Cascade Power Plant

Project Description Summary

January 2019

Prepared for:

Cascade Power GP Ltd.

Prepared by:

Stantec Consulting Ltd.

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Acronyms

%	percent
ACC	air cooled condenser
ACIMS	Alberta Conservation Information Management System
ACO	Alberta Aboriginal Consultation Office
ACT	Alberta Culture and Tourism
AEP	Alberta Environment and Parks
AIES	Alberta Interconnected Electric System
AUC	Alberta Utilities Commission
BC	British Columbia
BOP	balance of plant
Cascade	Cascade Power GP Ltd.
CEA Agency	Canadian Environmental Assessment Agency
CEAA 2012	the *Canadian Environmental Assessment Act, 2012*
CO	carbon monoxide
CO_2	carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DML	miscellaneous lease
FWMIS	Fisheries and Wildlife Management Information System
GHG	greenhouse gas
GJ	gigajoules
GSU	generator step-up transformer
GTG	Gas Turbine Generator
ha	hectare

HR	Historical Resources
HRIA	Historical Resources Impact Assessment
HRSG	Heat Recovery Steam Generator
km	kilometre
kV	kilovolt
m	metre
MMcf	million cubic feet
MW	MegaWatts
NIA	Noise Impact Assessment
NOx	nitrogen oxide
PIP	Participant Involvement Program
RAP	Restricted Activity Period
SARA	*Species at Risk Act*
SCR	selective catalytic reduction
SO_2	sulfur dioxide
SOMC	Species of Management Concern
STG	Steam Turbine Generator
SW	southwest
USA	United States of America
VOC	volatile organic compound

1.0 GENERAL INFORMATION AND CONTACTS

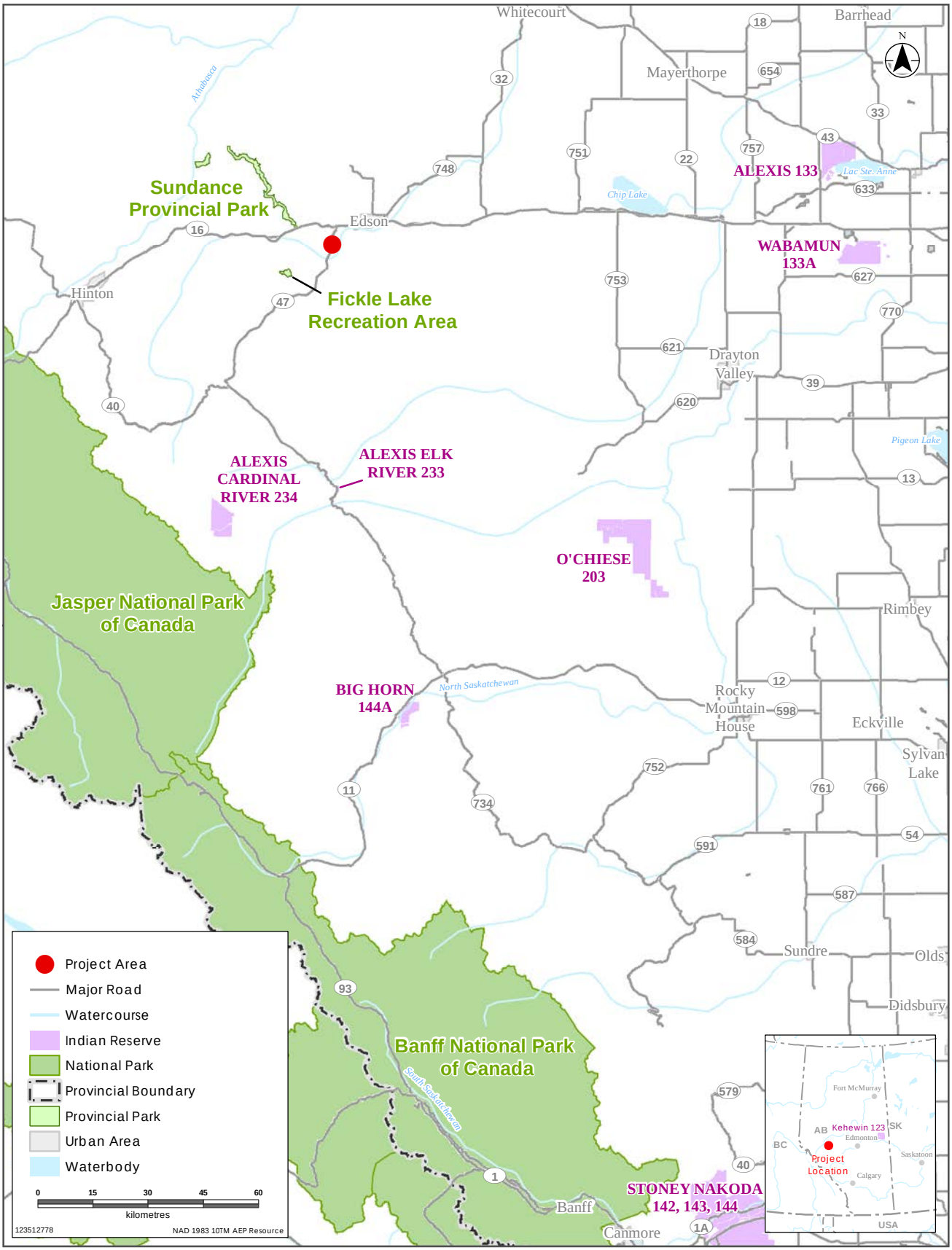
This Project Description summary has been prepared in accordance with the Canadian Environmental Assessment Agency's (CEA Agency) *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012 (Updated: March 2015)*.

1.1 NATURE AND PROPOSED LOCATION OF THE PROJECT

Cascade Power GP Ltd. (Cascade) is proposing to develop the 900 megawatt (MW) Cascade Power Plant located on crown land 12 km southwest of Edson, Alberta (the Project). Subject to final equipment configuration, it is anticipated that the Project will be developed in two phases, with equipment associated with the first 450 MW phase going into service by 2022 and equipment associated with the second 450 MW phase in service the following year. The Project will utilize class H gas turbines and will be supplied with pipeline specific natural gas.

In line with the new *Specific Gas Emitters Regulation*, green-field combined cycle power generation facilities are a viable option to assist the transition from coal power plants, which are nearing retirement in Alberta. When compared to coal, combined cycle plants emit significantly fewer emissions of carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen oxide (NO_x) and other air emissions. CO_2 emissions from combined cycle facilities are less than half that of coal fired plants.

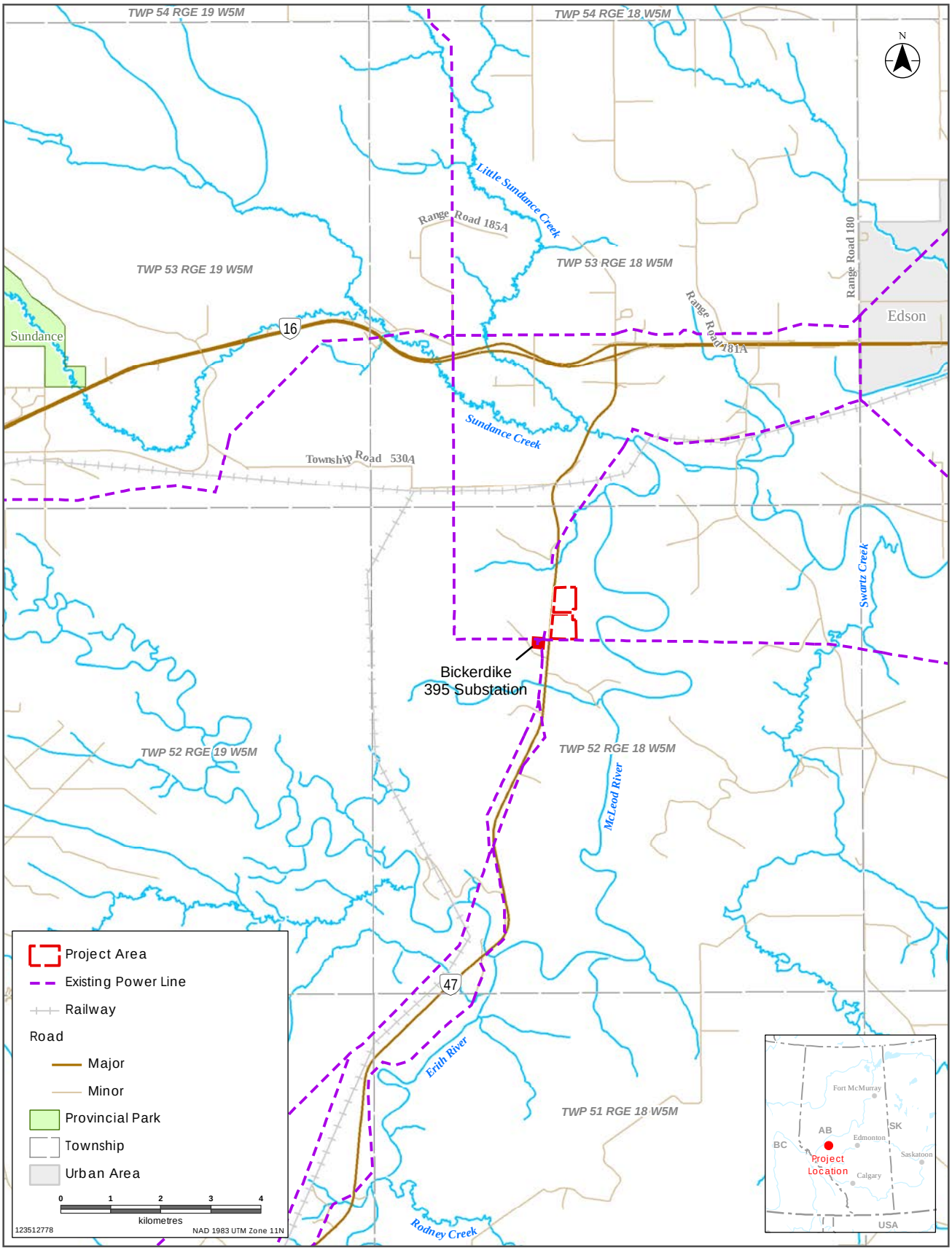
Figures 1-1 and 1-2 shows the general area where the Project is located.



Sources: Project data provided by Cascade Power GP Ltd.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 1-1: Project Location in Relation to Indigenous Reserves and Parks



Sources: Project data provided by Cascade Power GP Ltd.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 1-2: Location of the Cascade Power Plant

1.2 PROPONENT AND CONTACT INFORMATION

Cascade develops, owns and operates power generation facilities in Alberta. Cascade deploys the latest technologies to produce power from clean resources such as natural gas and delivers power to using the best economically available technology.

Name of the Designated Project:	Cascade Power Plant
Name of the Proponent:	Cascade Power GP Ltd.
Address of the Proponent:	1800, 715 5 Ave. SW Calgary, Alberta T2P 2X6
CEO:	Andrew Plaunt Phone: 403-460-2489 Email: Andrew.plaunt@cascadepower.ca
V.P. Operations:	Guido Bachmann Phone: 403-460-2489 Email: guido.bachmann@cascadepower.ca
Principal Contact Person:	Rob Thomas Director, Regulatory Services Phone: 403-815-0203 Email: rob.thomas@cascadepower.ca

1.3 RESULTS OF ANY CONSULTATION UNDERTAKEN WITH ANY JURISDICTIONS AND OTHER PARTIES INCLUDING ABORIGINAL PEOPLES AND THE PUBLIC

Cascade plans to construct and operate a project that will include consideration of input gathered from stakeholder and Indigenous engagement efforts. Cascade recognizes that public trust and confidence are earned through performance, open communication and ongoing community engagement. Cascade will strive to be a valued and trusted member of the local and regional community. Creating long-term economic and social benefits, as well as developing lasting relationships with the Indigenous communities and public stakeholders built on mutual trust and respect, are integral to the overall Cascade engagement and communications approach.

The Project engagement and communications activities involve two principle phases: Pre-Project Sanctioning, which covered the period of March – early July 2018, and the Application Phase, which covers the period of early July through to submission of the various provincial and federal regulatory applications, which is notionally targeted to occur in Q1 2019.

Pre-Project Sanctioning

Cascade and its external contractors, (including BV Lands and Communica) commenced site investigation and preliminary communications with public stakeholders, Indigenous communities and various provincial and federal regulators in March 2018. Communication included:

- BV Lands met in person with the Alberta Aboriginal Consultation Office (ACO) in Edmonton on March 28, 2018 to provide background on Cascade's engagement efforts with O'Chiese First Nation, Paul First Nation and Alexis Nakota Sioux Nation. The ACO indicated to Cascade that the contacted First Nations should provide a formal response with any site-specific geotechnical issues and concerns by April 6, 2018 the geotechnical program, on site. Cascade sent emails and followed up with phone calls, but no responses were received.
- Cascade met with the CEA Agency on April 12, 2018 to introduce the Project and determine the need for a Project Description. The need was confirmed in an email to Cascade dated April 12, 2018. The CEA Agency agreed to be available to review and comment on a draft of the Project Description prior to submission.
- Cascade met with Alberta Environment and Parks (AEP) on April 9, 2018. Cascade submitted a Project Summary to AEP, as per their guidelines, on May 30, 2018. A letter from AEP dated June 6, 2018 was received deeming that an Environmental Impact Assessment (EIA) was not required.
- Cascade provided public presentations to Town of Edson Mayor, Council and Administration on June 19, 2018, and the Yellowhead County Mayor and Council on July 24, 2018. On September 18, 2018, a presentation was made to the Edson Rotary Club. On October 10, 2018, a presentation was given to the Edson Chamber of Commerce. No concerns were raised at the presentations.
- A public open house was held in the town of Edson on July 25, 2018. The open house included representatives from Cascade, Stantec, Communica and BV Lands. Twenty individuals attended the open house. The majority of attendees were in favour of the Project with the exception of one individual who is developing some property to the north of the site and had some concerns around the noise potential. Cascade representatives remain in contact with that individual and continue to engage and address his concerns.

A list of the federal and provincial jurisdictions engaged for the Project, as well as stakeholders and other interest groups is provided in Table 1-1.

Table 1-1 Jurisdictions and Stakeholders Consulted by Cascade Regarding the Cascade Power Plant

Federal Government	Canadian Environmental Assessment Agency Fisheries and Oceans Canada Transport Canada
Provincial Government	Alberta Environment and Parks Alberta Culture and Tourism Alberta Utilities Commission
Municipal Government	Town of Edson
Local Landowners, Occupants and Residents	Personal consultation within 800 metres Notification within 3000 metres
Indigenous groups (approx. distance to main reserve lands from Project)	O'Chiese First Nation (103 km), Paul First Nation (138 km), Alexis Nakota Sioux Nation[1] (134 km) and Kehewin Cree Nation (380 km)
Regional Associations	Yellowhead County
Public	Recreational, business and other potentially interested parties
[1] Alexis Elk River Reserve No. 233 is 65 km from the Project and Alexis Cardinal River Reserve No. 234 is 76 km from the Project Area. The 134 km distance is to Reserve 133.	

