



Beacon Data Centers Heartland Project

Initial Project Description Summary

Prepared for:

IMPACT ASSESSMENT AGENCY OF CANADA

Prepared by:

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Acronyms / Abbreviations

AAAQO/G	Alberta Ambient Air Quality Objectives and Guidelines	PIP	Participant Involvement Plan
AACSW	Alberta Arts, Culture and Status of Women	PSIP	Project-specific information package
ACO	Aboriginal Consultation Office	PSL	Project-specific sound level
AESO	Alberta Electric System Operator	Q1	First quarter
AI	Artificial Intelligence	Q2	Second quarter
AIES	Alberta Interconnected Electric System	Q3	Third quarter
AUC	Alberta Utilities Commission	QPAC	Quick-deploy Power and Containerized system
CCS	Carbon capture and storage	RNMP	Regional Noise Management Plan
CH ₄	Methane	SARA	Species at Risk Act
CO	Carbon monoxide	SCC	Supreme Court of Canada
CO ₂	Carbon dioxide	SCR	Selective catalytic reduction
CO ₂ e	Carbon dioxide equivalent	t/GWh	Tonnes per gigawatt-hour
COD	Commercial Operation Date	TJ/day	Terajoules per day
DIZ	Designated Industrial Zone	TSP	Total suspended particulate
ESA	Environmentally Significant Area	WAIR	Wetland Assessment and Impact Report
GGP	Gas Generation Pod		
GHG	Greenhouse gas		
GOA	The Government of Alberta		
GWh	Gigawatt-hour		
GWP	Global Warming Potential		
ha	Hectare		
HRA	Historical Resources Act		
IAAC	Impact Assessment Agency of Canada		
IH-DIZ	Industrial Heartland - Designated Industrial Zone		
IPCC	Intergovernmental Panel on Climate Change		
km	Kilometer		
kV	Kilovolt		
m	meter		
MW	Megawatt		
MWe	Megawatt electrical		
NGTL	NOVA Gas Transmission Ltd.		
N ₂ O	Nitrous oxide		
NIA	Noise Impact Assessment		
NO ₂	Nitrogen dioxide		
NO _x	Oxides of nitrogen		
PAH	Polycyclic aromatic hydrocarbons		
PM	Particulate matter		
PM ₁₀	Particulate matter ≤ 10 µm		
PM _{2.5}	Particulate matter ≤ 2.5 µm		

PART A: General Information

1. The Project's Name, Type or Sector and Proposed Location

Heartland Power Generation LP and its general partner, Northbridge Power GPC Inc. (Heartland Power), are submitting this Initial Project Description Summary for the “Beacon AI Centers – Heartland” power generation facility (the Project). The Project is being developed by Beacon AI Centers (Beacon) through the project-specific entity Heartland Power.

This document summarizes the Initial Project Description that has been prepared following the Impact Assessment Agency of Canada (IAAC; Agency) Guide to Preparing an Initial Project Description (IAAC 2024). Although this IPD summary is being submitted in accordance with the Physical Activities Regulations (Canada 2019), Heartland Power/Beacon understands that the IAAC aligns its implementation of the Impact Assessment Act and regulations with the Supreme Court of Canada's ("SCC") decision in Reference re Impact Assessment Act (Supreme Court of Canada 2023). If the Project can be carried out without requiring any Federal authorizations or permits, because of the SCC Reference, the Impact Assessment Act ought not to apply to the Project. Furthermore, as demonstrated through the information provided herein, the Project will not result in "non-negligible adverse change" within federal jurisdiction.

1.1 Project Name

Beacon AI Centers Heartland

1.2 Type or Sector

The Project is a power generation facility with a capacity of 920 Mwe, providing 800 MWe of continuous, dispatchable electricity to the four on-site data centres. The Project features two hundred (200) INNIO Jenbacher J624 lean-burn natural-gas engine generators, organized into Quick-deploy Power and Containerized system (QPAC) modules. Each QPAC module integrates five of each reciprocating engines, alternators, exhaust-treatment systems and air-cooled radiators within a single three-storey steel enclosure engineered for industrial acoustic performance and emissions compliance. The QPAC modules are then arranged into four (4) gas generation pods (GGPs) (i.e., ten QPAC modules per GGP).

The major ancillary structures include:

- Natural gas pipeline to fuel the Project. The pipeline will be part of the existing integrated Nova Gas Transmission Ltd. (NGTL) and ATCO Pipeline system located 0.5-kilometer (km) east of the Project. The Project will require up to 218 Terajoules per day (TJ/day) at capacity
- Electricity will be delivered from the Project to the Alberta provincial grid through several new 240 kV transmission lines with the interconnection expected to be in Heartland substation 12S (53.85803° or 53° 51' 29" north, -113.23008° or 113° 13' 48" west). One (1) new on-site substation with a listed capacity of 400 MW is currently configured. The final substation capacity and configuration will be determined in the coming months as the Project progresses through the Alberta Electric System Operator (AESO) connection process.

- New substation and T-tap connection to an existing 240 kV transmission line owned by AltaLink with the point of interconnection 3.5 km away from the Project.
- The Project is co-located with four (4) data halls as part of an on-site data center capable of supporting Tier IV data-centre operations. Although Heartland Power is including information related to the data center at the request of the Impact Assessment Agency of Canada, information pertaining to the data center is not relevant to the assessment of the Project because the data center is not a Project component and is not associated with the construction, operation or decommissioning of the Project. Heartland Power is providing the most accurate information and assumptions known at this time in respect to the data center and doing so exclusively for informational purposes.

1.3 General Project Location and Land Use

The Project is located approximately 7 km east of Gibbons Alberta, immediately north-northeast of the Junction of Secondary Highway 643 and Range Road 223, as shown in Figure 1.1.1.

The Project is in Alberta's Sturgeon County Industrial Heartland – Designated Industrial Zone (IH-DIZ) (Sturgeon County 2007; Government of Alberta 2014; Government of Alberta 2019).

- Legal land description: NW and SW Quarters of Section 15-56-22-W4M
- Deg-Min-Sec Latitude and longitude coordinates: 53°50'23"N, 113°11'34"W
- Decimal Latitude and longitude coordinates: 53.84032, -113.192246

The Project is located within a 317 acres (128.3 hectares) data center campus at an elevation of approximately 644 meters. The Project will occupy a 32-acre footprint– arranged into four (4) GGPs - within the data center campus.

The project site is on privately owned land, which is already disturbed and previously used for agricultural purposes, as shown in Figure 1.1.2.

