Daily Traffic) with a breakdown of large trucks (AADTT – Annual Average Daily Truck Traffic) 11840 trucks per day. This breaks down to 84.7% cars, 3.9% single unit trucks, and 11.4% Multi unit trucks according to their traffic data. The HUD Noise Guidebook uses 15% of the daily traffic to estimate the nighttime traffic that occurs from 10 PM to 7 AM. From this, the average hourly traffic at night was estimated from this information and included in the model, since the quietest periods for the community was during the night.

The railroad noise information was retrieved from the US DOT Federal Railroad Administration Crossing Inventory form for the two closest crossings. These forms are included in Appendix C. There is no horn sounding in this section of the railroad. 31 trains per day are shown (13 of these at night). Train noise was modeled as an hourly average rail traffic at 40 MPH (low end of speed range reported).

Sound Model Results

Figure 5 illustrates the predicted noise contours for the existing Buck Steam Station, with all plants operating at maximum capacity, including the STAR system, the I-85 highway noise, and rail noise, and assumed the ambient Noise Standard. This scenario represents the worst-case noise levels for evaluating potential noise impacts.

Figure 6 shows the future predicted noise contours from only the Buck Steam Station operating at full capacity after Project completion. Sound levels from these operations do not exceed L_{eq} 55 dBA at an evaluated Noise Sensitive Receptor. The L_{eq} 55 dBA contour line does extend past the Duke property line into an undeveloped land in the north.

Figure 7 displays the predicted noise contours for the future Buck Steam Station operating at full capacity after Project completion, and incorporates the assumed ambient Noise Standard, as well as noise from the highway, rail.

Figure 8 shows the predicted difference in noise levels between the current and future conditions after the Project is completed. This prediction considers the noise from the Buck Steam Station, the existing ambient noise sources, the assumed ambient Noise Standard as well as noise from I-85 and the railway. This shows the anticipated increase in noise levels will remain well below 5 dB at the Duke property line and beyond. Increases are below 2 dBA at all except the closest locations on the map.

Figure 5. Existing Plant – Maximum Capacity – Both CCGT and STAR System operational with ambient noise sources

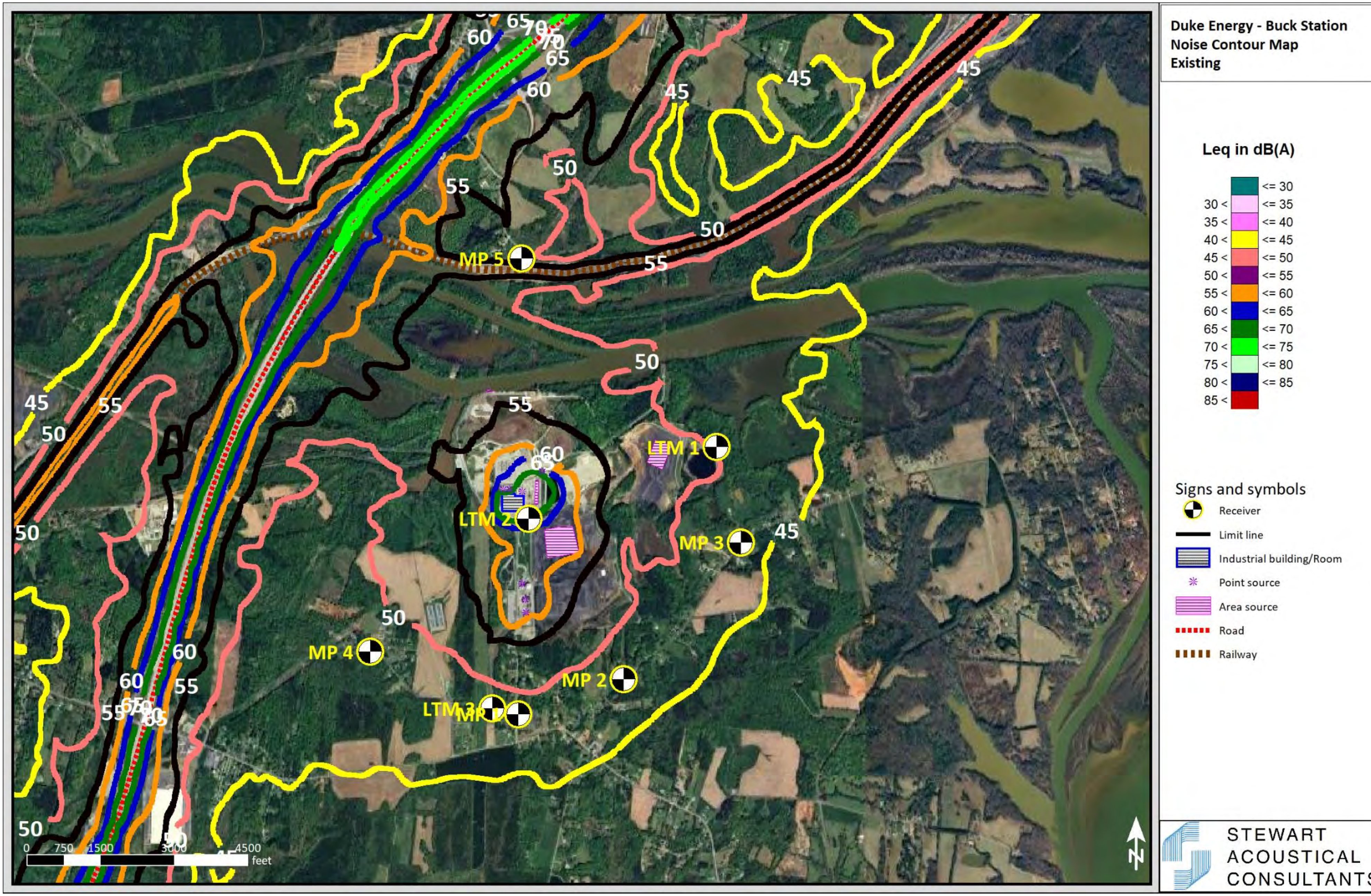


Figure 6. Future Noise Contour: Noise coming only from the Duke Plant Facility Project Operating – Maximum Capacity (No other ambient sources)

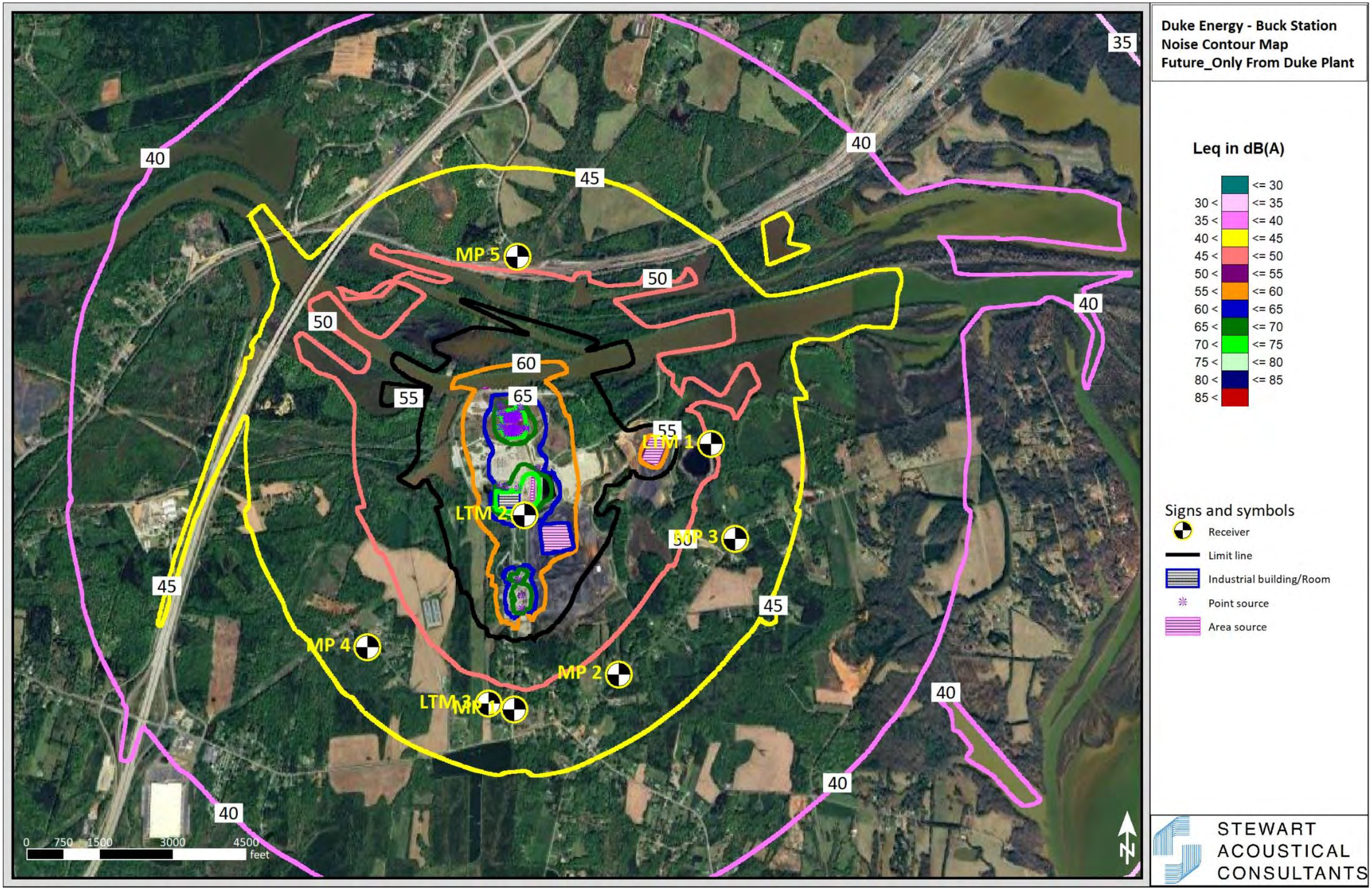


Figure 7. Future Noise Contour: Existing Plant, STAR system, Proposed with ambient noise sources

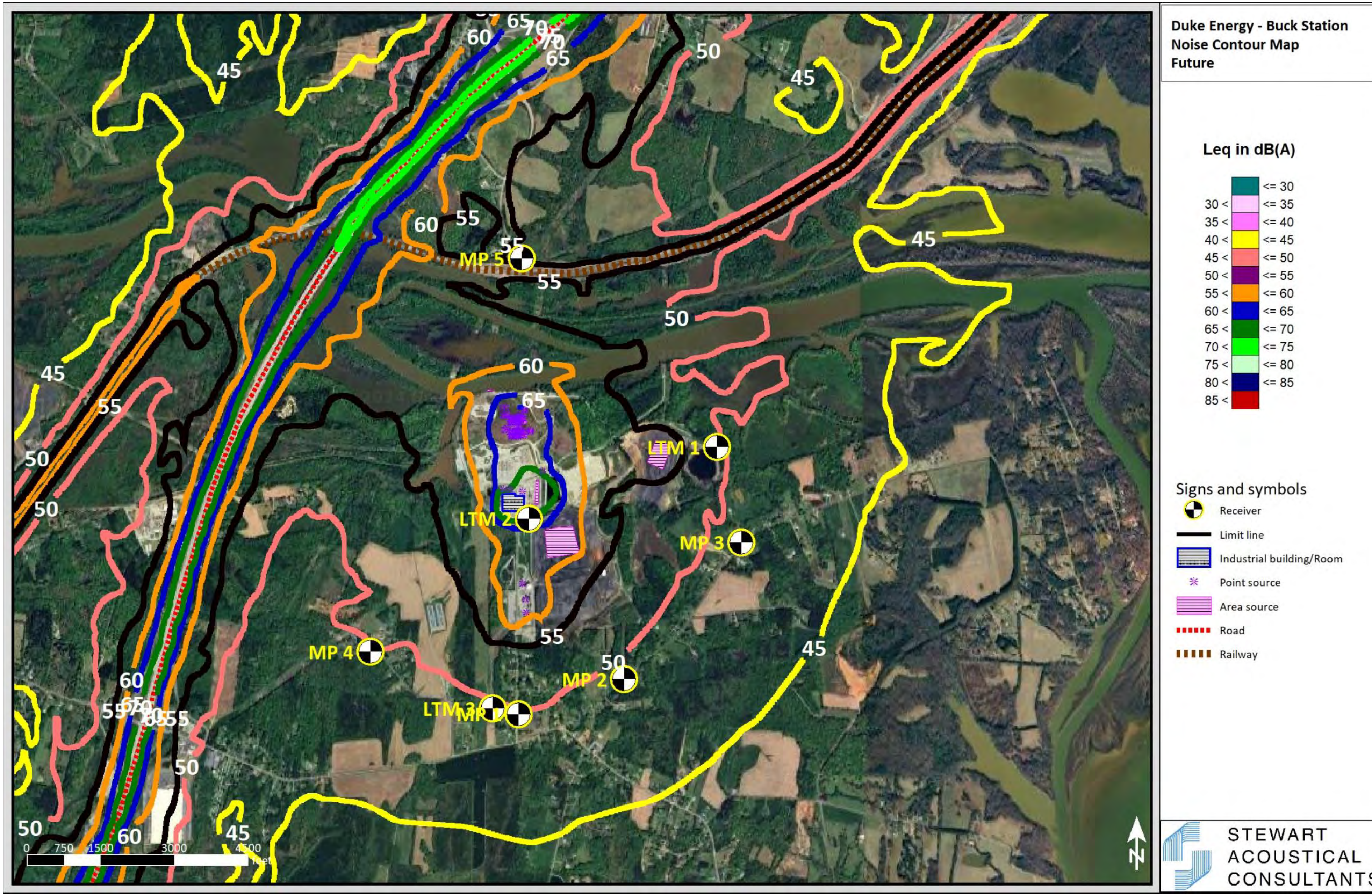
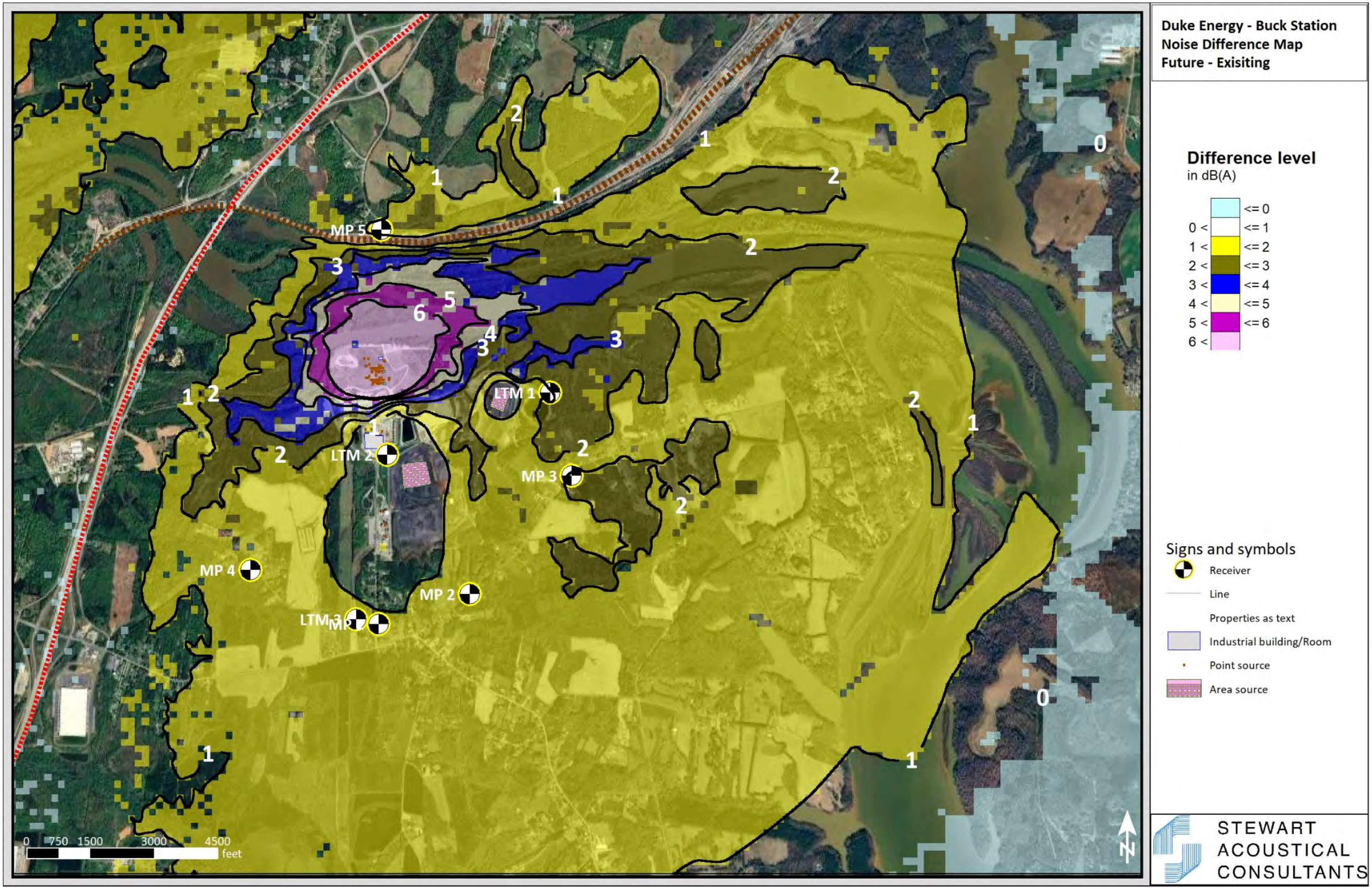


