Grant Lake Hydroelectric Project (FERC No. 13212)

Development Plan

Kenai Hydro, LLC

February 2022

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Acronyms and Abbreviations

ADF&G	Alaska Department of Fish & Game
APLIC	Avian Powerline Interaction Committee
APP	Avian Protection Plan
ARRC	Alaska Railroad Corporation
BGEPA	Bald and Golden Eagle Protection Act
cfs	cubic feet per second
ECM	Environmental Compliance Manager
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
GPS	global positioning system
HVAC	heating, ventilating, and air conditioning
INHT	Iditarod National Historic Trail
KHL	Kenai Hydro, LLC
kV	kilovolt
kW	kilowatt
MBTA	Migratory Bird Treaty Act
MCC	motor control center
MOU	Memorandum of Understanding
MW	megawatt
NAVD 88	North American Vertical Datum of 1988
Project	Grant Lake Hydroelectric Project
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

Development Plan
Grant Lake Hydroelectric Project (FERC No. 13212)

1 INTRODUCTION

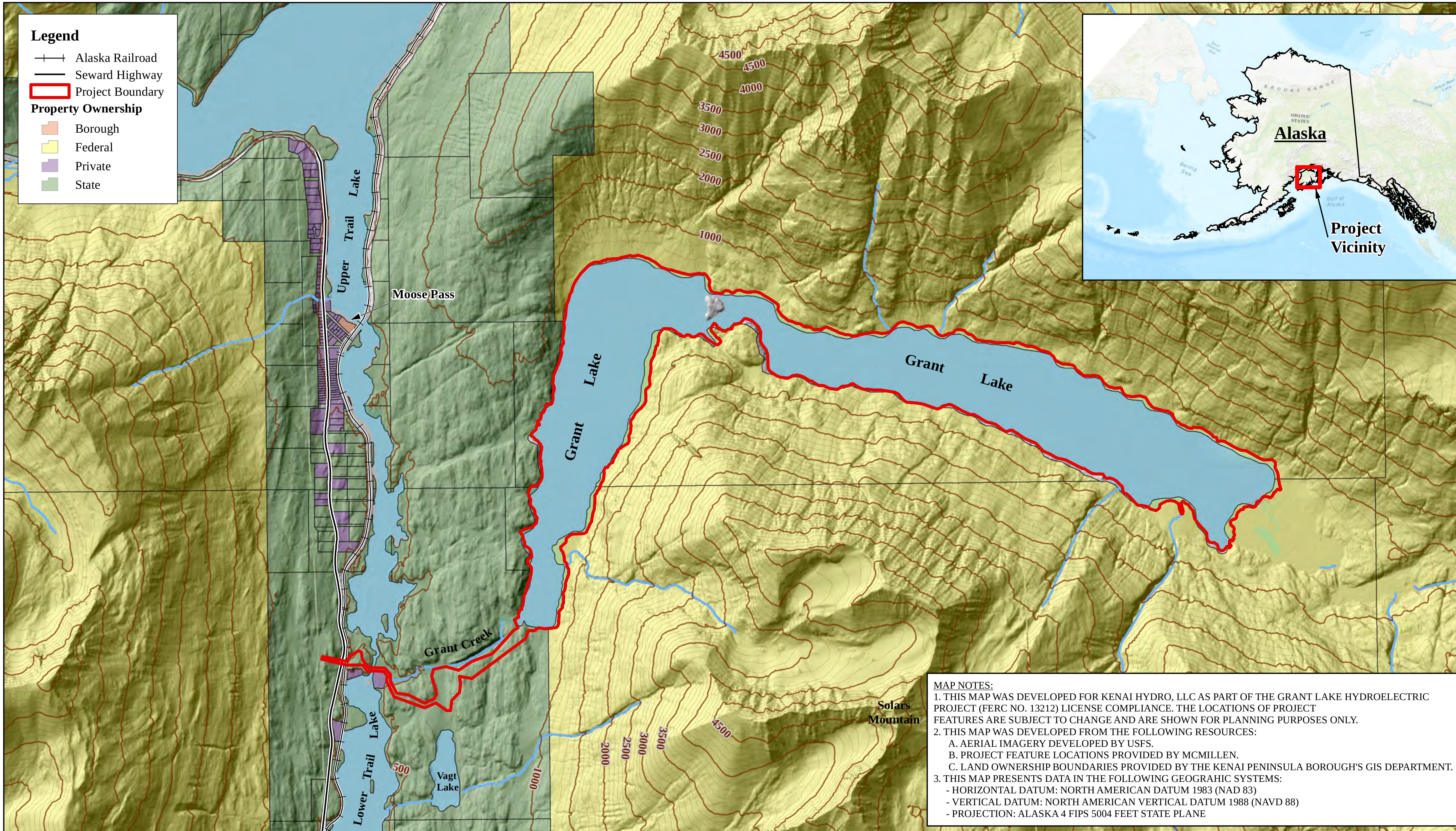
This document provides Kenai Hydro, LLC's (KHL's) proposed Development for the Grant Lake Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) No. 13212. KHL, a wholly owned subsidiary of Alaska Electric & Energy Cooperative (AEEC) is applying to the State of Alaska's Department of Natural Resources (DNR), Division of Mining, Land, and Water (DMLW), Southcentral Region Office (SCRO) for issuance of a 55-year non-competitive lease under the authority of AS 38.05.810(e). Renewable energy produced from the Project will be delivered to Homer Electric Association (HEA) members for off-site use.

1.1. Location

The proposed Grant Lake Hydroelectric Project would 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); this highway connects Anchorage (population 291,826) to Seward. The Alaska Railroad (ARRC) parallels the route of the Seward Highway, and is located adjacent to the Seward Highway in the Project area. Grant Lake is located 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 1,667 acres. A map showing the location of the Project is provided in Figure 1.

1.2. Project Description

The Grant Lake Project would 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 switchyard, and an overhead transmission line. The powerhouse would contain two Francis turbine generating units with a combined rated capacity of 5 megawatts (MW) with a maximum design flow of 385 cubic feet per second (cfs). The general proposed layout of the Project is shown in Figure 2.