Application Phase

Cascade commenced an Alberta Utilities Commission (AUC) Application process in July 2018. As part of this application process, Cascade undertook a comprehensive participant involvement program (PIP) for the Project in accordance with Section 3 and Appendix A of AUC *Rule 007: Applications for Power Plants, Substations, Transmission Lines and Industrial System Designations*. The PIP activities included:

- mailing of a PIP package that included a cover letter, Project specific map, Project newsletter and invitation to community open houses in Edson
- personal engagement with all landowners, occupants, residents and interest holders within an 800 m radius of the proposed Project Area
- Project information packages to all landowners, occupants, residents and interest holders within a 3000 m radius of the proposed Project Area
- presentations to Indigenous communities and interested members of the public (e.g., Edson Rotary Club, Edson Chamber of Commerce)
- community meetings or open houses
- tours and site visits

Various communication materials facilitate an understanding of the proposed Project, including a dedicated website, email account, and toll-free telephone inquiry line. The key concern expressed to date is about potential noise from the operation of the Project. Cascade conducted a comprehensive noise study as per the AUC Rule 007 process and the modelling results showed that the Project's noise levels are likely to be below the regulated permissible sound levels for all receptors. Cascade has received numerous emails from business owners in the Edson area in support of the Project.

1.4 OTHER RELEVANT INFORMATION

The Project will be subject to approvals issued by AEP under the *Environmental Protection and Enhancement Act;* Alberta Culture and Tourism (ACT) under the *Historical Resources Act*; and AUC under the *Hydro and Electric Energy Act.* Approvals will also be required from AEP under the *Water Act*. The applications to AEP and AUC were submitted on November 23, 2018.

Federally, the *Canadian Environmental Assessment Act*, *2012* (CEAA 2012), *Species at Risk Act* (SARA), and *Migratory Birds Convention Act, 1994* apply. Municipally, the *Municipal Government Act* applies.

1.5 PREVIOUS ENVIRONMENTAL STUDY

The Project will not be taking place in an area that has been or is the subject of a regional environmental study.

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2.0 PROJECT INFORMATION

2.1 DESIGNATED PHYSICAL ACTIVITY

In an email dated April 12, 2018, the CEA Agency determined that the Project is a designated physical activity as defined in item 2(a) of the *Regulations Designating Physical Activities* (the Regulations) and may require a federal environmental assessment. Pursuant to the requirements outlined in CEAA 2012, Cascade must submit a project description to the CEA Agency to inform the decision as to whether a federal environmental assessment is required. Item 2(a) of the *Regulations Designating Physical Activities* under the *Canadian Environmental Assessment Act, 2012* states:

"The construction, operation, decommissioning and abandonment of a new fossil fuel-fired electrical generating facility with a production capacity of 200 MW or more."

As the Project is anticipated to have a production capacity of 900 MW, the threshold defined in item 2(a) would be exceeded. As such, the Project would be considered a designated physical activity under the Regulations.

2.2 PROPOSED DEVELOPMENT

The Project is a 900 MW combined cycle power facility that will provide a reliable source of electricity to help meet the growing demand for electricity in Alberta. The combined cycle power facility uses natural gas as a fuel to produce power in a gas-turbine generator and then utilizes the waste energy from the exhaust in a Heat Recovery Steam Generator (HRSG) to produce steam, which drives the steam-turbine generator. The Project will feature two 1x1 gas/steam turbine line ups, each producing approximately 450 MW, for a total plant output of 900 MW. The electricity produced will be put into the Alberta Provincial Grid to meet the electric power requirements of the province. To fuel the combined cycle power facility, natural gas will be supplied from a pipeline tied to an existing natural gas distribution network. The Project will require up to 150,000 GJ/day of pipeline specific natural gas as fuel, with an estimated net plant efficiency of over 58%. In addition to the power generating components, the balance of plant (BOP) consists of fuel gas treatment components, generator step-up transformers, associated power distribution modules, and the demineralized water treatment facility with associated storage tanks.

The Project will require both electricity and water. The location of the Project is considered favourable because of its close proximity to AltaLink's Bickerdike 39S substation by transmission lines 1084L and 1135L. The proposed location will minimize the length of transmission interconnection to the Alberta Interconnected Electric System (AIES). Make-up water, required for the steam cycle, will be sourced locally from the town of Edson. The Project is not expected to withdraw water from an existing waterbody. Other components of each power train include an air-cooled condenser (ACC) and a generator step-up transformer (GSU).

This is a stand-alone Project and is not a component of a larger project that is not listed in the *Regulations Designating Physical Activities.*

2.3 COMPONENTS AND ACTIVITIES

Figures 2-1 presents a conceptual design of the gas turbine and Figures 2-2 and 2-3 present a preliminary plant layout for the Cascade Power Plant.

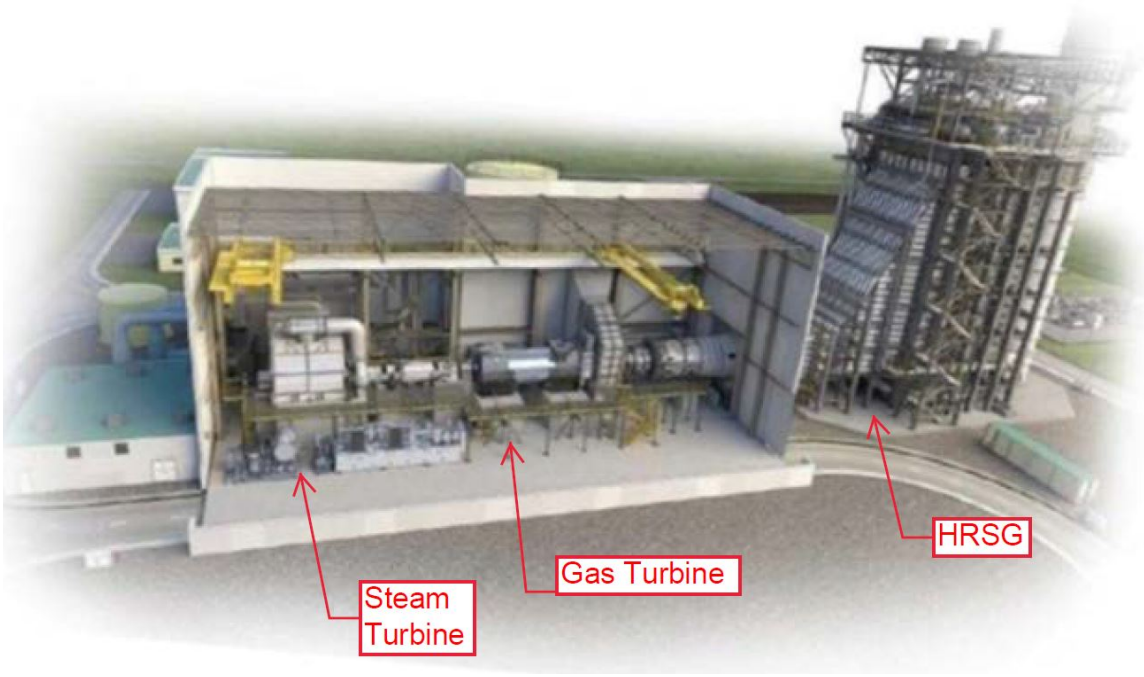
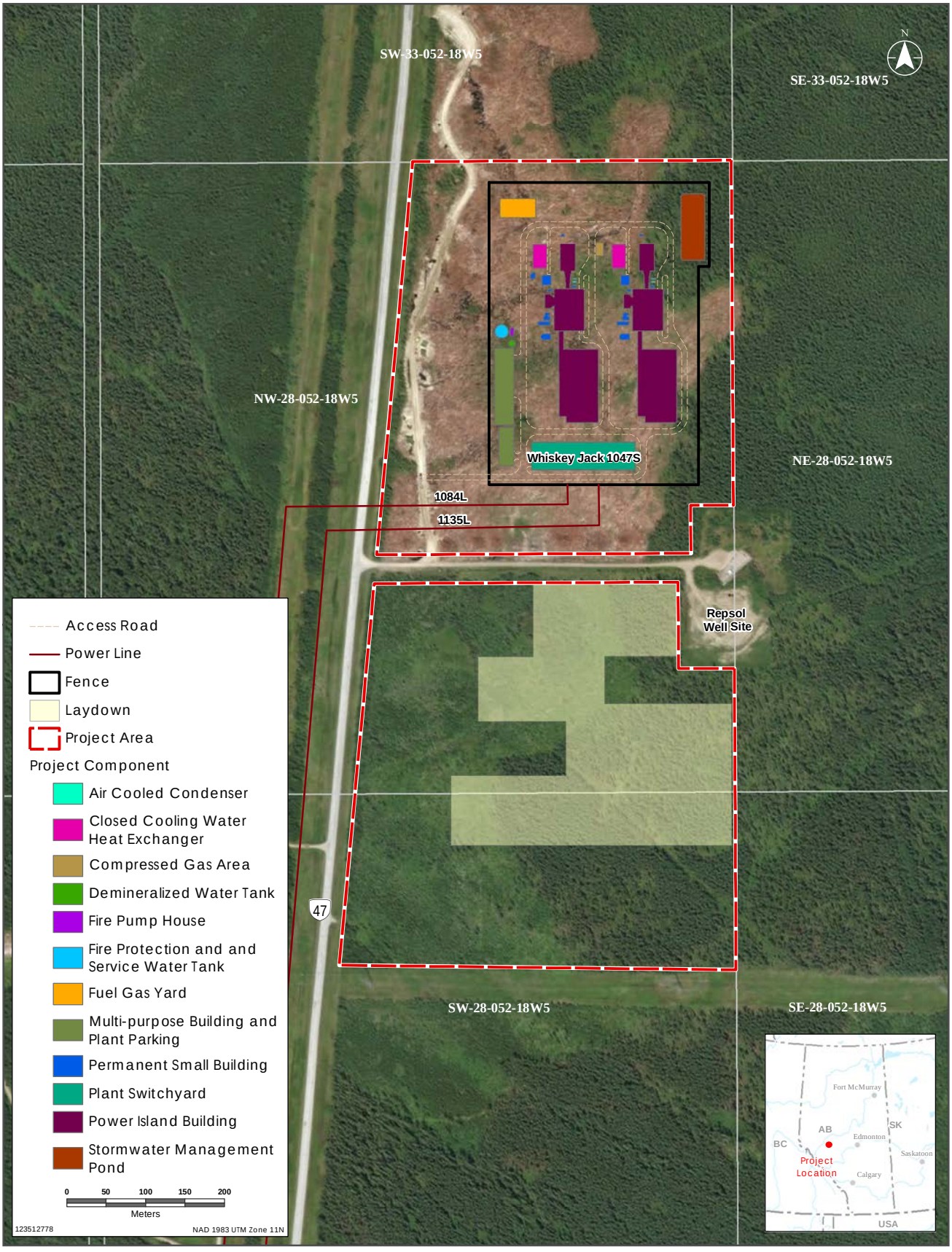


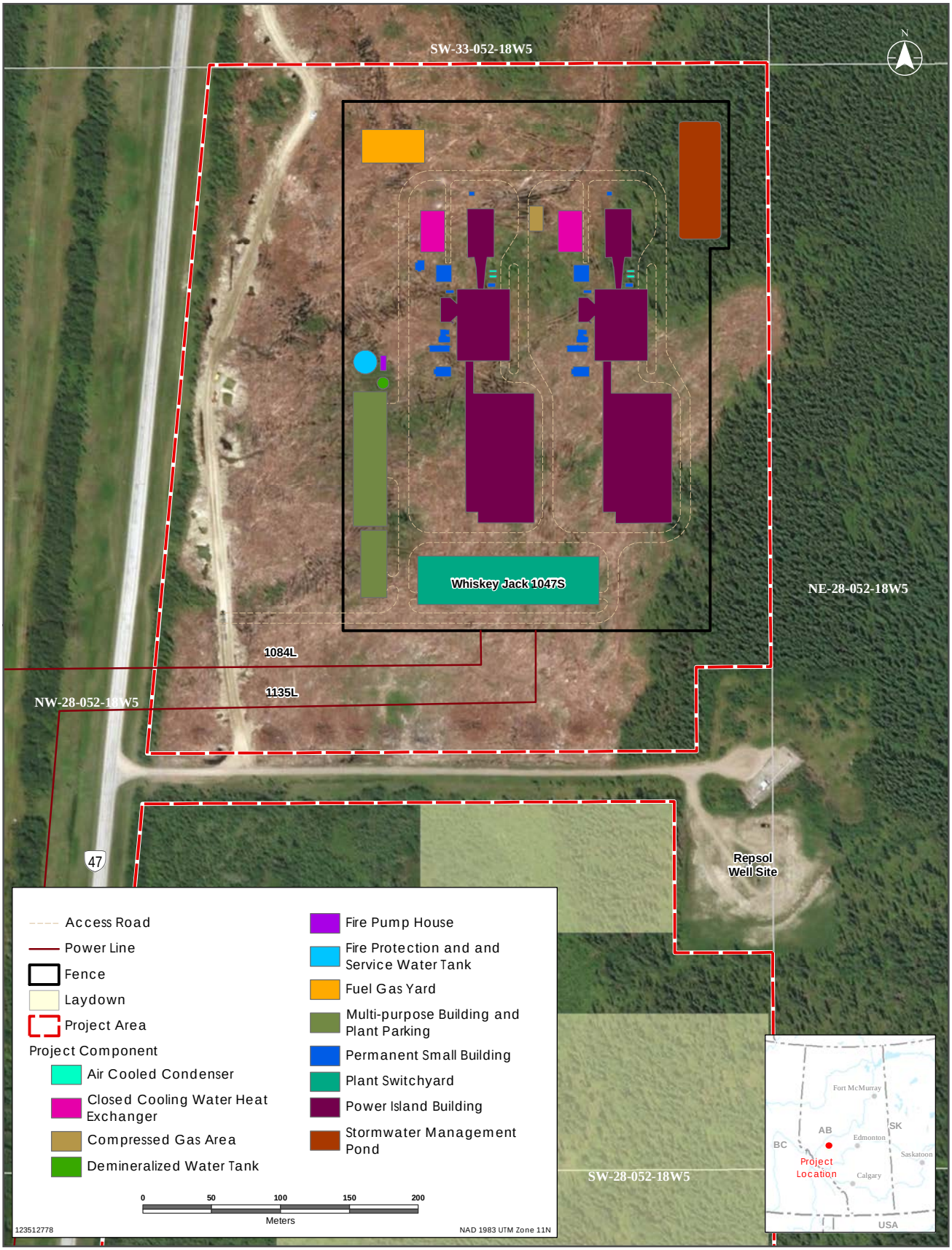
Figure 2-1 Conceptual Design of the Gas Turbine and HRSG Power Train Cascade Power Plant



Sources: Project data provided by Cascade.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 2-2: Preliminary General Layout of the Cascade Power Plant



Sources: Project data provided by Cascade.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 2-3: Enlargement of the General Layout of the Cascade Power Plant

Stantec

2.3.1 Physical Works Associated with the Designated Project

Each phase of construction of the combined cycle natural gas fired power plant involves installation of four main components: a gas turbine, a HRSG, a steam turbine, and a generator in a “1-on-1” configuration. This configuration applies a common rotating shaft between the gas turbine and the steam turbine to generate power. Other components of each power train include an ACC and a GSU. To minimize the exposure to ambient conditions, two power island buildings will enclose the gas and steam turbine components of each 1-on-1 power train. The BOP is the term used in describing all other components outside of power generating equipment such as warehouses, electrical distribution buildings, pumps and compressors that will be installed in the proximity of each power island building. In between each power island component line up, there will be interconnecting water, steam, compressed air, and natural gas supply lines to facilitate the operations of process equipment. There are no provisions for natural gas storage on site.