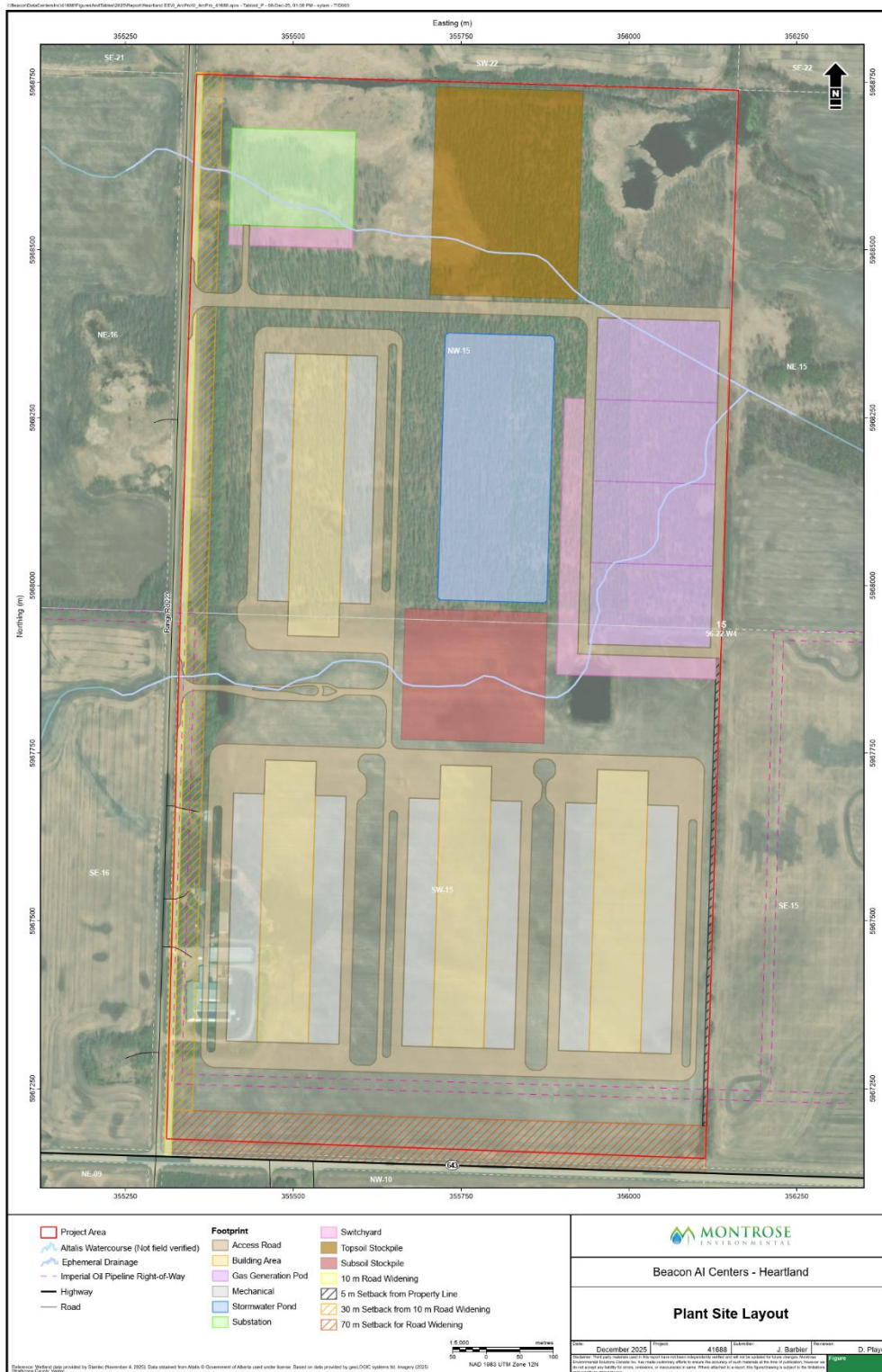


Figure 1.1.2 Project Site

2. Proponent's Name and Contact Information

Table 2.1.1 Proponent's Name and Contact Information

Name of Project:	Beacon AI Centers Heartland
Name of Proponent:	Heartland Power Generation LP and its general partner Northbridge Power GPC Inc. (Heartland Power)
Address of Proponent:	FL27 -140 4 th Avenue SW, Calgary, AB T2P 3N3
Website:	https://beaconaicenters.com/
Principal Contact Person:	Joseph Shovlin, Co-Founder, Beacon Data Centers Email: joseph@beacondatacenters.com Phone: +1 825 964 4339 Address: FL27 - 140, 4th Avenue SW Calgary, AB, T2P 3N3
Regulatory Contact Person:	Troy Adams, Regulatory Lead (JouleGrid) Email: Troy.adams@joulegrid.ca Phone: 403.836.3535 (office & mobile) Address: FL27, 140 4th Avenue SW, Calgary, AB T2P 3N3

3. Summary of Engagement with Jurisdictions or Agencies

Initial engagement with federal, provincial, and municipal agencies began in 2025 to introduce the Project and confirm regulatory expectations. Discussions with the Impact Assessment Agency of Canada (IAAC) were initiated in November 2025 to outline the forthcoming submission under the *Impact Assessment Act*.

At the provincial level, Heartland Power/Beacon has contacted Alberta Environment and Protected Areas regarding the Environmental Impact Assessment and Industrial Approval requirements, the Alberta Utilities Commission with respect to the power plant approval process, and the Alberta Electric System Operator concerning System Access Request submissions. The Aboriginal Consultation Office confirmed that consultation is not required because the Project is located on private land, and *Historical Resources Act* approval has been issued by Alberta Arts, Culture and Status of Women (AACSW 2025).

At the municipal level, Heartland Power/Beacon has engaged Sturgeon County to support local planning, permitting, and coordination within the Industrial Heartland – Designated Industrial Zone. Strathcona County is very supportive of the Project. Heartland Power/Beacon has also consulted with Alberta’s Industrial Heartland Association to ensure alignment with regional planning objectives. Engagement with all agencies will continue as the Project advances through the required regulatory processes.

4. Engagement with Indigenous Groups, Public, Other Stakeholders

4.1 Indigenous Groups

Although the project footprint is on private land with no expected *Water Act* applications with Crown interests, as a matter of due diligence and meeting the Crowns Duty to Consult, Heartland Power/Beacon

opted to follow the Government of Alberta’s Proponent Guide to First Nations, Métis Settlements and Credibly Asserted Métis Communities consultation procedures (Government of Alberta 2019) and submit a Pre-Consultation Assessment Request to the Aboriginal Consultation Office (ACO) for direction on consultation (Beacon 2025).

The ACO reviewer deemed no consultation was required for FNC202554497 on December 8th, 2025.