MAP NOTES:
1. THIS MAP WAS DEVELOPED FOR KENAI HYDRO, LLC AS PART OF THE GRANT LAKE HYDROELECTRIC PROJECT (FERC NO. 13212) LICENSE COMPLIANCE. 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

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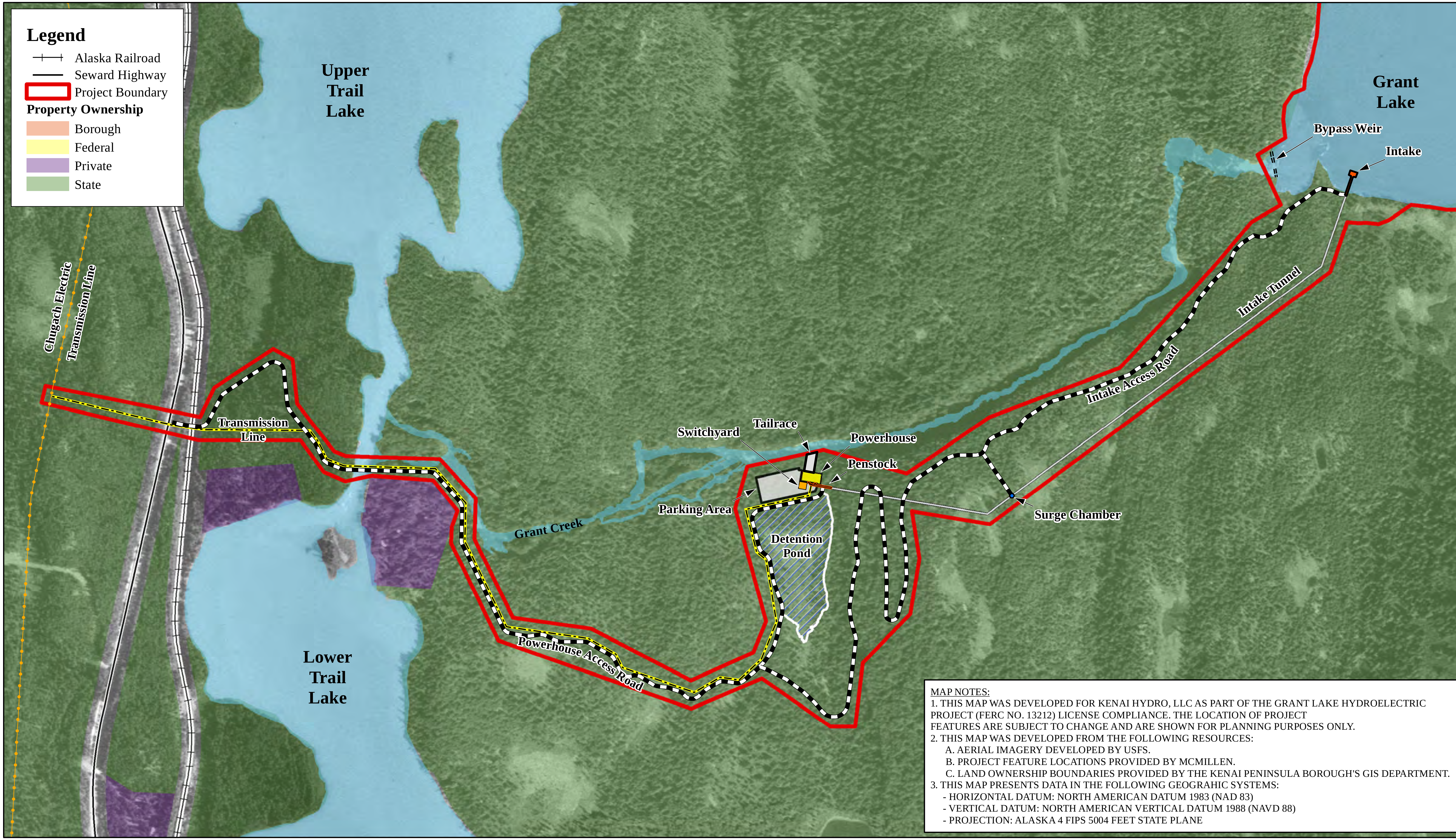
Homer Electric Association, Inc.
A Touchstone Energy Cooperative

GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT NO.13212
DEVELOPMENT PLAN SUMMARY
Location Map of Project Vicinity

Figure 1



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REV	DATE	BY	DESCRIPTION

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Drawing Scale:

0 250 500 1,000 Feet

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GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT NO.13212

DEVELOPMENT PLAN SUMMARY

General Project Features And Facilities

Figure 2

2 PROJECT OVERVIEW

2.1. Purpose

The purpose of the Project is to (1) make steps towards reaching renewable energy goals set by HEA's Board of Directors and the State of Alaska Legislature and (2) diversify HEA's energy generation portfolio.

2.2. Approximate Boundaries of Lease Area

The requested lease area totals 46.8 acres and encompasses primary Project works including the powerhouse, penstock, detention pond, tailrace, parking area, portions of the powerhouse access road and transmission line, intake structure, tunnel, surge chamber, and weir (Lease Application Attachment 1, Figure 2). The requested lease area is anticipated to be large enough to fully construct and access all Project structures. The entire lease area is within Township 4 North, Range 1 East, Sections 6 and 7 of the Seward Meridian.

