BRAINERD PUBLIC UTILITIES

8027 Highland Scenic Road • P.O. Box 373 • Brainerd, Minnesota 56401-0373

COMMISSION SECRETARY – Business Office 218.829.8726 – FAX 218.829.4703

SUPERINTENDENT OF UTILITIES – Repair Service Operations 218.829.2193 – FAX 218.829.2308

INTERNET WEB SITE – www.bpu.org

August 10, 2018

Interested Stakeholder

Re: FERC Project No. 2533 – Brainerd, Proposed Study Plan

Dear Interested Stakeholder:

Pursuant to 18 CFR § 5.11, Brainerd Public Utilities (BPU) electronically filed the Proposed Study Plan (PSP) for the relicensing of the Brainerd Hydroelectric Project, FERC Project No. 2533 (Project) with the Federal Energy Regulatory Commission (FERC).

BPU filed a Pre-Application Document (PAD) and Notice of Intent (NOI) for the Project on February 28, 2018. Following the filing of the PAD, FERC prepared and issued Scoping Document 1 (SD1) on April 26, 2018, and held scoping meetings with a site visit on May 16 and 17, 2018. Interested parties were able to file comments on the PAD and SD1 and request studies until June 28, 2018. Within 45 days from the comment period for the PAD closing, BPU is required to prepare and file a PSP. The filing of this PSP fulfills BPU's requirement. The PSP addresses study criteria, explains how the proposed studies address issues raised during scoping, and fills information gaps identified by the stakeholders. Comments generated by the agencies and interested parties are also incorporated into the development of the PSP.

In accordance with the Commission's regulations, 18 CFR § 5.1(d), BPU is providing notification of the availability of the PSP to appropriate federal and state agencies, Indian tribes, local governments, and members of the public likely to be interested in the proceeding, as set forth on the attached distribution list. All interested parties can access and download the PSP from BPU's public website: http://bpu.org/our-services/electric/hydro/ or the FERC website: https://www.ferc.gov/docs-filing/elibrary.asp.

Pursuant to 18 CFR § 5.12, BPU will host a PSP meeting, required by the Integrated Licensing Process. The meeting will be held at 10 a.m. on September 11, 2018. Refer to Section 1.3 in the PSP for meeting details. The purpose of the meeting is to clarify the PSP and initial information gathering or study requests and resolve outstanding issues with respect to the PSP.

Comments on the PSP must be filed within 90 days of filing the PSP, or by November 10, 2018. Comments must include an explanation of concerns with study plans and agreements reached with BPU regarding the concerns (18 CFR § 5.12). Additionally, proposed modifications to this PSP must address the study criteria in 18 CFR § 5.9(b).

BPU looks forward to working with you and other interested parties on the Project relicensing. If you have questions regarding the PSP, you may contact Ms. Adéle Braun at 952-842-3703 or by email at abraun@barr.com or me at 218-825-3213 or by email at smagnuson@bpu.org.

Sincerely,

Scott Magnuson

Brainerd Public Utilities, Superintendent

Distribution List

Federal Agencies

Advisory Council on Historic Preservation
John M. Fowler, Executive Director
Old Post Office Building
1100 Pennsylvania Ave NW STE 803
Washington, DC 20004

U.S. Bureau of Indian Affairs
Diane Rosen, Director, Midwest Regional Office
Norman Pointe II Building
5600 West American Blvd, Suite 500
Bloomington, MN 55437

Federal Emergency MGMT Agency
Brock Long, Administrator
500 C Street SW
Washington, DC 20472

Federal Energy Regulatory Commission
John Zygaj, Regional Engineer
Division of Dam Safety & Inspections
230 South Dearborn Street Room 3130
Chicago, IL 60604

US National Park Service
Randy Thoreson, Recreation Planner
111 East Kellogg Blvd. Suite 105
St. Paul, MN 55101

U.S. Senator
Office of Senator Smith
309 Hart Senate Office Building
Washington, DC 20510

U.S. Senator
Office of Senator Klobuchar
302 Hart Senate Office Building
Washington, DC 20510

U.S. Army Corps of Engineers
FERC Coordinator, St. Paul District
Robert K. Edstrom
190 5th St. East, Suite 700
St. Paul, MN 55101-1638

U.S. Bureau of Land Management
U.S. Department of the Interior
State Director
20 M Street SE Suite 950
Washington, DC 20003

U.S. Bureau of Reclamation
U.S. Department of the Interior
Commissioner
1849 C Street NW
Washington, DC 20240

U.S. Coast Guard
Navigation Standards Division
Commandant (CG-5533)
2100 2nd StREET SW Stop 7580
Washington, DC 20593-7580

U.S. Department of Agriculture - Forest Service
Regional Forester
626 East Wisconsin Avenue
Milwaukee, WI 53202

U.S. Department of Commerce
Office of the Secretary
1401 Constitution Avenue NW
Washington DC 20230

U.S. Environmental Protection Agency
Liz Pelloso, lead NEPA reviewer
77 West Jackson Boulevard
Chicago, IL 60604-3590

US Fish and Wildlife Service
Nick Utrop, Fisheries Biologist
101 American Blvd. East
Bloomington MN 55425

United States Geological Survey
Denver Federal Center
Box 25046
Denver CO 80225

Non-Government Organizations

American Canoe Association
Executive Director
1340 Central Blvd STE 210
Fredericksburg VA 22401

American Rivers
1101 14th St. NW STE 1400
Washington DC 20005-5637

Hydropower Reform Coalition
National Coordinator
1101 14th St. NW STE 1400
Washington DC 20005-5637

Trout Unlimited
227 SW Pine Street STE 200
Portland OR 97204-2700

State Agencies

Minnesota Department of Natural Resources
Charlotte W. Cohn, Hydropower Proj Planner
500 Layfayette Road
Eco. Resources – Box 25
St. Paul, MN 55155-4025

Minnesota Pollution Control Agency
Seth Goreham Watershed Unit Supervisor
North Central Region
7678 College Road STE 105
Baxter, MN 56425

Minnesota Historical Society
State Historic Preservation Office
Sarah J. Beimers
345 Kellogg Blvd West
St. Paul MN 55102-1903

Minnesota Public Utilities Commission
Daniel P. Wolf, Secretary
121 7th Pl East, Suite 350
St. Paul, MN 55101-2163

Office of the Attorney General
Attorney General Lori Swanson
State Capitol STE 102
St. Paul MN 55155

Office of the Governor
Governor Mark Dayton
130 State Capitol
75 Rev. Dr. Martin Luther King Jr. blvd
St. Paul MN 55155

Minnesota Geological Survey
Harvey Thorleifson, Director
2642 University Ave W
St. Paul, MN 55114-1032

Minnesota Board of Water & Soil Resources
John Jaschke, Executive Director
520 Lafayette Road North
St. Paul, MN 55155-0001

Minnesota Indian Affairs Council
161 St. Anthony Ave.
Suite 919
St. Paul, MN 55103

Local Governments

City of Brainerd
Paul Sandy, City Engineer
501 Laurel Street
Brainerd, MN 56401

City of Baxter
13190 Memorywood Drive
Baxter, MN 56425

Crow Wing County Government
326 Laurel St. Suite 13
Brainerd, MN 56401

Crow Wing Soil & Water Conservation District
322 Laurel St. #22
Brainerd, MN 56401

Township of Center
Chairwoman
22894 Antler Road
Merrfield, MN 56465

Township of Irondale
19121 County Road 12
Ironton, MN 56455

Township of Oak Lawn,
Supervisor
P.O. Box 333
Brainerd, MN 56401

Township of West Crow Wing
Chairman
6930 Cuyuna Avenue
Brainerd, Minnesota 56401

Native American Tribes

Bois Forte Band of Chippewa
Bev Latady, THPO
1500 Bois Forte Rd
Tower, MN 55790

Cheyenne & Arapaho Tribes
Virginia Richey, THPO
PO Box 167
Concho, OK 73022

Fond du Lac Reservation
Kevin R. Dupuis, Chairman
1720 Big Lake Road
Cloquet, MN 55720

Grand Portage Reservation
Mary Ann Gagnon, THPO
P.O. Box 428
Grand Portage MN 55605

Leech Lake Historic Preservation Office
Amy Burnette, THPO
190 Sailstar Drive NE
Cass Lake, MN 56633

Lower Sioux Indian Community of Minnesota
Cheyanne St. John, THPO
39527 Reservation Highway 1 PO Box 308
Morton MN 56270

Mille Lacs Band of Ojibwe
Natalie Weyaus, THPO
43408 Oodena Drive
Onamia MN 56359

Minnesota Chippewa Tribe
Kevin R. Dupuis, President
P.O. Box 217
Cass Lake MN 56633

Otoe-Missouria Tribe of Indians
John R. Shotton, Chairman
8151 Highway 177
Red Rock OK 74651-0348

Prairie Island Indian Community of Minnesota
Noah White, THPO
5636 Sturgeon Lake Road
Welch, MN 55089

Red Lake Band of Chippewa Indians of MN
Darrell G. Seki, Sr., Chairman
15484 Migizi Dr. P.O. Box 550
Red Lake MN 56671

Santee Sioux Tribal Council
Roger Trudell, Chairman
108 Spirit Lake Ave West
Niobrara NE 68760

Shakopee Mdewakanton Sioux Community of Minnesota
Bill Rudnicki, Tribal Administrator
2330 Sioux Trail NW
Prior Lake MN 55372

Upper Sioux Community of Minnesota
Kevin Jensvold, Chairman
5722 Travers Lane P.O. Box 147
Granite Falls MN 56241-0147

White Earth Reservation
Terrence Tibbetts, Chairman
P.O. Box 418
White Earth MN 56591

Proposed Study Plan

Proposed Study Plan

Brainerd Hydroelectric Project

FERC License No. 2533

Prepared for:
Brainerd Public Utilities
Brainerd, Minnesota

August 10, 2018

Available for Public Release

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
Phone: 952.832.2600

Proposed Study Plan
Brainerd Hydroelectric Project
August 10, 2018

Preface

The Proposed Study Plan (PSP) for the Brainerd Hydroelectric Project (Project) submitted by Brainerd Public Utilities (BPU) to the Federal Energy Regulatory Commission (FERC) during the Integrated Licensing Process (ILP) is presented herein.

BPU filed a Pre-Application Document (PAD) and Notice of Intent (NOI) for a license for the Project on February 28, 2018. The PAD provides a detailed description of the Project and serves as the foundation for issue identification, study plan development, and the FERC's environmental analysis. Following the filing of the PAD, FERC prepared and issued Scoping Document 1 (SD1) on April 26, 2018. FERC also held agency and public scoping meetings and a site visit on May 16 and 17, 2018. Public agencies and interested parties were able to file comments on the PAD and SD1 and request studies by June 28, 2018. Within 45 days of the comment period for the PAD closing, BPU is required to prepare and file a PSP which addresses each of the study criteria, explains how the proposed studies addresses the issues raised during scoping, and fills information gaps identified by the stakeholders. Comments generated by the agencies and interested parties are incorporated into the development of the PSP.

Proposed Study Plan
Brainerd Hydroelectric Project
August 10, 2018

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Acronyms

Acronym	Description
APE	Area of potential effect
BPU	Brainerd Public Utilities (Licensee)
BPUC	Brainerd Public Utilities Commission
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CRMP	Cultural Resources Management Plan
DO	Dissolved Oxygen
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
ILP	Integrated Licensing Process
ISR	Initial Study Report
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NGVD	National Geodetic Vertical Datum 1929
NHIS	Natural Heritage Inventory System
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NRHP	National Register of Historic Places
PAD	Pre-Application Document
Project	Brainerd Hydroelectric Project
PSP	Proposed Study Plan
SD1	Scoping Document 1
SHPO	State Historic Preservation Office
TSS	Total Suspended Solids
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Definitions

Authorized installed capacity	The licensed turbine capacity at the Project is 3,542.5 kW.
Installed capacity	The installed turbine capacity at the Project is currently 2,942.5 kW.
Licensee	The license was issued to the city of Brainerd and its Brainerd Public Utilities Commission (BPUC). Brainerd Public Utilities (BPU) manages the Project.
Project	Brainerd Hydroelectric Project, Federal Energy Regulatory Commission (FERC) No. 2533 (Project).
Project Area	The area within the Project boundary consisting of "…lands necessary for the operation and maintenance of the Project and for other Project purposes…" (Reference (1)).
Project Boundary	The boundary line defined in the Project license issued by the FERC that surrounds the "…lands necessary for the operation and maintenance of the Project and for other Project purposes…" (Reference (1)).
Relicensing	The process of acquiring a new FERC license for an existing hydropower project under expiration of the existing FERC license.
Resource Affected Area	The geographic area in which a specific resource is potentially affected by the Project.
RTE Species	Rare, threatened, endangered, and special-status species which, for purposes of this PAD, includes all species (plant and animal) listed, proposed for listing, or candidates for listing under the Federal and State Endangered Species Act (ESA) and those listed by the U.S. Fish and Wildlife Service (USFWS) as sensitive, special status, or watch list.
Study Plan Determination	A ruling from FERC that determines the studies conducted during relicensing.

1.0 Introduction

Brainerd Public Utilities (BPU) is filing this Proposed Study Plan (PSP) with the Federal Energy Regulatory Commission (FERC) for the relicensing of the Brainerd Hydroelectric Project (Project), FERC No. 2533 (Project), as required by Title 18 of the U.S. Code of Federal Regulations (18 CFR) § 5.11.

1.1 Pre-Application Document Background

BPU filed a Pre-Application Document (PAD) and Notice of Intent (NOI) for a new license for the Project on February 28, 2018. The PAD provides a detailed description of the Project and serves as the foundation for issue identification, study plan development, and the FERC's environmental analysis. BPU is not proposing any changes to the Project as part of relicensing. BPU is using FERC's Integrated Licensing Process (ILP).

BPU distributed the PAD and NOI simultaneously to federal and state resource agencies, local governments, Native American tribes, and other stakeholders interested in the relicensing proceedings. A PAD makes known all existing engineering, economic, and environmental information relevant to licensing a project that is reasonably available or can reasonably be obtained with due diligence. The purpose of the PAD was to provide participants in the relicensing process with the information necessary to identify issues and develop study requests; it served as the foundation for issue identification, study plan development, and the Commission's environmental analysis. Section 5 of the PAD identified two potential studies that could be used to address gaps associated with available information. These studies included a Recreation and Inventory Planning Assessment and Cultural Resources Inventory Plan.

Following the filing of the PAD, FERC prepared and issued Scoping Document 1 (SD1) on April 26, 2018. FERC also held agency and public scoping meetings and a site visit on May 16 and 17, 2018. Public agencies and interested parties were able to file comments on the PAD and SD1 and request studies by June 28, 2018. The letters received in response are included in Appendix A.

1.2 Proposed Study Plan Content

Within 45 days of the comment period for the PAD closing, a proposed study plan (PSP) is prepared and filed with the FERC. Following the requirements of 18 CFR § 5.11, the study plan addresses each of the study criteria, explains how the proposed studies addresses the issues raised during scoping, and fills information gaps identified by the stakeholders. Comments generated by the agencies and interested parties are incorporated into the development of the PSP.

1.2.1 Proposed Study Plan Comments

The FERC content requirements for the PSP comment process are specified in 18 CFR § 5.12. Comments on BPU's PSP must be filed within 90 days of filing the PSP, or by November 10, 2018. Comments must include an explanation of concerns with study plans and agreements reached with BPU regarding the concerns (18 CFR § 5.12). Additionally, proposed modifications to this PSP must address the study criteria in 18 CFR § 5.9(b).

1.3 Initial Study Plan Meeting

As required by the ILP (18 CFR § 5.12), BPU plans to hold a PSP meeting on September 11, 2018 at 10 am at the Brainerd Public Utilities Commission. The meeting can be attended in person or on the phone. The meeting location and call-in information is as follows:

- 8027 Highland Scenic Road, Baxter, MN 55425. Please note this location may be annexed to the city of Brainerd and may have a Brainerd, MN 56401 address in the future.
- Call-in number for the meeting: 1-866-469-3239; Meeting number access code: 689 24 340

The purpose of this PSP meeting will be to describe the studies BPU is proposing to complete and rationale for each. During this meeting, a request for any additional information or study requests will be made, and outstanding concerns with any of the studies proposed in the PSP will be discussed.

Additional meetings may be scheduled, as necessary, after this initial meeting. If additional meetings are scheduled, BPU will notify federal, state, and local agencies and other interested parties.

2.0 Additional Information Requested

FERC and the Minnesota Department of Natural Resources (MNDNR) requested additional information in their comments on the PAD. Their letters are included in Appendix A. Responses to these requests are provided in the following sections.

2.1 FERC Information Requests

FERC requested additional information in Schedule C of their comment letter, dated June 27, 2018, related to aquatic, terrestrial, recreation, cultural, and developmental resources for the Project. Responses to that information request are included below.

2.1.1 Aquatic Resources

Request 1: During the environmental site review on May 16, 2018, it was mentioned that zebra mussels were detected during a dive inspection at the Brainerd Hydroelectric Project (project). However, the PAD does not include a discussion of zebra mussels. Therefore, please describe the known abundance of zebra mussels at the project, including any monitoring and/or control measures that are currently being implemented.

