



December 5, 2022

Electronically Filed

The Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street N.E.
Washington, DC 20426

Subject: **Bad Creek Pumped Storage Project (P-2740-053)
Filing of Revised Study Plan for Relicensing Studies**

Dear Secretary Bose:

Duke Energy Carolinas, LLC (Duke Energy or Licensee) is the Licensee, owner, and operator of the 1,400-megawatt (MW) Bad Creek Pumped Storage Project (FERC Project No. 2740) (Project), located in Oconee County, South Carolina, approximately eight miles north of Salem. The Bad Creek Reservoir (or upper reservoir) was formed from the damming of Bad Creek and West Bad Creek and serves as the Project's upper reservoir. Lake Jocassee serves as the lower reservoir and is licensed separately as part of Duke Energy's Keowee-Toxaway Hydroelectric Project (FERC Project No. 2503).

The existing license for the Project was issued on August 1, 1977, under the terms of an Original License issued by the Federal Energy Regulatory Commission (FERC or Commission), and the current 50-year operating license for the Project expires on July 31, 2027. Accordingly, Duke Energy is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5.

In accordance with 18 CFR §5.11, on August 5, 2022, Duke Energy filed the Proposed Study Plan (PSP) describing the studies that the Licensee is proposing to conduct in support of relicensing the Project. The PSP provided a summary of consultation under the ILP since the filing of the PAD on February 23, 2022 and Duke Energy's responses to comments and study requests from FERC staff and stakeholders. Duke Energy is herein filing the Revised Study Plan (RSP) for the Project. The purpose of the RSP is to present the studies proposed by Duke Energy and to address, as appropriate, the comments and study requests submitted by resource agencies and other stakeholders. The RSP also provides FERC, regulatory agencies, Indian Tribes, and other stakeholders with the methodology and details of Duke Energy's proposed studies. Pursuant to the ILP, the Commission will issue a final Study Plan Determination within 30 days of the deadline for filing this RSP (i.e., by January 4, 2023).

Revised Study Plan

Since the filing of the PSP, Duke Energy held a site visit and Project tour on August 16, 2022 for the stakeholder Resource Committees that Duke Energy has voluntarily convened as part of the relicensing process. Duke Energy also held a combination in-person and virtual PSP meeting in Greenville, SC (and Microsoft Teams) on September 7, 2022. A summary of the PSP meeting was

prepared by Duke Energy and filed with FERC and the Project mailing list comments on October 19, 2022. Comments on the PSP were due 90 days from filing, therefore, the commenting period closed on November 5th. Comments on the PSP were considered in the development of the RSP. Duke Energy also held a virtual meeting with Resource Committee members on November 17, 2022 to review and discuss the comments received. The RSP includes copies of and summarizes comments received and Duke Energy's responses.

Duke Energy has evaluated the study requests and comments submitted by the Commission and stakeholders, with a focus on the requests that specifically addressed the seven criteria set forth in §5.9(b) of the Commission's ILP regulations, as discussed above. Based on Duke Energy's review of the requested study and comments, FERC criteria for study requests under the ILP, and available information (e.g., associated with the previous licensing effort or resulting from ongoing monitoring activities), in the RSP, as in the PSP, Duke Energy is proposing a total of six resource studies. These six studies consider stakeholder comments for relicensing of the existing Project as well as studies proposed by Duke Energy in the PAD for the potential construction of the Bad Creek II Complex:

1. Water Resources Study;
2. Aquatic Resources Study;
3. Visual Resources Study;
4. Recreational Resources Study;
5. Cultural Resources Study; and
6. Environmental Justice Study.

Duke Energy is filing the RSP with the Commission electronically and is distributing this letter to the parties listed on the attached distribution list. For parties listed on the attached distribution list who have provided an email address, Duke Energy is distributing this letter via email; otherwise, Duke Energy is distributing this letter via U.S. mail. All parties interested in the relicensing process may obtain a copy of the RSP electronically through FERC's eLibrary system¹, or from Duke Energy's public relicensing website.² If any party would like to request a CD containing a copy of the RSP, please contact the undersigned at the address listed below. Note that Critical Unclassified Information [CUI] pertaining to locations of protected archeological sites is being filed separately.

Comments on the RSP must be filed within 15 days of the deadline for filing this RSP, which is no later than December 20, 2022. Any proposed modifications to the RSP must address the Commission's seven ILP study criteria as presented in 18 CFR §5.9(b).

Response to Additional Information Requests

By letter to Duke Energy dated November 3, 2022, FERC staff submitted supplemental comments and requested additional clarification and/or information. Duke Energy has addressed all of the Commission's most recent Additional Information Requests in the enclosed RSP (Section 4).

Duke Energy looks forward to continuing to work with Commission staff, resource agencies, Indian Tribes, local governments, non-governmental organizations, and interested members of the public throughout the relicensing process. If there are any questions regarding this filing, please contact Alan

¹ <https://elibrary.ferc.gov/idmws/search/fercensearch.asp> under docket number P-2740-053

² <https://badcreekpumpedstorage.com>

Bad Creek Pumped Storage Project (P-2740)
Filing of Revised Study Plan

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Sincerely,

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cc (w/enclosure): Alan Stuart, Duke Energy
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REVISED STUDY PLAN

Bad Creek Pumped Storage Project FERC Project No. 2740

Oconee County, South Carolina



Prepared by: HDR Engineering, Inc.



Prepared for: Duke Energy Carolinas, LLC



December 5, 2022

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**REVISED STUDY PLAN
BAD CREEK PUMPED STORAGE PROJECT
FERC PROJECT NO. 2740
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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
APIC	Avian Power Line Interaction Committee's
Bad Creek or Project	Bad Creek Pumped Storage Project
Bad Creek II Complex	Bad Creek II Power Complex
CFD	computational fluid dynamics
CFR	Code of Federal Regulations
cfs	cubic feet per second
DLA	Draft License Application
DO	dissolved oxygen
Duke Energy or Licensee	Duke Energy Carolinas, LLC
EA	Environmental Assessment
EIS	Environmental Impact Statement
FERC or Commission	Federal Energy Regulatory Commission
FLA	Final License Application
FPA	Federal Power Act
fps	feet per second
ft	foot/feet
ft msl	foot/feet above mean sea level
HDR	HDR Engineering, Inc.
ILP	Integrated Licensing Process
ISR	Initial Study Report
KT Project	Keowee-Toxaway Hydroelectric Project
CCAA	Monarch Candidate Conservation Agreement with Assurances Program
MW	megawatt
MWh	megawatt-hour
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NOI	Notice of Intent
PAD	Pre-Application Document
PM&E	protection, mitigation, and enhancement
PSP	Proposed Study Plan
ROW	right-of-way
RSP	Revised Study Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USR	Updated Study Report
WOTUS	waters of the U.S.

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1 Introduction and Background

1.1 Project Overview

Duke Energy Carolinas, LLC (Duke Energy or Licensee) is the owner and operator of the 1,400-megawatt (MW) Bad Creek Pumped Storage Project (Project) (Project No. 2740) located in Oconee County, South Carolina, approximately eight miles north of Salem. The Project utilizes the Bad Creek Reservoir as the upper reservoir and Lake Jocassee, which is licensed as part of the Keowee-Toxaway (KT) Hydroelectric Project (FERC Project No. 2503), as the lower reservoir.

The existing (original) license for the Project was issued by the Federal Energy Regulatory Commission (FERC or Commission) for a 50-year term, with an effective date of August 1, 1977 and expires July 31, 2027. The license has been subsequently and substantively amended, with the most recent amendment on August 6, 2018 for authorization to upgrade and rehabilitate the four pump-turbines in the powerhouse and increase the Authorized Installed and Maximum Hydraulic capacities for the Project.¹ Duke Energy is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. In accordance with 18 CFR §5.11 of the Commission's regulations, Duke Energy is filing this Revised Study Plan (RSP) describing the studies that the Licensee is proposing to conduct in support of relicensing the Project.

1.1.1 Existing Project Description and Location

The Project is located in Oconee County, South Carolina, approximately eight miles north of the Town of Salem, and is situated in the northwestern-most portion of South Carolina, less than two miles from the North Carolina border. The Bad Creek Reservoir is situated immediately northwest of Lake Jocassee, which is used as the lower reservoir for pumped storage operation, and streams draining to this area make up the headwaters of the Savannah River Basin.

Downstream of Lake Jocassee is Lake Keowee, which is used as the lower reservoir for the Jocassee Pumped Storage Station and also supplies cooling water for Oconee Nuclear Station.

The existing Project Boundary and Project location are shown on Figure 1-1.

¹ *Duke Energy Carolinas LLC*, 164 FERC ¶ 62,066 (2018)

