NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-7, SUB 1297

APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

MARSHALL ENERGY COMPLEX
SIMPLE-CYCLE GAS COMBUSTION TURBINE ADDITIONS PROJECT

Exhibit 2: Siting Information

March 14, 2024

DUKE ENERGY® CAROLINAS

MARSHALL ENERGY COMPLEX
SIMPLE-CYCLE GAS COMBUSTION TURBINE ADDITIONS PROJECT
Siting Information

REFERENCES

APPENDIX A	Duke Energy Carolinas Marshall Steam Station Combustion Turbine Additions CPCN Noise Impact Study
APPENDIX B-1	Windshield Reconnaissance and Literature Review of the Duke Marshall Steam Station, Catawba County, North Carolina
APPENDIX B-2	Amec Foster Wheeler's Natural Resources Technical Report Marshall Steam Station, Catawba County, NC (Excerpt)
APPENDIX B-3	Phase 1 Archaeological Survey Results, Duke Energy's Marshall Steam Plant
APPENDIX B-4	State Historic Preservation Office Recommendation on Cultural Resources Survey
APPENDIX B-5	Environmental Services, Inc.'s Cemetery Investigation, Marshall Steam Plant
APPENDIX C	Marshall Steam Station Natural Resources Site Assessment Report

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INTRODUCTION

Pursuant to North Carolina Utilities Commission ("Commission") Rule R8-61(a), Duke Energy Carolinas, LLC ("DEC" or "the Company"), submits preliminary plans and information for review by the Commission in advance of the Company's planned request for certification to construct two 425-megawatt ("MW") simple-cycle gas combustion turbine ("SCGT") units with selective catalytic reduction ("SCR") about 1.25 miles northeast of its existing Marshall Steam Station in Catawba County, North Carolina ("NC"). As identified in DEC's and Duke Energy Progress, LLC's ("DEP" and together with DEC, the "Companies") 2023 Carbon Plan and Integrated Resource Plan filed with the Commission on August 17, 2023, in Docket No. E-100, Sub 190 and the 2023 Integrated Resource Plan filed with the Public Service Commission of South Carolina on August 15, 2023, in Docket Nos. 2023-8-E and 2023-10-E (the "Carolinas Resource Plan"), DEC plans to permanently retire Marshall Steam Station's coal-fired Units 1 and 2 and replace them with two SCGT units by January 1, 2029.[1] The SCGT units and their associated facilities will be herein referred to as the "Proposed Facility."

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

- 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] Carolinas Resource Plan Chapter 4 at 14 (Table 4-3); *see generally* Carolinas Resource Plan Appendix F.

PRELIMINARY PLANS AND EXHIBITS

1.0 SITE INFORMATION

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

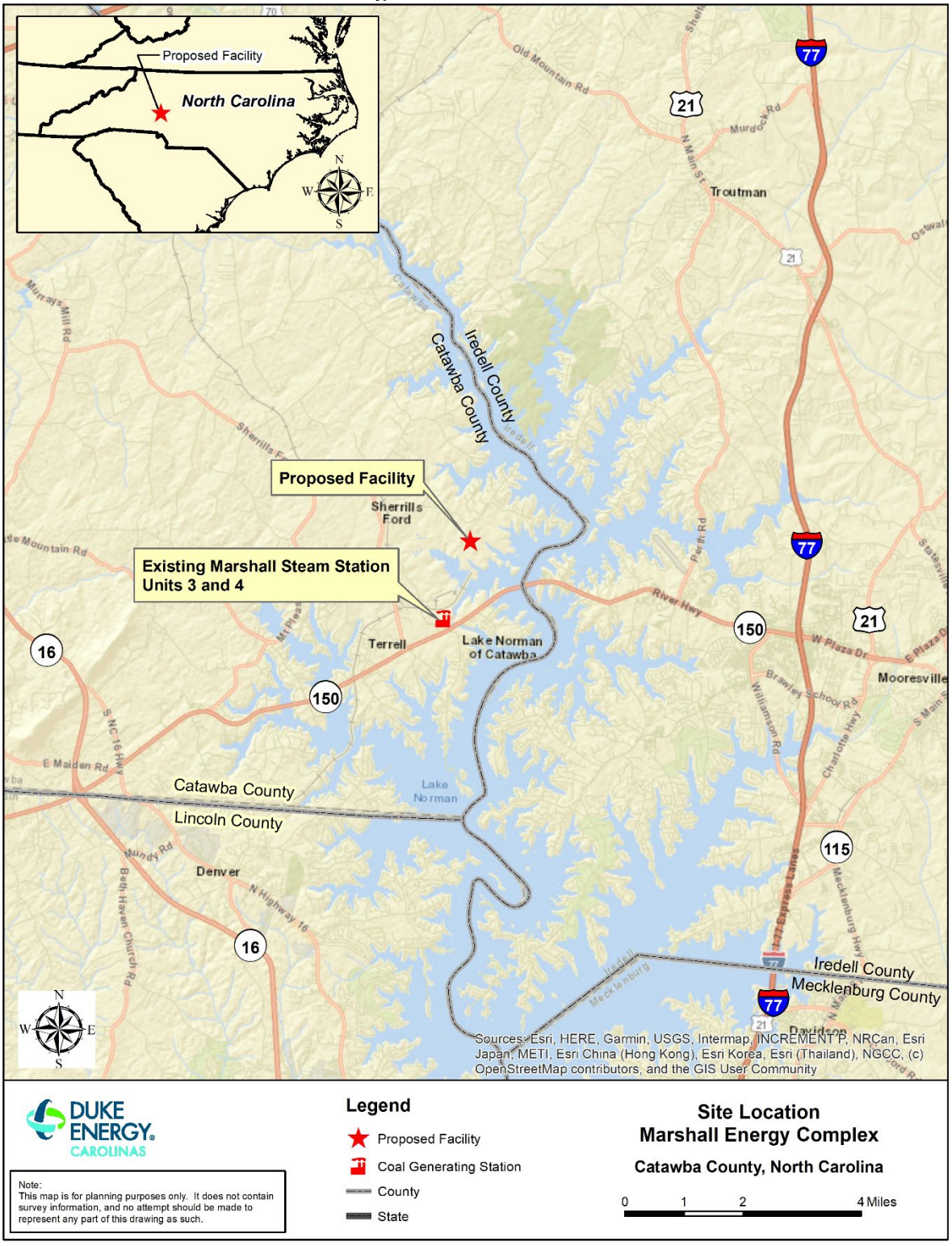
1.1 Site Location, Address, and Ownership

Marshall Steam Station is located in eastern Catawba County, NC, approximately one mile northeast from the unincorporated community of Terrell, about 15 miles east of Newton (the county seat), and about 20 miles north-northwest of Charlotte.

The Proposed Facility will be owned by DEC and located on DEC-owned property near the current Marshall Steam Station. Together, the remaining coal-fired Units 3 and 4 and the Proposed Facility will be known as the Marshall Energy Complex ("MEC"). The MEC's E911 street address will be 8320 NC Highway 150 E, Terrell, NC 28682. The global positioning system ("GPS") coordinates of the approximate center of the Proposed Facility are 35°36'56.77" north and 80°57'33.93" west.

Figure 1.1-1 shows the location of the MEC.

Figure 1.1-1: Site Location



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

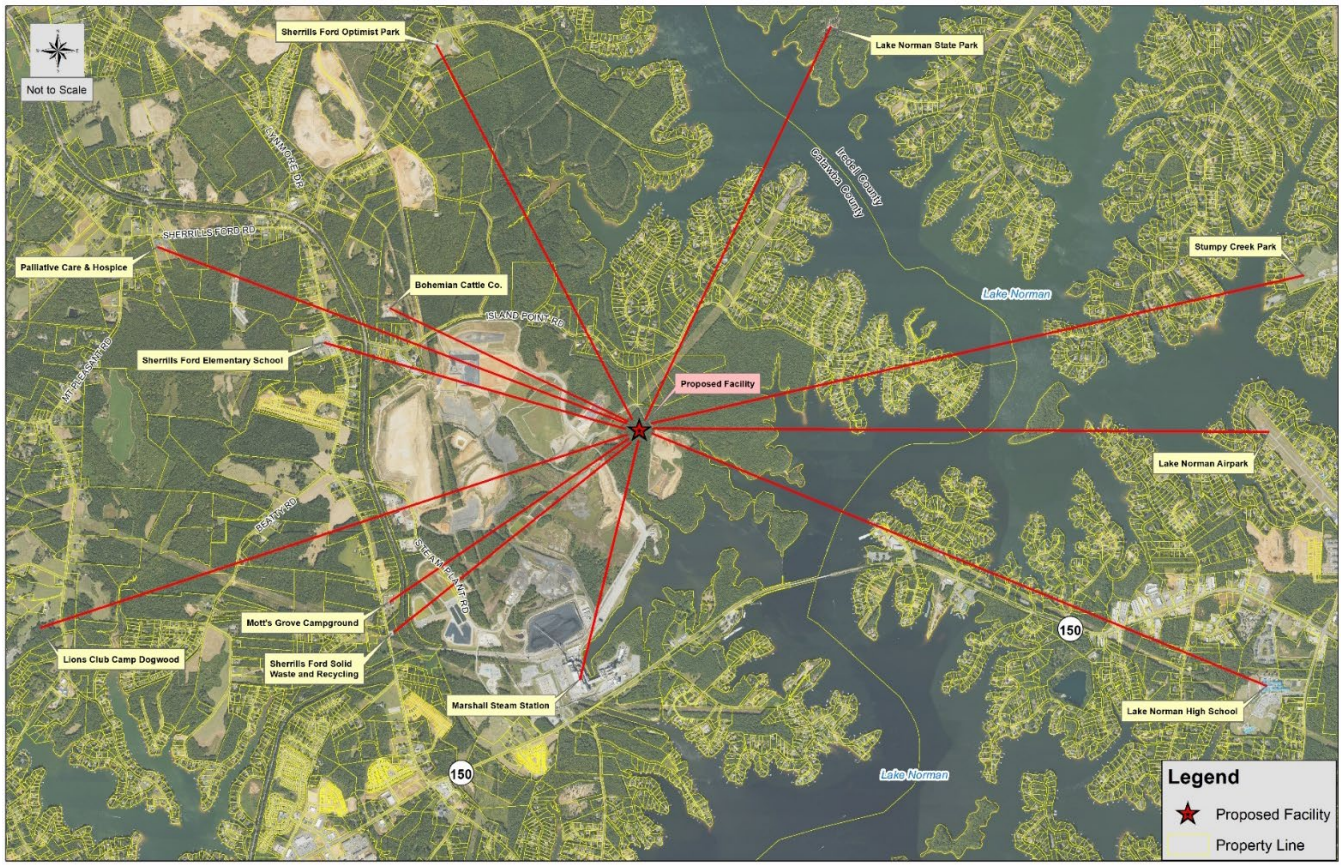
Marshall Steam Station, a four-unit, coal- and natural gas-fired 2,078 MW generating facility, is one of DEC's largest power plants in NC and South Carolina. It has been operating commercially since 1965. The station was originally fueled by coal alone, but in 2021, DEC connected the station to the natural gas pipeline network and completed conversion projects on the existing units to allow 50% natural gas co-firing on Units 3 and 4 and up to 40% natural gas co-firing on Units 1 and 2.

DEC's property surrounding Marshall Steam Station is partly forested and includes all the components of a coal- and gas-fired generating facility. Outside the DEC property is a mixture of rural, residential, commercial, and retail land uses, with Lake Norman to the east, southeast, and north.

The communities of Terrell, Sherrills Ford, Doolie, and Denver are about 2.0 miles southwest, 1.6 miles northwest, 3.7 miles east, and 7.1 miles southwest, respectively. Nearby towns include Mooresville (approximately 7.5 miles east), Davidson (approximately 9.8 miles southeast), and Statesville (approximately 12.2 miles northeast).

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

Figure 1.1-2: Land Use



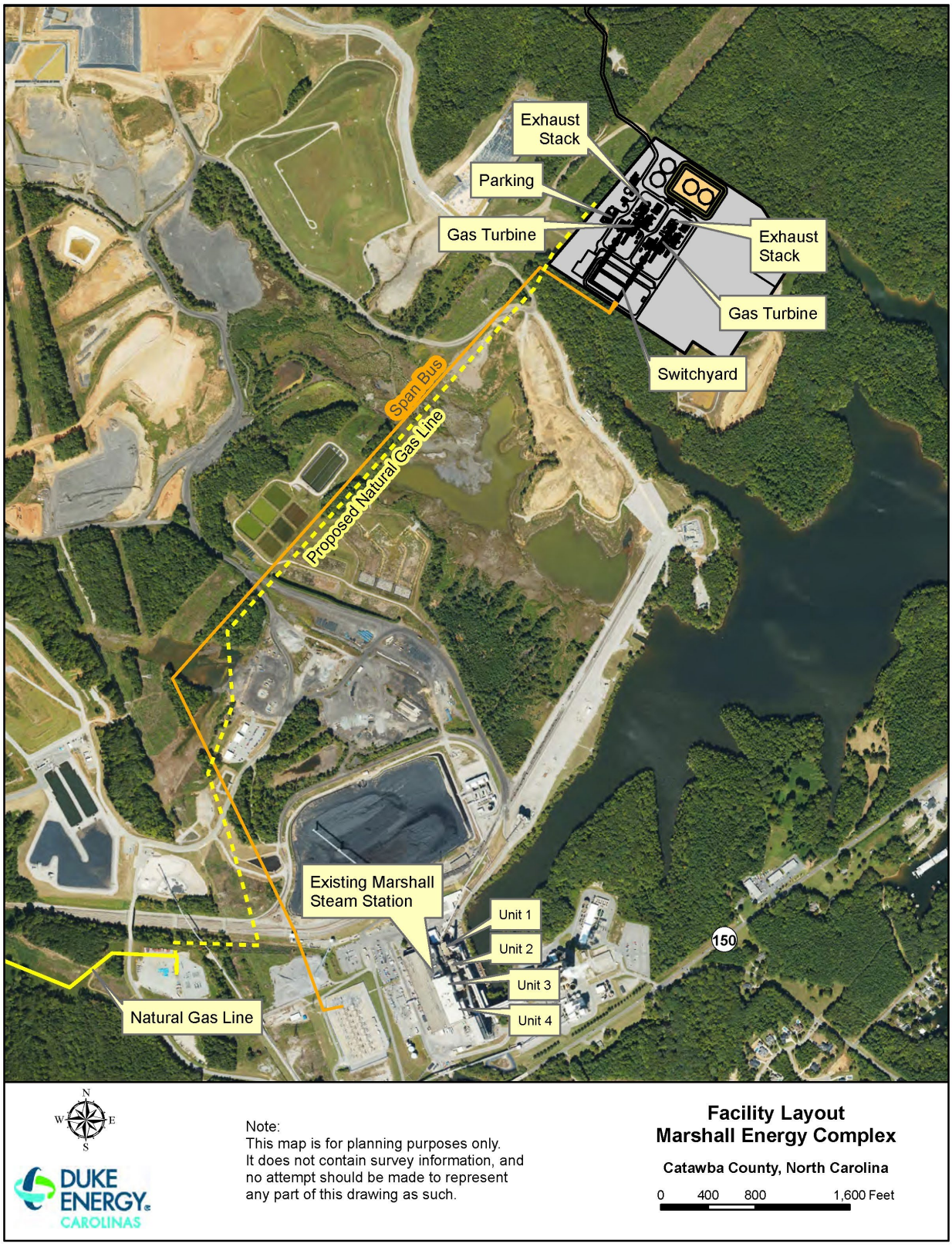
Map Sources: USDA Orthoimagery 2022; Catawba Co. GIS 2023; Iredell Co. GIS 2023

1.2 Site Description

Marshall Steam Station is encompassed by about 1,365 acres of DEC-owned land, a portion of which is occupied by the four existing coal- and gas-fired units described above, an electrical substation, transmission lines, coal-combustion products storage areas, and the associated balance of plant facilities, buffer lands, and forested areas. The footprint of the Proposed Facility will cover approximately 25 acres of partially disturbed but undeveloped land.

Figure 1.2 provides an overall view of the Proposed Facility.

Figure 1.2: Facility Layout



Map Sources: USDA Orthoimagery 2022

1.3 Site Selection

1.3.1 Siting Criteria

The Carolinas Resource Plan identified the need for additional generation, including the Companies' planned near-term action to construct the Proposed Facility to achieve commercial operation in 2028. The need for the Proposed Facility was also recognized 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 ("Carbon Plan Order") approving the Commission's initial Carbon Plan under N.C.G.S. § 62-110.9, and finding that planning for up to 800 MW of incremental combustion turbine gas generation is a reasonable step.[2] DEC evaluated site locations using the following factors: transmission capacity, natural gas capacity, fuel oil/water availability, long-term simple cycle operations, operational synergies, rail access, land availability, and projected retirement dates of existing units.

The criteria for the site selection are presented in Table 1.3.1 below.

[2] Carbon Plan Order at 79.

Table 1.3.1: Site Selection Criteria

Criteria	Reason
Transmission Capacity	Available transmission capacity can provide significant cost-saving opportunities, especially if able to be repurposed via Generator Replacement Request.
Natural Gas Capacity	Access to natural gas capacity or nearby existing natural gas infrastructure can provide synergistic opportunities.
Fuel Oil/Water Availability	Existing oil-loading, storage, and water infrastructure provides cost-saving opportunities during the commissioning test and for long-term operation.
Long-Term Simple Cycle Operations	Site characteristics support long-term operation as a system resource.
Operational Synergies	Existing fossil generation sites are staffed with personnel with a good understanding of the operation and maintenance of generation assets.
Rail Access	Access to nearby rail lowers cost of turbine and transformer delivery.
Land Availability	Existing generation sites have space constraints due to on-going operations.
Projected Retirement Dates	Coal-fired facility retirement dates projected in the 2022 Carbon Plan and recently filed 2023-2024 Carbon Plan and Integrated Resource Plan affect the transmission capacity available to meet the 2028-2029 timeframe.

1.3.2 Siting Results

DEC considered all its existing generation sites with planned unit retirement dates that aligned with planning need for new simple-cycle gas generation in the 2028-2029 timeframe. These sites were considered because the study process and the construction of new infrastructure—especially transmission facilities—necessary to support new SCGT units allowed for accelerated deployment of the Proposed Facility. Greenfield locations would have delayed the Proposed Facility in-service date beyond the identified planning need. Listed below are the potential sites that met the criteria described in Table 1.3.1:

- Allen Steam Station (Gaston County, NC);
- Cliffside Units (Rutherford County, NC); and
- Marshall Steam Station (Catawba County, NC).

1.3.3 Recommendation

The Marshall Steam Station had the most positive attributes of the sites evaluated. The targeted retirement date for its Units 1 and 2 most closely aligned with the targeted approximate in-service date of the proposed SCGTs. Also, Allen Steam Station does not have as much available land as the other sites considered. Based on a comprehensive site assessment, DEC found no major obstacles to adding SCGT units on the property, and subsequent detailed field work substantiated the preliminary evaluation.

A notable attribute of the recommended site is that there is an existing 20-inch pipeline operated by Piedmont Natural Gas Company, Inc. ("Piedmont"), that provides redelivery service exclusively for the Marshall Steam Station from Transcontinental Gas Pipe Line Company, LLC ("Transco"). This existing infrastructure allows for the gas required for the SCGT units to be delivered without adding any additional pipeline from Transco to the site. This makes the Marshall site advantageous compared to the Cliffside and Allen sites, which would have required the installation of new gas pipeline to deliver fuel to the SCGT units.

The Marshall Steam Station's existing transmission infrastructure also presented advantages over the other sites considered. Specifically, DEC could not submit a Generator Replacement Request ("GRR") to interconnect the two SCGT units at the Allen Steam Station. The GRR process facilitates expedited interconnection of replacement generation at the switchyard of retiring generation and can thereby save the cost of expensive interconnection facilities and network upgrades. The Allen Steam Station is not an optimal candidate for a SCGT GRR due to previous generation retirement at the site and the requirement that the GRR application has to be submitted at least one year prior to a generator's planned retirement date. The GRR process is also not available for the Cliffside site as its Unit 5 is the only potential retirement candidate and it does not have sufficient capacity to accommodate interconnection of the two proposed SCGT units. Finally, if the generation capacity of Marshall Units 1 and 2 is not replaced, DEC will have to accelerate completion of costly network

upgrades to prevent overloading the McGuire – Marshall 230Kv lines, which is an outcome that DEC can otherwise avoid by constructing the SCGT units at the Marshall Steam Station.

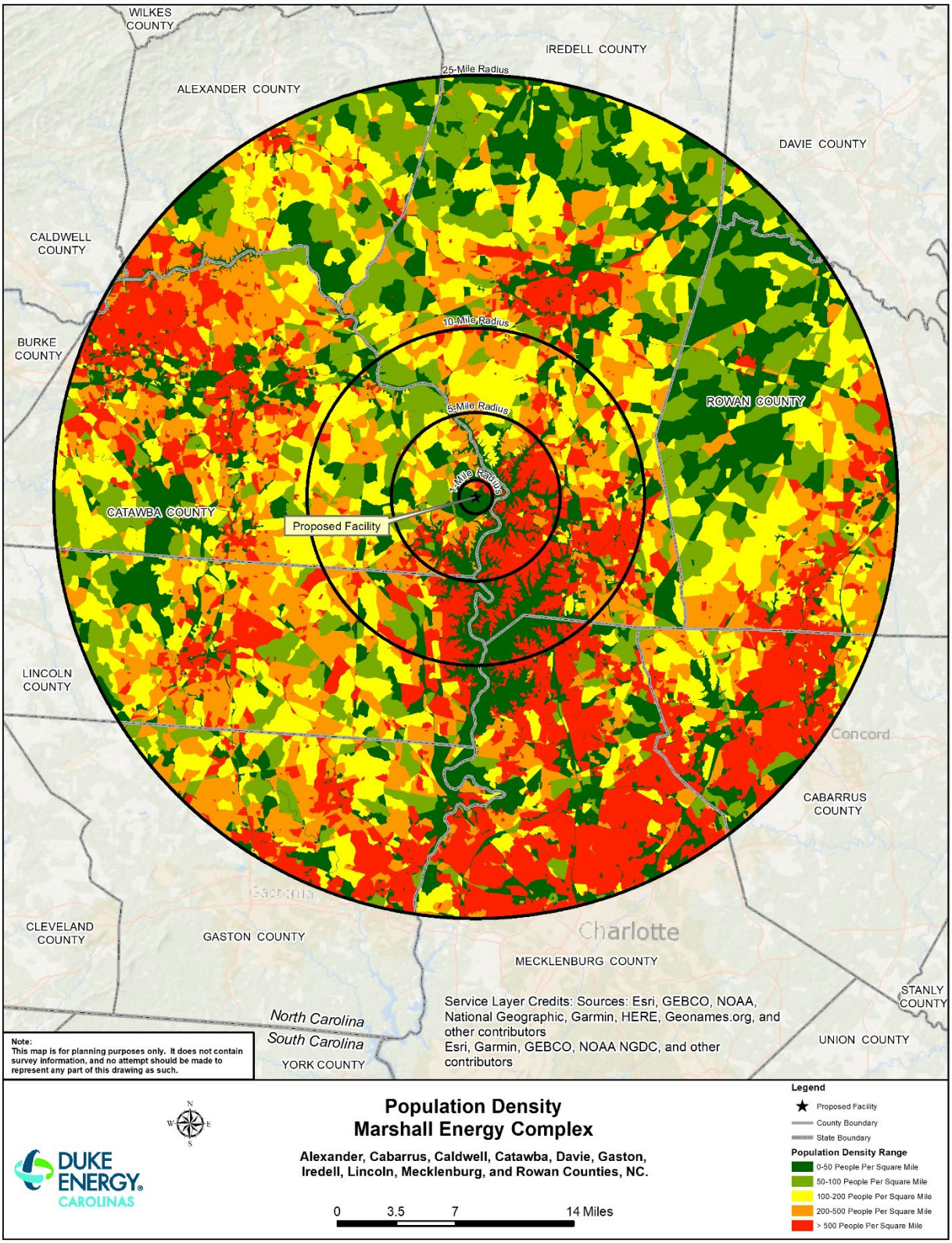
1.4 Site Characteristics

1.4.1 Local Population

According to the U.S. Census Bureau ("USCB"), Catawba County's 2020 population was 160,610, and neighboring Iredell County's 2020 population was 186,693. The towns of Statesville and Mooresville had 2020 populations of 28,419 and 50,193, respectively. Lake Norman of Catawba (a census designated place) had a 2020 population of 8,658 (USCB 2020).

Within a 25-mile radius of the Proposed Facility, the population is about 1,028,200 (USCB 2020a).

Figure 1.4.1: Population Density



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

1.4.2 Area Development

1.4.2.1 Existing Area Development

The sections of Catawba and Iredell Counties within a five-mile radius of the Proposed Facility are a mixture of rural, residential, commercial, and retail land uses. Numerous single-family neighborhoods and some apartments and condominiums are clustered around 32,510-acre Lake Norman. Using field reconnaissance, aerial photography, parcel data from Catawba and Iredell Counties, and desktop analysis, Pike located approximately 1,285 single-family residences and 30 multi-family residences within two miles of the Proposed Facility, as well as three churches and one public school.

Commercial development in the vicinity includes the recently opened Bohemian Cattle Company, a restaurant/event venue and recreation area (1.4 miles northwest) and Sherrills Ford Solid Waste & Recycling (1.6 miles southwest). Restaurants are plentiful: about 1.3 miles east across Lake Norman are Toucan's Lakepoint, The Blue Parrot, and Apps and Taps.

The area has multiple recreational areas and attractions, particularly along the Lake Norman shoreline: Sherrills Ford Optimist Park (2.2 miles northwest), Camp Dogwood (3.2 miles southwest), Lake Norman State Park (2.2 miles north), and Stumpy Creek Park (3.5 miles northeast). The 600-acre Mountain Creek Park is about 4.2 miles southwest of the proposed facilities. Officially opened in June 2022, the park has hiking and biking trails, playgrounds, a fishing pier, an observation deck, a paved Americans with Disabilities Act accessible waterside trail, a dog park, picnic shelters, and other amenities. Public and private boat access areas are abundant. DEC owns several nearby lake access areas that provide the public with access to Lake Norman, and which are managed by the North Carolina Wildlife Resources Commission.

About 1.6 miles west of the Proposed Facility is Sherrills Ford Elementary School; Lake Norman High School is 3.5 miles southeast. North View Harbour, a residential subdivision, is about one-half mile north-northeast of the Proposed Facility. Laurelbrook, a master-planned residential community of 1,700-plus

homes north of the project site, is presently under development. The residential Lake Norman Airpark is about 3.2 miles east.

DEC also considered various environmental justice aspects of the location of the Proposed Facility and undertook a variety of actions to engage with the community and discuss mitigation of community impact. Those actions included, but were not limited to, using a three-mile screening radius (notwithstanding that a one-mile radius is standard) and confirming that no areas of subsidized housing are located within the three-mile radius. DEC representatives communicated and engaged with representatives for the Catawba County Commission, have considered known non-DEC projects/activities that could create cumulative impacts to the community, and identified known areas, structures, and features of significance to the surrounding communities that may have community sensitivities. Through these efforts, DEC did not identify anything that would indicate construction and operation of the MEC would be problematic from an environmental justice perspective.

1.4.2.2 Future Area Development

Pike representatives met with Catawba County's Planning & Parks Director on Wednesday, May 17, 2023, and with Iredell County's Planning & Development's Director on September 28, 2023, to discuss any planned development within five miles of the Proposed Facility.

Only a small section of Iredell County is within five miles of the Proposed Facility. It is already highly developed, mostly with lakefront and inland residences, but also with a few restaurants and other commercial ventures. The County's Planning Director did not know of any planned development (federal, state, or otherwise) within the five-mile area and remarked that there were only a few scattered lots that might be used for building single-family homes.

Catawba County has recently approved housing projects Lakeside Point, which will include more than 200 homes (about four miles southwest of the Proposed Facility), and VR Farms, planned for 50 to 60 homes (about three miles to the northwest of the Planned Facility).

Energy United has plans to build a 44-kV transmission line and connect it to a DEC transmission line just north of Lynmore Drive, about two miles northwest of the Proposed Facility.

In 2017, the North Carolina Department of Transportation ("NCDOT") approved a project to improve traffic flow and reduce traffic congestion on 15 miles of NC 150 from the NC 16 Bypass in Catawba County to just west of the US 21/NC 150 interchange in Mooresville, in Iredell County. This would widen the mostly two-lane Highway 150 to multiple lanes and improve the I-77/NC 150 interchange in Mooresville. Highway 150 runs immediately south of Marshall Steam Station and travels northeast to within about two miles of the Proposed Facility before turning roughly east and entering Iredell County.

According to the website for the Highway 150 widening project, last updated in March 2022, right-of-way ("ROW") acquisition in Iredell County was at that time already underway; and construction contract bids for Iredell County would be accepted in 2025. For Catawba County, ROW acquisition was anticipated to start in 2025, with highway construction expected to begin in 2029.

DEC has plans to add a new recreational lake access area on DEC-owned property off Island Point Road in the 2028-2032 timeframe. The recreational area is planned to have a swimming area and other amenities. The planned site for the recreational area is northeast of the Proposed Facility. The vegetation between the proposed recreational area and the Proposed Facility will likely block any view of the Proposed Facility from the proposed recreational area.

1.4.3 Visual and Auditory

1.4.3.1 Visual

The study area for the visual resources assessment is a circular area with a five-mile radius extending from the Proposed Facility.

The degree of visual impact that the Proposed Facility will have on an existing feature (e.g., scenic vista, cultural resource) is directly related to the visual contrast between the Proposed Facility and the scenic quality of the existing area or region (i.e., the higher the scenic quality, the greater the

potential for adverse visual impacts and vice versa). Scenic quality is derived from the interrelationship of multiple factors, including landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.

Topographic conditions for the surrounding area are typical of those within the Southern Piedmont Physiographic Province, primarily consisting of gently rolling to moderately hilly terrain. In the immediate vicinity of the Proposed Facility, opportunities for scenic vistas are limited because there are few topographical high points, and some of the area is forested, especially in the northern and northwest portions of the study area. Diverse land uses have a direct impact on the scenic quality of the area. Southern portions of the study area, generally along the Highway 150 corridor, are highly modified by various types of residential, commercial, and industrial development and infrastructure. This area is characterized by a lack of visual definition or connectivity relative to varying land uses, and thus its visual quality relative to other areas has already been diminished. Except for the northwestern parts of the study area, extensive residential development around Lake Norman dominates the landscape.

The northwestern portions of the study area along Sherrills Ford Road, Mt. Pleasant Road, and Hopewell Church Road contrast to the highly developing Highway 150 corridor, and they are generally characterized by low-density rural-residential development along with some agricultural cultivated areas, pastureland, and wooded areas. Historic resources can be discovered along rural tree-lined roads that are intermixed with occasional pockets of pasture. Although there are more contributions to scenic quality in the northwestern portions of the study area than there are along the Highway 150 corridor, the northwestern portions still lack widespread opportunities for scenic enjoyment, such as interesting landscape features.

Highway 150 nevertheless provides some scenic vistas. For example, where the highway travels southwest of the existing Marshall Steam Station to span Lake Norman before and after crossing Little

Mountain Road and again, east of Marshall Steam Station, where Highway 150 crosses the lake and enters Iredell County, one can find scenic vistas of Lake Norman.

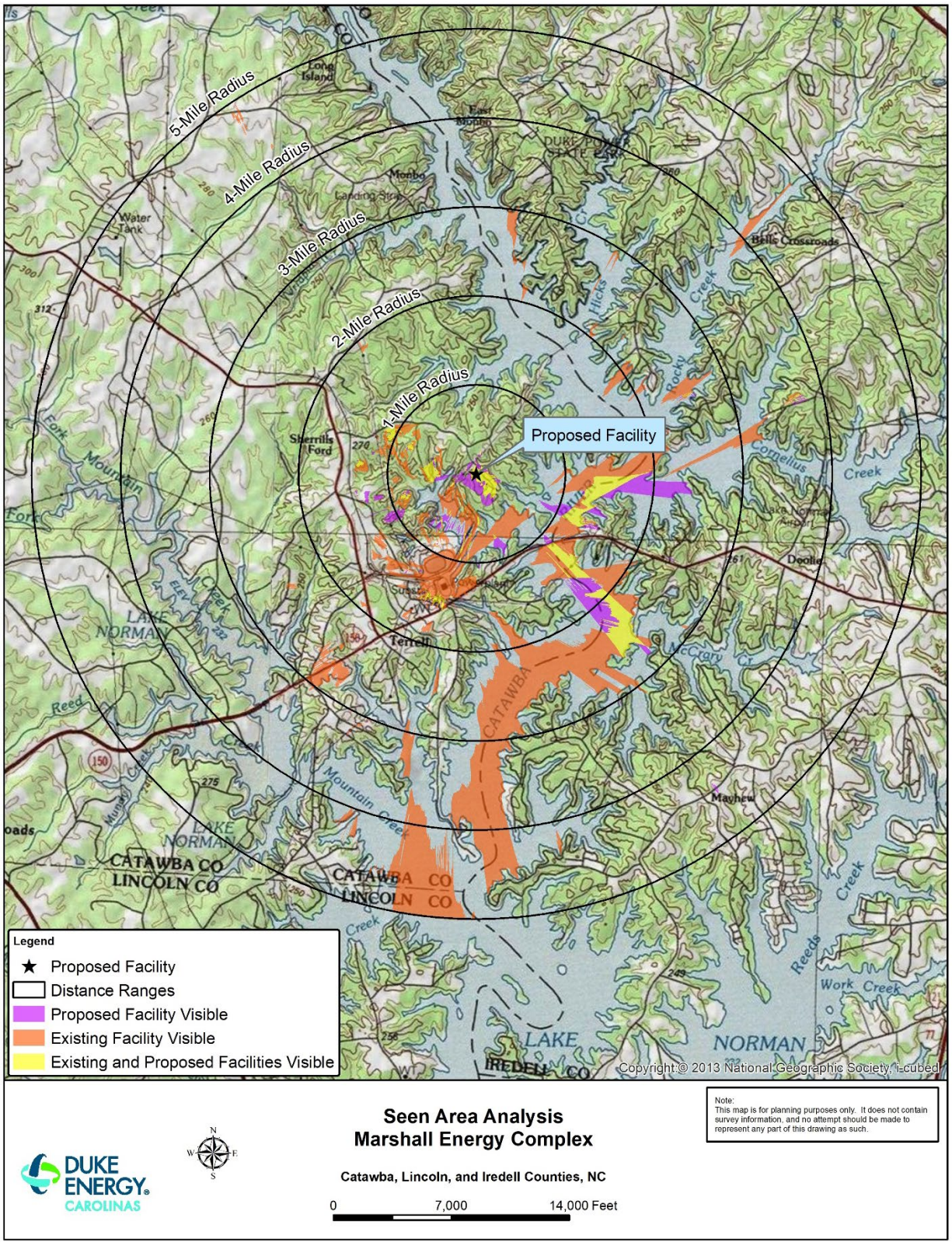
Lake Norman itself offers the most scenic vistas in the study area (i.e., for boaters and homeowners) because of its 520-mile shoreline and 32,510-acre surface area.

During a probable visual effects field study, Pike identified existing 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 have views of the existing Marshall Steam Station stacks and scrubber only, areas with a view of the Proposed Facility only, and areas predicted to have views of both.

Table 1.4.3.1 displays the results of the Seen Area Analysis and Predicted Visual Effects. The data confirms that the Proposed Facility may be visible from only a minor portion of the surrounding area because of visual obstructions from hills and mature forest cover. Of the total area within five miles of the Proposed Facility (78.55 square miles), the Proposed Facility will be visible in areas totaling only 0.69 square miles (0.88 percent of the total area) outside of DEC-owned property that is generally inaccessible to the public. Pike further predicts that outside of DEC-owned property, the future facility will be visible from only 0.34 square miles that do not already have a view of the existing generating facilities (0.43% of the total area). Most of the areas that will have a view of the Proposed Facility are located along the edge of Lake Norman.

Figure 1.4.3.1-1: Seen Area Analysis



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

Table 1.4.3.1: Seen Area Analysis and Predicted Visual Effects

Visual Effects Probability	View Distance Range from Proposed Facility (miles)	Total Area (sq. mi.)	Probable Total Area with a View of Only the Existing Plant (sq. mi.) [1]	Probable Total Area with a View of Only the Proposed Facility (sq. mi.) [1]	Probable Total Area with a View of Both the Existing Plant 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	0.00	0.00	0.00	0.00%
High	0.5 - 1.0	2.36	0.01	0.01	0.00	0.42%
Moderate-High	1.0 - 1.5	3.93	0.27	0.04	0.14	1.02%
Moderate	1.5 - 2.0	5.50	0.30	0.15	0.07	2.73%
Low-Moderate	2.0 - 3.0	15.71	1.36	0.13	0.14	0.83%
Low	3.0 - 4.0	21.99	0.62	0.01	0.00	0.05%
Very Low	4.0 - 5.0	28.27	0.90	0.00	0.00	0.00%
Totals	**Totals**	**78.55**	**3.46**	**0.34**	**0.35**	**0.43%**

[1] Visibility not calculated within DEC-owned property.
[2] Areas with additional visual effects are those without a previous view of the existing Marshall Steam Station.

***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.

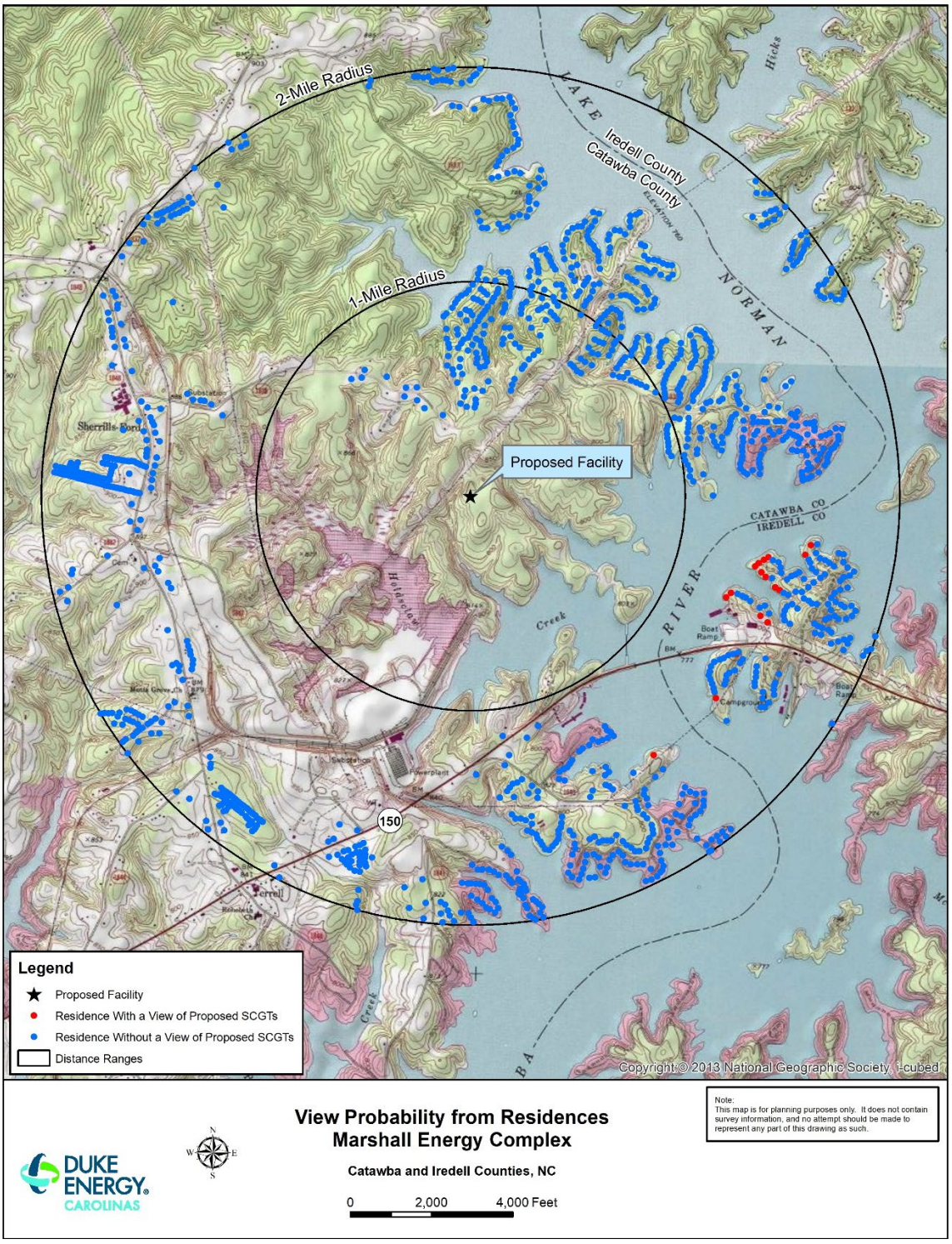
Using the distance from the viewer to the Proposed Facility, Pike predicted (ranked) the visual effects that may occur because of the Proposed Facility. The ranking represents a worst-case scenario; Pike made no attempt to reduce the predicted visual effects probability that will inevitably occur when foreground and mid-ground vegetation or backdrops are present. Also, Pike made no attempts to mitigate either predicted view ranking based on existing modifications to natural landscape settings; or 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 stack (the tallest structure) can be seen from half a mile away, the view effect was ranked as Very High.

Visibility from Residences

Pike conducted an extensive field investigation to determine the Proposed Facility's probable visual effects on residential properties within visual proximity. Initial investigations showed that approximately 16

residences on the edge of Lake Norman and southeast of the Proposed Facility will have potential views of the Proposed Facility. Pike determined that a combination of vegetation and terrain sufficiently screened other surrounding areas from the existing and proposed facilities.

