APPENDIX H

SECTION 106 COMPLIANCE STUDY REPORT

PHASE IA ARCHAEOLOGICAL OVERVIEW

THE PHASE IA ARCHAEOLOGICAL OVERVIEW CONTAINS PRIVILEGED INFORMATION AND IS LOCATED IN VOLUME 4, PRIVILEGED.

PHASE I/II ARCHAEOLOGICAL INVENTORY AND EVALUATION

THE PHASE I/II ARCHAEOLOGICAL INVENTORY AND EVALUATION CONTAINS PRIVILEGED INFORMATION AND IS LOCATED IN VOLUME 4, PRIVILEGED.

APPENDIX H-3

HISTORIC BUILDING INVENTORY AND EVALUATION

Loup River Hydroelectric Project

FERC Project No. 1256

Historic Building Inventory and Evaluation

Loup Power District
Hydro Project

September 24, 2010

Study 11.0 - Section 106 Compliance

Serving You Electrically
LOUP POWER DISTRICT

Loup Power District
Hydro Project

Loup River Hydroelectric Project
FERC Project No. 1256

Study 11.0
Section 106 Compliance
Historic Building Inventory and Evaluation

September 24, 2010

Prepared for:

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STUDY 11.0 SECTION 106 COMPLIANCE HISTORIC BUILDING INVENTORY AND EVALUATION

1. INTRODUCTION

The Loup River Hydroelectric Project (Project) is located in Nance and Platte counties, Nebraska, where water is diverted from the Loup River and routed through the 35-mile-long Loup Power Canal, which empties into the Platte River near Columbus. The Project includes various hydraulic structures, two powerhouses, and two regulating reservoirs.

Specifically, the Project begins at the Headworks, where water is diverted from the Loup River into the Settling Basin and the Loup Power Canal. The Upper Power Canal carries the water to the Monroe Powerhouse, and then the Lower Power Canal carries the water from the Monroe Powerhouse into two regulating reservoirs, Lake Babcock and Lake North, which supply water to the Columbus Powerhouse via the Intake Canal. From the Columbus Powerhouse, water discharges to the Tailrace Canal, which in turn discharges Loup River water to the Platte River downstream of the confluence of the Loup and Platte rivers. Figure 1-1, provided in Attachment A, shows the location of the Project and identifies the components described above. In addition, photographs provided in Attachment B show the components of the Project. The Project differs somewhat from a typical hydroelectric project in that it has no significant dam, instream reservoir, project spillway, or transmission lines.

The Section 106 Compliance study plan, approved by the Federal Energy Regulatory Commission (FERC) in its Study Plan Determination on August 26, 2009, specifies that a historic district documentation package be prepared for the Project. This Historic Building Inventory and Evaluation (HBIE) of the built environment owned by the Loup River Public Power District (Loup Power District or the District), constitutes a substantial portion of the historic district documentation package. This HBIE was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) and is intended to be a reasonable and good faith effort to identify District-owned buildings and structures that are present at this location that might be considered historic property[1] as defined by the NHPA. Nebraska SHPO concurred with the findings of this HBIE on September 15, 2010 (see Attachment C).

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[1] Historic property is defined in Section 301(5) of the NHPA as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register, including artifacts, records, and material remains related to such a property or resource" (16 USC 470w).

1.1 Undertaking

On October 16, 2008, the District filed a Notice of Intent (NOI) with FERC to obtain a new license for the existing 53.4-megawatt (MW) Loup River Hydroelectric Project (FERC Project No. 1256). The District is not proposing to add generation capacity, to implement any substantial modifications to the Project, or to change established Project operations. The current license expires on April 15, 2014, and the District is using FERC's Integrated Licensing Process for hydroelectric projects. The FERC licensing of the Project constitutes an undertaking in accordance with 36 CFR 800.16(y), which states:

> Undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.

1.2 Personnel

This HBIE was completed by HDR Engineering, Inc. (HDR). Mr. Joe Trnka, AICP, CEP, served as the Principal Investigator. Mr. Trnka meets the Professional Qualifications Standards of the Secretary of the Interior for both Historian and Architectural Historian, as codified in 36 CFR 61. This HBIE was reviewed by Mr. Michael Madson, RPA, also of HDR.

1.3 Incorporation by Reference

The following documents are readily available from the District or the Nebraska State Historic Preservation Office (SHPO) and are hereby incorporated by reference:

- Power and Progress: The History of the Loup Power District, 1933-2006. Prepared by the Loup Power District, Columbus, Nebraska, 2006. This document provides a thorough history of the construction of the Project.
- Nebraska Historic Building Survey: Reconnaissance Survey Final Report of Platte County, Nebraska. Prepared for the Nebraska State Historical Society, State Historic Preservation Office by the Mississippi Valley Archaeology Center, July 1996. This document provides a thorough contextual history of the development and built environment of Platte County, Nebraska.
- Pre-Application Document, Volume 1. Loup River Hydroelectric Project, FERC Project No. 1256. Prepared by the Loup Power District, Columbus, Nebraska, October 16, 2008. This document provides a thorough description of the physical setting within which the Project is located.

2. GOALS AND OBJECTIVES OF STUDY

The goal of the Section 106 compliance study is to achieve NHPA Section 106 compliance through a programmatic, ongoing consultation relationship between the District and the Nebraska SHPO.

The objectives of the HBIE are as follows:

1. To gather sufficient information to identify historic properties that may be affected by the Project.
2. To conduct field studies to identify and evaluate historic elements of the standing structure/built environment.
3. To document the historic properties in the Area of Potential Effects and develop a historic district documentation package.

3. STUDY AREA

The study area is the Area of Potential Effects (APE), or Project Boundary, which encompasses the entirety of the District's holdings that are subject to the relicensing effort described in the PAD. On January 23, 2009, Nebraska SHPO concurred that the Project Boundary, as defined in the PAD, is the APE (see Attachment C). The Project Boundary is shown in Figure 3-1, Sheets 1 through 14, provided in Attachment A.

4. HISTORIC CONTEXT

4.1 Rural Electrification at the National Level

In the 19th Century, the electrical industry was transformed from little more than a curiosity to a significant, modern industry. However, the majority of these advances did not reach rural households until well into the first half of the 20th Century. The historic context of the Project is the story of rural electrification throughout the U.S., a story in which Senator George William Norris of Nebraska played a key role.

Serious advances in electric battery development began around 1800, and batteries remained the primary source of electric power until the 1870s. The development of electric generators began in earnest in the 1830s and matured to the degree that generators were the primary source of electricity by the 1870s. Electric lighting and electric motor development also progressed through the latter half of the 1800s. By 1900, electrical generation, transmission, and distribution systems had matured and were rapidly expanding in the urban portions of the U.S. (Derry and Williams, 1960; Kirby et al., 1956).

At the beginning of the 1900s, electricity was typically generated by coal-fired steam electrical generation plants and water-powered hydroelectric power plants. Electrical transmission systems carried the power to the electrical distribution systems that distributed the power to the consumers. With their population density, cities were quickly electrified. City dwellers quickly took advantage of the improvements to their lives that electrical power meant. Lighting, food preparation, food preservation, cleaning, and entertainment were a few of the many industries that were electrified. Urban life itself was quickly and fundamentally transformed by electricity.

Electrification of the rural economy progressed much more slowly. The chief obstacle to rural electrification, once efficient transmission technologies had been developed, was the cost to distribute electricity throughout the rural economy. Unlike cities, where hundreds of customers could be connected for each mile of distribution system constructed, the rural environment with its low population density often meant that miles of lines had to be erected for each new customer. This led to electrical rates that were often four or more times higher than the rates for equivalent urban service. By 1920, rural life, a life of heavy physical labor doing tasks that could easily be electrified, still awaited transformation.

In 1923, the University of Minnesota conducted a study known as the "Red Wing Project." This study demonstrated that rural electrification was economically feasible. Still, by 1925, only 3 percent of the estimated 6.3 million U.S. farms were served by central electrical service. By 1930, electricity was widespread in U.S. cities; however, only about 10 percent of U.S. farms had been electrified (New Deal Network, 2003). Electrical producers continued to resist expansion of service into the rural market citing cost concerns while simultaneously resisting government attempts to electrify the rural economy due to concerns over competition. The disparity between urban and rural life had grown considerably as urban life became modern and rural life stagnated. In contrast with the urban environment, rural life remained characterized by labor-filled days spent in poorly heated homes with poor sanitation, no running water, and little means to store fresh food such as meat and milk. Meanwhile, government planners pointed out that electrification of the rural economy could do more than simply improve the quality of life on the farm. Rural electrification could increase agricultural production, reduce the amount of labor required by the rural economy, and provide an enormous new market for heavy duty electrical equipment of all types (refrigeration, milking, cooking, heating, lighting, processing, etc.).