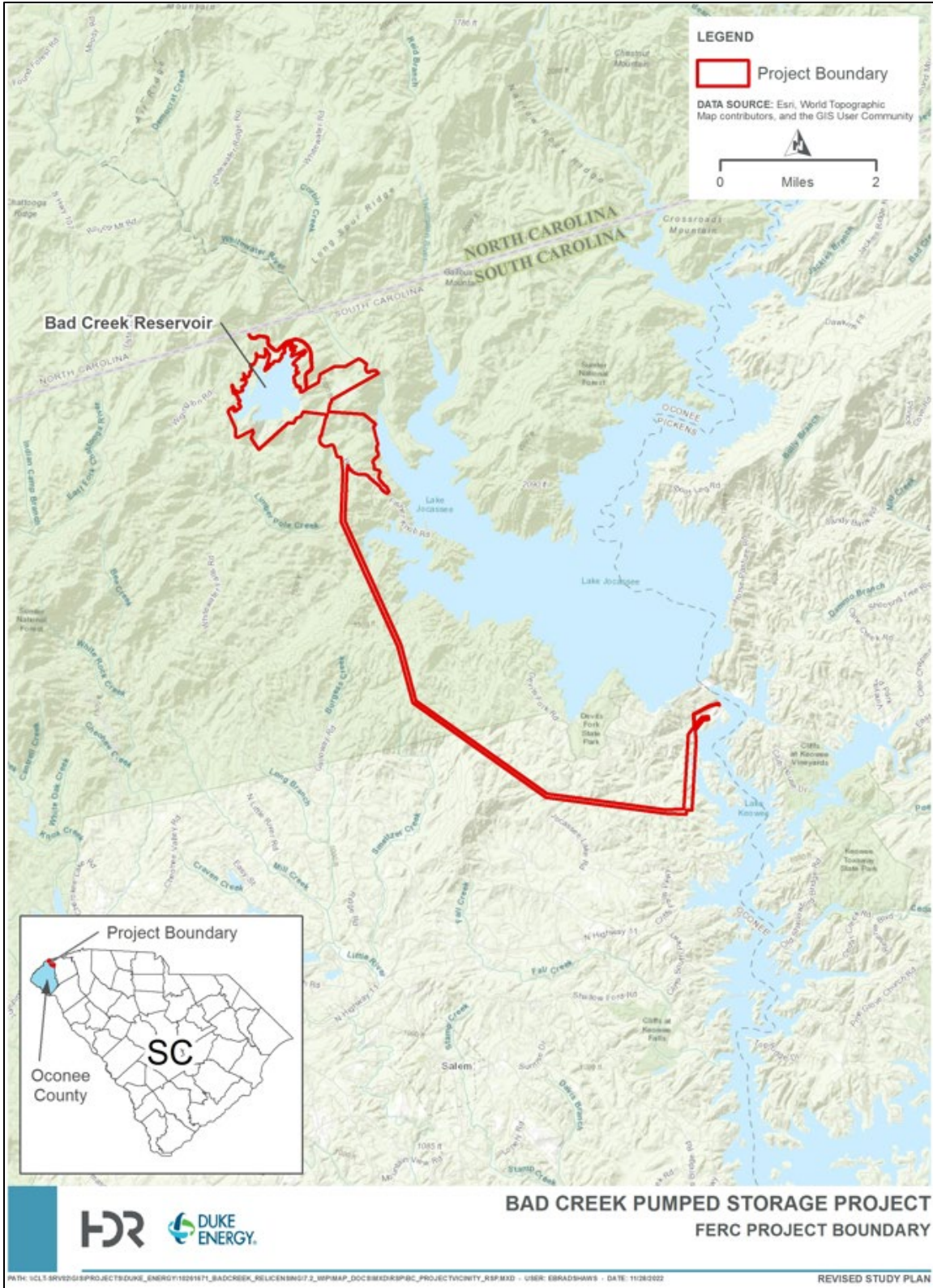


Figure 1-1. Bad Creek Pumped Storage Project Location and Existing FERC Project Boundary



The structures and features included in the Project license include the upper reservoir and dams, inlet/outlet structures in the upper and lower reservoirs, water conveyance system, underground powerhouse, tailrace tunnels, transmission facilities, and an approximately 9.25-mile-long transmission line corridor extending from Bad Creek to the KT Project's Jocassee switchyard. Project features are shown on Figure 1-2. The Bad Creek Reservoir was formed from the damming of Bad Creek and West Bad Creek and serves as the Project's upper reservoir.

Pumping water from Lake Jocassee up to the Bad Creek Reservoir provides a means of storing energy from surplus baseload generation during low demand periods and from other non-dispatchable renewables generation during certain periods. Project operation in turbine mode, from the Bad Creek Reservoir to Lake Jocassee, provides power back to the grid when energy demand is higher or renewable generation is not available. The now 30-year-old Project is one of the most powerful and flexible energy generation and storage assets in Duke Energy's system. The Jocassee and Bad Creek facilities combined will, following the completion of ongoing upgrades to the pump-turbine units at Bad Creek by August 2023, provide 2,110 MW of pumped storage capacity.

Bad Creek was originally designed as a "weekly cycle" facility with approximately six hours of generation per day, allowing Duke Energy to utilize approximately 29 hours of storage in the upper reservoir to generate at full load three hours in the morning and three hours in the evening, five days per week, and then pump back for a portion of each night and over the weekend with low cost and available baseload power from Duke Energy's coal and nuclear fleet. Today, Bad Creek operates on more of a "daily cycle" mode, commonly alternating between generating and pumping on a daily basis, with the upper reservoir surface elevation frequently maintained in the upper 50 to 60 feet (ft), compared to a maximum licensed drawdown of 160 ft. (With the upgraded pump-turbine units authorized by the 2018 license amendment, full drawdown of the reservoir requires approximately 23 hours of generation.) This operating mode allows Duke Energy to maximize head, energy density, and plant/unit efficiency and utilize the Project like a massive storage battery to help balance the regional transmission system, including rapid consumption or generation of power due to variable solar energy production. As a result of this operating mode, with operation of the upper reservoir in the upper third of the possible drawdown range, only 30 to 40 percent of the storage capacity of Bad Creek is regularly utilized.



Given the need for additional energy storage and renewable energy generation across Duke Energy's service territories over the Project's new 40 to 50-year license term, Duke Energy is evaluating opportunities to add pumping and generating capacity at the Project. Additional energy storage and generation capacity could be developed by constructing a new power complex (including a new underground powerhouse) adjacent to the existing Bad Creek Powerhouse. Therefore, construction of the 1,400-MW Bad Creek II Power Complex (Bad Creek II Complex or proposed Project) is an alternative relicensing proposal presently being evaluated by Duke Energy.

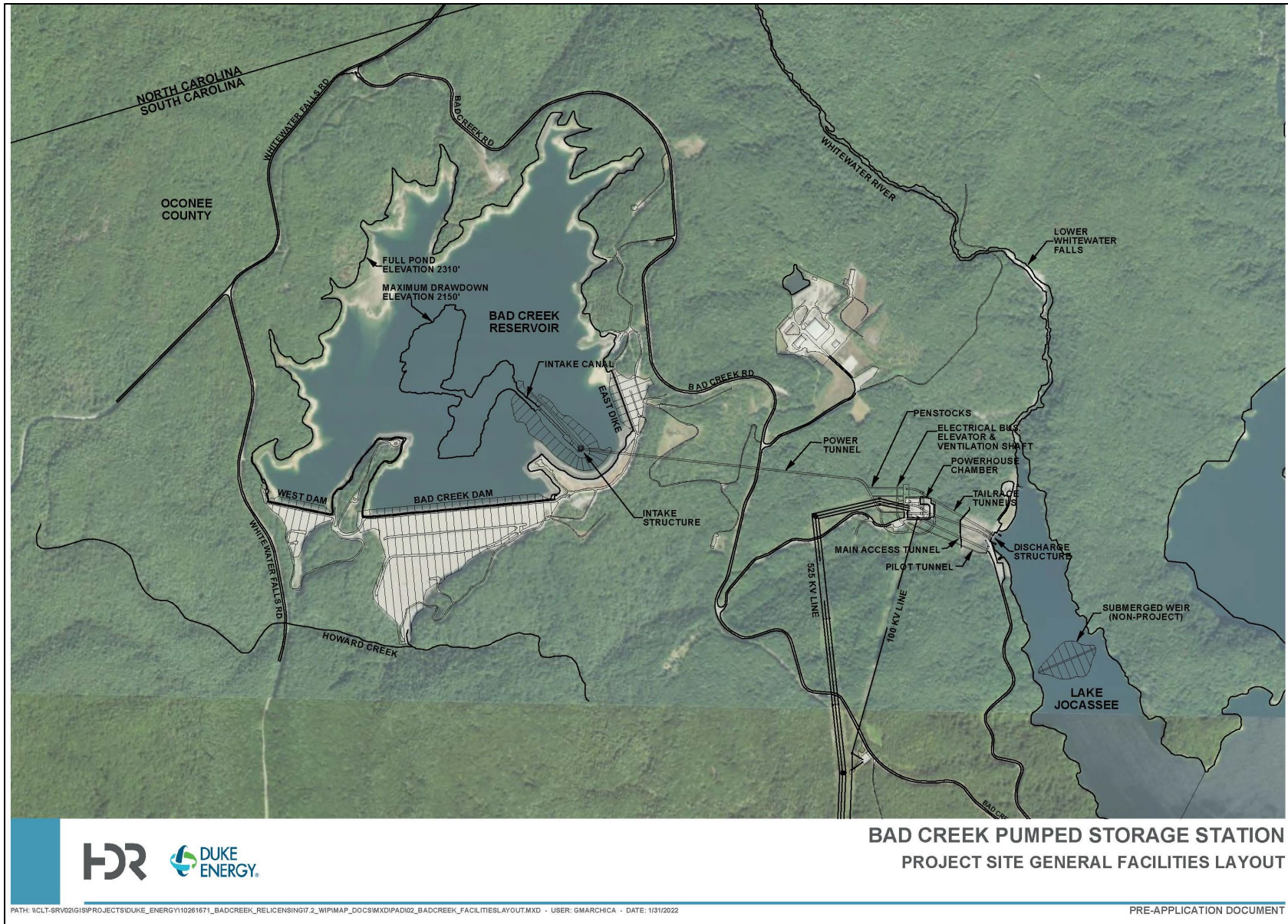


Figure 1-2. Bad Creek Existing Facilities Layout

1.1.2 Bad Creek II Complex Description and Location

Duke Energy will use the ILP pre-filing period to analyze the potential to develop the Bad Creek II Complex. The new facility would consist of a new inlet/outlet structure in the upper reservoir, water conveyance system (i.e., lower and high-pressure tunnels, shafts, manifolds, penstocks, and draft tube/tailrace tunnels), underground powerhouse, powerhouse access tunnels, lower reservoir inlet/outlet structure, switchyard, transformer yard, and transmission line (see Figure 1-3).

The Bad Creek II Complex powerhouse would include four new, reversible pump-turbine units with a combined installed generating capacity of 1,400 MW. The Bad Creek II Complex would utilize the existing Project's upper and lower reservoirs (Bad Creek Reservoir and Lake Jocassee, respectively) and would consist of a new upper reservoir inlet/outlet structure (within the existing upper reservoir), water conveyance system, underground powerhouse, and lower reservoir inlet/outlet structure (along the shoreline of Lake Jocassee). No modifications to the existing upper and lower reservoirs would be required for the Bad Creek II Complex other than construction of an upper reservoir inlet/outlet structure within the Bad Creek Reservoir and a lower reservoir inlet/outlet structure within Lake Jocassee.