Response 1: *Zebra mussels were observed on the upstream side of the Project during the 2014 dive inspection and in the streambed downstream from the spillway during sediment collection activities in 2017. Notes from these observations are included in the sections below. Monitoring efforts associated with zebra mussels occur every 5 years during the periodic dive inspection.*

Dive Inspection Notes

Zebra mussels were observed during the 2014 dive inspection, which was submitted as an appendix to the 2018 Dam Safety Surveillance and Monitoring Report e-filed with the FERC on March 29, 2018. Excerpts from this inspection report include:

- *The [east downstream] wingwalls had 100% coverage of zebra mussels present. Up to two (2) inches of zebra mussels were found.*
- *The [downstream] training wall has 100% coverage of zebra mussels throughout, up to two (2) inches thick.*
- *The zebra mussel coverage on the trash racks varied. The east side of the trash rack has 100% coverage of zebra mussels and moving towards the west, where the units were typically on, the amount of zebra mussel coverage lessened to 20% coverage. The zebra mussels were up to two (2) inches thick.*
- *There was 100% coverage of zebra mussels up to two (2) inches thick found throughout [the knife gate section].*
- *The [upstream] concrete and [bascule] gates were 100% covered with zebra mussels up to two (2) inches thick.*
- *[The tainter gate is] very new construction with light zebra mussel coverage.*

- *[The west wingwall is] very new construction with light zebra mussel coverage.*
- *Heavy buildup of marine growth (zebra mussels) found throughout the entire structure below the waterline.*

Sediment Collection Notes

Zebra mussels were observed during sediment collection activities in 2017. Sediment samples were collected at locations 5-8 on Figure 2-1*, which are within 100 feet from the downstream end of the apron, location QM 1520 on* Figure 2-2*, which is approximately 400 feet from the downstream edge of the spillway apron, and location QM 1526 on* Figure 2-2*, which is approximately 600 feet downstream from the spillway apron. At each location of these locations, a 6-inch by 6-inch dredge was dropped three times to sample the streambed material.*

- *Location 5: One rock was extracted from the streambed with mussels attached.*
- *Location 6: No material was extracted.*
- *Location 7: All three sampling attempts resulting in scraping some mussels off of rocks or the streambed.*
- *Location 8: A few mussels were collected with a rock during sampling.*
- *Location QM 1520: Smaller rock and some sandy, gritty mud material were collected along with some mussels.*
- *Location QM 1526: The dredge came up full of mussel shells along with a few 2-inch rocks. The mussel shells appeared to be the remains of dead mussels.*

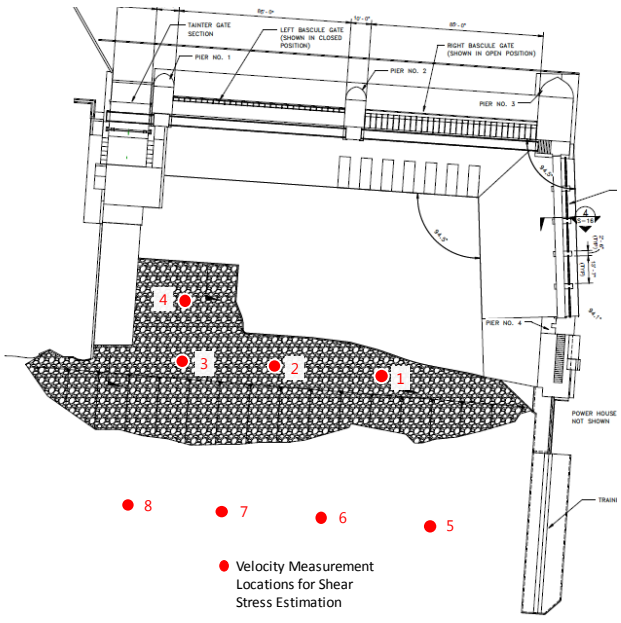

Figure 2-1 Sampling Locations

Figure 2-2 Sampling Locations QM 1500 and QM 1526

2.1.2 Terrestrial Resources

Request 2: Section 4.4.2, General Wildlife Resources, of the PAD (page 24) references two bald eagle nests in the project area. Additionally, a bald eagle was observed in the vicinity of the project during the environmental site review. Please provide information regarding: (1) the locations of any active or inactive bald eagle nests in the project area and (2) any historical observations of bald eagles and their project usage. Please file this information as privileged.

Response 2: *Paragraph (B) of the Order Approving and Modifying Annual Monitoring Plan for Nesting Bald Eagles issued March 23, 1994, requires that the results from the annual bald eagle monitoring plan be filed with the Commission by December 31 of each year. The order amending the bald eagle monitoring plan issued on May 1, 2008, amends the plan to document the presence of bald eagles at the Project consistent with USFWS guidelines, which recommend 5-year sampling events at the Brainerd Project. The last 5-year monitoring report was submitted by the previous licensee on June 9, 2014. The next 5-year bald eagle monitoring report is due December 31, 2018. In 2014, two nests were found—one active and one inactive. The 2014 5-year bald eagle monitoring report is included in* Appendix B *(filed under a separate cover as privileged).*

The MNDNR Natural Heritage Information Database was also reviewed to understand historic bald eagle observations in the vicinity of the Project boundary. Two nests have been historically observed, with their general locations shown on the Botanical and Wildlife Resources figure in Appendix B *(filed under a separate cover as privileged). Based on MNDNR records, one of these nests was found to be active when observed in 2000 and 2005. The other was last monitored in 1994 and found to be inactive at that time. Since the bald eagle is no longer listed and bald eagles are using the Project despite some level of human disturbance, BPU requests that the new license no longer include a condition to monitor the species.*

2.1.3 Recreation and Land Use

Request 3: Section 4.7, Recreation and Land Use, of the PAD provides a description of all existing recreation sites and facilities within the project boundary. However, the PAD does not include the Little Rabbit Lake Site boat launch facility, which is listed as an existing project recreation facility in the Recreation Monitoring Report, filed on November 25, 2009. Please provide a description of this recreation facility and its location in relation to the existing project boundary.

Response 3: *Section 4.8 of the PAD, Recreation and Land Use, only considered existing recreation sites and facilities within the Project boundary. The Little Rabbit Lake site boat launch facility is outside of the Project boundary (see Public Water Access figure in Appendix C); therefore, it was not included in Section 4.8 of the PAD. To evaluate the existing recreation around the site, the Little Rabbit Lake site will be considered in the Project study plans. Section 3.4 of*

this report provides a description of the Little Rabbit Lake access point and notes how that site, along with others, will be incorporated in the proposed recreation and inventory planning study.

2.1.4 Cultural Resources

Request 4: Section 4.9, Cultural Resources, of the PAD (page 28) states that Phase I cultural resource inventories were completed in 1989 and 1991. Also, a Phase II National Register of Historic Places (National Register) evaluation for cultural resources was completed, which included a more detailed assessment site identified in the Phase I effort. Finally, the Brainerd Dam was evaluated in 1991 for its National Register eligibility. However, the PAD does not contain these reports. Please file these reports as privileged.

Response 4: *A Phase I inventory survey was performed in 1989 and 1991 consisting of a literature and records search followed by a reconnaissance survey along the reservoir shoreline. A Phase II National Register evaluation was performed in 1991 by shovel testing the locations identified during the Phase I survey. The Phase I and Phase II surveys are documented in a single report (Reference* (2)*). During the same time, an evaluation of the National Register eligibility of the Project was conducted (Reference* (3)*). The following reports have been included as Appendix D to this report (filed under a separate cover as privileged):*

- ***Harrison, Christina, Burnett County Historical Society.*** *Report on Cultural Resource Reconnaissance Survey Around the Brainerd Reservoir, Crow Wing County, Minnesota. s.l. : prepared for Potlatch Corporation Northwest Paper Division, 1991.*

- ***Hess, Jeffrey H. of Hess Roise and Company.*** *Determination of National Register Eligibility for the Hydroelectric Plant and Associated Paper Mill of the Potlatch Corporation in Brainerd, Minnesota. s.l. : prepared for Potlatch Corporation Northwest Paper Division, January 1991.*

2.1.5 Developmental Resources

Request 5: Please provide a detailed description of existing facilities to include the composition and dimensions for the height and width of the powerhouse, slide gate section, bascule gate section, tainter gates, right embankment, and tailrace section. Also, provide a detailed description to include the composition, dimensions, and configuration of the dam.

Response 5: *Exhibit G-06 in* Appendix E *includes a drawing showing the relative locations and physical interrelationships of the principal project features. Detailed descriptions for each of these features, including the composition and dimensions of each feature, are included below:*

Dam

The dam structures include a short left embankment, a 256-foot-long powerhouse, a 78-foot-long slide gate section, a 207-foot-long bascule (crest) gate section, a single 20-foot-

wide steel tainter gate, and a 200-foot-long right embankment, as shown in Figure 2-3. *An isometric view is presented in* Figure 2-4.

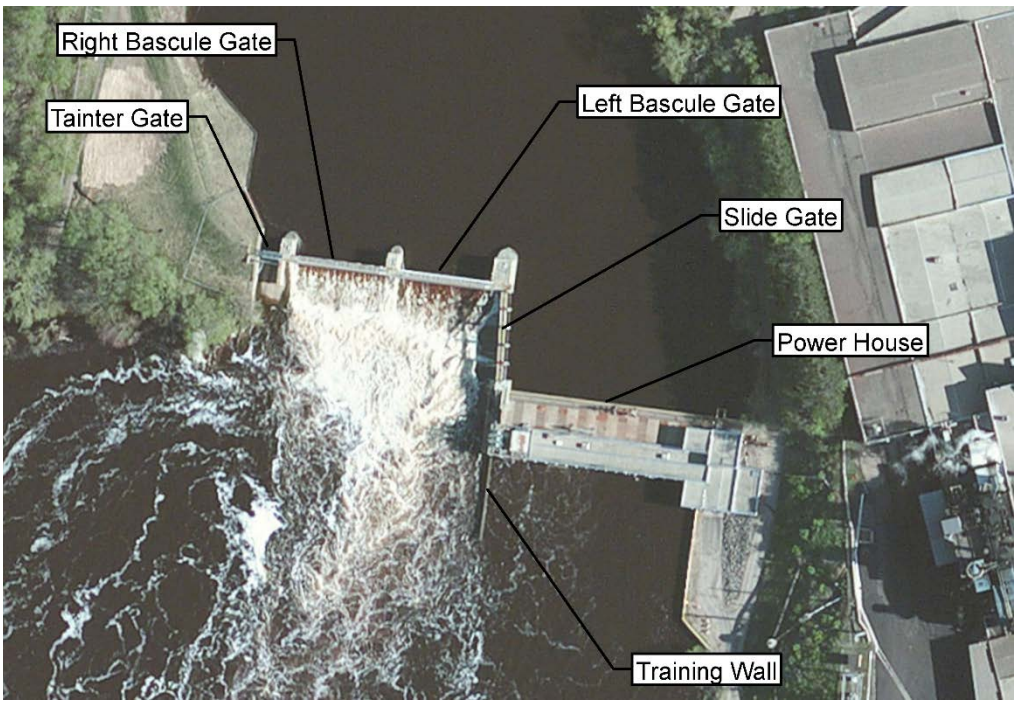

Figure 2-3 Project Overview

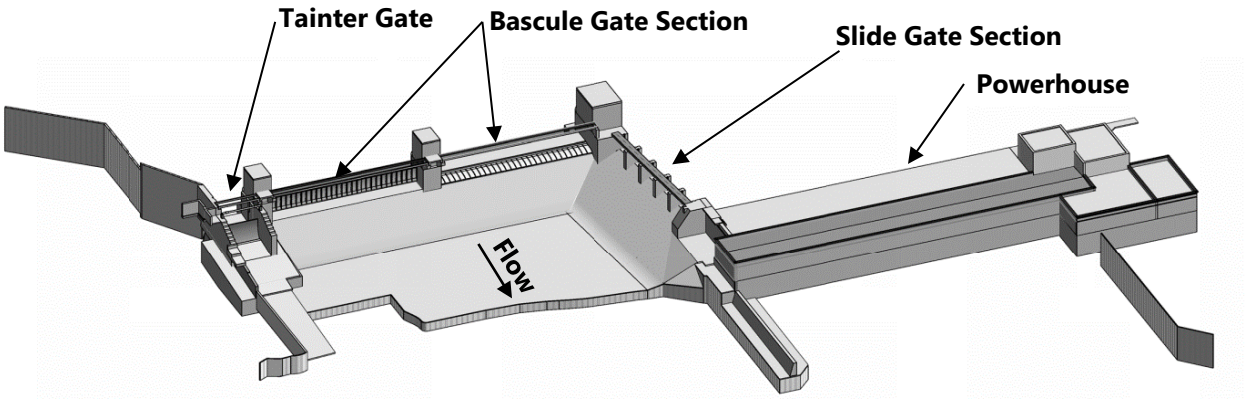

Figure 2-4 Isometric View of Project

Left Embankment

The left embankment includes a steel sheetpile wall extending from the powerhouse wall to the left slope. The top of the sheetpile wall is at elevation 1183.8 feet NGVD. A 16-foot-wide opening allows for vehicular access along the road. Stoplogs are available at the site to close the opening as necessary.

Powerhouse

The 59-foot-wide by 256-foot-long powerhouse is a reinforced concrete structure founded on timber piling with a brick superstructure. The flumes are numbered one through 10 with number one being closest to the river and number 10 closest to the left embankment. Five of the original 10 flumes are currently used for power generation. Turbines are located in flumes one through five, the Amjet turbine will be installed in flume six, flumes seven through nine are sealed with concrete, and flume 10 is used for firewater.

Slide Gate Section

The slide gate section is 78 feet long measured between Pier 4, the pier adjacent to the powerhouse, and Pier 3, the pier connecting the bascule gate section and slide gate section. This section consists of five steel 13.6-foot-wide by 5-foot-high vertical steel gates, four intermediate piers, guide assemblies, and a spillway section. During reconstruction of the Project in the 1950s, a steel sheet pile was installed and grouted along the upstream side of the slide gate sections serving as a cofferdam; the rock-filled timber cribbing was consolidated, a reinforced-concrete spillway facing was installed over the consolidated timber cribbing serving as the spillway, and the gates (also referred to as stop logs) and guide assemblies were installed.

Bascule Gate Section

The bascule gate section is 207 feet long measured from the left side of Pier 3, the pier connecting the bascule gate section and the slide gate section, to the right side of Pier 1, adjacent to the tainter gate section. This section consists of the three primary concrete piers on the upstream side of the Project, two 85-foot-long by 7-foot 10-inch-high bascule gates, a concrete ogee section, and a spillway apron. During reconstruction of the Project in the 1950s, a cellular-steel-sheetpile system was installed and grouted upstream from the existing structure serving as a cofferdam; the rock-filled timber cribbing was consolidated, the piers were constructed, a reinforced-concrete ogee facing was installed over the consolidated timber cribbing serving as the spillway, and the gates were installed. In 2017, the spillway apron was overlaid to elevation 1153.17 feet NGVD by anchoring reinforced concrete into the existing apron. A vertical sheetpile extends across the Project on the downstream edge of the spillway apron.

Tainter Gate

The tainter gate section is 20 feet long by 11 feet high, measured from the right side of Pier 1, adjacent to the bascule section to the right abutment wall. A wooden tainter gate was replaced in 2000 with a steel tainter gate. In 2017, the spillway section downstream from the tainter gate was overlaid by anchoring reinforced concrete into the existing section.

Right Embankment

The 220-foot-long right embankment was constructed of earth-fill over rock-filled timber cribs with a 10-foot-wide embankment crest. The earthen embankment was raised to elevation 1184.84 feet NGVD by constructing a sheetpile wall on the upstream side of the embankment and filling in behind the sheetpile with earth. The sheetpile wall extends for 149 feet from its connection point with the tainter gate section and is anchored by concrete deadmen and steel tiebacks.

Tailrace Section

Ten flumes were originally constructed for power generation. Only five of the 10 flumes are currently used, with a sixth flume expected to be operational in the near future when the Amjet turbine is installed. Below the draft tubes is a hard concrete floor. At the end of the concrete floor towards the downstream end of the tailrace, the floor transitions into timber planking.

Request 6: For all six turbine units employed, please provide their respective minimum and maximum hydraulic capacities.

Response 6: The hydraulic capacity range for each of the five existing turbines installed in flumes one through five is 295 to 2,773 cubic feet per second (cfs). The Amjet ATS-63 is expected to have a hydraulic capacity range of 310 to 925 cfs.

Request 7: The PAD references a previously approved sixth turbine to be installed in the 2018/2019 timeframe. Please describe any potential or anticipated changes to plant operation due to the installation and operation of the new unit.

Response 7: The addition of the sixth turbine involves no change to the dam or reservoir or to the existing operations of the present Project or its reservoir. The Project will remain run-of-river with inflow matching outflow. The only change is that instead of passing additional flow over the gated spillway section, the water will pass through the powerhouse, or the sixth turbine.

Request 8: In the PAD, the length and voltage is provided for the overhead portion of the project's transmission line, but it does not provide the same for the underground line from the pad-mounted transformer to the distribution grid. Also, the PAD does not identify/provide the point of interconnection information, i.e., the name and owner of the point of interconnection and any other pertinent information. Please provide this information.

Response 8: The 825-foot-long 34.5 kilovolt underground transmission line transfers power from the pad-mounted transformer (owned by BPU) to the distribution grid. The distribution grid is owned by BPU. Refer to Figure G-5 in Appendix E.

Request 9: Please provide an estimate of the dependable capacity for the project.

Response 9: *The dependable capacity for the Project was estimated to be 1388 kW at 1795 cfs (Reference* (5)*). The dependable capacity will be evaluated during the licensing process using currently available methods (Reference* (6)*) and available streamflow data from the USGS, and will be reported in the license application.*

Request 10: Please include an Exhibit G that includes a map or series of maps that sufficiently, clearly, and legibly show the location of the project; the relative locations and physical interrelationships of the principal project features such as dam, tailrace, powerhouse, intake, transmission line, substation/switchyard, and interconnection point; and a project boundary that encloses all of the principal project features. Please label all principal project features on the exhibit.

Response 10: *Updated figures (Exhibit G-4, Exhibit G-5, and Drawing G-6) are included in* Appendix E *showing the location of the project, principal project features with respective to the project boundary, and transmission information. These figures supplement the figures provided in Appendix B and C of the PAD.*

2.2 MNDNR Information Requests

MNDNR requested additional information for consideration in the PAD in their comment letter, dated June 28, 2018. The requested information related to recreational and aquatic resources. Responses to MNDNR's information request are included below.

2.2.1 Recreational Resources

Request 1: The section in the document on trails should also include the French Rapids trails and the Mississippi Northwoods trails.

Response 1: *The French Rapids trails are maintained by the Brainerd Nordic Ski Club. These trails are groomed for classic and skate skiing, include steep hills, and are targeted to intermediate and advanced skiers. The Mississippi River Northwoods Trail is located 5 miles northeast of Brainerd along the Mississippi River. It consists of 11.5 miles of historic forest roads on Crow Wing County forest lands. These trails are intended for off-highway vehicle recreation use. Both trails have been added to the Recreation Resources figure in Appendix C.*

2.2.2 Aquatic Resources

Request 2: Although albeit more of an issue for licensing of this proposed project and not specifically related to studies at this time, the MDNR strongly recommends that Brainerd Public Utilities work with the MDNR on early detection of aquatic species on the Mississippi River in the area of the Brainerd Hydropower Project. This will be important to avoid and prevent the spread of aquatic invasive species.