The problem of rural electrification was initially addressed through the creation by executive order of the Rural Electrification Administration (REA) on May 11, 1935. The REA was part of a larger relief package designed to stimulate an economy in the midst of the Great Depression. The following year, Congress resolved the issue when it passed the Rural Electrification Act on May 20, 1936. This act, which provided for long-term funding for rural electrification projects, was sponsored by Senator George William Norris of Nebraska (Nebraska State Historical Society, May 20, 2003). The Rural Electrification Act has been recognized as one of the most important of the many New Deal programs. The Rural Electrification Act provided the means to begin the transformation of rural life.

One key to its success was that the REA did not directly compete with existing electrical power producers. The REA changed the process of rural electrification by providing long-term, self-liquidating loans to state and local governments, farmers' electrification cooperatives, and nonprofit electrical cooperatives. The loan recipients then built and operated the electrical generation, transmission, and distribution systems and used a portion of the utility rates paid by their customers to liquidate their loans over time.

The REA provided a comprehensive rural electrification program. When electricity was provided to a new rural area, the REA provided teams of electricians who added wiring to houses and barns to use the newly available power being provided by the line crews (New Deal Network, 2003). A standard REA installation in a house consisted of a 60-amp, 230-volt fuse panel, with a 60-amp range circuit, a 20-amp kitchen circuit, and two or three 15-amp lighting circuits.

One ceiling-mounted light fixture was typically installed in each room and was usually controlled by a single switch near a door. Typically, only one electrical outlet was installed per room because plug-connected appliances were expensive and uncommon in the rural environment in the 1930s. The electrical wiring typically consisted of nonmetallic sheathed cable insulated with asbestos-reinforced rubber that was in turn covered by jute and tar (New Deal Network, 2003).

By 1950, despite a dramatic slow-down in rural electrification during World War II, 90 percent of American farms had electricity. Rural life had been transformed.

4.2 Hydropower and Irrigation on the Loup River

The Harza Engineering Company, in its February 1938 report, states that several attempts were made to harness local waterpower for either irrigation or generation prior to the Project. In 1894, a local stock company, the Columbus Power & Irrigation Company, was organized with a capital of $160,000. No tangible results were produced reportedly due to a lack of technical direction and financial resources. An effort in 1896 by the Nebraska Central Irrigation Company led to the construction of the first section of a proposed extensive canal and reservoir system for irrigation. The venture supplied a small number of farms with water until 1908; however, it did not prove to be profitable and was abandoned.

The next local project involved the construction of approximately 2 miles of canal from the Loup River to Beaver Creek just south of Genoa and a 600 kW generating plant. This project was abandoned circa 1915 due to financial difficulties after about 1 year of operation.

Planning for a new development was once again underway by 1922. Financial and legislative challenges tabled it until 1932, when the project was revived through an application submitted to the Reconstruction Finance Corporation (RFC) for a construction loan. Legal challenges were resolved in 1933 with passage of a Nebraska state act authorizing the creation of public power and irrigation districts.

The Loup River Public Power District was organized and approved by the end of May 1933. The original board of directors for the District consisted of Charles B. Fricke, August Ewert, Ed Kelly, D.A. Beecher, Ed Lusienski, Phil R. Hockenberger, E.E. Koebbe, A.H. Backus, J.E. Meyer, C.C. Sheldon, and A.R. Miller.

The loan request for the Columbus project was initially evaluated by the Federal Power Commission and the Public Works Administration. The Columbus project was also reviewed by the Federal Emergency Administration of Public Works. The government loan was approved in late 1933. The project was under the jurisdiction of the Federal Power Commission, which exercised general supervision over design and construction under a Federal power license granted on April 17, 1934.

Application for water rights on the Loup River were filed in September 1932, and hearings on the subject were held in January 1934. The water rights were granted on March 23, 1934.

The loan agreement between the District and the Federal government was executed on January 18, 1934. Bonds were prepared and funds became available on July 25, 1934. Government funds provided for the construction of the project and its associated transmission lines between the two power houses (exclusive of other transmission lines) totaled $8,700,000.00.

The District contracted with Harza Engineering Company of Chicago, Illinois, on June 11, 1934. Harza assumed responsibility for engineering and design of the project in detail. Erik Floor, of Harza, was in direct charge of the engineering work during the entire period of design and construction. The Public Works Administration (PWA) also maintained a staff of engineers and inspectors with local offices (Harza Engineering Company, February 1938).

4.3 Period of Historic Significance

A preliminary period of historic significance has been identified. It begins in 1937, when the District began production of saleable electrical power, and ends in 1950, by which time 90 percent of rural American households had been electrified. This preliminary period of historic significance is subject to change during the consultation process.

4.4 Historic Description of the Project

The Harza Engineering Company’s February 1938 report provides a detailed description of the Loup River Public Power Project, as it was then known. A summary of this description follows.

A low weir, or diversion dam, diverts water from the Loup River through the use of intake gates. The water enters a 2-mile-long settling basin, where the canal widens to reduce the velocity of the water, resulting in the deposition of a significant portion of the river's sediment load. The existing floating suction dredge, the Pawnee, began removing sediment from the settling basin in 1935.

At the lower end of the settling basin is the concrete skimming weir, where water flows into a normal section of earth cut-and-fill channel, known as the upper section of the canal, which runs the distance of about 11 miles to the Monroe Power House.

At the Monroe Power House, the water passes through three hydraulic turbines under a normal head of 32 feet and a design capacity of 7,000 kilowatts. From the Monroe Powerhouse, the water flows through 12 miles of the canal, known as the lower canal, to Lake Babcock, a small storage reservoir with a surface area of approximately 900 acres. The canal water enters Lake Babcock over a saw-tooth weir, the design of which was specifically chosen to increase the effective length of the weir and to ensure as little fluctuation in the water in the canal as was considered reasonably practicable.

From Lake Babcock, a forebay canal takes the water for 2 miles to the intake of the Columbus Power House. The Columbus Power House has a fall or head of 112 feet. At the intake, the water is screened through trash racks and converged through a concrete intake structure into three steel pipes or "penstocks" that are 20 feet in diameter and 320 feet in length. The Columbus Power House contains three generating units with a total capacity of 39,000 kilowatts. The Columbus Power House discharges into the "tail-race," which has a length of 5 miles. The tail-race discharges into the Platte River just downstream of where the Loup and Platte rivers meet. The tail-race weir, a concrete weir 700 feet in length, minimizes the fluctuations in water level of the tail-race canal.

4.5 Historic Materials on File with Loup Power District

A variety of historic materials regarding the construction and operation of the Project are currently on file at the District's office in Columbus. These include:

- Historic Construction Photographs – The District maintains a collection of approximately 3,365 historic photographs taken during the construction or early operation of the Project. These photographs have been scanned and organized by District personnel. Copies of the scanned photographs were provided to Nebraska SHPO along with a copy of this technical report.
- As-built Construction Drawings – The District maintains a collection of approximately 925 historic construction drawings associated with the construction of the Project. These drawings have been scanned and organized by District personnel. Copies of the scanned drawings were provided to Nebraska SHPO along with a copy of this technical report.
- Historic Construction Movie Footage – The District has black-and-white video footage titled "Canal System Construction." This video footage is organized as two digital files that total approximately 43 minutes of film

footage. The footage was shot during construction of the Project. Copies of the digitized film footage were provided to Nebraska SHPO along with a copy of this technical report.

5. BUILDING AND STRUCTURE INFORMATION

The Project consists of an integrated hydroelectric power generation system consisting of a number of key components and a variety of ancillary and supporting components. The key components include the following and are depicted in Figure 1-1, provided in Attachment A. Photographs 1 through 43, provided in Attachment B, illustrate the majority of the key elements of the Project.

5.1 Diversion Weir

The Diversion Weir is located in the Loup River approximately midway between Fullerton and Genoa. The structure is founded on the sand and silt river bed and is approximately 1,320 feet long. The Diversion Weir consists of a low concrete weir with a concrete apron stabilized with steel sheeting at its heel and toe. The fixed crest of the weir is at an elevation of 1,574 feet, and wooden flashboards (or planks) are normally maintained along the top of the weir to create an effective crest elevation of 1,576 feet. These sacrificial flashboards are designed to fail under heavy ice loads or extreme high water to prevent damage to the permanent fixed weir. The right, or south, abutment of the Diversion Weir is flanked by a dike extending approximately 3,000 feet to high ground. In mid-channel, the Diversion Weir makes an abrupt downstream turn and extends approximately 250 feet to terminate at the most riverward pier of the Sluice Gate Structure, described below.