Figure 8. Noise difference map with ambient noise sources



Comparison of Results with Established Noise Thresholds

Table 7. Noise Levels at Receptors for Measured, Existing Maximum Capacity, Future Maximum Capacity.

Receptor ID	Location	Existing: CCGT + STAR System LAeq	Future CPCN Addition+ STAR+CCGT L_{Aeq}	Future CPCN Addition+ STAR+CCGT (only from Duke Facility) L_{Aeq}	Assumed Ambient Sound Level L_{Aeq}	Above 55 dBA Threshold	Increase Above Existing Plant or Presumed Ambient	Exceeds the +5 dBA Increase in Noise Threshold?
MP1	Dukeville Rd	48	49	48	40	No	1 dBA	No
MP2	Leonard Rd	47	48	47	40	No	1 dBA	No
MP3	Leonard Rd	45	48	47	40	No	2 dBA	No
MP4	New Jersey Dr	47	49	46	40	No	1 dBA	No
MP5	7 Oaks Rd	51	53	49	40	No	2 dBA	No
LTM1	Duke Property Line,Buck Ash Pond	48	50	49	40	No	2 dBA	No

The predicted noise levels after the completion of the Project with the STAR system and existing plant in operation have no anticipated impact based on the established criteria. No noise sensitive receptors evaluated exceed the Threshold of Significant Impact (L_{eq} of 55 dBA, or is more than 5 dB above the Noise Standard and existing train and traffic noise). Similarly, Figure 8 shows increases are well below 5 dBA at the closest property lines and less than 2 dBA over most of the map except those closest locations. Thus, the project is anticipated to operate clearly below the established Threshold of Significant Impact in this area.

Appendix A – Detailed Sound Measurements

Table 8 - Short Term Sound Measurements (STM) obtained Tuesday, November 12, 2024.

Loc ID	Location	GPS N	GPS W	Duration (hh: mm: ss)	Start time	L_{Aeq}	L_{ASmax}	L_{10}	L_{50}	L_{90}
MP 1	Dukeville Road	35.695733°	-80.375190°	00:01:06	04:27 pm	55.1	66.4	56.6	48.3	47.0
MP 2	Leonard Rd	35.697846°	-80.367863°	00:01:54	04:33 pm	56.4	70.1	59.3	45.8	36.8
MP 3	Leonard Rd	35.705277°	-80.360011°	00:03:04	04:37 pm	36.8	48.5	39.8	34.0	32.5
MP 4	New Jersey Dr	35.699319°	-80.385663°	00:03:47	04:47 pm	43.1	53.5	43.8	42.4	41.7
MP 5	7 Oaks Dr	35.721350°	-80.375004°	00:05:15	05:10 pm	49.5	54.4	50.3	47.9	46.6

Table 9 - Noise Monitor 1, Location GPS 35.709020° N, GPS -80.361148° W, November 12 to 15, 2024, A-weighted (dBA)

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-12 11:00:00	0:25:41	58.3	41.2	44.4
60’	2024-11-12 12:00:00	1:00:00	58.1	40.7	44.8
60’	2024-11-12 13:00:00	1:00:00	59.1	40.6	44.2
60’	2024-11-12 14:00:00	1:00:00	58.1	40.7	44.0
60’	2024-11-12 15:00:00	1:00:00	59.7	40.7	45.3
60’	2024-11-12 16:00:00	1:00:00	60.0	41.1	44.7
60’	2024-11-12 17:00:00	1:00:00	53.4	45.2	47.8
60’	2024-11-12 18:00:00	1:00:00	51.6	45.8	47.5
60’	2024-11-12 19:00:00	1:00:00	61.9	44.8	46.8
60’	2024-11-12 20:00:00	1:00:00	55.5	44.4	46.5
60’	2024-11-12 21:00:00	1:00:00	55.3	43.4	45.5
60’	2024-11-12 22:00:00	1:00:00	48.3	42.5	44.7
60’	2024-11-12 23:00:00	1:00:00	49.0	42.2	44.3
60’	2024-11-13 00:00:00	1:00:00	63.8	42.4	44.8
60’	2024-11-13 01:00:00	1:00:00	59.3	42.5	44.8
60’	2024-11-13 02:00:00	1:00:00	58.0	41.9	45.0
60’	2024-11-13 03:00:00	1:00:00	48.9	41.7	45.0
60’	2024-11-13 04:00:00	1:00:00	48.0	41.9	44.2
60’	2024-11-13 05:00:00	1:00:00	60.3	42.7	45.0
60’	2024-11-13 06:00:00	1:00:00	58.0	42.7	44.9
60’	2024-11-13 07:00:00	1:00:00	58.8	42.7	45.3

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-13 08:00:00	1:00:00	50.8	41.0	43.2
60’	2024-11-13 09:00:00	1:00:00	59.1	40.5	42.9
60’	2024-11-13 10:00:00	1:00:00	63.5	39.5	43.9
60’	2024-11-13 11:00:00	1:00:00	57.2	38.7	42.7
60’	2024-11-13 12:00:00	1:00:00	62.0	39.6	43.2
60’	2024-11-13 13:00:00	1:00:00	54.7	38.9	42.7
60’	2024-11-13 14:00:00	1:00:00	60.0	38.1	43.8
60’	2024-11-13 15:00:00	1:00:00	62.5	39.1	44.2
60’	2024-11-13 16:00:00	1:00:00	52.5	39.2	42.0
60’	2024-11-13 17:00:00	1:00:00	60.2	40.5	45.5
60’	2024-11-13 18:00:00	1:00:00	59.0	42.4	44.8
60’	2024-11-13 19:00:00	1:00:00	48.5	42.2	44.1
60’	2024-11-13 20:00:00	1:00:00	59.5	41.2	45.0
60’	2024-11-13 21:00:00	1:00:00	49.5	41.1	44.4
60’	2024-11-13 22:00:00	1:00:00	60.7	42.5	44.7
60’	2024-11-13 23:00:00	1:00:00	48.1	41.5	43.7
60’	2024-11-14 00:00:00	1:00:00	55.6	41.6	43.7
60’	2024-11-14 01:00:00	1:00:00	45.7	41.8	43.3
60’	2024-11-14 02:00:00	1:00:00	46.5	41.0	42.5
60’	2024-11-14 03:00:00	1:00:00	55.0	41.0	42.6
60’	2024-11-14 04:00:00	1:00:00	45.1	41.1	42.3
60’	2024-11-14 05:00:00	1:00:00	52.9	40.8	47.6

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-14 06:00:00	1:00:00	52.1	42.7	45.3
60’	2024-11-14 07:00:00	1:00:00	54.8	42.0	46.7
60’	2024-11-14 08:00:00	1:00:00	61.6	46.8	50.8
60’	2024-11-14 09:00:00	1:00:00	61.3	44.4	51.1
60’	2024-11-14 10:00:00	1:00:00	63.1	42.5	55.3
60’	2024-11-14 11:00:00	1:00:00	58.8	41.0	44.6
60’	2024-11-14 12:00:00	1:00:00	64.6	40.5	45.5
60’	2024-11-14 13:00:00	1:00:00	66.7	54.5	59.9
60’	2024-11-14 14:00:00	1:00:00	66.4	56.5	61.6
60’	2024-11-14 15:00:00	1:00:00	67.4	48.3	56.2
60’	2024-11-14 16:00:00	1:00:00	63.8	48.3	55.7
60’	2024-11-14 17:00:00	1:00:00	63.4	45.4	52.4
60’	2024-11-14 18:00:00	1:00:00	58.3	42.6	46.6
60’	2024-11-14 19:00:00	1:00:00	57.0	41.9	45.2
60’	2024-11-14 20:00:00	1:00:00	62.9	40.8	45.1
60’	2024-11-14 21:00:00	1:00:00	55.2	40.4	43.9
60’	2024-11-14 22:00:00	1:00:00	52.4	40.2	44.1
60’	2024-11-14 23:00:00	1:00:00	49.3	35.5	41.0
60’	2024-11-15 00:00:00	1:00:00	50.0	33.5	38.9
60’	2024-11-15 01:00:00	1:00:00	59.8	35.1	41.1
60’	2024-11-15 02:00:00	1:00:00	62.0	36.4	44.1
60’	2024-11-15 03:00:00	1:00:00	54.3	37.6	43.4
60’	2024-11-15 04:00:00	1:00:00	52.7	41.8	46.3

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-15 05:00:00	1:00:00	57.5	44.2	49.4
60’	2024-11-15 06:00:00	1:00:00	65.5	46.4	52.4
60’	2024-11-15 07:00:00	1:00:00	67.7	50.1	53.9
60’	2024-11-15 08:00:00	1:00:00	60.2	49.6	54.3
60’	2024-11-15 09:00:00	1:00:00	64.9	48.7	53.8
60’	2024-11-15 10:00:00	1:00:00	64.6	42.8	48.8

Table 10 - Noise Monitor 2, Location GPS 35.706541° N, GPS -80.374662° W, November 12 to 15, 2024, A-weighted (dBA)

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-13 15:00:00	1:00:00	64.7	59.2	61.3
60’	2024-11-13 14:00:00	1:00:00	66.2	59.9	61.6
60’	2024-11-13 16:00:00	1:00:00	66.2	60.1	61.7
60’	2024-11-13 13:00:00	1:00:00	68.7	60.3	61.9
60’	2024-11-13 12:00:00	1:00:00	72.7	60.4	62.3
60’	2024-11-13 11:00:00	1:00:00	75.1	60.5	62.6
60’	2024-11-13 10:00:00	1:00:00	65.7	60.7	62.9
60’	2024-11-13 17:00:00	1:00:00	65.2	60.9	63.0
60’	2024-11-14 01:00:00	1:00:00	66.3	61.9	63.0
60’	2024-11-12 15:00:00	1:00:00	64.9	61.6	63.1
60’	2024-11-12 13:00:00	0:50:56	70.5	61.7	63.2
60’	2024-11-12 14:00:00	1:00:00	66.1	61.8	63.2
60’	2024-11-14 02:00:00	1:00:00	64.8	62.2	63.2
60’	2024-11-14 04:00:00	1:00:00	66.7	61.8	63.2

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-13 19:00:00	1:00:00	66.1	62.3	63.3
60’	2024-11-14 03:00:00	1:00:00	65.6	61.9	63.3
60’	2024-11-13 18:00:00	1:00:00	66.9	62.4	63.4
60’	2024-11-12 16:00:00	1:00:00	67.0	62.2	63.5
60’	2024-11-13 22:00:00	1:00:00	64.9	62.2	63.5
60’	2024-11-15 04:00:00	1:00:00	65.4	62.2	63.5
60’	2024-11-15 11:00:00	1:00:00	68.0	61.8	63.6
60’	2024-11-13 21:00:00	1:00:00	68.6	62.6	63.7
60’	2024-11-15 03:00:00	1:00:00	66.7	62.3	63.7
60’	2024-11-12 17:00:00	1:00:00	66.5	62.2	63.8
60’	2024-11-13 20:00:00	1:00:00	65.2	62.6	63.8
60’	2024-11-14 05:00:00	1:00:00	65.7	62.4	63.8
60’	2024-11-13 09:00:00	1:00:00	67.6	62.6	63.9
60’	2024-11-13 23:00:00	1:00:00	65.2	62.8	63.9
60’	2024-11-15 10:00:00	1:00:00	77.1	62.3	63.9
60’	2024-11-12 18:00:00	1:00:00	72.3	62.4	64.0
60’	2024-11-12 21:00:00	1:00:00	65.6	63.0	64.0
60’	2024-11-13 05:00:00	1:00:00	66.0	62.9	64.0
60’	2024-11-14 07:00:00	1:00:00	67.6	62.8	64.0
60’	2024-11-13 01:00:00	1:00:00	67.0	63.0	64.1
60’	2024-11-13 04:00:00	1:00:00	66.2	62.7	64.1
60’	2024-11-13 08:00:00	1:00:00	67.8	62.8	64.1
60’	2024-11-14 00:00:00	1:00:00	66.0	62.4	64.1