With both powerhouses generating, full drawdown of the reservoir (i.e., 160 ft) will require approximately 11.4 hours, and full refill of the reservoir (i.e., "pumpback") will require approximately 13 hours. In this manner, the addition of the Bad Creek II Complex introduces more capacity and generation into the power grid during a shorter period of time, which could increase the number of pumping-generating cycles per year, in turn increasing annual generation from the Project. Historical average annual generation since the Project began operation in 1992 is 1,954,292 MW-hours (MWh). While annual generation for a pumped storage project is solely dependent upon how the station is used to supplement/integrate with the Duke Energy power grid, assuming the same utilization factor for the existing Project and a total Project installed capacity of 2,800 MW, the annual generation for the Bad Creek Project, with the Bad Creek II Complex added, would increase to an estimated 4,886,000 MWh, an increase of 2,932,000 MWh per year. (Note that this increase in average annual generation is incorrectly characterized in FERC's Scoping Document 2 [SD2] as 25,856 MWh.)



If Duke Energy decides not to pursue the Bad Creek II Complex prior to the filing of the Final License Application (FLA) in 2025, this relicensing alternative would not be further advanced through the relicensing studies or license application documents.

If Duke Energy decides to pursue the Bad Creek II Complex and obtains all necessary regulatory approvals for construction, the period for construction of the Bad Creek II Complex is expected to span approximately 6 years. The construction schedule and sequence are informed by the actual construction schedule for the existing Bad Creek Project (1985-1991). Assuming commencement of construction shortly following New License issuance by July 2027, the Bad Creek II Complex is expected to be fully in service in 2033. Major construction phases and milestones for the Bad Creek II Complex are expected to include the following:

Lower reservoir inlet/outlet:	Jul 2027 – Feb 2032
Upper reservoir inlet/outlet:	Dec 2029 – Feb 2032
Water conveyance system:	Mar 2028 – Mar 2031
Powerhouse:	Oct 2027 – Nov 2032
Transformer yard and switchyard:	Nov 2027 – Nov 2031
Testing and commissioning:	Feb 2033 – Feb 2034

Construction of the Bad Creek II Complex would require modifications to the existing Project Boundary to enclose the new facilities. Duke Energy currently owns or maintains under a property easement all lands that would be required for construction of the Bad Creek II Complex as depicted on Figure 1-3 and intends to propose an expanded Project Boundary in the FLA that would include all lands necessary for access to, or control of, the expanded Project facilities. The proposed areas for expansion overlain on the existing Project Boundary are shown on Figure 1-4 at the end of this section to indicate where the Project Boundary would be expanded or modified by the Bad Creek II Complex

While Duke Energy owns all property required for the existing Project in fee simple, a portion of the transmission line corridor is currently maintained under a property easement. If additional lands are required to accommodate the selected corridor for the new transmission line, this RSP may require modification to cover additional areas, as would the expanded Project Boundary proposed in the Final License Application.



If, during pre-filing, Duke Energy determines that it will not include the Bad Creek II Complex in its final licensing proposal, the Licensee proposes instead to continue to operate the project as required by the Existing License.

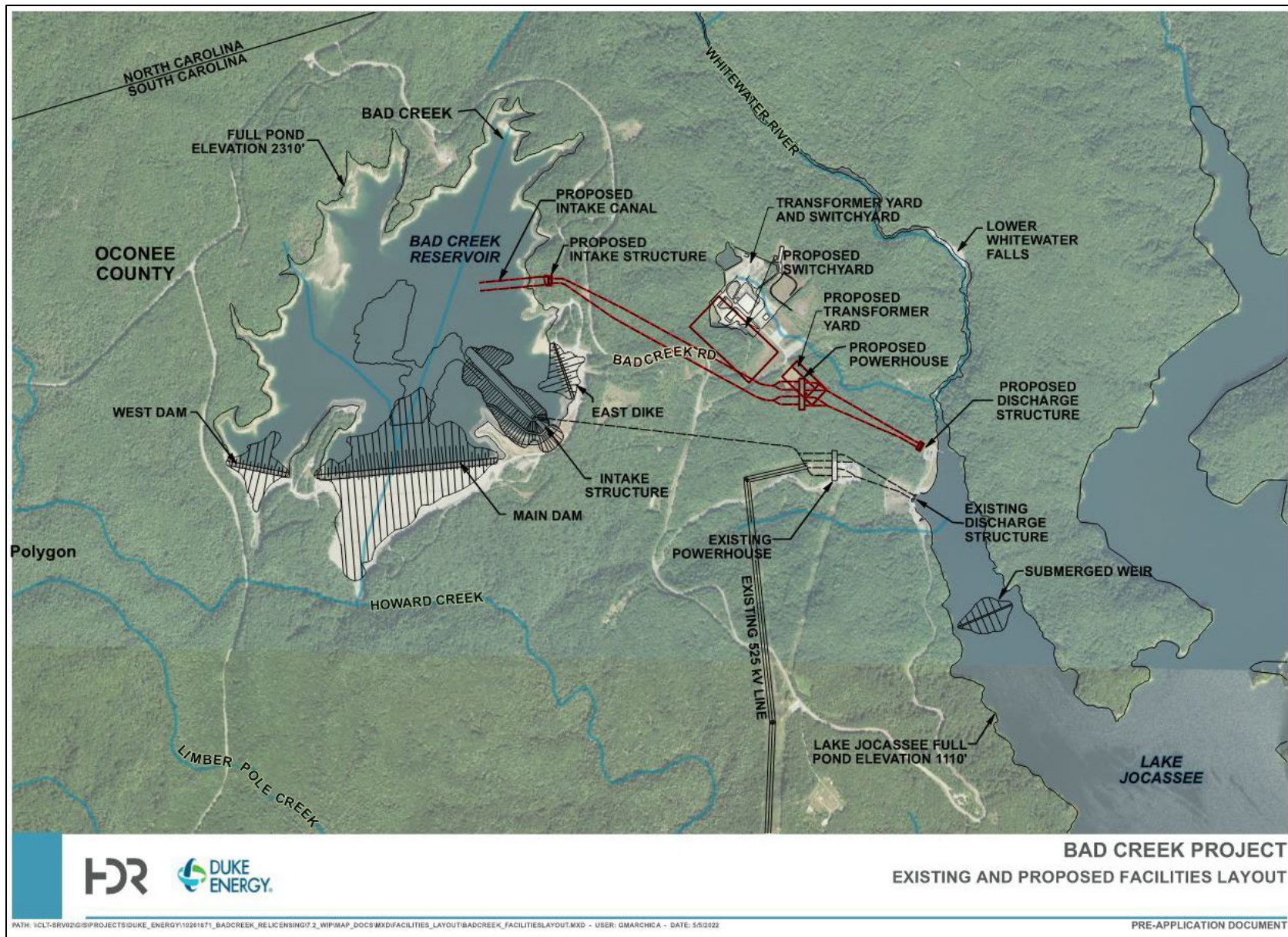


Figure 1-3. Proposed Bad Creek II Complex Facilities Layout (Major Existing Bad Creek Project Facilities are also Shown)



1.2 Study Plan Overview

Duke Energy filed a Pre-Application Document (PAD) and associated Notice of Intent (NOI) with the Commission on February 23, 2022 to initiate the ILP. The PAD provides a description of the Project and summarizes the existing, relevant, and reasonably available information to assist the Commission, resource agencies, Indian Tribes, non-governmental organizations (NGOs), and other stakeholders in identifying issues, determining information needs, and preparing study requests.

The National Environmental Policy Act of 1969 (NEPA), the Commission's regulations, and other applicable statutes require the Commission to independently evaluate the environmental effects of issuing a new license for the Project and to consider reasonable alternatives to relicensing. The Commission will prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS) (i.e., NEPA document) that describes and evaluates the site-specific and cumulative potential effects (if any) of issuing a subsequent license, as well as potential alternatives to relicensing. The EA or EIS is supported by a scoping process to identify issues, concerns, and opportunities for resource protection and enhancement associated with the proposed action. Accordingly, the Commission issued Scoping Document 1 (SD1) for the Project on April 22, 2022. SD1 was intended to advise resource agencies, Indian Tribes, NGOs, and other stakeholders as to the proposed scope of the EA or EIS and to seek additional information pertinent to the Commission's analysis. As provided in 18 CFR §5.8(a) and §5.18(b), the Commission issued a notice of commencement of the relicensing proceeding concomitant with SD1.

On May 16 and 17, 2022, the Commission held virtual (call-in) public scoping meetings due to concerns with large gatherings related to COVID-19. During these meetings, FERC staff presented information regarding the ILP and details regarding the study scoping process and how to request a relicensing study, including the Commission's study criteria. In addition, FERC staff solicited comments regarding the scope of issues and analyses for the EA or EIS. Due to the ongoing construction upgrade activities at the Project, the remote location of the Project, and the ongoing COVID-19 pandemic, Duke Energy prepared an overview video orientation of the Project for general viewing by interested parties in lieu of an on-site environmental review site

visit. The video can be viewed from a link on the Project's public relicensing website.² The virtual environmental site review presentation was given by Duke Energy one hour prior to each scoping meeting, pursuant to 18 CFR §5.8(d).

Resource agencies, Indian Tribes, and other interested parties were afforded a 60-day period to request studies and provide comments on the PAD and SD1. The comment period was initiated with the Commission's April 22, 2022 notice of commencement and concluded on June 23, 2022. During the comment period, eight stakeholders filed letters with the Commission providing general comments and comments regarding the PAD/NOI and SD1. A summary of stakeholder comments is provided in Appendix A of this document and copies of the letters filed with the Commission are provided in Appendix B. FERC also submitted comments during the comment period, which were addressed in Section 5 the Proposed Study Plan (PSP). Only one formal study request was received during the comment period (from the Commission [Environmental Justice]). The ILP required Duke Energy to file the PSP within 45 days from the close of the June 23, 2022 comment period (i.e., on or before August 7, 2022), therefore Duke Energy submitted the PSP on August 5, 2022.³ On the same day (August 5th), FERC issued SD2 to provide information on the proposed action and alternatives, the environmental analysis process FERC staff will follow to prepare the NEPA document, and a list of issues to be addressed in the NEPA document. On August 16, 2022, Duke Energy held a site visit at the Project for relicensing Resource Committee participants and provided a tour of the powerhouse and upper reservoir.

The PSP meeting was held in Greenville, SC on September 7, 2022. A summary of the PSP meeting was prepared by Duke Energy and filed with FERC and the Project mailing list comments on October 19, 2022. Comments on the PSP were due 90 days from filing, therefore, the commenting period closed on November 5th. Comments on the PSP were considered in the development of this RSP. Duke Energy also held a virtual meeting with Resource Committee members on November 17, 2022 to review and discuss the comments received. All comments received and Duke Energy's comment responses are included in the Comment Response Matrix

² www.badcreekpumpedstorage.com

³ If the due date falls on a weekend or holiday, the deadline is the following business day.



in Appendix A. Copies of meeting summaries and other correspondence referenced above are provided in Appendix B.

