EXHIBIT A: PROJECT DESCRIPTION

1 Contents and Purpose of This Exhibit

Kenai Hydro, LLC (KHL), a wholly-owned subsidiary of Homer Electric Association, Inc. (HEA), is filing this Draft License Application (DLA) for an original license for the Grant Lake Hydroelectric Project (FERC No. 13212 [Project or Grant Lake Project]) under Part I of the Federal Power Act.

Exhibit A of this DLA describes the proposed Project, including details about the Project structures, the reservoir, turbines and generators, transmission lines, and any additional equipment appurtenant of the Project.

2 General Project Description

The Grant Lake Hydroelectric Project would be a new 5-megawatt (MW) hydroelectric facility on Grant Lake and Grant Creek near Moose Pass, Alaska. The new Project would divert water from Grant Lake and deliver the flow to a powerhouse located near the outlet of the existing Grant Creek natural, incised rock canyon. The Project would include the following major components:

- An intake structure in Grant Lake.
- A tunnel extending from the lake intake to just east of the powerhouse.
- A powerhouse with two Francis turbines providing an anticipated combined 5-MW output. The maximum design flow will be approximately 385 cubic feet per second (cfs).
- Tailrace detention pond.
- Switchyard with disconnect switch and step-up transformer.
- An overhead transmission line.
- A pole mounted disconnect switch where the transmission line intersects the main power distribution line.

Ninety-one percent of HEA's current generation needs (approximately 470,000 megawatt hour (MWh)/year) are met via fossil fuel generation. In recognition of the importance to the environment and the need to provide power for sustainable growth, HEA's Board of Directors adopted a policy (HEA Board Policy 505 – Renewable Portfolio Goal) that set a renewable energy goal. The goal states that the cooperative will use best efforts to meet 22 percent of its annual peak generation with renewable energy by 2018. Furthermore, the State of Alaska and Legislature have adopted a renewable energy goal of 50 percent renewable energy by 2025. Additionally, HEA would like to diversify its fuel mix and reduce its dependence on the expensive natural gas supply (currently at $6.90/Mcf) available in the Cook Inlet Area. While approximately 9 percent of HEA's current generation needs are met through their stake in the Bradley Lake Hydroelectric Project, the operation of the Grant Lake Project would provide an additional 4 percent annually and represent HEA's first fully-owned hydroelectric facility.

3 Project Area and Vicinity

The proposed Grant Lake Project will be located near the community of Moose Pass, Alaska (population 219) in the Kenai Peninsula Borough, approximately 25 miles north of Seward, Alaska (population 2,693), and just east of the Seward Highway (State Route 9)(Figure A.3-1)[1]; this highway connects Anchorage (population 291,826) to Seward. The Alaska Railroad parallels the route of the Seward Highway, and is also adjacent to the Project area. Grant Lake is located is in the mountainous terrain of the Kenai Mountain Range and has a normal water surface elevation of 703 feet North American Vertical Datum of 1988 (NAVD 88) and surface area of approximately 1,703 acres.

The proposed Project generating facilities will be located on Grant Creek, a natural outlet of Grant Lake, which flows approximately one mile to Lower Trail Lake at elevation 469 feet NAVD 88. The proposed Project lies within Section 13 of Township 4 North, Range 1 West; Sections 1, 2, 5, 6, 7, and 18 of Township 4 North, Range 1 East; and Sections 27, 28, 29, 31, 32, 33, 34, 35, and 36 of Township 5 North, Range 1 East, Seward Meridian (U.S. Geological Survey [USGS] Seward B-6 and B-7 Quadrangles). The surrounding geographic features, land ownership, and proposed Project boundary are shown on the location map of Figure A.3-1.

[1] The Project boundary alignment, in the vicinity of Grant Lake, follows the 703-foot contour line derived from USGS-developed topographic data. Due to imprecision in the USGS topography, the Project boundary around Grant Lake does not currently align with the USFS-developed aerial imagery presented in some of the Exhibit A and Exhibit E figures. The Project boundary alignment will be refined as additional survey data of the Grant Lake shoreline becomes available. The updated Project boundary is anticipated to align more precisely with USFS imagery.