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-14 06:00:00	1:00:00	65.9	62.8	64.1
60’	2024-11-15 05:00:00	1:00:00	66.0	62.5	64.1
60’	2024-11-15 12:00:00	0:31:27	78.2	62.2	64.1
60’	2024-11-12 19:00:00	1:00:00	66.1	63.0	64.2
60’	2024-11-12 20:00:00	1:00:00	67.6	63.1	64.2
60’	2024-11-13 02:00:00	1:00:00	66.6	62.9	64.2
60’	2024-11-13 07:00:00	1:00:00	66.6	63.0	64.2
60’	2024-11-15 02:00:00	1:00:00	71.0	62.2	64.2
60’	2024-11-13 00:00:00	1:00:00	65.7	63.2	64.3
60’	2024-11-13 06:00:00	1:00:00	66.6	63.0	64.3
60’	2024-11-14 08:00:00	1:00:00	65.9	63.3	64.3
60’	2024-11-14 10:00:00	1:00:00	70.6	63.2	64.3
60’	2024-11-15 06:00:00	1:00:00	66.2	63.0	64.3
60’	2024-11-12 23:00:00	1:00:00	66.2	63.2	64.4
60’	2024-11-13 03:00:00	1:00:00	66.4	62.9	64.4
60’	2024-11-14 13:00:00	1:00:00	66.4	63.1	64.4
60’	2024-11-15 09:00:00	1:00:00	68.5	62.6	64.4
60’	2024-11-12 22:00:00	1:00:00	67.0	63.1	64.5
60’	2024-11-14 09:00:00	1:00:00	70.5	63.3	64.5
60’	2024-11-14 11:00:00	1:00:00	66.3	63.4	64.5
60’	2024-11-14 12:00:00	1:00:00	67.2	63.1	64.5
60’	2024-11-14 14:00:00	1:00:00	66.1	63.1	64.5
60’	2024-11-15 01:00:00	1:00:00	66.3	62.9	64.5

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-15 00:00:00	1:00:00	66.1	63.2	64.6
60’	2024-11-14 22:00:00	1:00:00	66.6	63.2	64.7
60’	2024-11-14 23:00:00	1:00:00	66.4	63.5	64.7
60’	2024-11-15 07:00:00	1:00:00	66.3	63.3	64.7
60’	2024-11-14 20:00:00	1:00:00	66.8	63.4	64.8
60’	2024-11-14 21:00:00	1:00:00	67.5	63.3	64.8
60’	2024-11-14 15:00:00	1:00:00	67.8	63.4	64.9
60’	2024-11-14 16:00:00	1:00:00	69.1	63.3	64.9
60’	2024-11-14 17:00:00	1:00:00	67.0	63.0	64.9
60’	2024-11-14 18:00:00	1:00:00	66.6	63.5	64.9
60’	2024-11-14 19:00:00	1:00:00	69.6	63.2	64.9
60’	2024-11-15 08:00:00	1:00:00	67.1	63.8	65.1

Table 11 - Noise Monitor 3, Location GPS 35.696326° N, GPS -80.376985° W, November 12 to 15, 2024, A-weighted (dBA)

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-12 16:00:00	0:20:34	84.3	42.0	61.2
60’	2024-11-12 17:00:00	1:00:00	72.5	42.8	51.7
60’	2024-11-12 18:00:00	1:00:00	72.2	42.5	49.4
60’	2024-11-12 19:00:00	1:00:00	72.3	42.1	48.7
60’	2024-11-12 20:00:00	1:00:00	63.0	41.0	44.5
60’	2024-11-12 21:00:00	1:00:00	83.0	40.4	52.4
60’	2024-11-12 22:00:00	1:00:00	50.7	38.3	42.1
60’	2024-11-12 23:00:00	1:00:00	79.4	38.2	50.4

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-13 00:00:00	1:00:00	78.0	39.5	51.5
60’	2024-11-13 01:00:00	1:00:00	80.1	40.0	51.1
60’	2024-11-13 02:00:00	1:00:00	76.4	40.0	49.6
60’	2024-11-13 03:00:00	1:00:00	80.2	40.4	51.7
60’	2024-11-13 04:00:00	1:00:00	80.3	40.3	56.8
60’	2024-11-13 05:00:00	1:00:00	80.1	41.0	59.7
60’	2024-11-13 06:00:00	1:00:00	84.8	42.2	62.5
60’	2024-11-13 07:00:00	1:00:00	81.2	42.2	60.4
60’	2024-11-13 08:00:00	1:00:00	82.6	40.0	58.9
60’	2024-11-13 09:00:00	1:00:00	82.2	39.1	58.1
60’	2024-11-13 10:00:00	1:00:00	80.0	37.8	57.6
60’	2024-11-13 11:00:00	1:00:00	82.8	37.2	57.1
60’	2024-11-13 12:00:00	1:00:00	77.8	36.5	56.2
60’	2024-11-13 13:00:00	1:00:00	80.7	36.8	56.9
60’	2024-11-13 14:00:00	1:00:00	78.3	35.3	54.1
60’	2024-11-13 15:00:00	1:00:00	85.7	38.0	55.9
60’	2024-11-13 16:00:00	1:00:00	81.8	35.5	56.1
60’	2024-11-13 17:00:00	1:00:00	74.2	38.9	52.1
60’	2024-11-13 18:00:00	1:00:00	72.1	40.2	50.1
60’	2024-11-13 19:00:00	1:00:00	70.5	40.2	45.3
60’	2024-11-13 20:00:00	1:00:00	55.7	37.5	41.5
60’	2024-11-13 21:00:00	1:00:00	76.1	37.3	46.8
60’	2024-11-13 22:00:00	1:00:00	56.0	39.5	42.8

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-13 23:00:00	1:00:00	76.8	39.1	49.5
60’	2024-11-14 00:00:00	1:00:00	77.2	37.4	46.8
60’	2024-11-14 01:00:00	1:00:00	45.6	36.3	39.3
60’	2024-11-14 02:00:00	1:00:00	78.1	37.0	51.8
60’	2024-11-14 03:00:00	1:00:00	82.2	37.5	55.7
60’	2024-11-14 04:00:00	1:00:00	85.2	35.9	59.3
60’	2024-11-14 05:00:00	1:00:00	83.5	38.1	59.9
60’	2024-11-14 06:00:00	1:00:00	83.7	41.0	63.5
60’	2024-11-14 07:00:00	1:00:00	82.3	40.4	62.6
60’	2024-11-14 08:00:00	1:00:00	83.8	42.2	62.2
60’	2024-11-14 09:00:00	1:00:00	80.7	38.3	59.1
60’	2024-11-14 10:00:00	1:00:00	80.0	38.6	59.1
60’	2024-11-14 11:00:00	1:00:00	87.3	36.7	60.0
60’	2024-11-14 12:00:00	1:00:00	79.1	38.3	56.2
60’	2024-11-14 13:00:00	1:00:00	81.5	44.8	57.7
60’	2024-11-14 14:00:00	1:00:00	83.3	47.8	59.4
60’	2024-11-14 15:00:00	1:00:00	78.9	47.0	55.8
60’	2024-11-14 16:00:00	1:00:00	76.8	46.6	55.5
60’	2024-11-14 17:00:00	1:00:00	78.1	45.6	53.1
60’	2024-11-14 18:00:00	1:00:00	78.0	43.4	53.6
60’	2024-11-14 19:00:00	1:00:00	52.7	43.4	46.7
60’	2024-11-14 20:00:00	1:00:00	57.7	43.4	46.7
60’	2024-11-14 21:00:00	1:00:00	54.7	42.8	45.6

Type	Start	Duration	LASmax [dB]	LASmin [dB]	LAeq [dB]
60’	2024-11-14 22:00:00	1:00:00	57.9	43.1	45.8
60’	2024-11-14 23:00:00	1:00:00	52.7	40.9	44.9
60’	2024-11-15 00:00:00	1:00:00	83.1	40.2	54.8
60’	2024-11-15 01:00:00	1:00:00	81.2	41.2	55.6
60’	2024-11-15 02:00:00	1:00:00	81.8	42.8	54.6
60’	2024-11-15 03:00:00	1:00:00	83.2	42.4	58.3
60’	2024-11-15 04:00:00	1:00:00	82.6	42.8	58.8
60’	2024-11-15 05:00:00	1:00:00	83.8	42.6	57.4
60’	2024-11-15 06:00:00	1:00:00	87.5	48.4	61.8
60’	2024-11-15 07:00:00	1:00:00	80.5	50.3	60.2
60’	2024-11-15 08:00:00	1:00:00	83.0	51.2	59.2
60’	2024-11-15 09:00:00	1:00:00	80.2	49.2	58.2
60’	2024-11-15 10:00:00	0:38:41	78.3	43.7	57.1

Appendix B - Background on Sound and Sound Levels

Sound is produced by minute fluctuations 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 a pressure of 1 Pascal (Pa) 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 were 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, the results are labeled 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. Rural residential communities can be below 40 dBA, especially in less densely populated areas. More urban settings are often above 50 dBA, especially near highways.

Maximum noise levels are used to describe instantaneous events. 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 when levels are changing rapidly. To evaluate environmental noise sound, levels are averaged over a 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 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 (07:00 to 22:00 hours) to 10 times the sound energy during the nighttime (22:00 to 07:00 hours). This is equivalent to a 10 dBA increase added at night, to 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 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 L_{90}.

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 a 6dB loss per doubling of distance. This is derived from the inverse square law. 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, which impacts energy reduction. Over long distances, atmospheric absorption reduces sound primarily at higher frequencies. Beyond 1000 feet or so, this effect and the inverse square law effect dramatically reduce higher-frequency sound energy; 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 reduced on sunny afternoons when the air near the ground is warmer than air higher in the sky, causing the sound to curve 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 and barriers. Sound levels can be significantly reduced upwind from a source and increased 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.

Appendix C – US DOT Federal Railroad Administration Crossing Inventory Forms

DUKE ENERGY CAROLINAS, LLC
BUCK ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B

LITERATURE REVIEW AND WINDSHIELD STUDY OF A PROPOSED GENERATION FACILITY AT DUKE ENERGY'S BUCK POWER PLANT

Brockington
CULTURAL RESOURCES CONSULTING

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

November 21, 2024

Re: *Literature Review and Windshield Study of a proposed generation facility at Duke Energy's Buck Power Plant, Rowan County, North Carolina*

On September 16, 2024, Pike Engineering, LLC contracted with Brockington and Associates, Inc. (Brockington) to conduct a literature review for a proposed generation facility at Duke Energy's existing Buck power plant in Rowan County, North Carolina. The study area includes the proposed project tract itself and a surrounding 2-mile buffer (Study Area). This investigation is a due-diligence effort designed for planning purposes so that any potentially significant cultural resources may be considered in advance of construction. This level of effort does not constitute fulfilment 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.

Literature Review for Known Cultural Resources

Previous Archaeological Surveys and Archaeological Sites

The literature review for the Study Area included a data search for previously recorded cultural resources, investigations, archaeological sites, and historic architectural resources. Data for previous cultural resources surveys and known archaeological sites and surveys were collected in person from the North Carolina State Historic Preservation Office (SHPO), Office of State Archaeology (OSA) in Raleigh, North Carolina. There are thirteen noted environmental review efforts (Section 106 or due diligence) within the Study Area (Table 1; Figure 1). Ten of those environmental review reports cross reference or accompany the thirteen previous investigations. A total of three reports have yet to be digitized in the OSA GIS Files.

There are a total of 54 archaeological sites within the Study Area (Table 2; Figure 2). Fifty-three sites are not eligible for the National Register of Historic Places (NRHP) or are unassessed. Those with undetermined status (n=20) would need field verification or revisits to acquire an eligibility determination, but none of these are within the project tract. One site, DV654, also known as Camp Yadkin (1.05-mi northeast of the project tract) has been determined eligible for the NRHP.

Currently, there are no previously recorded archaeological sites within the project tract. The nearest archaeological sites are RW208, RW240, DV15, DV331, and DV332. These five sites are within .6 miles of the project tract. Three of the sites, DV15, DV331 and RW208, are precontact lithic scatter sites. DV332 is a precontact lithic scatter and historic artifact scatter sites, and RW240 is a precontact and historic site with above-ground remains. Three of these sites, DV15, DV331 and DV332, have not been assessed for NRHP eligibility, while sites RW208 and RW240 have been determined not eligible for the NRHP.

Table 1. Previous cultural investigations in the study area.

Bib. Reference	Name	ER Number	Digital Status
1755	Archaeological study, Replacement of Bridge 601-63-30 over South Yadkin River	ER 84-7432	Digitized
3439	Archaeological survey of Salisbury's Proposed Wastewater Treatment Plant Sites	ER 95-7033	Digitized
4537	Archaeological Survey of I85 from North of SR 2120 to US 29	N/A	Digitized
4694	Phase I Archaeological Survey and Architectural/Historical Assessment of a Proposed Combustion Turbine Site	ER 01-8060	Digitized
5512	Assessment of NHRP Eligibility of 4 Proposed Historic Resources Associated with I85	N/A	Digitized
5597	Assessment of NRHP Eligibility of Yadkin River Crossing Historic District Associated with I85	ER 92-8556	Digitized
6057	Cultural Resources Survey of Proposed Buck Station Combined Cycle Project	ER 01-8060	Digitized
6209	Phase I Cultural Resources Survey of Approximately 105 miles Along PNG Buck	ER 08-1422	Digitized
6754	Archaeological Survey of Grants Creek Sand Dredging Operation	N/A	Digitized
7540	Recon. Archaeological Survey for Proposed I85 Business Park	ER 14-1900	Digitized
7731	Addendum. Archaeological Assessment of Beallmont House Footprint	ER 14-1901	Digitized
8585	Archaeological Survey of Little Land Development Tract	ER 14-1900	Digitized
8659	Archaeological Survey of Proposed Wetlands Impact Areas along Long Ferry Development Tract	ER 22-1398	Digitized
	Fort York Master Plan	ER 17-2914	Not Digitized
	Construction Industrial Development along Long Ferry Road	ER 22-1398	Not Digitized
	Middle Mile Broadbank Project (37-40-MM177)	ER 24-0773	Not Digitized

