**APPLICATION FOR PRELIMINARY PERMIT**
**BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION**

**For The**

# Cascade Creek
# Hydroelectric Project

**Petersburg, Alaska**

**Submitted by:**


**Hydro Development, LLC**
**928 Thomas Road**
**Bellingham, Washington 98226**


**February 2, 2012**

## INITIAL STATEMENT

**Before the FEDERAL ENERGY REGULATORY COMMISSION**
*Application for Preliminary Permit*

**(1) Name of Applicant.**

Hydro Development, LLC ("Applicant") applies to the Federal Energy Regulatory Commission ("FERC") for a preliminary permit for the proposed Cascade Creek Hydroelectric Project ("Project"), as described in the attached Exhibits. This application is made in order that the Applicant may secure and maintain priority of application for a license for the Project under Part 1 of the Federal Power Act while obtaining the data and performing the acts required to determine the feasibility of the Project and to support an application for a FERC license.

The Applicant is submitting this application for a preliminary permit in an effort to establish priority of license application while completing the necessary work to develop a final license application to submit to FERC.

**(2)** The location of the proposed Project is:

**State:** Alaska

**County:** Located in an unorganized borough

**Nearby Town:** Petersburg, Alaska

**Stream or other body of water:** Cascade Creek**,** Swan Lake and Falls Lake. Cascade Creek passes through both lakes.

**(3)** The exact name, business address, and telephone number of the Applicant are:

Hydro Development, LLC
928 Thomas Road
Bellingham, WA 98226
Phone: (360) 733-3332
FAX: (360) 671-9462

The exact name, business address and phone of each person authorized to act as agent for the Applicant in this application are:

Mr. Corky Smith
Hydro Development, LLC
928 Thomas Road
Bellingham, WA 98265
Phone: (360) 733-3332
FAX: (360) 671-9462
Email: oliviner@aol.com

**(4)** Hydro Development, LLC, is a domestic corporation organized and existing in the State of Alaska, and is not claiming preference under section 7(a) of the Federal Power Act.

**(5)** The proposed term of the requested Preliminary Permit is 36 months.

**(6)** There are no existing dams, or other existing Project facilities.

**Distribution:**

(1) For a preliminary permit or license, identify every citizen, association of citizens, domestic corporation. municipality or state who has or intends to obtain proprietary right to the site:

Included as Exhibit A

(2) Names and mailing addresses of:

(i) Any Federal facilities that would be used by the project:

U.S. Forest Service
Roads- US Forest Service
Petersburg Ranger District
PO Box 1328, Petersburg, AK 99833

(ii) Every irrigation district, drainage district, or similar special purpose political subdivision.

None

(iii) Every other political subdivision in the general area of the project that there is reason to believe would likely be interested in, or affected by, the application.

City of Petersburg
Kathy O'Rear, City Clerk
P.O. Box 329
Petersburg, AK 99833
(907)772-4519

City of Wrangell
Christine Jamison, City Clerk
P.O. Box 531
Wrangell, AK 99929

City of Kake
Mayor Henrich Kadake
P.O. Box 500
Kake, AK 99830
(907)785-3804

City of Ketchikan
Ketchikan Public Utilities
Karl Amylon
334 Front Street
Ketchikan, AK 99901
(907)874-2381

City of Angoon
Mayor Albert Howard
P.O. Box 189
Angoon, AK 99820

City of Kupreanof
Bob Dolan, Mayor
PO Box 50
Petersburg AK, 99833

Eric Wolfe
Southeast Alaska Power Agency
1900 First Ave. Suite 318
Ketchikan, AK 99901

Thomas Bay Power Authority
PO Box 1318
4.5 Mile Zimovia Highway
Wrangell, AK 99929

(iv) All Indian tribes that may be affected by the Project:

Organized Village of Kake
Gary Williams, Executive Director
P.O. Box 316
Kake, AK 99830-0316

Wrangell Cooperative Association
Tom Gillen Sr., President
PO Box 868
Wrangell, AK 99829

Petersburg Indian Association
Will Ware, Tribal Administrator
P.O. Box 1418
Petersburg, AK 99833

Central Council Tlingit and Haida Tribes of Alaska
Edward K. Thomas, President
320 W. Willoughby Ave., Suite 300
Juneau, AK 99801

Sealaska Heritage Institute Dr.
Rosita Worl, President One
Sealaska Plaza, Suite 301
Juneau, AK 99801

Sealaska Corporation
Chris E. McNeil, Jr., President
One Sealaska Plaza, Suite 400
Juneau, AK 99801

Kootznoowoo Incorporated
Peter Naoroz, General Manager
8585 Old Dairy Road, Suite 201
Juneau, Alaska 99801

Kake Tribal Corporation
Howard Martin, President
P.O. Box263
Kake, AK 99830

# EXHIBIT A

**Cascade Creeek Hydroelectric Project**
**Land Ownership Data**

1/31/2012 **PRELIMINARY**

| | Project Boundary Area | Sq Meters | Acres | Status | STR | Property Info | Owner Name | Address | State / Zip | Phone |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Swan Lake & Powerhouse Area | 2,763,604.6 | 682.899 | Federal Lands | Sec. 4,5,8,9,10,17,18,19, T56S, R80E & Sec. 24, T56S, R79E | National Forest | USFS - Tongass National Forest | Tongass National Forest Federal Building 648 Mission Street | Ketchikan, AK 99901 | 907-225-3101 |
| 2 | Thomas Bay Crossing | 166,474.5 | 41.137 | Waters of the State ??? | Sec. 24,25,26,35, T56S, R79E | Tide Line to Tide Line | State of Alaska | State of Alaska, Dept of Natural Resources, 550 W. 7th Ave. Suite 1260 | Anchorage, AK 99501 | 907-269-8400 |
| 3 | Thomas Bay Alaska Subdivision | 69,848.3 | 17.260 | State Lands - Subdivision | Sec. 35, T56S, R79E & Sec. 4, T57S, R80E | | State of Alaska | | | |
| 4 | Paterson Delta Reach | 143,549.8 | 35.472 | Federal Lands | Sec. 4,9,16,17,20, T57S, R80E | National Forest | USFS - Tongass National Forest | Tongass National Forest Federal Building 648 Mission Street | Ketchikan, AK 99901 | 907-225-3101 |
| 5 | Parcel AKJ003761 | 11,860.3 | 2.931 | Private | Sec. 20, T57S, R80E | Petersburg #93-6RS | Point Agassiz South HES Group | % Sam Bunge PO BOX 288 | Petersburg, AK 99833 | |
| 6 | Agassiz South Reach | 8,368.3 | 2.068 | Federal Lands | Sec. 20, T57S, R80E | National Forest | USFS - Tongass National Forest | Tongass National Forest Federal Building 648 Mission Street | Ketchikan, AK 99901 | 907-225-3101 |
| 7 | Frederick Sound Crossing | 380,530.5 | 94.031 | Waters of the State ??? | Sec. 20,29,32,31, T57S, R80E & Sec. 6,7,18,19, T58S, R80E & Sec. 24,25,36, T58S, R79E | Tide Line to Sandy Beach | State of Alaska | State of Alaska, Dept of Natural Resources, 550 W. 7th Ave. Suite 1260 | Anchorage, AK 99501 | 907-269-8400 |
| 8 | Roll No. Z000995.00 | 1,070.7 | 0.265 | City Owned Lot | Sec. 36, T58S, R79E | Beach, Zoning OSR | City of Petersburg | City of Petersburg PO BOX 329 | Petersburg, AK 99833 | 907-772-4519 |
| 9 | Roll No. 1002100.12 | 2,884.3 | 0.713 | City Owned Lot | Sec. 36, T58S, R79E | Lot, Zoning OSR | City of Petersburg | | | |
| 10 | Right of Way | 735.2 | 0.182 | City Owned Lot | Sec. 36, T58S, R79E | R.O.W. | City of Petersburg | | | |
| 11 | Roll No. Z002101.08 | 443.3 | 0.110 | City Owned Lot | Sec. 36, T58S, R79E | Lot, Zoning PU | City of Petersburg | | | |
| 12 | Roll No. 1002101.08 | 2,225.1 | 0.550 | City Owned Lot | Sec. 36, T58S, R79E | Lot, Zoning OSR | City of Petersburg | | | |
| 13 | Roll No. 1002104.00 | 8,073.3 | 1.995 | City Owned Lot | Sec. 36, T58S, R79E | GL2, Zoning OSR | City of Petersburg | | | |
| 14 | Roll No. Z002104.02 | 15,285.9 | 3.777 | City Owned Lot | Sec. 36, T58S, R79E | Lot, Zoning OSR | City of Petersburg | | | |
| 15 | Roll No. Z002104.01 | 310.8 | 0.077 | City Owned Lot | Sec. 36, T58S, R79E | Lot, Zoning PU | City of Petersburg | | | |