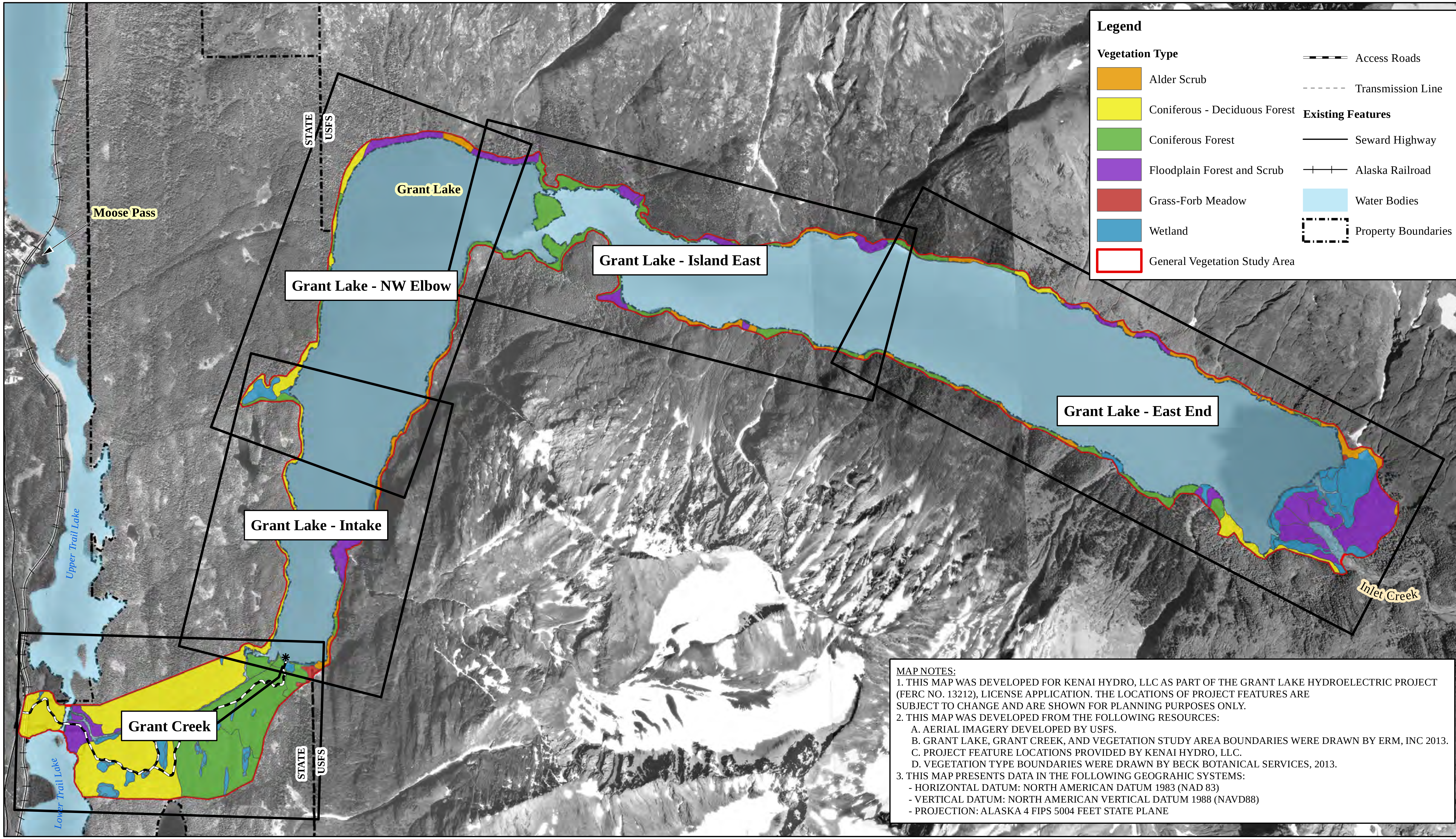
3 SITE DESCRIPTION

3.1. Terrain/Ground Cover

Other than the area designated as the Detention Pond, the terrain in the lease area was designated as Coniferous – Deciduous Forest in the upland vegetation studies that were completed as part of the FERC licensing process (Figure 3). The area designated as the Detention Pond is primarily Scrub – Scrub Wetlands with a small amount of Forested Wetlands on the slope to the east side of the detention pond as identified in the wetland studies that were completed as part of the FERC licensing process (Figure 4). The terrain / ground cover will be modified by the construction of the Powerhouse, Substation, Penstock, Tailrace, Detention Pond, portions of the Transmission Line, Access Road, and Parking Lot all described in the Lease Application and the Project Construction Plan (KHL 2020a).

3.2. Site Access

No current access exists to the Lease area. As shown in Figure 2, an access road, permitted via a separate easements, would be constructed off of the Seward Highway to allow for access to the site.



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B. GRANT LAKE, GRANT CREEK, AND VEGETATION STUDY AREA BOUNDARIES WERE DRAWN BY ERM, INC 2013.
C. PROJECT FEATURE LOCATIONS PROVIDED BY KENAI HYDRO, LLC.
D. VEGETATION TYPE BOUNDARIES WERE DRAWN BY BECK BOTANICAL SERVICES, 2013.
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Drawing Scale: 0 0.2 0.4 0.8 Miles

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GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT NO.13212

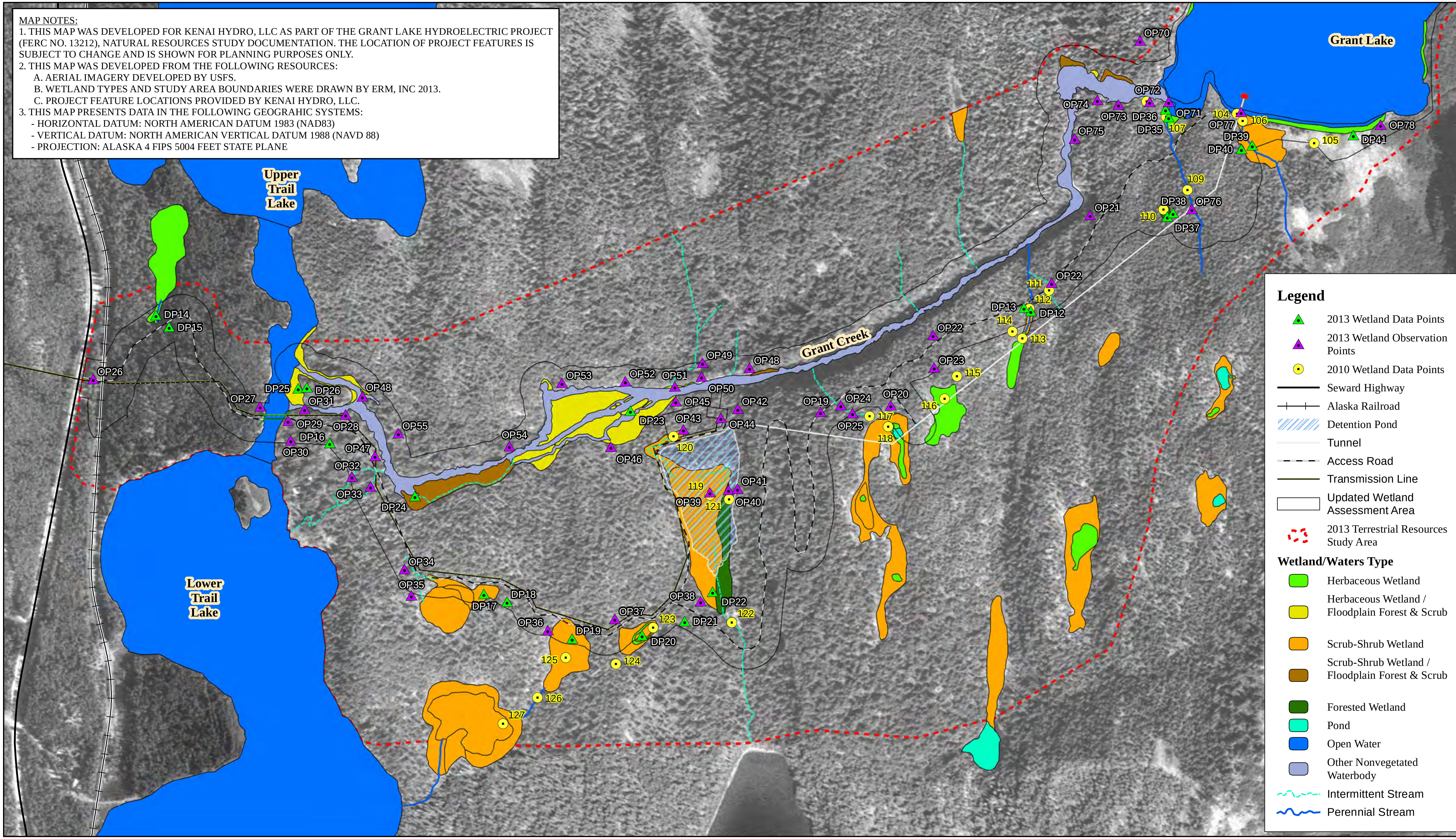
DEVELOPMENT PLAN SUMMARY

Figure 3
Upland Vegetation Types

DESIGNED J. Woodbury
DRAWN J. Woodbury
CHECKED K. Beck
ISSUED DATE 3/3/2016

DRAWING

SCALE: 1:24,600



REV	DATE	BY	DESCRIPTION

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Drawing Scale:

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DEVELOPMENT PLAN SUMMARY

Figure 4
2013 Wetland and Waters Types
Grant Creek

DESIGNED J. Woodbury
DRAWN M. Hjortsberg
CHECKED J. Blank
ISSUED DATE 3/3/2016

DRAWING

SCALE: 1:5,500

4 BUILDINGS, STRUCTURES, AND UTILITIES

4.1. 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 lie at the top of the existing hill slope that occurs near the mouth of the Grant Creek canyon (Reach 5). This location was selected based on the ability to maintain the aquatic habitat of Grant Creek and for the presence of an existing rock outcrop that would provide an effective downstream portal location for the tunnel. The powerhouse would be located south of Grant Creek. A natural lower area is located immediately south of the proposed powerhouse site. The entire site is forested with areas of open meadow. The powerhouse concrete foundation would tie into the existing hillside with the majority of the powerhouse structure located on relatively flat ground. 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.

4.2. Penstock

A 72-inch-diameter steel penstock would extend 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 at 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.

4.3. 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 514 feet NAVD 88. The channel would continue to the south bank of Grant Creek. Each of the draft tubes would be gated, allowing the flow to be routed to the detention pond for spinning reserve operation. 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 74 feet, side slopes of 2H:1V, and a channel depth ranging from 13 feet at the powerhouse to 8 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 would be placed in the channel to monitor the water level in the channel. A wildlife exclusion fence approximately 8 feet tall and constructed from steel posts with heavy gage woven wire would be installed at the tailrace channel. The fence would be located at the top of the bank on both sides of the tailrace channel. The fence would also cross the top of the tailrace barrier access deck, providing full exclusion of wildlife from the tailrace channel.

4.4. 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 spinning reserve were needed for the electrical transmission grid. To prevent a sudden increase in the water surface levels of Grant Creek as a result of the increased flows generated, the additional powerhouse flows would be diverted into the detention pond and then released slowly back into Grant Creek. The discharge associated with a spinning reserve event would be dispersed via the tailrace channel that flows into Grant Creek. The detention pond would be located immediately south of the powerhouse, and would be bordered by the access road. Storing additional powerhouse flows up to an elevation of 521 feet NAVD 88, the detention pond would have a capacity of approximately 15 acre-feet and a surface area of approximately 3.6 acres. The powerhouse would contain two generating units. The turbines would discharge into a splitter box located at the outlet of the turbine draft tubes. Isolation gates would be provided to route the turbine discharge to the detention pond when a unit was brought online to support a spinning reserve demand. Typically, when a turbine was brought online for spinning reserve, the turbine would operate for an average period of 15 to 20 minutes to meet the instantaneous demand. For example, assuming one turbine was allocated to spinning reserve, the turbine would divert the full 192.5 cfs of flow into the detention pond with a total of 173,250 cubic feet (cf) discharged during a 15-minute period. Once the spinning reserve demand was met, the unit would be brought offline and the detention pond flow released slowly back into the powerhouse tailrace.

4.5. Transmission Line/Switchyard

An overhead 115-kV transmission line would extend from the powerhouse to the existing 115-kV transmission line located on the west 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.

4.6. Access Road

The Project requires 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 month 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 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 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.

4.7. Grant Creek Diversion

The proposed Project would consist of a reinforced concrete intake structure located east of the natural lake outlet adjacent to the south shore. The Project would divert water up to a maximum of 385 cfs into the intake structure. Up to 385 cfs would flow to the powerhouse and up to 10 cfs would flow through the bypass system. The bypass system consists of a weir with an automated slide gate and pumps to provide up to 10 cfs of flow to the bypassed reaches of Grant Creek (reaches 5 and 6). When the lake level exceeds 703 feet NAVD 88, a maximum of 385 cfs could be diverted into the intake structure. Flow in excess of 385 cfs would then pass over the top of the bypass weir and into Grant Creek's natural outlet.

4.8. 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 south shore. The intake structure would consist of a reinforced concrete structure extending from approximately elevation 675 feet NAVD 88 up to a top deck elevation of 715 feet NAVD 88. The structure would have an outside dimension of 38 feet by 20 feet. The structure would include intake trashracks, selective withdrawal intake gates with wire rope hoist, and a vertical roller gate located on the water conveyance intake to allow isolation and dewatering of the tunnel. The intake would be divided into three bays, each fitted with an intake gate to provide flexibility for delivering the full flow range of 63 cfs to 395 cfs. The gate position within the water column would be set to deliver the required water temperature to Grant Creek below the powerhouse. The vertical roller gate would be 11 feet tall by 11 feet wide and fitted with a wire rope hoist lift mechanism. Electrical power and control cabling would be extended from the powerhouse to the intake to operate the intake and bypass weir. The cabling would be buried to the side of the intake access road. Pressure transducers would be installed to monitor the water level at the lake as well as within the intake tower. An access bridge approximately 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 18,791 acre-feet of active storage for the Project between elevations 703 feet NAVD 88 and 690 feet NAVD 88. The intake would be designed to allow the Project to draw water near the surface at various levels of storage, if deemed necessary to meet downstream temperature requirements. The invert of the intake would be at approximately elevation 675 feet NAVD 88 to provide for adequate submergence to the tunnel.

As part of Project development, KHL has conducted studies and collaborated with stakeholders on acceptable instream flow amounts through the bypass reach. As a result of Project operations, water would be utilized for power generation, effectively limiting flows in reaches 5 and 6 to some extent for the entirety of the year. A bypass weir and pump system would be utilized to provide minimum instream flows to Grant Creek. A concrete weir with a crest set at elevation 703 feet NAVD 88 at the outlet of Grant Lake would provide consistent water level control. The concrete weir would be approximately 100-feet in total length, spanning from the north shore to the south shore, and connecting in the middle to an existing island. An automated slide gate in the weir would provide bypass flows when lake levels remain at elevations above the bottom of the weir. When lake levels drop below the bottom of the weir a vertical turbine pump station would lift water from the drafted lake to a discharge location just below the concrete weir. Located at the intake structure, the pumps with a combined horsepower of 11 to 15 hp would provide bypass flow. The pumps would be sheltered from adverse weather conditions and the water would already be screened. A discharge pipe would be routed under the intake access bridge, and then be buried to its discharge location at invert El. 703 feet. The 16-inch diameter pipe would be approximately 400 feet long. The pump and weir combination would allow the minimum flow ranging from 5 to 10 cfs to be released at the top of reach 6. Under this proposed system, no reach of the creek would be dewatered. The water would be provided to maintain anadromous and resident passage in Reach 5 and provide persistent wetted habitat for any macroinvertebrate populations in Reach 6.