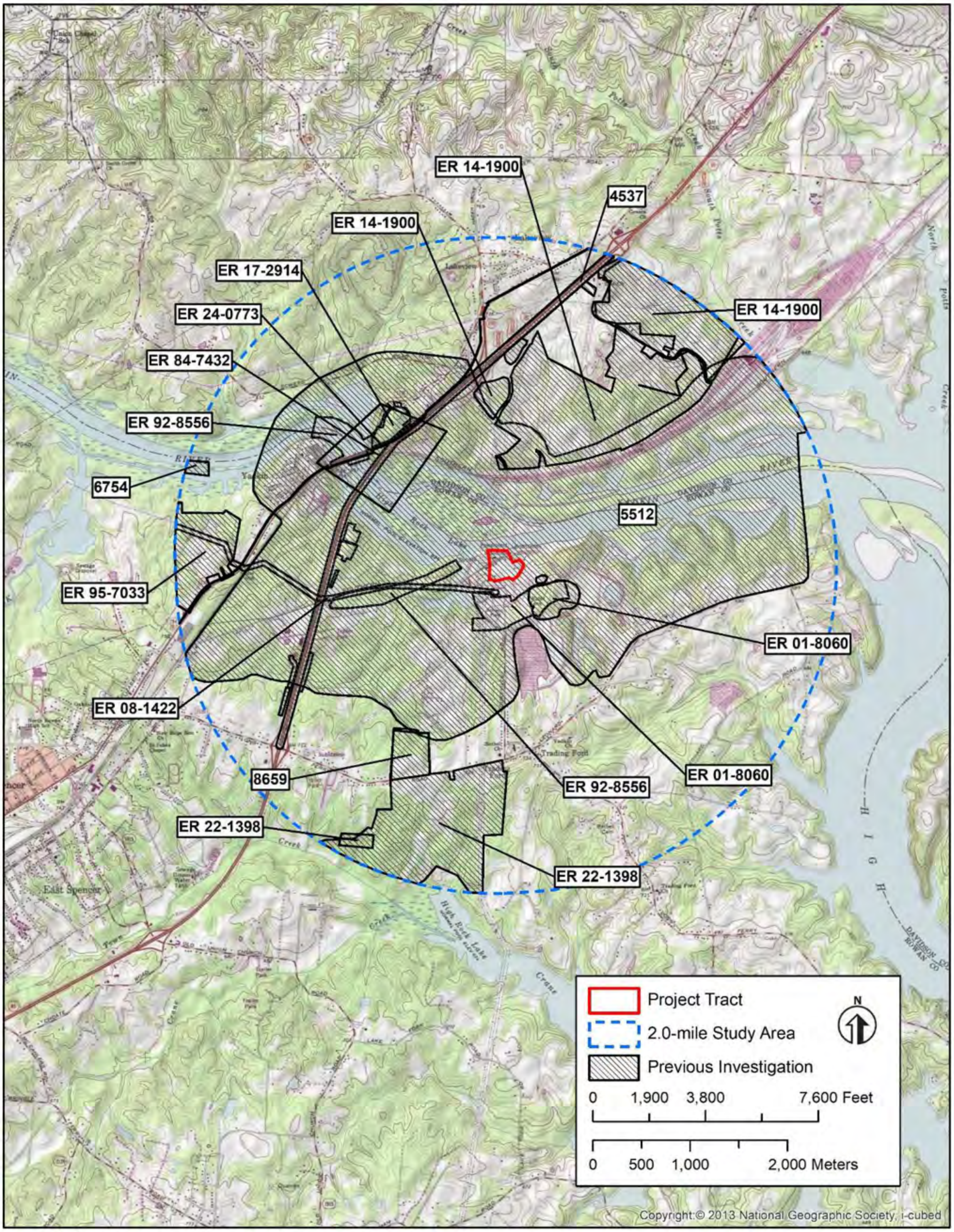


Figure 1. Previous cultural investigations in the study area.

Table 2. Previously identified archaeological sites in the study area.

Site Number	Environmental Review Reference	Bibliographic Reference	Status	SHPO Notes
DV1	N/A	No Data	No Data	No Data
DV2	N/A	No Data	No Data	No Data
DV14	N/A	No Data	No Data	No Data
DV15	N/A	No Data	No Data	No Data
DV16	N/A	No Data	No Data	No Data
DV17	N/A	No Data	No Data	No Data
DV326	N/A	112	No Data	No Data
DV327	N/A	112	No Data	No Data
DV329	N/A	112	No Data	No Data
DV330	N/A	112	No Data	No Data
DV331	N/A	112	No Data	No Data
DV332	N/A	112	No Data	Second Point?
DV333	N/A	112	No Data	No Data
DV338	N/A	112	No Data	No Data
DV430	31DV142	No Data	No Data	No Data
DV651	ER92-8556	4537	NE	No Data
DV652	ER92-8556	4537	NE	No Data
DV653	ER92-8556	4537	NE	No Data
DV654	ER92-8556; ER 17-291	4537	DE	Fort York, Camp Yadkin
DV770	ER 14-1900	8585	NE	Site 01
DV771	ER 14-1900	8585	NE	Site 02
DV772	ER 14-1900	8585	NE	Site 03
DV773	ER 14-1900	8585	NE	Site 04
DV776	ER 14-1900	8585	NE	Site 07
DV780	ER 14-1900	8585	NE	Site 11
DV781	ER 14-1900	8585	NE	Site 12
DV782	ER 14-1900	8585	NE	Site 13
DV783	ER 14-1900	8585	NE	Site 14
DV784	ER 14-1900	8585	NE	Site 15; associated with DV0321 Clark Homeplace, but may have been location of Grubb/Little House
DV785	ER 14-1900	8585	NE	Site 16
DV786	ER 14-1900	8585	NE	Site 17
DV787	ER 14-1900	8585	NE	Site 18
DV788	ER 14-1900	8585	NE	Site 19
DV789	ER 14-1900	8585	NE	Site 20
DV790	ER 14-1900	8585	NE	Site 21
DV791	ER 14-1900	8585	NE	Site 22
DV792	ER 14-1900	8585	NE	Site 23
DV793	ER 14-1900	8585	NE	Site 24
DV794	ER 14-1900	8585	NE	Site 25
DV795	ER 14-1900	8585	NE	Site 26

DV796	ER 14-1900	8585	NE	Site 27
DV797	ER 14-1900	8585	NE	Site 28
RW17	N/A	No Data	No Data	No Data
RW122	31DV79	No Data	No Data	No Data
RW139	93E-4300-0943	3439	No Data	Sowers Farm #1
RW142	93E-4300-0943	3439	No Data	Sowers Farm #4
RW202	ER92-8556	4537	NE	Duke Power
RW203	ER92-8556	4537	NE	No Data
RW204	ER92-8556	4537	NE	No Data
RW205	ER92-8556	4537	NE	No Data
RW208	ER01-8060	4694	NE	No Data
RW240	ER 01-8060	6057	NE	No Data
RW243	N/A	No Data	No Data	No Data
RW282	ER 22-1398	8659	NE	No Data

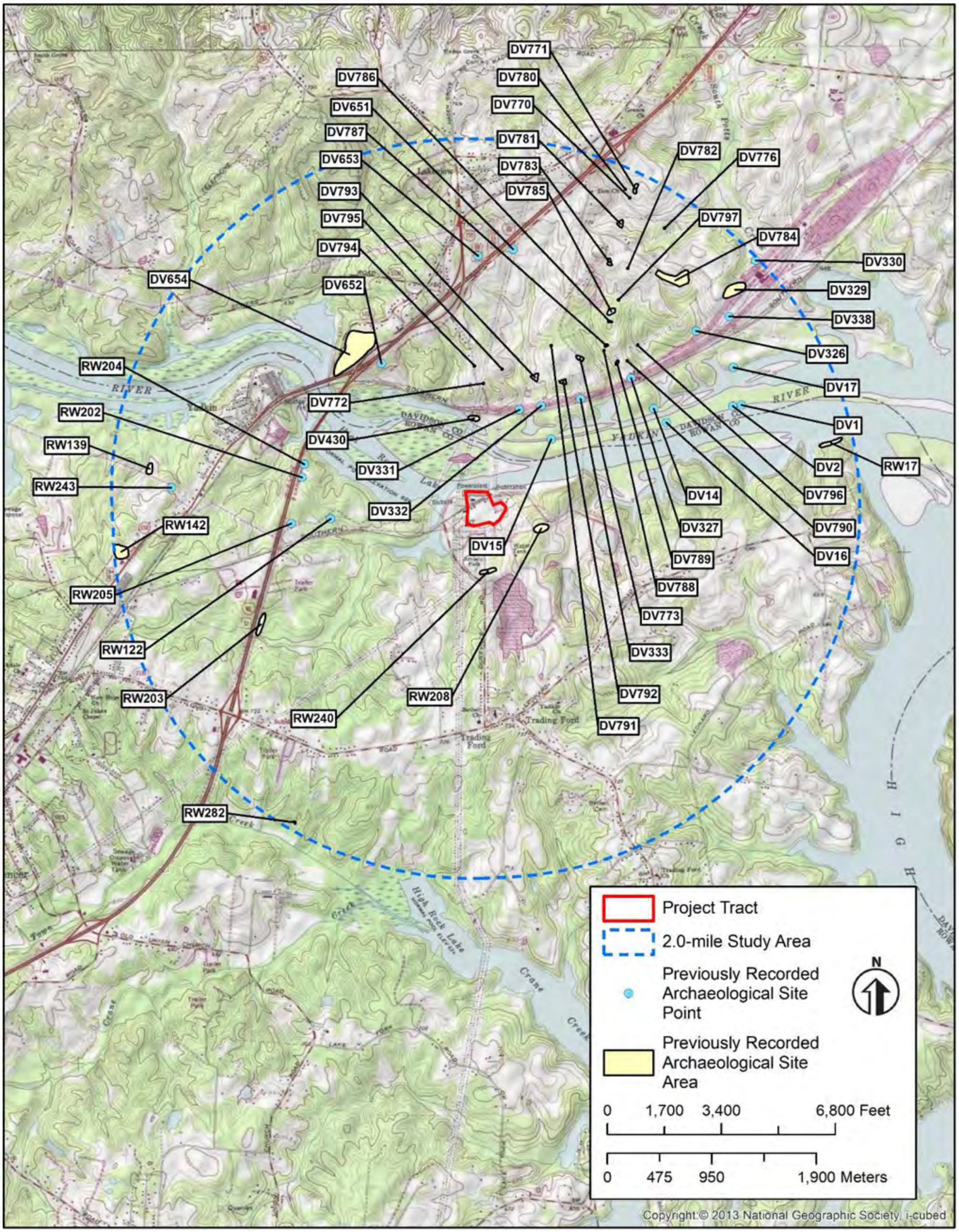


Figure 2. Previously identified archaeological sites in the study area.

Previously Recorded Historic Architecture

Data collection for historic architectural properties included a review of the North Carolina SHPO's GIS data website (HPOWEB) (see Figure 3; Table 3). The HPOWEB contains information regarding historic architectural resources and NRHP-listed properties. We also reviewed information from the Rowan County and Davidson County Historic Resources Commission (HRC), which included a listing and mapping for local historic landmarks, districts, and points of interest. In general, most previously recorded resources are located within the NRHP-eligible district or are individual resources (Table 3). There is one NRHP-listed district (Yadkin River Crossing Historic District), one Study Listed District (Trading Ford District), one NRHP-listed historic resource (Wilcox Bridge), five Study Listed individual historic resources (of which 2 are noted by SHPO as "gone" or "destroyed"), and seven unassessed historic resources within the study area.

Table 3. Previously recorded historic resources in the study area.

Site ID	Property Name	Description	NRHP Status
Historic Districts			
N/A	Yadkin River Crossings Historic District	1770-1953 district significant in areas of Transportation and Military History	Determined Eligible
N/A	Trading Ford District	No information	Study List
Individual Resources			
DV0320	Ellis Office	No information	Unassessed
DV0321	Clark Homeplace	c. 1930 2-story double pile frame Victorian house w/ wraparound 1-story porch, cross gable slate roof & outbuildings	Unassessed/Gone
DV0698	Bridge No. 46 (US 29/70 bridge)	No information	Individually Not Eligible/Contributing to Yadkin River Crossings Historic District
DV1058	Trading Ford Road and Monument Park	1953 steel stringer bridge	Study List
RW0691	Erlanger Mills (NC Finishing Co.)	No information	Unassessed
RW0765	Wilcox Bridge (Bridge No. 46, Yadkin River Bridge)	1922 technologically significant, reinforced concrete, open spandrel arch (DOT 790046)	Determined Eligible/Contributing to Yadkin River Crossings Historic District
RW0901	Dukeville School	No information	Study List
RW0934	Yadkin River Railroad Bridge	1907 & 1919 riveted steel deck truss bridges	Unassessed
RW1579	Yadkin Trading Ford and Ferry	No information	Study List/Gone
RW1580	Greene's Crossing at Trading Ford & military camps	No information	Study List/Destroyed
RW1581	Camp Yadkin/Fort York (York Hill)	No information	Study List/Contributing to Yadkin River Crossings Historic

			District
N/A	Big Island	No information	Unassessed/Contributing to Yadkin River Crossings Historic District
N/A	Trading Path Road Trace	0.8-mile trace of 17th century road bed	Unassessed/Contributing to Yadkin River Crossings Historic District
N/A	Beard's Bridge Piers/Piedmont Toll Bridge Site	1900 metal truss bridge built upon stone piers of c. 1820 bridge; Piedmont Toll Bridge removed in 1920s; stone piers still extant	Unassessed/Contributing to Yadkin River Crossings Historic District

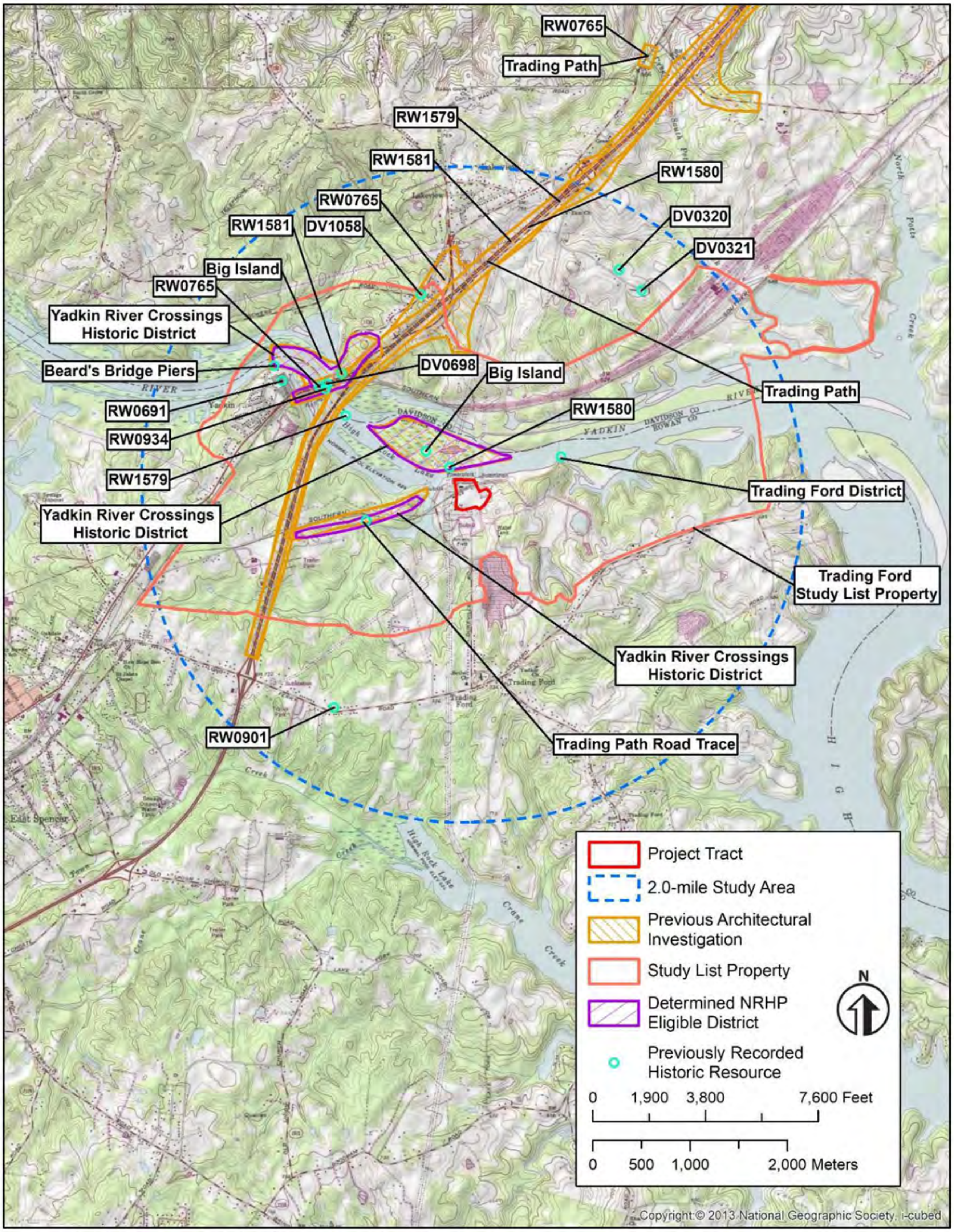


Figure 3. Previously recorded historic resources within the study area.