# EXHIBIT A CONT'

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | **State Lands** | 29,813.6 | **7.367** | State Lands | Sec. 35, T58S, R79E | Unknown | State of Alaska | State of Alaska, Dept of Natural Resources, 550 W. 7th Ave. Suite 1260 | Anchorage, AK 99501 | 907-269-8400 |
| 17 | **Roll No. 1001001.15** | 5,896.2 | **1.457** | City Owned Lot | Sec. 35, T58S, R79E | Lot, Zoning PU | City of Petersburg | City of Petersburg PO BOX 329 | Petersburg, AK 99833 | 907-772-4519 |
| 18 | **State Mental Health Lands** | 6,220.9 | **1.537** | State Lands | Sec. 35, T58S, R79E | State Mental Health Land | State of Alaska | State of Alaska, Dept of Natural Resources, 550 W. 7th Ave. Suite 1260 | Anchorage, AK 99501 | 907-269-8400 |
| 19 | **Roll No. 1001002.00** | 8,913.1 | **2.202** | Private | Sec. 35, T58S, R79E | Lot, Zoning U | Reid Bros. Logging & Const | PO BOX 1187 | Petersburg, AK 99833 | 907-772-3755 or 907-772-2482 |
| 20 | **State Lands** | 2,534.7 | **0.626** | State Lands | Sec. 34, T58S, R79E | Unknown | State of Alaska | State of Alaska, Dept of Natural Resources, 550 W. 7th Ave. Suite 1260 | Anchorage, AK 99501 | 907-269-8400 |
| 21 | **State Lands** | 35,912.9 | **8.874** | State Lands | Sec. 3, T59S, R79E | Unknown | State of Alaska | | | |
| 22 | **Roll No. 1001592.00** | 12,319.0 | **3.044** | Private | Sec. 3, T59S, R79E | Lot, Zoning U | Kenneth E. Hedin | 540 Hemlock Ct. | Friday Harbor, WA 98250-8063 | 360-378-4496 |
| 23 | **Roll No. Z001595.02** | 8,442.7 | **2.086** | Private | Sec. 3, T59S, R79E | Lot, Zoning SF | Island Ventures, LLC | PO Box 966 293 Mitkof Highway | Petersburg, AK 99833 | 907-772-3909 or 907-518-4055 |
| 24 | **Roll No. 1001595.02** | 12,484.4 | **3.085** | Private | Sec. 3, T59S, R79E | Lot, Zoning I, 293 Mitkof Hwy | Island Ventures, LLC | | | |
| 25 | **Roll No. 1001703.00** | 1,701.3 | **0.420** | Private | Sec 3, T59S, R79E | Lot, Zoning I, 118Lorelei Ln | Linda J Reller | PO BOX 806 | Petersburg, AK 99833 | 907-772-3604 |
| 26 | **Federal. Govt. Lot 5** | 2,791.1 | **0.690** | Federal Lands | Sec. 3, T59S, R79E | Federal Govt. Lot 5 | US Government | Bureau of Land Management Alaska State Office 222 W 7th Ave #13 | Anchorage, AK 99513 | 907-271-5960 |
| 27 | **Roll No. 1001762.00** | 8,727.9 | **2.157** | Private | Sec 10, T59S, R79E | Lot, Zoning I | Reid Bros. Logging & Const | PO BOX 1187 | Petersburg, AK 99833 | 907-772-3755 or 907-772-2482 |
| 28 | **Roll No. Z001753.00** | 3,850.9 | **0.952** | Private | Sec 10, T59S, R79E | Lot, Zoning I | Reid Bros. Logging & Const | | | |
| 29 | **Roll No. 1001753.00** | 3,961.0 | **0.979** | Private | Sec 10, T59S, R79E | Lot, Zoning SF, 327 Mitkof Hwy | Reid Bros. Logging & Const | | | |
| | | 3,718,834.7 | **918.940** | | | | | | | |

| | | | |
|---|---|---|---|
| **Totals** | Federal Lands | 2,918,313.8 | **721.128** |
| | State Lands | 691,335.5 | **170.832** |
| | City Lands | 36,924.8 | **9.124** |
| | Private Lands | 72,260.6 | **17.856** |
| | | 3,718,834.7 | **918.940** |

**THE FOLLOWING EXHIBITS ARE FILED HEREWITH AND ARE HEREBY MADE A PART OF THIS APPLICATION:**

| | |
|---|---|
| **EXHIBIT 1** | **DESCRIPTION OF THE PROJECT** |
| **EXHIBIT 2** | **DESCRIPTION OF STUDIES** |
| **EXHIBIT 3** | **COSTS AND FINANCING** |
| **EXHIBIT 4** | **PROJECT MAPS** |

## VERIFICATION STATEMENT

This application for a preliminary permit for the Cascade Creek Hydroelectric Project is executed in the State of Washington, County of Whatcom, by Hydro Development, LLC, 928 Thomas Road, Bellingham, WA 98226, being duly sworn, Corky Smith, Member and Agent for Hydro Development, LLC deposes and says that the contents of this application are true to the best of his knowledge or belief. The undersigned applicant has signed the application this 2 day of Feb, 2012.