5.2 Intake Gate Structure

The Intake Gate Structure is located on the north bank of the river. It is constructed of reinforced concrete and supports 11 steel radial gates that admit Loup River water into the Loup Power Canal. The elevation of the concrete gate sills is 1,569.5 feet, and each gate is 24 feet long with a maximum opening of 5 feet. Six gates are equipped with electric motors, and five gates are operated by either electric- or gasoline-powered gyros. An integral concrete service bridge spans the Settling Basin and provides for vehicle and operator access to all intake gates and utilities.

The downstream end of the Intake Gate Structure connects at a right angle with the Sluice Gate Structure, described below. To ensure operation of the intake and sluice gates during cold weather, a steam boiler with appropriate fixed piping and hoses is provided for ice control and thawing of all gates. The upstream end of the Intake Gate Structure is flanked by a sand-fill dike extending some 7,200 feet to high ground. Several auxiliary buildings are located north of the Intake Gate Structure, including the boiler house, gate tender’s residence, maintenance shop and offices, and storage buildings.

5.3 Sluice Gate Structure

The Sluice Gate Structure spans the portion of river flowing between the downstream leg of the Diversion Weir and the Intake Gate Structure. This geometry promotes formation of a scour channel along the front of the Intake Gate Structure. Sediment, as well as debris and ice, then migrates directly to the sluice gates when they are opened. Periodic sluicing of sediment and debris is critical to keep the Intake Gate Structure from being obstructed by sediment.

The Sluice Gate Structure is constructed of reinforced concrete and supports three steel gates. The elevation of the sluice gate sills is 1,568 feet, and each steel gate is 20 feet long with a maximum opening of 6 feet. All three gates are equipped with electric motors and can be accessed from an integral concrete service bridge.

5.4 Settling Basin

Water diverted from the Loup River enters the Settling Basin. The Settling Basin is designed for very slow flow velocity to allow heavier sediment materials to settle out of the water before it enters the much narrower, faster flowing Upper Power Canal. Therefore, flow velocity through the Settling Basin is less than 1 foot per second (fps). The Settling Basin is approximately 2 miles long and has a bottom width of 200 feet and a nominal depth of 16 feet. Hydraulic capacity of the basin is 3,500 cubic feet per second (cfs), and maximum basin water surface elevation is 1,572 feet. A key feature of the Settling Basin is the Hydraulic Dredge, described below.

5.5 Hydraulic Dredge *Pawnee*

Since 1935, a floating hydraulic dredge, the *Pawnee*, has been employed to remove accumulated sediment (sand, silt, and gravel) from the Settling Basin. Without frequent dredging, the Settling Basin would quickly become choked with sediment and cause the Project to shut down. The *Pawnee* operates using an electrically driven 2,500-horsepower pump with 30-inch suction and 28-inch discharge lines. The crane-supported suction line is equipped with a dustpan-type suction head. This device consists of a wide shallow suction nozzle with a row of forward-facing water jets to cut into, break up, and agitate the material to be removed. Electric power for the dredge is provided from 5-kilovolt (kV) overhead lines along both sides of the Settling Basin. From special connectors provided at each fixed discharge pipe, electric service is carried in cables along the pipeline bridge to the *Pawnee*, where all equipment is electrically operated.

The *Pawnee* is maneuvered using a system of cables wound on winches at the corners of the bow. These lines extend diagonally to snubbing posts fixed on opposite sides of the Settling Basin. Dredging is accomplished by pulling the dredge in an upstream direction by winding forward on the winches, thus forcing the suction head into the submerged sand bank. Pumps, auxiliaries, winches, and movement of the dredge are all controlled from an elevated control bridge located above the deck house.

Each winter, the *Pawnee* is put in dry-dock for maintenance of the dredging components. The corrugated steel deck house and barge are original and maintain the appearance of the original dredge; however, over the years, virtually all of the mechanical and electrical components of the dredge have been replaced.

Each year, the *Pawnee* removes approximately 1 million to 1.5 million cubic yards of sediment from the Settling Basin. Sediment pumped by the dredge is carried through an articulated steel pipeline to a series of fixed steel discharge pipes spaced along both sides of the Settling Basin. These pipes lead to the North and South Sand Management Areas (SMAs), discussed below, on either side of the Settling Basin. Water from the North and South SMAs is routed through a series of dikes and ditches and drains back into either the Loup River or the Loup Power Canal, depending on the location of the dredge.

5.6 Sand Management Areas

The North and South SMAs are located on either side of the Settling Basin. The North SMA is north of the Settling Basin, away from the Loup River, and the South SMA is south of the Settling Basin, adjacent to the Loup River. Although designed for the same purpose—to receive and decant dredged material—the two areas have evolved quite differently.

In the early years of Project operation, from 1937 to 1960, all dredged material was pumped to the South SMA. The quantity dredged during that period averaged 2,631,267 cubic yards annually. In 1961, dredged material began being pumped to the North SMA as well, though it was considerably less material than was pumped to the South SMA. Beginning in 1975, the majority of the total quantity dredged was pumped to the North SMA. Total material dredged from 1961 to 2007 has averaged 1,326,850 cubic yards annually.

At the South SMA, both the water and the solid material that are deposited eventually find their way back into the Loup River; solid material is presumably returned during high flow events. This is evidenced by the establishment of large trees and only small changes in the elevation of the site. The North SMA is never scoured by high flow events; therefore, material is not removed and has accumulated to impressive proportions. The resulting sand pile covers approximately 318 acres and extends over 80 feet above natural grade. In addition, the isolation, broad expanse, and frequent wetting of the North SMA have made it a popular nesting site for the threatened piping plover (*Charadrius melodus*) and endangered interior least tern (*Sterna antillarum athalassos*). This has led to voluntary cooperation to protect the nesting birds and cessation of dredging activity during the nesting/fledging season each year.

Also present in this area is a sand plant operated by Preferred Rocks of Genoa since 2006. This sand plant post-dates the period of significance and is not discussed further in this report.

5.7 Skimming Weir

The Skimming Weir is located at the downstream end of the Settling Basin. Here, decanted water passes over the Skimming Weir into a narrower section of the Loup Power Canal, where the maximum flow velocity is 2.25 fps. This fixed-crest concrete weir has a bridge-like superstructure and is fitted with screens to collect trash and debris before they can enter the Upper Power Canal. The crest elevation of the Skimming Weir is 1,568.2 feet. Overflow depth varies from 1.6 feet at 800 cfs to 4.2 feet at 3,500 cfs. The water level in the Settling Basin (and the depth of the basin) will vary with the amount of water passing over the Skimming Weir.

5.8 Upper Power Canal

The Upper Power Canal parallels the south side of the Nebraska Central Railroad (formerly Union Pacific Railroad) from the Settling Basin to Genoa, where it dips under Beaver Creek through an inverted siphon. The 10-mile canal segment then skirts along the south side of Genoa until it dips under the railroad in another siphon. The Upper Power Canal continues along the north side of the Loup River Valley, crosses under Looking Glass Creek in a third siphon, and continues to the Monroe Powerhouse. All three siphons along the Upper Power Canal are three-barrel concrete structures designed as rigid boxes and are capable of passing the maximum canal flow of 3,500 cfs at a velocity of 5.22 fps.

From the Settling Basin to the Looking Glass Creek Siphon, the Upper Power Canal has a bottom width of 73 feet and a normal water depth of 14.3 feet. Freeboard is 5 feet, and the design velocity is 2.25 fps. Much of this upstream canal segment is constructed in sand. From the Looking Glass Creek Siphon to the Monroe Powerhouse, the Upper Power Canal has a bottom width of 39 feet and a normal water depth of 19.5 feet. The canal bottom profile slopes only 3 inches per mile.

5.9 Monroe Powerhouse

The Monroe Powerhouse is located 0.75 mile north of Monroe. It spans the canal and functions as an energy-producing canal drop structure. The Monroe Powerhouse is a reinforced concrete structure that is 129 feet long, 39 feet wide, and 87 feet high. The station intake and powerhouse were built as one structure, and the entire building, including the scroll cases, substructure, and superstructure, is formed in concrete. The total weight of the building is 20,158 tons. A steel frame carried by rigid bents and fastened by rivets supports the original concrete tile roof. The original roof developed maintenance issues and was covered by a standing seam metal roof. The frame columns also support the crane girder. A 25-ton bridge crane provides for equipment handling and maintenance in the Monroe Powerhouse. The crane has a total lift of 25 feet 3 inches, a span of 35 feet, and a runway of 105 feet 5.75 inches long.

The Monroe Powerhouse, like the larger Columbus Powerhouse, is an excellent example of government-funded architectural design from the 1930s. The overall design provides for a clean, sleek, functional, and relatively unadorned building. With its white concrete walls and steel-sash windows, the building has the design, materials, workmanship, feeling, and association of the classic 1930s-era, minimalist Art Deco style as executed in concrete and steel. The simple geometric design, expressed largely in the concrete itself, gives the building its character without the use of exotic building materials or design methods. The simplicity of the concrete building is adorned largely by the electrical generation equipment it contains, and few Art Deco ornamental details, such as the terrazzo covering the generator floor, are found anywhere in the building.