The project tract is currently located within a "Trading Ford District" identified during 2003 Section 106 consultation efforts for multiple area projects. This district was placed on the North Carolina State Study List, which allows properties to be further investigated for potential eligibility for the NRHP. Through the Section 106 process for the area projects, the North Carolina SHPO identified an NRHP eligible Yadkin River Crossings District, which included four discontinuous properties: Fort York or Camp Yadkin, Wilcox Bridge (US 29 Bridge No. 1), US 29 Bridge No. 2, North Carolina Railroad Bridge No. 1, North Carolina Railroad Bridge No. 2, a 0.8 mile trace of the Trading Path Road, and Big Island. While the Trading Ford District remains on the state's Study List, and mapped within their online data, it is not currently considered an eligible district.

The NRHP-eligible Yadkin River Crossing Historic District has three discontinuous sections located within proximity to the existing Buck power plant property. These sections are located approximately .18 miles north, .31-miles east and 1.01-miles northeast of the project tract. The district was found eligible under *Criterion A* for its association with transportation history and under *Criterion D* for archaeological potential. This district was developed within the existing viewshed of industrial and commercial properties, including the railway yard on the northern side of the Yadkin River and the Buck Steam Plant on the opposite bank. There are seven contributing resources within the district (the Wilcox Bridge, US 29/70 Bridge, Beard's Bridge, Fort York or Camp Yadkin, Trading Path, Big Island, and North Carolina Railroad Bridges No. 1 and No. 2).

Beyond these two districts, the North Carolina SHPO GIS data includes five previously recorded individual properties. Resource RW0691 (Erlanger Mills [North Carolina Finishing Company]), was surveyed in 1977, but has not been assessed for NRHP eligibility. Resource RW1579 (Yadkin Trading Ford and Ferry) was surveyed in 2003. While officially on the Study list, the SHPO notes it is no longer extant due to the construction of High Rock Lake. Similarly, Study List Resource RW1580 (Greene's Crossing at Trading Ford and Military Camp) is also noted as having been destroyed. Resource RW0901, the Dukeville School, has also been placed on the North Carolina State Study List.

The remaining four resources within the Study Area are in Davidson County. Resource DV0698 (Bridge No. 46 (US29/70 Bridge) was a 1953 steel stinger bridge. This bridge is not individually eligible for the NRHP, but it does contribute to the eligibility of the Yadkin River Crossing Historic District. Resource DV1058 is the Trading Ford Road and Monument Park. It was surveyed in 2010; however, there is no further information on this resource concerning its NRHP eligibility, but it is on the Study List. The SHPO database has little information on Resource DV0320 (Ellis Office); it has no eligibility determination, so should be considered as unassessed. Resource DV0321, the Clark Homeplace, has no NRHP assessment, but SHPO records note that it has been destroyed.

Cultural Resources within the Project Tract

No archaeological sites have been recorded within the project tract; however, two previous investigations have been conducted close to the project tract within the Buck Power Plant property. The first investigation was conducted by Garrow and Associates, Inc. in 2000. This investigation was conducted ahead of proposed plant and fuel tank construction. Investigators reported that the project tract had been "subjected to moderate to severe erosion and other disturbances (Pickett, Nichols, and Idol 2000)." No above-ground historic resources were identified, and one archaeological site, RW208, was identified. This was a precontact site determined not eligible for the NRHP.

Brockington conducted a cultural resources investigation in 2007 ahead of the proposed 37-acre Buck Station combined cycle project (Friedemann and Stallings 2007). Investigators found a substantial amount of surface and subsurface soil disturbance in the project tract due to construction of the Buck Steam Station in the 1920s. These previous disturbances resulted in a low probability of recovering contextually intact archaeological deposits. One archaeological site, RW240 was identified during the investigation and a total of 80 artifacts were recovered from the site. These included both precontact and historic artifacts. These artifacts consisted of lithic debris, precontact pottery sherds, ball glass jar sherds, and other glass sherds. The precontact artifacts were dispersed throughout the area that was once used as the Buck housing complex. Due to these precontact scatters being out of context and common for the area, they were determined as not eligible for the NRHP. The housing site remains were also determined not eligible. One local informant/stakeholder also raised concerns regarding the presence of a Revolutionary War Battlefield and the Battle of Camp Yadkin in the area. Brockington conducted metal detecting in the area and did not recover any military artifacts.

The report also addressed any potential visual impact to the NRHP eligibility of the Yadkin River Crossings Historic District. Due to the district having been developed within the viewshed of industrial facilities such as plants, coal piles, substations, ash basins, and other large above-ground components, the construction of the new combined cycle facility was recommend as not having an adverse effect on its NRHP eligibility status. The North Carolina SHPO concurred with the report's findings.

Duke Energy proposes to construct a new energy generation facility at the Buck power plant. During the 1920s, Duke Power opened its Buck Steam Plant on the banks of the Yadkin River. The property consisted of the steam station, company housing for the employees called "Dukeville Village," a large area for coal storage, and other support facilities including rail spurs, substations, transformer yards, parking lots, and roads. The employee housing area was located south of the present-day coal storage and near the vicinity of the existing ash basin. The housing was demolished during the mid-to late-twentieth century before the ash basin was constructed. A new natural gas plant opened on-site in 2011, and the old Buck steam plant was demolished in 2018. In addition, the former coal storage area, which covered the present project area, was cleared and remediated. In 2020, ash basin excavation and clearing were initiated, and the area has since been graded and filled. Therefore, the project tract, and the power plant property, have changed significantly since initial construction in the 1920s (see Figures 4-7).

The new plant site will be in areas previously disturbed through construction and demolition of both the Buck Steam Plant and the associated coal storage area. Current aerials show this area to generally contain only clay and grass and there is likely limited undisturbed ground remaining. Previous cultural investigations on the Duke Energy property illustrated ground disturbances, eroded topsoil, and exposed surface clay that limited the potential for finding intact archaeological sites (Pickett, Nichols, and Idol 2000; Friedemann and Stallings 2007). Those archaeological sites that were identified ultimately lacked stratigraphy and context. Based on land use as evidenced in historic aerials and the results of previous investigations, we recommend that there is little to no archaeological potential within the project tract and archaeological investigations are not warranted. Further, regarding the Trading Ford Historic District, like the conclusions reached in the most recent report for the property (Friedemann and Stallings 2007), due to the continual evolution of industrial facilities within the property over the previous 100 years, there should be no adverse visual effects to the district.

Summary

In summary there have been 13 previous cultural investigations, and 54 previously identified archaeological sites within the broader study area. No investigations have occurred within the proposed project tract and no cultural resources have been identified within the project tract. However, two previous investigations have been conducted in proximity and both have illustrated the presence of disturbed soils and low potential for finding intact archaeological sites. Therefore, an archaeological study of the project tract is not recommended. As to historic resources, there is one NRHP-eligible district, the Yadkin River Crossings District, located within proximity to the project tract (approximately .18-miles north, .31-miles east and 1.01-miles northeast). The construction of the new generation facility will have no effect on the viewshed of the Yadkin River Crossings District due to it being developed within the existing viewshed of the industrial properties.

The attached resource maps (Figures 1-7) detail the findings from the literature review. Figures 4-7 help demonstrate the changes that have occurred in the project tract over the years. Should you have any questions about the GIS data or property recommendations, please do not hesitate to send me an email (patriciastallings@brockingtoncrm.com) or call at 678-638-4126.

Regards,

F. Patricia Stallings
Senior Historian

Assisted by

Kim Singley
Archaeologist

Figure 4. Historic aerial showing the study area in 1951 (USGS 1951).

Figure 5. Historic aerial showing the study area in 1960 (USGS 1960).

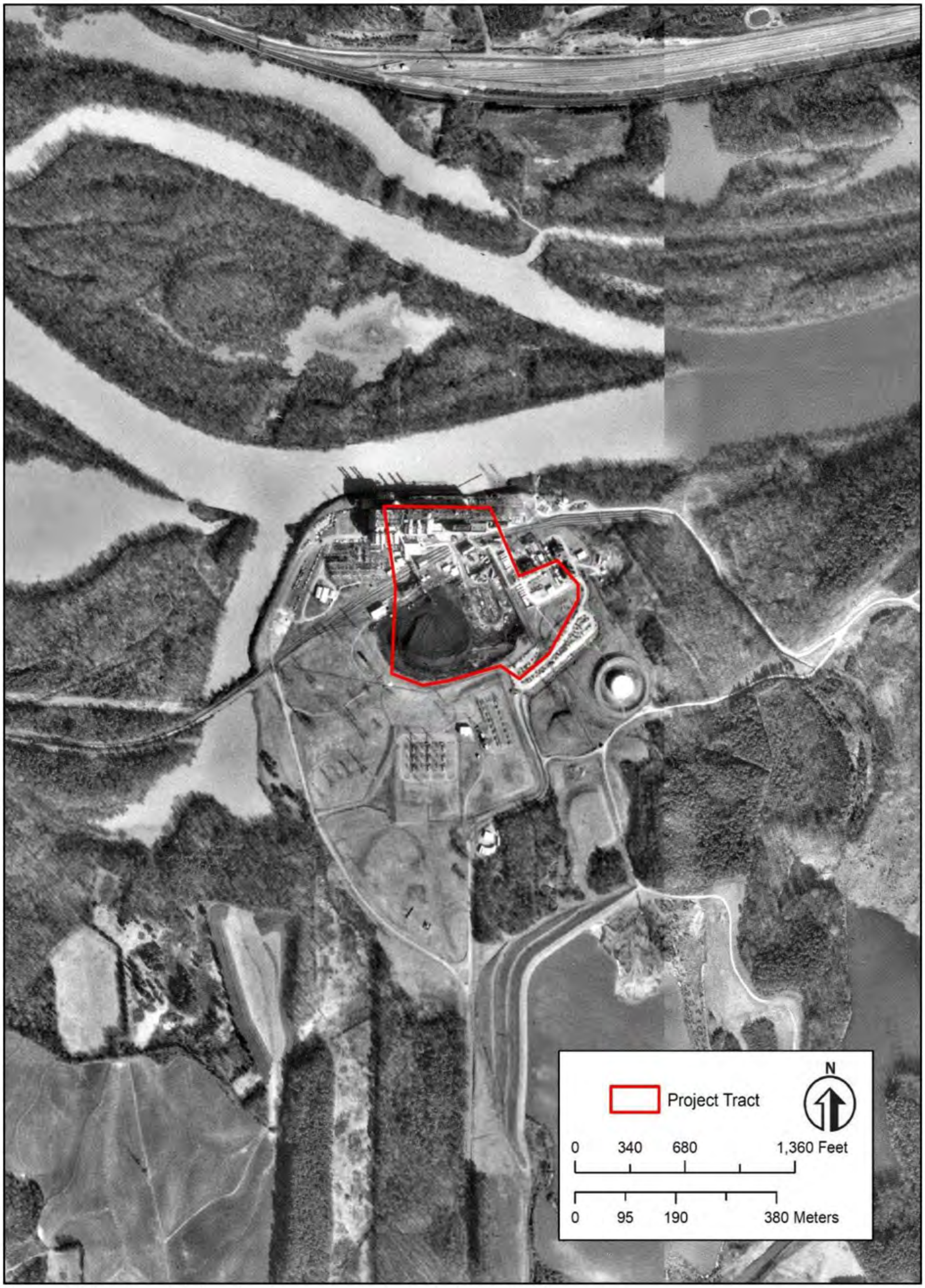


Figure 6. Historic aerial showing the study area in 1993 (USGS 1993).

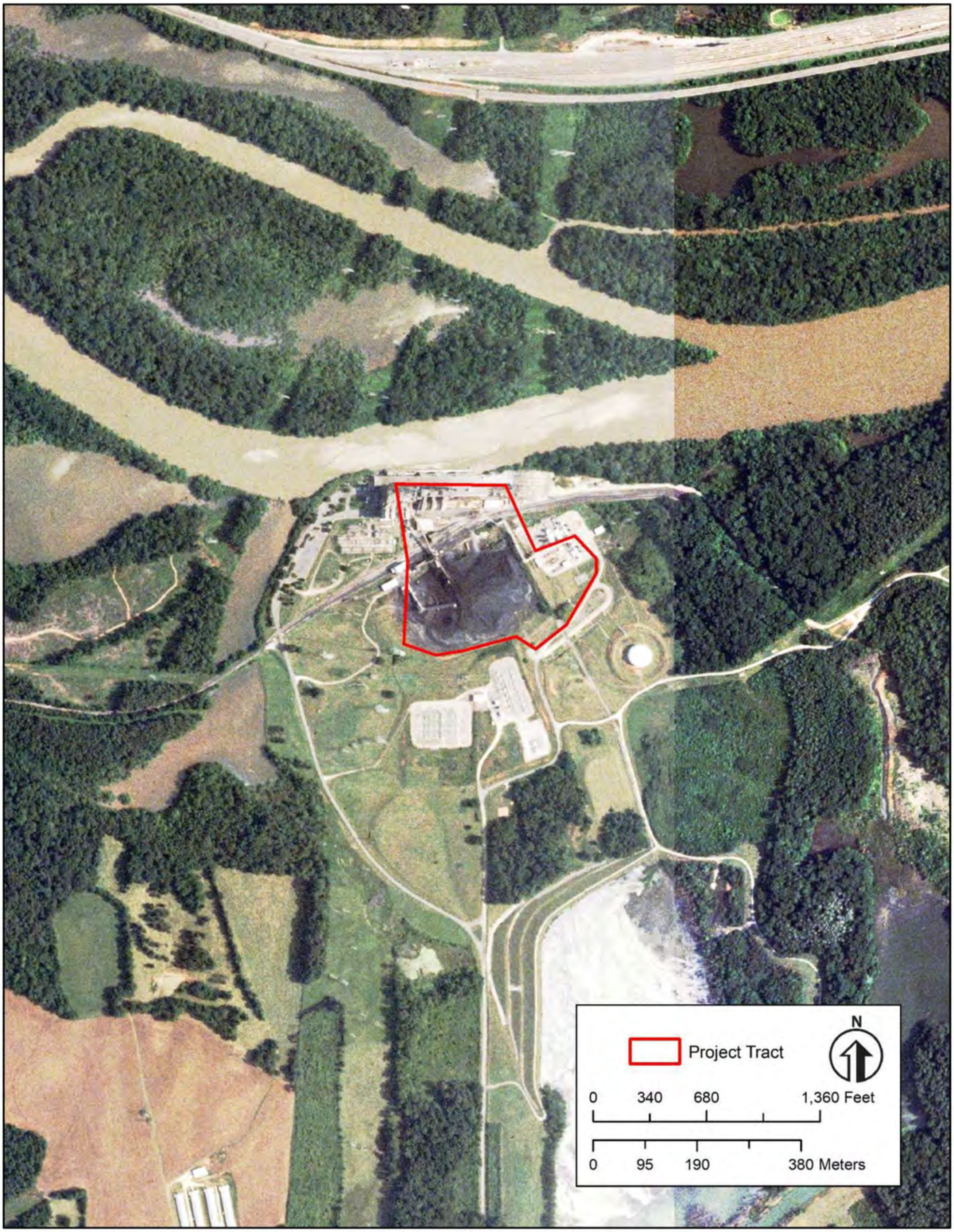


Figure 7. 2006 aerial image showing the study area (USGS 2006).