The purpose of this RSP is to present the studies proposed by Duke Energy and to address, as appropriate, the comments and study requests submitted by resource agencies and other stakeholders. This RSP also provides FERC, regulatory agencies, Indian Tribes, and other stakeholders with the methodology and details of Duke Energy's proposed studies. Pursuant to the ILP, the Commission will issue a final Study Plan Determination within 30 days of the deadline for filing this RSP (i.e., by January 4, 2023).

1.2.1 FERC Study Criteria

FERC's ILP regulations require that stakeholders who provide study requests include specific information to allow the Licensee, as well as Commission staff, to determine a requested study's appropriateness and relevancy to the Project and proposed action. As described in 18 CFR §5.9(b) of the Commission's ILP regulations, and as presented by FERC staff during the May 16 and 17, 2022 scoping meetings, the required information to be included in a study request is as follows:

(1) Describe the goals and objectives of each study and the information to be obtained (§5.9(b) (1));

This section describes why the study is being requested and what the study is intended to accomplish, including the goals, objectives, and specific information to be obtained. The goals of the study must clearly relate to a need to evaluate the effects of the Project on a particular resource. The objectives are the specific information that needs to be gathered to allow achievement of the study goals.

(2) If applicable, explain the relevant resource management goals of the agencies or Indian Tribes with jurisdiction over the resource to be studied (§5.9(b) (2));

This section must clearly establish the connection between the study request and management goals or resource of interest. A statement by an agency connecting its study request to a legal, regulatory, or policy mandate needs to be included that thoroughly explains how the mandate relates to the study request, as well as the Project's potential impacts.

(3) If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study (§5.9(b) (3));

This section is for non-agency or Indian Tribes to establish the relationship between the study request and the relevant public or tribal interest considerations.

(4) Describe existing information concerning the subject of the study proposal and the need for additional information (§5.9(b) (4));

This section must discuss any gaps in existing data by reviewing the available information presented in the PAD or information relative to the Project that is known from other sources. This section must explain the need for additional information and why the existing information is inadequate.

(5) Explain any nexus between project operation and effects (direct, indirect, and/or cumulative) on the resource to be studied and how the study results would inform the development of license requirements (§5.9(b) (5));

This section must clearly connect Project operations and Project effects on the applicable resource. This section can also explain how the study results would be used to develop PM&E measures that could be implemented under a new FERC license. The proposed protection, mitigation, and enhancement (PM&E) measures can include those related to any mandatory conditioning authority under Section 401 of the Clean Water Act⁴ or Sections 4(e) and 18 of the Federal Power Act, as applicable.

(6) Explain how any proposed study methodology is consistent with generally accepted practices in the scientific community or, as appropriate, considers relevant tribal values and knowledge. This includes any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration (§5.9(b) (6));

This section must provide a detailed explanation of the study methodology. The methodology may be described by outlining specific methods to be implemented or by referencing an approved and established study protocol and methodology.

(7) Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs (§5.9(b) (7));

This section must describe the expected level of cost and effort to conduct the study. If there are proposed alternative studies, this section can address why the alternatives would not meet the stated information needs.

⁴ 33 U.S.C. §1251 et seq.

1.2.2 Duke Energy's Revised Study Plan

Duke Energy has evaluated the study requests and comments submitted by the Commission and stakeholders, with a focus on the requests that specifically addressed the seven criteria set forth in §5.9(b) of the Commission's ILP regulations, as discussed above. Based on Duke Energy's review of the requested study and comments, FERC criteria for study requests under the ILP, and available information (e.g., associated with the previous licensing effort or resulting from ongoing monitoring activities), in the RSP, as in the PSP, Duke Energy is proposing a total of six resource studies. These six studies consider stakeholder comments for relicensing of the existing Project as well as studies proposed by Duke Energy in the PAD for construction of Bad Creek II:

- Water Resources Study
- Aquatic Resources Study
- Cultural Resources Study
- Visual Resources Study
- Recreational Resources Study
- Environmental Justice Study

Information regarding each of these studies is provided in Appendices C through H of this RSP.

For each of Duke Energy's proposed studies, this RSP describes:

- 1) The goals and objectives of the study;
- 2) The defined study area;
- 3) A summary of background and existing information pertaining to the study;
- 4) The nexus between Project operations and potential effects on the resources to be studied;
- 5) The proposed study methodology;
- 6) Level of effort, cost, and schedules for conducting the study; and
- 7) References cited.

1.2.3 Other Studies in Support of Project Expansion

Duke Energy recognizes that construction of the Bad Creek II Complex will require studies and field surveys in addition to the studies proposed in the RSP. Because these studies will be conducted pursuant to separate but parallel engineering or regulatory processes, the Licensee

does not believe that additional study under the formal ILP study plan for the relicensing are required (ILP Study Criteria No. 4). These studies are described below.

Geology

As summarized in FERC's SD1 and SD2, Duke Energy is conducting a geotechnical investigation and geological assessment to identify potential effects of construction and operation of the Bad Creek II Complex and inform mitigation measures to maintain geological stability. Duke Energy has provided excerpts and relevant attachments from this feasibility study in Appendix I. More specifically, information from the geologic and seismic study and geotechnical study is included in Appendix I.

Hydrology, Climate, and Operations

While not studies per se, existing operations and hydraulic models developed for the Bad Creek II Complex feasibility study and the past KT Project relicensing will be used and updated by Duke Energy in parallel with the ILP studies. These models are expected to be utilized to simulate different operation and climatological scenarios in support of other studies proposed in the RSP (e.g., Water Resources Study).

Previous models of the upper Savannah River Basin have been developed by Duke Energy as well as the U.S. Army Corps of Engineers (USACE) to support a variety of hydropower-related evaluations in the upper Savannah River Basin. Physical characteristics and reservoir operations have been evaluated in several updates and iterations of these models, most recently for the relicensing of the KT Project and the 2014 renewal of the USACE 1968 Operating Agreement between Duke Energy, USACE, and the Southeastern Power Administration.

The primary model used by Duke Energy for KT Project and Bad Creek Project operations is the Computer Hydro-Electric Operations and Planning Software™ (CHEOPS) model developed for the KT Project relicensing. This computer-based hydraulic water quantity simulation model includes daily unimpaired inflow data series with the hydraulic characteristics of the reservoirs and flow release structures. The operations model's system includes the Duke Energy-owned Bad Creek Project, the Jocassee Development, and Keowee Development and the downstream USACE projects (Hartwell, Richard B. Russell, and J. Strom Thurmond). Detailed information about this model was included in reports filed with FERC in 2014 as part of the KT Project

License Application. Since that time, the model has been updated to reflect unit upgrades at Jocassee and Bad Creek projects, as well as to simulate operations of the potential Bad Creek II Complex.

Most recently, a three-dimensional computational fluid dynamics (CFD) model study was carried out to evaluate, among other considerations, shoreline erosion in the Whitewater River arm of Lake Jocassee due to operation of the Bad Creek II Complex. Excerpts and relevant attachments from the CFD model study report are included in Appendix I.

Transmission Siting Study

Also as acknowledged in SD1 and SD2, Duke Energy is in the process of conducting a transmission line siting study for the transmission lines that would be part of the Bad Creek II Complex. This study is being performed internally by Duke Energy under a separate schedule and process, to comply with relevant requirements pursuant to The South Carolina Utility Facility Siting and Environmental Protection Act, S.C. Code Ann. § 58-33-10 et seq. Duke Energy will provide a status updated on the execution or findings of this study in the Initial Study Report (ISR).

Additional Natural Resources Field Surveys and Assessments

In addition to the resource issues listed in each study plan proposed in this RSP, FERC's SD1 and SD2 also listed additional preliminary environmental issues to be addressed in FERC's NEPA document. Some of these impacts can be evaluated using existing information, including the natural resources assessments performed for Duke Energy prior to the filing of and presented in the PAD, and others will be informed by field surveys and natural resource assessments to be performed in support of parallel regulatory applications and approvals. Such resource issues include, generally, effects of Bad Creek II Complex construction and spoil disposal on soil erosion and sedimentation, as well as water quality and aquatic resources; effects of project construction, operation, and maintenance activities and project-related recreation on terrestrial resources and threatened and endangered species; and effects of land management activities within the Project Boundary on natural resources. Other environmental issues preliminarily identified by FERC for evaluation in the NEPA document will be addressed through desktop

evaluations performed in support of preparation of Exhibit E (environmental report) of the Draft and Final License Application.

Additionally, in parallel with the ILP pre-filing consultation and study phase, Duke Energy will be consulting with USACE and resource agencies in support of development of application for Section 404/401 permitting under the Clean Water Act.⁵ For the benefit of FERC staff and other stakeholders, major steps in this process to be taken by Duke Energy are summarized below:

- Jurisdictional determination to identify and map aquatic resources in the field to determine jurisdictional waters of the U.S. (WOTUS) that have the potential to be impacted by Bad Creek II construction.
- Pre-application consultation with the USACE Charleston District and applicable interested resource agencies (federal, state, tribal, and local).
- Application for Section 401 water quality certification for Project construction.⁶
- Submittal of pre-construction notification of application, including all necessary information for standard permit applications (33 CFR §325.1):
 - Public Notice Description
 - Approved USACE Jurisdictional Determination
 - Project Purpose and Need
 - Areas of WOTUS directly/indirectly affected by volume of fill material
 - Alternatives Analysis, which may include a no-action alternative and on-site alternatives analysis
 - Avoidance and minimization measures
 - Description of secondary/indirect and cumulative effects
 - Detailed Project Schedule

⁵ Construction of the proposed Bad Creek II Complex would result in unavoidable impacts to aquatic resources. Section 404 of the Clean Water Act (33 U.S.C §1344) designates the USACE as the statutory authority to regulate the discharges of dredged and fill material in waters of the U.S. The USACE also has authority to regulate and permit work in navigable WOTUS under Section 9 and 10 of River and Harbors Act of 1899 (33 CFR 320.3). A federal agency may not issue a permit or license to conduct any activities that may result in discharge to WOTUS unless a Section 401 Water Quality Certification is issued, or certification is waived to protect water quality of federal regulated waters. The South Carolina Department of Health and Environmental Control administers the 401 Water Quality Certification program in South Carolina.