Hydro Development, LLC

By: _____
Corky Smith, Member
Agent for Hydro Development, LLC

STATE OF WASHINGTON,
County of Whatcom

Subscribed and sworn to before me this 2nd day of February, 2012.

By: Diana C Challender
Notary Public in and for the State of WA
My Commission expires on 09/15/2014
Recorded in Whatcom County

DIANA C CHALLENDER
COMMISSION EXPIRES
NOTARY PUBLIC
09.15.2014
STATE OF WASHINGTON

## EXHIBIT 1 - DESCRIPTION OF THE PROJECT

### (1) PROJECT FEATURES

The proposed Cascade Creek Hydroelectric Project ("Project") is located on Swan Lake, Cascade Creek, and Thomas Bay, approximately 15 miles northeast of Petersburg, Alaska in the Tongass National Forest ("Tongass"), administered by the United States Forest Service ("USFS"). Hydro Development, LLC ("Applicant") proposes to construct a lake siphon at Swan Lake, with a gatehouse and valve entry to an approximately three mile long power conduit including a tunnel complex of horizontal and vertical shafts, and a buried penstock. The power conduit leads to a powerhouse near tidewater on Thomas Bay, which will accommodate three turbine generator units for a total capacity of approximately 70 megawatts (MW). A 138-kilovolt (kV) transmission line, comprised of overland and undersea cable, would extend approximately 18.7 miles from the powerhouse to an interconnection point near Petersburg.

**Dam.**

No dam is anticipated as part of this proposal.

**Spillway.**

An outlet control structure would consist of a small, low-head weir approximately 6-ft-high above the lowest elevation of the lake outlet. The weir would include a 3-ft high by 50-ft wide crest gate that could be lowered during extreme high flows to maintain lake levels at or below the natural high level. An outlet control building would house the mechanical and electrical equipment required to remotely control the crest gate and bypass valve. The weir would serve several purposes: minimize outflow leakage through the shallow substrata, provide for minimum in-stream flow contribution if required; facilitate lake level management by adding the ability to store or release water as necessary in drought or flood conditions to help maintain the desired lake level; and allow for emergency overflow discharge to the stream outlet of Swan Lake.

**Penstock/Power Conduit.**

Water would be delivered to the powerhouse from the lake siphon via a tunnel and penstock power conduit. An unlined 12-ft-diameter low pressure tunnel would originate at a tunnel invert elevation of 1,419-ft near the gatehouse, and would extend 12,700-ft at a slope of 0.75 percent. From this point, it would drop into an unlined 1,320-ft-long 14-ft-diameter vertical shaft/vent. The shaft would be connected at the bottom end to a 14-ft diameter by 1,980-ft-long tunnel at a slope of 1 percent that would terminate at the lower tunnel portal at El 265-ft. A 9-ft-diameter steel penstock would be installed within the entire length of the lower tunnel segment. A 9-ft-diameter buried steel penstock would extend approximately 780-ft from the lower tunnel portal to the powerhouse at El 46-ft (turbine centerline) near tidewater on Thomas Bay.

**Powerhouse.**

The powerhouse, located at tidewater on Thomas Bay, would consist of a concrete and metal building, approximately 140-ft-long by 80-ft-wide, embanked by rock fill on the east side. Its foundation would be cast-in-place concrete, founded on bedrock. The superstructure would be reinforced pre-cast concrete tilt-up with a sloped metal roof. Applicant proposes to site the structure at least 200-ft off the shoreline to provide an aesthetic vegetative buffer and avoid effect to the coastal zone. Inside the powerhouse, an overhead service crane would provide access to place and maintain the turbine generating equipment. The turbine housings would be cast in the concrete substructure. It would house three generating units, and water would drop vertically from the units to the tailrace below.

**Tailrace.**

The tailrace is proposed as a low gradient open stream riprap-armored trapezoidal channel approximately 450-ft-long and 40-ft-wide, discharging as a new outlet to Thomas Bay. It would exit the powerhouse in a southern direction for approximately 300-ft and then turn west to Thomas Bay for approximately 150-ft in order to maintain a tree screen to visually hide the powerhouse from Thomas Bay. The tailrace would be designed to deter use by anadromous fish.

**Dock.**

There will be no road access to the proposed hydroelectric facility location as the site is isolated from the nearest town of Petersburg. Access for both construction and long-term operation and maintenance of the Project will be by boat, barge, or aircraft. Applicant proposes to construct a new marine access facility on Thomas Bay, immediately adjacent to the powerhouse site. A new dock would be approximately 290-ft-long on a fixed pier with a 60-ft-long ramp down to a 60-ft by 30-ft float stationed to piling. The dock and adjacent barge landing ramp would provide direct access to the site during construction and operations. Applicant intends to make the new dock available to the public after the Project begins commercial operation, barring any legal obstacles or stipulations from the USFS, as it has the potential to provide the public safe landing access for any upland use purposes.

**Access Roads.**

The Project is separated from the nearest town of Petersburg by Frederick Sound. This gives no opportunity for road access to the Project from a nearby town. There will be no road access to the proposed hydroelectric facility location. The only access for both construction and long-term operation and maintenance

of the Project would be via boat or aircraft. Access for both construction and long term operation and maintenance of the Project will be by boat, barge or aircraft.

**Other Structures**.

Flow to the powerhouse would be drawn from Swan Lake through a lake siphon. The submerged lake siphon inlet, equipped with intake screens, would be placed at an approximate depth of 40-ft. A 58-ft-long, 49-ft-wide, and 25-ft-high underground gatehouse would be constructed near the shore of Swan Lake and would house the vacuum pump, vacuum receiver tank, and valve system to control water flow to the power conduit. A 26-ft by 26-ft by 98-ft deep concrete lined vertical shaft below the gatehouse would house the vertical portion of the 10-ft diameter siphon piping and siphon shutoff valve. The intake structure is located at latitude 57° 01' 41", longitude 132° 44' 11".

Two proposed housing units would be located north of the powerhouse to house workers during construction of the Project. The houses would remain after construction for use by plant operators and maintenance crews. Water, wastewater, and waste management will be compliant with Alaska Department of Environmental Conservation standards. Systems will be closed tank/containers if onsite development is not feasible. The proposed housing buildings would be separate from other structures and would be surrounded by proposed and existing vegetative screening. Localized transportation from the housing units to the powerhouse site would be by vehicle or by foot.

**(2) RESERVOIR**

The Project would utilize the natural impoundment of Swan Lake, a high alpine, glacially-fed water body with a surface area of approximately 574 acres and an approximate usable stored capacity of 22,500 acre-ft (af), assuming a 40-ft operational drawdown. The water surface elevation of Swan Lake naturally fluctuates within an approximate maximum 8-ft range, and an annual natural fluctuation within an average 6-ft range. Applicant does not propose to impound Swan Lake above its natural ordinary high water elevation. The Project will withdraw lake water for power generation in a manner that will provide for forecasted energy shortfall in Southeast Alaska and possibly other areas.