Response 2: *Noted. As noted in the response to FERC's zebra mussel question in Section 2.1.1, zebra mussels have been observed during dive inspections.*

3.0 Study Plan Proposals

3.1 Dissolved Oxygen and Temperature Study

FERC has requested a baseline dissolved oxygen (DO) and temperature study to evaluate the DO concentration of water entering the Project intakes within the reservoir, then discharged immediately downstream of the dam into the Mississippi River during summer conditions.

3.1.1 Goals and Objectives

The goal of this study is to determine if DO and temperature at the Project meet state water quality standards. The objectives of this study are to (a) identify the DO concentration and temperature of water entering the Project intakes, (b) describe any temporal variations of DO concentration and temperature, (c) identify the DO and temperature profile within the Project reservoir in the vicinity of the intakes, and (d) describe the changes of DO concentrations and temperature in the river downstream of the Project.

3.1.2 Known Resource Management Goals

The state of Minnesota has established water quality standards (Minnesota Rules, Chapter 7050) to protect water resources for uses such as fishing, swimming, and other recreation and to sustain aquatic life. These standards are a measure to identify polluted waters or healthy waters in need or protection and guide the limits on what regulated facilities can discharge to surface water. These rules are administered by the Minnesota Pollution Control Agency (MPCA). The MPCA is continually working to revise, develop, and otherwise improve Minnesota's water quality standards.

3.1.3 Public Interest Considerations

FERC must give equal consideration to all uses of the waterway on which a project is located and what conditions should be placed on any license that may be issued. In making its license decision, FERC must equally consider the environment, recreation, fish and wildlife, and other non-developmental values of the Project, as well as power and other developmental values.

Water quality at the Project supports an aquatic ecosystem that provides public opportunities, including sport fisheries. FERC considers the effects of Project operation on water quality relevant to its public interest determination.

3.1.4 Background and Existing Information

The MPCA has a water quality monitoring station approximately 1,700 feet upstream of the Project, and the U.S. Geological Survey (USGS) operates two water quality monitoring stations within 200 feet downstream of the Project. However, none of these stations have recorded measurements for DO and temperature.

In the absence of data in close proximately to the Project, raw monitoring data from all USGS and MPCA water quality monitoring stations within a 1-mile radius were evaluated for relevance to this study, resulting in the consideration of five additional monitoring stations. However, DO and temperature data

from these monitoring stations were either outdated (most dating to 2007 or prior) or nearly a mile away from the Project.

3.1.5 Project Nexus

Typically, lower DO concentrations are most likely to exist during summer months when water temperatures are increased. Collecting water temperature and DO data immediately upstream and downstream of the Project during the summer months helps determine if Project operation is negatively affecting water quality at the Project. Therefore, understanding current DO and temperature conditions would inform the need for and development of potential license conditions to protect aquatic resources at the Project.

3.1.6 Proposed Study Methodology

The proposed methodology for the Dissolved Oxygen and Temperature Study is described in the following sections.

3.1.6.1 Data Collection

To sample the upstream portion of the Project, DO and temperature measurements will be taken in the reservoir within an approximately 33-foot (10-meter) radius of the Project intake or at the closest safe distance upstream from the Project intake. Turbines shall be operating at the time of the measurement. DO and temperature measurements will begin approximately 3 feet (1 meter) below the surface of the reservoir, with subsequent measurements taken at 3-foot (1-meter) intervals. Measurements shall terminate within 3 feet (1 meter) of each intake structure. Field notes shall indicate the intake structure where measurements were taken. To the extent feasible, based on turbine operations, an attempt will be made to take measurements at consistent locations.

Downstream of the Project, DO concentration and temperature will be monitored and recorded at three sites in the Mississippi River, located as follows: Site 1 – within approximately 150 feet downstream of the Project, Site 2 – approximately 300 feet downstream of the Project, and Site 3 – approximately 450 feet downstream of the Project. Samples will again be collected at 3-foot (1 meter) intervals beginning 3 feet (1 meter) below the water surface. The habitat type of each sampling location (i.e., pool, run, riffle, etc.) will be identified and recorded, along with GPS coordinates for each sampling location.

Upstream and downstream sampling will both take place weekly from June 1 through September 30. The reservoir surface elevation will be recorded during each sampling event, and discharge in cfs from USGS stream gauge #05242300 (located at the Project) will be recorded.

3.1.6.2 Reporting

Upon conclusion of DO and temperature-monitoring activities, a report will be compiled that includes analytical summaries and graphical representations of the data, including average DO concentration and average temperature with associated measures of confidence. The report will include a histogram of depth, DO, and temperature within the reservoir and a graphical representation of any changes of these components over the monitoring period. The report will also include a histogram of river distance, DO,

and temperature content with a similar graphical representation of any changes of these components over the monitoring period. All data points used to develop the report (including latitude/longitude coordinates, date, and time of data collection) will be included as a report appendix.

3.1.7 Cost and Level of Effort

The estimated cost of conducting this study is approximately $20,000 based on the level of effort described above. The Dissolved Oxygen and Temperature Study is expected to take place during one study season in 2019.

3.2 Cultural Resources Study

A cultural resources study is proposed to determine the potential effects of existing operations and the Project on archaeological and historic resources within an APE to be determined in coordination with the State Historic Preservation Office (SHPO). The study will focus on resources that are included or eligible for listing on the National Register of Historic Places (NRHP) and may be affected over the life of the Project.

3.2.1 Goals and Objectives

The goal of this study is to determine the potential effects of Project operations on archaeological and historic resources within the APE that are included or eligible for listing on the NRHP. This study will be developed in coordination with FERC, SHPO, and any federally recognized tribes with expressed interest in the Project. To date, no tribes have indicated interest in the Project.

3.2.2 Known Resource Management Goals

FERC's issuance of a new license for the continued operation of the Project is subject to approval under Section 106 of the National Historic Preservation Act (NHPA), which requires federal agencies to consider the effects of a proposed undertaking (i.e., relicensing) on resources listed or eligible for listing on the NRHP.

In accordance with FERC regulation (18 CFR §5.5(e)), FERC has authorized BPU as the non-federal representative to conduct informal Section 106 consultation with SHPO.

Previous studies have identified 33 archaeological sites within the Project's APE that were determined or are believed to have significant archaeological research potential. Resource management goals for these sites include the following:

1. The development of a Cultural Resources Management Plan (CRMP) in coordination with FERC and SHPO that will establish a formal schedule for monitoring the 33 archaeological sites within the Project's APE

2. The development of a plan to install/reinstall monitoring control points in a manner that is less subject to disturbance by natural environmental factors

3. The development of a plan to conduct Phase II investigations at four archaeological sites that appear to be at risk of disturbance through erosion and loss of shoreline

3.2.3 Public Interest Considerations

FERC must consider the impacts that Projects may have on Historic Properties under Section 106 of the NHPA. The Section 106 process requires consultation with the SHPO, federally recognized tribes with expressed interest in the Project, and other stakeholders. To date, no tribes have indicated interest in the Project.

The locations of archaeological sites is considered protected information; therefore. Locations of archaeological sites may not be distributed to the public.

3.2.4 Background and Existing Information

In 2007, Archeological Research Services (ARS) subcontracted with Kramer Leas Deleo (KLD), local surveyors based in Brainerd, to use GPS to install markers for monitoring control points. In November 2017, Barr inspected archaeological sites in the Project's APE and made recommendations for further treatment. During the November 2017 monitoring, markers were located and assessed for updating. If markers could not be located, recommendations have been added to replace the markers. Markers at four of the sites have been identified for replacement. Most sites are recommended for monitoring again in 2020. Four sites are recommended for mitigation measures before the 2020 monitoring period.

The 2018 cultural resources monitoring report (Reference (6)), filed to the FERC, and SHPO's review letter have been included as Appendix D to this report (filed under a separate cover as privileged):

- ***Barr Engineering Co.*** *Cultural Resources Monitoring Report: Brainerd Hydroelectric Project, FERC License No. 2533, Prepared for Brainerd Public Utilities, March 2018.*

3.2.5 Project Nexus

The proposed cultural resources study will provide current information on historic and archaeological resources potentially eligible for listing within the Project's APE. The study will identify potential adverse effects to historic and cultural resources resulting from continued Project operations and will provide a basis for SHPO concurrence of potential effects, as well as help facilitate the Section 106 consultation process.

3.2.6 Proposed Study Methodology

Plans to install/reinstall monitoring control points will include the collection and use of current geographic information system (GIS) data and tools to create a monitoring system that is more spatially accurate and not subject to disturbance by natural environmental factors. Location data will be collected with a sub-meter accuracy GPS unit that can more precisely track shoreline loss and erosion at monitoring locations.

The methods used to conduct the Phase II investigations at four archaeological sites will consist of standard methodology and will be conducted in accordance with guidelines put forth by the SHPO.

Phase II testing will likely consist of the excavation of 1- by 1-meter test units. To characterize the nature of the archaeological deposits, assess the significance of the deposits, and determine if mitigation strategies are necessary, the test units will be excavated in the portions of the sites most at risk of erosion or shoreline loss.

3.2.7 Cost and Level of Effort

The estimated cost of conducting this study is approximately $50,000 based on the level of effort described above. The Phase II investigations and a portion of the monitoring control point installations are expected to take place during one season in 2019. Monitoring will take place in subsequent years as dictated by the CRMP.

3.3 Desktop Fish Entrainment and Impingement Study

At the request of FERC, a desktop fish entrainment and impingement study is proposed to evaluate fish entrainment (i.e., involuntary passage through intakes and turbines) and fish impingement (i.e., involuntary entrapment against Project features such as screens, trashracks, etc.). As described further below, this desktop assessment approach relies on results of published turbine passage survival studies and site-specific turbine specifications to estimate entrainment rates and fish passage survival. Impingement will be evaluated qualitatively using publicly available information about fish morphology, trashrack spacing, and calculated approach velocities at intake areas. Estimates derived from this desktop study are expected to be suitable for determining general potential for and levels of entrainment and impingement that may occur as a result of the Project; the findings should not be considered absolute quantitative results.

3.3.1 Goals and Objectives

The goal of this study is to evaluate the potential for fish entrainment and impingement at the Project and its potential effects on the health of the Upper Mississippi River fishery. The objectives of this study are to:

- Describe the physical characteristics of the intake structures, including the location, dimensions, and the velocity distribution in front of each structure.
- Analyze fish species for factors that influence their vulnerability to impingement, entrainment, and turbine survival.
- Assess the potential for fish species impingement at the Project.
- Estimate entrainment rates and turbine-passage survival rates for fish species at the Project.
- Describe the likely effects of Project-induced entrainment or impingement on fish resources, based on the physical characteristics of the Project.

3.3.2 Known Resource Management Goals

In Minnesota, fisheries and conservation programs are principally managed by the MNDNR at the state level and by the U.S. Fish and Wildlife Service (USFWS) at the federal level. MNDNR aims to sustain

healthy waterways, conserve aquatic species and habitat, and provide the public access to outdoor recreational opportunities. To enhance fisheries in Minnesota, the MNDNR practices ecosystem-based fisheries management to ensure long-term health of fisheries in rivers and lakes, including the Mississippi River. As part of the MNDNR Ecological and Water Resources Division's 2018–2028 Strategic Plan (Reference (7)), the agency emphasized a focus on managing water resources sustainably and preserving biological diversity. The goals of the agency include managing water resources sustainably and improving or maintaining water quality throughout the state. To protect local species, the agency aims to prevent the spread of invasive species and to minimize the impact of these invasive species if they do spread. Finally, the agency will focus in the coming years on protecting ecosystems from the impacts of climate change.

The USFWS also plays a role in managing fisheries on the Upper Mississippi River. According to the agency's 2016–2020 Strategic Plan (Reference (8)), it aims to conserve aquatic species through conservation, restoration, and enhancement of habitat. This includes managing aquatic invasive species, many of which threaten the Mississippi River. Additionally, the agency will promote and enhance recreational fishing and other public uses of aquatic resources and educate the public about conservation.

3.3.3 Public Interest Considerations

Sections 4(e) and 10(a) of the Federal Power Act require that FERC give equal consideration to all uses of the waterway on which a project is located. In making its license decision, FERC must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the Project, as well as power and developmental values.

Fish populations in the Project boundary support a sport fishery. As such, the effects that operating the Project may have on fisheries resources are relevant to FERC's public interest determination.

3.3.4 Background and Existing Information

The powerhouse is a 256-foot long structure. Flumes are numbered one through 10 with number one being closest to the river and number 10 closest to the left embankment. Flumes one through five are currently used for power generation. The Amjet turbine will be installed in flume six. Refer to Drawing G-06 in Appendix E. The flume intakes are approximately 15 feet wide and the distance from normal water elevation to the concrete sill at the trashrack is approximately 16 feet. Trashracks are located in front of the intakes to minimize fish entrainment. Trash racks consist of 3" by ¼" bars spaced at 2 inches on center.

3.3.5 Project Nexus

The operations of the Project may result in the mortality of entrained or impinged fish during normal operations. In general, hydropower dams may affect fish species that are more subject to travel through the riverine system than fish species that may inhabit only certain portions of the riverine system (i.e., pools or the impoundment area) for their entire life cycles.

3.3.6 Proposed Study Methodology

The methodology for this analysis will follow standard methods and data sources previously accepted by FERC or standard methods used by fisheries management professionals for desktop evaluation of impingement, entrainment, and turbine mortality (References (9), (10), (11), and (12)). Fish that are small enough to pass through the Project's trash racks will be considered susceptible to entrainment. Individuals large enough to be physically excluded due to size (length, width/body depth) will be considered as potentially susceptible to impingement. Fish species found in the Project reservoir may not be equally susceptible to impingement or entrainment because of individual species habitat use, behaviors, or swimming abilities.

Fish species and abundance information available from the MNDNR and MPCA will be used to characterize the fisheries community composition upstream of the Project. Fish species will be grouped into family groups and size classes for evaluation. For species/family groups where no comparable or applicable data can be found, the survival rate reported for a similar group/size class will be substituted. Fish species/groups for evaluation will be developed in conjunction with the MNDNR. Preliminary review of fisheries data indicates evaluation of walleye, smallmouth bass, largemouth bass, channel catfish, yellow perch, northern pike, bigmouth buffalo, white sucker, shorthead redhorse, and silver redhorse will be considered as potential target species/groups.

Fish entrainment and mortality data from other similar hydroelectric projects (head, turbine type, flow capacity, etc.) will be selected from the databases available from the Electric Power Research Institute (Reference (13)) and FERC (Reference (9)) to develop a BPU project estimate using the Project-specific fish species/group assemblages. The evaluation will be sequenced with the following inputs:

1. Develop a matrix of entrainment/impingement/mortality studies that can be applied to the BPU Project.

2. Calculate and estimate fish entrainment rates at the Project site based on available Project operation information. Maximum approach velocity at each turbine will be estimated based on the size of the intake area and the maximum hydraulic capacity at each turbine. Entrainment will be defined as the number of fish/volume of water entrained.

3. Utilize reservoir-specific species compositions in conjunction with applicable prior studies to characterize the composition of the fish community susceptible to impingement or entrainment.

4. Apply physical, biological, or reservoir factor filters that may impact susceptibility to impingement or entrainment at the Project.

5. Estimate the potential for turbine mortality of entrained fish based on turbine mortality estimates from project studies at similar sites. Utilize blade-strike mortality models developed by Franke et al. (Reference (14)) if applicable studies are not available.

6. Estimate impingement mortality for fish eliminated from entrainment estimates.

7. Report estimates of entrainment, mortality, and impingement on a monthly fish group/size per hour of Project operation and fish per volume of water passed through the Project. Estimated monthly entrainment and impingement rates will be reported based on the relative abundance of species according to existing fisheries data from the MNDNR.

3.3.7 Cost and Level of Effort

The estimated cost of conducting this study is approximately $30,000 based on the level of effort described above. The Desktop Fish Entrainment and Impingement Study is expected to take place over a 3-month period in 2019.

3.4 Recreation Use and Inventory Planning Study

A recreation and inventory planning study is proposed to assess the condition of recreation sites/facilities within the Project boundary and site use. This type of study was also requested by MNDNR, and FERC provided comments for consideration in study development.

3.4.1 Goals and Objectives

The goals of this study are to gather information on existing recreation sites/facilities, evaluate existing recreational use and capacity, and estimate future recreation demands within the Project boundary. The objectives of this study are to:

- Identify the condition of all informal and formal recreation sites and facilities wholly or partially within the Project boundary.
- Determine current and projected capacity at each recreation site/facility.
- Identify who owns, operates, and maintains each recreation site/facility.
- Conduct visitor surveys during the recreation season to determine the adequacy of Project recreation facilities and whether modifications or upgrades are needed to meet current or future recreation needs.

3.4.2 Known Resource Management Goals

As noted above, the MNDNR aims to sustain healthy waterways, conserve aquatic species and habitat, and provide the public with access to outdoor recreational opportunities. The MNDNR's water recreation goal is to provide and maintain free, safe, and convenient access to public waters for recreation while protecting and enhancing natural resources through facility design, program management, and public education. In its study request, MNDNR expressed interest in identifying how river recreation is affected by the dam and reservoir.

3.4.3 Public Interest Considerations

Section 4(e) and 10(a) of the Federal Power Act require that FERC give equal consideration to all uses of the waterway on which a project is located. In making its license decision, FERC must equally consider the

environmental, recreational, fish and wildlife, and other non-developmental values of the Project, as well as power and developmental values.

The Project allows for and supports several recreation opportunities, including boating, hiking, fishing, watersports, and passive recreation activities. As such, the Project's effects on recreational resources is relevant to FERC's public interest determination.

3.4.4 Background and Existing Information

The Project supports a variety of recreation opportunities. BPU owns and maintains a canoe portage within the Project boundary, located on the west side of the impoundment, immediately upstream from the dam. This facility allows canoeists a means to safely pass from the upstream side of the dam to the downstream side.

The following recreation sites are located within the Project boundary, but are operated by different entities:

- Lum Park – This facility is owned and operated by the City of Brainerd, with a motorized boat launch providing access to Rice Lake and the Mississippi River. Additional recreational amenities at Lum Park include a public swimming beach, restroom and shower facilities, a fishing pier, pavilion, playground, sand volleyball courts, and a disc golf course.
- French Rapids access – Crow Wing County maintains a public motorized boat launch, picnic area, and shoreline fishing area in this location.
- Green's Point access – This location features a carry-in boat launch point, as well as a shoreline fishing area and is maintained by the MNDNR.

