



21R-04370

Initial Project Description

Marguerite Lake
Compressed Air Energy Storage
NW-35-064-06 W4M

Prepared for:

Federation Group Inc.

Prepared by:

Vertex Professional Services Ltd.

Date:

November 23, 2023

Initial Project Description
Marguerite Lake Compressed Air Energy Storage NW-35-064-06 W4M

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Key to Abbreviations within the Initial Project Description

Abbreviation	Description
AAAQO	Alberta Ambient Air Quality Objectives
ABC	Athabasca
ABWRET	Alberta Wetland Rapid Evaluation Tool
ACO	Aboriginal Consultation Office
ACIMS	Alberta Conservation Information Management System
AER	Alberta Energy Regulator
AERMET	American Meteorological Society and Environmental Protection Agency Regulatory Meteorological data preprocessor
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AESO	Alberta Electric System Operator
AFS	Application for Service
AIES	Alberta Interconnected Electric System
AMWI	Alberta Merged Wetland Inventory
AQM	Alberta Greenhouse Gas Quantification Methodologies
ARV	Amber Valley
ATCO	ATCO Electric Ltd.
AUC	Alberta Utilities Commission
AQMG	Air Quality Model Guideline
A-CAES	Adiabatic Compressed Air Energy Storage
BLCN	Beaver Lake Cree Nation
BLMS	Buffalo Lake Metis Settlement
CAES	Compressed Air Energy Storage
Ca-HCO ₃	Calcium-bicarbonate
CCME	Canadian Council of Ministers of the Environment
CER	Canada Energy Regulator
CH ₄	Methane
CLFN	Cold Lake First Nation
cm	centimetre
CO ₂	Carbon Dioxide
dba	A-weighted Decibel
ECCC	Environment and Climate Change Canada
EMS	Elizabeth Metis Settlement
EPA	Alberta Environment and Protected Areas
EPP	Environmental Protection Plan
ERP	Emergency Response Plan

Abbreviation	Description
ESA	Environmentally Significant Areas
ESAR	Environmental Site Assessment Repository
EPEA	<i>Environmental Protection and Enhancement Act</i>
FEED	Front End Engineering Design
FLMS	Fishing Lake Metis Settlement
FWMIS	Fisheries and Wildlife Management Information System
FWIMT	Fish and Wildlife Internet Mapping Tool
GHG	Greenhouse Gas
GJ/d	Gigajoule per day
GRR	Provincial Grazing Reserve
GWP	Global Warming Potential
H2SC	Hydrogen Simple Cycle
ha	hectares
HADD	Harmful Alteration, Disruption or Destruction
HFC	Hydrofluorocarbons
HDD	Horizontal Directional Drill
HLFN	Heart Lake First Nation
HRIA	Historical Resources Impact Assessment
HRV	Historic Resource Value
IAA	<i>Impact Assessment Act</i>
IAAC	Impact Assessment Agency of Canada
IPCC	Intergovernmental Panel on Climate Change
KCFN	Kehewin Cree First Nation
km	Kilometre
KMS	Kikino Metis Settlement
kPa	kilopascal
ktCO ₂ e	Kilotonnes of carbon dioxide equivalent
kWh	Kilowatt hour
kW-hr	Kilowatt per hour
LARP	Lower Athabasca Regional Plan
LAT	Landscape Analysis Tool
LICA	Lakeland Industrial Community Association
LGA	Local Geographic Area
masl	metres above sea level
mbgs	metres below ground surface

Abbreviation	Description
MBCA	<i>Migratory Birds Convention Act</i>
m	metre
mg/L	Milligrams per litre
MOP	Maximum Operating Pressure
MV	Medium Voltage
MW	Megawatt
m/m	Metres per minute
NF ₃	Nitrogen Trifluoride
NGTL	Nova Gas Transmission Line
NIR	National Inventory Report
N ₂ O	Nitrous Oxides
NO _x	Oxides of Nitrogen
NPS	Nominal Pipe Size
OLCN	Onion Lake Cree Nation
PDC	Power Distribution Centers
psi	Pounds per square inch
PSL	permissible sound level
PFC	Perfluorocarbons
PIN	Pinehurst
SACC	Strategic Assessment of Climate Change
SAR	Species at Risk
SARA	<i>Species At Risk Act</i>
SCR	Selective Catalytic Reduction
SF ₆	Sulfur Hexafluoride
SIL1	survey intensity level 1
SLCFN	Saddle Lake Cree First Nation
TDL	Temporary Diversion License
TLU	Traditional Land Use
UNFCCC	United Nation Framework Convention on Climate Change
VEC	Valued Ecosystem Component
VFD	Variable Frequency Drive
WBEA	Wood Buffalo Environmental Association
WLFN	Whitefish (Goodfish) Lake First Nation
WLPGR	Wolf Lake Provincial Grazing Reserve
WRF	Weather Research Forecast

PART A: GENERAL INFORMATION

1.0 Project Information

Federation Group Inc. (Federation) is pleased to submit this Initial Project Description (IPD) of the Marguerite Lake Compressed Air Energy Storage (CAES) facility (the “Project”). The intent of this document is to fulfill the requirements of an IPD under the *Impact Assessment Act* (IAA). The document reflects the requirements of the Information and Management of Time Limits Regulations and the Impact Assessment Agency of Canada’s (IAAC) *Guide to Preparing an Initial Project Description and a Detailed Project Description* (Government of Canada, 2019a; Government of Canada, 2023a and 2022a).

1.1 Type or Sector

The proposed Project is a power plant, specifically a CAES facility with a total capability of 320 MW, adjacent to the existing Marguerite Lake substation. CAES facilities use electric motor driven compressors to capture excess electricity from the grid, storing the energy as compressed air underground (Figure 1). During hours of peak demand, the compressed air is withdrawn from storage, heated and routed to the expansion turbines to generate electricity.

The proposed footprint is 13.5 ha (hereafter referred to as “disturbance area”) and will be composed of a graveled, fenced plant site that encompasses electrical power generation, compression equipment, caverns, source and disposal wells, borrow pit/stormwater pond, soil storage areas, buildings and emergency equipment. Pending regulatory approval, Federation anticipates construction will begin in May 2025 with an in-service date for CAES operations (for Cavern 1) of March 2028. A detailed schedule is presented in Section 11.0.

1.1.1 Justification for the Project

The Cold Lake area is currently an exporter of surplus electrical energy, making the Marguerite Lake substation and associated high-voltage transmission lines significantly underutilized. The Project will enable more intermittent renewable energy development in Alberta, as well as provide ancillary services to the Alberta Interconnected Electric System (AIES).

The Project offers several additional benefits. As an energy storage project, the Project would contribute to greater grid stability and reliability. The CAES technology also allows for flexibility in the grid as the time to bring generation online is much quicker compared to natural gas generators. The Project also contributes to the goals of Alberta’s *Emissions Reduction and Energy Development Plan* (Government of Alberta, 2023a) and the Government of Canada’s Sustainable Development Goal of affordable and cleaner energy (SDG No. 7; Government of Canada, 2023b), as well as the Clean Electricity Regulations (Government of Canada, 2023c), by providing energy storage and the future use of clean energy (i.e., hydrogen) in project design. Further, the Project will help Alberta meet its net-zero goal of having a zero emissions grid by 2035. Potential benefits of the Project are described in detail in Section 7.0.

1.2 Proposed Location

The Project is located on provincial Crown land in NW-35-064-06 W4M approximately 16 kilometres (km) north of the town of La Corey, Alberta, within the Municipal District of Bonnyville No. 87 (M.D. of Bonnyville). Alberta

Environment and Protected Areas (EPA) has issued a miscellaneous lease (DML 210041, Plan No: 148028 MS; Appendix A) to Federation for the Project. The Project falls within the Wolf Lake Provincial Grazing Reserve (WLPGR) boundary. The regional location of the Project is shown on Figure 2 and an overview of the site is shown on Figure 3.

The coordinates at the approximate center of the Project site are:

- Latitude 54.585788
- Longitude -110.803468

2.0 Proponent Information

2.1 The Proponent's Name and Contact Information

Name of the Proponent: Federation Group Inc. (Federation)

Address of the Proponent: 45521 Highway 660 #2, PO Box 7217, Bonnyville, Alberta T9N 2H6

2.2 Primary Representative

Primary representative: Jordan Costley, P.L.(Eng.)
Director, Projects
jordanc@federationengineering.com
Cell: 780.201.8697

2.3 Project Team

Federation contracted Vertex Professional Services Ltd. (Vertex) to evaluate the environmental effects of the Project and to prepare the regulatory submission. Vertex has extensive experience in evaluating the effects of power projects, both in Alberta and across Canada.

3.0 Public and Regulatory Engagement Summary

3.1 Public Engagement

Federation has initiated an engagement program with Indigenous groups, as well as regulatory and public stakeholders. Federation's Indigenous engagement program is detailed in Section 4.0. The intent of the engagement program is to provide Project information, allow for feedback, carefully consider traditional and cultural land uses and respond to any questions and concerns. Communication and engagement activities and responses are documented in a record of communication. Commencing in May 2021, through to present date, Federation has engaged in preliminary Project planning activities, including but not limited to the following:

- Engagement with Indigenous communities
- Review of options for CAES facility location and identification of potentially affected landowners and residents (via title searches)

- Desktop planning exercises including review of aerial imagery, environmental considerations, proximity to residences, and potentially impacted landowners
- Preliminary engagement with WLPGR team lead, Environmental Protection land use officers regarding proposed Project
- Preliminary engagement with local municipal authorities and industry

A summary of the results of engagement undertaken for the Project to date is presented in the subsections below, and further detail is included in the Public Disclosure and Consultation Report (Appendix B).

Both Indigenous and public engagement will continue during the regulatory review process and throughout the life of the Project. Ongoing consultation activities will include, but not necessarily be limited to the following:

- Further consultation with parties is ongoing. Stakeholder questions, concerns, or issues will be fully explored and solutions put forward to address or mitigate concerns
- All landowners, occupants, residents, interested parties, local authorities, synergy groups and other stakeholders will be kept apprised of Project updates through periodic mailouts
- Federation is establishing a Project website where stakeholders will be able to obtain Project updates and information.

3.2 Regulatory and Public Stakeholders

Engagement with stakeholders early in the planning of the Project is beneficial to the Project proponent, regulatory agencies and stakeholders. Federation initiated engagement to identify requirements of regulators and concerns of stakeholders over 2 years ago and continues to solicit feedback from local stakeholders and regulators. Engagement will also consider the integration of appropriate measures in Project design and development to address identified concerns.

The regulatory and public stakeholders listed below were identified as potentially having an interest in or potentially being affected by the Project. Engagement about the Project was initiated with all stakeholders listed, including regulators and municipal authorities, regional industrial associations, and adjacent individual and industry landowners. The Project notification letter contained information on the Project, including general description, rationale, location, environmental planning approach, schedule and contact information. Adjacent landowners and Crown disposition holders within 2 km of the Project were chosen for engagement. This radius aligns with the notification requirements of the Alberta Energy Regulator (AER) under Directive 056 (Alberta Energy Regulator, 2023). A Project notification letter was sent to all regulatory and public stakeholders identified. Also, engagement was initiated with all residents and landowners within 800 m of the Project boundary, as well as other relevant stakeholders. The regulatory and public stakeholders identified for the Project are as follows:

- Government and Municipal Regulators
 - Impact Assessment Agency of Canada (IAAC)
 - Alberta Culture and Tourism
 - Alberta Electric System Operator (AESO)

- Alberta Energy Regulator
- Alberta Environment and Protected Areas (EPA)
- Alberta Transportation
- Alberta Utilities Commission (AUC)
- M.D. of Bonnyville
- WLPGR Association

- Industry and Individual Stakeholders
 - Adjacent landowners – Residents and landowners within 2 km of the disturbance area
 - Crown disposition holders within 2 km of the disturbance area
 - ATCO Electric Ltd. (ATCO)
 - Canadian Natural Resources Limited
 - Canadian Oil & Gas International Inc. (no longer exists and notification re-directed to the Orphan Well Association)
 - Cold Lake Pipeline Ltd.
 - Rogers Communications Inc.
 - Telus Communications Inc.

During the spring of 2021, an agreement was reached with WLPGR Association for the lease of the lands by Federation for construction and operation of the proposed Project. The M.D. of Bonnyville provided consent to construct an approach off the La Corey resource road (owned by the M.D.) on September 20, 2022. Further consultation with the M.D., including a development permit application, will occur as part of the Project regulatory process.

To date, no unresolved Project specific concerns have been raised by public stakeholders (Appendix B). Federation had a meeting with the M.D. of Bonnyville on June 30, 2023, to provide an overview of the Project, discuss the road use agreement terms and the development permit. A future meeting to present the Project to the council for the Municipal District may be scheduled, if needed.

3.3 Plan for Future Engagement

Federation continues to communicate with regulators, industry and landowners to provide additional information and obtain relevant regulatory guidance regarding the Project. Federation is committed to continuing to collect feedback and evaluate requests of the public and regulatory stakeholders and will record all Project-related concerns considered throughout the Project planning and regulatory review process.

4.0 Indigenous Engagement Summary

4.1 Indigenous Groups

Engagement with Indigenous groups occurred early in the planning of the Project as Federation recognizes the benefit to both the Project proponent and Indigenous groups of early engagement. Federation initiated engagement to identify community concerns and potential impacts to traditional land use activities and Aboriginal and Treaty

Rights. Engagement with Indigenous groups also assists in integrating appropriate measures in Project design and development to identify and address concerns at the pre-Front End Engineering Design (FEED) and FEED Project stages.

Federation identified Indigenous Groups who may have asserted Traditional territory in the Project area, or whose traditional land use activities or Aboriginal and Treaty Rights may be affected by the Project. A Project notification letter was sent to all listed groups (seven First Nations and four Metis settlements). Indigenous communities potentially affected by the Project are as follows:

- Beaver Lake Cree Nation (BLCN)
- Buffalo Lake Metis Settlement (BLMS)
- Cold Lake First Nation (CLFN)
- Elizabeth Metis Settlement (EMS)
- Fishing Lake Metis Settlement (FLMS)
- Heart Lake First Nation (HLFN)
- Kehewin Cree First Nation (KCFN)
- Kikino Metis Settlement (KMS)
- Onion Lake Cree Nation (OLCN)
- Saddle Lake Cree First Nation (SLCFN)
- Whitefish (Goodfish) Lake First Nation (WLFN)

4.2 Indigenous Engagement

As directed by the Aboriginal Consultation Office (ACO), Federation has been engaged in consultation with the 11 Indigenous communities listed above since May of 2021 regarding the Project. An Indigenous consultation adequacy decision was received from the ACO on July 21, 2021, along with receipt of the formal surface land disposition approval from the Government of Alberta for DML 210041 on August 19, 2021. Table 4-1 provides a summary of issues and concerns raised and the results of the engagement with Indigenous communities.

Table 4-1. Summary of Indigenous Consultation and Federation Response

Notification / Issue and Concerns Log	Federation Response
BLCN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure and a Landscape Analysis Tool (LAT) report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • May 28, 2021-- BLCN stated they have no concerns at this time • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, BLCN has raised no site-specific Project concerns related to the proposed Project

Notification / Issue and Concerns Log	Federation Response
BLMS	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package • Early June 2021- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO • June 8, 2021-- BLMS responded to confirm that there were no errors in the record of communication and did not provide any additional comments • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, BLMS has raised no site-specific Project concerns related to the proposed Project
CLFN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 30, 2021 – Federation met with CLFN to review the proposed Project, as requested by CLFN <ul style="list-style-type: none"> ○ Prior to meeting, CLFN requested additional information regarding the following items: noise during operations, engineering/geophysical risks, Project lifespan, reclamation and required regulatory approvals/schedule. ○ CLFN informed Federation Group that the Project overlaps and is in close proximity to the locales where CLFN members exercise their treaty rights to hunt, fish and trap as well as associated traditional uses, such as Indigenous Rights to construct and occupy structures, pick berries, obtain drinking water from on-the-land sources, harvest firewood, maintain and use trails and other routes of access, to teach their children about the Denesuline culture, to transmit traditional knowledge to younger generations, and to steward and protect their cultural heritage and traditional lands. • June 17, 2021-- CLFN visited the site • June 26, 2021 – following the site visit, CLFN informed Federation Group that CLFN completed a site visit on June 17, 2021 and did not identify anything that is necessary to bring forward to Federation Group at the time. • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project • October 14, 2021-- CLFN followed up requesting an update on regulatory approvals and schedule • October 21, 2021-- CLFN followed up on the status of the geomechanical study and other studies required by the AER and requested that CLFN be provided with the studies associated with each regulatory approval • October 26, 2021-- CLFN followed up to find out when cores would be drilled and an update on the regulatory forecast • November 16, 2021 - Federation Group representatives met with CLFN leadership and representatives. During the meeting the Project was reviewed. CLFN leadership expressed serious concerns regarding the safety of the Project. Concerns about incidents such as blow outs were raised. • May 3, 2023-- the AUC sent a letter of notification that Federation had applied to construct and operate the Project and requested written submissions by May 31, 2023 	<ul style="list-style-type: none"> • Federation presented a Project overview discussion and answered questions about truck traffic; source of solution mining water and disposal of the solution; the size of the cavern; mitigation to prevent surface release; and regulatory schedule. Federation to provide additional information regarding schedule, traffic and cavern development • October 20, 2021-- Federation provided an update noting that the schedule for regulatory permitting was being revised • October 21, 2021-- Federation followed up on the status of the thermodynamic and geomechanical analysis; these studies will be provided to CLFN when available • June 2022-- An open house was held for the CLFN community and elders • May 4, 2023 – Federation provided a link to a shared folder where application documents and technical reports could be viewed

Notification / Issue and Concerns Log	Federation Response
CLFN cont.	
<ul style="list-style-type: none"> • May 4, 2023-- CLFN requested the engineering and technical reports that were used to develop the AUC application. Federation provided a link to a shared folder on May 4, 2023, where AUC application documents and technical reports from Vertex, PGSC and RESPEC were available • June 6, 2023-- CLFN filed a statement of intent to participate in the AUC proceeding. CLFN informed the AUC that multiple members from different CLFN families and different age groups have identified specific hunting locales within three kilometers of the Project. Hunting for food in the area includes moose, rabbits, and grouse. Fishing occurs at Marguerite Lake, and there is intensive use of the Marguerite Lake shore and surrounding area for moose hunting. Use of the area for procuring food and for transmission of Indigenous Knowledge from older hunters to younger hunters has occurred over the generations and involves members from multiple CLFN families. Continued use by multigenerational family hunting groups occurs to this day. 	<ul style="list-style-type: none"> • Federation has continued to have discussions with the CLFN Economic Development Department outside of the Project-specific consultation about how CLFN can participate in the Project and economic opportunities for CLFN and companies which CLFN is a part of (e.g., Seven Lakes). Much of the economic opportunity hinges on the progress of the Project to a state where schedule and regulatory risks have been concluded • June 29, 2023-- a community session was held with the Chief and Council to provide updates on the Project • July 7, 2023-- a meeting was conducted with the consultation manager • August 8, 2023-- a meeting was held with the consultation manager and their team to define the agenda for a community session • August 17, 2023-- a community session was held that included a review of technical concerns and questions, CLFN 101 presentation and a community meeting • Sep 27, 2023 – community section regarding cavern development

Notification / Issue and Concerns Log	Federation Response
EMS	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO <ul style="list-style-type: none"> ○ EMS did not provide any feedback regarding the proposed Project • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, EMS has raised no site-specific Project concerns related to the proposed Project
FLMS	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • May 28, 2021-- FLMS requested a site visit • June 10, 2021 -- the Site visit occurred; no site-specific concerns were noted at time of visit • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO • June 24, 2021-- FLMS confirmed that they had no site-specific concerns regarding the proposed Project • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, FLMS has raised no site-specific Project concerns related to the proposed Project
HLFN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • June 3, 2021-- HLFN responded that the Project falls in HLFN territory and requested a shapefile to continue to review. HLFN identified potential concerns around hunting, trapping, fishing and harvesting • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO • June 17, 2021-- additional information was received from HLFN outlining concerns around cumulative effects and non-site-specific impacts to: hunting, trapping, fishing, birds, plant harvesting, cultural sites and land use (cabins, trails etc.) • June 22, 2021-- HLFN responded that there were no site-specific or static locations of impact. HLFN confirmed they were satisfied that consultation on the Project was complete • June 23, 2021-- record of consultation logs were sent and HLFN was notified that they had 5 working days to review the log and follow up on any clarification or with any comments 	<ul style="list-style-type: none"> • June 4, 2021-- Federation provided a shapefile. • June 9, 2021-- Follow up was conducted to confirm the status of review and to request site-specifics around the general potential concerns identified • June 21, 2021-- Federation provided detailed responses to each of HLFN concerns

Notification / Issue and Concerns Log	Federation Response
HLFN cont.	
<ul style="list-style-type: none"> • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	
KCFN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO <ul style="list-style-type: none"> ○ KCFN did not provide any feedback regarding the proposed Project • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, KCFN has raised no site-specific Project concerns related to the proposed Project
KMS	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • May 17, 2021-- KMS responded that they have no site-specific concerns but identified general concerns • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO <ul style="list-style-type: none"> ○ KMS did not provide any feedback regarding the proposed Project • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • Federation acknowledges that KMS has identified no site-specific concerns. • Federation has also reviewed the general concerns and commits to reduce their footprint and implement best practices at all opportunities, including but not limited to: maintaining surface drainage, reducing new access/fragmentation and reclaiming the land back to pre-disturbance equivalent capability.

Notification / Issue and Concerns Log	Federation Response
OLCN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • May 27, 2021-- OLCN responded and requested a Project overview meeting and site visit • June 23, 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO <ul style="list-style-type: none"> ○ No comments were received from OLCN • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • June 3, 2021-- the scope of work was accepted and proposed meeting and site visit dates were suggested • June 9 and 17, 2021, follow ups were sent regarding meeting and site visit dates (without response from OLCN)
SLCFN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • Early June 2021, Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO <ul style="list-style-type: none"> ○ SLCFN did not provide any feedback regarding the proposed Project • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, SLCFN has raised no site-specific Project concerns related to the proposed Project
WLFN	
<ul style="list-style-type: none"> • May 12, 2021-- As directed by the ACO, a Project Notification package was prepared and sent out on to all impacted communities <ul style="list-style-type: none"> ○ The notification package included a plain language Project description form, Project profile, a survey plan showing the Project location and access, wetland delineation figure, and a LAT report, which details baseline biophysical attributes for the area searched • May 2021-- Follow up regarding consultation package occurred • Early June 2021-- Record of Consultation logs were sent to the notified communities for their review and feedback prior to requesting an adequacy decision from the ACO <ul style="list-style-type: none"> ○ WLFN did not provide any feedback regarding the proposed Project • July 20, 2021-- ACO issued a consultation adequacy decision related to the Project 	<ul style="list-style-type: none"> • To date, WLFN has raised no site-specific Project concerns related to the proposed Project

4.3 Plans for Future Indigenous Engagement

Federation continues to communicate with local Indigenous groups with an interest in the area. Federation is committed to continuing to collect feedback and evaluate requests of Indigenous stakeholders and will record all Project-related concerns considered throughout the Project planning and regulatory review process.

Since July, 2023 Federation and CLFN have submitted joint letters to the AUC, requesting additional time to allow for further activities to continue to work towards resolving CLFN's concerns.

Federation acknowledges that the Project is situated on the traditional territory of CLFN. Federation also recognizes CLFN's perspective that their concerns have not been entirely addressed, and that the Project's direct and adverse impacts on CLFN's Indigenous Rights have not been fully addressed or accommodated. Recent consultation efforts have included the following:

- Information sessions to discuss the Project development and operational details, as well as wildlife habitat and traditional land use concerns
- Technical review meetings to discuss noise impact and emissions modelling assessments, as well as potential risks of subsurface compressed air storage

CLFN and Federation Group are planning further activities to continue to discuss CLFN's concerns and the direct and adverse impacts of the Project on CLFN's Indigenous Rights.

5.0 Studies, Plans and Assessments

5.1 Federal

A federal Impact Assessment under the IAA may be required for this Project (Government of Canada, 2019b). The Project is considered an Activity of the Physical Activities Regulations under the IAA (see Section 8.0).

Federation Group Inc. is not a Canada Energy Regulator (CER) regulated company, and the Project is not located on federal lands and does not cross a provincial boundary, as a result the Project is not CER regulated.

Federal acts, regulations, guidance documents and best management practices that apply to the Project include:

- *Fisheries Act* (Government of Canada, 2019c)
- *Migratory Birds Convention Act* (MBCA; Government of Canada, 1994)
- *Species at Risk Act* (SARA; Government of Canada, 2002)

5.2 Provincial

5.2.1 Alberta Environment and Protected Areas

As the Project will generate 320 MW once fully operational, it is a mandatory activity under the *Environmental Protection and Enhancement Act* (EPEA) and the *Environmental Assessment Mandatory and Exempted Activities Regulation* (Government of Alberta, 2023c; Government of Alberta, 2017). Power plants are defined activities under the *Activities Designation Regulation* (Government of Alberta, 2023b) and, as the Project will generate more than 1 MW, it will require an approval from EPA. A Project summary table and Project location map have been submitted; Federation has received a letter stating that an Environmental Impact Assessment Report will not be required (Lori Havanka, EPA Approvals Program Manager, personal communication, May 2, 2023).

5.2.2 Alberta Utilities Commission

The AUC is responsible for the review of applications for electricity generation in the Province of Alberta. As the Project will generate greater than 10 MW, a full AUC Application is required. Power Plants need to follow the requirements under AUC Rule 007 (Alberta Utilities Commission, 2022). Compressed air energy is an example of what the AUC considers an "Other Power Plant" and, therefore, follows the OP requirements listed in Rule 007. An

Environmental Evaluation was prepared to meet requirement OP20 of Rule 007 (effective date April 25, 2022) and was submitted on March 31, 2023 (Proceeding 28132).

5.2.3 Provincial Legislation and Guidance

Provincial acts, regulations, guidance documents and best management practices that apply to the Project include:

- Activities Designation Regulation (Government of Alberta, 2023b)
- *Agricultural Pests Act* (Government of Alberta, 2023d)
- AUC Rule 007 (Alberta Utilities Commission, 2022)
- *Conservation and Reclamation Guidelines for Alberta* (Government of Alberta, 1997)
- *Environmental Protection and Enhancement Act* (Government of Alberta, 2023c)
- *Environmental Protection and Enhancement Act Waste Control Regulation* (Government of Alberta, 2022a)
- Environmental Assessment (Mandatory and Exempted Activities) Regulation (Government of Alberta, 2017)
- *Forest and Prairie Protection Act* (Government of Alberta, 2022b)
- *Historical Resources Act* (Government of Alberta, 2022c)
- *Hydro and Electrical Energy Act* (Government of Alberta, 2022d)
- Master Schedule of Standards and Conditions (Government of Alberta, 2021a)
- *Public Lands Act* (Government of Alberta, 2022e)
- Sensitive Species Inventory Guidelines (Government of Alberta, 2013a)
- *Soil Conservation Act* (Government of Alberta, 2022f)
- *Water Act* (Government of Alberta, 2023e)
- *Weed Control Act* (Government of Alberta, 2022g)
- Weed Control Regulation (Government of Alberta, 2016)
- Weed Management on Industrial Sites (Government of Alberta, 2021b)
- Wetland Mitigation Directive (Government of Alberta, 2018)
- Wetland Policy (Government of Alberta, 2013b)
- *Wildlife Act* (Government of Alberta, 2022h)
- Wildlife Regulation (Government of Alberta, 2023f)

5.3 Municipal

The Project is located entirely within the M.D. of Bonnyville. Municipal bylaws, guidance documents and best management practices that apply to the Project include:

- Municipal District of Bonnyville No. 87 Land Use Bylaw No. 1667 (M.D. of Bonnyville, 2017)
- Municipal Development Plan Bylaw No. 1367 (M.D. of Bonnyville, 2007)
- Municipal Development Plan Bylaw No. 1462 (M.D. of Bonnyville, 2010)
- Municipal Development Plan Bylaw No. 1539 (M.D. of Bonnyville, 2013)
- Consolidated Public Safety Bylaw 1812 (M.D. of Bonnyville, 2023a)

5.4 Regional Studies and Plans

Vertex has contacted IAAC about relevant regional studies. No regional assessments in the vicinity or relevant to the Project were located in a search of the Canadian Impact Assessment Registry as of April 18, 2023.

The Project is located within the Lower Athabasca Regional Area, which is one of the seven land-use regions established under Alberta's Land Use Framework. The Lower Athabasca Regional Plan (LARP) identifies strategic direction for the region. This Plan was approved in 2012 and is currently in the process of a 10-year review (Government of Alberta, 2012). The 10-year review does not amend, replace or repeal the regional plan but evaluates the relevance and effectiveness of the regional plan (Government of Alberta, 2022i). The Project does not fall within any of the Conservation Areas (Provincial Parks or Public Land-use Zones), Provincial Recreation Areas or Public Land Areas for Recreation/Tourism identified within the Schedule G of the LARP (Government of Alberta, 2012). The LARP's Outcome 3 indicates that landscapes are to be managed to maintain ecosystem function and biodiversity; this is aligned with Alberta's Crown Land Vision.

The LARP identifies limits and triggers for air quality limits (based on Alberta Ambient Air Quality Objectives[AAAQO]) and surface water quality (based on Canadian Council of Ministers of the Environment [CCME] and other established guidelines), as well as triggers for groundwater quality (Government of Alberta, 2012). Management Frameworks are the way that long-term cumulative effects of development on a regional level are managed in Alberta. The LARP includes Environmental Management Frameworks for air quality, surface water quality, surface water quantity, groundwater and tailings management. The LARP commits to developing a biodiversity management framework, but this has yet to be developed. Using monitoring information, EPA annually assesses air quality, surface water quality and quantity in relation to the triggers and limits established in the Lower Athabasca Region (Government of Alberta, 2023g). Triggers for groundwater management have not yet been finalized.

The *Cold Lake Subregional Integrated Resource Plan* addresses ecological resources, which it defines as special or representative ecological features or systems, and includes locations such as Provincial Parks, Ecological Reserves, Natural Areas and candidate Natural Areas (Government of Alberta, 1996). This plan focuses on the protection of these areas or management to protect areas that may be candidates for these designations. As the Project is not located in any of these areas and does not meet the current Environmentally Significant Areas (ESA) designation threshold (see Section 14.2), the management guidelines with respect to the environment are not applicable.

The M.D. of Bonnyville Municipal Development Plan seeks to promote environmentally responsible development through the identification and dedication of ESA, restriction of development on Environmental Reserve land as well as setbacks from banks, steep slopes and floodplains (M.D. of Bonnyville, 1999). This plan also aims to protect groundwater and surface water quality and quantity by requiring that EPA groundwater guidelines and the groundwater licensing requirements are applied (M.D. of Bonnyville, 1999).

The disturbance area is located within the WLPGR (GRR 8865). Industrial development within the WLPGR is not permitted without prior approval of the Provincial Grazing Reserve Agrologist. Federation has received Provincial Grazing Reserve consent for construction of the proposed Project. The Project is located in an area that has Zoning Code A, which is for agriculture (M.D. of Bonnyville, 2023b).

The Project is not located in a region that is the subject of a regional environmental study or any Regional Assessment carried out under the IAA.

During the consultation with Indigenous groups, some groups have indicated that they have conducted Traditional Land Use (TLU) studies. Some groups have shared TLU studies with Federation. Due to the confidential nature of this information, details will not be provided as the Nation(s) have requested that Federation keep the TLU report contents confidential.

6.0 Strategic Assessments

The Project is not located in a region that is the subject of a strategic assessment as defined in Section 95 of the IAA. Although it is not specific to the region where the Project is located, the Strategic Assessment of Climate Change (SACC; Government of Canada, 2022b) is applicable to the Project and is discussed further in Section 23.6.

PART B: PROJECT INFORMATION

7.0 Purpose, Need and Benefits of the Project

7.1 Purpose

Federation is developing a 320 MW CAES facility, adjacent to the existing Marguerite Lake substation. The Marguerite Lake substation provides Federation's CAES facility (and the 1146S AESO Osborne Creek substation that is integral to the Project) access to existing 240 kilovolt (kV) double circuit infrastructure and the AIES. The proposed CAES facility will use electric motor driven compressors to capture excess electricity from the grid and store the energy as compressed air underground.

The Project will consist of a single 125 MW compressor train and two 160 MW expander trains with compressed air storage in a solution mined salt cavern sized for 48 hours of full-load output. The solution mined salt cavern for compressed air storage will be in the 200 m thick Lotsberg halite of the Elk Point Group at a depth of 1,100 m below surface. The depth and thickness of the Lotsberg halite at the Project location provides perfect conditions for utilization of the Siemens Energy SXT-800 compressor and expander technology. Each expander train can operate from 16 MW to 160 MW power production with 20% ramp rate per minute, and full generation in 10 minutes. The expansion trains are capable of 50% hydrogen co-firing with path to 100% in the future.

7.2 Project Need

The existing ATCO Marguerite Lake substation was developed in the mid-1980s to serve the projected growth of the Cold Lake area oil sands projects. Due to the development of the cogeneration power plants at these projects and deregulation of the electricity market in 1996, the Cold Lake area is currently an exporter of surplus electrical energy, making the Marguerite Lake substation and associated high-voltage transmission lines significantly underutilized. The Project will enable more intermittent renewable energy development in Alberta, as well as provide ancillary services to the AIES.

7.3 Potential Benefits of the Project

The Project offers several potential benefits. Energy storage projects contribute to greater grid stability and reliability, which is a critical component to meet the challenges of adding additional renewable energy generation to the grid. CAES technology is less dependent on siting than some energy storage technologies allowing the Project to reduce its overall footprint by utilizing infrastructure such as existing roads, tying into existing power lines, siting adjacent to an existing substation and proximity to existing natural gas pipelines. The CAES technology also allows for flexibility in the grid as the time to bring generation online is much quicker compared to conventional natural gas generators, which are commonly used to meet peak demands. As described in the recently released Alberta *Emissions Reduction and Energy Development Plan* “Future investment in technologies such as energy storage and clean hydrogen will likely complement natural gas as a reliability backstop but, in the near term, as more intermittent wind and solar generation have come online, reliable, firm and “on-demand” generation are required to ensure power is available when needed” (Government of Alberta, 2023a). Therefore, the Project would contribute to the achievement of this emissions reduction plan.

The location chosen for the Project allows for a reduced overall footprint (minimal access road, existing transmission line right-of-way and utilizing an existing pipeline right-of-way) and ensures that the Project can be completed in a cost-effective manner. The Project is expected to add up to 20 jobs during operations and up to 200 jobs during peak construction. The Government of Canada has a Sustainable Development Goal (SDG No. 7) of affordable and clean energy (Government of Canada, 2023b). Under this Sustainable Development Goal, Canada is transitioning to clean energy, adopting cost-effective standards for technologies, and expanding infrastructure and upgrading technology to provide clean energy. The draft Clean Electricity Regulations (Government of Canada, 2023c) also ensure that investments in the grid are directed toward clean sources. The Project has been designed to support Federal and Provincial clean energy goals and with the potential to co-fire the expanders with 50% Hydrogen and a goal of retrofit to 100% hydrogen to further reduce emission and provide even greater de-carbonization in the future (see Section 23.6).

A further benefit of the Project is that it is aligned with meeting Provincial net-zero goals. The AESO has set a goal to have a zero emissions grid by 2035. In order to meet that goal, in the AESO Net-Zero Emissions Pathways Report, the AESO predicts that, by 2035 Alberta will need 496 MW of 60-hour long-duration CAES and 1,495 MW of Hydrogen Simple Cycle (H2SC) in the Renewables and Storage Rush Scenario (which is one of the scenarios outlined to meet the net zero goal; Alberta Electric System Operator, 2022). By 2039, these numbers are expected to increase to 1,096 MW of CAES and 2,020 MW of H2SC (Alberta Electric System Operator, 2022). The Project, with a capacity of 320 MW, is designed to help Alberta meet these goals.

8.0 Physical Activities Regulations

CAES is not specifically identified as a designated project listed under the Physical Activities Regulation (Government of Canada, 2023a). The Project is not located on federal lands. However, Item 30 of the Physical Activities Regulation states that “The construction, operation, decommissioning and abandonment of a new fossil fuel-fired power generating facility with a production capacity of 200 MW or more” is a Physical Activity governed under the *Impact Assessment Act* (Government of Canada, 2023a). The Project will generate 320 MW of electricity, which exceeds the

200 MW trigger for power generated generating facilities that are fossil fuel-fired. Thus, the Project is a designated physical activity under item 30 of the Physical Activities Regulations.

Natural gas will be required to provide fuel for the expander train turbines (for the foreseeable future the expander turbines will be powered by natural gas, although the expander generator is capable of 50% hydrogen co-firing with a path to 100% in the future), and therefore, the Project may be considered to be fossil fuel-fired. At the maximum output of 160 MW, the expander generator would use an estimated 8.5 lbs/s of natural gas (Siemens Energy, 2022). Compared to conventional simple-cycle combustion turbines used for rapid load response, the CAES power block consumes about 67 % less fuel, resulting in lower carbon dioxide (CO₂) emissions per kW-hr of electricity produced (Siemens Energy, 2021).

9.0 Description of Project Activities

9.1 Project Works and Activities

The following subsections describe the Project structures, physical works and activities including any incidental activities. The key structures and features of the Project are shown on Figure 4 and a detailed depiction of the Project components is shown on the Plot Plan in Appendix C.

9.1.1 Physical Works

The Project's proposed footprint is 13.5 ha (referred to as "disturbance area") and will be composed of a graveled, fenced plant site that encompasses electrical power generation, compression equipment, caverns, source and disposal wells, borrow pit/stormwater pond, soil storage areas, buildings and emergency equipment. Further details of the equipment are provided below, and the operational layout of the Project is shown on Figure 4 and the Plot Plan (Appendix C).