Figure 1.4.3.1-2: View Probability from Residences



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

The residences represented by blue dots in Figure 1.4.3.1-2 will not have a view of the Proposed Facility. The residences represented by red dots in Figure 1.4.3.1-2 may have a slight view of the tallest parts of the Proposed Facility (e.g., the exhaust stacks and SCR) on the horizon because there are no significant visual obstructions (e.g., tree cover) between them and the Proposed Facility. Nevertheless, the visual quality of the area should not be negatively impacted because the distances between the Proposed Facility and residences noted in Figure 1.4.3.1-2 (the closest are about 1.3 miles away, and the farthest are approximately 1.6 miles away) will render the stacks visually inferior to the surrounding environment, which already includes some views of the existing facility, stacks, and electrical transmission lines.

Visibility from Public Roads

The MEC is surrounded by several arterial or collector roads in Catawba County. The main arterial roads are NC Highway 150 to the south, Sherrills Ford Road to the west, and Island Point Road to the north. Other arterial roads within the Catawba County study area include the following: Molly's Backbone Road to the north, Long Island Road and Hopewell Church Road to the northwest, Mt Pleasant Road and Little Mountain Road to the west, and Slanting Bridge Road and Kiser Island Road to the south. East of the Proposed Facility, in Iredell County, arterial roads include State Park Road and Morrison Farm Road to the northeast, NC Hwy 150 and Perth Road to the east, and Brawley School Road to the southeast. Interstate 77 runs north-south just over five miles east of the Proposed Facility. Numerous secondary roads in both counties serve the many residential subdivisions along Lake Norman.

Pike scrutinized all computer modeling that indicated potential visibility for roads. The results of Pike's analysis are presented below.

Catawba County

1. Any view of the Proposed Facility from Marshall Road, a residential street 1.6 miles to the south, would likely be blocked by existing Marshall Steam Station buildings and power lines.
2. The closest viewpoint to the Proposed Facility (and the widest area with possible views) is the East NC Highway 150 bridge that crosses Lake Norman, approximately 1.1 miles southeast of the Proposed Facility. It is the only main road that would have a view of the Proposed Facility.
3. About 1.6 miles from the Proposed Facility, near the intersection of East NC Highway 150 and Kiser Island Road, the views would likely be mostly blocked by the Marshall Steam Station buildings.
4. There are two sites which could have brief views of the Proposed Facility on Steam Plant Road, to the southwest of the Proposed Facility. On one side of Steam Plant Road are commercial buildings. The other side is part of the DEC-owned Marshall Steam Station Property, where plant-related activity occurs.

Iredell County

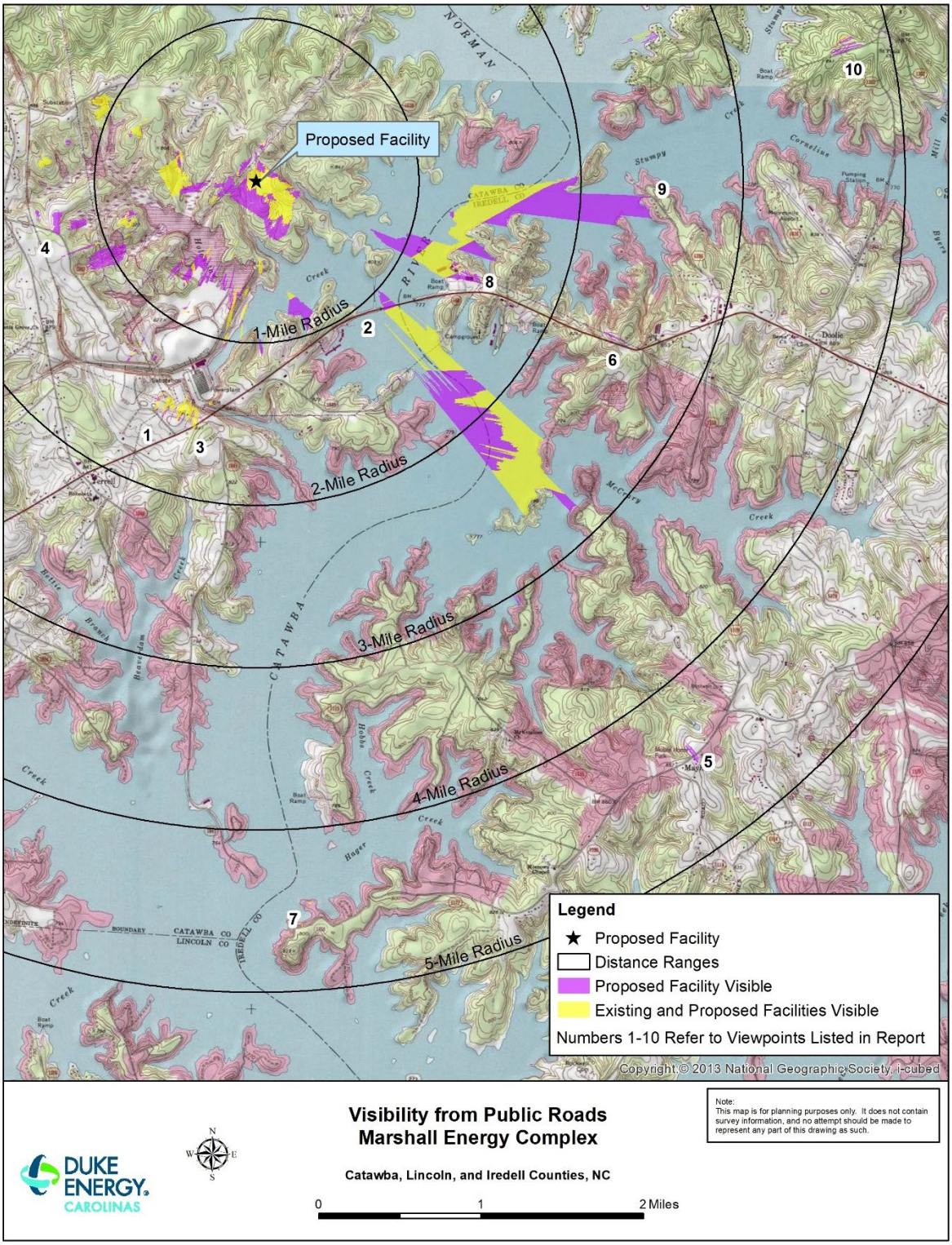
5. A site on Brawley School Road about 4.5 miles southeast is predicted to have a very brief view of the Proposed Facility. However, an apartment building under construction should, when finished, effectively block any views of the Proposed Facility.
6. Two residential roads (Hermance Lane and Waddell Road) both intersect a transmission line right-of-way approximately 2.4 miles southeast of the Proposed Facility. Each road will have a brief view of the Proposed Facility from that intersection, but the view will be obscured by the transmission line.
7. A large lakeside house will likely block the predicted visibility from Landover Lane, about 4.5 miles south of the Proposed Facility.

8. Across Lake Norman, about 1.5 miles east of the Proposed Facility, is Pinnacle Lane. On the lake side of the street are several restaurants, and the other side is residential. Motorists who are looking toward the lake will have a view of the Proposed Facility, but that view will be subordinate to their view of the existing Marshall Steam Station.
9. Robinson Road loops through a peninsular residential area about 2.4 miles east of the Proposed Facility. Motorists may have very brief views of the Proposed Facility in between houses.
10. Stumpy Creek Road and Kiskadee Drive, about 3.7 miles east of the Proposed Facility, intersect at one of the Stumpy Creek Park entrances. Modeling shows that this area could have a brief view of the Proposed Facility.

It is likely that only motorists driving along the East NC Highway 150 bridge, Pinnacle Road, and Steam Plant Road (all of which are fewer than two miles from the Proposed Facility) will have more than brief views of the Proposed Facility; and in most cases, their visibility will be subordinate to that of the existing Marshall Steam Station. The remaining viewpoints of the Proposed Facility are from distances greater than two miles. That distance coupled with the obstructions noted will likely render the Proposed Facility visually unnoticeable to the casual viewer.

On Figure 1.4.3.1-3, numbers corresponding to viewpoints Nos. 1 – 10 above show the approximate locations of potential viewpoints from roads.

Figure 1.4.3.1-3: Visibility from Roads



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

1.4.3.2 Auditory

The U.S. Occupational Safety and Health Administration 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 at lower amplitudes), A-weighting is applied to the dB reading, and the decibel measurements are given as dBA. The background noise in a quiet classroom or worship space would be about 30-35 dBA, whereas a normal conversation level would be about 60 dBA from three feet away. An outdoor condensing fan about 20 feet away could be 50-55 dBA, but a loud siren might be 120 dBA at closer distances (Yale 2023).

Sound levels in most non-urban NC residential communities are in the range of 40-50 dBA. Rural residential communities can be below 40 dBA, especially in less densely populated areas; urban settings are often above 50 dBA, especially near highways.

Each change of 10 dB indicates that ten times as much sound is present, which is generally perceived as twice as loud by humans. A doubling of 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.

Sound levels can be reduced on sunny afternoons, when air near the ground is warmer than air higher in the sky, and the sound curves upward. At sunset and until an hour or so after sunrise, sound that starts upward will curve back downward, often not passing through sound-reducing components such as the ground or barriers, causing louder levels beyond the first few hundred feet. Sound levels can be significantly reduced upwind

from a source and increased 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 enough acoustical absorption to be significant; and over long distances, sounds can pass over the tops of the trees because of the atmospheric curvature effect discussed above (which limits the sound reduction benefit).

A human's noise exposure is a measure of the noise that an individual experiences over a period of time. Noise level is a measure of noise at a given instant, but noise levels are rarely constant for long periods. Community noise is in a constant flux because it is comprised of many distant noise sources that together become a somewhat stable background noise.

Noise at various levels can interfere with sleep, concentration, and communication; and it can cause physiological and psychological stress. For these reasons, some land uses are considered more sensitive to ambient noise levels than others. In this report, these sensitive land uses (places) are called "noise-sensitive receptors." Hospitals, libraries, churches, parks, and residences are just a few examples of noise-sensitive receptors.

Noise impacts on a community are based on the increase in noise levels compared to noise sources already present in the community, the general level of the noise source, type of noise (speech, music, tonal), time of day, and many other factors. In the case of the MEC, Stewart proposed that the Threshold of Significant Impact at any noise-sensitive receptor would be noises exceeding 55 dBA (i.e., 55 dBA Equivalent Continuous Sound Pressure Level, a measure of a constant sound with the same energy as a time-varying noise over the same period of time). Also, a 5-dBA increase over the lowest measured ambient noise level (which includes the existing Marshall Steam Station noise) would be a significant impact for similar receptor locations because the noise is clearly noticeable. This 5-dBA threshold for a "significant impact" for the MEC does not, in any way,

connote that projected noise levels would be damaging to human or animal health or hearing.

Stewart identified and evaluated six noise-sensitive receptors in the vicinity of the Proposed Facility. All the receptors are single-family properties. Receptors 1 through 5 are north or east of the Proposed Facility but Receptor 6 is to the east-southeast. Receptor 1 is the closest to the Proposed Facility.

To document existing ambient noise levels in the vicinity of the Proposed Facility, Stewart set up two long-term monitors north of the Proposed Facility. Long-Term Monitor 1 ("LTM 1") was on Island Point Road at the Marshall Steam Station property line, just south of Receptor 1; and Long-Term Monitor 2 ("LTM 2") was placed on Fair Oak Drive, a little farther north and to the east of LTM 1. From August 8 through August 10, 2023, for more than 40 continuous hours, these monitors measured noise levels. Stewart also used hand-held instruments to obtain short-term (10-minute) measurements at these two locations. Figure 1.4.3.2 shows the locations of each noise-sensitive receptor and the sites where Stewart placed the long-term monitors.

Ambient daytime noises at LTM 1 were dominated by traffic on busy Island Point Road, where vehicular maximum noise levels reached 79 dBA. Other sounds recorded included the chirping of birds and insects. The quietest hour (39 dBA) was at 3:00 a.m. on August 9, 2023, and the loudest hour (56 dBA) was at 9:00 p.m. on August 9, 2023. Late-night and very early morning hours had lower sound levels because of reduced traffic noise.

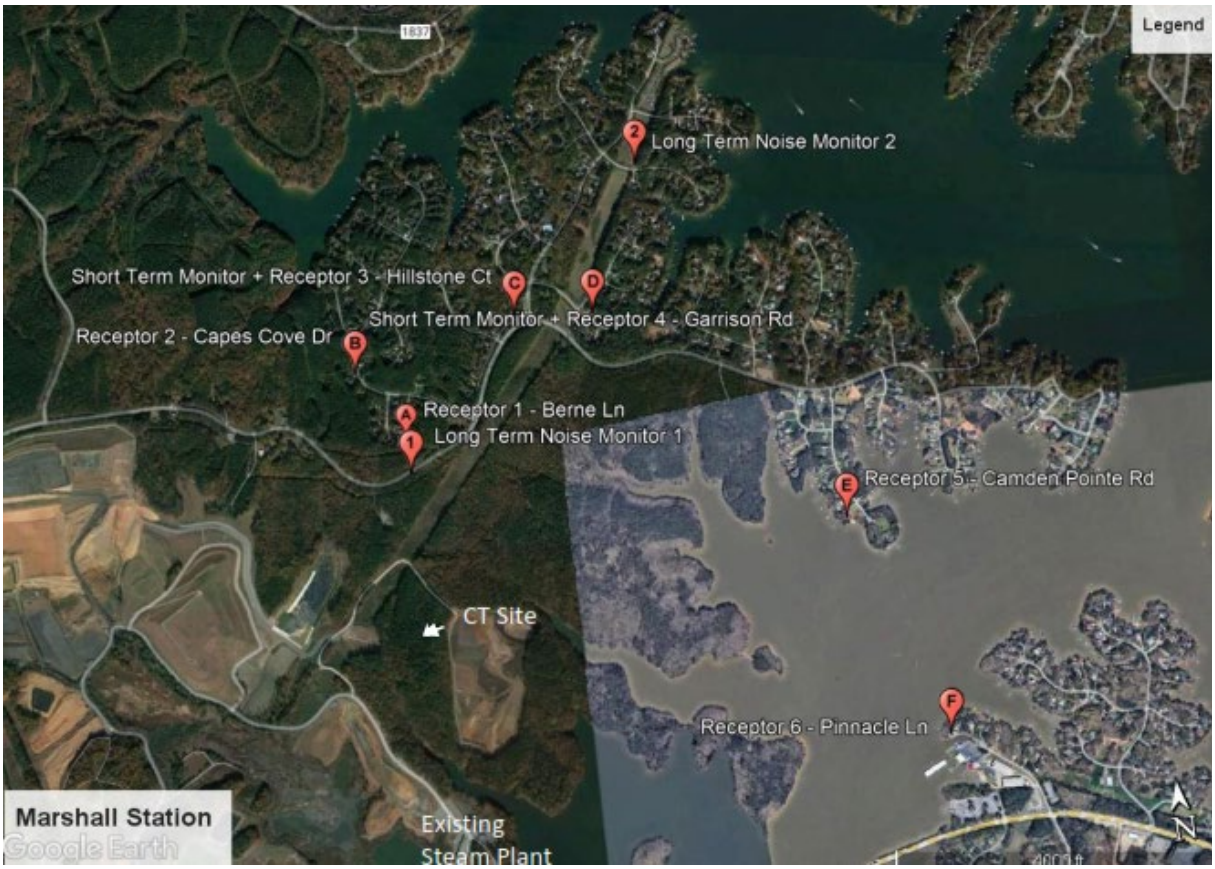
LTM 2 was located further north and to the east of LTM 1 and local traffic and landscaping work were its primary daytime noises. The quietest hour (49 dBA) occurred at 7:00 a.m. on August 9, 2023, and the loudest hour (56 dBA) occurred at 9:00 p.m. on August 9, 2023.

Stewart made short-term measurements at Noise-Sensitive Receptors 3 and 4 just after 1:00 p.m. on August 10, 2023. Both sites

measured 52 dBA with local traffic and yard work identified as the controlling noise sources.

Stewart's long-term monitors recorded 24-hour measurements at Noise-Sensitive Receptors 5 and 6 from April 18 to April 19, 2023, and Stewart used these measurements to help calibrate the noise model.

Figure 1.4.3.2: Noise-Sensitive Receptor and Long-Term Noise Monitor Locations



Map Source: Stewart Acoustical Consulting (Appendix A)

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

how much sound is being introduced into a location, one can compare the sound power of an existing source with that of a proposed source.

To estimate future sound levels for the MEC, Stewart created a SoundPLAN computer model using sound information of anticipated similar SCGTs as well as field measurements of the existing gas- and coal-fired units.

Appendix A describes the methodology Stewart used for measuring sounds levels of existing units and their related equipment and for estimating sounds levels of the Proposed Facility.

Stewart scaled its measurements to represent sound power with all four units operating at total capacity. With no coal-car shaker activity, the total sound power level for Marshall Steam Station is **122.9 dBA**. With Units 1 and 2 (and their shared cranking transformer, assigned transformers, etc.) retired, the total sound power would be **120.8 dBA**, a change of -2.1 dBA without consideration of the coal-car shaker.

The siren—a short-duration maximum event—for the coal-car shaker has an estimated sound power of **144.2 dBA**, and the banging of the cars (also a short-duration maximum event) is estimated at **140.2 dBA**. Stewart measured a sound power of **129.2 dBA** in August 2023, which is within the range of expected sound power for such equipment.

An April 2023 log of coal-car shaker use allowed Stewart to deduce that it is operational 8.4% of the time, although there were extended usage periods of 6.7 and 9 hours, and one period was more than 12 hours. This is a significant duration, longer than the typical peak load conditions with all units running; and Stewart believes that it should be considered part of the normal maximum condition with all operational units running for both existing and future conditions.

Stewart predicts that, with all equipment running, the proposed MEC will have a total sound power of **123.1 dBA**. Without the two stack exits (each at 116.8 dBA, together **119.8 dBA**), the remaining sound energy from all other equipment has a sound power of 120.3 dBA. These two

groups of sources are equal; thus, any effort to reduce noise will require addressing both groups.

Table 1.4.3.2 displays the measured noise levels for the two long-term monitors and the noise-sensitive receptors. No measurements at any noise-sensitive receptor location exceed the Threshold of Significant Impact (55 dBA), but Receptor 1 is predicted to have a 5.5 dBA noise level increase; and LTM 1 is predicted to have a 6.9 dBA increase. These impacts just outside the DEC property line are significant because the increase is greater than 5 dBA and therefore clearly noticeable to human hearing.

However, the Proposed Facility will not expose sensitive receptors to any noises exceeding the 55 dBA Threshold of Significant Impact. These increased sound levels will be clearly noticeable at those locations, but the increases should have no impact on human or animal health. The overall future noise will be no louder than typically found acceptable in communities because of other sources of noise, such as road noise, boats, air conditioning condensing units, and the like. However, it will still be a significant impact to those closer to the Proposed Facility (Receptor 1 and LTM 1), where the level during the typical quietest periods of the night will be increasing more than 5 dBA.

Table 1.4.3.2: Receptor Noise Levels - Measured, Existing and Future Maximum Capacity

ID	Location	Existing Max Steam + Shaker SoundPLAN L_{Aeq*}	Future Max Steam + Shaker +CT SoundPLAN L_{Aeq+}	Quietest Noise Level Assumed	Above 55 dBA Threshold	Increase above Ambient and Existing Plant
1	Berne Lane	34.3	49.0	45 dBA	No	5.5 dBA*
2	Capes Cove Drive	32.6	45.1		No	3.1 dBA
3	Hillstone Court	31.3	42.9		No	2.1 dBA
4	Garrison Road	30.9	42.1		No	1.8 dBA
5	Camden Pointe Road	32.7	41.6		No	1.6 dBA
6	Pinnacle Lane	33.7	41.1		No	1.5 dBA
LTM 1	Island Point Road	35.1	50.9		No	6.9 dBA*
LTM 2	Fair Oak Drive	28.8	39.3		No	1.0

*Significant Change That Is Noticeable to Human Ears

The loudest noise events (siren alerts of a railroad car about to move and banging noises that occur when released railroad cars couple with empty cars) are of short duration. These are the noises that are most likely to be heard at the greatest distances from Marshall Steam Station. However, as these are noises that already emanate from the existing generating facility, they are not an impact that will be caused by the Proposed Facility.

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

1.4.4 Aesthetic/Cultural Resources

The federal government's official list of cultural resources, which includes districts, archaeological sites, aboveground sites (buildings), and objects deemed worthy of preservation, is the National Register of Historic Places ("NRHP"). The NRHP was established with the passage of the National Historic Preservation Act ("NHPA") of 1966, as amended, and traditionally uses four classifications for cultural resources: NRHP Listed, NRHP Eligible, Potentially Eligible, and Not

Eligible. Cultural resources consist of historic and archaeological resources (U.S. Department of Agriculture 2015, U.S. Department of the Interior 1983). Section 106 of the NHPA, 54 U.S.C.S. § 306108, 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.

Pike contracted with Brockington Associates to conduct architectural literature reviews and windshield surveys for new project construction on the Marshall Steam Station property. This was a due-diligence effort to ensure that any potentially significant cultural resources would be considered in siting the Proposed Facility. This effort does not constitute fulfilment of more intensive studies that would be required under Section 106 of the NHPA, should that law become applicable for this project.

Brockington limited its research to a two-mile Area of Potential Effect ("APE"). An APE is defined by the NHPA as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." 36 C.F.R. § 800.16(d). For this cultural-resources study, the APE is a circle with a radius extending two miles from the Proposed Facility.

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

Four previous environmental review efforts (Section 106 or due diligence) have been made in the APE. Seventeen archaeological sites have been recorded, and one site investigated in 1961 requires additional work before any recommendation can be made. All the remaining archaeological surveys had been noted as not eligible. An intensive 2005 cultural resources survey for the Catawba-

Wateree Hydroelectric Relicensing Project recorded both architectural and archaeological resources within the APE.

To obtain locations of potentially historic properties and guide their field efforts, Brockington also considered and reviewed the following:

- any locally significant properties that might not be formally listed with the state (e.g., the Catawba County Historical Association operates several significant historic sites, including Resource CT0651 and Sherrill Family Cemetery, which are located within the APE);
- relevant county planning documents; and
- historic maps and aerial photographs.

1.4.4.1 Architectural Resources

According to Brockington's September 2023, letter report, attached to this document as Appendix B-1, NCSHPO lists 32 previously recorded aboveground resources in the APE. Among those resources is the Terrell Historic District, which was NRHP-listed in 1986. Increased demolition in the district, however, prompted NCSHPO in a 2022 review to determine that the district is no longer eligible (without formally de-listing it from the NRHP). The current APE partially overlaps one previous Brockington windshield survey (Stallings 2017) that includes three potentially eligible architectural resource: TL-1, 8550 Sherrill's Ford Road; TL-3, 8112 Sherrills Ford Road; and TL-4, 7958 Sherrills Ford Road.

Figures 1.4.4.1-1 through 1.4.4.1-5 show the architectural resources within the APE that are State Listed or Eligible for the NRHP. The complete list of recorded resources can be found in Appendix B-1.

Figure 1.4.4.1-1: Major Henry W. Connor House

Source: Brockington and Associates (Appendix B-1)

The c. 1830 Major Henry W. Connor House, state-listed in 1981, is an example of traditional vernacular architecture—built using local materials and in a style that kept a region's traditions. It reflects the federal style, which was simple, generally rectangular, and symmetrical.

Figure 1.4.4.1-2: Mott's Grove Campground

Source: Brockington and Associates (Appendix B-1)

The historic 30-tent Motts Grove Church Campground, about 1.5 miles southwest of the Proposed Facility, was established in 1872 and still holds camp meetings each August.

Figure 1.4.4.1-3: House

Source: Brockington and Associates (Appendix B-1)

This unnamed architectural resource is a c. early-twentieth century hipped- roof, double-pile building.

Figure 1.4.4.1-4: J.P. Sherrill House

Source: Brockington and Associates (Appendix B-1)

The J.P. Sherrill House is a late nineteenth-century gable front and wing two-story building.

Figure 1.4.4.1-5: Marshall Steam Station

Source: Duke Energy Carolinas

Marshall Steam Station was determined eligible during the NCDOT survey of NC-150 (van den Hurk 2014). The eligible boundary includes a significant portion of DEC's property. It is important to note that the Marshall Steam Plant derives its significance through the generation of electricity and includes several existing outgoing transmission lines. The addition of another proposed generating facility would be consistent with the historical use of the property.

Table 1.4.4.1-1 lists previously recorded architectural resources within two miles of the Proposed Facility.

Table 1.4.4.1-1: Previously Recorded Architectural Resources in the Area of Potential Effect that Are Extant and Remain Eligible or Potentially Eligible for the NRHP

Site ID	Name	Description	Identification/ Year	Reconnaissance Notes	Reconnaissance NRHP Assessment
CT0378	Terrell Historic District	Turn-of-the-century crossroads District	NRHP-listed 1986; No Longer Eligible 2022	Extant; seven contributing buildings demolished	No Longer Eligible; but remains listed
CT0461	Major Henry W. Connor House	c. 1830 Trad/Vern/Federal	State Listed 1981	Extant	State Listed
CT0561	House	c. Early 20th century hipped roof, double-pile	Survey with No Recommendation 1977	Extant; minor alterations	Eligible
CT0580	Mott's Grove Campground	Late 19th century African-American campground	Placed on Study List (Unknown Year)	Campground extant; recommend adding Mott's Grove Church to complex	Eligible; State Listed
CT0649	J.P. Sherrill House	Late 19th century gable front and wing, two-story	Survey with no recommendation 1977	Extant; minor alterations	Eligible
CT0650	W.J. Holdsclaw House	Late 19th century gable front and wing, 2-story	Survey with no recommendation 1977	Extant	Potentially Eligible
CT0651	Sherrill Family Cemetery	Early 19th century family cemetery	Survey with no recommendation 1977	Extant	Potentially Eligible
CT1303	Marshall Steam Station	1965-1970 power plant	Section 106 DOE under Crit A and C, 2014	Extant	Eligible
MAR-145	Marshall Steam Plant Cemetery	Late 19th century cemetery	Reconnaissance Potentially Eligible 2018	Extant	Potentially Eligible
TL-1	8550 Sherrill's Ford Road	c. 1910 two-story gable front and wing	Reconnaissance Potentially Eligible 2017	Extant	Remains Potentially Eligible
TL-3	8112 Sherrill's Ford Road	c. 1900 two-story double-pile	Reconnaissance Potentially Eligible 2017	Extant	Remains Potentially Eligible
TL-4	7958 Sherrill's Ford Road	c.1951 Minimal traditional	Reconnaissance Potentially Eligible 2017	Extant	Remains Potentially Eligible

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

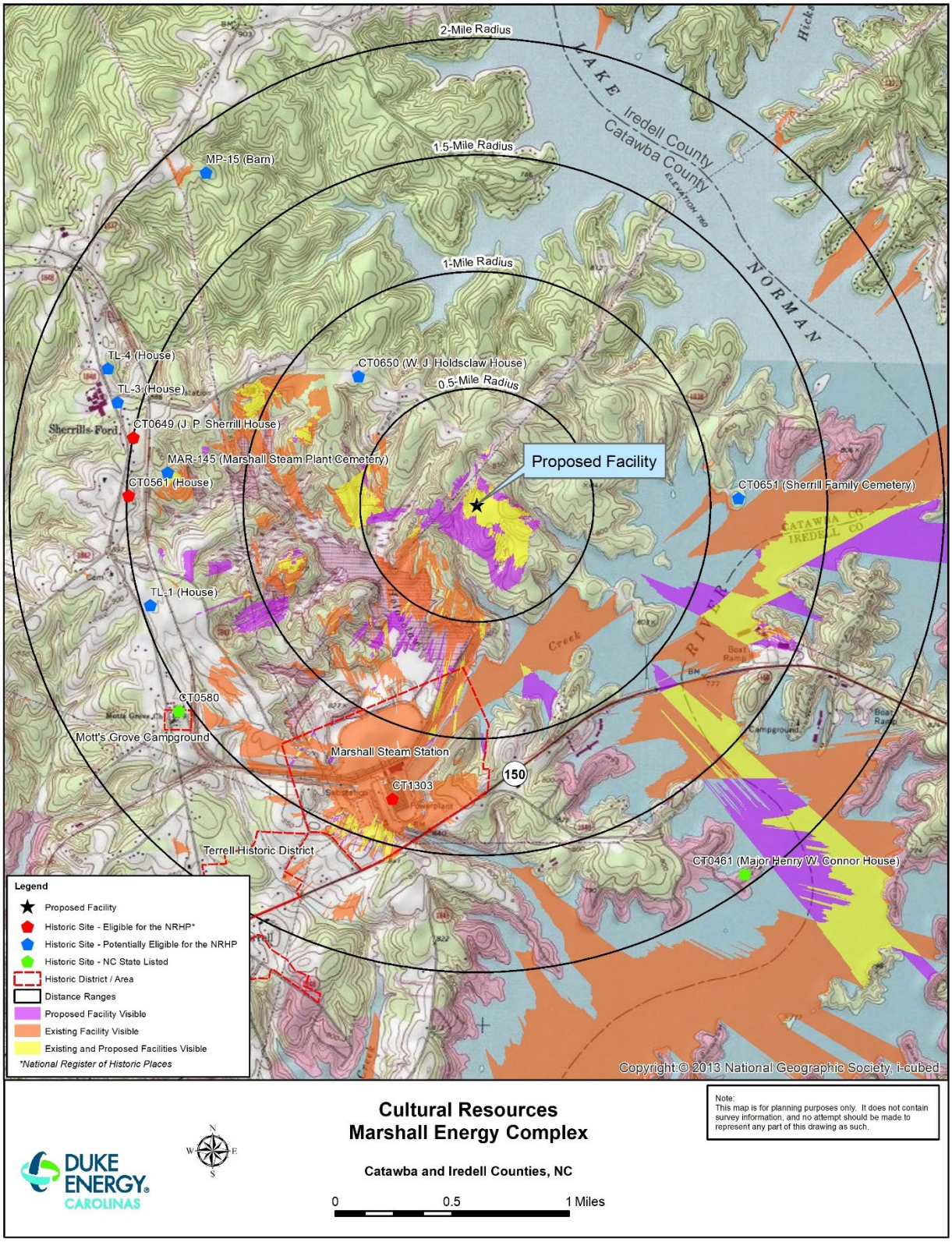
Table 1.4.4.1-2: Potentially Eligible Architectural Resources Identified in 2023 Reconnaissance

Site ID	Location	Description	Reconnaissance NRHP Assessment
MP-15	Barn located on Raccoon Track Drive (no address available)	c. 1905 barn	Potentially Eligible

Figure 1.4.4.1-6 shows the locations of previously listed architectural resources as well as those identified in the Brockington surveys. Pike also created line-of-sight profile graphs to determine whether any historic sites could be affected by visibility of the Proposed Facility. The graphs show that the Proposed Facility will not be visible from any of the cultural sites.

Additional photographs of the architectural resources can be found in Appendices B-1 and B-3.

Figure 1.4.4.1-6: Visibility from Cultural Resources



Map Sources: Courtesy of the USGS; USGS NED 2023, USDA Orthoimagery 2022; Brockington and Associates 2023, ESI 2018

1.4.4.2 Archaeological Resources

Brockington collected data for previous cultural resources surveys and known archaeological sites and surveys through HPOWEB. Table 1.4.4.2 lists the four previous cultural resource investigations within the APE.

Table 1.4.4.2: Previous Archaeological Investigations within the Area of Potential Effect

Survey	Recorded	Results
Archaeological Shoreline Survey at Lake Norman: Catawba, Iredell, Lincoln, and Mecklenburg Counties, NC	2003 Rachet Tibbits Bobby Southerlin	Reconnaissance-archaeological survey 7 archaeological sites
Cultural Resources Survey for the Catawba-Wateree Hydroelectric Relicensing Project: Alexander, Burke, Catawba, Gaston, Iredell, Lincoln, McDowell, and Mecklenburg Counties, NC	2005 Heather Mills Damon Jones	Intensive survey 39 archaeological sites 37 architectural resources
Phase I Intensive Archaeological Survey for the Proposed Twenty-Inch Duke 451 Pipeline, Lincoln and Catawba Counties, NC	2019 Paul D. Jackson	Intensive archaeological survey 9 archaeological sites
Archaeological Survey for The Villas at Sherrills Ford Project, Catawba County, NC	2020 Tasha Benyshek Michael Nelson	Reconnaissance-archaeological survey No archaeological sites

In 2015 Amec Foster Wheeler Environment & Infrastructure, Inc., ("AFW") conducted a desktop review of the study area based on available resources from the NRHP files and information on archaeological resources from the state Archaeological Site File repository at the NCSHPO. This literature review was performed prior to and as part of DEC's planned ash basin closure activities near the ash ponds at Marshall Steam Station. Exhibit B-2 provides an excerpt from AFW's report.

According to the state Office of Archaeology ("NCOSA") records, the APE had not been surveyed for archaeological resources. Only five sites had been previously identified within the study area, and none of those sites had been deemed eligible for the NRHP because of low density of artifacts and/or high disturbance of soils from erosion. 17 identified sites that were within a half-mile radius of the Proposed Facility were assessed as ineligible or as requiring additional information.

In October 2018, a survey crew marking the area for a proposed drainage trench associated with the Marshall Steam Station ash removal project came upon an undocumented potential grave site. DEC contracted with Environmental Services, Inc., ("ESI") to locate the limits of the cemetery (designated as MAR-145) to prevent potential impacts to marked or unmarked graves. ESI performed background research and conducted field investigations to determine the cemetery's boundaries.

After researching Catawba County Deed Books, ESI was able to discover that E.L. Sherrill and Julia E. Sherrill had conveyed a 142-acre parcel to Junius Phelps Sherrill, Sr., in 1887. The land included a wheat mill, sawmill, corn mill, cotton gin, cotton press, and other buildings; but there was no reference to a cemetery. An 1886 Catawba County map shows E.L. Sherrill's home was located west of the graveyard.

This early 18th-century cemetery appears to contain 18 graves marked only with plain, uncarved fieldstones—burial practices typical of slave and/or post-emancipation-era tenant farmer cemeteries. After receiving results of the ESI investigation, DEC protected the cemetery with permanent fencing. The cemetery is not within the footprint of the Proposed Facility. Appendix B-5 provides more information about the cemetery.

In August 2023, Pike contracted with Brockington to conduct a Phase I archaeological survey of a 92-acre tract which encompasses the site of the Proposed Facility. The survey incorporated background research, field investigation (including shovel tests in undisturbed accessible areas), laboratory analysis and curation, and report preparation. It was conducted in accordance with both federal and state guidelines including Section 106 of the NHPA of 1966 (54 U.S.C. § 30010, as amended through 2016), the Advisory Council on Historic Preservation's implementing regulations (36 C.F.R. Part 800), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (1983), and cultural resources survey and reporting guidelines set forth by the NCOSA Archaeological Investigation Standards and Guidelines (December 2017).

The project tract consists of wooded ridgelines surrounding an open soil borrow area overlooking Lake Norman to the southeast. A transmission corridor extends along the northwest boundary of the tract, and a gravel haul road enters the tract from the north. During the survey, Brockington inspected the ground surface for cultural materials and used shovel testing to investigate subsurface cultural deposits. Shovel tests were 30 centimeters (cm) in diameter and pre-plotted within the project tract at 30m intervals. Although 429 shovel tests were initially plotted within the project tract, 141 of these could not be excavated because of excessive slope >30 degrees (in accordance with NCOSA guidelines) and disturbances such as gravel access roads.

Brockington screened soils from the shovel tests through one-quarter-inch mesh hardware cloth. Records of each shovel test were kept in field notebooks, including information on content (e.g., presence or absence of artifacts, artifact descriptions) and context (i.e., soil colors and texture descriptions, depth of definable levels, observed features).

A typical soil profile of the 288 shovel tests consisted of a 7.5 yellow-red ("YR") 5/6 strong brown sandy loam between 0 and 20 centimeters below surface, underlain by a 2.5 YR 4/6 red sandy clay subsoil. Most of the soils along the ridgetops and slopes have been severely eroded. Brockington observed modern debris from the use of the central area as a borrow pit along the ground surface, including rubber tires, concrete barriers, and erosion-control mesh fencing. All shovel tests were negative for cultural materials.

Brockington identified no archaeological resources within the project tract. Therefore, no significant or NRHP-eligible resources will be impacted by construction within the project tract. Additional management considerations with regards to archaeological resources for the proposed project are not warranted.

Appendix B-3 provides a summary of Brockington's survey and includes photographs and figures for the archaeological survey.

1.4.5 Geology

The study area for the geological assessment is a 25-acre site northeast of the existing Marshall Steam Station and approximately 0.18 miles west of Lake Norman. The study area is also immediately adjacent to DEC's existing 230-kV transmission lines right-of-way. The study area is located entirely on DEC-owned property.

1.4.5.1 Geology and Geologic History

The eastern United States and NC consist of three major physiographic regions: the Blue Ridge Mountain region, the Piedmont region, and the Coastal Plain region. 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 NC, the Piedmont region occupies about 45% of the area of the state. The study area is centered at approximately 500 feet above sea level.

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

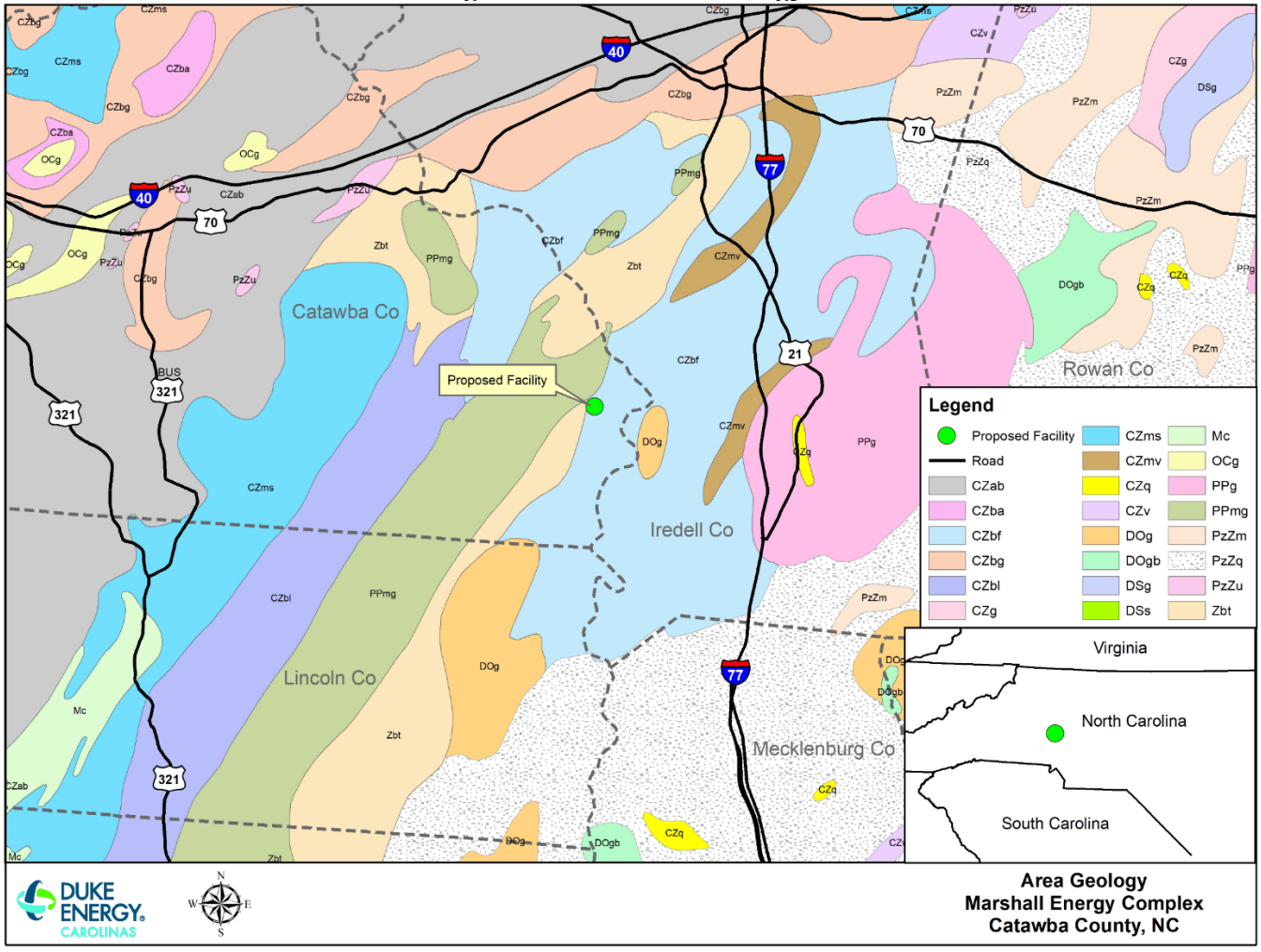
The first significant mountain-building event (orogeny) occurred around 440-480 MYA, and the early Appalachian Mountain chain began to form. During this and subsequent mountain-building events, the Appalachian region was folded, faulted, intruded by magma, sheared, uplifted, and metamorphosed. Both the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

As a result of continental collision, rocks were accreted (i.e., gradually accumulated) onto the present-day North American continent as a patchwork of volcanic islands and fragments of land and former ocean-bottom sediments. This led to the formation of distinct geologic belts, or terranes, that currently trend northeast-southwestward (Hibbard et al. 2002; Secor et al., 1983). The study area is located within the Charlotte and Milton terranes or belts, within the Northern Inner Piedmont zone (Figure 1.4.5.1 (NCDEQ 2023; NCGS 1985)).

The Charlotte and Milton belts consist of fine-grained, metamorphosed igneous rock such as biotite gneiss. These rocks include gneiss, muscovite shale, and amphibolite. The Belt is massive to strongly foliated with minor layers of amphibolite and muscovite shale. Units are intruded by a variety of pre and post kinematic (granitic) plutons (Overstreet and Bell 1965). The rocks range in age from about 300 to 500 million years old. They were part of a large (USGS 2023) chain of ancient volcanic islands that formed off the coast of the ancient continent called Gondwana. These igneous rocks are a good source for crushed stone for road aggregate and construction materials. Gold was also produced from the Charlotte terrane (NCDEQ 2023).