Legend

- Project Boundary
- Seward Highway
- Alaska Railroad

Property Ownership

- Borough
- Federal
- Private
- State

Upper Trail Lake

Lower Trail Lake

Moose Pass

Grant Lake

Grant Lake

Grant Creek

Vagt Lake

Solars Mountain

4500
4000
3500
3000
2500
2000
1500
1000
500

Alaska

Project Vicinity

MAP NOTES:

1. THIS MAP WAS DEVELOPED FOR KENAI HYDRO, LLC AS PART OF THE GRANT LAKE HYDROELECTRIC PROJECT (FERC NO. 13212), LICENSE APPLICATION. THE LOCATIONS OF PROJECT FEATURES ARE SUBJECT TO CHANGE AND ARE SHOWN FOR PLANNING PURPOSES ONLY.
2. THIS MAP WAS DEVELOPED FROM THE FOLLOWING RESOURCES:
   A. AERIAL IMAGERY DEVELOPED BY USFS.
   B. PROJECT FEATURE LOCATIONS PROVIDED BY MCMILLEN.
   C. LAND OWNERSHIP BOUNDARIES PROVIDED BY THE KENAI PENINSULA BOROUGH'S GIS DEPARTMENT.
3. THIS MAP PRESENTS DATA IN THE FOLLOWING GEOGRAHIC SYSTEMS:
   - HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 (NAD 83)
   - VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88)
   - PROJECTION: ALASKA 4 FIPS 5004 FEET STATE PLANE

REV	DATE	BY	DESCRIPTION

Drawing Scale: 0 0.25 0.5 1 Miles

N

McMILLEN, LLC
THE SONNA BUILDING
910 MAIN ST. SUITE 258
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Developed For:
Homer Electric Association, Inc.
A Touchstone Energy® Cooperative

GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT NO.13212

LICENSE APPLICATION

Figure A.3-1
Location Map of Project Vicinity

DESIGNED	Jake Woodbury
DRAWN	Jake Woodbury
CHECKED	C. Warnock
ISSUED DATE	2/18/2015

DRAWING

SCALE: 1:35,000

4 Proposed Project Facilities

KHL was issued a preliminary permit to investigate a proposed hydropower development on Grant Creek near the outlet of Grant Lake. The Grant Lake Project will consist of the Grant Lake/Grant Creek development, an intake structure in Grant Lake, a tunnel, a surge chamber, a penstock, a powerhouse, tailrace channel with fish exclusion barrier, access roads, a step-up transformer, a breaker, an overhead transmission line, and a switchyard. The powerhouse will contain two Francis turbine generating units with a combined rated capacity of 5 MW with a maximum design flow of 385 cubic feet per second (cfs).

The general proposed layout of the Project is shown in Figure A.4-1. Specific proposed facility characteristics are listed in Table A.4-1 and described in more detail in Sections 4.1 through 4.10 of this Exhibit. Individual proposed facility design drawings are provided in Exhibit F and proposed locations of facilities within the Project boundary are shown in Exhibit G of this DLA.