There are several other recreation sites located outside the Project boundary, but in close proximity. With the exception of the Little Rabbit Lake site, these have been included in previous recreation monitoring efforts for the dam.

- Little Rabbit Lake and Rowe Mine Pit (i.e., Little Rabbit/Rowe) access – This facility is owned and managed by Crow Wing County and provides a campground, public motorized boat launch, dock, and restroom facilities. It is located approximately 0.70 miles upstream of the Project boundary, which extends slightly into Little Rabbit Lake.
- Little Rabbit Lake access – This facility is administered by Irondale Township and provides motorized boat access to Little Rabbit Lake. It is located approximately 0.39 miles upstream of the Project boundary and is accessible by a minimally maintained dirt/gravel roadway.
- Evergreen Drive access – This facility consists of a concrete motorized boat launch and is administered by the City of Brainerd. It is located approximately 0.69 miles downstream of the Project boundary.

3.4.5 Project Nexus

BPU provides recreational opportunities within the Project boundary in accordance with the conditions of its existing license. It also has a responsibility for ongoing maintenance of its recreation facilities throughout the license term. FERC requires licensed projects to provide reasonable public recreation opportunities consistent with the safe and effective operation of the Project. FERC also has ongoing responsibility to ensure that those recreation facilities meet recreational demand over the term of the new license.

MNDNR requested recreational-use surveys be completed for flowing and impounded stretches of the river but did not provide spatial boundaries in their request. As such, the Recreation Use and Inventory Planning Study extents will be primarily limited to the four facilities located within the Project boundary (BPU canoe portage, Lum Park, French Rapids access, and Green's Point access). The Evergreen Drive access and the Little Rabbit/Rowe access will also be included in the study to provide downstream and upstream recreational use comparisons.

3.4.6 Proposed Study Methodology

The proposed methodology for the Recreation Use and Inventory Planning Study is described in the following sections.

3.4.6.1 Facility Inventory and Condition Assessment

BPU will conduct a site inventory and condition assessment at each of the following recreation sites:

- Evergreen Drive access
- Canoe portage
- Lum Park
- French Rapids access
- Green's Point access
- Little Rabbit/Rowe access

The facility inventory and condition assessment will include a brief description of each site and location of the facilities in relation to the Project boundary:

- Identification of whether or not the facility is located within the Project boundary
- Ownership and party responsible for operation and maintenance of each facility
- Hours and seasons of operation
- Type, number, and condition of amenities provided, including parking and signage
- General observations of site use and accessibility

- Identification of areas that show signs of erosion or other forms of instability

Photographs will accompany the facility inventory and condition assessment, and coordination will take place with each facility operator to discuss projected capacity at each recreation site/facility.

3.4.6.2 Recreation Use Survey

BPU will conduct a recreation use survey at each of the six sites included in the facility inventory and condition assessment effort.

All sampling days will be randomly selected. Survey routes will be completed on a rotating basis and at different times of day to account for time-of-day use patterns. Each count will last for 2 hours per site, per day and will be conducted on 4 days per month, including two randomly selected weekdays and two randomly selected weekend days. If a month contains a three-day holiday weekend (i.e., Memorial Day, Independence Day, Labor Day), one day per holiday weekend will be included in addition to the standard survey days. The recreation use surveys will be completed during the recreation season to capture recreational use occurring while the facilities are open to the public. The recreation season for this Project is defined as the opening weekend of fishing season (mid-May) to the opening weekend of waterfowl hunting season (late September).

The recreation use survey will be administered to facility users to gain opinions with regard to existing recreation facilities and opportunities. This survey will record the number of people in a party, their primary reason for visiting the site (i.e., type of recreation), their perception of level of site use, and their opinions with regard to the amount and types of recreation opportunities offered within the Project boundary.

3.4.6.3 Spot Counts

Spot counts will be conducted in conjunction with the recreation use survey. Spot counts are brief in duration to provide a snapshot of use at each recreation site. Spot counts will last approximately 5 minutes and will record the number of vehicles parked at a site and the number of users observed. This information will be used in estimating site use.

3.4.6.4 Reporting

BPU will prepare a report that includes a discussion of study area, study methodology, and analysis of the study findings. The report will document the number of days spent at the monitored sites, average number of persons per party, and will include a determination of the percent of each facility's capacity currently utilized. The report will also provide documentation of the facility inventory. Potential future recreation demand and needs over the term of the license will be assessed based on the results of the facility inventory and condition assessment, existing recreation use, and estimated population projections and the demand for future recreational resources.

3.4.7 Cost and Level of Effort

The estimated cost of conducting this study is approximately $20,000 based on the level of effort described above. The Recreation Use and Inventory Planning Study is expected to take place during one study season in 2019.

4.0 Anticipated Study Plan Schedule

FERC's Study Plan Determination is anticipated by January 9, 2019, allowing BPU to undertake most of the proposed studies in 2019, as noted in Table 4-1. Based on FERC's ILP regulations, the Initial Study Report (ISR) is due 1 year following FERC's Study Plan Determination (January 9, 2020). In order to obtain agency feedback prior to the 2020 field season, BPU anticipates that the ISR meeting will occur in January 2020.

Table 4-1 Anticipated Study Plan Schedule

Study	Anticipated Start Date	Anticipated Completion Date
Dissolved Oxygen and Temperature Study	June 1, 2019	September 30, 2019
Cultural Resources Study	June 1, 2019	Fall of 2019 for Phase II investigations
Desktop Fish Entrainment and Impingement Study	May 2019	July 2019
Recreation Use and Inventory Planning Study	Mid-May 2019	Late-September 2019

5.0 Requested Studies Not Adopted

As stated in 18 CFR § 5.11(b)(4), BPU must include an explanation of why any requested study was not adopted, with reference to criteria set forth in 18 CFR § 5.9(b).

The following study requests have not been adopted, as described in further detail in subsequent sections:

- Botanical Resources Study
- Impoundment Bathymetric Study
- Sediment Accumulation and Contaminant Study

5.1 Botanical Resources Study

FERC requested a Botanical Resources Study in a letter dated June 27, 2018, to map and/or confirm vegetation types within the Project boundary, including age-class and composition of forested areas; identify and map rare, threatened, or endangered plant species or potential habitats; and document presence, absence, and location of invasive plant species.

This study request has not been adopted for the following reasons:

- The Project is operated as a run-of-river project and maintains a target elevation of 1174.04 feet, with fluctuations limited to 0.1 foot. As such, adjacent lands experience little change in water elevation, posing minimal change to vegetation communities and habitat types.
- There are no federally listed threatened or endangered plant species found in Crow Wing County, where the Project is located. In addition, there are no designated critical habitats for any federally listed species in Crow Wing County.
- Based on review using the MNDNR Natural Heritage Inventory System (NHIS) database, there are no state-listed plant species in the vicinity of the Project boundary.
- The Minnesota Department of Agriculture's Noxious Weed Mapper (Reference (15)) was reviewed to assess the presence of noxious weed infestations within the Project boundary. There are three mapped noxious weed occurrences in the Project area: two purple loosestrife observed in 2007/2008 and one common tansy observed in 2013. Mapped noxious weed occurrences are included in Appendix C (Noxious Weed Records figure). This information was not included in the PAD.
- The only land BPU owns adjacent to the Project boundary is that immediately surrounding the dam and auxiliary facilities. This land primarily comprises access roadways and facility structures. BPU actively mows and manages weeds on green spaces associated with these areas.

- BPU does not own or manage additional lands beyond the Project boundary limits and is not authorized to dictate vegetation management, including noxious weed control, of these lands.

5.2 Impoundment Bathymetric Study and Sediment Accumulation and Contaminant Study

The MPCA requested a new Impoundment Bathymetric Study and a new Sediment Accumulation and Contaminant Study in a letter dated June 28, 2018, to provide information necessary to support review of an expected request for 401 Certification of the Project. According to the MPCA, these studies are needed to establish baseline data to "compare possible future impacts that the additional turbine installation [and] continued operation of existing facilities addressed by the relicensing may have on water quality." MPCA also states that the study "will measure the increase or possible decrease in TSS and assist in determining what measures Brainerd Public Utilities must implement to reduce or eliminate TSS from entering the water column."

These studies have not been adopted for the following reasons:

- Installation of an additional turbine was approved through a license amendment in April 2015. Since this activity has already been approved, it is not a part of the request for relicensing.
- In its study request, MPCA does not establish how the information developed by this study would be used to develop potential license requirements.
- MPCA considers the outcome of this study to be providing baseline data to determine if ongoing operations may contribute to impairments of the waterway. However, the dam has been in place since 1916. As such, any newly collected data reflects a changed condition rather than a baseline condition to fully assess the effects of the structure on water quality.
- The MPCA does not indicate that Project operation:
    - Is negatively affected by the sediment stored in the reservoir.
    - Exacerbates sedimentation in the reservoir.
    - Actively mobilizes sediment in the reservoir.
- No dredging is proposed in the Project boundary, nor is any additional construction planned that would disturb reservoir sediments.

6.0 References

1. **Federal Energy Regulatory Commission (FERC).** *Division of Hydropower Administration & Compliance, Compliance Handbook.* Washington : Department of Energy, 2015.

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8. **U.S. Fish and Wildlife Service.** Strategic Plan for the U.S. Fish and Wildlife Service Fish and Aquatic Conservation Program: FY2016-2020. *U.S. Fish and Wildlife Service.* [Online] 2016. https://www.fws.gov/fisheries/pdf_files/FAC_StrategyPlan_2016-2020.pdf.

9. **Federal Energy Regulatory Commission (FERC).** Preliminary Assessment of Fish Entrainment at Hydropower Projects, a Report on Studies and Protective Measures. Washington, D.C. : FERC Office of Hydropower Licensing, 1994 and 1995. Vol. 1 and 2.

10. **Alden Research Laboratory, Inc.** Guidelines for Hydro Turbine Fish Entrainment and Survival Studies. EPRI Report No. TR-107299 Holden, MA : Electric Power Research Institute, July 1997.

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12. **Bell, M.C.** Revised Compendium on the Success of Passage of Small Fish through Turbines. Portland, OR : U.S. Army Corps of Engineers, North Pacific Division, 1991.

13. **Alden Research Laboratory, Inc.** Turbine Entrainment and Survival Database--Field Tests. EPRI Report No. TR-108630 Holden, MA : Electric Power Research Institute (EPRI), October 1997.

14. **Franke, G.F., et al.** Development of Environmentally Advanced Hydropower Turbine System Concepts. s.l. : Department of Energy, 1997. DEAC07-96ID13382.

15. **Minnesota Department of Agriculture.** Mapping Minnesota's Noxious Weeds. *Minnesota Department of Agriculture*. [Online] [Cited: July 2, 2018.] https://app.gisdata.mn.gov/mda-noxiousweeds/index.htm?4390.

Appendix A

Comments and Study Plan Requests

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUN 2 5 2018

REPLY TO THE ATTENTION OF:

Kimberly D. Bose, Secretary
U.S. Federal Energy Regulatory Commission
888 First Street, Northeast
Washington, District of Colombia 20426

Re: Request for Comments on the Pre-Application Document and Scoping Document. Brainerd Hydroelectric Relicensing Project. Mississippi River, City of Brainerd, Crow Wing County, Minnesota. Docket Number P-2533

Dear Ms. Bose:

EPA has received your request for comments on the Pre-Application Document (PAD) and Scoping Document for the project referenced above. The Federal Energy Regulatory Commission (FERC) is the lead agency under the National Environmental Policy Act (NEPA), and Brainerd Public Utilities is the project proponent. EPA provided input to inform development of the PAD through an August 30, 2017 comment letter. We offer comments in this letter to inform development of the Environmental Assessment (EA).

The proposed action is FERC relicensing the Brainerd Hydroelectric Project. FERC issued the current license in 1993, and it expires in 2023. The existing project consists of five turbine generators. A sixth generating unit was previously authorized but has not yet been installed. Beyond installation of the sixth generating unit, Brainard Public Utilities does not propose any changes to infrastructure or operations. The project would continue to operate in a run-of-the-river mode.

Adaptation

The Scoping Document explains that FERC may issue licenses for terms ranging from 30 to 50 years for non-federal hydroelectric projects. We recommend considering the current condition and likely integrity of the project's physical infrastructure over the life of the new license. The National Climate Assessment[1] finds that in the Midwest, extreme heat, heavy downpours, and flooding will affect infrastructure. Consider resiliency and adaptation measures or plans to ensure that the infrastructure will maintain its structural integrity and safe operating conditions under changing heat and precipitation conditions.

Aquatic Species

The PAD explains that project operations cause impingement, entrainment, and turbine induced fish mortality. We recommend that the EA describe the context and intensity of impacts to fish

[1] The U.S. Global Change Research Program's National Climate Assessment is available at: https://www.globalchange.gov/browse/reports

species, and consider whether measures are available and warranted to minimize impacts. Consider best practices, such as optimizing spacing between bars in trash racks. Coordinate with the Minnesota Department of Natural Resources on best practices to protect aquatic species, and document coordination in the EA.

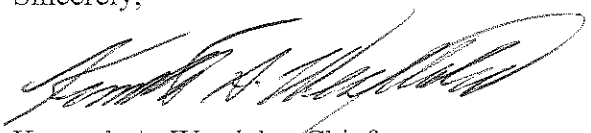
Water Quality
The PAD explains that the Mississippi River is impaired in the project area. This reach of the River was listed as impaired for mercury in fish tissue in 1998, and a Total Maximum Daily Load (TMDL) Plan for mercury was approved in 2007. The River was also listed as impaired for total suspended solids in 2016, and a TMDL is targeted for completion in 2021. In the EA, we recommend describing existing water quality conditions and ensuring that the proposed project would not further impair water quality or delay remediation of current impairments.

Project Boundary
The PAD includes a project map with an outline of the project boundary. The project boundary covers the Brainard Dam and the area upriver. The area downriver does not appear to be included. We recommend extending the project boundary south for purposes of considering potential impacts to water quality, aquatic species, and other downstream resources.

Environmental Data
To access environmental information that may be useful for the EA, we recommend using EPA's NEPAssist web-based analytical tool, available at: https://www.epa.gov/nepa/nepassist. NEPAssist allows users to access geospatial environmental data for user-defined locations.

We appreciate the opportunity to provide input. If you would like to discuss our comments, please contact Jennifer Tyler of my staff at 312-886-6394 or tyler.jennifer@epa.gov. Please provide future NEPA documents for this project to the mailing address above and electronically to Ms. Tyler.

Sincerely,



Kenneth A. Westlake, Chief
NEPA Implementation Section
Office of Enforcement and Compliance Assurance

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
June 27, 2018

OFFICE OF ENERGY PROJECTS

Project No. 2533-061 – Minnesota
Brainerd Hydroelectric Project
Brainerd Public Utilities

Scott Magnuson, Superintendent
Brainerd Public Utilities
8027 Highland Scenic Road
P.O. Box 273
Brainerd, Minnesota 56401

Reference: Comments on Preliminary Study Plans, Request for Studies, and Additional Information

Dear Mr. Olson:

After reviewing the Brainerd Hydroelectric Project's Pre-Application Document, the transcripts of the scoping meetings held May 16 and 17, 2018, and participating in a project environmental site review on May 16, 2018, we have determined that additional information is needed to adequately assess potential project effects on environmental resources. We have three study requests (enclosed in Schedule A) for aquatic and botanical resources, and recommend that you consider our comments on your two preliminary study plans (enclosed in Schedule B). We also have additional information needs (enclosed in Schedule C). Please provide the requested additional information when you file your proposed study plan, which must be filed by August 12, 2018.[1]

Please include in your proposed study plan a master schedule that includes the estimated start and completion date of all field studies, when progress reports will be filed, who will receive the reports and in what format, and the filing date of the initial study report. All studies, including fieldwork, should be initiated and completed during

[1] The Commission's Rules of Practice and Procedure provide that if a filing deadline falls on a Saturday, Sunday, holiday, or other day when the Commission is closed for business, the filing deadline does not end until the close of business on the next business day. 18 C.F.R. § 385.2007(a)(2) (2017). Because the deadline falls on a Sunday (i.e., August 12, 2018), the filing deadline is Monday, August 13, 2018. However, the process plan and schedule established in the scoping document 1, issued on April 26, 2018, is still valid.

the first study season, and the study reports should be filed as a complete package. If, based on the study results, you are likely to propose any plans for measures to address project effects, drafts of those plans should be filed with your Preliminary Licensing Proposal (or draft license application).

Please note that we may, upon receipt and review of scoping comments/study requests from other entities due June 28, 2018**,** as well as your proposed study plan, request additional studies or information at a later time.

If you have any questions, please contact Patrick Ely at (202) 502-8570, or via e-mail at patrick.ely@ferc.gov.

Sincerely,

Janet Hutzel, Chief
Midwest Branch
Division of Hydropower Licensing

Enclosures: Schedule A
Schedule B
Schedule C

Schedule A

Study Requests

After reviewing the information in the Pre-Application Document (PAD), we have identified information that is needed to assess project effects. As required by section 5.9 of the Commission's regulations, we have addressed the seven study request criteria in the study requests that follow.

Fish Entrainment and Impingement Study

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of the study is to evaluate the potential for fish entrainment and impingement at the Brainerd Hydroelectric Project (Brainerd Project or project) and its potential effects on the health of the Upper Mississippi River fishery.

The objectives of the study are to:

1. describe the physical characteristics of the intake structures, including the location, dimensions, and the velocity distribution in front of each structure;

2. analyze fish species for factors that influence their vulnerability to impingement, entrainment, and turbine survival;

3. assess the potential for fish species impingement at the project;

4. estimate entrainment rates and turbine passage survival rates for fish species at the project; and

5. describe the likely effects of project-induced entrainment or impingement on fish resources, based on the physical characteristics of the project.

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

Not applicable.

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

Sections 4(e) and 10(a) of the Federal Power Act require that the Commission give equal consideration to all uses of the waterway on which a project is located. In making

its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values.

Fish populations in the reservoir support a sport fishery. The effect of project operation on this resource is relevant to the Commission's public interest determination.

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

The PAD contains no information regarding: (1) the locations and dimensions of intakes; (2) the velocity distribution in front of the intakes; (3) the clear bar spacing between the trashrack bars; or (4) the likely effects of project-induced entrainment or impingement on fishery resources. This information is needed to identify any potential project effects of entrainment and impingement on fishery resources at the project.

