Moose Jaw Combined Cycle Power Station Project

Summary of the Project Description

Submitted to:

The Canadian Environmental Assessment Agency

Submitted by:

Saskatchewan Power Corporation (SaskPower)

May 3, 2019

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Abbreviations and Acronyms

ACC	Air Cooled Condenser
AUC	Alberta Utilities Commission
BOP	Balance of Plant
CAAQS	Canadian Ambient Air Quality Standards
CCGT	Combined Cycle Gas Turbine
CEAA	Canadian Environmental Assessment Agency
CEMS	Continuous Emission Monitoring System
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide equivalent
CRA	Commercial, Recreational and Aboriginal
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPC	Engineer-Procure-Construct
EASB	Environmental Assessment and Stewardship Branch

GHG	Greenhouse Gas
GTG	Gas Turbine Generator
GWP	Global Warming Potentials
HCB	Heritage Conservation Branch
HDD	Horizontal Directional Drilling
HDPE	High-Density Polyethylene
HRIA	Heritage Resource Impact Assessment
HRSG	Heat Recovery Steam Generator
kg/MWh	Kilogram per Megawatt Hour
kV	Kilovolt
LHV	Low Heating Value
MHI	Ministry of Highways and Infrastructure
MW	Megawatt
MWh	Megawatt hour
NSPML#160	New Southern Plains Métis Local 160
NO_X	Nitrogen Oxide
N_2O	Nitrous Oxide
OEM	Original Equipment Manufacturer
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter of 2.5 microns in diameter or smaller

PM_{10}	Particulate matter of 10 microns in diameter or smaller
PPM	Parts Per Million
RM	Rural Municipality
ROW	Right-of-Way
SAAQS	Saskatchewan Ambient Air Quality Standards
SARA	Species at Risk Act
SK ENV	Saskatchewan Ministry of Environment
SOMC	Species of Management Concern
SO_2	Sulphur Dioxide
STG	Steam Turbine Generator
TLE	Treaty Land Entitlement
ULN	Ultra-Low NO_X
VOC	Volatile Organic Compound
WSA	Water Security Agency

1.0 GENERAL INFORMATION AND CONTACT(S)

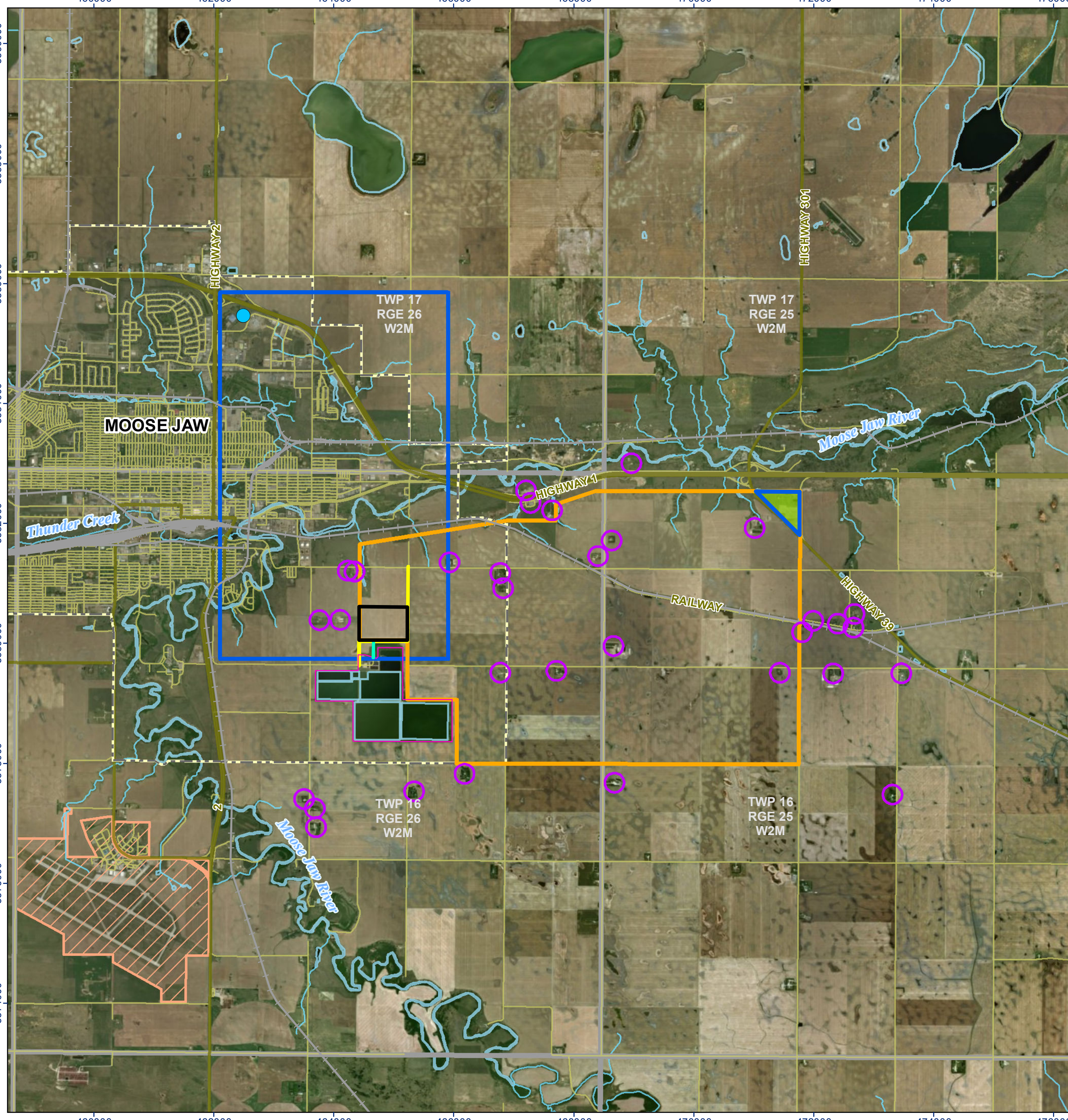
1.1 PROJECT'S NAME, NATURE AND PROPOSED LOCATION

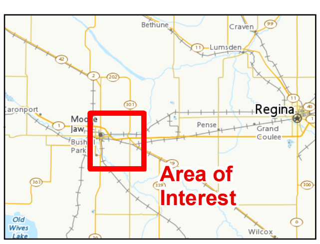
The proposed Moose Jaw Combined Cycle Power Station Project (the Project) is a nominal 350 megawatt (MW), with a seasonal maximum of 366 MW combined cycle natural gas facility.

The Project is located on the southeast edge of the City of Moose Jaw, Saskatchewan, within two partial quarter sections of land, SE 27-16-26 W2M and NE 27-16-26 W2M (Figure 1). The land is within an industrial park, zoned as heavy industrial. The Project also includes incidental activities to be constructed for operation, including:

- water infrastructure
- electrical power infrastructure
- a fibre-optic line
- road upgrades, and
- natural gas infrastructure.

SaskPower has prepared a Project Description that complies with the *Prescribed Information for the Description of a Designated Project*, and the *Guide to Preparing a Description under the Canadian Environmental Assessment Act, 2012* (Canadian Environmental Assessment Agency [CEAA] 2012). This Project Description Summary is prepared to assist in the Canadian Environmental Assessment Agency's (the Agency) determination on the requirement of a federal environmental assessment (EA) of the Project.





- Project Site
- Incidental Activity Study Area
- Potable Water Supply Study Area
- SaskPower Pasqua Switch Station
- Distribution Line
- Roads Upgrade Area
- Moose Jaw Wastewater Treatment Plant
- Canadian Forces Base - Moose Jaw
- City of Moose Jaw Northeast Reservoir
- Occupied Rural Residence
- Major Road
- Minor Road
- Railway
- City Limits
- Township

0 1 2 Km

(At original document size of 8.5x11)
1:100,000

N

Notes
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Data Sources: Government of Saskatchewan, Government of Canada, SaskPower
3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Stantec SaskPower

Project Location
Moose Jaw, Saskatchewan

Prepared by MDWallace on 2019-03-26
Technical Review by JHennig on 2019-03-26

Client/Project
113254233-010 REVB

Moose Jaw Combined Cycle Power Station Project

Figure No.
1

Title
Project Overview

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1.2 PROPONENT'S NAME AND CONTACT INFORMATION

The Project name and proponent contact information are provided below:

Name of the designated project: Moose Jaw Combined Cycle Power Station Project

Name of the proponent: Saskatchewan Power Corporation (SaskPower)

Address of the proponent: 2025 Victoria Avenue, Regina, Saskatchewan S4P 0S1

Chief Executive Officer:

Mike Marsh
President and Chief Executive Officer
SaskPower
Phone: 306-566-3271
MMarsh@saskpower.com

Principal contact person:

Michael Dedman
Project Manager
SaskPower
Phone: 306-566-3209
MDedman@saskpower.com

1.3 JURISDICTIONS, OTHER PARTIES, AND INDIGENOUS GROUPS CONSULTED FOR THE PROJECT

SaskPower identified and engaged with the regulatory agencies, governmental bodies, Indigenous peoples, stakeholders, and other parties who may hold an interest in this Project, starting with the siting process. These entities are listed in Table 1. Additional information on Indigenous groups engaged for the Project is presented in Section 1.3.1.

Table 1 List of Jurisdictions and Other Parties and Indigenous Groups Consulted for the Project

Federal Government	The Agency Nav Canada Transport Canada Canadian Forces Based Moose Jaw, 15 Wing Canadian Forces Based Winnipeg, 17 Wing
Provincial Government	Saskatchewan Ministry of Environment (SK ENV), Environmental Assessment and Stewardship Branch (EASB) SK ENV, Landscape Conservation Environmental Protection Branch Saskatchewan Ministry of Parks, Culture and Sport, Buffalo Pound Provincial Park TransGas Limited SaskWater Water Security Agency (WSA)

MOOSE JAW COMBINED CYCLE POWER STATION PROJECT

General Information and Contact(s)

Municipal Government	Rural Municipality (RM) of Bratt's Lake No. 129 RM of Pense No. 160 RM of Edenwold No.158 RM of Lajord No. 128 RM Moose Jaw No. 161 RM Sherwood No. 159 City of Moose Jaw Town of Pense Village of Grand Coulee Village of Belle Plaine City of Regina
Local landowners, businesses, special interest groups	Residents near four potential sites were contacted during the initial site options study by SaskPower Sherwood Park Golf & Country Club The Mosaic Company Moose Jaw Watershed Stewards Watershed Association Wascana Upper Qu'Appelle Watershed Association Ducks Unlimited Canada Saskatchewan Wildlife Federation Great Plains Air Zone Moose Jaw Chamber of Commerce Nature Saskatchewan Saskatchewan Environmental Society Native Plant Society of Saskatchewan Nature Conservancy of Canada
Indigenous Communities	Carry the Kettle Nakoda Nation Cowessess First Nation Day Star First Nation File Hills Qu'Appelle Developments George Gordon First Nation Kawacatoose First Nation Muscowpetung First Nation Muskowekwan First Nation Nekaneet First Nation New Southern Plains Métis Local 160 (NSPML#160) Ochapowace First Nation Pasqua First Nation Piapot First Nation Regina Riel Métis Council Sakimay First Nation Standing Buffalo Dakota Nation Star Blanket Cree Nation Wood Mountain Lakota Nation

1.3.1 DESCRIPTION OF ENGAGEMENT ACTIVITIES CARRIED OUT TO DATE WITH INDIGENOUS COMMUNITIES

SaskPower's engagement approach with Indigenous communities is an iterative model that evolves as the development of the Project progresses. It began with sharing meaningful project information and learning from the Indigenous communities about their interests and concern, which began in February 2017 during The Project siting process. A summary of engagement with Indigenous communities is provided in Table 2.