Generator Equipment (Expander Train)

- Two 160 MW discharging expander-generators
- Very high pressure expander turbine
- High pressure expander turbine
- Low pressure expander turbine
- Generator circuit breaker
- Generator MV PDC
- Waste heat recovery unit
- High voltage disconnect switch
- High voltage circuit breaker
- Ammonia storage and forwarding pumps

Compressor Equipment

- Single 125 MW charging compressor-motor
- Low pressure compressor
- High pressure compressor

- Inlet air filter
- Compressor motor starting VFD
- Compressor circuit breaker
- Compressor MV PDC

Substation (Osborne Creek 1146S)

- Generator utility transformer
- Generator step up transformer
- Compressor utility transformer
- Compressor main transformer

Electrical Transmission Line

Federation is proposing the CAES facility be connected to existing double circuit 240 kV transmission lines 9L36 and 9L37 via Marguerite Lake Substation 826S, all of which are owned and operated by ATCO. The connection point from the proposed ATCO power line to the CAES facility is shown on the Plot Plan in Appendix C. A new large general services/industrial connection (as a part of the CAES facility) will connect to the existing ATCO transmission/distribution system. ATCO will be responsible for the interconnection. The interconnection power line between Osborne Creek 1146S and the existing Marguerite Lake 826S will be approximately 500 m long and is designated as 9L42. Based on current design, it is not anticipated that the footprint of the existing 826S substation will need to be expanded to accommodate the connection apparatus.

Caverns

- Two solution mined salt caverns
- Buffer tank
- Cavern pump building
- Brine tank

Wells

- Two disposal wells
- Four source wells
- Observation well

While no water is required for the operation of the Project, source water will be required for cavern mining. Cavern mining will require approximately 4,300 m³/day for solution mining for a duration of approximately 2 years. The location of source wells, observation well and disposal wells will be determined at a later design phase based on additional subsurface data and regulatory considerations. Depending on the location of the wells, there may be a need for water pipelines to convey water from the source wells or to disposal wells. Although the exact locations are yet to be confirmed, the water wells and any associated water pipelines will be within the disturbance area (i.e., site boundaries).

Fuel Gas

- Fuel gas yard
- Fuel gas pipeline
- Delivery station

The energy requirements of the expander-generators will be supplied by natural gas. A new fuel gas pipeline will be constructed that will supply the Project; this new pipeline will tie in on the north side of the site. The connection will be made with the existing Leming Lake Lateral Loop within 10-06-066-05 W4M via a newly constructed delivery station named Marguerite Lake Sales #2. The fuel gas pipeline will run adjacent to the existing La Corey North Resource Road and be contained within existing easements (Telus EZE160001/160002 and ATCO EZE840086/850219); no new land will be required for the proposed pipeline.

Federation submitted an Application for Service (AFS) with Nova Gas Transmission Line (NGTL) in April 2022 and it is currently in the connection queue negotiating contract terms. The planned pipeline diameter is Nominal Pipe Size (NPS) 8 and an approximate length of 14 km. The requested quantities are 10,000 gigajoules per day (GJ/d), with a normal operating pressure of 5,000 kilopascal (kPa). The Maximum Operating Pressure (MOP) of the Leming Lake Lateral Loop is 8,450 kPa.

Cooling Equipment

- Closed water and glycol cooling loop
- Fin/Fan aerial coolers
- Cooling water pumps

The cooling system used for air compression is represented on the Plot Plan (Appendix C). A closed water and glycol cooling loop has been selected.

Stormwater Pond/Borrow Pit

- Stormwater transfer pump house
- Perimeter ditch system

All water from the disturbance area will be collected in the stormwater pond. If the pond and ditches are full, excess water from the pond will be disposed of in a disposal well on-site. If the water meets Alberta EPEA standards, it will be pumped off-site.

Soil Storage Areas

Separate topsoil and subsoil storage piles will be used, which will be seeded and stabilized. Soil will be managed as per Conservation and Reclamation Guidelines (Government of Alberta, 1997).

Buildings

- Control/administration building and a warehouse/maintenance building

- Potable water tank
- Instrument air building
- Switchyard control house

Emergency Equipment

- Back up emergency generator
- Fire water pump building
- Source water/fire water tank

9.1.2 Project Activities

Project activities can generally be grouped into pre-construction, construction, operations and maintenance, and decommissioning and reclamation. The sections below detail activities expected to occur during each part of the Project lifespan.

Pre-construction

- Baseline environmental surveys
- Obtain required permits and approvals
- Survey

Construction

Up to 200 full-time staff will be employed during construction. Construction will include activities such as:

- Source well drilling
- Clearing of vegetation
- Stripping and grading
- Concrete foundation installation
- Equipment installation
- Equipment testing
- Gravel pad installation
- Fence installation
- Seeding/stabilization of topsoil and subsoil piles
- Geomechanical study
- Drilling of cavern wells, disposal wells and the observation well
- Cavern solution mining
- Cavern mechanical integrity testing
- Cavern dewatering

Operations and Maintenance

The Project is anticipated to be in-service as of 2026-2028 (for Cavern 1) and operate for more than 30 years. During operations, up to 20 full-time staff are anticipated to be employed at the site. Operations staff will monitor the

stormwater pond, perimeter ditch and any sediment and erosion control devices according to the specifications and approval conditions. The site will be monitored for weeds or undesirable vegetation growth and both maintenance and control will be performed, as needed.

Decommissioning and Reclamation

The Project is expected to be in operation for 30 years or more. Once the Project is no longer needed and is ready to be taken out of operation, Federation will decommission and reclaim the area as per regulations of the time, the Project-specific approvals and the desired end land use. It is anticipated that the fuel gas pipeline will be abandoned in place. The wells will be cleaned, plugged, filled and then cut and capped according to the well type, approval conditions and requirements of the day. The equipment, buildings and fence will be removed, and the gravel will be salvaged. Subsoil will be ripped in areas where compaction is present. The site will be re-graded, and topsoil and subsoil piles will be redistributed. Reclamation and revegetation will depend on the desired end land use. Monitoring of the success of reclamation will be conducted as per the regulations and conditions of the time.

Additionally, Federation is committed to including CLFN in the planning of decommissioning activities and will work collaboratively with CLFN to develop a framework to guide culturally appropriate reclamation practices. Federation will consult with a CLFN cultural monitor for all decommissioning activities. This means that reclamation planning will be grounded in ensuring that CLFN has the confidence that the environmental quality and resource quantity that underlies the meaningful practice of treaty and Indigenous rights, is sufficient to meet the needs of CLFN at the time of reclamation and for generations to come.

9.1.3 Incidental Activities

Existing Substation and Electrical Transmission Lines

Federation is proposing the CAES facility be connected to existing double circuit 240 kV transmission lines 9L36 and 9L37 via Marguerite Lake Substation 826S, all of which are owned and operated by ATCO. Federation and ATCO have signed an AESO Project Plan (AESO Project Number 2438) formalizing the overall Project and the responsibilities of each company. ATCO has provided Federation with a letter indicating ATCO's conditional waiver to the *Electric Utilities Act* Section 101(2), which enables Federation to apply to the AESO directly for the Project. The ATCO Electric Marguerite Lake substation was developed in the mid-1980s to serve the projected growth of the Cold Lake area oil sands projects and, therefore, is not for the sole benefit of the Project. The existing 9L36 and 9L37 transmission lines are currently in-use and are not for the sole benefit of the Project.

Existing Gas Pipeline

The Leming Lake Sales Lateral Loop was constructed to meet aggregate firm service contractual obligations in the south Kirby Area and was built in approximately 2014 (NGTL 2013). This natural gas pipeline is operated by NGTL and is not for the sole benefit of the Project.

Additional activities that are incidental to the Project that would not be under Federation's care or control include telecommunications and highway access to the site.

10.0 Maximum Project Production Capacity

The maximum output of the Project is 320 MW as the two expansion trains included in the Project have a maximum design output of 160 MW (Siemens Energy, 2022). The production processes and the CAES facility design of 320 MW were described in detail in Section 7.0

11.0 Schedule

Upon receiving regulatory approvals, and assuming that a Federal Impact Assessment is not required, the expected Project schedule is as follows:

- Site Access and Well Pad Preparation: May 2025
- Source Water Well Drilling and Testing: May 2025
- Disposal Well Drilling and Testing: May 2025
- Cavern Well Drilling: August 2025
- Site Construction: November 2025 – January 2028
 - Clearing and Site Preparation: November – December 2025
 - Piling and Concrete Foundations: December 2025 – May 2026
 - Equipment Installation: April – September 2026
- Cavern 1 Solution Mining: August 2025 – April 2026
- Cavern 2 Solution Mining: May 2026 – December 2026
- Interconnection/Energization: September 2027
- Cavern 1 Compressed Air Operations: March 2028
- Cavern 2 Compressed Air Operations: September 2028

The Project is expected to be in operation for 30 years or more and, based on the above schedule, this would mean that operations would occur between approximately 2028 and 2058. Decommissioning would occur after 2058 and take approximately 1 year. Abandonment of the facility would occur after 2060 and would take up to 5 years (but is dependent on the regulations of the time and the desired end land use).

If a Federal Impact Assessment is required, the Project schedule would need to be adjusted. The schedule below reflects the schedule incorporating an estimated 2.5 years from the Agency's decision to conduct an impact assessment.

- Site Access and Well Pad Preparation: October 2026
- Source Water Well Drilling and Testing: October 2026
- Disposal Well Drilling and Testing: October 2026
- Cavern Well Drilling: January 2027
- Site Construction: February 2027 – July 2029
 - Clearing and Site Preparation: February – March 2027
 - Piling and Concrete Foundations: March – August 2027
 - Equipment Installation: September 2027 – March 2028

- Cavern 1 Solution Mining: January – September 2027
- Cavern 2 Solution Mining: October 2027 – May 2028
- Interconnection/Energization: January 2029
- Cavern 1 Compressed Air Operations: August 2029
- Cavern 2 Compressed Air Operations: February 2030

The Project is expected to be in operation for 30 years or more. Based on the schedule provided above (in the event a Federal Impact Assessment is required), operations would occur between approximately 2030 and 2060. Decommissioning would happen after 2060 and take approximately 1 year. Abandonment of the facility would occur after 2062 and would take up to 5 years (but is dependent on the regulations of the time and the desired end land use).

12.0 Alternatives to the Project

Due to the increasing proportion of renewable generation, there is a need to be able to store energy for use during peak demands and to provide consistent power regardless of environmental factors that affect wind and solar resources. The purpose of the Project is to provide storage capability to increase grid stability and reliability. The Project has been designed such that it has the capacity to supply up to 48 hours of full load output.

12.1 Alternative Approaches

In the region (including AESO planning areas of Cold Lake [Area 28], Lloydminster [Area 13], and Vegreville [Area 56]), the main sources of power supply include the gas-fired plant at Battle River and the cogeneration power plants in the Cold Lake Area: Mahkeses, Nabiye and Primrose. Installation of a new natural gas generated power plant is a feasible alternative to the Project in the sense that a natural gas plant could meet one component of the need for the Project, which is to expand the capacity to meet peak demands. However, the flexibility and speed of a CAES facility are better suited to meeting this need as a gas generator may not be able to operate at low output levels. CAES has a wide operating range that would allow more flexibility in adjusting the plant output. In addition, CAES is able to achieve a fast start-up. The Compressor train can transition from offline to full load in 4 minutes and the expander train can achieve full power from start in less than 10 minutes. However, a natural gas fired generator does not allow for storage of energy produced from renewable sources for later use.

Additional alternatives that allow for the storage of energy are pumped storage hydro, battery storage and hydrogen energy storage systems. As compared to battery storage, CAES offers a lower cost based on 2020 costs (Mongird et al., 2020). Pumped storage hydro requires specific site characteristics with reservoirs with a large elevation difference, these conditions are not widely available and are not suitable in regions with relatively flat terrain. Pumped storage hydro often needs a site with pre-existing reservoirs to make the system cost-effective. An additional advantage with a CAES solution is that it offers long-duration storage, from 8 hours to several days.

Based on the Project objectives, a CAES facility was determined to be the best solution to meet the need.

There are several approaches to CAES that were considered during the design process. The points below explain the

alternative approaches and the justification for why they were not chosen.

- Use of naturally occurring salt caverns, as opposed to solution mining, does not allow the flexibility of location. Although naturally occurring salt caverns could potentially reduce the cost of a CAES project, there are other factors that influence the economics and viability of the Project that outweigh the lower cost if a suitable existing salt cavern can be used
- Adiabatic CAES (A-CAES) uses heat exchangers and a thermal energy storage system to store thermal energy generated during the compression process and then reuses it to preheat the compressed air prior to expansion. This method has a greater efficiency and no CO₂ emissions. However, A-CAES was not suitable for this Project as the length of time that the energy is able to be stored is shorter using this technology

12.2 Project Siting

Federation considered many factors in the siting of the proposed Project location including:

- Location near to an existing substation
- Location near to an existing transmission line
- Location with appropriate geology for salt cavern mining
- Groundwater monitoring wells were installed to characterize the pre-disturbance groundwater levels (quantity) and groundwater chemistry (quality) at the proposed CAES site and evaluate presence of potential near surface high permeability deposits
- Existing salt caverns in the area demonstrate the feasibility of salt cavern mining
- Location in an industrial corridor which allows for easier interconnection and access while reducing cumulative effects and concerns around new access development
- Current location takes advantage of future Carbon Capture and Storage infrastructure that will allow the CAES facility to achieve net zero
- The grazing Leaseholder is supportive of the Project
- Some of the Indigenous communities consulted have visited the site and had no site-specific static concerns
- There are no objections to the Project or the Project location, to date
- The location reduces noise impacts to residences

A combination of the above factors minimizes the cost of developing the Project and ensures that it remains economical.

12.3 Alternative Means

Federation has evaluated different technological approaches to the Project; some previously considered approaches include:

- An underground transmission line for the 240 kV interconnection between the existing Marguerite Lake 826S substation and the new Osborne Creek 1146S substation was evaluated
- Simple-cycle combustion turbines are capable of providing a rapid load response. However, the CAES power

block provided by Siemens Energy (which has been selected for this Project) uses recuperation coupled with high air storage pressures (up to 3,000 pounds per square inch [psi]) to increase energy efficiency using approximately about 67% less fuel, and therefore produces less CO₂ per kilowatt hour (kWh; Siemens Energy, 2021)

- The cooling system used for air compression is represented on the Plot Plan (Appendix C as an open evaporative cooling system. However, Federation is planning a closed water and glycol loop equipped with fin/fan aerial coolers

Some components of the Project that are still being evaluated include:

- The placement for the water source and disposal wells is still being evaluated. Federation is determining if one of the source wells will be freshwater and one will be saline water. CLFN has expressed to Federation Group that the use of fresh water for industrial development purposes is a direct and adverse impact on the Nation's Indigenous Rights. Federation is dedicated to minimizing the use of freshwater for industrial development purposes in response to this concern.
- The generator technology can be co-fired with 50% hydrogen. Siemens anticipates having a retrofit path to 100% hydrogen by 2035. The final plan is to utilize blue hydrogen to fuel the Project at a future date.

PART C: LOCATION INFORMATION AND CONTEXT

13.0 Description of the Project Location

The Project is located approximately 16 km north of the town of La Corey, Alberta, within the M.D. of Bonnyville. The regional location of the Project is shown on Figure 2 and an overview of the site is shown on Figure 3. The Project falls within the WLPGR boundary.

13.1 Geographic Coordinates

The coordinates at the approximate center of the Project site are:

- Latitude 54.585788
- Longitude -110.803468

13.2 Site Maps

Figure 2 shows the regional location of the Project in relation to international and provincial boundaries and shows the nearest First Nation Reserve/Metis Settlement. Figure 2 also shows the Project in relation to parks, Crown land, ESA (Provincial) and airports. Figure 3 shows an overview of the Project location at a closer scale showing nearby roads, towns, lakes and the extent of the WLPGR.

The Plot Plan (Appendix C) shows the Project components within the site. The key site components are also shown on Figure 4 overlaid on an imagery base map.

13.3 Legal Description

The Project is located in LSD 14 of 35-064-06 W4M on provincial Crown land.

The Project has received a miscellaneous lease (DML 210041) from EPA, Plan No: 148028 MSL (Appendix A). The Project boundary overlaps with an existing ATCO transmission line right-of-way (R/W Plan 862 2434, EZE 840084); the overlap is approximately 0.77 ha along the northwest boundary. Federation and ATCO have signed an AESO Project Plan (AESO Project Number 2438) formalizing the overall Project and the responsibilities of each company. The M.D. of Bonnyville provided consent to construct an approach off the La Corey resource road (owned by the M.D.) on June 18, 2021.

13.4 Nearest Residences and Communities

The CAES facility is located on Crown land approximately 16 km north of the hamlet of La Corey, Alberta, within the M.D. of Bonnyville. La Corey is the nearest community to the Project (Figure 2). The Project falls within the WLPGR (GRR 8865) boundary. The nearest residence, the WLPGR Headquarters/residence in SE-34-064-06 W4M, is located approximately 900 m southwest of the disturbance area. The next closest residence is over 2 km away and is located in NE-21-064-06 W4M. The nearest residences are shown on Figure 5.

13.5 Proximity to Indigenous and Traditional Land Use

The nearest First Nations Reserve is Cold Lake 149B located 32 km east of the Project. The nearest Metis Settlement is KMS, located 85 km west of the Project. There are currently no comprehensive land claim agreements or self-government agreements in the vicinity of the Project (Government of Canada, 2016; Government of Alberta, 2023h).

As directed by the ACO, Federation has been engaged in consultation with 11 Indigenous communities since May 2021 regarding the proposed Project. A pre-consultation assessment request was submitted to the ACO, and an Adequacy Assessment was completed on September 21, 2022 (FNC202204766). Based on the information provided in the pre consultation assessment, which detailed the consultation that had occurred with 11 communities (as part of FNC 202102643), the ACO determined that the consultation was deemed adequate for the activity. A detailed summary of questions and concerns raised by the Indigenous communities consulted is provided in Section 4.0. The information below provides a high-level summary of issues raised. Some groups have identified that they have conducted TLU studies and have shared this TLU information with Federation. Due to the confidential nature of TLU studies the nation(s) have requested that Federation keep the TLU report contents confidential.

CLFN identified that the Project overlaps lands where the nation exercise their Traditional Territory. General concerns related to subsistence hunting for large game and potential direct impact on wildlife and plants were raised. As the nation is unfamiliar with CAES projects, they requested additional Project details and a site visit to further assess impacts. A site visit was conducted, and no site-specific concerns were identified as a result of the site visit. Concerns around noise, vibration, the potential safety risks associated with storage (e.g., geophysical instability, release of air, leaked air interacting with existing oil wells) and long-term impacts of the Project in the decommissioning and reclamation phases have been raised and Federation is currently working to respond to and address these concerns.

The HLFN shared information that identified general cumulative effect concerns, and the nation requested a response regarding wildlife impacts, traffic, surface disturbance and mitigation to reduce impact to the surrounding environment. A detailed response was provided to HLFN on June 21, 2021, to which no further response was received from HLFN. The Project area was identified as an area of traditional use including activities such as hunting, trapping, food gathering and medicine gathering. However, no site-specific or static traditional land use locations of impact were identified.

KMS indicated that lands surrounding the area have historical and contemporary traditional land uses. They raised general concerns regarding habitat, fragmentation, access, water and cumulative effects. Following discussions and the completion of their review, the KMS identified no site-specific concerns and provided a letter that outlined general concerns on behalf of the Metis settlement.

13.6 Proximity to Federal Lands

The Project is not located on Federal lands. The nearest Federal lands to the Project are the Cold Lake Air Weapons Range 20 km to the north and the Cold Lake IR149B 32 km to the east (Figure 2).

14.0 Biophysical Setting

This section presents the baseline environmental data collected to characterize the biophysical setting of the Project. The setting includes desktop reviews of relevant and available databases, field surveys as well as a summary of potential effects.

14.1 General

The Project is located on public (Crown) land within NW-35-064-06 W4M, in the White area of Alberta. The Project is located within the WLPGR and is not located within any Parks or Protected Areas (Government of Alberta, 2021c).

The disturbance area is dominated by pasture interspersed with wetlands (see site photographs included in Appendix D). Lands surrounding the Project are predominantly cultivated (tame pasture) and natural, including forests, swamps, peatlands and water bodies. Predominant land uses are grazing, and oil and gas activity (including wellsites, access roads, pipelines and seismic lines; Figures 5 and 6). Multiple dugouts are located within the surrounding tame pasture areas. An electrical substation is located to the west, across Range Road 61A. One private residence is located approximately 900 m southwest of the disturbance area. The nearest watercourses/water bodies to the disturbance area are Osborne Creek and Marguerite Lake located approximately 0.5 km northwest and 2.5 km to the northeast, respectively. According to Fish and Wildlife Internet Mapping Tool (FWIMT; Government of Alberta, 2023i), Marguerite Lake is the closest fish bearing lake to the disturbance area.

14.2 Environmentally Significant Areas

The disturbance area is not located in a Provincial ESA (Government of Alberta 2014a; Fiera Biological Consulting Ltd., 2014), and the nearest designated ESA is within NE-03-065-06 W4M, approximately 990 m northwest of the disturbance area. As the quarter section where the disturbance area is located has an ESA quarter section score

below the ESA cut-off value, environmental effects for ESAs were not considered further in the assessment of potential effects.

14.3 Terrain and Soils

14.3.1 Desktop Review

The Alberta Soil Information Viewer (Alberta Agriculture and Forestry, 2022) indicated that the disturbance area is in SCA 21, the Gray Soil Zone of northeast-central Alberta, and contains only one soil map unit comprising Athabasca, Grosmont and Miscellaneous Coarse Dark Gray Chernozems with a coarse texture. Review of satellite imagery (Google Inc., 2021) indicated several depressions within the disturbance area. These areas were delineated separately with the expectation of finding Gleysolic soils and possibly gleyed Luvisolic soils within the depressions.

The land suitability rating for spring grains indicated that the soil polygon for the disturbance area is classified as entirely Class 2 for small, seeded grains (Agronomic Interpretations Working Group, 1995; Alberta Agriculture and Forestry, 2022). Class 2 signifies land that has slight limitations that may restrict the growth of the specified crops or require modified management practices (Agronomic Interpretations Working Group, 1995).

An AER Spills and Complaints Report confirmed that there were no historical spills located in the quarter section containing the disturbance area (Abacus Datagraphics Ltd., 2021). No historical environmental reports were found in a review of the Environmental Site Assessment Repository (ESAR; Government of Alberta, 2023j).

14.3.2 Field Summary

A total of 12 soil inspections were completed by qualified personnel on July 28, 2022. Data collected during the soil inspections included topography, drainage moisture regime, surface stoniness, soil profile description, parent material, as well as soil classification into subgroup and series. The number of soil inspections completed corresponds to survey intensity level 1 (SIL1), that requires at least one inspection per polygon, and between 0.2 and 1.0 inspections per hectare (Mapping System Working Group, 1981).

The topography in the disturbance area is comprised of an undulating landscape, with slopes ranging from 0 to 2%, including four distinct depressions. Parent materials comprise several, often contrasting, layers of till deposits ranging in texture from sand to clay.

Soil series occurring on the uplands consist of Athabasca (ABC), that includes of well drained Orthic Gray and Dark Gray Luvisols, and Pinehurst (PIN), that includes rapidly drained Eluviated Eutric Brunisols. Soils series occurring in the depressions include Amber Valley (ARV), that includes imperfectly to poorly drained Orthic Luvic Gleysols.

Three soil map units were created to stratify the soils/terrain units in the work area (ABC6, ARV1, ARV6). Soil map units were delineated using the soil and terrain information collected during fieldwork, and interpretation of satellite imagery.

The map unit ABC6 covers an area of 10.7 ha (85%) and encompasses the upland areas of the site. The map unit is primarily comprised of the Athabasca and Pinehurst series. Water and wind erosion for this map unit is rated as moderate to low risk; however, there is a high risk to compaction and puddling due to the medium to fine texture.

The map unit ARV1 covers an area of 0.49 ha (4%) and ARV6 covers an area of 1.32 ha (11%), and these two units encompass the depressions and low topographic areas. The map units are primarily comprised of the Amber Valley series. Water and wind erosion for these map units are rated as low to no risk; however, there is a high risk of compaction and puddling due to the high water content in these soils.

Soil samples were taken at four representative sites to a depth of 100 centimetres (cm) and submitted for analysis. These horizons were rated Fair as reclamation materials, mainly due to fine texture and pH. One sample tested had an Unsuitable rating due to the high saturation percentage. As the soil was located in a depression and was holding water, it would not be suitable for reclamation or construction due to its instability. It should be noted that subsoil on the disturbance area has textures ranging from loamy sand to heavy clay. This results in a wide range of suitability ratings as sandy textured soils rate poorly, as sand does not hold water, and clay rates poorly, as it does not allow drainage as a growing medium. During soil salvage, subsoil will be mixed, diluting the poorly rated textures and creating a balanced growing medium.

14.3.3 Environmental Effects

The following Project-related activities may adversely affect soils and terrain:

- Source well drilling
- Clearing and grubbing
- Stripping and grading
- Excavation, installation of foundations
- Cavern well drilling and solution mining
- Operations and maintenance
- Regrading
- Soil replacement
- Revegetation/seeding

Potential Project-related effects on soils and terrain include:

- Loss of soil during salvage, handling and storage
- Reduction of topsoil quality due to admixing of subsoil with topsoil
- Loss of topsoil due to wind or water erosion
- Loss of soil quality due to compaction and puddling

Key mitigation measures to reduce the Project-related effects on soils and terrain include: minimizing the disturbance area; re-vegetating and re-claiming areas that are no longer required; and having qualified personnel supervise soil handling activities, including salvage, storage and replacement. If surface water is present in depressions, it will be pumped into a vegetated area at a low release rate prior to soil salvage. Upper subsoil will be salvaged separately from topsoil and stockpiled for use in reclamation. Stockpiles will be placed away from natural

drainage channels, and stockpiles will be managed to prevent erosion and the establishment of invasive plant species. Proper equipment will be used, and efforts will be made to prevent admixing.

A list of proposed mitigation measures is presented in Appendix E. Based on the implementation of these measures, the Project is not expected to cause high magnitude adverse effects to soil and terrain.

14.4 Groundwater and Surface Water

14.4.1 Desktop Review

The site is located within the southern portion of the Marguerite Upland (Andriashek and Fenton, 1989), characterized by a hummocky, stagnant-ice topography with numerous wetlands. The elevations in the southern portion of the upland range from 560 to 650 metres (m) above sea level (masl).

Relatively shallow groundwater conditions are typical for this area of Alberta. Groundwater levels are dependent on precipitation infiltration for recharge, and levels are expected to fluctuate on a seasonal basis and will be the highest after periods of heavy or prolonged precipitation and snowmelt.

Several aquifers have been mapped in the region within the Quaternary drift deposits. Groundwater yields range between less than 10 m³/day to approximately 100 m³/day in the Grand Centre, Sand River and Ethel Lake formations, and from 10 m³/day to more than 1,000 m³/day in the Bonnyville Unit 1, Muriel Lake, Empress Unit 3 and Empress Unit 1 formations (Hydrogeological Consultants Ltd, 2002).

There are 28 water wells within a 5 km radius of the site including: five observation and monitoring wells, six domestic wells, eight stock wells, one domestic and stock well, one domestic and irrigation well, one industrial well and six wells classified as other (Appendix F). Water well depths range from approximately 12 to 143 m (Government of Alberta, 2023k).

The Project is located within the Middle Beaver River Watershed with a Hydrological Unit Code [HUC] 8: 12020101 and a drainage area of 82,382 ha (Government of Alberta, 2021d). Surface water within and around the disturbance area generally drains to the southwest. The disturbance area is relatively undeveloped with the presence of low-lying shallow waterbodies and rolling pasture.

After development of the site, it is expected that impervious surfaces and graded soils will be increased by 26% and 63%, respectively. This increase in impervious surfaces decreases the runoff infiltration in the ground, contributing to the increase in the surface water runoff volumes. The runoff volumes are estimated to increase by approximately 154%. Additionally, the run-on drainage area on the north side can contribute approximately an additional 28% of the post-disturbance stormwater runoff volumes to the stormwater pond.

14.4.2 Field Summary

Borehole drilling and monitoring well installation was completed on November 21 and 22, 2022, by means of a truck mounted rig. Groundwater monitoring and sampling was conducted November 26, 2022.

A total of five groundwater monitoring wells were completed for the baseline hydrogeology assessment: four shallow (approximately 6 m depth) and one deep (approximately 15 m depth). The hydraulic conductivity was estimated at 1.3×10^{-7} m/s and 5.4×10^{-7} m/s at two wells in the shallow groundwater bearing zone, and 1.4×10^{-8} m/s within the deeper groundwater bearing zone.

The depth to groundwater measured on November 26, 2022, ranged from 1.206 m below ground surface (mbgs) to 2.427 mbgs in the shallow water bearing zone, and was measured at 3.682 mbgs in the deeper groundwater bearing zone. The shallow groundwater surface elevations ranged from 638.822 masl near the southern site boundary to 641.127 masl near the northern boundary. The inferred local shallow groundwater flow direction is to the south/southwest.

Based on the groundwater surface elevations measured at a nested well pair, the vertical hydraulic gradient was estimated at 0.2 metres/minute (m/m), indicative of downward flow potential. Furthermore, the surface elevation at the northernmost wetland was higher than the groundwater elevations at the nearest monitoring well, suggesting potential recharge conditions with regards to groundwater-surface water interactions. The horizontal hydraulic gradient for the site was estimated at 0.0075 m/m. Based on a geometric mean hydraulic conductivity of 2.65×10^7 m/s, lateral hydraulic gradient of 0.0075, and effective porosity of 0.1, the average linear groundwater flow velocity for the site was estimated at 0.6 m/year.

The groundwater at all monitoring wells was of calcium-bicarbonate (Ca-HCO_3) hydrochemical type with total dissolved solids concentrations generally less than 450 milligrams/litre (mg/L) and below the applied guidelines of 500 mg/L, except at two shallow monitoring wells with reported concentrations of 613 mg/L and 630 mg/L. Petroleum hydrocarbon parameters were mostly below the laboratory detection limit except for toluene detected below the applied guidelines at a concentration of 0.00087 mg/L. The detected toluene is not of concern and is either naturally occurring or likely anomalously detected given the low concentration, which was close to the laboratory detection limit.

With regard to surface water, the existing drainage system in the disturbance area was assessed during a site visit on November 22, 2022. Ditches on both sides of Range Road 61A on the west side of the disturbance area and an existing culvert under the range road were observed. The culvert ran perpendicular to the range road and was designed to channel surface runoff water in the southeast-northwest direction. Due to heavy snow cover during the site visit, locations of any local drainages or low-lying areas could not be observed.

14.4.3 Environmental Effects

The following Project-related activities may adversely affect groundwater and surface water quality or quantity:

- Source well drilling
- Clearing and grubbing
- Stripping and grading
- Excavation, installation of foundations

- Cavern well drilling and solution mining
- Cavern integrity testing and de-watering
- Operations and maintenance
- Removal of equipment and well closure
- Regrading
- Soil replacement
- Revegetation/seeding

Potential Project-related effects on groundwater and surface water include:

- Change in groundwater quality due to saltwater spills, fuel spills or spills of other chemicals
- Reduction of groundwater levels as a result of wetland clearing and dewatering activities, as well as withdrawal of water from the source wells
- Increased turbidity, increased suspended sediments or contaminants in surface water
- Alteration of surface drainage behaviour

Key mitigation measures to reduce the Project-related effects on groundwater and surface water include: developing and implementing a groundwater monitoring program; following the Environmental Protection Plan (EPP) measures and contingency plans for spill prevention and containment; constructing engineered containment to guarantee the integrity of the cavern operation; limiting wetland dewatering; following the wetland mitigation measures in the EPP, including a runoff pond or sedimentation pond designed to current best practices; and developing a stormwater management plan.

A list of proposed mitigation measures is presented in Appendix E. Based on the implementation of these measures, the Project is not expected to cause high magnitude adverse effects to groundwater and surface water.

14.5 Wetlands

14.5.1 Desktop Review

A comprehensive desktop delineation with field verification (Pathway 5 from the Alberta Wetland Identification and Delineation Directive [Government of Alberta, 2015a]) was used to delineate the wetlands. Wetlands were classified according to the Alberta Wetland Classification System (Government of Alberta, 2015b). The desktop review and fieldwork were completed by qualified wetland science practitioners and verified by an authenticating professional (Courtenay Clark, M.Sc., P.Biol.).

All wetlands within or directly connected to wetlands within 100 m of the disturbance area were delineated to their full extent. A variety of resources were used during the desktop review to delineate wetland boundaries, including: topographic maps; historical photographs; satellite imagery from World Imagery (ESRI, 2021), Abacus Datagraphics Ltd. (2021), Bing Maps (Microsoft Corporation, 2021) and Google Earth Mapping Service (Google Inc., 2021); the Alberta Merged Wetland Inventory (AMWI; Government of Alberta, 2021e); and the Alberta Wet Areas Mapping database (Government of Alberta, 2021f). The provincial wildfire database was also consulted (Government of Alberta, 2021g).

There are several wetlands within and surrounding the disturbance area according to the AMWI, and historical and current aerial imagery (Government of Alberta, 2021e). The Alberta Wet Areas Mapping did not cover the wetland desktop assessment area (Government of Alberta, 2021f). There are no records of burns in the local area from the period of 1931 to 2019 according to the provincial wildfire database (Government of Alberta, 2021g).

Based on the aerial photograph review from the Alberta Aerial Photographic Record System, photographic evidence of the disturbance area has been available since 1952 (Government of Alberta, 2021h). Local historical precipitation data were reviewed to select appropriate years for aerial photograph review (Government of Alberta, 2021i). Aerial photographs were reviewed from 1952, 1969, 1973, 1986, 1993 and 2011. Satellite imagery was also reviewed from 2006, 2013, 2017 and 2020 (Abacus Datagraphics Ltd., 2021) and 2016 (ESRI, 2021).

A historical review of wetlands within the disturbance area was conducted using the following sources: Government of Alberta (2021e and 2021f); Abacus Datagraphics Ltd. (2021); and ESRI (2021). Wetlands (mostly swamps) within the area had been cleared for agriculture (grazing) by 1973. The road west of the disturbance area was developed by 1969 and had been re-routed through NW-35-064-06 W4M by 1986. Construction of the new highway and the substation on the west side of the highway split the wetland that originally spanned both sides of the road, creating artificial boundaries around the portion remaining on the west side of the road. By 2006, the dugout north of the disturbance area was created and was visibly connected to the open water wetland immediately to the south of it. Moderate fluctuations in surface water levels were visible across the years, with some years showing notably more small open water areas throughout the field than others.

14.5.2 Field Summary

Wetlands were assessed in the field on April 17, 2021, by qualified wetland science practitioners. Wetland field assessments prioritized the disturbance area and a 100 m buffer around it (the “wetland field assessment area”). Fieldwork included field verification of the desktop delineations, assessment of vegetation, soils and hydrology characteristics and completion of the Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) form in accordance with the *Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) Guide* (Government of Alberta, 2015c).

A total of six wetlands were mapped within the wetland field assessment area (Figure 6). Four wetlands occur within the disturbance area: a permanent shallow open water/seasonal graminoid marsh/dugout complex, a seasonal graminoid marsh, and two temporary graminoid marshes. Two additional wetlands occur outside the disturbance area within 100 m of the disturbance area. An anthropogenic dugout also occurs within 100 m of the disturbance area.

The ABWRET-A form, reviewed by EPA, determined that the wetlands within the disturbance area are considered to be D value. Indirect impacts are unlikely to occur for wetlands outside the disturbance area as they are not hydrologically connected to the disturbance area. Federation has received approval to alter the four wetlands within the disturbance area under Water Act Approval DAUT008313. Federation will follow all associated conditions.

14.5.3 Environmental Effects

The following Project-related activities may adversely affect wetlands:

- Clearing and grubbing
- Stripping and grading
- Excavation, installation of foundations
- Operations and maintenance
- Regrading
- Soil replacement
- Revegetation/seeding

Potential Project-related effects on wetlands include:

- Loss of wetland function, approximately 1.75 ha
- Alteration of wetland function

Key mitigation measures to reduce the Project-related effects on wetlands include: following all conditions of the *Water Act* Approval DAUT0008313; using erosion and sediment control measures; installing containment measures as required; storing soil piles away from wetlands; restoring natural drainage channels, maintaining an emergency spill kit; ensuring equipment is clean; and preventing deleterious substances from contaminating surface water or groundwater resources. A list of proposed mitigation measures is presented in Appendix E.

All four wetlands within the disturbance area will be permanently impacted due to construction of the Project. The total wetland area that will be directly impacted by Project activities is 1.75 ha. Project construction and operation activities will result in permanent loss of wetland function and associated wildlife habitat within the impacted wetlands. Federation has paid wetland replacement fees for the permanent loss of wetlands within the disturbance area, as per *Water Act* Approval DAUT0008313.

Based on the implementation of the mitigation measures (including compensation for wetland replacement), the Project is not expected to cause high magnitude adverse effects to wetlands.

14.6 Vegetation Species and Communities

14.6.1 Desktop Review

The disturbance area is within the Central Mixedwood Natural Subregion of the Boreal Forest Natural Region. Reference vegetation within the Central Mixedwood Natural Subregion is characterized by closed canopy mixedwood forests where stands of aspen are dominant in the early seral stages, and white spruce becomes more common as the forests age. Jack pine is common on sandy sites and black spruce and tamarack are common in peatland areas. Wetlands cover almost half of the subregion, the majority being peatlands and a small proportion being marshes. Many small lakes and watercourses exist within the subregion (Natural Regions Committee, 2006).

No rare plant species or communities were documented within the disturbance area on the Alberta Conservation Information Management System (ACIMS) online database (Alberta Conservation Information Management System, 2022). Information on species at risk (SAR) is provided in Section 14.9.