Figure 1.4.5.1 gives a color-coded view of the area's geology.

Figure 1.4.5.1: Area Geology



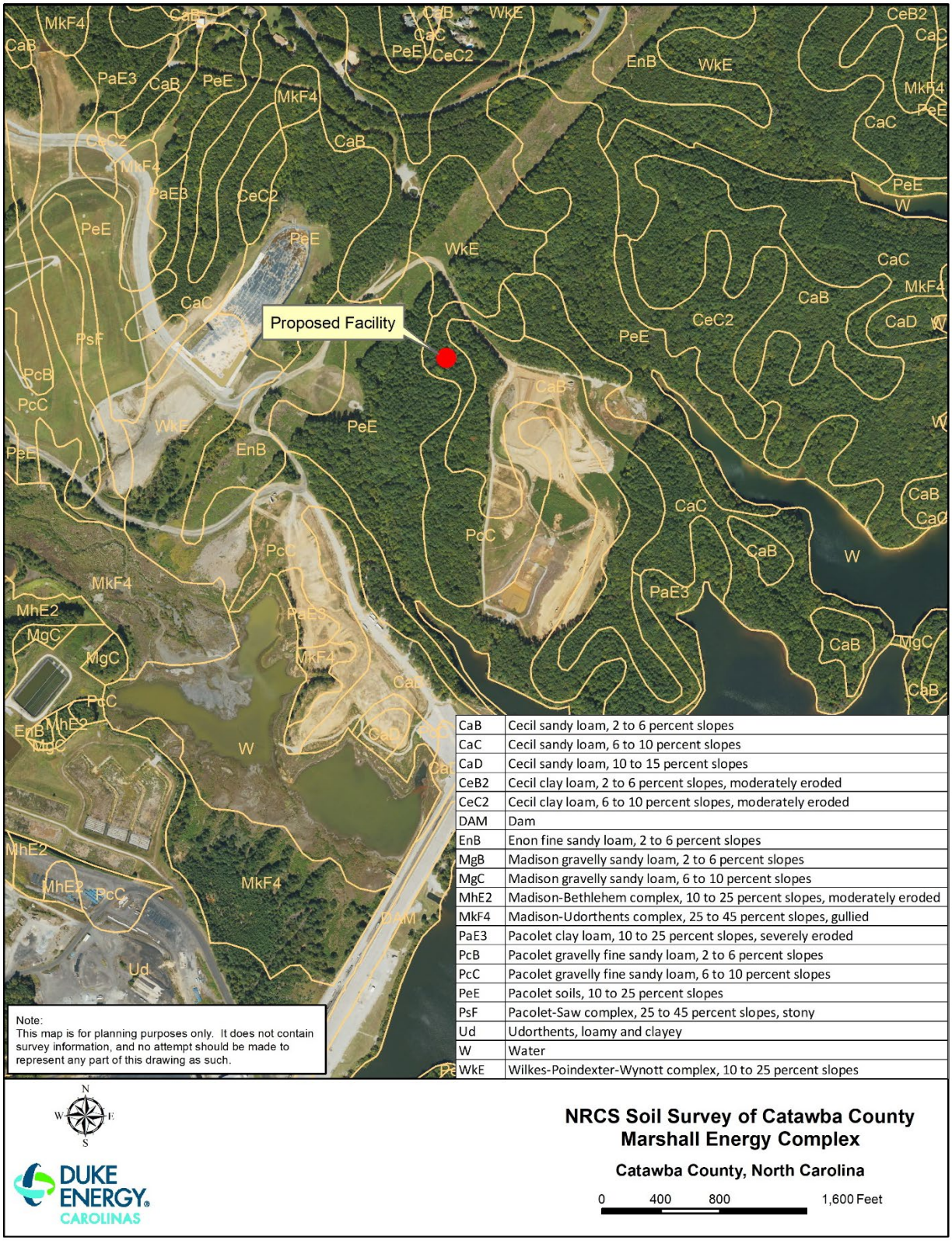
Map Sources: Area Geology Courtesy of United States Geological Surveys of NC 2023; Esri; TomTom NA, Inc.; i-cubed; County Boundary Sources: Esri; U.S. Dept, of Commerce, Census Bureau; NOAA; National Ocean Service; National Geodetic Survey

1.4.5.2 Dominant Soil Types

As in 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 soil data (Natural Resource Conservation Service ("NRCS") 2023), the Proposed Facility's foundation material within the shallow subsurface consists primarily of soils within the Pacolet, Cecil, and Wilkes-Poindexter-Wynott complex soil series (Figure 1.4.5.2). This site has undergone a series of ground disturbances over the last several decades.

The study area consists of Pacolet soils (PeE) at 35.4% of the site, Pacolet gravelly, fine sandy loam (PcC) at 30.7% of the site, Cecil Sandy Loam (CaB and CaC) at 33.6% of the site, and Wilkes-Poindexter-Wynott complex (WkE) at 0.3% of the site (Figure 1.4.5.2).

Figure 1.4.5.2: NRCS Soil Survey of Catawba County



CaB	Cecil sandy loam, 2 to 6 percent slopes
CaC	Cecil sandy loam, 6 to 10 percent slopes
CaD	Cecil sandy loam, 10 to 15 percent slopes
CeB2	Cecil clay loam, 2 to 6 percent slopes, moderately eroded
CeC2	Cecil clay loam, 6 to 10 percent slopes, moderately eroded
DAM	Dam
EnB	Enon fine sandy loam, 2 to 6 percent slopes
MgB	Madison gravelly sandy loam, 2 to 6 percent slopes
MgC	Madison gravelly sandy loam, 6 to 10 percent slopes
MhE2	Madison-Bethlehem complex, 10 to 25 percent slopes, moderately eroded
MkF4	Madison-Udorthents complex, 25 to 45 percent slopes, gullied
PaE3	Pacolet clay loam, 10 to 25 percent slopes, severely eroded
PcB	Pacolet gravelly fine sandy loam, 2 to 6 percent slopes
PcC	Pacolet gravelly fine sandy loam, 6 to 10 percent slopes
PeE	Pacolet soils, 10 to 25 percent slopes
PsF	Pacolet-Saw complex, 25 to 45 percent slopes, stony
Ud	Udorthents, loamy and clayey
W	Water
WkE	Wilkes-Poindexter-Wynott complex, 10 to 25 percent slopes

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

The Pacolet soils are well drained at 6-25% slopes. The complex occurs at elevations of 200 to 1,400 feet in elevation. These farmland soils of state importance typically occur at side slope landforms. This complex, consisting of a profile of gravelly sandy loams and sandy clay loam, has a medium runoff class, no frequency of flooding or ponding, and a typical depth-to-water table of more than 80 inches (NRCS 2023; NCGS 1985). The complex is derived from a parent material of saprolite derived from granite and gneiss and/or schist. The typical soil profile of the Pacolet soil complex is included in Table 1.4.5.2.

The Cecil sandy loam soils are at 6-10% slopes. The series occurs at elevations of 70 to 1,400 feet in elevation, sometimes includes farmland of state significance, and typically occurs at side slope landforms. Consisting of a profile of sandy loams, clay, and clay loam, the series is well-drained, has no frequency of flooding or ponding, and its typical depth--to-water table is more than 80 inches (NRCS 2023). The parent material of the complex is derived from saprolite from granite, gneiss, and/or schist. The typical soil profile of the Cecil sandy loam soil series is included in Table 1.4.5.2.

The Wilkes-Pondexter-Wynott complex series is at 10-25% slopes and occurs at elevations of 200 to 1,400 feet. It is not prime farmland, and it typically occurs at side slope landforms. This well-drained series consists of a profile of loam, clay, and clay loam, with no frequency of flooding or ponding, and a typical depth-to-water table of more than 80 inches (NRCS 2023). The complex is derived from a parent material of weathered diorite and/or gabbro and/or diorite and gneiss. The typical soil profile of the Wilkes-Poindexter-Wynott complex soil series is included in Table 1.4.5.2.

Table 1.4.5.2: Typical Subsurface Soil Profiles of the Site

Pacolet Gravelly Fine Sandy Loam (PcC)	Pacolet Soil Series (PeE)	Cecil Sandy Loam Series (CaB)	Cecil Sandy Loam Series (CaC)	Wilkes-Poindexter-Wynott Complex (WkE)
Depth (inch) Description	**Depth (inch) Description**	**Depth (inch) Description**	**Depth (inch) Description**	**Depth (inch) Description**
0-3 gravelly fine sandy loam	0-3 gravelly sandy loam	0-8 sandy loam	0-8 sandy loam	0-3 loam
3-7 gravelly fine sandy loam	3-7 gravelly sandy loam	8-42 clay	8-42 clay	3-6 loam
7-25 sandy clay	7-25 sandy clay	42-50 clay loam	42-50 clay loam	6-10 clay
25-80 sandy clay loam	25-80 sandy clay loam	50-80 loam	50-80 loam	10-80 clay loam and weathered bedrock

(NRCS 2023)

DEC 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.

1.4.6 Ecological

The ecological study area for the Proposed Facility includes a 25-acre tract where the SCGTs and associated components (e.g., construction lay-down area, switchyard, administration building, etc.) will be located. This area is significantly disturbed from past and current activities associated with the Marshall Steam Station. The area is surrounded by areas of mixed hardwood-pine woodland, agricultural areas, transmission line corridors, residential communities, and Lake Norman.

1.4.6.1 Terrestrial Resources

1.4.6.1.1 Botanical

According to the Classification of the Natural Communities of North Carolina - Fourth Approximation (Schafale 2012), the western half of the proposed site can be classified as Mesic Mixed Hardwood (Piedmont Subtype). The Proposed Facility is in uplands surrounded by existing facility infrastructure (e.g., facility access roads and transmission line rights-of-way). These relatively small wooded-area remnants and adjacent areas are described below based on known site information and field assessments. As mentioned previously, the western portion of the proposed site is disturbed and in a barren soil condition.

Mesic Mixed Hardwood Forest (Piedmont Subtype)

This community is comprised of mature woody, herbaceous, and vine species including black oak (*Quercus velutina*), northern red oak (*Q. rubra*), scarlet oak (*Q. coccinea*), white oak (*Q. alba*), post oak (*Q. stellata*), water oak (*Q. nigra*), southern red oak (*Q. falcata*), American beech (*Fagus grandifolia*), loblolly pine, (*Pinus taeda*) Virginia pine (*P. virginiana*), mockernut hickory (*Carya tomentosa*), sweetgum (*Liquidambar styraciflua*), black gum (Nyssa sylvatica), tulip poplar (*Liriodendron tu*lipifera), red maple (*Acer rubra*), American holly *(Ilex opaca*), black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), eastern redcedar (*Juniperus virginiana*), sourwood (*Oxydendrum arboreum*), sassafras (*Sassafras abidum*), American basswood (*Tilia americana*), greenbriar (*Smilax spp.*), muscadine grape (*Vitus rotundifolia*), Virginia creeper (*Parthenocissus quinquefolia*), spotted pipsissewa (*Chimaphilia maculate*), Christmas fern (*Polystichum acrostichoides*), ebony spleenwort (*Asplenium platyneuron*), New York fern (*Thelypteris noveboracensis*),

rattlesnake plantain (*Goodyera oblongifolia*), Indian pipe (*Monotropa uniflora*), pine sap (*Monotropa hypopitys*), partridgeberry (*Mitchella repens*), Common cinquefoil (*Potentilla simplex*), necked-flower tick-trefoil (*Desmodium nudiflorum*), wooly elephants foot (*Elephantopus tomentosus*), deer tongue grass (*Dichanthelium clandestinum*), James sedge (*Carex jamesii*), St. John's wort (*Hypericum hypericoides*), arrow-leaved heartleaf (*Hexastylis arifolia*), American ceasar mushroom (*Amanita jacksonii*), chanterelle waxy cap (*Hygrocybe cantharellus*), and lions mane (*Hericium erinaceus*). This area will be permanently affected by the Proposed Facility.

Utility Line Rights-of-Way

The Proposed Facility is also immediately adjacent to a DEC 230-kV transmission line right-of-way. These routinely managed linear corridors (i.e., three to five-year cycles), maintained in an early-successional stage, are characterized by grasses, forbs, and woody plants dominated by dense broomsedge (*Andropogon virginicus*), broad-leaved panic grass (*Dichanthelium latifolium*), dogfennel (*Eupatorium capillifolium*), fleabane species (*Erigeron spp.*), goldenrod species (*Solidago spp.*), Japanese honeysuckle, greenbriar, and blackberry (*Rubus allegheniensis*). Sweetgum, red maple, shortleaf pine and redcedar saplings can also be present based on the timing of the maintenance cycle. This transmission line corridor will not be affected by the Proposed Facility.

Wetlands and Jurisdictional Waters of the U.S.

DEC biologists conducted a reconnaissance-level survey of the study area for wetlands and jurisdictional waters of the United States, under Section 404 of the Clean Water Act. The area was examined according to the methodology described in the U.S. Army Corps of Engineers ("USACE") 1987 Wetland Delineation Manual,

USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory regime, and the North Carolina Division of Water Resources Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11), as well as review of the U.S. Fish and Wildlife Service's ("USFWS") National Wetland Inventory database. Based on the existing information and the survey, no wetlands or Waters of the U.S. will be affected by the Proposed Facility (see Appendix C).

Federally Protected Plant Species

DEC obtained and reviewed a list of federally protected plant species for Catawba County and the specific area within the study area (USFWS 2023). DEC also reviewed its internal Natural Resource GIS Viewer database, which includes known element occurrences and critical habitat of federal and state protected species. DEC has also conducted field assessments of listed species in the study area over the last several years. No known occurrences of federally or state protected species within the Proposed Facility's study area, or immediately adjacent thereto, are indicated on the database or the field assessments.

The USFWS's Information for Planning and Consultation ("IPaC") tool revealed two federally protected plant species within the general study area and Catawba County. These species include the dwarf-flowered heartleaf (*Hexastylis naniflora*) and the Schweinitz's sunflower (*Helianthus schweinitzii*).

Dwarf-flowered heartleaf (Threatened) is found in the upper piedmont regions of both North and South Carolina. In NC, the range for this species extends through Catawba, Lincoln, Rutherford, Cleveland, and Burke Counties. This heartleaf species grows in acidic, sandy loam soils along bluffs and nearby slopes, in boggy areas adjacent to creek heads and streams, and along the

slopes of hillsides and ravines. The most important habitat requirement is soil type; this species appears to need Pacolet, Madison gravelly sandy loam, or Musella fine sandy loam soils to grow and survive. Provided the soil type is favorable, the plant can survive in either dry or moderately moist conditions. For maximum flowering, the plant needs sunlight in early spring. The most conducive habitat types for flowering and high seed production are creek heads where shrubs are rare and bluffs with light gaps.

Schweinitz's sunflower (Endangered) inhabits clearings in, and edges of, upland oak-pine-hickory woods on moist to dryish clays, clay-loams, or sandy clay-loams that often have high gravel content and are moderately podzolized (i.e., have undergone a process during which upper layers have leached and material has accumulated in lower layers, developing characteristic horizons). In these habitats, the underlying rock types are highly weatherable, generally contain low amounts of resistant minerals such as quartz, and generally weather to fine-textured soils. This endangered plant requires the full to partial sun of an open habitat, which was formerly maintained over the species' range by wildfires and grazing by herds of bison and elk. Now, most occurrences are confined to roadsides and utility corridors. NC populations are found in Union, Stanly, Cabarrus, Mecklenburg, and Rowan Counties.

Although potential habitat for the two species is found in the study area and specifically around the Proposed Facility, assessments revealed no known occurrences of these species (see Appendix C).

1.4.6.1.2 Wildlife

Terrestrial communities in the study area are primarily composed of small, forested habitats and transmission line corridors that support a diverse number of wildlife species. Representative mammal, bird, reptile, and amphibian species commonly occurring

in these habitats are listed below. Individual species and/or evidence of species (e.g., tracks, scat, visual observations) observed during the field assessments are indicated with an asterisk (*). DEC obtained information about wildlife species that typically use these habitats in the Southern Outer Piedmont ecoregion from relevant literature, mainly the Biodiversity of the Southeastern U.S., Upland Terrestrial Communities (Martin et al., 1993).

Mammal species that commonly occur in these habitats include the eastern cottontail (*Sylvilagus floridanus*); gray squirrel (*Sciurus carolinensis*)*;various vole, rat, and mice species; raccoon (*Procyon lotor*); Virginia opossum (*Didelphis virginiana*); groundhog (*Marmota monax*); white-tailed deer (*Odocoileus virginianus*)*; gray fox (*Urocyon cinereoargenteus*); red fox (*Vulpes vulpes*); and the coyote (*Canis latrans*)*.

Bird species that commonly use these habitats include the American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*)*, Carolina chickadee (*Poecile carolinensis*)*, tufted titmouse (*Baeolophus bicolor*)*, American robin (*Turdus migratorius*)*, eastern towhee (*Pipilo erythrophthalmus*)*, 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*), white-throated sparrow (*Zonotrichia albicollis*), indigo bunting (*Passerina cyanea*)*, mourning dove (*Zenaaida macroura*)*, turkey (*Meleagris gallopavo*)* and wood duck (*Aix sponsa*)*.

Raptors in the study area include the red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), barred owl (*Strix varia*)*, turkey vulture (*Cathartes aura*), black vulture (*Coragyps atratus*), and an occasional bald eagle (*Haliaeetus leucocephalus*).

Two active bald eagle nests are approximately 1,745.3 and 2,210.9 feet east of the Proposed Facility (i.e., the Holdsclaw Creek arm of Lake Norman). However, the Proposed Facility is well outside the 660-foot no-disturbance zone surrounding the nests; and no bald eagle foraging habitat is found within or adjacent to the Proposed Facility. Thus, no construction or operational impacts to these active nests and the associated eagles are expected.

Reptile and amphibian species that can use the associated terrestrial communities include the eastern black rat snake (*Pantherophis alleghaniensis*), eastern corn snake (*P. guttatus*), copperhead (*Agkistodon contortrix*), black racer (*Coluber constrictor*)*, 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*)*, copes treefrog (*Hyla chrysoscelis*)*, and spring peeper (*Pseudacris crucifer*).

DEC will need to remove a relatively small mixed hardwood forested area before beginning construction of the Proposed Facility; this will displace the remaining wildlife at the site. DEC anticipates that affected wildlife will move to adjacent undeveloped forests in the general area.

Since the Proposed Facility's footprint is small and localized, construction activities are not expected to impact the diversity or number of species or interfere with the movement of resident or migratory species. DEC does not anticipate that daily

operations, including noise from equipment and vehicle traffic, will affect wildlife beyond the Proposed Facility's footprint.

Federally Protected Animal Species

DEC's review of the USFWS IPaC tool revealed three federally protected or proposed protected wildlife species within the general study area and Catawba County. These include the tri-colored bat (*Perimyotis subflavus*), bog turtle (*Glyptemys muhlenbergii*), and monarch butterfly (*Danaus plexippus*).

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

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

The project study area and the site of the Proposed Facility include potential habitat (forest and woodland) for the species. Since the mixed hardwood-pine forest on that site will be cleared, DEC will use acoustic monitoring to assess whether any tricolored bats are present. If the species is present, DEC will coordinate with

the USFWS-Asheville Ecological Field Office to determine how the Endangered Species Act Section 10 will be implemented.

The bog turtle (Threatened-Similarity of Appearance) is North America's smallest turtle. Growing to only 4.5 inches in length, it can be recognized by the orange patch on either side of its head. It favors open, groundwater-fed wet meadows and bogs dominated by tussock sedge and grasses. It thrives in mountain bogs or isolated wetlands with acidic, wet soil, thick moss, clumps of vegetation, and deep layers of mud, such as in the Piedmont and Mountains of NC (including the study area).

Habitat for this species is not found in the Proposed Facility's footprint or within the immediately adjacent transmission line corridor. Thus, this species will not be affected by the project.

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

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

DEC is a partner within the nationwide Monarch Candidate Conservation Agreement with Assurances, and its transmission rights-of-way are managed in a way that is beneficial to the species

and associated habitat. The adjacent transmission line rights-of-way will not be affected by the Proposed Facility, and the current Integrated Vegetational Management practices will not be altered because of the project. Thus, this species will not be affected by the project (see Appendix C).

1.4.6.2 Aquatic Resources

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

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

An existing intake from Lake Norman will be the source of water for plant testing and operations, and there will be a backup municipal water supply. No thermal issues will be associated with discharge from the Proposed Facility, and thus operations of the facility are not expected to affect aquatic resources adversely.

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

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

1.4.7 Meteorology

1.4.7.1 Climatology

The Proposed Facility's site is in the Piedmont region of NC. The Appalachian Mountains lie to the west, and the Atlantic Ocean is to the east. Both features play important roles in the climatological conditions of the site. The National Weather Service reporting station at Charlotte, NC (KCLT), located approximately 27 miles south, is representative of the climate conditions at the proposed facility site.

This region traditionally features a temperate winter climate. The Atlantic Ocean's proximity 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, the 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 normal high is 52.6° F (2006-2020 average) (NOAA/NCEI).

Typical winter precipitation events are 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 to the northeast. Fronts crossing the region from the northwest are also common in winter, but these typically provide much less rainfall because the Appalachians block some of the moisture from reaching the lee side. The dominant winter precipitation is rain, which averages about 3.61 inches per month at KCLT from December to February (NOAA/NCEI).

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 one inch every year.

Heavy snowfalls are possible but rare. The heaviest recorded 24-hour snowfall at KCLT was 12.1 inches in January of 1988 (NOAA/NCEI B).

Sleet and freezing rain are also a winter risk for the 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 summer weather, 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 58 days per year reach or exceed 90° F (NWS Greenville/Spartanburg 2022).

Summer precipitation is typically driven by air mass thunderstorms caused by diurnal heating. Afternoon showers and thunderstorms often form in the mountains and foothills just west of the site and then move into the region in the late afternoon and evening. KCLT averages 46 thunderstorm days annually; 70% of these occur between May and August. The months of June, July, and August each average just below four inches of precipitation per month (NOAA/NCEI).

Spring and autumn are transitional seasons. Spring is characterized by warming temperatures and a shift 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 across the Carolinas in all four seasons. Although spring is the typical peak, a secondary peak associated with tropical systems and stronger cold fronts occurs in the fall. As a state, NC averages around 30 tornadoes per year. About 11% of all tornadoes observed since 2002 in NC have been F2/EF2 or higher (NCSU 2021).

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). 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 (NOAA/NCEI).

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 region, leading to stagnant conditions, mostly in the summer and fall.

In terms of plume transport, winds at KCLT (10-meter level) since 2000 emanate 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) is provided in Figure 1.4.7.1 (Windrose 2022). Local winds at the Proposed Facility would likely have some influence from Lake Norman; but, based on local data from McGuire Nuclear station on the southern end of Lake Norman (not shown), on-site conditions would likely be similar to the KCLT winds.

Figure 1.4.7.1: Wind Rose for KCLT

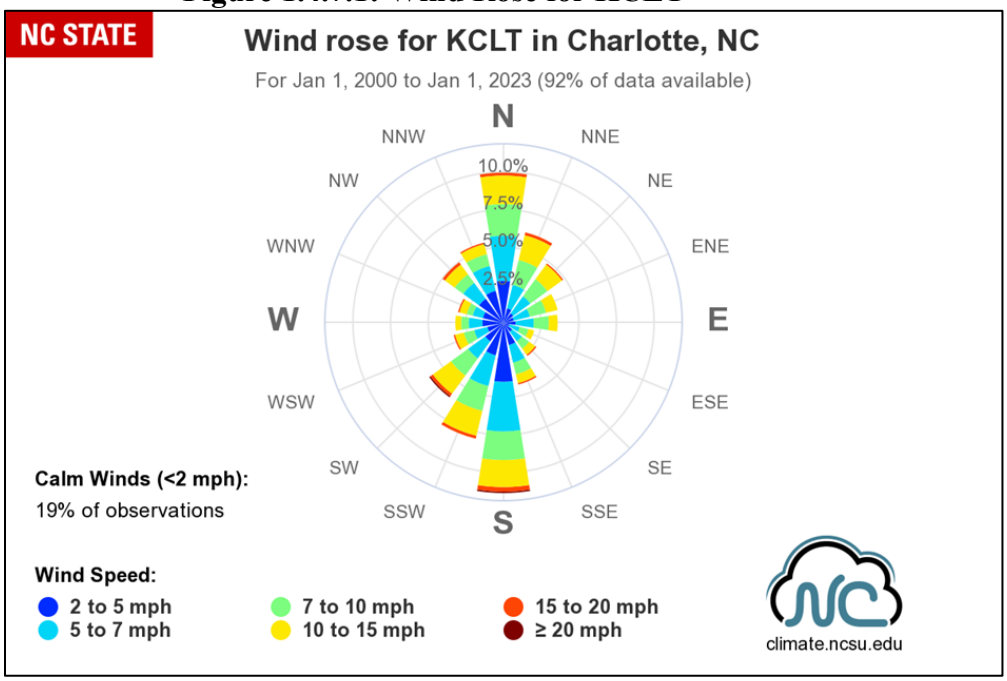


Table 1.4.7.1 provides a brief overview of the region's climatological extremes for highest and lowest daily temperatures, maximum three-second gusts, maximum precipitation, and 24-hour snowfall, based on the full period of record from NOAA/National Center for Environmental Information (NOAA/NCEI B).

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	January 2014
Maximum 24-hour Precipitation (inches)	8.19	August 2008
Maximum 24-hour Snowfall (inches)	12.1	January 1988

Source: NCDC 2022

1.4.7.2 Air Quality

The U.S. Environmental Protection Agency ("USEPA") has established National Ambient Air Quality Standards ("NAAQS") that have been adopted by the N.C. Department of Environmental Quality ("NCDEQ"), formerly the N.C. Department of Environment and Natural Resources. These standards, outlined in Title 15A of the North Carolina Administrative Code ("NCAC"), Chapter 2D (Air Pollution Control Requirements), §.0400, establish certain maximum limits on parameters of air quality considered necessary for the preservation and enhancement of NC'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 NC has reached attainment and continues to satisfy the attainment criteria for each of the six listed pollutants. In the past, portions of NC (e.g., the Charlotte metropolitan area) have experienced intermittent non-attainment designations for ozone; but this is not uncommon in larger cities during the warmest periods of the year. In summer, ground-level ozone limits may be exceeded in metropolitan areas and large suburbs because increased chemical reactions between vehicle emissions and ultraviolet radiation and sunlight can cause (temporarily) increased ozone levels.

The Proposed Facility's operations will be permitted as part of the existing Marshall Steam Station air permit. DEC expects the air permit application to be submitted in the spring 2024. Should potential emissions from the equipment exceed significant emission rates, the facility would be permitted as a "major" modification for the purposes

of Prevention of Significant Deterioration ("PSD") permitting. As part of the permitting process, the facility would then be required to evaluate Best Available Control Technology and perform a dispersion modeling analysis. If emission increases due to the project are less than PSD significant emission rates, the project will be permitted through the North Carolina Division of Air Quality's ("NCDAQ") 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. Water trucks will be used to suppress dust as required. Fugitive dust impact is expected to be equivalent to a normal construction project of this magnitude.

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

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

1.4.8 Seismology

1.4.8.1 Seismic Character and Seismic Hazards

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

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

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

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

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

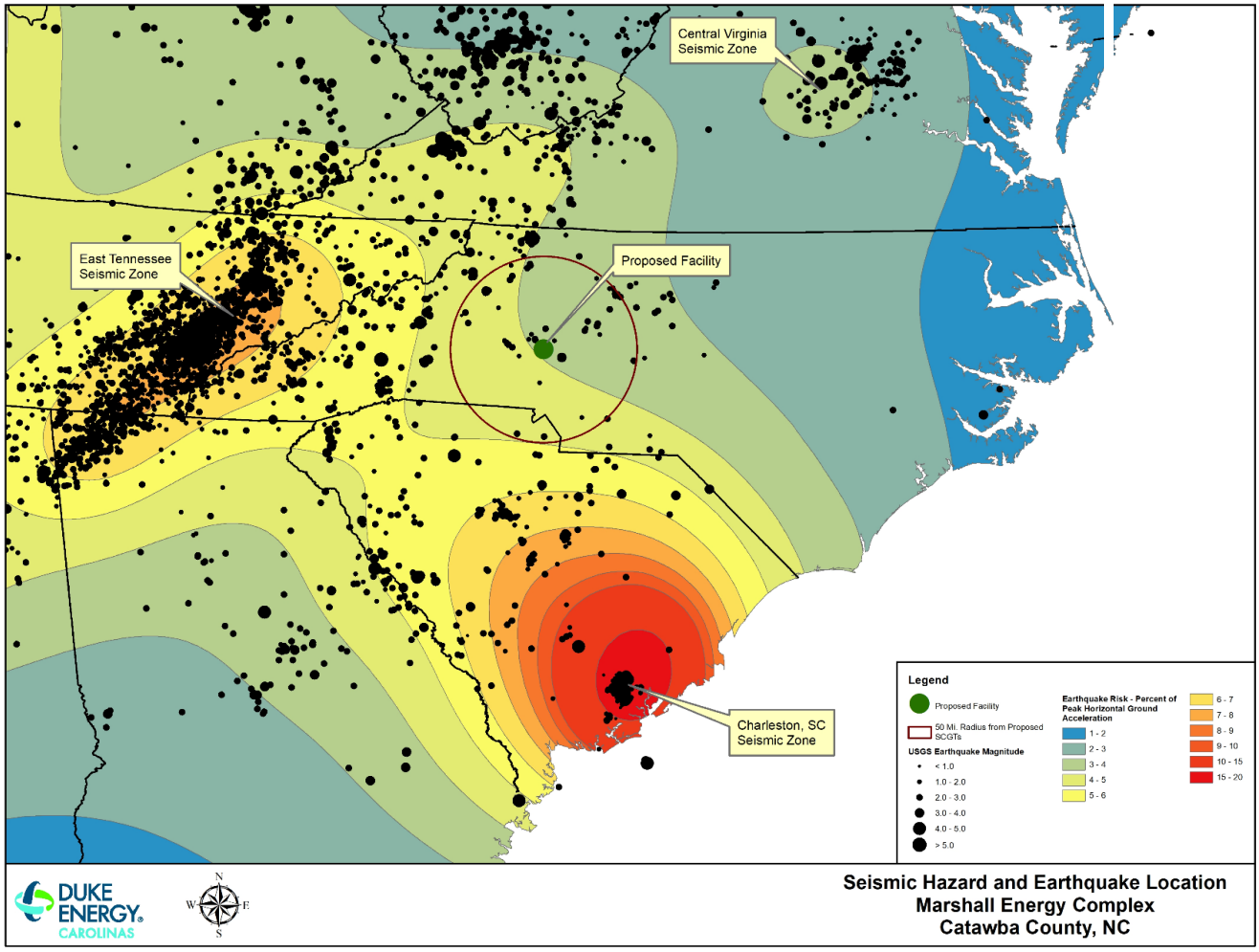
The study area for seismic hazards includes the terrain within a 50-mile radius of the Proposed Facility. Peak Ground Acceleration ("PGA") for the study area has been estimated using the U.S. Geologic Survey ("USGS") National Seismic Hazard Mapping database (2018). The study area has 10 to 14% (as expressed as a fraction of standard gravity) of exceedance in 50 years (USGS 2014). Figure 1.4.8.1 shows the location of the site, 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 of an earthquake with a magnitude greater than 5.0 on the Richter Scale within 100 years and within 30 miles of the Proposed Facility is very small (0.02-0.03%) (USGS 2014). The seismic hazard map shows peak ground accelerations having a 2-3% probability of being exceeded in 50 years for a firm rock site. The map is based on the most recent USGS models for the conterminous U.S. (2018), Hawaii (1998), and Alaska (2007). The models, based on seismicity and fault-slip rates, consider the frequency of earthquakes of various magnitudes.

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

earthquake if appropriate considerations are made during preliminary and final design.

Figure 1.4.8.1: Seismic Hazard and Earthquake Locations



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

1.4.8.2 Seismic Zones and Magnitude

The central and eastern United States have three major seismic zones: (1) the Charleston, South Carolina, seismic zone, (2) the East Tennessee seismic zone, and (3) the Central Virginia seismic zone (Figure 1.4.8.1). These zones are located approximately 186, 167, and 203 miles from the Proposed Facility, respectively. Figure 1.4.8.1 delineates these three zones; and the clusters of various-sized black circles represent the

locations of previous earthquakes and their respective magnitudes on the Richter Scale.

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

The closest recorded earthquake with a magnitude greater than 4.0 that originated in NC occurred in 1916 near Skyland, Buncombe County—89 miles west of the Proposed Facility. Estimated at 5.2 M, this earthquake was most likely associated with the East Tennessee seismic zone. In more recent history, the largest earthquake felt in NC originated near Richmond, Virginia, in 2011. It was associated with the Central Virginia seismic zone and registered as a 5.8 M on the Richter Scale. Both the Charleston and East Tennessee seismic zones are considered areas of high seismic hazard by the USGS.

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

1.4.9 Water Supply

The Proposed Facility will be located within the Upper Catawba River Basin (lower portion) (HUC 03050101). According to the North Carolina Division of Water Quality's 2018 Upper Catawba River Basin Restoration Priorities Plan (NCDEQ 2009), the land cover for this hydrologic unit code is mostly forested (66.7%), with significant areas of developed land (13.6%) and agricultural lands (11.9%). Agricultural lands are spread-out across the landscape; and the largest

developed areas include Mooresville, Huntersville, Hickory, Gastonia, Morganton, Lenoir, and the outlying areas of northwest Charlotte.

The Proposed Facility will be located within the Lake Norman Water Supply Watershed, which is classified as Water Supply ("WS") IV and is a protected area by the NCDEQ. A WS-IV watershed is a source of water for drinking, culinary, or food processing. These waters are also protected for Class C uses (including aquatic life propagation, survival and maintenance of biological integrity, wildlife, secondary contact recreation, and agriculture). Secondary contact recreation includes wading, boating, and other uses not involving human body contact with water, and activities involving human body contact with water where such activities take place on an infrequent, unorganized, or incidental basis.

The Proposed Facility is approximately one mile west of Lake Norman.

1.4.10 Aviation

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

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

- If requested by the FAA, or if any of the following types of construction or alteration are proposed, a notice must be filed with the FAA of:
  a) Any construction or alteration that is more than 200 feet above ground line at its site.
  b) Any construction or alteration that exceeds an imaginary surface extending outward and upward from the aviation facility at any of the following imaginary surface 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 C.F.R. § 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 airport listed in 14 C.F.R. § 77.9(d), with its longest runway no more than 3,200 feet in actual length, excluding heliports.

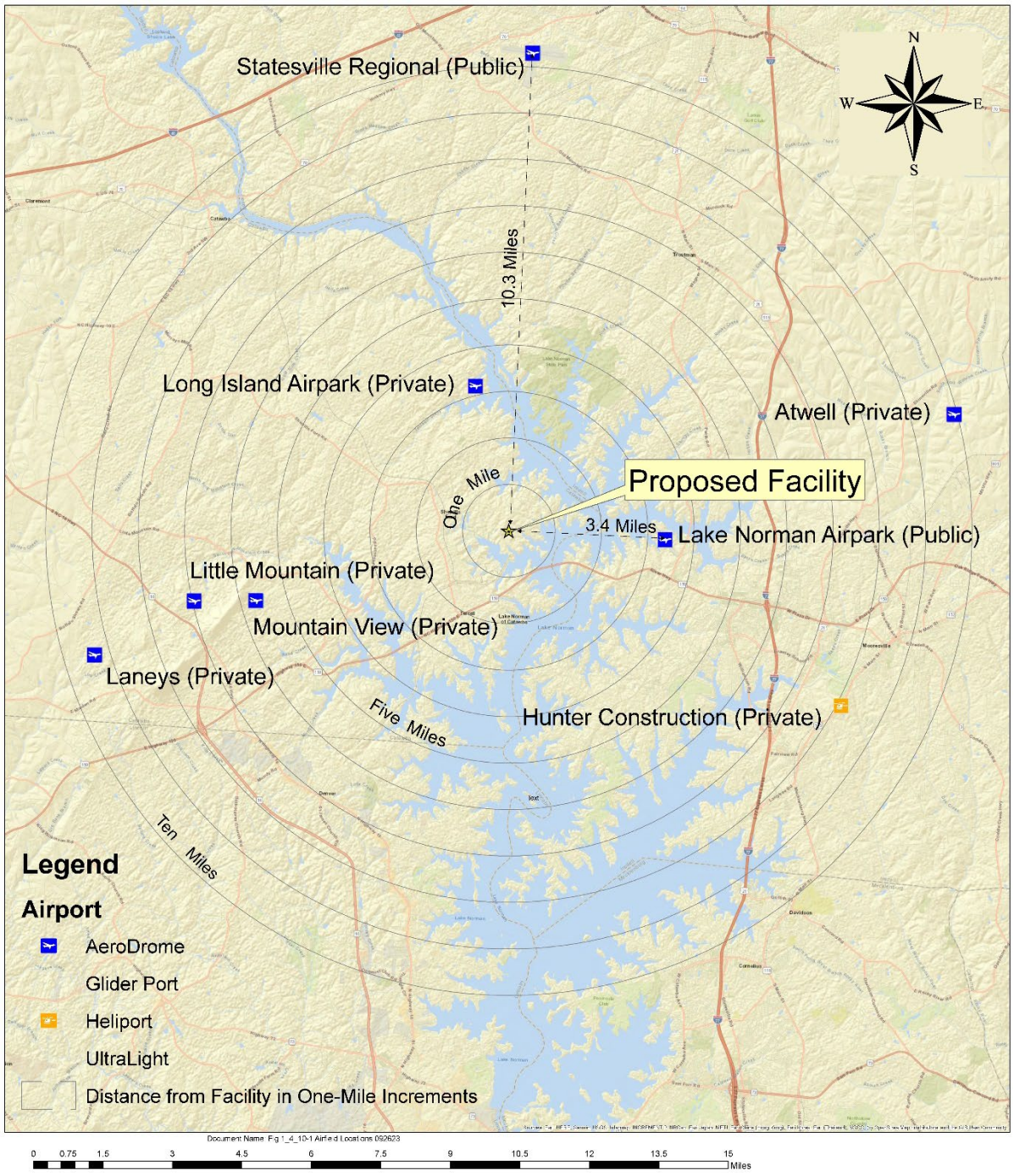
iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport listed in 14 C.F.R. § 77.9(d).

(14 C.F.R. § 77.9(b)).

14 C.F.R. § 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 Charlotte Sectional Aeronautical Chart and the FAA Airport Database published by the U.S Department of Transportation, Federal Aviation–Aeronautical Information Services (08/06/2019) to determine the location of any aviation facilities within 10 miles of the Proposed Facility (see Figure 1.4.10-1).

Figure 1.4.10-1: Airfield Locations



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

The Statesville Regional Airport and the Lake Norman Airpark are the closest public airfields to the Proposed Facility, at 10.3 miles and 3.4 miles, respectively, as shown on Figure 1.4.10-1. Within about ten miles of the Proposed Facility are the following five private airports and one private heliport:

- Long Island Airpark (NC26), Chick Drive, Sherrills Ford, NC 28673;
- Little Mountain Airport (6NC1), 3524 Airport Road, Maiden, NC 28650;
- Mountain View Airport (20NC), 3545 Mt. Beulah Road, Sherrills Ford, NC 28673;
- Atwell Airport (1NC2), 135 Atwell Farm Lane, Mooresville, NC 28115;
- Laneys Airport (N92), 4235 Pool View Drive, Maiden, NC 28650; and
- Hunter Construction Heliport (NR06), 118 Timber Road, Mooresville, NC 28117.

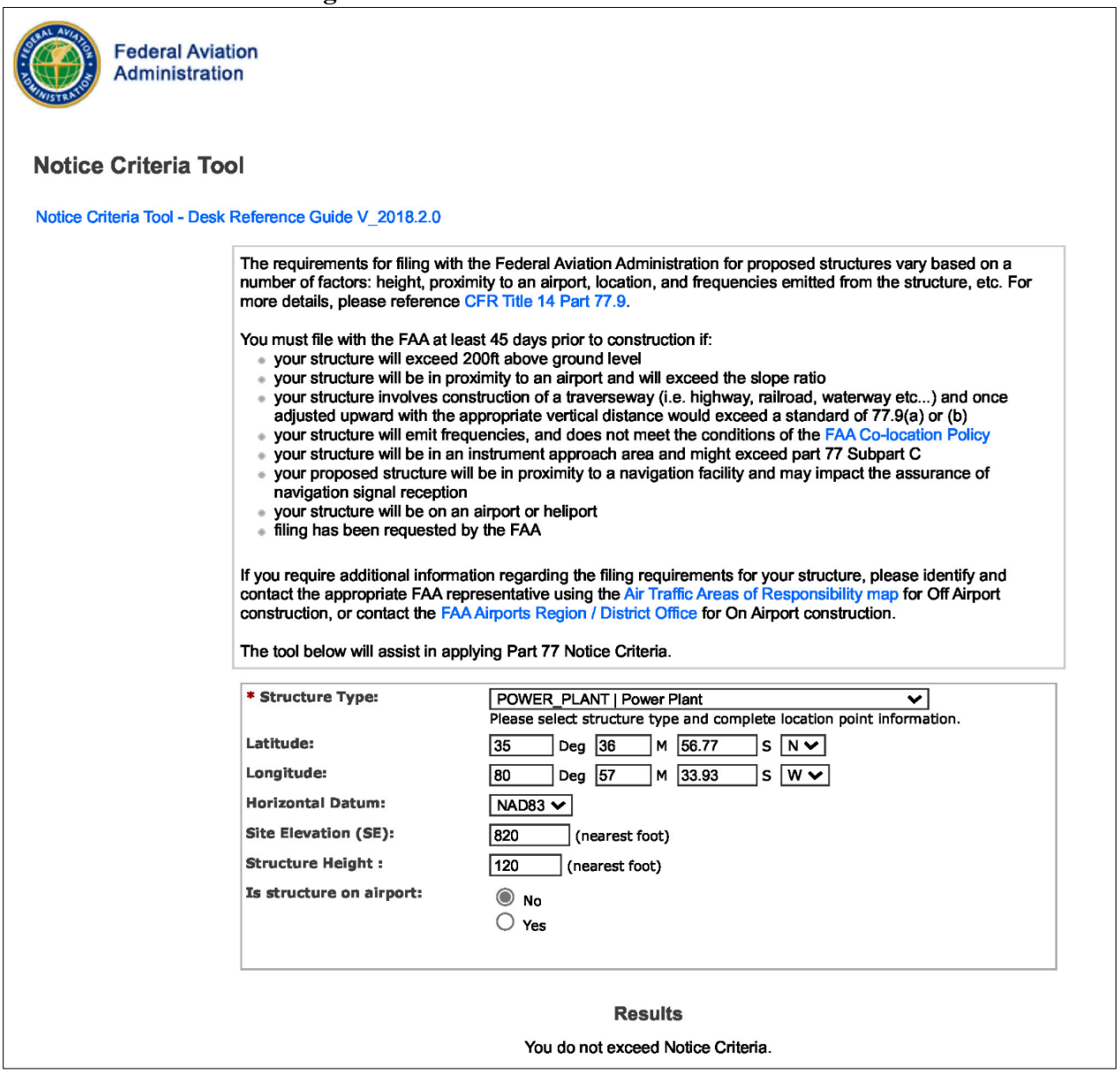
Information for the public airports is as follows:

- Statesville Regional Airport (SVH), 238 Airport Road, Statesville, NC 28677; and
- Lake Norman Airpark (14A), 149 Yeager Road, Mooresville, NC 28117.