There will be a section of the site allocated to a 240 kV switchyard that will connect the Project via the 1084L and 1135L transmission lines to the nearby Bickerdike 39S substation owned and operated by AltaLink. AltaLink will be responsible for maintaining any electrical and telecommunications infrastructure that connects the Project to the AIES. Overall, the Project footprint, defined as the fenced area which demarcates the plant equipment, encompasses an area of approximately 10.4 ha. This footprint will be located in the cleared area in the northern portion of the 44 ha Project Area and will allow for the power plant and the construction lay down areas. If additional temporary laydown areas are required for construction, areas of the southern portion of the Project Area may be utilized (see Figure 2-2). These temporary laydown areas, which cover approximately 8 ha, avoid any wetlands and, if used, will be restored following the completion of construction. Each power island building will be approximately 33 m high. The height of each HRSG stack will be approximately 55 m. During construction, all facilities within the Project land lease will be under the care and control of Cascade. Upon commencement of commercial operations of the site, all facilities shown inside the plant boundary fence will be under the care and control of Cascade.

Table 2-1 summarizes the Project structures and components.

Table 2-1 Project Structures and Components

Project Component	Description
Permanent Facilities	
Power Island Building	Building to enclose the Gas Turbine Generator (GTG), Steam Turbine Generator (STG), HRSG and other BOP electrical and mechanical equipment. The approximate dimension of the power island building will be 50 m L (long) x 50 m W (wide) x 29 m H (high). The exhaust transition duct will be constructed outside of the building leading towards the HRSG. The HRSG exhaust stack is anticipated to be 55 m tall.
Multi-purpose Building	A multi-purpose building will be constructed to house the operating and maintenance staff. The multi-purpose building will include an administration/control room, warehouse, maintenance shop, and water treatment area. A permanent parking lot will be located on the west side of the multi-purpose building. The approximate dimensions of the Multi-purpose building will be 98 m L x 23 m W x 7.6 m H.
Fuel Gas Building	A pre-engineered fuel gas building will condition the plant's fuel gas. Inside this building will be a closed loop glycol gas heater system where glycol is circulated to heat up fuel gas, a fuel gas filter/separator, and a knockout tank. This equipment will be used to prepare the natural gas for combustion in the gas turbine. The approximate dimension for the Fuel Gas Building will be 15 m L x 13 m W x 6 m H.
Glycol Closed Loop and Fin-Fan Heat Exchanger	A glycol loop will be used in a closed-cycle system to cool various STG, GTG, and BOP equipment. The glycol loop is cooled by a fin-fan heat exchanger.
Air Cooled Condenser	The ACC is a heat exchanger which condenses steam from the steam turbine to condensate. There will be one ACC per power train, for a total of two. The approximate dimensions for each ACC section will be 80 m L x 50 m W x 15 m H.
Underground Wash Water Drain Tank	An underground wash water drain tank will be located just outside of each power island building. The 5 m x 7 m tank will collect water from the compressor wash and will be hauled off site periodically for disposal at an approved facility. The compressor wash is demineralized water with added soap to remove soot buildup on the turbines. Washing is performed at pre-determined intervals to maintain the cleanliness of the gas turbine compressors.
Water	Make-up water is primarily required for the HRSG and equipment cooling needs. Utilization of air-cooled condensers in place of a water cooled apparatus minimizes the need for make-up water. The water requirement for the site is estimated at 125 gallons/min subject to final design. It is anticipated that water will be brought to site via tanker trucks from Edson on a daily basis. This water is then processed in the demineralized water facility on site to bring it up to acceptable specification. Demineralized water will be stored in demineralized water tanks.
Fire/Service Water and Demineralized Water Tanks	A fire/service water tank will supply water for plant fire protection measures. The approximate holding capacity of this tank will be 800,000 gallons. The demineralized water tank serves to improve operational reliability of the unit in the event of reduced access to demineralized water. It is anticipated that the tank will hold a nominal 2-day storage for demineralized water requirements. The approximate holding capacity of the demineralized water tank will be 750,000 gallons subject to final design. The water for both tanks will be trucked in to the site.
Oil/Water Separators	Oil/water separators will be used to separate oil from the water that will be collected from the facility drains.

Table 2-1 Project Structures and Components

Project Component	Description
Permanent Small Buildings	The Project will include several other permanent small buildings or enclosures of varying sizes including the fire water pump building, emergency diesel generator, and power distribution modules. The fire water pump and emergency diesel generation buildings will each be approximately 12 m L x 4 m W x 3 m H. The power distribution modules building will be approximately 20 m L x 6 m W x 3 m H. All dimensions noted above are subject to the final design.
Stormwater Pond	The stormwater pond will be designed to collect surface water runoff only and will be designed for a 25-year storm event. The stormwater pond will be constructed with pond liners for the retention of liquids and prevention of leaching of water into local groundwater. Based on preliminary design, the approximate footprint of the pond will be 4,500 m^2 with an approximate depth of 2 m. In the unlikely event of the pond filling up, water would be stored in the ditch system leading to the pond allowing for excess water to be slowly released to the pond as the space becomes available. Surface catch basins and below-grade piping and perimeter swales will direct water and any surface runoff outside the perimeter to the stormwater pond. The ditching system will be at least 0.6 m deep with a 1.5 m wide flat bottom. If the pond and ditches were full, excess water would be released to the adjacent wetland. Prior to release, Cascade would first test the water to ensure it meets EPEA water quality standards (GOA 2018). Should the water not meet these standards, Cascade would pump the water into a truck for it to be disposed of at an approved disposal site. The release of stormwater will be designed to maintain existing drainage patterns so adjacent properties are not affected.
Site Access Road	The site access road will be built in the Project Area. The access road will be an all-weather crushed rock road and will be sited to avoid wetland areas within the Project Area. The main access road to the fenced area will be approximately 12 m wide and 125 m long and will run from the Highway 40 turn off to the east boundary of the Project footprint. There is an existing access road into the site belonging to Repsol Oil and Gas Canada. Cascade will be responsible for construction to upgrade the road to handle the heavy equipment. The road will be under Cascade's care and control within the Project footprint during construction and operation. Repsol will utilize the access road during Project construction but that access will be minimal and will be coordinated with Cascade
Utilities and Infrastructure	
Utilities and Infrastructure Electrical Power	The Project will be connected to the Altalink's Bickerdike 39S substation by two 1.0 km 240kV transmission lines 1084L and 1135L (see Figures 1-2 and 2-2). On the plant side, the lines will be terminated at the Whiskey Jack 1074S substation within the Project fenced area. AltaLink and the Alberta Electric System Operator (AESO) will be responsible for routing of the powerlines, stakeholder engagement and regulatory approvals/permits, and construction, operation and maintenance for both components. These transmission lines are outside of the care and control of Cascade.
Telecommunications	Telecommunications will be required for operation of the Project. The primary method of communication with the Project controls will be through a wide area network whose central medium for communication is fibre optics. AltaLink will be responsible for the fibre optic routing, regulatory approvals/permits, construction, operation and maintenance of the telecommunications.

Table 2-1 Project Structures and Components

Project Component	Description
Natural Gas Infrastructure	The Project requires a natural gas supply of high pressure service to supply the gas turbine and low pressure service to supply the building heaters. At a net output of 900 MW, the plant fuel requirements are 150,000 GJ or approximately 145 million cubic feet (MMcf) per day. Natural gas will be supplied by a new high pressure supply line connecting local gas producers to the plant. The supply lines will be sited, constructed, operated and maintained by the suppliers. In addition, a new 7 km tie-line to Nova Gas Transmission Ltd. will serve as back-up in case of any shortfall in gas supply. This line will be constructed, owned, and operated by Cascade. This pipeline will be 12" to 16" in diameter subject to further design. Pipeline routing is not finalized but will be from the TransCanada PipeLines Limited (TCPL) meter station adjacent to the Repsol Edson Gas Plant (see Figure 3-1). The pipelines will be regulated by the Alberta Energy Regulator. The plant natural gas system will begin at the downstream side of the fuel gas metering yard. An emergency stop valve, manually controlled from the control room, will be provided downstream of the metering yard to provide emergency shutoff capabilities in the event of an on-site gas system leak or major plant fire.

2.3.2 Size of the Designated Project

The Project Area is located on 44 ha of crown land. The Project equipment will be located in the northern portion of the Project Area and will encompass the fenced area (see Figure 2-2) approximately 10.4 ha. When fully operational, the Project will be capable of producing a maximum of 900 MW of power, which is above the threshold of 200 MW set out in item 2(a) of the *Regulations Designating Physical Activities*. This output coincides with the maximum capacity of the AIES to receive power in the Hinton/Edson service area.

The permanent structures constructed on site facilitate the operation of the main generating and other associated equipment. During the construction period, temporary structures such as construction trailers, scaffolding, temporary shelters and cranes will support the construction activities. These will be located in the fenced area or temporary laydown area (Figure 2-2). The Project is a new facility and not a component or expansion of another project.

2.3.3 Description of Project Activities

Project activities would consist of:

- construction
- operation and maintenance
- decommissioning and abandonment

Construction activities will include:

- a pre-construction geotechnical investigation to obtain surface and sub-surface information for foundation design
- clearing vegetation

- surface preparation, including grading, installing the site fence, preparing the switchyard area, and installing the main access roads on the site; soil will be stripped and stored on site for restoration upon decommissioning of the Project
- foundation excavation and construction which includes excavation, piling construction and foundation/substructures construction; duct bank and grounding grid construction, and underground piping will be completed at the same time
- building construction, including mechanical, electrical and switchyard construction, and equipment installation, which will be connected by piping and cables
- site drainage and erosion control, and site clean-up and restoration

The Project will be owned by Cascade Power GP Ltd. and operated by an Operation and Maintenance contractor on behalf of Cascade. Day to day operation and maintenance will be provided by a staff of operators, engineers and support staff totaling approximately 20 persons. Additional support staff will be available from the operator's other natural gas plants in Alberta. The turbine and generator manufacturer will provide major maintenance and inspection work.

The basic principle of a combined cycle gas turbine plant is to combust natural gas to produce power in a gas turbine which can be converted to electrical power by a coupled generator. The hot exhaust gases from the gas turbine are used to produce steam in an HRSG. This steam is supplied to the steam turbine generator to produce additional power.

Pipeline quality natural gas will be used as the only fuel for the units. Prior to entering the gas turbine, the natural gas will be heated to a temperature specified by the original equipment manufacturer (OEM). The heated natural gas is then combusted in the gas turbine to drive the turbine to generate electricity. Electricity generated by the gas turbines generator will be stepped up to 240 kV using the generator step-up transformers before interconnecting to the AltaLink transmission system. For this Project, an advanced H-class gas turbine has been selected for the facility.

The temperature of the exhaust gas from the gas turbine ranges from 590°C to 630°C at the outlet of the turbine exhaust. The hot exhaust gas is ducted to the HRSG via the GTG exhaust transition piece to generate steam. The HRSG is a waste heat boiler which produces high pressure, intermediate pressure and low-pressure steam. The HRSG also provides a cooling medium to the kettle boiler for the gas turbine compressor air. High temperature air from the compressor is extracted and piped to the kettle boiler. The cooled rotor air is returned to the gas turbine. The kettle boilers capture the waste heat from the rotor air to heat up low pressure and intermediate pressure feedwater thereby increasing the overall plant output. Amine, phosphate and ammonia are injected into the steam cycle along with continuous and intermittent boiler blowdown to maintain desired cycle chemistry to minimize corrosion and prevent scale formation. Exhaust gas exits the HRSG via the stack. The stack is estimated to be approximately 55 m in height.

Steam from the low-pressure part of the turbine exhausts into the ACC. Ambient air drawn from the surroundings by fans of the ACC condenses the exhaust steam and the condensate collects in the condensate tank. Condensate is then pumped by condensate pumps and the boiler feedwater pumps to the HRSG and the steam cycle repeats.

The HRSG boiler blowdown system collects continuous and intermittent blowdown from the HRSG and steam drains local to the HRSG. Drains are routed from the collection points to the boiler blowdown tank where the steam expands and cools and is recycled back to the service water tank for reuse, reducing the overall water consumption of the facility. The boiler blowdown drain, HRSG stack drain, and feedwater pressure relief valves (PRVs) are routed to the plant drains system and pumped back to the Fire/Service Water Tank for reuse.

By adopting the process design above, the efficiency of the plant is approximately 58% on an annual average ambient condition on a low heating value (LHV) basis. As a result, the CO_2 emissions of the facility are expected to be well below the emission limits (GOC 2018a) across all ambient conditions when the GTG is operating at full load. CO_2 emissions are estimated to range between 350 to 370 kg/MWh when the GTG operates at 100% load. As the plant ages, the unit will experience degradation which decreases the plant efficiency thereby increasing CO_2 emissions per MWh. The plant degradation curve follows a logarithmic function, reaching 1.5% in the first year and 3.6% overall at the end of the gas turbine major maintenance interval. The percent degradation corresponds to a reduction in MW output of the plant. The absolute cap for greenhouse gas emissions will not change during the life of the Project. Future degradation will be mitigated by implementing a long-term service agreement with the gas turbine supplier with contractual remedies on performance to ensure the facility will not exceed emission limits (GOC 2018a) over the life of the facility. The use of ACC saves water consumption by more than 90% when compared to a wet cooled unit. A continuous emissions monitoring system (CEMS) will be installed at the facility to measure and report emissions data per the requirements of the New Source Emission Guidelines for Thermal Generation and for use in controlling the unit. The Project is expected to operate for approximately 30 years. Precise timing for the decommissioning of the facility cannot be predicted at this time as it depends solely on the mode of operation. However, all relevant environmental regulations in existence at the time of decommissioning will be adhered to. A Decommissioning and Reclamation Plan will be developed for the Project at that time.