§5.9(b)(5) – *Explain any nexus between project operations 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.*

Fish that reside upstream of the project could be susceptible to impingement on project trashracks or entrainment through the turbines when the project is operating. Evaluation of the physical characteristics of each of the intake structure and estimating entrainment/survival rates would help inform a decision on the effects of project operation.

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

Conduct a desktop analysis that evaluates the likelihood of entrainment and impingement based on the physical characteristics of the project. The study should include the following information: (1) a description of the physical layout of the trashrack bars; (2) turbine types and orientation; (3) turbine runner speed and diameter; (4) hydraulic capacity of the turbine units; (5) a description of normal operations; (6) information relative to the timing and magnitude of spill; and (7) the water velocity in front of the intake structures.

A number of different methodologies could be used to collect the water velocity profiles of the intake structure, such as acoustic Doppler technology. Existing literature should be available to describe life history characteristics, swimming speeds, and avoidance behaviors of the dominant fish species in the project area to assess the risk of

impingement and entrainment. Existing entrainment studies from the Electric Power Research Institute (EPRI) Entrainment and Survival Database (EPRI, 1997) should be used to identify sites that have similar physical characteristics (*e.g.*, head, turbine type, flow capacity, runner diameter, and runner speed) to find a set of applicable studies that can be used to evaluate entrainment rates and turbine passage survival at the project.

Entrainment rates should be estimated by species and/or guilds/groups, size, and season (*e.g.*, number of fish per million cubic feet of water in summer); these entrainment rates should then be applied to the average flow through the project to estimate potential entrainment on a monthly basis. Entrainment rates should be based on the relative abundance of species gathered from existing fisheries data (e.g., Minnesota Department of Natural Resources' (Minnesota DNR) 2014 survey of the project reservoir)[2] and the influence of physical characteristics of the intake areas on each individual species and/or guilds/groups (*e.g.*, intake location in water column, near shore), as available.

Published turbine passage survival rates from the EPRI (1997) database should be used to estimate turbine passage survival for fish species and life stages. If applicable studies from the database cannot be found, blade strike models developed by Franke et al. (1997) should be used to assess turbine survival for fish species and life stages.

The results of Minnesota DNR's 2014 survey of the project reservoir would also help describe the health of the existing fishery and whether it might be affected by entrainment or impingement.

§5.9(b)(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.*

The cost of this study would be in the range of $8,000 to $12,000 and may be completed in one study season. Fieldwork would be required to obtain the water velocity data; otherwise, the study would involve desktop review of the literature on entrainment and impingement at hydroelectric sites and the results of the Minnesota DNR's 2014 fish survey. The velocity data should be collected, at a minimum, at the maximum hydraulic capacity of the turbine units.

Literature Cited

Electric Power Research Institute (EPRI). 1997. Turbine entrainment and survival database – field test. Report TR-108630. Prepared by Alden Research Laboratory. October 1997.

[2] http://www.dnr.state.mn.us/lakefind/showreport.html?downum=18014500

Franke, G.F., D.R. Webb, R.K. Fisher, D. Mathur, P.N Hopping, P.A. March, M.R. Headrick, I.T. Laczo, Y. Ventikos, and F. Sotiropoulios. 1997. Development of Environmentally Advanced Hydropower Turbine System Concepts. Prepared by DOE Contract No. DEAC07-96ID13382.

Baseline Dissolved Oxygen and Temperature Study

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of this study is to evaluate the dissolved oxygen (DO) concentration and temperature of water entering the project intakes within the project reservoir, and then discharged immediately downstream of the dam into the Mississippi River during summer conditions. More specifically, the goal of this proposed study is to determine if DO and temperature at the project meets state water quality standards.

The objectives of the study are to:

1. identify the DO concentration and temperature of water entering the project intakes;

2. describe any temporal variations of DO concentration and temperature;

3. identify the DO and temperature profile within the project reservoir in the vicinity of the intakes; and

4. describe any changes of DO concentrations in the river downstream of the project.

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

Not applicable.

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

Sections 4(e) and 10(a) of the Federal Power Act require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values.

Water quality at project supports an aquatic ecosystem that provides public opportunities, including sport fisheries. Ensuring that the effects of project operation pertaining to water quality is considered in a reasoned way is relevant to the Commission's public interest determination.

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

The PAD does not provide any data pertaining to DO concentration or water temperature in the project area. The PAD states that the Minnesota Pollution Control Agency (Minnesota PCA) assessed water quality in 2017 (Minnesota PCA, 2017) for a section of the Mississippi River that encompassed the project boundary; however, the referenced document does not include any site specific water quality data at or near the project. Therefore, we cannot determine potential project effects on water quality in the project area and additional information on DO and temperature is needed to establish baseline conditions at the project.

§5.9(b)(5) – *Explain any nexus between project operations 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.*

Typically, lower dissolved oxygen concentrations are most likely to exist during summer months when water temperatures are increased. Collecting water temperature and dissolved oxygen data upstream and downstream of the project during the summer months would help determine if project operation is negatively affecting water quality at the project. Therefore, establishing baseline water quality conditions would inform the need for, and the development of, potential license conditions to protect aquatic resources at the project.

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

Using generally accepted practices in the scientific community:

1. Monitor and record dissolved oxygen concentration and water temperature at the approximate location (within a radius of 10 meters) of two of the project intakes within the reservoir with operating turbines at the time of the measurements, as applicable. Temperature and DO measurements should begin one meter below the surface of the reservoir, with subsequent measurements taken every meter, terminating at the approximate depth (within 1 meter) of the intake structures.

Sampling should take place at least once a week, beginning on June 1st and ending on September 30th. During each sampling event, reservoir surface elevation should be recorded.

2. Monitor and record the concentration of dissolved oxygen at a minimum of three sites downstream from the project, in the Mississippi River. Timing of river sampling should coincide with reservoir sampling efforts. The first sampling site should be located approximately 150 feet downstream of the dam. Each subsequent sampling site should be located longitudinally downstream from the first sampling site, and at approximately equidistant intervals. Exact sampling locations within the specified framework should be chosen at random, using a scientifically accepted method. The habitat type of each sampling location should be identified and recorded (i.e., pool, run, riffle, etc.), including GPS coordinates for each sampling location. During each sampling event, discharge (cubic feet per second) from USGS stream gage #05242300 located at the project should be recorded.

3. Prepare a report that includes an analytical summary and graphical representations of the data, including average temperature and DO concentration with associated measures of confidence. The report should include a histogram of depth, temperature, and DO within the reservoir and a graphical representation of any changes of these components over time. Similarly, the report should include a histogram of river distance, DO, and temperature content, and a graphical representation of any changes of this component over time. All data points used to develop the report (including date and time of collection) should be included as an appendix to the report.

§5.9(b)(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.*

The estimated cost of this work is approximately $20,000. The dissolved oxygen and temperature monitoring survey may be completed within one study season.

Literature Cited

Minnesota PCA, 2017. Our Upper Mississippi River: What to protect, what to fix. Monitoring and Assessment Study. [Online] https://www.pca.state.mn.us/sites/default/files/wq-iw8-08ab.pdf.

Botanical Resources Study

§5.9(b)(1) – *Describe the goals and objectives of each study proposal and the information to be obtained.*

The goal of the study is to develop additional information necessary to address the potential effects of project operation and maintenance activities on botanical resources within the project boundary. The results of this study would be used to determine how potential effects can be avoided, minimized, or otherwise mitigated.

The objectives of the botanical resources study are as follows:

1. map and/or confirm vegetation types within the project boundary, including age-class and composition of forested areas;

2. identify and map any rare, threatened, or endangered plant species or potential habitats; and

3. document the presence, abundance, and location of invasive plant species.

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

Not applicable.

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

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located, and what conditions should be placed on any license that may be issued. In making its license decision, the Commission must equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values.

The Brainerd Project provides habitat for a variety of plants and animals. An understanding of the botanical resources within the project boundary would provide information on the type, abundance, and location of habitat potentially affected by continued operation and maintenance of the project. Understanding the project's effects on botanical resources is relevant to the Commission's public interest determination.

§5.9(b)(4) – *Describe existing information concerning the subject of the study proposal, and the need for additional information.*

In the PAD, Brainerd Public Utilities provides a general discussion of vegetation types common to the ecoregion, but omits a substantive discussion of botanical resources at the project. Brainerd Public Utilities also references a Minnesota Biological Survey[3] site which overlaps much of the project boundary, but does not provide additional information regarding the plants or animals that make use of this habitat. Therefore, we cannot determine the potential project effects on botanical resources in the project boundary.

§5.9(b)(5) – *Explain any nexus between project operations 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.*

Project operation and maintenance activities have the potential to disturb botanical resources in the project boundary. This study would assist in identifying plant species and their habitats within the project and provide baseline information from which to evaluate the effects of continued operation and maintenance of the Brainerd Project on those resources.

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

Field Survey

There would be one field survey with multiple components. The spatial boundaries of the field study area would consist of the project facilities and the riparian corridor upstream and northeast of the project to County Road 3. A general inventory of plants, including any state listed rare, threatened, or endangered botanical species, should be conducted within the study area. Age class, species composition and relative density of any forested understory should be recorded, as well as the presence of snags or old-growth hardwoods with sloughing bark. The invasive species portion of the survey should focus on non-native species, examining disturbed habitats (including areas adjacent to infrastructure and roadside ditches) and natural terrestrial habitats (woodlands, meadows, Brainerd Project shoreline) where invasive species are observed or likely to occur in the project boundary. The survey should be conducted during the

[3] The Minnesota Biological Survey, through the Minnesota DNR, systematically collects, interprets, monitors, and delivers data on plant and animal distribution, including rare, threatened, and endangered species.

spring and summer months when diagnostic features are most identifiable. Each invasive species occurrence should be mapped with a handheld GPS unit and depicted on an aerial photograph. Data should be recorded for each invasive species occurrence, including species name, GPS location, approximate density, and area of coverage. Representative photos should be taken and general observations should be noted regarding habitat and site conditions, including type and quality.

The methods described above are consistent with accepted methods for conducting botanical resources surveys.

Report Preparation

Brainerd Public Utilities would prepare a report that summarizes the botanical resources encountered within the project boundary. The report should include species occurrence data, high-resolution land cover maps, approximate land cover by type and acreage, age class and composition of any forested habitat, and mapping of invasive species. Captioned photographs of typical and/or significant habitat conditions should be included in the report. Documentation of rare, threatened, or endangered species occurrence should be filed with the Commission as privileged.

§5.9(b)(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.*

The estimated cost of a reconnaissance-level botanical resources survey and the preparation of a report containing the above criteria is approximately $5,000.

Schedule B

Comments on Preliminary Study Plans

Based on our review of your preliminary study plans outlined in your Pre-Application Document (PAD), we request the following modifications. Please address our requests in your proposed study plans.

Recreation and Land Use

Recreation Inventory and Planning Assessment

In section 5.2 of the PAD, *Proposed Studies by Resources,* you propose to conduct a Recreation Inventory and Planning Assessment. However, you do not provide information on how recreation would be measured or what would be assessed (e.g., condition of existing sites, current and future recreation use, facility capacity, etc). Also, the PAD provides a discussion of existing recreation facilities and sites within and adjacent to the project boundary. However, the PAD does not include a detailed description of the condition of each recreation site and facility. Further, it is unclear how much use each site and or facility receives because recreation use data was not included in the PAD. Understanding the condition of the existing project recreation sites and facilities, the amount of current and projected future use, and how these sites and facilities are managed is essential in determining the adequacy of project recreation facilities to meet current and future recreation needs; and therefore, is relevant to the Commission's public interest determination.

In the absence of recreational use data and facility conditions, we cannot determine that the existing information is adequate for us to assess the adequacy of existing recreation facilities to meet current and future demand. So that we may fully understand and evaluate the effects of continued project operation and maintenance on recreation use, please provide recreational use data collected over the past 5 years, as required by Article 408 of the current license,[4] a description of the methodology used to collect recreational use data, and a discussion of the condition and adequacy of existing recreational facilities to meet current and future recreational demand at the project. Additionally, please include photographs of each recreation site and facility and any other relevant documentation of recreation at the project. Please file the information when you file your proposed study plan.

If you cannot provide the information requested above, please include the following in your study proposal for recreation resources:

[4] 62 FERC ¶ 62,143 (1993).

1. identify the condition of all informal and formal recreation sites and facilities, and identify if they are located within, outside, or partially within the project boundary;

2. determine the current and projected capacity at each recreation site and/or facility;

3. identify who owns, operates, and maintains each recreation site and/or facility; and

4. conduct visitor surveys during the recreation season to determine the adequacy of project recreation facilities and if changes or upgrades to the sites would be needed to meet current or future recreation needs.

Recreation Use Surveys

A schedule should be developed for the distribution of the recreation use surveys. All sampling days should be randomly selected and survey routes should be completed on a rotating basis and at different times of day to account for time-of-day use patterns. These counts should last for at least two hours per site on each day and should be conducted on four (4) days per month which should include two (2) randomly selected weekdays and two (2) randomly selected weekend days. If a month contains a three-day holiday weekend, one (1) day per holiday weekend should be included in addition to the standard survey days. The recreation use survey should occur during the recreation season to capture recreational use occurring while the various project facilities are open to the public.

The recreation use survey should be administered to users to gain user opinions with regard to the existing project recreation facilities and opportunities. The survey should record the number of people in a party, their primary reason (recreational activity) for visiting the project, their perception of level of use, and their opinions with regard to the amount and types of recreation opportunities offered within the project boundary.

Spot Counts

Spot counts should also be conducted on survey days. The spot counts represent short-term counts (approximately 5 minutes per site) and should record the number of vehicles parked at a site/facility and the number of users observed. This information should be statistically analyzed to develop the recreational use figures for the project. Final recreation use for the recreation facilities and sites within the project should be summarized by season and activity type for each site.

Facility Inventory

The inventory of project recreation facilities and sites should include the following:

1. the location of facilities in relation to the project boundary;
2. the types and number of amenities provided at each site and facility;
3. the condition of the facility/amenities;
4. the entities responsible for the operation and maintenance of each facility;
5. hours/seasons of operation; and
6. accompanying photographs.

Report Preparation

Brainerd Public Utilities would prepare a report that includes information on the number of recreation days spent at project recreation sites, average number of persons per party, and a determination of the percent of the each facility's capacity that is currently being utilized. The above information should be entered into spreadsheets for statistical analysis. The collected information should be used to project changes to project recreation demand over the term of any new license, if issued.

The report should also include a facility inventory including the following:

1. the location of facilities in relation to the project boundary, including facilities/amenities that may straddle the project boundary;
2. the types and number of amenities provided at each facility;
3. an inventory of all informal and formal project recreation facilities and sites and the condition of the facility/amenities;
4. identification of entities responsible for the ownership, operation, and maintenance of the facilities;
5. hours/seasons of operation;
6. photographs of the facilities;
7. recreation use figures for each recreation site, overall recreational use figures, and projected use figures; and
8. a compilation of responses to the recreation use survey.

Cultural Resources

Cultural Resources Inventory Plan

Section 5.2, *Proposed Studies by Resources*, of the PAD proposes a Cultural Resources Inventory Plan to assess cultural resources survey needs. However, you do not provide information on what would be assessed and any surveys that would be conducted. The PAD provides information on known archaeological and historic resources within the project vicinity; however, there is no indication if a recent Phase I survey was conducted to identify cultural resources or to reassess know cultural resources at the project to determine if they are still eligible for, or listed on, the National Register of Historic Places (National Register or historic properties). In addition, there is no description and map depicting the Area of Potential Effects (APE). This information is necessary for use to determine the effects of project operation on historic properties. Therefore, a Phase I archaeological survey of the project Area of Potential Effects (APE) should be conducted. Also, as part of your proposed study, and prior to any surveys conducted, you should consult with the Minnesota State Historic Preservation Officer (Minnesota SHPO), federally-recognized Tribes who have an active interest in the project, and any interested parties.

If you have existing information, studies, surveys, or other data that would satisfy the proposed items listed below, please state this in your proposed study plan and file this information when the proposed study plan is filed.[5] If you cannot provide the information, please include the following in your study proposal for cultural resources:

1. a defined APE for the project that would include all lands and waters enclosed by the project boundary and any other lands or properties outside the project boundary where project operation may affect historic properties. Also include: (a) a detailed map showing all aspects of the APE in relation to the project boundary;[6] (b) a background section on previous work in and around the APE; and (c) a cultural history of the research area;

[5] Please file any cultural resource surveys or reports as privileged.

[6] The APE should be developed after consultation with the Minnesota SHPO, federally-recognized Tribes who have an active interest in the project, and any interested parties. Once you have defined your APE, please send your APE definition and APE map to the Minnesota SHPO and seek their concurrence.

2. survey methodology, including: (a) areas to survey for archaeological and/or historic resources relative to the defined APE;[7] and (b) an evaluation of cultural resources, including known archaeological sites within the APE for National Register-eligibility; and (c) site- or resource-specific descriptions of existing and potential project-related effects on historic properties;

3. re-evaluate the pocket grinders located in the Brainerd powerhouse to determine if they are still eligible for listing on the National Register, and identify any existing and potential project-related effects.

4. survey results and concurrence from the Minnesota SHPO, any interested federally-recognized Tribes, and any interested parties on the results of the survey; and

5. a record of consultation with the Missouri SHPO, interested federally-recognized Tribes, and other interested parties regarding the proposed study, results and APE, and related concurrence letters.

In the event that any historic properties would be adversely affected by project operation or maintenance, you would need to develop a draft Historic Properties Management Plan (HPMP) to avoid, lessen, or mitigate for any project-related adverse effect on National Register-eligible properties. A draft HPMP should be developed after consultation with the Minnesota SHPO, the federally-recognized Tribes who have an active interest in the project, and interested parties, and filed with your Preliminary Licensing Proposal (or draft license application).

The draft HPMP should, at a minimum, address the following elements:

1. identification of the APE for the project and inclusion of a map or maps that clearly show the APE in relation to the existing and proposed project boundary;

2. completion, if necessary, of identification of historic properties within the project's APE; continued use and maintenance of historic properties;

3. treatment of historic properties threatened by project-induced shoreline erosion,[8] other project-related ground-disturbing activities, and vandalism;

[7] Lands that are highly disturbed are less likely to contain cultural resources, and may not need to be surveyed.