The changes to the original building have been minor, and building maintenance has been excellent. The overall building integrity is excellent with very few changes to the historic fabric. The largest single change has been the covering of the original roof with a metal, standing seam roof; however, this change does not detract substantially from the historic integrity of the building or its architectural lines.

The plant was designed for a normal gross head of 32 feet. It contains three 2,600-horsepower, vertical axis Francis turbines directly connected to generators rated at 2,750 kilovolt-amperes (kVA) at a 0.95 power factor. At full load, each turbine generating unit can pass 1,000 cfs. All three units were sequentially rehabilitated and modernized from 2004 to 2007. Power is generated at 6.9 kV and stepped up to 34.5 kV at the substation located at the north end of the powerhouse. Six electrically operated vertical head gates (two to each turbine generating unit) provide for closing off the turbine intake flumes.

In the event of a total plant shutdown, a single automated radial bypass gate will quickly redirect the canal flow around the Monroe Powerhouse. The 15-foot-4-inch-wide gate is fully enclosed from the elements at the north end of the powerhouse. It is operated by means of a 5-ton electrically powered hoist equipped with a solenoid brake. A 9-ton counterweight is used to lift the gate. When the solenoid is released, a centrifugal fan brake automatically comes into operation. Precise discharge control is accomplished by means of floats and relay control of the radial bypass gate.

5.10 Lower Power Canal

The Lower Power Canal extends approximately 13 miles from the Monroe Powerhouse to Lake Babcock, a regulating reservoir, and has a bottom width of 39 feet and a water depth of 19.5 feet. The Lower Power Canal dips under two siphons, the Dry/Cherry Creek Siphon and the Oconee Siphon (at the Union Pacific Railroad). These siphons, like those on the Upper Power Canal, are three-barrel concrete structures designed as rigid boxes. Additionally, the 916 Siphon carries Lost Creek under the Lower Power Canal.

5.11 Sawtooth Weir

A concrete weir structure, called the Sawtooth Weir, is located where the Lower Power Canal enters Lake Babcock. Its purpose is to control the depth of water in the Lower Power Canal and to prevent Lake Babcock from back-flowing in the event of a canal breach. When this weir is viewed from above, it has a sawtooth or zigzag shape. This design geometry was used to obtain a greater crest length and overflow capacity for the distance available between abutments. Head loss at this structure is approximately 0.40 feet at maximum canal flow.

5.12 Lake Babcock

Lake Babcock, the original regulating reservoir, is located 3 miles north of Columbus. Its purpose is to temporarily pond water for later release through the Columbus Powerhouse during peak load periods. Lake Babcock was created in a natural depression by building compacted earth embankments on the north, east, and south sides. The lake currently covers 760 acres at its full pool elevation of 1,531 feet. The original storage capacity of 11,000 acre-feet was drastically reduced by sediment deposition during the first 25 years of Project operation, prior to the construction of Lake North, discussed below. When Lake North was opened, it was estimated that Lake Babcock had a storage capacity of 2,400 acre-feet at an elevation of 1,531 feet and 1,050 acre-feet at an elevation of 1,529 feet. In 1995, when the lake was last surveyed, these values had dropped to approximately 2,270 acre-feet and 730 acre-feet, respectively. Daily fluctuation of the reservoir surface averages about 2 feet; however, in certain circumstances, it can be as much as 3 feet.

The open water portion of the lake experiences substantial wave buildup on windy days. Therefore, much of the shore is protected with riprap. In addition, a substantial reach of embankment near the outlet and bordering Lake North is protected with a concave seawall constructed of concrete.

5.13 Lake North

After 25 years of Project operation, sediment accumulation in Lake Babcock had substantially reduced its ponding capacity. The District determined that the best solution to the problem was to build a second regulating reservoir adjacent to and connected with Lake Babcock. This new regulating reservoir, named Lake North, was completed in 1962. It was constructed by adding new compacted earth embankments to the north and east and using existing Lake Babcock embankments to the south and west. Lake North covers 200 acres at an elevation of 1,531 feet, providing 2,080 acre-feet of storage.

A concrete control structure in the south dike links the two regulating reservoirs. The control structure is located such that Lake North does not experience the rapid sedimentation that occurred in Lake Babcock; therefore, Lake North is a major recreation feature of the Project. A set of steel stoplogs are stored at the control structure, and they can be installed to isolate the regulating reservoirs as necessary for maintenance or emergency purposes.

To control erosion, much of the Lake North shoreline has been lined with steel sheet pile protection and concrete riprap.

5.14 Intake Canal

Water exiting Lake Babcock flows 1.5 miles through the Intake Canal to the Columbus Powerhouse. The Intake Canal was designed for a capacity of 4,800 cfs, which is the hydraulic capacity of the turbine generating units in the Columbus Powerhouse. The bottom width of the Intake Canal is 108 feet when it leaves Lake Babcock. This width reduces to 94 feet as the Intake Canal approaches the Powerhouse Inlet Structure. The embankments for the Intake Canal were constructed of compacted earth fill, similar to the reservoir dikes. Intake Canal water depth varies from 17.2 to 22.2 feet, depending on the reservoir stage and rate of flow. The slope of the canal profile is 3 inches per mile. Flow velocity in the canal varies from 1.4 to 2.0 fps.

5.15 Powerhouse Inlet Structure

The Intake Canal terminates at the Powerhouse Inlet Structure. This three-bay reinforced concrete structure is 60 feet long, 104 feet wide, and 40 feet high. A concrete tower structure for the gate hoists extends an additional 34 feet above the deck of the Powerhouse Inlet Structure. Approaching canal flow is smoothly routed through vertical steel trash rack panels that are designed to exclude large items that could harm the turbines or mechanical equipment at the Columbus Powerhouse, and a large mechanical trash rake is mounted on rails to traverse the inlet width and clean the trash racks.

Behind the trash racks, each inlet bay is provided with a steel inlet gate that can be lowered to stop the flow to the Penstocks for maintenance or emergency purposes. Each gate weighs 26,500 pounds and is designed to close off the passage under maximum flow conditions. The ability to quickly and dependably shut down the flow is critical because there is no spillway or flow bypass device at the Columbus Powerhouse. In an emergency, any two turbine generating units can pass up to 4,100 cfs, which is 600 cfs more than the maximum system inflow diverted at the Headworks.

5.16 Penstocks

Three steel Penstocks connect the Powerhouse Inlet Structure with the Columbus Powerhouse. Each penstock is 20 feet in diameter and 385 feet in length. Thickness of the riveted steel sections increases from 3/8 inch at the top to 7/8 inch at the bottom, where hydraulic pressure is greatest. The Penstocks are supported on a gravel base that extends up to the spring line of the pipe. Flow velocity in the Penstocks is approximately 5.1 fps. The Penstocks were designed for a low velocity to eliminate the need for a surge tank.

5.17 Columbus Powerhouse

The Columbus Powerhouse is located 2.5 miles northeast of Columbus and is the primary power-generating element of the Project. It has 3.5 times the head and 1.4 times the flow capacity of the Monroe Powerhouse. In addition, and with several limitations, the regulating reservoirs allow the Columbus Powerhouse to use its daily measure of water to produce electricity when it is of greatest value to the regional electric system.

The Columbus Powerhouse is a reinforced concrete structure that is 180 feet long, 57 feet wide and 115 feet high. Like the smaller Monroe Powerhouse, the Columbus Powerhouse is an excellent example of government-funded architectural design from the 1930s. The overall design provides for a clean, sleek, functional, and relatively unadorned building. With its white concrete walls and steel-sash windows, the building has the design, materials, workmanship, feeling, and association of the classic 1930s-era, minimalist Art Deco style as executed in concrete and steel. The simple geometric design, expressed largely in the concrete itself, gives the building its character without the use of exotic building materials or design methods. The simplicity of the concrete building is adorned largely by the electrical generation equipment it contains, and few Art Deco ornamental details, such as the terrazzo covering the generator floor, are found anywhere in the building.

The changes to the original building have been minor, and building maintenance has been excellent. The overall building integrity is excellent with very few changes to the historic fabric. The largest single change has been the covering of the original roof with a metal, standing seam roof; however, this change does not detract substantially from the historic integrity of the building.

The Columbus Powerhouse was designed for a normal head of 115 feet, and it contains three 19,140-horsepower, vertical axis Francis turbines directly connected to generators rated at 16,000 kVA at a 0.95 power factor. At full gate, each turbine generating unit can pass 2,060 cfs. However, total plant generation is limited by the 4,800-cfs hydraulic capacity of the Intake Canal. The turbine generating units normally operate at about 1,600 cfs for the most efficient use of water. All three units were sequentially rehabilitated and modernized from 2004 to 2007. A 75-ton bridge crane provides for equipment handling and maintenance in the Columbus Powerhouse. The crane also has a 15-ton auxiliary hook. Power is generated at 13,800 volts and stepped up to 115,000 volts by District-owned step-up transformers as it enters the Nebraska Public Power District (NPPD)-owned transmission facilities located at the east end of the Columbus Powerhouse.