4.9. Tunnel and Surge Chamber

The intake structure would connect to a tunnel extending to the Project powerhouse. The tunnel would be approximately 3,350 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 would 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 would be located at the transition between the two tunnel slopes. This chamber would be approximately 10 feet in diameter and would extend from the tunnel invert elevation of 675 feet NAVD 88 to the ground surface at approximately elevation 790 feet NAVD 88. The surge chamber would provide a non-mechanical relief for hydraulic transients that could occur if a load rejection occurred at the powerhouse. Rock anchors and shotcrete stabilization techniques would be used to stabilize the tunnel exposed rock surface where required. A rock trap would be located at the surge chamber location to collect dislodged rocks from the unlined tunnel section.

The surge chamber outlet at the existing ground elevation would be fitted with a pre-fabricated steel structure that would span the chamber. The steel frame structure would be covered with wire mesh, providing a fully screened structure capable of allowing air in for the surge chamber, while also excluding wildlife and the public from accessing the surge chamber. A removable roof structure would be located on the steel outlet, allowing access to remove material from the rock trap that would be located in the tunnel directly below the surge chamber. The surge chamber cover structure would be painted to blend into the natural forest environment. During operations, if/when a load rejection at the powerhouse occurs, the pressure wave and associated volume of water would be contained within the surge chamber. As the wave dissipated, the water level in the surge chamber would decrease until it matched the level in Grant Lake.

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 that transitioned 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.

4.10. Appurtenant Facilities

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

- Intake selective withdrawal intake gate
- Intake trashrack system
- Intake vertical roller gate used to isolate the tunnel and downstream generation facilities

- Bypass system consisting of a weir with an automated slide gate and pumps located in the intake structure to provide agreed upon instream flows to the bypass reach (reach 5 and 6).
- 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 tailrace, as well as pressures in the tunnel and penstock
- Security cameras at the intake and powerhouse
- Sanitary waste holding tank or septic system at the powerhouse
- Power and control cables extending from the powerhouse to the intake to supply electrical power and controls to the intake and bypass weir
- Temperature instrumentation at the intake structure and at various stream locations to monitor water temperature
- Facility communications & controls cables (likely fiber-optic) will either be buried by the side of the powerhouse access road or installed as an under-run on the transmission line.

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

4.11. Site Utilities, Waste Disposal, and Hazardous Materials

4.11.1. Power Source

Construction activities will need generated electric power until construction of the transmission line is complete and power is established at the proposed powerhouse site. Power will initially be generated by diesel- or propane-powered generators. Fuel will be delivered by truck to the Narrows staging area for all fuel needs. After power has been established at the powerhouse site, power will be back fed to the tunnel portal to meet demands for tunnel construction. Power for the Project will be self-generated when the facility is generating power and will be backed up by an emergency generator. Critical loads are further backed up by batteries.

4.11.2. Water Supply

Non-potable water will be provided via a tap from the penstock. The water will be routed through a filter and used for utility water. Bottled water will be used for potable water.

4.11.3. Solid Waste Disposal

During construction, garbage will be collected daily and stored in bear-proof containers for weekly disposal to the Seward Transfer Facility or another approved disposal facility (Figure 5). Garbage will be transported from the site via trucks along the access roads.

Construction debris will be collected, contained and removed from the site via trucks along the access roads. Construction debris will be temporarily stockpiled and/or immediately removed from the site for disposal at the Seward Transfer Facility or another approved disposal facility.

Upon commencement of operations, it is anticipated that solid waste generation will diminish significantly. As such, all solid waste generated will be stored indoors, or outdoors in bear-proof containers, and removed from the site on a monthly basis consistent with the presence of operators on-site for routine maintenance activities.

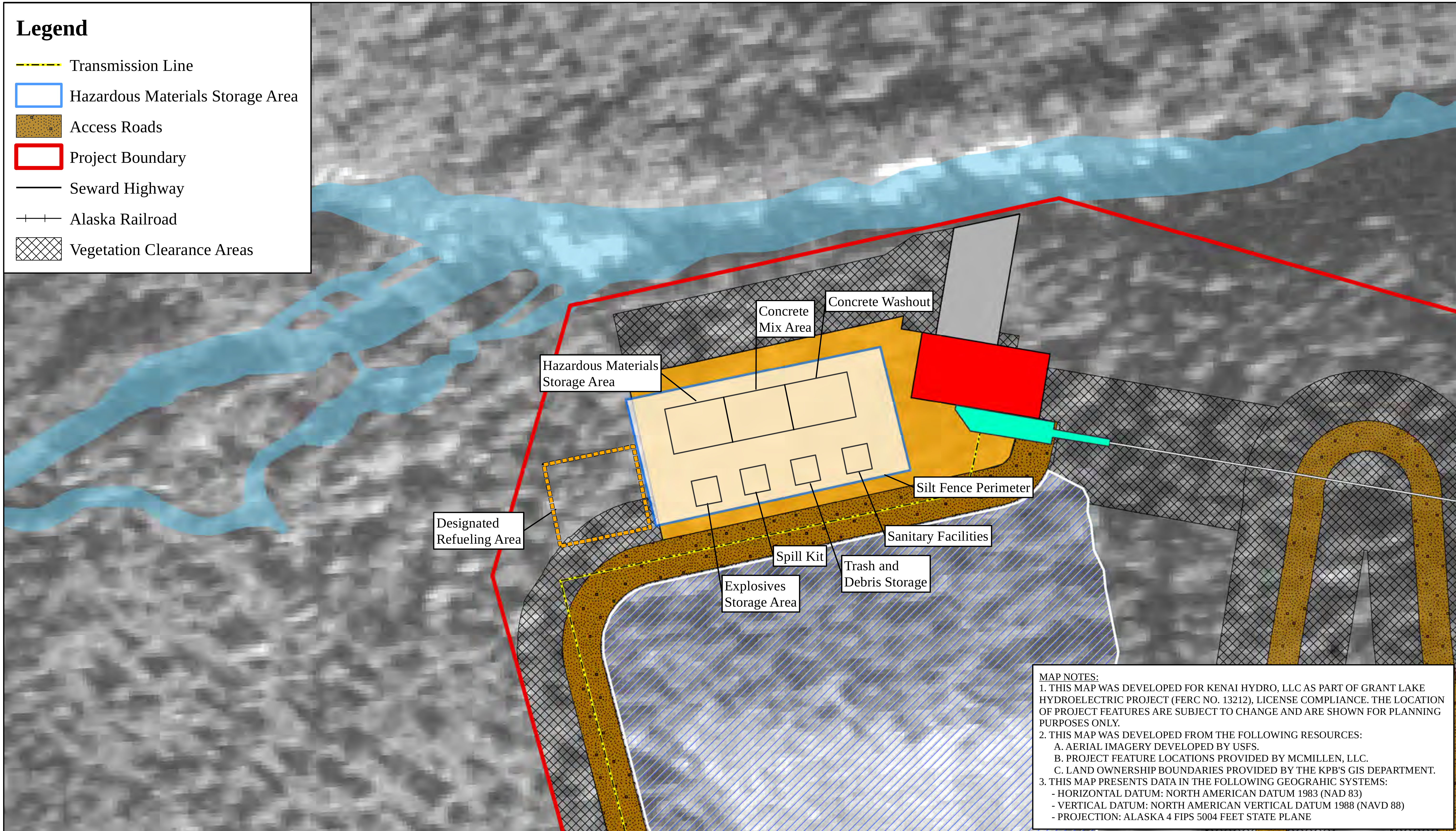
All solid waste will be sorted per the requirements of the disposal facility. The Project Solid Waste and Wastewater Plan (KHL 2020c) provides additional detail regarding plans for solid waste disposal.