In recognition of the Project’s location within Treaty 6 territory, Heartland Power/Beacon has consulted with the following Indigenous Communities in accordance with Alberta Utilities Commission (AUC) Rule 007: Facility Applications (AUC 2024a) (Appendix A1-B – Participant):

- 1.) Alexander First Nation;
- 2.) Alexis Nakota Sioux Nation;
- 3.) Beaver Lake Cree Nation;
- 4.) Cold Lake First Nations;
- 5.) Enoch Cree Nation #440;
- 6.) Ermineskin Cree Nation;
- 7.) Frog Lake First Nation;
- 8.) Heart Lake First Nation;
- 9.) Kehewin Cree Nation;
- 10.) Louis Bull Tribe;
- 11.) Friends of Michel Society (former Michel Indian Band);
- 12.) Montana First Nation;
- 13.) O’Chiese First Nation;
- 14.) Onion Lake Cree Nation;
- 15.) Paul First Nation;
- 16.) Saddle Lake Cree Nation;
- 17.) Samson Cree Nation;
- 18.) Sunchild First Nation;
- 19.) Whitefish Lake Indian Reserve #128 (Whitefish (Goodfish) Lake First Nation);
- 20.) Buffalo Lake Métis Settlement;
- 21.) Kikino Métis Settlement;
- 22.) Lac Ste. Anne Métis Community Association;
- 23.) Métis Nation of Alberta - Otipemisiwak Métis Government.

The Indigenous groups near the Project are shown in Figure 4.1.1. Engagement with these groups will continue as the Project advances. Project interactions with Indigenous Peoples are further described in Sections 21 and 22.

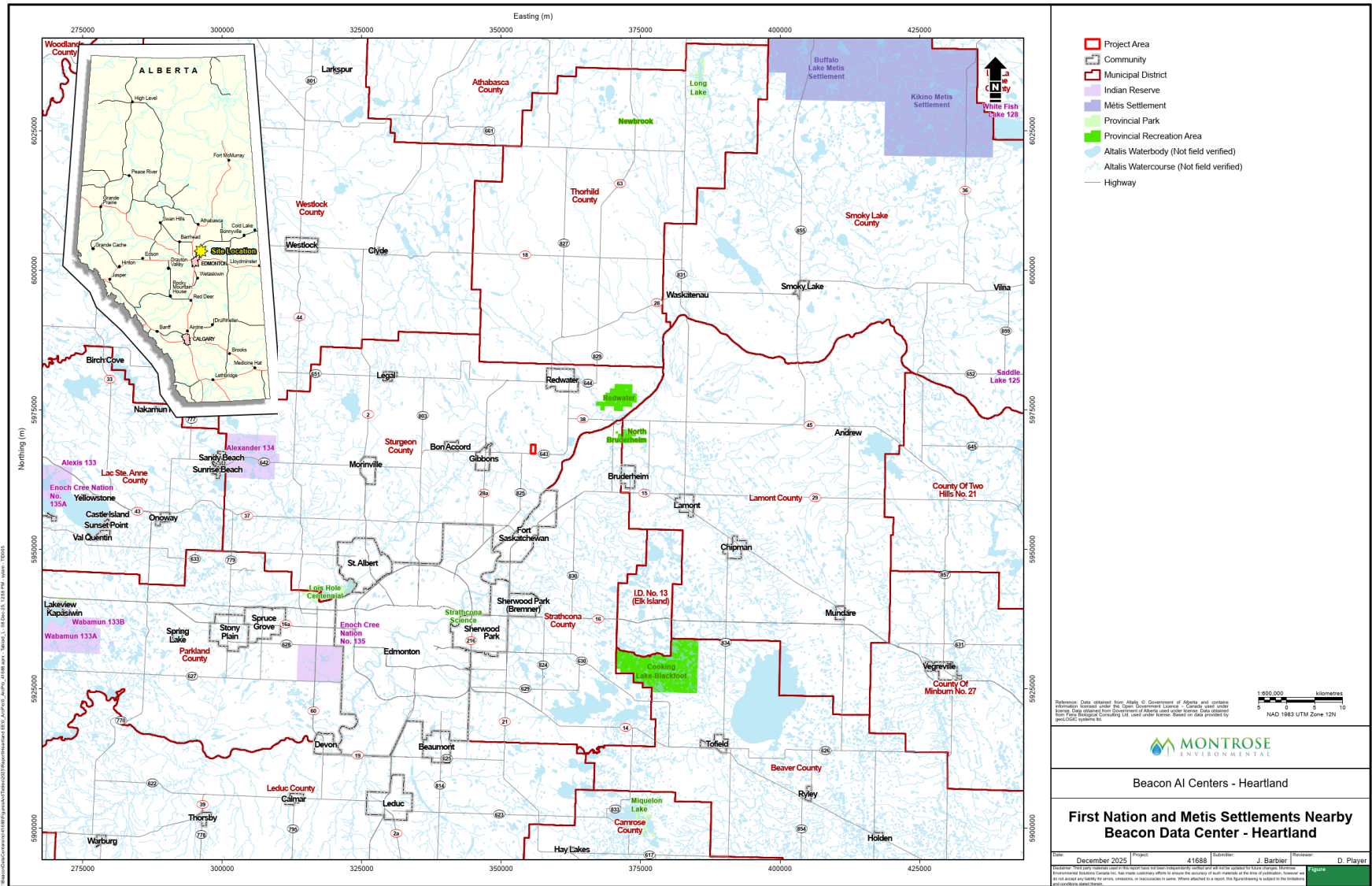


Figure 4.1.1 First Nation and Metis Communities Nearby Beacon AI Centers – Heartland Project



4.2 Engagement with Indigenous Groups

Heartland Power/Beacon acknowledges and respects the rights of Indigenous people. Heartland Power/Beacon sent a Project-specific information package (PSIP) via email on November 14, 2025, to the identified Indigenous Communities listed above. The November 2025 Project notification included:

1. An introductory cover letter with a Project and Proponent description;
2. An open house invitation;
3. Project mapping; and
4. AUC brochure titled Public Involvement in a Proposed Utility Development.

The Friends of Michel Society, formerly the Michel Indian Band, contacted the Proponent via email on November 28, 2025 to request inclusion in the AUC Participant Involvement Plan (PIP). They were added to the Indigenous contact list and were included in further Project updates as well as meetings as requested.

Indigenous Communities were offered meetings with the Proponent to discuss the Project. The Proponent met with or has scheduled to meet with:

- O'Chiese First Nation;
- Onion Lake Cree Nation;
- Kikino Metis Settlement;
- Ermineskin Cree Nation;
- Louis Bull Tribe;
- Samson Cree Nation; and
- Friends of Michel Society (former Michel Indian Band).

4.3 Results of Engagement and Key Issues Raised

During consultation and engagement activities, O'Chiese First Nation requested a Technical Review, however, to date no budget, or scope has been received. Heartland Power/Beacon will continue to communicate with the Nation to provide Project updates and discuss the scope of a technical review as more details are provided.

Additionally, the Proponent has Project Information meetings scheduled with Ermineskin Cree Nation and Louis Bull Tribe respectively in the first week of January 2026 to accommodate the Consultation Timeline Pause from December 22, 2025, to January 2nd, 2026, inclusive.

Heartland Power/Beacon will continue to communicate with Indigenous Communities and Stakeholders following the Project application being submitted. Additional notifications will be circulated to provide updates on further Project submissions and next steps.