Table 2 Summary of Indigenous Engagements

Indigenous Community	Date	Means of Engagement
Sakimay First Nation	February 2017	Letter sharing information about the need for a future natural gas generation facility, the four geographical areas of interest under consideration, site selection process, information on open house locations and dates, and SaskPower contact information.
	July 2018	Provided update letter that SaskPower had narrowed its focus to the Moose Jaw Industrial Park and Belle Plaine areas.
	January 2, 2019	Project update letter/email that SaskPower had selected the Moose Jaw Industrial Park as the preferred site for the Project.
	January 9, 2019	Follow up call – left message on Chief Acoose's voicemail asking to contact SaskPower to discuss and set up possible meeting time.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Cowesses First Nation	February 2017	Letter sharing information about the need for a future natural gas generation facility, the four geographical areas of interest under consideration, site selection process, information on open house locations and dates, and SaskPower contact information.
	July 2018	Provided update letter that SaskPower had narrowed its focus to the Moose Jaw Industrial Park and Belle Plaine areas.
	January 2, 2019	Project update letter/email that SaskPower had selected the Moose Jaw Industrial Park as the preferred site for the Project.
	January 9, 2019	Follow up call – left message for Chief Delorme to call SaskPower.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019

MOOSE JAW COMBINED CYCLE POWER STATION PROJECT

General Information and Contact(s)

Indigenous Community	Date	Means of Engagement
NSPML#160	February 2017	Letter sharing information about the need for a future natural gas generation facility, the four geographical areas of interest under consideration, site selection process, information on open house locations and dates, and SaskPower contact information.
	July 2018	Provided update letter that SaskPower had narrowed its focus to the Moose Jaw Industrial Park and Belle Plaine areas.
	January 9, 2019	Project update letter/email that SaskPower had selected the Moose Jaw Industrial Park as the preferred site for the Project.
	January 10, 2019	President Trudel leaves message with SaskPower to contact him to set up a meeting.
	January 14, 2019	SaskPower returns call to President Trudel. Agree that SaskPower will come to Moose Jaw to meet during the week of January 20, 2019. President Trudel will send SaskPower an email with possible dates and times.
	January 15, 2019	Email from President Trudel requesting a meeting on January 24, 2019 in Moose Jaw at their offices. SaskPower responds and accepts meeting time and date.
	January 24, 2019	Engagement Meeting –SaskPower representatives deliver presentation regarding Project to President Trudel and board members and answer questions.
	March 25, 2019	Email to President Laverne Trudel from SaskPower which includes follow up summary information regarding Air Emissions associated with the Project. SaskPower indicates in email that if further detailed information is required or additional questions arise, please contact SaskPower Indigenous Relations to discuss.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
	April 3, 2019	Phone call from Vice-President confirming that they will be attending the open house and agrees to a meeting at 10:00am at their offices to discuss updates and other matters
	April 17, 2019	Meeting held with SaskPower representatives at NSPML160 offices to discuss the Project, procurement opportunities as well as other possible partnerships with SaskPower. Three members of the NSPML160 attended the open house in Moose Jaw.

MOOSE JAW COMBINED CYCLE POWER STATION PROJECT

General Information and Contact(s)

Indigenous Community	Date	Means of Engagement
Carry the Kettle Nakoda Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message for Chief O’Watch to call SaskPower.
	February 6, 2019	Follow-up text with Chief O’Watch to call SaskPower to set up engagement meeting.
	February 6, 2019	Chief O’Watch return text asks to meet at end of month. SaskPower asks for suitable date time and location to set up.
	March 8, 2019	Engagement meeting held at Carry the Kettle First Nation’s Indian Head office with Chief O’Watch and several Councilors.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
	April 17, 2019	Red Eagle Tail Consultants attended the Open House in Moose Jaw on behalf of the Band.
Day Star First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message for Chief Buffalo to call SaskPower.
	January 10, 2019	Chief Buffalo returned call to SaskPower and leaves message and new number to contact him at.
	January 14, 2019	SaskPower returns call and speaks with Chief Buffalo. SaskPower outlines Project and purpose of early engagement. Resends letter and presentation to new email provided. Chief Buffalo will respond back to SaskPower if there is a need to meet or with questions.
	January 28, 2019	Chief Buffalo returns call and asks to meet at Daystar First Nation during the week of February 11. SaskPower gives three dates, 12/13/14 in the morning at 10AM. Chief Buffalo responds that he will get back to SaskPower shortly to set up.
	March 18, 2019	To date, SaskPower has not heard back from Chief Buffalo to arrange a date.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019

MOOSE JAW COMBINED CYCLE POWER STATION PROJECT

General Information and Contact(s)

Indigenous Community	Date	Means of Engagement
George Gordon First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 10, 2019	Follow up call – No answer, left message on voice mail for Chief Anderson to call SaskPower.
	March 4, 2019	SaskPower receives delegation letter which provides for “delegation of consultation authority” to George Gordon Developments Ltd., and Wicehtowak Limnos Consulting Services Ltd. (WLCS). SaskPower responds with a request for suitable dates to meeting to discuss project.
	March 15, 2019	SaskPower met with George Gordon First Nation and WLCS and provided a project overview. Various economic opportunities related to the project were discussed and a follow up meeting was requested as the project moves forward.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
	April 17, 2019	Representatives from GGFN/WLCS attended the Open House in Moose Jaw.
Kawacatoose First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 10, 2019	Follow up call – talked with receptionist, confirmed letter was received and left message for Chief Dustyhorn to call SaskPower to set up meeting and/or discuss any concerns.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Muscowpetung First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 10, 2019	Follow up call – Chief Cappo, attempted to leave message to call SaskPower but voicemail was full.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Muskowekwan First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message for Chief Bellerose to call SaskPower.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019

MOOSE JAW COMBINED CYCLE POWER STATION PROJECT

General Information and Contact(s)

Indigenous Community	Date	Means of Engagement
Nekaneet First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message for Chief Francis to call SaskPower.
	January 27, 2019	SaskPower texted Chief Francis asking him to contact SaskPower to discuss Project.
	January 28, 2019	SaskPower arranges meeting with Nekaneet representatives for February 26, 2019 at 1:30 PM Regina Office.
	February 26, 2019	SaskPower meets with Chief Alvin Francis and provides overview presentation of the Project. Chief Francis asks about training and employment opportunities as well as procurement. SaskPower ensures Chief Francis that Nekaneet will be invited to all open houses and procurement sessions which will outline opportunities.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Ochapowace First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message for Chief Bear to call SaskPower.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Pasqua First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message on Band Office phone for Chief Peigan to call SaskPower.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Piapot First Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call. Spoke with Executive Coordinator regarding letter and possible meeting to discuss Project. Meeting set for January 17, 2019.
	January 17, 2019	Engagement Meeting. SaskPower presented Project overview and answered questions. Follow-up meeting requested. Awaiting suitable date from Chief and Council.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019

MOOSE JAW COMBINED CYCLE POWER STATION PROJECT

General Information and Contact(s)

Indigenous Community	Date	Means of Engagement
Standing Buffalo Dakota Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – left message for Chief Redman to call SaskPower. Chief Redman returned call and indicated that he will talk with their lawyer and get back to SaskPower if there are any concerns.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Star Blanket Cree Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 10, 2019	Follow up call – left message for Chief Starr to call SaskPower.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Wood Mountain Lakota Nation	January 2, 2019	Project notification letter and presentation sent by both email and mail.
	January 9, 2019	Follow up call – Chief Lecaine indicated that she had not seen the letter yet and provided new email address to send to. Chief Lecaine said she will review letter and get back to SaskPower if there is a desire to meet or if there are any concerns. Resent electronic version of letter and presentation.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
Regina Riel Métis Council	January 9, 2019	Project notification letter and presentation sent by both email and mail.
	January 23, 2019	Follow up call – left message for President Brooks.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019
File Hills Qu'Appelle Developments	March 5, 2019	Email notification to Thomas Benjoe, CEO/President of FHQ Developments from SaskPower requesting a meeting regarding the project.
	March 27, 2019	Invitation letter sent by SaskPower for Public Open House in Moose Jaw being held on April 17, 2019

The Indigenous communities below have provided verbal feedback to date.

- NSPML#160 – Support the Project and would like the opportunity to partner with SaskPower on a number of fronts including possible employment for Métis people during construction of the Project. A question was asked about air emissions from the Project and SaskPower has followed up with summary information.
- Wood Mountain Lakoda Nation – Chief Lecaine indicated that if there are any concerns or questions regarding the Project, she will contact SaskPower.

- Piapot First Nation – No concerns identified to date. Request a follow up meeting with SaskPower.
- George Gordon First Nation – Various economic opportunities related to the project discussed and a follow up meeting was requested as the project moves forward. WLCS requested an opportunity for a band member to gain environmental survey experience on the Project. SaskPower, working with Stantec Consulting, has provided an opportunity for a member of WLCS to be employed to assist in the conducting of the 2019 environmental field surveys as well as provide their Indigenous Traditional Knowledge perspective.
- Nekaneet First Nation – Interested in training, employment, and procurement opportunities.
- Carry the Kettle First Nation – General comments on the problems that Saskatchewan has had regarding consultations with First Nations. Raised the possibility of cumulative effects. Asked about funding to facilitate proper and meaningful consultations. Interested in training, employment, and procurement opportunities.

In summary, to date, no concerns regarding the site selected for the Project or specific potential adverse impacts to Indigenous communities have been raised through the early engagement activities with Indigenous communities. Note that SaskPower is currently reviewing and synthesizing all the information received during the recent (April 2019) engagement activities.

1.4 ENVIRONMENTAL ASSESSMENT AND REGULATORY REQUIREMENTS OF OTHER JURISDICTIONS

The Project has the potential to be regulated by federal and/or provincial jurisdictions. However, depending on the results of the screening, different regulatory pathways may result. A summary of the federal and provincial processes and “triggers” are described below. Additionally, summary descriptions of municipal, provincial, and federal legislation, regulatory requirements, and permits, licenses, and authorizations that may be applicable to the Project are provided in Section 1.4.4.

1.4.1 Federal

Paragraph 2(a) of the *Regulations Designating Physical Activities* (Government of Canada 2014) states that a review needs to occur through the Minister of Environment under the CEAA 2012 (Government of Canada 2012a) for the construction, operation, decommissioning, and abandonment of a new fossil fuel-fired electrical generating facility with a production capacity of 200 MW or more. The proposed Project is nominally 350 MW in size and is therefore subject to a Screening by the Agency under requirements of Section 10 of CEAA 2012 (Government of Canada 2012a), to determine if an EA is required.

The Project is not an incidental activity of a larger Project that is listed in the *Regulations Designating Physical Activities* (Government of Canada 2014). This is a new project and neither the Project nor any of its components are an expansion under CEAA 2012 (Government of Canada 2012a).

1.4.2 Provincial

In addition to federal jurisdiction, the Project may also constitute a "development" for the purposes of *The Saskatchewan Environmental Assessment Act*, as the term is defined by Section 2(d) of the *Act (*Government of Saskatchewan 1980a).

Developments that are likely to have significant environmental implications must be granted approval from the SK ENV-EASB before proceeding with a project. A separate application will be submitted to the SK ENV-EASB in August 2019 to inform their decisions regarding the acceptability of potential environmental effects from the Project. Following the review, it will be determined if the Project is deemed a development and whether the submission of an environmental impact statement (EIS) is required. At this time, SK ENV has not determined whether an EIS is required for the Project.

Similar to the federal process, through the submission of an EIS, if required, the EA process is intended to provide a detailed review of the biophysical, socio-economic and cultural issues associated with a proposed project. It allows for the public, potential stakeholders, and appropriate government agencies to be made aware of and comment on the potential environmental effects associated with a proposed project.

1.4.3 Municipal

This Project is not subject to a municipal level EA. Municipal legislation and regulatory requirements relevant to the Project are presented in Section 1.4.4.

1.4.4 Summary of Legislative and Regulatory Requirements

The Project will be subject to several legislative and regulatory requirements including permits, licenses, and authorizations. Project planning is at the early stages and consequently, all requirements for permits, licenses, and authorizations are not currently known. A list of municipal, provincial, and federal legislation; regulatory requirements; and permits, licenses, and authorizations that may be applicable to the Project is provided in Table 3. This list will be updated and refined as the Project details are confirmed.

Table 3 Summary of Potential Legislative and Regulatory Requirements for the Project

Legislation/Regulations	Overseeing Agency	Relevance to Project
	Federal Authorities	
The Canadian Environmental Assessment Act (Government of Canada 2012a)	The Agency	The Project is a "designated project" and requires a screening under Sections 8 to 12 of the Act. The Agency may require an EA under CEAA 2012.

Legislation/Regulations	Overseeing Agency	Relevance to Project
Fisheries Act (Government of Canada 1985b)	Fisheries and Oceans Canada (DFO)	The *Fisheries Act* defines requirements by which commercial, recreational and Aboriginal (CRA) fisheries are protected, including the prevention of "serious harm to fish" including fish habitats and to fish that support a CRA fishery. A review of available information indicates that no fish bearing water features are expected to be affected by the Project. The proposed potable water supply pipeline will cross the Moose Jaw River, which is fish bearing; this document describes appropriate mitigation to avoid potential effects through the use of horizontal directional drilling (HDD) techniques.
Species at Risk Act (SARA) (Government of Canada 2002)	Environment and Climate Change Canada	The SARA lists species in Canada that are classified as being extirpated, endangered, threatened, or of special concern. These species are granted special measures to protect them. Federally listed species at risk may occur in the Project area and have the potential to interact with the Project. This document describes appropriate mitigation to avoid potential effects.
Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity (Government of Canada 2018b)	Environment and Climate Change Canada	It establishes a limit of 420 tonnes of CO_2 emissions/GWh of energy produced for natural gas turbines in excess of 150 MW.
Migratory Birds Convention Act (Government of Canada 1994)	Environment and Climate Change Canada	The Migratory Birds Regulations define provisions which are meant to protect native species of migratory birds, nests, and eggs. The Project including the proposed transmission line may interact with migratory birds and this document describes appropriate mitigation to avoid potential effects.
Aeronautics Act (Government of Canada 1985a)	Nav Canada	SaskPower will be required to submit a Land Use Submission Form to Nav Canada prior to Construction.
Aeronautics Act (Government of Canada 1985a), Canadian Aviation Regulations, Standard 621 (Government of Canada 1996)	Transport Canada	SaskPower will be required to submit an Aeronautical Assessment Form for Obstruction Marking and Lighting for Transport Canada to determine the need for the use of marking and lighting on objects that may pose a hazard to aviation. SaskPower will work to ensure compliance with the *Moose Jaw Airport Zoning Regulations*.
Standards Respecting Pipeline Crossings Under Railways (Government of Canada 2000)	Transport Canada	Any utilities, including pipelines, that cross under railways are to be installed, renewed, and maintained in a safe manner, and must conform with the requirements stated within *Standards Respecting Pipeline Crossings Under Railways*.