Clubroot is considered a pest under the *Alberta Agricultural Pests Act* (Province of Alberta, 2014). As per the Alberta Clubroot Management Plan (Government of Alberta, 2014b), landowners and occupants of land must prevent new clubroot infestations and control known infestations. The M.D. of Bonnyville has identified multiple areas of concern for clubroot infestations (M.D. of Bonnyville, 2022a). The Project is not located in any of the areas of concern.

Correspondence with the M.D. of Bonnyville Pest Control Officer indicates the Project site is within the WLPGR with several different farms having cattle grazing the area (personal communication, Mike Penner, M.D. of Bonnyville Agricultural Coordinator, January 12, 2023). Areas surrounding the disturbance area containing merchantable timber will not be disturbed during the construction of the central CAES facility.

14.6.2 Field Summary

Vegetation field assessments were completed by qualified personnel on June 8 and September 11, 2022, and included dominant vegetation community classifications, a rare plant survey and incidental weed observations.

Most of the disturbance area was dominated by pasture (approximately 11.71 ha, 87% of the disturbance area). A total of four wetlands were identified within the disturbance area, with an additional two wetlands within a 100 m of the disturbance area (approximately 1.75 ha, 13% of the disturbance area). One upland forested ecosite phase (d1 – lowbush cranberry – trembling aspen) was found outside the disturbance area, north and southeast of the site, but within 100 m. Vegetation within the d1 ecosite phase was dominated by tree species including trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), and willow (*Salix* sp.). Dominant shrub species in the d1 ecosite area included prickly rose (*Rosa acicularis*), Saskatoon (*Amelanchier alnifolia*) and snowberry (*Symphoricarpos albus*; Beckingham and Archibald, 1996). The vegetation in pasture areas within the disturbance area consisted of a graminoid/forb layer that included red fescue (*Festuca rubra*), wild strawberry (*Fragaria virginiana*), alsike clover (*Trifolium hybridum*), timothy (*Phleum pratense*), common yarrow (*Achillea millefolium*), small bedstraw (*Galium trifidum*) and tall goldenrod (*Solidago altissima*).

No rare plant species or communities were observed within the disturbance area.

Two noxious weed species were recorded within the disturbance area during the vegetation assessments: Canada thistle (*Cirsium arvense*) and perennial sow-thistle (*Sonchus arvensis*). Both were documented sporadically throughout the disturbance area, occasionally forming larger patches.

14.6.3 Environmental Effects

The following Project-related activities may adversely affect vegetation species and communities:

- Clearing and grubbing
- Stripping and grading

- Operations and maintenance
- Revegetation/seeding

Potential Project-related effects on vegetation species and communities include:

- Loss or change of vegetation community
- Introduction and spread of weeds
- Introduction and spread of clubroot

Key mitigation measures to reduce the Project-related effects on vegetation species and communities include: minimizing the disturbance area; using existing trails; seeding soil stockpiles with appropriate vegetation to protect them from erosion; replanting with native seed mixes during decommissioning and limiting grazing on the reclaimed area during the first growing season. Mitigation measures to reduce the potential for introduction spread of weeds and clubroot include: ensuring all equipment is clean prior to arrival; stabilizing stockpiles with a suitable tackifier; seeding soil stockpiles as soon as possible; planting vegetation native to the area during reclamation and monitoring reclaimed and restored areas.

A list of proposed mitigation measures is presented in Appendix E. Based on the implementation of these measures, the Project is not expected to cause high magnitude adverse effects to vegetation species and communities.

14.7 Fish and Fish Habitat

14.7.1 Desktop Review

The Project occurs within Fish Watershed Unit: NB1 of the Northern Boreal Zone (Government of Alberta, 2023i). According to FWIMT (Government of Alberta, 2023i), Marguerite Lake is the closest fish bearing lake and is 2.48 km to the northeast. Highbank Lake, 4.6 km to the southeast, provides the closest aquatic habitat. Fish-bearing is defined as supporting fish for all or part of a year (Government of Alberta, 2020), and aquatic habitat is determined by the availability of substrate information (e.g., bedrock, gravel, cobble, boulders) and the overall complexity of that habitat (Government of Alberta, 2019). There is an unnamed waterbody located approximately 0.2 km east of the disturbance area; however, this lake has not been documented as fish-bearing or important aquatic habitat. None of these lakes are listed under the Sportfishing Regulations for Alberta (Government of Alberta, 2023i). The FWIMT search completed on June 27, 2023, did not show any fish inventory or stocked inventory within 5 km of the disturbance area (Government of Alberta, 2023i).

14.7.2 Environmental Effects

There are no drainages, watercourses or hydrological connectivity to other watercourses or fish-bearing waterbodies within the Project, apart from the anthropogenic dugout that is intermittently connected to one wetland. As a result, no direct impacts to fish or fish habitat are expected due to the Project. The topography of the area slopes from northeast to southwest and therefore, surface water from the site (if left un-mitigated) would potentially flow to the southwest, away from Marguerite Lake and the unnamed lake to the east. Following the successful implementation of the mitigation measures addressing groundwater, surface water and wetlands (Appendix E), no

residual effects to Fish or Fish Habitat are anticipated.

14.8 Wildlife and Wildlife Habitat

14.8.1 Desktop Review

The FWIMT (Government of Alberta, 2023i) search completed on April 16, 2021, showed that the disturbance area is located with the Sharp-tailed Grouse Survey Area, indicating that this specific species inventory would be required. There were no other sensitive wildlife habitats or ranges identified in the Project area (Government of Alberta, 2022j). No active wildlife features have historically been recorded within 1,000 m of the disturbance area.

The FWIMT search results identified eight species recorded in or adjacent to the disturbance area, seven of which are SAR. Field data were compiled and submitted by email to Fisheries and Wildlife Management Information System (FWMIS) on March 24, 2021. The review of the FWMIS data received on March 26, 2021, from the area biologist indicated that up to 126 different species of birds, mammals, and amphibians, as well as 41 wildlife features inhabit the region (personal communication, Justin Gilligan, Area Wildlife Biologist, March 26, 2021).

Information on SAR is provided in Section 14.9.

14.8.2 Field Summary

Field surveys to determine the wildlife and wildlife habitat present on-site or within the surrounding areas were conducted for the Project. Field surveys included Breeding Bird, Amphibian, Sharp-tailed Grouse, Raptor Nest and Winter Tracking Surveys. All SAR observations from the field surveys or incidentally are reported in Section 14.9.

No active breeding bird nests were identified during the Breeding Bird Surveys on June 12 and 27, 2022. A total of 29 different bird species at three survey points were observed, and the most common species observed were the American Robin (*Turdus migratorius*), Clay-colored Sparrow (*Spizella pallida*), Wilson's Snipe (*Gallinago delicata*), and Red-winged Blackbird (*Agelaius phoeniceus*), accounting for approximately 40% of the total observations. Observations were relatively even across the disturbance area.

Amphibian surveys at four survey stations were conducted on April 25, June 11 and June 26, 2022. Boreal Chorus Frogs (*Pseudacris carolina*) were identified calling at the three survey points east of the highway. Wood Frogs (*Lithobates sylvaticus*) were also heard calling at the westernmost of these three survey locations. There were no observations at the survey station located west of the highway.

There were no Sharp-tailed Grouse (*Tympanuchus phasianellus*) heard or leks observed during the Sharp-tailed Grouse surveys conducted on April 7 and 26, 2022. There were also no incidental observations of Sharp-tailed Grouse during any other surveys conducted.

No active raptor nests or raptors were identified during the single Raptor Nest Survey conducted on April 26, 2022. Raptors observed included the Northern Harrier (*Circus hudsonius*), Swainson's Hawk (*Buteo swainsoni*), Turkey Vulture (*Cathartes aura*), and Red-tailed Hawk (*B. jamaicensis*). Of the raptor nests identified, one nest and

four potential nests were determined to be inactive. Three stick nests belonging to American Crows (*Corvus brachyrhynchos*) were also confirmed inactive at the time of the survey.

A winter tracking survey was completed on February 23, 2022. Tracks observed included the Coyote (*Canis latrans*), Snowshoe Hare (*Lepus americanus*), Red Fox (*Vulpes vulpes*), Red Squirrel (*Sciurus vulgaris*), Moose (*Alces alces*), Ruffed Grouse (*Bonasa umbellus*) and White-tailed Deer (*Odocoileus virginianus*).

Ten “secure” bird species were observed incidentally. Four inactive coyote dens and four inactive mammal dens were incidentally noted during the surveys. There were no other sensitive wildlife habitats or ranges identified (Government of Alberta, 2023i) in the disturbance area.

14.8.3 Environmental Effects

The following Project-related activities may adversely affect wildlife and wildlife habitat:

- Source well drilling
- Pre-construction surveys
- Clearing and grubbing
- Stripping and grading
- Excavation and installation of foundations
- Equipment installation
- Cavern well drilling and solution mining
- Operations and maintenance
- Removal of equipment and well closure
- Regrading
- Soil replacement
- Revegetation/seeding

Potential Project-related effects on wildlife and wildlife habitat include:

- Habitat loss, loss of connectivity and/or fragmentation of habitat
- Alteration of movement patterns
- Increase in wildlife mortality or injury
- Effects to SAR (discussed in Section 14.9)

Key mitigation measures to reduce the Project-related effects on wildlife and wildlife habitat include: using existing disturbed areas; reclaiming and re-vegetating areas that are no longer required; implementing species-specific timing restrictions and setbacks; conducting nest and wildlife sweeps prior to construction; minimizing noise; minimizing light; containing and removing wastes; reducing vehicle speeds and fencing.

A list of proposed mitigation measures is presented in Appendix E. Based on the implementation of these measures, the Project is not expected to cause high magnitude adverse effects to wildlife and wildlife habitat.

14.9 Species at Risk

14.9.1 Desktop Review

There are no drainages, watercourses or hydrological connectivity to other watercourses or fish-bearing waterbodies within the Project area; thus, the disturbance area does not provide habitat for fish, aquatic or marine SAR.

No plant SAR have been documented within the disturbance area (Alberta Conservation Information Management System, 2022).

According to the FWIMT fish inventory and stocked inventory records, no fish or aquatic SAR were recorded within 5 km of the disturbance area (Government of Alberta, 2022j).

The FWIMT (Government of Alberta, 2023i) search showed that the site is located with the Sharp-tailed Grouse Survey Area, indicating that this specific species inventory would be required. Sharp-tailed Grouse are listed as “Sensitive” in Alberta (Government of Alberta, 2022j).

The FWIMT search results identified seven “Sensitive” species historically recorded in or adjacent to the disturbance area, including the Common Yellowthroat (*Geothlypis trichas*), Horned Grebe (*Podiceps auritus*), American Bittern (*Botaurus lentiginosus*), Sora (*Porzana carolina*), Sharp-tailed Grouse, Sprague’s Pipit (*Anthus spragueii*), and American Kestrel (*Falco sparverius*; Government of Alberta, 2022j). The Horned Grebe and Sprague’s Pipit are considered “Special Concern” and “Threatened”, respectively, under Schedule 1 of the SARA (Government of Canada, 2002).

A record of wildlife SAR observed on-site, including both historical and Project assessment records, is included in Table 14-1. Species at risk observed on-site included 23 historical records, including five mammals, two amphibians and 27 birds. Most of the SAR observed are listed as “Sensitive” in Alberta (Government of Alberta, 2022j). The Wolverine (*Gulo gulo*), Canadian Toad (*Anaxyrus hemiophrys*), Barn Swallow (*Hirundo rustica*), Short-eared Owl (*Asio flammeus*), and Western Wood-pewee (*Contopus sordidulus*) are listed as “May be at Risk” in Alberta.

Species listed as “Special Concern” under Schedule 1 of the SARA (Government of Canada, 2002) that may occur in the disturbance area include American Badger (*Taxidea taxus*), Wolverine, Boreal Toad (*A. boreas*), Horned Grebe, Peregrine Falcon (*Falco peregrinus*), and Pileated Woodpecker (*Dryocopus pileatus*; Government of Alberta, 2022j; Government of Canada, 2021a). Species listed as “Threatened” under Schedule 1 of the SARA that may occur in the disturbance area include Barn Swallow, Common Nighthawk (*Chordeiles minor*), Short-eared Owl, and Sprague’s Pipit (Government of Alberta, 2022j; Government of Canada, 2021a).

Table 14-1. Current and Historical Records of Species at Risk within the Project Area Region

Common Name	Latin Name	Status Alberta ¹	COSEWIC Status ²	SARA Status ²	Record Origin
Mammals					
American Badger	<i>Taxidea taxus</i>	Sensitive	Special Concern	Special Concern	Historical
Bobcat	<i>Lynx rufus</i>	Sensitive	-	-	Historical
Canada Lynx	<i>Lynx canadensis</i>	Sensitive	Not at Risk	-	Incidental
Fisher	<i>Martes pennanti</i>	Sensitive	-	-	Historical
Wolverine	<i>Gulo gulo</i>	May be at Risk	Special Concern	Special Concern	Historical
Amphibians					
Boreal Toad	<i>Anaxyrus boreas</i>	Sensitive	Special Concern	Special Concern	Historical
Canadian Toad	<i>Anaxyrus hemiophrys</i>	May be at Risk	Not at Risk	-	Historical
Birds					
American Bittern	<i>Botaurus lentiginosus</i>	Sensitive	-	-	Historical
American Kestrel	<i>Falco sparverius</i>	Sensitive	-	-	Historical
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Sensitive	Not at Risk	-	Historical
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sensitive	Not at Risk	-	Historical
Baltimore Oriole	<i>Icterus galbula</i>	Sensitive	-	-	Historical
Barn Swallow	<i>Hirundo rustica</i>	May be at Risk	Special Concern	Threatened	Breeding Bird Survey
Barred Owl	<i>Strix varia</i>	Sensitive	-	-	Historical
Black Tern	<i>Chlidonias niger</i>	Sensitive	Not at Risk	-	Breeding Bird Survey
Cape May Warbler	<i>Dendroica tigrine</i>	Sensitive	-	-	Historical
Common Nighthawk	<i>Chordeiles minor</i>	Sensitive	Special Concern	Threatened	Incidental
Common Yellowthroat	<i>Geothlypis trichas</i>	Sensitive	-	-	Incidental
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Sensitive	-	-	Breeding Bird Survey
Forster's Tern	<i>Sterna forsteri</i>	Sensitive	Data Deficient	-	Historical
Great Blue Heron	<i>Ardea herodias</i>	Sensitive	-	-	Historical
Horned Grebe	<i>Podiceps auritus</i>	Sensitive	Special Concern	Special Concern	Historical
Least Flycatcher	<i>Empidonax minimus</i>	Sensitive	-	-	Incidental
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Sensitive	-	-	Historical
Peregrine Falcon	<i>Falco peregrinus</i>	At Risk	Not at Risk	Special Concern	Historical
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Sensitive	Special Concern	Special Concern	Historical
Sandhill Crane	<i>Grus canadensis</i>	Sensitive	-	-	Incidental
Short-eared Owl	<i>Asio flammeus</i>	May be at Risk	Special Concern	Threatened	Historical
Sora	<i>Porzana carolina</i>	Sensitive	-	-	Historical
Sprague's Pipit	<i>Anthus spragueii</i>	Sensitive	Threatened	Threatened	Historical
Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>	Sensitive	-	-	Historical
Trumpeter Swan	<i>Cygnus buccinator</i>	Sensitive	Not at Risk	-	Incidental

Common Name	Latin Name	Status Alberta ¹	COSEWIC Status ²	SARA Status ²	Record Origin
Western Wood-pewee	<i>Contopus sordidulus</i>	May be at Risk	-	-	Breeding Bird Survey
Wilson’s Snipe	<i>Gallinago delicata</i>	Sensitive	-	-	Breeding Bird Survey

¹Government of Alberta, 2022j

²Government of Canada, 2021a

“-” Indicates that a species is not listed

14.9.2 Field Summary

No plant SAR were observed within the disturbance area during the vegetation assessment.

No direct impacts to fish or fish habitat are expected as part of the Project as there are no drainage locations or hydrological connectivity to other waterbody features in the vicinity of the Project. As a result, fish and aquatic SAR were not included in the field assessment.

Wildlife and wildlife habitat field surveys included surveys for SAR (see Section 14.8). All SAR observations within the disturbance area, including historical observations of SAR, are presented in Table 14-1.

Species listed as “Threatened” under Schedule 1 of SARA (Government of Canada, 2002) that were observed in the disturbance area during Project surveys were:

- Barn Swallow
- Common Nighthawk

Species listed as “May be at Risk” in Alberta (Government of Alberta, 2022j) that were observed in the disturbance area during Project surveys were:

- Barn Swallow
- Western Wood-pewee

Species listed as “Sensitive” in Alberta (Government of Alberta, 2022j) that were observed in the disturbance area during Project surveys were:

- Bald Eagle
- Black Tern
- Canada Lynx
- Common Yellowthroat
- Common Nighthawk
- Eastern Kingbird
- Least Flycatcher
- Sandhill Crane

- Trumpeter Swan
- Wilson's Snipe

14.9.3 Environmental Effects

The following Project-related activities may adversely affect wildlife SAR:

- Source well drilling
- Pre-construction surveys
- Clearing and grubbing
- Stripping and grading
- Excavation and installation of foundations
- Equipment installation
- Cavern well drilling and solution mining
- Operations and maintenance
- Removal of equipment and well closure
- Regrading
- Soil replacement
- Revegetation/seeding

Potential Project-related effects on wildlife SAR include:

- Habitat loss, loss of connectivity and/or fragmentation of habitat
- Alteration of movement patterns
- Increase in wildlife mortality or injury

Mitigation measures to reduce the Project-related effects on wildlife and wildlife habitat will also reduce the effects on wildlife SAR. Recording SAR sightings, conducting nest and wildlife sweeps, implementing SAR specific timing restrictions and setbacks, and implementing SAR appropriate buffers, if applicable, will minimize the effects on SAR.

A list of proposed mitigation measures is presented in Appendix E. Based on the implementation of these measures, the Project is not expected to cause high magnitude adverse effects to SAR.

14.10 Air Quality

14.10.1 Desktop Review

The Project will consist of a single 125 MW compressor train (electric driven) and two 160 MW expander train turbines. The energy requirements of the expander train turbines will be supplied by natural gas which will emit oxides of nitrogen (NOx). The expander train turbines will utilize Selective Catalytic Reduction (SCR), using ammonia (NH₃) to reduce NOx emissions. This will result in emissions of NH₃ when SCR is employed. The Project will also use a diesel-fueled emergency generator and fire water pump that will be used in emergency situations (non-routine situations).

A refined dispersion modelling assessment consistent with the Alberta Air Quality Model Guideline (AQMG) was undertaken using the United States Environmental Protection Agency American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) dispersion modelling system. For this assessment, AERMOD and American Meteorological Society and Environmental Protection Agency Regulatory Meteorological data preprocessor (AERMET) Versions 22112 were used.

The AQMG provides guidelines on when to include other sources and indicates that “all industrial emission sources within 5 km of the Project boundary must be included in the modelling assessment” (Government of Alberta, 2021j). The closest other facilities to the Project are greater than 10 km away; therefore they were not explicitly considered in the modelling. As per guidance from the AQMG, baseline concentrations were based on the most recent 3 years of ambient data.

A systematic review of the NO₂ and NH₃ concentrations that could be expected from the operation of the Project was undertaken. The review was based on local terrain considerations and the meteorological conditions that could be expected and included all emission sources at the Project site and background concentrations. The ground elevation on the lease is approximately 640 masl. The maximum elevation within 10 km is located approximately 9.5 km to the northeast at an elevation of approximately 665 masl.

Meteorological parameters of interest include wind direction, wind speed, atmospheric stability and mixing height. AERMET is the pre-processor used to prepare meteorological data for use in the AERMOD model. AERMET uses meteorological measurements to calculate the atmospheric boundary layer parameters required by AERMOD to estimate wind, turbulence and temperature profiles.

Site-specific characteristics of albedo, surface roughness and Bowen ratio are used by AERMET as these parameters will influence the growth and structure of the atmospheric boundary layer. Albedo is the fraction of solar radiation reflected back to space; surface roughness is related to the height of obstacles to the wind flow; and Bowen ratio is an indicator of surface moisture. The site-specific characteristics used were determined selected based on 2015 land cover data acquired from the federal government.

Atmospheric stability can be represented by three distinct categories: unstable, neutral and stable. Unstable conditions represent daytime periods when atmospheric turbulence is enhanced due to solar heating of the ground (convective conditions, positive heat flux). Stable conditions represent night-time periods when turbulence is suppressed due to surface cooling (negative heat flux). While neutral conditions represent day or nighttime periods that are either overcast or characterized by high wind speed, mechanically dominated conditions (heat flux is essentially zero). Atmospheric stability was considered in AERMET. The raw meteorological data used by AERMET for this assessment were extracted from Weather Research Forecast (WRF) V4.2.1 data for 2015 to 2019 provided by EPA.

The AERMET files contain data for a total of 43,824 hours, which represents 100% of the maximum number of hours available for the 2015 to 2019 period. Calm winds were reported during 680 hours. The Project is located in an area in which terrain, vegetation and buildings could affect the wind patterns. The expected meteorological conditions at

and adjacent to the Project are expected to be complex. It is not expected that the steady-state Gaussian plume models and meteorological data extracted from the WRF data would be totally representative of the complex conditions at the disturbance area.

Background NO₂ concentrations for this assessment were taken from the Lakeland Industrial Community Association (LICA) Cold Lake South station for 2019 to 2021, which is located approximately 42 km southeast of the Project. Background NH₃ concentrations for this assessment were taken from the Wood Buffalo Environmental Association (WBEA) Patricia McInnes station for 2019 to 2021, which is located in Fort McMurray approximately 240 km north of the Project. Although this monitor is fairly distant, it is the closest location that continuously measures NH₃.

The modelling results indicate that the routine and non-routine (emergency) operation of the Project will comply with the AAAQO for NO₂ and NH₃ for the emission limits evaluated. Figures 7 and 8 show the spatial distribution of the maximum 1-h predicted NO₂ and NH₃ concentrations, respectively.

14.10.2 Environmental Effects

Pre-construction, construction, operations, and decommissioning/reclamation activities may all affect air quality. Potential Project-related effects on air quality include a decrease in air quality due to equipment emissions and dust.

Key mitigation measures to reduce the Project-related effects on air quality include: maintaining exhaust systems; controlling dust and odour emissions; avoiding burning of construction debris; limiting traffic; avoidance of idling vehicles; and conducting air emissions monitoring as per the specifications and approval conditions.

A list of proposed mitigation measures is presented in Appendix E. Based on the implementation of these measures and the modelling results indicating the Project will comply with the AAAQO for NO₂ and NH₃, the Project is not expected to cause high magnitude adverse effects to air quality.

14.11 Noise

14.11.1 Desktop Review

Environmental noise limits for the utility sector in Alberta are regulated by the AUC and noise emissions from the proposed CAES facility are governed by Rule 012 (Alberta Utilities Commission, 2021). Rule 012 establishes daytime and nighttime A-weighted maximum permissible sound levels (PSLs) at any impacted receptors (dwellings) or at 1.5 km from the CAES facility boundary when there are no dwellings within 1.5 km radius from the CAES facility boundary. The nearest dwelling to the Project is located approximately 900 m to the southwest. The CAES facility can operate 24 hours per day and, as such, the noise emissions were compared against the more stringent nighttime PSL of 40 A-weighted Decibel (dBA) as established by AUC Rule 012 for the Project. There are numerous existing energy-related facilities near the Project, with the potential to generate significant environmental noise including the Marguerite Lake substation and several wellpads. As per Rule 012, cumulative sound levels were assessed.

The Project is located entirely within the M.D. of Bonnyville and, as such, the Project must also comply with Noise Control Bylaw/1657.

The Project will be comprised of two modules, each with a single 125 MW compressor train and two 160 MW expander trains with compressed air storage in a solution mined salt cavern sized for 48 hours of full-load output. A noise propagation model for the Project was developed using CadnaA software by DataKustik GmbH. The model uses the calculation standard of ISO 9613 Parts 1&2, which is widely used for the calculation of noise propagation outdoors. The noise propagation model incorporates each source listed in the noise emission inventory as well as topography, reflecting objects, obstacle shielding, ground absorption, atmospheric effects and source directivity. CAES facility sound levels were calculated at the R1 residential receptor.

Calculated nighttime sound pressure levels were:

- 38.2 dBA for the CAES Facility
- 27.9 dBA for all other facilities
- 35.0 dBA for ambient sound
- 40.0 dBA for the cumulative sound level

A noise contour map illustrating the calculated dBA sound levels at varying distances from the Project and the assessed residential R1 receptor is shown on Figure 9. 40 dBA is the Rule 012 Nighttime PSL, the calculated sound levels are in compliance with the PSL. The calculated CAES facility C-weighted minus A-weighted sound level at the R1 receptor was below the nighttime PSL.

14.11.2 Environmental Effects

Pre-construction, construction, operations, and decommissioning/reclamation activities may all affect noise levels. CAES facility noise sources include the expander train, the compressor train, the aerial cooler and the instrument air building. Major noise sources correspond to building breakout noise from walls and roof, as well as building inlet and exhaust ventilation openings. Other sources of noise include the water heat recovery unit, the generator step up transformer, the air inlet filter face, the compressor transformer and the aerial cooler intake and discharge.

Proposed mitigation measures include:

- Design equipment/enclosures, to reduce major sources of noise. This includes ensuring that the expander enclosure, the compressor enclosure and the instrument air building are acoustic buildings with absorptive interior liners with inlet and exhaust ventilation silencers
- Install a silencer on the water heat recovery stack and the air inlet filter face
- Maintain equipment and the CAES facility in order to minimize excessive noise (e.g., mufflers intact, greased properly)
- Construction activities causing elevated noise levels should be limited to daylight hours and adhere to applicable local noise by-laws. In the event construction activities may cause excessive noise levels, an approval for noise exemption must be obtained

With the recommended noise mitigation measures installed, sound levels from the proposed Project will comply with both the daytime and the nighttime PSL of AUC Rule 012 at the nearest residential receptor. The estimated A-weighted sound level at the R1 receptor was below the nighttime PSL of 40 dBA. However, low-frequency noise is

included in the predictive noise impact assessment for information purposes only. Low-frequency noise may cause sensory disturbance to wildlife, particularly wildlife SAR, possibly resulting in habitat loss and changes to wildlife movement (Sections 14.8 and 14.9). Further investigation and monitoring may be conducted following construction if needed. The Project is not expected to cause high magnitude adverse effects.

15.0 Heritage, Human Health, Social and Economic Conditions

15.1 Historical Resources

15.1.1 Desktop Review

The Project does not cross lands assigned a Historic Resource Value (HRV), nor are there any previously identified historic resource sites located within 1 km of the Project. Ortho imagery and topographic data indicated that the Project is situated within rolling pasture, with a poorly drained and low-lying area in the north. A Historical Resources Impact Assessment (HRIA) was completed and an application for *Historical Resources Act* Approval was submitted to the Historic Resources Management Branch, Alberta Culture and Status of Women. *Historical Resources Act* approval was granted for the Project on February 7, 2022.

15.1.2 Effects

The Project has limited potential to have significant impact on significant historic resources.

If a contractor encounters a potential archaeological resource, the contractor will immediately stop any activities that disturb the resource or the site in which it is contained. The area will be flagged or staked and the Environmental Inspector and Regulatory and Lead Officer will be notified immediately. The Regulatory and Lead Officer will then contact the Director, Archaeological Survey for further instructions.

Based on the limited potential for significant historic resources and the chance find procedures identified above, the Project is not expected to cause high magnitude adverse effects to historical resources.

15.2 Human Health

15.2.1 Human Health

The Project is located within the North Zone (Z5), Bonnyville Local Geographic Area (LGA) for Alberta Health Services (Government of Alberta, 2022k).

Life expectancy in Bonnyville was 79.6 years in 2018, which is less than the life expectancy for Alberta (81.7 years) (Government of Alberta, 2023m). The mortality rate (per 100,000 population) due to all causes was higher in the LGA in 2019 to 2021 compared to the province (823.7 for the LGA as compared to 700.3 for the Province; Government of Alberta, 2022k). The top cause of death from 2011-2021 was disease of the circulatory system. More than three-quarters of all reported deaths were due to four major causes: diseases of the circulatory system (29.7%), neoplasms (i.e., abnormal masses, 27.6%), injuries (10.3%) and diseases of the respiratory system (8.8%; Government of Alberta, 2022k).

The percentage of obese adults in the North Zone was much higher than the provincial percentage in 2020 (38.2%

versus 28.8%). As well, there was a lower proportion of people with good to excellent mental health compared to Alberta (69.1% versus 72.1%) during the COVID-19 pandemic (Government of Alberta, 2022k). In 2020, the disease with the highest prevalence rate (per 100 population) in Bonnyville was hypertension. The rate associated with this disease was 1.2 times higher than the provincial rate (25.6 versus 20.6).

While Bonnyville's birth rate per 1,000 women was similar to the provincial rate (22.4 versus 23.1), the teen birth rate per 1,000 women was higher than Alberta's teen birth rate (11.7 versus 6.9). The infant mortality rate in the North Zone varied between 4.2 per 1,000 births in 2019 and 6.7 per 1,000 births in 2020 (Government of Alberta, 2022k). Compared to Alberta, infant mortality rates in the North Zone were higher for 2 of the last 3 calendar years and equal in the third year.

15.2.2 Human Health Services

The nearest hospital to the Project is the Bonnyville Healthcare Centre located approximately 40 km or 29 minutes to the south. This is the main point for health care in the Lakeland Region. This facility provides a range of healthcare services including a 24/7 emergency department. Other services include addiction and mental health treatment, ambulatory care, cardiac diagnostics, day surgery and recovery, general medicine, general radiography, laboratory services, obstetrics, occupational therapy, pharmacy services, respiratory therapy, and ultrasound. There are currently 33 physicians, 33 acute care beds and 30 continuing care beds (Bonnyville Health Foundation, 2023).

The next closest hospital is the Cold Lake Healthcare Centre in Cold Lake, Alberta. This facility offers similar services to the Bonnyville Healthcare Centre and is located approximately 57.6 km or 38 minutes south and east of the Project.

There are five community pharmacies in the Bonnyville LGA (Government of Alberta, 2022k). Other health services in the LGA include a supportive living facility, an addiction community center, two long term care facilities, a medical laboratory, three diagnostic imaging facilities, and two mental health facilities.

The preliminary design of the Control/admin building for the Project includes a first aid room with a gurney/laydown area. The first aid room is expected to provide the first area of response and will be able to handle more minor injuries or events.

The nearest fire department (Station #6) is located in the Hamlet of La Corey, Alberta, approximately 17 km south of the Project. Station #6 houses a 2006 Superior 4,3000 L/min Pumper and a 7700 Liter Tanker designed for wildland firefighting. There are seven other fire stations spread throughout the M.D. of Bonnyville. These stations are located in Goodridge, Glendon, Iron River, Bonnyville, Ardmore and Fort Kenny. Additionally, the City of Cold Lake Fire Station is contracted to the M.D. of Bonnyville for support (Bonnyville Regional Fire Authority, 2023). The design of the CAES facility includes a fire water pump and fire water tank (Appendix C).

15.2.3 Emergency Response

Project information was sent to the M.D. of Bonnyville on November 18, 2022 and Federation will continue consultation with the MD regarding the Emergency Response Plan (ERP), summarized below.

The ERP was established to ensure the Project can adequately and effectively respond to an emergency during construction and/or operations. Four emergency levels were defined in the ERP:

- Alert – an incident that can be handled on-site
- Level 1 – no danger outside the disturbance area with no threat to the public and minimal environmental impact. Also handled by on-site personnel
- Level 2 – no immediate danger outside of the disturbance area, but there is potential for the emergency to extend beyond the Project area. As there is moderate threat to the public and/or environment, outside agencies must be notified
- Level 3 – immediate danger and the safety of the public is in jeopardy from a major uncontrolled hazard, with likely significant and ongoing environmental impacts. Immediate notification of multi-agency municipal and provincial government authorities is required

All impacted stakeholders within the ERP radius will be provided with a copy of the ERP. The nearest RCMP detachment is located in Bonnyville, approximately 21 km away. Contact information for police, fire and medical emergencies are listed in the Project ERP.

15.2.4 Potential Effects to Human Health

Federation has an excellent safety record and has carefully considered Project design to ensure safe working conditions. Federation will further implement mitigation measures such that the likelihood of an accident or malfunction is unlikely to occur. Given the implementation of the ERP, implementation of additional mitigation measures, fire prevention equipment on-site, first aid supplies and facilities available on the site during operations as well as the limited number of operations staff (expected to be up to 20), the Project-related increase to use of community services such as fire, hospital and paramedics is expected to be minimal to non-existent.

The air modelling results indicated that the routine and non-routine operation of the Project will comply with the AAAQO for NO₂ and NH₃ for the emission limits evaluated (Section 14.10). The noise propagation model results indicated that, with the proper noise mitigation measures installed, the Project will be in compliance with the PSL established in the AUC's rule 012 at the nearest residential receptor (Section 14.11). The Project may have sound levels above 20 dBA; therefore, a low-frequency noise complaint is possible. However, there are no residences, nursing homes or other long-term care facilities within 500 m of the disturbance area and the nearest community is 16 km away.

15.3 Social and Economic Conditions and Effects

15.3.1 Cities, Towns and Hamlets

The Project is located approximately 16 km north of the Hamlet of La Corey, Alberta, within the M.D. of Bonnyville. La Corey is the closest community to the Project.

According to the municipal census, the population of La Corey was 59 in 2014 (M.D. of Bonnyville, 2014). The nearest town is Bonnyville, population 5,915 in 2022 (Government of Alberta, 2022), approximately 34 km to the south. The

population of the M.D. of Bonnyville was 13,085 in 2022 (Government of Alberta, 2023n). The population density of the M.D. of Bonnyville was 2.1 people per square km in 2021 (Statistics Canada, 2021). The nearest city is Cold Lake, located approximately 34 km to the southeast. The population of Cold Lake was 15,546 in 2022 (Government of Alberta, 2023o).

15.3.2 Transportation Network

Range Road 460, Highway 41 (Buffalo Trail) and Highway 55 are the major transportation routes for the Hamlet of La Corey (Figure 3). Access to the Project is via Highway 41, north of Bonnyville through the Hamlet of La Corey on Range Road 60, Township Road 640, Range Road 62 and Range Road 61a for approximately 19 km.

The Project will cause a short-term increase in local vehicle traffic during the construction period. Project-related traffic will include lowboy trucks carrying various pieces of heavy equipment and light pick-up trucks. This will be noticed primarily by other users of Highway 41 and the Range and Township Roads listed above, and the effect will be relatively short-term. Once in operation, Project-related use of the local transportation network will drop significantly as Project operations only requires 20 full-time staff. The Project is expected to have no net negative effects on motor vehicle traffic.

15.3.3 Land Use

Existing land uses within the Hamlet of La Corey include agriculture, commercial, residential and industrial uses (M.D. of Bonnyville, 2022b). There are several pipelines and power transmission lines in the Hamlet. There is a landfill located at NW-11-063-05 W4M (Government of Alberta, 2023p) and a cemetery (M.D. of Bonnyville, 2022b).

The Project disturbance area is entirely within public (Crown) land, and the areas adjacent to the Project are mainly cultivated (tame pasture) and natural, including forests, swamps, peatlands and waterbodies. The Project is located within the WLPGR (Government of Alberta, 2021c). Predominant industrial land uses in the vicinity of the Project are grazing and oil and gas activity including: wellsites, access roads, pipelines, seismic lines and facilities (Figure 5).

End land use following closure and reclamation of the Project is anticipated to be pasture or hayland. Federation will conduct a post-construction reclamation assessment within a year (growing season) and provide specific recommendations for further reclamation measures if necessary. Roads and permanent erosion and sediment control structures may be left in place at the request of the land manager.

15.3.4 Labor and Economy

The M.D. of Bonnyville consists largely of farmland and large expanses of natural parkland and lakes. The main forms of industry are agriculture, oil and gas, and forestry. Construction, transportation, tourism, service and retail, and government offices also add to the economy (Town of Bonnyville, 2023). The surrounding lakes provide recreational opportunities.

The average employment income for a full-time worker in the M.D. of Bonnyville in 2020 was \$57,600, with an average total household income of \$130,400 (Statistics Canada, 2021). Industry in the M.D. of Bonnyville is dominated by agriculture, oil and gas, tourism and community services (Town of Bonnyville, 2023). The Bonnyville

LGA reported a lower proportion of people with university certificates, diplomas or degrees as compared to the Provincial average (13.2% versus 31.4%; Government of Alberta, 2022k).

The development and operations of the Project will play an important role in the local economy by providing jobs, potentially benefiting both local and Indigenous community members. Additionally, Federation will use local businesses and suppliers where possible. The Project is expected to bring up to 200 full-time jobs during construction and up to 20 full-time operations jobs. The Project will have a positive effect on the local economy in terms of salaries, use of local services and supplies, and taxes. The M.D. of Bonnyville will realize financial benefits due to annual taxation related to the Project.

15.3.5 Permanent, Seasonal or Temporary Residences

One residence, the WLPGR Headquarters/Residence, is located approximately 900 m southwest of the disturbance area. The residence is typically occupied for 6 months of the year during spring, summer and fall (T. Silzer, personal communication, January 23, 2023). During the spring of 2021, an agreement was reached with WLPGR Association for the lease of the lands by Federation for construction and operation of the proposed Project.

The air modelling results indicate that the routine and non-routine (emergency) operation of the Project will comply with the AAAQO for NO₂ and NH₃ for the emission limits evaluated. Thus, air quality for local residences is not expected to be affected.

With the recommended noise mitigation measures installed, sound levels from the proposed Project will comply with both the daytime and the nighttime PSL of AUC Rule 012 at the nearest residence. As discussed in Section 14.11, sound levels could be greater than 20 dBA.

15.3.6 Social and Economic Effects

The largest age group in the LGA in 2021 was 35-64 year olds, accounting for 40.6% of the population (Government of Alberta, 2022k). Children 17 and under made up 24.4% of the population, which is higher than the provincial average (22.0%). Individuals 65 and older accounted for 12.9% of the population in the LGA versus 14.1% in Alberta.