**(3) TRANSMISSION LINE**

A 138-kV transmission line would extend underground approximately 560-ft from the powerhouse substation to tide water near the marine access facility, then cross Thomas Bay as a 2.8-mile-long undersea cable. The cable would be "jetted in," or buried in the near-shore areas. The transmission line would then transition to an overhead vertical design on single wood poles, and extend overland approximately 4.5-miles from the shoreline of Thomas Bay across the Patterson Delta to the shoreline of Frederick Sound. It would then

transition back to an undersea cable and continue 7.7-miles to the shoreline of Mitkof Island. The cable would be “jetted in,” or buried in the near-shore areas. From here, the line would transition back to an overhead design and continue overland 3.7-miles to the interconnection point at the existing Scow Bay substation near Petersburg.

There would be a switchyard/transformer/circuit breaker on site at the powerhouse; however, Applicant is not proposing to construct new interconnect facilities and/or substations at the point of interconnection. Applicant anticipates working through existing system upgrade requirements prior to and during interconnection discussions, which will occur post-licensing.

## (4) INSTALLED CAPACITY AND ENERGY PRODUCTION.

**Average Annual Energy Production.**

The total average annual energy production is estimated to be 200 gigawatt hours (GWh), depending on installed capacity and final design.

**Installed Capacity.**

The project would be constructed in phases. Phase I would be one of three turbine generators with a capacity of 23.3 megawatts (MW). The total proposed installed capacity of all completed phases would be 70 MW.

**Hydraulic Head.**

The gross hydraulic head for estimating capacity would be 1,471-ft.

**Turbines and Generators.**

Three 23.3 MW vertical shaft, 5 jet impulse (Pelton) type turbines will be used, for a combined power plant capacity of 70 MW. Each turbine will produce 31,246 hp at a gross head of 1,471-ft and a rated flow of 223 cfs. The turbine rotational speed will be 600 rpm. The generators will be a synchronous type rated at approximately 26,000 kVA at a .9 power factor, 6,900 volt, 3 phase, 60 Hz, and will be provided with a brushless excitation system. Generating equipment specifications are subject to change based on detailed engineering design and consultation with equipment suppliers.

## (5) AFFECTED LANDS OF THE U. S. GOVERNMENT

The Project boundary, less the land occupied by the transmission line, is located entirely within the Tongass. The Tongass is owned by the United States of America and administration of these lands is delegated to the USFS. As such, these National Forest System lands are managed according to the USFS's land use plans and other directives. The total acreage of U.S. lands within the Project boundary is estimated at 721.2 acres as shown in Table A-1.

There is a Power Withdrawal P.S.C. # 9 Swan Lake dated August 20, 1921 encompassing 1,400 acres around Swan Lake and Cascade Creek for the purpose of constructing a hydroelectric power facility as further described in paragraph 6 below.

**Table A-1. U.S. Lands Within the Project Boundary**

| Description | Acres | Project Features | Map Locations |
|---|---|---|---|
| Tongass National Forest | 720.4 acres | Project boundary including swan lake, intake, outlet control structure, tunnel complex, penstock, powerhouse, tailrace, marine access above tidewater, and housing units. | Sections 4,5,8,9,10,17,18,19 of Township 56S, Range 80E & Section 24 of Township 56S Range 79E, all & Sections 4,9,16,17,20 of Township 57S Range 80E all of the Copper River Meridian |
| Federal Govt. Lot 5 | 0.8 acres | Portion of the Project transmission line within the incorporated boundary of the City of Petersburg. | Section 3 of Township 59S, Range 79E of the Copper River Meridian |
| **TOTAL** | **721.2 acres** | | |

There are no known areas within the Project boundary that are included in or have been designated for study for inclusion in the National Wild and Scenic Rivers. There are no areas within the proposed Project boundary that are under the provisions of the Wilderness Act that have been designated as wilderness area, or designated as wilderness study area.

The proposed Project Boundary is shown on Figure 4.3, and the Project location is as follows:

**Latitude** 57°00’21”, **Longitude**132°46’45” NAD27

**Intake, Powerhouse & related facilities**
Sections 4, 5, 8, 9, 10, 17, 18, 19 of Township 56S, Range 80E of the Copper River Meridian (CRM)
Sections 24 of Township 56S, Range 79E of the C.R.M.

**Transmission segment from proposed powerhouse to Petersburg**
Sections 24, 25, 26, 35 of Township 56S, Range 79E, of C.R.M.
Sections 4, 9, 16, 17, 20, 29, 31, 32 of Township 57S, Range 80E, of C.R.M.
Sections 6, 7, 18, 19, 30 of Township 58S, Range 80E of C.R.M.
Sections 25, 34, 35, 36 of Township 58S, Range 80E, of C.R.M.
Sections 3, 10, T59S, Range 79E of C.R.M.

**(6) HOW THE PROJECT WOULD DEVELOP, CONSERVE, AND UTILIZE IN THE PUBLIC INTEREST IN THE WATER RESOURCES OF THE REGION.**

The Applicant proposes to construct and operate the proposed Project within Power Site Classification No. 9 established by Order of the Secretary of the Department of the Interior on August 20, 1921. The lands within the Power Site Classification No. 9 have been ordered (Interpretation No. 174, August 20, 1931) to be construed as describing the following area:

*TONGASS NATIONAL FOREST*

*In Power—Site Classification No. 9*

*All lands below the 1,650 foot contour above sea level which drain into Swan Lake, located in the Cascade Creek Basin about 2.5 miles inland from the east shore of Thomas Bay, Alaska; all lands south of Cascade Creek within one mile of the middle of said creek, and all lands north of Cascade Creek within one-eighth of a mile of the middle of said creek, extending from Swan Lake to the shore of Thomas Bay.*

There is an anticipated increased energy demand in Southeast Alaska as a result of four major factors: 1) slow load growth increase; 2) a continued trend of fuel oil heat to electric heat conversion as the price of fuel oil increases; 3) the introduction of electric vehicles offsetting petroleum fuel in towns with short drive distances and high fuel prices; and 4) implementation of connecting large cruise ships to shore power in lieu of onboard diesel generation. All of these trends have resulted in substantially revised power need forecasts for Southeast Alaska. The Applicant anticipates the regional energy demands to increase from 279,058 MWh in 2013 to 538,770 MWh in 2028. If no other hydroelectric facilities are approved and constructed, existing plant generation of approximately 268,000 MWh will be unable to meet this demand. Additional energy needs will continue to require fossil fuel generation (primarily diesel).

The Project will fulfill the public interest for reasonably priced, reliable, and environmentally sound source of renewable energy. The approval of this Project would reduce greenhouse gas releases associated with fossil fuel generation.