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2023 *FIELD SURVEY AND ELIGIBILITY EVALUATION Western North Carolina Railroad/Richmond and Danville Railroad/Southern Railway/Norfolk Southern Railway, Rowan, and Iredell Counties.*

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1999 *Reconstruct 1-85 to accommodate 8 to 10 lanes from north of SR 2110 (Exit 81) in Rowan County to USS 29-52-70/1-85 Business (Exit 87) in Davidson County, and Rowan Counties.*

Brown, Marvin A., Daniel F. Cassidey, Mary Pope Farr, and Matt Wilkerson

2005 *Assessment of National Register Eligibility of Yadkin River Crossings Historic District Associated with Interstate 85 from North of SR 2120 (Exit 81) to US 29-52-70/1-85 Business (Exit 87), Rowan and Davidson Counties, North Carolina.*

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2007 *Cultural Resources Survey of the Proposed Buck Station Combined Cycle Project.*

Historic, Aerials

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DUKE ENERGY CAROLINAS, LLC
BUCK ENERGY COMPLEX

PRELIMINARY PLANS FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX C

NATURAL RESOURCE ASSESSMENT AND AQUATIC RESOURCES DELINEATION

NATURAL RESOURCE ASSESSMENT AND AQUATIC RESOURCES DELINEATION

BUCK SIMPLE CYCLE GENERATION

PIKE PROJECT NO. 24-35987-000

ROWAN COUNTY, NC

APRIL 2025

Prepared For:

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Abbreviations

AJD	Approved Jurisdictional Determination
BMP	Best Management Practice
CCA	Candidate Conservation Agreement
CDP	Census-designated Place
CWA	Clean Water Act
DBH	Diameter Base Height
DHEC	South Carolina Department of Health and Environmental Control
DWM	North Carolina Division of Waste Management
DWR	Noth Carolina Division of Water Resources
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
IPaC	Information Planning and Conservation Service
JD	Jurisdictional Determination
NCDEQ	North Carolina Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
NRA	Natural Resource Assessment
NRCS	Natural Resource Conservation Service
PJD	Preliminary Jurisdictional Determination
PSA	Project Study Area
RHA	Rivers and Harbors Act
ROW	Right-of-way
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish & Wildlife Service
WOTUS	Waters of the U.S.

1 INTRODUCTION

On behalf of Duke Energy (“Duke”), Pike Engineering (“Pike”) conducted a Natural Resource Assessment (NRA) and Aquatic Resources Delineation for a project known as “Buck Simple Cycle Generation”. The NRA included an office review of natural resource databases, Federal listed species database, and field surveys to determine the extent of jurisdictional aquatic resources and the presence or absence of potentially suitable habitat and occurrences of federal- and state-listed species.

Field surveys were conducted in November 2024 by Pike staff. Aquatic resources were sequentially flagged by feature type, with pink and yellow flagging representing wetland boundaries, and pink flagging representing potential stormwater features that exhibit stream and wetland characteristics. The extent of aquatic resources was documented using a GPS unit with sub-meter accuracy, such as a Trimble GeoExplorer 3000 Series or similar device.

2 LOCATION OF THE PROJECT STUDY AREA

For the purpose of this report, the Project Study Area (PSA) consists of an approximate 67-acre site, as depicted in **Appendix A, Figure 1**. The PSA lies in Salisbury in northeastern Rowan County, North Carolina.

3 EXISTING CONDITIONS

3.1 Vegetation

The PSA contained several different vegetation communities. These include maintained and unmaintained open areas, scrub/shrub, forested areas, transmission ROW, wetlands, and potential stormwater features. Based upon the Classification of the Natural Communities of North Carolina – Fourth Approximation (Schafale, 2012), forested portions of the site can be characterized as Mesic Mixed Hardwood (Piedmont Subtype).

The maintained open areas consisted of various turfgrasses with or without typical turfgrass weeds, such as dandelion (*Taraxacum sp.*), wild strawberry (*Fragaria sp.*), and clover (*Trifolium spp.*).

Unmaintained open areas consisted of a turfgrass base that has been heavily filled in with other species. These include common mullein (*Verbascum Thapsus*), Johnsongrass (*Sorghum halepense*), ragweed (*Ambrosia artemisifolia*), and broomsedge (*Andropogon virginicus*).

Scrub/Shrub and transmission ROW areas consisted of kudzu (*Pueraria spp.*), blackberry (*Rubus spp.*), pokeweed (*Phytolacca americana*), broomsedge, Johnsongrass, multiflora rose (*Rosa multiflora*), goldenrod (*Solidago sp.*); additional tree sapling species included winged elm (*Ulmus alata*) and sweetgum (*Liquidambar styraciflua*).

Forested areas consisted of a mesic mixed community, consisting predominantly of tulip poplar (*Liriodendron tulipifera*), willow oak (*Quercus phellos*), winged elm, and red maple (*Acer rubrum*).

Wetland vegetation was primarily composed of spotted lady’s thumb (*Persicaria maculosa*), curly dock (*Rumex crispus*), soft rush (*Juncus effusus*), black willow (*Salix nigra*) and green ash (*Fraxinus pennsylvanica*).

Potential stormwater features consisted of black willow, cattails (*Typha spp.*), and marsh seedbox (*Ludwigia palustris*).

3.2 Topography

Pike utilized the United States Geological Survey (USGS) topographic quadrangle information to evaluate naturally occurring topographic characteristics of the greater region and elements occurring within the PSA. Frequently, tributaries have been historically identified and are represented on topographic quadrangles with flow regimes determined at the time the maps were produced; this information can be utilized to track changes to hydrology in the region and within the PSA. Often, local or state buffers utilize USGS topographic quadrangles to apply buffers to tributaries. In instances where flow regimes depicted on USGS topographic quadrangles are inconsistent with flow regimes determined during a field assessment, the data obtained during a field assessment is generally more accurate in representing existing conditions. **Appendix A, Figure 2** shows the mapped USGS topographic quadrangle relative to the PSA.

3.3 Soils

Pike utilized the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) web soil survey and 'National Hydric Soils List' (USDA Natural Resource Conservation Service) to determine soil types mapped as occurring within the PSA (**Appendix A, Figure 3**). Table 3-1 shows soil map units, a description of the map unit, their hydric status, the area covered by a particular map unit, and the percentage of the PSA covered by the map unit.

Table 3-1 Soils within PSA.

Map Unit Symbol	Description	Hydric Status	Area (ac)	Percentage
CeC2	Cecil sandy clay loam, 8 to 15 percent slopes, moderately eroded	Nonhydric	0.1	0.2
Ud	Udorthents, loamy	Nonhydric	66.9	99.7
W	Water	Nonhydric	0.1	0.1
		Totals	67.1	100.0

3.4 Federal Emergency Management Agency (FEMA) Flood Hazard Layers

Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (Federal Emergency Management Agency, 2020). FEMA mapped flood hazard areas are shown on **Appendix A, Figure 4**.

3.5 Water Quality

The North Carolina Surface Water Classification and Water Supply Watershed databases were used to determine surface water classifications and water quality concerns within the PSA. The site is entirely contained in the Yadkin Pee Dee Basin (Hydrologic Unit Code 03040103). The North Carolina Surface Water

Classification states the Yadkin River is classified as a WS-V surface water. These waters are protected as water supplies which generally upstream and draining to Class WS-IV waters or waters used by industry to supply their employees with drinking water or as waters formerly used as water supply. These waters are also protected for Class C uses.

The North Carolina Division of Water Resources determined in 2008 that the Yadkin River did not meet state water quality standards and it was added to the 303(d) list. The 303(d) list is a list of waters that exceed water quality criteria and are “impaired”.

4 JURISDICTIONAL WETLANDS AND WATERS

4.1 Methodology

A delineation of wetlands and other surface waters was performed within the PSA to identify aquatic features that may be subject to the jurisdiction of the United States Army Corps of Engineers (USACE) as “Waters of the United States” (also known as “waters of the U.S.”, or “WOTUS”), in accordance with the Federal Clean Water Act, 33 U.S.C. § 1251 et seq. (CWA), and Section 10 of the Rivers and Harbors Act (RHA) of 1899, 33 U.S.C. 401 § 403. Section 404 of the CWA authorizes the USACE to regulate, which includes permitting, temporary and permanent discharges of dredged or fill material into WOTUS.

Wetlands are described by the USACE (33 C.F.R. § 328.3) and the United States Environmental Protection Agency (USEPA) (40 C.F.R. § 230.3) as "those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 C.F.R. § 328.3; 40 C.F.R. § 230.3). From this regulatory definition, a three-parameter approach (i.e., vegetation, soils, and hydrology) was developed by the USACE to identify and delineate wetlands for purposes of Section 404 of the CWA and Section 10 of the RHA (33 U.S.C. 403). This approach requires positive verification of the presence of wetland hydrology, hydrophytic vegetation, and hydric soils as precursors for an area to be determined a wetland.

The field evaluation was conducted using methods consistent with those described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (U.S. Army Corps of Engineers, 2012); and *Corps of Engineers Wetlands Delineation Manual* (U.S. Army Corps of Engineers, 1987). Where differences occur in the two documents, the regional supplement takes precedence over the *1987 Manual* for applications in the Eastern Mountains and Piedmont region. This delineation, and the associated data collected, supports a request for a Jurisdictional Determination (JD) to USACE if project-related impacts to WOTUS are required.

The North Carolina Department of Environmental Quality (NCDEQ) Division of Water Resources (DWR) stream evaluation methods described in *Methodology for Identification of Intermittent and Perennial Streams and Their Origins* (Version 4.11), effective September 1, 2010, were used to conduct stream flow regime assessments of tributaries identified within the PSA. Stream evaluations included a qualitative review of channel characteristics for purposes of documenting ephemeral, intermittent, or perennial flow regimes, and assessing their jurisdictional status accordingly.

4.2 Delineation Results

Pike conducted a delineation of streams, wetlands, and open waters within the PSA in November 2024. Pink and yellow flagging, sequentially numbered, was used to identify wetland boundaries. Pink flagging was used to identify potential stormwater features that exhibit wetland characteristics. **Appendix A, Figure**

5 illustrates the results of the delineation. Photographs documenting aquatic resources are included in **Appendix B**.

4.2.1. Wetlands

Primarily occurring in a valley, one wetland of varying landscape elevation was identified in the PSA, totaling approximately 0.09 acres. Pike believes that the connection of Potentially Isolated Wetland 1 to downstream waters has been severed, therefore the wetland may potentially be considered "isolated". Table 4-1 lists the wetland by its corresponding unique field identification used during the survey. **Appendix A, Figure 5** illustrates the results of the delineation. Additional discussion of the regulatory implications of this feature being considered potentially isolated is found in Section 4.3 (Permit History and Jurisdictional Assessment under Clean Water Act Section 404) and 6 (Recommendations).

Table 4-1 Wetlands Identified within the PSA.

Wetland ID	Approximate Size (Acres)	Wetland Type	Latitude	Longitude
Potentially Isolated Wetland 1	0.092	Palustrine Emergent	36.7106409°N	-80.3735037°W
Total	**0.092 acres**			

4.2.2. Potential Stormwater Features

There are multiple features located in the drainage area in the eastern portion of the PSA that appear to have been designed as part of a stormwater treatment system. These features have begun to naturalize into wetlands and currently meet wetland criteria; however, they also display evidence that support their intended use was for stormwater management, including features such as rock check dams, rip rap lined channels, and erosion control matting. Additional discussion of the potential stormwater features' jurisdictional status under the Clean Water Act is included in sections 4.3 (Permit History and Jurisdictional Assessment under Clean Water Act Section 404) and 6 (Recommendations).

Table 4-2 Potential Stormwater Features Identified within the PSA.

Stormwater ID	Approximate Size (Acres)	Latitude	Longitude
Stormwater 1	0.06	35.7120380°N	-80.3738637°W
Stormwater 2	0.008	35.7122430°N	-80.3728523°W
Stormwater 3	0.059	35.7131756°N	-80.3732554°W
Stormwater 4	0.013	35.7113760°N	-80.3738588°W
Total	**0.14 acres**		

4.3 Permit History and Jurisdictional Assessment under Clean Water Act Section 404

"Waters of the United States" is a threshold term used in the CWA and establishes the geographic scope of federal jurisdiction under the Act. Sections 404 and 401 of the CWA regulates the discharge of dredged or fill material into "Waters of the US"; therefore, aquatic resources assessed as meeting the definition of WOTUS are subject to the regulations and permitting requirements set forth within the Act. USACE is the permitting authority for implementation of the CWA and administers the permitting program that regulates permanent or temporary discharges of dredged or fill materials into WOTUS (U.S. Environmental Protection Agency, 2023).

4.3.3. Permit History

To assist with determining the potential jurisdictional status of aquatic features identified onsite, particularly the stormwater features and isolated wetland, Pike searched publicly available records for applicable permit history to determine if the features were constructed under previously permitted site work.

<u>National Pollutant Discharge Elimination System (NPDES)</u>

The NCDEQ Division of Energy, Mineral, and Land Resources issued a National Pollutant Discharge Elimination System (NPDES) permit to Duke Energy Carolinas, LLC on August 1, 2018 for the discharge of stormwater from the Buck Steam Station site (NPDES No. NCS000578). The NPDES permit identifies the location of stormwater outfalls and provides a description of their associated drainage areas. The eastern portion of the PSA, where Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4 are located, lie within drainage area 56.

Drainage area 56 also contained the main fuel oil storage tank, the combustion turbine area, multiple tanker truck unloading stations, above ground ash sluice lines, and above ground fuel oil piping. Multiple stormwater structures, including concrete channels, yard inlets, and underground storage tanks, were installed to collect stormwater runoff and contain any potential releases from the fuel tank and combustion turbine areas. In 2023, Duke Energy Carolinas, LLC submitted a request to rescind the NPDES Stormwater Permit NCS000578 and modify NPDES Stormwater Permit NCS000554, which was issued to address the stormwater outfalls associated with the new Buck Combined Cycle Plant. In the permit modification request there is a summary of the Best Management Practices (BMPs) associated with the Buck Combined Cycle Plant. One of the BMPs is a 0.83-acre stormwater retention pond located just south of the PSA.