Bonnyville had a higher proportion of First Nations and Inuit people compared to Alberta (8.7% versus 2.8%). The percentage of female lone-parent families was lower than the provincial average (9.6% versus 11.0%; Government of Alberta, 2022k). The most common non-official languages spoken at home in the LGA were: Tagalog (Pilipino), Filipino, Aboriginal languages, Afrikaans, Sinhala (Sinhalese) and Arabic (Government of Alberta, 2022k). However, the LGA had a lower proportion of non-English and non-French speaking people compared to Alberta (0.3% to 1.4%) (Government of Alberta, 2022k).

The Project is not located in proximity to residences, schools, public spaces, recreational areas or other services. The nearest school is in Iron River, approximately 10 km west of La Corey, Alberta. La Corey is home to the Willow Prairie Senior Citizens Club, approximately 16 km south of the Project. The Bonnyville Senior Citizens Drop-In Centre is located in Bonnyville, Alberta, approximately 21 km south of the Project.

Federation will continue to engage with Indigenous communities throughout the Project and will seek to incorporate feedback on how barriers to employment or participation in the procurement of goods and services for the Project can be reduced, and where opportunities for capacity building may exist. Federation is committed to enhancing and sustaining an inclusive and diverse workforce. However, the potential effect of an increase in the population of temporary workers to affect diverse groups or vulnerable populations is limited. The Project is not anticipated to disproportionately affect any groups based on gender, culture or identity.

PART D: FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS AND MUNICIPAL INVOLVEMENT

16.0 Federal Financial Support

No federal financial support is required or has been provided to the Project and no federal financial support is anticipated throughout the Project.

17.0 Use of Federal Lands

No federal lands would be used for the purpose of carrying out the Project and the Project does not require the Crown to grant any interest in federal lands (e.g., easement or right-of-way).

18.0 Applicable Jurisdictions and Regulatory Requirements

No federal licences or permits are required for the Project. Aside from the potential for the Project to require an Impact Assessment, there are no other Federal authorizations expected to be required for the Project. Mitigation measures will be implemented to ensure the Project is in compliance with the MBCA (Government of Canada, 1994), the SARA (Government of Canada, 2002) and the *Fisheries Act* (Government of Canada, 2019c).

The other departments and jurisdictions on a Provincial and Municipal level that the Project will need to seek permits, licences or authorizations from are listed below. Additional detail on the regulatory context of the Project is provided in Section 5.0.

Alberta Environment and Protected Areas

- EPEA – the activity is a mandatory activity under EPEA; however, Federation has received a letter from EPA confirming that an Environmental Impact Assessment Report is not required (Government of Alberta, 2023c; Lori Havanka, EPA Approvals Program Manager, personal communication, May 2, 2023)
- *Public Lands Act* – EPA has issued a miscellaneous lease (DML 210041 [Appendix A]; Government of Alberta, 2022e)
- *Public Lands Act* – surface access and Temporary Diversion License (TDL) for drilling and pump test of source wells (Government of Alberta, 2022e)
- *Water Act* – Wetland Impact Approval # DAUT0008313 received on November 23, 2021, for 1.75 ha impact within the disturbance area (Government of Alberta, 2023e)
- *Water Act* – for water source wells, required for storage cavern mining (Government of Alberta, 2023e)

Alberta Utilities Commission

- Application guided by Other Power Plant requirements in AUC Rule 007 submitted on March 30, 2023 (Proceeding 28132; Alberta Utilities Commission, 2022)

Alberta Historic Resources Management Branch

- *Historical Resource Act – Historical Resource Act Clearance* for the Project was received on February 7, 2022 (HRA number 4668-22-0002-001; Government of Alberta, 2022c)

Alberta Ministry of Indigenous Relations

- Aboriginal Consultation Office – Adequacy Assessment was completed on September 21, 2022 (FNC202204766)

M.D. of Bonnyville

- Development Permit (M.D. of Bonnyville, 1999)
- Road Use Agreement (M.D. of Bonnyville, 2023c)

PART E: POTENTIAL EFFECTS OF THE PROJECT

Federation reviewed the baseline physical and biological setting of the disturbance area and conducted engagement. Federation used the baseline information to assess potential adverse effects on the various Valued Ecosystem Components (VECs) that may interact with the Project. Federation then identified environmental management practices and mitigation measures (Appendix E) to support Project development in an environmentally acceptable manner, ensuring compliance with regulatory requirements and environmental commitments.

19.0 Effects Related to Federal Acts

Environmental assessment and regulatory requirements relevant to the Project may fall under the legislative authority of Parliament. As defined under Section 2 of the IAA, this may include Project-related effects on:

- Fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act* (Government of Canada, 2019c)
- Aquatic species, as defined in subsection 2(1) of the SARA (Government of Canada, 2002)
- Species at risk, as defined in subsection 2(1) of the SARA (Government of Canada, 2002)
- Migratory birds, as defined in subsection 2(1) of the MBCA (Government of Canada, 1994)

Other considerations under Section 2 of the IAA include:

- Changes to the environment that occur on
 - Federal lands
 - In a province other than the one where the physical activity occurs
 - Outside of Canada
- With respect to the Indigenous peoples of Canada, an impact – occurring in Canada and resulting from any change to the environment – on
 - Physical and cultural heritage

- The current use of lands and resources for traditional purposes
- Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance
- Any change occurring in Canada to the health, social or economic conditions of the Indigenous peoples of Canada
- Any change to a health, social, or economic matter that is within the legislative authority of Parliament that is set out in Section 3.

Project-related effects to Federal lands and cross boundary effects are discussed in Section 20.0. Project-related effects to the physical and cultural heritage and land use are discussed in Section 21.0. Project-related effects to the health, social or economic conditions of Indigenous peoples are discussed in Section 22.0.

19.1 Fish and Fish Habitat, as Defined In Subsection 2(1) of the *Fisheries Act*

The *Fisheries Act* (Government of Canada, 2019c) was enacted to manage and protect Canada's fisheries resources. It protects freshwater and marine fish and fish habitat through the prohibition of serious harm to fish and by prohibiting the harmful alteration, disruption or destruction (HADD) of important aquatic habitat. Industrial projects could affect fish or fish habitat if there is direct or indirect disturbance to the fish or the fish habitat. Factors that pose a threat to fish and fish habitat include habitat degradation, habitat modification, the introduction of aquatic invasive species, overexploitation of fish, pollution and climate change (Government of Canada, 2019d). These threats can be cumulative and have unforeseen or unpredictable consequences for fish and fish habitat.

As described in Section 14.7, the nearest watercourses or water bodies are Osborne Creek and Marguerite Lake located approximately 0.5 km northwest and 2.5 km northeast to the disturbance area, respectively. Marguerite Lake is the closest designated fish bearing waterbody to the disturbance area (Government of Alberta, 2023i). No fish inventory or stocked inventory was documented within 5 km of the disturbance area (Government of Alberta, 2023i).

There are no drainages, watercourses or hydrological connectivity to other watercourses or fish-bearing waterbodies within the disturbance area, apart from the anthropogenic dugout intermittently connected to one wetland. Thus, there is no direct pathway for activities within the disturbance area to affect fish or fish habitat. As described in Section 14.5.2, indirect impacts are unlikely to occur for wetlands outside the disturbance area as they are not hydrologically connected to the disturbance area. In addition, the topography of the area is such that any runoff (if left unmitigated) would extend to the southwest from the site rather than to the north and east where the nearest waterbodies are located.

Although the route of the transmission line interconnection between the exiting ATCO substation (Marguerite Lake Substation 826S) and the proposed Osborne Creek 1146S has not yet been finalized, it will be relatively short (approximately 500 m long) and require a small number of structures. The structure locations will be placed to avoid watercourses and waterbodies and, as a result, the interconnection transmission line is not anticipated to have a pathway to cause effects on fish or fish habitat. Based on current design, the footprint of the existing 826S substation (an incidental Project component) is not anticipated to need to be expanded to accommodate the connection

apparatus for the interconnection transmission line. Therefore, no potential pathways to affect fish and fish habitat are likely to occur in relation to the existing substation.

A fuel gas pipeline will be required to supply natural gas to the expander generators (in the short-term, assuming that a source of hydrogen will be available by 2035). This pipeline has potential for effects to fish and fish habitat. Although the footprint has not yet been finalized, the pipeline will be a small diameter, will be installed within existing easements and no new land will be required. It is expected that, due to the small size and location (next to an existing road), impacts to drainages and watercourses will be reduced by having construction equipment install the pipeline from the existing roadbed. This avoids the need for a travel lane or any temporary crossings during construction. In addition, depending on the location of the pipeline within the existing easements, it may be possible to avoid modification of any existing culverts and avoid impacts to drainages which intersect the roadway.

If culverts, drainages or watercourses that intersect the existing roadway cannot be avoided or if it is not feasible to cross them using a trenchless method, mitigation to reduce impacts to watercourses, as well as fish and fish habitat may include:

- Ensure that any necessary approvals, notifications, licences and permits are in place prior to commencing applicable construction activities
- Where feasible, use trenchless crossing methods
- Where feasible, conduct open cut crossing under dry or frozen conditions
- Should flowing water be present during any open cut crossing, isolation of the site is required. Fish salvage of the site must be conducted prior to dewatering
- Water quality monitoring should be conducted to ensure that no deleterious materials enter the watercourse during construction activities, as required under the Code of Practice
- It is recommended that a Qualified Aquatic Environmental Specialists be on-site for the crossing of any fish-bearing watercourses
- Implement appropriate precautions to prevent deleterious substances (e.g., gasoline, sediment, oil, etc.) from entering the watercourse. Cleaning, re-fueling and servicing of equipment should be conducted in an area where spills or wash water will not contaminate surface water or groundwater resources. Consideration should be given to the use of non-petroleum based oils for machinery (e.g., vegetable oil)
- Ensure an appropriate emergency spill kit is available at all times. The kit should contain (at a minimum) emergency contact numbers, a plan to contain and remediate any substance release that causes or may cause an adverse effect on the aquatic environment, readily accessible materials and supplies for containment, and access to approved disposal sites for contaminated materials
- The Construction Supervisor and Environmental Inspector shall review the Sediment Release Contingency Plan prior to construction
- Report any environmental emergencies and/or spills immediately
- Ensure all equipment arrives on-site in a clean and well-maintained condition
- Ensure equipment is not washed in, or within 100 m of, a watercourse
- Ensure oil changes, re-fueling and lubricating of equipment are conducted a minimum of 100 m away from any watercourse
- Ensure no construction materials, debris, fuel, lubricating fluids, hydraulic fluids, methanol, antifreeze,

herbicides, biocides or any other chemicals are released on the ground or enter any watercourse

- Equip all fuel powered pumps, light standards or generators with secondary spill containment trays
- Store spoil and waste materials removed from the worksite above the high watermark. Stabilize this material, if warranted, to reduce the potential for runoff events to transport them into the watercourse (greater than 100 m)
- Halt construction when adverse construction conditions caused by inclement weather occur (i.e., weather that may cause an increased potential for erosion or sedimentation)
- Ensure proper drainage of overland runoff through or around all work areas. Runoff will not be allowed to exit the worksite without first being filtered to levels meeting or exceeding turbidity levels of the receiving watercourse
- Review all mitigation and regulatory requirements prior to construction to ensure that all mitigation requirements are understood and can be implemented
- Limit clearing in the vicinity of watercourse crossings to the removal of trees and shrubs along the trench line in order to protect riparian areas
- Clear vegetation located within the watercourse vegetation buffer area crossed by the pipeline footprint only if absolutely necessary

Once the final pipeline footprint has been determined, site-specific permitting and mitigation measures will be determined. If fish habitat is identified during the final design of the proposed fuel gas pipeline, Federation will implement mitigation measures (such as the preceding) to reduce or avoid potential effects to fish and fish habitat.

The existing Leming Lake Sales Lateral Loop pipeline that the proposed fuel gas pipeline will tie into, is not for the sole benefit of the Project, nor is it under Federation's care or control. Additionally, no changes to the existing Leming Lake Sales Later Loop pipeline, aside from the tie-in with the proposed fuel gas pipeline, are anticipated as a result of the Project.

As mitigation will be applied to avoid or minimize any effects to fish or fish habitat, there are no likely direct or indirect Project-related effects to cause harm to fish or fish habitat. No impacts to fish or fish habitat are expected due to the Project and, therefore, the provisions of the *Fisheries Act* (Government of Canada, 2019c) do not apply.

19.2 Aquatic Species or Marine Plants, as Defined in Subsection 2(1) of the *Species at Risk Act*

The SARA (Government of Canada, 2002) prohibits the killing, harming, harassing, capturing and the take of species listed under this Act, with some exceptions. Under SARA, aquatic species are defined as wildlife species that are fish, as defined in Section 2(1) of the *Fisheries Act* (Government of Canada, 2019c), or a marine plant (e.g., algae and phytoplankton) as defined in Section 47 of the *Fisheries Act*. Threats to aquatic species or marine plants include those that might cause serious or irreversible damage or harm, either to individuals or their critical habitat (Government of Canada, 2002).

As described in Section 14.7, the nearest watercourses or water bodies to the disturbance area are Osborne Creek and Marguerite Lake located approximately 0.5 km northwest and 2.5 km northeast of the disturbance area, respectively. These waterbodies were not designated as having important aquatic habitat (Government of Alberta,

2023i). The nearest designated waterbody containing important aquatic habitat is Highbank Lake, 4.6 km southeast of the disturbance area.

As described in Section 14.7, there are no drainages, watercourses or hydrological connectivity to other watercourses or fish-bearing waterbodies within the disturbance area, apart from the anthropogenic dugout intermittently connected to one wetland. Thus, there is no direct pathway for activities within the disturbance area to affect aquatic species or marine plants. As described in Section 14.5.2, indirect impacts are unlikely to occur for wetlands outside the disturbance area as they are not hydrologically connected to the disturbance area and the topography of the area slopes to the southwest. In addition, mitigation measures have been developed to reduce the potential for impacts to groundwater, surface water and wetlands (Appendix E).

As described in Section 19.1, there are no anticipated pathways of effects from the proposed Project from either the disturbance area or the proposed interconnection transmission line. There may be effect pathways from the proposed fuel gas pipeline, depending on the final footprint. Once the final pipeline footprint has been determined, site-specific permitting and mitigation measures will be established. If fish habitat is identified during the final design of the proposed fuel gas pipeline, Federation will implement mitigation measures (see Section 19.1) to avoid potential effects to aquatic SAR or marine plants.

19.3 Species at Risk, as Defined in Subsection 2(1) of the *Species at Risk Act*

The SARA (Government of Canada, 2002) was enacted to assist in preventing wildlife species from becoming extinct and to secure the necessary actions for their recovery by providing legal protection for wildlife species and the conservation of biological diversity. The SARA prohibits killing, harming, harassing, capturing and the take of species listed under the Act. Potential Project-related effects to SAR include habitat loss, loss of connectivity, and habitat fragmentation; alteration of movement patterns; and increase in wildlife mortality or injury.

Species at risk that have been observed in the vicinity of the Project are described in Section 14.9 and Table 14-1. The list includes two mammals, one amphibian and seven birds. Due to industrial and agricultural land use in the Project area, SAR are not expected to be present.

Best management practices to protect SAR will focus on preventing human caused mortality, reducing the risk of predation associated with anthropogenic features and activities, and protecting and conserving critical habitat. As there were no federal sensitive wildlife habitats or ranges identified (Government of Alberta, 2022j) in the Project area, it is anticipated that mitigation proposed should provide the appropriate measures to avoid or minimize any potential impacts resulting from the Project. If a wildlife feature of a SAR is observed, a professional biologist will implement a species-specific appropriate buffer, based on federal guidelines or in consultation with the appropriate regulator, until the nest has fledged, or the area has been cleared by the biologist.

Amphibian breeding ponds will have a recommended 100 m year-round setback. If new activities cannot be avoided within the setback, a mitigation plan will be developed. The mitigation plan may include mitigation measures such as amphibian monitors, exclusion fencing, amphibian assessments and amphibian salvage and relocation. All necessary permits will be obtained.

Clearing from approximately February 15 through April 1, in suitable habitat, will be avoided or minimized due to potential of disturbing early nesting birds such as Short-eared Owl, and other bird SAR. Construction will occur outside the Migratory Bird Nesting Period (April 1 to August 30; Environment Canada, 2015) or a pre-construction nest and wildlife sweep will be conducted so that a species-specific buffer can be maintained around nesting SAR.

Federation will comply with the prohibitions described in SARA (Government of Canada, 2002) during all phases of Project development. Recording SAR sightings, conducting nest and wildlife sweeps, implementing SAR specific timing restrictions and setbacks, and implementing SAR appropriate buffers, if applicable, will minimize the effects on SAR. In addition to the best management practices and mitigation discussed above, full mitigation measures to reduce the Project-related effects on SAR and SAR habitat are presented in Appendix E. Based on the implementation of these measures, the Project is not expected to cause adverse effects to SAR.

19.4 Migratory Birds, as Defined in Subsection 2(1) of the *Migratory Birds Convention Act*

The MBCA (Government of Canada, 1994) was enacted to protect and conserve migratory birds, as populations and as individuals, as well as their nests. The Act prohibits the harming of migratory birds and the disturbance and destruction of nests and eggs.

There is a pathway connecting the Project and migratory birds. Migratory birds have the potential to occur and nest within the disturbance area. To mitigate the effects on migratory birds, clearing will occur outside of the Migratory Bird Nesting Period (Nesting Zone B5: April 1 to August 30; Environment Canada, 2015) to be compliant with the MBCA (Government of Canada, 1994). If clearing or construction must proceed during the Migratory Bird Nesting Period, a pre-construction nest and wildlife sweep will be completed no more than 7 days prior to construction activities. If a nest or potential wildlife feature is discovered, a species-specific appropriate buffer, based on federal guidelines will be established and maintained until the nest has fledged or the area has been cleared by a biologist.

During site orientation, Project personnel will be encouraged to record wildlife sightings and report these to a Project representative. If active nests are discovered, a professional biologist will be consulted regarding setback distances, timing restrictions and other potential mitigation measures.

Migratory birds such as ducks, geese and gulls may be attracted to the stormwater pond. Project personnel will record wildlife sightings as dictated within the EPP. Should migratory birds interact with the stormwater pond, Federation will consult with a professional biologist to determine additional mitigation measures (e.g., netting, bird deterrent floats, effigies) to reduce further impacts.

Federation will comply with the prohibitions described in MBCA (Government of Canada, 1994) during all phases of the Project. The mitigation measures described above will assist in reducing the potential Project-related effects on migratory birds. Migratory birds and their nests will be avoided by scheduling clearing and construction activities to avoid the breeding season. If that is not possible, Federation will conduct nest sweeps to identify active migratory bird nests and establishing species-specific buffers around active nests to reduce Project-related impacts. Project personnel will report sightings of active nests and bird use of the stormwater pond, allowing Federation to

implement further mitigation if necessary. Thus, the Project is not expected to cause adverse effects to migratory birds.

20.0 Effects to Federal Lands or Cross-Boundary Effects

Industrial projects have the potential to affect federal lands and/or have cross-boundary effects depending on the proximity of the project to these lands or boundaries and the nature of the project activities. The Project is not located near a provincial or international border (Figure 2). The Project location in relation to provincial and international borders is described below:

- Alberta-Saskatchewan border is approximately 51 km east of the Project
- Alberta-British Columbia border is approximately 593 km west of the Project
- Alberta-Northwest Territories border is approximately 603 km north of the Project
- Canada-USA international border is approximately 622 km south of the Project

The federal lands closest to the Project are 20 km to the north (i.e., Cold Lake Air Weapons Range).

Due to the distance of federal lands and borders from the Project, the potential for the Project to have an effect is limited to non-existent. In addition, the majority of the effects of the Project will be constrained to the disturbance area, which is the area where the physical disturbance will occur, and the magnitude and extent of the direct effects will be mitigated by the successful implementation of mitigation (Appendix E).

There is potential for some indirect effects to extend outside of the disturbance area. Indirect effects to land use, terrain, soils, wetlands, vegetation and vegetation habitat are not anticipated to extend beyond 100 m from the edge of the disturbance area; pathways of potential effects extending beyond the disturbance area could include introduction and spread of invasive species, and impacts to Wetland 1 (permanent shallow open water/seasonal graminoid marsh/dugout complex) which extends outside of the disturbance area but is within 100 m of the disturbance area. The disturbance area watershed extends approximately 400 m, which provides an indication of the extent of the potential effects of the Project on surface water. Indirect effects to wildlife and wildlife habitat are expected to extend up to 1 km from the disturbance area, for effect pathways like wildlife habitat loss or fragmentation. Concentrations of air emissions rapidly diminish as distance from the site increases (Figures 7 and 8) and the noise propagation contour is expected to be less than 35 dBA at a distance 2 km from the edge of the disturbance area.

In consideration of the effects that are likely to occur the greatest distance from the disturbance area, effects related to the fuel gas pipeline and cumulative effects resulting from air emissions are the effects that are anticipated to extend the furthest.

The proposed fuel gas pipeline is expected to extend 14 km north of the disturbance area. The northern end of the fuel gas pipeline where it ties into the existing pipeline will not have any emissions sources or lead to any impacts to groundwater. As the fuel gas pipeline will be adjacent to or within existing rights-of-way and clearing will not be required for the construction of the fuel gas pipeline, habitat loss or fragmentation effects will not occur as a result

of the construction of the fuel gas pipeline. The most extensive effects from the pipeline tie-in point will be the temporary effects to wildlife during construction. Potential indirect effects on wildlife and wildlife habitat have potential to extend up to 1 km from the tie-in point and would be mostly in relation to auditory effects during construction. It is assumed that when the fuel gas pipeline is no longer needed it will be decommissioned in place and any activity at the tie in point to disconnect or isolate the line would be relatively short in duration.

The Alberta AQMG provides guidelines on when to include other emissions sources and indicates that “all industrial emission sources within 5 km of the Project boundary must be included in the modelling assessment” (Government of Alberta, 2021j). Therefore, an extent of 5 km from the Project is considered a reasonable distance to consider indirect or cumulative effects of air emissions.

Based on the forgoing effect pathways and the extent of the potential for direct and indirect effects resulting from the Project, the maximum extent of potential indirect effects would be approximately 5 km extending from the edge of the disturbance area and 1 km extending from the fuel-gas pipeline. These extents do not intersect with any Federal lands or cross any Provincial or National boundaries.

The magnitude and extent of the indirect effects will be mitigated by the successful implementation of mitigation (Appendix E).

21.0 Effects to Indigenous Peoples Resulting from Changes to the Environment

Changes to the environment can affect Indigenous physical and cultural heritage, the current use of lands and resources for traditional purposes and/or the current use of structures, sites or things that are of historical, archaeological, paleontological or architectural significance. Engagement with Indigenous People, as well as searches of available public information, assists in determining the use and importance of various elements or areas. Additional details are provided below.

21.1 Potential Effects to Indigenous Physical and Cultural Heritage and Land Use

The Project is located on Treaty 10 and Treaty 6 lands. There are 11 groups who may have asserted Traditional territory in the Project area, or whose traditional land use activities or Aboriginal and Treaty Rights may be affected by the Project (see Section 4.0). The disturbance area is not within or adjacent to any reserve lands or lands subject to any pending Indigenous land claims or court cases (Government of Canada, 2023d). The nearest reserve is Cold Lake 149B and the nearest Métis Settlement is KMS.

The Project is located within Métis Harvesting areas B and D (Métis Nation of Alberta, 2019). Within the Métis Harvesting area, recognized Métis Harvesters may fish, hunt and trap food within specific areas. No rivers or lakes where Métis Harvesting is permitted are within 10 km of the Project. The nearest lakes to the Project where Métis Harvesting is permitted are Wolf Lake, which is approximately 12 km northwest, and Tucker Lake, which is approximately 11 km southeast (Alberta Environment and Parks, 2021a).

The disturbance area is located on Crown land within the fenced perimeter of the WLPGR. EPA has issued a

miscellaneous lease (DML 210041, Plan No: 148028 MS [Appendix A]) to Federation for this Project. Historical aerial photograph review indicated that the area had been cleared for agriculture (grazing) by approximately 1973 (Government of Alberta, 2021h).

During consultation, Indigenous groups identified concerns related to wildlife and wildlife habitat, vegetation, impacts to subsistence hunting for large game, surface disturbance, traffic, access, impacts to water and cumulative effects. Some groups have identified that this area has historical and contemporary traditional land use. No physical cultural heritage sites were identified during consultation or site visits, however, Federation Group understands that the absence of physical cultural heritage within a proposed project footprint is not to be interpreted to mean that there are no project specific impacts to the exercise of Indigenous Rights. There are some ongoing concerns related to the cumulative effects in the region resulting from cumulative effects that could displace Indigenous peoples from preferred traditional used areas due to noise, increased activity of personnel, increased traffic or safety risks. Concerns around noise, vibration, the potential safety risks associated with storage (geophysical instability, release of air, leaked air interacting with existing oil wells) and long-term impacts of the Project in the decommissioning and reclamation phases have been raised and Federation is currently working to respond to and address these concerns.

Based on winter tracking surveys conducted in 2022, the following species, which may be of interest as game species, were observed in the Project area: Coyote, Snowshoe Hare, Red Fox, Red Squirrel, Moose, Ruffed Grouse and White-tailed Deer. Additional detail on wildlife and wildlife habitat, including potential effects, are included in Section 14.8.

One of the considerations when selecting the site for the Project was to minimize new access to reduce any impacts to traditional land uses. The Project is located adjacent to an existing highway and will access directly from this road. In addition, the disturbance area is across the highway from an existing electrical substation and within the fenced perimeter of the WLPGR. Changes to traffic are described in Section 15.3.2. As the Project is located adjacent to an existing range road (Figure 4), the Project is not expected to increase access to previously inaccessible areas.

The Project is anticipated to have a limited impact on water and drainage, as well as vegetation and land use. Federation is committed to mitigation measures and best management practices that reduce the Project-related effects on water and vegetation. This includes careful site design and placement, erosion and sediment control, stormwater management, weed control, and reclamation with native seed mixes and vegetation native to the area. Changes to water and drainage as a result of the Project are addressed in Section 14.4. Effects to vegetation and land use are addressed in Section 14.6.

Federation Group has been consulting with Indigenous groups since 2021. On July 20, 2021 consultation was deemed adequate by the ACO. However, CLFN has continued to raise concerns and has provided Federation and the AUC with more detailed information regarding direct and adverse impacts of the Project on its Indigenous and Treaty Rights. Federation will continue to consult with CLFN and other potentially affected Indigenous groups throughout the lifetime of the Project.

21.2 Potential Effects to Indigenous Peoples Resulting from Changes to Structures, Sites or Items of Historical, Archaeological, Paleontological or Architectural Significance

The disturbance area does not currently contain any structures or buildings. There are no previously recorded sites or structures of historical, archaeological, paleontological or architectural significance known to exist within the disturbance area. The Project does not cross lands assigned a HRV, nor are there any previously identified historic resource sites located within 1 km of the Project. A HRIA was completed and an application for *Historical Resources Act* Approval was submitted to the Historic Resources Management Branch, Alberta Culture and Status of Women. *Historical Resources Act* approval was granted for the Project on February 7, 2022.

During site visits with CLFN and FLMS, no physical cultural heritage sites were identified, however, Federation Group understands that the absence of physical cultural heritage within a proposed project footprint is not to be interpreted to mean that there are no project specific impacts to the exercise of Indigenous Rights.

The Project has limited potential to have significant impact on significant historic resources, based on the review of the archeologist conducting the HRIA for the Project. As a result, the likelihood of an unidentified site or item of historical, archaeological or paleontological significance is low. Therefore, any potential effects to Indigenous Peoples as a result of these potential effects would be unlikely. However, chance find procedures are in place such that if a contractor encounters a potential archeological or paleontological resource, activities will be stopped until the potential resource can be evaluated. The requirements of the HRIA approval also indicate specific reporting procedures in the event that a previously unidentified Aboriginal Traditional Use Site is discovered; the site will be appropriately reported to the Aboriginal Heritage Section of Alberta Culture and Status of Women. In alignment with CLFN's request, Federation commits to notify CLFN promptly in case of a chance discovery of an archaeological or paleontological resource, or the discovery of a previously unidentified Aboriginal Traditional Land Use Site.

22.0 Effects to Indigenous Peoples Resulting from Changes to Health, Social or Economic Conditions

22.1 Potential Effects to Indigenous Health

The CLFN Health Centre provides health care services on the CLFN reserve. The CLFN Health Centre provides community health services including: community nursing, counseling and addictions services, head start, medical transfers and homecare (Cold Lake First Nations, 2023a). Dene Wellness provides mental health and substance abuse treatment services to CLFN members. Services offered at Dene Wellness include: mental health therapy, addictions counselling as well as supporting programs which target alcohol, drug and solvent abuses and suicide prevention (Cold Lake First Nations, 2023b).

CLFN has an emergency services department, which provides emergency response service to members on reserve and the local community. The department includes trained fire fighters, response teams and a fire truck (Cold Lake First Nations, 2023c).

The Project would not be expected to access emergency or medical services that are specific to Indigenous communities such as the CLFN Health Centre, Dene Wellness and the CLFN emergency services department. The

potential for increased use of emergency services in the region is low due to the emergency and fire equipment that will be available on site as well as the mitigation planning in place to reduce the likelihood and severity should an emergency occur (see Section 15.2).

No likely potential effects to fish and fish habitat have been identified (see Section 14.7).

Much of the disturbance area is currently used as pasture (approximately 87% of the disturbance area); the remainder of the area is covered by four wetlands. Vegetation within the pasture area is a mixture of agronomic species (e.g., red fescue, alsike clover and timothy) mixed with forbs (e.g., wild strawberry, common yarrow, small bedstraw and tall goldenrod). Due to the ongoing grazing and management within this area, the diversity of species is limited and some invasive species are present. Indigenous communities have indicated a general concern related to plant harvesting in the area surrounding the Project. During operations, the disturbance area will be maintained in an unvegetated condition. During the decommissioning phase, the Project will be reclaimed according to the desired end land use for the area and will meet an equivalent land capability. The Project will result in an incremental temporary reduction in the area available for plant harvesting but is not anticipated to cause indirect effects to the health of country foods or the abundance of plants for traditional harvesting outside of the disturbance area. This is due to the implementation of mitigation measures to reduce the introduction and spread of invasive species, reduce the likelihood of spills and to mitigate any spills of hydrocarbons or saline water.

The potential impacts resulting from the Project to water quality and quantity will be mitigated by implementing mitigation measures such as: a groundwater monitoring program; constructing engineered containment to guarantee the integrity of the cavern operation; implementation of a stormwater management program; construction of a runoff/sedimentation pond and following mitigation measures in the EPP including contingency plans for spill prevention and containment. As a result of these measures, the potential impacts to ground and surface water will be localized and avoid indirect impacts to water wells and surface water in the area. Therefore, no effects to drinking water used by Indigenous communities are anticipated.

As described in Section 15.2.4, the Project meets established guidelines for air emissions and noise based on conservative estimates of the air emissions and noise during all phases of the Project.

Visual and auditory effects may cause alteration of wildlife movement patterns during construction and operations phases; however, these effects are considered to be of low magnitude following the implementation of mitigation measures and because of the existing disturbance in the area. As a result, the incremental effect to game availability in the area is expected to be low in magnitude and fully reversible following decommissioning.

Based on the preceding, though some incremental effects to harvesting are expected, Federation does not anticipate any health impacts to Indigenous peoples due to the Project.

22.2 Potential for Social Impacts to Indigenous Populations

No increases in the temporary population of the M.D. of Bonnyville or the permanent population of the M.D. of Bonnyville are expected as a result of the Project. The workforce needed for the construction phase as well as the

operation phase are expected to be sourced primarily from the local area so the Project will not be expected to generate substantial demand for workers from outside the local area. Therefore, it is not expected to change the demographics or composition of people. As the Project is not expected to cause population growth reduced access to community services for Indigenous people is not anticipated.

As described above, the Project has been sited to avoid creating new access to previously inaccessible areas. Therefore, the Project is not expected to increase non-Indigenous use of Crown lands. As highlighted by CLFN, Federation acknowledges that its assessment of social impacts on Indigenous Populations is based on Western science-based valued components and indicators. In response to this concern, Federation is committed to continuously engaging with Indigenous groups to gain a deeper understanding of community-specific valued components and indicators related to social impacts and will work towards mitigating direct and adverse social impacts that are identified through this engagement process.

22.2.1 Potential Economic Impacts on Indigenous Communities and Groups

Federation has been building relationships for several years with local Indigenous communities and has been discussing potential for community building and economic opportunities. Positive economic impacts for Indigenous communities, companies or individuals which participate in the Project through business opportunities or employment are expected.

On the basis of the above Sections, Federation does not expect the Project to cause high magnitude adverse environmental, health or socio-economic impacts that could potentially affect Indigenous Groups.

23.0 Estimated Greenhouse Gas Emissions

Federation is committed to maintaining air quality within the Project area and will conduct continuous air emissions modelling as per the specifications and approval conditions. A discussion on the estimated greenhouse gas emissions (GHG) is presented below. All phases of the Project are considered, including construction, operations, and decommissioning, as well as third-party (indirect) emissions and net emissions.

23.1 Construction Phase

The direct GHG emissions from the construction phase are presented in Table 23-1. The sources of GHG include fuel combustion by on-road, off-road, other construction equipment, and activities associated with land clearing such as uproot, burning and decay. Construction emissions are mainly from land clearing activities (65.91%) followed by off-road equipment (28.64%).

Table 23-1. Total Greenhouse Emissions – Construction

Emission Source	Total Construction Emissions (tonnes)				Percent of Total Construction Emissions
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Off-road Construction Equipment	5,302.18	0.14	0.45	5,426.76	28.64%
On-road Construction Equipment	557.57	0.02	0.03	566.48	2.99%
Other Construction Equipment	460.63	0.01	0.02	465.51	2.46%
Land Clearing, Burning and Decay	-	-	-	12,488.72	65.91%
Total	6,320.38	0.17	0.49	18,947.47	100%

23.2 Operation Phase

The direct GHG emissions during operation are presented in Table 23-2. The emission sources associated with the operation phase are the two expander trains running on natural gas, emergency diesel generator, fire water pump and fugitive sources. Operation emissions are mainly from the two expander trains (99.88% combined) followed by the diesel Emergency Generator (0.08%).

To estimate GHG emissions, each turbo expander train is expected to operate 1,739 hours per year at a rate of 3.9 kg/sec. The total direct GHG emissions are based on annual plant operation.

Table 23-2. Total Greenhouse Emissions – Operation

Emission Source	Total Operation Emissions (tonnes)				Percent of Total Operation Emissions
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Expander-I	38,601.28	0.73	0.65	38,793.72	49.94%
Expander-II	38,601.28	0.73	0.65	38,793.72	49.94%
Emergency Generator	64.16	0.0019	0.0005	64.34	0.08%
Fire Water Pump	7.69	0.0002	0.0001	7.72	<0.01%
Fugitive Sources	-	-	-	26.50	0.03%
Total	77,271.07	1.46	1.30	77,686.00	100%

23.3 Decommissioning

The Project is expected to have a lifespan operation of greater than 30 years; therefore, decommissioning will take place after 2058 at which point the Project is expected to have achieved its goal of net zero emissions by transitioning to hydrogen for power generation and using hydrogen and/or electricity powered vehicles and equipment. Many heavy equipment manufacturers are beginning to roll out models that utilize hydrogen fuel cells, electricity or hydrogen combustion and, although options are limited now, by 2058 many heavy equipment manufacturers have a net zero commitment (Equipment Journal, 2022; Equipment World, 2022; For Construction Pros, 2022). As a result, it is reasonable to expect that there will be greater availability of this type of equipment by 2058, though it may still be more costly than the traditional fossil fueled counterparts. Therefore, GHG emissions are not expected to be generated during the decommissioning phase of this Project.

23.4 Third-Party (Indirect) Emissions

The indirect GHG emissions from electricity consumption during the construction and operation phase of the Project are presented in Table 24-13.

Table 23-3. Total Indirect Greenhouse Gas Emissions

Emission Source	Total GHG Emissions (tCO ₂ e)
Construction Phase	16,000.00
Operation Phase	206,320.00

23.5 Fugitive Emissions

Fugitive emissions are leaks and other irregular releases of gases from pressurized containment such as pipelines and storage tanks. The sources of fugitive emissions include areas such as connectors, valves, flanges and pumps. An average industry fugitive leak rate of 0.40 ft³/min (5,953.30 m³/year) was used. Fuel leaks from the Project area conservatively assumed to be natural gas.

Emissions are calculated as:

$$tCO_2e = fuel\ leak * 0.004452$$

23.6 Net Greenhouse Gas Emissions

The direct GHG emissions from the entire Project construction period is estimated to be 18,947.47 tCO₂e (including emissions associated with land-use change), of which the emissions from land clearing activities accounts for 65.91% of the total construction emissions followed by off-road equipment (28.64%). Using the 2021 GHG emissions totals for Canada (670,000 kilotonnes of carbon dioxide equivalent [ktCO₂e]) and Alberta (256,400 ktCO₂e) as a baseline, the direct emissions (excluding emissions associated with land-use change activities) during the construction phase represents 0.003% and 0.007% of Canada’s and Alberta’s 2021 total annual GHG emissions, respectively (Environment and Climate Change Canada, 2021). In addition, the indirect GHG emissions associated with imported electricity during construction is 16,000.00 tCO₂e. Total GHG emissions for the construction phase including both direct and indirect emissions is estimated at 34,947.47 tCO₂e.

During the construction phase, approximately 13.5 ha of trees, shrubs, and grassland may be removed, and the land converted to industrial use for soil stockpiling. The release of GHG emissions associated with clearing of this land is expected to be 12,488.72 tCO₂e. The emissions represent approximately 0.002% and 0.005% of 2021 Canada and Alberta total annual GHG emissions, respectively (Environment and Climate Change Canada, 2021). Therefore, land clearing is estimated to have minimal impact on climate change.