2.3.4 Incidental Activities

All activities undertaken as part of the Project construction and operations will be for the purpose of power generation and will be under Cascade's care and control. Activities that are incidental to the Project construction and operation that would not be under Cascade's care and control include telecommunications, provision of power and fuel to the Project and highway access to the site.

2.4 EMISSIONS, DISCHARGES AND WASTES

Emissions, discharges and wastes that may be generated during construction and operation of the Cascade Power Plant include:

- Fugitive dust and fine particulate emissions from land clearing, site preparation, earth moving and material handling, and vehicles creating dust by traveling on land. Emissions of particulates associated with combustion will be low due to the use of clean-burning natural gas to power the generators.

- Combustion by-products such as NO_x, carbon monoxide (CO), and volatile organic compounds (VOCs) when the Project operates by combusting fuel. The application of new H-Class dry low NO_x combustion technologies will meet the emission limit of 85 g NO_X/GJ (energy output) as required under the *Guidelines for the Reduction of Nitrogen Oxide Emissions from Natural Gas-fueled Stationary Combustion Turbines* established by Environment and Climate Change Canada (ECCC 2017). The H-Class GTG will have the most up-to-date Dry Low Emission (DLE) technology which keeps emissions low. In addition, CO and VOC emissions will be controlled through adjusting turbine firing temperatures that are implemented by combustion controls on the design of the gas turbine.
- Greenhouse gases (GHGs) from construction equipment. During operations, emission sources include a 900 MW natural gas-fired power facility. The Project will require up to 150,000 GJ/day of pipeline specific natural gas as fuel. Additional emission sources include an auxiliary boiler and a standby diesel generator. The primary Project emissions during operation will include CO_2, NO_X, $PM_{2.5}$, and CO. Due to the low sulphur content of the fuel gas, the Project is not expected to emit measurable quantities of SO_2. Estimated maximum potential annual GHG emission rates during construction and operation are provided in Table 2-2.
- In addition, CO and VOC emissions will be controlled through adjusting turbine firing temperatures that are implemented by combustion controls on the design of the gas turbine.
- Noise emissions during construction from the use of heavy equipment and trucks to clear vegetation, prepare the ground surface and install equipment. During operations, noise will be generated from rotating equipment including inlet exhaust, ventilation openings, coolers, compressors, and transformers. Other ancillary equipment will also generate noise. Noise emissions produced during operations will be substantially curtailed first by the turbine noise enclosure and then subsequently by the power island building. The Project noise effects were assessed based on the Project engineering preliminary design information and acoustic modelling. The Project will comply with applicable regulatory noise limits, including the AUC Rule 012: *Noise Control*.
- Liquid discharges will be primarily stormwater, which will be collected in a pond located in the Project Area. The pond will be constructed with a liner to prevent any leaching of water to local ground water. There will be no recirculation water discharge. All other liquid discharge such as water from the demineralization and compressor wash systems will be collected through gravity drain lines and pumps into above ground tanks and disposed of in accordance with regulatory codes and standards. These tanks will be coated with anti-corrosion coating on the outer shell or will be equipped with cathodic protection. A leak detection system will be provided to indicate if a leak has occurred in the inner tank. The secondary containment structures will be concrete curbed areas that collect spills from equipment to prevent contamination. The demineralization wastewater and compressor water tank will have an approximate capacity of 250,000 and 200,000 gallons, respectively. Should any spills occur, they will be dealt with according to the Project-specific spill response and reporting plan that will be developed prior to commencing construction and operation of the Project.
- The sewage waste and waste water from the multi-purpose building or other washrooms will be collected in on-site tanks and will be serviced on a regular basis. All other liquid discharge such as water from demineralization and compressor wash system will be collected through gravity drain lines and pumps into above ground tanks and disposed of in accordance with regulatory codes and standards

Greenhouse gas emissions during operation of the Project were conservatively modelled, assuming all turbines operating continuously at the maximum rated capacity with all exhaust exiting through the HRSG stacks. The potential emissions for both construction and operation are summarized in Table 2-2.

The Project is being designed with the best available control technology to achieve ground level effects that will meet the Alberta and Canadian ambient air quality standards. However, provisions will be made during the HRSG stack construction to allow for installation of a selective catalytic reduction (SCR) system, should federal emission requirements become more stringent in the future. Emission rates for NO_X, $PM_{2.5}$, and CO will be calculated, and dispersion modelling will be undertaken to confirm that the Project meets the relevant air quality objectives.

Table 2-2 Estimated Maximum Potential Annual Greenhouse Gas Emission Rates of the Project during Construction and Operation

Pollutant	Construction				Operation (kt/y)
	Year 1 (kt/y)	Year 2 (kt/y)	Year 3 (kt/y)	Total Over 3 Years (kt/y)	
CO_2	44.130	59.062	10.735	113.927	2,832[a]
CH_4	0.0018	0.0024	0.0004	0.0046	0.055[b]
N_2O	0.00004	0.0005	0.0001	0.00064	0.049
CO_{2e}	44.282	59.266	10.772	114.320	2,848

NOTES:
kt/y = kilotonnes per year
[a] Based on the assumption the 100% carbon in fuel is converted to CO_2
[b] Based on Environment Canada emission factors (0.037 g/m^3 for CH_4 and 0.33 g/m^3 for N_2O for industrial sources

The Project will comply with applicable regulatory noise limits, including the AUC Rule 012: *Noise Control*. Reasonably foreseeable mitigation measures include exhaust silencers, air inlet silencers, enclosing equipment in buildings, and procuring equipment with noise ratings that will allow the Project to meet Rule 012 requirements.

Table 2-3 lists the types of waste expected from the Project and their method of disposal.

A small stand-alone enclosure will be provided for hazardous waste storage, the enclosure will:

- provide protection from access by unauthorized persons
- be posted as a hazardous waste/recyclables storage area
- have dedicated people responsible for the site and be able to respond to emergency situations
- be located away from sewer drains, manholes, drainage ditches and standing water
- provide for protection from the weather
- have adequate ventilation
- store wastes in double walled containers in good condition
- have secondary containment for liquids

- be of sufficient size to ensure non-compatible wastes are not stored together
- have the waste containers marked and labeled

Table 2-3 Wastes and Waste Management Methods for the Project

Waste Stream	Management Method
Domestic waste	Contracted waste disposal
Recyclables (wood, paper, metal)	Contracted recycling
Hazardous waste[1]	Licensed disposal facility
Waste oil[2]	Licensed recycler

NOTE:

[1] Hazardous wastes include paint, solvents, batteries, fluorescent light bulbs, herbicides, etc. for use during construction and operation. Hazardous materials will be stored in secure cabinets. Wastes will be stored in a bin located adjacent to the multi-purpose building for disposal at a licensed facility.

[2] Waste oil from equipment is not captured and stored. Equipment containing oil will be located on a concrete pad with secondary containment and closed drain valves. In the event of a leak, the oil will be removed/cleaned up by a vacuum truck and hauled offsite to a licensed disposal facility.

2.5 CONSTRUCTION AND OPERATION PHASES AND SCHEDULING

The Project schedule is presented in Table 2-4.

Table 2-4 Cascade Power Plant Proposed Schedule

Date	Project Phase
2018	Permitting, engagement & preliminary front-end engineering & design
2019 Q1	CEA Agency Project Description submission
2019 Q1&2	Final engineering
2019 Q3&4	Permit approval; financing conclusion
2020 Q1	Site Preparation
2020-2021	Construction
2022 Q2	In service
2052-2054	Project decommissioning (after estimated 30-year life)

CASCADE POWER PLANT
PROJECT DESCRIPTION SUMMARY

Project Information
January 2019

3.0 PROJECT LOCATION

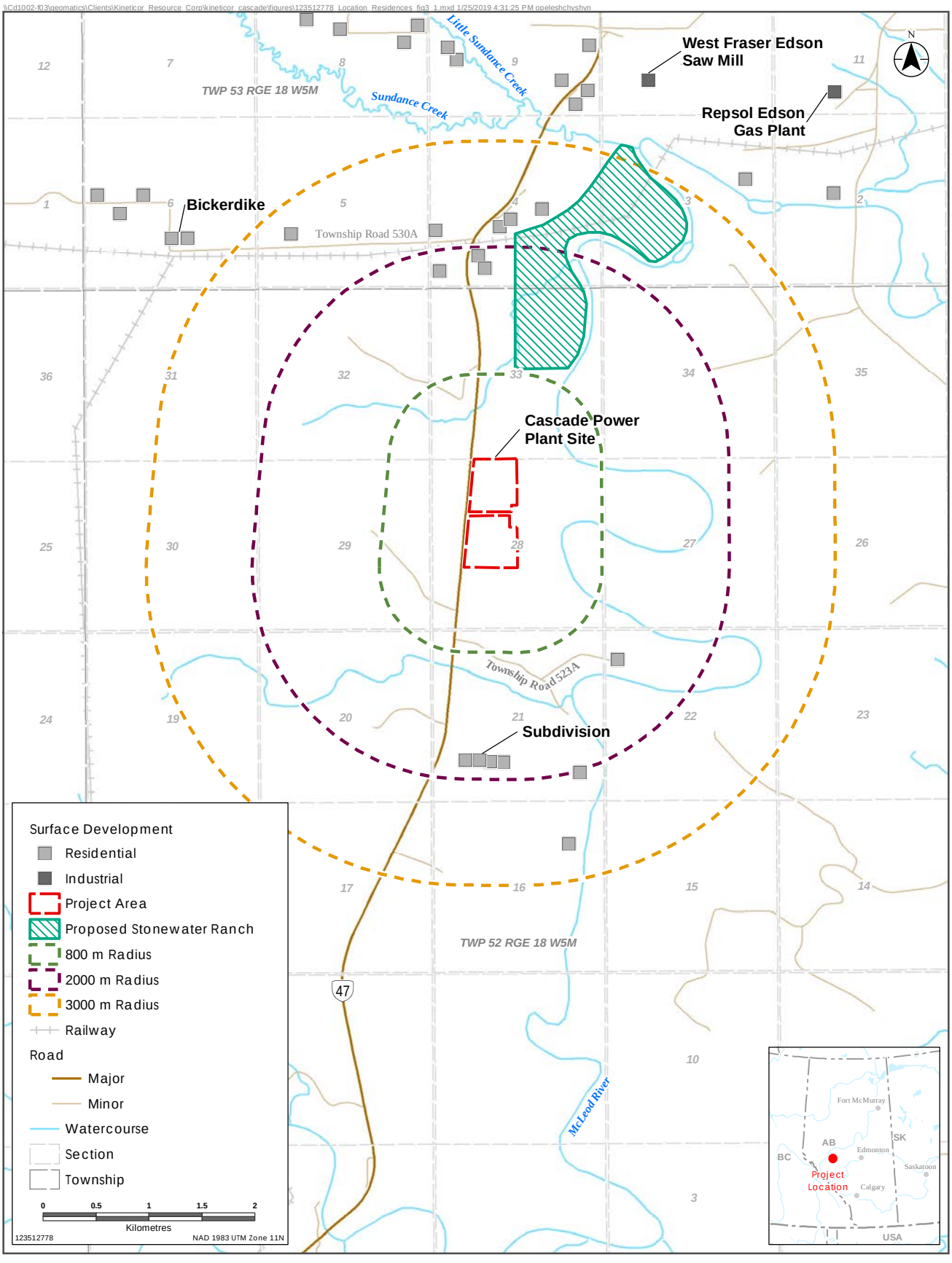
3.1 DESCRIPTION OF PROJECT LOCATION

The Project's proposed location is in Yellowhead County on crown land in the west half of 28-52-18-W5M, approximately 12 km southwest of Edson, Alberta. The centre of the Project Area is located at 53° 31' 38" N 116° 35' 30" W. The Project Area is approximately 44 hectares (ha) in size and represents the area in which the development is sited. The total fenced portion of the Project Area, which demarcates the area where plant equipment is to be located, is approximately 10.4 ha and will be situated on the north portion of the Project Area.

The Project is located approximately 70 m from Highway 47 and is approximately 380 m to the west of the McLeod River, at its closest point.

The nearest residence is located over 800 m to the southeast of the Project. Several other permanent residences and one seasonal accommodation facility are located within a 2 km radius of the Project. Stonewater Ranch, a proposed resort development is located in Sec 34 TWP 52, RGE 18, W5 M, 800 m north of the Project. Yellowhead County approved the land use plan for the development in 2009 but there has been no construction to date. Five Indigenous groups have identified to Cascade, traditional territories in the vicinity of the Project: O'Chiese First Nation, Paul First Nation, Alexis Nakota Sioux Nation, Kehewin Cree Nation and the Stony Nakoda Nation. The First Nation Reserves for these Indigenous groups area located over 65 km from the Project. The Fickle Lake Provincial Recreation Area and the Sundance Provincial Park are the closest provincial sites and are located over 10 km from the Project Area. The closest federal lands to the Project is Jasper National Park, located approximately 80 km west of the Project Area. The Project is located approximately 140 km from the Alberta-BC provincial border, 436 km from the Alberta-Saskatchewan provincial border and 502 km from the Canada – USA border.

Figures 1-1, 1-2 and 3-1 show the location of the Project. Figures 3-2 to 3-5 are photographs of the Project Area.



Sources: Project data provided by Cascade Power GP Ltd.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 3-1: Location and Residences near the Cascade Power Plant

Figure 3-2 Project Footprint, looking north

Figure 3-3 Project Footprint, looking southeast

Figure 3-4 Project Footprint, looking northwest

Figure 3-5 Project Footprint, looking south

3.2 LAND AND WATER USE

The Project Area is provincial crown land. The southern side of the Project Area is defined by a 240 KV power line and the Bickerdike 39S substation is across Highway 47 from the southwest corner of the Project Area. The Talisman Edison Gas Plant is approximately 2.5 km northeast of the Project Area. The Canadian National Rail Mainline runs east-west approximately 2 km north of the Project Area.

The Project is located in the provincial Green Area which is mostly public land managed for timber production, energy development, watershed, fish and wildlife, recreation and other uses. The Yellowhead County Land Use Bylaw (Yellowhead County 2013) classifies the Project Area as Rural District (RD) where permitted uses include Public Utility and discretionary uses include General Industrial and Natural Resource Processing. The Yellowhead County Municipal Development Plan classifies the area as being in the Foothills Policy Area where industrial and resource uses are supported provided that they are sited in a manner that ensures minimal conflicts with other land uses. The Project, then, is an acceptable land use in terms of the Land Use Bylaw and Municipal Development Plan. No other authorizations exist other than a Repsol wellsite (a subsurface lease) located east of the Project Area between the north and south halves (see Figure 2-2). Current land use dispositions in the vicinity of the Project Area are listed in Table 3-1.