Discharge from this pond is controlled manually and its travel path is identified as entering a grassed swale that flows generally north-northeastward within Drainage Area 56 to ultimately discharge on the banks of the Yadkin River, which aligns with the locations of Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4.

<u>Preliminary Jurisdictional Determination (PJD)</u>

Records indicate a Preliminary Jurisdictional Determination (PJD) was issued by Ms. Joyce Thames of USACE for the larger Buck Steam Station site on January 8, 2016. Notably, none of the identified Potential Stormwater Features or Isolated Wetland appear on the PJD.

4.3.4. Jurisdictional Assessment

Pike believes the aforementioned permit history supports that Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4 are associated with the BMPs implemented under the NPDES permit for the site, and may therefore be considered non-jurisdictional under the CWA.

If this is the case, the features would likely not qualify as regulated WOTUS under the current definition under the CWA, and would not require a CWA permit to be impacted. However, it is important to note that

USACE is the regulatory authority that determines jurisdiction, therefore submitting an Approved Jurisdictional Determination (AJD) to USACE, with this supporting documentation, would definitively clarify the jurisdictional status of these features. Pike can provide more information as to the differences between PJDs, AJDs, and recommended next steps, as needed.

Findings assessing the jurisdictional status of potential Waters of the U.S. are subject to verification and modification by USACE and are subject to change based on the Clean Water Act rules, amendments, and guidance effective at the time of site development. The findings within this report can be used to support a Jurisdictional Determination to USACE, should one be required.

5 FEDERAL PROTECTED SPECIES

5.1 Methodology

Species with the federal classification of endangered, threatened, proposed endangered or threatened, and final (or proposed) designated critical habitat are protected under the Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 et seq. No activity can be authorized by a federal permit or action if the continued existence of a federally-listed species would be jeopardized, or its critical habitat destroyed or adversely modified, by the proposed activity or action.

Pike used the USFWS Information Planning and Conservation System (IPaC) tool to identify federally protected species that may occur within the PSA, and a species list was generated for the proposed project (**Appendix C,** *USFWS Species List*).

The IPaC report identifies one Endangered species, one Proposed Endangered species, and one Proposed Threatened species that may occur within the PSA. The IPaC report identified no Designated or Proposed Critical Habitats within the PSA.

Table 5-1 lists species identified by the USFWS IPaC tool as potentially occurring in the PSA or within a one-mile radius of the PSA, and that were included in the site evaluation.

Table 5-1 Threatened and Endangered Species that May Occur Within the PSA

Listed Species	Protection Status (T, E, P, C)	USFWS Optimal Survey Window[1]	USFWS Recommended Tree-Clearing Moratorium[2]
Tricolored Bat (*Perimyotis subflavus*)	P	N/A	April 1st-October 15th
Monarch Butterfly (*Danaus plexippus*)	P	N/A	N/A
Schweinitz's Sunflower (*Helianthus schweinitzii*)	E	Late August-October	N/A

E Federally Endangered
P Proposed for Listing in Federal Register

5.2 Species and Habitat Descriptions

5.2.1. Tricolored Bat (*Perimyotis subflavus*)

The tricolored bat is a small insectivorous bat that is distinguished by its unique tricolored fur and often appears yellowish to nearly orange. The once common species is wide ranging across the eastern and

[1] Refer to https://www.fws.gov/story/2022-06/south-carolinas-federally-threatened-endangered-and-risk-plant-species
[2] Location dependent.

central United States and portions of southern Canada, Mexico and Central America. During the winter, the tricolored bat often found in caves and abandoned mines, although in the southern United States, where caves are sparse, can often be found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures (U.S. Fish & Wildlife Service, 2023). Notably, the tricolored bat has been found capable of roosting in trees measuring four inches diameter base height (DBH), in limb scars, and in leaves. Because of the very generalized habitat requirements and widespread roosting habitat, USFWS has established a recommended tree-clearing moratorium period from December 15th – February 15th and May 1st – July 15th (subject to modification by USFWS, and location-dependent), during the winter topor and pup season in the year-round active zone (U.S. Fish & Wildlife Service, 2024).

5.2.2. Monarch Butterfly (*Danaus plexippus*)

The monarch is a large-winged invertebrate. Most of the wings are bright orange edged by black borders and veins on top, and pale orange underneath. Within the black border are two rows of white spots. Bodies of Monarchs have black and white markings. Monarchs reach approximately three to four inches in width and length. Monarchs undergo a complete metamorphosis, from egg, to larva (caterpillar), to pupa (chrysalis), and then to adult (butterfly). Adult Monarchs lay their eggs exclusively on milkweed (Asclepias spp.) species. These eggs hatch after three to five days and the larva feed on the leaves of the host plant (milkweed). The monarch's preferred habitat is within sufficiently large populations of milkweed to support host and feeding groups. The milkweeds grow in a variety of habitats, swamps and uplands, with adequate sunshine and minimal physical disturbance (such as mowing or plowing) (U.S. Fish & Wildlife Service, 2023).

5.2.3. Schweinitz's Sunflower (*Helianthus schweinitzii*)

Habitat for Schweinitz's Sunflower includes clearings and edges of upland woods, thickets, and pastures. The species is found along roadsides, powerline clearings, old pastures, and woodland openings. Schweinitz's Sunflower requires disturbance (blowdowns, storm, or fire) to create open areas for full sunlight, but may also grow in open stands of trees with minimal shade. Soils may be either shallow, sandy with high gravel content, or a clayey hardpan. The sunflower may prefer soils derived from basic material (Krings, Goyette, Suiter, & Samuels, 2021).

5.3 Habitat Evaluation and Species Survey Results

5.3.1. Tricolored Bat

The vegetative community within the PSA primarily consisted of herbaceous, scrub/shrub, and vine strata, lacking saplings and trees; however, a few areas within the study area contain trees in all states of maturity that could provide potentially suitable habitat for the species. Surveys for bat species are highly specialized and require specialized equipment and training, therefore Targeted surveys to determine presence/absence were not conducted as part of this evaluation.

If tree-trimming/clearing activities or disturbance to potentially suitable habitat is necessary, targeted surveys for the species and/or coordination with USFWS to determine potential species effects may be needed should the species become uplisted to federally Endangered status.

5.3.2. Monarch Butterfly

Duke participates in a nationwide Candidate Conservation Agreement (CCA) for the monarch butterfly on Energy and Transportation lands—an integrated agreement that consists of assurances and a CCA for the species. Duke surveys for the presence of the species or suitable habitat, reduces development impacts, implements the use of native plants in revegetation and stabilization practices, and implements a management plan that targets benefits to wildlife species requiring early successional habitats (habitats typical of transmission line ROWs). Duke previously assisted in the development of a Nationwide Monarch Butterfly CCA in collaboration with numerous other federal and state agencies and utilities, and already has this program in place addressing all of the USFWS recommendations from this species. A copy of the Candidate Conservation Agreement is available upon request.

Potentially suitable habitat is present within unmanaged grassland and prairie areas of the PSA (i.e. early successional growth areas, and areas generally maintained in herbaceous conditions with minimal management). If disturbance to potentially suitable habitat is necessary, targeted surveys for the species and/or coordination with the USFWS to determine potential species effects may be needed should the species become uplisted to federally Threatened status.

5.3.3. Schweinitz's Sunflower

Areas of open habitat within the existing ROW and scrub/shrub areas contain marginally suitable habitat for Schweinitz's Sunflower, specifically those areas with lower density of competing species. No varieties of *Helianthus* were observed during the field evaluation. Because marginally suitable habitat is present, but the field evaluation yielded negative survey results, Pike believes there will be no effect to this species.

Table 5-2 summarizes the habitat and species survey results for species identified as potentially occurring within the PSA.

Table 5-2 Habitat and Species Survey Results

Listed Species	Designated Critical Habitat? (Y, N)	PSA Inside Designated Critical Habitat? (Y, N, N/A)	Suitable Habitat Present in PSA? (Y/N)	Species Identified in PSA? (Y, N, N/A)
Tricolored Bat	N	N/A	Y	N/A[3]
Monarch Butterfly	Y	N	Y	N
Schweinitz's Sunflower	N	N/A	Y	N

Potential impacts of a proposed project must be reconsidered if new information reveals that those impacts may affect any listed species or critical habitat in a manner not previously considered, if the proposed project is modified in a manner that was not considered in the effect determination, or if a new species is listed or critical habitat is designated that may be affected by the proposed project.

[3] Targeted surveys were not performed for this species.

6 RECOMMENDATIONS

On behalf of Duke Energy, Pike Engineering has completed a Natural Resource Assessment, including an aquatic resources delineation and protected species assessment, for a project known as Buck Simple Cycle Generation. A delineation of the Project Study Area resulted in identification of potentially isolated wetlands and potential stormwater features that exhibit wetland and stream characteristics, but given the permit history of the site, these features may not be considered jurisdictional WOTUS. A protected species and habitat survey of the PSA identified potentially suitable habitat for species known to occur in the county, but no occurrences were identified. Comprehensive surveys for Tricolored Bat and Monarch Butterfly were not performed.

Pike's recommendation is that an AJD should be submitted to the USACE to determine if Potentially Isolated Wetland 1 and Potential Stormwater Features 1-4 are jurisdictional under the CWA. USACE currently prioritizes the review of Individual and Nationwide permits over Jurisdictional Determination requests, and PJD/AJD requests have no statutory timeline for review by USACE, therefore the timeline to receive a PJD/AJD from USACE is difficult to gauge.

Clarification on the jurisdictional status of these features will inform CWA permit options, should impacts to these features be needed for future sitework. Alternatively, it can be assumed that all of the aquatic resources identified in the PSA are jurisdictional, and impacts to those features can be permitted under the CWA accordingly, but the impacts may require compensatory mitigation.

Pike's general recommendation is to avoid and minimize impacts to jurisdictional aquatic resources to the maximum extent practicable. Should temporary or permanent impacts be necessary, it is possible the project can utilize a Nationwide Permit 57 (Electric Utility Line and Telecommunications Activities) if project construction and design efforts implement measures consistent with the Nationwide Permit General and Regional Conditions.

If proposed temporary and permanent impacts to jurisdictional streams and wetlands may be close to or exceed the acreage limitation for utilizing a Clean Water Act Section 404/401 Nationwide Permit (½-acre total limitation, and streambed loss cannot exceed 0.05 acre), the project would require acquisition of an Individual Permit (IP). Pike has extensive permitting experience with USACE and can manage the process of an NWP or IP as needed.

If the proposed project requires acquisition of a federal permit, targeted surveys for tricolored bat may be needed, particularly if the species is formally uplisted from "Proposed Endangered" to "Endangered" under the Endangered Species Act. Given the pending uplisting of the species, Pike may recommend proactive coordination with USFWS to evaluate potential tree-clearing moratoriums and/or presence/absence survey options, depending on project timelines.

Pike is pleased to present the results of our Natural Resource Assessment and Aquatic Resources Delineation for the Buck Simple Cycle Generation. Please do not hesitate to contact us should you have questions or concerns regarding the report.

Sincerely,

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Appendix A

Figures

Figure 1. Site Location Map
Natural Resource Assessment and Aquatic Resources Delineation

Legend
Project Study Area

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Project Name: Buck Simple Cycle Generation

Drawn by: W. Johnson

Reviewed By: M. Jolly

Date: 12/3/2024

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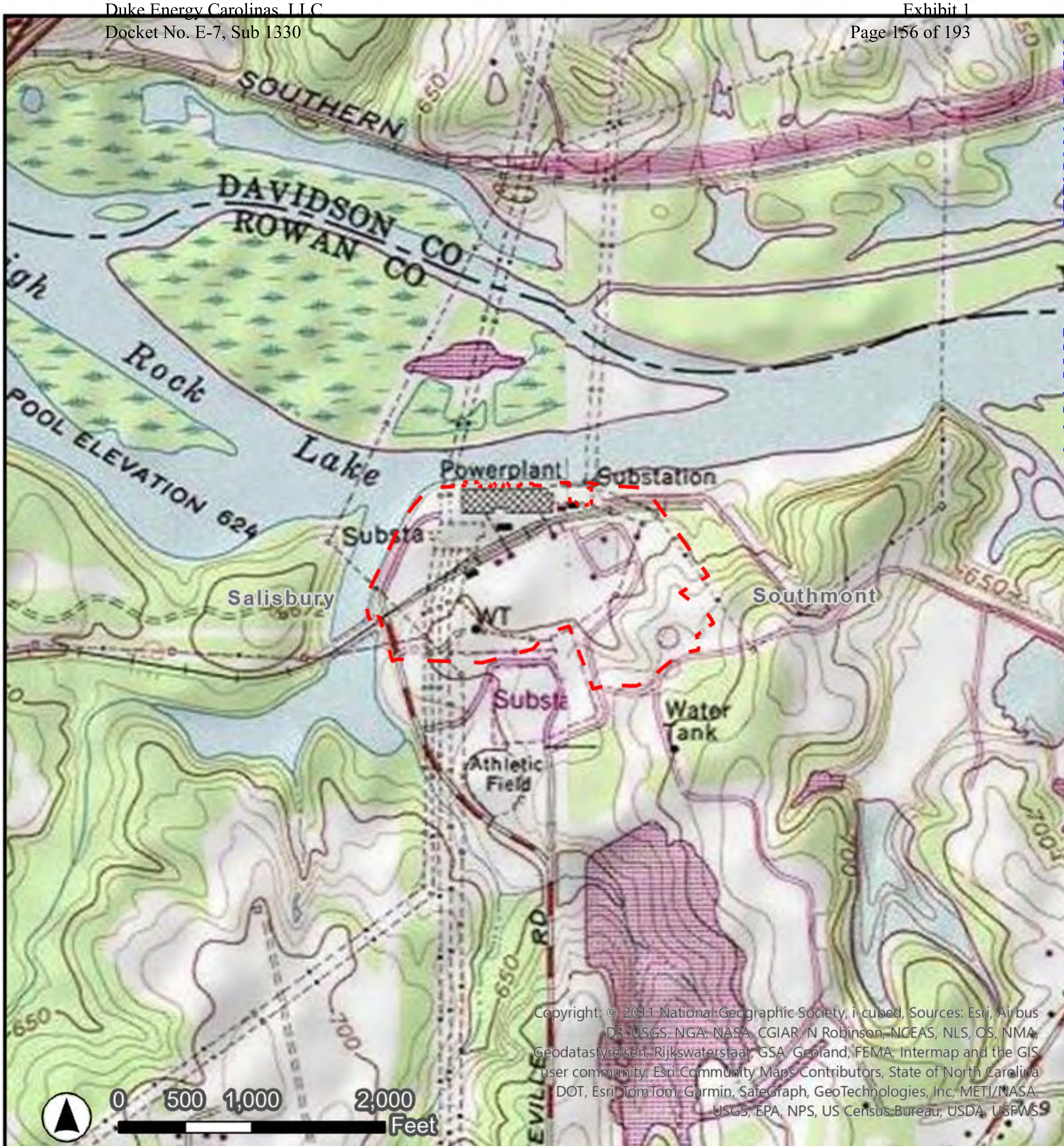