Legislation/Regulations	Overseeing Agency	Relevance to Project
Provincial Authorities		
The Environmental Assessment Act (Government of Saskatchewan 1980a)	SK ENV	Developments that are likely to have significant environmental implications must be granted approval from the Saskatchewan SK ENV-EASB before proceeding with a project. SaskPower will submit a Technical Proposal to the Saskatchewan SK ENV-EASB to inform their decisions regarding the acceptability of potential environmental effects from the Project. Following the review, the SK ENV-EASB will determine if the Project is deemed a development. If the Project is deemed a development, an EA is required.
Environmental Management and Protection Act (Government of Saskatchewan 2010a)	SK ENV	Air quality is regulated by the SK ENV under the *Environmental Management and Protection Act* which regulates potentially harmful activities and substances to protect the air, land and water resources of the province. SaskPower will be required to meet the requirements of Chapter E.1.2, of the Saskatchewan Environmental Code, adopted pursuant to the *Environmental Management and Protection Act*. The Project will also require industrial works construction and operation approvals including approval to construct and store hazardous substances and/or waste dangerous goods from the Environmental Protection Branch.
The Water Security Agency Act (Government of Saskatchewan 2005)	SK ENV – Fish, Wildlife and Lands Branch; WSA	The Project may require a water rights license to construct and operate works as well as an approval to construct and operate a storm water pond. SaskPower will have to pay an industrial usage fee as required by WSA. In addition, an Aquatic Habitat Protection Permit may be required prior to beginning construction. Types of activities associated with the Project that may require an Aquatic Habitat Protection Permit include the construction of incidental activities (e.g., electrical power infrastructure, road upgrades, water infrastructure); and riparian and aquatic vegetation removal.
The Wildlife Act (Government of Saskatchewan 1998)	SK ENV – Fish and Wildlife Branch	Plant and animal species at risk as defined in the *Wildlife Act*, are protected from being disturbed, collected, harvested, captured, killed, sold or exported without a permit.
The Highway and Transportation Act (Government of Saskatchewan 1997)	Ministry of Highways and Infrastructure (MHI)	The Project may require permits for the movement of oversized and overweight vehicles on provincial highways. Permits may also be required for on premise and off-premise identification signs. SaskPower will work with the Saskatchewan MHI, the RM of Moose Jaw (and any other required RM) and the City of Moose Jaw to obtain necessary agreements or permits for work within existing road allowances and roadway crossings prior to potable water supply pipeline construction.

Legislation/Regulations	Overseeing Agency	Relevance to Project
The Heritage Property Act (Government of Saskatchewan 1980b)	Ministry of Parks, Culture and Sport – Heritage Conservation Branch (HCB)	The HCB has designated each quarter section parcel within the southern half of the Province as either "sensitive" or "non-sensitive" for heritage resources. Developments occurring within a "non-sensitive" land parcel may proceed to development without needing to submit an application to the HCB for evaluation. The Project is within a non-sensitive parcel (SE 27-16-26 W2M) and a sensitive parcel (NE 27-16-26 W2M). The interconnections and incidental activities (e.g., electrical power, road upgrades, water infrastructure) associated have the potential to intersect some sensitive parcels. SaskPower's in-house archaeologists will review the Project and its components to reduce the potential risk of affecting heritage resources. The Project may require a heritage resource impact assessment (HRIA) to be conducted. The results of the HRIA, if required, will be provided to the HCB who will issue a letter granting clearance for the Project under the *Heritage Properties Act*.
The Occupational Health and Safety Act (Government of Saskatchewan 1993)		The water and gas pipeline trenches will be designed and constructed in accordance with *The Occupational Health and Safety Regulations, 1996; Part XVII Excavations, Trenches, Tunnels and Excavated Shafts.*
Municipal Authority		
Zoning Bylaw (City of Moose Jaw 2019b)	City of Moose Jaw	SaskPower will be required to apply for a Zoning and Building Certificate from the City of Moose Jaw prior to development.
Building Bylaw (City of Moose Jaw 2016)	City of Moose Jaw	All structures and buildings developed for the Project will be required to comply with the Building Bylaw. SaskPower will obtain the necessary building permits for the Project prior to development.

1.5 PREVIOUS ENVIRONMENTAL STUDY

The Project will not be taking place in an area that has been subject to a regional environmental study.

2.0 PROJECT INFORMATION

2.1 PROJECT CONTEXT AND OBJECTIVES

The proposed Project is one part of SaskPower's Strategic Supply and Renewable power plan for Saskatchewan. The plan looks to contribute to Canada's ability to meet its environmental obligations and its commitments in respect of climate change. SaskPower is targeting a 40% reduction in greenhouse gas (GHG) emissions from 2005 levels by 2030, exceeding the national target of a 30% reduction. To achieve this target, SaskPower will transition over 1,400 MW of conventional coal-fired generation facilities to lower GHG emitting supply options. This includes a significant focus on additional renewables as SaskPower announced plans to increase its renewable generation capacity from 25% today to up to 50% by 2030 in support of meeting the emission reduction target.

The Project, as proposed, is part of the most cost-effective solution to meet increasing electricity demand as well as replace existing conventional coal-fired generation within the timelines required. It will also result in an overall reduction of GHG and other air emissions. As SaskPower phases out conventional coal-fired generation, leverages carbon capture and storage technology, and adds natural gas and renewables into its system, GHG emission levels will reduce significantly.

Currently, independent power producer contracts are in place that will triple SaskPower's installed wind capacity to more than 600 MW in the near future. In addition, the competitive procurement process for another 200 MW wind project is expected to begin later in 2019. SaskPower announced last year that the province's first utility-scale solar project will be constructed near Swift Current and recently started the competitive procurement process for another 10 MW solar facility. These two projects will contribute to SaskPower's goal of adding 60 MW of solar generation by 2021 through a combination of competitive procurement, a partnership with the First Nations Power Authority, and community-driven projects. For SaskPower, developing a combined cycle natural gas turbine (CCGT) facility is a critical enabler for other technologies such as renewables and thus is a necessary first choice.

To integrate these renewable supply options, that are intermittent by nature, a back-up generation source is required to match electricity generation with electricity demand. Natural gas generation is an ideal candidate as it can quickly ramp up or down as the renewable generation output fluctuates. For Saskatchewan, it is the most practical and economic option for integration of renewables to reach SaskPower's 40% emission reduction target by 2030, as other intermittent support options such as hydro resources or grid scale energy storage are either limited in their potential within Saskatchewan or not economically or technically viable at the scale required. To ensure power supply continuity and availability while integrating renewable power sources, the backstop must be in place beforehand.

Natural gas generation is a key component to achieving an increase in renewable capacity, a reduction in GHG emissions, and a cost-effective solution to replace existing conventional coal-fired generation within the timelines required. The transition from conventional coal facilities will require SaskPower's conventional coal-fired baseload generating units be retired, the first of these will be Boundary Dam Units 4 and 5 which are forecasted to shut down by the end of 2021 and 2024, respectively. The retirement of the units will leave a supply shortfall by the end of 2024 that must be backfilled by renewable generation options including hydroelectric import and the construction of a new natural gas power station. The transition of conventional coal-fired generating units to renewables and natural gas represents a significant reduction in GHG and other criteria air contaminants.

2.2 THE PROVISIONS IN THE SCHEDULE TO THE REGULATIONS DESIGNATING PHYSICAL ACTIVITIES

Paragraph 2(a) of the *Regulations Designating Physical Activities* (Government of Canada 2014) states that a review needs to occur through the Minister of Environment under the CEAA 2012 for the construction, operation, decommissioning, and abandonment of a new fossil fuel-fired electrical generating facility with a production capacity of 200 MW or more. The proposed Project is a nominal 350 MW CCGT facility and is therefore subject to a Screening by the Agency under requirements of Section 10 of CEAA 2012, to determine if an EA is required.

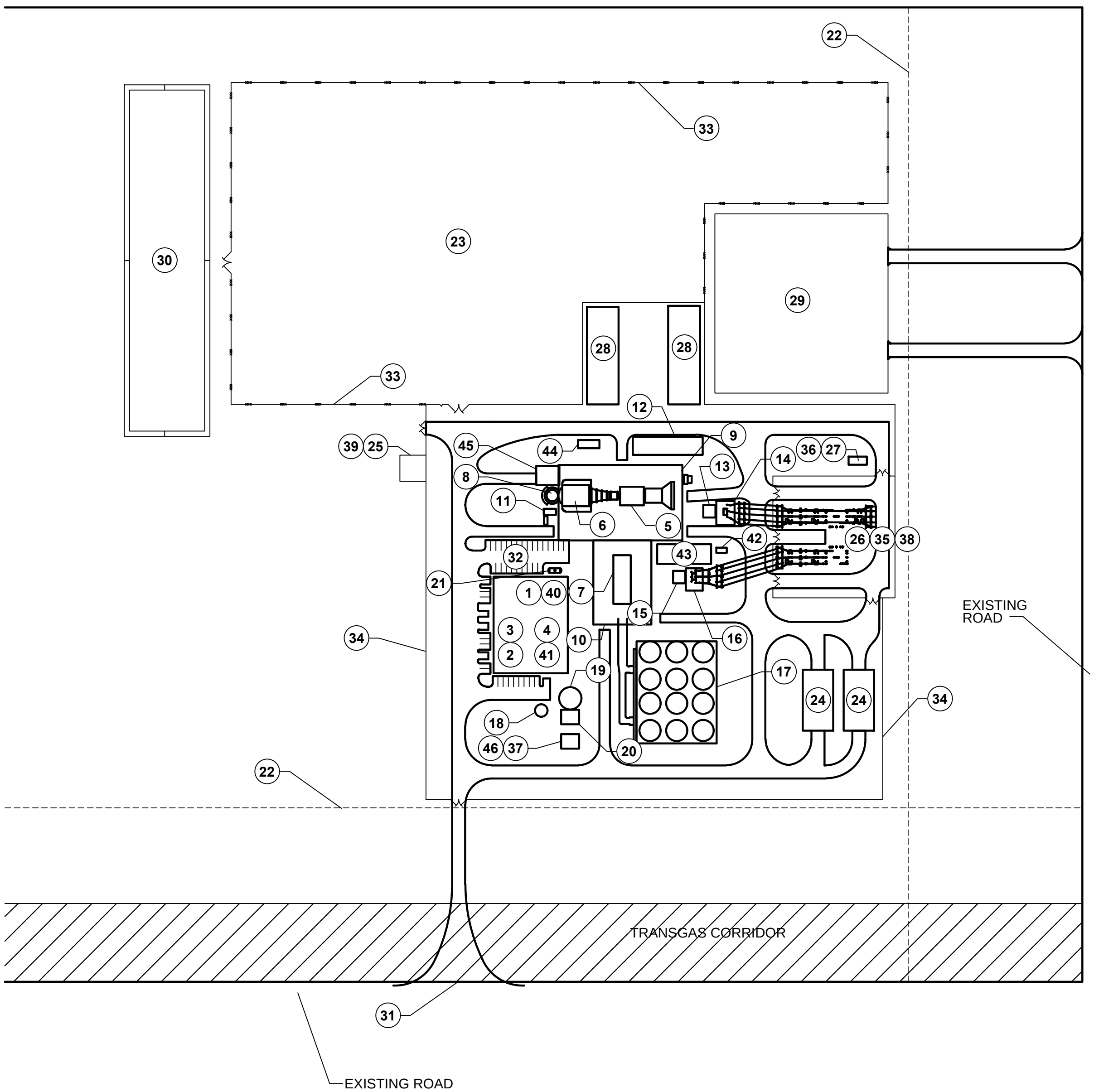
2.3 DESCRIPTION OF PHYSICAL WORKS AND STRUCTURES

The Project will be a power generation facility which uses natural gas CCGT technology to generate a nominal 350 MW of electricity. Components will include the Project as well as the following incidental activities:

- water infrastructure
- electrical power infrastructure
- a fibre-optic line
- road upgrades, and
- natural gas infrastructure.