Heartland Power/Beacon is committed to ongoing and open dialogue with all Indigenous Communities, Stakeholders, Municipalities, and special interest groups who have interest in the Project. Heartland

Power/Beacon is determined to plan, develop and operate the Project with a respectful, socially, environmentally, and economically responsible approach (Beacon 2025)

4.4 Engagement with Public and Other Stakeholders

Public and stakeholder engagement for the Project began with the distribution of introductory information packages to nearby landowners and local municipalities. Heartland Power/Beacon also hosted an Open House.

Engagement with landowners, municipalities, and regional stakeholders will continue throughout Project planning and development, including ongoing distribution of Project updates and future opportunities for meetings and information sharing.

The key concerns raised by Indigenous Communities, Stakeholders, Municipalities and Associations during the Open House event and throughout consultation and engagement are summarized in Table 4.4.1 below.

Table 4.4.1 Issues, Concerns and Mitigations

Key Concerns	Specific Interests	Response/Mitigative Measure
Land Use	Change of Land Use	The project will be situated on private agricultural land within the Industrial Heartland - Designated Industrial Zone in Sturgeon County, approximately eight kilometers east of Gibbons.
Noise Impact	Impact that sound may have on neighbours, community or region.	The project will comply with AUC Rule 012 noise standards, implementing design and site-specific mitigation measures such as silencers and acoustic barriers to ensure sound levels remain within permissible limits at nearby receptors. Noise modeling predicts compliance with daytime and nighttime limits without low frequency noise effects (AUC 2024b).
Air Impact	Impacts to air quality from the power generation proposed at the site.	Dispersion modeling indicates that emissions of NO ₂ (Nitrogen Dioxide), CO (Carbon Monoxide) and PM _{2.5} (particulate matter with a diameter of 2.5 micrometers or smaller) from the project will remain below Alberta's Ambient Air Quality Objectives and Guidelines (AAAQO/G), with minor increases attributable primarily to existing regional industrial facilities rather than the project itself (AEPA 2024; Stantec 2025a).
Water Usage	Project participants have read concerns that Data Centres use excessive amounts of water.	The project has an approved permit for municipal treated potable water use at 1,500 cubic meters per day, addressing concerns about excessive water consumption by data centers.
Consultation Commitment	When will consultation end.	Beacon AI Centers commits to ongoing engagement with communities and stakeholders throughout the project's lifespan, providing updates and addressing inquiries.

5. Study or Plan, Relevant to The Project

There are no known regional assessments of the area in which the Project is located that have been carried out under Sections 92 or 93 of the *Impact Assessment Act*.

The Government of Alberta (GOA) developed the Designated Industrial Zone (DIZ) regulatory framework (GOA 2019), which designated the Industrial Heartland – Designated Industrial Zone (IH-DIZ) as the first DIZ in Alberta. The DIZ Framework provides principles and operational policies for long-term management of cumulative environmental effects within the IH-DIZ and guides statutory decision-making for industrial development in the region. The IH-DIZ is municipally zoned for heavy industrial use, and the policies outlined in the DIZ Framework align with this planning intent.

Environmental studies have historically been completed within the IH-DIZ as part of several provincial environmental impact assessments, including the Shell Canada Limited Quest Carbon Capture and Storage Project, the Sasol Canada Gas-to-Liquids Project, the TOTAL E&P Canada Ltd. Upgrader Project, and other major industrial developments in the region. To support ongoing industrial development, the Government of Alberta has also commissioned regional studies focused on air emissions and water management. Ongoing monitoring of indicators such as air quality and watershed conditions occurs through organizations including the Heartland Air Monitoring Partnership and the North Saskatchewan Watershed Alliance, in addition to provincial and federal monitoring networks (Stantec 2021; Ramboll 2022).

6. Strategic Assessments Relevant to The Project

No strategic assessments under Subsection 95(2) of the *Impact Assessment Act* have been completed that are specific to the Project. However, the *Strategic Assessment of Climate Change* (Government of Canada 2020) applies to designated projects under the *Impact Assessment Act* and will be relevant to the assessment of greenhouse gas (GHG) emissions and potential climate-related effects for the Project.

PART B: Project Information

7. Project Purpose and Need

7.1 Project Purpose

The purpose of the Project is to provide a reliable, dispatchable on-site electricity supply for a new data-centre campus in Alberta's Industrial Heartland. The Project will produce up to 920 MWe of electricity, providing 800 MWe of continuous, reliable, affordable and dispatchable electricity to support four on-site data centres and Albertans. The Project will form the cornerstone of a purpose-built digital-energy campus capable of supporting Tier IV data-centre operations while decreasing energy dependence from the provincial electricity grid (the Alberta Interconnected Electric System [AIES]). The Project will also contribute positively towards Albertans receiving safe and reliable electricity for cooling and heating during extreme events at time when output from renewable electricity sources in Alberta has historically been limited or non-existent.

7.2 Project Need

Demand for high-density, continuous power is increasing in Alberta due to the growth of artificial intelligence (AI), high-performance computing, and cloud-service industries. The Project offers a localized generation solution that supports this demand by providing fast-response, modular, and resilient power within the data center campus. The Project reduces dependency on provincial grid infrastructure by deploying a localized, modular power system integrated into data center campus, in alignment with Alberta's data center policies which will likely require data centers to "bring your own power".

7.3 Project Benefits

The Project is expected to contribute economic and community benefits through construction and long-term employment, increased municipal and provincial tax revenue, infrastructure enhancements, collaboration with local colleges for technical training, and the use of local contractors and suppliers. The Project will be located within a planned 317-acre digital-energy campus designed to integrate environmental buffers, stormwater features, and site landscaping.

8. Physical Activities Regulation

Under the conditions set out subsection 2(1) of the *Physical Activities Regulations* (Canada 2019, Physical Activities Regulation) and paragraph 30 of the schedule to these regulations, the Project is a physical activity designated for the purpose of the definition of "designated project" in section 2 of the *Impact Assessment Act*.

9. Activities, Infrastructure, Permanent or Temporary Structures and Physical Works

This section describes the infrastructure and permanent structures that Heartland Power/Beacon intends to build, as well as the activities required to complete the Project. Emphasis is placed on the equipment's design, location and main functions.

9.1 Project Structures

The Project is a natural gas-fired power generation facility comprised of several permanent structures. The Project includes forty (40) QPAC modules housing a total of 200 INNIO Jenbacher J624 lean-burn natural-gas reciprocating engine generators. Each QPAC module integrates five (5) reciprocating engines, alternators, exhaust-treatment systems, and air-cooled radiators within a single three-storey steel enclosure engineered for industrial acoustic performance and emissions compliance.

Additional permanent structures will include a maintenance building, storage areas for operating materials, outdoor electrical equipment, and a substation that connects the Project to the Alberta Interconnected Electric System. Supporting infrastructure will include access roads, internal circulation routes, utility connections, and stormwater management features.

During construction, temporary laydown areas, workspaces, and construction facilities will be required. At the end of the Project's life, above-grade equipment will be removed in accordance with applicable regulations.