The direct GHG emissions as a result of the Project during operation are estimated to be 77,686.00 tCO₂e, of which the emissions from the two expanders account for about 99.88% of the operation emissions followed by emergency generator (0.08%). Using 2021 GHG emission totals for Canada and Alberta as a baseline, the direct emissions during the operation phase represents 0.012% and 0.030% of Canada’s and Alberta’s 2021 total annual GHG emissions,

respectively (Environment and Climate Change Canada, 2021). The indirect GHG emissions associated with imported electricity during operation is 206,320.00 tCO₂e. The Project does not capture and store CO₂ and there are no avoided emissions as a result of the Project. The total annual GHG emissions for the operation phase, including both direct and indirect emissions is estimated to be 284,006.00 tCO₂e.

The GHG emission estimates incorporated several conservative assumptions such as:

- The construction activity would be spread evenly over the duration of the construction period
- Trees and shrubs removed from the land clearing activities are conservatively assumed to be burned
- The natural gas used by the expanders is conservatively assumed to be 100% methane

Overall, the GHG emissions associated with the Project construction and operation are low in magnitude when compared to provincial and national emission totals.

23.7 Strategic Assessment of Climate Change and Net-Zero Plan

The Project will utilize electricity during off-peak from Alberta's electricity grid to compress air underground, releasing it during on-peak hours to power a series of electricity generators and feed the electricity transmission system. In doing so, the Project will help meet growing electricity demand in Western Canada by balancing the electricity grid, while reducing GHG emissions from natural gas fired generation used during peak hours and creating economic opportunities within the region. According to the AESO Net-Zero Emissions Pathways report, 85% of Alberta's power, as of June 2022, comes from natural gas and coal (Alberta Electric System Operator, 2022). In order for the AESO to meet its goal of a zero-emissions grid by 2035, new infrastructure and innovative technologies will be needed.

The Project will assist the Government of Canada in meeting its goal to achieve a net-zero electrical grid by 2035, as determined by the Draft Clean Electricity Regulations (Government of Canada, 2023c). The core principles of the Draft Clean Electricity Regulations are to maximize GHG reductions to achieve net-zero emissions from the electricity grid by 2035, maintain electricity affordability for Canadians and businesses, and maintain grid reliability to support a strong economy and meet Canada's growing energy needs. The Project is designed to meet these principles and will specifically be used to balance the electricity grid in Alberta, thus providing predictable and affordable electricity rates. As well, the Project is expected to phase out natural gas as the source of energy for powering expander trains and to utilize 100% hydrogen by the year 2035.

The SACC, developed by Environment and Climate Change Canada (ECCC; Government of Canada, 2021b), has been reviewed and used to calculate GHG emissions associated with the Project. Section 3 and 4 of the SACC are satisfied in the Project's GHG emissions evaluation and calculation. Overall, the GHG emissions associated with the Project are very low in magnitude compared to provincial and national emission totals. The only direct source of emissions expected from the Project are from fugitive emissions and process equipment (expander trains, emergency generator and fire water-pump).

The Project is expected to generate negligible upstream GHG emissions; therefore, upstream emissions were not estimated. Section 3.1.1 of the SACC requires proponents to provide net GHG emission estimate by year for each phase of the Project operation based on maximum throughput or capacity. The SACC provides guidelines for calculating emission intensity, which is calculated by dividing net GHG emissions by units produced. However, the SACC notes that GHG intensity could not be estimated for some project types, for example energy storage projects, which do not produce any units or products. Therefore, the emission intensity calculation does not apply to this Project. As a result, emissions intensity has not been calculated.

The Project is expected to have a lifespan of at least 30 years and is expected to be in operation from 2028 to 2059. As the proposed Project will be in operation beyond 2050, a formal plan to achieve net-zero emissions by 2050 is outlined below in accordance with Section 5.1.4 of the SACC.

CAES technology is a promising solution to the energy sector. It offers a viable solution for balancing the supply and demand of electricity generation. With the continued development and implementation of CAES technology, it is expected to play a significant role in future energy generation.

The Project is expected to phase out natural gas as the source of energy for powering expander trains and to utilize 100% hydrogen by the year 2035, thereby meeting the nation's net-zero emission goal. Various energy producers and gas suppliers have programs underway to developing the hydrogen energy platform. The Hydrogen Energy Platform is an important initiative for lowering GHG emissions while helping meet future energy reduction targets. The federal government has developed a hydrogen strategy to establish hydrogen production to meet the nation's net-zero emissions target and be a leader of clean and renewable energy by year 2050. Alberta's hydrogen plan is aligned the federal government plan. Alberta's Industrial heartland region near Edmonton is expected to become one of the first hydrogen producing hubs in Canada. The region has access to abundant natural gas and potential carbon capture, utilization, and storage sites, an existing hydrogen pipeline, and two CO₂ pipelines. The federal and provincial strategies include using hydrogen for electrical power generation.

24.0 Wastes and Emissions

24.1 Greenhouse Gas Emissions

The expected GHG emissions to be released during the construction and operation of this Project include carbon dioxide (CO₂), methane (CH₄), and nitrous oxides (N₂O). GHGs not expected to be released during Project activities are perfluorocarbons (PFC), hydrofluorocarbons (HFC), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃) as the material/activities that would generate these emissions are not present or used in this Project. Therefore, they are excluded from this assessment.

All GHG gases do not have the same atmospheric lifetime and heat trapping potential. The Global Warming Potential (GWP) metric examines each GHGs ability to trap heat in the atmosphere compared to CO₂. Using GWP of 100-year time horizon as per the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2014), GHG emissions are multiplied by their GWP and reported as CO₂ equivalent (CO₂e). The GWP used for these GHGs are as follows:

- CO₂ = 1
- CH₄ = 28
- N₂O = 265

The total mass of CO₂e for the Project is calculated as:

$$CO_2e = (mass\ CO_2 * 1) + (mass\ CH_4 * 28) + (mass\ N_2O * 265)$$

24.1.1 Greenhouse Gas Emissions Released During the Construction Phase

Off Road Construction Equipment

Most, if not all, off-road equipment and vehicles used on construction sites are diesel-fueled heavy-duty equipment such as drilling rig, tractor, crawler, excavator, scraper, backhoes, articulate truck, graders, dozers, compactors, horizontal directional drill (HDD) rig, cranes, etc. These types of equipment and vehicles are not allowed on highways and public roads. The list of off-road equipment and vehicles used for the Project during the construction phase and estimated diesel consumption of each piece of equipment was estimated based on the Project schedule and required work hours for each construction activity as well as the equipment anticipated to be used for that activity. Considering the various equipment involved in a particular activity, for example piling installation would involve a pile driving rig, crane, and heavy haul truck to transport piles to the construction site, and that each type of equipment consumes fuel at different rates, an average hourly fuel consumption of all equipment involved in the activity was used. The equipment was assumed to be operating 8 hours/day for the duration of the activity. Construction activities and associated fuel consumption for off-road construction equipment are provided in Table 24-1.

Table 24-1. Off-road Construction Equipment

Construction Activity	Work Days	Work Hours	Fuel Consumption (L)
Clearing and Site Preparation	33	264	16,902
Piling Installation	52	416	47,091
Concrete Foundation Installation	69	552	40,627
Underground Piping and Electrical Installation	52	416	25,214
Structural Steel and Piperack Module Installation	206	1,648	151,341
Building Construction and Skid Package Installation	311	2,488	448,255
Equipment Installation	329	2,632	241,705
Aboveground Piping Construction	227	1,816	107,212
Aboveground Electrical Installation	312	2,496	126,859
Instrumentation and Control System Installation	260	2,080	54,704
Insulation and Cladding Installation	261	2,088	54,914
Major Equipment Installation	399	3,192	622,653
Grid Interconnection and Fuel Gas Pipeline Construction	206	1,648	40,211

Emissions are calculated as:

$$\text{Emissions (tonnes)} = \text{Fuel Consumption (L)} * \text{Unit Conversion (kL/10}^3\text{L)} * \text{Emission Factor (t/kL)}$$

Emission factors for CO₂, CH₄ and N₂O are from the Alberta Greenhouse Gas Quantification Methodologies (AQM; (Alberta Environment and Parks, 2021b). These emission factors are used to convert fuel consumption totals to GHG emissions. The emission factors used for this off-road equipment are summarized in Table 24-2.

Table 24-2. Emission Factors for Off-road Equipment

Emission Source	Emission Factor (t/kL Fuel)		
	CO ₂	CH ₄	N ₂ O
Off-Road – Diesel >= 19kW (Tier 4)	2.681	7.3E-05	2.3E-04

Source: AQM Table 1.1 and Table 5.1 from Alberta Environment and Parks, 2021b

On-Road Construction Equipment

On-road construction equipment and vehicles used for construction include: diesel-fueled equipment such as pick-up trucks, crew cabs, welder trucks, gravel trucks, fuel trucks, hydro-vac trucks and freight trucks. These equipment and vehicles are approved to travel on highways and public roads. The equipment list and fuel consumption were estimated based on the Project work schedule and examples of on-road equipment used in similar construction projects. The fuel consumption rate for each piece of equipment was determined and using estimated working hours in the Project schedule, the total fuel consumption for each piece of on-road equipment was calculated based on an 8 hour day. The on-road construction equipment list and their associated fuel consumption are provided in Table 24-3.

Table 24-3. On-road Construction Equipment

On-Road Equipment	Workdays	Work Hours	Fuel Consumption (L)
Pick-up Truck	2,112	16,896	50,688
Crew Truck	1,056	8,448	25,344
Welder Truck	866	6,928	15,242
Gravel Truck	899	7,192	87,023
Fuel Truck	301	2,408	29,137
Freight Truck	21	168	538

Emission factors for CO₂, CH₄ and N₂O are from the AQM (Alberta Environment and Parks, 2021b). The emission factors used for this on-road equipment are summarized in Table 24-4.

Table 24-4. Emission Factors for On-road Equipment

Emission Source	Emission Factor (t/kL Fuel)		
	CO ₂	CH ₄	N ₂ O
On-Road – Heavy-Duty Diesel Vehicles (advanced control)	2.681	1.1E-04	1.5E-04

Source: AQM Table 1.1 and Table 5.1 of Alberta Environment and Parks, 2021b

Other Construction Equipment

Other equipment used for the construction includes propane fueled heaters and diesel fueled light towers. The equipment list and the associated fuel consumption were estimated using the work schedule and fuel consumption per hour for this equipment. For the light towers, a fuel rate of 1.67 L/hr was used and it was assumed to be in use for 10 hours per day for the 2,717 working days in the schedule. Total fuel consumption was based on two light towers. For the propane heater, a fuel consumption rate of 2.2 L/hr was used and it was assumed to be operational 24 hours a day for the entire period of the winter season (6 months). Two heaters were assumed to be in use for the duration of the Project construction. Fuel consumption of these equipment is provided in Table 24-5.

Table 24-5. Other Construction Equipment

Equipment Description	Fuel Type	Total Fuel Consumption (L)
Light Tower	Diesel	90,748
Heaters	Propane	143,456

Source: D. Caparroz, personal communication, April 14, 2023

Emission factors for CO₂, CH₄ and N₂O are from the AQM (Alberta Environment and Parks, 2021b). These factors are used to convert fuel consumption total to GHG emissions. The emission factors used for this other construction equipment are summarized in Table 24-6.

Table 24-6. Emission Factors for Other Equipment

Emission Source	Emission Factor (t/kL Fuel)		
	CO ₂	CH ₄	N ₂ O
Light Tower (Diesel fueled)	2.681	7.8E-05	2E-05
Heater (Propane fueled)	1.515	2.4E-05	1.08E-04

Source: AQM Table 1.1 (Alberta Environment and Parks, 2021b)

Land Clearing

The total area of land disturbance (clearing of trees/woody vegetation/grassland) for the construction of the Project is 13.5 ha. The land will be cleared to accommodate CAES facility construction and soil stockpiling associated with the Project.

Emissions related to land clearing are estimated using the following equation:

$$\text{Emissions (tCO}_2\text{e)} = \text{Area Cleared (ha)} \times \text{Emission Factor of Eco-region (tCO}_2\text{e emitted/ha)}$$

To estimate CO₂e emissions related to land clearing, burning and decay, factors from United Nation Framework Convention on Climate Change (UNFCCC; United Nations Framework Convention on Climate Change, 2009) spreadsheet are identified based on ecoregion and salvaging practices. The emission factor for Mid-north Coast was used for the Project. As this source does not include locations in Alberta, this ecoregion provides the most conservative estimate as it has the highest emission factors within British Columbia’s database of ecoregion-specific emission factors. The average emission factor shown in Table 24-7 was applied.

Table 24-7. Emission Factors for Land Clearing

Emission Source	Emission Factor (tCO ₂ e/ha)
Land clearing and decay	925.09

Source: United Nations Framework Convention on Climate Change, 2009

24.1.2 Greenhouse Gas Emissions Emitted During Operation Phase

The emissions sources during operation include two expander trains running on natural gas (provided by Siemen Energy turbines), an emergency power generator using diesel (provided by Finning Caterpillar) and a diesel fire water pump. All other equipment used in the operation will be electrically driven and will not result in GHG emissions.

During operations, prior to 2058, the Project will make the transition to hydrogen as the power source for the expander trains (see also Section 23.2). As a part of the transition from natural gas to hydrogen firing, it is anticipated that there will be a brief transitional phase where co-firing of natural gas and hydrogen occurs. The exact duration of this period will be determined by the technology of the time but is expected to be relatively brief (on the order of months). Due to the short, and as yet hard to predict, duration of this transition phase a calculation for co-firing has not been provided. Instead, the conservative assumption that the Project will be 100% natural gas fired up to the time that the Project switches to hydrogen firing has been used.

A list of GHG emission combustion sources and estimated fuel consumption for each was provided by Federation and is shown in Table 24-8.

Table 24-8. Greenhouse Gas Emission Sources During Operation

Emission Sources	Fuel Type	Flow Rate (tonnes/year)	Flow Rate (m ³ /year)
Expander Train I	Natural Gas	24,416.00	19,674,456.08
Expander Train II	Natural Gas	24,416.00	19,674,456.08
Emergency Generator	Diesel	23.94	-
Fire Water Pump	Diesel	2.87	-

Both expanders have a flow rate of 3.9 kg/sec and are expected to operate an average of 1,739 hours per year each. The diesel operated emergency generator has a flow rate of 272.1 L/hr at 100% load capacity with the fan running. For the purposes of these calculations, a conservative assumption has been made that the generator would be in operation 1% of the time (88 hours/year). The fire water pump has a flow rate of 32.6 L/h and a conservative assumption has been made that it would be in operation 1% of the time (88 hours/year).

To calculate the GHG emissions for natural gas fuel combustion, Emission Factors and Reference Values, Table 1 and Table 2 of the ECCC website reference were used (Environment and Climate Change Canada, 2022). GHG emissions factors for natural gas combustion and non-variable diesel combustion are shown in Tables 24-9 and 24-10, respectively. Emissions factors used are the most conservative for all industries.

Table 24-9. Greenhouse Gas Emissions Factors from Combustion of Natural Gas

Emission Source	CO ₂ (g GHG/m ³ natural gas)	CH ₄ (g GHG/m ³ natural gas)	N ₂ O (g GHG/m ³ natural gas)
Expander Train	1,962	0.037	0.033

Table 24-10. Greenhouse Gas Emissions Factors from Non-variable Diesel Combustion

Emission Source	CO ₂ (tonnes/kl)	CH ₄ (tonnes/kl)	N ₂ O (tonnes/kl)
Emergency Generator	2.68	7.8E-05	2E-05
Fire Water Pump	2.68	7.8E-05	2E-05

24.1.4 Third Party (Indirect) Emissions

The third party (indirect) emissions are the result of imported electricity from the grid used during construction and operation of the Project. Imported electricity will be used in wash pumps and other auxiliary utilities during the construction phase. During the operation phase, imported electricity will be used for the electric driven single 125 MW compressor train. Electric consumption for the construction and operation phases were estimated based on information provided by Federation (Table 24-11).

Table 24-11. Imported Electricity Consumption

Activity	Electricity Consumption
Construction Phase	25,000.00 MWh
Operation Phase	322,375.00 MWh/year

Source: D. Caparroz, personal communication April 14, 2023

The GHG emissions associated with third-party electricity generation are calculated using ECCC National Inventory Report (NIR), electricity intensity factor for Alberta (Environment and Climate Change Canada, 2022) as summarized in Table 24-12.

Table 24-12. Emission Factor for Third-party (Indirect) Emissions

Emission Source	Consumption Intensity (g CO ₂ ^e /KWh electricity consumed)
Purchased electricity - Alberta	640

Source: Emission Factors and Reference Values - Table 6 (Environment and Climate Change Canada, 2022)

24.2 Additional Wastes Generated

This section summarizes the additional wastes (i.e., heat, liquids and solids) expected to be generated during all phases of the Project.

The process of air compression will result in the production of heat. Federation has selected a closed water and glycol loop equipped with fin/fan aerial coolers. This system would result in an incremental release of heat to the ambient air during operations.

Brine generated from the salt cavern mining process will be disposed in deep disposal wells (within Cambrian formations). Federation has evaluated the geology of the area to ensure that the disposal wells are located in viable reservoirs that are deep enough to safely dispose of waste brine without interfering with groundwater and oil and gas production in the area. Brine disposal requirements are expected to be approximately 4,300 m³/day, which is anticipated to be split between two disposal wells. Brine will only be generated during the construction and not the operations or decommissioning phase.

Grey water produced during operations generated from use of washrooms and kitchen facilities, for example, would be trucked off-site and disposed of at an approved waste facility.

A Project stormwater management plan will be developed and implemented prior to construction. The stormwater pond on-site (location shown in Appendix C) is designed to capture and retain stormwater runoff for a period of time prior to release. This allows sediments to settle out and provides some treatment for pollutants. Stormwater will be released when it meets the water quality criteria outlined in the EPEA and will be released in a controlled manner to minimize erosion impacts downstream from the release point.

Waste oil will be stored in secure containers, separate from other incompatible wastes. Any waste with potential to be released to the environment will have secondary containment in place in accordance with AER Directive 055

(Alberta Energy Regulator, 2022). Quantities of waste oil are expected to be minimal and will be disposed of off-site at an oil recycling facility or an appropriately licensed disposal facility. All vehicle refueling will occur off-site.

Solid waste generated during construction is expected to include: food wastes and packaging generated by the construction crew, recyclable construction wastes, non-recyclable construction wastes and sewage. Materials used as part of Project activities will be salvaged and recycled whenever possible by a contracted recycling company. Other waste will be disposed of in accordance with all applicable provincial and federal regulations by a contracted waste disposal company. Portable outhouses will be used during construction and will be maintained by a contractor licensed to handle these wastes.

The volume of solid waste generated during operations is expected to be much less due to the nature of the activities occurring during operation, as well as the lower number of full-time personnel (decreasing from approximately 200 to approximately 20 full time roles during operation). Solid waste generated during operations are expected to include: food wastes, paper towels and packaging generated by operations staff; recyclables generated by operations staff; sewage and grey water produced by washroom, kitchen and shower facilities; small volumes of non-recyclable waste and small volumes of hazardous waste. Hazardous wastes generated may include solvents, paint, batteries, fluorescent light bulbs, herbicides and waste oil, as previously mentioned. Appropriate contractors will be engaged to remove recyclable and non-recyclable wastes generated during construction. Any hazardous wastes generated during construction or operation phases will be disposed of at a licensed disposal facility. Sewage and grey water will be held in septic tanks then trucked and disposed of off-site by a third party.

Once the Project is no longer needed and is ready to be taken out of operation, Federation will decommission and reclaim the area as per regulations of the time, the Project-specific approvals and the desired end land use. It is anticipated that the fuel gas pipeline will be abandoned in place. Wastes generated during pipeline decommissioning may include water, cleaning solution and any residue recovered from the cleaning of the pipeline, as well as any segments of the pipeline, valves or instruments that are removed from the pipeline but can no longer be used elsewhere. The cavern wells will be cleaned, plugged, filled and then cut and capped according to the well type, approval conditions and requirements of the day. Waste generated during cavern well closure may include water, cleaning solution and any residue recovered during well cleaning. The equipment and buildings will be removed; if the equipment and buildings cannot be used elsewhere, any recyclable components or salvageable materials (e.g., metals) will be brought to an appropriate facility. The fence will be removed and the gravel will be salvaged. The site will be re-graded and topsoil and subsoil piles will be redistributed. The reclamation process is expected to produce minimal wastes but may include a small amount of packaging and construction debris. As with wastes generated during construction and operation, materials will be hauled off-site and any materials that cannot be sold, salvaged or recycled will be disposed of at an appropriate facility and according to the regulations of the day.

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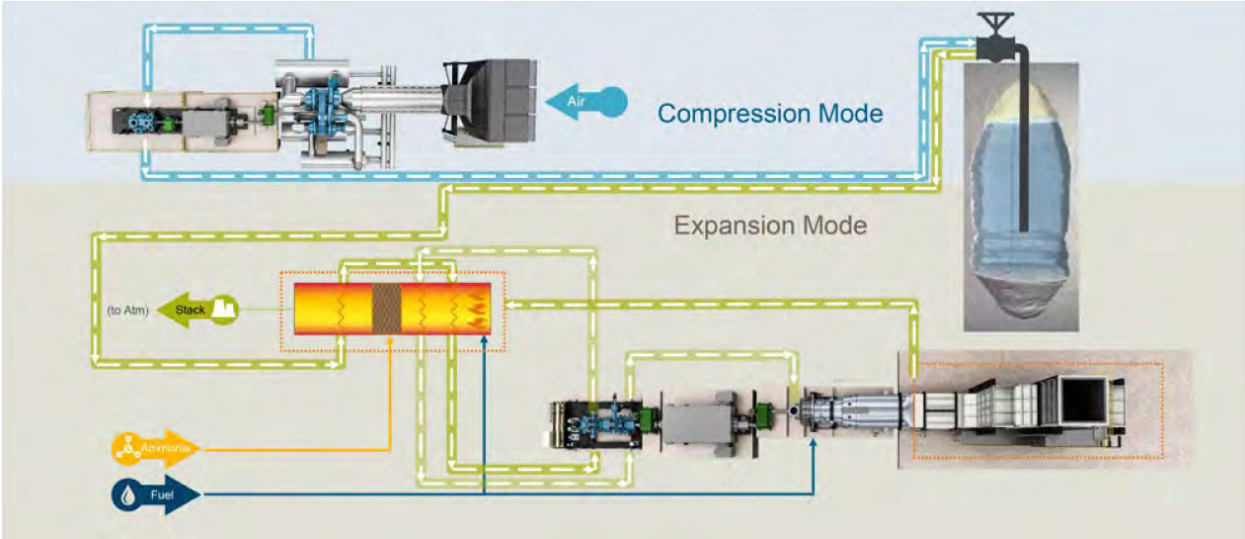
26.0 Limitations

This report has been prepared for the sole benefit of Federation Group Inc. (Federation). This document may not be used by any other person or entity, with the exception of the Impact Assessment Agency of Canada, without the express written consent of Vertex Professional Services Ltd. (Vertex) and Federation. Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

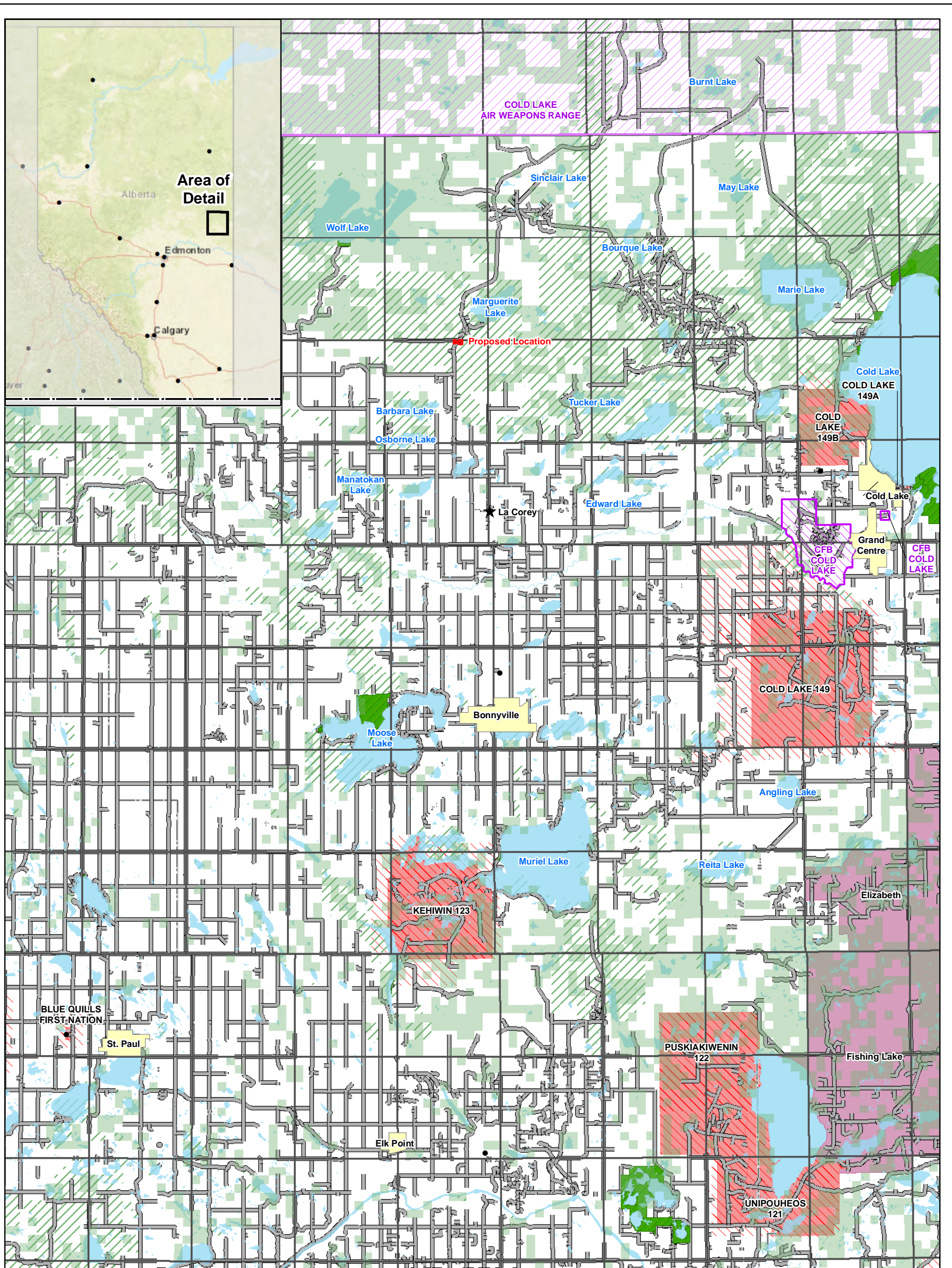
The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgement of Vertex based on the data collected during the assessment. Due to the nature of the assessment and the data available, Vertex cannot warrant against undiscovered environmental liabilities. Conclusions and recommendations presented in this report should not be considered legal advice.

FIGURES

Figure 1. Overview of the Compressed Air Energy Storage Process



Source: Siemens Energy, 2021



- Airports
- Road
- City/Town
- Proposed Location
- Township Section
- Provincial ESAs
- Provincial Boundary
- Lakes
- Parks/Protected Areas
- Provincial Boundary
- Crown Land (Provincial)
- Crown Land (Federal)
- First Nations
- Metis Settlement
- DND Military Base
- DND Training Ground



0 5 10 Km
 NAD 1983 UTM Zone 12N
 Date: Oct 20/23



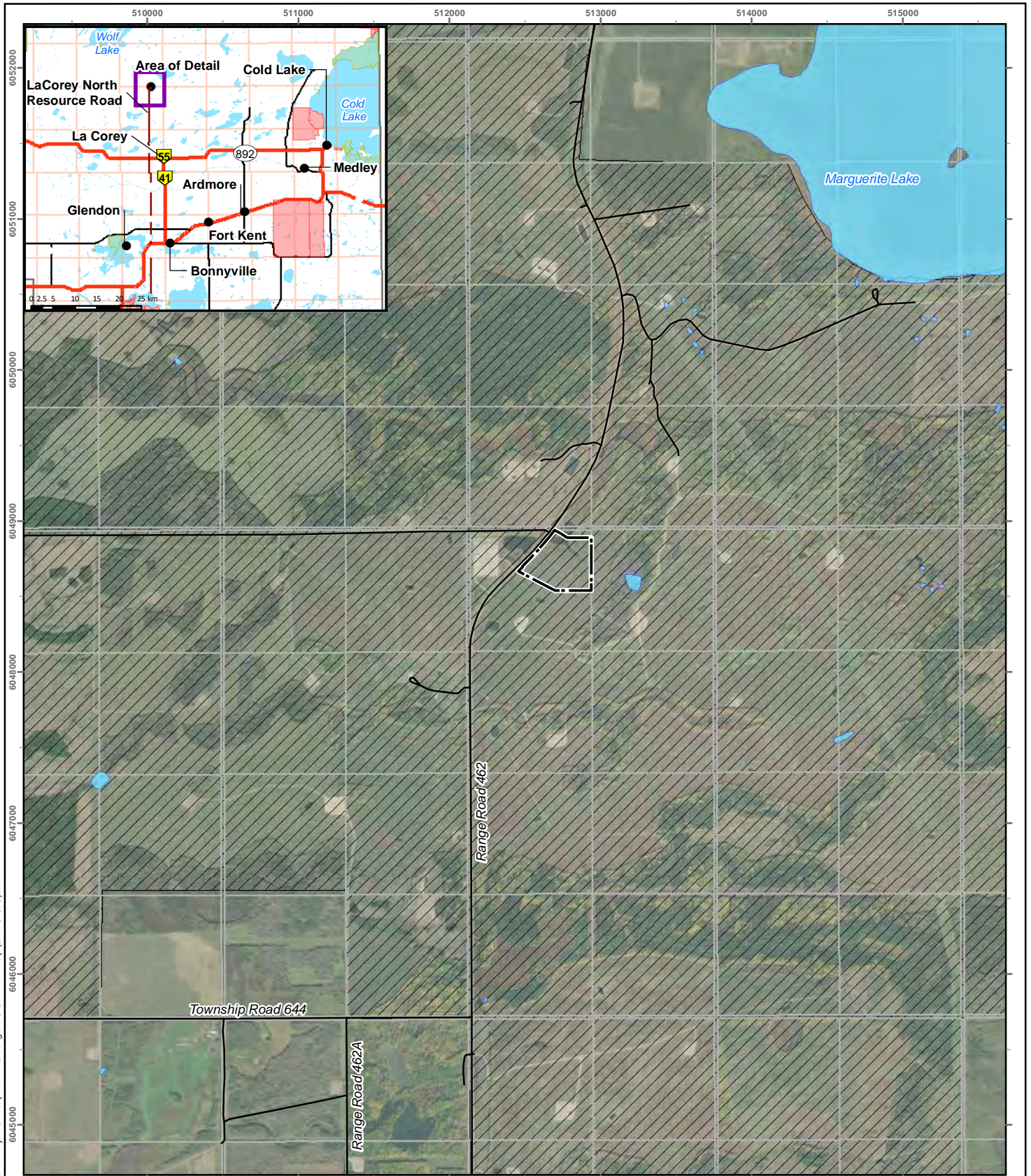
Regional Location
 Sec. 35 Twp. 64 Rge. 06 W. 4M.

FIGURE:
 2



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Note: Georeferenced image from Esri, 2017. Features from Alberta Environment and Parks, Government of Alberta, 2022-2023. Federal crown land from Esri, 2019. Provincial ESAs (2014) from ACIMS, 2022. Airports locations from University of California, 1945. Vertex Professional Services Ltd., 2023.



- Road
- Disturbance Area
- First Nation Reserve
- Parks and Protected Areas
- Quarter Section
- Waterbody
- Wolf Lake Provincial Grazing Reserve Boundary



0 200 400 800 m
 Bonnyville No. 87
 NAD 1983 UTM Zone 12N
 Date: Sep 18/23



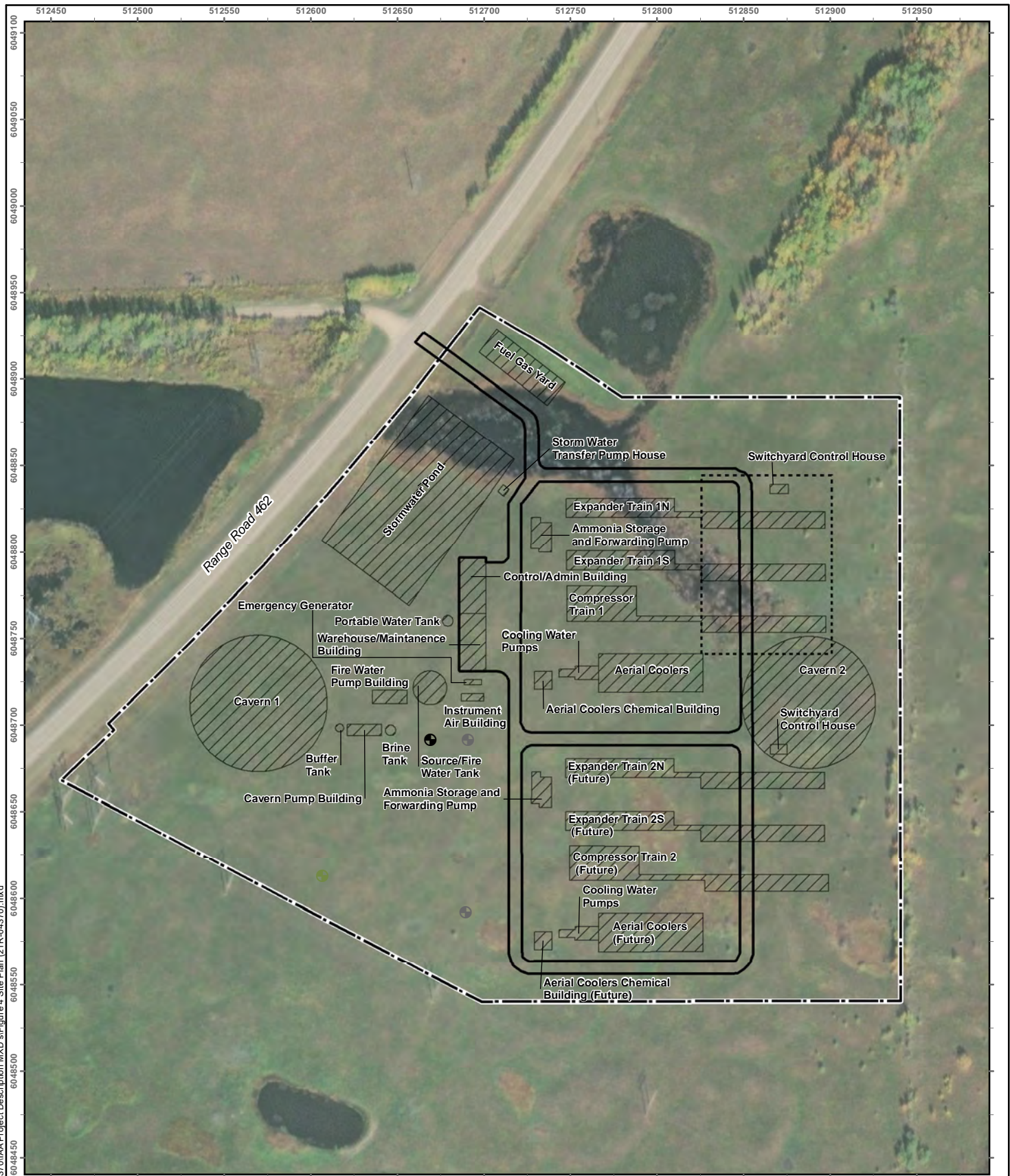
Overview Map
Sec.35 Twp.64 Rge.06 W.4M.

FIGURE:
3

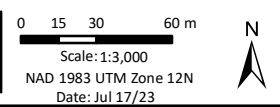


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Note: Image acquired by ESRI, 2020. Wolf Lake Grazing Reserve boundary, Government of Alberta, 2017. Base hydrography, protected parks and First Nation reserve data from Alberta Environment and Parks, Government of Alberta, 2022. Vertex Professional Services Ltd., 2023.



- Disposal Well
- Observation Well
- Source Well
- Access Road
- Disturbance Area
- Infrastructure
- Substation 1146S AESO Osborne



Site Plan
Sec.35 Twp.64 Rge.06 W.4M.