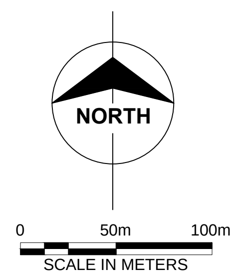
Except for the incidental activities, all structures and equipment will be located at E1/2 27-16-26 W2M which SaskPower currently has an option to purchase from the City of Moose Jaw. This includes the powerhouse, with steam turbine and gas turbine building areas, multipurpose building with main control/administration areas, warehouse, workshop, and water treatment building, air cooled condenser (ACC), switchyard, and miscellaneous auxiliary buildings and structures.

The site layout illustrates the proposed locations of the physical structures to be erected on the Project site (Figure 2, Table 4).



KEY NOTES:

1. CONTROL ROOM/ADMINISTRATION/ OFFICES/STAFF FACILITIES
2. WAREHOUSE
3. MAINTENANCE SHOP
4. WATER TREATMENT BUILDING
5. GAS TURBINE GENERATOR (GTG)
6. HEAT RECOVERY STEAM GENERATOR (HRSG)
7. STEAM TURBINE GENERATOR (STG)
8. GTG STACK
9. GTG BUILDING
10. STG BUILDING
11. CONTINUOUS EMISSIONS MONITORING (CEMS) AND HRSG/CONTROL ENCLOSURE
12. CLOSED COOLING WATER FIN FAN COOLER
13. GTG AUXILIARY TRANSFORMER
14. GTG GENERATOR STEP-UP TRANSFORMER
15. STG AUXILIARY TRANSFORMER
16. STG GENERATOR STEP-UP TRANSFORMER
17. AIR COOLED CONDENSER (ACC)
18. DEMINERALIZED WATER STORAGE TANK
19. SERVICE/FIRE WATER STORAGE TANK
20. FIRE PUMP ENCLOSURE
21. OIL/WATER SEPARATOR
22. 100 METER PROPERTY EASEMENT CORRIDOR
23. CONSTRUCTION LAYDOWN
24. STORAGE BUILDING
25. FUEL GAS CUSTODY TRANSFER AREA
26. TRANSMISSION SUBSTATION
27. CONSTRUCTION POWER TRANSFORMER
28. CONSTRUCTION TRAILERS
29. CONSTRUCTION PARKING
30. STORM WATER POND
31. ACCESS ROAD
32. PARKING LOT
33. CONSTRUCTION FENCE
34. PERMANENT FENCE
35. ELECTRICAL TRANSMISSION (230kV) INTERCONNECTION POINT
36. ELECTRICAL DISTRIBUTION (25kV) INTERCONNECTION POINT
37. POTABLE WATER INTERCONNECTION POINT
38. FIBRE-OPTIC INTERCONNECTION POINT
39. NATURAL GAS INTERCONNECTION POINT
40. SEWAGE INTERCONNECTION POINT
41. PROCESS WASTEWATER INTERCONNECTION POINT
42. EMERGENCY DIESEL GENERATOR
43. PLANT CONTROL AND MONITORING MODULE
44. WASH WATER DRAIN TANK
45. FUEL GAS BUILDING
46. POTABLE WATER BUILDING



PRELIMINARY - NOT FOR CONSTRUCTION

SaskPower

FIGURE 2

Table 4 Description of Physical Works

Physical Work	Description
Permanent Facilities and Infrastructure	
Powerhouse	Building to enclose the Gas Turbine Generator (GTG), Steam Turbine Generator (STG), Heat Recovery Steam Generator (HRSG), and other balance of plant (BOP) electrical and mechanical equipment. The footprint of the building will be approximately 4,400 m^2. The exhaust stack is anticipated to be 49 m tall.
Multipurpose Building	A multipurpose building will be constructed to house the operating and maintenance staff. The multipurpose building will include a warehouse, maintenance shop, water treatment area, and control/administration rooms. An enclosed breezeway will be constructed to connect the multipurpose building and the powerhouse
Fuel Gas Building	A 5 m by 14 m pre-engineered fuel gas building will be located in the northwest corner of the Project and will contain a performance gas heater where feedwater is used 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.
High-voltage Switchyard and Transmission System	Provides the interconnection between the Project electrical system and the utility electrical grid for the transfer of power generated out of the Project, and supply of startup and auxiliary power into the Project.
Water/glycol Loop and fin-fan heat exchanger	A water/glycol loop will be used in a closed-cycle cooling water system to cool various STG, GTG, and BOP equipment. The water/glycol loop is cooled by a fin-fan heat exchanger. The closed cooling fin-fan heat exchanger measures approximately 10 m by 42 m.
Air Cooled Condenser	The ACC is a heat exchanger that condenses steam from the steam turbine to condensate. The ACC will be located near the south boundary of the Project with an overall dimension of approximately 52 m by 52 m with a height of approximately 30 m.
Underground Wash Water Drain Tank	An underground wash water drain tank will be located to the north of the GTG building. The 3 m by 5 m tank will collect water from the compressor wash and will be hauled off site periodically for disposal at an approved Project.
Fire/Service Water and Demineralized Water Tanks.	The fire/service water tank will have a capacity of approximately 1,892,706 litres whereas the demineralized tank is estimated to have a capacity of 378,541 litres. The water storage tanks serve to improve operational reliability of the unit in the event of interruption of service from the City, or equipment malfunction in producing demineralized water.
Oil/Water Separators	An oil/water separator will be used to separate oil from the water that will be collected from the Project drains. It will be designed to store 3,785 litres of oil.
Permanent Small Buildings	Several other permanent buildings or enclosures including the fire water pump enclosure, emergency diesel generator, and three electrical equipment modules.
Storm Water Pond	A storm water pond will also be constructed for the Project. The storm water pond will be designed to retain all site drainage water. The pond is estimated to be 35 m x 200 m in size.

Project Information

Physical Work	Description
Electrical Generator System	The electrical generator system will convert the mechanical rotating energy into electrical energy to supply the power system load through the three-phase Generator Step-Up Transformers (GSUs) to the high-voltage transmission system.
Site Access Road and Permanent Parking Lots.	The site access road that will be built on the Project quarter section will be approximately 110 m in length and 8 m wide. Permanent parking lots will be located on the north, west, and south sides of the multipurpose building and will have approximately 30 parking stalls. The access road and parking lot will be all-weather and surfaced with crushed rock.
Security Fence	A security fence will be constructed around the perimeter of the Project.
Utilities and Infrastructure	
Potable Water Supply	Water for the Project will be obtained from the City of Moose Jaw via a new underground pipeline. Engineering design discussions are preliminary, but it is expected that the pipeline would be fed from an existing City of Moose Jaw reservoir. The water pipeline will be constructed of an approximately 14" high density polyethylene (HDPE) pipe. The pipeline is expected to have a right-of-way (ROW) up to 20 m-wide and be approximately 10 km long with a capability of transporting water at approximately 379 litres per minute.
Process Wastewater Discharge	The Project will require a complementary infrastructure connection to the City of Moose Jaw Wastewater Treatment Plant lagoons located immediately south of the Project to transport waste water from the Project site.
Sanitary Discharge	The City of Moose Jaw is currently investigating infrastructure strategies to support all future proponents of their industrial park. Currently the Project is anticipated to tie into the City system approximately 0.5 km north of the Project. A 6-inch HDPE line will connect to transport the sanitary waste discharge anticipated to be at a rate of approximately 3 liters per minute.
Electrical Transmission Line Infrastructure	SaskPower will route, construct, and operate an approximately 12 km-long new 230 kV transmission line within a 40 m-wide ROW to interconnect the Project to SaskPower's existing Pasqua Switching Station located in NE 32-16-25 W2M.
Distribution Line Infrastructure	SaskPower will route, construct, and operate 25 kilovolt (kV) power to the Project. It is expected that this supply will be tapped off of an existing overhead 25 kV line located directly south of the property. It is anticipated that the total length of the distribution line will be approximately 800 m within a 10 m-wide ROW.
Fibre Line	SaskPower will route, construct, and operate an approximately 12 km-long fibre-optic line. It will be run either underground with a 10 m-wide ROW or strung overhead on existing or to be installed on transmission line structures depending upon feasibility to interconnect the Project to the existing Pasqua switching station at NE 32-16-25 W2M.

Project Information

Physical Work	Description
Natural Gas Infrastructure	Specific natural gas infrastructure associated with the Project will consist of a high pressure feed (< 2 km-long) from a new pipeline being developed by TransGas to a TransGas Customer Metering, Regulation, and Odorization Facility. At this location TransGas will measure the gas flow, reduce the pressure to meet the supply requirements of SaskPower, and inject odorant for safety purposes. These TransGas facilities will be placed on a parcel of land, approximately 100 m x 100 m in size, and situated in a location that has yet to be confirmed, but which may be either adjacent to, or in proximity (< 1 km) to the Project. Downstream of the TransGas Metering and Regulation Facility, the regulated and odorized gas will be transported a short distance (<1 km in length) to the Fuel Gas Custody Transfer Area at the Project.
Facility Gas System	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.
Road Upgrades	New roads are not required for the Project; however, road upgrades are required to support construction traffic and heavy loads being deliver to the Project. It is expected that approximately 4 km of road will need to be upgraded to a 30 m-wide ROW heavy haul road.

2.4 PRODUCTION CAPACITY

The Project has been designed to generate a nominal net output of 350 MW. The Project output is greater than the 200 MW threshold established for new fossil fuel-fired electrical generating facilities under the *Regulations Designating Physical Activities* (Government of Canada 2014).

Power output, heat rate, and efficiency for CCGT technologies have improved incrementally over the years, primarily due to the advancement in the design of the gas turbine. For an intermediate to base load CCGT facility, a combined cycle using G, H, and J class gas turbines[1] would have better efficiency. However, output of a CCGT facility using these technologies would be higher than SaskPower's single largest contingency of 350 MW. Due to grid and interconnection constraints, a power plant using these larger gas turbine technologies would require a derate of the power plant to stay near 350 MW, which in turn decreases the efficiency resulting in a higher heat rate and higher emissions.

The 1x1 F-class[2] turbine configuration chosen for the Project is best suited to meet the 350 MW output. Since carbon capture technology is not used for CCGT units, higher efficiency (lower heat rate) means that less CO_2 is generated.

2.5 PROCESSING

The basic principle of the Project is to combust natural gas in a gas turbine which is coupled to a generator to produce power. The combustion turbine hot exhaust gases are then used to produce steam in a HRSG. This steam produced is utilized in a steam turbine coupled to a generator to produce additional power. As a result, CCGT facilities are one of the most efficient and reliable generation technologies available.

Pipeline quality natural gas will be used as the only fuel for the unit. Prior to entering the gas turbine, the natural gas will be heated in accordance to Original Equipment Manufacturer (OEM) guidelines using the intermediate pressure feedwater. Increasing the temperature of the natural gas increases the cycle efficiency. The heated natural gas is then combusted in the gas turbine to drive the turbine to generate electricity. Electricity generated by the GTG will be stepped up to 230 kV using the generator step up transformer before interconnecting to the SaskPower transmission system. For this Project, an advanced F-class gas turbine has been selected for the Project. The advanced F-class gas turbine utilizes state-of-the-art technology to improve efficiency and boost output. The gas turbine is equipped with Ultra Low

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[1] Gas turbines are categorized by manufactures based on their output, firing temperature and pressure ratio. These categorizations are called classes. The letter associated with the class generally refers primarily to when the technology was developed, how it has evolved and the overall output. Generally speaking, H and J-class machines are more efficient than F-Class by 1%-2%, but are too large to be accommodated by SaskPower's transmission system at peak efficiency. The smallest H and J-class combustion turbines output 40 – 80 MW more than the largest F-class turbine.

[2] F-Class turbines are smaller than the G, H and J class turbines, and are the largest, most efficient that can be accommodated by SaskPower's transmission system.

nitrogen oxide (ULN) burners which optimizes the ratio of combustion air to fuel as well as combustion temperature to control nitrogen oxide (NOx) emissions from the natural gas combustion process.

The gas turbine exhaust gas temperature ranges from 590ºC to 630ºC at the outlet of the gas turbine. The hot exhaust gas is ducted from the GTG to the HRSG 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 combustion 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 Project 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.

The exhaust gas exits the HRSG via the stack. The stack is estimated to be approximately 49 m high based on findings from the air dispersion modelling performed specifically for the Project to meet the Saskatchewan Ambient Air Quality Standards (SAAQS) and Canadian Ambient Air Quality Standards (CAAQS).

Steam generated in the HRSG is used to drive a steam turbine and generator to produce electricity. Electricity generated by the STG will be stepped up to 230 kV using the generator step up transformer before interconnecting to the SaskPower transmission system. Exhaust steam exits the low pressure section of the turbine and is ducted into the ACC. The ACC is a heat exchanger where ambient air is drawn from the surroundings by the fans to condense the exhaust steam and the condensate collects in the condensate tank. Condensate is then pumped by condensate pumps and 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 Project. The boiler blowdown drain, HRSG stack drain, and feedwater pressure relief valves are routed to the Project drains system where the collected drains will be pumped back to the Service/Fire Water Tank for reuse.