[8] Project-induced shoreline erosion does not include shoreline erosion attributable to flood flows or phenomena, such as wind driven wave action, erodible soils, and loss of vegetation due to natural causes.

4. consideration and implementation of appropriate treatment that would minimize or mitigate unavoidable adverse effects on historic properties;

5. treatment and disposition of human remains that may be discovered, taking into account any applicable State laws and the Advisory Council's "Policy Statement Regarding Treatment of Burial Sites, Human Remains, and Funerary Objects," February 23, 2007;

6. discovery of previously unidentified properties during project operation;

7. public interpretation of the historic and archaeological properties at the project;

8. a list of activities (i.e., routine repair, maintenance, and replacement in kind at the project) not requiring consultation with the Minnesota SHPO because these activities would have little or no potential effect on historic properties;

9. a procedure to address effects on historic properties in the event of a project emergency; and

10. a review of the HPMP by the licensee, the Minnesota SHPO and consulting parties to ensure that the information continues to assist the licensee in managing historic properties and updating the HPMP based on agency and tribal consultations.

Schedule C

Additional Information

Aquatic Resources

1. During the environmental site review on May 16, 2018, it was mentioned that zebra mussels were detected during a dive inspection at the Brainerd Hydroelectric Project (project). However, the Pre-Application Document (PAD) does not include a discussion of zebra mussels. Therefore, please describe the known abundance of zebra mussels at the project, including any monitoring and/or control measures that are currently being implemented.

Terrestrial Resources

2. Section 4.4.2, *General Wildlife Resources*, of the PAD (page 24) references two bald eagle nests in the project area. Additionally, a bald eagle was observed in the vicinity of the project during the environmental site review. Please provide information regarding: (1) the locations of any active or inactive bald eagle nests in the project area; and (2) any historical observations of bald eagles and their project usage. Please file this information as privileged.

Recreation and Land Use

3. Section 4.7, *Recreation and Land Use*, of the PAD provides a description of all existing recreation sites and facilities within the project boundary. However, the PAD does not include the Little Rabbit Lake Site boat launch facility, which is listed as an existing project recreation facility in the Recreation Monitoring Report, filed on November 25, 2009. Please provide a description of this recreation facility and its location in relation to the existing project boundary.

Cultural Resources

4. Section 4.9, *Cultural Resources*, of the PAD (page 28) states that Phase I cultural resource inventories were completed in 1989 and 1991. Also, a Phase II National Register of Historic Places (National Register) evaluation for cultural resources was completed, which included a more detailed assessment site identified in the Phase I effort. Finally, the Brainerd Dam was evaluated in 1991 for it National Register-eligibility. However, the PAD does not contain these reports. Please file these reports as privileged.

Developmental Resources

5. Please provide a detailed description of existing facilities to include the composition and dimensions for - the height and width of the powerhouse, slide gate

section, bascule gate section, tainter gates, right embankment, and tailrace section. Also, provide a detailed description to include the composition, dimensions, and configuration of the dam.

6. For all six turbine units employed, please provide their respective minimum and maximum hydraulic capacities.

7. The PAD references a previously approved sixth turbine to be installed in the 2018/2019 timeframe, please describe any potential or anticipated changes to plant operation due to the installation and operation of the new unit.

8. In the PAD, the length and voltage is provided for the overhead portion of the project's transmission line, but it does not provide the same for the underground line from the pad-mounted transformer to the distribution grid. Also, the PAD does not identify/provide the point of interconnection information, i.e., the name and owner of the point of interconnection and any other pertinent information. Please provide this information.

9. Please provide an estimate of the dependable capacity for the project.

10. Please include an Exhibit G that includes a map or series of maps that sufficiently, clearly, and legibly show the location of the project; the relative locations and physical interrelationships of the principal project features such as dam, tailrace, powerhouse, intake, transmission line, substation/switchyard, and interconnection point; and a project boundary that encloses all of the principal project features. Please label all principal project features on the exhibit.

June 28, 2018 **[SENT BY FERC ELECTRONIC FILING]**

Ms. Kimberly D. Bose, Secretary
Secretary, Federal Energy Regulatory Commission (FERC)
888 First Street N.E.
Washington, D.C. 20246

Subject: Brainerd Hydroelectric Project (Brainerd Project) (FERC Project No. 2533-061)
Minnesota Department of Natural Resources (MDNR) Comments and Recommendations
On the Pre-Application Document (PAD), FERC-Prepared Scoping Document 1 (SD1),
And MDNR Identification of Issues and Submitted Study Requests

Dear Secretary Bose:

The Minnesota Department of Natural Resources (MDNR) has reviewed and submits Comments and Recommendations on the Pre-Application Document (PAD) and the Federal Energy Regulatory Commission-prepared (FERC-prepared) Scoping Document 1, as well as Study Requests for the new license process for the Brainerd Hydroelectric Project (Project and FERC Project No. 2533) proposed by Brainerd Public Utilities (current project Licensee and proposed Applicant). The documents for review were provided as part of the licensing process for a new license for the Brainerd Hydroelectric Project.

The Project is located on the Mississippi River in the City of Brainerd in Crow Wing County, Minnesota. As identified in the documents submitted for review and comment, the existing Project consists of: (1) a short left embankment; (2) a 256-foot-long powerhouse containing between five and six turbine generators with a totaled installed capacity of between approximately 2.9 megawatts and 3.5 megawatts (MW); (3) a 78-foot-long slide gate section; (4) a 207-foot-long bascule (crest) gate section; (5) a single 20-foot-wide steel Tainter gate; (6) a 200-foot-long right embankment; (7) a 236-foot-long, 2.4-kilovolt (kV) overhead transmission line; (8) a 25-foot-high dam; and a (9) 2,500-acre impoundment. Brainerd Public Utilities proposes to continue operating the project as a run-of-river facility. In Minnesota, this Project and license are only the second of the major hydropower licenses issued by the FERC in the early 1990s which is proposed for a new license (i.e., and the continuing relicensing process).

The MDNR emphasizes the importance of the location of this project on the Mississippi River in Minnesota. The Mississippi River has the largest drainage basin in Minnesota and is one of the most important river resources in both the United States and in the world. The river is a critically valuable and important natural resource of the State of Minnesota, the region, and the Brainerd and surrounding area. In the vicinity of the proposed project, the fisheries resource is important, and the reservoir and area are important for public and private recreational access and uses. The volume and flow of water in the river at this location is also important. The Mississippi River is a state-designated Water Trail.

Based on the Federal Power Act and FERC regulations, the MDNR is the recognized State of Minnesota Resource agency. The MDNR is the Minnesota state agency responsible for and with administrative responsibilities over fisheries and wildlife resources; water use, supply, and regulation; and recreation and aesthetic resources. The MDNR is also responsible for implementing the Fish and Wildlife Coordination Act in Minnesota.

The MDNR and a number of MDNR staff and offices, have been involved with various aspects of the Project for a number of years. The MDNR participated in the FERC licensing of the Project that resulted in the current license. MDNR staff have been part of project operations and project developments related to the existing Project. MDNR staff have been involved with and submitted written comments at the time of the license transfer particularly when Brainerd Public Utilities purchased the project and the hydropower license was transfered. As part of that transfer, the MDNR was also required to inspect the condition of the dam and to submit a report to the Minnesota Legislature as ownership and responsibility were changing from a private hydroelectric project to a publicly-owned and operated hydroelectric project. In 2015 and 2016, MDNR staff reviewed and submitted written comments on the proposed non-capacity license amendment. Also in 2013 and 2017, Brainerd Public Utilities obtained MDNR Joint Public Waters Work and Prohibitied Invasive Species permits to repair the dam's spillway apron. MDNR staff attended and participated in the May 16 and May 17, 2018 Environmental Site Review and the Scoping Meeting. This work involved excavation and fill in the river bed. MDNR staff, have also participated with and been part of meetings, consultations, and communications with the Licensee and Applicant and their consultants regarding this relicensing process.

These MDNR comments and recommendations are provided on Brainerd Public Utilities' Preliminary Application Document (PAD); on the sufficiency of the FERC-prepared Scoping Document 1; and include the MDNR's Study Request for a Recreational Use Survey and Study (attached directed to this letter).

As noted to some extent in these comments the MDNR has or knows of a number of other publications, reports, plans, and documentation which support our comments and recommendations. These can, upon request, be provided to the FERC and to the Applicant as the FERC licensing process continues. For example, the MDNR and most of our individual administrative divisions have prepared and adopted vision statements for natural resources management in Minnesota. In addition, the MDNR has previously submitted comprehensive plan and other planning documents to the FERC which the FERC has formally accepted as statewide comprehensive plans.

These comments and recommendations are based on the MDNR's review of the PAD and the Scoping Document provided to us up to this point. The MDNR anticipates to be involved in further review and comment throughout the licensing process, including clarifying and refining the comments being submitted. Therefore, there will likely be additional comments, concerns, and recommendations provided, including license conditions and provisions at much later points in time.

The MDNR is using the opportunity of these comments to reiterate the importance of effective study schedules and study plans, particularly as these comments might be relevant in the event that study seasons may not be limited to one or two years. As is often the situation with the type of studies being done for this project, it is important for the Licensee/Applicant to recognize that the studies and the Study Schedule reflected may take longer than the contemplated and identified start dates and completion dates. This is a factor long-recognized by the FERC and by the resource agencies for studies on hydropower projects in Minnesota and throughout the country. This likely applies to a number of the resource-based studies recommended by the resource agencies, by the FERC, and by the Applicant/Licensee during this process. For example, for the 2018 study season, directions and decisions about schedules for the field and study season have already been determined at this time; studies could reasonably not occur during the 2018 study season. There are also limitations and restrictions about when certain work and studies can and should occur to preserve and protect natural resources. Permits or approvals associated with certain of the studies need to be acquired in connection with studies and this may need to occur a number of weeks or months in advance. The MDNR recommends that both the Applicant and the FERC, to the extent needed, may well need to also revisit this issue to assure having an effective and reasonable timeline for all studies to be done, understanding that complete studies may extend into more than one or two study seasons. After all, the goal and interest should be to have studies that will provide the best data for the resources in the area and upon which licensing decisions are based on complete study results.

At this point in time, the SD1 indicates that the FERC intends to prepare an Environmental Assessment (EA) and not necessarily and Environmental Impact Statement (EIS). The MDNR recommends an EIS for a hydroelectric project of this nature and at this location to completely, accurately, and effectively evauate the environmental affects associated with the proposed licensing (relicensing) of this project. . This is the first relicensing for this facility by Brainerd Public Utilities, they are a newer owner/operator for this facility and based on newer FERC regulations, the license period is now a 40 year term. This is also necessary since the project as originally licensed was privately-owned and is now a public project since its purchase by and transfer to Brainerd Public Utilities.

Regarding the preliminary issues and alternative to be addressed in the EA or EIS, the MDNR recommends the following for effective evaluation of issues:

- Instream Flow Methodology
- Baseline Fisheries study
- Fish Passage
- Botanical and Wildlife Resources including Minnesota State-Listed endangered, threatened, and rare species and the proposed taking of any State-Listed species.
- Recreational Developments and Opportunities
- Invasive and aquatic species and risks to these species

- A discussion of and proposals for protection, mitigation, and enhancement measures to protect and mitigate, and enhance loss to fisheries, wildlife, and other natural resources

Specific comments regarding fish and fisheries issues in the area of the Brainerd Dam and the Brainerd Hydropower Project. Comments also apply to studies or study plans suggested by other entities.

- The MDNR's knowledge is that the Brainerd Dam appears to be the upstream limit of common carp distribution in the Mississippi River in this area. The MDNR recommends that any fisheries baseline studies and evaluations need to develop ways to allow native fish to pass, but exclude common carp. Fisheries studies should determine if common carp or invasive carp could pass through the dam under extreme flows both upstream and downstream of the dam affecting the fishery of the Mississippi River.

- The project boundary and area being studied at this time needs to be and should be extended upstream to near the mouth of the Pine River and downstream effects need to be included and evaluated. The first non-impounded riffle habitat occurs near the confluence with the Pine River. Effects of the dam on the fish community both upstream and downstream of the dam need to be analyzed and evaluated including biological connectivity and alteration of habitat.

- Regarding the extent of existing technical information, the applicant should be aware there are existing fish population assessments completed by both the MDNR and the Minnesota Pollution Control Agency (MPCA) covering areas both upstream and downstream of the dam. An MDNR fish population assessment was collected in 2007 and the MPCA collected a fish population assessment in 2013.

- The Muskellunge population in the area of the dam is important and requires an effecctive and sufficient evaluation and analysis. The reach downstream of the dam supports a native, genetically unique, naturally reproducing Muskellunge population.

  The Muskellunge population upstream of the dam is being enhanced by stocking by the MDNR since 2006 (i.e,. there was also limited stocking of Muskellunge above dam in 1960 and through the 1990s). The MDNR anticipates there is downstream movement by Muskellunge out of the reservoir through the dam. One marked stocked muskellunge was captured by the MDNR downstream of the dam in July, 2014, the year following its stocking above the dam in the Fall, 2013. Prior to stocking, Muskellunge above the Brainerd Dam were rare, but have been more common prior to dam construction.

  The MDNR is aware of and provides information regarding a number of technical documents which discuss more specific details and documentation about the genetics and population status of Muskellunge below the Brainerd dam. There is an assessment of population characteristics

and genetic origin of Muskellunge in a section of the Mississippi River, Minnesota (see K. Kapuscinski, and coeditors, Muskellunge Management: Fifty Years of Cooperation among Anglers, Scientists, and Fisheries Biologists by the American Fisheries Society, Symposium 85, Pages 565-582).

- The MDNR has repeatedly and consistently submitted statements and written comments to proposed applicants, licensees, and to the FERC regarding ineffective desktop analyses and that full on-site entrainment studies are necessary and required. This is particularly the situation for this proposed project which is not a new hydropower project and due to recent FERC decision, we know the relicensing will be for a standard 40 year period of time. The proposed deskop fish entrainment, mortality study, and fish protection plan is not sufficient. Brainerd Public Utilities should provide specific information about the extent of protection currently in effect. The MDNR knows that at this time in the process, the size of the trashracks is not a study issue but rather handled as part of license conditions. Even with this knowledge, the MDNR recommends that any fish entrainment and mortality studies should include the option of a one-inch angeled trash rack. Sometimes, the U.S. Fish and Wildlife Service (USFWS) may also request a size of one-inch spaced angled trash racks to provide a measure of fish protection and reduce entrainment of at least larger fish. Fish entrainment and fish mortality studies need to include and address intake velocity which can be a significant issue with fish impingement at hydropower dams and projects. In addition, there are Minnesota state laws and rules for compensations for the taking and loss of the fishery resource. These rules provide for compensation at a level and extent different from the American Fisheries Society compensation levels often used by the FERC staff. Minnesota laws and rules must be followed by the Applicant and the Licensee in this matter.

- The Applicant needs to revise their plans and provid safe, legal shore fishing access on the right bank below the dam in the vicinity of the portage trail. Fishing and angling is both a fisheries issue and a recreation issue. The MDNR knows that many anglers already shorefish in this area, passing or avoiding current no trespassing signs on the access road off of Riverside.

- The MDNR knows and provides that a fish kill of smallmouth bass occurred during snowmelt in the late winter or spring in approximately 2006 to 2007 with the dead/dying fish appearing to originate from immediately below the dam. The MDNR is not aware if an actual cause for this fish kill was determined. At the time, water samples and fish specimens were examined by MDNR fish pathologists.

- The applicant indicates there are no plans for any changes in the project plans or operations. This is not sufficient. As the licensing process continues, the MDNR anticipates and expects the Applicant to have and to present proposals for protection, mitigation, and enhancement for the effects on natural resources.

Additional specific comments regarding recreations applicable to the PAD and/or to SD1.

- The section in the documents on trails should also include the French Rapids trails and the Mississippi Northwoods trails.
- Althougth albeit more of an issue for licensing of this proposed project and not specifically related to studies at this time, the MDNR strongly recommends that Brainerd Public Utilities work with the MDNR on early detection of Aquatic Invasive Species on the Mississippi River in the area of the Brainerd Hydropower Project. This will be important to avoid and prevent the spread of Aquatic Invasive Species.

The MDNR fully recognizes that while some of the comments in this submittal may address matters related to future points in the FERC licensing process, we are identifying some of these issues for consideration both now and may also raise these issues as the licensing process continues.

Thank you for the continued opportunity up to this point to review and provide the MDNR's comments and recommendations and study request on the proposed relicensing of the Brainerd Public Utilities Hydroelectric Project. The MDNR continues to anticipate to remain involved in further review and comment throughout the licensing process, and may also continue to be involved in participation in some of the studies being prepared. The agency will likely provide additional comments, concerns, and recommendations throughout this licensing process.

Sincerely,

Charlotte W. Cohn, Hydropower Projects Manager
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
e-mail to charlotte.cohn@state.mn.us
Telephone to 651.259.5072

c: Judy Boudreau and Jason Boyle
Ian Chisholm
Nancy Stewart
Heidi Lindgren
Marc Bacigulupo
Mike Duval
Scott Magnuson, Brainerd Public Utilities (smagnuson@bpu.org)
Adele Braun, Barr Engineering (ABraun@barr.com)
Patrick Ely, FERC Contact (Patrick.Ely@ferc.gov)
William Wilde, MPCA
Nick Utrup, USFWS

Study Request Criteria – **MDNR Requested Recreation Use Survey and Study (June 28, 2018)**

a) Goals and Objectives

Very little is known definitively about resource use in the Mississippi River stretches influenced by this facility. Currently, recreation use at the dam is poorly documented. Information on the dam's effects on recreational use of the river is limited.

The goals of this study are:

1. to establish comparable usage information for flowing and impounded stretches of the river;
2. to identify facilities needed in river stretches influenced by the dam to foster similar recreation use as non-dammed stretches;
3. to identify limiting factors to river recreation access that the dam may be creating;
4. identify how the fish species assemblage and recreation is affected by the dam (i.e., through creel/survey design);
5. determine the importance of user point of origin and destination on use of the river in the project vicinity;
6. to allow a more uniform use of flowing river recreation upstream, within the project area and downstream, to decrease user conflicts on heavily used river sections not impacted by the dam, and,
7. identify ways in which the dam's negative effects on flowing river recreation may be mitigated.