⁶ Duke Energy plans to consult with South Carolina Department of Health and Environmental Control to determine the potential and process for a single Section 401 Water Quality Certification for the expansion and operation of the Project over the new license term.



- Names and Addresses of Adjoining Property Owners
- List of authorizations required by other federal, interstate, state, or local agencies for the work
- Biological Assessment for Endangered Species Act consultation.
- Cultural Resources Assessment
- Compensatory Mitigation Plan, used to offset losses resulting in unavoidable impacts to waters of the U.S.

Both USACE and FERC have their own responsibilities for review and authorization under NEPA and other related statutes. As outlined in the *2011 Memorandum of Understanding between the U.S. Army Corps of Engineers and the Federal Energy Regulatory Commission on Non-Federal Hydropower Projects*, FERC serves as the lead Federal agency for the preparation of the NEPA document, and USACE may choose to serve as a cooperating agency.

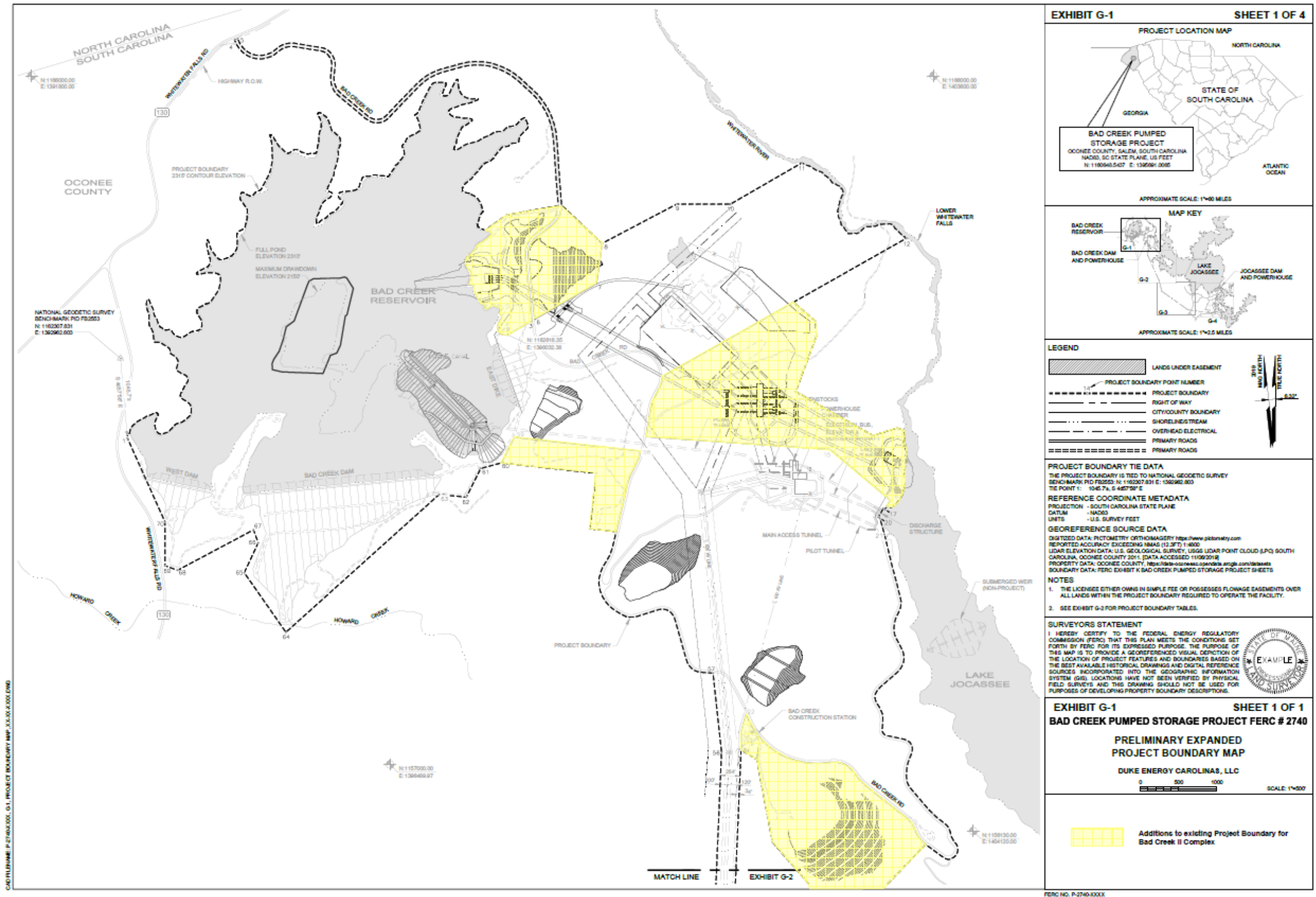


Figure 1-4. Existing Project Boundary and Proposed Areas for Expansion (Sheet 1 of 4)

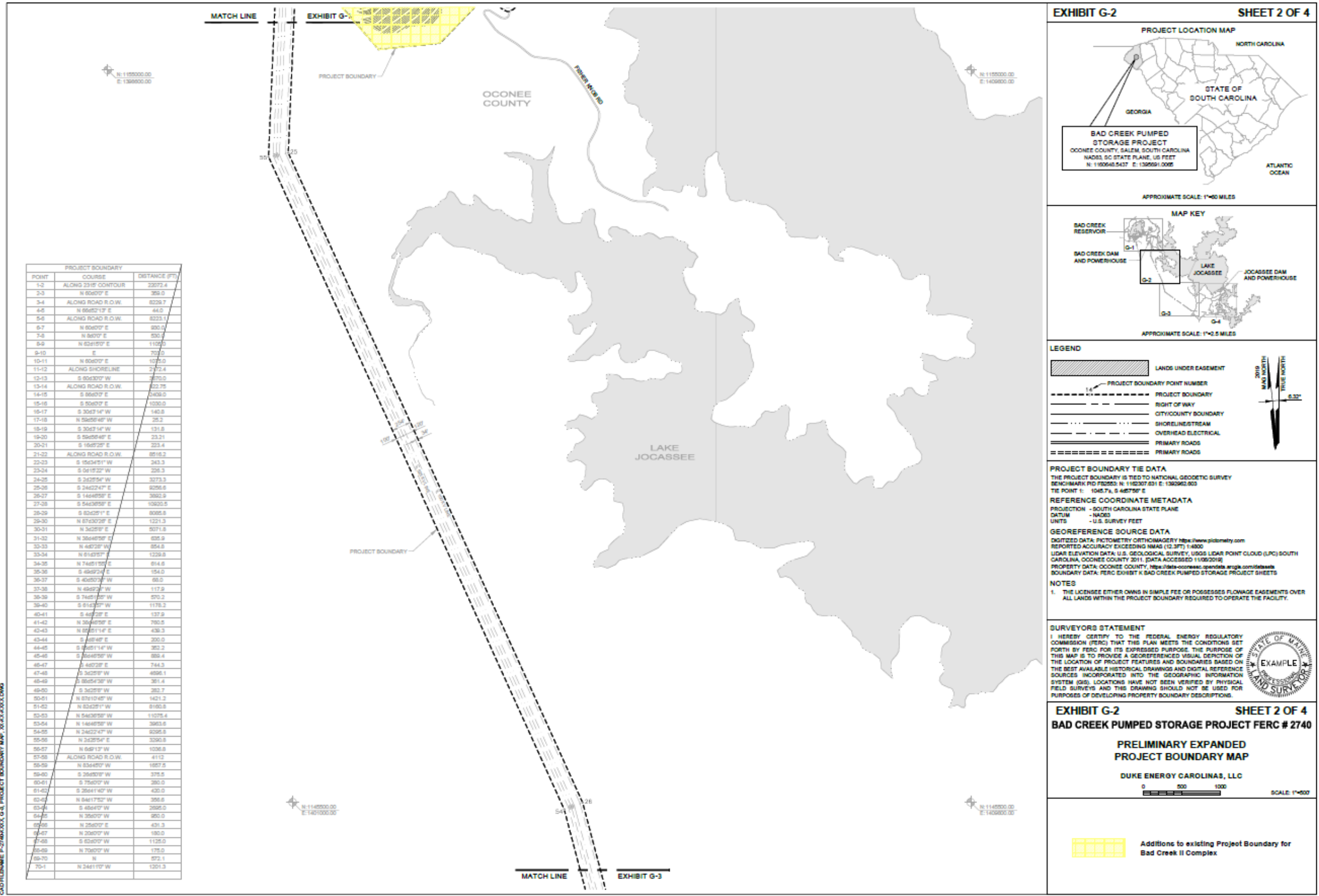


Figure 1-4. Existing Project Boundary and Proposed Areas for Expansion (Sheet 2 of 4)