Table 3-1 Dispositions in the Cascade Power Plant Area

Disposition	Description
TPA 1742	Trapline – David Winward
DLO 830363 DML 810061 EZE 770011 EZE 810180 EZE 870162 EZE 910204 VCE 900163	AltaLink Management: Department Licence of Occupation, Powerlines, Vegetation Control Easement, Miscellaneous
REA 1216 REA 1217	Fortis Alberta Inc.: Powerlines
MSL 062413 PLA 062765	Peyto Exploration & Development Corp.: Miscellaneous, Pipeline Agreement
MSL 1530 MSL 9048 PLA 2230 PLA 2401 PLA 4861	Repsol Oil & Gas Canada Inc.: Miscellaneous, Pipeline Agreements
MSL 9048	Repsol Oil & Gas Canada Inc.: Access Road
DML 130128	Swan Hills Synfuels Ltd.: Miscellaneous
RRD2594PX	Alberta Transportation: Registered Roadway

Table 3-1 Dispositions in the Cascade Power Plant Area

Disposition	Description
PLA 091597	West Lake Energy Corp.: Pipeline Agreement
DPL 920518	Yellowhead Gas Co-op Ltd.: Department Pipeline Agreement
CNT090040	Alberta Forestry – Edson Office: Consultative Notation
CTL R13Z001	Precision Forest Industries Ltd.: Coniferous Timber Licence
FMA9700032	West Fraser Mills Ltd.: Forest Management Agreement

Based on the information received from Indigenous groups to date, the Project Area does not have resources currently used for traditional purposes by Indigenous peoples. Cascade's ongoing engagement with the four First Nations registered with the ACO as having traditional lands in the Project Area has not identified traditional use of the Project perimeter or within the Project Area by their individuals. Letters have been sent to the Métis Settlements near the Project Area informing them of the Project and, to date, no communication has been received back. Cascade will continue to reach out to those communities to ensure that they do not have any concerns. Based on the information received from Indigenous groups to date, the Project will not require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Indigenous peoples.

4.0 FEDERAL INVOLVEMENT

The Project does not include any proposed or anticipated federal financial support. No federal lands would be used for the purpose of carrying out the Project, nor would there be any granting of interest in federal land (i.e. easement, right-of-way, transfer of ownership).

Outside of the *Regulations Designating Physical Activities* under CEAA 2012, there are no confirmed federal legislative or regulatory requirements (including any federal permits, licences or other authorizations) applicable to the Project.

CASCADE POWER PLANT
PROJECT DESCRIPTION SUMMARY

Federal Involvement
January 2019

5.0 ENVIRONMENTAL EFFECTS

5.1 PHYSICAL AND BIOLOGICAL COMPONENTS THAT MIGHT BE ADVERSELY AFFECTED BY THE PROJECT

5.1.1 Environmental Overview Methods

A desktop review of existing literature and publicly available geospatial datasets was conducted to identify potential environmental considerations relevant to the Project. Field reconnaissance surveys of the Project Area were conducted in April, June and July 2018.

The Project has the potential to cause changes in the environment, including air quality, acoustics, surface water, groundwater, fish and fish habitat, vegetation and wetlands, wildlife, and historical resources. Fish and fish habitat, listed aquatic species and migratory birds come under federal jurisdiction and are discussed in section 5.2.

5.1.2 Atmospheric Environment

5.1.2.1 Air

As discussed in Section 2.4, fugitive dust and fine particulate emissions during Project construction will be generated from land clearing, site preparation, earth moving and material handling, and vehicle movement. In addition, construction equipment (dozers, compressors, etc.) will release combustion by-products such as NO_x and carbon monoxide (CO). Construction emissions are expected to be minor and of limited duration. Effects from construction emissions are expected to be limited to the immediate vicinity of the Project Area. Construction emissions will be addressed using standard mitigation measures as discussed below.

A dispersion modelling assessment compliant with the Alberta Air Quality Model Guideline (AQMG) was completed to assess the effects of Project operations on air quality. The dispersion modelling assessment considered the primary Project emissions of NO_X, $PM_{2.5,}$ and CO. It also accounted for other substantial emission sources within the study area. Output from the model was compared to relevant regulatory objectives. Figure 5-1 shows the 20 km by 20 km study area used for the air quality modelling and the regional emission sources.

To assess the effects on air quality associated with emissions from the Project, dispersion modelling was conducted for the following scenarios:

- **Base Case:** includes emissions associated with existing regional facilities in the study area and ambient background
- **Project Case:** Includes emissions from the Cascade Power Plant (Project) alone
- **Application Case:** Includes cumulative emissions from all sources associated with the Project, existing regional facilities and ambient background

For this assessment, the Edson and Steeper stations were selected for the ambient background concentration analysis. The Edson monitoring station is 13 km northeast of the Project Area and is the closest monitoring station measuring NO_2 and $PM_{2.5}$. The Steeper monitoring station is 54 km southwest of the Project Area and is the closest monitoring station measuring CO. Ambient data for 2017 were analyzed using the AQMG methodology (AEP 2013) to calculate background concentrations.

In all modelling cases, the NO_2, CO and $PM_{2.5}$ concentrations are below the Alberta Ambient Air Quality Objectives. The Application Case shows increases that are 0% from the Base Case with the exception of annual NO_2 concentrations which show a 1.1 % increase.

Potential Effects

Air quality within the Project Area will be temporarily affected during the construction period by an increase in combustion by-products such as NOx, CO, and VOCs and particulate matter. Construction equipment will also emit greenhouse gases. Multiple control measures will be implemented during construction to minimize air emissions and potential effects. After grading, the untraveled or lightly traveled locations will be watered, mulched, overlain with a crushed stone layer, or vegetated to minimize fugitive PM emissions. Activities that potentially generate fugitive total suspended particle (dust) emissions will be monitored visually by construction personnel. If fugitive emissions become visible, water will be sprayed on the affected areas.

Many of the site preparation and construction activities such as land clearing, filling, and grading, will be intermittent and of short duration. These activities. as well as control measures, will serve to reduce potential effects. Construction equipment and vehicles will be spread out over the Project Area and will only operate during the construction phase. Therefore, Project construction effects on air quality are expected to be limited. During operations, the primary Project emissions will include CO_2, NO_X, $PM_{2.5}$, and CO. The Project is designed to control atmospheric emissions to meet the Alberta ambient air quality standards (AEP 2018c).

Mitigation measures to reduce potential adverse effects of the Project on ambient air quality will include the following:

- adherence to federal emission standards and guidelines for new turbine emissions (ECCC 2017)
- meeting ambient air quality objectives, and industry standard best practices for operational emissions
- emissions of NOx complying with the Alberta Air Emission Standards for Electricity Generation
- regular inspection and maintenance of the gas turbines to ensure optimum performance and minimize emissions
- reducing the idling of construction equipment and vehicles

With the application of the mitigation measures and the fact that emissions are anticipated to be below the AAAQO guidelines, the effects of the Project on ambient air quality are assessed as being not significant.

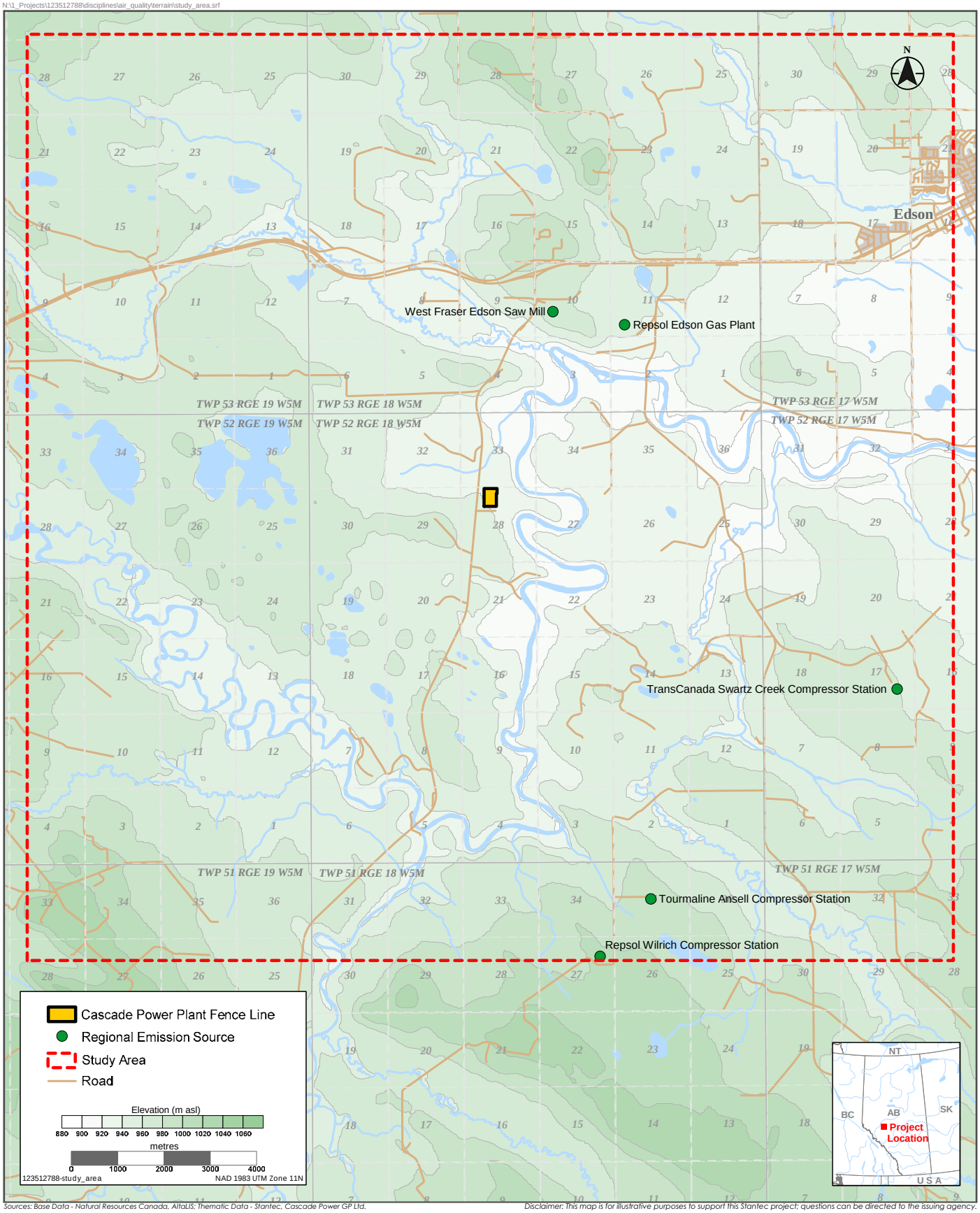


Figure 5-1: Air Quality 20 km by 20 km Study Area Showing Regional Emission Sources

5.1.2.2 Acoustic Environment

A noise impact assessment (NIA) has been completed for the Project. The purpose of the NIA was to quantify the Project's noise contribution within the acoustic study area. The acoustic study area was the area within 3 km of the Project fenceline i.e., the fence around the Project footprint (Figure 5-2). The results of the NIA were compared to the requirements under AUC Rule 012: *Noise Control* (AUC 2017) which sets Permissible Sound Levels (PSLs) for a project. Achieving PSLs at a 1.5 km boundary limit means that the Project noise effect beyond the 3 km study area will be below the assumed ambient sound level for remote areas and have a negligible impact.

A noise survey was conducted in June 2018 to quantify the noise emissions from third-party regulated facilities within 3 km of the Project. The only active regulated facility within the study area is the AltaLink 9S Substation. There are two system transformers rated at 240/138 kV, 180/240//269 MVA within the substation. There is also a Repsol gas plant approximately 4.5 km northeast of the Project. Although it is located outside the study area, it is included because it is a large facility with the potential to contribute to the cumulative sound level within the acoustic study area.

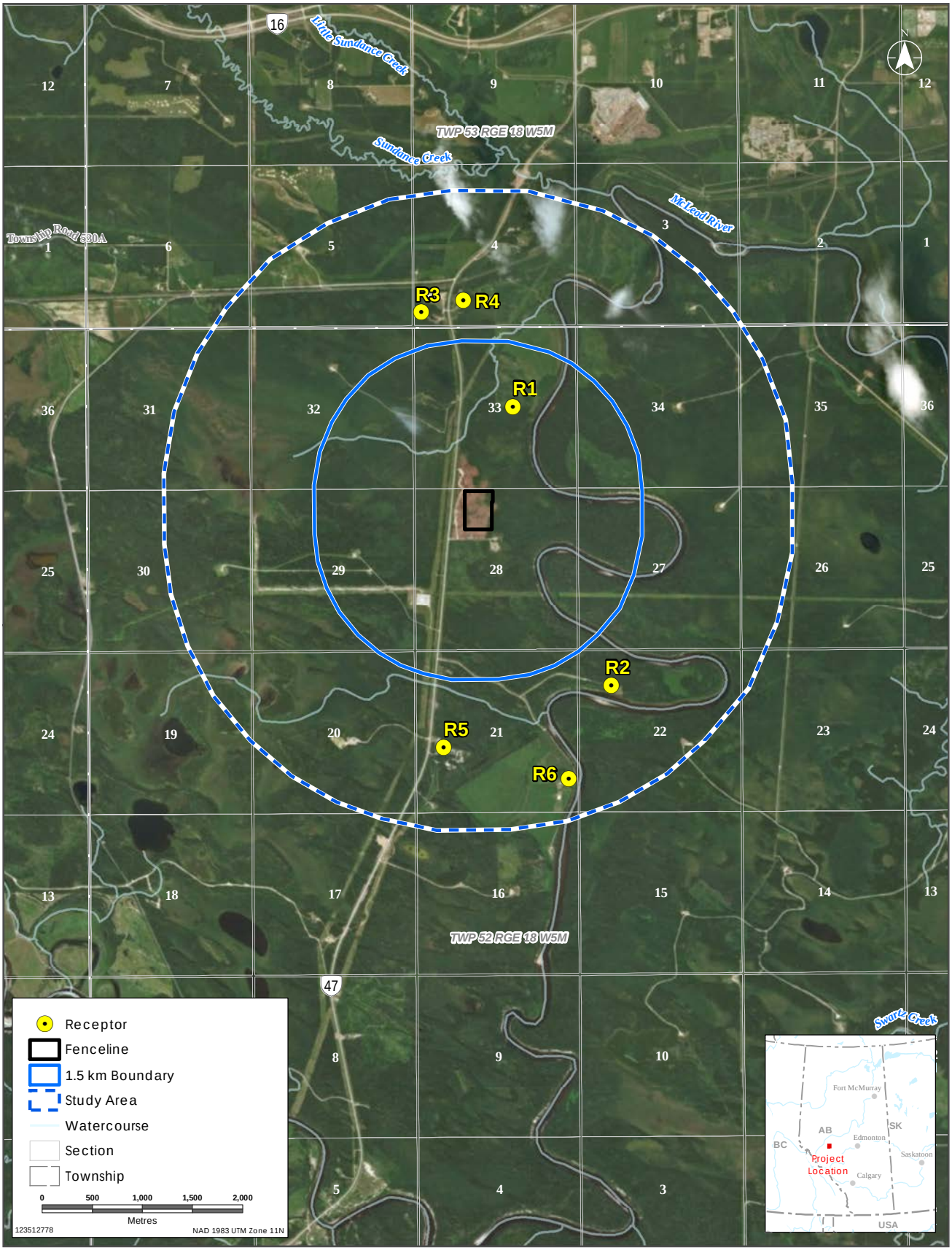
Project construction noise will occur during construction activities such as site preparation and the use of construction equipment for grading, pile driving, excavations, concrete pouring, and steel and component installation. Rule 012 does not set noise limits for construction activities; however, measures will be implemented to minimize noise effects from these activities. These mitigation measures include:

- Noisy construction activities will be scheduled within the daytime hours of 07:00 to 22:00.
- Noise mitigation devices installed on construction equipment (e.g., mufflers) will be kept in good working condition.
- Construction vehicles will follow posted speed limits.
- Construction equipment not in use will be turned off where practical.