Study Objectives are to gather use data consisting of participation (# of people) and type of recreation (i.e., canoe, kayak, tube, and/or fishing) on flowing and impounded stretches of the Mississippi River. Also, the Study aims to survey users on where they use the river; frequency of use; and for what types of activities; and to survey users on what facilitates and creates a barrier to use of flowing and impounded river stretches.

b) Information to be Obtained

The Recreation Use Study will gather use data consisting of participation (# of people) and type of recreation (i.e., canoe, kayak, tube, fishing, and number and species of fish caught/creeled) on flowing stretches of the river above and below the project. It will also survey users on where they use the river; frequency of use; and for what types of activities; and survey users on what facilitates and creates a barrier to use of flowing and impounded river stretches. Suggested survey topics include public's knowledge on how to access river; "why each section gets used or not?"; and "what types of uses are more common and why?" These are example questions that we propose should be answered through this Study. We also intend that the Study will allow us to look at use above and below and dam and compare to with non-dammed sections of the river.

c) Relevant Resource Management Goals

Provide a base line of use information to identify how flowing river recreation is being concentrated in a few areas and under used in others due to the influence of the reservoir and dam. A dam and reservoir on flowing sections of the river create barriers to river recreation by

creating slack water in the reservoir that can be impossible to cross for tubers to challenging with windy conditions for some paddlers. Poor access to flowing river stretches due to the barriers created by the dam and reservoir that would provide similar experiences end up concentrating users to a few flowing stretches without these barriers.

d) Describe existing information concerning the subject of the study proposal and the need for additional information

Existing information is limited or nonexistent. The Recreation Use Study would help identify why non-dam sections of the river are favored? What facilities or user knowledge may influence the use? What can be done to mitigate the impacts the dam has on the public's use of the flowing public waters of the Mississippi River. In Minnesota only watercraft greater than ten feet need to be registered. There are a lot of non-motorized watercraft under ten feet that are exempt from the registration requirement. Even with this exemption, the numbers of kayaks and paddleboards represent the largest increasing classification of boating registrations in the state.

e) Explain any nexus between project operations and effects (direct, indirect, and cumulative) on the resource to be studied; how study results would inform the development of license articles/requirements.

The Brainerd Hydroelectric Project and the reservoir it creates are barriers to flowing river recreation on the Mississippi River. The dam itself creates the need for exit, portage, and entry points, each of which can prevent users with differing physical abilities from recreating on the river. Surveying river users to determine why they favor certain stretches will help identify ways the recreation facilities at the dam can be modified to increase the public's access to flowing river recreation. The reservoirs create a different barrier. The slack water created is not favorable and is often impassible for tubers; and the distance, wind, and waves can be challenging for many paddle users. This impacts more than just the area around the dam itself. The barrier it creates renders this section of river unusable or most certainly unfavorable if users are unable to get off the river before the reservoir. The survey will help identify why various sections of the river are either highly used or under used.

f) **Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.**

Propose public surveys of river users be done on site for several week ends including at least one holiday throughout the summer. The river up- and downstream from the project could be broken into approximately three sections (upstream; facility, including reservoir; and downstream). Surveys would be done for the same duration at the same time at each location. Information collected at these three study sections should include catch (creel) data for any anglers surveyed. The MDNR Fisheries Section has extensive experience designing and implementing fisheries creel surveys (which is a segment of recreation) and should be consulted for scoping this aspect of the Recreational Survey and Study.

A complimentary on-line survey could be done for interested parties who frequent the river but may not be using it at the time of the survey with solicitation through local public advertisements. Surveys of this type are common, and standard practices and methodologies would be followed to gather the information and guide its analysis.

g) 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.

Cost and effort to accomplish this work would not be significant compared to the loss of public recreation use that hydroelectric facilities create. There are numerous colleges and universities in Minnesota that have recreation programs that could be used to facilitate this study. By beginning to identify the impacts the hydroelectric plants have on recreational use of the Mississippi River, the MDNR, Brainerd Hydroelectric, and the FERC can identify ways in which these impacts can be mitigated. The end goal is to provide the public with access to the river's publicly-owned resources in areas where the hydroelectric plant operations currently limit or prevent public use.

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

June 28, 2018

Kimberly D. Bose, Secretary
Nathaniel J. Davis, Sr., Deputy Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

RE: Brainerd Public Utilities - Brainerd Hydroelectric Relicensing Project,
Federal Energy and Regulatory Commission: Project Number: P-2533,
Review and Comment on Scoping Document 1 and Pre-Application Document, Requesting Impoundment Bathymetric Study and Sediment Accumulation and Contaminant Study

Dear Kimberly D. Bose and Nathaniel J. Davis, Sr.:

In accordance with 18 Code of Federal Regulations (CFR) §5.9, the Minnesota Pollution Control Agency's (MPCA) Section 401 Water Quality Certification (401 Certification) Program hereby requests new studies in support of the relicensing of the Brainerd Hydroelectric Project (Project).

Specifically, the MPCA requests a new Impoundment Bathymetric Study and a new Sediment Accumulation and Contaminant Study to provide information necessary to support review of an expected request for 401 Certification for the relicensing Project. The 401 Certification is required by the MPCA under authority of Section 401 of the Clean Water Act (CWA) (33 USC § 1251 et seq.), Minn. Stat. chs. 115 and 116 and Minn. R. chs. 7001.1400-1470, 7050, 7052, and 7053.

As required by 18 CFR §5.9(b), any information or study request must contain the following:

1. Describe the goals and objectives of each study proposal and the information to be obtained;

2. If applicable, explain the relevant resource management goals of the agencies or tribes with jurisdiction over the resource to be studied;

3. If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study;

4. Describe existing information concerning the subject of the study proposal, and the need for additional information;

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;

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

7. Describe considerations of level of effort and cost, as applicable, and why proposed alternative studies would not be sufficient to meet the stated information needs.

The MPCA offers the following support for its new study requests:

1. **Describe the goals and objectives of each study proposal and the information to be obtained.** There are no currently approved studies that target analysis of water quality as a goal or objective. There are two proposed studies identified in Scoping Document 1 (SD-1): the Recreation and Land Resources Study and the Cultural Resources Study. However, in order to ensure compliance with the Anti-degradation Rules finalized in November 2016, the MPCA seeks information to describe existing water quality and predict anticipated future water quality, particularly as it pertains to sedimentation and changes in bathymetry over time. The MPCA believes the requested studies, and the sampling associated with them, would provide this information in support of the request for 401 Certification. Within the Project area, both Rice Lake and the reach of the Mississippi River from the Pine River to the Crow Wing River are listed as impaired. Rice Lake is impaired for mercury in fish tissue (affected designated use is aquatic consumption). The Mississippi River reach is impaired for both mercury in fish tissue and total suspended solids (TSS) (affected designated uses are aquatic consumption and aquatic life). Additionally, the reach of the Mississippi River on which the Project is located is a restricted Outstanding Resource Value Waters (ORVW) (Minn R. 7050.0335, subp 1); Minn. R. 7050.0265 requires that 401 Certifications ensure that the exceptional characteristics for which a water body was designated as a restricted ORVW are protected.

   The MPCA is requesting these additional studies to establish baseline data that will be used to compare possible future impacts that the additional turbine installation continued operation of existing facilities addressed by the relicensing may have on water quality. These studies will measure the increase or possible decrease in TSS and assist in determining what measures Brainerd Public Utilities must implement to reduce or eliminate TSS from entering the water column. The information from the requested studies will help to ensure that 401 Certification of the proposed relicensing would both prevent further impairments of affected waterways and also protect the exceptional characteristics of the Mississippi River over the 40-year relicensing life of the Brainerd Hydroelectric Dam facility.

2. **If applicable, explain the relevant resource management goals of the agencies or tribes with jurisdiction over the resource to be studied.** The resource management goals of the MPCA's 401 Certification Program are to achieve and maintain the highest possible quality in surface waters of the state and ensure compliance with all state water quality standards. This includes protecting and maintaining existing uses and the level of water quality necessary to protect such uses; minimizing degradation of high water quality; preserving the exceptional characteristics of outstanding resource value waters; and ensuring that activities with the potential for water quality impairments associated with thermal discharges are consistent with the CWA 401 Certification Program.

3. **If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.** The MPCA seeks to ensure that information necessary to assess the Project is made available in a timely fashion to assist both the agency and the public in reviewing the Project.

4. **Describe existing information concerning the subject of the study proposal, and the need for additional information.** As described above, there are known impairments for mercury in fish tissue and TSS in the waters of the Project area. Providing baseline data regarding sedimentation and bathymetry will help to assess whether ongoing operations may contribute to impairments and whether the expected 401 Certification might include conditions to help address existing impairments and ensure continued protection of the Mississippi River as a restricted ORVW.

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.** Sedimentation may occur in the impoundments created behind the dam. These sediments can accumulate over time, resulting in changes to water depths, water velocities, water quality, and aquatic habitat. Bathymetric and sediment accumulation studies (including contaminant screening occurring as part of the sediment accumulation study) will help to determine the potential degradation that may result from continued operation of the relicensed Project. If there are prudent and feasible methods for avoiding, minimizing, or mitigating any adverse effects resulting from such degradation, these methods could potentially be incorporated as conditions of a future 401 Certification. If, alternatively, the studies were to show negligible projected degradation, the MPCA could potentially waive or certify the Project without additional conditions.

6. **Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.** The bathymetry and sedimentation and contaminant surveys, if approved, would be conducted during the summer or fall of 2019 at times when the head pond elevation can be managed and held stable. The study area would begin just upstream of the Dam and continue to the upper extent of the Project boundary. The studies would be conducted in the Brainerd Dam Impoundment area. The MPCA is not proposing a specific methodology for the requested studies. However, these types of studies are a common component of water quality analyses, and can be designed using generally accepted scientific practices.

7. **Describe considerations of level of effort and cost, as applicable, and why proposed alternative studies would not be sufficient to meet the stated information needs.** The estimated costs for the bathymetric study are $25,000. The estimated costs for the sediment accumulation and contaminant study are $40,000. These costs are estimated based on previous studies conducted at similar type hydroelectric facilities. The MPCA believes these costs, and level of effort needed to conduct the studies, are reasonable given the length of license (40-years) under consideration and potential for impacts on water quality resulting from

sedimentation. The MPCA is unaware of any alternative studies that would provide the necessary information regarding bathymetry and sedimentation to inform the 401 Certification review of existing and expected future water quality.

The MPCA appreciates the opportunity to review the April 2018, SD-1 Report and the February 2018, Pre-Application Document and provide this request for additional studies. If you have any questions concerning this request, please contact Bill Wilde of my staff at 651-757-2825 or at william.wilde@state.mn.us .

Thank you for your time and consideration in this matter.

Sincerely,

Melissa Kuskie, Supervisor
Certification, Environmental Review and Rules Section
Resource Management & Assistance Division

MK/BW:ds

Appendix B

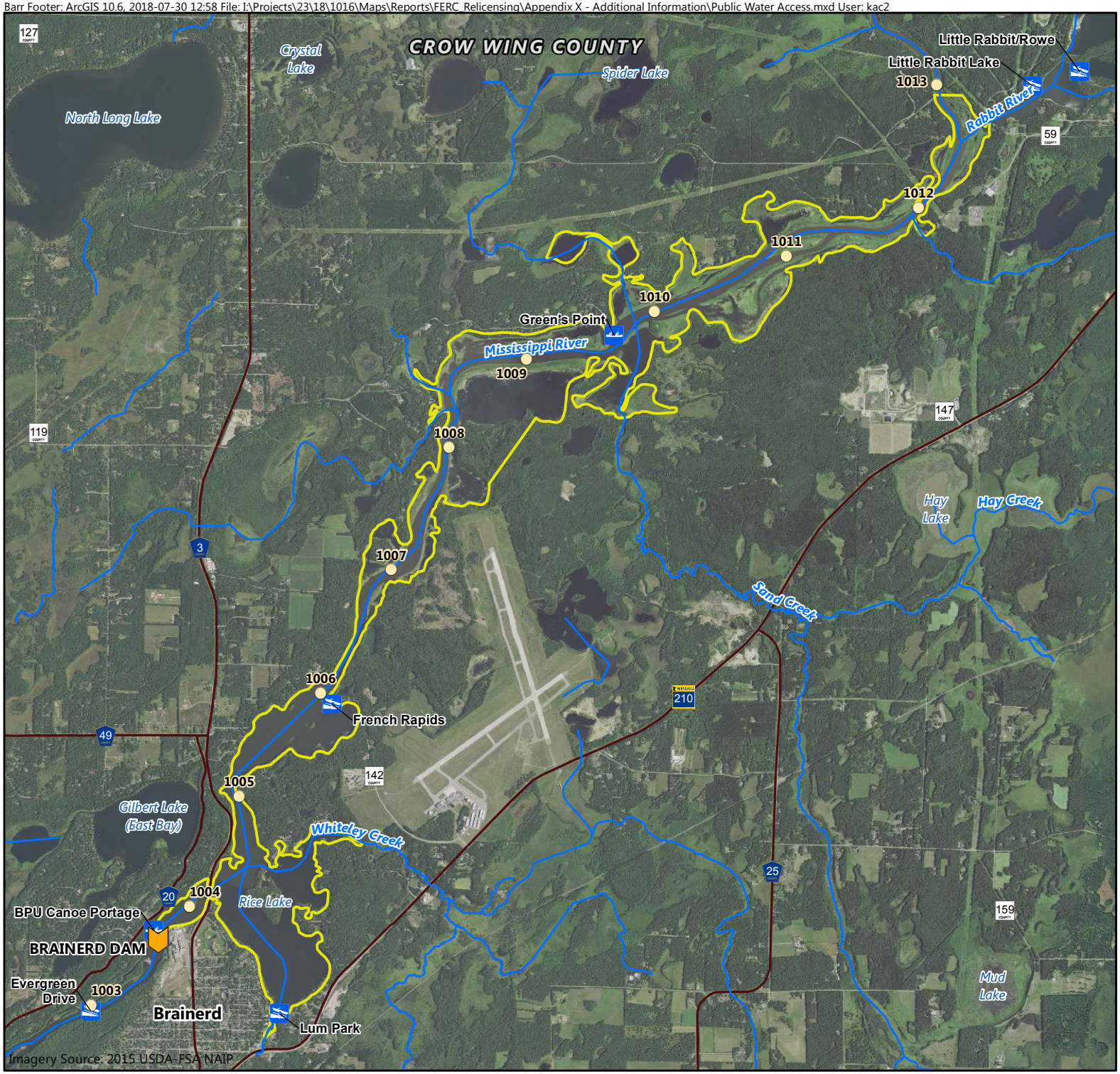
Bald Eagle Information

(Privileged and Confidential – filed under separate cover)

Appendix C

Figures

Barr Footer: ArcGIS 10.6, 2018-07-30 12:58 File: I:\Projects\23\18\1016\Maps\Reports\FERC_Relicensing\Appendix X - Additional Information\Public Water Access.mxd User: kac2



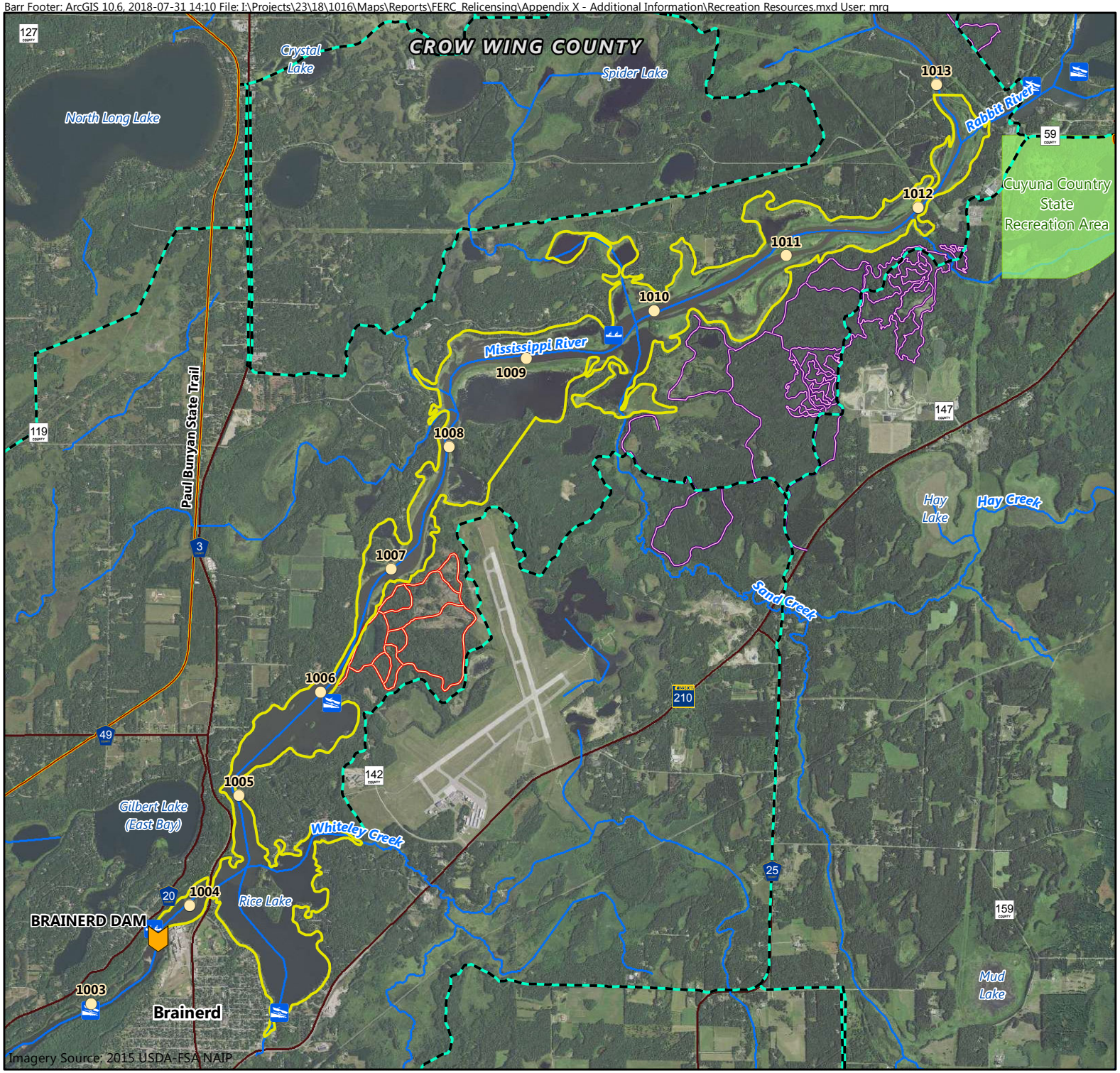
River Mile Marker
Dam Location
Project Boundary
Major Highway
Carry-in/Portage
Trailer Launch