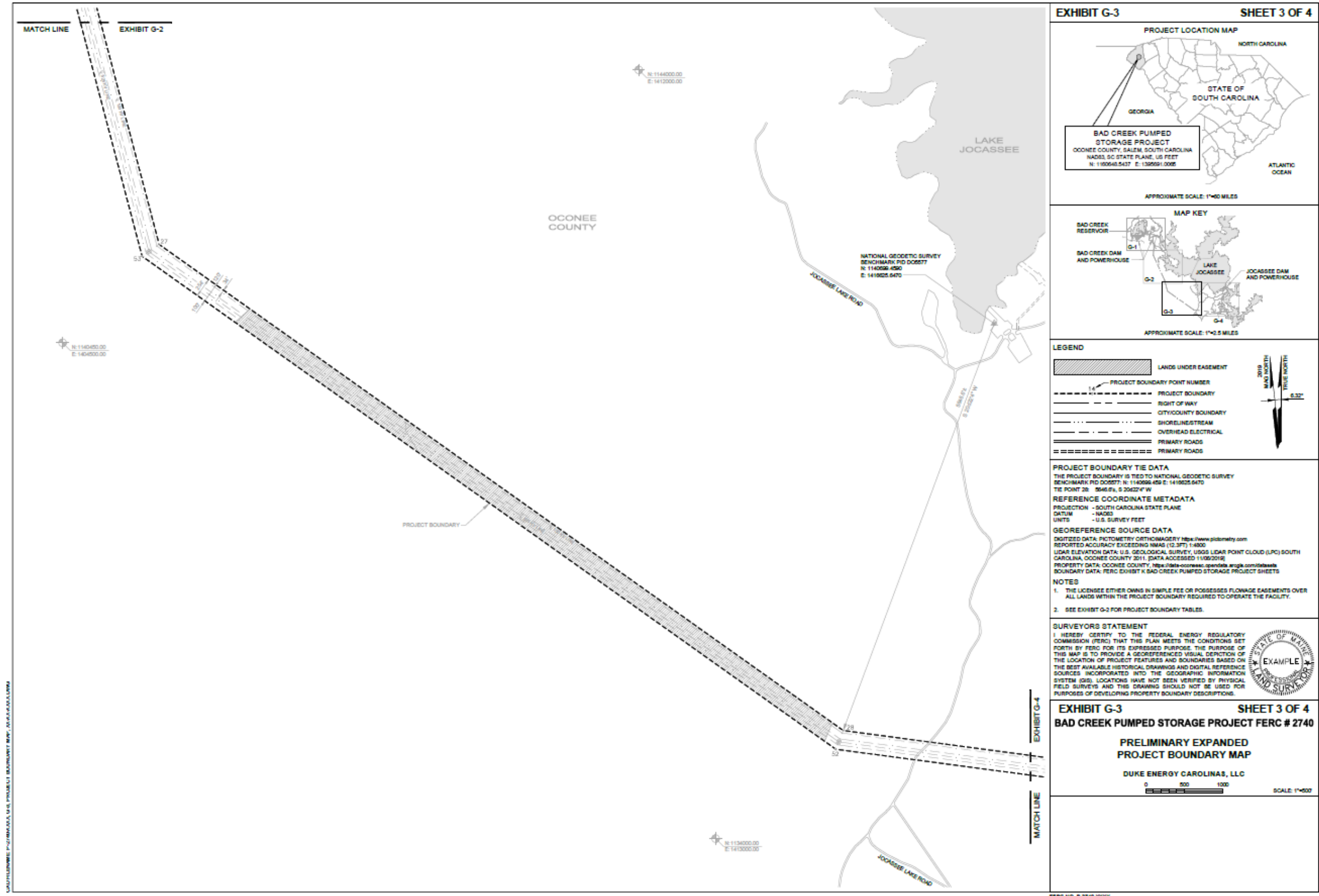


Figure 1-4. Existing Project Boundary and Proposed Areas for Expansion (Sheet 3 of 4)

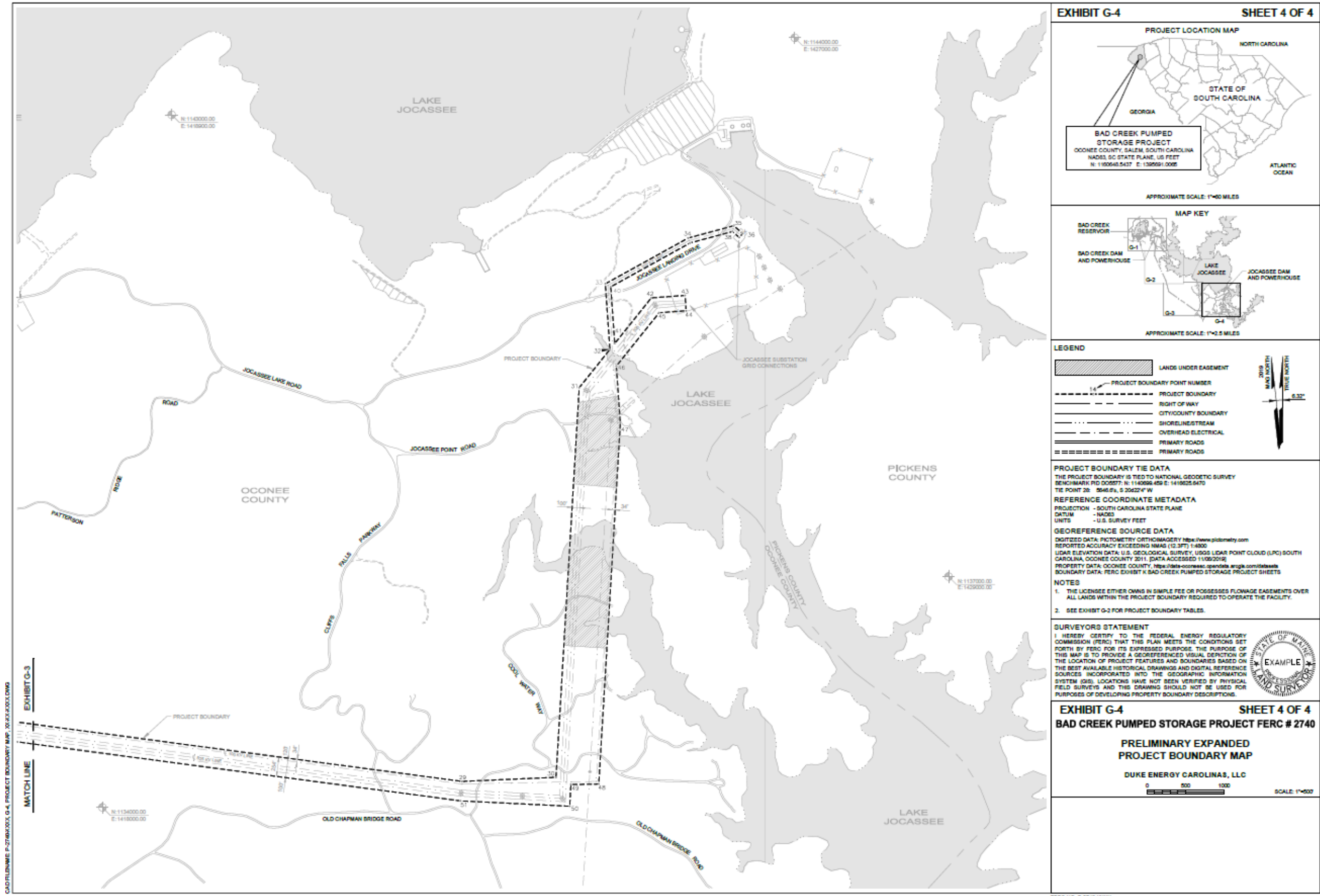


Figure 1-4. Existing Project Boundary and Proposed Areas for Expansion (Sheet 4 of 4)



2 Execution of the Study Plan

As required by Section 5.15 of FERC’s ILP regulations, Duke Energy will prepare ILP study progress reports on a quarterly basis, develop and file an ISR, hold an ISR Meeting with stakeholders and FERC staff to discuss the initial study results, and prepare and file an Updated Study Report (USR), and convene an associated USR Meeting as appropriate. Duke Energy will submit all study documents that must be filed with the Commission via FERC’s eFiling system.

2.1 Process Plan and Schedule

The Process Plan and Schedule, as appended to FERC’s SD1, is presented in Table 2-1. Gray shaded milestones are unnecessary if there are no study disputes. If the due date falls on a weekend or holiday, the due date is the following business day. Early filings or issuances will not result in changes to these deadlines.

Table 2-1. Process Plan and Schedule

Activity	Responsible Parties	Timeframe	Estimated Filing Date or Deadline
File NOI and PAD (18 CFR §5.5(d))	Licensee	Within 5 years to 5.5 years prior to license expiration	Feb 23, 2022
Initial Tribal Consultation Meeting (18 CFR §5.7)	FERC	No later than 30 days following filing of NOI/PAD	Mar 25, 2022
Issue Notice of NOI/PAD and Scoping Document 1 (SD1) (18 CFR §5.8(a))	FERC	Within 60 days following filing of NOI/PAD	Apr 22, 2022
Conduct Scoping Meetings and site visit (18 CFR §5.8(b)(viii))	FERC	Within 30 days following Notice of NOI/PAD and SD1	May 16 and 17, 2022
Comments on PAD, SD1, and Study Requests (18 CFR §5.9(a))	Licensee Stakeholders	Within 60 days following Notice of NOI/PAD and SD1	June 23, 2022
Issue Scoping Document 2 (SD2), if necessary (18 CFR §5.10)	FERC	Within 45 days following deadline for filing comments on PAD/SD1	Aug 5, 2022
File Proposed Study Plan (PSP) (18 CFR §5.11)	Licensee	Within 45 days following deadline for filing comments on PAD/SD1	Aug 5, 2022
PSP Meeting (18 CFR §5.11(e))	Licensee	Within 30 days following filing of PSP	Sep 7, 2022
Comments on PSP (18 CFR §5.12)	Stakeholders	Within 90 days following filing of PSP	Nov 5, 2022



Activity	Responsible Parties	Timeframe	Estimated Filing Date or Deadline
File Revised Study Plan (RSP) (18 CFR §5.13(a))	Licensee	Within 30 days following deadline for comments on PSP	Dec 5, 2022
Comments on RSP (18 CFR §5.13(b))	Stakeholders	Within 15 days following filing of RSP	Dec 20, 2022
Issue Study Plan Determination (18 CFR §5.13(c))	FERC	Within 30 days following filing of RSP	Jan 4, 2023
§5.13(a) Notice of Formal Study Dispute	Mandatory Conditioning Agencies	With 20 days of SPD	Jan 24, 2023
§5.13(1) Study Dispute Determination	FERC	Within 70 days of Notice of Formal Study Dispute	April 4, 2023
Conduct First Season of Studies (18 CFR §5.15)	Licensee	-	Spring-Fall 2023
File Study Progress Reports (18 CFR §5.15(b))	Licensee	Quarterly	Spring 2023 -Fall 2024
File Initial Study Report (ISR) (18 CFR §5.15(c))	Licensee	Pursuant to the Commission-approved study plan or no later than 1 year after Commission approval of the study plan, whichever comes first	Jan 4, 2024
ISR Meeting (18 CFR §5.15(c)(2))	Licensee Stakeholders	Within 15 days following filing of ISR	Jan 19, 2024
File ISR Meeting Summary (18 CFR §5.15(c)(3))	Licensee	Within 15 days following ISR Meeting	Feb 5, 2024
Comments on ISR Meeting and Additional or Modified Study Requests (18 CFR §5.15(c)(4))	Stakeholders	Within 30 days following filing of ISR Meeting Summary	Mar 4, 2024
File Response to Comments on ISR and Meeting Summary (18 CFR §5.15(c)(5))	Licensee	Within 30 days following filing of ISR Meeting Comments	Apr 3, 2024
Resolution of Meeting Summary Disagreements and Issue Amended Study Plan Determination (if required) (18 CFR §5.15(c)(6))	FERC	Within 30 days following filing of response to ISR Meeting Comments	May 3, 2024
Conduct Second Season of Studies (if necessary)	Licensee	-	Spring-Fall 2024
File Updated Study Report (USR) (18 CFR §5.15(f))	Licensee	Pursuant to the approved study plan or no later than 2 years after Commission approval, whichever comes first	Jan 3, 2025