Mitigation measures for noise during operation of the Project will include:

- noise reduction features on Project equipment
- incorporating noise attenuation measures on air cooled condensers during design by reducing fan speed, using low-noise fan blades, adding acoustic materials to the discharge plenum/fan housing, or by adding acoustic louvers to the inlet or discharge
- installation of a 4" thick envelope with 24 gauge exterior steel cladding, high density mineral wool insulation, and a perforated inside liner on turbine buildings

Noise levels during Project operation were modelled at six receptors within 3 km of the Project fenceline (see Figure 5-2). The sound levels of the Project were combined with the baseline sound levels to give cumulative sound levels. The cumulative levels are below the regulated PSLs for all receptors. The effect of the Project on the acoustic environment is assessed as not significant.



Sources: Project data provided by Cascade Power GP Ltd.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 5-2: Noise Study Area and Receptor Locations

Stantec

5.1.3 Aquatic Environment

5.1.3.1 Surface Water

The McLeod River drains the area east of the Project and lies approximately 380 m away at its closest point. Historical monthly flow from 1984-2014 for the McLeod River near the Project Area is shown in Figure 5-3. Mean annual flow for this period is 24.6 m^3/s. The minimum mean-monthly flow was 1.1 m^3/s for January 2004, and the maximum mean-monthly flow was 185.1 m^3/s for July 1986.

An unnamed tributary to the McLeod River drains the areas west and north of the Project Area and lies approximately 350 m to the northwest at its closest point. A drainage south of the Project Area directs water toward the McLeod River. Fish, fish habitat, and surface water quality data are not available for the tributary or drainage (AEP 2018a).

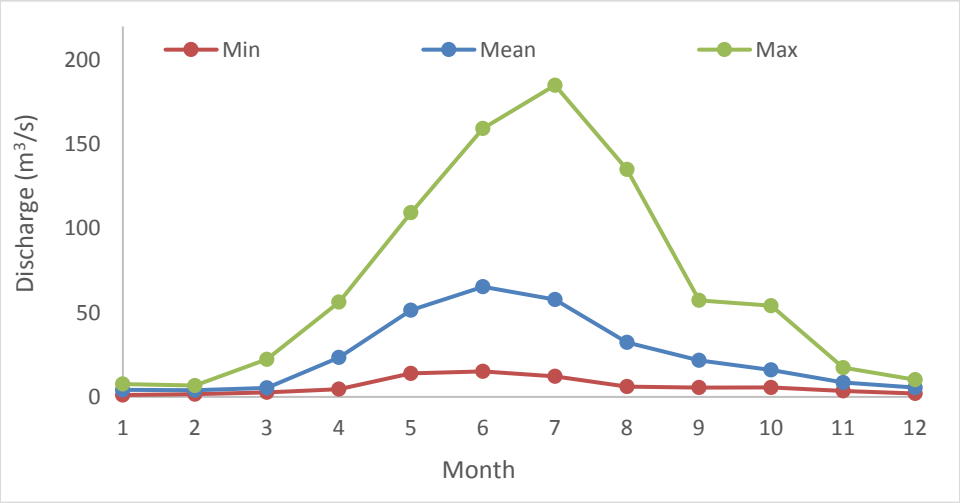


Figure 5-3 Historical Monthly Flow (McLeod River near Project Area)

5.1.3.2 Groundwater

The AEP Water Well Information Database identifies two registered industrial water wells within 1 km of the Project Area (AEP 2018b). A preliminary geotechnical investigation was conducted at the Project Area in May 2018. Seven test holes were drilled and the recorded depth to the water table ranged from 0.2 to 1.19 m.

The average expected aquifer yield of the Project Area and the area within 1 km to the north, south, and west is 25 to 100 imperial gallons per minute (igpm), which would be considered high yield. The area within 1 km to the east of the Project Area has an average expected aquifer yield of 100 to 500 igpm (Vogwill 1983). No artesian conditions or springs were identified within 1 km of the Project Area. There is no regional information pertaining to groundwater quality available for the Project Area and surrounding area.

5.1.3.3 Fish

For the McLeod River, the Fisheries and Wildlife Management Information System (FWMIS) database shows presence of arctic grayling, which are listed as a species of Special Concern by Alberta's Endangered Species Conservation Committee, and bull trout, which are listed as Threatened (GOA 2015). Other reported fish species from FWMIS in the McLeod River are listed in Table 5-1, none of which are listed under Schedule 1 of the *Species at Risk Act*. Athabasca rainbow trout, listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered, are present in the McLeod River (COSEWIC 2018). No FWMIS records exist for the unnamed tributary to the McLeod River draining the areas west and north of the Project Area (AEP 2018a).

Table 5-1 Fish Species Presence in McLeod River

Common Name	Scientific Name	Alberta Status[1]	Federal Status[2]
arctic grayling	*Thymallus arcticus*	Special concern	-
Athabasca rainbow trout	*Oncorhynchus mykiss*	Threatened	Endangered
brook trout	*Salvelinus fontinalis*	-	-
Bull/brook trout hybrid	*Salvelinus confluentus X Salvelinus fontinalis*	-	-
bull trout	*Salvelinus confluentus*	Threatened	-
burbot	*Lota lota*	-	-
flathead chub	*Platygobio gracilis*	-	-
finescale dace	*Phoxinus neogaeus*	-	-
goldeye	*Hiodon alsoides*	-	-
lake chub	*Couesius plumbeus*	-	-
longnose dace	*Rhinicthys cataractae*	-	-
longnose sucker	*Catostomus catostomus*	-	-
mountain whitefish	*Prosopium williamsoni*	-	-
northern pike	*Esox lucius*	-	-
pearl dace	*Semotilus margarita*	-	-
rainbow trout	*Oncorhynchus mykiss*	-	-
spoonhead sculpin	*Cottus ricei*	-	-
spottail shiner	*Notropis hudonius*	-	-
trout-perch	*Percopsis omiscomaycus*	-	-
walleye	*Sander vitreus*	-	-
white sucker	*Catostomus commersoni*	-	-
yellow perch	*Perca flavescens*	-	-

NOTES:
1. Status from Species at Risk – A Guide to Endangered and Threatened Species and Species of Special Concern in Alberta, Version 2, 2015
2. Status from COSEWIC

5.1.3.4 Potential Effects on Surface Water and the Aquatic Environment

The following potential effects to surface water and the aquatic environment could be associated with the Project:

- change in surface water quality due to runoff and deleterious substance release such as leaks of hydrocarbons from equipment
- change in surface water quantity due to changes in flow patterns
- change in hydrological and sediment transport regime from construction of roads, drains, buildings and other related infrastructure

Mitigating the potential release of deleterious substances includes installing silt fences around construction activity and exposed earth to minimize erosion and sediment transport, as well as using drip pans for motorized equipment, and having spill kits nearby. The Stormwater Management Plan will include measures to minimize effects on surface water and groundwater quantity and quality from the collection of stormwater, the design of the stormwater pond, the placement and composition of stormwater drainage ditches and the operation, and monitoring and maintenance of the system.

As described in Table 2-1, the stormwater pond will be designed to collect surface water runoff from the Project Area. The stormwater pond will be constructed with pond liners for the retention of liquids and prevention of leaching of water into local groundwater. In the unlikely event of the pond filling up, water would be stored in the ditch system leading to the pond allowing for excess water to be slowly released to the pond as the space becomes available. If the pond and ditches were full, excess water would be released to the adjacent wetland. Prior to release, Cascade would first test the water to ensure it meets EPEA water quality standards (GOA 2018). Should the water not meet these standards, Cascade would pump the water into a truck for it to be disposed of at an approved disposal site. The release of stormwater will be designed to maintain existing drainage patterns so adjacent properties are not affected.

5.1.3.5 Potential Effects on Groundwater

The Project has the potential to change groundwater quantity and quality as a result of excavation and potential dewatering activities during construction. Dewatering during construction will be done in accordance with standard construction practices and mitigation measures to direct discharge water away from drainage courses, water bodies and wetlands. The amount of drawdown is expected to be low because of the limited depth of the excavation and the relatively short period of dewatering at a given location.

The Project has the potential to change groundwater quality in the vicinity of the Project Area as a result of accidental spills during construction and/or operation in areas where groundwater is shallow (i.e., springs, water wells, wetlands). In the event of a spill, efforts to contain, remove and remediate any contaminant(s) causing environmental effects would be completed.

5.1.4 Terrestrial Environment

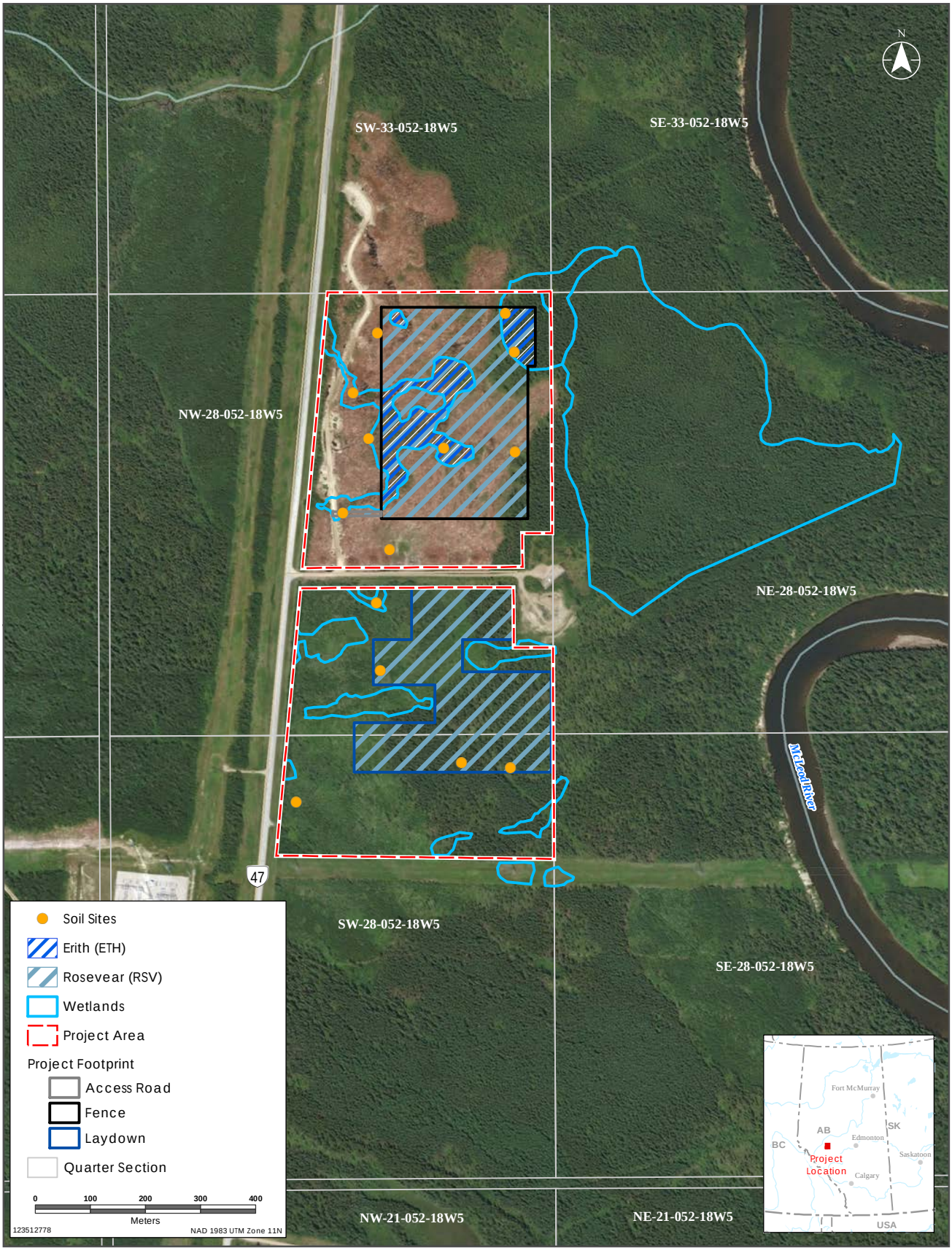
5.1.4.1 Soils and Terrain

A soil survey of the Project site was conducted in July 2018. This was supplemented by a desktop review of existing literature and publicly available datasets to identify potential environmental considerations relevant to soil and terrain. Figure 5-4 shows the soil units underlying the Project fenced and laydown areas.

Potential Project effects on soils and terrain may include loss of soil from the surface during construction and from soil stockpiles, and the degradation of soil fertility due to admixing of topsoil and subsoil to be used for reclamation. Mitigation will include:

- Implementing drainage and erosion control measures (e.g., silt fences) around stockpiles to prevent erosion
- Stripping and stockpiling separate topsoil and subsoil horizons for use in reclamation
- Revegetating exposed areas after construction

Operation of the Project is not anticipated to change soil quality or soil quantity because topsoil salvage and storage will be completed during the construction phase. The Project is not anticipated to change terrain as the Project Area is not located in an area of unstable terrain or steep slopes.



Sources: Project data provided by Cascade Power GP Ltd.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 5-4: Cascade Power Plant Soil Units in the Project Footprint

5.1.4.2 Vegetation and Wetlands

The Project is situated within the Lower Foothills Natural Subregion of the Foothills Natural Region of Alberta. The Lower Foothills Natural Subregion has the most diverse forests in Alberta in terms of forest types and tree species. Wetlands in this Natural Subregion are characterized by peat accumulations up to 3 m thick. They are dominantly treed fens with some bogs and open fens. Wet mineral soils occasionally occur under the fens.