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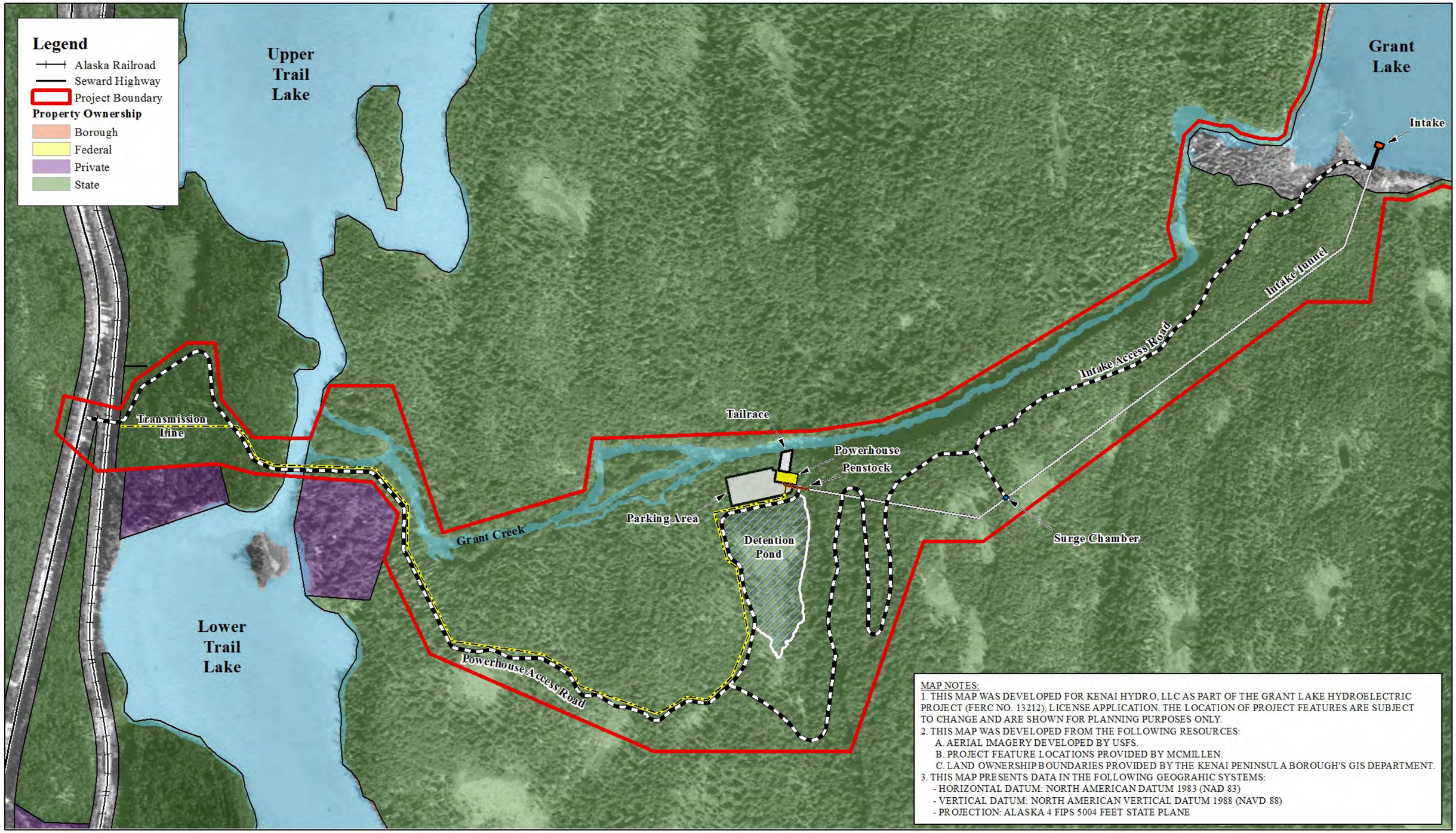

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REV	DATE	BY	DESCRIPTION

Drawing Scale: N

0 250 500 1,000 Feet

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Figure A.4-1
General Project Features And Facilities

DESIGNED	Jake Woodbury
DRAWN	Jake Woodbury
CHECKED	C. Warnock
ISSUED DATE	2/18/2015

DRAWING

SCALE: 1:5,000

Table A.4-1. General characteristics of the proposed Grant Lake Project facility.