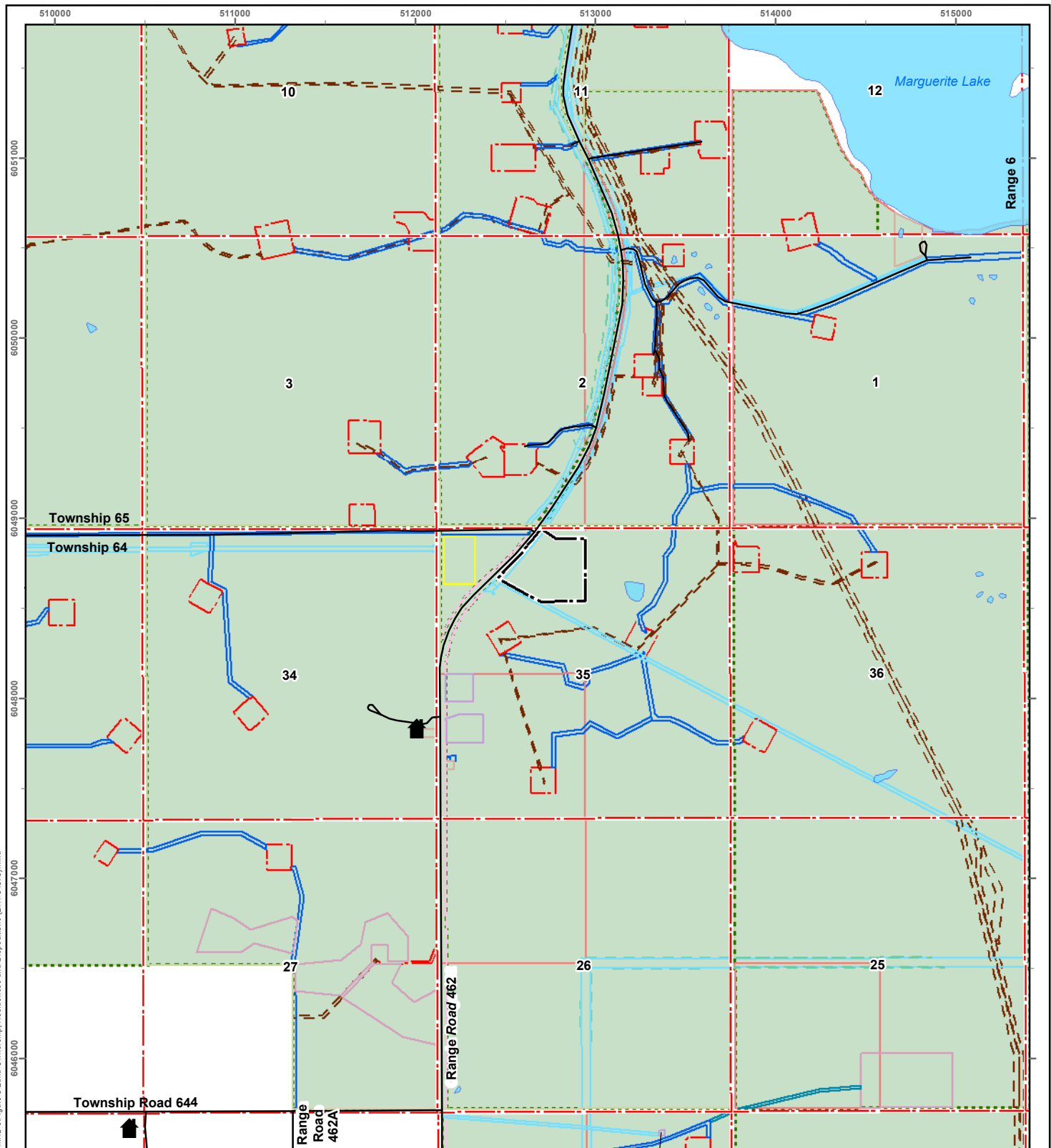
FIGURE:
4



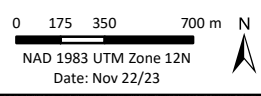
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Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Georeferenced image from Esri, 2020. Feature locations from AUC application, 2023. Vertex Professional Services Ltd., 2023.



- | | | | | | |
|------------------|----------------------------|-----------------------------|-----|-----|-----|
| Residences | Marguerite Lake Substation | Existing Disposition | DRS | MSL | SML |
| Road | Section | CNT | EZE | PIL | VCE |
| Crown Lands | Township | DLO | GRL | PLA | |
| Disturbance Area | Waterbody | DML | GRR | PNT | |
| | | DPL | LOC | RRD | |



Land Ownership, Residences and Dispositions
Sec.35 Twp.64 Rge.06 W.4M.

FIGURE:
5











Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Disposition Atlas Ltd., 2022. Base Hydrography from Alberta Environment and Parks, Government of Alberta, 2022. Crown Land file from Dept. of Sustainable Resources Development, 2005. Residences from site sketch. Site boundary from survey plan. Vertex Professional Services Ltd., 2023.

Document Path: G:\1-Projects\Federation\21R-04370\AA\Project Description MXD\sf figure 5 Land Ownership, Residences and Dispositions (21R-04370).mxd



- | | |
|---|--|
|  Current Wetland Delineation | Vegetation |
|  Disturbance Area |  Aspen Forest |
|  Disturbance Area (100m Buffer) |  Disturbed |
|  Sharp-tailed Grouse Survey Area |  Mixedwood Forest |
| |  Pasture |



0 25 50 100 m
 NAD 1983 UTM Zone 12N
 Date: Apr 27/23



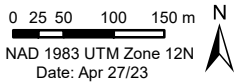
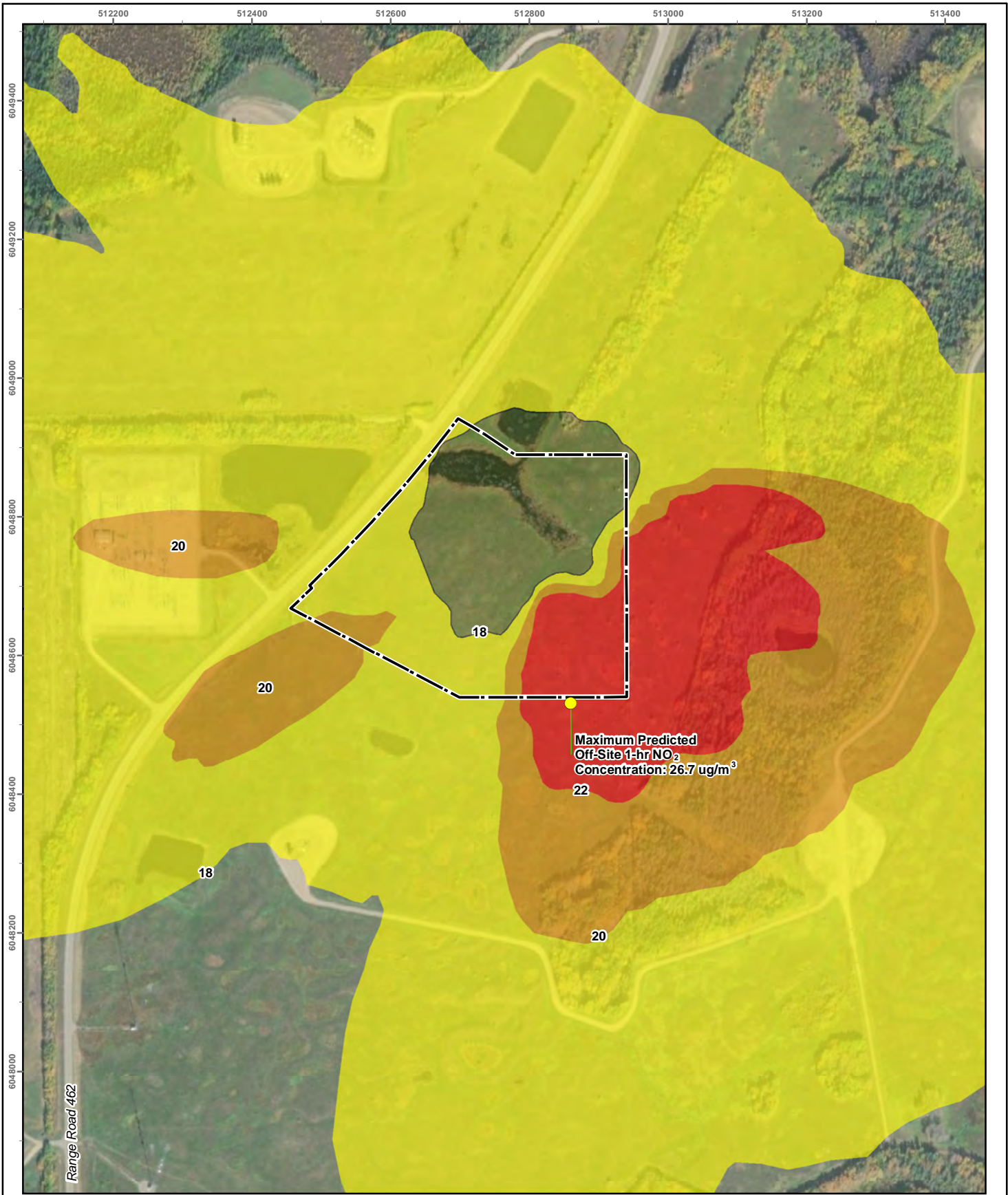
Biophysical Features
 Sec.35 Twp.64 Rge.06 W.4M.

FIGURE:
6



Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Image acquired by ESRI, 2020. Sharp-tailed Grouse Survey, Alberta Environment and Parks, Government of Alberta, 2013. Feature locations from Vertex Professional Services Ltd., 2022.



Maximum Predicted 9th Highest 1-Hour Average NO₂ Concentration Contours from Operation of the Expander Trains with SCR Based on AERMOD Model Predictions Including Background Concentrations for the Local Area Around the CAES Project

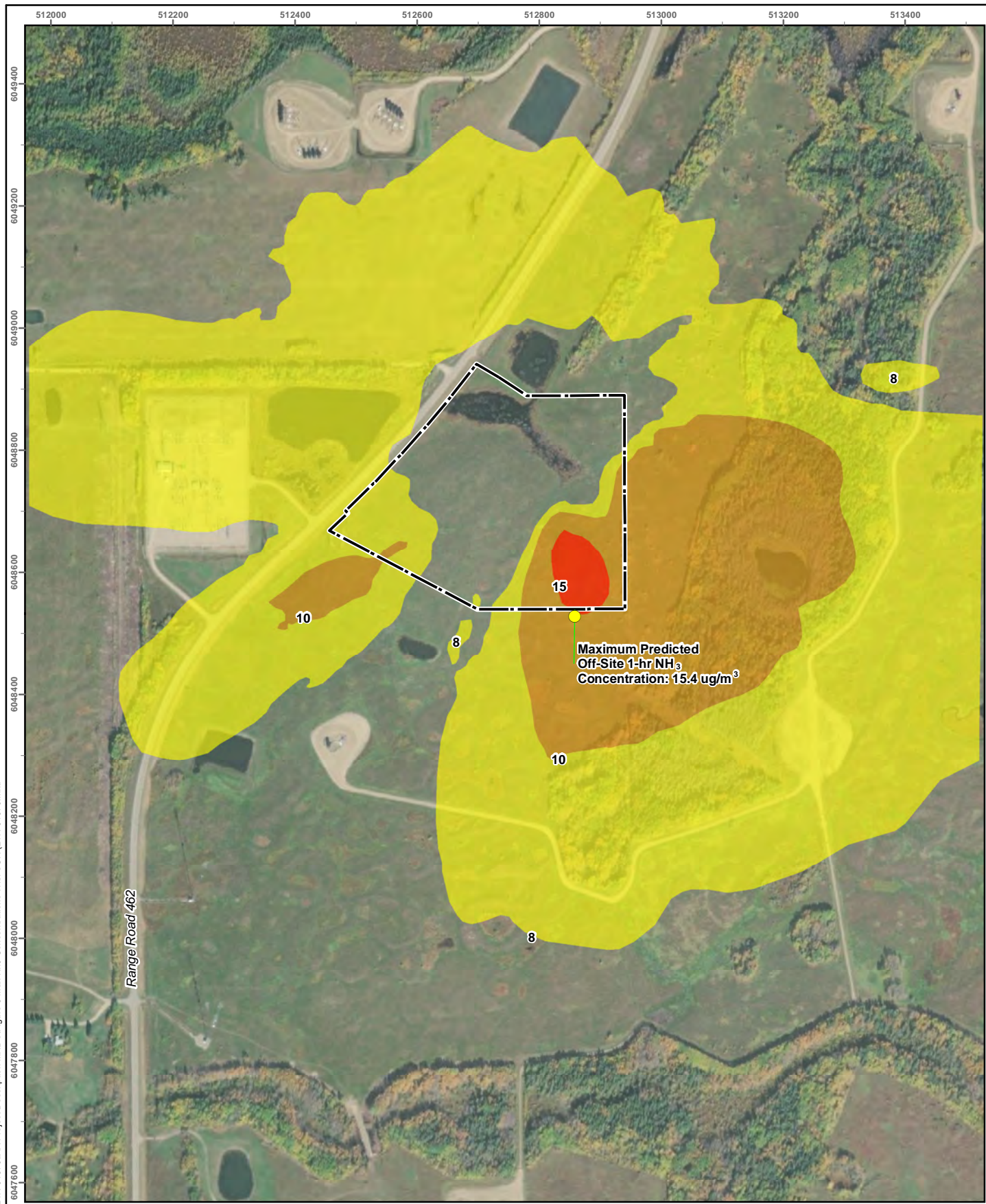
FIGURE:
7



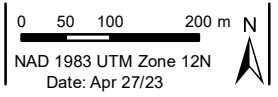
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Note: Image acquired by ESRI, 2020. Kristofer A. Sirunas (2022). Disturbance area from survey plan. Modelling assessment of the proposed Federation Engineering Compressed Air Energy Storage Project (CAES Project). Sirius Consulting Inc. Vertex Professional Services Ltd., 2023.

Document Path: G:\I-Projects\Federation\21R-0437\01AA Project Description MXD's\Figure 8 Max NH3 Concentrations With SCR (21R-04370.mxd)



Disturbance Area



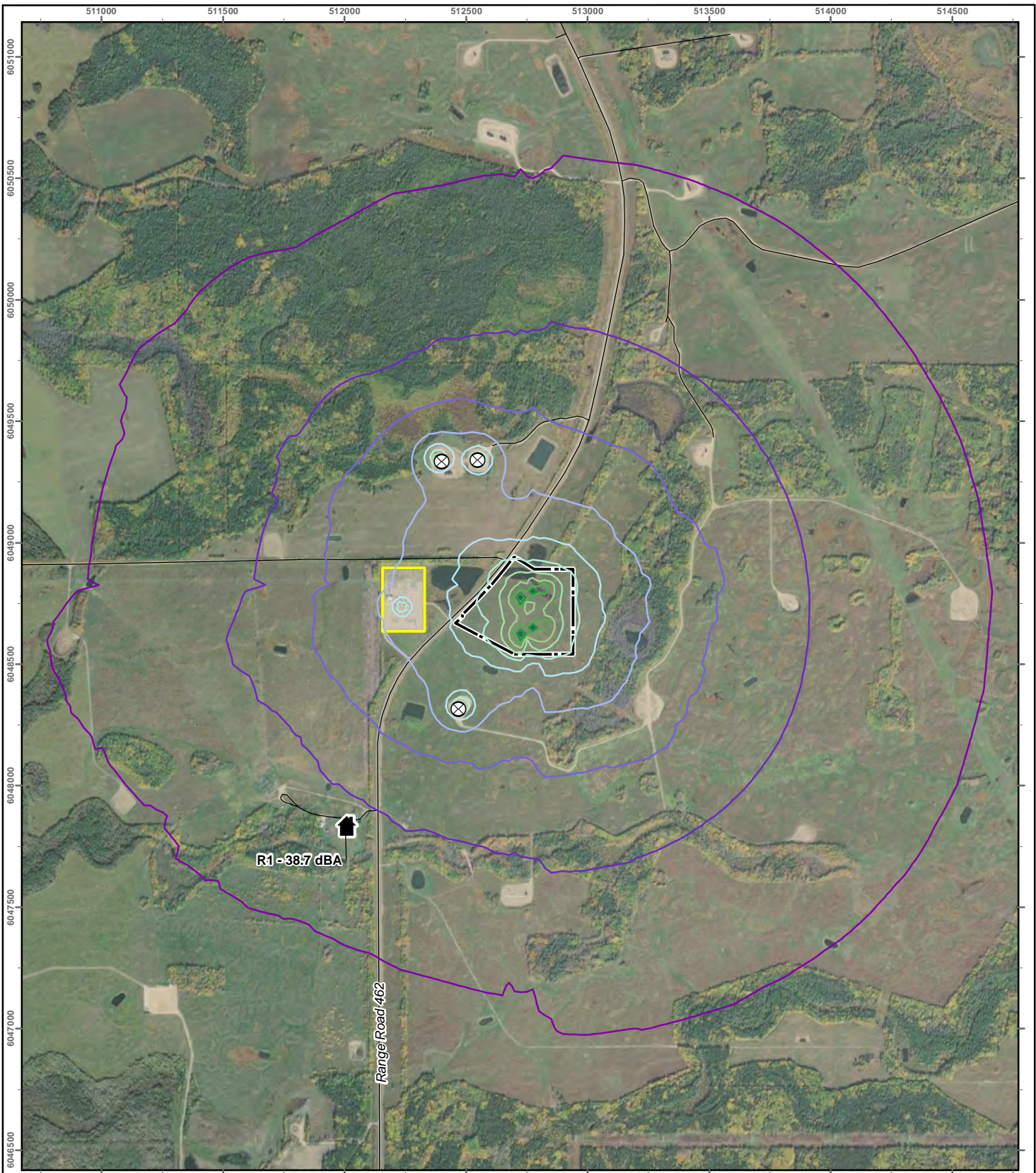
Maximum Predicted 9th Highest 1-Hour Average NH₃ Concentration Contours from Operation of the Expander Trains with SCR Based on AERMOD Model Predictions Including Background Concentrations for the Local Area Around the CAES Project

FIGURE:
8



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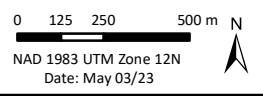
Note: Image acquired by ESRI, 2020. Kristofer A. Sirunas (2022). Disturbance area from survey plan. Modelling assessment of the proposed Federation Engineering Compressed Air Energy Storage Project (CAES Project). Sirius Consulting Inc. Vertex Professional Services Ltd., 2023.



- CNRL Well Pad
- Residences
- Disturbance Area
- ATCO Marguerite Lake Substation
- Road

Noise Propagation Contour (dBA)

035	050	065	080
040	055	070	085
045	060	075	



**Noise Propagation Contour – Application Case
Sec.35 Twp.64 Rge.06 W.4M.**

FIGURE:
9



Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes. Note: Image acquired by ESRI, 2020. Feature locations from Vertex Professional Services Ltd., 2022, Alberta Utilities Commission (AUC) Permissible Sound Level Determination Receptor R1 AUC Rule 012 Federation Group Inc. Vertex Professional Services Ltd., 2023.

APPENDICES

APPENDIX A



DISPOSITION

PROVINCE OF ALBERTA

PUBLIC LANDS ACT

R.S.A. 2000, c.P-40, as amended

DISPOSITION TYPE

Miscellaneous Lease

DISPOSITION NUMBER

DML210041

PURPOSE

Electrical

ACTIVITY

Power Station / Substation

DISPOSITION HOLDER

FEDERATION GROUP INC.

EFFECTIVE DATE

2022-08-11

EXPIRY DATE

2026-08-10

PLAN NUMBER

148028 MS

PLAN VERSION DATE

2022-08-11

ADMINISTRATIVE CONDITIONS

Definitions

- 001** All definitions in the *Public Lands Act*, RSA 2000, c P-40 and regulations apply except where expressly defined in this Disposition.

Where a definition is not provided for in the *Public Lands Act*, RSA 2000, c P-40 and regulations or this Disposition, the definition contained in the ***Alberta Public Lands Glossary of Terms*** shall apply.

In this Disposition,

"Act" means the *Public Lands Act*, RSA 2000, c P-40, as amended;

"Activity" means the construction, operation, use and reclamation associated with the purpose for which this disposition has been granted.

"Director" means the "director" duly designated under the Act;

"Disposition" means this disposition, granted pursuant to the Act, which includes this document in its entirety, including all recitals, indices and Schedules;

"Disposition Holder" means the holder of a disposition according to the records of the Regulatory Body;

"Effective Date" means the date referred to as such on the first page of this Disposition;

"Expiry Date" means the date referred to as such on the first page of this Disposition;

"Lands" means those lands as identified in the approved Plan which forms part of this Disposition;

"Personal Information" has the meaning as set out in the Freedom of Information and Protection of Privacy Act, RSA 2000, c F-25, as amended;

"Regulatory Body" means the Department of Environment and Parks or the Alberta Energy Regulator;

"Regulation" means all regulations, as amended, under the Act.

"Term" has the meaning set forth in section 5 of this Disposition.

Grant of Disposition

- 002** The Regulatory body issues this Disposition to the Disposition Holder, in accordance with the Act/ Regulation subject to the terms and conditions contained in this Disposition.
- 003** The Disposition Holder must only enter, occupy and use the Lands for the purpose* and activity as referred to as such on the first page of this Disposition.
- 004** Notwithstanding any references in this Disposition, the Act, or the Regulation, this Disposition is not intended to be, nor shall it be interpreted as or deemed to be a lease of real property at common law.

Term

- 005** The term of this Disposition means the period of time commencing on the Effective Date and ending on the Expiry Date, unless otherwise changed in accordance with this Disposition (the “Term”).

Disposition Fees and Other Financial Obligations

- 006** The Disposition Holder must pay all fees, rents, charges, security and other amounts payable in accordance with the Act and Regulations.
- 007** The Disposition Holder must be responsible for the payment of, and must pay promptly and regularly as they become due and payable, any tax, rent, rate or assessment that is duly assessed and charged against the Disposition Holder, including but not limited to property taxes and local improvement charges with respect to the municipality in which the Lands are located.

Notwithstanding that this Disposition has expired, the Disposition Holder remains liable for the amount of rent, property taxes and local improvement charges.

Notwithstanding that this Disposition has been cancelled, the Disposition Holder remains liable for the amount of the property taxes and local improvement charges, as calculated on a pro-rated basis from January 1st of the last year of the Term to the date of cancellation of the Disposition.

- 008** The Disposition Holder must be responsible for the payment of all costs to the appropriate service provider or to the Regulatory Body charges with respect to the supply and consumption of any utility services and the disposal of garbage.

Compliance

- 009** The Disposition Holder must obtain federal, provincial, municipal, and other permits and approvals, as applicable, with respect to activities that may take place on the Lands.

Condition of the Lands

- 010** The Disposition Holder accepts the Lands on an “as is” basis.

Improvements to the Lands

- 011** The Lands and buildings, structures and equipment erected thereon must be used by the Disposition Holder solely for the purposes permitted by this Disposition, the Act, and the Regulations.

Impact on Other Disposition Holders

- 012** The Disposition Holder shall be responsible for damage to improvements or to the Lands in which prior rights have been issued, including damage to traps, snares or other improvements.

- 013** The disposition holder is required to contact the registered trapper(s) identified on an Activity Standing Search Report by registered mail at least ten days prior to commencing any activity.

Province's Use of the Lands

- 014** The Province may reconstruct, expand or alter its facilities on the Lands in any manner. The Disposition Holder must, if directed by the Regulatory Body, relocate the Disposition Holder's improvements at the Disposition Holder's expense in order to facilitate reconstruction, expansion or alteration of the Province's facilities.
- 015** The Disposition Holder acknowledges that:
- a) the Regulatory Body may issue additional dispositions to any person authorizing that person to enter onto, use and occupy the Lands for various purposes including, but not limited to, the extraction and removal of merchantable resources, or to conduct development, including, but not limited to mineral resource development;
 - b) the Regulatory Body may retain revenues from such additional dispositions; and
 - c) the Disposition Holder is not entitled to any reduction in its fees, rents, charges or other amounts payable on the basis that additional dispositions relating to the Lands have been issued.

Assignment, Subletting and Encumbrances

- 016** The Disposition Holder must not:
- a) Permit any builder's liens or other liens for labour or material relating to work to remain filed against the Lands; or
 - b) Register, cause or allow to be registered, or permit to remain registered any caveat or encumbrance against the title to the Lands, without first obtaining the prior written consent of the Regulatory Body, which may be arbitrarily withheld.

Default and Termination

- 017** The Regulatory Body may cancel this Disposition immediately if:
- a) a creditor lawfully seizes any of the Disposition Holder's property on the Land;
 - b) the Disposition Holder is adjudged bankrupt or makes a general assignment for the benefit of creditors;
 - c) a receiver of any type is appointed for the Disposition Holder's affairs;
 - d) in the Regulatory Body's opinion, the Disposition Holder is insolvent;
- 018** When a Disposition has been terminated, the Regulatory Body may cancel any associated dispositions.
- 019** The Regulatory Body may, upon written notice to the Disposition Holder of not less than 60 days, cancel this Disposition or withdraw any part of the Lands from this Disposition as the Regulatory Body considers necessary to construct banks, drains, dams, ditches, canals, turnouts, weirs, spillways, roads or other structures necessary or incidental to those works.

Indemnification and Limitation of Liability

- 020** The Disposition Holder must indemnify and hold harmless the Province and/or the Regulatory Body, its employees, and agents against and from all actions, claims, demands, or costs (including legal costs on a solicitor-client basis) to the extent arising from:
- a) the Disposition Holder's breach of this Disposition, or
 - b) any actions or omissions, negligence, other tortious act, or willful misconduct of the Disposition Holder, or of those for whom the Disposition Holder is legally responsible, in relation to the exercise of the rights, powers, privileges or duties under this Disposition.
- 021** The Disposition Holder will not be entitled to any damages, costs, losses, disbursements, or compensation whatsoever from the Province or the Regulatory body, regardless of the cause or reason therefore, on account of:
- a) partial or total failure of, damage caused by, lessening of the supply of, or stoppage of utility services or any other service;
 - b) the relocation of facilities or any loss or damage resulting from flooding or water management activities;
 - c) the relocation of facilities or any loss or damage resulting from wildfire or wildfire management activities;
 - d) any damage or annoyance arising from any acts, omissions, or negligence of owners, occupants, or tenants of adjacent or contiguous property; or
 - e) the making of alterations, repairs, improvements or structural changes to the utility services, if any, anywhere on or about the Lands provided the same, must be made with reasonable expedition.

Insurance

- 022** The Disposition Holder must at all times during the Term, at its own expense and without limiting the Disposition Holder's liabilities therein, maintain the following insurance coverage in compliance with the *Insurance Act*, RSA 2000, c I-3, with carriers, on forms, and with coverage and endorsements satisfactory to the Regulatory Body in its sole discretion:
- i. General or commercial liability insurance in an amount not less than \$2,000,000 inclusive per occurrence, insuring against bodily injury, personal injury, and property damage including loss of use thereof. That includes employees and members as additional insureds, products and completed operations liability if applicable; sudden and accidental pollution coverage if applicable; and watercraft liability if applicable;
 - ii. Automobile liability insurance on all vehicles owned, operated or licensed in the name of the Disposition Holder and used on or taken onto the Lands or used in carrying out the obligations under this Disposition in an amount not less than \$2,000,000;
 - iii. "All risk" property insurance insuring the Disposition Holder's personal property on the Lands against accidental loss or damage; and
 - iv. Such additional insurance policies and coverage as the Regulatory Body reasonably requires from time to time, including, but not limited to, wildfire expense coverage in an amount not less than \$250,000

023 The Disposition Holder must on request of the Regulatory Body, provide the Regulatory Body with acceptable evidence of insurance, in the form of a detailed certificate of insurance, prior to using or occupying the Lands and at any other time upon request of the Regulatory Body. On request, the Disposition Holder must promptly provide the Regulatory Body with a certified true copy of each policy.

024 Any insurance called for under this Disposition must be endorsed to provide the Regulatory Body with at least 30 days advance written notice of cancellation or material change.

Notices

025 The Disposition Holder must maintain current contact information with the Regulatory Body.

Interpretation

026 The headings used throughout this Disposition are inserted for convenience of reference only and do not form part of the Disposition.

027 A reference to any federal or provincial law or regulation or to any municipal bylaw shall be deemed to be a reference to the law, regulation or bylaw as may be amended, revised, repealed and replaced, or substituted from time to time.

General

028 For greater certainty, the Disposition Holder must comply with the terms of the attached indices, supplements, addendums and schedules, including:

- a) Landscape Analysis Tool Report
- b) Supplements
- c) Condition Addendum (if applicable)
- d) Or otherwise identified by the regulatory body

029 Should any term of the disposition be invalid or not enforceable, it must be severed from the Disposition and the remaining terms of the disposition must remain in full force and effect.

030 The Disposition Holder must:

- a) generate and receive an Entry Confirmation Number through the Electronic Disposition System (EDS) within 72 hours of commencing the activity; and
- b) provide other notifications in relation to the status of the activity as directed in writing by the Regulatory Body.

- 031** The Disposition Holder must comply with the direction as provided within the *Pre-Application Requirements for Formal Dispositions* document as amended and in effect on the date of issuance of this Disposition.

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LAT Number:	000005BD87	LAT Date:	2021-04-26	15:40:51
Project Name:	Federation_Substation 14-35-64-6-4_Rev1 Final			
Project Description:				
Disposition Type:	DML	Miscellaneous Lease		
Purpose Type:	EDRA	Electrical		
Activity Type:	EDRA02DMLP	Power Station / Substation		

Responsibility of Applicants:

It is the applicant's responsibility to conduct a full review of the generated LAT Report, ensuring that you are aware and have a full understanding of the identified standards and conditions, and any additional limitations that may also be imposed by an approved higher level plan, reservation or notation or any other law or Order of the Province or the Government of Canada that may impact the placement, construction or operation of the proposed disposition, purpose and activity.

The applicant must assess if the proposed disposition, purpose and activity can meet the applicable standards, conditions and any limitations which will subsequently determine if the application can be submitted to the regulatory body. Applicants should complete a thorough review of regulatory and application processes including supporting procedural documents and the generated LAT Reports prior to making this determination.

Where the applicant chooses not to meet, or is not able to meet, one or more Approval Standards or higher level plans within the generated LAT Report as submitted as part of the application, or any affected reservations as identified within the land status report, the applicant is required to complete the appropriate mitigation as part of their supplement submission that addresses individually each of the items not being met.

The information provided within the LAT Tool is a spatial representation of features provided to the applicant for activity and land use planning. The accuracy of these layers varies depending on the resource value being represented. The regulatory body insists that site visits, wildlife surveys and groundtruthing efforts are completed to ensure that you, the applicant can meet the procedures detailed within the *Pre-Application Requirements for Formal Dispositions*, the identified approval standards, operating conditions and *Best Management Practices* as represented within the *Master Schedule of Standards and Conditions*.

Proximity to Watercourse/Waterbodies:

Applicants will ensure that standards or conditions for Watercourse/Waterbody features as identified within the generated LAT Report are followed. It is the responsibility of the applicant to ensure the identified setbacks and buffers are properly established through a pre-site assessment and maintained.

NOTE: Be aware that the submission of a LAT Report as part of an application submission does not imply approval of the activity. The standards and conditions identified within the LAT Report may be subject to change based on regulatory review.

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Base Features	
Green/White Area	White Area
Municipality	M.D. of Bonnyville No. 87
FMA	
FMU	LO1
Provincial Grazing Reserve	Wolf Lake
Rocky Mountain Forest Reserve	
PLUZ Areas	
Protected Areas	

Provincial Sanctuaries	
Wildlife Corridors	
Restricted Area	
Game Bird	Zone 1
Seasonal	

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Higher Level Plans	
Integrated Resource Plan (Local)	
Integrated Resource Plan (Subregional)	Cold Lake Subregional Integrated Resource Plan
Access Management Plan	
Landscape Management Plan	

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Additional Application Requirements

Wildlife Survey		DND Area	
-----------------	--	----------	--

Historical Resources

HRV Rating	Category
------------	----------

Historic Resources Application Required: No

While no specific historic resource concerns have been identified within the proposed activity area, Section 31 of the *Historical Resources Act* states that "a person who discovers a historic resource in the course of making an excavation for a purpose other than for the purpose of seeking historic resources shall forthwith notify the Minister of the discovery." Should a historic resource be encountered with the construction or operation of this disposition, information on who to contact can be found on the Ministry of Culture and Tourism's website in; Standard Requirements under the Historical Resources Act: Reporting the Discovery of Historic Resources.

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Sensitive Features

Wildlife and Other Sensitive Species

	Intersected		Intersected
Burrowing Owl Range		Mountain Goat and Sheep Areas	
Caribou Range		Disease Buffer	
Caribou Range - Zone A		Ord's Kangaroo Rat Range	
Caribou Range - Zone B		Ord's Kangaroo Rat Key Habitat Area	
Colonial Nesting Birds		Piping Plover Waterbodies	
Critical Habitat of Aquatic Species at Risk		Provincial Hibernacula Buffer	
Endangered and Threatened Plants Ranges		Sensitive Amphibian Ranges	
Greater Short-horned Lizard Habitat		Sensitive Raptor Range	
Greater Short-horned Lizard Range		Sensitive Snake Habitat	
Greater Sage Grouse Core Area		Sensitive Snake Hibernacula Range	
Greater Sage Grouse Recovery Area		Sharp-tailed Grouse Leks and Buffer	
Greater Sage Grouse Leks and Buffer		Sharp-tailed Grouse Survey	Yes
Grizzly Bear Zone		Special Access Area	
High Risk Watersheds		Swift Fox Range	
Key Wildlife and Biodiversity Areas		Trumpeter Swan Waterbodies/Watercourse	
Mountain Goat and Sheep Zone		Trumpeter Swan Watercourse Buffer	

Federal Orders:

	Intersected
Greater Sage Grouse	

Grassland and Natural Regions:

	Intersected		Intersected
Central Parkland		Mixed Grass Sub-region layer	
Central Parkland and Northern Fescue		Montane	
Chinook Grasslands		Northern Fescue	
Dry Mixed Grass		Peace River Parkland	
Foothills Fescue		Permafrost	
Foothills Parkland Grasslands		Rough Fescue PNT	
Grassland and Parkland Natural Region		Subalpine or Alpine	

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Alberta Township System (ATS) Land List

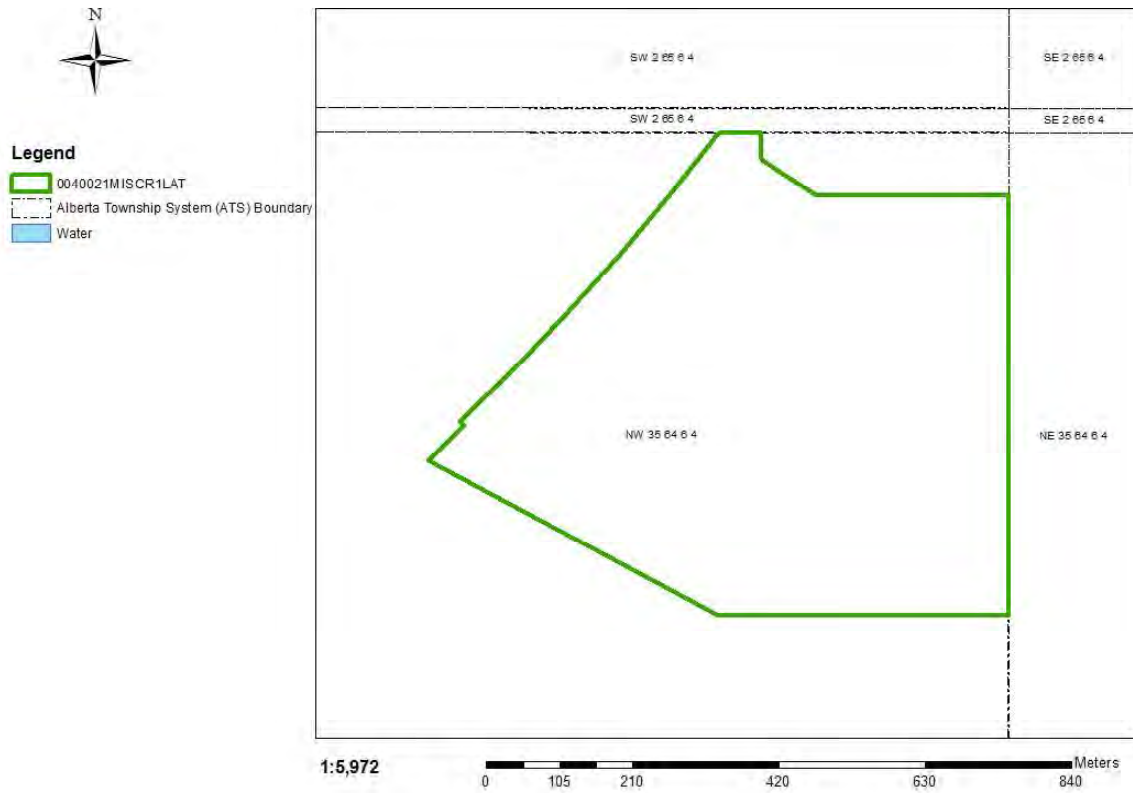
Quarter	Section	Township	Range	Meridian	Road Allow.	Sensitive Features Identified
NW	35	64	6	4		Sharp-tailed Grouse Survey, Provincial Grazing, Green / White Area

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Land Management		
Report ID	Approval	Condition
1	1030-AS	Where an Integrated Resource Plan or a Reservation/Protective Notation identifies a greater set back, the greater set back will prevail.
2	1031-AS	Where a Higher Level Plan* exists, the Disposition Holder must follow any direction provided within that plan.
3	1033-AS	With the exception of pipelines, for activities that fall within any Protective Notation (PNT) lands with a purpose code 400 Series encompassing a section of land (259 hectares) or less, located in the Provincial White Area, the Disposition Holder must construct all activities within lands previously disturbed or cleared. Where no previous disturbance exists, activities must occur within 100 metres of the PNT.
4	1041	The Disposition Holder must maintain proper drainage of surface water.
5	1044-AS	The Disposition Holder must not locate activities within 45 metres from the top of any coulees* with the exception of activities such as; access, pipelines and linear easements crossing those features.
6	1049	The Disposition Holder must remove all garbage and waste material from this site.
7	1053	The Disposition Holder must not enter the boundaries of any research or sample plot unless consent is received from the reservation holder.
8	1061	Where FireSmart activities are considered, the Disposition Holder must follow Information Letter- "Authorization of FireSmart Activities on Public Land" as amended from time to time.
Vegetation		
Report ID	Approval	Condition
9	1300	The disposition holder must manage all regulated weeds to the satisfaction of the regulatory body.
10	1302	"The Disposition Holder must remove all deciduous or coniferous merchantable timber from the Activity as per the following utilization standards; - Deciduous Timber: 15 cm Base/10 cm Top - Coniferous Timber: 15 cm Base/11cm Top and haul said timber to the location of end use."
11	1304	For fire control purposes on forested lands, the Disposition Holder must dispose of excess coarse woody debris* not utilized for rollback* or stockpiled for reclamation*.
12	1305	Within FireSmart Community Zones*, the Disposition Holder must dispose of coarse woody debris* by burning unless a Debris Management Plan has been approved under the Forest and Prairie Protection Act.