4.11.4. Temporary Wastewater Disposal

Contractors will be given the option of commuting to the Project on a daily basis or staying in a temporary camp located near the powerhouse site. All waste will either be captured in contained portable toilets and transported off site weekly or disposed of onsite using a pit privy design approved by the Alaska Department of Natural Resources (ADNR) (Figure 5). If utilized, portable toilets will be serviced and maintained in a safe and hygienic manor with waste transported for disposal to the City of Seward's sewage treatment plant. Portable toilets will be spaced appropriately and meet all Alaska DEC specifications and requirements as detailed in 18 AAC 72. The Project Solid Waste and Wastewater Plan (KHL 2020c) provides additional detail regarding plans for temporary wastewater disposal.

4.11.5. Permanent Wastewater Disposal

The powerhouse will have an approved DEC septic system, pit toilets pumped as needed, or an approved alternative. The Project Solid Waste and Wastewater Plan (KHL 2020c) provides additional detail regarding plans for permanent wastewater disposal.



REV	DATE	BY	DESCRIPTION

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Drawing Scale:
0 40 80 160 Feet

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GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT NO.13212

DEVELOPMENT PLAN

Powerhouse Site Construction Staging Area Plan

Figure 5

4.11.6. Organic Waste

Organic waste consisting of stumps, timber, limbs, brush, moss, and other vegetation will be generated during construction of the Project. If economically feasible, merchantable timber from state lands with a top diameter greater than 6 inches will be limbed and transported off site for commercial use. Non-merchantable timber, limbs and brush will be chipped on site and the chips will be used for permanent site stabilization. Moss and other vegetation will be contoured to the existing terrain and used to revegetate the powerhouse visual landform barrier and in small amounts adjacent to the access roads. The Project Solid Waste and Wastewater Plan (KHL 2020c) provides additional detail regarding plans for organic waste disposal.

4.11.7. Spoils Disposal

KHL has designed the Project to optimize the use of excavated materials by incorporating them into Project infrastructure, leaving minimal spoils. The majority of excavated materials will be used to construct necessary Project features. Remaining excavated materials will be used for permanent stabilization of the site. Soil that remains unused after construction will be contoured to the existing terrain slope and used to revegetate the powerhouse visual landform barrier and in small amounts adjacent to access roads. Rock spoils that remain after construction will be contoured to the existing terrain adjacent to the access roads or the visual landform barrier adjacent to the powerhouse. Storage of spoils, whether temporary or long-term, will be a minimum of 100-ft away from Grant Creek. The Project Spoils Disposal Plan (KHL 2020d) provides additional detail regarding spoils disposal.

4.11.8. Hazardous Materials

Hazardous materials will be stored at the powerhouse site, including paints, chemicals, fertilizers, pesticides, oil and grease, and explosives (Figure 5). The powerhouse site storage area will be secured so that the public, if in the area, will not be able to access these items. Containment and storage measures for hazardous substances and fuels will be used so that these materials are not accidentally introduced into the air, water, or ground, causing contamination. The Project Hazardous Materials Plan (KHL 2020b) provides additional detail regarding hazardous materials protocols.

4.11.8.1. Hazardous Materials Storage

KHL will store, maintain, and dispose of hazardous substances based on the following regulations:

- All materials stored on site will be stored in a neat, orderly manner in their appropriate containers.
- To the extent practicable, products will be kept in their original containers with the original manufacturers' labels. When storage in original containers is not feasible, hazardous substances shall be stored in containers, such as those approved by the U.S. Department of Transportation (DOT), which are chemically inert to and appropriate for the type and quantity of the hazardous substance.

- Containers of hazardous substances shall not be stored in locations or in a manner that results in physical damage to, or deterioration of, the container. Containers shall not be stored where they are exposed to heat sufficient to rupture the containers or to cause leakage.

- Containers used to package a substance which gives off toxic, poisonous, corrosive, asphyxiant, suffocant, or anesthetic fumes, gases, or vapors in hazardous amounts (e.g., fuming sulfuric acid, hydrofluoric acid, nitrous oxide, chlorine, or other compressed or liquefied toxic gases) shall not be stored in locations where it could be reasonably anticipated that employees would be exposed. This requirement shall not apply to small quantities of such materials kept in closed containers, or to tank cars or trucks.

- Substances which, when mixed: (1) react violently, (2) evolve toxic vapors or gases, or (3) become hazardous by reason of toxicity, oxidizing power, flammability, explosibility, or other properties, shall be considered incompatible. Incompatible substances shall be separated from each other in storage by distance or by partitions, dikes, berms, secondary containment or otherwise, to preclude accidental contact between them.

- Explosives shall be stored in accordance with federal regulations set forth in Occupational Health and Safety Administration (OSHA) regulations set forth in Code of Federal Regulations (CFR) 1910.109 at the minimum allowable distances set forth in Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Table 555.218. Explosives will be stored in the storage area near the proposed powerhouse in facilities provided by the contractor. The anticipated maximum amount of explosives stored at any one time will be less than 25,000 lbs. Access to the storage area will be restricted and only authorized personnel will be permitted entrance. Proper signage will be installed, and local authorities will be notified of the stored explosives.

Safety Data Sheets (SDS) will be available for all hazardous substances being bought, stored, handled, or used within the Project area, and will be located both at each location where hazardous substances are stored and in the Project trailer to comply with federal, state, and local laws and regulations.

For further details regarding hazardous materials storage, please see the Project Hazardous Materials Plan (KHL 2020b).