Number of Generating Units	2
Turbine Type	Francis
Rated Generator Output	
Unit 1	2.5 MW
Unit 2	2.5 MW
Total	5.0 MW
Maximum Rated Turbine Discharge	
Unit 1	192.5 cfs
Unit 2	192.5 cfs
Total	385 cfs
Minimum Rated Turbine Discharge	
Unit 1	58 cfs
Unit 2	58 cfs
Total	116 cfs
Turbine Centerline Elevation	526 ft NAVD 88
Normal Tailwater Elevation in Grant Creek at the confluence with the powerhouse and tailrace channel	
Minimum	517 ft NAVD 88
Maximum	518.3 ft NAVD 88
Average Annual Energy	18,600 megawatt-hours (MWh)
Normal Maximum Lake Elevation	703 ft NAVD 88
Normal Minimum Lake Elevation	690 ft NAVD 88
Gross Head	184.7 ft
Net Head at Maximum Rated Discharge	171.7 ft
Grant Lake	
Drainage Area	44.2 miles $(mi)^2$
Surface Area	1,703 acres
Active/Net Storage Volume	18,790 ac-ft (elevation 703 to 690 feet NAVD 88)
Gross Storage Volume	251,920 ac-ft
Average Annual Natural Outflow	149,140 ac-ft
Average Annual Natural Outflow	206 cfs
Water Conveyance	
Intake	Intake structure at lake
Approximate dimensions of intake structure	25 ft x 38 ft
Invert Elevation	675 ft NAVD 88
Bypass Pipe for Instream Flows	
Type	Directional bore with HDPE liner
Length	900 ft
Diameter	18 in

Table A.4-1, continued…

Lower Pressure Pipeline	
Type	Welded steel
Length	200 ft
Diameter	48 in
Pressure Tunnel	
Type	10-ft horseshoe
Length	3,300 ft
Velocity at Maximum Turbine Discharge	3.9 fps
Surge Chamber	
Diameter	120 in
Base Elevation (preliminary)	680 ft NAVD 88
Top Elevation (preliminary)	785 ft NAVD 88
Penstock	
Type	Welded steel
Length	150 ft
Diameter	72 in
Tailrace	
Type	Open channel
Length	95 ft
Fish Exclusion Barrier	
Type	Picket barrier at tailrace outfall
Maximum Design Flow	385 ft
Tailrace Detention Pond	
Approximate Acreage	5 acres
Approximate Capacity	15 ac-ft
Outlet Conveyance Length	200 ft
Powerhouse	
Approximate Dimensions	50 ft x 100 ft x 30 ft high
Finished Floor Elevation	523 ft NAVD 88
Transmission Line	
Type	Overhead
Length	Approximately 3.5 miles
Voltage	115 kilovolt (kV)
Powerhouse Access Road	
Type	Two-lane gravel surfacing with turnouts
Width	24 feet
Length	One (1) mile from Seward Highway to powerhouse
Intake Access Road	
Type	Two-lane gravel surfacing with turnouts
Width	24 feet
Length	One (1) mile from the powerhouse to the intake

4.1. Grant Creek Diversion

The proposed Project consists of a reinforced concrete intake structure located on the south side of the natural lake outlet. No structural modifications would be made to the existing lake natural outlet. The Project will divert water up to a maximum of 385 cfs into the intake structure. When the lake level exceeds the natural outlet of 703 feet NAVD 88, a maximum of 385 cfs will be diverted into the intake structure and routed to the powerhouse. Flow in excess of 385 cfs would pass over the natural outlet to Grant Creek.

4.2. Grant Lake Intake

The Project water intake would be a concrete structure located approximately 500 feet east of the natural outlet of Grant Lake and adjacent to the shore. The intake structure consists of a reinforced concrete structure extending from approximately elevation 675 NAVD 88 feet up to a top deck elevation of 703 feet NAVD 88. The structure has an internal dimension of 38 feet by 15 feet. The structure includes intake trashracks, a selective withdrawal intake gates with wire rope hoist, and a roller gate located on the water conveyance intake. The intake is divided into three bays, each fitted with an intake gate to provide flexibility for delivering the full flow range of 58 cfs to 385 cfs. The gate position within the water column will be set to deliver the required water temperature to Grant Creek below the powerhouse. The roller gate would be 11 feet tall by 11 feet wide and fitted with a wire rope hoist lift mechanism. Electrical power will be extended from the powerhouse to the intake to operate the intake and isolation gates. Pressure transducers will be installed to monitor the water level at the lake as well as within the intake tower. An access bridge 16 feet wide would be installed from the lake shore out to the intake structure.