N

0 5,000 10,000
Feet

BARR

PUBLIC WATER ACCESS
Brainerd Dam
Brainerd Public Utilities



Imagery Source: 2015 USDA-FSA NAIP

- River Mile Marker
- Dam Location
- Project Boundary
- Major Highway
- Carry-in/Portage
- Trailer Launch
- State Trail
- Ski Trail
- Snowmobile Trail
- Off-Highway Vehicle Use Trail
- State Park

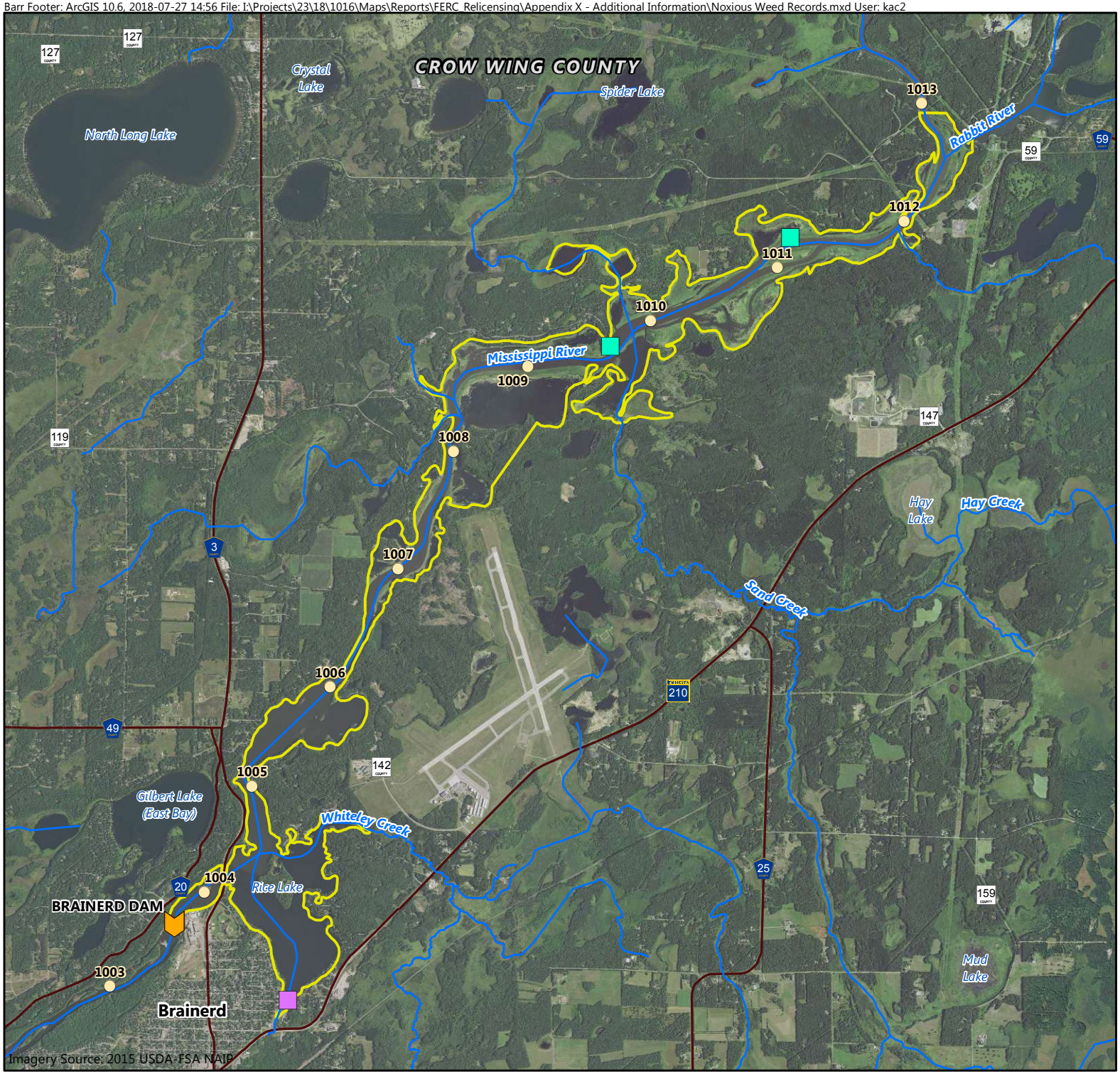
N

0 5,000 10,000

Feet

BARR

RECREATION RESOURCES
Brainerd Dam
Brainerd Public Utilities



Imagery Source: 2015 USDA-FSA NAIP

River Mile Marker

Dam Location

Project Boundary

Noxious Weed Record

Common Tansy

Purple Loosestrife

Major Highway

N

0 5,000 10,000

Feet

BARR

NOXIOUS WEED RECORDS
Brainerd Dam
Brainerd Public Utilities

Appendix D

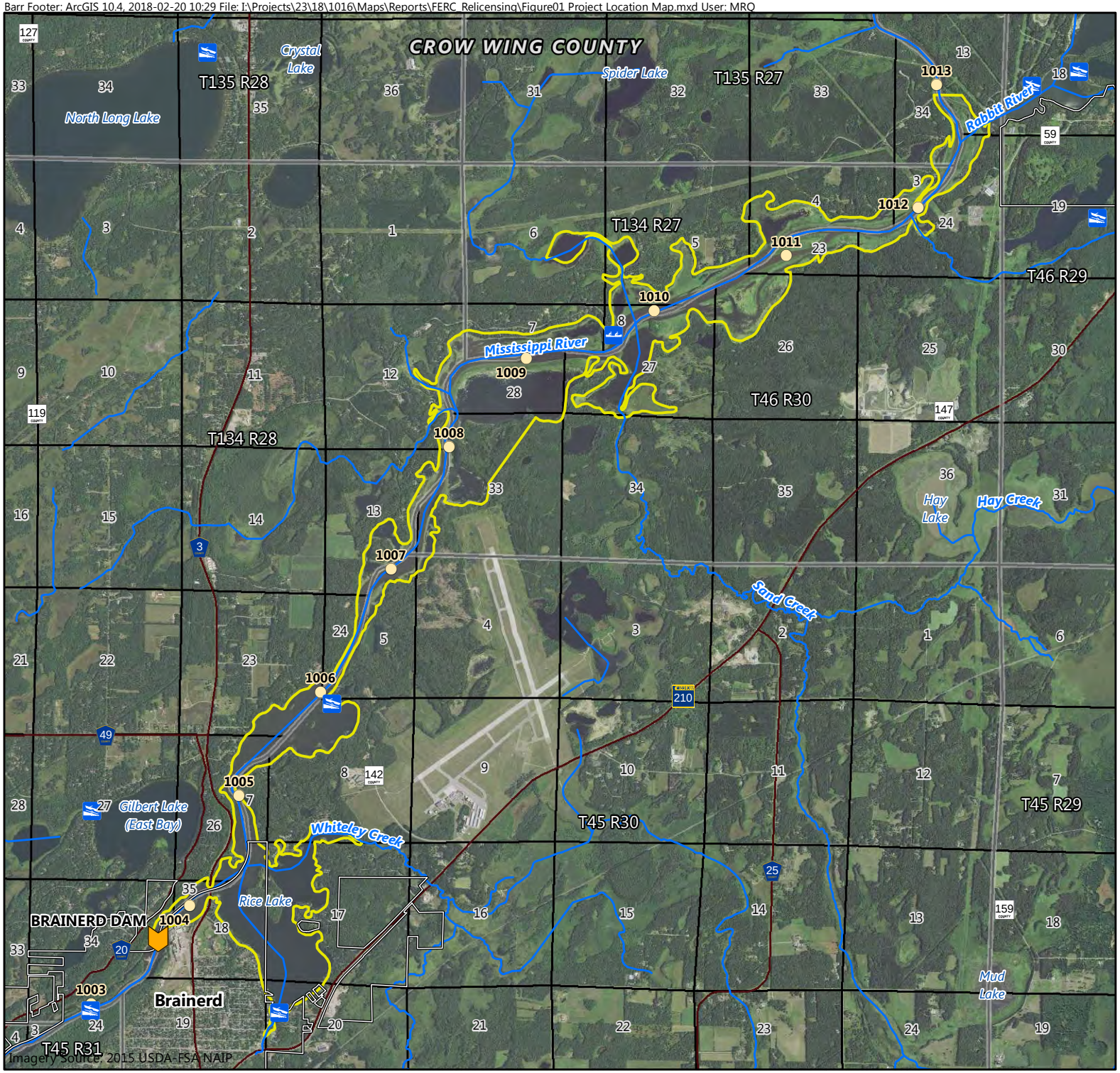
Cultural Resources Information

(Privileged and Confidential – filed under separate cover)

Appendix E

Updated Exhibit G Drawings

Barr Footer: ArcGIS 10.4, 2018-02-20 10:29 File: I:\Projects\23\18\1016\Maps\Reports\FERC_Relicensing\Figure01 Project Location Map.mxd User: MRQ



- Carry-in/Portage
- Trailer Launch
- River Mile Marker
- Dam Location
- Major Highway
- Project Boundary
- Corporate Limits
- PLSS Township
- PLSS Section

N

0 5,000 10,000

Feet

BARR

Exhibit G-4

PROJECT LOCATION
Brainerd Dam
Brainerd Public Utilities

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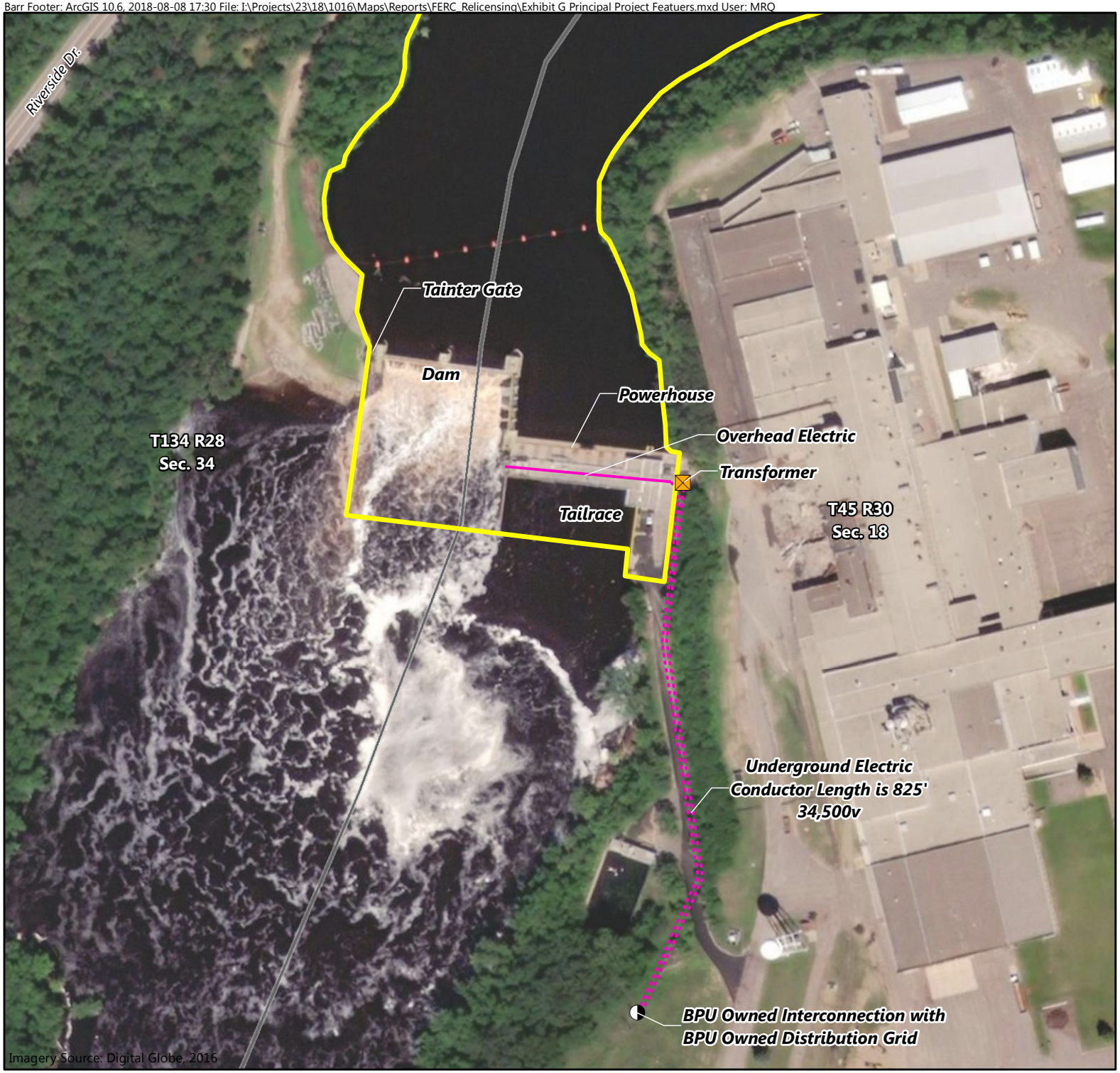


Project Boundary
PLSS Township
PLSS Section

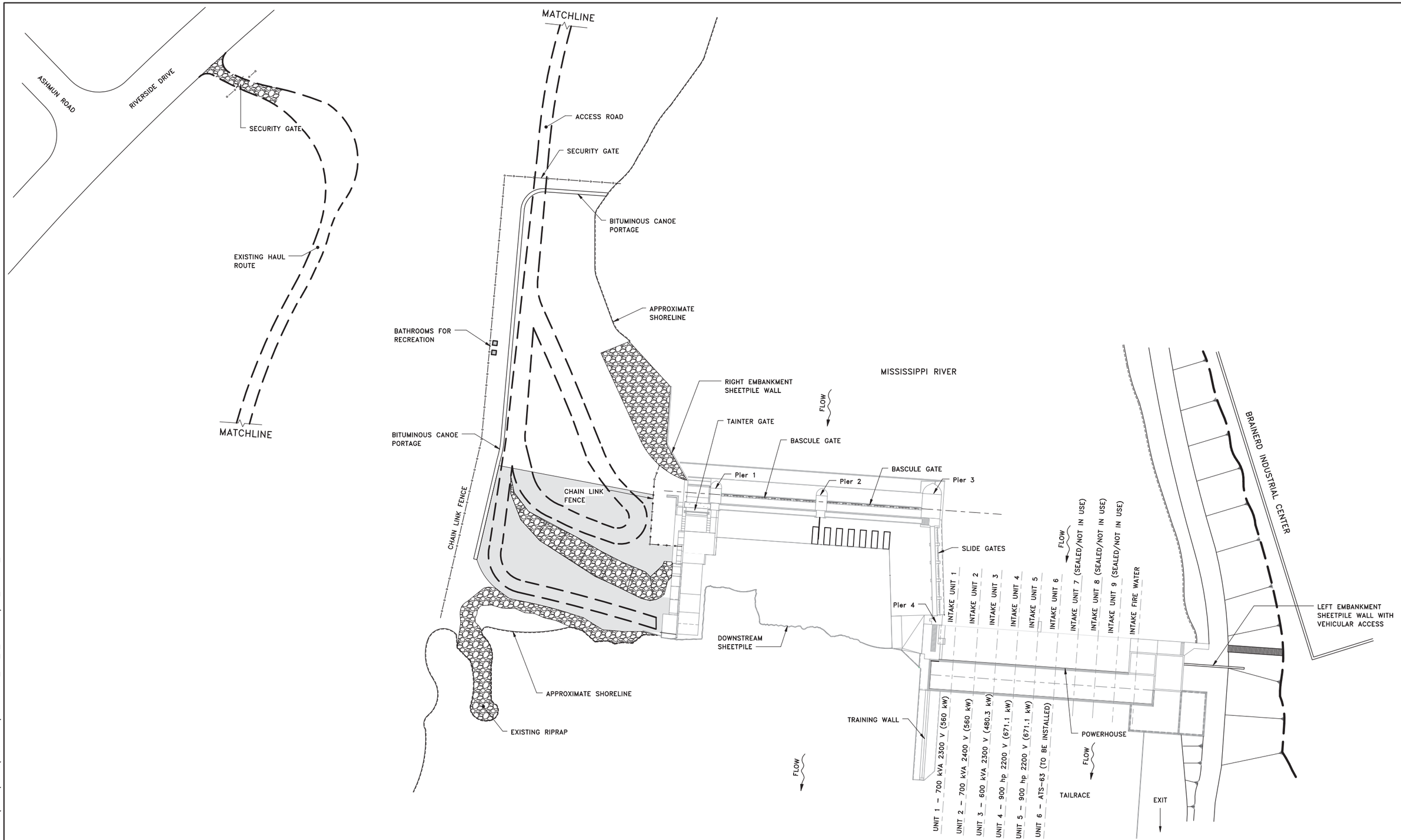
N

0 200 400
Feet

BARR

Exhibit G-5

PRINCIPAL PROJECT FEATURES
Brainerd Dam
Brainerd Public Utilities



CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION – DO NOT RELEASE

EXHIBIT DRAWING – NOT FOR CONSTRUCTION

NO.	BY	CHK	DATE	REVISION DESCRIPTION

CLIENT								
BID								
CONSTRUCTION								
RECORD								
RELEASED TO/FOR	A	B	C	0	1	2	3	
DATE RELEASED								

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1–800–632–2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
SUITE 200
MINNEAPOLIS, MN 55435
Ph: 1–800–225–1966
Fax: (218) 262–3460
www.barr.com

Scale	N/A
Date	8/01/2018
Drawn	
Checked	
Designed	
Approved	

BRAINERD PUBLIC UTILITIES
BRAINERD, MINNESOTA

BRAINERD HYDROELECTRIC PROJECT
BRAINERD, MINNESOTA

Site Plan

BARR PROJECT NO. 23/18–1016.05
CLIENT PROJECT NO. ---
DWG NO. G–06
REV NO.