Based on the lower heating value (LHV) of natural gas, annual average ambient conditions, the thermal efficiency of the Project is almost 58%. As a result, the annual CO_2 emissions of the Project are expected to be well below 420 kilogram per megawatt hour (kg/MWh) across all ambient conditions when the GTG is operating at full load in compliance with *Regulations Limiting Carbon Dioxide Emissions from Natural Gas-fired Generation of Electricity (*Government of Canada 2018b*)*. Instantaneous CO_2 emissions are estimated to range between 371 kg/MWh to 392 kg/MWh when the GTG operates at full load. As the Project ages, the unit will experience degradation which decreases the Project efficiency thereby increasing CO_2 emissions per MWh. 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 Project will not exceed emission limits of 420 kg/MWh over the life of the Project.

The use of ACC saves water consumption by more than 90% compared to a wet cooled unit. However, the use of an ACC does impact the efficiency of the cycle, increasing the CO_2 emissions in kg/MWh. Due to the temperate climate at Moose Jaw, impact on heat rate using an ACC is much less than a location with a hot climate such as Phoenix, Arizona. A Continuous Emission Monitoring System (CEMS) will be installed at the Project to measure and report emission data per the requirements of the annexed New Source Emission Guidelines for Thermal Electricity Generation (Government of Canada 1999), published in the Canada Gazette, Part 1, and for controlling the unit. The CEMS information will be in accordance with Protocol and Performance Specifications Environmental Protection Service 1/Power Generation/7 referenced in the guidelines.

2.6 DESCRIPTION OF PROJECT ACTIVITIES

2.6.1 Pre-construction

The Project pre-construction activities are anticipated to start in the fall of 2019. Activities will include land and geotechnical surveys required for design and construction. Land surveys will identify site boundaries and topographic details required for site preparation and grading. Geotechnical surveys will be conducted to gather information on soil consistency and structure needed for piling and foundation design. A site procedure manual will also be developed and will include a site emergency response plan, an environmental management plan, and site safety procedures.

2.6.2 Construction

Construction of the Project will include:

Site Preparation and Grading – Project preparation activities will be performed prior to any other construction work. Site preparation construction is expected to take approximately four to five months to complete and is ideal for the work to be completed outside of frozen ground conditions. The general sequence of the site preparation construction will be to begin work in the main Project area and in the construction management trailer area/parking lot area. Following the initial work, the balance of the site preparation construction scope will be performed, which includes installing the site fence, preparing the switchyard area, installing the storm water pond, and installing the main construction roads on the site.

Foundation Excavation and Construction – Includes excavation, piling construction, and foundation/substructures construction. Piling construction work will begin in April 2020 followed by foundation/substructures construction beginning in May 2020. Using this approach, it is expected that all foundation construction work can be completed by December of the same year. Ductbank and grounding grid construction and underground piping installation work will be completed during the construction of the foundations in the same areas.

Building and Equipment Installation – Building construction will begin following completion of foundation construction. Building construction also includes mechanical, electrical, and switchyard construction.

Water Infrastructure – The Project requires a pipeline to supply water to the Project. Water for the Project will be obtained from the City of Moose Jaw via a new underground pipeline. Engineering design discussions are preliminary, but it is expected that the pipeline would be fed from an existing City of Moose Jaw reservoir. SaskPower is currently working with the City to determine the optimal connection location for this pipeline. SaskPower will use a subcontractor to design and construct the water pipeline. The water pipeline will be installed where possible, within existing developed road allowances (i.e., ditches). Conventional open trenching technology will be used to construct most of the water pipeline other than at crossings (e.g., highway, railway, utilities, etc.) and environmentally sensitive areas (i.e., water features) where HDD will be used.

Electrical Power Infrastructure – The Project will require an approximately 12 km-long 230 kV transmission service with a 40 m-wide ROW to interconnect the Project to SaskPower's existing Pasqua switching station location in NE 32-16-25 W2M. The Project will also require an approximately 800 m-long 25 kV distribution line with a 10 m-wide ROW that will connect to SaskPower's existing distribution system for construction power to the Project. Transmission and distribution line routing, stakeholder engagement, regulatory approvals/permits, construction, and operation are the responsibility of SaskPower

Fibre-optic Line – Telecommunications through a fibre-optic line will be required for operation of the Project. The primary method of communication with the Project will be through a Wide Area Network whose central medium for communication is fibre-optics. Existing fibre-optic cables are in place at the Pasqua switching station in support of SaskPower's existing switching station control systems. SaskPower will be responsible for routing, constructing, and operating the fibre-optic line. Approximately 12 km of new fibre-optic cable will be needed. It will be run either underground with a 10 m-wide ROW or overhead on existing or new transmission line structures. A final route for the fibre-optic line is expected to be developed in late 2019.

Natural Gas Infrastructure – TransGas will be responsible for providing natural gas infrastructure required to supply the Project. This includes the construction of a new natural gas transmission pipeline that is approximately 30 km in length to supply the Moose Jaw Industrial Park as well as specific facilities associated with the Project, which consists of a short (<2 km length) high pressure feed from the new transmission pipeline to TransGas' new Customer Metering, Regulation, and Odorization Facilities either adjacent to, or in close proximity (< 1 km) to the Project, and a short pipeline from these facilities to the Fuel Gas Custody Transfer Area at the Project Site. Natural gas infrastructure routing, stakeholder engagement, regulatory approvals/permits, construction, and operation are the responsibility of TransGas.

Commissioning and Testing – The principal activities provided during this stage include Project start-up planning and preparation, start-up and commissioning process, start-up and commissioning management, operator training management, and performance testing.

2.6.3 Operation

The Project will be owned and operated by SaskPower. Day to day operation and maintenance will be provided by a staff of operators, engineers, and support staff totaling approximately 20 people. Additional support staff will be available from the other natural gas facilities in the SaskPower fleet.

Major maintenance and refurbishment work on the STG and GTG will be provided by the turbine and generator manufacturer.

During operation of the Project, the ongoing operation and maintenance of the electrical power infrastructure and fibre optic line will be the responsibility of SaskPower. Operation and maintenance of the water and natural gas infrastructure will be the responsibility of the City of Moose Jaw and SaskEnergy, respectively.

2.6.4 Decommissioning and Reclamation

Cleanup activities will be ongoing throughout construction. Upon completion of the construction work, SaskPower and contractor personnel will ensure that any remaining construction materials and other debris are removed. Upon completion of the construction of the incidental activities, subcontractors will confirm that any remaining construction materials or other debris are removed, and any surface disturbance is reclaimed, where applicable (i.e., recontouring and application of seed and/or sod).

The Project is expected to operate until at least 2053. Precise timing for the decommissioning of the Project and the incidental activities under the care and control of SaskPower (i.e., electrical power infrastructure and fibre optic line) 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 outlining the decommissioning and reclamation objectives, methodologies, and estimated costs to be submitted as a required part of the provincial Authorization to Operate application process.

Water and natural gas infrastructure will be operated under the care and control of the City of Moose Jaw and SaskEnergy, respectively, as such, decommissioning of these facilities will be the sole responsibility of these parties.

2.7 EMISSIONS, DISCHARGES AND WASTES

2.7.1 Atmospheric Emissions

2.7.1.1 Construction Emissions

Air emissions generated during construction of the Project will result from several sources and activities. Particulate matter (PM) is the term used to refer to solid particles and liquid droplets found in the air. The PM is reported according to the diameter of the particle size; PM_{10} refers to coarse dust particles 10 microns in diameter or smaller and typically includes crushing and grinding operations and dust from vehicles on roads. $PM_{2.5}$ refers to fine particles 2.5 microns or less in diameter and can only be seen with an electron microscope. Fine particles are produced from all types of combustion and some industrial processes. The United States (US) Environmental Protection Agency (EPA) emission standards were used to determine construction combustion emission from the Project for PM emissions. There are no PM_{10}, and $PM_{2.5}$ emission standards. Therefore, for conservativeness, it was assumed that PM_{10}, and $PM_{2.5}$ combustion emissions from the Project are equivalent to PM emissions for the purpose of air emissions calculations.

Fugitive dust and fine particulate emissions will be generated from land clearing, site preparation, earth moving and material handling, and vehicles creating dust by traveling on land. In addition, off-road construction equipment (dozers, compressors, etc.) will release combustion by-products such as NO_x, carbon monoxide (CO), and volatile organic compounds (VOCs) when they operate by combusting fuel. Fugitive dust emissions ($PM/PM_{10}/PM_{2.5}$) will be higher during land clearing and site preparation and during active construction periods when there is increased vehicle traffic on the site from mobile equipment.

Construction equipment will also emit GHG emissions. To estimate potential carbon dioxide (CO_2) equivalent (CO_2e) emissions from the construction equipment, emission factors for CO_2, methane (CH_4), and nitrous oxides (N_2O) were obtained from the EPA Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98) and ratioed with their appropriate Global Warming Potentials (GWP). The potential GHG construction emissions were calculated using the parameter data shown in Table 5 and GHG emission factors. The potential emissions are summarized in Table 6.

Table 5 Estimated Maximum Potential Annual Greenhouse Gas Emission Rates of the Project During Construction

Pollutant	Construction Year 1 (tonnes per year)	Construction Year 2 (tonnes per year)	Construction Year 3 (tonnes per year)	Total Construction Emissions Over 3 years (tonnes)
CO_2	44,130	59,062	10,735	**113,927**
CH_4	1.8	2.4	0.4	**4.6**
N_2O	0.4	0.5	0.1	**1**
CO_2e	44,282	59,266	10,772	**114,320**

2.7.1.2 Operation Emissions

Emission of air contaminants during operation of the Project will result from the combustion of natural gas in the proposed combined-cycle combustion turbine. There will also be emissions of air contaminants generated from the emergency diesel generator, emergency diesel fire pump, and dew point heater. The maximum emissions from any operating load including start-up and shut down emissions for the combustion turbine were used to demonstrate the maximum potential emissions for each pollutant. The maximum potential air emissions associated with the Project, based on 8,760 hours per year of operation, including start-up and shut down emissions for the turbine and auxiliary equipment emissions can be found in Table 6.

Table 6 Theoretical Maximum Potential Air Emissions Associated with the Project During Operation

Pollutant	Potential Air Emissions (tonnes per year)
NO_x	449.3
CO	163.6
$PM/PM_{10}/PM_{2.5}$	26.8
Sulphur Dioxide (SO_2)	28.7
CO_2	1,263,467
CO_{2e}	1,264,674

The CO_2 estimate in Table 6 is based on a Project operating scenario of 100% load for 100% of the year which is not a realistic operating scenario. Given the Project is designed to be dispatched, under an operating scenario that represents a normal operating year (assuming 85% capacity of the gas turbine at 100% load), the CO_2 emissions would be approximately 1,037,437 tonnes/year.

Natural gas power stations using CCGT technology emit 40% as much CO_2 as conventional coal-fired generation in Saskatchewan. For reference, Units 4 and 5 at SaskPower's Boundary Dam Power Station emit approximately 2.3 million tonnes of CO_2 annually to generate 280 MW. Units 4 and 5 are slated for shut down by the end 2021 and 2024, respectively. The Project will result in a greater generation output (a nominal 350 MW) with a lower GHG footprint as indicated in Table 7. As SaskPower phases out conventional coal-fired generation and adds natural gas and renewable generation to the system, the GHG emissions will continue to improve (i.e., diminish).

Table 7 Estimated Maximum Potential Annual Greenhouse Gas Emissions Associated with the Project During Operation

Pollutant	Combined-Cycle Combustion Turbine[a] (tonnes per year)	Dew Point Heater (tonnes per year)	Emergency Diesel Fire Pump (tonnes per year)	Emergency Diesel Generator (tonnes per year)	Total (tonnes per year)[b]
CO_2	1,035,610	1,735.1	17.9	73.4	**1,037,437**
CH_4	18.7	0.03	0.001	0.003	**18.7**
N_2O	1.9	0.003	0.0001	0.001	**1.9**
CO_2e	1,036,634	1,737	18	74	**1,038,463**

[a] Represents 100% annual average ambient unfired scenario

[b] Based on 7,446 hours of turbine and heater operation, and 100 hours of pump and generator operation, per year

The F-Class GTG will have the most up-to-date technology which includes several technologies to keep emissions low. NOx emissions will be controlled by the use of ULN burners. Emissions of particulates will be low due to the combustion of clean-burning natural gas. In addition, CO and VOC emissions will be minimized through effectively tuned combustion turbine controls. Further, natural gas has the lowest SO_2 emissions of any fuels. The Project is being designed with the best available control technology to achieve ground level effects

2.7.2 Sources and Locations of Liquid Discharges

2.7.2.1 Construction Liquid Discharges

The main sources of plausible liquid discharge during the construction phase include sanitary waste, rain water, snowmelt, and machinery fluids (e.g., diesel fuel, lubricating oils). Each source will be controlled differently to avoid spills and unplanned releases.

During the construction phase, portable toilets will be used by personnel. Sanitary waste will be stored in a septic tank with a holding capacity of approximately 7,570 litres and will be pumped and removed from site by licensed contractors and disposed of in accordance with federal, provincial, and municipal regulations.