The intake would allow for drawdown of Grant Lake to elevation 690 feet NAVD 88 thereby creating approximately 18,790 acre-feet of active storage for the Project between elevations 703 feet NAVD 88 and 690 feet NAVD 88. The intake can be designed to allow the Project to draw water near the surface at various levels of storage, if deemed necessary. The invert of the intake would be at elevation 675 feet NAVD 88 to provide for adequate submergence to the tunnel.

A bypass pipe would extend from the intake structure to the base of the existing water fall in Grant Creek. The installed pipe would be 900 feet long and approximately 18 inches in diameter allowing the minimum flow ranging from 5 to 10 cfs to be released. A control gate would be located within the intake structure to regulate and monitor the bypass flow releases.

4.3. Tunnel and Surge Chamber

The intake structure would connect to a tunnel extending to the Project powerhouse. The tunnel would be approximately 3,300 feet long with a 10-foot-horseshoe shape. Drill and shoot techniques would be used to construct the tunnel using an entrance portal at the powerhouse for access. The lower 900 feet of tunnel would be constructed at a 15 percent slope. This section of the tunnel will be concrete lined. The upper 2,400 feet of tunnel would be constructed at a 1 percent slope and would be unlined. This proposed arrangement provides a low pressure hydraulic conduit in the upper tunnel reaches suitable for an unlined tunnel. A surge chamber is located at the transition between the two tunnel slopes. This chamber is approximately 10 feet in

diameter and would extend from the tunnel invert elevation of 650 feet NAVD 88 to the ground surface at approximately elevation 790 feet NAVD 88. The surge chamber provides a non-mechanical relief for hydraulic transients that could occur if a load rejection occurs at the powerhouse. Rock anchors and shotcrete stabilization techniques would be used to stabilize the tunnel where required. A rock trap would be located at the surge chamber location to collect dislodged rocks from the unlined tunnel section.

The tunnel would transition to a 6-foot diameter steel penstock approximately 150 feet from the powerhouse. The transition section would consist of a welded steel concentric structure which transitions from the 10-foot tunnel section to the 72-inch diameter penstock. A steel liner would extend from the downstream tunnel portal approximately 300 feet into the tunnel. The liner would be installed within the exposed rock surface with grout pumped behind the liner to provide an impermeable and structurally sound tunnel section. A similar steel tunnel liner section would be installed at the connection to the intake structure for a total distance of approximately 150 feet.

4.4. Penstock and Surge Tank

A 72-inch diameter steel penstock extends 150 feet from the downstream tunnel portal to the powerhouse. The welded steel penstock would be supported on concrete pipe saddles along the penstock route. The penstock would bifurcate into two 48 inch diameter pipes feeding each of the powerhouse turbines. The penstock fitted with welded steel thrust rings would be encased in concrete thrust blocks at the tunnel portal as well as the powerhouse. These thrust blocks would be designed to resist the full hydraulic load associated with the Project operation. An interior and exterior coating system would be applied to the penstock providing full corrosion protection. An access manway would be provided on the exposed penstock section allowing access for future inspection and maintenance.