Activity	Responsible Parties	Timeframe	Estimated Filing Date or Deadline
USR Meeting (18 CFR §5.15(f))	Licensee Stakeholders	Within 15 days following filing of USR	Jan 18, 2025
File USR Meeting Summary (18 CFR §5.15(f))	Licensee	Within 15 days following USR Meeting	Feb 3, 2025
Deadline to File Preliminary Licensing Proposal (PLP) or Draft License Application (DLA) (18 CFR §5.16(a))	Licensee	No later than 150 days prior to the deadline for filing the FLA	March 3, 2025
File Comments or Disagreements on USR Meeting Summary (18 CFR §5.15(f))	Stakeholders	Within 30 days following filing of USR Meeting Summary	Mar 4, 2025
File Response to Comments on USR Meeting Summary (18 CFR §5.15(f))	Licensee	Within 30 days following filing of Disputes	Apr 3, 2025
Resolution of USR Meeting Summary Dispute (if necessary) (18 CFR §5.15(f))	FERC	Within 30 days following filing of response to USR Meeting Comments	May 1, 2025
Comments on PLP or DLA (18 CFR §5.16(e))	Stakeholders	Within 90 days following filing of PLP or DLA	June 2, 2025
Deadline to file FLA (18 CFR §5.17)	Licensee	No later than 24 months before the existing license expires	July 31, 2025
Publish Public Notice of FLA Filing (18 CFR §5.17(d)(2))	Licensee	Within 14 days following filing of FLA filing	August 13, 2025

2.2 Proposed Studies and Schedule

Table 2-2 lists the six proposed studies and the proposed schedule for each. Duke Energy expects to report on the progress and results of studies within the framework afforded by the ISR and associated ISR Meeting, as well as the USR and USR meeting. Based on the exact timing of completion of work for each study, Duke Energy may issue draft products between the ISR and USR to the extent practicable. At this time, Duke Energy is proposing to file technical study reports with the Commission and to provide stakeholders access to the study reports consistent with the schedule presented in Table 2-2. As necessary, Duke Energy will update stakeholders of changes in the schedule in quarterly study progress reports.



Table 2-2. Proposed Studies and Schedule

Study	Anticipated Date of Study Completion	Anticipated Date of Initial Study Report
1. Water Resources Study	Winter 2024	January 4, 2024
2. Aquatic Resources Study	Fall 2023	January 4, 2024
3. Cultural Resources Study	Fall 2023	January 4, 2024
4. Visual Resources Study	Summer 2024	January 4, 2024
5. Recreational Resources Study	Fall 2023	January 4, 2024
6. Environmental Justice Study	Fall 2023	January 4, 2024

2.3 Study Area

Consistent with the ILP study requirements, Duke Energy has proposed a study area for each individual study that considers existing lands in the Project Boundary, potential expansion of the Project Boundary for the Bad Creek II Complex, and additional areas where the potential for relicensing activities to impact specific resources exists. Note that the study areas proposed in this RSP have been refined since the preliminary study areas presented in the PSP to align with the expanded Project Boundary, where appropriate. Duke Energy believes the tasks and activities within the study areas described in this RSP are sufficient to inform agency recommendations and FERC license conditions for the Project and focusing the geographic scope of the proposed studies on these Study Areas is consistent with generally accepted practice in the scientific community and within FERC relicensing criteria (ILP Study Criteria No. 6).

3 Responses to Stakeholder Comments and Study Requests

In developing this RSP, Duke Energy has carefully evaluated and considered FERC and stakeholder comments and study requests filed in response to the PAD, SD1, SD2, and the PSP, and as discussed during meetings with stakeholders (i.e., the PSP meeting and two Resource Committee meetings voluntarily convened by Duke Energy).

3.1 Comments and Study Requests Received in Response to the PAD and SD1

Duke Energy filed the PAD for the Project on February 23, 2022. FERC issued SD1 on April 22, 2022 and conducted virtual public scoping meetings on May 16 and 17, 2022. In accordance with ILP regulations, comments on the PAD and SD1 and study requests were due to FERC by June 23, 2022. By letter to Duke Energy dated June 16, 2022, FERC staff submitted comments on the PAD and requested additional clarification and/or information. Duke Energy's responses to FERC comments were included in Section 5 of the PSP. Duke Energy received one study request from the Commission and comment letters from the following stakeholders:

- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- South Carolina Department of Natural Resources (SCDNR)
- Foothills Trail Conservancy
- Upstate Forever
- Friends of Lake Keowee Society
- Fishers Knob Homeowners

Duke Energy reviewed the stakeholder comments and requested studies included in the FERC record. Study comments received were considered in preparation of each proposed resource study plan and a summary of stakeholder comments on the PAD/NOI and SD1 was provided in Appendix A of the PSP (these comment responses are now part of the official correspondence documentation, included in Appendix B of this RSP).

3.1.1 Requested Studies Adopted

In the PAD, Duke Energy proposed two studies for the relicensing of the existing Project (Water and Recreational Resources) and three additional studies (Aquatic Resources, Cultural Resources, Visual Resources) if the proposed facility were to be pursued. This RSP assumes that the Bad Creek II Complex will be constructed; therefore, it includes all studies initially proposed in the PAD:

- (1) Water Resources Study
- (2) Aquatic Resources Study
- (3) Recreational Resources Study
- (4) Cultural Resources Study
- (5) Visual Resources Study

Based on the Commission's study request, a sixth study was adopted in the PSP and is also included in this RSP:

- (6) Environmental Justice Study

3.1.2 Requested Studies Not Adopted

No formal study requests (i.e., addressing the FERC ILP study criteria) were received from stakeholders (other than the Environmental Justice Study requested by FERC); therefore, this section is not applicable.

3.1.3 Requested Studies Adopted with Alteration

No formal study requests (i.e., addressing the FERC ILP study criteria) were received from stakeholders (other than the Environmental Justice Study requested by FERC); therefore, this section is not applicable.

3.2 Comments and Study Requests Received in Response to the PSP

Duke Energy received timely formal comments from the Commission, SCDNR, Upstate Forever, and the Foothills Trail Conservancy. Comments were to include an explanation of any study plan



concerns and any accommodations reached with Duke Energy regarding those concerns (18 CFR §5.12), and any proposed modifications to the PSP were to address the Commission's criteria as presented in 18 CFR §5.9(b).

In preparation of this RSP, Duke Energy reviewed the stakeholder comments and study requests included in the FERC record. A comprehensive summary of study requests and study-related comments is provided in Appendix A. Copies of the comments and other consultation correspondence received are included in Appendix B.



4 FERC Additional Information Requests (AIRs) and Supplemental Comments

By letter to Duke Energy dated November 3, 2022, FERC staff submitted supplemental comments and requested additional clarification and/or information. Duke Energy's responses are provided in Table 4-1.



Table 4-1. Responses to FERC Additional Information Requests

Comment / Request for Information	Duke Energy Response
<p>Response #5: Duke Energy states that the potential operation of the Complex will not result in any change to the operating band of the upper reservoir ‘from existing conditions.’ The current license order authorizes Duke Energy to operate the upper reservoir between 2,150 feet mean sea level (msl) and 2,310 feet msl (a 160-foot fluctuation band). However, the PAD states that under normal project operation, the upper reservoir is maintained between 2,250 feet msl and 2,310 feet msl (a 60-foot fluctuation band). Please clarify whether ‘existing conditions’ refer to the 160-foot band or the 60-foot band in the Revised Study Plan (RSP).</p>	<p>The PAD states: “<i>Bad Creek currently operates on more of a “daily cycle” mode, commonly alternating between generating and pumping on a daily basis, with the reservoir typically maintained in the upper 50 to 60 ft at elevations of 2,310 and 2,250 ft msl (compared to a maximum drawdown of 160 ft).</i>”</p> <p>The 160-foot is in reference to the original design and licensed capacity to operate the upper reservoir within a 160-foot maximum drawdown, whereas the 60-foot was simply referencing the operating band normally used on a day-to-day basis. To clarify “existing conditions” (i.e., the addition of Bad Creek II will not cause a modification to “existing conditions”), Duke Energy is referencing the licensed 160-foot operating band; clarification has also been provided in Section 6.4 of the Water Resources Study.</p>
<p>Response #9: In order to provide stakeholders a complete and accurate understanding of the existing and proposed project features, and vegetation management strategies, in the RSP, please include a map displaying, and a table listing, all primary transmission line right-of-way (ROW) corridors, in the current and proposed project, including, as appropriate, the corridors identified in the PSP by Duke Energy’s names: Jocassee NW 1 (1J2672 BP-#7, 1J2672#13-EP, & 5J2817 BP-EP) and Oconee NW 1 (1J2672 #7-13). On the map, please show all primary transmission ROW corridors as being within the proposed project boundary and label each transmission line corridor with Duke Energy’s names. In the table, please include Duke Energy’s names for each transmission line corridor, as well as the transmission ROW characteristics such as width and length, and line characteristics such as voltage.</p> <p>Further, in the RSP, please explain which native grasses, wildflowers and herbaceous plants are the “desirable allelopathic” plants that became established in the Jocassee NW 1 Corridor after the 2018 aerial treatment. Also, please note that although <i>Lespedeza bicolor</i> was described as a native species in the PSP, it is a non-native invasive species. Please refer to the USDA’s Plants Database (https://plants.usda.gov/home) and/or other authoritative sources to confirm origins/nativity of plants for accurate descriptions.</p> <p>Lastly, the PSP states that Duke Energy uses a “bare ground mix” of herbicides to treat brush and grasses on dam faces to keep them vegetation-free, and that this same mix is used by Duke Energy’s transmission department. However,</p>	<p>A table (Table 4-2) and map (Figure 4-1) depicting the primary and the proposed transmission ROW corridors including the specific Duke Energy transmission line names are provided at the end of this section. The transmission lines occur within the FERC Project Boundary. Duke Energy stated that a 2018 herbicide application eliminated a substantial amount of brush type growth and helped establish a large amount of desirable allelopathic type vegetation such as native grasses, wildflower, and herbaceous plants. Allelopathic plants (i.e., plants that inhibit the growth of others) that occur within the Jocassee NW1 Corridor include: rhododendron and laurel species (<i>Rhododendron</i> and <i>Kalmia</i> spp.), goldenrod species (<i>Solidago</i> spp.), several fern species, dogfennel (<i>Eupatorium capillifolium</i>), and several species of grasses including switchgrass (<i>Panicum virgatum</i>) and little bluestem (<i>Schizachyrium scoparium</i>). Duke Energy’s target and resulting vegetation types associated with vegetation management (i.e., herbicide use) are as follows. (1) Transmission line ROWs: Target species include woody vegetation (e.g., pine, poplar, red maple) and vines, within the ROW corridor, that can grow vertically to interfere with the structures, as well as invasive species. Resulting vegetation types include low growing shrubs and herbaceous grasses and plants. (2) On-site access roads: Target species are all vegetation types (woody and herbaceous species) that can affect and obstruct access road use. There are no resulting vegetation types (all vegetation removed). (3) Reservoir areas (dam access roadways, dam abutments, and dam face): Target species are all vegetation types (woody and herbaceous species). There are no resulting vegetation types (all vegetation removed). (4) Transformer and</p>