Pike entered the coordinates for the Proposed Facility (35°36'56.77" north and 80°57'33.93" west), plant grade elevation, and 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 Proposed 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

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 36 M 56.77 S N
Longitude:	80 Deg 57 M 33.93 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	820 (nearest foot)
Structure Height :	120 (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

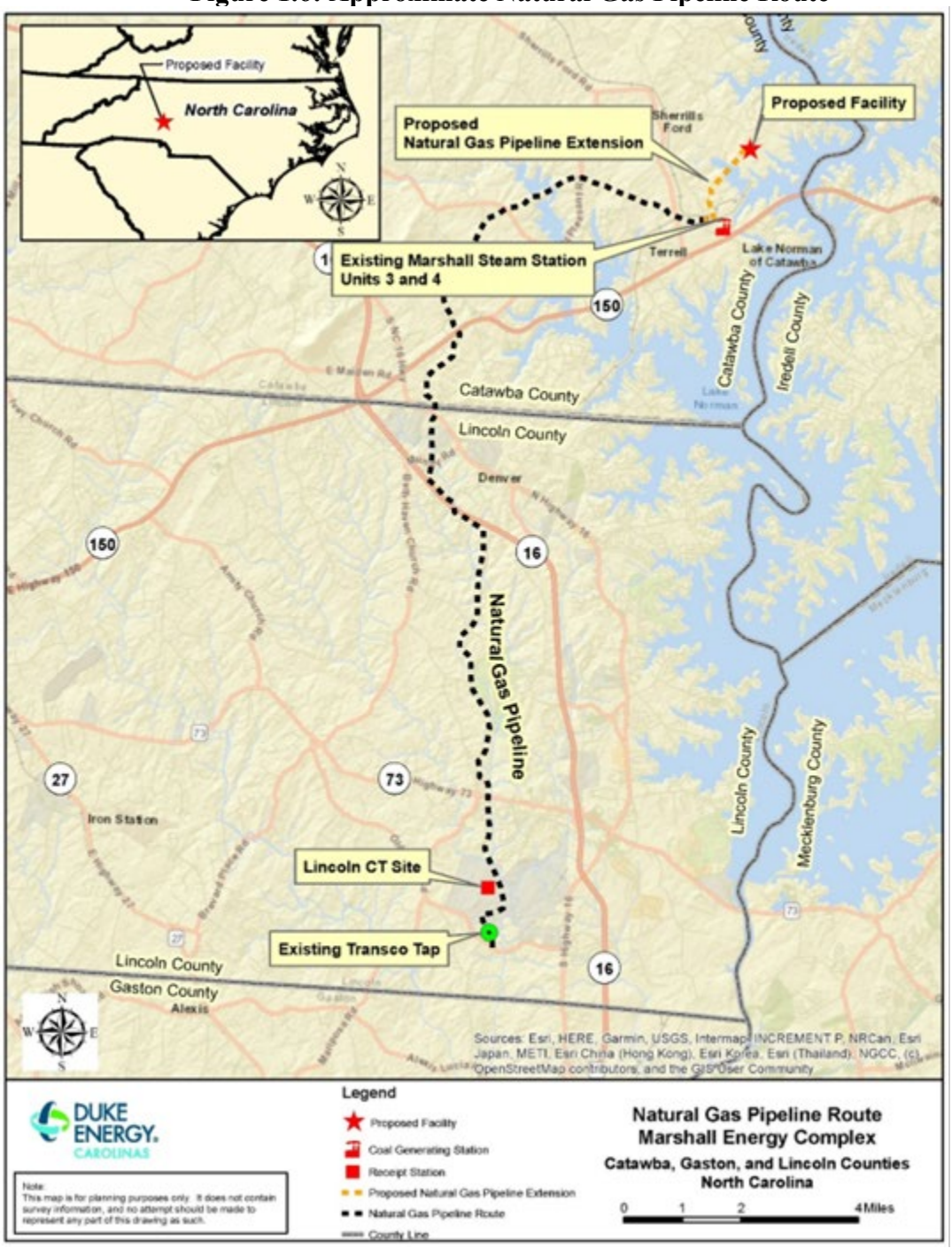
Piedmont is an operating natural gas local distribution company and a wholly owned subsidiary of Duke Energy Corporation. Piedmont currently provides intrastate natural gas pipeline redelivery service to the Marshall Steam Station as well as numerous other DEC gas generating stations. The current volume and pressure of Piedmont's firm transportation ("FT") service to the Marshall Steam Station is 147,000 Dth/day at 150 psi.

To serve the Proposed Facility's SCGT units, Piedmont will construct five new electric compressors at DEC's Lincoln Combustion Turbine Steam Station in Lincoln County, near Denver, NC ("Lincoln CT Site"), which is less than a mile from the Transco receipt station.

Piedmont's existing gas distribution line to the Marshall Steam Station is supplied only by Transco. Like other DEC combustion turbines, the Proposed Facility's SCGT units will not have interstate FT service earmarked for them. However, they could use portfolio Transco FT service if it is not being utilized by a more efficient combined-cycle generator. Thus, most of the time, the Proposed Facility's SCGT units will procure Transco Zone 5 delivered gas supply as required. Additionally, these SCGT units will have diesel dual-fuel capability along with six days' worth of on-site diesel fuel storage that can be relied upon for generation purposes if gas supply is curtailed or is uneconomic in comparison to diesel.

Figure 1.6 shows the approximate route of the natural gas pipeline from the Lincoln CT Site to the Marshall Steam Station. DEC will provide additional analysis of the sufficiency of firm interstate natural gas transportation capacity for the Proposed Facility in the forthcoming application for a certificate of public convenience and necessity.

Figure 1.6: Approximate Natural Gas Pipeline Route



Sources: Esri; US Dept. of Commerce; U.S. Census Bureau; NOAA; National Oceanic Service; National Geodetic Survey; National Pipeline Mapping System (NPMS); Catawba County GIS 2023; Gaston County GIS 2023; Iredell County GIS 2023, Lincoln County GIS 2023

1.7 Transmission

Figure 1.7, which shows the location of the existing Marshall Steam Station electrical substation, also shows that each proposed SCGT unit will supply, each through its own breaker, a 230 kV 1.09-mile span bus line that will be connected to the nearby Marshall Steam Station 230 kV switchyard.

Several 230 kV breakers in the Marshall Steam Station's switchyard are required to complete the breaker-and-a-half scheme to facilitate the MEC's point of interconnection. The routing of the two new span bus lines will require relocating a section of an existing 230 kV transmission line to prevent line crossings and open a location for the points of interconnection at the existing Marshall Steam Station's switchyard.

DEC has filed a GRR under the Companies' Large Generator Interconnection Process to conduct studies for interconnection of the Proposed Facility (replacing ~780 MW (winter) of Marshall Units 1 and 2) and has also submitted an interconnection request in the 2023 DISIS to support the incremental generation exceeding the retiring capacity being studied in the GRR process. The GRR System Impact Study results are expected in the fall 2023, and the Facility Study results are expected in early 2024. The final design will be determined after the studies have been completed.

The transmission lines currently emanating from the Marshall Steam Station can also be seen in Figure 1.7.

Figure 1.7: Transmission

Map Sources: USDA Orthoimagery 2022

1.8 Unit Capacity

The projected net capacity of the Proposed Facility at 0° C/32° F is 850 MW and its projected gross capacity is 900 MW in alternating current. The projected nameplate capacity of the Proposed Facility at 0° C/32° F is 900 MW in alternating current, subject to final determination.

2.0 METHODOLOGY

2.1 Population

The smallest geographic unit of digital 2020 census data available directly from the U.S. Census Bureau is the census block. Esri, a third-party vendor, offers census data geographic files and population tables at the block level, which Exhibit 2 uses to analyze population data to the census block level.

Esri's census-block geographic files and population statistical tables for the state of North Carolina contain an array of population data for each census-block polygon. Pike's GIS specialist downloaded the files for North Carolina, extracted the data within 25 miles of the Proposed Facility, and then calculated population density using the area (in square miles) and total population of each census block.

It should be noted that for the purposes of this study, Pike assumed that the total population for each census block was evenly distributed throughout its geographic area. Thus, for the census blocks that were split into two parts based on distance from the Proposed Facility, Pike calculated a percentage of the entire block acreage for each piece (after-split acreage divided by pre-split acreage). Pike then multiplied the resultant decimal fraction by the total population number for the entire block to calculate the population figure applicable to each piece.

2.2 Area Development

Pike and DEC researched existing area development through intensive field reconnaissance, desktop mapping (using current aerial photography along with county tax parcel and other digital data), and contacts with governmental officials.

To ascertain future development plans in the vicinity of the Proposed Facility, Pike consulted Catawba and Iredell County planning officials and researched future Catawba and Iredell County land use documents and mapping online.

2.3 Visual and Auditory

2.3.1 Visual

Pike conducted the Visual Effects Analysis in three steps.

- First, Pike conducted a comprehensive field study to identify sensitive visual resources and characterize existing visual conditions. During the Probable Visual Effects field study, Pike identified existing residential properties and public roadways as resources with the potential to be most affected by views of the Proposed Facility.

- Second, using the USGS National Elevation Dataset ("NED"), which is "a seamless mosaic of best-available elevation data" (Product Description 2023), Pike built a computer-generated Seen Area Analysis model (Figure 1.4.3.1-1) that predicts areas within five miles that will likely have a view of the Proposed Facility.

Pike delineated tree cover by using the ArcGIS system to classify georeferenced aerial photography and extract a raster image of tree cover. This digital raster image was converted to polygons representing tree locations. Where these polygons overlapped the NEDs, Pike added 60 feet (an assumed average tree height) to the NED elevations to create a five-mile visual probability model that accounts for the screening effects of topography and vegetation. Pike assumed that forested areas were opaque in building viewshed models but did not consider the heights of buildings or their potential screening effects.

A viewshed is used to highlight what is visible from a given point (Analyze Viewshed 2023). Using the ArcGIS Spatial Analyst module, Pike developed a viewshed map to predict the visibility of the existing and future facilities within five miles, using an estimated maximum height of 120 feet for the emission stacks of the Proposed Facility and 300 feet for the existing stacks.

- Third, Pike interpreted and analyzed the information and data developed during the first and second steps, taking into account the fact that any visual effects of the Proposed Facility would be influenced by such factors as distance, the parts of the Proposed Facility that would be seen, the backgrounds of visible structures, any foreground or mid-ground vegetation in the view, and the scenic condition of the area from which the facility would be viewed.

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

Using the distance from the viewer to the Proposed Facility, Pike predicted (ranked) the visual effects that may occur because of the Proposed Facility. The ranking (Table 1.4.3.1) represents a worst-case scenario, since Pike made no attempt to: (1) reduce the predicted visual effects probability that will inevitably occur when foreground and mid-ground vegetation or backdrops are present; or (2) mitigate predicted view ranking based on existing modifications to natural landscape settings or the fact that only minor plant features may be seen from an area having a probable view. For example, even if only the top segment of the emission stack could be seen from within one-half mile, Pike ranked the view effect as Very High.

Pike conducted an extensive field investigation to determine the probable visual effects of the Proposed Facility on residential properties and public roadways.

2.3.2 Auditory

Community noise impacts are based on the increase in noise levels compared to other noise sources already present, the general level of the noise source, and other factors.

To confidently predict noise levels for the MEC, Stewart first had to identify area noise-sensitive receptors—places where the land use is more

sensitive to ambient noise levels than others. Some typical noise-sensitive receptors are libraries, churches, schools, hospitals, and residential areas.

Stewart used a sound analyzer to measure and document existing sounds at six nearby noise-sensitive receptors (Figure 1.4.3.2) and two NTI Audio XL2 long-term monitors north of the Proposed Facility to record typical noise variations. LTM 1 was placed on Island Point Road at the Marshall Steam Station property line, just south of Receptor 1; LTM 2 was placed on Fair Oak Drive, a little farther north and to the east of LTM 1. These long-term monitors measured noise levels for more than 40 continuous hours on August 8, 9, and 10, 2023. Stewart also used hand-held instruments to obtain short-term (10-minute) measurements at those locations.

Because Marshall Steam Station is largely enclosed, Stewart determined sound power by using a Casella Model CEL-63x Type 1 sound level meter to measure short-term sound pressure levels of each unit of active equipment at close range. Stewart also considered the reflective parking lot surface, which increases the projection of sound, and the buildings, which serve as barriers to sound going from one side to the other.

Using the information collected, Stewart modeled the sources and scaled them based on operations:

- if all equipment of a type was close together, Stewart added 10 Log ($N_{\text{running at desired operation condition}}/N_{\text{running on site}}$), and
- if a type of equipment was placed at different physical locations, Stewart, duplicated the individual equipment sources in the model, placed them at each location, and then turned them on or off based on modeling conditions. For example, if only one of five fans were running, Stewart would determine the maximum noise condition by adding 10 Log (5/1) = +7 dB. However, for the four independent step-up transformers of each unit, Stewart duplicated them to each specific unit location and turned them on or off based on model conditions.

Stewart calibrated the model to the operating conditions that existed

during close-range monitoring at Locations 5 and 6, when Units 1, 2, and 4 were running. Finally, Stewart compared measured sound levels to predicted sound levels. After refining and calibrating the model, the data was in good agreement.

Using the scaling techniques described, Stewart represented all equipment as operating in the model to determine that the total sound power without the coal car shaker is 122.9 dBA. To determine the future condition with only Units 3 and 4, Stewart eliminated five pressure blowers for Units 1 and 2, one cranking transformer between Units 1 and 2, and transformers for Units 1 and 2, and assumed that 7 of 10 closed, cool-water pumps would still operate. The total sound power for Units 3 and 4 and other equipment remaining would be 120.8 dBA (with no coal car shaker). Thus, the predicted change in noise level from retiring Units 1 and 2 is -2.1 dBA.

Stewart conducted a 12-minute sound level measurement when the coal car shaker was operating. Using the statistical data from the measurement and a recording of the sources, Stewart separated the sound level and spectra of three related noise sources: the alarm that signals coal car movement, the banging of each released car as it couples with empty cars, and the steadier noise of the coal car shaker's rotating drum. From this, Stewart evaluated distances to estimate sound power levels for each source.

The alarm has an estimated sound power of 144.2 dBA. This is a short-duration maximum event. The banging of the cars, also a short-duration maximum event, has an estimated sound power of 140.2 dBA. Stewart's measurements of the 12-minute coal car shaker operating indicated a sound power of 129.2 dBA, which is within the expected sound power range of such equipment.

Stewart used a table of sound power levels and other information from B&M's basic noise study, the provided site plan, and other DEC-provided maps to locate the new SCGT units in a SoundPLAN outdoor

noise model. The estimated total sound power of the Proposed Facility with all equipment running is 123.1 dBA. Without the two stack exits, the remaining sound energy from all the other equipment the sound power is 120.3 dBA.

For more information on the noise impact study for the Proposed Facility, see Appendix A.

2.4 Cultural Resources

Brockington limited their cultural resources research to a two-mile 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 C.F.R. § 800.16(d).

Before beginning fieldwork, Brockington reviewed all previously recorded above-ground resources and known archaeological sites on file through HPOWEB, the NCSHPO's repository of recorded architectural property data. HPOWEB includes information about NRHP-listed properties, resources recorded during Section 106 investigations, determinations of eligibility, properties placed on the state Study List for further research, and resources recorded through surveys for counties and municipalities.

Both archaeological and architectural investigations were conducted with reference to state and federal guidelines (OSA *Archaeological Investigation Standards and Guidelines for Background Research, Field Methodologies, Technical Reports, and Curation* [2017] and the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* [United States Department of the Interior 1983]) for conducting archaeological and architectural investigations. Reports were prepared in accordance with the Office of State Archaeology.

Prior to architectural fieldwork, Brockington consulted architectural data and tax records from the NCSHPO's online database and architectural data housed in the NCSHPO's Raleigh, North Carolina, office for properties located within the two-mile APE to determine which buildings met the NRHP 50-years-or-older age criteria as of 2023. Background research also focused on relevant sources of local historical information and available historical maps, which Brockington examined to provide historical context for

the study area and to check for any buildings and other cultural features present within the APE.

With consideration to the background research, Brockington conducted architectural windshield surveys within their respective APEs. These efforts entailed a survey of each resource 50 years or older within the defined APE. Resources that retained architectural integrity, were representative of type, and/or differed from other resources within the APE were photographed and recorded in digital data files. Resources that retained little architectural integrity or were severely altered were not recorded. Due to private property issues, resources not visible or easily accessible from public rights-of-way were also not surveyed.

Pike used Seen Area Analysis modeling data as described in Section 2.3.1 to further assess visual impacts to architectural resources within the APE. Pike prepared line-of-sight graphs to display any obstructions, or lack thereof, that lie in the visual path of the Proposed Facility. The graphs also show the elevation, distance, and number of elements contributing to screening, as well as areas where additional screening elements could be implemented to mitigate any negative visual effects incurred by the construction of the facility.

In 2015, AFW conducted a desktop review of the study area based on available resources from the NRHP files and information on archaeological resources from the state Archaeological Site File repository at the NCSHPO. This literature review was performed prior to and as part of DEC's planned ash basin closure activities near the ash ponds at Marshall Steam Station. Exhibit B-2 provides an excerpt from AFW's report.

According to NCOSA records, the APE had not been surveyed for archaeological resources. Only five sites had been previously identified within the APE, and none of those sites had been deemed eligible for the NRHP because of low density of artifacts and/or high disturbance of soils from erosion. 17 identified sites that were within a half-mile radius of the Proposed Facility were assessed as ineligible or as requiring additional information.

In November 2018, ESI located the limits of an undocumented cemetery (designated as MAR-145) to prevent potential impacts to marked or unmarked graves. ESI performed background research and conducted field investigations to determine the

cemetery's boundaries. After receiving results of the ESI investigation, DEC protected the cemetery with permanent fencing.

In August 2023, Brockington conducted a Phase I archaeological survey of a 92-acre tract which encompasses the site of the Proposed Facility. The survey incorporated background research, field investigation (including shovel tests in undisturbed accessible areas), laboratory analysis and curation, and report preparation. It was conducted in accordance with both federal and state guidelines including Section 106 of the NHPA of 1966 (54 U.S.C. § 30010, as amended through 2016), the Advisory Council on Historic Preservation's implementing regulations (36 C.F.R. Part 800), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (1983), and cultural resources survey and reporting guidelines set forth by the NCOSA Archaeological Investigation Standards and Guidelines (December 2017).

During the survey, Brockington inspected the ground surface for cultural materials and used shovel testing to investigate subsurface cultural deposits. Shovel tests were 30 centimeters in diameter and pre-plotted within the project tract at 30m intervals. Although 429 shovel tests were initially plotted within the project tract, 141 of these could not be excavated because of excessive slope >30 degrees (in accordance with NCOSA guidelines) and disturbances such as gravel access roads.

Brockington screened soils from the shovel tests through one-quarter-inch mesh hardware cloth. Brockington kept records of each shovel test in field notebooks, including information on content (e.g., presence or absence of artifacts, artifact descriptions) and context (i.e., soil colors and texture descriptions, depth of definable table, observed features).

2.5 Geology

DEC scientists reviewed the existing geology-related general literature and maps of the southeastern Piedmont region and the study area. Using North Carolina Geological Survey Data maps, Pike was able to generate maps and find information about site-specific bedrock types, terranes/belts, structural features, formations, and presence of intrusions. Finally, DEC and Pike used the United States Department of Agriculture, Natural Resources Conservation Service database (including Web Soil Survey) to generate site-

specific data reports for soil types, soil conditions, landforms, and soil profiles typical of the study area and the proposed project footprint.

2.6 Ecology

DEC scientists performed a desktop review of publicly available data, reviewed up-to-date in-house databases and GIS Natural Resource Viewers, and conducted on-site investigations that included an assessment for jurisdictional wetlands and waters of the U.S., federally and state protected species, and natural and vegetation communities.

DEC biologists conducted a reconnaissance-level survey of the 25-acre tract where the Proposed Facility and its associated components will be located for wetlands and jurisdictional waters of the United States under Section 404 of the Clean Water Act. DEP used the methodology described in the USACE 1987 Wetland Delineation Manual, USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory regime, and the North Carolina Division of Water Resources Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11) to examine the area and to review the USFWS's National Wetland Inventory database. Within this exhibit, existing vegetative communities are described based on the Classification of the Natural Communities of North Carolina - Fourth Approximation (Schafale 2012).

2.7 Meteorology

DEC conducted an extensive online review of pertinent reports from the National Climatic Data Center, the Environmental Protection Agency, North Carolina State University, and the State Climate Office of North Carolina.

2.8 Seismology

DEC scientists reviewed the USGS National Seismic Hazard Mapping database to obtain seismic data and estimated Peak Ground Acceleration for the study area. They used the USGS Probabilistic Seismic Hazard Analysis Model that is part of the Seismic Hazard Mapping program to predict the probability of an earthquake (>5.0 magnitude) near the study area and assessed the USGS Earthquake Track website to identify and compile

documented historic and recent earthquakes, the distance of earthquake epicenters from the study area, the depth of earthquakes from the surface, and magnitudes of the individual events. DEP scientists also reviewed USGS publications for information about seismic character in the southeastern United States.

2.9 Water Supply

DEC reviewed information from the North Carolina Department of Environmental Quality as well as internal databases and site data to compile the information regarding water supply, uses, and classification.

2.10 Aviation

Pike reviewed the Charlotte Sectional Aeronautical Chart and the FAA Airport Database published by the U.S Department of Transportation, Federal Aviation–Aeronautical Information Services (08/06/2019) to determine the location of any aviation facilities within 10 miles of the proposed facility.

Pike reviewed FAA notification criteria and entered the Proposed Facility's location coordinates, pad elevation, and stack height into the FAA Notice Criteria Tool on the FAA's website (Federal Aviation Administration 2017).

If the highest structure and/or any construction equipment exceeds 200 feet, DEC would be required to submit a notice.

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DUKE ENERGY CAROLINAS, LLC
MARSHALL ENERGY COMPLEX

APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX A

DUKE ENERGY CAROLINAS MARSHALL STEAM STATION
COMBUSTION TURBINE ADDITIONS CPCN NOISE IMPACT STUDY

Duke Energy Carolinas Marshall Steam Station Combustion Turbine Additions CPCN Noise Impact Study

Prepared for

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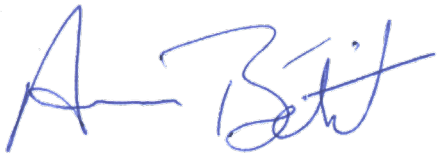

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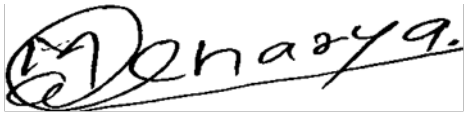

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Executive Summary

Existing Marshall Steam Station

The Duke Energy Carolinas ("DEC") Marshall Steam Station is located at 8320 NC Highway 150 E, Sherrills Ford, North Carolina, and has four coal- and gas-fire steam units. Units 1 and 2 are 350 Megawatt (MW) units. Units 3 and 4 are 648 Megawatt units which operate based on energy load requirements. Thus, as few as one unit may be in operation, and as many as all four units may be in operation.

Proposed Facility

The Proposed Facility will shut down existing Units 1 and 2 permanently and construct two 400-megawatt gas turbines on the northwest part of the property.

Existing Community Noise Levels

Noise measurements were performed north of the Marshall Steam Station and the proposed simple-cycle gas combustion turbine ("Proposed Facility")'s property line to document the ambient noise levels at the nearest noise sensitive receptors. Two long-term monitors were set up that measured noise continuously for over 40 hours, and 10-minute duration handheld measurements were obtained at these two locations. Two-short term measurements were performed at location 3 and 4 to further document ambient noise levels. Long-term measurement locations 5 and 6 were performed within the plan to help calibrate the sound model. Measurement locations are indicated in Figure 2. Measurement results are documented in table 3 and the Appendix.

Noise Criteria

The Catawba County North Carolina Code of Ordinances, Article II "Noise" does not provide limits in terms of a measurable metric. It states: "It shall be unlawful for any person to authorize, allow, or cause to be emitted from any property or source under his control any noise that is unreasonably loud, raucous, or disturbing so as to frighten, pose a danger to the health of, or seriously disturb any person of ordinary sensibilities."

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 Proposed Facility, or an anticipated increase of more than 5 dBA in the existing ambient noise level of 45 dBA (using the typical quietest measured hourly Leq from our monitoring).

Impact of Proposed Facility to Community

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

Future sound levels and resulting changes vary by location, but sound levels are not more than 55 dBA with all CT's and Units 3 and 4 operating at any adjoining property lines. However, increases at the sensitive receptor closest to the proposed simple-cycle gas turbines ("SCGT")s are more than 5 dBA

above the 45 dBA ambient noise level and, thus a clearly noticeable increase for those locations. All other receptors are well below this threshold and are not a significant impact.

Introduction

This report provides an evaluation of the potential noise impacts of proposed modifications to the Marshall Steam Station at 8320 NC Highway 150 E, Sherrills Ford, North Carolina. The modifications to be performed will be to shut down two coal- and gas-fire units (1 and 2) and two SCGTs on the northwest portion of the property.

The noise impact evaluation is based on a comparison of the anticipated noise levels from the Marshall Steam Station and the Proposed Facility with the County of Catawba Noise Ordinance and the existing ambient noise.

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 pressure of 1 Pascal (Pa) is equivalent to 94dB sound pressure level. Each change of 10 dB indicates 10 times as much sound present; doubling of sound energy results in an increase of 3 dB. The human hearing does not respond proportionately to the increase in energy of sound. A 3 dB change in sound level means twice or half as much sound energy, but to humans is just barely noticeable unless the frequency content or duration changes. A 5-6 dB change is three to four times as much sound energy and is noticeable to humans. A human perceives a 10 dB change in sound level as twice as loud.

The human hearing system does not respond to very low- or high-pitched sounds as well as those sounds in the speech range, especially for lower amplitudes. A series of frequency weighting filters 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 50dBA, 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 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 impacting the energy reduction. Over long distances, atmospheric absorption reduces sound primarily at the higher frequencies. Beyond 1000 feet or so, this effect in addition to the inverse square law effect dramatically reduces 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 significantly reduced on sunny afternoons when air near ground is warmer than air higher in the sky causing 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 increase downwind from a source. Trees can provide limited sound reduction over distances of approximately 300 feet. This is also dependent on the season and density of trees. Over short distances, the trees do not provide enough acoustical absorption to be significant. Over long distances, sound can pass over the top of the trees due to the atmospheric curvature effect, limiting the sound reduction benefit.

Existing Marshall Steam Station

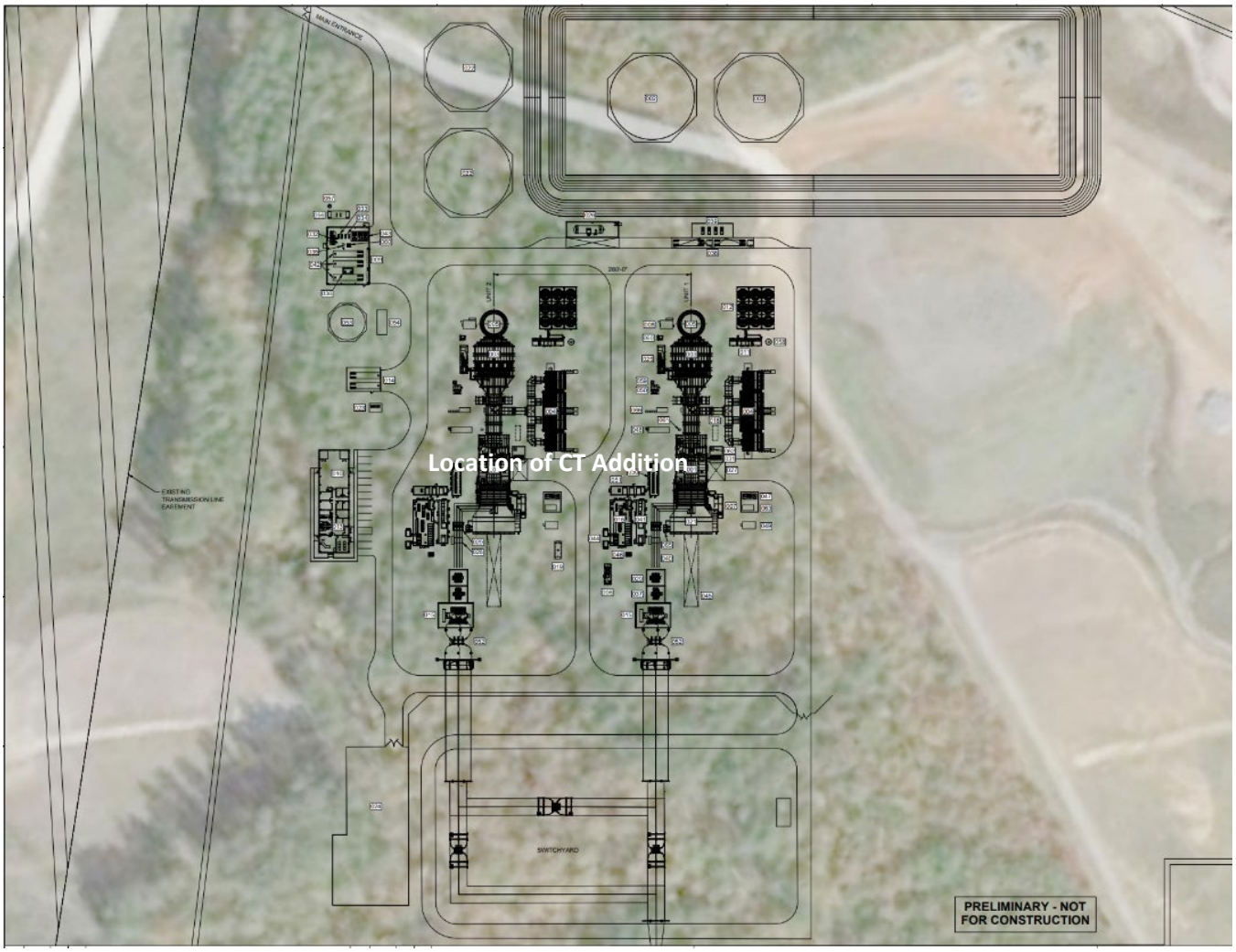
The existing Marshall Steam Station is located at 8320 NC Highway 150 E Sherrills Ford, North Carolina. Sherrills Ford is an unincorporated community in Catawba County, North Carolina. The closest municipalities outside of Catawba County include Mooresville, North Carolina, located approximately 2 miles to the east of the Marshal Steam Station property, and Iredell, North Carolina, located approximately 1.4 miles to the east. The existing station has four coal- and gas-fire steam units. Units 1 and 2 are 350 MW units. Units 3 and 4 are 648 Megawatt units. The units operate based on energy load requirements. Thus, as few as one unit may be in operation and as many as all four units may be in operation.

Noise levels of the various components of a 350-Megawatt generating unit and a 648-Megawatt generating unit were measured and included within a computer model.

Proposed Facility

Duke proposes to shut down units 1 and 2 permanently and construct two 400-MW SCGTs on the northern 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 with the Burns and McDonnel report dated December 15, 2022, during operation. Figure 1 shows the location of the proposed gas turbines. Table 4 indicates the noise limits for the equipment.

Figure 1. Location of future Marshall combustion turbines

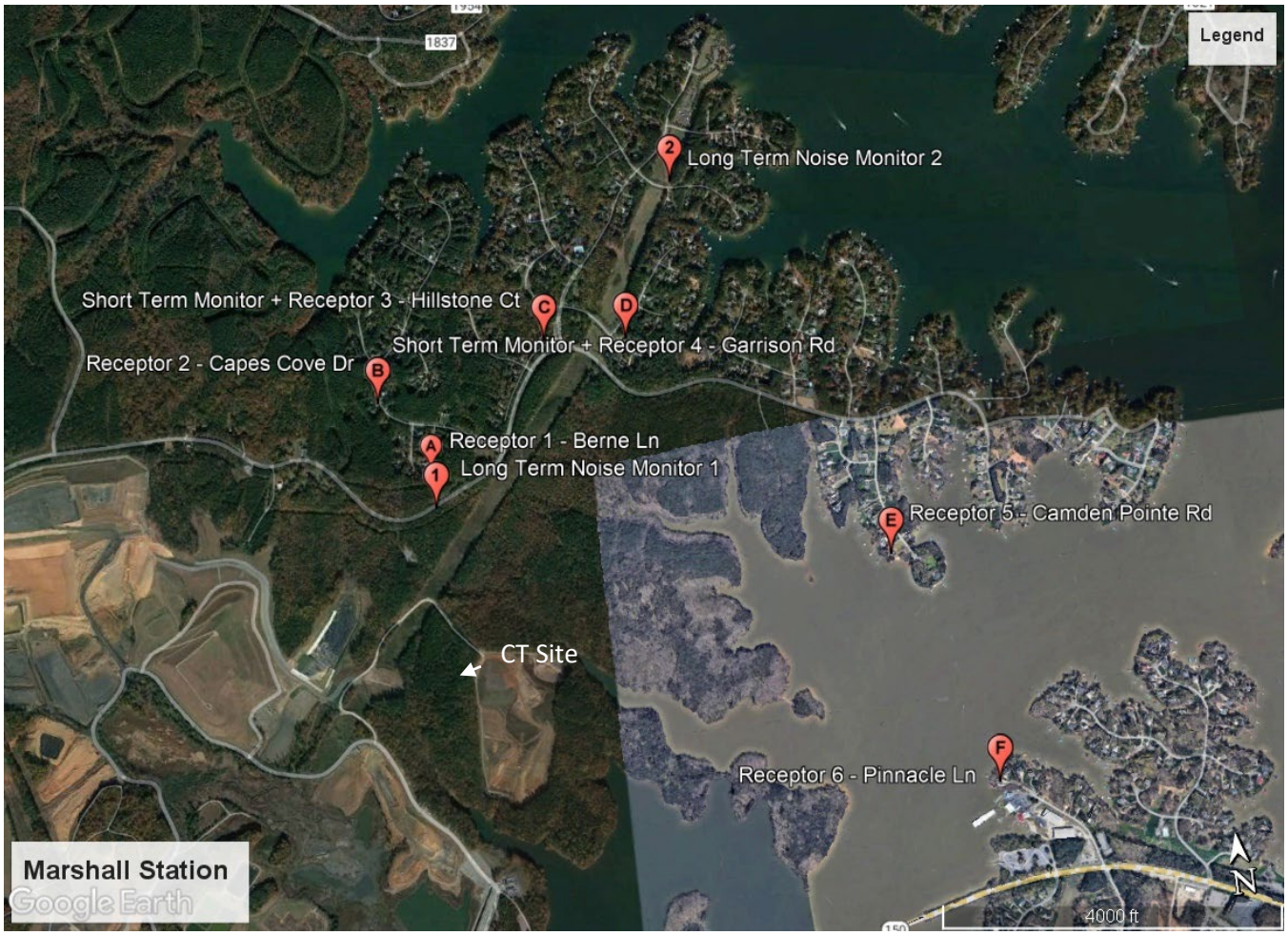


Noise Sensitive Receptors

Since the new combustion turbines will be operating on the northern part of the property, Noise Sensitive Receptors in this area were evaluated. All the Noise Sensitive Receptors are at single-family residences, and Figure 2 shows their locations as well as the locations of long-term and short-term noise monitors. Long-Term Monitor (LTM) 1 is at the Marshall Steam Station Property line.

In addition to the Marshall Steam Station, noise sources contributing to the existing ambient noise level include local street traffic. Power boat activity on Lake Norman will impact the ambient noise level at Receptors 5 and 6, primarily during the daytime. Figure 2 below identifies the Noise Sensitive Receptors.

Figure 2. Noise Sensitive Receptors and Noise Monitor Locations



Ambient Noise Measurements

The existing ambient noise levels were measured along the perimeter of the north side of the Proposed Facility. Ambient noise levels will vary with time of day, time of year, atmospheric conditions, and generating unit operating conditions. Measurements were performed on August 8th through the 10th, 2023 for long term monitor locations 1 and 2. Long term measurements were also conducted April 18th to April 21st 2023 for locations 5 and 6. Noise measurements were obtained long enough to record typical variations under current operating conditions. Long term monitors were manufactured by NTI Audio, model XL2. Serial numbers for Monitors 1 and 2 are A2A-19429-E0 and A2A-18143-E0, respectively. Serial number A2A-13647-EQ was used for location 5 and A2A-0438-D2 was used at location 6. A Bruel and Kjaer model 2250 with a serial number of 2819971 was used for measurement locations 3 and 4.

Atmospheric conditions varied over the measurement period. Table 1 provides the weather during August 8 through August 10 for Mooresville, NC. Mooresville is located 9 miles to the east of the Marshall Steam Station. Table 2 provides the weather conditions for April 18th to April 21st, 2023.

Table 1. Weather conditions during environmental noise measurements in August

Date:	**August 8**				**August 9**				**August 10**			
Time:	12 AM	6 AM	12 PM	6 PM	12 AM	6 AM	12 PM	6 PM	12 AM	6 AM	12 PM	6 PM
Hi Temp (F):	70	84	84	81	72	81	86	86	75	73	86	86
Low Temp (F):	68	68	81	72	64	64	81	73	72	70	75	72
Wind Speed (MPH):	4	4	11	4	1	1	4	1	2	2	6	4
Wind Direction:	SW	W	NW	NW	N	NW	W	Varied	S	SW	SW	W
Humidity (%):	95	82	52	67	83	77	48	70	88	94	73	69

Table 2. Weather conditions during environmental noise measurements in April

Date:	**April 18**				**April 19**				**April 20**				**April 21**			
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	12 AM	6 AM	12 PM	6 PM
Hi Temp (F):	48	68	91	79	57	77	82	82	59	77	84	82	64	77	81	77
Low Temp (F):	39	37	70	57	50	48	77	61	52	50	49	63	55	57	77	64
Wind Speed (MPH):	0	5	9	4	1	2	7	2	1	3	9	5	2	6	9	3
Wind Direction:	-	NE	E	NE	E	NE	NE	NE	NE	NE	NE	NE	N	N	N	N
Humidity (%):	67	52	22	42	72	62	23	43	75	65	28	71	73	61	34	53

The sound was measured in octave bands as well as the overall A-weighted level. Statistical sampling was used to see the variation within each measurement period. A summary of the ambient noise measurements is reported in Table 3 below. Detailed noise levels measurements are reported in the Appendix. Figure 2 identifies the noise measurement locations.

Table 3. Ambient Noise 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} 54.0, 1:00 PM, 8-08-2023 to 1:00 PM, 8-09-2023	L_{Aeq} 56.3 dBA, (1-hour) @ 8:00 AM, 8-10-2023	L_{Aeq} 38.9 dBA @ 3:00 AM 8-09-2023
Long Term Measurement 2	L_{dn} 59.5, 1:00 PM, 8-08-2023 to 1:00 PM, 8-09-2023	L_{Aeq} 58.9 dBA @ 8:00 AM, 8-10-2023	L_{Aeq} 48.6 dBA @ 7:00 AM, 8-09-2023
Short Term Measurement 3	Not Applicable	L_{Aeq} 51.8, @ (3:58) 8/10/2023 13:11	Not Applicable
Short Term Measurement 4	Not Applicable	L_{Aeq} 51.8, @ (3:04) 8/10/2023 13:18	Not Applicable
Long Term Measurement 5	L_{dn} 61.3, 2:00 PM 4-18-2023, to 2:00 PM 4-19-2023	L_{Aeq} 88.4 dBA (1-hour) @ 3:00 PM, 4-18-2023	L_{Aeq} 66.4 dBA (1-hour) @ 7:00 PM, 4-18-2023
Long Term Measurement 6	L_{dn} 68.2, 2:00 PM 4-18-2023, to 2:00 PM 4-19-2023	L_{Aeq} 88.9 dBA (1-hour) @ 6:00 AM, 4-19-2023	L_{Aeq} 56.3 dBA (1-hour) @ 12:00 AM, 4-19-2023

Referring to Figure 2, long term monitor 1 is located at the north property line of the Future SCGT Units near Island Point Road. Ambient daytime noise levels at monitor 1 were controlled by traffic on Island Point Road. The vehicles maximum sound levels reach Lmax 79 dBA. Vehicle noise levels quickly rose as the vehicle approached and subsided once the vehicle passed.