## EXHIBIT 2 - DESCRIPTION OF STUDIES

### (1) PROPOSED STUDIES, INVESTIGATIONS, TESTS AND SURVEYS.

**Environmental Study Planning and Study Conduct**

- The applicant anticipates studies related to the following topics:
- Survey of existing and/or pending water, mineral, timber, access, utility and conservation rights.
- Tribal interests including usual and accustomed treaty rights, historical and special use interests.
- General history of land uses, existing structures, artifacts and potential archeological interests.
- Precipitation, hydrology, discharge and water quality studies.
- Surface mapping of topography, soils, geology, slope stability, bedrock & subsurface analysis.
- Fish & wildlife inventories, utilization, presence/absence surveys, critical habitat identification.
- Vegetation & wetland system mapping, rare plant survey, noxious weed inventory.
- Recreational uses inventory, user surveys, feature mapping, demand forecast, mitigation.
- Scenic and aesthetic resources and potential effects thereupon.
- Community concerns, construction & operational impacts, potential changes, sights & sounds.
- Project design and engineering, cost estimating, feasibility analysis, decommissioning issues.

**Need for Power Analysis**

A future need for power analysis for the region has been completed as the Draft Southeast Integrated Resources Plan prepared by Black & Veatch, January 2012 for the Alaska Energy Authority. The results of the analysis will be used to supplement the Applicant's license application for the Project.

**Economic Analysis**

An economic analysis of the proposed Project will be completed by the Applicant in 2012, The analysis will be used to supplement the Applicant's license application for the Project.

**Engineering Design**

A preliminary Supporting Design Report will be submitted with the Applicant's final license application.

**NEW ROADS for CONDUCTING STUDIES.**

The Applicant expects no new roads to be required for conducting required field studies.

### (2) WORK PLAN FOR NEW DAM CONSTRUCTION.

The Applicant is planning a lake siphon, which would not require new dam construction or its application.

## EXHIBIT 3 - COSTS AND FINANCING

### (1) ESTIMATED COSTS AND FINANCING

**Engineering and Economic Evaluation Costs.**

Based on review of existing information and data, the Applicant expects engineering and economic evaluation costs to be between $50,000 and $150,000.

**Environmental Consultation and Study Costs.**

Based on review of planned work, the Applicant expects environmental consultation, studies, and preparation of the final license application to cost between $1,000,000 and $2,000,000.

### (2) FINANCING

The Applicant intends to obtain the capital requirements for Project licensing through private financing.

### (3) MARKET FOR POWER GENERATED

The Project will be owned and operated by the Applicant. Energy generated will be sold at wholesale price to local and regional markets, aggregators, or other wholesale purchasers of electric generation.

The Project will fulfill the public interest for reasonably priced, reliable, and environmentally sound sources of renewable energy. The approval of the Project would also help in reducing acid rain and greenhouse effects associated with coal and oil-fired generation.

The Southeast Alaska communities of Petersburg (pop. 3,000), Wrangell (pop. 2,300) and Ketchikan (pop. 14,500) are electrically connected by the Southeast Intertie, operated by the Southeast Alaska Power Authority (SEAPA). The community of Kake (pop. 650) is proposed to be connected with a new northern extension of the Southeast Intertie, which is currently under study by the USFS as lead NEPA agency. SEAPA also provides generation to the connected region from two existing hydro projects, Tyee Lake 22.5 MW and Swan Lake near Ketchikan 22.5 MW. Along with the SEAPA hydro projects, Ketchikan Public Utilities owns and operates the Silvas Lake, Beaver Falls, and Ketchikan Lakes hydropower projects. Petersburg owns the Crystal Lake hydropower project. Each community also has additional diesel generation plants for back-up or prime use. Power in Kake is presently diesel generation only. There are no other connections to any generation or load facilities. A proposal to connect the Southeast Intertie to B.C. Canada and the North American Grid has been studied and placed under future planning consideration by the Alaska Energy Authority, a state agency.

Community leaders in Kake, Wrangell and Ketchikan have all declared that a source of additional, affordable power will be necessary to support economic development as well as meet future energy needs.

There is an anticipated increased energy demand in Southeast Alaska because of four major categories: 1) slow load growth increase; 2) a continued trend of fuel oil heat to electric heat conversion as the price of fuel oil increases; 3) the introduction of electric vehicles offsetting petroleum fuel in towns with short drive distances and high fuel prices; and 4) implementation of connecting large cruise ships to shore power in lieu of onboard diesel generation. All of these trends have resulted in substantially revised power need forecasts for Southeast Alaska. The Applicant anticipates energy demands to increase from 279,058 MWh in 2013 to 538,770 MWh in 2028. If no other hydroelectric facilities are approved and constructed, existing plant generation of approximately 268,000 MWh will be unable to meet this demand. Additional energy needs will continue to require fossil fuel generation (primarily diesel).

The Project will fulfill the public interest for reasonably priced, reliable, and environmentally sound sources of renewable energy. The approval of this Project would reduce greenhouse gas releases associated with fossil fuel generation.

**Use of Energy By The Applicant.**

The Applicant would not use the Project's energy on-site other than for station service as required.