4.11.8.2. Containment

Storage locations will have secondary containment units so that if a leak occurs, it will be contained and not allowed to enter the surrounding environment. For fuel storage sites, the containment should have a minimum volume of 120 percent of the volume of the largest container stored in that site. Secondary containment should be maintained, clean, and free of water. Fuel containment sites and hazardous storage locations should be sited to minimize the chance of a discharge.

Hazardous substances will be stored and protected from rain and runoff to avoid contamination of soil or transfer to a water source. Along with utilizing the correct storage container, KHL will label, tag, or mark each substance with overall signage including the name of the substance, the hazard warning (e.g., corrosive, poison, etc.), and the manufacturer's contact information.

When hazardous materials are being handled or used during construction activities, spill kits will be readily available in the case of an unforeseen spill. Proper personal protective equipment will be used when handling the hazardous materials including gloves, boots, eyeglasses or goggles, and appropriate work attire. All hazardous materials will be contained in an appropriate container when transported.

For further details regarding hazardous materials containment, please see the Project Hazardous Materials Plan (KHL 2020b).

4.11.8.3. Spill Prevention Measures

KHL will ensure that all practicable measures are taken to minimize the potential for and consequences of a spill in the Project area (Figure 5). KHL will comply with applicable environmental and safety laws and regulations and will provide training to personnel to prevent spills. The proper use of materials, equipment, and storage greatly reduces the potential for contamination resulting from hazardous substance spills. The following construction practices will be implemented to minimize the potential for spills:

- An effort will be made to only store enough hazardous material products to complete the Project.
- Fuels and lubricating oils for vehicles or heavy equipment will not be stored near water or sensitive biological habitats. When terrain and conditions allow, storage of these types of materials will be at least 100 feet from these areas.
- All refueling of heavy equipment will be performed in specified non-smoking areas.
- Designated fueling areas will be provided with appropriate absorbent materials readily available. Spill pans and/or pads will be placed underneath connection points during refueling. There will be no refueling or changing of fluids in machinery or vehicles within 100 ft of the Ordinary High Water Mark of Grant Lake, Grant Creek, or tributaries. Care will be taken to properly secure spill pans and pads such that severe weather events (winds, rains) do not wash away or otherwise destroy employed prevention measures.
- Work practice controls will be utilized to prevent spills during refueling and maintenance operations that involve power tools, site vehicles, and equipment (this will include the use of spill pads to collect spilled materials). Work practices will include (but are not limited to) the following:
    - Ensuring that connections are tight where fluid is transferred;
    - Providing containment when decanting substances from one container to another;
    - Closing containers when not in use;
    - Following manufacturers' recommendations for proper use and disposal of materials;
    - Using proper equipment for the job; and
    - Minimizing refueling during rain events.

- During construction, oil pads or spill containment platforms will be placed underneath equipment and secured in place when the equipment is parked on-site.
- Construction materials will not be stockpiled near or on the bank of any waterway where they could be washed away by storm events.
- Storage areas will be secured so that the general public and/or wildlife cannot easily access hazardous materials.
- Storage containers will display labels that identify the contents of the container and whether the contents are hazardous. Copies of all SDS will be maintained and provided to any person upon request.
- Spill response kits will be provided in easily accessible locations in the Hazardous Material Storage Areas. Spill response kits shall contain a sufficient quantity of absorbent and barrier materials to adequately contain and recover potential spills of fuels or oils. These kits may include, but are not limited to, drip pans, buckets, absorbent pads, straw bales, absorbent clay, sawdust, floor drying agents, spill containment barriers, heavy plastic sheeting, plastic bags, shovels, and sealable containers.
- Construction activities will be performed by methods that will minimize entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into streams, flowing or dry watercourses, lakes, wetlands, or underground water sources.
- Remediation procedures for the removal and clean-up of spilled hazardous materials will be completed in accordance with Homer Electric Association's (HEA's) Operations Procedure Manual (see the Project Hazardous Materials Plan (KHL 2020b, Appendix B)).
- Personnel will be trained to follow spill prevention procedures and to readily and effectively contain and clean up spills.
- Specific measures for spill prevention, reporting and cleanup will be discussed at job site briefings.

For further details regarding spill prevention measures, please see the Project Hazardous Materials Plan (KHL 2020b).

5 STAFFING, MAINTENANCE, AND OPERATIONS

5.1. Parking and Storage Areas

The parking area is located to the west of the powerhouse and will be used for storage and concrete mixing during construction (Figure 5). During operations, the parking area will be used for parking vehicles during monthly site inspections by HEA's O&M staff.

5.2. Number of People Using the Site

During construction, up to 70 people may be on site to participate in construction activities.

During typical operations, the facility would be unmanned and remotely operated and monitored from the existing HEA Dispatch Center, which is manned 24 hours a day, 7 days a week, 365 days a year. The site would be visited monthly for inspection, and planned and unplanned maintenance by HEA's existing roving O&M crew (typically one or two persons) that currently maintains and operates HEA's backup thermal generation plants in Nikiski, Soldotna, and Seldovia.

5.3. Maintenance and Operations

The facility would be unmanned and remotely operated and monitored from the existing HEA Dispatch Center, which is manned 24 hours a day, 7 days a week, 365 days a year. The site would be visited monthly for inspection, and planned and unplanned maintenance by HEA's existing roving O&M crew (typically one or two persons) that currently maintains and operates HEA's backup thermal generation plants in Nikiski, Soldotna, and Seldovia. Depending on the scope of work involved contractors would be utilized for major overhauls and maintenance work, as well as, specialty work such as vegetation management, required environmental studies, etc.

6 SITE CLOSURE AND RECLAMATION PLAN

HEA plans to retain the Project and all associated structures through the duration of the requested lease term (55 years).

6.1. Revegetation and Restoration of Disturbed Areas

HEA proposes to revegetate areas disturbed by Project construction and operations. These areas include areas adjacent Project features, laydown areas for equipment and construction materials, as well as temporary vehicle use and parking areas (Figures 2 and 5). Revegetation efforts would restore areas to their previous upland vegetation type. Upland vegetation types in the Project area were surveyed and mapped as a part of vegetation studies of the Grant Lake Project area (Figure 4).

Revegetation of disturbed areas will occur upon completion of construction or ground disturbance. These areas would be documented in a manner similar to invasive plant infestations, described in Section 3.1. The following measures and BMPs regarding revegetation would be employed during construction and operation of the Project:

- Only weed-free materials (rock, mulch, straw, plant materials, native seed mixes) would be used for revegetation.
- During construction, native shrubs, forbs, soils, and vegetation mats would be salvaged from areas where plants were destroyed, for later use in revegetation. As much soil as reasonably possible would be kept with salvaged plant roots.
- Natural revegetation would be promoted when local seed source and site conditions were favorable for achieving revegetation objectives.
- When conditions were not favorable for natural revegetation, native plant sources would be used for revegetation stock.
- Preference would be given to using plant materials for revegetation from the local region to maximize adaption to the Project area, and to maintain local genetic composition.