Other noise events heard were birds chirping, and insects. The quietest hour Leq was 39 dBA at 3AM on August 9th, 2023. Most of the quiet period of the night was in the mid 40's. This location is not near any homes. Despite the traffic, the L_{dn} was 54.0 between 1PM August 8th and 1PM August 9th, and 56.7 between 1PM August 9th and 1PM August 10th. The loudest hour L_{eq} was 56 dBA. Late night and very early morning hours had lower levels due to reduced traffic noise.

Monitor 2 is located further north on Fair Oak Drive. Local traffic and landscaping work was the primary noise during the day. The quietest hour Leq was 49 dBA. The loudest hour was 59 dBA. The L_{dn} was 59.5 between 1PM, August 8th and 1PM August 9th, and 60.1 between 1PM August 9th and 1PM August 10th.

Monitor 3 and 4 were short term measurements. Local traffic and yard work were the controlling noise sources.

Monitor 5 is located on the southwest property line of the Marshall Steam Station, while Monitor 6 is located near Unit 4 of the Steam Station. These measurements were used to help calibrate the noise model.

Noise Criteria

The Catawba County North Carolina Code of Ordinances, Article II "Noise" does not provide limits in terms of a measurable metric. It states: "It shall be unlawful for any person to authorize, allow, or cause to be emitted from any property or source under his control any noise that is unreasonably loud, raucous, or disturbing so as to frighten, pose a danger to the health of, or seriously disturb any person of ordinary sensibilities."

Noise impacts to 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 – speech or music, impulsive, tonal, time of day, or periodic nature. When combined community and generating unit noise levels are not increased more than 3 or 4 dB, the impact is generally considered not to be noticeable. Where noise levels from the Proposed Facility will increase 5 or more decibels than the ambient noise (including existing Marshall Steam Station noise), it is generally considered to be clearly noticeable and a significant impact. In the end, individual responses will vary to a new noise source. For the purposes of this analysis, we propose the Threshold of Significant Impact be the Marshall Energy Complex not exceed 55 dBA Leq at any Noise Sensitive Receptor. Additionally, an increase of Leq 5 dBA above the lowest measured ambient noise level added to the projected existing Steam Station noise levels from the analysis is considered a Significant Impact for similar receptor locations. The typical quietest part of the night from Noise Monitor Location 1 was in the mid 40's and Noise Monitor 2 was near 50 dBA. Thus, a 5 dBA increase (at or exceeding 50 dBA) at a Noise Sensitive Receptor is considered a Significant Impact for this report for those sensitive receptor locations with similar quiet background levels. A Significant Impact should be understood as a clearly noticeable change in the existing ambient noise at a Noise Sensitive Receptor. The thresholds for Significant Impact used in this report does not in any way necessarily indicate noise levels that are damaging to human or animal health or hearing.

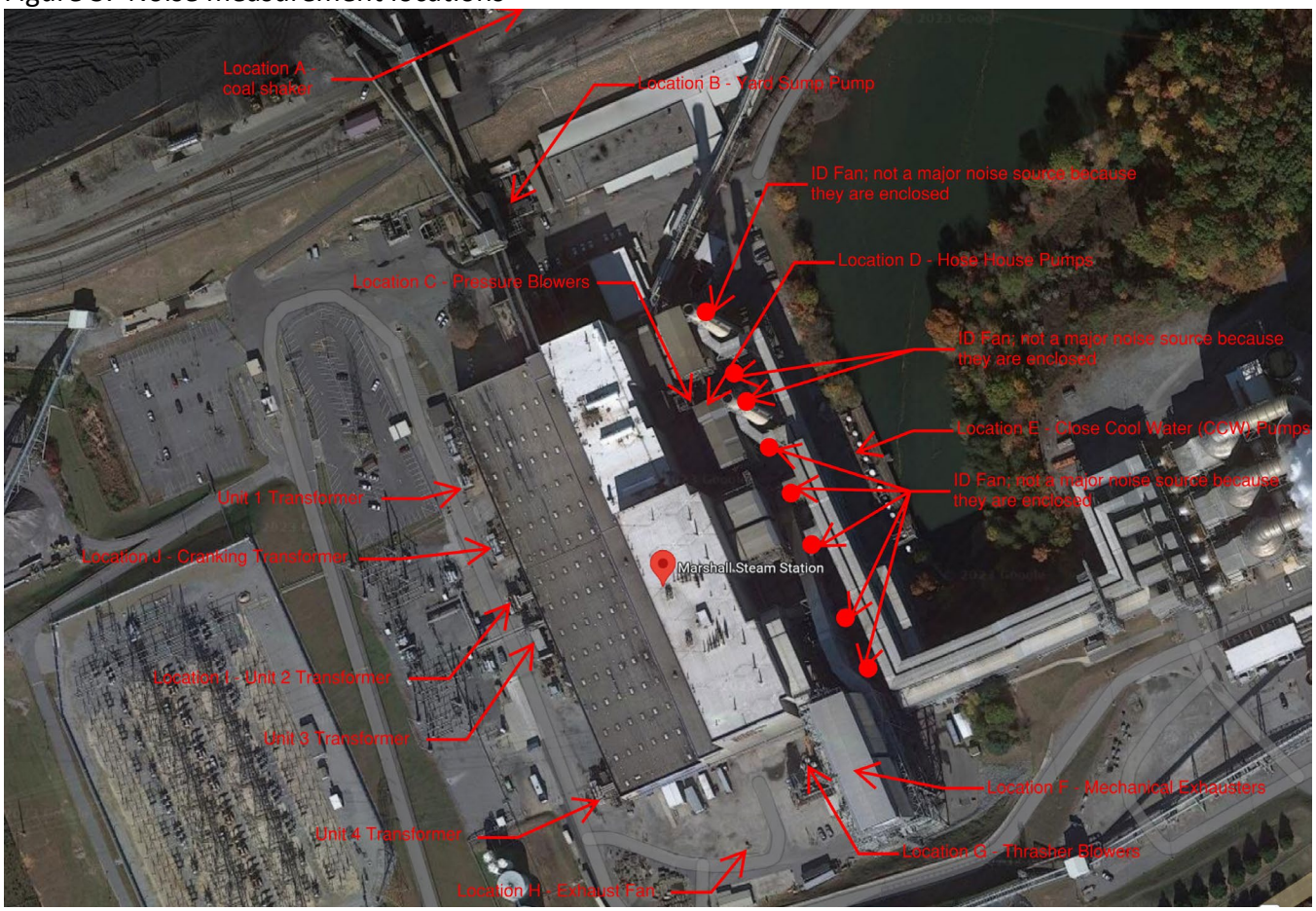
Sound Power Estimation

Sound Power Estimation for the Existing Coal- and Gas-Fired Generating Units (Units 1-4)

The maximum noise condition of the existing coal- and gas-fired generating units occurs when all four units are at maximum capacity. The maximum generating capacity of the units on the nameplate is 1996 MW. Units 1 and Unit 2 are 350 MW each, and Units 3 and 4 are 648 MW each. The total power generation capacity reported on DEC's website is 2090 MW.

Since this facility is largely enclosed, we had to determine the sound power of the Steam Station by measuring up close the sound pressure level of the active individual equipment that was radiating outdoors. A Casella model CEL-63x type 1 sound level meter with a serial number of 128716 was used for the short-term sound measurements to document the noise generated by the various pieces of equipment. Measurement results are documented in the Appendix. Figure 3 provides an aerial view of the DEC Marshall Steam Station and short-term noise measurement locations of the noise generating equipment. Noise levels for these measurements were controlled by the piece of equipment being measured.

Figure 3. Noise measurement locations



From these measurements, knowing the size of the equipment and the distance of the measurement, we were able to determine the sound power of the equipment running the day we were on site. The sound power levels used in our computer model, based on the close in measurements, are reported in the Appendix. To accurately show the propagation of the sources, we also included the reflective parking lot surface, which increases the projection of sound and the buildings since they serve as a barrier to sound from one side going to the other.

Knowing how many of each type of equipment there was, their locations, and how many of each kind were running while we were making those measurements, we could then model these sources and scale them based on operations. We scaled the sound power of each type of equipment by adding 10 Log

($N_{running\ at\ desired\ operation\ condition}$ /$N_{running\ on\ site}$) if all equipment of that type was located close to each other. If a type of equipment was at different physical locations, we instead duplicated the individual equipment sources in the model, placed them at each location, and then turned them on/off based on modeling conditions. For scaling for example, if there are 5 fans and one was running, for the maximum noise condition, we would add 10 Log (5/1) = +7 dB. However, for the independent step-up transformers (MSUs) for each unit, they were duplicated to each specific unit location (total of 4) and turned on or off based on the model conditions.

We then calibrated our model to the operating conditions during our closer long-term monitoring at locations 5 and 6. We found an evening with good sound propagation conditions, where units 1, 2, and 4 were all in operation that gave favorable calibration conditions. From this, we compared the resulting sound level we measured versus what we predicted and then refined and calibrated the model. The data was in good agreement after a few minor refinements.

Existing sound power (all units running)

The Lw (sound power level) was scaled to represent when all four units are operating at total capacity. This was done by representing all equipment as operating in the model (with the scaling techniques discussed above). The total sound power without the coal car shaker is **122.9 dBA**.

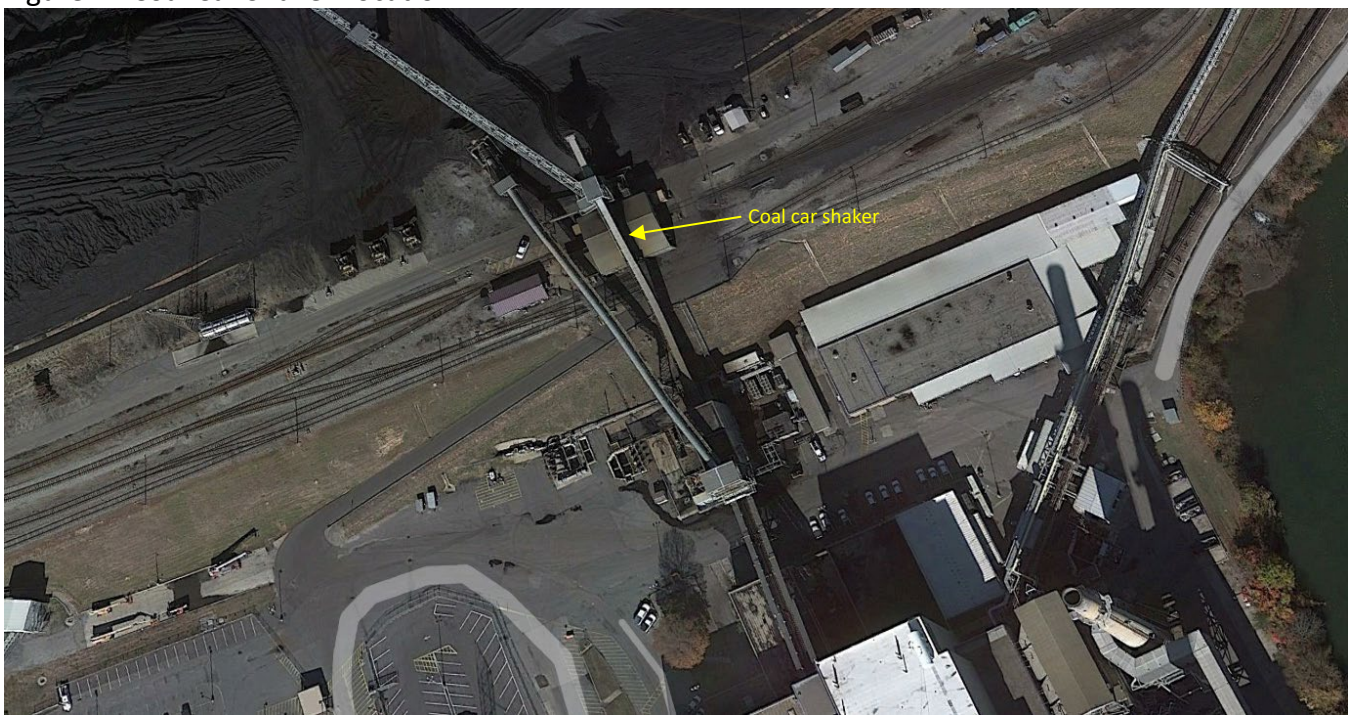
Future sound power (units 3 and 4)

For the future condition, we then needed to estimate the sound power of the existing coal fired units that would remain once Units 1 and 2 are offline. For this, we eliminated one cranking transformer between units 1 and 2, transformers for units 1 and 2, and assumed 7 of 10 closed, cool water pumps (based on the fraction of MW remaining in use) would still run. We also eliminated pressure blowers (total of 5) for units 1 and 2. All other sources remained. The total sound power for units 3 and 4 and other equipment remaining (with no coal car shaker) is **120.8 dBA**.

Thus, the change noise level of the coal- and gas-firing generating units is estimated to be -2.1 dBA. This is without the coal car shaker being considered.

Coal car shaker and related sources

Figure 4. Coal Car Shaker Location



We used a 12-minute measurement while the coal car shaker operation was active to determine sound power levels for three different sources: the alarm when the car starts movement, the banging of each released car as it couples with empty cars, and the steadier noise from the rotating drum coal car shaker. We used a recording of the sources and the statistical data from the 12-minute measurement to separate the sound level and spectra of the three sources. From this, we then evaluated the distances to estimate the sound power level of each of the sources. The alarm and cars banging are maximum level short duration events.

Siren and banging car short duration events - The siren (short duration maximum event) has an estimated sound power of **144.2 dBA**. The banging of the cars (short duration maximum event) has an estimated sound power of **140.2 dBA**. We have plotted the contributions of this with the overall noise separately due to their short duration to show their impact.

Coal car shaker - We were fortunate that just after concluding our monitoring, we were able to get on site and measure the coal car shaker. We also have historical data for this kind of source that can confirm the levels as being within the expected range. Available public resources indicate sound power levels (calculated from known distances and sound pressure levels in some cases) for an open coal car shaker ranged from 122-129 dBA. One source indicated that rotating shakers can be less. Our own measurements of open coal car shakers at the DEC W.S. Lee Station (when the coal fired generating unit was still operating) and the DEC Asheville Plant had sound power levels of 134-137 dBA. From our measurements, we determined a sound power (Lw) of **129.2 dBA**. This is within the range of expected sound power for such equipment.

We were provided a log of coal car shaker use over the month of April. The shaker on that log operated for a period of generally 6.7 hours to 9 hours at a time, with one outlier over 12 hours. From the log, we deduced it was operational 8.4% of the time. This activity was clearly regularly occurring as part of plant operations and should be included with the peak load conditions to show the normal maximum condition with all operational units running (for both existing and future conditions).

Estimation of Sound Power Levels for the New SCGT Units

Burns and McDonnell (B&M) produced a basic noise study of the Proposed Facility at an alternate location (same layout, same exact equipment to be used at this site). That report provided a table of sound power levels for most sources and the interior sound pressure level for the one building with an STC rating of the construction (B&M report December 15th, 2022, see p.5). The new CTs will be specified to limit the maximum sound power level of each unit to meet the sound power levels identified in the Burns and McDonnell report. We created a library of sources for use in our model from this table. Using the site plan (Figure 1) provided, which is identical in layout to the B&M report, and other project maps provided by DEC, we located these sources in our SoundPLAN outdoor noise model. For the one building, we estimated the height from the 3D views provided. Acoustically hard surfaces such as pavement were given reflective properties, and grass/natural terrain areas were given absorptive qualities. Assumptions were made for future grading based on the range of the existing topography. We had an excellent agreement with B&M noise contours from the alternate site considered, and the noise contours at this site are also in good agreement.

The Proposed Facility total sound power (Lw) with all equipment running is **123.1 dBA**. Without the two stack exits (each at 116.8 dBA, together **119.8 dBA**), the remaining sound energy from all the other equipment has a sound power (Lw) of **120.3 dBA**. These two groups of sources are equal. Thus, any effort to reduce noise would require addressing both groups.

The color-coded **table that follows** shows the contributions of the various noise sources (existing and then Proposed Facility). Please note how the spectrum and level of the building source is different from the B&M report, as the B&M results were not presented as total sound power, but instead as an interior sound pressure level and some unspecified STC 32 construction. We have shown this building as the total sound power radiating for each surface of the building.

Table 4. SCGT Unit Noise Limits

Sound power levels of Existing Coal Plant									
Name	63.0	125.0	250.0	500.0	1000.0	2000.0	4000.0	8000.0	A-weighted overall level
S01:1 Yard Sump Pump 1A (4)	69.5	85.1	94.1	97.1	98.5	96.5	90.6	79.2	103.2
S01:2 Yard Sump Pump #2 (4)	65.5	81.1	90.1	93.1	94.5	92.5	86.6	75.2	99.2
S02: Units 1+2 Pressure Blowers (3)	79.4	89.9	98.2	107.4	112.3	108.8	103.8	95.0	115.2
S03: Units 1+2 Pressure Blowers (2)	77.2	101.8	94.9	105.7	112.8	108.4	102.5	95.3	115.3
S04:01 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:02 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:03 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:04 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:05 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:06 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:07 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:08 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:09 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S04:10 Closed Cool Water Pump	75.7	85.1	90.2	90.0	100.3	93.6	90.2	83.1	102.2
S05: Mechanical Exhausters	70.3	85.0	103.1	110.3	114.9	113.5	105.6	93.1	118.5
S06: Pressure Ash Blowers (units 3 and 4) (3)	80.3	90.8	100.3	102.6	110.0	106.2	100.2	90.4	112.6
S07: Exhaust Fan	65.2	85.4	91.7	95.8	95.4	94.2	88.2	76.8	101.0
S08:1 Unit 1 Transformer	74.4	97.0	97.2	105.0	95.1	90.2	85.8	75.3	106.7
S08:2 Unit 2 Transformer	74.4	97.0	97.2	105.0	95.1	90.2	85.8	75.3	106.7
S08:3 Unit 3 Transformer	74.4	97.0	97.2	105.0	95.1	90.2	85.8	75.3	106.7
S08:4 Transformer Unit 4	74.4	97.0	97.2	105.0	95.1	90.2	85.8	75.3	106.7
S09:1 Cranking Transformer 1	73.7	84.9	85.0	89.2	87.4	84.2	76.4	64.8	93.7
S09:2 Cranking Transformer 2	73.7	84.9	85.0	89.2	87.4	84.2	76.4	64.8	93.7
S10: Coal Car Shaker	107.7	108.8	110.2	114.2	121.3	126.6	122.5	110.1	129.2

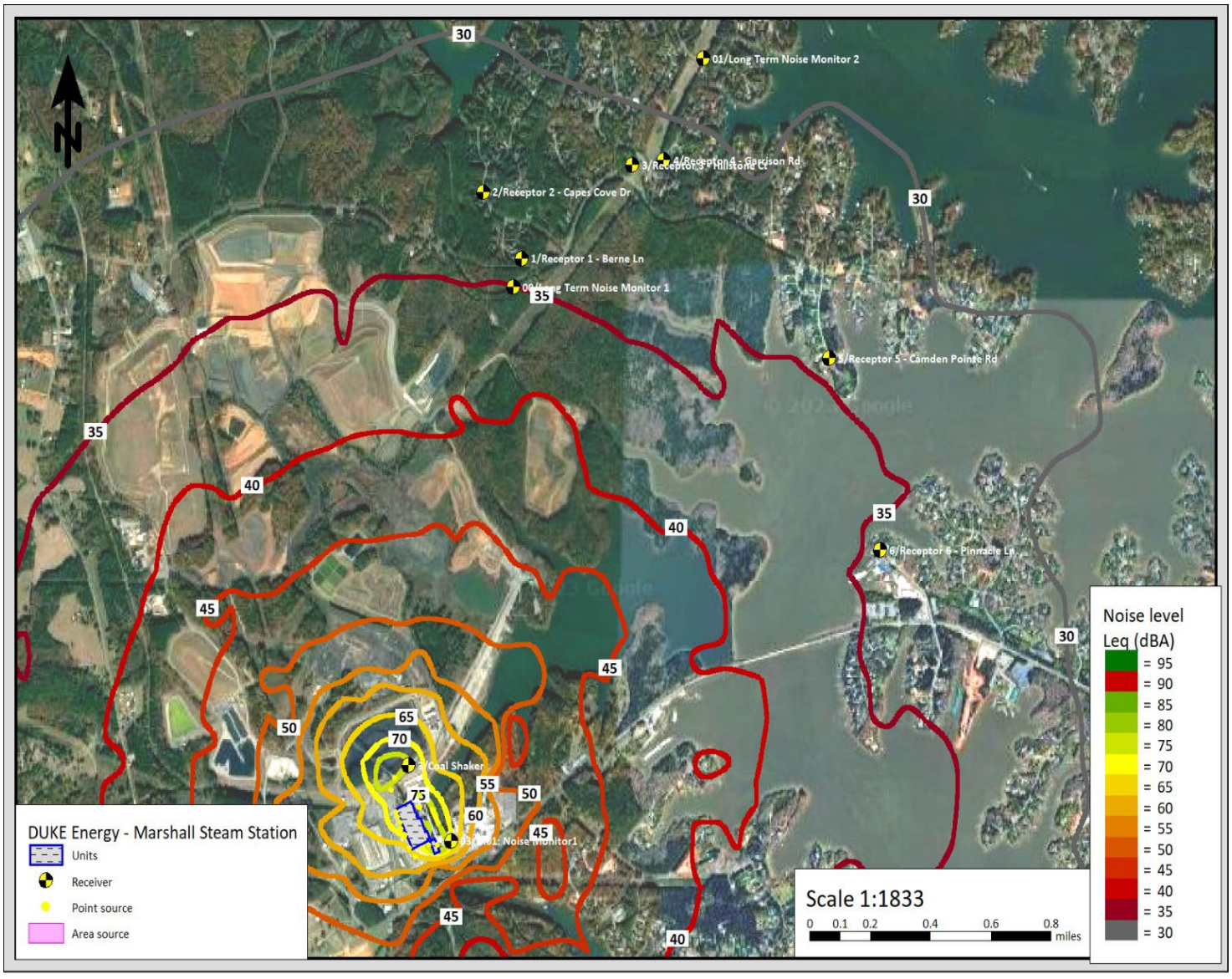
Sound power levels of future CT plant addition major noise sources									
Name	63.0	125.0	250.0	500.0	1000.0	2000.0	4000.0	8000.0	A-weighted overall level
001 GT Generator 1	78.8	90.9	87.4	98.8	100.0	101.2	96.0	82.9	105.7
001 GT Generator 2	78.8	90.9	87.4	98.8	100.0	101.2	96.0	82.9	105.7
001 GT Turbine Compartment	76.8	84.9	86.4	93.8	97.0	102.2	107.0	92.9	108.9
001 GT Turbine Compartment 2	76.8	84.9	86.4	93.8	97.0	102.2	107.0	92.9	108.9
001 GT Turbine Exhaust Diffuser 1	91.8	88.9	90.4	88.8	92.0	95.2	87.0	71.9	99.8
001 GT Turbine Exhaust Diffuser 2	91.8	88.9	90.4	88.8	92.0	95.2	87.0	71.9	99.8
003 GT Stack Exit 2	105.8	111.9	113.4	106.8	97.0	96.2	96.0	93.9	116.8
003 SCR Breech 1	75.8	61.9	53.4	57.8	63.0	50.2	46.0	29.9	79.0
003 SCR Breech 2	75.8	61.9	53.4	57.8	63.0	50.2	46.0	29.9	79.0
003 SCR CO 1	84.8	71.9	59.4	57.8	56.0	60.2	51.0	27.9	90.2
003 SCR CO 2	84.8	71.9	59.4	57.8	56.0	60.2	51.0	27.9	90.2
003 SCR Inlet Diffuser Duct	73.8	67.9	60.4	65.8	71.0	63.2	55.0	37.9	82.2
003 SCR Inlet Diffuser Duct	73.8	67.9	60.4	65.8	71.0	63.2	55.0	37.9	82.2
003 SCR Inlet Duct 1	77.8	64.9	52.4	57.8	64.0	55.2	46.0	24.9	83.3
003 SCR Inlet Duct 2	77.8	64.9	52.4	57.8	64.0	55.2	46.0	24.9	83.3
003 SCR Temp Air Duct	79.8	66.9	54.4	53.8	51.0	55.2	46.0	25.9	85.2
003 SCR Temp Air Duct	79.8	66.9	54.4	53.8	51.0	55.2	46.0	25.9	85.2
004 GT Inlet Fan 3	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 GT Inlet Vent Fan 4	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 GT Inlet Vent Fan 5	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 GT Inlet Vent Fan 6	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 GT Inlet Vent Fan 7	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 GT Turbine Inlet Fan 2	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 GT Vent Fan 1	75.8	93.9	92.4	94.8	95.0	95.2	99.0	93.9	103.8
004 Tempering Air Horizontal Duct 1	82.8	71.9	62.4	67.8	68.0	85.2	85.0	62.9	89.6
004 Tempering Air Horizontal Duct 2	82.8	71.9	62.4	67.8	68.0	85.2	85.0	62.9	89.6
004 Tempering Air Inlet 1	104.8	95.9	71.4	72.8	77.0	81.2	85.0	93.9	106.5
004 Tempering Air Inlet 2	104.8	95.9	71.4	72.8	77.0	81.2	85.0	93.9	106.5
004 Tempering Air Manifold 1	91.8	75.9	71.4	76.8	77.0	94.2	94.0	71.9	98.5
004 Tempering Air Manifold 2	91.8	75.9	71.4	76.8	77.0	94.2	94.0	71.9	98.5
004 Tempering Air Outlet Duct 1	69.8	56.9	27.4	28.8	31.0	38.2	36.0	39.9	72.8
004 Tempering Air Outlet Duct 2	69.8	56.9	27.4	28.8	31.0	38.2	36.0	39.9	72.8
005 GT Stack Casing 1	79.8	70.9	61.4	50.8	48.0	39.2	50.0	33.9	83.5
005 Stack Casing 2	79.8	70.9	61.4	50.8	48.0	39.2	50.0	33.9	83.5
005 Stack Exit 1	105.8	111.9	113.4	106.8	97.0	96.2	96.0	93.9	116.8
007 Lube Oil Module 1	77.8	83.9	90.4	94.8	97.0	98.2	99.0	88.9	103.9
007 Lube Oil Module 2	77.8	83.9	90.4	94.8	97.0	98.2	99.0	88.9	103.9
011 Closed Cool Water Pump 1 of 2	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
011 Closed Cool Water Pump 2 of 2	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
012 Cooling Module	72.8	96.9	96.4	100.8	104.0	95.2	90.0	89.9	107.1
012 GT Cooling Module	72.8	96.9	96.4	100.8	104.0	95.2	90.0	89.9	107.1
015 GSU Transformer 1	73.8	87.9	95.4	100.8	88.0	84.2	77.0	69.9	102.3
015 GSU Transformer 2	73.8	87.9	95.4	100.8	88.0	84.2	77.0	69.9	102.3
021 GT Air Inlet Face 1	78.8	84.9	85.4	86.8	91.0	97.2	105.0	93.9	106.2
046 Excitation Transformer 1	58.8	72.9	77.4	88.8	84.0	75.2	70.0	61.9	90.5
046 Excitation Transformer 2	58.8	72.9	77.4	88.8	84.0	75.2	70.0	61.9	90.5
047 Liquid Fuel Pump Skid 1	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
047 Liquid Fuel Pump Skid 2	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
056 Compressed Air Skid	52.8	72.9	80.4	87.8	97.0	96.2	92.0	77.9	100.6
057 Air Dryer (Dry Air Receiver)	68.8	82.9	85.4	86.8	79.0	70.2	70.0	67.9	90.5
062 Fuel Gas Filter 1	73.8	72.9	72.4	76.8	86.0	89.2	92.0	87.9	95.5
062 Fuel Gas Filter 2	73.8	72.9	72.4	76.8	86.0	89.2	92.0	87.9	95.5
063 Fuel Oil Heater 1	77.8	85.9	88.4	90.8	90.0	84.2	80.0	73.9	95.7
063 Fuel Oil Heater 2	77.8	85.9	88.4	90.8	90.0	84.2	80.0	73.9	95.7
063 Heater Skid 1	74.8	82.9	85.4	87.8	87.0	81.2	77.0	70.9	92.7
063 Heater Skid 2	74.8	82.9	85.4	87.8	87.0	81.2	77.0	70.9	92.7

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
Water Treatment BLDG-Facade 01	76.5	77.6	71.1	55.5	35.7	16.9	12.7	2.6	81.0
Water Treatment BLDG-Facade 02	77.8	78.9	72.4	56.8	37.0	18.2	14.0	3.9	82.3
Water Treatment BLDG-Facade 03	76.5	77.6	71.1	55.5	35.7	16.9	12.7	2.6	81.0
Water Treatment BLDG-Facade 04	77.8	78.9	72.4	56.8	37.0	18.2	14.0	3.9	82.3
Water Treatment BLDG-Roof 01	80.4	81.5	75.0	59.4	39.6	20.8	16.6	6.5	84.9
021 GT Air Inlet Face 2	78.8	84.9	85.4	86.8	91.0	97.2	105.0	93.9	106.2
021 GT Air Inlet Housing 1	71.8	82.9	90.4	88.8	88.0	103.2	100.0	81.9	105.3
021 GT Air Inlet Housing 2	71.8	82.9	90.4	88.8	88.0	103.2	100.0	81.9	105.3
021 GT Inlet Plenum 1	73.8	82.9	85.4	91.8	98.0	98.0	95.0	90.0	102.8
021 GT Inlet Plenum 2	73.8	82.9	85.4	91.8	98.0	98.0	95.0	90.0	102.8
024 Fuel Gas Meter 1	73.8	72.9	72.4	76.8	86.0	89.2	92.0	87.9	95.5
024 Fuel Gas Meter 2	73.8	72.9	72.4	76.8	86.0	89.2	92.0	87.9	95.5
025 Ammonia Skid 1	78.8	82.9	90.4	92.8	95.0	95.2	94.0	87.9	101.1
025 Ammonia Skid 2	78.8	82.9	90.4	92.8	95.0	95.2	94.0	87.9	101.1
031 Liquid Fuel and Water Injection Filter Skid 1	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
031 Liquid Fuel and Water Injection Filter Skid 2	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
037 Auxiliary Transformer 1	58.8	72.9	77.4	88.8	84.0	75.2	70.0	61.9	90.5
037 Auxiliary Transformer 2	58.8	72.9	77.4	88.8	84.0	75.2	70.0	61.9	90.5
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0
039 Fuel Oil Forwarding Pumps (4)	68.8	80.9	88.4	90.8	91.0	88.2	89.0	83.9	97.0

Sound Model Results

Figure 5 documents the predicted noise contours for the existing Marshall Steam Station with all units operating at maximum capacity, **with** coal cars unloading but **no** maximum level short duration events (no siren and no railroad cars banging). This condition is most representative of worst-case existing noise

Figure 5. Existing Marshall Steam Station – Maximum Capacity with Coal Car Shaker, but no Siren or Cars Banging



levels for evaluating noise impact. Please note that coal car shaker dominates once off DEC property. This is because the existing Steam Station is more than 6 dBA quieter than the coal car shaker.

Figure 6 documents the predicted existing Marshall Steam Station at Full Capacity with Coal Car Shaker Operations AND with short duration maximum events (railroad cars banging and sirens**)**. This is useful to show what is experienced when these short events occur. When they occur, these short duration events together are over 15 dBA louder than everything else.

Figure 6. Noise Contours of the Existing Marshall Steam Station at Full Capacity with Coal Car Shaker Operations AND with short duration maximum events (railroad cars banging and siren).

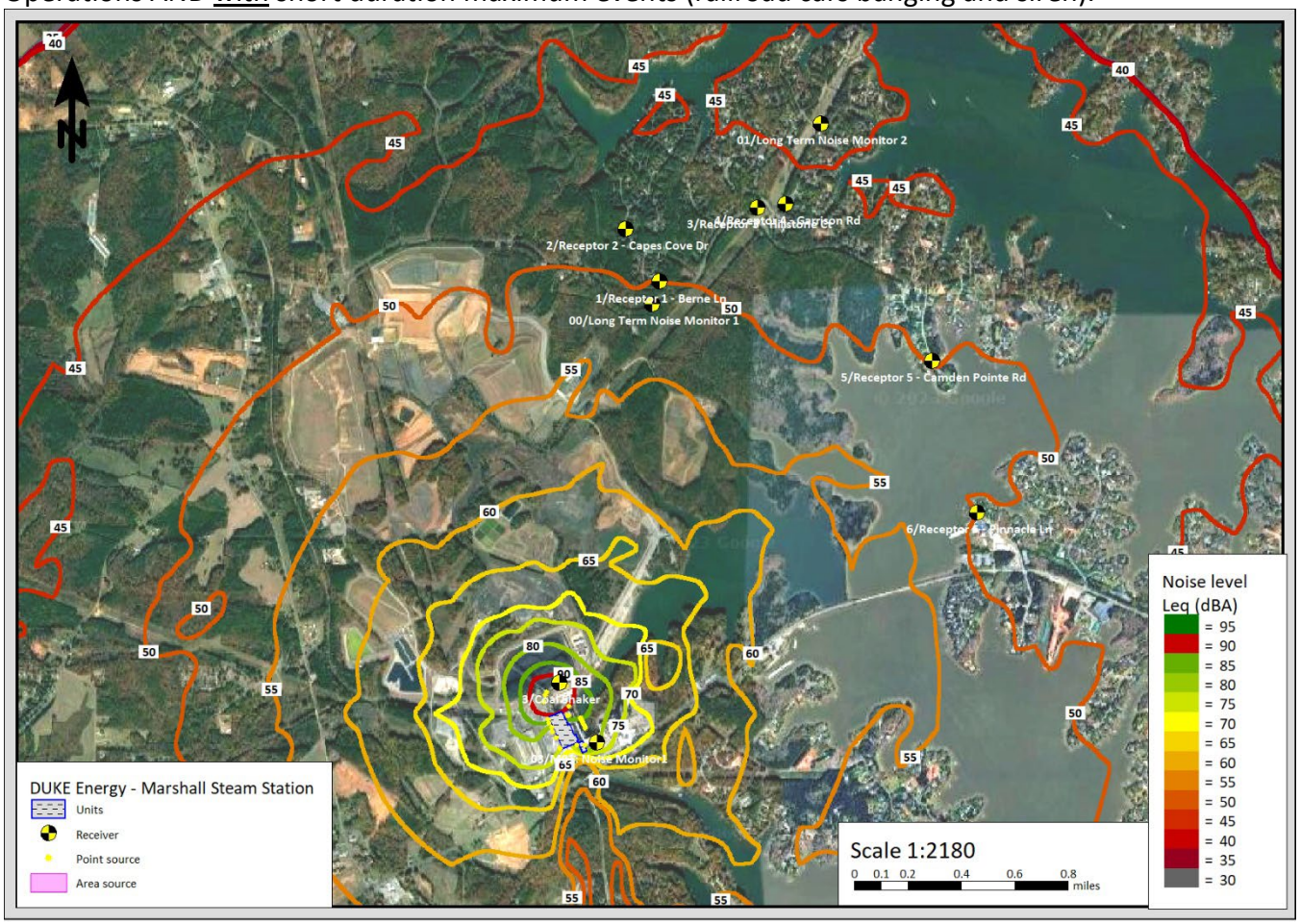


Figure 7 documents the predicted Future Marshall Energy Complex at full capacity after completion of the project with the coal car shaker noise, but with no short duration events. Close to the proposed SCGT site, the noise emanating from the project site has a dominant effect. Close to the new site, the site's noise sources determine the sound level. Once the distance from the new site reaches about half as far as from the Marshall Steam Station operation sources, the existing site and the project site contribute equally. Once the two source groups are about the same distance from a receiving location, the shaker controls the sound level.

Figure 7. Noise Contours Marshall Steam Station at Full Capacity Project Completed (Future) with Coal Car shaker – no short duration events from cars banging or sirens.

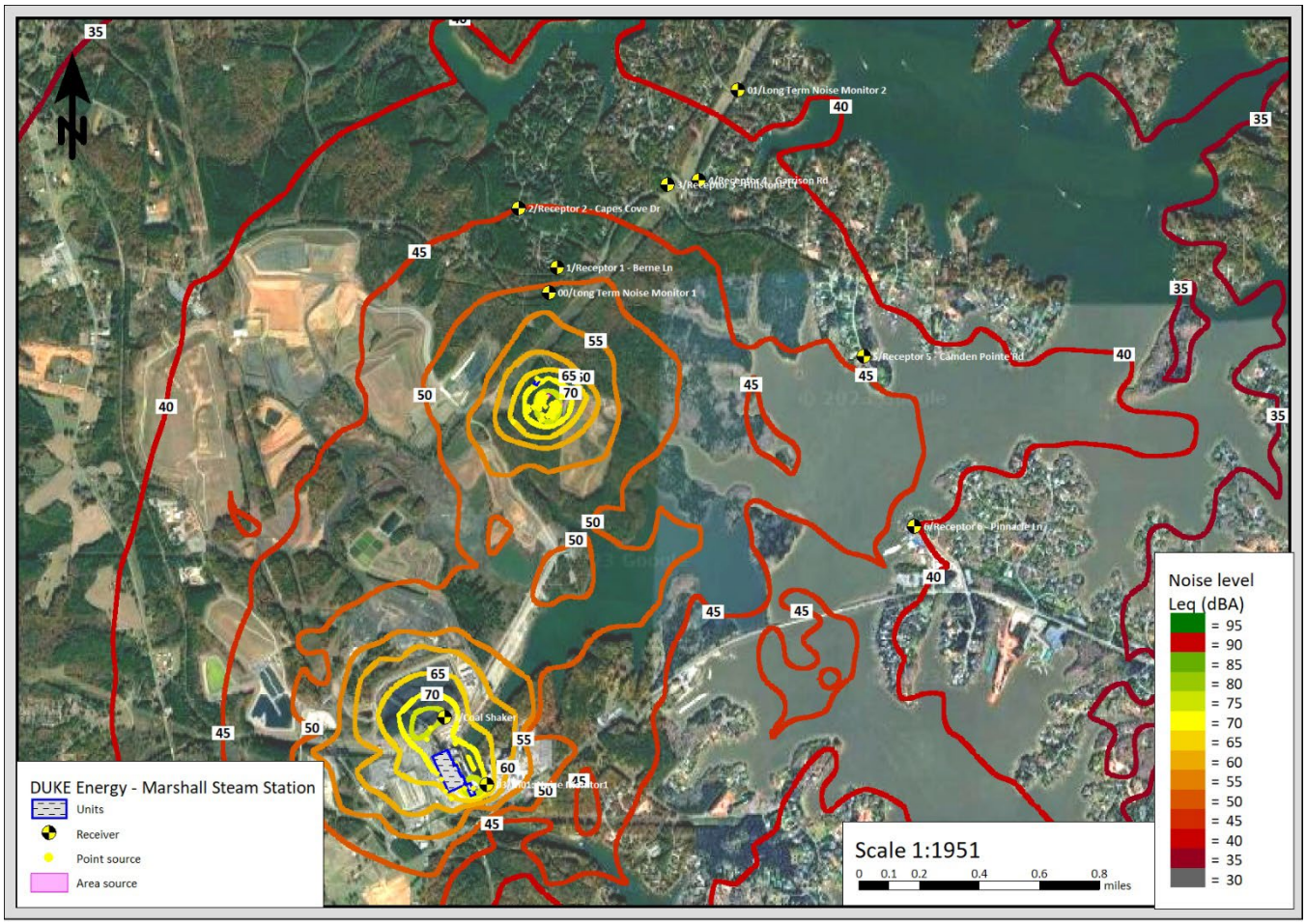
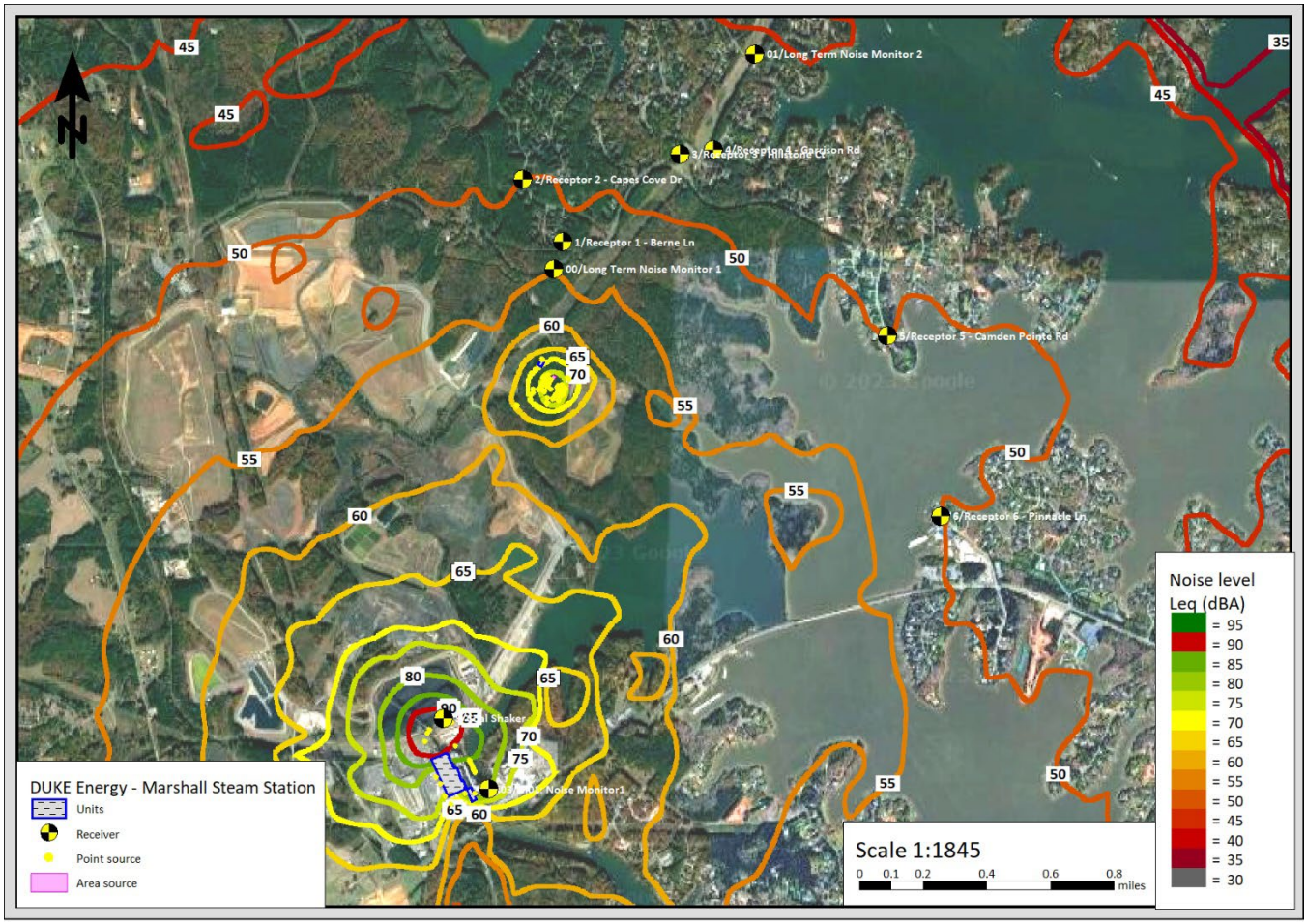


Figure 8 documents the predicted noise levels after completion of the project with coal car shaker operations and with short duration events from the siren and cars banging. When these events occur, for most locations they dominate the noise heard and thus have similar contours to Figure 7.