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Soil		
Report ID	Approval	Condition
13	1356	The Disposition Holder must not conduct the Activity during adverse ground conditions*.
14	1357	The Disposition Holder must prevent erosion* and sedimentation on to adjacent* Lands or Water bodies * that results from the activity.
15	1359-AS	The Disposition Holder must not remove from the Lands topsoil* or subsoil* unless approved in writing by the Regulatory Body.
16	1360	"Where activities have occurred on the Lands that do not involve minimal disturbance* construction, the Disposition Holder must salvage topsoil* for land reclamation as follows: a. Salvage all topsoil* from: i. Mineral soils ii. Shallow organic soils* iii. Reclaimed soils b. Where the depth of the topsoil* is less than 15 cm, the topsoil* and part of the subsoil* to a total depth of 15 centimetres must be salvaged, unless the upper subsoil* is considered chemically unsuitable*."
17	1363	All reclamation material* must be considered suitable as defined in the May 2001 Salt Contamination Assessment Guidelines and meet the February 2016 Alberta Tier 1 Soil and Groundwater Remediation Guidelines, as amended or replaced from time to time.
18	1365	"The Disposition Holder must store reclamation material* in accordance with all of the following: a. reclamation material* must not be placed beneath the ground surface or buried in any way; b. coarse woody debris* stored for reclamation purposes for greater than 12 months must be mixed with topsoil*; and c. topsoil* and subsoil* must be stored separately."
19	1367	The Disposition Holder must not mix wood chips with any reclamation material*.
20	1368	The Disposition Holder must not apply wood chips to the lands at a depth greater than five (5) centimeters.
21	1369	The Disposition Holder must manage wood chips in accordance with the directive ID 2009-01 Management of Wood Chips on Public Land as amended from time to time.
22	1370	The Disposition Holder must not store piles or windrows of reclamation material* within standing timber.
23	1371	The Disposition Holder must not use soil sterilant on the Lands.

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Watercourse / Waterbody		
Report ID	Approval	Condition
24	1402-AS	The Disposition Holder must not conduct the Activity within the following watercourse* setbacks from the top of the breaks: a. Intermittent watercourses* including springs must have a setback of at least 45 metres. b. Small Permanent watercourses* must have a setback of at least 45 metres. c. Large Permanent watercourses* must have a setback of at least 100 metres.
25	1412	The Disposition Holder must acquire an authorization for access (off-disposition) for water withdrawal activities.
26	1419	For use of equipment within the bed of a water body*, the Disposition Holder must prior to operations follow the "Decontamination Protocol for Work in or Near Water", as amended from time to time.
27	1420	The Disposition Holder must provide a completed Record of Decontamination form as proof of decontamination to the Regulatory Body upon request.

Reclamation		
Report ID	Approval	Condition
28	1451	For progressive reclamation* on forested lands*, the Disposition Holder must replace all reclamation materials* that have been salvaged in accordance with all of the following: a. all salvaged subsoil* must be replaced, then all salvaged topsoil*; and b. reclamation materials* must be replaced over the entire progressive reclamation area*; unless otherwise approved in writing by the Regulatory Body.
29	1453	The Disposition Holder must complete temporary reclamation* on the Lands within 1 growing season of construction phase* for all topsoil* and subsoil* stockpiles required for final reclamation*.
30	1454	The Disposition Holder must prior to seeding herbaceous seed in forested* or peatlands* submit a Request for Seeding in writing to the Regulatory Body that contains all of the following: a. rationale for conducting seeding of herbaceous species*; b. a description of the proposed site for seeding including information with respect to the following: i. whether the Lands are subject to high erosion* and; ii. whether the Lands are prone to invasion from agronomic or weed species. c. a proposed seed mix composition for re-vegetation of the Lands in accordance with the Native Plant Revegetation Guidelines for Alberta, 2001 as amended or replaced from time to time or a rationale for alternate species; d. provide a seed certificate in accordance with the Seed Act for the seed mixed mix to be used for re-vegetation* and; any other information requested by the Regulatory Body.

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31	1455	The Disposition Holder must only conduct seeding in accordance with the written authorization of the Regulatory Body.
32	1456	The Disposition Holder must when seeding cultivated lands*; a. use agronomic or forage seed that meets or exceeds Certified #1 as outlined in the Seeds Act and Seeds Regulations; b. use seed mixes that are free of species listed in the Weed Control Act and; c. provide a seed certificate to the Regulatory Body within 30 days of request.
33	1457	Within the Green Area* of the Province, the Disposition Holder must re-vegetate the Lands with trees or shrubs that meet the requirements of the December 2016 Alberta Forest Genetic Resource Management and Conservation Standards document, as amended or replaced from time to time.
34	1459	The Disposition Holder must not have slash and rollback* accumulations within five (5) metres of the perimeter of the disposition boundary, greater than the percent ground cover on the surrounding undisturbed forest floor.
35	1461	The Disposition Holder must complete progressive reclamation* on forested lands* for all associated and incidental disturbances to the Disposition.
36	1462	The following activities are excluded from progressive reclamation* requirement on forested lands*: a) Lands that have received authorization for clay pad construction; and b) Lands with a 4:1 or steeper slopes where a cut and fill has been constructed to level the ground surface.
37	1463	For final reclamation*, the Disposition Holder must complete all of the following: a. contour the disturbed land to the pre-disturbance landform or to the landform approved by the Regulatory body; b. replace all stockpiled subsoil*, then replace all stockpiled topsoil*; c. spread all coarse woody debris* on forested lands* and; d. reclamation materials* must be replaced over the entire area from which they were removed unless otherwise approved in writing by the Regulatory Body.
38	1464	The Disposition Holder must reclaim the Lands to the pre-disturbance land use type* unless otherwise authorized in writing by the Regulatory Body.

Integrated Use on Agriculture and Grazing Lands

Report ID	Approval	Condition
39	1501-AS	The Disposition Holder must not conduct activities in fields while being grazed or in fields scheduled for grazing in the current grazing season, unless the local Range Agrologist has verified that the activity timing will not interfere with livestock operations.
40	1502-AS	Within the Grassland Natural Subregion, the Disposition Holder must locate activities within existing disturbances*.
41	1503-AS	Except within the Grassland Natural Subregion, the Disposition Holder must not locate activities on tame pasture areas.

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42	1504-AS	Within the Kleskun Lake Provincial Grazing Reserve, the Disposition Holder must construct wellsite pads to a minimum elevation of 657.5 metres above sea level and maintain a solid perimeter clay berm* at a minimum elevation of 658.3 metres.
43	1505	If the location of an activity prevents livestock access to identified watering locations or facilities, the Disposition Holder must provide permanent or temporary alternate water source(s) that are reliable and clean.
44	1506	The Disposition Holder must install and maintain fences surrounding all permanent facilities in grazing pastures to prevent livestock access unless otherwise approved by the local Rangeland Agrologist or issuing Regulatory Body.
45	1507	The Disposition Holder must repair or rebuild damage to existing pasture fences to the asset specification standards of the PGR Fence Specifications as amended.
46	1511-AS	All livestock must remain confined within the pasture as found. Where access roads intersect with existing fences, the Disposition Holder must install a Texas gate to a minimum width of 2.25 metres and installed over a pit that is a minimum of 76 centimetres deep and maintained and free of dirt, with a steel swing gate overtop and a separate wire gate must be installed adjacent to the Texas gate to allow access for livestock movement between pastures, unless otherwise approved by the local Rangeland Agrologist. Any installed texas gate pits must be maintained free of dirt to a minimum of 76cm deep.

Wildlife

Report ID	Approval	Condition
47	1600	The Disposition Holder must conduct a complete and immediate Wildlife Sweep* of the Lands subject to the disposition prior to any activity, as per the "Wildlife Sweep Protocol".
48	1601	The Disposition Holder must submit observations from a Wildlife Sweep* to the Fisheries and Wildlife Management Information System (FWMIS) and notify the issuing Regulatory Body in writing upon request that the Wildlife Sweep* was completed.
49	1602-AS	The Disposition Holder must incorporate a buffer* zone of a minimum width of 100m undisturbed vegetation, where an established buffer* does not already exist for any and all key habitat features including, but not limited to leks*, nests, dens and houses identified in the Wildlife Sweep*.
50	1603	When Wildlife Surveys* are required, the Disposition Holder must submit results as defined by the sensitive species inventory guidelines from Wildlife Survey* to the Fisheries and Wildlife Management Information System (FWMIS).
51	1608	The Disposition Holder must incorporate buffers*, setbacks and activity timing restrictions for any and all key habitat features including, but not limited to leks*, nests, dens and houses identified in the wildlife survey*.

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52	1611-AS	<p>The Disposition Holder must conduct appropriate pre-construction wildlife* surveys as per the direction of the Sensitive Species Inventory Guidelines as amended from time to time where you intersect any of the following sensitive species;</p> <ul style="list-style-type: none"> - Sensitive Raptor Range - Burrowing Owl Range - Sensitive Snake Hibernacula Range - Sharp-tailed Grouse Survey - Swift Fox Range - Ords Kangaroo Rat Range - Piping Plover Waterbodies - Endangered and Threatened Plant Ranges - Grassland and Parkland Natural Regions (Grassland Bird Surveys)
Sharp-Tailed Grouse Survey / Leks and Buffers		
Report ID	Approval	Condition
53	1740-AS	The Disposition Holder must not conduct any activities* within 500 metres of the perimeter of any known or identified active sharp-tailed grouse lek* sites.
54	1742-AS	The Disposition Holder must install and use perch-preventing technology in accordance with the Avian Power Line Interaction Committee (APLIC) (http://aplic.org) on all above ground structures that are greater than 1 metre in height and within 1000 metres of a sharp-tailed grouse lek*.

LAND DESCRIPTION

PURPOSE: Electrical

ACTIVITY: Power Station / Substation

PLAN NUMBER: 148028 MS

PLAN VERSION DATE: 2022-08-11

AFFECTED LANDS:

Qtr/LS	Sec	Twp	Rge	Mer	Qtr/LS	Sec	Twp	Rge	Mer
NW	35	64	6	4					

Application Supplement - Miscellaneous

Submitted Date:	2021-06-10 14:01:59	Application Supplement Number:	AS2021000381
Disposition Type:	DML	Purpose Assigned Code:	EDRA02DMLP
Purpose/Activity Type:	Electrical - Power Station / Substation		
Project Name:	Federation - Marguerite Lake Compressed Air Energy Storage (CAES) NW 35-64-6 W4M (21L-00538)		

A. Project/Construction Description

- Does the proposed activity generate any waste as defined in the Alberta User Guide for Waste Managers?

If Yes, describe the waste disposal method
- Does the proposed activity generate any sewage?

If Yes, indicate the amount of waste in M3:

If Yes, describe the disposal Method
- Identify all aspects of vegetation removal/management:
 - Is merchantable timber present?
 - Describe your method of site clearing:

No merchantable timber or brush disposal required. Site located in tame pasture lands.
 - Brush disposal: (select all that apply)

Rollback
 Mulch
 Spread
 Pile & Burn
 N/A
 Other:
- Topsoil Handling:
 - Method:

Describe soil storage and potential debris storage for site clearing:

Site located in cleared Provincial Grazing Lease (Wolf Lake) - no debris storage required. Soils will be salvaged and stored in windrows along site boundary's. Top soil and sub soils will be stored separately. Piles will be seeded to mitigate erosion potential. Portion of salvaged soils will be re-spread within site after construction for areas not required for ongoing operations.
- Site Profile (Upland/Wetland area): Define in hectares the amount of Upland and Wetland area that is present within the proposed disposition area prior to construction:

Upland area: (ha)
 Wetland area: (ha)

B. Land Standing Review

1. Based on the Detailed Lands Standing search of the affected lands, were any reservations/notations identified?

Yes

Reservation Number		Purpose Code	Restriction Code	Contact Required with Reservation/ Notation Holder	Date of Contact	Response Recieved from Reservation/ Notation Holder	Were Concerns Noted	Were Concerns Accommodated by the Applicant prior to application	Application Options
Type	Number								
PNT	040371	0100	5	Yes	2021-02-26	Yes	Yes	Yes	Routine or Non-Routine

2. Based on the LAT Report and the Detailed Land Standing search of the affected lands, were any government approved higher level plans identified?

Yes

If **Yes**, identify the government approved higher level plan within the table below, identify the direction as identified within Table 5 of the Pre-Application Requirements for Formal Dispositions and when contact was made, if required.

Higher Level Plan Name	
Cold Lake Subregional Integrated Resource Plan - La Corey / Moose Hills RMA	
Table 5 Direction	Date of Contact (if required)
Proponent must follow plan guidance	

Higher Level Plan Name	
Table 5 Direction	Date of Contact (if required)

Note: Approving staff may request the notification or referral response documents at any time to support land use decisions or compliance and assurance purposes.

3. Based on the LAT Report, is an approval under the Historical Resources Act Required?

No

Historical Resources Application Number:

Date Application was Submitted:

C. Site Sensitivity

1. Was a Wildlife Survey required for this activity based on the LAT Report?

Yes

If Yes, complete the next question.

2. Did the Wildlife Survey identify any of the sensitive species listed below?

No

If Yes, select all that apply:

Sensitive Raptor Nest

Sharp Tailed Grouse Lek

Burrowing Owl Den/Nest

Active Swift Fox Den

Sensitive Snake Rookery

Ord's Kangaroo Rat Den

Sensitive Snake Hibernacula

Eastern Short-Horned Lizard Coulee or Valley Edge

Endangered/threatened plant species:

D. Incidental Activities

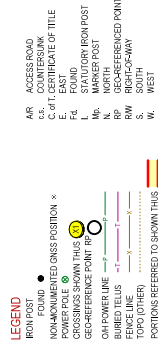
The details of all incidental activities identified on your application plan must be provided in the following table. All fields must be filled out properly in order to be processed by the regulating body.

NOTE: Incidental activities shown on the authorized plan that comply with the PLAR Approval and Authorizations Procedures shall be permitted during the term of a Short Term Disposition. This approval is limited to: borrow pits, log decks, temporary work spaces, push outs and bank stabilization, within identified sizing limits.

The disposition holder must obtain a separate TFA before commencing any incidental activities or temporary uses which are not shown on the authorized plan or those that do not comply with the *PLAR Approval and Authorizations Procedures*.

CROSSINGS	XING	OWNER	DESCRIPTION	LOCATION	XING DWG. REF. #
	Ⓞ	ATCO	Variable Width Power Line RW Plan 642 249 EZE 84084	N.W.35-64-4	

NOTES
 DISTANCES ARE IN METRES AND DECIMALS THEREOF.
 BEARINGS AND COORDINATES ARE GRID UTM MAGNETIC EPOCH 2002 ZONE 12,
 DERIVED FROM GNS3 OBSERVATIONS AND PROCESSED THROUGH PPP,
 COMPUTED AS OF 08/09/21, 5:17:10.04E,
 COMBINED SCALE FACTOR IS 0.9999999999999999,
 TO THE BEST OF OUR KNOWLEDGE.
 NEAREST KNOWN RESIDENCE IS 4094th S.W. (RESIDENCE S.E.4444-44-54)
 NEAREST URBAN CENTRE IS 4328th S.E. (HAMLET OF FORT KENT)
 LAND SEARCH CURRENT AS OF 1/26/21
 THIS PLAN DOES NOT INCLUDE THE DMG-RESOURCES APPLICATION.



CROWN AREA USAGE

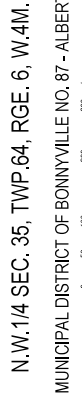
DISPOSITION	WITHIN SUBSISTENCE	OUTSIDE EXISTING	TOTAL	EXISTING OUT	NEW OUT
TYPE	Ac.	Ac.	Ac.	Ac.	Ac.
SUBSTATION	0.77	1.9	12.88	31.3	13.45
					0.000

FINAL REVISION SUMMARY

- REMOVED SUBSTATION SIZE
- REMOVED AS PER AEP REVISIONS. REMOVED PORTION OF PROPOSED SITE
- REMOVED SUBSTATION SIZE AND REMOVED ACCESS ROAD
- ORIGINAL ISSUE

FEDERATION GROUP INC.

SKETCH PLAN SHOWING
ELECTRICAL - POWER STATION/SUBSTATION
 WITHIN
 N.W.1/4 SEC. 35, TWP.64, RGE. 6, W.4M.
 MUNICIPAL DISTRICT OF BONNYVILLE NO. 87 - ALBERTA

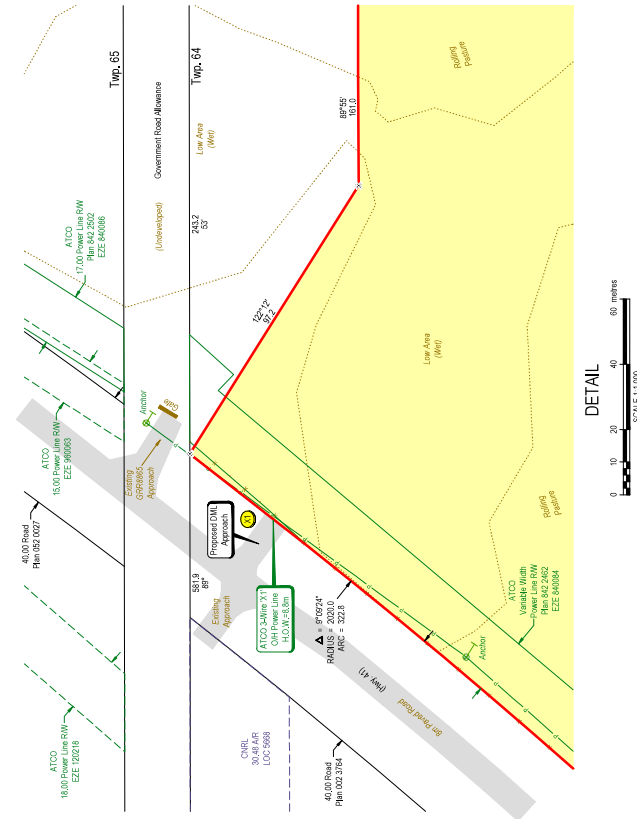
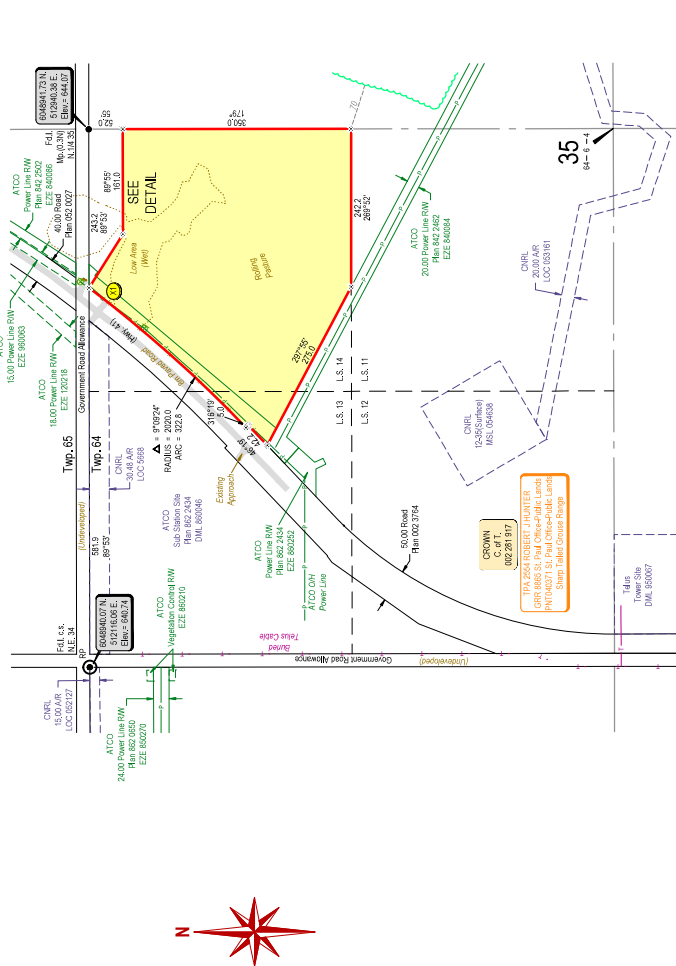


DML 210041

DISCLAIMER
 THIS PLAN REPRESENTS THE BEST INFORMATION AVAILABLE AT THE TIME OF SURVEY. COMPASS GEOMATICS LTD. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR THE LOCATION OF ANY UNDERGROUND PIPES, CONDUITS, OR FACILITIES. AN ADDITIONAL SEARCH FOR SPECIFIC BURIED FACILITIES USING ALL RESOURCES MUST BE PERFORMED PRIOR TO CONSTRUCTION. ALBERTA FIRST CALL 1-800-242-3447

COMPASS
 Geomatics Ltd.
 1-4608 10th Street
 Red Deer, Alberta T4E 0T3
 Office (403) 956-0111 Fax (403) 956-0114
 www.compassgeomatics.ca

CLIENT FILE NO. 21L-00338
 A/E NO. 1011



Signature Page

Pursuant to the *Public Lands Act*, RSA 2000, c P-40, this disposition is issued on the date noted above subject to the attached terms and conditions.

UserName: darrell.kentner

Title: NE Lands Manager

Date: Thursday, 11 August 2022, 01:09 PM Mountain Daylight Time

Meaning:

=====

APPENDIX B



Public Disclosure and Consultation Report
Federation Group Inc.
Marguerite Lake Compressed Air Energy Storage

Project: Compressed Air Energy Storage

Project Type: NOTIFICATION / CONSULTATION

Project: 21R-04370

Land Interest	Parcels	Stakeholder Details	Dates	Communication Logs
NOTIFICATION Crown disposition holder CNT020008	NW-26-064-06-W4M	Environment and Protected Areas – St. Paul 5025 - 49 Avenue Box 417 St Paul, Alberta Canada TOA 3A4 Phone: (780) 645-6336	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders CNT030012, DRS900126	SW-35-064-06-W4M	Alberta Environment and Parks – Red Deer 304, 4920 - 51 Street Red Deer, Alberta Canada T4N 6K8 Phone: (403) 340-5451 Fax: (403) 340-7081	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holder CNT130042	SE-01-065-06-W4M SW-01-065-06-W4M NW-01-065-06-W4M NE-01-065-06-W4M	Alberta Environment and Parks - Lac La Biche Office 2nd Floor, 9503 Beaverhill Rd. Lac La Biche, Alberta Canada TOA 2C0 Phone: (780) 623-5279 Contact: Jamie Laird Lands Team Lead NE Email: jamie.laird@gov.ab.ca Work: (780) 623-5396	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holder DRS860201	NE-01-065-06-W4M	Alberta Environment and Parks - Bonnyville 209, 4902 - 50th Avenue Box 6009 Bonnyville, Alberta Canada T9N 2G7 Phone: (780) 826-4297 Fax: (780) 826-6068 Contact: Luc Boullanne Lands Officer Email: luc.boullanne@gov.ab.ca Work: (780) 645-6237	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders DRS940069, GRR8865 (all lands), PNT040371	SE-34-064-06-W4M NE-35-064-06-W4M	Environment and Protected Areas – St. Paul 5025 - 49 Avenue Box 417 St Paul, Alberta Canada TOA 3A4 Phone: (780) 645-6336	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2023-02-14 - Phone - Jason Hancheruk contacted Tanya Silzer to discuss potential non-saline water source testing timeline and potential pump off options on GRR lands. 2023-01-23 - Jason Hancheruk contacted Tanya Silzer (Senior Agrologist Team Lead) to discuss Wolf Lake Grazing Reserve headquarters (residence) located in LSD 8-34-64-06 W4M. Discussed typical length to occupancy to residence to be 6 months during spring / summer / fall. 2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders CRB190060, SML180043	NW-26-064-06-W4M	1753368 Alberta Ltd. PO Box 7291, Alberta Canada T9N 2H6	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders CRB15044, SML140046	NE-27-064-06-W4M	Tim Kalinski 606 Beach Avenue Cold Lake, Alberta Canada T9M 1G5 Phone: (780) 639-3085	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders TPA2554	064-06-W4M	Robert Hunter Box 6724 Bonnyville, Alberta Canada T9N 2H2	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders TPA 2118	SE-01-065-06-W4M SW-01-065-06-W4M NE-01-065-06-W4M NW-01-065-06-W4M SE-02-065-06-W4M NW-02-065-06-W4M NE-02-065-06-W4M SW-02-065-06-W4M SE-03-065-06-W4M SW-03-065-06-W4M NE-03-065-06-W4M NW-03-065-06-W4M NW-11-065-06-W4M SW-11-065-06-W4M NE-11-065-06-W4M SE-11-065-06-W4M NW-12-065-06-W4M NE-12-065-06-W4M SE-12-065-06-W4M SW-12-065-06-W4M	Ivan Cardinal Box 5127 Bonnyville, Alberta Canada T9N 2J1 Phone: (780) 815-7926	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holder WRO920001	SW-12-065-06-W4M NE-12-065-06-W4M SE-12-065-06-W4M NW-12-065-06-W4M	Brent Stasuik 812 - 12th Avenue S Cold Lake, Alberta Canada T9M 1H6 Phone: (780) 639-2137	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders	SE-25-064-06-W4M SW-25-064-06-W4M	ATCO Electric Ltd. 10035 - 105 Street NW	Notified: 2022-11-18 Consent: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA EMAIL.



**Public Disclosure and Consultation Report
Federation Group Inc.
Marguerite Lake Compressed Air Energy Storage**

Project: Compressed Air Energy Storage

Project Type: NOTIFICATION / CONSULTATION

Project: 21R-04370

Land Interest	Parcels	Stakeholder Details	Dates	Communication Logs
14 Dispositions	NE-25-064-06-W4M NW-25-064-06-W4M NE-26-064-06-W4M SW-26-064-06-W4M NW-26-064-06-W4M SE-26-064-06-W4M NE-33-064-06-W4M NW-33-064-06-W4M SE-33-064-06-W4M SW-33-064-06-W4M SE-34-064-06-W4M NE-34-064-06-W4M NW-34-064-06-W4M SW-34-064-06-W4M NE-35-064-06-W4M NW-35-064-06-W4M SW-35-064-06-W4M SE-35-064-06-W4M NW-36-064-06-W4M SE-36-064-06-W4M SW-36-064-06-W5M NE-36-064-06-W4M SE-01-065-06-W4M SW-01-065-06-W4M NE-01-065-06-W4M NW-01-065-06-W4M SW-02-065-06-W4M SE-02-065-06-W4M NW-02-065-06-W4M NE-02-065-06-W4M NW-11-065-06-W4M SW-11-065-06-W4M NE-11-065-06-W4M SE-11-065-06-W4M	PO Box 2426 Stn Main Edmonton, Alberta Canada 5J 2V6 Phone: (780) 420-3468 Email: crossingrequests@atcoelectric.com Contact: Land Department Email: crossingrequests@atcoelectric.com	Expiry: N/A	
NOTIFICATION Crown disposition holders RRD0023764, RRD0520027	SE-25-064-06-W4M SW-25-064-06-W4M NE-25-064-06-W4M NW-25-064-06-W4M NE-26-064-06-W4M SW-26-064-06-W4M SE-26-064-06-W4M NW-26-064-06-W4M SE-27-064-06-W4M NE-27-064-06-W4M SW-27-064-06-W4M NW-27-064-06-W4M SE-34-064-06-W4M NE-34-064-06-W4M NW-34-064-06-W4M SW-34-064-06-W4M NE-35-064-06-W4M NW-35-064-06-W4M SW-35-064-06-W4M SE-35-064-06-W4M NW-36-064-06-W4M SE-36-064-06-W4M SW-36-064-06-W4M NE-36-064-06-W4M SE-01-065-06-W4M SW-01-065-06-W4M NE-01-065-06-W4M NW-01-065-06-W4M SW-02-065-06-W4M SE-02-065-06-W4M NW-02-065-06-W4M NE-02-065-06-W4M NW-11-065-06-W4M SW-11-065-06-W4M SE-11-065-06-W4M	Municipal District of Bonnyville No. 87 4905 50 Avenue Bag 1010 Bonnyville, Alberta Canada T9N 2J7 Phone: (780) 826-3171 Fax: (780) 826-4524	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA EMAIL.
NOTIFICATION Crown disposition holders PLA100689, PLA100691, PLA840514, PLA860289, PLA 100689, PLA 100691, PLA 840514, PLA 860289	NW-36-064-06-W4M SE-36-064-06-W4M SW-36-064-06-W4M NE-36-064-06-W4M SE-01-065-06-W4M SW-01-065-06-W4M NE-01-065-06-W4M NW-01-065-06-W4M SW-02-065-06-W4M SE-02-065-06-W4M NW-02-065-06-W4M NE-02-065-06-W4M NW-11-065-06-W4M SW-11-065-06-W4M SE-11-065-06-W4M	Cold Lake Pipeline Ltd 2600, 237 - 4th Avenue SW Calgary, Alberta Canada T2P 4K3 Email: land@interpipeline.com	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA EMAIL.
NOTIFICATION Crown disposition holders DML950067, EZE160001	NW-35-064-06-W4M SW-35-064-06-W4M SE-34-064-06-W4M NE-34-064-06-W4M NE-27-064-06-W4M	Telus Communications Inc. 3030 2nd Ave SE Calgary, Alberta Canada T2A 5N7 Email: crossings@telus.com	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA EMAIL.
NOTIFICATION Crown disposition holder DML020070	SW-35-064-06-W4M	Rogers Communications inc. c/o Rogers Real Estate Services One Mount Pleasant Road Floor 2 Toronto, Ontario Canada M4Y 2Y5	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA EMAIL.
NOTIFICATION Crown disposition holders Water Well (#216921), Water Well (#298968), Water Well (#216827)	SW-03-065-06-W4M SE-34-064-06-W4M NW-36-064-06-W4M	Wolf Lake Grazing Association P.G.R. Box 6545 Bonnyville, Alberta Canada T9N 2H1 Phone: (780) 201-5561	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL



Public Disclosure and Consultation Report
Federation Group Inc.
Marguerite Lake Compressed Air Energy Storage

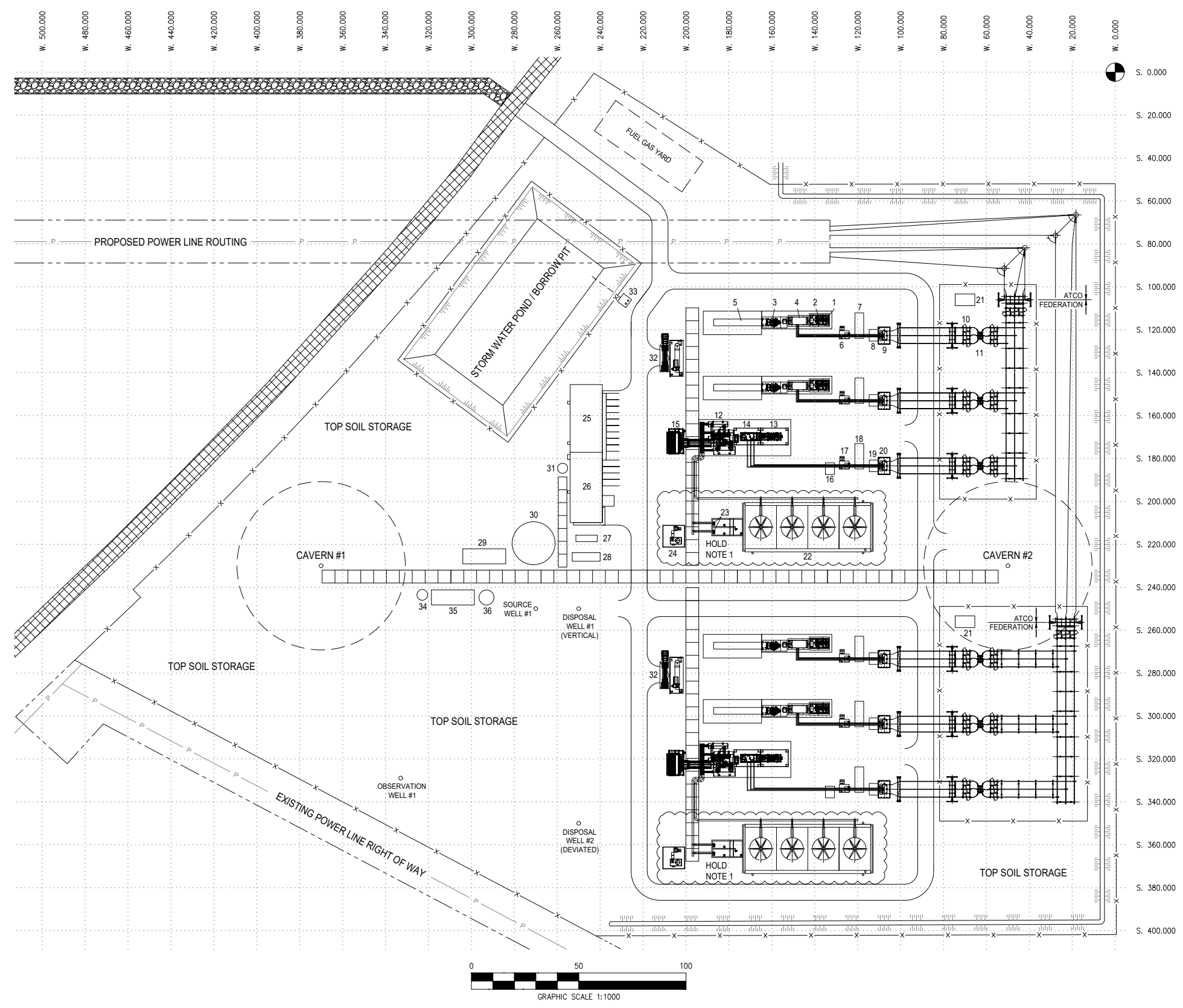
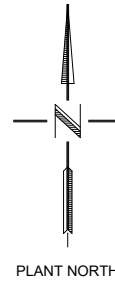
Project: Compressed Air Energy Storage

Project Type: NOTIFICATION / CONSULTATION

Project: 21R-04370

Land Interest	Parcels	Stakeholder Details	Dates	Communication Logs
NOTIFICATION Crown disposition holder Water Well (#160988)	NE-34-064-06-W4M	Keith E. Foster General Delivery La Corey, Alberta Canada T0H 2E0	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-12-15 - registered mail returned unclaimed
NOTIFICATION Crown disposition holder Water Well (#216816)	SE-34-064-06-W4M	Garring Construction Ltd. #3 9817 - 44 Avenue NW Edmonton, Alberta Canada T6E 5E3	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-12-09 - registered mail returned as unclaimed 2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders Water Well (#216825) 2349E, Water Well (#216822) 2348E OBS, Water Well (#216817 2 of 2)	SW-35-064-06-W4M	Alberta Environment and Parks - Edmonton South Tower, 2nd Floor, 9915 - 108th Street Edmonton, Alberta Canada T5K 2G8 Phone: (780) 427-3570 Fax: (780) 422-3120	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - NOTIFICATION, MAP AND PROJECT INFORMATION SENT VIA REGISTERED MAIL
NOTIFICATION Crown disposition holders 79 Dispositions	NE-35-064-06-W4M NW-35-064-06-W4M SW-35-064-06-W4M SE-35-064-06-W4M NW-36-064-06-W4M SE-36-064-06-W4M SW-36-064-06-W4M NE-36-064-06-W4M SE-01-065-06-W4M SW-01-065-06-W4M NE-01-065-06-W4M NW-01-065-06-W4M NE-03-065-06-W4M SE-03-065-06-W4M SW-03-065-06-W4M NW-03-065-06-W4M SW-11-065-06-W4M SE-11-065-06-W4M SW-02-065-06-W4M SE-02-065-06-W4M NW-02-065-06-W4M NE-02-065-06-W4M NE-27-064-06-W4M NW-27-064-06-W4M NE-34-064-06-W4M NW-34-064-06-W4M SW-34-064-06-W4M NE-33-064-06-W4M NE-01-065-06-W4M NW-01-065-06-W4M	Canadian Natural Resources Limited 2100, 855 - 2 Street SW Calgary, Alberta Canada T2P 4J8 Phone: (403) 517-6700 Fax: (403) 517-7350	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-28 - Phone - Jason Hancheruk had phone conversation with Michelle regarding potential use of CNRL produced water. Topic will be revisited if and when produced water is required for project 2022-11-28 - Jason Hancheruk contacted Michelle and LVM. 2022-11-24 - CNRL joint venture representative Michelle Thoen reached out inquiring to see if Federation would be interested in using produced water during salt cavern mining operations via email.
NOTIFICATION Crown disposition holders LOC 940335, MSL 940473, MSL 940474	SE-02-065-06-W4M SW-11-065-06-W4M	Canadian Oil & Gas International Inc. c/o Orphan Well Association 1800, 222-3rd Ave SW Calgary, Alberta Canada T2P 0B4 Phone: (403) 297-6416	Notified: 2022-11-18 Consent: N/A Expiry: N/A	2022-11-18 - via email, redirected to Orphan Well as COGI no longer exists
CONSULTATION Regulator		Ministry of Environment and Protected Areas 2938-11 Street NE T2E 7L7 Phone: 403) 297-5921 Email: wasim.mufti@gov.ab.ca		2023-03-17 - Jason Hancheruk sent an email to Wasim regarding status of no EIA required letter 2023-03-01 - Jason Hancheruk sent an email to Wasim regarding status of no EIA required letter 2023-02-10 - Jason Hancheruk provided detailed project description along with air modelling to Wasim for review and guidance 2022-07-20 - Meeting occurred with Jason Hancheruk, Chisenga Mulenga (Vertex), Jordan Costley (Federation), Wasim Mufti (EPA - Team Lead EPEA) and Shannon Chotach (EPA - water authorizations). Review and discussed CAES project and potential water source requirements
FNC202102643 Consultation	NW 35-64-6W4M	Beaver Lake Cree Nation		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Elizabeth Metis Settlement		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Kehewin Cree Nation		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Saddle Lake Cree First Nation		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Buffalo Lake Metis Settlement		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Fishing Lake Metis Settlement		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Kikino Metis Settlement		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Whitefish (Goodfish) Lake First Nation		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Cold Lake First Nation		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Heart Lake First Nation		FNC adequacy decision received on July 20, 2021
FNC202102643 Consultation	NW 35-64-6W4M	Onion Lake First Nation		FNC adequacy decision received on July 20, 2021

APPENDIX C



NOTES

- HOLD OPEN LOOP WATER COOLING CIRCUIT FOR CLOSED LOOP GLYCOL / WATER COOLING CIRCUIT EVALUATION.