Rainwater and snowmelt runoff will be monitored and controlled during construction and operation of the Project. The Project site will be graded to drain surface water to temporary drainage ditches and a storm water pond. The storm water pond will be designed to collect the main sources of water including surface water runoff and ACC wash water only, therefore it is extremely unlikely to come into contact with contaminants given the storage, secondary containment and handling procedures employed at site. The limited possible exception could be very small amounts of hydrocarbons from minor, undetected leakages from vehicles or incidental grease or oil contact when washing dust from the ACC. The storm water pond has been designed to accommodate a 100-year storm event and preliminary design anticipates the pond will be approximately 7,000 m^2 and approximately 2 m-deep. The overflow structure will allow for excess water to slowly release over a period of a few days, until the pond is returned to its normal depth of water. This will be done in accordance with a Drainage approval from the WSA and the release of storm water will be designed to maintain existing drainage patterns on the Project site. Water quality in the storm water pond is expected to be similar to that of natural wetland habitats. Regular testing of storm water prior to release is not part of the storm water pond normal operations, as the pond is designed to collect surface water runoff only and is thus highly unlikely to come into contact with contaminants.

Out of an abundance of caution a storm water pond hydrocarbon monitoring and mitigation procedure will be established and employed throughout the life of the facility (including construction and operation).

Machinery will be kept in proper working order during construction to avoid spills of machinery fluids such as oils, fuels and coolants. The site procedures manual will identify proper spill handling techniques and spill reporting criteria for the Project.

2.7.2.2 Operation Liquid Discharges

The Project will contain various sources of possible liquid discharges that must be controlled during operation.

The Project will utilize an ACC, which significantly reduces the water consumption and associated discharges. The estimated process wastewater that will be discharged during normal operation will range between 32 litres/minute and 35 litres/minute (46-50 m^3/day) across various ambient conditions.

The waste water generated from the Project will mainly consist of effluent water from the water treatment process and be discharged to the City of Moose Jaw. The benefit of sending the water to the City of Moose Jaw is that SaskPower will not be required to build an evaporation pond.

During operation of the Project, sanitary waste will be collected and pumped to the city of Moose Jaw. Given sanitary waste water generated during operation will be less than 18 m^3 per day, the waste system will be regulated by *The Plumbing and Drainage Regulations*.

The storm water pond will be designed for a 100-year storm event and preliminary design anticipates the pond will be approximately 7,000 m^2 and approximately 2 m-deep. See Section 2.7.2.1 for more information on the storm water pond.

In addition to the liquid stream during operation, there are also other liquid waste streams associated with maintenance work. These streams are usually intermittent flows such as gas turbine compressor wash, ACC wash, lube oil, etc. Details regarding the disposal and effects of the intermittent flows can be found in Table 8. Final locations of drains and trenches are to be determined in final design for construction.

Table 8 - Summary of the Estimated Quantities of the Intermittent Liquid Waste Streams

Liquid Waste	Description	Volume		Containment	Disposal Method	Potential Effects on the Environment
		Normal	Maximum			
Waste effluent from HRSG blowdown	Blowdown from HRSG HP,IP, and LP drums. Used to maintain boiler chemistry by blowing down solids from the bottom of the boiler drums into a blowdown tank. Liquid effluent is quenches and sent to the plant sump and vapor is sent to an atmospheric vent.	3.2 m^3/hour	15.9 m^3/hour	Plant Sump	Recycled back to service water storage tank and filtered in plant demineralizer	None
Waste effluent from demineralized water treatment plant	Water treatment plant discharge waste stream	2.1 m^3/hour	4.2 m^3/hour	City of Moose Jaw	Effluent will be pumped to the city of Moose Jaw through an underground pipeline	None
Sampling discharge	Sample panel drains	0.9 m^3/hour	0.9 m^3/hour	Plant Sump	Recycled back to service water storage tank and filtered in plant demineralizer	None
Drainage within powerhouse building	Miscellaneous floor drains and equipment drains	2.3 m^3/hour	2.3 m^3/hour	Plant Sump	Water will be sent through oil water separators and recycled back to the service water tank or sent to the City of Moose Jaw	None; oil water separators will have oil level switches and pump interlock to prevent discharging oil laden water. Oil will be trucked offsite.
Gas turbine water wash	Gas turbine compressor water wash will be a combination of water and cleaning agent that will be collected in a drains tank and trucked offsite.	5.2 m^3/hour	7.9 m^3/hour	Water Wash Drains Tank	Will be treated as hazardous waste and trucked offsite.	None
Air cooled condenser water wash	Air cooled condenser fin wash to remove dust accumulation on the outside of the ACC fins	200 m^3 per wash (wash quantity dependent on weather cycles, est. 2 washes per year)	N/A	N/A	Plant storm water system	Extremly minimal; clean plant water is used in the pressure washer. Potential rare occurance for hydrocarbons to be present on the ACC and contaminate the waste wash water
Used oil and other solvents (hazardous waste)	Used lube oil and control oil for turbines and other cleaners used in plant	TBD	TBD	Plastic totes or barrels	Oil will be sold or recycled to/by qualified carrier.	None
Sewage	Sanitary waste from admin building	5 m^3/day	N/A	N/A	Sewage will be pumped to the city of Moose Jaw through an underground pipeline	None

Notes:
1. Information in this table is preliminary and values will be updated as required during permit application process.

2.7.3 Types of Wastes and Plans for Disposal

Solid wastes that will be generated during construction will be typical of activities associated with power generation construction, such as packing materials, office wastes, scrap lumber, excess concrete, metals, cables, glass, cardboard containers, and other miscellaneous debris. Solid waste will be collected in large waste containers and hauled off and disposed of by licensed waste contractors in accordance with federal, provincial, and municipal regulations. Waste disposal will occur only at either locally or regionally approved facilities.

Solid wastes generated during the operation phase of the Project will be typical of activities associated with operation of a power generation facility. Wastes will include domestic and office waste generated by operations personnel, packaging wastes from supplies, as well as wastes from ongoing maintenance activities (e.g., oil containers, rags, etc.). Wastes generated during operation will be disposed of by licensed waste contractors in accordance with federal, provincial, and municipal regulations using approved facilities. Table 9 provides the estimated quantity of solid wastes that will be generated during operation of the Project.

Table 9 Estimated Quantity of Solid Wastes Generated from the Project during Operation

Waste Material	Disposal Method	Estimated Annual Quantity (tonnes)
Waste oil/filters/hazardous waste/oily rags/aerosol cans	Collected and disposed of through registered collectors and recovered/recycled through registered processors/disposal class 2 landfill.	3
Domestic waste	Municipal Landfill	3
Paper/cardboard/tin/plastic	Approved recycling facility	8-15
Scrap metal	Approved recycling facility	15

2.8 CONSTRUCTION, OPERATION, AND DECOMMISSIONING AND ABANDONMENT PHASES AND SCHEDULING

The proposed Project schedule is outlined in Table 10. The schedule may be affected by SaskPower internal governance approvals and by regulating agency assessments and approvals. The schedule assumes that no federal or provincial EA will be required and there are no SaskPower governance approval delays. In the event that an EA is required, the Project milestones will be shifted accordingly based on the time required to conduct the EA.

Table 10 Project Schedule

Activity	Anticipated Schedule
Land and Geotechnical Surveys	September 2019
Permit Applications and Approval	October 2019 to December 2020
Site Clearing & Grubbing	January 2020 to February 2020
Site Preparation/Levelling	March 2020 to June 2020
Piling Installation	April 2020 to July 2020
Foundation and Underground Installation	May 2020 to December 2020
Building Erection	October 2020 to September 2021
Equipment Installation	April 2021 to May 2022
Water Interconnection Construction	March to May 2022
Commissioning & Start-up	September 2022 to August 2023
Decommissioning (after estimated 30-year Project life)	2053 to 2055

3.0 PROJECT LOCATION

The Project will be located in E½ 27-16-26 W2M, which is in the Moose Jaw Industrial Park and currently owned by the City of Moose Jaw (Photo 1 and Photo 2). This land has been designated industrial since 2011 as part of both the RM of Moose Jaw and City of Moose Jaw Official Community Plans. As of April 2017, the land was zoned M2 Heavy Industrial. SaskPower has signed an option purchase this parcel of land. The center point of the Project is as follows:

- 50˚ 22’ 30.18” N; 105˚ 29’ 39.75” W

The mineral titles for the property are currently owned by the City of Moose Jaw.

A site plan of the Project can be seen in Figure 2.

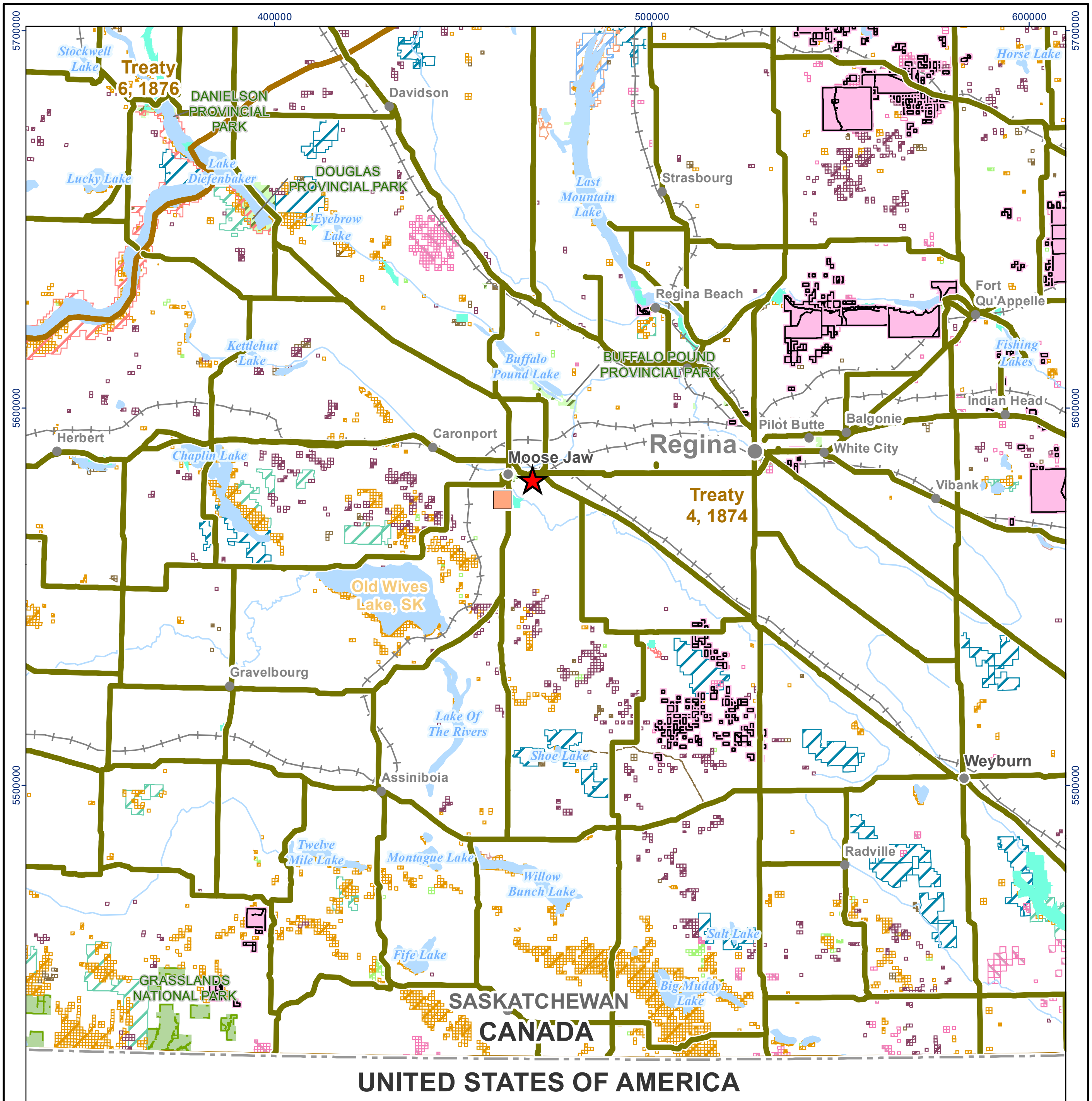
The incidental activities have various starting points before interconnecting to the Project (Figure 1). The incidental activities and their start points are presented below:

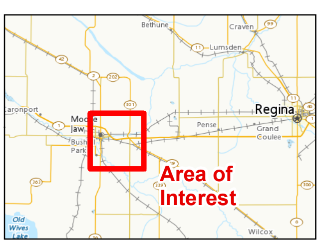
- process wastewater discharge – 50° 21' 22.85" N; 105° 29' 47.22" W
- sanitary discharge – start point 50° 22' 57.88" N; 105° 29' 52.42" W
- overhead 230 kV transmission line and underground fibre-optic line – 50°23'27.06"N; 105°23'57.40" W
- underground potable water pipeline – 50° 25' 12.06" N; 105° 31' 40.77" W
- underground 25 kV power distribution line – 50° 22' 07.16" N; 105° 29' 49.89" W
- road upgrades – 50° 22' 03.68" N; 105° 30' 01.65" W and 50° 22 '55.95" N; 105° 29' 20.10" W
- natural gas infrastructure – to be determined, but within 1 km of the Project site

The nearest occupied rural residence is located approximately 600 m west of the Project. The Project is located within Treaty 4 area and the nearest First Nation home reserve community is the Piapot First Nation which is located approximately 110 km northeast of the Project (Figure 3). Piapot First Nation also have Treaty Land Entitlement (TLE) reserves located approximately 60 km to the southeast of the Project location. The NSPML#160 office is located in Moose Jaw and its members include residents of Moose Jaw and the surrounding Moose Jaw area. The entire Moose Jaw area is claimed as within the Homeland of the Métis.