5.18 Tailrace Canal

After passing through the Columbus Powerhouse, water is discharged to the Tailrace Canal for its return to the river basin. The Tailrace Canal is approximately 5.5 miles long and has a bottom width of 42 feet and a normal water depth of about 19 feet. This canal was designed to carry a nominal 4,800 cfs at a velocity of 3 fps. The Tailrace Canal was excavated along its entire length, and the slope of the hydraulic gradient is 0.0007 foot/foot.

An interesting feature of the Tailrace Canal is the unique form of shore protection installed during the 1950s and 1960s. It consists of hundreds of junked automobiles lined side by side along the embankment waterline. This "Detroit riprap," as it is known locally, has done an effective job of bank stabilization and has become so entrenched in the soil and plant material as to be scarcely identifiable.

In the tailrace area just downstream of the Columbus Powerhouse, there are two structures of note, the Lost Creek Flood Control Channel spillway and the Lost Creek Siphon. In 1983, after many years of flooding problems in Columbus related to Lost Creek, the Lost Creek Flood Control Project was constructed. This project included construction of a concrete spillway structure on the west bank of the Tailrace Canal that discharges overflow water from the Lost Creek Flood Control Channel into the canal immediately downstream of the Columbus Powerhouse.

The Lost Creek Siphon was constructed with the original Project to carry Lost Creek under the Tailrace Canal. The siphon consists of a 60-inch-diameter, west-to-east-flowing pipe that drops approximately 20 feet below Lost Creek to pass under the Tailrace Canal. The pipe then rises approximately 16 feet to discharge into re-aligned Lost Creek on the east side of the Tailrace Canal. Because of the intermittent flow and high sediment characteristics of Lost Creek, it is necessary to prevent the siphon invert from becoming blocked with sediment. This is accomplished by providing for flow through the siphon using water from the Tailrace Canal. A 24-inch by 45-inch adjustable sluice gate was installed in the west canal embankment. This gate opens to a 24-inch-diameter culvert that passes through the embankment and discharges into the west entrance of the Lost Creek Siphon. At full gate opening and normal canal level, this sluiceway can maintain a flushing flow of 20 cfs from the Tailrace Canal to the Lost Creek Siphon.

5.19 Outlet Weir

The Outlet Weir, also called the Tailrace Weir, is located at the confluence of the Tailrace Canal and the Platte River. It is east of Columbus and approximately 2 miles downstream of the confluence of the Loup River with the Platte River. An important function of the Outlet Weir is to maintain sufficient submergence of the draft tubes at the Columbus Powerhouse. This concrete overflow weir has a straight 700-foot-long crest. The transition from canal section to this width is 550 feet long. The weir crest was originally built at an elevation of 1,413 feet. Sometime later, it was lowered approximately 18 inches, presumably to obtain more net head at the Columbus Powerhouse.

6. METHODOLOGY

The methodology for the Section 106 compliance study includes six tasks. Task 4 describes the methodology for this HBIE.

Task 4 Historic District Inventory and Evaluation

To make a reasonable and good faith effort to evaluate the built environment of the Project within the APE, or Project Boundary, for buildings and/or structures that are eligible for listing on the National Register of Historic Places (NRHP) as historic property, the following steps were completed:

- Background research and a literature review were conducted. Historic maps and historic aerial photographs were provided by the District, and historic literature and records for the APE were reviewed.
- A field survey was conducted in March 2010 to identify, document, and evaluate the historic significance and integrity of the properties associated with the Project. The buildings and structures that comprise the Project were reviewed and photographed by a professional architectural historian using a high resolution digital camera. This survey was performed in accordance with 36 CFR 800.4, Identification of historic properties, by qualified personnel meeting the Professional Qualifications Standards of the Secretary of the Interior (36 CFR 61).
    - Given that the majority of the built environment within the APE was of sufficient age and had the potential to be determined historic property, it was formally evaluated in accordance with National Park Service (NPS) guidance.
    - Given that the majority of the built environment within the APE is already of an age that is greater than 50 years, there was no requirement to consider Criterion Consideration G, which addresses buildings and structures that are recent (that is, less than 50 years in age). Thus, there was no need to complete an evaluation of "exceptional" importance for any of the District's property.

7. DISCUSSION AND RECOMMENDATIONS

7.1 Findings

The findings for this HBIE are summarized in Table 7-1, below. Property that is eligible for listing on the NRHP consists of a district of both individually eligible and contributing buildings and structures, as defined below. Photographs of many of the properties discussed in Table 7-1 are included in Attachment B. These include representative examples of the properties along the canal itself along with examples of the numerous county road bridges and the one remaining farm access bridge within the historic district. Some of the property elements of the historic district, such as the 303 Drainage Siphon, are primarily buried or found under water and cannot be depicted by photographs.

Key buildings and structures are individually eligible historic properties that were purpose-built at the beginning of the Project, are highly visible to the general public, and retain a significant degree of historic integrity to their period of construction. Individually eligible buildings and structures exhibit a high degree of importance and would likely exhibit historic significance even if a historic district were not present. The loss of any of the individually eligible structures has the potential to seriously compromise the overall historic integrity of the entire historic district.

Contributing buildings and structures add to the historic significance of the district; however, they are of lesser historic importance and might not be considered eligible if the historic district were not present. Generally, the loss of contributing elements would not be likely to seriously compromise the overall historic integrity of the historic district to the same degree that the loss of a key structure would have on the historic district.

Non-contributing buildings and structures are also found within the historic district boundary. Generally, non-contributing property has been rebuilt since its original construction with a significant loss of historic integrity or was introduced into the historic district decades after the original construction of this district. The loss of non-contributing property would not detract from the historic integrity of the historic district. In some cases, the removal of non-contributing property may actually improve the historic integrity of the historic district, especially if the non-contributing property were an intrusion into the historic district.

Table 7-1. Historic Building Inventory and Evaluation Findings

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Diversion Weir	1937	Key Structure Individually Eligible	A low wall at the Headworks diverts Loup River water into the Intake Gate Structure (see Attachment B, Photo 1). Non-contributing properties at the Headworks include the Gate Tender House, the Boiler House, and an Equipment Shed (see Attachment B, Photos 2 and 3).

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Intake Gate Structure	1937	Key Structure Individually Eligible	Intake gates regulate diverted flow into the canal system (see Attachment B, Photo 4).
Sluice Gate Structure	1937	Key Structure Individually Eligible	A sluice gate is used to bypass water past the inlet structure and canal down the Loup River bypass reach (see Attachment B, Photo 5).
Settling Basin	1937	Key Structure Individually Eligible	This basin is 2 miles long and allows sand and silt to settle for removal by dredge (see Attachment B, Photo 6).
Hydraulic Dredge	1935	Key Object Individually Eligible	The dredge *Pawnee* has been responsible for removal of sand and slit from the Settling Basin since 1935 (see Attachment B, Photo 7).
North Sand Management Area	1960s	Non-contributing Feature Not Eligible	This area was added in the 1960s for management of sand and silt dredged from the Settling Basin by the *Pawnee*.
South Sand Management Area	1937	Non-contributing Feature Not Eligible	This area was created for management of sand and silt dredged from the Settling Basin by the *Pawnee*.
Skimming Weir	1937	Key Structure Individually Eligible	The deck was rebuilt in the 1960s (see Attachment B, Photo 8).
Upper Power Canal	1937	Key Structure Individually Eligible	This portion of the canal is 11.5 miles long and carries water from the Settling Basin to the Monroe Powerhouse.

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #1 – Nebraska State Highway 22 Bridge	Unknown	Non-contributing Structure Not Eligible	The original bridge in this location was rebuilt by the State when Nebraska State Highway 22 was rerouted to this location. This reinforced concrete bridge is 204 feet long and 28 feet wide. It has a rated capacity of 30 tons. The State inspects and maintains this bridge. The bridge deck was rebuilt by the State in 1974.
Beaver Creek Siphon	1937	Contributing Structure Eligible	This siphon conveys the Upper Power Canal under Beaver Creek (see Attachment B, Photo 9).
Bridge #3 – Genoa Concrete Bridge	1937	Contributing Structure Eligible	This reinforced concrete, two-lane bridge is 124 feet long and 22 feet wide with a 5-foot walkway on each side (see Attachment B, Photo 10). It has a rated capacity of 15 tons. It is inspected by Nance County and is maintained by the District.
Railroad Siphon	1937	Contributing Structure Eligible	This siphon conveys the Upper Power Canal under an existing railroad (see Attachment B, Photo 11).
Bridge #4 – Nance County Road Bridge	1937	Contributing Structure Eligible	An original Nebraska State Highway 22 bridge, this reinforced concrete and steel, two-lane bridge is 168 feet long and 20 feet wide (see Attachment B, Photo 12). It has a rated capacity of 15 tons. It is inspected by Nance County and is maintained by the District.
303 Drainage Siphon	1937	Contributing Structure Eligible	This siphon collects drainage water and conveys it under the Upper Power Canal to the Loup River.