In addition to the above described structures that comprise the Project, within the ~317 acre (~128.3 ha) site footprint, four data halls as shown, one substation and a storm drainage pond are currently under consideration.

A conceptual site plan is provided in Figure 9.1.1.

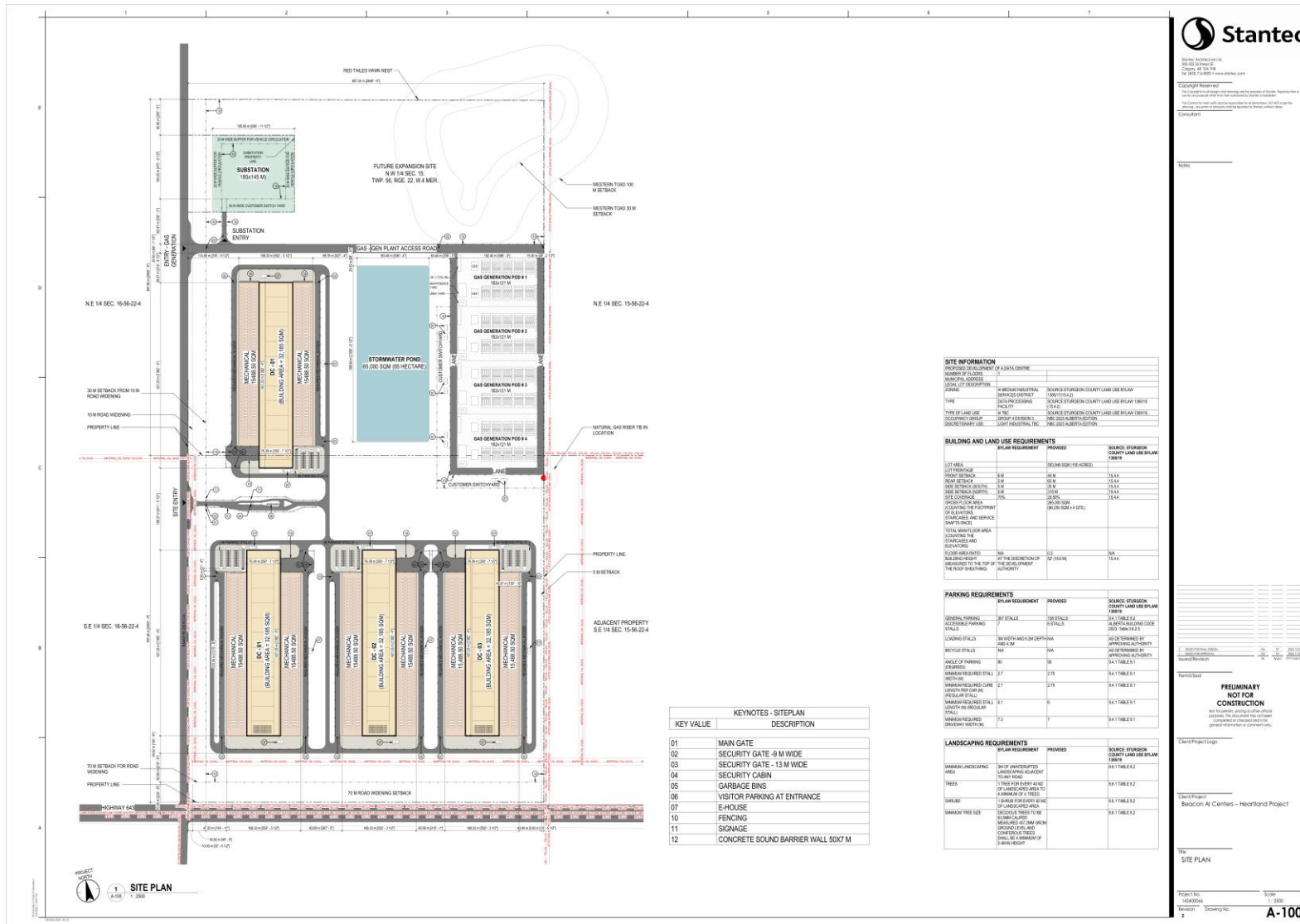


Figure 9.1.1 Site Plan



9.2 Plant Process Overview

The Project will use natural gas-fired reciprocating engine generators housed in modular units to produce electricity for the on-site data-centre campus. Natural gas will be supplied from the Nova Gas Transmission Ltd. system through a dedicated lateral and processed on site before distribution to the generation modules.

Within each module, engines combust natural gas to generate electricity, and exhaust gases pass through emission-control systems before release to the atmosphere. Engine heat will be managed through closed-loop cooling systems and air-cooled radiators. Electrical power produced by the engines will be collected through internal switchgear and distributed to the data-centre facilities and the on-site substation.

The facility will operate using automated control, protection, and monitoring systems housed within a central operations control centre.

9.3 Major Equipment

The Project will include modular natural gas-fired reciprocating engine generators housed in purpose-built enclosures, along with associated electrical, cooling, and emissions-control systems. Permanent supporting infrastructure will include a substation, fuel-supply systems, control and operations facilities, internal roads, and stormwater management features. Temporary laydown areas and construction facilities will be required during construction.

Raw materials for the Project will primarily consist of natural gas used as the combustion fuel, along with auxiliary consumables required for engine operation and emissions-control systems. Potable water and domestic water for building services will be supplied separately and are not part of the industrial processes.

The Project's principal product will be electrical energy produced for use within the data-centre campus and for interconnection to the Alberta Interconnected Electric System.

Project by-products will include treated combustion exhaust gases, waste heat dissipated through air-cooled systems, and routine operational wastes such as used lubricants, filters, and maintenance materials. All wastes will be handled and disposed of in accordance with applicable regulatory requirements.

9.4 Facilities

The Project will include several buildings and industrial enclosures required to support power generation and data-centre operations. These will consist of modular engine enclosures, a gas-metering and regulating building, an operations and control facility, maintenance areas, and reagent storage, as well as buildings associated with the data-centre campus.

Major equipment for the Project will include natural-gas reciprocating engine generator modules, associated cooling systems, emission-control units, electrical switchgear, transformers, and control and monitoring systems. Final quantities and configurations will be confirmed during detailed design.

9.5 Ancillary Infrastructure

Ancillary infrastructure for the Project will include a transmission interconnection to the Alberta Interconnected Electric System, natural gas supply from the Nova Gas Transmission Ltd. system, and municipal water supply to support the overall data-centre campus. Internal roads, utilities, and service connections will be constructed within the site as required. Telecommunications service will be provided through fibre-optic networks to support plant operations and data-centre connectivity.

9.6 Project Activities

Project activities, spanning construction, operation, and eventual decommissioning, are discussed below.

Construction

Construction of the Project is expected to span approximately two years and will include site preparation, installation of foundations and underground utilities, delivery and placement of modular generation units, and installation of electrical and control systems. Temporary laydown areas, construction facilities, and access routes will be established for the duration of construction.