Comment / Request for Information	Duke Energy Response
<p>based on the description of herbicide treatments in the PSP, Duke Energy doesn't appear to be targeting a "bare ground" result in the project transmission line ROW corridors. In the RSP, please clarify Duke Energy's target, resulting vegetation types for each treatment area and where Duke Energy's "bare ground mix" of herbicides is used within the project boundary.</p>	<p>Switchyards: Target species are all vegetation types (woody and herbaceous species). There are no resulting vegetation types (bare ground treatment).</p>
<p>Response #10: Duke Energy states that "future enhancement of Monarch and pollinator habitat, within the project area, will be evaluated by the Wildlife & Botanical Resource Committee (RC) upon better understanding of the transmission project. These areas could then be enrolled into the CCAA [Monarch Candidate Conservation Agreement with Assurances program] acreage of protection." In the RSP please clarify what Duke Energy is referring to by "better understanding of the transmission project." If Duke Energy is referring to answering the question of whether or not Duke Energy would build a new transmission line/corridor as part of the Complex, please make that explicit. In addition, in the RSP please clarify how the existing and potential transmission line corridors would be evaluated by the Wildlife & Botanical RC for the monarch program and when the results of the evaluation would be provided to stakeholders. Please file this evaluation with the study results when available (e.g., ISR, USR), PLP, or no later than the license application. Please state the reasons for including, or excluding, the existing and any proposed transmission line ROW corridor(s) for enrollment in the program.</p>	<p>Duke Energy included the phrase "better understanding of the transmission line" to indicate that if the Bad Creek II Power Complex is constructed and the associated 525 kV transmission line is built, Duke Energy will have a better understanding of the location and impacts of the new line. Once the ROW is constructed and the habitats are established, more information regarding the associated areas for known and probable Monarch Butterfly habitat protection will be identified and collected. Duke Energy will consult with the Wildlife & Botanical Resource Committee convened for this relicensing regarding the evaluation of the existing corridors and any to be proposed (to be determined) transmission line corridor and the impacts on Monarchs and Monarch habitat. The results of any assessment will be provided in the Draft License Application Exhibit E. As required by the Monarch CCAA terms and conditions, Duke Energy is required to select several monitoring sites. These sites are selected randomly and include 28 specific areas with the Carolinas. Duke Energy would be able to include new CCAA monitoring sites within the transmission line corridors and can detail them as an PM&E measure in the License Application.</p>
<p>Response #11: Duke Energy states that there were no known adverse avian interactions at the project transmission lines or switchyard during the past 3 years, and the existing transmission lines are consistent with the Avian Power Line Interaction Committee's (APLIC) and U.S. Fish and Wildlife's (FWS's) guidelines for avian protection (including conductor separation). Other than conductor separation, please clarify in the RSP whether there are avian protection measures installed on the existing transmission lines or at the switchyard (e.g., marker balls, animal guards, etc.). In addition, please note that it is staff's understanding that APLIC is in the process of updating its 2006 and 2012 guidance documents on avian electrocution and collision. If the updated APLIC guidance documents become available during the pre-filing portion of the relicensing process, please review them, and provide an updated assessment of the existing, and any proposed, project transmission facilities in the ISR, USR, PLP, or license application (i.e., as soon as feasible).</p>	<p>Besides the existing transmission line conductor separation, there are no other installed avian protection measures (e.g., bird flight diverters, marker balls, bird shields) regarding the existing transmission lines or associated ancillary facilities (i.e., switchyard and substation). If updated APLIC (e.g., Best Practices on Powerlines) guidance documents become available during the pre-filing portion of the relicensing process, Duke Energy will review these documents and provide an updated assessment of existing or any proposed transmission facilities in future relicensing documents. Duke Energy will consult with U.S. Fish and Wildlife Service (USFWS) staff and the other Wildlife & Botanical Resource Committee members regarding any applicable transmission line, avian design standards.</p>



Comment / Request for Information	Duke Energy Response
<p>Further, Duke Energy proposes to evaluate avian protection measures to incorporate in the new transmission line design once the transmission line route is determined, and will discuss the proposed transmission line design standards with the Wildlife & Botanical RC. In the RSP please clarify whether FWS staff will be included in the Wildlife & Botanical RC.</p>	
<p>Response #13b: In the RSP, please describe the data types included in “Duke’s Natural Resources GIS Viewer”, the source(s) of those data, and how frequently the data are updated. Also, please clarify whether Duke Energy’s practice of conducting “a known or potential bat roosting habitat review” prior to tree cutting activities includes field surveys using the FWS’s survey protocols. Commission staff notes that Duke Energy’s existing best management practices (BMPs) to avoid removal of potential roost trees greater than [or equal to] 5 inches in diameter at breast height (dbh) is the correct guidance for Indiana bats, but would not be as protective of northern long-eared bats (NLEBs)² or tricolored bats, which FWS recently proposed for listing as endangered under the Endangered Species Act.³ Current BMPs for areas inhabited by NLEBs include avoiding cutting, trimming, or removing trees that are greater than or equal to 3 inches dbh during the pup season (May through July in South Carolina) or the active season (most protective). BMPs for tricolored bats will likely be developed as part of FWS’s proposed listing process for the tricolored bat. Please ensure that the PLP and license application include information about the proposed tricolored bat in addition to the federally listed species listed in scoping document 2.</p> <p>Duke Energy states that potential roost trees would be marked with blue paint, a 15-foot buffer would be set with blue flagging, and any hazard/danger tree within the buffer would also be marked with blue paint. In the RSP, please clarify how tree crews would distinguish between potential roost trees and hazard/danger trees if they are both marked with blue paint. Finally, in the RSP, please elaborate on the methods used for conducting “aerial saw operations” to cut/trim trees (e.g., equipment used, time of year, and frequency of this type of treatment).</p>	<p>Duke Energy’s Natural Resources GIS Viewer (Viewer) data is sourced from NatureServe and the state Natural Heritage Program databases. The Viewer data types include element occurrence-based species information (for only selected Duke Energy individuals), species locations (by polygon), best management practices (by polygon), Duke Energy subject matter expert contact information, infrastructure and asset information (e.g., transmission, distribution lines, generation facilities), eagle risk areas, and federal, state, and tribal land boundaries. Duke Energy has annual data sharing agreements with NatureServe and the pertinent state and federal natural heritage agencies. The Viewer is updated quarterly to ensure accuracy of the data. Duke Energy’s practice of conducting “known or potential bat roosting habitat” evaluations follows the current USFWS guidance (i.e., Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines, March 2022). Duke Energy, through periodic coordination, also coordinates and verifies these evaluations with the appropriate USFWS Ecological Field Office on a project-by-project basis. The Draft License Application Exhibit E will include information regarding the new listing of the Tri-colored bat and any other newly listed and uplisted species. Potential bat maternity roost trees will be marked differently (e.g., different color or marking) from the other non-bat habitat hazard trees to be cut. This process will be coordinated with the USFWS-Charleston Ecological Field Office. Any aerial saw operations, to side trim trees along the ROW, will be coordinated with the USFWS-Charleston office. The coordination will include information regarding the equipment used (helicopter-based, multi-saw blades attached to a boom), and the time of year (outside of the pertinent tree cutting moratorium for bats). The standard frequency of this side wall trimming is typically every three to four years.</p>



Table 4-2. Primary Transmission Line Rights-of-Way Features (FERC AIR Response #9)

Transmission Line Name	Asset Number	Voltage	Structure Type	ROW Width	Note
Esto-Jocassee SUP SW-Bad Creek Hydro (i.e., Esto)	1J2672	100kV	Wooden H-Frame and Steel Lattice (common ROW with 525kV)	54-ft and 254-ft *	*54-ft ROW, southwest from Switchyard to Bad Creek Retail Substation; then 254-ft ROW combined with common 525kV. Total ROW length: 9.25 miles (from Bad Creek Switchyard to Jocassee Tie Substation)
Whitewater-Jocassee Tie to Bad Creek Hydro (i.e., Whitewater)	5J2817	525kV	Single Circuit, Steel Lattice	200-ft and 254-ft**	** 200-ft ROW south from Switchyard to Structure 37; then 254-ft ROW combined with common 100kV. Total ROW length: 9.25 miles (from Jocassee Tie Substation to Bad Creek Switchyard)



Figure 4-1. Bad Creek Project Primary Transmission Lines (FERC AIR Response #9)

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Appendix A

Appendix A – PSP Comment
Summaries and Responses

Filed separately



Appendix B

Appendix B –
Correspondence

Filed separately



Appendix C

Appendix C – Water
Resources Study Plan

Filed separately



Appendix D

Appendix D – Aquatic
Resources Study Plan

Filed separately



Appendix E

Appendix E – Visual
Resources Study Plan

Filed separately



Appendix F

Appendix F – Recreational
Resources Study Plan

Filed separately



Appendix G

Appendix G – Cultural
Resources Study Plan

Filed separately



Appendix H

Appendix H – Environmental
Justice Study Plan

Filed separately



Appendix I

Appendix I – Supplemental
Information-Geology and
Project Feasibility

Filed separately