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #5 – Nebraska State Highway 22 Bridge	1979-1980	Non-contributing Structure Not Eligible	This reinforced concrete bridge is 120 feet long and 40 feet wide. It has a rated capacity of 30 tons. It is inspected and maintained by the State. It was rebuilt by the State in 1979-1980.
Looking Glass Creek Siphon	1937	Contributing Structure Eligible	This siphon conveys the Upper Power Canal under Looking Glass Creek (see Attachment B, Photo 13).
Looking Glass Creek Bridge	1944	Contributing Structure Eligible	This bridge was constructed by the District in 1944 to provide farm access across Looking Glass Creek (see Attachment B, Photo 14). The bridge is an excellent example of how wartime building material shortages were overcome by District engineers through the use of atypical building materials that were available.
Bridge #6 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 174 feet long and 20 feet wide (see Attachment B, Photo 15). It has a rated capacity of 10 tons. It is inspected by Platte County and is maintained by the District.
Bridge #7 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 132 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
Bridge #8 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 134 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #9 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 132 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
Monroe Powerhouse	1937	Key Structure Individually Eligible	The Monroe Powerhouse is a single-story, reinforced concrete structure that is 129 feet long, 39 feet wide, and 87 feet high (see Attachment B, Photos 16 through 21). It is largely intact, with only minor modifications being made to its equipment, including replacement of turbines in 2000s and rebuilding of the generators in 1960s, 1980s, and 2000s. Non-contributing properties at the Monroe Powerhouse include the Operator House and a Storage Shed.
Lower Power Canal	1937	Key Structure Individually Eligible	This portion of the canal is 12 miles long and carries water from the Monroe Powerhouse to the Columbus Powerhouse.
Bridge #10 – Platte County Road Bridge	1982	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 132 feet long and 30 feet wide. It has a rated capacity of 20 tons. The bridge was rebuilt by Platte County in 1982. It is inspected and maintained by Platte County.
Dry/Cherry Creek Siphon	1937	Contributing Structure Eligible	This siphon conveys the Lower Power Canal under Dry and Cherry creeks (see Attachment B, Photo 22).

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #11 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 146 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
Bridge #12 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 122 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
Bridge #13 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete and steel bridge is 144 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
916 Siphon	1937	Contributing Structure Eligible	This siphon conducts the headwaters of Lost Creek under the Lower Power Canal (see Attachment B, Photo 23). It also allows the Lower Power Canal to be drained in case of emergency.
Bridge #14 – Platte County Road Bridge	1981	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 112 feet long and 30 feet wide. It has a rated capacity of 20 tons. It was rebuilt by Platte County in 1981. It is inspected and maintained by Platte County.
Oconee Siphon	1937	Contributing Structure Eligible	This siphon transports Lower Power Canal water under railroad tracks controlled by the Nebraska Central Railroad (see Attachment B, Photo 24).

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #15 – Platte County Road Bridge	Circa 2007	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 132 feet long and 16 feet wide. It has a rated capacity of 15 tons. It was rebuilt by Platte County circa 2007 It is inspected by Platte County and is maintained by the District.
Bridge #16 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete bridge is 113 feet long and 24 feet wide (see Attachment B, Photos 25 and 26). It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
Bridge #11 – Farm Bridge	1937	Non-contributing Structure Eligible	This wood bridge is 117.5 feet long and 16 feet wide (see Attachment B, Photo 27). It has a rated capacity of 10 tons. It is inspected and maintained by the District.
Bridges #17A and #17B – Nebraska State Highway 81 Bridges	1996	Non-contributing Structure Not Eligible	The original bridge in this location was replaced by the State with twin two-lane bridges in 1996. These bridges are inspected and maintained by the State.
Bridge #32 – Platte County Road Bridge (also known as the Platte Center Cemetery Bridge)	Rebuilt in 1973 and 2002	Non-contributing Structure Not Eligible	This timber bridge is 140 feet long and 16 feet wide (see Attachment B, Photo 28). It was rebuilt in 1973 and 2002. This bridge has a rated capacity of 5 tons; however, it was closed in 2009 and remains closed today due to structural damage. It is inspected by Platte County and is maintained by the District.

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #18 – Platte County Road Bridge	1976	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 112 feet long and 28 feet wide. It has a rated capacity of 20 tons. It is inspected and maintained by Platte County.
Bridge #19 – Platte County Road Bridge	1937	Contributing Structure Eligible	This reinforced concrete bridge is 128 feet long and 16 feet wide. It has a rated capacity of 15 tons. It is inspected by Platte County and is maintained by the District.
Bridge #20 – Platte County Road Bridge	1980	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 126 feet long and 36 feet wide. It has a rated capacity of 30 tons. It was rebuilt by Platte County in 1980. It is inspected and maintained by Platte County.
Sawtooth Weir	1937	Key Structure Individually Eligible	This structure regulates the water level in the Lower Power Canal where it discharges into Lake Babcock (see Attachment B, Photo 29).
Lake Babcock	1937	Key Structure Individually Eligible	This lake is one of two regulating reservoirs that store water for later use in hydroelectric power generation.
Lake North	1960s	Non-contributing Structure Not Eligible	This lake is one of two regulating reservoirs that store water for later use in hydroelectric power generation.
Bridge #21 – Platte County Road Bridge	1978	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 248 feet long and 36 feet wide. It has a rated capacity of 30 tons. It was rebuilt by Platte County in 1978. It is inspected and maintained by Platte County.

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #22 – Platte County Road Bridge	1981	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 250 feet long and 30 feet wide. It has a rated capacity of 20 tons. It was rebuilt by Platte County in 1981. It is inspected and maintained by Platte County.
Powerhouse Inlet Structure	1937	Key Structure Individually Eligible	This structure regulates the flow of water into the Penstocks and then into the Columbus Powerhouse (see Attachment B, Photos 30 through 32).
Penstocks	1937	Key Structure Individually Eligible	This structure conveys water as it descends down into the Columbus Powerhouse (see Attachment B, Photos 30 through 32).
Columbus Powerhouse	1937	Key Structure Individually Eligible	The Columbus Powerhouse is a single-story, reinforced concrete structure that is 180 feet long, 57 feet wide, and 115 feet high (see Attachment B, Photos 31 through 41). It is largely intact, with only minor modifications being made to its equipment, including replacement or rebuilding of the turbines and generators in the 2000s. Non-contributing properties at the Columbus Powerhouse include a new east well house.
Tailrace Canal	1937	Key Structure Individually Eligible	This portion of the canal is 5.5 miles long and carries water from the Columbus Powerhouse to the Outlet Weir. A non-contributing element at the Tailrace Canal is the “Detroit Riprap” (see Attachment B, Photo 42).

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Bridge #23 – Platte County Road Bridge	Circa 2007	Non-contributing Structure Not Eligible	This reinforced concrete bridge is 168 feet long and 16 feet wide. It has a rated capacity of 15 tons. It was rebuilt by Platte County circa 2007. It is inspected by Platte County and is maintained by the District.
Bridge #24 – Platte County Road Bridge	1997	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge was rebuilt by Platte County in 1997. It is inspected and maintained by Platte County.
Bridges #25A and #25B – U.S. Highway 30 Bridges	1983	Non-contributing Structure Not Eligible	The original bridge at this location was replaced by twin two-lane bridges in 1983. They are inspected and maintained by the State.
Bridge #26 – Union Pacific Railroad Bridge	Unknown	Non-contributing Structure Not Eligible	This reinforced concrete and steel railroad bridge is 102 feet 2 inches long. It has a rated capacity of 70 tons. A second bridge and rail were added circa 2009 by the Union Pacific Railroad. The District has no responsibilities for this bridge.
Bridge #27 – Platte County Road Bridge	1986	Non-contributing Structure Not Eligible	This reinforced concrete and steel bridge is 152 feet long and 20 feet wide. It has a rated capacity of 15 tons. It was rebuilt by Platte County in 1986. It is inspected and maintained by Platte County.
Bridge #28 – Platte County Road Bridge	Unknown	Non-contributing Structure Not Eligible	This reinforced concrete bridge is 152 feet long and 16 feet wide. It was rebuilt by Platte County. It is inspected and maintained by Platte County.
Bridge #29 – Gas Pipeline Crossing Bridge	Unknown	Non-contributing Structure Not Eligible	This 8-inch pipeline truss span is 120 feet long. It is owned by the Northern Natural Gas Company. The District has no responsibilities for this bridge.