4.5. Tailrace

The powerhouse draft tubes would connect to a tailrace channel located on the north side of the powerhouse structure. The draft tubes would extend from a low point elevation of approximately 509 feet NAVD 88 up to the tailrace channel invert elevation of 515 feet NAVD 88. The channel would continue to the east bank of Grant Creek. Each of the draft tubes will be gated allowing the flow to be routed to the detention pond for spinning reserve. Isolation bulkheads would be provided allowing dewatering of the draft tubes for inspection and maintenance of the turbine. The tailrace channel would be trapezoidal in shape with a bottom width of 43 feet, side slopes of 2H:1V and a channel depth ranging from 13 feet at the powerhouse to 7 feet at the creek. A concrete structure would be constructed at the confluence of the channel and Grant Creek. A picket-style fish barrier would be placed on this concrete structure as well as provision for installation of stoplogs allowing the tailrace channel to be dewatered for inspection and maintenance. The channel would be excavated from native material and lined with riprap to provide a long term stable section. A staff gage and pressure transducer will be placed in the channel to monitor the water level in the channel.

4.6. Tailrace Detention Pond

An off-stream detention pond would be created to provide a storage reservoir for flows generated during the rare instance when the units being used for emergency spinning reserve are needed to provide full load into the electrical transmission grid. In this situation, the additional powerhouse flows would be diverted into the detention pond and then released slowly back into Grant Creek. It is anticipated that the discharge associated with a spinning reserve event would be dispersed via the tailrace channel which flows into Grant Creek. The detention pond would be located immediately south of the powerhouse and would have a capacity of approximately 15 acre-feet and a surface area of approximately 5 acres.

4.7. Powerhouse

The powerhouse would be located on the south bank of Grant Creek immediately west of the downstream tunnel portal and adjacent to the detention pond. The powerhouse would consist of a concrete foundation and a pre-engineered metal building superstructure. The building would be approximately 100 feet long (east to west) and 50 feet wide (north to south). The penstock would tie into the powerhouse on the south side and the tailrace channel on the north side of the building. The building floor would be set at approximately elevation 523 feet NAVD 88 and the centerline of the turbine runner at elevation 526 feet NAVD 88. The draft tube floor would be set at elevation 509 feet NAVD 88 with an operating tailwater inside the draft tubes ranging from 518.0 feet to 519.3 feet NAVD 88.

Two horizontal Francis type turbine/generator units with a rated total capacity of 5,000 kilowatt (kW) would be housed in the powerhouse structure. The powerhouse flow would range from a maximum of 385 cfs to a minimum of 58 cfs with each turbine operating flow ranging from 192.5 cfs to 58 cfs. Associated mechanical and electrical equipment would include hydraulic power units, turbine isolation valves, penstock drain, utility water system, lube oil system, oil water separator, battery system, and heating, ventilating, and air conditioning (HVAC) system. A control room housing the motor control center (MCC), communication rack, fiber optic panels, computers, and related equipment would also be provided. The Project switchgear would be located within the powerhouse. A standby generator, transformer, and fused pad mounted switch assembly would be mounted on an enclosed switchyard located on the south side of the powerhouse. Dewatering pumps would be provided to support dewatering of the turbine draft tubes. A 30-ton bridge crane would be provided for equipment maintenance. The crane would travel on rails mounted on the steel building support columns. An energy dissipation valve would extend off the penstock and provide bypass flows into the Project tailrace.

4.8. Transmission Line/Switchyard

An overhead 115-kilovolt (kV) transmission line will extend from the powerhouse to the existing 115-kV transmission line located on the east side of the Seward Highway. In addition to overhead transmission structures, the facilities would include a switchyard at the powerhouse consisting of a 115-kV fused pad-mounted disconnect switch and a pad-mounted 115-kV GSU transformer. The transmission line would run from the powerhouse parallel to the access road where it would intersect Chugach Electric's transmission line. The interconnection would have a pole mounted disconnect switch.

Wooden poles would be designed as tangent line structures on about 250-foot centers. Design of the line would also incorporate the latest raptor protection guidelines. Collision avoidance devices would be installed on the line at appropriate locations to protect migratory birds.