Sitework

Sitework will include vegetation clearing, topsoil stripping and stockpiling, grading, installation of drainage features, internal road construction, and preparation of areas for buildings and equipment. Soil will be salvaged for later reclamation. Erosion and sediment controls will be implemented throughout construction.

Power Transmission Line and Interconnection

The Project will connect to the Alberta Interconnected Electric System through an AltaLink-developed transmission interconnection. AltaLink will be responsible for permitting and constructing the required facilities in coordination with the Alberta Electric System Operator.

Natural Gas Pipeline

Natural gas will be provided by a pipeline from the integrated Nova Gas Transmission Ltd. (NGTL) and ATCO Pipeline system through a dedicated lateral. The new lateral will be constructed and permitted by Nova Gas Transmission Ltd. Final routing and construction details will be determined by NGTL.

Water Supply

Water for the data-centre campus will be supplied through Sturgeon County's municipal system. The power-generation components of the Project do not require process water.

Data Halls

The data halls are currently under design. Currently, 4 separate data hall structures are planned, with a capacity rating of 200 MWe per data hall.

Ancillary Roads and Utilities

Internal access roads, utility corridors, and required service connections will be developed within the Project site. These elements will integrate with existing infrastructure in the Industrial Heartland – Designated Industrial Zone.

Telecommunications

Telecommunications services for plant operations and monitoring will be provided through fibre-optic networks and other communication systems.

Operation and Maintenance

The facility will be operated by a qualified operator and staffed with operations and maintenance personnel. Activities will include routine monitoring, inspection, and maintenance of equipment and supporting infrastructure. The Project will comply with provincial and federal requirements related to air emissions, noise, water use, wastewater, and waste management (AEPA 2024; AUC 2024b).

Decommissioning and Abandonment

At the end of the facility's operating life, above-grade equipment will be removed and the site reclaimed in accordance with applicable regulations. A detailed decommissioning plan will be prepared prior to closure.

Incidental Activities

Incidental activities not under Beacon's direct control include telecommunications services, fuel and power supply from third-party providers, and public-road access to the Project site.

10. Estimate of the Maximum Production Capacity and Description of the Production Processes

10.1 Estimated Maximum Production Capacity

The Project will have an installed electrical generation capacity of approximately 920 megawatts electric (MWe), with an expected operating output of about 800 MWe to supply the on-site data-centre campus.

10.2 Description of the Production Processes

The Project will generate electricity using natural gas-fired reciprocating engine generators housed in modular enclosures. Natural gas will be supplied from the Nova Gas Transmission Ltd. system, conditioned on site, and distributed to the generation modules.

Within each module, natural gas is combusted in the engines to produce mechanical energy, which is converted to electricity through generators. Exhaust gases will pass through emission-control systems before being released to the atmosphere. Engine heat will be managed through closed-loop cooling systems with air-cooled radiators.

Electricity produced on site will be collected and distributed through internal switchgear and transformers to supply the co-located data-centre campus, with the system designed to operate as an internal microgrid.

11. Project Schedule

The anticipated Project schedule is presented in Table 11.1.1

Table 11.1.1 Project Schedule

Project Phase	Schedule
Permitting & Design Work	Q1 2025 – Q3 2026
Civil Works & Foundations	Q3 2026 – Q3 2026
Module Delivery & Mechanical Installation	Q3 2026 – Q2 2027
Electrical Integration & Testing	Q1 2027 – Q2 2027
Commissioning & Performance Testing – Site Wide	Q2 2027 – Q3 2027
Commercial Operation Date (COD)	Q3 2027
Project decommissioning and abandonment (after estimated 25-year life)	2050-2055

If the IAAC determines that a federal Impact Assessment is required, the schedule will be extended by approximately two years, with an estimated in service date in 2030 Q3 (IAAC 2024).

12. Potential Alternatives

12.1 Alternative Means of Carrying Out the Project

Beacon considered alternative approaches related to facility siting, cooling methods (e.g., water versus air), and power-generation technology (e.g., configuration and sizing). The selected Project site was identified as the preferred location due to its zoning for heavy industrial use and its proximity to existing natural gas and electrical infrastructure. Development of the Project will occur within a previously disturbed parcel, minimizing additional land disturbance.

Air-cooled, closed-loop cooling was selected over water-based systems to reduce water use and simplify operations. Natural gas-fired reciprocating engines in modular enclosures were chosen as the preferred generation technology to meet the Project’s power, reliability, and operational requirements.

12.2 Alternatives to The Project

No technically or economically feasible alternatives were identified that could provide the required level of continuous electrical supply needed to support the data-centre campus.

PART C: Location Information

13. Description of the Proposed Location

13.1 Geographic Description

The Project will be located on privately owned land within the Industrial Heartland – Designated Industrial Zone (IH-DIZ) in Sturgeon County, Alberta, and is zoned for heavy industrial development. The site consists of the NW and SW quarters of Section 15-56-22-W4M and its geographic coordinates are 53°50'23"N, 113°11'34"W (53.84032, -113.192246). The Project is approximately 7 km east of Gibbons and is surrounded by existing and planned industrial uses. Regional features include the Sturgeon River, located about 4 km southwest of the site.

13.2 Site Maps

The Project location and conceptual site layout are shown in Figures 1.1.1 and 9.1.1.

13.3 Legal Description of Land

The Project will be situated entirely on a single industrial parcel within the IH-DIZ.

Legal land description: NW and SW 15-56-22-W4M.

Coordinates: 53°50'23"N, 113°11'34"W (53.84032, -113.192246).

13.4 Permanent, Seasonal or Temporary Residences and to The Nearest Affected Communities

The Project is located within an area designated for heavy industrial development, where new residential construction is restricted. There is only one noise receptor within 1.5 km of the Project, located approximately 200 meters (m) north. The City of Fort Saskatchewan is approximately 7 km south of the Project and the Town of Gibbons is located 7 km to the west.

13.5 Proximity to Land Use for Traditional Purposes

The Project is located within Treaty 6 territory. The site itself is privately owned and zoned for industrial use and is not used for Indigenous harvesting or other traditional land-use activities. Indigenous groups located within the broader region are identified in Figure 4.1.1 using federal and provincial tools (GOA 2024; IAAC 2024).

13.6 Proximity to Federal Land

The Project is not located on federal land. The nearest federally owned lands include the Redwater military training area (approximately 15 km northeast), Elk Island National Park (approximately 22 km southeast), and the Edmonton Garrison (approximately 24 km west). (Government of Canada 2025)

14. Physical and Biological Environment

14.1 Project Environmental Setting

The Project is located on privately owned agricultural land within the Industrial Heartland – Designated Industrial Zone in Sturgeon County, Alberta. The surrounding area consists of cultivated fields and patches of deciduous woodland, with adjacent land uses dominated by agricultural and industrial activities. The site is gently sloped, with drainage generally flowing northeast toward existing roadside ditches.