Figure 2. USGS Topographic Quadrangle

Natural Resource Assessment and Aquatic Resources Delineation

Legend

Project Study Area

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Figure 3. NRCS Web Soil Survey

Natural Resource Assessment and Aquatic Resources Delineation

Legend

Project Study Area

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Figure 4. FEMA Floodplain Panel

Natural Resource Assessment and Aquatic Resources Delineation

Legend

Project Study Area

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Project Name: Buck Simple Cycle Generation

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Date: 12/3/2024

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Figure 5. Delineation of Wetlands and Waters

Natural Resource Assessment and Aquatic Resources Delineation

Legend

- Project Study Area
- Dataform
- Potential Stormwater Feature
- Wetland

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Project Name: Buck Simple Cycle Generation

Drawn by: W. Johnson

Reviewed By: M. Jolly

Date: 12/5/2024

Figure 5. Delineation of Wetlands and Waters

Natural Resource Assessment and Aquatic Resources Delineation
Inset 1

Legend

- Project Study Area
- Dataform
- Potential Stormwater Feature

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Project Name: Buck Simple Cycle Generation

Drawn by: W. Johnson

Reviewed By: M. Jolly

Date: 12/5/2024

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Figure 5. Delineation of Wetlands and Waters

Natural Resource Assessment and Aquatic Resources Delineation
Inset 2

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Project Name: Buck Simple Cycle Generation

Drawn by: W. Johnson

Reviewed By: M. Jolly

Date: 12/5/2024

Legend

- Project Study Area
- Dataform
- Potential Stormwater Feature
- Wetland

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Appendix B

Photographs

Photo Log

Natural Resource Assessment and Aquatic Resources Delineation

Legend

Project Study Area

Photo Point and Direction

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Project Name: Buck Simple Cycle Generation

Drawn by: W. Johnson

Reviewed By: M. Jolly

Date: 12/4/2024

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Buck Simple Cycle Generation Photo Log

Stormwater Control Measure Photos

Photo 11 - View of Stormwater 1 looking upslope of flag 2.

Photo 12 - View of Stormwater 1 looking upslope of flag 5.

Photo 13 - View of Stormwater 2 looking North.

Photo 14 – View of Stormwater 2 looking South.

	
Photo 15 – View of Stormwater 3 looking upslope of flag 3. (Culvert behind photographer).	Photo 16 – View of Stormwater 3 looking downslope of flag 5. (Culvert behind photographer).
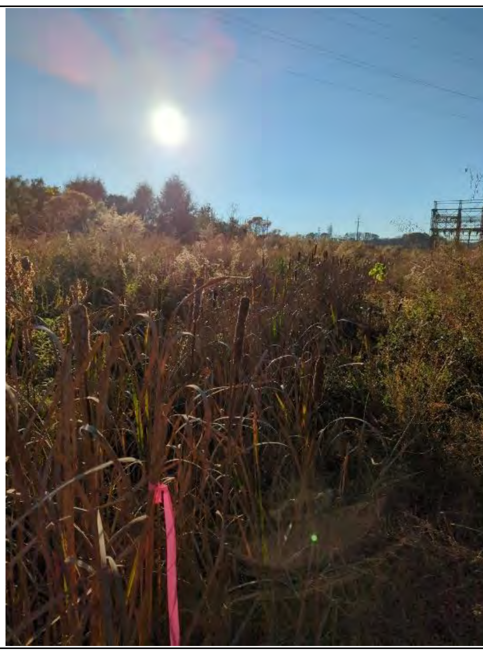	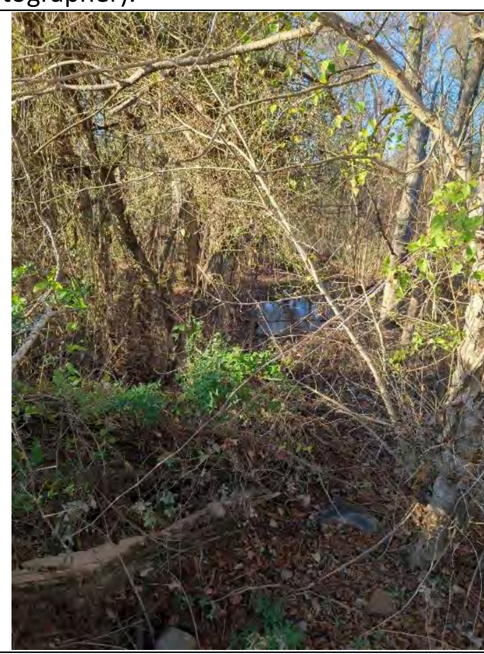
Photo 17 – View of Stormwater 3 looking upslope of flag 9. (Culvert behind photographer).	Photo 18 – View of Stormwater 3, outlet of culvert into wetland adjacent to Yadkin River. Culvert and wetland are outside of PSA.

	
Photo 25 – View of Stormwater 4 looking downslope of flag 1.	Photo 26 – View of Stormwater 4 looking upslope of flag 4.

Wetland Photos

	
Photo 4 - View of Wetland 1 looking downslope of flag 1.	Photo 5 – View of Wetland 1 looking upslope of flag 5.

	
Photo 6 – View of Wetland 1a upslope of flag 2.	Photo 7 – View of Wetland 1a upslope of flag 5.
	
Photo 8 – View of Wetland 1a looking Northwest of flag 10.	Photo 9 – View of Wetland 1a looking Southeast of flag 15.

Photo 10 – View of Wetland 1a looking North of flag 20.

Existing Conditions

Photo 2 – Photo of stormwater detention pond upslope of Wetland 1.

Photo 3 – Outlet culvert of stormwater detention pond immediately upslope of Wetland 1.

	
Photo 1 – Existing conditions of former coal storage area near southwest corner of storage area.	Photo 22 – Existing conditions of former coal storage area west of the center of the coal storage area.
	
Photo 21 – Existing conditions of former coal storage area near center of coal storage area.	Photo 20 – Existing conditions of former coal storage area northeast of center of coal storage area.

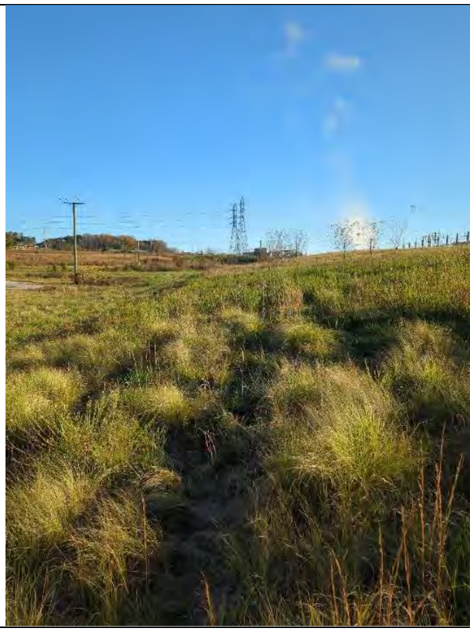

Photo 19 – Existing conditions of former coal storage area near northeast corner of storage area.

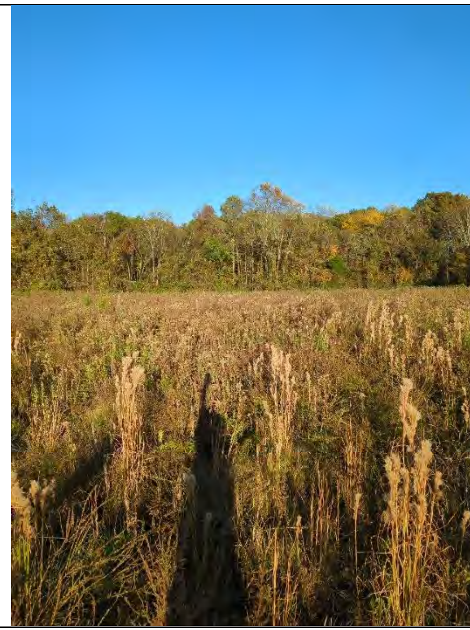

Photo 23 – Existing conditions near center of former fuel storage area.

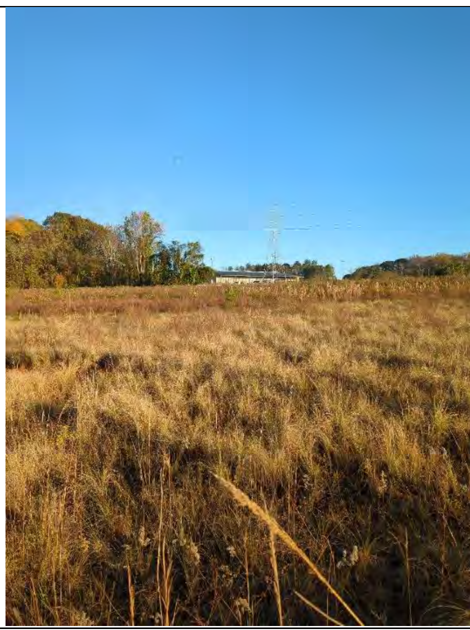

Photo 24 – Existing conditions along western edge of former fuel storage area berm.

Appendix C

U.S. Fish & Wildlife Service (USFWS)
IPaC Species List

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.

Location

Rowan County, North Carolina

Local office

Asheville Ecological Services Field Office

(828) 258-3939
(828) 258-5330

160 Zillicoa Street, Suite B

Asheville, NC 28801-1082

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. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. 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 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 There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Flowering Plants

NAME	STATUS
Schweinitz's Sunflower Helianthus schweinitzii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3849	Endangered

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 [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The data in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the Supplemental Information on Migratory Birds and Eagles document to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management 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 avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Bald and Golden Eagle information is not available at this time

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (FWS). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The FWS interprets the MBTA to prohibit incidental take.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management 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 avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Migratory bird information is not available at this time

Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential

susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

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Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
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Survey Timeframe
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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

(NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

LAKE
    L1UBHh

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix D

Wetland Determination Data Forms

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Buck Simple Cycle Generation City/County: Rowan County Sampling Date: 11-11-24

Applicant/Owner: Duke Energy State: NC Sampling Point: DP1

Investigator(s): MB/DW Section, Township, Range: Salisbury

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.712135 Long: -80.373766 Datum: NAD 83

Soil Map Unit Name: Udorthents, loamy (Ur) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ___
Hydric Soil Present?	Yes X No ___		
Wetland Hydrology Present?	Yes X No ___		

Remarks:
Data point is representative of stormwater feature exhibiting wetland indicators.
According to the Antecedent Precipitation Tool, Rowan County had normal conditions at the time of the site visit.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 8	
Water Table Present?	Yes X	No ___	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 5	**Wetland Hydrology Present? Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP1

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix nigra*	10	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	10	=Total Cover	
50% of total cover:	5	20% of total cover:	2
Herb Stratum (Plot size: 5)			
1. *Typha latifolia*	90	Yes	OBL
2. *Ludwigia palustris*	10	No	OBL
3. *Salix nigra*	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105	=Total Cover	
50% of total cover:	53	20% of total cover:	21
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
100% of dominant vegetation is FAC or wetter.

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	85	5YR 4/6	15	C	PL/M	Loamy/Clayey	Prominent redox concentrations
5-20	N 5/	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Mucky Mineral (F1) **(MLRA 136)**
X Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 122, 136)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
Indicators of hydric soil are present.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Buck Simple Cycle Generation City/County: Rowan County Sampling Date: 11-11-24

Applicant/Owner: Duke Energy State: NC Sampling Point: DP2

Investigator(s): MB/DW Section, Township, Range: Salisbury

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): None Slope (%): 2-4

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.710470 Long: -80.373491 Datum: NAD 83

Soil Map Unit Name: Udorthents, loamy (Ur) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:
Data point is representative of non-jurisdictional upland area.
According to the Antecedent Precipitation Tool, Rowan County had normal conditions at the time of the site visit.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Indicators of wetland hydrology are not present.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP2

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pueraria montana*	75	Yes	UPL
2. *Solidago altissima*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80	=Total Cover	
50% of total cover:	40	20% of total cover:	16

Woody Vine Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
0% of dominant vegetation is FAC or wetter.

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/3	100					Loamy/Clayey	
5-20	5YR 4/6	60	10YR 3/4	40	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Mucky Mineral (F1) **(MLRA 136)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 122, 136)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
Indicators of hydric soil are not present.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: Buck Simple Cycle Generation City/County: Rowan County Sampling Date: 11-11-24

Applicant/Owner: Duke Energy State: NC Sampling Point: DP3

Investigator(s): MB/DW Section, Township, Range: Salisbury

Landform (hillside, terrace, etc.): Valley Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.710530 Long: -80.373441 Datum: NAD 83

Soil Map Unit Name: Udorthents, loamy (Ur) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	Yes X No ___	
Wetland Hydrology Present?	Yes X No ___	

Remarks:
Data point is representative of Wetland 1.
According to the Antecedent Precipitation Tool, Rowan County had normal conditions at the time of the site visit.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ True Aquatic Plants (B14)
___ High Water Table (A2)	___ Hydrogen Sulfide Odor (C1)
___ Saturation (A3)	X Oxidized Rhizospheres on Living Roots (C3)
___ Water Marks (B1)	___ Presence of Reduced Iron (C4)
___ Sediment Deposits (B2)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Drift Deposits (B3)	___ Thin Muck Surface (C7)
___ Algal Mat or Crust (B4)	___ Other (Explain in Remarks)
___ Iron Deposits (B5)	
___ Inundation Visible on Aerial Imagery (B7)	
___ Water-Stained Leaves (B9)	
___ Aquatic Fauna (B13)	

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Indicators of wetland hydrology are present.

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP3

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Salix nigra*	15	Yes	OBL
2. *Fraxinus pennsylvanica*	10	Yes	FACW
3. *Liquidambar styraciflua*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
	30	=Total Cover	
50% of total cover:	15	20% of total cover:	6
Herb Stratum (Plot size: 5)			
1. *Persicaria maculosa*	15	Yes	FACW
2. *Microstegium vimineum*	10	Yes	FAC
3. *Rumex crispus*	5	No	FAC
4. *Rubus argutus*	5	No	FACU
5. *Pueraria montana*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	40	=Total Cover	
50% of total cover:	20	20% of total cover:	8
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)
100% of dominant vegetation is FAC or wetter.

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	95	5YR 4/6	5	C	PL	Loamy/Clayey	Prominent redox concentrations
4-7	10YR 4/4	80	5YR 4/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
7-12	10YR 3/3	95	5YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ 2 cm Muck (A10) **(LRR N)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
___ Thin Dark Surface (S9) **(MLRA 147, 148)**
___ Loamy Mucky Mineral (F1) **(MLRA 136)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
___ Umbric Surface (F13) **(MLRA 122, 136)**
___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) **(MLRA 147)**
___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ____
Depth (inches): ____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
Indicators of hydric soil are present.