4.9. Appurtenant Facilities

The following pertinent mechanical and electrical equipment will be applicable to the Project:

- Intake selective withdrawal intake gate
- Intake trashrack system
- Intake roller gate used to isolate the tunnel and downstream generation facilities
- Control gate located on the bypass pipeline pipe
- A 30-ton bridge crane in the powerhouse
- Pumps located in the powerhouse used to dewater the draft tubes
- Pressure transducers located throughout the project used to monitor the water level in the reservoir, tunnel and trailrace, as well as pressures in the tunnel and penstock
- Security cameras at the intake and powerhouse
- Sanitary waste holding tank at the powerhouse
- A power line extending from the powerhouse to the intake to supply electrical power to the gates and trashrack
- Temperature instrumentation at the intake structure and at various stream locations to monitor water temperature

This equipment along with other identified miscellaneous mechanical and electrical equipment will be developed during the final design and included in the construction documents.

4.10. Access Roads

The Project would require an access road to both the powerhouse located near the base of the Grant Creek canyon and to the intake at Grant Lake. The access road would be used to construct the Project and afterwards, to maintain the facilities. It is anticipated that the powerhouse would be visited approximately once a week and the intake visited approximately once a month beginning just after the ice melts and continuing until just before freeze up. The powerhouse access road would be maintained year around. The intake access road would not be maintained in winter.

The 24-foot wide access road would tie into the Seward Highway at approximately MP 26.9. The route would travel eastward to cross Trail Lakes at the downstream end of the narrows between Upper and Lower Trail lakes and then continue eastward to the powerhouse. This route would be approximately one mile long. It would cross the Alaska Railroad (ARRC) tracks near an existing railroad crossing for a private driveway. The road would cross the narrow channel connecting Upper and Lower Trail lakes with an approximately a 110-foot-long single lane bridge. This bridge is proposed as a clear span with the west abutment located on bedrock and the east abutment on fill. The proposed route would avoid cuts and travel along the base of some small hills on the south side of Grant Creek to the powerhouse. This proposed access road would have one 90-degree crossing of the Iditarod National Historic Trail (INHT).

The intake access road would be approximately one mile long, beginning at the powerhouse. The road would ascend a 230-foot bluff to get to the top of the southern lip of the Grant Creek canyon. A series of road switchbacks would be required to maintain a road grade of less than 8 percent. The road would then generally follow the southern edge of the canyon until it descends to Grant Lake. A small parking area and turn-a-round area would be provided at the intake structure. A 16-foot wide bridge will extend from the bank out to the intake structure.

The road would be gravel with a 16-foot top width. Maximum grade would be 8 percent. Periodic turnouts would be provided to allow construction traffic to pass. Fifty-foot radius curves would be used to more closely contour around the small steep hills of bedrock to limit the extent of the excavation and the height of the embankments.

5 Project Lands

The proposed Project boundary as shown in Figure A.3-1 and in more detail in Exhibit G of this DLA consists of 1,758.1 acres. The U.S. Forest Service (USFS) manages a total of 1,642.8 acres (94 percent) of this total. USFS lands are part of the Chugach National Forest, which surrounds most of Grant Lake. Alaska Department of Natural Resources (ADNR) owns the remainder of land totaling 115.3 acres (6 percent).

Lands of the U.S. government to be used by the Project as shown on the Exhibit G Project boundary drawings are tabulated below (Table A.5-1).

Table A.5-1. Tabulation of federal lands within the proposed Project boundary, by township, range and section.

Location	Owner/Agency	Acreage	Exhibit G Figure No.
AK T4N R1E S1	USFS	57.8	G-2
AK T4N R1E S2	USFS	57.8	G-2
AK T4N R1E S5	USFS	73.2	G-2
AK T4N R1E S6	USFS	68.0	G-2
AK T5N R1E S28	USFS	29.9	G-2
AK T5N R1E S29	USFS	180.6	G-2
AK T5N R1E S31	USFS	38.6	G-2
AK T5N R1E S32	USFS	318.1	G-2
AK T5N R1E S33	USFS	169.7	G-2
AK T5N R1E S34	USFS	320.2	G-2
AK T5N R1E S35	USFS	299.1	G-2
AK T5N R1E S36	USFS	29.8	G-2
	Total Acreage:	**1,642.8**	

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