Revegetated areas will be monitored on a prescribed schedule and restoration success will be evaluated based on a set of restoration success criteria as described below. The success of revegetation methods will be monitored monthly between April and September during construction and annually thereafter for 5 years. Annual revegetation monitoring will occur during the growing season (June-August) to optimize plant identification. One survey will occur per year between June and August following the completion of construction.

Successful revegetation is defined as a 60% reduction in disturbed, bare areas (due to natural regeneration or growth of revegetation) by the final year of monitoring. Any patches not meeting these criteria by the final year of monitoring will be revegetated again. If supplemental revegetation of any area is deemed necessary at the end of the 5-year monitoring period, vegetation monitoring of these areas will continue for two additional growing seasons, or until success criteria are met for two consecutive growing seasons.

6.2. Site Closure

As described above, HEA intends to operate the Project and retain all Project infrastructure through the duration of the requested lease term (55 years) and likely will apply for a second or third lease as hydroelectric plants can and have operated for more than 120 years. When the Project requires decommissioning in the future, HEA would remove all above-ground structures and dispose of them in accordance with local solid waste disposal regulations. The tunnel would be capped or gated on both ends and would remain in place to avoid additional site disturbance. The site would be regraded to remove bermed areas and ponds, then permanent erosion and sediment BMPs installed. Areas disturbed by Project construction and operations would be revegetated as described in Section 6.1 above.

7 PERMITS AND AUTHORIZATIONS

On August 28, 2019, Kenai Hydro, LLC (KHL) received its License for the Grant Lake Hydroelectric Project (Project) from the Federal Energy Regulatory Commission (FERC). Issuance of the license was the culmination of over 10 years of work and adherence to a rigid set of timelines, process requirements and feasibility assessments. The FERC licensing process requires the project proponent to participate in significant collaboration with state and federal agencies, Tribal corporations and the local public (stakeholders) throughout. Through this collaboration, an extensive and resource-specific set of multi-year studies were developed and implemented to assess the potential impacts associated with the development and long-term operation of the Project.

At the initiation of the formal FERC licensing process, KHL facilitated and participated in multiple years of dialogue with stakeholders and FERC dedicated to reaching agreement on the suite of studies that everyone agreed would adequately define both the existing environment in the Project area and the potential for that area to be impacted as a result of Project development and operations. Once the study program was agreed upon and all study plans were developed and approved by FERC, KHL spent approximately 1 year collaborating with requisite stakeholders and filing for all necessary natural resource permits required to conduct the studies. Permits required and attained for study purposes included but were not limited to:

- Multiple ADNR Land Use Permits
- ADFG Fish Resource Permits
- ADFG Fish Habitat Permits
- ADNR Archeology Permit
- Multiple USFS Special Use Permits

It is noteworthy that in addition to the aforementioned permits, KHL also proactively developed and distributed a water rights application and a draft 404 permit, to ADNR and the US Army Corps of Engineers, respectively.

Upon permit acquisition, KHL implemented a suite of aquatic, water resource, terrestrial, cultural and recreational studies over the course of a 3-year period. At the end of each study season, KHL met with stakeholders to discuss results, needs for any supplemental assessments and plans for the following study season. Once the study program was complete, a series of resource-specific study reports were developed by KHL, and reviewed/discussed with the stakeholders during a series of meetings. These post-study meetings were also utilized to collaboratively discuss and reach agreement on a series of mitigation and enhancement measures that the group felt justified incorporation into a FERC license. Concurrent with these discussions, KHL developed a Draft License Application (DLA) which they distributed to the stakeholders for review and comment in advance of finalization and ultimate filing with FERC to begin their National Environmental Policy Act (NEPA) review for the Project. Upon receiving comments on the DLA, KHL organized additional meetings with stakeholders to discuss any outstanding comments and ultimately revised the DLA in accordance with a majority of the technical and editorial comments received. The result of these revisions was a comprehensive Final License Application (FLA) that not only included study results and an associated Project impact assessment but also a preliminary design description, infrastructure-specific engineering drawings, Project land use information and maps (ownership, acreages, etc.), Project cost information and a suite of proactively developed management plans requested by stakeholders and intended to confirm the resource-specific impact assessments conducted during the licensing effort.

On April 18, 2016, KHL filed its FLA for the Grant Lake Hydroelectric Project. Upon response by KHL to an additional information request, FERC accepted the FLA for filing on July 19, 2016. This acceptance initiated FERC’s NEPA assessment process during which, a comprehensive internal analysis of the application was conducted. In addition to a review of the application to assess the Project’s merits and potential impacts to the natural environment, FERC is charged with confirming that the proposed Project adheres to all local, state and federal aspects of the following:

- Clean Water Act
- Coastal Zone Management Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Essential Fish Habitat

- Endangered Species Act

Once the review for the Project was completed, a draft Environmental Impact Statement (DEIS) was developed that provides FERC's evaluation of KHL's Project proposal as well as all potential alternatives associated with the licensing of the Project. This DEIS was publicly issued and comments were solicited. Upon receiving stakeholder comments, FERC reviewed responses and revised and finalized the document based upon stakeholder input that they felt was justified. The final EIS (FEIS) was issued by FERC on May 1, 2019 with a commitment to make a licensing decision based upon "all concerns relevant to the public interest". On August 28, 2019, per its authority under the Federal Power Act, FERC issued an original License to Kenai Hydro, LLC for the construction, operation and maintenance of the Grant Lake Hydroelectric Project and rights to that development on 1,688.7 acres of federal land on which Grant Lake resides. No objections to license issuance were received by FERC.

Since License issuance, KHL has obtained the following permits:

- All requisite permits to conduct pre-construction surveying, bathymetry and geotechnical assessments
- A state permit to conduct initial gravel monitoring in Grant Creek, per the License requirements

8 REFERENCES

Much of the information used in the preparation of this Development Plan was derived from the following KHL source documents:

KHL (Kenai Hydro LLC). 2016. Grant Lake Hydroelectric Project (FERC No. 13212), Final License Application. April 2016.

KHL. 2020a. Grant Lake Hydroelectric Project (FERC No. 13212), Construction Plan. September 2020.

KHL. 2020b. Grant Lake Hydroelectric Project (FERC No. 13212), Hazardous Materials Plan. October 2020.

KHL. 2020c. Grant Lake Hydroelectric Project (FERC No. 13212), Solid Waste and Wastewater Plan. August 2020.

KHL. 2020d. Grant Lake Hydroelectric Project (FERC No. 13212), Spoils Disposal Plan. August 2020.

KHL. 2020e. Grant Lake Hydroelectric Project (FERC No. 13212), Vegetation Management Plan. July 2020.