Figure 8. Noise Contours Marshall Energy Complex at Full Capacity Project Completed with Coal Car shaker AND with short duration maximum events from cars banging and siren.



Comparison of Results with Established Noise Thresholds

Table 5. Noise Levels at Receptors for Measured, Existing Maximum Capacity, Future Maximum Capacity.

Receptor ID	Location	Existing Max Steam + Shaker SoundPLAN L_{Aeq}	Future Max Steam + Shaker + SCGT SoundPLAN L_{Aeq}	Quietest Noise Level Assumed	Above 55 dBA Threshold	Increase Above Ambient and Existing Marshall Steam Station
1	Berne Ln	34.3	49.0	45 dBA	No	5.5 dBA*
2	Capes Cove Dr	32.6	45.1		No	3.1 dBA
3	Hillstone Ct	31.3	42.9		No	2.1 dBA
4	Garrison Rd	30.9	42.1		No	1.8 dBA
5	Camden Pointe Rd	32.7	41.6		No	1.6 dBA
6	Pinnacle Ln	33.7	41.1		No	1.5 dBA
LTM1	Island Point Rd	35.1	50.9		No	6.9 dBA*
LTM2	Fair Oak Dr	28.8	39.3		No	1.0 dBA

The predicted noise levels after completion of the project (with coal car shaker, remaining Marshall Steam Station, and the SCGT in operation) have a Significant Impact at Sensitive Receptor location 1 and LTM 1, which is on the DEC property line. This impact at locations just outside the DEC property line are significant because the increase is greater than 5 dBA and therefore clearly noticeable to human hearing. However, the Proposed Facility will not expose sensitive receptors to any noises exceeding the 55 dBA Threshold of Significant Impact. In other words, the overall future noise is not louder than typically found acceptable in communities due to other sources of noise such as road noise, boats, air conditioning condensing units, etc. However, it will still be a significant impact to those closer to the SCTG site near Receptor 1 and LTM 1 where the level during the typical quietest periods of the night will be increasing more than 5 dBA.

The loudest events are the short duration existing siren and railroad car banging, and of course, that does not change. These events are probably heard at the greatest distances for DEC sources. There is of course no impact for this, since this is an existing source.

Appendix – Detailed Sound Measurements

Table A1. Short Term Sound Measurements (STM) obtained Thursday, August 10, 2023.

Loc ID	Location	GPS N	GPS W	File	L_{Aeq}	L_{ASmax}	L_{10}	L_{50}	L_{90}
3	Hillstone Ct	35.625663°	-80.952989°	Location three	50.1	64.1	51.7	45.6	40.6
4	Garrison Rd	35.625561°	-80.951145°	Location four	51.8	66.3	52.0	43.8	40.8

Table A2. Noise Monitor 1, Location GPS N °, GPS W °, August 8, 9, 10, 2023, A-weighted (dBA)

Type	Start	Duration	LASmax	LAeq	L_{10}	L_{50}	L_{90}
60'	2023-08-08 13:00:00	01:00:00	61.4	49.8	53.0	47.8	43.8
60'	2023-08-08 14:00:00	01:00:00	60.9	49.8	52.8	48.7	44.3
60'	2023-08-08 15:00:00	01:00:00	66.4	50.4	52.9	49.0	45.1
60'	2023-08-08 16:00:00	01:00:00	61.2	46.8	48.8	45.4	42.8
60'	2023-08-08 17:00:00	01:00:00	64.9	48.1	50.6	46.4	42.4
60'	2023-08-08 18:00:00	01:00:00	56.8	46.8	49.1	45.2	42.8
60'	2023-08-08 19:00:00	01:00:00	59.8	43.9	46.5	40.7	37.7
60'	2023-08-08 20:00:00	01:00:00	58.4	52.8	54.8	53.2	47.7
60'	2023-08-08 21:00:00	01:00:00	57.6	54.2	55.7	53.8	52.9
60'	2023-08-08 22:00:00	01:00:00	56.3	51.8	52.6	51.8	51.0
60'	2023-08-08 23:00:00	01:00:00	55.8	51.2	52.3	51.1	49.9
60'	2023-08-09 00:00:00	01:00:00	55.6	49.4	51.0	49.1	47.5
60'	2023-08-09 01:00:00	01:00:00	52.6	46.6	47.9	46.9	44.2
60'	2023-08-09 02:00:00	01:00:00	47.8	42.7	44.0	42.8	40.1
60'	2023-08-09 03:00:00	01:00:00	46.1	38.9	40.2	38.7	37.5
60'	2023-08-09 04:00:00	01:00:00	46.5	39.2	40.2	38.9	37.7
60'	2023-08-09 05:00:00	01:00:00	47.6	39.2	40.8	38.7	36.1
60'	2023-08-09 06:00:00	01:00:00	60.7	42.9	44.4	41.3	38.8
60'	2023-08-09 07:00:00	01:00:00	67.8	43.3	44.3	38.4	35.3
60'	2023-08-09 08:00:00	01:00:00	62.6	47.7	49.8	40.4	37.3
60'	2023-08-09 09:00:00	01:00:00	63.8	46.0	48.4	42.0	39.6
60'	2023-08-09 10:00:00	01:00:00	55.6	44.8	47.6	43.2	39.9
60'	2023-08-09 11:00:00	01:00:00	57.6	48.6	51.5	48.0	40.4
60'	2023-08-09 12:00:00	01:00:00	61.9	48.2	50.6	47.0	44.1
60'	2023-08-09 13:00:00	01:00:00	68.3	47.5	49.4	44.2	40.8
60'	2023-08-09 14:00:00	01:00:00	63.9	46.2	48.2	43.1	40.2
60'	2023-08-09 15:00:00	01:00:00	67.7	47.6	48.8	44.0	41.3
60'	2023-08-09 16:00:00	01:00:00	66.6	48.7	52.2	45.1	38.3
60'	2023-08-09 17:00:00	01:00:00	64.3	48.8	51.7	46.1	38.9
60'	2023-08-09 18:00:00	01:00:00	67.7	49.0	51.0	45.4	40.5
60'	2023-08-09 19:00:00	01:00:00	62.3	49.4	52.1	49.1	41.2
60'	2023-08-09 20:00:00	01:00:00	68.7	53.4	56.5	52.5	44.7
60'	2023-08-09 21:00:00	01:00:00	58.0	55.6	57.0	55.3	54.4
60'	2023-08-09 22:00:00	01:00:00	61.2	53.8	54.5	53.7	52.8
60'	2023-08-09 23:00:00	01:00:00	57.0	53.2	53.9	53.2	52.5
60'	2023-08-10 00:00:00	01:00:00	55.4	53.3	54.3	53.2	52.4
60'	2023-08-10 01:00:00	01:00:00	57.6	50.3	53.2	50.2	42.4
60'	2023-08-10 02:00:00	01:00:00	52.2	47.2	49.5	46.9	43.1
60'	2023-08-10 03:00:00	01:00:00	50.6	48.0	49.1	47.9	46.7
60'	2023-08-10 04:00:00	01:00:00	48.8	43.8	45.5	43.3	41.6
60'	2023-08-10 05:00:00	01:00:00	51.5	41.8	43.4	41.3	39.8

Type	Start	Duration	LASmax	LAeq	L_{10}	L_{50}	L_{90}
60'	2023-08-10 06:00:00	01:00:00	55.9	43.7	44.7	42.9	41.4
60'	2023-08-10 07:00:00	01:00:00	57.4	43.3	46.9	40.4	38.0
60'	2023-08-10 08:00:00	01:00:00	79.0	56.3	59.6	52.1	49.2
60'	2023-08-10 09:00:00	01:00:00	67.7	53.1	55.8	50.9	47.3
60'	2023-08-10 10:00:00	01:00:00	67.5	48.6	50.1	46.0	40.3
60'	2023-08-10 11:00:00	01:00:00	54.3	43.3	45.8	41.8	39.6
60'	2023-08-10 12:00:00	01:00:00	65.6	46.8	48.7	44.2	40.8
60'	2023-08-10 13:00:00	01:00:00	69.7	47.4	47.9	42.6	39.6

Figure A1. Monitor 1 - L_{Aeq} and L_{ASmax} time histories.

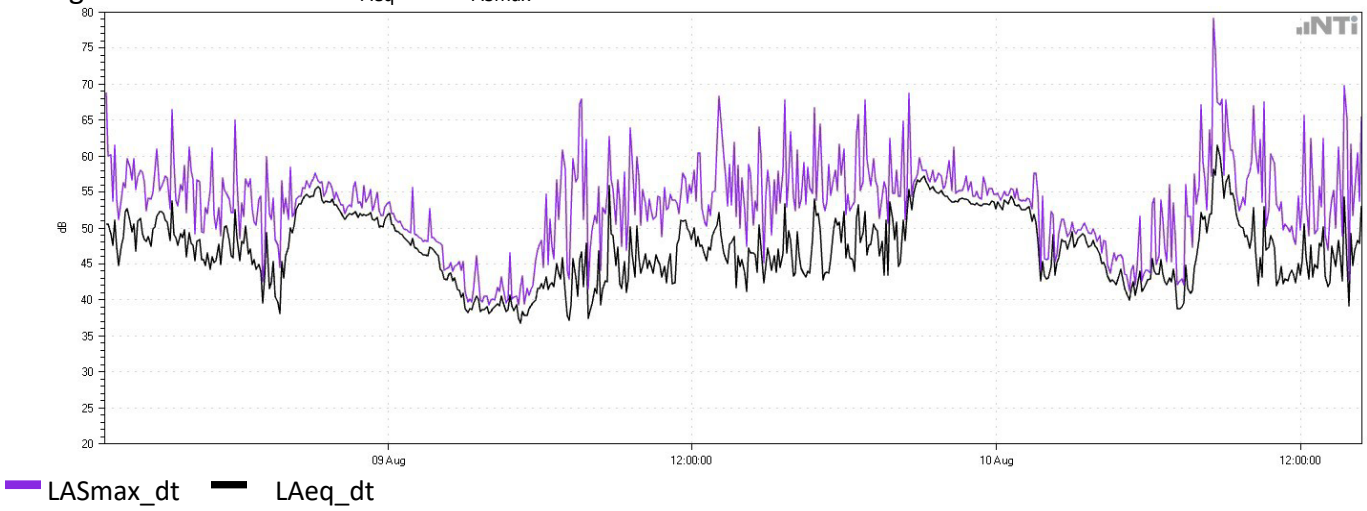


Figure A2. Monitor 1 - L_{10}, L_{50} and L_{90} time histories.

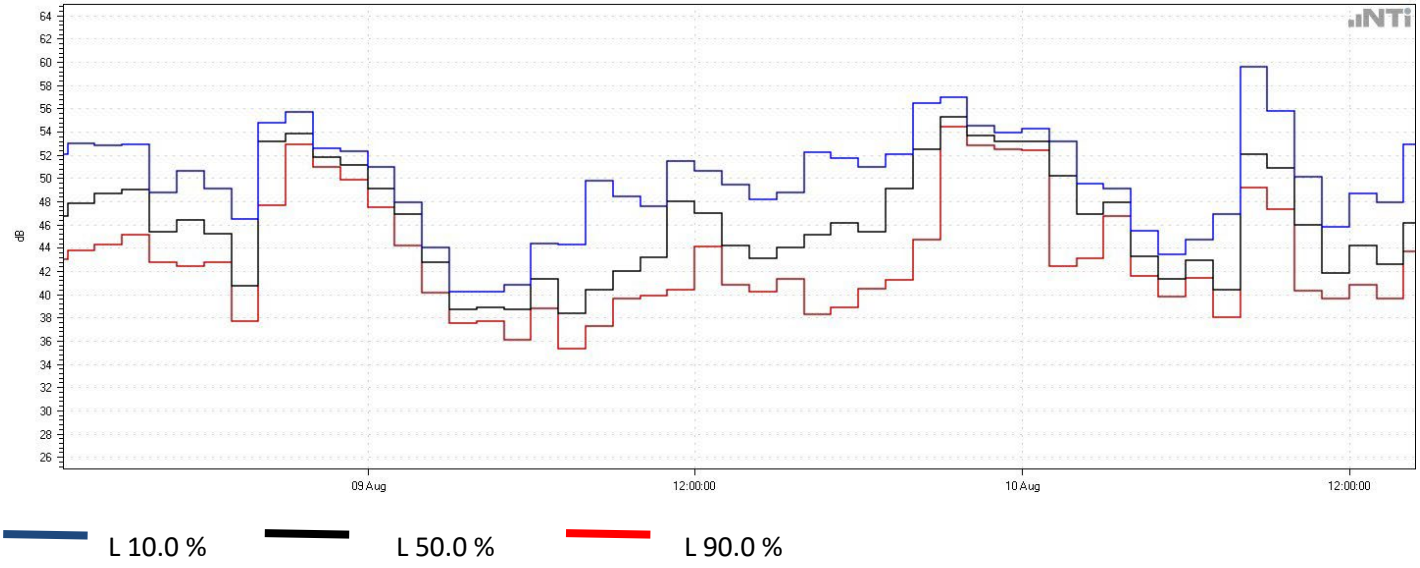


Table A3. Noise Monitor 2, Location GPS N °, GPS W °, August 8, 9, 10, 2023, A-weighted (dBA)

Type	Start	Duration	L_{ASmax}	L_{Aeq}	L_{10}	L_{50}	L_{90}
60'	2023-08-08 13:00:00	01:00:00	67.4	51.8	55.1	47.0	42.1
60'	2023-08-08 14:00:00	01:00:00	69.0	52.2	55.6	48.6	44.3
60'	2023-08-08 15:00:00	01:00:00	69.6	51.5	54.9	46.9	42.7
60'	2023-08-08 16:00:00	01:00:00	66.4	51.1	54.2	46.6	42.6
60'	2023-08-08 17:00:00	01:00:00	72.6	53.5	56.2	49.2	46.2
60'	2023-08-08 18:00:00	01:00:00	66.0	52.3	55.9	48.1	44.6
60'	2023-08-08 19:00:00	01:00:00	66.5	49.8	53.7	44.0	38.3
60'	2023-08-08 20:00:00	01:00:00	65.0	53.8	56.7	51.6	47.4
60'	2023-08-08 21:00:00	01:00:00	63.2	56.1	56.7	55.9	55.4
60'	2023-08-08 22:00:00	01:00:00	63.7	55.4	56.0	55.2	54.5
60'	2023-08-08 23:00:00	01:00:00	67.2	54.5	55.5	54.1	53.1
60'	2023-08-09 00:00:00	01:00:00	60.8	53.3	54.1	53.3	52.2
60'	2023-08-09 01:00:00	01:00:00	57.8	53.0	53.8	52.9	52.0
60'	2023-08-09 02:00:00	01:00:00	54.9	51.3	52.5	51.2	50.2
60'	2023-08-09 03:00:00	01:00:00	55.5	50.6	51.5	50.6	49.3
60'	2023-08-09 04:00:00	01:00:00	58.2	52.3	53.0	52.3	51.1
60'	2023-08-09 05:00:00	01:00:00	59.4	52.5	53.6	52.3	51.0
60'	2023-08-09 06:00:00	01:00:00	67.1	53.2	54.2	52.5	52.0
60'	2023-08-09 07:00:00	01:00:00	65.2	54.1	55.9	53.1	51.7
60'	2023-08-09 08:00:00	01:00:00	71.6	55.9	57.6	54.2	52.3
60'	2023-08-09 09:00:00	01:00:00	67.2	55.5	57.6	54.5	50.8
60'	2023-08-09 10:00:00	01:00:00	70.0	53.8	56.6	50.6	47.0
60'	2023-08-09 11:00:00	01:00:00	67.8	51.9	55.1	48.7	43.2
60'	2023-08-09 12:00:00	01:00:00	66.5	51.3	54.9	45.8	38.8
60'	2023-08-09 13:00:00	01:00:00	69.1	52.4	55.5	46.0	39.4
60'	2023-08-09 14:00:00	01:00:00	63.5	49.4	53.6	41.9	33.8
60'	2023-08-09 15:00:00	01:00:00	67.1	52.0	55.2	49.3	37.9
60'	2023-08-09 16:00:00	01:00:00	67.4	51.7	55.2	47.7	39.5
60'	2023-08-09 17:00:00	01:00:00	69.4	51.8	55.2	46.6	40.3
60'	2023-08-09 18:00:00	01:00:00	76.1	50.9	54.2	43.8	39.1
60'	2023-08-09 19:00:00	01:00:00	64.6	48.6	52.6	44.1	38.9
60'	2023-08-09 20:00:00	01:00:00	64.5	53.1	55.8	52.1	45.3
60'	2023-08-09 21:00:00	01:00:00	65.7	56.4	57.0	56.0	55.3
60'	2023-08-09 22:00:00	01:00:00	68.0	55.8	56.4	55.4	54.7
60'	2023-08-09 23:00:00	01:00:00	65.1	55.9	56.5	55.8	55.2
60'	2023-08-10 00:00:00	01:00:00	57.6	55.5	56.8	55.6	53.5
60'	2023-08-10 01:00:00	01:00:00	62.3	53.2	56.4	50.6	45.7
60'	2023-08-10 02:00:00	01:00:00	57.4	49.3	52.1	47.9	46.0
60'	2023-08-10 03:00:00	01:00:00	58.3	51.8	54.3	51.3	46.8
60'	2023-08-10 04:00:00	01:00:00	58.7	55.1	55.8	55.0	54.3
60'	2023-08-10 05:00:00	01:00:00	59.2	54.6	55.6	54.4	53.3
60'	2023-08-10 06:00:00	01:00:00	65.7	53.9	54.9	53.5	51.9
60'	2023-08-10 07:00:00	01:00:00	64.9	54.6	56.4	54.6	48.8
60'	2023-08-10 08:00:00	01:00:00	74.2	58.9	62.6	56.3	52.5
60'	2023-08-10 09:00:00	01:00:00	65.6	56.3	59.1	55.3	50.5

Type	Start	Duration	L_{ASmax}	L_{Aeq}	L_{10}	L_{50}	L_{90}
60'	2023-08-10 10:00:00	01:00:00	84.6	58.8	56.8	52.1	48.9
60'	2023-08-10 11:00:00	01:00:00	66.1	53.7	56.2	52.0	49.5
60'	2023-08-10 12:00:00	01:00:00	65.7	53.5	56.6	51.1	46.6

Figure A3. Monitor 2 - L_{Aeq} and L_{Asmax} time histories

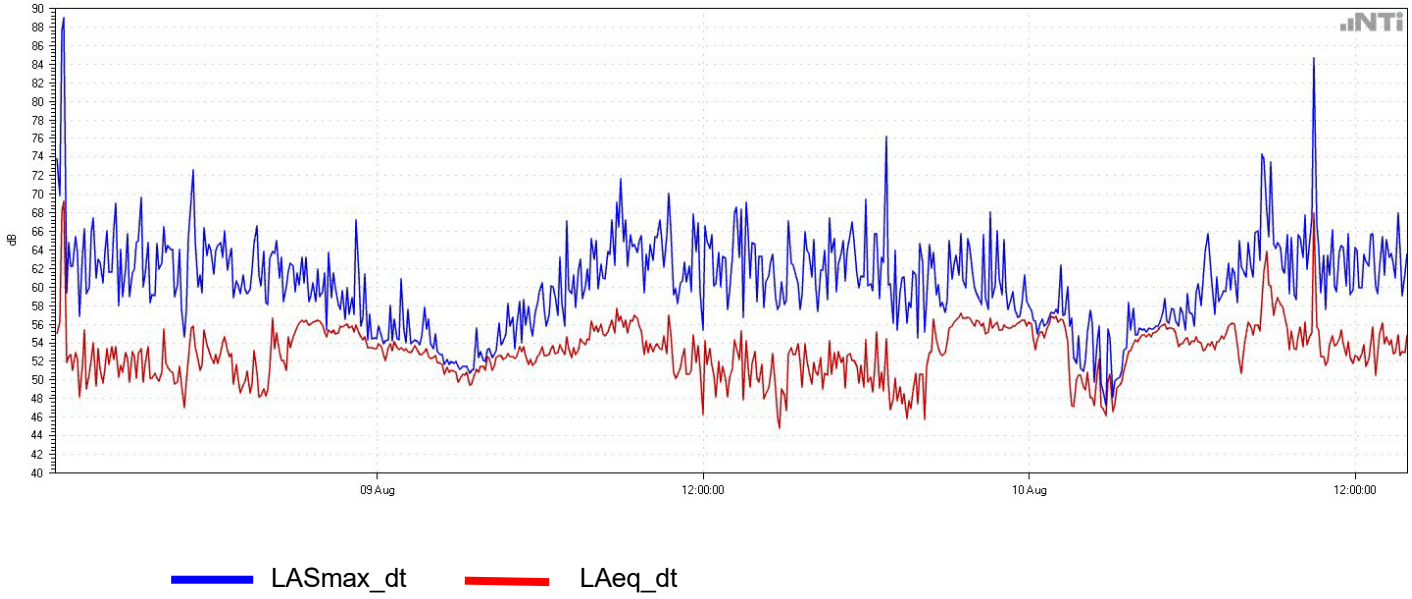


Figure A4. Monitor 2 - L_{10}, L_{50} and L_{90} time histories

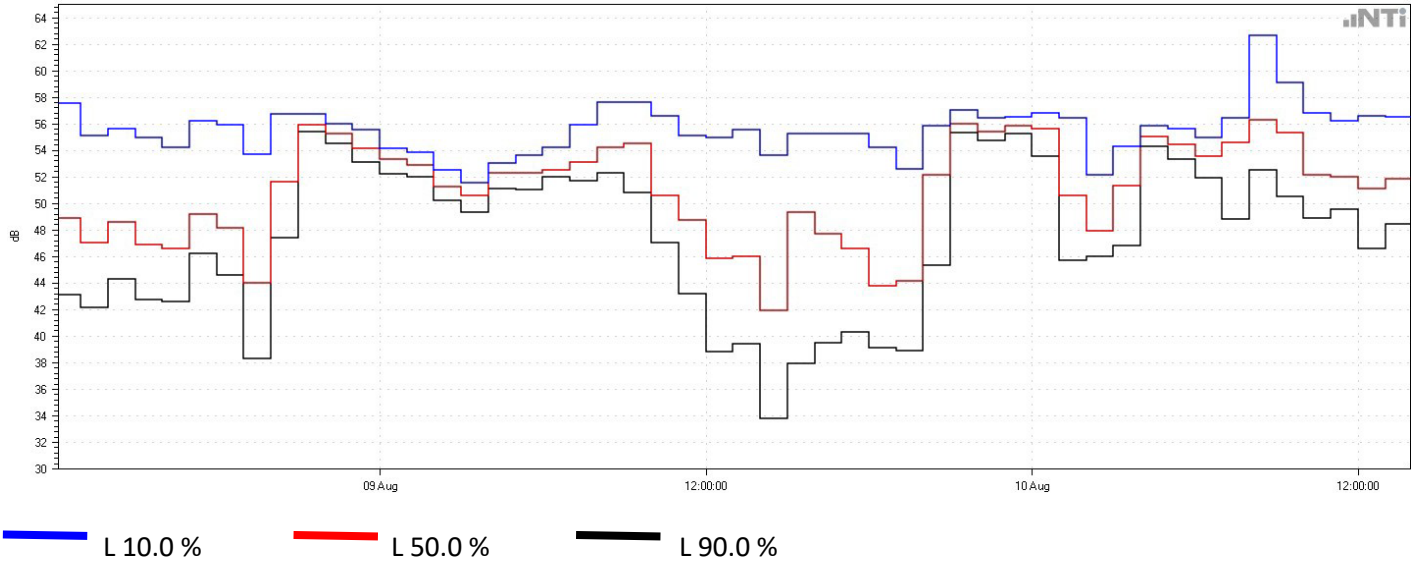


Table A4. Noise Monitor 5, Location GPS N °, GPS W °, April 18th to April 21st, 2023, A-weighted (dBA)

Start	Duration	LASmax [dB]	LAeq [dB]	L 1.0 % [dB]	L 10.0 % [dB]	L 50.0 % [dB]	L 90.0 % [dB]
2023-04-18 13:00:00	0:34:22	84.0	69.3	79.8	72.9	64.5	57.9
2023-04-18 14:00:00	1:00:00	78.1	58.3	69.8	60.4	47.1	43.2
2023-04-18 15:00:00	1:00:00	87.4	62.0	69.6	59.2	55.9	44.0
2023-04-18 16:00:00	1:00:00	76.1	56.9	69.3	60.4	47.6	43.5
2023-04-18 17:00:00	1:00:00	76.0	53.7	65.0	54.7	47.3	44.5
2023-04-18 18:00:00	1:00:00	71.8	52.8	65.2	52.7	46.3	43.1
2023-04-18 19:00:00	1:00:00	67.5	48.7	58.8	49.4	45.3	42.6
2023-04-18 20:00:00	1:00:00	71.1	48.5	54.5	49.6	46.6	44.3
2023-04-18 21:00:00	1:00:00	60.9	46.8	52.2	49.0	45.9	43.6
2023-04-18 22:00:00	1:00:00	62.3	46.7	54.1	49.0	44.8	42.5
2023-04-18 23:00:00	1:00:00	64.3	46.0	54.0	48.3	44.8	41.0
2023-04-19 00:00:00	1:00:00	56.3	46.4	50.6	48.1	45.9	44.4
2023-04-19 01:00:00	1:00:00	64.7	46.6	54.7	47.4	44.9	42.3
2023-04-19 02:00:00	1:00:00	58.4	48.3	55.3	51.4	46.8	42.4
2023-04-19 03:00:00	1:00:00	65.1	50.2	59.5	52.5	47.9	45.1
2023-04-19 04:00:00	1:00:00	78.8	53.3	62.1	52.5	48.5	46.3
2023-04-19 05:00:00	1:00:00	73.0	56.3	69.5	56.0	50.8	48.3
2023-04-19 06:00:00	1:00:00	88.9	61.3	69.8	63.6	54.3	51.3
2023-04-19 07:00:00	1:00:00	76.7	60.7	71.2	65.5	52.5	50.1
2023-04-19 08:00:00	1:00:00	75.6	61.9	69.7	66.1	58.7	49.3
2023-04-19 09:00:00	1:00:00	75.6	60.4	68.1	64.0	55.9	53.2
2023-04-19 10:00:00	1:00:00	77.4	56.6	66.0	57.9	53.7	51.0
2023-04-19 11:00:00	1:00:00	77.9	55.9	67.6	55.2	50.8	48.5
2023-04-19 12:00:00	1:00:00	74.6	56.5	69.4	56.5	51.0	47.8
2023-04-19 13:00:00	1:00:00	72.2	54.9	68.2	54.9	50.6	48.1
2023-04-19 14:00:00	1:00:00	71.8	52.6	59.5	54.4	50.5	47.2
2023-04-19 15:00:00	1:00:00	79.8	55.6	68.5	54.9	49.8	47.1
2023-04-19 16:00:00	1:00:00	73.1	55.9	67.7	57.4	50.4	47.5
2023-04-19 17:00:00	1:00:00	75.6	53.8	64.5	55.8	47.9	45.4
2023-04-19 18:00:00	1:00:00	80.9	55.3	67.0	53.1	47.4	45.1
2023-04-19 19:00:00	1:00:00	67.0	49.5	59.0	50.6	47.6	45.0
2023-04-19 20:00:00	1:00:00	69.6	51.8	60.4	53.1	50.2	48.5
2023-04-19 21:00:00	1:00:00	64.8	51.0	57.4	53.3	49.9	48.2
2023-04-19 22:00:00	1:00:00	71.0	51.6	61.3	52.9	49.2	47.1
2023-04-19 23:00:00	1:00:00	66.9	49.9	57.4	51.7	48.8	45.4
2023-04-20 00:00:00	1:00:00	62.7	47.6	51.4	49.4	47.3	44.1
2023-04-20 01:00:00	1:00:00	57.7	47.4	52.4	48.8	46.7	45.5
2023-04-20 02:00:00	1:00:00	65.1	50.9	61.1	53.4	48.2	45.9
2023-04-20 03:00:00	1:00:00	65.7	49.7	58.7	51.9	47.3	45.4

Start	Duration	LASmax [dB]	LAeq [dB]	L 1.0 % [dB]	L 10.0 % [dB]	L 50.0 % [dB]	L 90.0 % [dB]
2023-04-20 04:00:00	1:00:00	79.2	52.0	59.3	50.7	45.5	42.6
2023-04-20 05:00:00	1:00:00	71.4	54.7	68.2	55.7	49.8	45.5
2023-04-20 06:00:00	1:00:00	82.9	60.1	70.3	63.3	53.8	50.1
2023-04-20 07:00:00	1:00:00	73.7	55.0	66.3	55.3	51.7	49.4
2023-04-20 08:00:00	1:00:00	75.0	56.1	69.5	55.4	49.4	45.9
2023-04-20 09:00:00	1:00:00	71.8	53.2	67.9	52.0	46.2	43.7
2023-04-20 10:00:00	1:00:00	73.2	51.1	61.8	49.8	45.7	43.0
2023-04-20 11:00:00	1:00:00	71.6	51.5	63.1	50.9	45.8	43.4
2023-04-20 12:00:00	1:00:00	74.0	52.9	65.8	52.1	45.0	42.6
2023-04-20 13:00:00	1:00:00	74.0	52.3	65.4	50.1	45.4	43.1
2023-04-20 14:00:00	1:00:00	75.4	53.4	66.4	51.8	46.0	43.9
2023-04-20 15:00:00	1:00:00	79.6	53.4	64.9	51.5	47.1	44.7
2023-04-20 16:00:00	1:00:00	71.0	52.7	64.8	52.6	46.9	44.8
2023-04-20 17:00:00	1:00:00	77.7	54.4	65.5	55.5	48.3	45.6
2023-04-20 18:00:00	1:00:00	78.2	53.3	65.2	51.3	46.9	45.1
2023-04-20 19:00:00	1:00:00	66.0	48.8	57.2	50.6	46.8	45.0
2023-04-20 20:00:00	1:00:00	69.7	49.9	57.1	51.1	47.9	46.5
2023-04-20 21:00:00	1:00:00	61.2	48.8	54.1	51.0	47.9	45.9
2023-04-20 22:00:00	1:00:00	59.7	48.4	54.9	50.2	47.4	45.4
2023-04-20 23:00:00	1:00:00	62.6	48.8	55.7	50.1	47.7	46.4
2023-04-21 00:00:00	1:00:00	60.7	47.2	51.8	48.8	46.8	44.2
2023-04-21 01:00:00	1:00:00	59.3	47.5	53.8	49.5	46.4	43.8
2023-04-21 02:00:00	1:00:00	64.8	50.2	58.9	52.2	48.4	45.8
2023-04-21 03:00:00	1:00:00	59.8	46.9	53.7	48.7	45.7	44.1
2023-04-21 04:00:00	1:00:00	71.9	51.6	63.5	51.0	46.6	43.4
2023-04-21 05:00:00	1:00:00	71.4	55.5	68.2	56.0	50.0	47.0
2023-04-21 06:00:00	1:00:00	77.4	59.2	69.5	63.0	53.7	49.7
2023-04-21 07:00:00	1:00:00	70.4	54.3	65.4	55.4	50.8	47.6
2023-04-21 08:00:00	1:00:00	69.7	51.6	65.3	51.0	46.7	44.6
2023-04-21 09:00:00	1:00:00	76.7	55.4	69.3	53.5	46.8	44.7
2023-04-21 10:00:00	0:17:06	68.8	52.4	62.4	54.8	48.8	45.0

Figure A5. Monitor 5 - L_{Aeq} and L_{Asmax} time histories

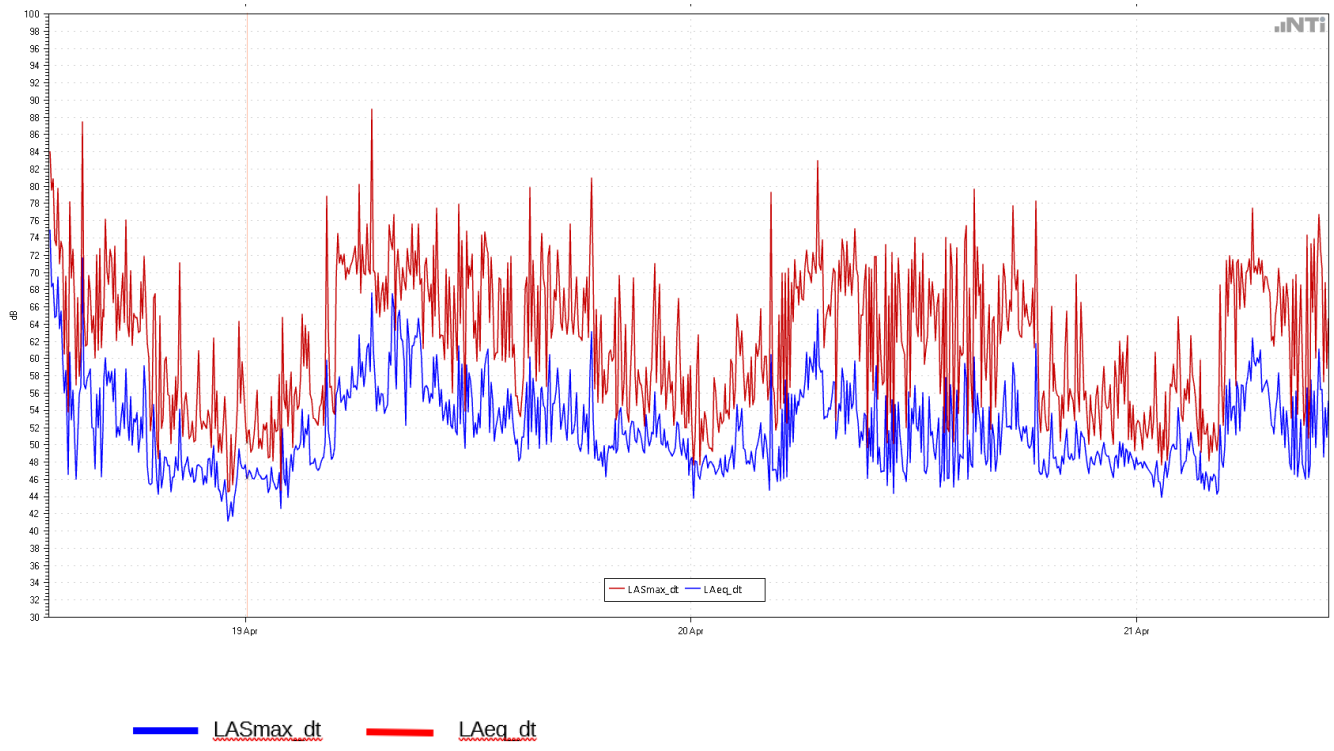


Figure A6. Monitor 5 - L_{10}, L_{50} and L_{90} time histories

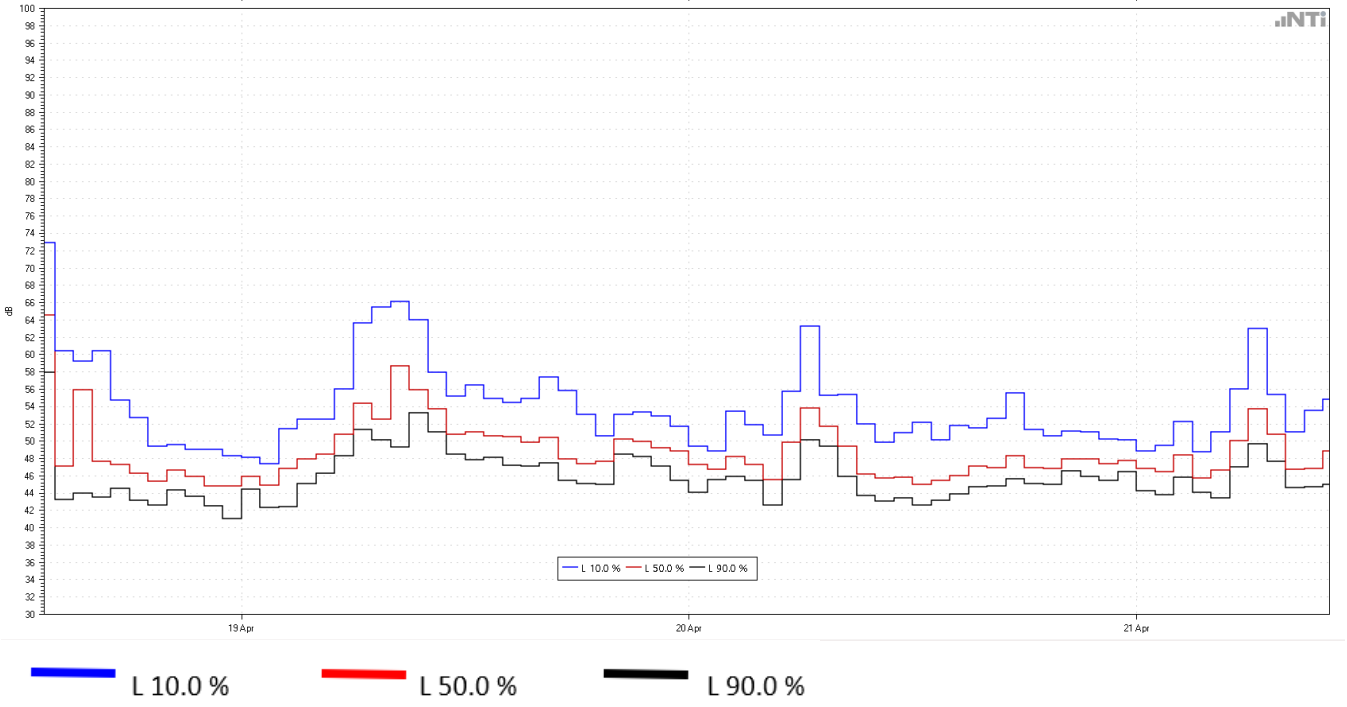


Table A5. Noise Monitor 6, Location GPS N °, GPS W °, April 18th to April 21st, 2023, A-weighted (dBA)

Start	Duration	LASmax [dB]	LAeq [dB]	L 10.0 % [dB]	L 50.0 % [dB]	L 90.0 % [dB]
2023-04-18 13:00:00	0:23:58	76.1	57.5	58.4	56.5	55.5
2023-04-18 14:00:00	1:00:00	75.4	58.6	58.7	56.7	55.4
2023-04-18 15:00:00	1:00:00	88.4	66.3	65.6	57.9	55.4
2023-04-18 16:00:00	1:00:00	75.6	60.8	64.1	57.1	55.2
2023-04-18 17:00:00	1:00:00	73.1	57.7	58.5	57.1	56.1
2023-04-18 18:00:00	1:00:00	69.5	57.9	58.8	57.5	56.7
2023-04-18 19:00:00	1:00:00	66.0	58.1	58.9	57.9	57.1
2023-04-18 20:00:00	1:00:00	76.1	62.1	63.3	61.8	59.9
2023-04-18 21:00:00	1:00:00	77.3	62.7	63.2	62.1	61.2
2023-04-18 22:00:00	1:00:00	77.0	62.5	63.2	61.9	61.0
2023-04-18 23:00:00	1:00:00	76.0	62.1	62.7	61.5	60.6
2023-04-19 00:00:00	1:00:00	76.5	61.8	62.3	61.3	60.3
2023-04-19 01:00:00	1:00:00	75.7	61.2	62.3	60.8	59.4
2023-04-19 02:00:00	1:00:00	74.7	60.7	61.6	60.2	59.6
2023-04-19 03:00:00	1:00:00	74.6	61.1	61.9	60.6	59.8
2023-04-19 04:00:00	1:00:00	74.8	61.5	62.4	61.2	60.2
2023-04-19 05:00:00	1:00:00	74.6	61.8	63.0	61.3	60.1
2023-04-19 06:00:00	1:00:00	75.6	62.4	63.7	62.0	60.6
2023-04-19 07:00:00	1:00:00	78.4	62.9	63.6	61.9	60.7
2023-04-19 08:00:00	1:00:00	75.2	62.0	62.7	60.9	59.7
2023-04-19 09:00:00	1:00:00	75.6	61.8	63.1	61.1	59.6
2023-04-19 10:00:00	1:00:00	74.4	61.3	62.5	60.9	59.6
2023-04-19 11:00:00	1:00:00	85.6	64.5	64.9	62.8	60.7
2023-04-19 12:00:00	1:00:00	74.4	61.7	62.9	61.0	60.0
2023-04-19 13:00:00	1:00:00	82.4	64.8	67.1	62.2	60.9
2023-04-19 14:00:00	1:00:00	76.1	62.8	64.1	61.7	60.7
2023-04-19 15:00:00	1:00:00	76.8	64.7	66.4	64.2	61.3
2023-04-19 16:00:00	1:00:00	80.3	65.0	66.3	64.5	62.2
2023-04-19 17:00:00	1:00:00	76.4	65.7	66.6	65.4	64.1
2023-04-19 18:00:00	1:00:00	74.9	64.7	66.1	64.5	63.1
2023-04-19 19:00:00	1:00:00	75.4	64.4	65.6	64.1	62.8
2023-04-19 20:00:00	1:00:00	75.6	64.4	65.7	64.2	62.9
2023-04-19 21:00:00	1:00:00	76.7	65.0	66.4	64.7	63.4
2023-04-19 22:00:00	1:00:00	76.1	65.2	66.6	64.8	63.4
2023-04-19 23:00:00	1:00:00	76.1	63.8	64.9	63.6	62.4
2023-04-20 00:00:00	1:00:00	76.2	64.1	65.4	63.6	62.6
2023-04-20 01:00:00	1:00:00	75.5	63.6	64.9	63.2	62.2
2023-04-20 02:00:00	1:00:00	75.9	62.9	64.2	62.5	61.3
2023-04-20 03:00:00	1:00:00	76.6	63.9	65.1	63.6	62.1