The closest federal land is the Moose Jaw Canadian Forces Base (15 Wing), approximately 5 km southwest of the Project.

A figure showing the Project and administrative boundaries is presented in Figure 3.





★ Approximate Site Location
Canadian Forces Base - Moose Jaw
City/Town
Major Road
Minor Road
Railway
Watercourse
Canada/USA Border
Conservation Easements
Crown Conservation Easements
Federal Pastures
First Nations Treaty Boundary
Fish and Wildlife Development Fund Lands
Game Preserve
Indian Reserve
Land Claim Selections
Migratory Bird Sanctuary
National Wildlife
National Park
Provincial Park
Protected Area (Other)
Ramsar Wetland
Reservoir Development Areas
Sask Agriculture and Food Pastures
Waterbody
Water Security Agency
Wildlife Habitat Protection Act (WHPA) Land
Wildlife Refuge

0 25 50 Km
(At original document size of 8.5x11)
1:1,550,000

N

Notes
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Data Sources: Government of Saskatchewan, Government of Canada, SaskPower
3. Background:

Stantec SaskPower

Project Location
Moose Jaw, Saskatchewan

Prepared by MDWallace on 2019-05-03
Technical Review by JHennig on 2019-05-03

Client/Project
113254233-011 REVC
Moose Jaw Combined Cycle Gas Turbine Facility

Figure No.
3

Title
Administrative Boundaries

G:\active\clients\saskpower\moose_jaw\figures\113254233_0011_REVC_CEAA_AdminBoundaries.mxd Revised: 2019-05-03 By: MDWallace

Photo 1: Viewing north along the east edge of SE 27-16-26 W2M

Photo 2: Viewing southwest from the northeast corner of NE 27-16-26 W2M

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, ROW, transfer of ownership).

Current Project details indicate that a permit is required under the *Aeronautics Act* for marking the Project stacks. An authorization under the *Fisheries Act* is not expected to be required for the construction of the potable water supply pipeline. No other federal permits, licenses, or authorizations are expected at this point. All other federal regulatory requirements shall be adhered to as are applicable (Table 3).

5.0 ENVIRONMENTAL EFFECTS

SaskPower is ISO 14001 environmental management system certified and is guided by existing commitments to environmental sustainability and best practice. SaskPower is committed to incorporating environmental management approaches and strategies into Project planning and execution so that not only is the Project compliant with regulatory requirements, but that it also enhances positive effects. SaskPower has consulted with regulators and will consult the public, to better understand the issues that are of most concern to them, as well as to understand requirements for the preparation of this document.

SaskPower has experience developing, operating, and maintaining power generation facilities in Saskatchewan. This experience will be used for the development of environmental management tools prior to Project construction to support the proactive management of potential environmental effects.

The incorporation of environmental management tools into Project planning has occurred in several ways, including in the design and selection of Project components and activities. Environmental management tools will be used to avoid or mitigate potential effects on natural features (e.g., wetlands) and will include, but not be limited to, the use of site selection criteria, performance of biophysical field surveys, and development of an Environmental Management Plan. By integrating this environmental management framework into Project planning, several potential environmental effects can be avoided or appropriately managed prior to Project execution.

Potential environmental effects resulting from the Project on environmental components are presented in the sections below.

5.1 ATMOSPHERIC ENVIRONMENT

Existing air quality conditions are generally characteristic of a rural environment, with agricultural activities accounting for much of the dust generated across the landscape. Grid roads are used for travel by local and regional traffic and are a source of dust.

Air emissions associated with Project construction are expected to be minor and occur only for short intervals. During operation, maximum predicted concentrations of the substances of interest are below the relevant regulatory objectives (SAAQS and CAAQS) for all averaging periods. Maximum predicted concentrations are expected to occur in close proximity to the Project and decrease with increasing distance from the Project. The dispersion modelling indicates that the operation of the Project will not cause or contribute to a substantial degradation of ambient air quality. Additional information related to atmospheric emissions is provided in Section 2.7.

The primary air quality mitigation measure for the Project during operation is the use of ULN burners in the combustion turbine, which optimizes the ratio of combustion air to fuel as well as combustion temperature to control NO_X emissions from the natural gas combustion process. NOx emissions will comply with the national emissions guidelines set out by Environment and Climate Change Canada. In addition, the intermittent sources (i.e., the emergency generator and fire pump) will burn ultra-low sulphur fuel (ECCC 2017).

The Project noise effects will affect the existing acoustic environment. The severity of the noise effect decreases with increasing distance from the noise sources. At further distance, the Project noise effect will diminish to a level below the baseline sound level. Based on the predicted Project noise emissions and with the inclusion of mitigation strategies, the modelling results indicate the Project will comply with Alberta Utilities Commission (AUC) Rule 012 – Noise Control. In order to comply with Rule 012, several mitigation measures will be implemented, including, but not limited to the installation of low-noise equipment (e.g., fans, transformers) and silencers.

5.2 TERRAIN AND SOIL

The Project is situated within the Moist Mixed Grassland ecoregion and Regina Plain landscape area. The landscape within the Moist Mixed Grassland ecoregion is typically level to gently undulating, with varying areas that include hummocky uplands, sand dunes, and river valleys. Dark brown chernozems are the dominant soil type within this ecoregion (Acton et al. 1998, University of Saskatchewan 1965).

Project activities have the potential to cause changes in terrain integrity and soil quality and quantity through processes such as loss of topsoil, admixing, erosion, compaction, and rutting. However, changes to terrain integrity and soil quality and quantity can be addressed through the implementation of mitigation measures.

Mitigation for potential Project related effects on terrain integrity will focus on avoiding areas with poor slope stability. Additionally, the HDD crossing of the Moose Jaw River for the potable water supply pipeline crossing will avoid steep slopes. Structures for the overhead transmission line will also be sited to avoid and span areas with steep slopes to the extent feasible.

Mitigation for potential Project related effects on soil quality and quantity include using proper soil handling techniques, implementing erosion control measures, implementing trenchless methods (i.e., HDD) to avoid constructing within areas of steep terrain, and restricting heavy equipment and vehicle use to dry or frozen soil conditions for the incidental activities, where feasible.

Following the implementation of these mitigation measures, no residual environmental effects to terrain and soil are expected to occur.

5.3 VEGETATION AND WETLANDS

Landcover to be affected by the Project and incidental activities is predominantly cultivated agricultural and developed lands (100% of the Project site, and over 80% of the route corridors for the incidental activities. No wetlands were observed within the Project footprint; however, wetlands of varying sizes and classes overlap the incidental activity route corridors (less than 10% of the incidental activity route corridors). Construction of the incidental activities could result in the loss of native vegetation and shrubland, wetlands, and tame pasture. These land uses are limited throughout the Project (0% of the

Project site and between 10% and 18% within the incidental activity route corridors); however, they are potential habitat for plant species of management concern (SOMC) and therefore, plant SOMC could occur within the Project.

A search of the Saskatchewan Conservation Centre (SKCDC) database identified four historical records of plant SOMC within 1 km of the Project site and incidental activities (Government of Saskatchewan 2019, SKCDC 2018). The records were for pepperwort (*Marsilea vestita*), small lupine (*Lupinus pusillus ssp.pusillus*), racemose milk-vetch (*Astragalus racemosus var. racemosus*), and tall beggar's ticks (*Bidens frondosa*). These plant SOMC are all provincially ranked by the SKCDC as S3, except racemose milk-vetch, which is ranked S2 (SKCDC 2019). None of these plant SOMC are federally listed.

There are several mitigation measures that have already been and/or will be implemented to avoid or reduce Project effects to vegetation and wetlands including, but not limited to:

- developing the Project site within cultivated lands, avoiding wetlands and suitable habitat for plant SOMC to the extent feasible
- completion of pre-construction plant SOMC and weed surveys, planned for 2019 field season
- staking features (e.g., plant SOMC, if observed, and weed infestations) within the Project prior to construction
- inspecting vehicles so they are clean and free of weeds before entering and leaving the Project or its incidental components
- reclaiming disturbed areas, including topsoil replacement and seeding when ground conditions and moisture levels permit, and
- reseeding areas if native vegetation has been removed or damaged using a native seed mix immediately following construction.

For a full listing of SaskPower's standard mitigations for vegetation and wetlands please refer to SaskPower's Environmental Beneficial Management Practices (SaskPower 2018).

Through the implementation of the above mitigation measures, permanent loss or alteration/removal of wetlands along the incidental activities is not expected. It is expected that mitigation measures implemented for pre-construction, during construction, and throughout operation and maintenance will mitigate effects of the potential loss of suitable habitat for plant SOMC. However, subsequent to mitigation, some residual effects to vegetation and wetlands are expected to occur as a result of the Project.

5.4 WILDLIFE AND WILDLIFE HABITAT

The area within 5 km of the Project site and incidental route corridors has the potential to provide habitat for 54 SOMC (including 30 *Species at Risk Act* (SARA) listed species) given historical records and current range extents: 6 invertebrate species, 7 herptile species, 34 bird species, and 7 mammal species (Government of Canada 2019). Additionally, this area has the potential to support 254 bird species, including 220 migratory bird species (as defined by the *Migratory Birds Convention Act, 1994* [Government of Canada 1994]) (SKCDC 2018)

The Project is predominantly situated on cultivated or developed lands (See section 5.3) and is adjacent to existing sources of anthropogenic disturbance (e.g., residential and commercial development, infrastructure, cultivation) and habitat conversion that have already compromised habitat effectiveness. Overall, wildlife habitat is limited due to the high proportion of anthropogenic disturbance that provides little to no habitat value to most wildlife species, and particularly for SOMC.

Wastewater treatment plant lagoons adjacent to the southern extent of the Project site provide staging habitat for migratory birds while the remaining wetland habitats within one km of the Project site provide limited opportunities for breeding and non-breeding migratory birds due to the high levels of previous disturbance (i.e., cultivation).

There are no provincially- or federally-designated lands for wildlife within 1 km of the Project or the incidental activity corridors; however, a provincial conservation easement is located 2.5 km west of the Project site in section 20-16-26 W2M and N½-17-16-26 W2M that includes tame pasture and broadleaf shrub and treed riparian habitats along the Moose Jaw River (SKCDC 2018).

Historical records of ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus excubitorides*), and American badger (*Taxidea taxus taxus*) were identified within 5 km of the Project site (SKCDC 2018). Other historical wildlife SOMC records identified within the incidental activity route corridors included barn swallow (*Hirundo rustica*) and Sprague's pipit (*Anthus spragueii*).

Where suitable wildlife habitat does exist, mitigation measures will be used to reduce the potential for direct and indirect Project-related effects. Project-specific mitigation measures, along with standard industry practices and avoidance measures will be implemented during construction and operation and maintenance to reduce potential effects on wildlife habitat. For example. direct loss of habitat will be mitigated by strategic routing, minimizing the extent of vegetation cleared where possible, and constructing through temporary and seasonal wetlands during dry or frozen conditions if they cannot be avoided. Direct loss of habitat by the potable water supply pipeline construction will be mitigated by installing sections of pipe using HDD technology at the Moose Jaw River crossing.

Temporary indirect habitat loss due to sensory disturbance during construction will be mitigated by using standard noise abatement equipment on machinery (i.e., mufflers) to control noise levels. Noise during operation and maintenance will be mitigated by building the Project to acceptable noise standards (i.e., AUC Rule 012). Mitigation measures typically include applying the guidelines for species specific- setback distances and restricted activity periods (Government of Saskatchewan 2017) for key wildlife features that have been identified and those that may be identified in future pre-construction surveys, if applicable.

The storm water pond will create habitat that can potentially be used by wildlife, including migratory birds. In the very unlikely event of a significant influx of hydrocarbons into the storm water pond. If hydrocarbons are identified, immediate actions to prevent water birds, species at risk or other wildlife including but not limited to migratory birds, from contacting the contaminants would be used. Such measures may include deployment of staff with flags to deter them from entering the pond. Additionally, other devices, such as scare cannons, “scary-man’ inflatables, etc., would be utilized until hydro-vac units could be summoned to vacuum up the contaminants and remove them from site for proper disposal.