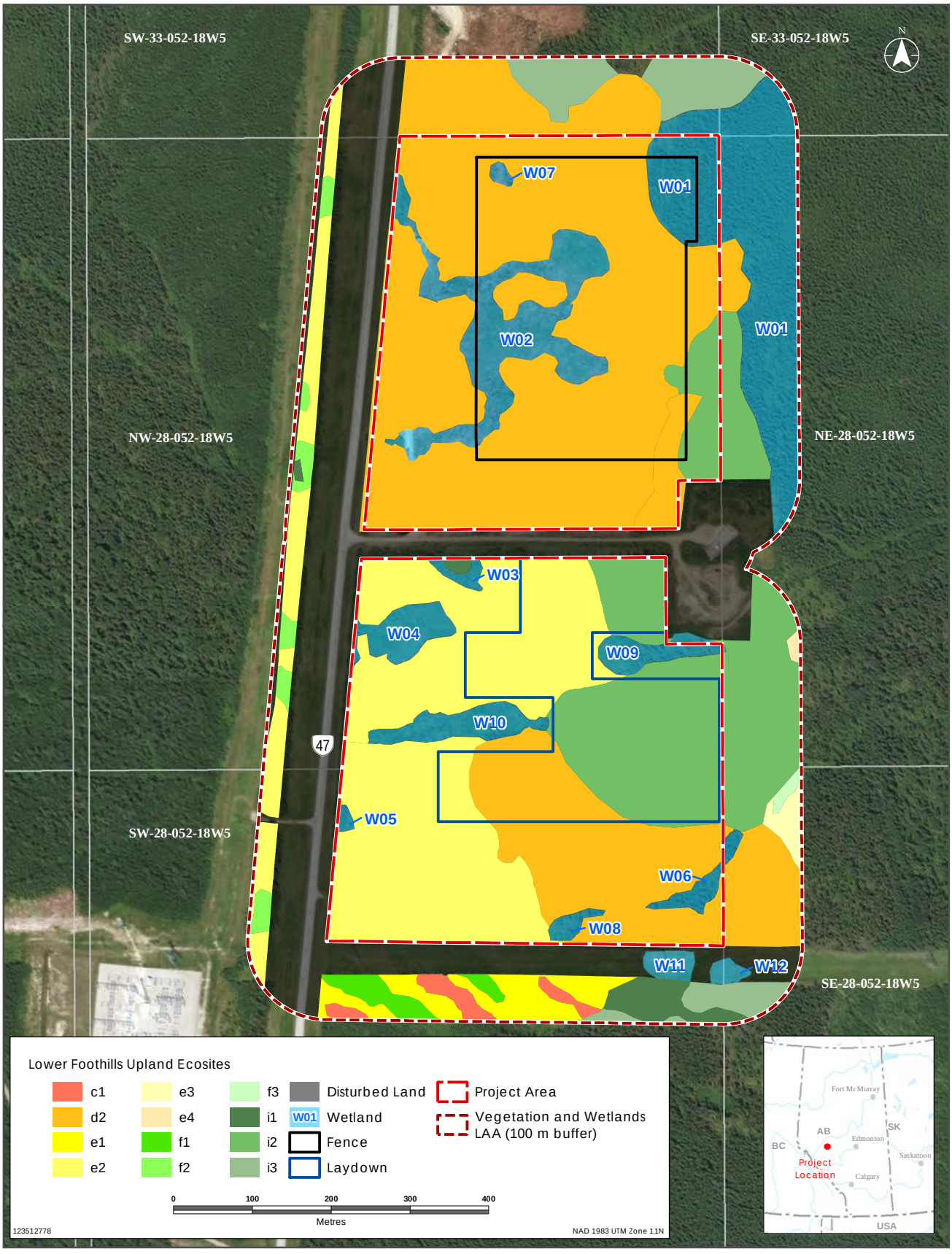
The Project Area has been largely logged and is composed of regenerating vegetation on portions of West 1/2-28-52-18-W5. Other disturbances include a cleared oil and gas facility, wellsite, and associated permanent access road, and cleared seismic line and powerline rights-of-way. Mature forest remains on the Project Area on the eastern side of NW-28-52-18-W5 and the NE corner of SW-28-52-18-W5. Field reconnaissance conducted in June and July 2018 identified three upland communities within the Project footprint (Figure 5-5):

- e2 – low-bush cranberry aspen (mesic/medium)
- i2 - horsetail (hygric/rich)
- d2 – Labrador tea – mesic lodgepole pine

There is potential for vegetation communities to support migratory bird species and Species of Management Concern (SOMC), including alder flycatcher, olive-sided flycatcher, Canada warbler, common nighthawk and grizzly bear.

The Alberta Conservation Information Management System (ACIMS) identifies a non-sensitive S3 lichen in the Project Area (*Cladonia squamosa* or dragon cladonia lichen) (ACIMS 2018). This designation indicates that the lichen may be somewhat vulnerable due to factors such as restricted range, relatively small population sizes or other factors. No *Species at Risk Act* listed plant species were observed during field surveys, nor were any identified from historical records.

Vegetation field reconnaissance found numerous wetlands present within or intersecting the Project Area (Figure 5-5). The Project footprint will be placed in the north portion of the Project Area where wetland W07 will be completely disturbed and portions of wetlands W01 and W02 will be disturbed. These disturbances will trigger the Alberta Wetland Policy and Alberta *Water Act*. The areas for temporary laydown situated in the southern portion of the Project Area will avoid wetlands to the degree possible so that the Wetland Policy and *Water Act* are not triggered.



Sources: Project data provided by Cascade Power GP Ltd.
Base data provided by the Governments of Canada, and Alberta.

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Figure 5-**5**: Cascade Power Plant Vegetation Cover

Stantec

Potential effects on vegetation include:

- change in species diversity due to direct or indirect loss or alteration
- change in community diversity due to direct or indirect loss or alteration
- change in wetland function and area due to alteration or loss of area or class
- change in wetland function due to indirect alteration of water quality, surface water or groundwater flow patterns

The extent of wetland disturbance is 3.37 ha. The effects of interaction between the Project and vegetation and wetlands will be managed through mitigation. Vegetation clearing will be restricted to the area needed for the Project footprint and laydown areas. Facilities have been sited to avoid wetlands wherever possible. In cases where avoidance is not possible, wetlands removed from the Project Area will be compensated for, as per the requirements of the Alberta Wetland Policy. Dust generated during construction will be controlled by water spraying when necessary. Exposed soil surfaces will be covered with mulch or a stone layer or revegetated after construction to control the proliferation of invasive species.

5.1.4.3 Wildlife

A field reconnaissance survey of the Project Area was conducted in June 2018 to determine existing conditions for wildlife species and habitat. This was supplemented by a wildlife desktop review to identify wildlife SOMC and habitat features (e.g., dens, hibernacula) that may require regulatory consideration during Project construction. Species of Management Concern include species that are:

- listed federally as “Endangered”, “Threatened” or “Special Concern” on Schedule 1 of the *Species at Risk Act* (GOC 2018b)
- designated federally as “Endangered”, Threatened” or “Special Concern”, or identified as “under review” for listing by COSEWIC (2018)
- listed provincially as “Endangered” or “Threatened” under the Alberta *Wildlife Act*; or listed as special concern by the Alberta Endangered Species Conservation Committee (AESCC) (GOA 2015)
- designated provincially as “At Risk”, “May be at Risk” or “Sensitive” according to the General Status of Alberta’s Wild Species (AEP 2017)

A review of wildlife species ranges (Naughton 2012; Pattie and Fisher 1999; Sibley 2003; Stebbins 2003; Federation of Alberta Naturalists 2007; eBird 2018) and the presence of available wildlife habitat indicate that a total of 57 wildlife SOMC (44 bird, 9 mammal, 2 amphibian and 2 reptile species) may occur (breed, migrate, winter and/or reside) within 5 km of Project Area. Sixteen of these SOMC are listed under Schedule 1 of SARA as “Special Concern”, “Threatened” or “Endangered” (Table 5-2).

Table 5-2 Wildlife Species of Management Concern with the Potential to Occur in the Project Area

Common Name	Scientific Name	*SARA* Listing
Birds		
Horned grebe	*Podiceps auritis*	Special Concern
Western grebe	*Aechmophorus occidentalis*	Special Concern
Common nighthawk	*Chordeiles minor*	Threatened
Yellow rail	*Coturnicops noveboracensis*	Special Concern
Short-eared owl	*Asio flammeus)*	Special Concern
Olive-sided flycatcher	*Contopus cooperi*	Threatened
Bank swallow	*Riparia riparia*	Threatened
Barn swallow	*Hirundo rustica*	Threatened
Canada warbler	*Cardellina canadensis*	Threatened
Rusty blackbird	Euphagus carolinus	Special Concern
Mammals		
Grizzly bear	*Ursus arctos*	Special Concern
Wolverine	*Gulo gulo*	Special Concern
Badger	*Taxidea taxus taxus*	Special Concern
Little brown myotis	*Myotis lucifugus*	Endangered
Northern long-eared myotis	*Myotis septentrionalis*	Endangered
Herpetiles		
Western toad	*Anaxyrus boreas*	Special Concern

The Project and surrounding area do not intersect any sensitive wildlife ranges such as caribou, grizzly bear, or a provincial Key Wildlife Biodiversity Zone (AEP 2016). The Project Area is not located within or near any nationally significant ecological areas. Jasper National Park is 80 km west of the Project Area.

The FWMIS search revealed no important bird areas, provincially protected areas, ecological reserves, wilderness areas, wildland provincial parks, wilderness parks, provincial parks, natural areas, heritage rangelands, or provincial recreation areas within 5 km of the Project Area.

Results from the FWMIS database indicated 11 previously recorded SOMC within 5 km of the Project Area including trumpeter swan, pied-billed grebe, common nighthawk, broad-winged hawk, northern pygmy owl, least flycatcher, grizzly bear, Canada lynx, fisher, badger and western toad. In addition, barn swallow has been previously recorded (eBird 2018). No previously recorded SOMC have been identified within 1 km of the Project Area.

All of the wildlife SOMC that may occur within the Project Area have restricted activity periods associated with them (GOA 2017, ECCC 2017). Although the restricted activity periods vary depending on wildlife species, the restricted activity period generally extends from March 1 to August 31, which provides protection for raptors as well as migratory birds and species at risk.

The Project has the potential to result in direct and indirect (e.g., sensory disturbance) habitat loss as well as increased mortality risk associated with vegetation removal and ground disturbance during construction and vehicle collisions during construction and operations. Project construction will result in the loss or alteration of approximately 15.9 ha of upland vegetation communities (85.5% of the fenced area, access road and laydown area), which provides moderate suitability for wildlife habitat. Most of this upland vegetation occurs on areas that were previously disturbed and have regenerated, currently support communities composed of both native and agronomic species, and which provide habitat for migratory birds including grass, shrub and tree nesting species, bats, and other small mammals. Vegetation communities within the laydown area (approximately 8.1 ha), consist of upland vegetation communities, and will be temporarily disturbed and allowed to regenerate over time. Laydown areas will be returned to existing uses following completion of construction.

Pre-construction surveys will be conducted if construction activities overlap with a SOMC restricted activity period. Site-specific mitigation would be developed for all wildlife features identified, which might include species-specific setback distances (e.g., active bird nests).

Potential effects on wildlife during operations include sensory disturbance (light and noise) from the facility, the potential for mortality risk from bird collisions with stacks, and vehicle collisions. Stacks will be designed with the minimum height allowable and no guy wires to mitigate against bird strikes. Sensory disturbance and vehicle collision effects are assessed as being minimal given that the Project will meet the AUC noise limits and the low number of workers at the site.

The Project has the potential to affect wildlife species protected under federal and provincial legislation. Effects to wildlife will be reduced by carrying out construction activities outside of the restricted periods established by Alberta Environment and Parks (GOA 2017).

The decommissioning and reclamation plan for the facility will be developed prior to the plant closure and will meet the regulations in effect at that time. Reclamation will include habitat restoration in the Project Area.

With the implementation of the mitigation measures identified above, the relatively small area of habitat in the Project Area compared to the surrounding undisturbed area and the absence of critical wildlife habitat in the Project Area, the effects of the Project on wildlife are assessed as not significant.

5.1.5 Historical Resources

In Alberta, historical resources are protected under the Alberta *Historical Resources Act*, and are defined as precontact, historic, and palaeontological sites and their contents. Certain types of Indigenous traditional use sites are also considered to be historical resources.

5.1.5.1 Archaeology

The Project was evaluated against the provincial database of known historical resource sites (ACT 2017). There are no previously recorded historical resources within the Project Area or within a one kilometre buffer around it.

The *Listing of Historic Resources* specifies that the eastern portion of the Project footprint, adjacent to the McLeod River has elevated potential for containing previously unknown archaeological sites. This area contains some previously undisturbed terrain which could contain intact archaeological sites. An Historical Resources (HR) Application for the Project Area, covering both archaeology and palaeontology, was submitted to ACT on October 29, 2018. ACT responded to the Application on January 2, 2019 stating that there are no *Historical Resources Act* requirements associated with the Project, however Cascade Power must comply with Standard Requirements under the *Historical Resources Act*, reporting the discovery of historic resources, which are applicable to all land surface disturbance activities in the Province. Cascade Power will meet these requirements.

If any undocumented historical resources sites are discovered within the Project Area, mitigation measures such as avoidance, surface collection and documentation or excavation will be implemented. If a chance find occurs, construction will be suspended until ACT gives permission for work to continue. By following these mitigations measures, no significant effects on archaeology are predicted.

5.1.5.2 Palaeontology

The Project Area is within the foothills, which are part of the disturbed belt for Cordilleran deformation. A significant early mammal locality has been recorded along the McLeod River downstream of the Project Area. No previously recorded sites are included in the *Listing of Historical Resources* for the Project Area (ACT 2017).

Construction activities that require deep excavation through till and into bedrock have the potential to disturb palaeontological resources. ACT's January 2, 2019 response to the October HR Application requires that a palaeontological monitoring program be initiated if excavation is to occur where bedrock is close to the surface. Based on a geotechnical investigation in May 2018, bedrock is at least 13 m below surface. As the deepest open excavation will be up to 8 m deep, bedrock will not be exposed by construction. If undocumented paleontological resources are discovered during a construction monitoring program, salvage operations will be completed according to the draft *Microsite Fossil Collecting by Palaeontological Consultants – Guidelines* in preparation by the Royal Tyrrell Museum of Palaeontology (RTMP). With the implementation of these mitigation measures, the effects of the Project on palaeontology are expected to be not significant.

5.2 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FISH AND FISH HABITAT, LISTED AQUATIC SPECIES, AND MIGRATORY BIRDS

5.2.1 Fish and Fish Habitat, as Defined in the *Fisheries Act*

The Project will not have direct interaction with fish or fish habitat. Project water requirements will be met by tanker trucks that will bring water to site daily. All Project activities will be confined to the Project Area and no activities are planned in or near the McLeod River or any other watercourse. Indirect interaction may occur through runoff from the site and hazardous material spills, which could affect the aquatic environment. As stated above, all water from the Project Area will be collected in the stormwater pond. If the pond and ditches are full, excess water from the pond will be released to the adjoining wetland, only if the water meets Alberta EPEA standards (GOA 2018). Water that does not meet these standards will be pumped into a truck for disposal at an approved disposal site. The Project is not expected to have any effects on fish, including the COSEWIC listed Athabasca rainbow trout (*Oncorhynchus mykiss*). Mitigating the potential release of deleterious substances includes installing silt fences around construction activity and exposed earth to minimize erosion and sediment transport, as well as using drip pans for motorized equipment and having spill kits nearby.