Several small wetlands and waterbodies occur within the broader assessment area; none are designated as environmentally significant under available provincial datasets. No environmentally significant areas occur within the Project footprint, and the nearest mapped Environmentally Significant Area (ESA) is located approximately 2.4 km north of the site.

The Project lies within the Dry Mixedwood subregion of Alberta’s Boreal natural region, characterized by aspen-dominated forests, agricultural lands, and scattered wetlands. The site has been previously disturbed through agricultural use and does not include undisturbed native habitat (Montrose 2025).

14.2 Air Quality

The Project is located within the Industrial Heartland – Designated Industrial Zone, an area with multiple existing industrial facilities and established ambient air-quality monitoring. Regional air quality is monitored through the Heartland Air Monitoring Partnership, which operates several continuous monitoring stations in nearby communities.

Available monitoring data indicate that ambient air quality in the region is generally within provincial objectives for most of the year, with occasional elevated particulate matter levels primarily associated with wildfire smoke. Representative baseline concentrations for key pollutants were derived from nearby monitoring stations and were used to support the Project’s air-quality assessment (Stantec 2025a).

14.3 Acoustic Environment

The Project is located within the Industrial Heartland – Designated Industrial Zone, where industrial noise is managed under established provincial requirements and regional noise-management frameworks. A Noise Impact Assessment (Stantec 2025b) was completed for the Project in accordance with applicable regulatory guidance.

The assessment determined that sound levels from the Project, including cumulative contributions from nearby industrial facilities, are expected to meet applicable daytime and nighttime noise limits at the nearest receptor. Low-frequency noise effects are not anticipated.

14.4 Geology and Hydrogeology

The Project is located on gently undulating terrain underlain by Pleistocene-aged eolian deposits and stagnant ice moraine sediments primarily comprised of till consisting of an unsorted mixture of clay, silt, and sand, with local water-sorted material over bedrock of the Belly River Group, with bedrock generally encountered at depths of approximately 10 to 20 meters below ground surface.

Groundwater occurs within shallow surficial deposits and in deeper sandstone units of the regional bedrock aquifers. Groundwater flow in both shallow and bedrock systems is generally interpreted to move east-southeast toward the North Saskatchewan River. No regionally significant aquifers are located within the Project footprint.

Water wells in the surrounding area are used primarily for domestic and agricultural purposes. Groundwater and surface-water licences within 5 km of the Project are limited and are associated with small-scale domestic, agricultural, industrial, or municipal uses. The Project is not expected to interact with regional aquifers or affect existing groundwater users.

14.5 Surface Water and Fish and Fish Habitat

The Project is located within the North Saskatchewan River watershed on previously cultivated land. Several small wetlands and drainage features occur within the broader assessment area, and two unnamed tributaries of the North Saskatchewan River intersect the local study area. No mapped waterbodies or fish-bearing streams occur within the Project footprint.

The nearest major watercourses, the North Saskatchewan River and the Sturgeon River, are several kilometers from the Project and will not be directly affected by Project activities. A review of regional fisheries information indicates that a variety of fish species occur in these larger systems; however, no federally designated critical habitat is located in the vicinity of the Project, and no aquatic species at risk are expected to occur within the Project area or nearby tributaries.

The watershed is classified as having a moderate to high risk for whirling disease, but the Project will not involve alterations to fish habitat or direct interaction with fish-bearing watercourses.

14.6 Soils

The Project is located on cultivated agricultural land within Sturgeon County, where soils are typical of the Dry Mixedwood region. The area is characterized by gently rolling terrain underlain by Black Chernozemic soils, with localized Gleysolic conditions in low-lying areas. These soils support long-standing agricultural use and are considered suitable for reclamation once the Project is decommissioned.

A soil and terrain assessment conducted by Montrose Environmental Solutions (2025) confirmed that surface soils are generally loam to sandy-loam in texture, with moderate wind-erosion risk and low water-erosion risk due to gentle slopes. Soil quality varies from good to moderate across upland areas and is more limited in poorly drained depressions.

Overall, the baseline soil conditions are typical of the region, with no unique or sensitive soil features identified.

14.7 Vegetation and Wetlands

Vegetation within the Project area reflects a mix of cultivated fields and planted deciduous tree stands, consistent with long-term agricultural activity in the region. Native upland forest communities are limited due to historical land clearing. A field assessment completed in 2025 identified wetlands in low-lying portions of the site, including marshes and shrubby and wooded swamp types. Many of these features show signs of past disturbance from cultivation.

No provincially listed rare plant species or rare ecological communities were recorded within the Project area or surrounding assessment area. Two noxious weed species, creeping thistle and perennial sow-thistle, were observed and will be managed in accordance with provincial requirements.

Wetlands and ephemeral drainages within the Project boundary will be addressed through the Project's stormwater and site-design measures.

Wildlife and Wildlife Habitat

A wildlife assessment was completed to describe the species and habitat present within the Project area and a 1,000-meters buffer. The assessment included desktop review and field surveys for amphibians, breeding birds, and raptors. These surveys were used to confirm habitat types, identify species of management concern, and inform mitigation measures.

The surrounding landscape is dominated by cultivated land with patches of mixedwood forest and wetlands, which provide localized habitat for amphibians and birds. Species at risk historically recorded in the region include northern leopard frog, western toad, American kestrel, bank swallow, barn swallow, sora, common yellowthroat, and several owl and hawk species.

Field surveys confirmed the presence of common amphibians (boreal chorus frog, wood frog) and a western toad call within a semi-permanent marsh. Breeding bird surveys recorded a range of species typical of agricultural and wetland edges, including several provincially listed Sensitive species. No raptor nests or species at risk raptors were observed within 1 km of the Project footprint.

Where wildlife features cannot be avoided, the Project will implement timing and setback measures consistent with provincial guidance, including pre-construction wildlife sweeps, breeding-bird nest sweeps, and amphibian-specific mitigation where required. These measures will reduce the potential for disturbance during construction and support compliance with applicable wildlife-protection requirements.

Historical Resources

Historical resources in Alberta are regulated under the Historical Resources Act and administered by Archaeological, Archives and Collections Services of Alberta (AACSW) (Alberta 2000). A Historical Resources Act (HRA) approval (HRA No. 4835-25-0120-001) was issued for the Project on December 5, 2025 (AACSW 2025).

No historical resource concerns were identified through the provincial review. Standard chance-find procedures apply, and any unanticipated historical, archaeological, or paleontological materials discovered during construction will be reported to AACSW in accordance with regulatory requirements (AACSW 2023b).

Given the disturbed agricultural setting, residual effects on historical resources are not anticipated.

15. Health, Social and Economic Context in the Region

The Project is located within the Edmonton Metropolitan Region, near the municipalities of Fort Saskatchewan (7 km southeast) and Gibbons (7 km west). Edmonton is the nearest major urban centre, while Sturgeon County provides the surrounding rural context. The region includes a mix of agricultural lands, industrial facilities, and established residential communities.