Start	Duration	LASmax [dB]	LAeq [dB]	L 10.0 % [dB]	L 50.0 % [dB]	L 90.0 % [dB]
2023-04-20 04:00:00	1:00:00	74.5	63.8	65.0	63.4	62.6
2023-04-20 05:00:00	1:00:00	75.0	63.8	65.2	63.5	62.1
2023-04-20 06:00:00	1:00:00	75.7	63.6	64.9	63.1	61.9
2023-04-20 07:00:00	1:00:00	82.5	64.6	65.2	63.1	62.1
2023-04-20 08:00:00	1:00:00	76.3	64.4	65.5	63.7	61.8
2023-04-20 09:00:00	1:00:00	77.7	65.6	67.9	62.8	61.3
2023-04-20 10:00:00	1:00:00	80.9	64.5	65.9	63.6	62.2
2023-04-20 11:00:00	1:00:00	76.6	63.1	64.3	62.1	61.1
2023-04-20 12:00:00	1:00:00	74.7	63.7	65.8	62.5	61.3
2023-04-20 13:00:00	1:00:00	80.5	72.4	75.6	71.3	64.1
2023-04-20 14:00:00	1:00:00	75.5	66.7	70.1	64.8	62.1
2023-04-20 15:00:00	1:00:00	75.6	64.5	65.9	64.1	62.5
2023-04-20 16:00:00	1:00:00	75.7	65.9	67.1	65.3	63.9
2023-04-20 17:00:00	1:00:00	75.9	65.5	66.7	65.2	63.9
2023-04-20 18:00:00	1:00:00	75.5	65.2	66.5	64.8	63.6
2023-04-20 19:00:00	1:00:00	75.6	65.1	66.2	64.8	63.7
2023-04-20 20:00:00	1:00:00	75.2	65.3	66.4	65.0	63.9
2023-04-20 21:00:00	1:00:00	75.8	65.4	66.6	65.2	63.9
2023-04-20 22:00:00	1:00:00	75.5	65.6	66.9	65.3	63.9
2023-04-20 23:00:00	1:00:00	75.9	64.4	65.8	64.1	62.6
2023-04-21 00:00:00	1:00:00	76.1	62.7	64.2	62.0	61.1
2023-04-21 01:00:00	1:00:00	76.0	62.6	64.1	61.9	60.9
2023-04-21 02:00:00	1:00:00	75.6	62.1	63.5	61.4	60.7
2023-04-21 03:00:00	1:00:00	75.5	62.1	63.6	61.6	60.6
2023-04-21 04:00:00	1:00:00	75.5	62.3	63.7	61.7	60.8
2023-04-21 05:00:00	1:00:00	75.4	62.7	64.4	61.7	60.9
2023-04-21 06:00:00	1:00:00	75.4	63.1	64.4	62.4	61.5
2023-04-21 07:00:00	1:00:00	75.6	64.3	65.8	63.7	62.2
2023-04-21 08:00:00	1:00:00	75.0	63.1	64.4	62.6	61.6
2023-04-21 09:00:00	1:00:00	73.3	63.6	65.1	63.2	61.6
2023-04-21 10:00:00	0:25:39	73.9	64.3	65.5	64.2	62.0

Figure A7. Monitor 6 - L_{Aeq} and L_{Asmax} time histories

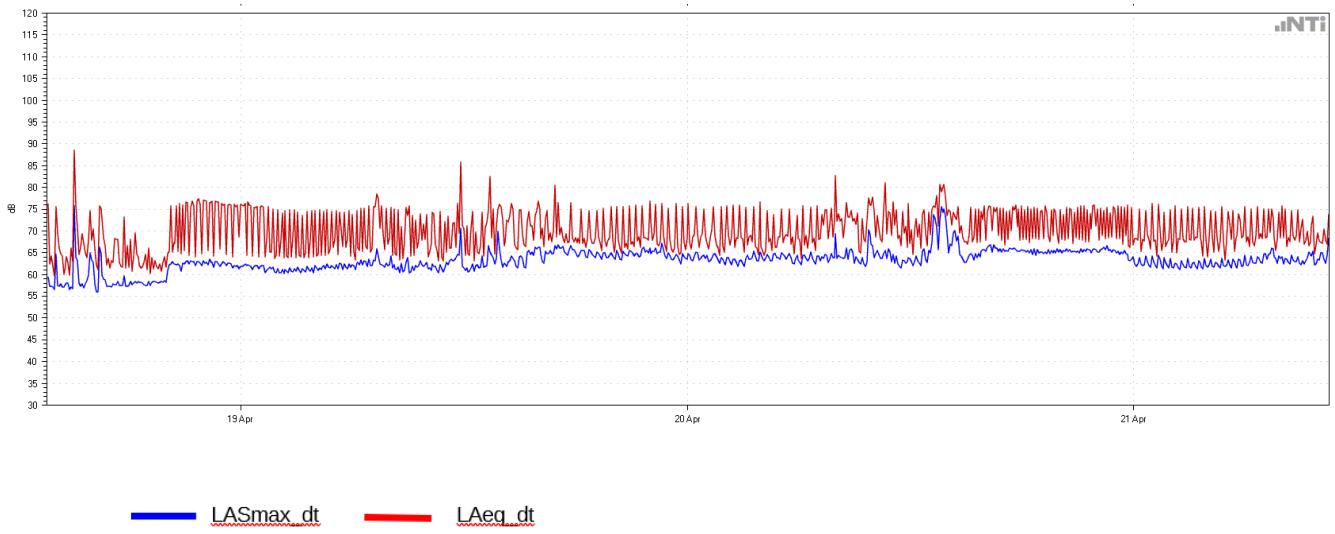
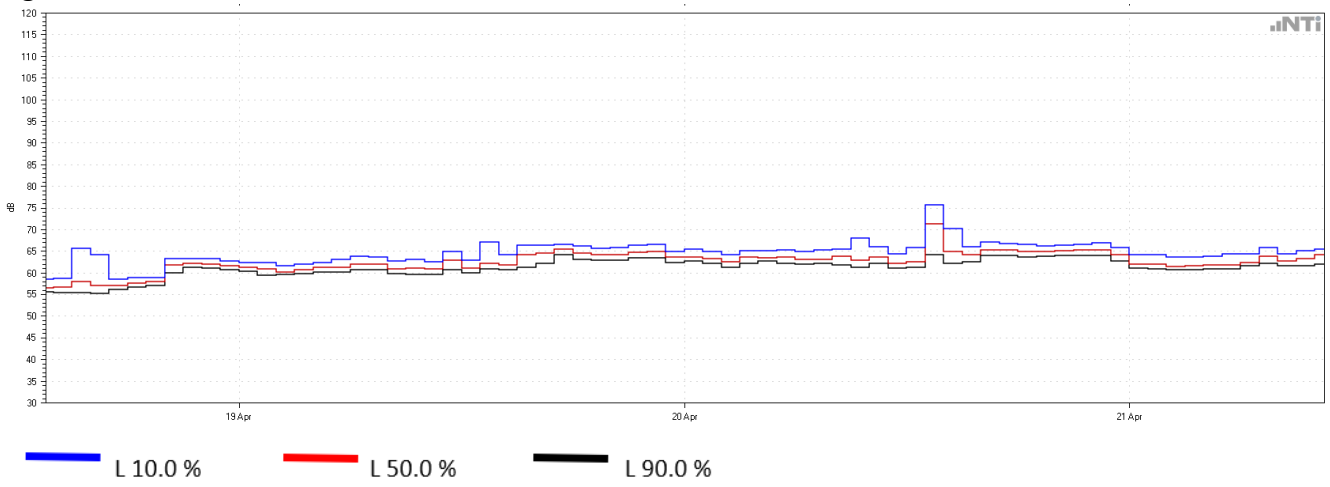


Figure A8. Monitor 6 - L_{10}, L_{50} and L_{90} time histories



DUKE ENERGY CAROLINAS, LLC
MARSHALL ENERGY COMPLEX

APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-1

WINDSHIELD RECONNAISSANCE AND LITERATURE REVIEW OF THE DUKE MARSHALL STEAM STATION, CATAWBA COUNTY, NORTH CAROLINA

Brockington®
CULTURAL RESOURCES CONSULTING

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

September 27, 2023

Windshield Reconnaissance and Literature Review of the Duke Marshall Steam Station, Catawba County, North Carolina

Dear Mr. Jenkins,

On June 29, 2023, Pike Engineering contracted with Brockington and Associates, Inc. (Brockington) to conduct an architectural literature review and windshield reconnaissance for a proposed construction project at Duke Energy's Marshall Steam Station in Catawba County, North Carolina. The study area is located east and north of Duke Energy's existing Marshall Steam Station. The project area is in eastern Catawba County and consists of approximately 8,831.49 acres. Brockington conducted a similar study (Stallings 2017) west of the existing station, and the relevant, overlapping results are incorporated into this report. This investigation is a due diligence effort designed for planning purposes in siting the proposed facility so that any potentially significant cultural resources may be considered during the siting process. This level of effort does not constitute fulfillment of more intensive studies that would be required under Section 106 of the National Historic Preservation Act (NHPA), should that law become applicable in this project.

Literature Review for Known Cultural Resources

Previous Cultural Resources Surveys and Archaeological Sites

Data for previous cultural resources surveys and known archaeological sites and surveys were collected through HPOWEB 2.0, the North Carolina State Historic Preservation Office (NCSHPO) repository for cultural data. HPOWEB 2.0 includes information on the National Register of Historic Places (NRHP) listed properties, resources recorded during Section 106 investigations, and resources recorded through surveys for counties and municipalities. There have been several environmental reviews (Section 106 or due diligence) efforts within the study area, and each is itemized in Table 1. There are 17 archaeological sites recorded within the study area, and one site requires additional work. The remainder are noted as not eligible (Table 2).

Table 1. Cultural resources investigations (n=4) within the study area.

Survey	Recorded	Results
Archaeological Shoreline Survey at Lake Norman Catawba, Iredell, Lincoln, and Mecklenburg Counties, North Carolina (ER 92-7435)	Rachel Tibbits and Bobby Southerlin 2003	Reconnaissance-archaeological survey, 7 archaeological sites
Cultural Resources Survey for the Catawba-Wateree Hydroelectric Relicensing Project, Alexander, Burke, Catawba, Gaston, Iredell, Lincoln, McDowell, and Mecklenburg Counties, North Carolina (ER 92-7435)	Heather Millis and Damon Jones 2005	Intensive survey, 39 archaeological sites, 37 architectural resources
Phase I Intensive Archaeological Survey for the Proposed Twenty-Inch Duke 451 Pipeline, Lincoln and Catawba Counties, North Carolina (ER 19-3571)	Paul D. Jackson 2019	Intensive archaeological survey, 9 archaeological sites
Archaeological Survey for The Villas at Sherrills Ford Project, Catawba County, North Carolina (ER 19-3164)	Tasha Benyshek and Michael Nelson 2020	Reconnaissance-archaeological survey, 0 archaeological sites

Table 2. Archaeological sites (n=17) within the study area.

Site Number	Site Type	Recorded	NRHP
31CT203	18th to 19th Century (Sherrill Family Cemetery)	1997	Not Eligible
31CT204	Mississippian and Woodland	1997	Not Eligible
31CT205	Early Woodland	1997	Not Eligible
31CT206	Prehistoric surface scatter	1961	Not Eligible
31CT207	20th Century	1997	Not Eligible
31CT208	Early Woodland	1997	Not Eligible
31CT215	Prehistoric surface scatter	1999	Not Eligible
31CT242	19th to 20th Century surface scatter	2004	Not Eligible
31ID27	Prehistoric surface scatter	1960	Not Eligible
31ID40	Prehistoric surface scatter	1960	Not Eligible
31ID102	Middle Archaic, Late Woodland, Ceramic, and Lithic	1961	Additional Work Needed
31ID104	Prehistoric surface scatter	1962	Not Eligible
31ID105	Unknown; underwater site	1962	Not Eligible
31ID106	Prehistoric surface scatter	1962	Not Eligible
31ID107	Unknown Prehistoric	1962	Not Eligible
31ID108	Prehistoric surface scatter	1961	Not Eligible
31ID109	Prehistoric surface scatter	1961	Not Eligible

Historic Architecture

This research included a review of all previously recorded above-ground resources on file through the HPO Web, the North Carolina State Historic Preservation Office (NCSHPO) repository of recorded architectural property data. This data includes the NRHP-listed properties, resources recorded during Section 106 investigations, determinations of eligibility (DOEs), properties placed on the state Study List for further research, and resources recorded through surveys for counties and municipalities. NCSHPO records identify a total of 32 previously recorded architectural resources in the study area. This includes

one NRHP-listed resource: CT0378, the Terrell Historic District (listed 1986). Due to increased demolition activities throughout the District, CT0378 is no longer considered eligible. During a 2022 review, NCSHPO determined that the district is no longer eligible; however, it has not been formally de-listed from the NRHP (McDonald et al. 2022). The study area also includes two state-listed architectural resources (CT0461, Major Henry W. Connor House, and CT0580, Motts Grove Campground). Finally, the current study area partially overlaps with one previous Brockington windshield survey (Stallings 2017) that includes three potentially eligible architectural resources (TL-1, 8550 Sherrill's Ford Road; TL-3, 8112 Sherrill's Ford Road; and TL-4, 7958 Sherrill's Ford Road). These resources were submitted for internal planning and not as part of a Section 106 investigation requiring review by the SHPO and are included in Table 3 below.

We also considered any locally significant properties that may not be formally listed with the state. The Catawba County Historical Association operates several significant historic sites, including Resource CT0651, Sherrill Family Cemetery, which is located within the study area. We also reviewed relevant county planning documents, but no additional resources were identified besides those itemized in the SHPO records (Table 3). Prior to the windshield survey, we also reviewed historic maps and aerials to obtain locations of potentially historic properties and guide our field effort.

Table 3. Previously recorded architectural resources (n=32) in the study area.

Site ID	Name	Description	Identification/ Year	Reconnaissance Notes	Reconnaissance NRHP Assessment
CT0378	Terrell Historic District	Turn of the century crossroads district	NRHP Listed 1986; No Longer Eligible 2022	Extant; seven contributing buildings demolished	No Longer Eligible; however, remains listed
CT0387	Kermit Lee Howard House	c. 1970 Ranch	Contributing to Terrell NRHP District 1986	Extant	Not Eligible
CT0389	Jason Sherrill House	c. 1890 19th-20th c. traditional/vernacular house	Contributing to Terrell NRHP District 1986	Extant; combined with CT644	Not Eligible
CT0461	Major Henry W. Connor House	c. 1830 Trad/Vern/Federal	State Listed 1981	Extant	State Listed
CT0559	House		Section 106 Not Eligible 1977	Demolished	N/A
CT0560	House	c. 1959 Ranch	Section 106 Not Eligible 1977	Extant	Remains Not Eligible
CT0561	House	c. early 20th century hipped roof, double-pile	Survey with No Recommendation 1977	Extant; minor alterations	Eligible

Site ID	Name	Description	Identification/ Year	Reconnaissance Notes	Reconnaissance NRHP Assessment
CT0580	Mott's Grove Campground	Late 19th-century African-American campground	Placed on Study List (Unknown year)	Campground extant; recommend adding church to complex	State Listed
CT0648	Mott's Grove School	late 19th century school	Survey with No Recommendation 1977	Poor condition; roof collapsing	Remains Not Eligible
CT0649	J. P. Sherrill House	late 19th century gable front and wing, 2-story	Survey with No Recommendation 1977	Extant; minor alterations	Eligible
CT0650	W.J. Holdsclaw House	late 19th century gable front and wing, 2-story	Survey with No Recommendation 1977	Extant	Potentially Eligible
CT0651	Sherrill Family Cemetery	Early 19th century family cemetery	Survey with No Recommendation 1977	Extant	Potentially Eligible
CT1303	Marshall Steam Station	1965-1970 power plant	Section 106 DOE under Crit A and C, 2014	Extant	Eligible
MAR-145	Marshall Steam Plant Cemetery	Late 19th century cemetery	Reconnaissance Potentially Eligible 2018	Extant	Potentially Eligible
CT1548	House	1965 ranch	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1549	House	1956 ranch	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1550	House	1946 minimal traditional	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1551	House	1947 ranch	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1552	Barn	1930 barn	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1557	House	1946	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1558	Church	1960 church	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1559	House	1954	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1560	House	1954 Ranch	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1561	House	1961 Ranch	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1567	Bridge #117	1963 bridge	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1568	House	1946	Section 106 Not Eligible 2014	Extant	Remains Not Eligible

Site ID	Name	Description	Identification/ Year	Reconnaissance Notes	Reconnaissance NRHP Assessment
CT1569	House	1963	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1570	House	1965	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
CT1571	Bridge #138	1961 bridge	Section 106 Not Eligible 2014	Extant	Remains Not Eligible
TL-1	8550 Sherrill's Ford Road	c. 1910 two-story gable front and wing	Reconnaissance Potentially Eligible 2017	Extant	Remains Potentially Eligible
TL-3	8112 Sherrill's Ford Road	c. 1900 two-story double-pile	Reconnaissance Potentially Eligible 2017	Extant	Remains Potentially Eligible
TL-4	7958 Sherrill's Ford Road	c. 1951 Minimal Traditional	Reconnaissance Potentially Eligible 2017	Extant	Remains Potentially Eligible

Windshield Reconnaissance for Historic Architecture

On July 11-12, the project historian conducted a windshield reconnaissance of the two-mile project area for the proposed construction project at the Duke Marshall Steam Station. As outlined in National Register Bulletin #24, a windshield reconnaissance-level survey is useful in ascertaining "a general picture of the distribution of different types and styles [of architectural resources], and of the character of different neighborhoods" (Parker 1985:35-36). Windshield surveys are also useful for making preliminary assessments of eligibility based on the architectural integrity of properties, but not in ascertaining the historical associations a property might possess.

The reconnaissance consisted of a vehicular inspection of architectural resources visible from all publicly accessible roads within the study area. When a comparison of current and historic topographic or aerial maps indicated properties located along private roads or abandoned and existing field roads, we supplemented our work through a review of aerial photography or online tax records if possible. In general, minimal vegetation enabled good visibility to most properties, although some private properties distanced from roadways were not visible. The purpose of our windshield reconnaissance was to:

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

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

moderate alterations were assessed as potentially eligible. Those with recent formal evaluations retain the official NCSHPO determination of eligibility.

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

The Marshall Steam Station study area is in eastern Catawba County near the community crossroads of Terrell. It encompasses approximately 8,831.49 acres bisected primarily by county arterial roads, including Sherrill's Ford Road, Azalea Road, and Island Point Road. NC Highway 150 East bisects the southeastern periphery of the study area near the Terrell crossroads and Marshall Steam Station. There are numerous other smaller neighborhood roads, including those surrounding portions of Lake Norman. Historic aerials indicate broader agricultural land usage in the study area until the creation of Lake Norman between 1959 and 1964. Since that time, the area has transitioned to smaller farms and pasturage, though some large tracts still exist, with much modern residential infill. The study area is largely residential, with few examples of industrial or commercial development. Notable exceptions are the Marshall Steam Station in the western quadrant of the study area.

The study area contains numerous resources that are at least 50 years of age, but the vast majority have been modified by non-historic materials and/or incompatible alterations. The oldest building stock is generally represented by mid-to-late nineteenth-century two-story framed I-houses, most of which were captured in a 1977 county survey. Late-nineteenth and early-twentieth-century buildings are represented by single-story pyramidal (or hipped) vernacular houses and bungalows. There is also a moderate degree of early to mid-twentieth-century style houses, including Minimal Traditional and Ranch. Many of the ranch houses retain much of their architectural integrity; however, none appear to exhibit expressive ranch features beyond their basic linear form. Some of the best examples were captured during a 2014 NCDOT survey along NC-150, and these were determined not eligible for the NRHP. The most recent resources (post-1973) are largely concentrated along the shores of Lake Norman and dedicated subdivisions stemming from arterial roadways. Others are dispersed throughout the study area where farmland has been subdivided over time.

The study area includes the northern portion of the (Former) Terrell Historic District (CT0378), NRHP listed in 1986; it was considered "the most intact crossroads community remaining in Catawba County [and is] representative of numerous crossroad settlements throughout rural North Carolina" (Catawba County 2014). According to the NRHP form, the community served the "surrounding prosperous farms," however, "its role has taken on a new dimension since the 1960s…when Lake Norman was created from the Catawba River. Now the Terrell store provides supplies for vacationers as well as farmers." Additional evaluation of the district was offered in 2014 during an NCDOT Section 106 environmental review of the proposed widening of NC-150 (van den Hurk 2014). The report recommended that because of the demolition of key properties within the district (see Table 1), the NRHP boundary should be adjusted to eliminate non-contributing buildings or properties. In a subsequent evaluation, McDonald, and Turco (2022) recommended the Terrell Historic District as ineligible and the NCSHPO concurred. The NCSHPO did "not plan to seek delisting" the district. However, the original NRHP boundary for the Terrell Historic District has not yet been formally

adjusted; therefore, for purposes of project planning, we recommend avoiding the current bounds of the (Former) Terrell Historic District. We reviewed the study area for other potential historic districts, but no cohesive collection of architecture was identified. Additionally, a 2017 windshield study was completed by Brockington for UC Synergetic, LLC (Stallings 2017). That study identified nine potentially eligible architectural resources (TL-1-TL-9). These resources are currently extant, but only Resources TL-1, TL-3, and TL-4 are within the current study area.

There is one historical church congregation within the study area. This includes Motts Grove United Methodist Church. The Church has an associated graveyard and is recorded by the NCSHPO: Mott's Grove Campground (CT0580). Mott's Grove, an African American religious campground, is also recorded on the NCSHPO's Study List. After review, we recommend both the campground and the associated church (built in 1960) as eligible for the NRHP. The recommended boundary for Mott's Grove is depicted on the attached resource map and provided in our GIS dataset. Resource CT0651, Sherrill Family Cemetery, and MAR-145, Marshall Steam Plant Cemetery, are the two cemeteries within the project area, which have been determined as potentially eligible.

Finally, one previously recorded property of note is Duke's Marshall Steam Station (CT1303). NCSHPO records show that the facility was determined eligible during the NCDOT survey of NC-150 (van den Hurk 2014).[1] The eligible boundary includes a significant portion of Duke Energy's property. It is important to note that the Marshall Steam Plant derives its significance through the generation of electricity and includes several existing outgoing transmission lines. The addition of another proposed generating facility would be consistent with the historical use of the property.

There are 32 previously recorded architectural properties within the study area, including the eligible Marshall Steam Station. The NRHP-listed property (CT0378 "Terrell Historic District") has been determined to no longer retain its eligibility due to severe impacts by demolition. However, the district remains listed as eligible on the NRHP (McDonald et al. 2022). Seven properties have been demolished within the historic district based on a review of historic and current aerial photography. Two (2) of the previously recorded properties are assessed as eligible, six (6) as potentially eligible, 20 as not eligible (one of which has been demolished), and two (2) as state-listed. Table 3 provides additional details on each of the properties. Attachment A provides photographs.

During the reconnaissance, we identified one other resource that appears to 1) retain sufficient architectural integrity and 2) possess architectural significance to be potentially eligible for the NRHP. This includes one stand-alone barn with no other associating structures. Table 4 summarizes this resource, and Attachment B provides a resource photograph.

Table 4. Potentially eligible architectural resources were identified during the reconnaissance.

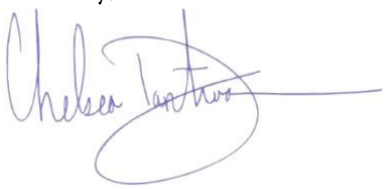
Site ID	Location	Description	Reconnaissance NRHP Assessment
MP-15	Barn located on Raccoon Track Drive (No Address Available)	c. 1905 barn	Potentially Eligible

[1] At the request of the NCSHPO, the 2014 report provided additional information on the plant and recommended it not eligible for the NRHP. However, the most current NCSHPO records indicate the plant was ultimately determined eligible.

Where possible, architectural properties identified as listed, eligible, or potentially eligible for the NRHP should be avoided and visual effects considered during project planning. Also, as previously noted, an additional generating facility on the property of the NRHP-eligible Marshall Steam Station is consistent with the facility's significance; therefore, visual effects do not need to be accounted for.
Finally, we observed numerous other properties that appear to be 50 years old (thus, meeting the minimal standard for NRHP eligibility consideration) distributed throughout the study area; these are properties that would be recorded by an architectural historian to satisfy NHPA Section 106 if regulatory compliance is required. Due to alterations or modifications, these properties appear to have lost their architectural integrity and may not meet the criteria of eligibility for listing on the NRHP under Criterion C. However, these properties might possess a historical significance that could only be determined through more detailed archival research. We did not attempt to plot each of these resources in our GIS dataset.

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

Sincerely,



Chelsea Dantuma, MCP
Architectural Historian/Project Manager

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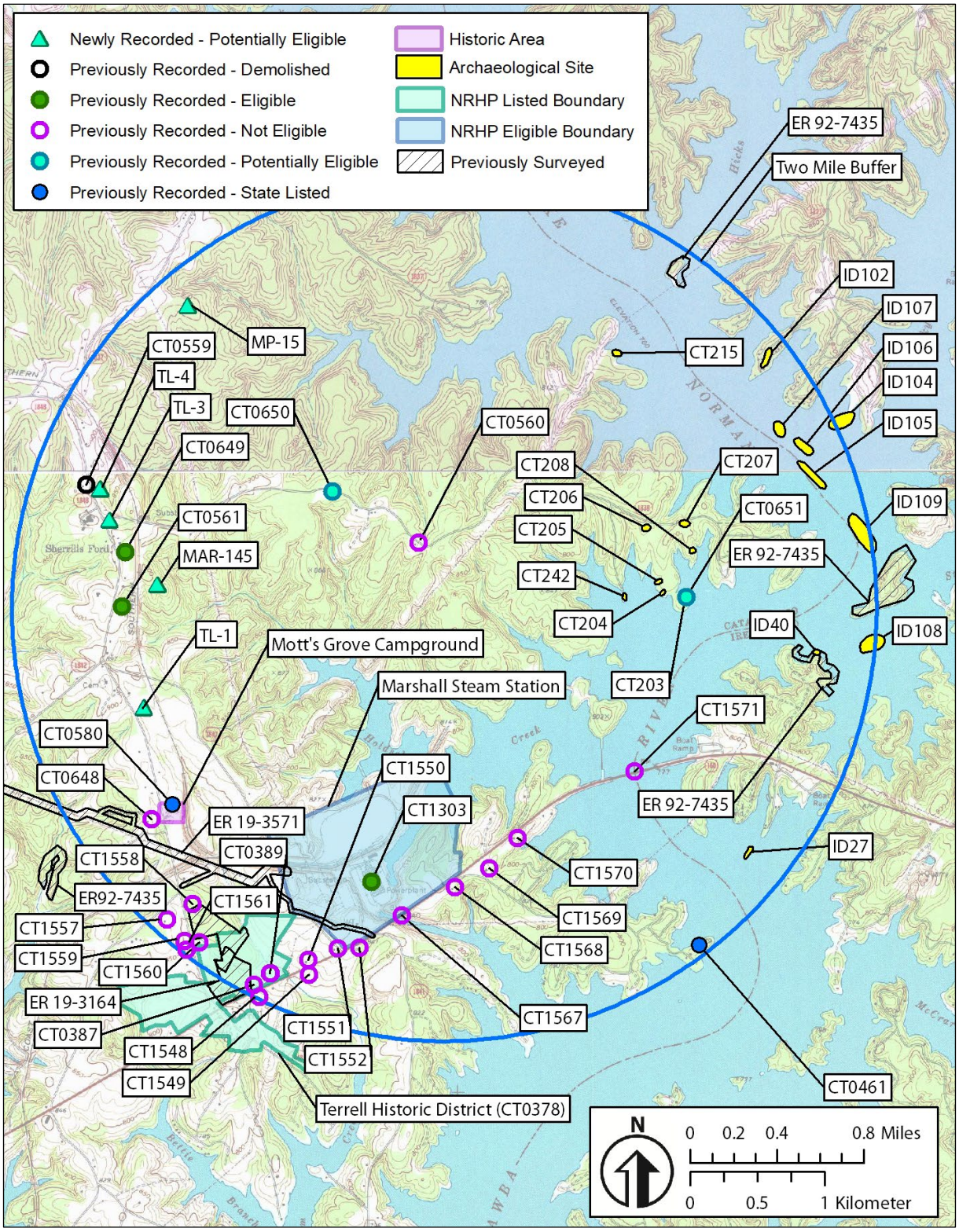

Figure 1. Marshall Plant Study Area, Resources Map (see GIS data for additional detail).

Attachment A

Attachment A
Previously Recorded Resources

Resource CT0378, Terrell Historic District (crossroads)

Resource CT0387, Kermit Lee Howard House

Resource CT0389 and CT0644, Jason Sherrill House

Resource CT0461, Major Henry W. Connor House

Resource CT0561, House

Resource CT0580, Mott's Grove Campground

Resource CT0648, Mott's Grove School (background)

Resource CT0649, J.P. Sherrill House

Resource CT0650, W.J. Holdsclaw House

Resource CT0651, Sherrill Family Cemetery

Resource CT1303, Marshall Steam Station

Resource CT1548, House

Resource CT1549, House

Resource CT1551, House

Resource CT1552, Barn

Resource CT1557, House

Resource CT1558, Church

Resource CT1559, House

Resource CT1560, House

Resource CT1561, House

Resource CT1567, Bridge #117

Resource CT1568, House

Resource CT1569, House

Resource CT1570, House

Resource CT1571, Bridge #138

Resource TL-1, 8550 Sherrill's Ford Road

Resource TL-3, 8112 Sherrill's Ford Road

Resource TL-4, 7958 Sherrill's Ford Road

Resource MAR-145, Marshall Steam Plant Cemetery (Russ 2018: 5)

Attachment B

Attachment B
Newly Identified Resources

Resource MP-15, Barn on Raccoon Track Drive

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APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-2

AMEC FOSTER WHEELER'S NATURAL RESOURCES TECHNICAL REPORT
MARSHALL STEAM STATION, CATAWBA COUNTY, NC
(EXCERPT)

Cultural Resources Review

Amec Foster Wheeler conducted a desktop review of the study area based on available data resources from the NRHP files and information on archaeological resources from the North Carolina Archaeological Site File repository at the NC SHPO. Table 4 and Figure 8 present the results of the desktop survey. According to the NC SHPO, a portion of the study area, Marshall Steam Station (CT1303), is determined eligible for the NRHP, but has not been listed at this time. The Terrell Historic District (CT0378 - listed) and the Motts Grove Campground (CT580 - survey listed) are located next to the study area. According to the North Carolina Office of State Archaeology records, the study area has been not been surveyed for archaeological resources. During the review of the state files, 22 sites were identified within or around the study area. However, only five sites have been previously identified *within* the study area. These sites are 31CT19, 31CT242, 31CT205, 31CT206, and 31CT228, which have been assessed and are not eligible for the NRHP due to low density of artifacts and/ or high disturbance of soils from erosion. The remaining 17 sites are outside the study area but within the half mile radius. These sites have been assessed as not being eligible or are now submerged by Lake Norman. If federal permits are required as part of future project plans, required consultation with the NC SHPO will likely result in a request for a Phase I archaeological survey of the study area.

Table 4. Identified Archaeology and Historic Sites near the Marshall Steam Station Study Area, Catawba County, North Carolina.

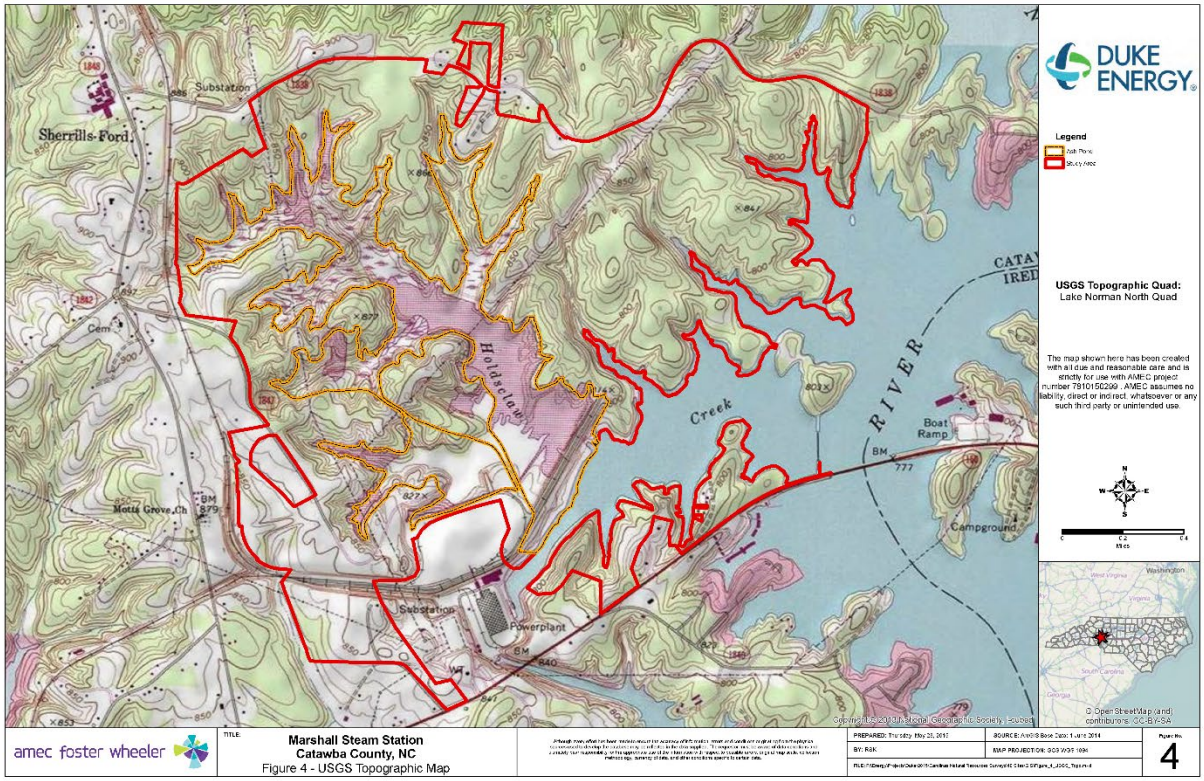
Archaeology Site Number	Description	NRHP Status
31CT227	Prehistoric Lithic Debitage	Not Eligible
31CT228	Prehistoric Lithic Debitage	Not Eligible
31CT229	Historic 20th Century Domestic Scatter	Not Eligible
31CT226	Prehistoric Lithic Debitage	Not Eligible
31CT225	Prehistoric Lithic Debitage	Not Eligible
31CT219	Prehistoric Lithic Debitage	Not Eligible
31CT224	Prehistoric Lithic Debitage	Not Eligible
31CT207	Prehistoric and Historic Artifact Scatter	Not Eligible
31CT208	Historic Ceramics	Not Eligible
31CT206	Historic 20th Century Domestic Scatter	Not Eligible
31CT205	Prehistoric and Historic Artifact Scatter	Not Eligible
31CT204	Prehistoric Ceramic Scatter	Not Eligible
31CT203	Historic 18th-19th Century Cemetery	Not Eligible
31CT20	Prehistoric Lithic and Ceramic Scatter	Unassessed
31CT242	Historic 19-th20th Century Domestic Scatter	Not Eligible
31CT19	Prehistoric Lithic Scatter	Not Eligible
31CT18	Prehistoric Lithic Scatter	Unassessed
31CT1	Prehistoric Lithic and Ceramic Scatter	Unassessed
31CT2	Prehistoric and Historic Artifact Scatter	Unassessed

Archaeology Site Number	Description	NRHP Status
31ID6	Prehistoric Ceramic Scatter	Unassessed
31ID7	Prehistoric Ceramic Scatter	Unassessed
31ID110	Prehistoric Ceramic Scatter	Unassessed
Historic Site Number	Description	NRHP Status
CT580	Motts Grove Campground	Survey Listed
CT1303	Marshall Steam Station	Determined Eligible
CT0378	Terrell Historic District	Listed

Conclusions

According to the NC SHPO, a portion of the study area, Marshall Steam Station (CT1303), is determined eligible for the NRHP, but has not been listed at this time. The Terrell Historic District (CT0378-listed) and Motts Grove Campground (CT0580-survey listed) are next to the study area. According to the North Carolina Office of State Archaeology records, the study area has been not been surveyed for archaeological resources. Five sites were identified previously within the study area; however, these sites were assessed and determined to be not eligible for the NRHP. If federal permits are required as part of future project plans, required consultation with the NC SHPO will likely result in a request for a Phase IA archaeological survey of the study area.

This report is intended for the use of Duke Energy, subject to the contractual terms between Duke Energy and Amec Foster Wheeler. Reliance on this document by any other party is prohibited without the expressed, written consent of Amec Foster Wheeler. Use of this report for purposes beyond those reasonably intended by Duke Energy and Amec Foster Wheeler will be at the sole risk of the user.



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APPENDIX B-3

PHASE 1 ARCHAEOLOGICAL SURVEY RESULTS, DUKE ENERGY'S MARSHALL STEAM PLANT

Brockington
CULTURAL RESOURCES CONSULTING

October 16, 2023

Henry Jenkins
Pike Engineering, LLC
123 N White St.
Fort Mill, SC 29715

Re: Duke Energy's Marshall Plant Expansion, Catawba County, North Carolina, Archaeological Survey Results

Mr. Jenkins:

This letter provides a brief summary of the October 9-13, 2023, archaeological survey completed by Brockington and Associates, Inc. (Brockington), at the Marshall Steam Plant (project tract) in Catawba County, North Carolina. The project tract consists of a 92-acre parcel located in the Zone 14 Soil Borrow Area within the Marshall Plant property (Figure 1). This investigation was requested by Pike Engineering, LLC, on behalf of Duke Energy as a due diligence effort to identify any archaeological sites located within the area of potential impact for the proposed plant expansion. The goals of this investigation were to

- identify all archaeological resources within the project tract,
- provide a preliminary National Register of Historic Places (NRHP) eligibility status of any identified archaeological resource (i.e. – eligible, not eligible, unknown/pending additional testing), and
- provide management recommendations for any identified archaeological resource.

Our investigation was conducted in accordance with both federal and state guidelines including Section 106 of the National Historic Preservation Act (NHPA) of 1966 (54 USC 30010, as amended through 2016), the Advisory Council on Historic Preservation's (ACHP) implementing regulations (36 CFR Part 800), Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (1983), and cultural resources survey and reporting guidelines set forth by the North Carolina Office of State Archaeology (NCOSA-Archaeological Investigation Standards and Guidelines [December 2017]).

Archaeological Survey Results

The project tract consists of wooded ridgelines surrounding an open soil borrow area overlooking Lake Norman to the southeast. A transmission corridor is present along the northwest boundary of the tract with a gravel haul road entering the tract from the north. Figures 2 and 3 show typical views of the tract. During the survey, the ground surface was inspected for cultural materials, and shovel testing was utilized to investigate subsurface cultural deposits. Shovel tests were 30 centimeters (cm) in diameter and pre-plotted within the project tract at a 30m interval. A total of 429 shovel tests were initially plotted within the project tract, 141 of these were not excavated due to excessive slope >30 degrees (in accordance with NCOSA guidelines) and disturbances such as gravel access roads. Soils from the shovel tests were

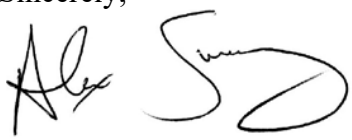
screened through one-quarter-inch mesh hardware cloth. Records of each shovel test were kept in field notebooks, including information on content (e.g., presence or absence of artifacts, artifact descriptions) and context (i.e., soil colors and texture descriptions, depth of definable levels, observed features).

A total of 288 shovel tests were excavated within the project tract (Figure 4). A typical soil profile consisted of a 7.5 yellow-red (YR) 5/6 strong brown sandy loam between 0 and 20 centimeters below surface, underlain by a 2.5 YR 4/6 red sandy clay subsoil. Most of the soils along the ridgetops and slopes have been severely eroded. Modern debris from the use of the central area as a borrow pit was observed along the ground surface, including rubber tires, concrete barriers, and erosion control mesh fencing. All shovel tests were negative for cultural materials.

No archaeological resources were identified within the project tract. Therefore, no significant or NRHP-eligible resources will be impacted by construction within the project tract. Additional management considerations with regards to archaeological resources for the proposed project are not warranted.

Please feel free to contact me at 912-233-2550 or alexsweeney@brockingtoncrm.com if you have any questions regarding this project.