Building/Structure	Year Placed into Service	Recommended NRHP Status	Comments
Lost Creek Siphon	1937	Contributing Structure Eligible	This siphon conveys Lost Creek under the Tailrace Canal.
Bridge #30 – Chicago Burlington & Quincy Railroad Bridge	1996	Non-contributing Structure Not Eligible	This reinforced concrete and steel railroad bridge has a rated capacity of 50 tons. The original bridge in this location was removed in 1985. This bridge was constructed in 1996. The District has no responsibilities for this bridge.
Bridge #33 – Kaneb Pipeline Bridge	Unknown	Non-contributing Structure Not Eligible	This 12-inch pipeline truss span bridge is 168 feet long. It is owned by the Kaneb Pipe Line Company. The District has no responsibilities for this bridge.
Bridge #34 – Quest Telephone Crossing Bridge	Unknown	Non-contributing Structure Not Eligible	This 6-inch communication cable/steel conduit truss span bridge is 260 feet long. It is owned and maintained by Quest but is currently not in service. The District has no responsibilities for this bridge.
Pedestrian Bridge #35 – “Castner’s Crossing”	2000	Non-contributing Structure Not Eligible	This steel truss with chromated copper arsenate (CCA) plank deck is 130 feet long and 11 feet 5 inches wide. It was designed and manufactured by Husker Steel in 2000. The abutments were designed by Kirkham Michael and constructed by Platte County. The bridge was assembled and set by Hartman Crane Service. The District built and maintains this bridge, which is used by the public in conjunction with hiking and biking trails.
Outlet Weir	1937	Key Structure Individually Eligible	Tailrace canal water overflows into the Platte River (see Attachment B, Photo 43).

7.2 Findings and Recommendations

The Project is a historic district consisting of property eligible for listing on the NRHP. The Project consists of 16 properties that exhibit individual eligibility and 21 properties that lack individual eligibility but contribute to the historic district. The historic district also includes non-contributing properties that are not eligible for listing on the NRHP. The LPD historic district's eligibility is found under Criteria A, B, and C, which are defined below. The Project does not appear to meet the requirements for eligibility under Criterion D, which is also defined below. The LPD historic district is significant because it is an excellent example with extraordinary historic integrity of a vital national program of rural electrification from the 1930s. This HBIE and the accompanying high-resolution photographs of the structures taken in 2010, along with the historic materials discussed in Section 4.5 of this HBIE, document the construction of the LPD historic district and how the historic district appears now.

The findings below are based on the criteria for evaluation set forth in 36 CFR 60.4 and reprinted in National Park Service Bulletin 15, "How to Apply the National Register Criteria for Evaluation" (2002). These criteria state that "The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association," and are associated with at least one of the four criteria for NRHP eligibility discussed below (36 CFR 60.4):

A. That are associated with events that have made a significant contribution to the broad patterns of our history.

   The Project is clearly associated with the overall development of a substantial portion of the Columbus region of Nebraska. By providing affordable and reliable electrical power to thousands of industrial, commercial, and residential subscribers, the Project greatly facilitated economic development in the region. The provision of substantial quantities of affordable energy dramatically boosted the viability of the region and fostered economic growth, thereby making the Project a significant local and regional energy provider.

B. That are associated with the lives of persons significant in our past.

   The Project is historically associated with the life of Senator George William Norris of Nebraska, a transcendent figure in Nebraska history. The Norris home in McCook is a National Historic Landmark in recognition of his role in Nebraska history. Senator Norris was one of the sponsors of the Rural Electrification Act of 1936, which funded the construction of numerous rural electrification projects nationwide. Senator Norris is not clearly embodied in or expressed by the Project; however, it is likely that projects such as this would not have been created if Senator Norris had not led the legislation necessary to fund them.

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

The Project clearly embodies distinctive characteristics of the type, period, and method of construction. Specifically, the massive engineering nature of the overall project combined with the emphasis on simply designed, concrete structures places the key elements of the Project firmly in the realm of 1930s engineering in America. The Project was reported in detail in national technical publications, including a detailed write-up in the August 6, 1936, issue of *Engineering News-Record*.

D. That have yielded, or may be likely to yield, information important in prehistory or history.

The built environment of the Project has not yielded, and does not appear to have the potential to yield, information important in prehistory or history.

8. STUDY VARIANCE

There were no variances from the Section 106 Compliance study plan, approved by FERC in its Study Plan Determination on August 26, 2009.

9. REFERENCES

The following documents are cited in this report:

36 CFR 60.4 Criteria for evaluation.

36 CFR 61. Procedures for State, Tribal, and Local Government Historic Preservation Programs.

36 CFR 800.16(y). Protection of Historic Properties, Definitions.

16 USC 470w. Definitions (Section 301 of the National Historic Preservation Act of 1966, as amended).

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PHASE I/II ARCHAEOLOGICAL INVENTORY AND EVALUATION ADDENDUM

THE PHASE I/II ARCHAEOLOGICAL INVENTORY AND EVALUATION ADDENDUM CONTAINS PRIVILEGED INFORMATION AND IS LOCATED IN VOLUME 4, PRIVILEGED.

APPENDIX H-5

ETHNOGRAPHIC DOCUMENTATION

Loup River Hydroelectric Project

FERC Project No. 1256

Ethnographic Documentation

Loup Power District Hydro Project

Study 11.0 - Section 106 Compliance

August 26, 2011

Serving You Electrically
LOUP POWER DISTRICT

Loup Power District
Hydro Project

Loup River Hydroelectric Project
FERC Project No. 1256

Study 11.0
Section 106 Compliance
Ethnographic Documentation

August 26, 2011

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List of Tables

STUDY 11.0 SECTION 106 COMPLIANCE ETHNOGRAPHIC DOCUMENTATION

1. INTRODUCTION

The Loup River Hydroelectric Project (Project) is located in Nance and Platte counties, Nebraska, where water is diverted from the Loup River and routed through the 35-mile-long Loup Power Canal, which empties into the Platte River near Columbus. The Project includes various hydraulic structures, two powerhouses, and two regulating reservoirs.

The Section 106 Compliance study plan, approved by the Federal Energy Regulatory Commission (FERC) in its Study Plan Determination on August 26, 2009, specifies that an Ethnographic Documentation report be developed that identifies any known properties of traditional religious and cultural importance to Native American tribes. The report is to document meetings with and written correspondence provided by the tribes. Any such properties will be evaluated for listing on the National Register of Historic Places (NRHP), and effects will be assessed by FERC in consultation with the tribes, the Loup River Public Power District (Loup Power District or the District), and the Nebraska State Historic Preservation Office (SHPO).

The efforts made to consult with relevant tribes and elicit responses regarding the presence of properties of traditional religious and cultural importance are documented herein. This is part of the District's obligation to identify cultural resources that may be eligible for listing on the NRHP and is subject to the review process established under 36 CFR 800, the regulations implementing Section 106 of the National Historic Preservation Act.

2. GOALS AND OBJECTIVES OF STUDY

The goal of the Section 106 compliance study is to achieve NHPA Section 106 compliance through a programmatic, ongoing consultation relationship between the District and the Nebraska SHPO.

The objectives of the Section 106 compliance study are as follows:

1. To review existing information with FERC and the Interested Parties (Nebraska SHPO, the Pawnee Tribe, the Iowa Tribe of Kansas and Nebraska, the Omaha Tribe, the Santee Sioux Tribe, and the Ponca Tribe of Nebraska) to identify consultation needs and additional archival and field data collection requirements.
2. To gather sufficient information to identify any historic properties that may be affected by the Project.

3. To conduct field studies to identify and evaluate historic properties, including archaeological properties and elements of the standing structure/built environment as well as properties of traditional religious and cultural value important to Native American tribes.
4. To document the historic properties in the Area of Potential Effects and, as applicable, present management recommendations in technical reports, an ethnographic memorandum, and a historic district documentation package.
5. To develop, in consultation with Nebraska SHPO, Native American tribes, and the Advisory Council on Historic Preservation (ACHP), a Historic Properties Management Plan (HPMP) in accordance with FERC guidelines.
6. To develop a Programmatic Agreement (PA) to complete the Section 106 compliance process and to incorporate in the Project license (this is a standard procedure carried out by FERC).

Development of the ethnographic documentation was intended to help facilitate identification and documentation of cultural resources to fulfill the objectives of the Section 106 compliance study.

3. STUDY AREA

The study area is the Area of Potential Effects (APE), or Project Boundary, which encompasses the entirety of the District’s holdings that are subject to the relicensing effort described in the District’s Pre-Application Document (PAD) (October 16, 2008).