5.2.2 Marine Plants, as Defined in the *Fisheries Act*

The Project is located hundreds of kilometres away from any marine environment that supports marine plants. The Project will have no direct interaction with marine plants

5.2.3 Aquatic Species, as defined in *Species at Risk Act*

There are no aquatic species in the Project Area listed under Schedule 1 of SARA. All Project activities will be confined to the Project Area. No activities are planned in or near the McLeod River or any other watercourse. The Project will not directly interact with aquatic species. Indirect interaction may occur through runoff from the site and hazardous material spills which could affect the aquatic environment. Mitigations as per Section 5.1.3.4 will limit any effects.

5.2.4 Migratory Birds, as Defined in the *Migratory Birds Convention Act, 1994*

The Project Area includes 35 migratory bird SOMC, as defined in the *Migratory Birds Convention Act, 1994*. Of these species, common nighthawk (*Chordeiles minor*), olive-sided flycatcher (*Contopus cooperi*), barn swallow (*Hirundo rustica*), bank swallow (*Riparia riparia*) and Canada warbler (*Cardellina canadensis*) are listed as Threatened under Schedule 1 of SARA. Horned grebe (*Podiceps auratus*), western grebe (*Aechmophorus occidentalis*), yellow rail (*Coturnicops noveboracensis*), and rusty blackbird (*Euphagus carolinus*) are listed as Special Concern under Schedule 1 of SARA.

The entire Project Area has the potential to support migratory birds including grass, shrub and tree nesting species and those that favour wetland habitats. There is potential to affect migratory birds including species at risk during geotechnical activity and construction of the proposed Project. Specifically, removal of vegetation from the Project footprint (10.4 ha) and ground disturbance have potential to result in the direct loss of migratory bird habitat as well as result in indirect habitat loss and other effects associated with sensory disturbance. Potential sensory disturbance (e.g., noise, light) has the potential to continue during operations; however, mortality risk associated with potential vehicle collisions is expected to decrease during operations as there will be fewer vehicles travelling to and from the Project Area once construction ceases. Although there is potential to directly and indirectly affect breeding bird and raptor habitat, planning construction activities outside the restricted activity period (RAP) will reduce potential effects associated with sensory disturbance (i.e., indirect effects) as well as mortality risk. RAPs for wildlife extend approximately from May 1 to August 10. However, in consideration of species at risk as well as recommended RAPs for raptors (GOA 2017, ECCC 2018), construction activities will avoid the breeding bird period (March 15- August 31), where possible. If Project construction is scheduled to occur during RAPs for migratory birds or raptors, a bird nest search will be conducted using non-intrusive (i.e., passive) search techniques.

The construction and operation of the Project will result in the loss of 10.5 ha of habitat in the fenced area and access road for the duration of the Project and temporary loss of 8.9 ha of habitat in the laydown area. The laydown area will be reclaimed to equivalent habitat following construction. The fenced area and access road will be reclaimed to equivalent habitat following decommissioning of the Project. Loss or degradation of wetlands will be compensated for as per the Alberta *Water Act*. The Project footprint will include a stormwater pond to hold any surface run-off prior to release. This area may be used by migratory birds in a similar fashion to use of surrounding wetlands. Potential indirect interaction may occur through runoff from the site and hazardous material spills which could affect the quality of the stormwater pond. The surface runoff collected in the stormwater pond not expected to contain measurable volumes of hydrocarbons nor will it contain any hazardous waste, which will be collected and disposed of at licensed facilities. With implementation of the Stormwater Management Plan, the stormwater pond is not expected to adversely affect migratory birds as the water quality is expected to be similar to other wetlands in the area.

5.2.5 Species at Risk, as Defined in the *Species at Risk Act* (SARA)

There are 10 birds, one amphibian (western toad) as well as five mammals (American badger, little brown myotis, northern long-eared myotis, grizzly bear and wolverine) listed under Schedule 1 of SARA that have potential to occur in the Project Area. The Project has the potential to affect these species if they are present in the Project Area through similar effects pathways as previously described, including direct and indirect habitat loss as well as increased mortality risk. Standard industry practices will be implemented to reduce potential bear-human conflicts on site (e.g., reducing or eliminating attractants, utilizing bear-resistant garbage containers). Wildlife mitigation measures, including conducting pre-construction surveys to identify wildlife features; avoiding removing vegetation during the RAP for migratory birds and raptors; and reclaiming exposed land following construction will be implemented to reduce effects on SARA species.

5.3 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FEDERAL LANDS OR LANDS OUTSIDE OF ALBERTA OR CANADA

Federal lands in the vicinity of the Project Area include Indigenous reserve lands and Jasper National Park. These are shown in Figure 1-1 and their distances from the reserve boundary to the Project Area are as follows:

- O'Chiese Reserve No. 203 (O'Chiese First Nation) – 103 km
- Wabamun No. 133A (Paul First Nation) – 138 km
- Alexis Indian Reserve No.133 (Alexis Nakota Sioux Nation) – 134 km
- Alexis Elk River Reserve No. 233 (Alexis Nakota Sioux Nation) – 65 km
- Alexis Cardinal River Reserve No. 234 (Alexis Nakota Sioux Nation) – 76 km
- Kehewin No. 123 (Kehewin Cree Nation) – 380 km
- Big Horn Reserve No. 144A (Bearspaw, Chiniki, Stoney, Wesley First Nations) – 126 km
- Stoney Nakoda Reserve Nos. 142, 143, 144 (Bearspaw, Chiniki, Stoney, Wesley First Nations) – 273 km
- Jasper National Park – 80 km

Given their distance, changes to federal lands by the Project are not anticipated. The Project is located approximately 140 km from the Alberta-BC provincial border, 436 km from the Alberta-Saskatchewan provincial border and 502 km from the Canada- USA border. Given the size of the Project and the localization of effects on air quality, noise, soil, vegetation, wildlife and heritage resources, and the expected lack of effects on aquatic resources, the Project is not anticipated to have any adverse environmental effects outside of Alberta.

5.4 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO INDIGENOUS PEOPLES RESULTING FROM CHANGES TO THE ENVIRONMENT

The environmental effects of the construction and operation of the Project on 44 ha of land southwest of Edson are expected to be minimal, therefore impacts to Indigenous peoples are also expected to be minimal. Changes to the environment, including air quality, noise, soil, vegetation, wildlife, and heritage resources are expected to be localized in the Project Area, and the Project is not expected to have effects on the aquatic environment. The minimal effects on the environment are expected to have negligible effects on Indigenous peoples, including effects to health and socio-economic conditions, physical and cultural heritage, any structure, site or thing that is of historical, archaeological, paleontological, or architectural significance, and the current use of the land and resources for traditional purposes (current use).

With regard to health and socio-economics, no ingestion or inhalation pathways that could trigger the need for a human health risk assessment are anticipated. Given this, effects on human health are not anticipated. In addition, Cascade is developing an Indigenous Engagement Plan that includes identifying

and participating in long-term, meaningful processes to promote economic prosperity for the Indigenous groups identified by the ACO, as well as any other Indigenous groups that may come forward. Socio-economic effects are anticipated to be positive for Indigenous groups due to opportunities for employment.

Currently, there are no identified sites or structures of historical, archaeological, paleontological, or architectural significance in the Project Area. If any undocumented sites are discovered, mitigation measures such as avoidance, surface collection and documentation or excavation may be recommended. If undocumented paleontological resources are discovered during a construction monitoring program, salvage operations will be completed.

Cascade acknowledges the proposed Project Area lies within the Traditional Territories of Alexis Nakota Sioux Nation, Kehewin Cree Nation, O'Chiese First Nation and Paul First Nation. At the direction of the ACO, Cascade has engaged four Indigenous groups, listed in Table 6-1. Site visits were conducted with Alexis Nakota Sioux Nation, O'Chiese First Nation, and Paul First Nation, and no issues or concerns regarding effects on current use were identified during the site visits. This conclusion is further supported by:

- the small size of the Project in relation to the Crown land in Yellowhead County
- the distances from the Project to the Indigenous groups in the county
- the fact that the proposed site has already been clear cut.

Cascade will continue to engage with Indigenous communities as directed by the ACO and if potential effects are identified, Cascade will evaluate the need for mitigation at that time.

6.0 PROPONENT ENGAGEMENT WITH INDIGENOUS GROUPS

Further to the direction provided by the Government of Alberta's ACO, Cascade has developed a comprehensive Indigenous engagement plan, which is guided by the principles of respect, understanding, trust and mutual benefit. The intent of the Indigenous engagement plan is to enable Cascade to build long-term relationships with Indigenous groups in close proximity to the Project Area, representing a positive investment in the Project's future. The engagement plan is being implemented in alignment with the public engagement plan. Results from these engagement plans will be used in developing the regulatory applications.

Cascade acknowledges the proposed site lies within the Traditional Territories of Alexis Nakota Sioux Nation, Kehewin Cree Nation, O'Chiese First Nation, Paul First Nation and Stoney Nakoda Nation. It is anticipated that additional information regarding actual Traditional Land Use related to the proposed Project Area will be identified as part of the AUC application process. Cascade also recognizes that additional Indigenous groups, including Métis groups, may practice traditional land use around the Project Area and that the ACO may not have this information on file.

Cascade also acknowledges that the *Natural Resources Transfer Acts* provide Treaty First Nations with the right to hunt, fish and trap for food on all unoccupied Crown lands and lands to which they have the right of access.

Cascade will continue to work with Indigenous communities to understand how individual Indigenous groups wish to be consulted and to gather preliminary information on Indigenous interests and concerns. A summary of the engagement activities that have occurred to date are outlined in Table 6-1.

Table 6-1 Summary of Engagement Activities to Date

Indigenous Group	Project Notification Packages Mail out	Project Introduction Meeting	Site Visit	ACO Record of Consultation Logs
Alexis Nakota Sioux Nation	March 16, 2018 & July 27, 2018	n/a	August 28, 2018	April 6, 2018 September 6, 2018
Kehewin Cree Nation (added on June 2, 2018)	July 27, 2018	August 16, 2018	TBD	September 6, 2018
O'Chiese First Nation	March 16, 2018 & July 27, 2018, follow-up inquiries August 16, 2018	n/a	August 29, 2018	April 6, 2018 September 6, 2018
Paul First Nation	March 16, 2018 & July 27, 2018	March 26, 2018	August 20, 2018 August 28, 2018	April 6, 2018 September 6, 2018

Proponent Engagement with Indigenous Groups
January 2019

On March 16, 2018, Cascade submitted a pre-engagement assessment to the ACO for proposed temporary fieldwork for the purpose of geotechnical testing for the Project. As a result of the ACO review, it identified that a Level 1 streamlined engagement was required with the following three Indigenous groups in Treaty 6 who have the potential to be affected or may be interested in the Project: Alexis Nakota Sioux Nation, O'Chiese First Nation, and Paul First Nation.

On June 15, 2018, Cascade submitted a pre-engagement assessment to the ACO for a miscellaneous lease (DML) on crown land. As a result, the ACO determined Level 2 Standard Consultation was required with the following four Indigenous groups in Treaty 6 who have the potential to be affected or may be interested in the Project. In addition to the three Indigenous groups mentioned above, Cascade received notification from the ACO on June 15, 2018 that consultation was also required with Kehewin Cree Nation.

On April 25, 2018, Cascade asked the CEA Agency for a preliminary list of Indigenous groups that may be contacted regarding the Project. A list of seventeen Indigenous groups was provided by the CEA Agency on April 27, 2018 (see Table 6-2). On September 11, 2018, a registered letter and a Project information package were sent to all seventeen Indigenous groups. Cascade received responses from Stoney Nakoda Nation, Montana First Nation and Ermineskin Cree Nation. A meeting with the Stoney Nakoda Nation occurred on September 25, 2018, at which Cascade agreed to provide the environmental information for Cascade's permit applications when submitted. Cascade is currently trying to arrange to meet with Montana First Nation. Cascade met with the Ermineskin Cree Nation on Oct 31, 2018 where information on the Project was presented. On November 26, 2018 a copy of the environmental evaluation from the AUC application was sent to the Stoney Nakoda Nation and Ermineskin Cree Nation.

No responses of objection to the Project were received from any First Nations both from an engagement level or the respective field visits. Record of Consultation Logs were sent to Alexis Nakota Sioux Nation, O'Chiese First Nation and Paul First Nation for review on April 6, 2018 and to Alexis Nakota Sioux Nation, Kehewin Cree Nation, O'Chiese First Nation and Paul First Nation on September 6, 2018.

Table 6-2 Indigenous Groups Identified by CEA Agency

Nation	Treaty	Distance from Project by Road (approx. kms)
Alexis Nakota Sioux Nation	6	146
Paul First Nation	6	149
O'Chiese First Nation	6	194
Sunchild First Nation	6	202
Enoch Cree Nation	6	192
Samson Cree Nation	6	290
Montana First Nation	6	290
Louis Bull Tribe	6	290
Ermineskin Cree Nation	6	290
Saddle Lake Cree Nation	6	356

Table 6-2 Indigenous Groups Identified by CEA Agency

Nation	Treaty	Distance from Project by Road (approx. kms)
Alexander First Nation	6	221
Whitefish Lake First Nation	6	353
Stoney Nakoda Nation	7	440
Tsuut'ina Nation	7	445
Horse Lake Nation	8	435
Foothills Ojibway First Nation	Other	85
Nakcowinewak Nation of Canada	Other	231
Metis Nation of Alberta Region 4	Métis	200
Gunn Métis Local #55	Métis	167
Drayton Valley Local #888	Métis	141

Should Indigenous communities not identified by the ACO express interest in the Project, Cascade is committed to engaging with those interested communities through the following methods:

- provide relevant, up to date Project information
- identify potential concerns related to Indigenous community rights and traditional uses within the Project Area and work with each community to develop effective mitigation for potential impacts
- ongoing Project notifications and Project updates
- Project information packages and maps sent by registered mail
- ongoing communications (telephone, email correspondences)

Cascade will continue to engage with Alexis Nakota Sioux Nation, Kehewin Cree Nation, O'Chiese First Nation and Paul First Nation throughout the life of the Project. Cascade plans to engage the Indigenous groups in early 2019 to provide them with information and to solicit their questions and concerns regarding the Project. Cascade plans to send out quarterly updates on the Project, which will be sent to the public and Indigenous groups.

Proponent Engagement with Indigenous Groups
January 2019

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