# EXHIBIT 4: PROJECT MAPS

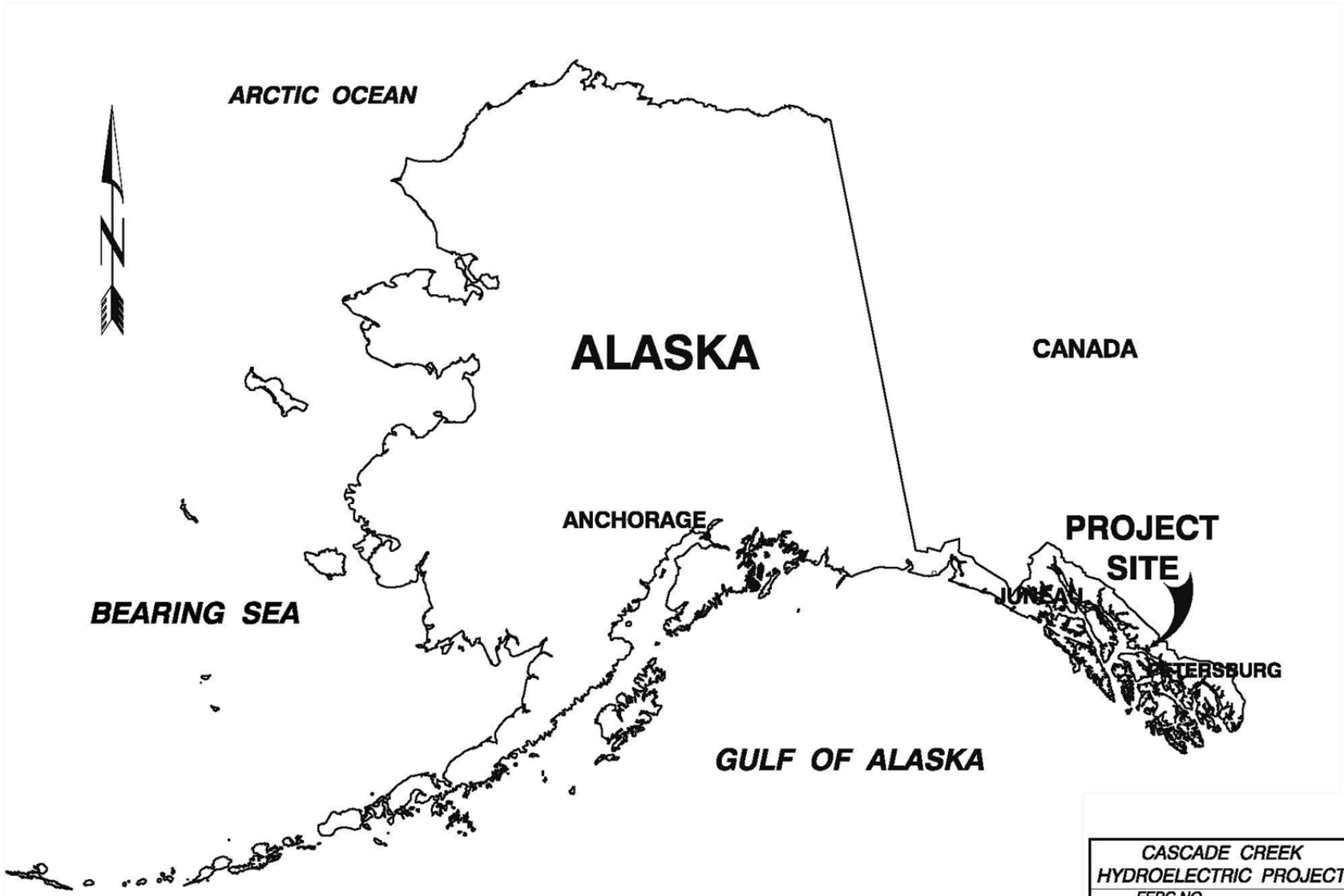
**4.1 PROJECT LOCATION MAP**

**4.2 PROJECT VICINITY MAP**

**4.3 PROJECT BOUNDARY & FACILITIES MAP**

**4.4 PROJECT TRANSMISSION LINE MAP**

**4.5 POWER CONDUIT**



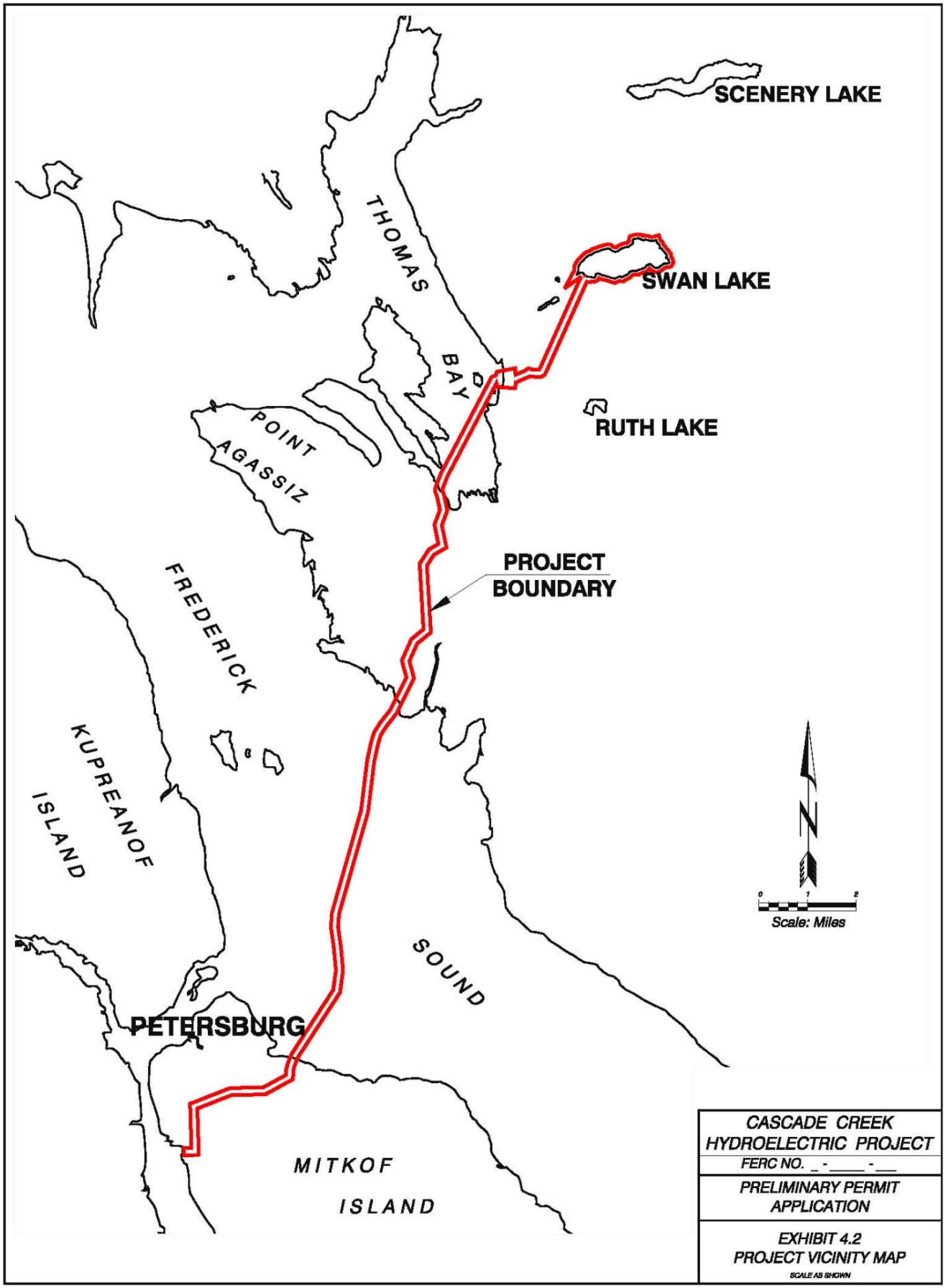

CASCADE CREEK
HYDROELECTRIC PROJECT

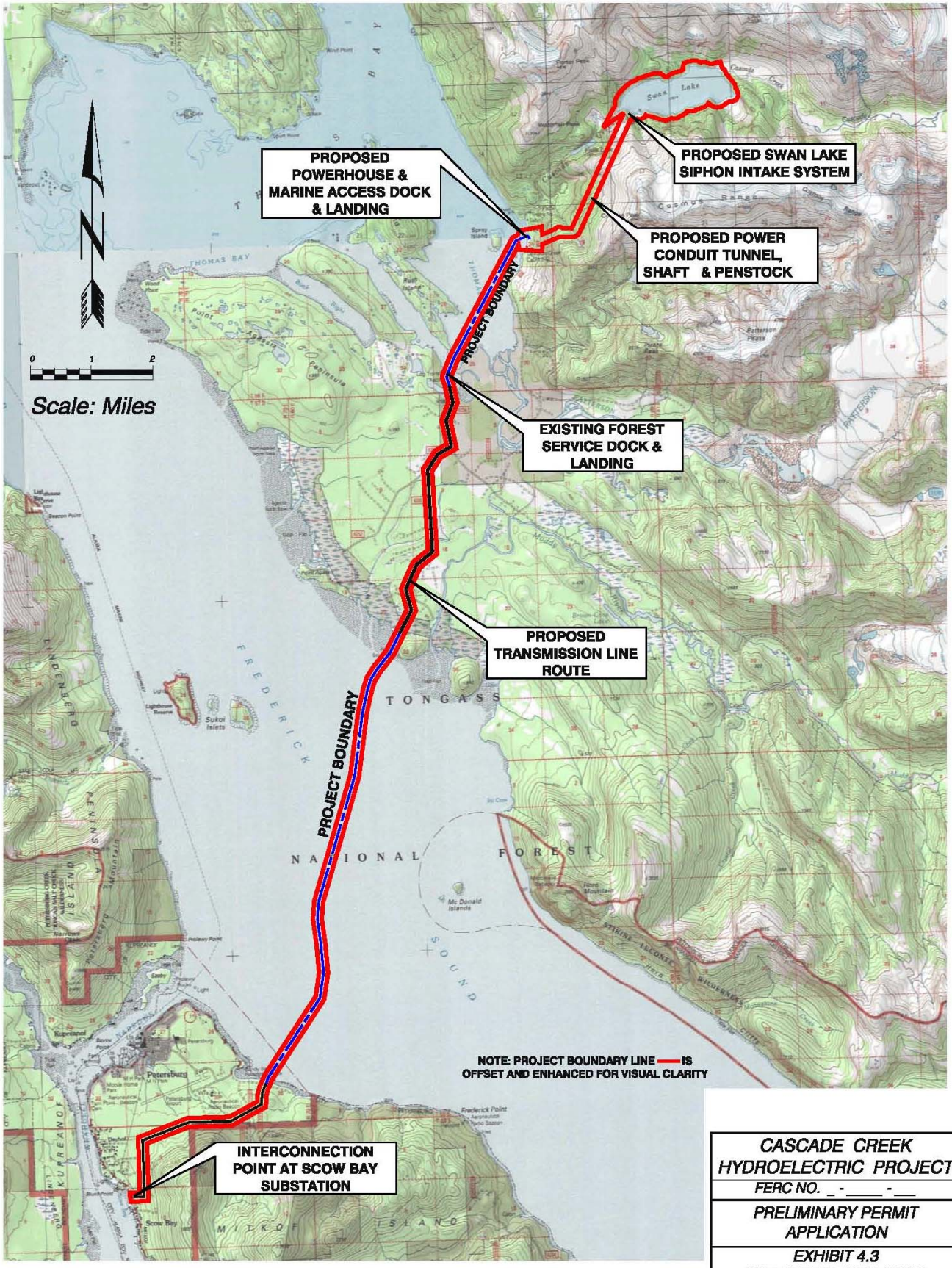
FERC NO. _ - ____ - __

PRELIMINARY PERMIT
APPLICATION

EXHIBIT 4.1
PROJECT LOCATION MAP

NOT TO SCALE


SCENERY LAKE
THOMAS
BAY
SWAN LAKE
RUTH LAKE
POINT
AGASSIZ
PROJECT
BOUNDARY
FREDERICK
KUPREANOF
ISLAND
N
0
1
2
Scale: Miles
SOUND
PETERSBURG
MITKOF
ISLAND
CASCADE CREEK
HYDROELECTRIC PROJECT
FERC NO. _ -____ -__
PRELIMINARY PERMIT
APPLICATION
EXHIBIT 4.2
PROJECT VICINITY MAP
SCALE AS SHOWN