4. CONSULTATION EFFORTS

The following six tribes are known to have historic affiliation to the Project vicinity:

- Omaha Tribe of Nebraska
- Pawnee Nation of Oklahoma
- Ponca Tribe of Nebraska
- Ponca Tribe of Oklahoma
- Santee Sioux Tribe of Nebraska
- Winnebago Tribe of Nebraska

Efforts to consult with these tribes and assess their interest in the Project are summarized below. Letters that were sent to the tribes to initiate Section 106 consultation and to provide notice of availability of documents for tribal review are listed in Table 2-1. In addition, the District attempted to reach tribal contacts by telephone in a less formal context to ascertain their interest in the Project; however, most of these attempts were unsuccessful in reaching the tribal contact.

Table 2-1. Letters Sent to Elicit Tribal Participation

From	Date	Purpose	To	Response
HDR	September 5, 2008	Invite tribes to participate in planning	Tony Provost, NAGPRA Coordinator, Omaha Tribe of Nebraska	None
			Francis Morris, Pawnee Nation of Oklahoma	None
FERC	October 23, 2008	Initiate Section 106 consultation	Ansley Griffin, Chairman, Omaha Tribe of Nebraska	None
			George Howell, President, Pawnee Nation of Oklahoma	None
			Larry Wright, Jr., Chairperson, Ponca Tribe of Nebraska	Received from Gary Robinette, THPO, on October 29, 2008 – No comment on relicense approval
			Trey Howe, Chairman, Ponca Tribe of Oklahoma	None
			Roger Trudell, Chairman, Santee Sioux Tribe of Nebraska	None
			John Blackhawk, Chairman, Winnebago Tribe of Nebraska	Received from Louis C. Houghton, Jr., secretary, on December 9, 2008 – Will not participate; no property in project area
Loup Power District	March 26, 2009	Invite tribes to participate in planning	Ansley Griffin, Chairman, Omaha Tribe of Nebraska	None
			George Howell, President, Pawnee Nation of Oklahoma	None
			Larry Wright, Jr., Chairperson, Ponca Tribe of Nebraska	None
			Trey Howe, Chairman, Ponca Tribe of Oklahoma	None
			Roger Trudell, Chairman, Santee Sioux Tribe of Nebraska	None
			John Blackhawk, Chairman, Winnebago Tribe of Nebraska	None

From	Date	Purpose	To	Response
Loup Power District	October 16, 2009	Provide notice of availability of Phase IA Archaeological Overview report for review and comment	Ansley Griffin, Chairman, Omaha Tribe of Nebraska	None
			Amen Sheridan, Chairman, Omaha Tribe of Nebraska	None
			George Howell, President, Pawnee Nation of Oklahoma	None
			Julia Sage, Environmental Director, Ponca Tribe of Nebraska	None
			Larry Wright, Jr., Chairperson, Ponca Tribe of Nebraska	None
			Trey Howe, Chairman, Ponca Tribe of Oklahoma	None
			Douglas Rhodd, Chairman, Ponca Tribe of Oklahoma	None
			Roger Trudell, Chairman, Santee Sioux Tribe of Nebraska	Received from Cora L. Jones, secretary, on November 2, 2009 – No objection unless places of cultural, traditional cultural, or natural importance to the Dakota culture are found
			John Blackhawk, Chairman, Winnebago Tribe of Nebraska	None
Loup Power District	August 26, 2010	Provide notice of availability of Phase I/II Archaeological Inventory and Evaluation for review and comment	Ansley Griffin, Chairman, Omaha Tribe of Nebraska	None
			Amen Sheridan, Chairman, Omaha Tribe of Nebraska	None
			George Howell, President, Pawnee Nation of Oklahoma	None
			Larry Wright, Jr., Chairperson, Ponca Tribe of Nebraska	None
			Douglas Rhodd, Chairman, Ponca Tribe of Oklahoma	None
			Roger Trudell, Chairman, Santee Sioux Tribe of Nebraska	None

From	Date	Purpose	To	Response
Loup Power District	November 1, 2010	Provide copy of Phase I/II Archaeological Inventory and Evaluation for review and comment	Gary Robinette, Director of Cultural Affairs, Ponca Tribe of Nebraska	None
Loup Power District	November 3, 2010	Provide copy of Phase I/II Archaeological Inventory and Evaluation for review and comment	Emily Smith, Winnebago Tribe of Nebraska	None

The general lack of responses from the tribes to several requests for their participation in the review of the Project and the cultural resources reports should not be viewed as indicative of a lack of concern among the tribes regarding the Project. The Ponca Tribe of Nebraska offered no comment on the approval of the new license, the Winnebago Tribe indicated that it would not participate in the process, and the Santee Sioux Nation responded with no objection provided that resources of importance were not found. Although the remaining tribes—the Omaha Tribe of Nebraska, Pawnee Nation of Oklahoma, and Ponca Tribe of Oklahoma—did not respond to the District's requests, their silence may be interpreted in several ways. For example, it is possible that the tribes have no concerns about the relicensing project if no land alterations are being deliberated. In some instances involving Section 106 reviews, however, tribes prefer to remain silent rather than risk divulging sensitive traditional cultural information that should not be shared outside traditional communities regarding the location or nature of significant traditional cultural properties and practices. Tribal governments and traditional practitioners are often hesitant to share such information, even when properties of importance are threatened by land alterations.

For this relicensing project, no land alterations are proposed as part of the Federal undertaking under review. However, the Phase IA Archaeological Overview established that previous archaeological investigations of Pawnee village sites situated in the immediate vicinity of Genoa, Nebraska, were partially investigated and severely damaged or destroyed when the Project was constructed in the 1930s. These investigations included the excavation and recovery of habitation structures and human remains, which may continue to be held traditionally valuable among the Pawnee people. Consequently, some tribes may be ambivalent about taking an active role in the review process at this time, pending an actual perceived threat to the known properties in the vicinity of the Project, at which time they may feel compelled to voice their concerns. The Section 106 review process should proceed with the recognition that tribes may come forward at a later time with information relevant to the identification of properties of traditional cultural and religious importance.

5. PAWNEE AFFILIATIONS

Although Omaha, Ponca, Santee Sioux, and Winnebago peoples are known to have occupied and used the general Project vicinity historically, the Project is within the traditional territory of the Pawnee, which centered on the Loup, Platte, and Republican river valleys. Unlike many of the more nomadic Plains tribes, the Pawnee were semi-sedentary horticulturalists living in semi-permanent villages comprised of earth lodges. They raised a variety of crops, and their ceremonies tended to emphasize the importance of agriculture rather than bison procurement, a pattern distinctive from other more nomadic tribes on the Plains. This distinction may render a greater sense of historical and cultural affinity for these specific village site locations.

As indicated in the Phase I/II Archaeological Inventory and Evaluation for the Project, several earth-lodge villages attributable to Pawnee occupation are known in the vicinity. Sites 25NC06/25NC20, 25NC03, 25NC04, 25PT1, and 25PT18 may be Pawnee village sites that may still be known and valued by the Pawnee Tribe. Although these sites were either damaged or destroyed during Project construction in the 1930s, it is unknown whether some portions may remain intact and whether the Pawnee Tribe, which appears to be most closely affiliated with these sites, value them as places of traditional religious and cultural importance.

6. RECOMMENDATIONS AND CONCLUSIONS

The apparent lack of interest by the tribes regarding the Project may represent reluctance, by some, to divulge sensitive information pending an actual perceived threat to properties of traditional importance. As the tasks involved in the Section 106 process proceed for the Project, the District will continue to provide tribes with ongoing opportunities to identify any concerns or interests they may have. Specifically, the following recommendations should be considered to ensure that tribes receive adequate opportunities to express their interests with regard to any effects the Project may have on properties of traditional religious and cultural importance:

1. An invitation will be extended to the Pawnee Tribe to provide a representative knowledgeable in tribal history and traditional cultural properties, to participate in an on-site review of properties identified during the archaeological survey effort, and to provide any insights relevant to the NRHP evaluation of traditional cultural values retained by any identified properties within the Area of Potential Effects (APE).
2. The Historic Properties Management Plan will provide mechanisms for ensuring that tribes are kept informed of any future land-altering activities that may affect properties of interest to them and for extending opportunities during its implementation to participate in the review of proposed actions or documents that may be relevant to their interests.
3. The tribes should be invited to participate in the development of the Project Programmatic Agreement for purposes of compliance with Section 106 and should be invited to sign it as concurring parties. This would represent a good-faith effort evidencing that tribes continue to be provided a meaningful role in the review and approval process, even if they may choose not to participate at any particular stage.

7. REFERENCES

FERC. August 26, 2009. Letter from Jeff C. Wright, Director, Office of Energy Projects, FERC, to Neal D. Suess, President/CEO, Loup Power District, regarding Study Plan Determination for the Loup River Hydroelectric Project.

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