Sincerely,



Alex Sweeney
Branch Manager and Senior Archaeologist
Brockington and Associates, Inc.
31 Park of Commerce Way, Suite 200A
Savannah, Georgia 31405

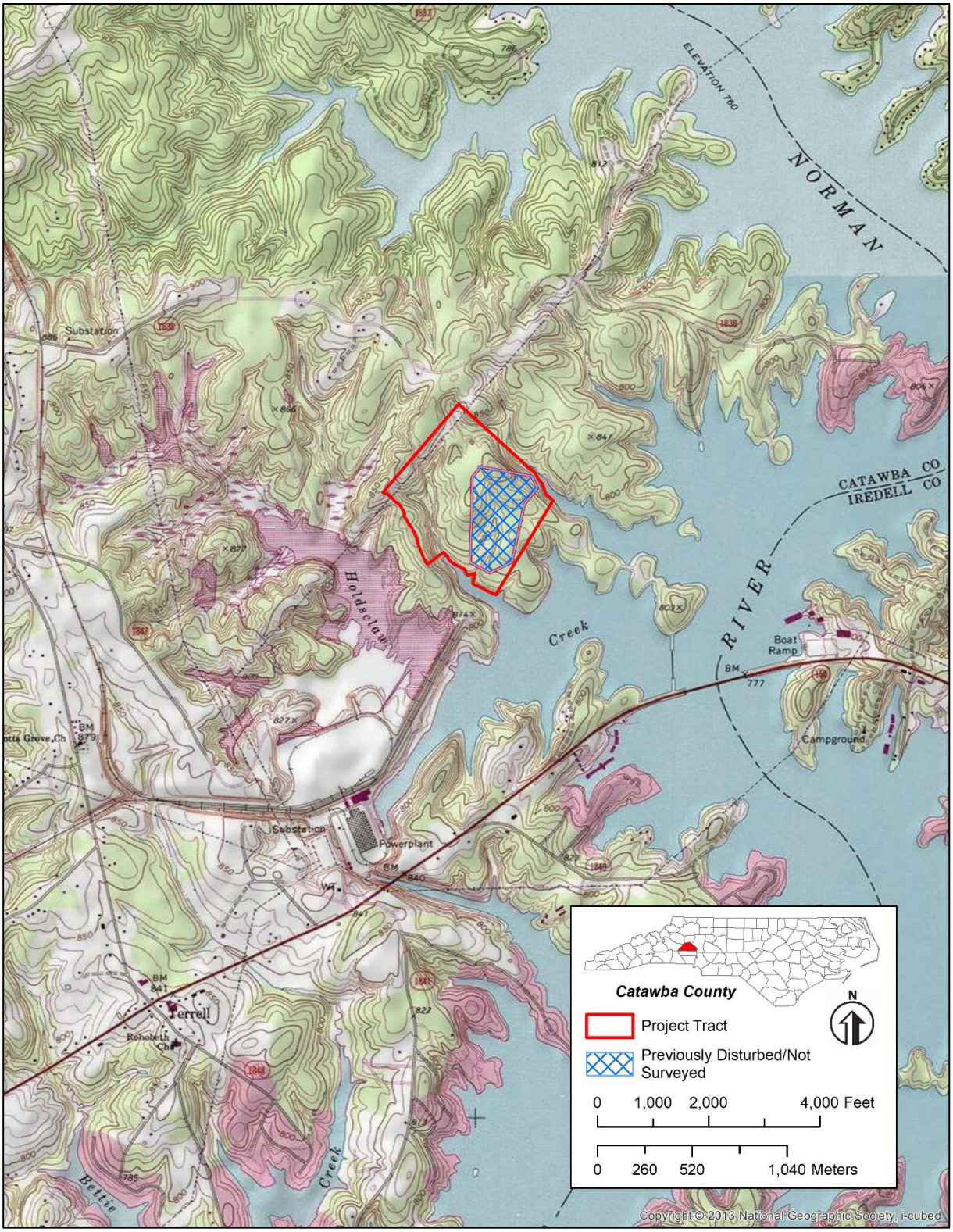


Figure 1. Project location, *Lake Norman* 7.5' USGS quadrangle.

Figure 2. Typical view of project tract, facing southeast toward Lake Norman.

Figure 3. View of northern portion of project tract, facing northeast within the transmission corridor.

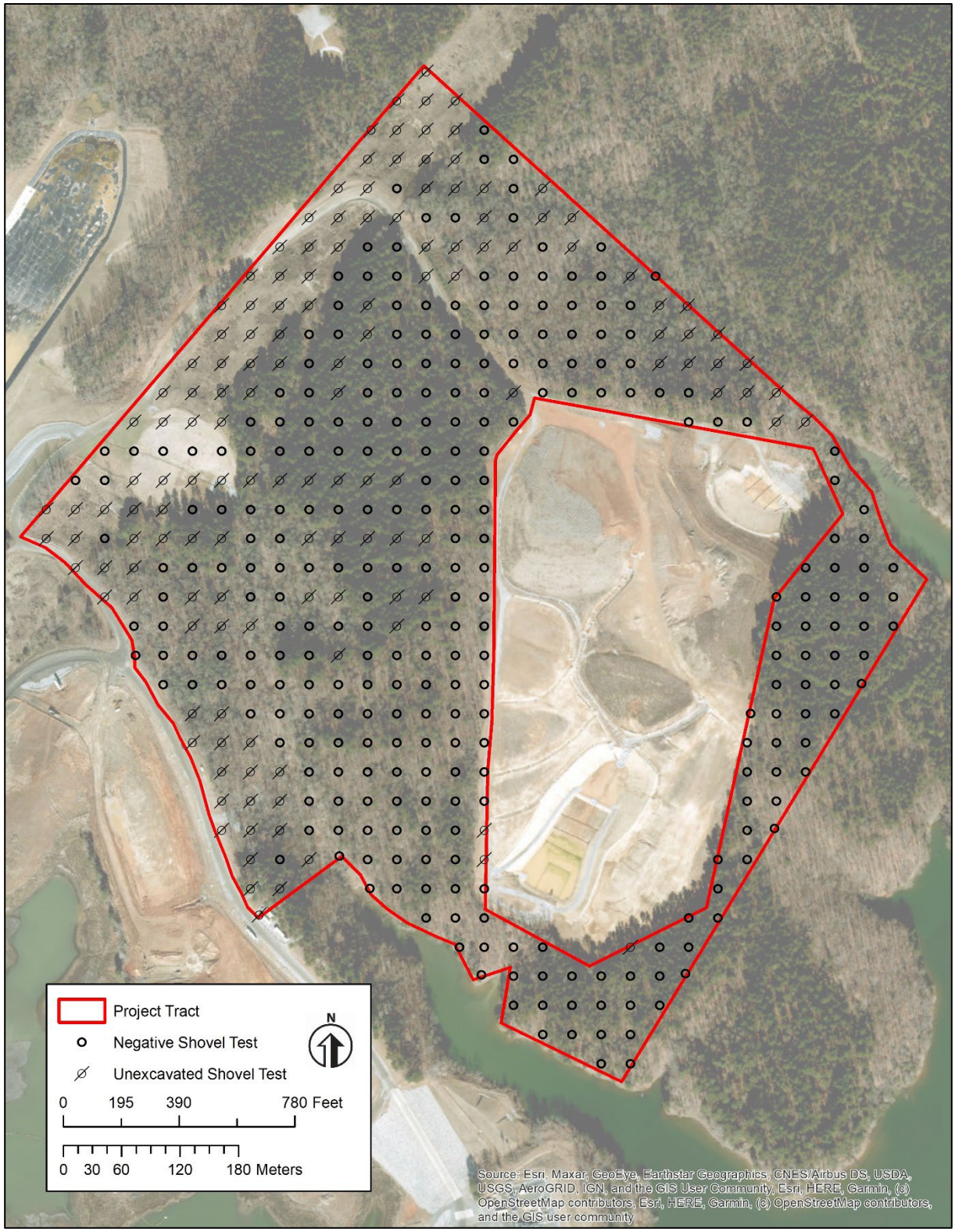


Figure 4. Project tract, showing shovel test locations and results.

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APPENDIX B-4

STATE HISTORIC PRESERVATION OFFICE RECOMMENDATION ON CULTURAL RESOURCES SURVEY

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary D. Reid Wilson

Office of Archives and History
Deputy Secretary, Darin J. Waters, Ph.D.

September 26, 2023

Alex Sweeney
Brockington and Associates, Inc.
4000 DeKalb Technology Parkway, Suite 400
Atlanta, GA 30340

alexsweeney@brockingtoncrm.com

Re: Expand Marshall Plant, Island Point Road, Catawba County, ER 23-1891

Dear Mr. Sweeney:

Thank you for your email of August 17, 2023, regarding the above-referenced undertaking. We have reviewed the submittal and offer the following comments.

The submitted plans include the testing methods proposed for a Phase I cultural resources survey of the Marshall Plant in Catawba County. However, a large portion of the project area has been subject to substantial ground disturbance, such as grading and sediment pond construction. Furthermore, previous surveys near the area of potential effects (APE) indicate that the geologic, topographic, and hydrologic characteristics make it unlikely that archaeological resources remain intact within the APE. Given the substantial disturbance and low probability for cultural resources, we would not have recommended an archaeological investigation for this project. In the future, we strongly recommend that all projects be submitted to the State Historic Preservation Office (SHPO) for environmental review prior to scoping or conducting archaeological investigations, as an archaeological survey is not always required.

However, if you do proceed with the Phase I cultural resources survey, we concur that the methods outlined in the submitted proposal are adequate to identify any archaeological sites that may still exist, and we look forward to reviewing the technical report that produced from this work. Please note that the technical report and any related site files must meet our standards and guidelines and be submitted following the procedure outlined below.

As of June 30, 2023, OSA is using Citrix ShareFile for archaeological consultants to submit digital archaeological reports and site files for Environmental Review. Consultants should review our ShareFile User Guidelines and submit a ShareFile User Access Form to Kim Urban (kimberly.urban@dncr.nc.gov) to obtain access to ShareFile if they have not already done so.

Additionally, the OSA has changed our Environmental Review report and site form submission requirements. We now require:

- One (1) digital copy of the archaeological survey report, to be sent through ShareFile.

- One (1) digital copy of each NC Site Form(s) with site map(s) for each site that was recorded as part of the archaeological investigation, to be sent through ShareFile. Please submit each site form as a separate document.
- Hard copies of reports will be requested by the OSA once we determine that no further changes to the report are needed. Concurrence letters will not be sent until after we receive the hard copy of the final archaeological survey report.

More information on our Environmental Review submission requirements can be found at: https://archaeology.dncr.nc.gov/programs/environmental-review.

We have determined that the project as proposed will not have an effect on any historic structures.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@dncr.nc.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona Bartos, Deputy
State Historic Preservation Officer

DUKE ENERGY CAROLINAS, LLC
MARSHALL ENERGY COMPLEX

APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX B-5

ENVIRONMENTAL SERVICES, INC.'S CEMETERY INVESTIGATION,
MARSHALL STEAM PLANT

ENVIRONMENTAL SERVICES, INC.
4901 Trademark Drive
Raleigh, North Carolina 27610
919-212-1760
www.environmentalservicesinc.com

MEMORANDUM

FROM: Terri Russ

DATE: 7 November 2018

RE: **Marshall Steam Plant**
Catawba County, North Carolina
Cemetery Investigation

Project Background

On October 9, 2018, a survey crew working on behalf of Duke encountered a previously undocumented potential grave site while delimiting the area for a proposed drainage trench action (designated as MAR-145), associated with the Marshall Steam Plant CCP ash removal project in Catawba County, North Carolina. Duke has requested that ESI locate the limits of the cemetery to avoid impacts to marked or unmarked graves. ESI conducted background research and field investigations in an attempt to determine the limits of the cemetery. The general project vicinity is shown on **Figure 1.**

Historic Background

The parcel containing the cemetery ("Tract 9" in Catawba County Deed Book [DB] 2954 Page [PG] 421) was purchased by Duke from Aspen Properties, LLC in 2008 (DB2947 PG1142). A plat showing the 6.374 acres (Plat Book 68 Page77) from 2008 shows the general cemetery area (**Figure 2**). The parcel containing the cemetery was part of "Tract 2" (11.576 acres) conveyed from Shuford Development, LLC, to Aspen Properties, LLC, in 2004 (DB2547 PG1545). Tract 2 was purchased from Larry and Martha Schronce in 1980 (DB 1238 PG339). The deed refers to the property as Lots 10 and 11 of the J.P. Sherrill Estate; however, there is no mention of a cemetery. Larry and Martha Schronce purchased the property from J.P. Sherrill, Jr., and his siblings in 1977 (DB1138 PG912). J.P Sherrill, Jr. and his siblings inherited the property from their father Junius Phelps Sherrill, Sr.

The property containing the cemetery was conveyed to Junius Phelps Sherrill, Sr., in 1887 by his parents E.L. Sherrill and Julia E. Sherrill (DB 32 PG 459). The approximately 142-acre parcel of land included a wheat mill, saw mill, corn mill, cotton gin, cotton press, and other buildings. There is no reference to a cemetery. A map of Catawba County dated 1886 shows E.L. Sherrill's home was located west of the cemetery (**Figure 3**).

Field Investigations- Cemetery

ESI archaeologist Terri Russ conducted field investigations in the vicinity of the purported cemetery on 1 November 2018. The surrounding parcel consists of a recently clear-cut area and active construction zone. The area containing the graves is located on a small hill covered in young trees and sparse undergrowth. The area appears to have been cleared prior to Duke's purchase of the property, as the trees within the cemetery area are around 10 years old or younger. A 1993 aerial photograph shows the area was forested (**Figure 4**). Later aerial photographs indicate that the area was cleared prior to Duke's purchase of the parcel. Remnants of old flagging demarcate the approximate cemetery boundaries.

Two rows of uncarved fieldstones extending approximately 40 feet north-south were observed within this area. The two rows of stones were set generally upright, approximately 4 to 5 feet apart. Most of the stones were native stones with no evidence of carving; a few appeared to have been roughly shaped. Several depressions associated with the stones were noted. An area adjacent to the graves appears to have been purposefully vandalized (the area was partially excavated).

A total of 18 possible graves were recorded during the current investigation. Most of the graves were marked with plain or roughly shaped fieldstones and several exhibited depressions in the ground aligned roughly east-west. Probing was conducted using a standard 3-feet long steel soil probe along North-South transects within the area in an attempt to identify linear areas of subsurface soil disturbance (less compact soils) that could represent unmarked grave shafts. A sketch plan of the area is shown on **Figure 5**. Representative photographs of the cemetery are shown on **Figures 6–8**.

Given the small size, informal layout, and uncarved fieldstone markers, it is likely that the cemetery contains the remains of slaves or tenant farmers who lived and worked in the area in the late nineteenth to early twentieth century. The 1860 U.S. Federal Census Slave Schedule indicates that E.L. Sherrill owned two slaves: a 23-year-old male and 19-year-old female. Son J.P. Sherrill is also listed as owning two slaves: a 65-year-old male and 14-year-old male. Several other members of the Sherrill family residing nearby were also listed as slave owners. The 1870 census shows E.L. Sherrill's neighbors as African American tenant farmers Logan Abernathy and John Hooper and their families. These men and their families were likely former slaves who now rented land from their former owners. In addition to slaves who died prior to emancipation, the cemetery could contain the remains of these local African American tenant farmers who may not have had the money or access to allow burial in a formal church cemetery.

Recommendations

In summary, the cemetery appears to contain several graves marked only with plain, uncarved fieldstones (burial practices typical of slave and/or post-emancipation era tenant farmer cemeteries). The cemetery appears to be confined to the area indicated by the stones. It is recommended that the area be protected from future ground disturbance through formal survey and, if feasible, installation of fencing or other protective barrier surrounding the graves. ESI recommends that no ground disturbing activities take place within the limits of the cemetery, as currently flagged. Any clearcutting or tree removal within the cemetery should be conducted by hand to reduce the possibility of subsurface disturbance to potential gravesites.

Figure 1: Cemetery Location

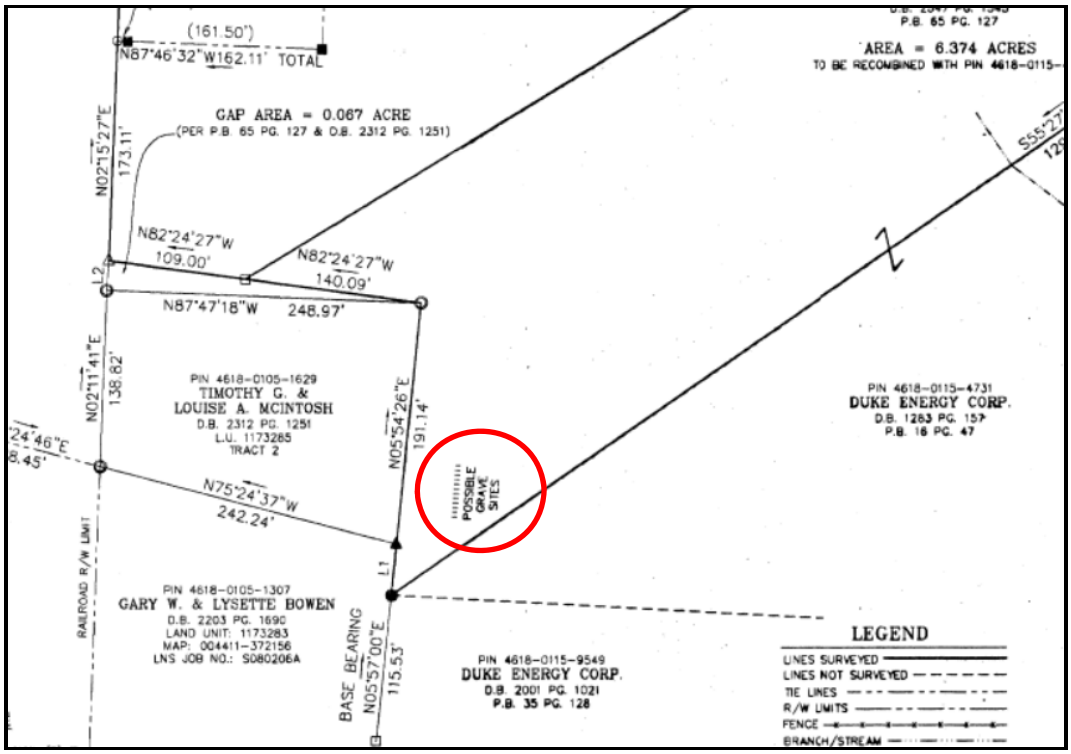

Figure 2: Portion of Plat Book 68 Page 77 (2008)

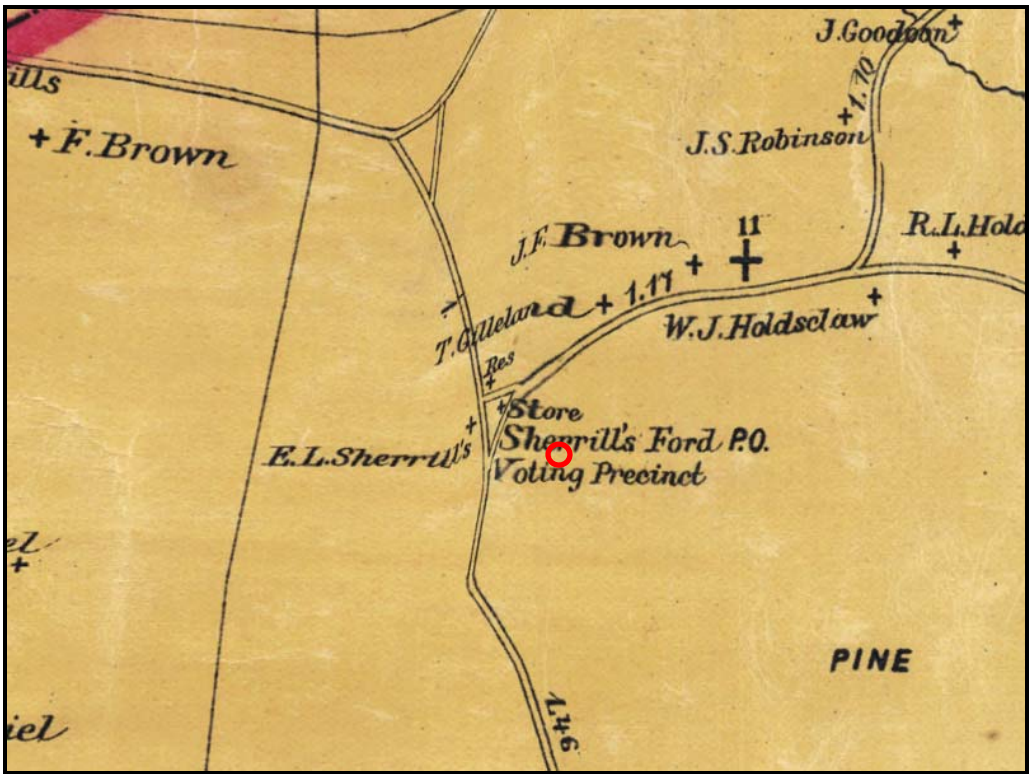

Figure 3: 1886 County Map showing Approximate Cemetery Location

Figure 4: 1993 Aerial Photograph of Cemetery Location

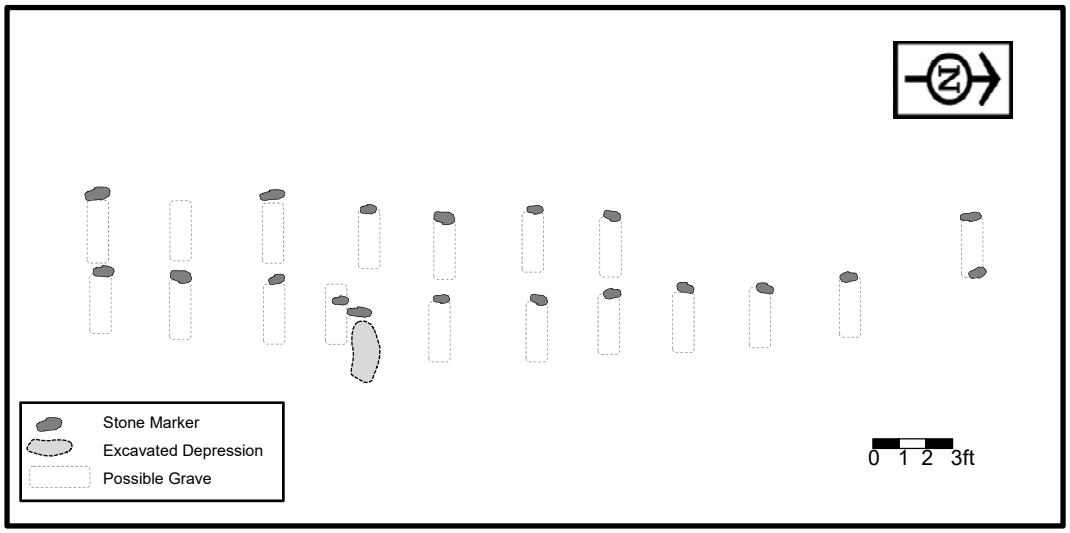

Figure 5: Sketch Map of Cemetery

Figure 6: General View of Cemetery, facing North

Figure 7: Close up of Fieldstone Grave Markers

Figure 8: Close up of Fieldstone Grave Markers

DUKE ENERGY CAROLINAS, LLC
MARSHALL ENERGY COMPLEX

APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

APPENDIX C

MARSHALL STEAM STATION NATURAL RESOURCES SITE ASSESSMENT REPORT

Duke Energy Corporation
13339 Hagers Ferry Road, MG03A3
Huntersville, NC 28078

Advanced Class, Simple-Cycle, Dual Fuel Gas Turbine
Marshall Steam Station
Natural Resources Site Assessment Report

To: Todd Shuping, PMC, Duke Energy Business Services
From: Scott T. Fletcher, Manager of Natural Resources, EHS, Duke Energy Business Services
Date: 10/23/2023
Location: Marshall Steam Station, Proposed Simple-Cycle, Dual Fuel, Gas Turbine site. 8320 NC-150, Terrell NC 28673, NC 27343
Subject: Natural Resources Reconnaissance and Assessment

1.0 PROJECT DESCRIPTION

Duke Energy Carolinas, LLC (DEC) is planning to construct two advanced class simple-cycle, dual fuel gas turbine (SCGT) units at the existing Marshall Steam Station generating site in Terrell, NC (see figure below). The natural resources assessment study area for the Marshall site includes an approximately 25-acre tract where the proposed facility and its associated components (e.g., construction lay-down area, switchyard, administration building) will be located. Approximately 50 percent of the site is significantly disturbed from past and current activities associated with the Marshall Steam Station. The area is surrounded by areas of mixed hardwood-pine woodland, transmission line corridors, and other disturbed areas associated with the generation station. Regarding this proposed generation facility, Duke Energy Business Services (DEBS), Environmental, Health & Safety (EHS)-Natural Resources reviewed existing information, conducted a desktop analysis, and subsequently conducted a natural resource assessment of the site.

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2.0 METHODS

DEBS-Natural Resource scientists performed a desktop review of publicly available and project-area company data, use of the USFWS IPaC (Information, Planning, and Consultation) tool, reviewed up-to-date in-house databases and the EHS GIS Natural Resource Viewer, and conducted on-site assessments that included an assessment for federally and state protected species, and natural and vegetation communities. DEBS scientists also conducted a reconnaissance-level survey of the proposed project area or wetlands and jurisdictional waters of the United States under Section 404 of the Clean Water Act (CWA). DEBS used the methodology described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory regime, and the North Carolina Division of Water Resources (NCDWR) Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11) to examine the area and to review the USFWS's National Wetland Inventory (NWI) database. Existing vegetative communities are described based on the Classification of the Natural Communities of North Carolina - Fourth Approximation (Schafale 2012).

3.0 FINDINGS AND RESULTS

Botanical Resources

Based on the Classification of the Natural Communities of North Carolina -Fourth Approximation (Schafale 2012), the western half of the proposed site can be classified as Mesic Mixed Hardwood (Piedmont Subtype) and it located in uplands surrounded by existing facility infrastructure (e.g., facility access roads and transmission line rights-of-way). These relatively small, remnant wooded areas and adjacent areas are described below based on known site information and field assessments. The western portion of the proposed site is disturbed and in a barren soil condition. This community is comprised of mature woody, herbaceous, and vine species including black oak (Quercus velutina), northern red oak (Q. rubra), scarlet oak (Q. coccinea), white oak (Q. alba), post oak (Q. stellata), water oak (Q. nigra), southern red oak (Q. falcata), American beech (Fagus grandifolia), loblolly pine, (Pinus taeda) Virginia pine (P. virginiana), mockernut hickory (Carya tomentosa), sweetgum (Liquidambar styraciflua), black gum (Nyssa sylvatica), tulip poplar (Liriodendron tulipifera), red maple (Acer rubra), American holly (Ilex opaca), black cherry (Prunus serotina), flowering dogwood (Cornus florida), eastern redcedar (Juniperus virginiana), sourwood (Oxydendrum arboreum), sassafras (Sassafras abidum), American basswood (Tilia americana), greenbriar (Smilax spp.), muscadine grape (Vitus rotundifolia), Virginia creeper (Parthenocissus quinquefolia), spotted pipsissewa (Chimaphilia maculate), Christmas fern (Polystichum acrostichoides), ebony spleenwort (Asplenium platyneuron), New York fern (Thelypteris noveboracensis), rattlesnake plantain (Goodyera oblongifolia), Indian pipe (Monotropa uniflora), pine sap (Monotropa hypopitys), partridgeberry (Mitchella repens), Common cinquefoil (Potentilla simplex), necked-flower tick-trefoil (Desmodium nudiflorum), wooly elephants foot (Elephantopus tomentosus), deer tongue grass (Dichanthelium clandestinum), James sedge (Carex jamesii), St. John's wort (Hypericum hypericoides), arrow-leaved heartleaf (Hexastylis arifolia), American ceasar mushroom (Amanita jacksonii), chanterelle waxy cap (Hygrocybe cantharellus), and lions mane (Hericium erinaceus). This area will be permanently affected by the proposed project.

The proposed project area is also immediately adjacent to Duke Energy's existing 230kV transmission line right-of-way. These routinely managed linear corridors (i.e., 3-5 year cycles), maintained in an early-successional stage, are characterized by grasses, forbs, and woody plants dominated by dense broomsedge (Andropogon virginicus), broad-leaved panic grass (Dichanthelium latifolium), dogfennel (Eupatorium capillifolium), fleabane species (Erigeron spp.), goldenrod species (Solidago spp.), Japanese honeysuckle, greenbriar, and blackberry (Rubus allegheniensis). Sweetgum, red maple, shortleaf pine and redcedar saplings can also be present based on the timing of the maintenance cycle. This transmission line corridor will not be affected by the proposed project.

Wetlands and Jurisdictional Waters of the U.S.

DEC biologists conducted a reconnaissance-level survey of the proposed project area for wetlands and jurisdictional waters of the United States, under Section 404 of the Clean Water Act (CWA). The area was examined according to the methodology described in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual, USACE Eastern Mountains and Piedmont Regional Supplement, the pre-2015 regulatory

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regime, and the North Carolina Division of Water Resources (NCDWR) Methodology for Identification of Intermittent and Perennial Streams and their Origins (Version 4.11), as well as review of the USFWS's National Wetland Inventory (NWI) database. Based on the existing information and the survey, no wetlands or Waters of the U.S. will be affected by the proposed facility.

Listed and Protected Plant Resources

DEC obtained and reviewed a list of federally protected plant species for Catawba County and the specific area within the study area (USFWS 2023). Duke Energy's Natural Resource GIS Viewer database, which includes known element occurrences and critical habitat of federal and state protected species was also reviewed. Field assessments, regarding listed species, have also been conducted in the study area over the last several years. The data base reviews, as well as the site assessments revealed no known occurrences of federally or state protected species within the proposed project footprint or immediately adjacent.

Review of the USFWS's Information for Planning and Consultation (IPaC) tool revealed two federally protected plant species within the general study area and Catawba County. These species include the dwarf-flowered heartleaf (Hexastylis naniflora) and the Schweinitz's sunflower (Helianthus schweinitzii).

Dwarf-flowered heartleaf (Threatened) is found in the upper piedmont regions of both North and South Carolina. In North Carolina, the range for this species is from Catawba, Lincoln, Rutherford, Cleveland, and Burke Counties. This heartleaf species grows in acidic, sandy loam soils along bluffs and nearby slopes, in boggy areas adjacent to creek heads and streams, and along the slopes of hillsides and ravines. The most important habitat requirement is soil type; this species appears to need Pacolet, Madison gravelly sandy loam, or Musella fine sandy loam soils to grow and survive. Provided the soil type is favorable, the plant can survive in either dry or moderately moist conditions. For maximum flowering, the plant needs sunlight in early spring. The most conducive habitat types for flowering and high seed production are creek heads where shrubs are rare and bluffs with light gaps.

Schweinitz's sunflower (Endangered) inhabits clearings in, and edges of, upland oak-pine-hickory woods on moist to dryish clays, clay-loams, or sandy clay-loams that often have high gravel content and are moderately podzolized. The underlying rock types are highly weatherable, generally contain low amounts of resistant minerals such as quartz, and generally weather to fine-textured soils. This endangered plant requires the full to partial sun of an open habitat, which was formerly maintained over the species' range by wildfires and grazing by herds of bison and elk. Now most occurrences are confined to roadsides and utility corridors. The North Carolina populations are in Union, Stanly, Cabarrus, Mecklenburg, and Rowan Counties.

Although potential habitat for the two species is found in the study area and specifically in the proposed facility, assessments (i.e., for this study and several past site studies) revealed no known occurrences of these species.

Wildlife Resources

Terrestrial communities in the study area are primarily composed of small, forested habitats and transmission line corridors that support a diverse number of wildlife species. Representative mammal, bird, reptile, and amphibian species commonly occurring in these habitats are listed below. Individual species and/or evidence of species (e.g., tracks, scat, visual observations) observed during the field assessments are indicated with an asterisk (*). Information on wildlife species that typically use these habitats in the Southern Outer Piedmont ecoregion was obtained from relevant literature, mainly the Biodiversity of the Southeastern U.S., Upland Terrestrial Communities (Martin et al., 1993).

Mammal species that commonly occur in these habitats include the eastern cottontail (Sylvilagus floridanus), gray squirrel (Sciurus carolinensis)*, various vole, rat, and mice species, raccoon (Procyon lotor), Virginia opossum (Didelphis virginiana), groundhog (Marmota monax), white-tailed deer (Odocoileus virginianus)*, gray fox (Urocyon cinereoargenteus), red fox (Vulpes vulpes), and the coyote (Canis latrans)*.

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Bird species that commonly use these habitats include the American crow (Corvus brachyrhynchos), blue jay (Cyanocitta cristata)*, Carolina chickadee (Poecile carolinensis)*, tufted titmouse (Baeolophus bicolor)*, American robin (Turdus migratorius)*, eastern towhee (Pipilo erythrophthalmus)*, 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), indigo bunting (Passerina cyanea)*, mourning dove (Zenaaida macroura)*, turkey (Meleagris gallopavo)* and wood duck (Aix sponsa)*. Raptors in the study area include the red-tailed hawk (Buteo jamaicensis), red-shouldered hawk (Buteo lineatus), barred owl (Strix varia)*, turkey vulture (Cathartes aura), black vulture (Coragyps atratus), and an occasional bald eagle (Haliaeetus leucocephalus).

There are two active bald eagle nests approximately 1,745.3 and 2,210.9 feet to the east of the proposed project (i.e., Holdsclaw Creek arm of Lake Norman). However, the proposed project is well outside of the 660 foot no-disturbance zone surrounding the nest and no bald eagle foraging habitat is found within or adjacent to the proposed site. Thus, no construction or operational impact, to these active nests and the associated eagles, is expected.

Reptile and amphibian species that can use the associated terrestrial communities include the eastern black rat snake (Pantherophis alleghaniensis), eastern corn snake (P. guttatus), copperhead (Agkistodon contortrix), black racer (Coluber constrictor)*, 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)*, Copes treefrog (Hyla chrysoscelis)*, and spring peeper (Pseudacris crucifer).

Construction of the proposed facility will require removal of the existing and relatively small mixed hardwood forested area and thus will displace the remaining wildlife at the site. During construction, wildlife is expected to move to adjacent undeveloped forested areas of the general area. Although mortality is likely regarding less mobile species such as ground dwelling small mammals, and reptiles and amphibians. Since the proposed project footprint is small and localized, the proposed construction activities are not expected to impact the diversity or number of species or interfere with the movement or resident or migratory species. Duke Energy does not anticipate that daily facility operations, including noise from equipment and vehicle traffic, will affect wildlife beyond the proposed facility's footprint.

Listed and Protected Wildlife Resources

Duke Energy obtained and reviewed a list of federally protected plant species for Catawba County and the specific area within the study area (USFWS 2023). Duke Energy's Natural Resource GIS Viewer database, which includes known and updated element occurrences and critical habitat of federal and state protected species was also reviewed. Field assessments, regarding listed species, have also been conducted in the study area over the last several years. The data base reviews, as well as the site assessments revealed no known occurrences of federally/state protected species or designated critical habitats within the study area and the proposed project footprint.

Review of the USFWS's Information for Planning and Consultation (IPaC) tool revealed three federally protected or proposed protected wildlife species within the general study area and Catawba County. These species include the tricolored bat (Perimyotis subflavus), bog turtle (Glyptemys muhlenbergii), and the monarch butterfly (Danaus plexippus).

The tricolored bat (Proposed Endangered) 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 central United States and portions of southern Canada, Mexico and Central America including the Piedmont of North Carolina. During the winter, tricolored bats are often found in caves and abandoned mines, although in

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the southern United States, where caves are sparse, tricolored bats are often 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 pine trees, and occasionally human structures. Tricolored bats face extinction due primarily to the rangewide impacts of white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent. This species is proposed to be listed by the 4th quarter of 2023 and potential habitat (forest and woodland) for the species is found in the study area and specifically in the proposed facility. Since the footprint will be cleared of the mixed hardwood-pine habitat, the habitat can be assessed for the presence or absence of the species (i.e., acoustic monitoring). If the species is present, Endangered Species Act Section 10 coordination with the USFWS-Asheville Ecological Field Office will be conducted. Any tree clearing will be scheduled outside of a bat-tree cutting moratorium that consists of April 1 through October 15.

The bog turtle (Threatened-Similarity of Appearance) is North America's smallest turtle, growing only to 4.5 inches in length. It is recognized by the orange patch on either side of its head, and it favors open, groundwater-fed wet meadows and bogs dominated by tussock sedge and grasses. It thrives in mountain bogs, or isolated wetlands with acidic, wet soil, thick moss, clumps of vegetation, and deep layers of mud in the Piedmont and Mountains of North Carolina including the general study area. Habitat for this species is not found in the proposed project footprint or within the immediately adjacent transmission line corridor. Thus, this species will not be affected by the project.

The monarch butterfly (Candidate Species) is large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily Asclepias spp.), and larvae emerge after two to five days. There are multiple generations of monarchs produced during the breeding season. In many regions where monarchs are present, monarchs breed year-round. Individual monarchs in temperate climates, such as eastern and western North America (including the Piedmont of North Carolina), undergo long-distance migration, and live for an extended period. In the fall, in both eastern and western North America, monarchs begin migrating to their respective overwintering sites in Mexico. Habitat for this species is not found in the proposed project footprint. However, marginal habitat (nectar-bearing plants) exists within the immediately adjacent transmission line corridor. Duke Energy is a partner within the nationwide Monarch Candidate Conservation Agreement with Assurances (CCAA) and the transmission rights-of-way are managed in a way conducive for the species and associated habitat. The adjacent transmission rights-of-way will not be affected by the project nor will the current Integrated Vegetational Management practices be altered due to the project. Thus, this species will not be affected by the project.

4.0 RECOMMENDATIONS

The natural resources assessment, study area for the Marshall advanced-class simple cycle, dual-fuel unit additions include a 25-acre tract where the proposed facility and its associated components (e.g., construction lay-down area, switchyard, administration building) will be located. Approximately 50 percent of the site is significantly disturbed (and cleared) from past and current activities associated with the Marshall Steam Station. The area is surrounded by areas of mixed hardwood-pine woodland, transmission line corridors, and other disturbed areas associated with the existing generation station.

The project study area and the site of the proposed facility include potential habitat (forest and woodland) for the species. Since mixed hardwood-pine forest will be cleared, DEC will only cut and clear the forested habitat from October 15-March 31, to protect roosting and maternity roosting tricolored, and little brown bats, as well as nesting migratory birds. DEC will coordinate with the USFWS-Asheville Ecological Field Office to determine how the Endangered Species Act Section 10 will be implemented.

DEC is a partner within the nationwide Monarch Candidate Conservation Agreement with Assurances (CCAA), and its transmission rights-of-way are managed in a way that is beneficial to the species and associated habitat. The adjacent transmission line rights-of-way will not be affected by the proposed facility, and the current Integrated Vegetational Management practices will not be altered because of the project. However, it is

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recommended that DEC into the facility transmission line corridors into the annual monitoring program with the CCAA.

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ATTACHMENT A

SITE PHOTOGRAPHS

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Photograph 1. View looking north across proposed Marshall SCGT footprint depicting both the forested and the disturbed portions of the site.

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Photograph 2. View looking north across proposed Marshall SCGT footprint and mixed hardwood-pine community.

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ATTACHMENT B

USFWS IPaC RESOURCE LIST

MARSHALL SCGT SITE IN CATAWBA COUNTY, NC

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IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Catawba County, North Carolina

Local office

Asheville Ecological Services Field Office

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

160 Zillicoa Street
Asheville, NC 28801-1082

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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**

Reptiles

NAME	STATUS
Bog Turtle *Glyptemys muhlenbergii* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6962	SAT

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	**Candidate**

Flowering Plants

NAME	STATUS

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Dwarf-flowered Heartleaf Hexastylis naniflora Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2458	Threatened
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[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- 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

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

Probability of Presence Summary

NORTH CAROLINA UTILITIES COMMISSION
DOCKET NO. E-7, SUB 1297

APPLICATION FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY

MARSHALL ENERGY COMPLEX
SIMPLE-CYCLE GAS COMBUSTION TURBINE ADDITIONS PROJECT

Exhibit 2: Permitting Information

March 14, 2024

DUKE ENERGY® CAROLINAS

INTRODUCTION

The Marshall Energy Complex will be constructed and operated in accordance with Duke Energy Business Services, LLC's ("DEBS") environmental compliance standards. These standards include adherence to the Duke Energy Environmental, Health, and Safety Management System and the Duke Energy Environmental Compliance Manual ("ECM"). The ECM requires that every teammate at Duke Energy:

- Act with integrity,
- Promote event-free operations, and
- Ensure regulatory compliance in every aspect of our business.

These standards and compliance principles also include proper implementation of the environmental permits and approvals noted below.

I. Permit Matrix

Air emission objectives are contingent upon the final air permit, which must be obtained from the Division of Air Quality within the North Carolina Department of Environmental Quality ("NCDAQ") prior to the start of construction.

The air permit will comply with Prevention of Significant Deterioration regulations. The stack will be equipped with NOx, CO, and diluent continuous emissions monitoring systems and certified fuel-flow meters to determine compliance against the allowed "cap" of emissions.

A comprehensive matrix of environmental permits and approvals that may be required is found in the following table.

Environmental Permits/Approvals

Permit	**Agency**
Construction Permits	Catawba County
Temporary Buildings	Catawba County
Permanent Buildings	Catawba County
Section 404 Clean Water Act	U.S. Army Corps of Engineers
Section 401 Clean Water Act	North Carolina Department of Environmental Quality ("NCDEQ")
Rare Threatened & Endangered Species (RTE) Concurrence	U.S. Fish and Wildlife Service
Wastewater POTW	Catawba County
(Construction) Stormwater/Erosion and Sediment Controls	North Carolina Department of Environmental Quality, Division of Energy, Mineral, and Land Resources
(Post-Construction) Stormwater	Catawba County
Air Permit	NCDAQ
FAA	Federal Aviation Administration
SPCC	NCDEQ
Potable Water	Catawba County
Watershed	Catawba County
Cultural Resources Clearance	NC State Historic Preservation Office
Stream Buffer Variance	Catawba County

II. Permitting Status

DEBS has completed preliminary site studies but has not yet filed for any permits. The air permit generally has the longest lead time and is planned to be filed on or about March 28, 2024. Site studies did not identify any significant cultural, wetland, or rare and endangered species issues. Concurrence with the appropriate agencies will be required prior to starting construction. Construction and building permits, as required, will be obtained from Catawba County.