The primary strategy to mitigate wildlife mortality during construction includes timing construction outside of the migratory bird nesting period, outlined by Environment and Climate Change Canada (April 15 to August 17; Government of Canada 2018a), to avoid mortality of ground-nesting or slow-moving wildlife during this sensitive period (i.e., nesting and rearing). The Project will take a minimum of 42 months to complete and year-round construction will be required; however, incidental activities will be constructed outside of the migratory bird nesting period where possible. If construction activities must occur during the migratory bird nesting period in or adjacent to suitable nesting habitat, a pre-construction nest sweep survey will be conducted to avoid any potential disturbance to migratory bird nests. If an active nest or other wildlife feature is encountered, a species appropriate buffer will be applied and work in that area will temporarily shut down until an acceptable mitigation plan is approved by SK ENV.

Overhead transmission line routing will avoid high-risk mortality locations (e.g., wetlands) where possible. In instances where this is not feasible (i.e., adjacent to the lagoons) mitigation measures will be implemented to increase line visibility to migratory birds (i.e., line markers) and reduce the potential for wildlife mortality following SaskPower’s Environmental Beneficial Management Practices for line marking (SaskPower 2018).

Wildlife mortality will also be mitigated by maintaining speed limits on and off the Project to limit the risk of vehicle collisions with wildlife. Speed limits will be reduced in areas where species wildlife concerns or movement corridors have been identified. Collisions with wildlife will be reported to provincial regulators as appropriate.

Construction and operation and maintenance personnel will not be permitted to harass or feed wildlife. Nuisance wildlife will be reported to the appropriate authorities (e.g., SK ENV conservation officer).

Subsequent to mitigation, some residual effects on wildlife and wildlife habitat have the potential to occur as a result of the Project, including a change in wildlife habitat and mortality risk. Overall, wildlife habitat with the potential to be affected by the Project is limited due to the high proportion of anthropogenic disturbance that provide little to no habitat value to most wildlife species, and particularly for SOMC.

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

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

The Project is not expected to interact with fish and fish habitat. The Project will implement mitigation measures based on discussions with DFO during the design and construction of the Moose Jaw River water pipeline crossing. This will include using HDD methods which are not expected to result in adverse environmental effects on fish or fish habitat. However, HDD construction methods have the potential for the inadvertent release of drilling fluid into the river through subsurface fissures, commonly known as frac-out, which has the potential to cause an increase in turbidity, which could affect fish or fish habitat.

The Moose Jaw River is located 1.3 km away from the Project site and HDD activities for the potable water supply pipeline will occur in upland habitat, at least 50 m from the watercourse. Fish resources in the Moose Jaw River are comprised of small-bodied, large-bodied, and sport-fish species. Seven fish species are known to occur in the Moose Jaw River; brook stickleback (*Culaea inconstans)*, fathead minnow (*Pimephales promelas*), northern pike (*Esox lucius*), river shiner (*Notropis blennius*), walleye (*Sander vitreus*), white sucker (*Catostomus commersonii*), and yellow perch (*Perca flavescens*), however, other species may migrate into the Moose Jaw River during high-water conditions (Liaw 1991; SKCDC 2018). No aquatic species at risk (SAR) have been identified in the Moose Jaw River (SKCDC 2018).

Prior to beginning construction, a frac out plan will be developed that identifies materials and equipment that would be required for response and cleanup, measures for containing drilling mud and reducing the potential for fluids entering or reentering the watercourse, as well as contact information for applicable authorities and regulators. During HDD activities, the watercourse will be monitored for signs of a frac-out of drilling mud within the watercourse as well as in riparian and upland habitats. If a frac out occurs, measures to avoid causing harm to fish and fish habitat include having appropriate material and equipment onsite for the containment of drilling mud to prevent it from entering or reentering the river. Cleanup activities would be prioritized and conducted in a manner that does not create the potential for greater damage to fish habitat.

In the event that HDD methods fail, the contingency method will include attempting to re-drill at a more suitable location. It is not anticipated that in-stream work involving trenching and pipeline installation would be used as a contingency method, limiting the potential pathways for direct effects to fish and fish habitat. Contingency plans will once again be guided by DFO consultation and best management practices for instream construction.

5.5.2 Aquatics Species, as Defined by the *Species at Risk Act*

There are no known aquatics species at risk, as defined by SARA, expected to occur within 1 km of the Project and none are expected to occur due to the lack of suitable aquatic habitats (Government of Canada 2002, 2019). The Project is not expected to adversely affect aquatic species, as defined by the SARA.

5.5.3 Migratory Birds, as Defined by the *Migratory Birds Convention Act*

This section summarizes the potential effects on migratory birds and their habitat as a result of Project construction, operation and maintenance, and decommissioning and reclamation activities. Additional information regarding migratory birds and migratory bird SOMC that may be affected by the Project, suitable habitat for migratory birds, as well as the potential effects to migratory birds and mitigation measures to be implemented are presented in Section 5.4.

Project-specific mitigation measures, along with standard industry practices and avoidance measures will be implemented during construction and operation and maintenance to eliminate or reduce potential effects on migratory birds. Subsequent to mitigation, some residual effects on migratory birds are expected to occur as a result of the Project. The residual effects relate to migratory birds are summarized below.

Migratory bird mortality has the potential to occur through vegetation clearing, ground disturbance, and vehicle collisions even after mitigation measures have been applied. The likelihood of Project activities interacting with migratory birds is greater in areas where natural habitats exist (e.g., wetlands) but the risk is greatly reduced with the implementation of mitigation measures.

The primary strategy to mitigate wildlife mortality during construction includes timing construction outside of the migratory bird nesting period, outlined by Environment and Climate Change Canada (April 15 to August 17; Government of Canada 2018), to avoid mortality of ground-nesting or slow-moving wildlife during this sensitive period (i.e., nesting and rearing). The Project will take a minimum of 42 months to complete and year-round construction will be required; however, incidental activities will be constructed outside of the migratory bird nesting period where possible. If an active nest or other wildlife feature is encountered, a species appropriate buffer will be applied and work in that area will temporarily shut down until an acceptable mitigation plan is developed.

Overhead transmission line routing will avoid high-risk mortality locations (e.g., wetlands) where possible. In instances where this is not feasible (i.e., adjacent to the City of Moose Jaw wastewater treatment plant lagoons) mitigation measures will be implemented to increase line visibility to migratory birds (i.e., line markers) and reduce the potential for wildlife mortality following SaskPower’s Beneficial Management Practices for line marking (SaskPower 2018).

Reduced speed limits and installation of signage where specific wildlife concerns have been identified are also expected to reduce mortality risk to migratory birds. Incorporating line markers to enhance transmission line visibility in high-risk area will reduce mortality risk for migratory birds during the operation and maintenance phase.

5.6 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FEDERAL LANDS OR LANDS OUTSIDE OF SASKATCHEWAN

The Project and incidental activities are located on privately owned land. The closest provincial border (Alberta) is located approximately 320 km to the west. The US border is located approximately 150 km to the south. No changes to air quality or other aspects of the environment are expected to occur on federal lands as a result of carrying out the Project. The Project is not expected to cause any changes in air quality or other aspects of the environment that would adversely affect lands outside of Saskatchewan.

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

Carrying out the Project is not expected to change the environment such that it would affect Indigenous peoples, including effects to Aboriginal and Treaty Rights, health or socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site, or thing that is of historical, archaeological, palaeontological, or architectural significance. Additional detail is provided below.

5.7.1 Effects on Health and Socio-economic Conditions

No ingestion or inhalation pathways that could trigger the need for a human health risk assessment are anticipated. Air dispersion modelling conducted for the Project shows that maximum predicted concentrations of the substances of interest (e.g., PM 2.5 and 10, total suspended particulates, hydrogen sulphide, nitrogen dioxide) are below the relevant regulatory objectives (SAAQS and CAAQS) for all averaging periods. There are members of the NSPML #160 within the City of Moose Jaw and surrounding area, however, no negative effects are anticipated given that the dispersion modelling indicates that the operation of the Project will not cause or contribute to a substantial degradation of ambient air quality. The modelling also indicates that the predicted concentrations of Project related emissions will decrease with distance from the Project, therefore adverse health effects to Indigenous communities or people are not expected.

The Project is not expected to have any effect on drinking water quality (e.g., surface and groundwater), country foods, or resources traditionally affected by Indigenous peoples (e.g., berries, medicinal plants).

There are members of the NSPML#160 within the City of Moose Jaw and surrounding area but given that the Project will comply with AUC Rule 012 – Noise Control adverse noise effects on Indigenous peoples are not expected.

Socio-economic effects are anticipated to be positive for Indigenous groups due to opportunities for employment. SaskPower will require the selected Engineer-Procure-Construct (EPC) partner to have and deliver on Indigenous employment targets that reflect the local Indigenous capacity. SaskPower’s Indigenous Procurement Department will monitor and assist with identifying opportunities.

5.7.2 Physical and Cultural Heritage and Structures, Sites, or Things of Historical, Archaeological, Palaeontological, or Architectural Significance

Currently, there are no identified cultural heritage considerations or sites or structures of historical, archaeological, palaeontological, or architectural significance on land subject to development.

The Project is within a non-heritage sensitive parcel (SE 27-16-26 W2M) and a heritage sensitive parcel (NE 27-16-26 W2M), as identified by the Developers’ Online Screening Tool maintained by the Ministry of Park, Culture and Sport. The incidental activities (e.g., transmission line, road, water supply pipeline, etc.)

associated with the Project have the potential to intersect some heritage sensitive parcels. SaskPower will conduct an HRIA for the Project as required, which will include the development of mitigation measures to reduce the potential effects to Indigenous peoples. These mitigation measures will include a thorough site assessment of the heritage resource.

> *Site assessment is concerned with determining the relative value or significance of each archaeological resource located in unavoidable conflict with development activities. The results are used to determine what type and level of mitigative action, if any, will be needed. Several kinds of significance (e.g. scientific, humanistic, historical, interpretive, economic, etc.) need to be considered when evaluating archaeological resources. Criterial used to measure these heritage values, and the evaluation process or system itself, must be explicitly documented. Data on which to base a significance determination is most often obtained through systematic test excavation and surface artifact collection. Assessment also involves describing all development-related impacts on sites, establishing when they are expected to occur, and assessing their effect (in as objective and quantitative a manner as possible) on future use of the resource* (HCB 2010:9).

If significant heritage resources, including historical, archaeological, or palaeontological sites, are identified in unavoidable conflict with the Project, a heritage resource impact mitigation, will be completed prior to construction. Mitigation studies involve the implementation of approved measures for reducing adverse, development related impacts on the heritage resource. Options available for mitigating impacts include: site protection measures (e.g. Physical Barriers, stabilization, protective covering or “capping”, etc.), and systematic archaeological data recovery (e.g. complete or partial salvage excavation) (HCB 2010:9). Additionally, SaskPower will develop a communication plan, depending on the type of heritage resource and location, for contacting potentially interested Indigenous communities in the event of the discovery of an undocumented cultural heritage resource.

5.7.3 Current Use of Lands and Resources for Traditional Purposes

The Project is located on a quarter section that is owned by the City of Moose Jaw and will be purchased by SaskPower. The incidental activities will be developed primarily within private agricultural land, developed road allowances owned by the Province of Saskatchewan, and within the Moose Jaw city limits. Privately owned lands are typically not available for traditional land use and as such, the Project is not expected to affect the ability of Indigenous peoples to exercise Treaty Rights, or use, access, or develop lands and resources currently used for traditional purposes. To date, concerns over further potential adverse impacts to traditional uses in the Project area have not been specifically raised by Indigenous peoples during discussions and engagement efforts. Engagement efforts will continue through construction and early operation phases of the Project.

The Moose Jaw River is crossed by the proposed water pipeline for the Project and is the only known fish bearing water feature that has the potential to be affected by the Project. Through the use of standard mitigation measures (e.g., HDD pipeline installation), the Moose Jaw River is not expected to be affected by the Project and therefore, adverse effects to fish and fish habitat and water are not anticipated. In the event that HDD methods fail, the contingency method will include attempting to re-drill at a more suitable location. It is not anticipated that in-stream work involving trenching or excavation in or near the Moose Jaw River would be used as a contingency method, limiting the potential pathways for direct effects to fish and fish habitat.

The Project will be graded to drain surface water to temporary drainage ditches and a storm water pond. The storm water pond will be designed to collect surface water runoff and ACC wash water only, therefore it is unlikely to come into contact with contaminants. Waste water generated from the Project will be discharged to the City of Moose Jaw for treatment. As such, no effects to water quality are expected.

To date, no potential off site effects to lands or resources by Indigenous peoples have been identified during the early engagement activities with Indigenous communities see section 1.3.1 for further information.

To date, no concerns with regard to potential effects on health and socio-economic conditions, physical and cultural heritage, any structure, site, or thing that is of historical, archaeological, palaeontological, or architectural significance have been raised during engagement with Indigenous communities. Through ongoing engagement, SaskPower will seek affirmation from Indigenous communities whether lands proposed for the project are currently used by Indigenous people for traditional purposes.

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