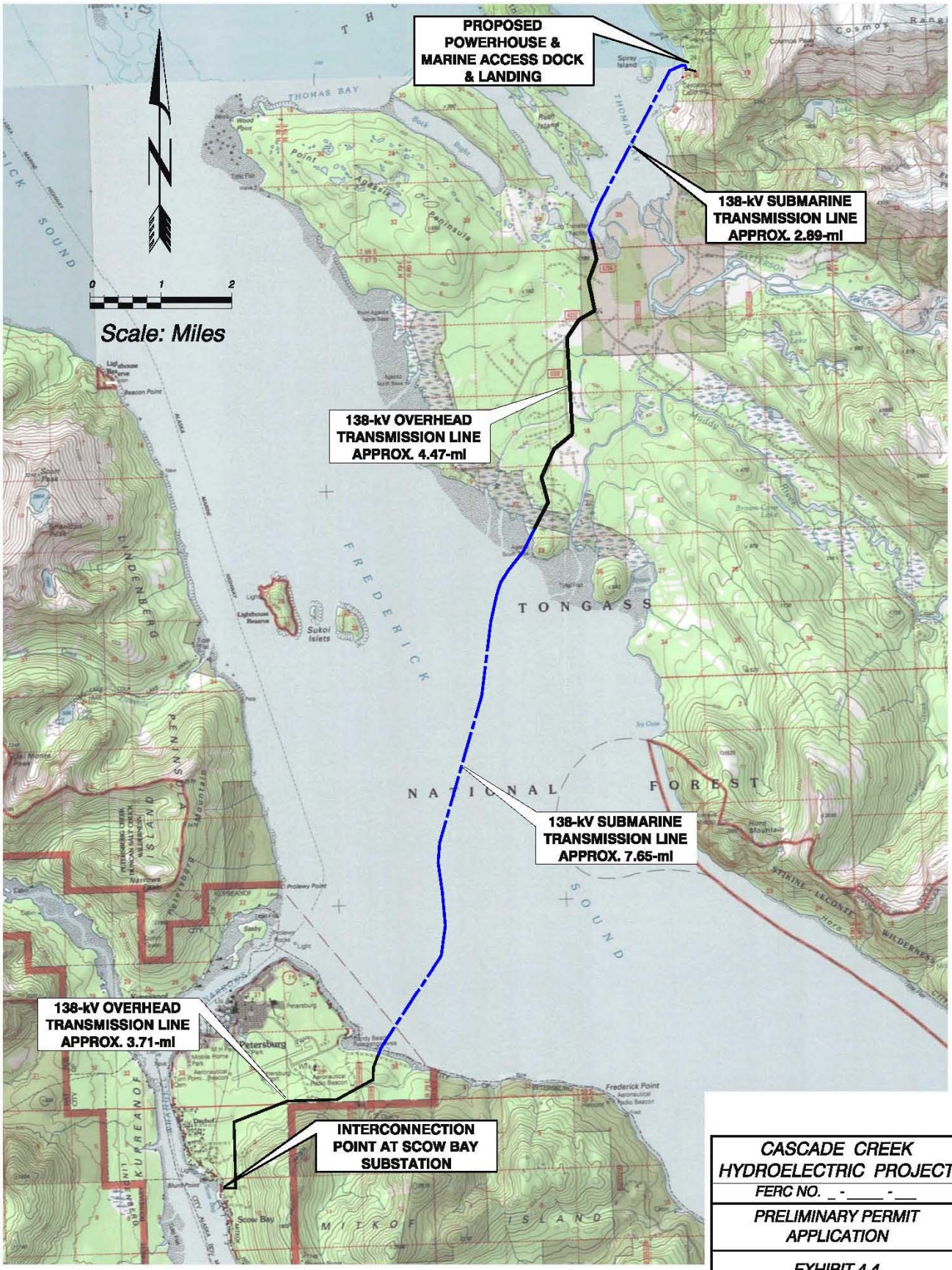



CASCADE CREEK HYDROELECTRIC PROJECT

FERC NO. _ -____ -___

PRELIMINARY PERMIT APPLICATION

EXHIBIT 4.3
PROJECT BOUNDARY & FACILITIES MAP
SCALE AS SHOWN



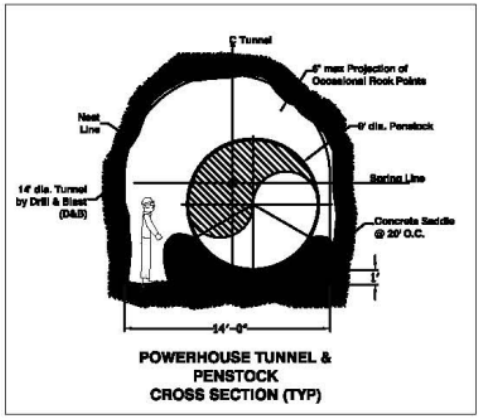

CASCADE CREEK HYDROELECTRIC PROJECT

FERC NO. _ -____ -___

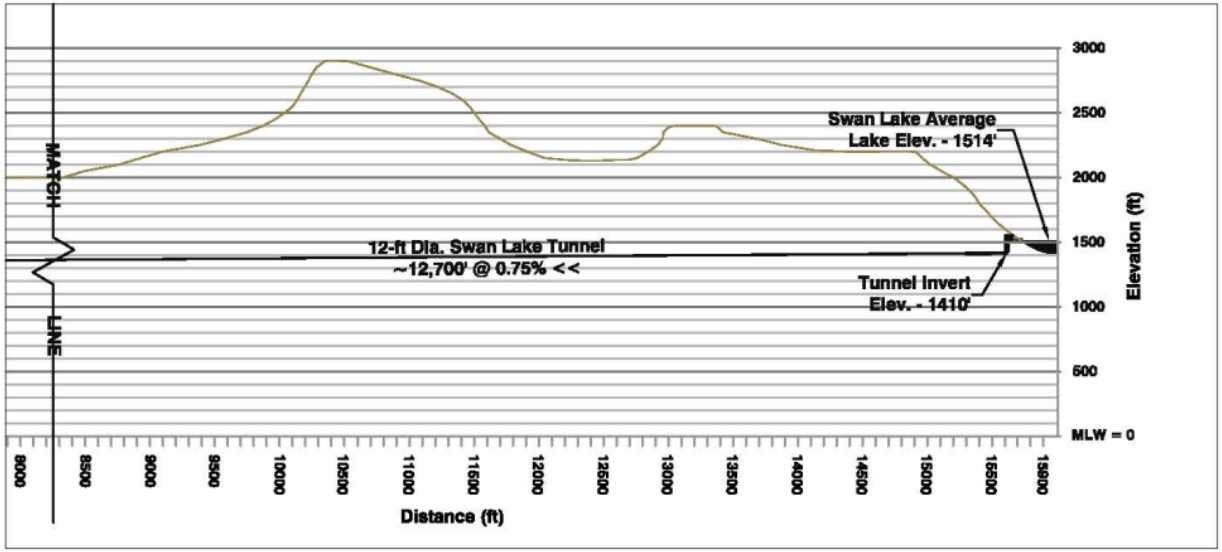
PRELIMINARY PERMIT APPLICATION

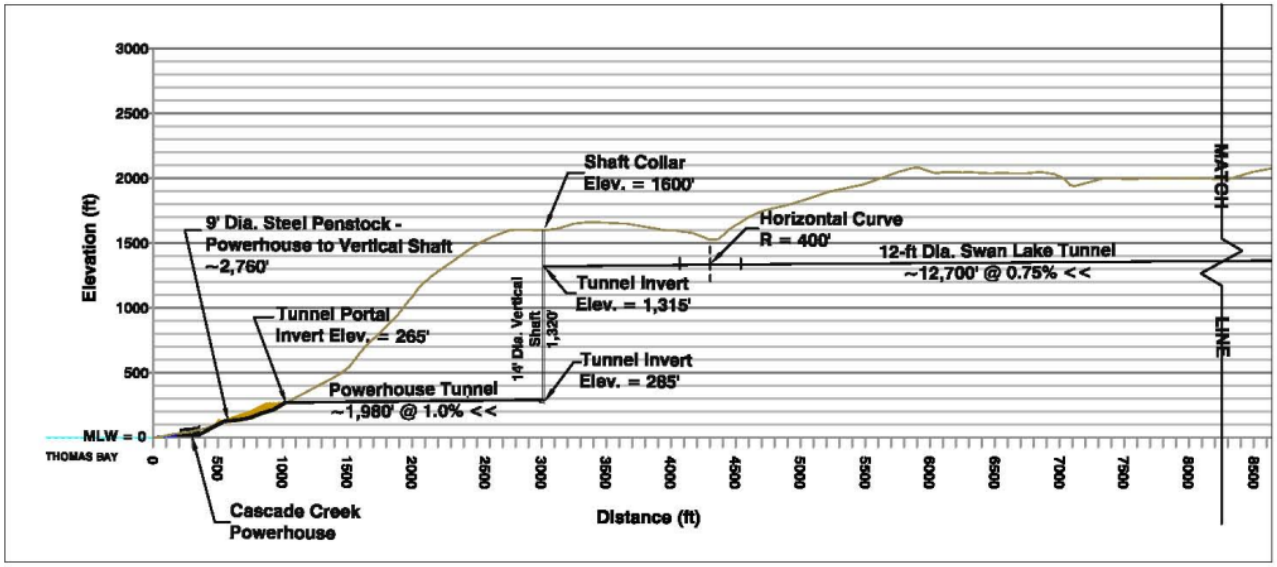
EXHIBIT 4.4
TRANSMISSION LINE MAP

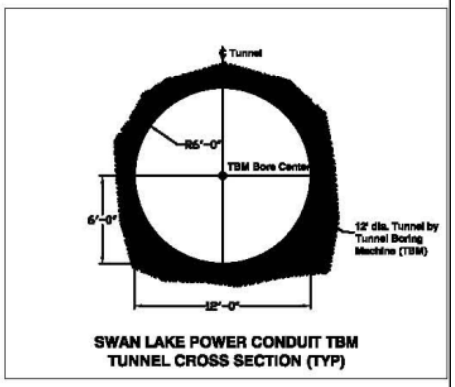
SCALE AS SHOWN




POWERHOUSE TUNNEL & PENSTOCK CROSS SECTION (TYP)




SWAN LAKE POWER CONDUIT TBM TUNNEL CROSS SECTION (TYP)

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|---|
| CASCADE CREEK HYDROELECTRIC PROJECT |
| FERC NO. _ - ____ - __ |
| PRELIMINARY PERMIT APPLICATION |
| EXHIBIT 4.5 |
| POWER CONDUIT SCHEMATIC |
| SCALE AS SHOWN |