EQUIPMENT

- VERY HIGH PRESSURE EXPANDER TURBINE
- HIGH PRESSURE EXPANDER TURBINE
- LOW PRESSURE EXPANDER TURBINE
- EXPANDER GENERATOR
- WASTE HEAT RECOVERY UNIT
- GENERATOR CIRCUIT BREAKER
- GENERATOR MV PDC
- GENERATOR UTILITY TRANSFORMER
- GENERATOR STEP UP TRANSFORMER
- HV DISCONNECT SWITCH
- HV CIRCUIT BREAKER
- LOW PRESSURE COMPRESSOR
- HIGH PRESSURE COMPRESSOR
- COMPRESSOR MOTOR
- INLET AIR FILTER
- COMPRESSOR MOTOR STARTING VFD
- COMPRESSOR CIRCUIT BREAKER
- COMPRESSOR MV PDC
- COMPRESSOR UTILITY TRANSFORMER
- COMPRESSOR MAIN TRANSFORMER
- SWITCHYARD CONTROL HOUSE
- COOLING TOWER
- COOLING WATER PUMPS
- COOLING TOWER CHEMICAL BUILDING
- CONTROL / ADMIN BUILDING
- WAREHOUSE / MAINTENANCE BUILDING
- EMERGENCY GENERATOR
- INSTRUMENT AIR BUILDING
- FIRE WATER PUMP BUILDING
- SOURCE / FIRE WATER TANK
- POTABLE WATER TANK
- AMMONIA STORAGE AND FORWARDING PUMPS
- STORM WATER TRANSFER PUMP HOUSE
- BUFFER TANK
- CAVERN PUMP BUILDING
- BRINE TANK

LEGEND

- X — FENCE
- P — OVERHEAD POWER LINES
- PERIMETER DITCH SYSTEM
- AGGREGATE SURFACING
- ASPHALT SURFACING
- CONCRETE
- SEEDING

PRELIMINARY DESIGN

FEDERATION-ENG 1		2		3		4		5		6		7		8		9		10		11		12	
												PERMIT STAMP		ENGINEER'S STAMP				MARGUERITE LAKE COMPRESSED AIR ENERGY STORAGE PROJECT NW-35-64-06-W4M					
																		GENERAL SITE ARRANGEMENT					
NUMBER		TITLE		A		ISSUED FOR REGULATORY APPLICATIONS		PT		2023-01-19		DC		JC		SCALE		DRAWING NUMBER		REV		A	
		REFERENCE DRAWINGS		NO		REVISION		BY		DATE		CKD		APP		1:1000		ML-GPD-209-0001					
												ENGINEER'S STAMP SHALL APPLY ONLY TO REVISION(S)		FEDERATION PROJECT No. 000-002E		DWG. SIZE A1 (594x841)							

APPENDIX D



Photo 1. Viewing north from southwest corner of disturbance area

Photo Date: June 12, 2022

Photo Location: 12N E: 512514 N: 6048657



Photo 2. Viewing northwest from north of disturbance area toward Class III Wetland (WL 1)

Photo Date: April 17, 2021

Photo Location: 12N E: 512805 N: 6048918



Photo 3. Viewing north toward Class III wetland (WL-2) from south boundary of disturbance area

Photo Date: June 12, 2022

Photo Location: 12N E: 512871 N: 6048586



Photo 4. Viewing south toward M-G(III) from Class III wetland (W-1)

Photo Date: April 17, 2021

Photo Location: 12N E: 512833 N: 6048799

APPENDIX E

Appendix E. Proposed Mitigation Measures for Potential Adverse Effects

Category	Potential Adverse Effect	Proposed Mitigation Measures
Land Use	Reduction in land available for agricultural land use	<ul style="list-style-type: none"> • Minimize the area disturbed to the amount necessary • Follow measures from the Soil and Terrain element below that minimize the loss of topsoil due to wind or water erosion • Follow measures from the Surface Water element below that address the potential for increased turbidity, increased suspended sediments or contaminants in surface water and the potential for alteration of surface drainage behavior • Follow measures from the Vegetation element below that address the potential for the introduction and spread of weeds and the potential for introduction and spread of Clubroot • Follow fire prevention measures and fire contingency measures in the Project-specific Environmental Protection Plan (EPP)
Soils/Terrain	Loss of topsoil during salvage, handling and storage	<ul style="list-style-type: none"> • Minimize the area disturbed to the amount necessary • Revegetate or reclaim areas that are no longer needed • Qualified personnel should supervise soil handling activities, including salvage, storage and replacement • The identification and location of topsoil and subsoil stockpiles will be clearly understood, from the time of stripping until needed for reclamation. Clear separation between stockpiles, accurate maps, and/or informative signage or staking will be maintained • If surface water is present in the depressions, the water should be pumped into a vegetated area at a low release rate prior to soil salvage • Upper subsoil should be salvaged separately from topsoil to its full depth or 30 cm, whichever is less, and stockpiled for use in reclamation. Where Poor or Unsuitable upper subsoil is found, it may be left in place, while Good or Fair material of equal volume is salvaged to a greater depth elsewhere on the site • Ensure that potential sources of additional or replacement subsoil and topsoil are identified in the contingency plan prepared by the contractor prior to reclamation
	Reduction of topsoil quality due to admixing of subsoil with topsoil	<ul style="list-style-type: none"> • Minimize the area disturbed to the amount necessary • All topsoil should be salvaged either to a specified colour break or to a specified depth • Athabasca topsoil should be stripped to the obvious colour boundary • Upper subsoil should be salvaged separately from topsoil, to its full depth or 30 cm, whichever is less, and stockpiled for use in reclamation. Where Poor or Unsuitable upper subsoil is found, it may be left in place, while Good or Fair material of equal volume is salvaged to a greater depth elsewhere on the site • Qualified personnel should supervise soil handling activities, including salvage, storage and replacement • Use equipment capable of fine depth adjustment where accurate topsoil salvage is hampered by a rough, frozen, or uneven boundary between topsoil and subsoil • In frozen conditions, topsoil and upper subsoil layers should be fractured and salvaged separately, using equipment capable of appropriate fracture and depth control • To prevent unwanted soil admixing, topsoil should be stored on topsoil. Upper subsoil should be stored where topsoil has been stripped, but subsoil has not • Topsoil and upper subsoil should be stored in locations that are: <ul style="list-style-type: none"> ○ At least 4 m from any existing or planned cut ○ Clearly separated from each other, at least 1 m apart at the toe for permanent piles and clear separation maintained through construction ○ Clearly separated from trees and tall shrubs ○ Moderately well drained or better, and never in a ditch, depression or drainage way ○ Located away from traffic and possible future disturbance • Topsoil and subsoil stockpiles should be placed in such a way that the subsoil will be more readily accessible at the time of reclamation, as the subsoil will be placed first on the final landscape • The identification and location of topsoil and subsoil stockpiles will be clearly understood, from the time of stripping until needed for reclamation. Clear separation between stockpiles, accurate maps, and/or informative signage or staking will be maintained • During final reclamation subsoil, and then topsoil, should be replaced to uniform depths on all portions of the site that have been disturbed • Soil salvage should be halted in adverse weather conditions such as excess wind or rain to avoid admixing of soils

Category	Potential Adverse Effect	Proposed Mitigation Measures
Soils/Terrain cont.	Loss of topsoil due to wind or water erosion	<ul style="list-style-type: none"> • Minimize the area disturbed to the amount necessary • Delaying or phasing any clearing and earthmoving until the area is required • Revegetate or reclaim areas that are no longer needed • Erosion and sediment control measures should be installed, and their condition and function should be monitored and maintained until reclamation has been achieved • Following an adverse weather event, all sediment and erosion control measures should be inspected for efficacy and any required corrective action should be taken • Soil stockpiles should be seeded with appropriate vegetation to protect them from erosion • Following the salvage of topsoil, if warranted, topsoil and subsoil stockpiles may be stabilized with a suitable tackifier, or with water, until vegetative cover can be established • Soil stripping and handling to be postponed during windy conditions • To reduce erosion, it is recommended that the slopes of the soils stockpiles should not exceed 7:1 • During final reclamation, if the land will not be seeded right away, a cover crop may be seeded to assist in weed and erosion control. The following techniques may be considered if wind erosion is of concern after topsoil replacement: <ul style="list-style-type: none"> ○ Seeding cereal or sterile hybrid cover crop ○ Applying hydro mulch or tackifier ○ Installing wind fences ○ Slopes of the stockpile will be scarified with heavy equipment
	Loss of soil quality due to compaction and puddling	<ul style="list-style-type: none"> • Minimize the area disturbed to the amount necessary • When reclamation commences, prior to topsoil and subsoil replacement, any compacted material that may underlie them should be ripped with a multi-shank ripper or breaking disc to a depth of 30 cm or the depth of compaction, whichever is deeper. If soils are moist, ripping should be postponed until the material is dry or frozen to ensure that the soils fracture when ripped • Use appropriate equipment for soil salvaging to minimize soil compaction and erosion. Heavy machinery should be avoided in areas with sensitive soil or vegetation • Topsoil in the depressions (ARV1 and ARV6 soil map units) should be salvaged in dry conditions, if possible, when equipment traffic and soil handling cannot cause compaction, rutting or puddling • Traffic should be minimized on replaced topsoil
Groundwater	Potential for incremental change in groundwater quality as a result of accidental spills or releases	<ul style="list-style-type: none"> • Construct engineered containment around the cavern and disposal well areas and proposed fuel gas yard • Develop and implement a Groundwater Monitoring Program • Investigate deviations in groundwater quality compared to baseline conditions and evaluate for potential effects from Project activities • Follow Spill Prevention, Containment and Reporting measures the Project-specific EPP • The low hydraulic conductivity of the surficial sediment at the site act as barrier to potential adverse impacts at the surface • Any equipment to be decommissioned in-place (e.g. fuel gas pipeline) should be flushed of production fluids, purged, and cut and capped underground
	Short-term reduction of groundwater levels as a result of Project activities	<ul style="list-style-type: none"> • Develop and implement a Groundwater Monitoring Program • Limit wetland dewatering to the extent practical • Ensuring all work areas are clearly marked to ensure no unnecessary vegetation clearing or soil stripping occurs within or adjacent to any water body • Follow Wetland Mitigations listed under the wetland category • Restore any drainage around the site that was redirected or modified as a result of the site construction

Category	Potential Adverse Effect	Proposed Mitigation Measures
Surface Water	Potential for incremental increase in turbidity, suspended sediments or contaminants as a result of high rainfall events or accidental spills or releases	<ul style="list-style-type: none"> • Site design should include a runoff pond or sedimentation pond • Runoff pond/stormwater pond design should include freeboard requirements for 1/10 and 1/25 events • Site design should include diversion of run-on to prevent introduction of any contamination from the Project site into surface water • Stormwater in sedimentation pond will be released only when it meets the water quality criteria outlined in the EPEA and in a controlled manner • Follow Spill Prevention, Containment and Reporting measures in the Project-specific EPP • See erosion and sediment control measures listed for the soil category above
	Increase in surface runoff volume	<ul style="list-style-type: none"> • Site design should include a runoff pond or sedimentation pond • Runoff pond/stormwater pond design should include freeboard requirements for 1/10 and 1/25 events • Site design should include diversion of run-on to prevent introduction of any contamination from the Project site into surface water • Develop and implement a Stormwater Management Plan • See erosion and sediment control measures listed for the soil category above
Wetlands	Loss of wetland function	<ul style="list-style-type: none"> • Follow all of the conditions of <i>Water Act</i> Approval DAUT0008313 including: <ul style="list-style-type: none"> ○ The Approval Holder shall immediately report to the Director by telephone, any contravention of the terms and conditions of the <i>Water Act</i> Approval at 1.780.422.4505 ○ Federation shall not deposit or cause to be deposited any substance in, on, or around the water body that has, or may have, the potential to adversely affect the water body ○ A copy of the <i>Water Act</i> Approval and the Wetland Assessment and Impact Report will be retained at the site during construction activities ○ The Activity will be conducted in accordance with the Wetland Assessment and Impact Report ○ Federation shall develop a written Spill Contingency Plan prior to commencing the Activity ○ A copy of the Spill Contingency Plan will be retained at the site at all times during Project activities ○ Federation shall minimize wetland impacts as described in the Wetland Assessment and Impact Report ○ Federation shall not do or permit anything to be done, nor omit or permit any omissions, which cause or may cause an adverse effect related to siltation or erosion as a result of the Project activities • Federation has paid wetland replacement fees for the permanent loss of Wetlands 1 to 4 (Figure 6) • During construction, the wetlands should be monitored to ensure all conditions of the <i>Water Act</i> approval have been met

Category	Potential Adverse Effect	Proposed Mitigation Measures
Wetlands cont.	Alteration of wetland function portion of Wetland 1	<ul style="list-style-type: none"> • Ensuring that any approvals, notifications, licences and permits that are necessary are in place prior to commencing applicable construction activities • Ensuring all work areas are clearly marked to ensure no unnecessary vegetation clearing or soil stripping occurs within or adjacent to any water body • Utilizing and maintaining erosion and sediment control measures (i.e., silt fencing) to prevent deleterious substances from entering any water body • Installing secondary containment measures on-site as required (i.e., storage tanks, corrugated containment system and/or clay berms) • Storing soil piles away from wetland boundaries • Restoring any drainage around the site that was redirected or modified as a result of the site construction • Regular monitoring for and control of weeds, as required, following the completion of construction activities • Ensuring an appropriate emergency spill kit is available at all times. The kit should contain (at a minimum): emergency contact numbers, a plan to contain and remediate any substance release that causes or may cause an adverse effect on the aquatic environment, readily accessible materials and supplies for containment, and access to approved disposal sites for contaminated materials. Any environmental emergencies and/or spills should be reported immediately to the Energy and Environment Response Line 24-hour spill reporting line (1.800.222.6514) and Fisheries and Oceans Canada emergency response line (1.855.852.8320) • Ensuring all equipment arrives on-site in a clean and well-maintained condition • Ensuring equipment is not washed in, or within, 100 m of a water body • Ensuring oil changes, refueling and lubricating of equipment are conducted a minimum of 100 m away from any water body • Ensuring no construction materials, debris, fuel, lubricating fluids, hydraulic fluids, methanol, antifreeze, herbicides, biocides or any other chemicals are released on the ground or enter any watercourse • Implementing appropriate precautions to prevent deleterious substances (e.g., gasoline, sediment, oil, etc.) from entering any nearby waterbodies. Cleaning, fueling and servicing of equipment will be conducted in an area where spills or wash water will not contaminate surface water or groundwater resources. Consideration should be given to the use of non-petroleum-based oils for machinery (e.g., vegetable oil) • Halting construction when adverse construction conditions caused by inclement weather occur (i.e., weather that may cause an increase of erosion or sedimentation) • Ensuring proper drainage of overland runoff through or around all work areas. Runoff will not be allowed to exit the worksite without first being filtered to levels meeting or exceeding turbidity levels of the receiving watercourse • Reviewing all mitigation and regulatory requirements prior to construction to ensure that all mitigation requirements are understood and can be implemented • Ensuring construction and monitoring activities are conducted or directed by appropriately qualified practitioners
Vegetation Species and Communities	Alteration of vegetation community	<ul style="list-style-type: none"> • Clearly mark the limits of the site to minimize travel and disturbance to unauthorized areas • Construction traffic should utilize existing access whenever possible • Seed disturbed soils in areas requested by the landowner/lessee with an approved EPA native seed mix or seed mix requested by the landowner/lessee • To help encourage revegetation with agronomic species on cultivated land, Federation may work with landowners/occupants to discourage or limit livestock grazing on the reclaimed area during the first growing season following construction. This may involve temporary grazing, deferred grazing or an increased grazing rotation frequency
	Introduction and spread of weeds	<ul style="list-style-type: none"> • Ensure all equipment, including rig mats, arrive in a clean, well maintained condition. Equipment working in areas identified as having a weed problem will be steam cleaned or shovel and compressed air cleaned prior to continuing work on the Project area • Cleaning equipment prior to egress from particularly weed infested areas • Following the salvage of topsoil, if warranted, topsoil and subsoil stockpiles may be stabilized with a suitable tackifier, or with water, until vegetative cover can be established • Seeding subsoil stockpiles with an approved seed mix as soon as possible • Planting vegetation typical of the area (from locally sourced nurseries or salvaged stock); in some areas, it might be prudent to allow plants to establish naturally from adjacent habitats. Strategies should be determined with the landowner • Monitoring reclaimed and restored areas (plantings) to ensure they survive or establish naturally; replacing those that do not survive and reseeding areas that did not establish; considering the goal of 80% survival over 5 years for planted material • Evaluate of the disturbance area for weed populations and poor revegetation • Manage all weeds in accordance with the <i>Weed Control Act</i> and specific requirements of the county

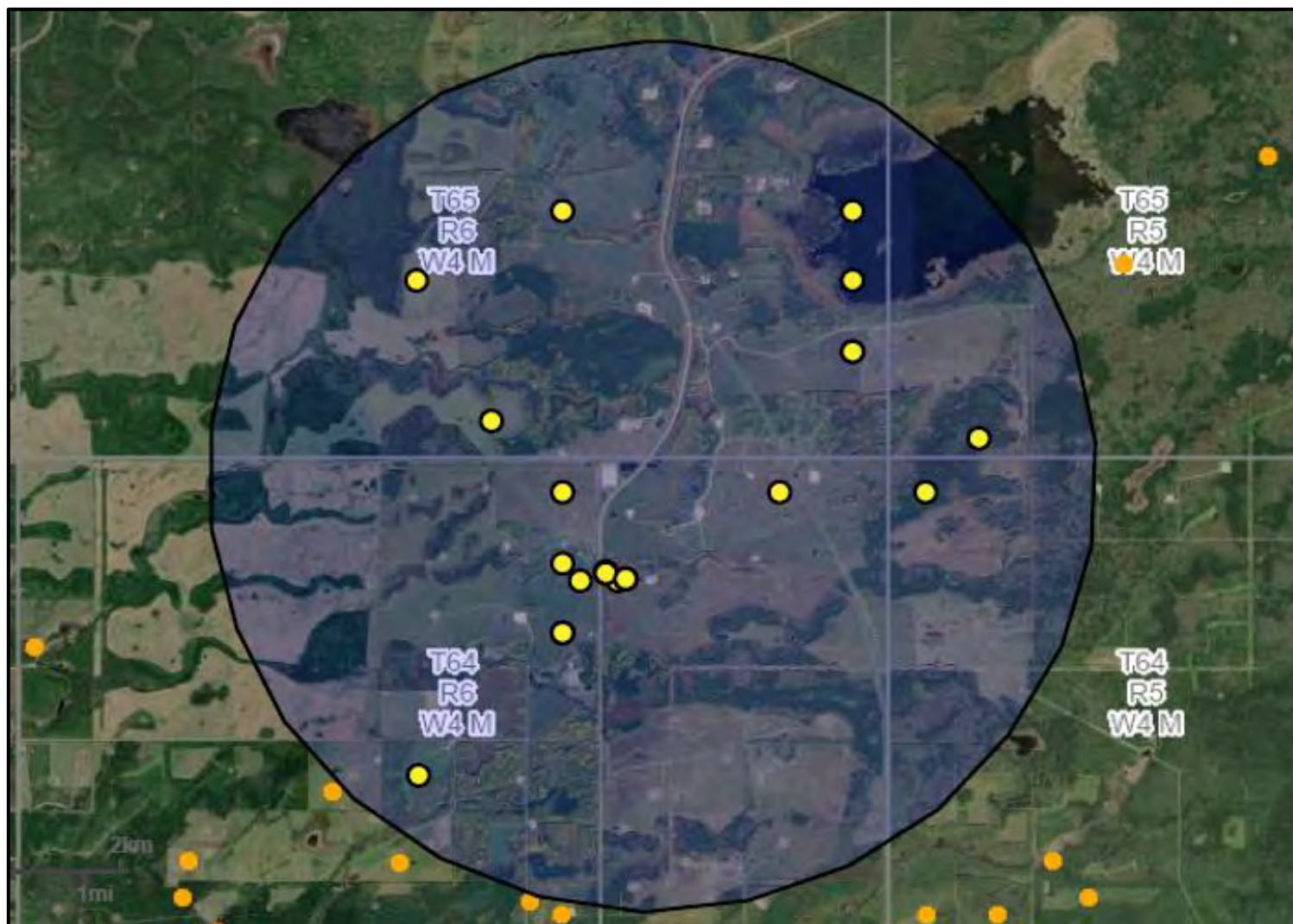
Category	Potential Adverse Effect	Proposed Mitigation Measures
Vegetation Species and Communities (cont.)	Introduction and spread of Clubroot	<ul style="list-style-type: none"> As a best management practice, all vehicles, machinery and equipment arriving on-site should be cleaned of debris and loose soil or washed with a bleach solution prior to arriving on-site
Wildlife and Wildlife Habitat	Temporary wildlife habitat loss and change in habitat connectivity	<ul style="list-style-type: none"> Utilize existing disturbed areas to the extent possible Any clearing or disturbance will be incrementally completed only as needed for development Revegetate or reclaim areas that are no longer needed Amphibian breeding ponds will have a recommended 100 m year-round setback implemented. If new activities cannot be avoided within the setback, a mitigation plan will be developed for any activities within the wetland setback that cannot be avoided. This plan may include, but is not limited to, mitigation measures such as amphibian monitors, exclusion fencing, and amphibian assessments, and obtaining a permit to conduct amphibian salvage and relocation To diminish the possibility of animals having their movement patterns disrupted or being trapped in excavations, the amount of time the excavation is open, and size of open excavation should be minimized Clearing from approximately February 15 through April 1, in suitable habitat, will be avoided or minimized due to potential of disturbing early nesting birds such as Northern Goshawk, Short-eared Owl, and other bird species at risk Construction should occur outside the Migratory Bird Nesting Period (B5, April 1 to August 30; Environment Canada, 2015) to be compliant with the <i>Migratory Birds Convention Act</i> (Government of Canada, 1994) and Alberta <i>Wildlife Act</i> (Government of Alberta, 2014). Alternately, if any clearing or construction occurs during the early nesting or migratory bird nesting period, a pre-construction nest and wildlife sweep should be completed no more than 7 days prior to construction activities. If a nest or potential wildlife feature is discovered, a species-specific appropriate buffer, based on provincial and federal guidelines, should be established, and maintained until the nest has fledged or area has been cleared by a biologist
	Alteration of wildlife movement patterns	<ul style="list-style-type: none"> Maintain equipment and the facility in order to minimize excessive noise (e.g., mufflers intact, greased properly) To minimize light disturbance, facilities can opt to utilize light shields or directional lighting to lessen sky glow and use photocells or motion detectors to control light fixtures visited infrequently Properly containing, collecting, and removing food waste and other debris from the site on a daily basis to an approved disposal facility during construction and operation of the facility
	Increase in wildlife mortality or injury	<ul style="list-style-type: none"> Project personnel and contractors will be encouraged to record wildlife sightings and report these to a Project representative during site orientation. Wildlife Observation Forms, including time, date, location of the observation as well as behaviors observed, will be the key method for reporting these sightings. All sensitive and endangered species sightings will be reported to the appropriate regulator Migratory birds such as ducks, geese and gulls may be attracted to the stormwater pond. Project personnel will record wildlife sightings as dictated within the Environmental Protection Plan. Should migratory birds interact with the stormwater pond, Federation will consult with a professional biologist to determine additional mitigation measures (e.g., netting, bird deterrent floats, effigies) to reduce further impacts. Properly containing, collecting, and removing food waste and other debris from the site on a daily basis to an approved disposal facility during construction and operation of the facility Removing any workers harassing or feeding wildlife, or littering during site construction from the project Keeping domestic pets and animals off the site at all times to avoid attracting or disturbing wildlife Policies on hunting on or near the site should be created to prevent employees or contractors from hunting near the site to avoid increasing wildlife mortality near the project Implementing a reduced speed limit of 50 km/h near the site to reduce the risk of wildlife and vehicle collisions Restrict access with vehicles, including ATVs and UTVs, to reduce unnecessary traffic and the possibility of wildlife and vehicle collisions Any wildlife mortalities or injuries will be reported to project personnel and as deemed necessary, the appropriate regulator If any clearing or construction occurs during the early nesting or migratory bird nesting period, a pre-construction nest and wildlife sweep should be completed no more than 7 days prior to construction activities. If a nest or potential wildlife feature is discovered, a species-specific appropriate buffer, based on provincial and federal guidelines, should be established, and maintained until the nest has fledged or area has been cleared by a biologist Structure placement away from high use areas, avoiding or reducing the use of guy wires, and marking for increased visibility (through window decals, line markers, other high contrast markers) may help to reduce wildlife collisions with infrastructure Inspect any excavation periodically during the day for trapped wildlife. Removal of wildlife from the excavation should be conducted by a competent wildlife biologist and reported to EPA Any excavations to be left open and that are at risk of filling with water should be covered or filled in before filling with water to avoid becoming possible amphibian habitat Should wildlife wander into the area where ongoing operations may be hazardous to the wildlife, operations will cease until the animal moves on If a wildlife feature of a species at risk (SAR) is observed, a professional biologist should implement a species-specific appropriate buffer, based on provincial and federal guidelines or in consultation with the appropriate regulator, until the nest has fledged, or area has been cleared by the biologist

Category	Potential Adverse Effect	Proposed Mitigation Measures
Wildlife and Wildlife Habitat cont.	Potential effects to wildlife Species At Risk	<ul style="list-style-type: none"> • Project personnel and contractors will be encouraged to record wildlife sightings and report these to a Project representative during site orientation. Wildlife Observation Forms, including time, date, location of the observation as well as behaviors observed, will be the key method for reporting these sightings. All sensitive and endangered species sightings will be reported to the appropriate regulator. • Any wildlife mortalities or injuries will be reported to project personnel and as deemed necessary, the appropriate regulator • Clearing from approximately February 15 through April 1, in suitable habitat, will be avoided or minimized due to potential of disturbing early nesting birds such as Northern Goshawk, Short-eared Owl, and other bird species at risk • Construction should occur outside the Migratory Bird Nesting Period (B5, April 1 to August 30; Environment Canada, 2015) to be compliant with the <i>Migratory Birds Convention Act</i> (Government of Canada, 1994) and <i>Alberta Wildlife Act</i> (Government of Alberta, 2014). Alternately, if any clearing or construction occurs during the early nesting or migratory bird nesting period, a pre-construction nest and wildlife sweep should be completed no more than 7 days prior to construction activities. If a nest or potential wildlife feature is discovered, a species-specific appropriate buffer, based on provincial and federal guidelines, should be established, and maintained until the nest has fledged or area has been cleared by a biologist • Should wildlife wander into the area where ongoing operations may be hazardous to the wildlife, operations will cease until the animal moves on • If a wildlife feature of a SAR is observed, a professional biologist should implement a species-specific appropriate buffer, based on provincial and federal guidelines or in consultation with the appropriate regulator, until the nest has fledged, or area has been cleared by the biologist
Fish and Fish Habitat	Potential effects to fish and fish habitat if the fuel gas pipeline cannot avoid impacts to drainages	<p>If culverts, drainages or watercourses that intersect the existing roadway cannot be avoided or if it is not feasible to cross them using a trenchless method, mitigation to reduce impacts to watercourses as well as fish and fish habitat may include:</p> <ul style="list-style-type: none"> • Ensure that any necessary approvals, notifications, licences and permits are in place prior to commencing applicable construction activities • Where feasible, utilize trenchless crossing methods • Where feasible, conduct open cut crossing under dry or frozen conditions • Should flowing water be present during any open cut crossing, isolation of the site is required. Fish salvage of the site must be conducted prior to dewatering • Water quality monitoring should be conducted to ensure that no deleterious materials enter the watercourse during construction activities, as required under the Code of Practice • It is recommended that a Qualified Aquatic Environmental Specialists be on-site for the crossing of any fish-bearing watercourses • Implement appropriate precautions to prevent deleterious substances (e.g. gasoline, sediment, oil, etc.) from entering the watercourse. Cleaning, re-fueling and servicing of equipment should be conducted in an area where spills or wash water will not contaminate surface water or groundwater resources. Consideration should be given to the use of non-petroleum based oils for machinery (e.g. vegetable oil) • Ensure an appropriate emergency spill kit is available at all times. The kit should contain (at a minimum) emergency contact numbers, a plan to contain and remediate any substance release that causes or may cause an adverse effect on the aquatic environment, readily accessible materials and supplies for containment, and access to approved disposal sites for contaminated materials. • The Construction Supervisor and Environmental Inspector shall review the Sediment Release Contingency Plan prior to construction • Report any environmental emergencies and/or spills immediately • Ensure all equipment arrives on-site in a clean and well-maintained condition • Ensure equipment is not washed in, or within, 100 m of a watercourse • Ensure oil changes, re-fueling and lubricating of equipment are conducted a minimum of 100 m away from any watercourse • Ensure no construction materials, debris, fuel, lubricating fluids, hydraulic fluids, methanol, antifreeze, herbicides, biocides or any other chemicals are released on the ground or enter any watercourse • Equip all fuel powered pumps, light standards or generators with secondary spill containment trays • Store spoil and waste materials removed from the worksite above the high watermark. Stabilize this material, if warranted, to reduce the potential for runoff events to transport them into the watercourse (>100 m) • Halt construction when adverse construction conditions caused by inclement weather occur (i.e. weather that may cause an increased potential for erosion or sedimentation) • Ensure proper drainage of overland runoff through or around all work areas. Runoff will not be allowed to exit the worksite without first being filtered to levels meeting or exceeding turbidity levels of the receiving watercourse • Review all mitigation and regulatory requirements prior to construction to ensure that all mitigation requirements are understood and can be implemented • Limit clearing in the vicinity of watercourse crossings to the removal of trees and shrubs along the trench line in order to protect riparian areas • Clear vegetation located within the watercourse vegetation buffer area crossed by the pipeline footprint only if absolutely necessary

Category	Potential Adverse Effect	Proposed Mitigation Measures
Air Quality	Increase in air emissions from vehicles and equipment	<ul style="list-style-type: none"> • Exhaust systems and engines will be maintained and kept in good working order • Dust and odour emissions will be controlled at the source where possible to contain and limit the release of particles to acceptable levels • Implement dust suppression using water trucks on construction site, particularly gravel/dirt roads and the soil stockpile area • Avoid burning of construction debris or refuse • Consider the use of multi-passenger vehicles for the transportation of construction personnel • Advise construction and operation personnel to avoid idling vehicles where practical • Follow fire prevention methods in the Project-specific EPP • Conduct continuous air emissions modeling as per the specifications and approval conditions
Noise	Increase in noise	<ul style="list-style-type: none"> • Design equipment/enclosures, to reduce major sources of noise. This includes ensuring that the expander enclosure, the compressor enclosure and the instrument air building are acoustic buildings with absorptive interior liners with inlet and exhaust ventilation silencers • Installing a silencer on the water heat recovery stack and the air inlet filter face • Maintain equipment and the facility in order to minimize excessive noise (e.g., mufflers intact, greased properly) • Construction activities causing elevated noise levels should be limited to daylight hours and adhere to applicable local noise by-laws. In the event construction activities may cause excessive noise levels, an approval for noise exemption must be obtained

APPENDIX F

Alberta Water Well Information Database Map



Legend

- Groundwater Drilling Report
- ◆ Baseline Water Well Report

Projection

Web Mercator (Auxillary Sphere)

Datum

WGS 84

Date

1/7/2023, 3:53:06 PM

Information as depicted is subject to change, therefore the Government of Alberta assumes no responsibility for discrepancies at time of use.
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Reconnaissance Report

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (m)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (m)	TEST RATE (L/min)	SC_DIA (cm)
<u>152272</u>	NE	21	64	6	4	TIZZARD DRILLING LTD.	1989-11-29	11.58	New Well	Stock		2		PARY, ALBERT	6.40	272.77	60.96
<u>160988</u>	NE	34	64	6	4	UNKNOWN DRILLER		19.81	Chemistry	Domestic				FOSTER, KEITH E.			0.00
<u>167609</u>	NE	12	65	6	4	UNKNOWN DRILLER		143.26	Chemistry	Domestic				ALTA FOREST SVC			0.00
<u>216815</u>	NE	27	64	6	4	MORTON'S WATER WELL DRILLING LTD.	1984-04-13	121.92	New Well	Industrial		14		MOBIL OIL CAN LTD #9-27	0.00	681.91	17.15
<u>216815</u>	NE	27	64	6	4	MID-WEST DRILLING LTD.	2004-07-17	121.92	Existing Well- Decommissioned	Other				EXXONMOBIL CANADA LTD.			
<u>216816</u>	1	34	64	6	4	TIZZARD DRILLING LTD.	1979-11-16	25.60	New Well	Domestic & Stock		4		GARRING CONSTR LTD	3.35	13.64	60.96
<u>216817</u>	4	35	64	6	4	ALBERTA ENVIRONMENTAL PROTECTION/TECHNICAL SERVICES DIVISION	1985-07-24	182.58	Test Hole- Decommissioned	Other	1	21		ALTA ENV #2347E	76.47		0.00
<u>216822</u>	4	35	64	6	4	ALBERTA ENVIRONMENTAL PROTECTION/TECHNICAL SERVICES DIVISION	1985-07-27	146.61	New Well	Other	1	17		ALBERTA ENVIRONMENT	76.47	27.28	14.12
<u>216825</u>	4	35	64	6	4	ALBERTA ENVIRONMENTAL PROTECTION/TECHNICAL SERVICES DIVISION	1985-07-30	77.11	New Well	Other	4	14		ALBERTA ENVIRONMENT	10.70	227.30	
<u>216825</u>	4	35	64	6	4	ALBERTA ENVIRONMENTAL PROTECTION/TECHNICAL SERVICES DIVISION	1985-07-30	77.11	New Well	Other	4	14	39	ALBERTA ENVIRONMENT	10.70	227.30	
<u>216825</u>	4	35	64	6	4	UNKNOWNDRILLINGCOMP11		77.11	Old Well-Yield	Observation		1	7	ALBERTA ENVIRONMENT	13.17	60.55	
<u>216825</u>	4	35	64	6	4	UNKNOWNDRILLINGCOMP11		77.11	Old Well-Yield	Observation		1	20	ALBERTA ENVIRONMENT	11.56	56.78	
<u>216827</u>	NW	36	64	6	4	LAKELAND DRILLING LTD.	1988-06-03	97.54	New Well	Stock		19		WOLF LK GRAZING RESERVE #3	17.98	113.65	12.70
<u>216827</u>	NW	36	64	6	4	LAKELAND DRILLING LTD.	1988-06-03	97.54	New Well	Stock		19		WOLF LK GRAZING RESERVE #3	0.00	136.38	12.70
<u>216871</u>	2	6	65	5	4	UNKNOWN DRILLER		57.91	Test Hole	Unknown				ARC			0.00
<u>216916</u>	NE	1	65	6	4	SAWCHUK DRILLING	1986-10-14	50.29	Test Hole	Domestic		4		ALTA FOREST SVC			0.00
<u>216917</u>	NE	1	65	6	4	SAWCHUK DRILLING	1986-10-17	60.96	Test Hole	Domestic		10		ALTA FOREST SVC			0.00
<u>216921</u>	SW	3	65	6	4	LAKELAND DRILLING LTD.	1988-06-18	128.93	New Well	Stock		16		WOLF LK GRAZING RESERVE #WELL7	39.32	136.38	11.43
<u>216922</u>	SE	9	65	6	4	LAKELAND DRILLING LTD.	1988-06-02	134.11	New Well	Stock		28		WOLF LK GRAZING RESERVE #WELL2	38.71	127.29	11.43
<u>216922</u>	SE	9	65	6	4	LAKELAND DRILLING LTD.	1988-06-02	134.11	New Well	Stock		28		WOLF LK GRAZING RESERVE #WELL2	0.00	136.38	11.43

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (m)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (m)	TEST RATE (L/min)	SC_DIA (cm)
<u>216924</u>	NE	10	65	6	4	LAKELAND DRILLING LTD.	1988-05-31	134.72	New Well	Stock		10		WOLF LK GRAZING RESERVE#WELL1	35.97	122.74	11.43
<u>216924</u>	NE	10	65	6	4	LAKELAND DRILLING LTD.	1988-05-31	134.72	New Well	Stock		10		WOLF LK GRAZING RESERVE#WELL1	0.00	136.38	11.43
<u>216926</u>	SE	12	65	6	4	A&C WATER WELL DRILLING	1986-11-27	132.59	New Well	Domestic		16		ALTA FORESTRY LANDS & WILDLIFE	26.21	68.19	12.70
<u>235040</u>	NW	31	64	5	4	PETE'S WATERWELL CONTRACTING LTD.	1986-07-01	15.24	New Well	Domestic		7		RONDEAU, MRS	5.49	22.73	60.96
<u>298968</u>	SE	34	64	6	4	PARKLAND DRILLING LTD.	2001-08-31	73.15	New Well	Domestic & Irrigation		3	9	WOLF LAKE GRAZING RESERVE/ASSO	15.24	113.65	12.55
<u>1500912</u>	4	35	64	6	4	MCALLISTER DRILLING INC.	2003-07-22	118.87	New Well	Monitoring		31		CNRL		0.00	5.08
<u>1500913</u>	4	35	64	6	4	MCALLISTER DRILLING INC.	2003-07-22	13.72	New Well	Monitoring		3		CNRL			5.08
<u>1500920</u>	4	35	64	6	4	MCALLISTER DRILLING INC.	2003-07-22	30.48	New Well	Monitoring		5		CNRL			5.08