Population in the region has generally grown between 2016 and 2021, with notable increases in Fort Saskatchewan (12.1%) and modest growth in Gibbons (1.9%). Edmonton grew by 8.3%, while Sturgeon County remained stable. Indigenous residents represent between 5% and 10% of local populations, with the proportion increasing in several communities over the last census period (Statistics Canada 2022).

Economic conditions in the area reflect a diversified regional economy anchored by industrial operations, manufacturing, and service sectors. Median household incomes vary across the region, with higher averages in Sturgeon County and Fort Saskatchewan.

The region is served by the Alberta Health Services Edmonton Zone, which includes major hospitals, community care centres, and local health facilities in Fort Saskatchewan and Gibbons. Health indicators in the Edmonton Zone are broadly comparable to provincial averages; most residents report very good or excellent overall health and mental health. Chronic conditions such as arthritis, asthma, and high blood pressure occur at rates similar to Alberta as a whole. Patterns of smoking, alcohol use, physical activity, and perceived stress are also generally consistent with provincial trends (Alberta Health Services 2023).

Overall, the regional health, social, and economic context is defined by steady population growth, a resilient labour market influenced by the surrounding industrial sector, and access to extensive health services within the Edmonton Zone.

PART D: Federal, Provincial, Territorial, Indigenous and Municipal Involvement

16. Financial Support from Federal Authorities

The Project does not require financial support from federal authorities. Beacon may explore federal grant or funding opportunities in the future, if available.

17. Use of Federal Lands for Project

The Project will not be constructed or operated on federal lands (Canada 1999; Canada 2019).

18. Jurisdictions That Have Powers, Duties or Functions in Relation to an Assessment of the Project's Environmental Effects

18.1 Federal Regulatory Requirements

In addition to requirements under the *Impact Assessment Act*, the Project may interact with the following federal legislation:

- *Fisheries Act* – Authorization may be required if Project activities involve disturbance to a fish-bearing waterbody or fish habitat.
- *Migratory Birds Convention Act* – Construction activities will follow federal guidance to avoid harm to migratory birds, including measures such as nest surveys and activity timing, if required.
- *Species at Risk Act (SARA)*– If species listed under Schedule 1 of SARA are identified during environmental surveys, avoidance and mitigation measures will be developed in accordance with federal direction.
- Other federal legislation may be relevant depending on design and permitting needs, including the *Canadian Navigable Waters Act and Aeronautics Act*. No interaction with navigable waters is expected. An application to Transport Canada in regards to Obstruction Marking and Lighting and to Nav Canada relating to land use submission is being prepared.

(Government of Canada 1994; Canada 1985; Canada 2002; Canada 2019).

18.2 Provincial Regulatory Requirements

The Project is subject to several provincial regulatory requirements associated with power generation, environmental protection and land-use planning, including:

- *Hydro and Electric Energy Act* — Approval under AUC Rule 007 for construction and operation of the power plant. AltaLink L.P. will be responsible for the transmission development application.
- *Electric Utilities Act* — AESO will review the Project's grid connection through a system access service request to confirm the design meets Alberta's competitive electricity market and reliability requirements.

- *Environmental Protection and Enhancement Act (EPEA)* — Approval required for construction and operation of a power plant, including pre-disturbance site assessments and soil conservation planning.
- *Water Act* — No surface water diversion license is anticipated. Wetlands within the Project area will be directly impacted by the project, resulting in loss of wetland area, with the exception of the semi-permanent graminoid marsh in the northeast corner of NW 15-56-22 W4.- A Wetland Assessment Impact and Report (WAIR) has been submitted and a Water Act Application will be submitted for proposed impacts to wetlands.
- *Historical Resources Act (HRA)*— HRA clearance has been granted (HRA #4835-25-0120-001). Any chance finds must be reported to AACSW.
- *Pipeline Act* — Nova Gas Transmission Ltd. will apply separately for pipeline permitting associated with the natural gas lateral.
- *Public Lands Act* — The Public Lands Act applies mainly to Crown land and water bodies. The Project is on private land, except for Crown-claimable wetlands.

(Alberta 2000; Alberta 2003; AUC 2024a).

18.3 Municipal Regulatory Requirements

The Project is located in Sturgeon County and must adhere to applicable municipal plans and bylaws, including:

- Sturgeon County Municipal Development Plan (Bylaw 1313/13)
- Sturgeon County Land Use Bylaw (1385/17)
- Alberta's Industrial Heartland Area Structure Plan (Bylaw 1118/07)

(Sturgeon County 2007; Sturgeon County 2014).

The Project is situated within the Alberta Industrial Heartland – Designated Industrial Zone (IH-DIZ). Development in the IH-DIZ is supported by regional planning policies that promote coordinated industrial growth and establish expectations for environmental performance. Relevant management frameworks include:

- Air emissions management policies and Alberta Ambient Air Quality Objective and Guidelines (AAAQO/G) applicable within the Industrial Heartland – Designated Industrial Zone (IH-DIZ)
- The Water Management Framework for the Industrial Heartland and Capital Region
- Regional policies and guidelines for soil conservation and topsoil storage
- The NCIA Regional Noise Management Plan (RNMP), which provides a coordinated noise-modeling and management framework for IH-DIZ industrial operators.

(Government of Alberta 2019; NCIA 2024).

PART E: Potential Effects of the Project

The Project consists of a natural-gas-fired power generation facility. Related infrastructure to the Project includes a new power transmission line (to be developed by AltaLink), a natural gas lateral pipeline (to be developed by NGTL), and ancillary infrastructure regulated under provincial legislation.

The Project is co-located with four (4) data halls as part of an on-site data center capable of supporting Tier IV data-centre operations.

As noted above, although the data center is not a Project component, Heartland Power has included consideration of the data center in its assessment where relevant to provide the Impact Assessment Agency of Canada with a fulsome representation of the data centre campus based on most accurate information and assumptions known at this time.

19. Potential Changes under Federal Legislative Authority

The following information is intended to provide a complete and thorough overview of the anticipated effects arising from the Project; however, none of these effects are anticipated to cause non-negligible adverse changes to the environment falling within Federal jurisdiction.

The representations in this section apply to the entire data center campus (i.e., Project and data center).

19.1.1 Fish and Fish Habitat

The Project is not expected to result in adverse effects on fish or fish habitat as defined under the *Fisheries Act*. No natural watercourses occur within or adjacent to the Project footprint, and construction will not involve work below the ordinary high-water mark. All construction water will be sourced municipally, and the Project will not withdraw or divert water from the North Saskatchewan River or its tributaries.

Stormwater will be managed through an engineered system that maintains existing drainage patterns and prevents uncontrolled releases.

No interactions with aquatic species at risk are anticipated during construction, operations, or decommissioning.

19.1.2 Aquatic Species at Risk

No effects on aquatic species at risk listed under the *Species at Risk Act* are expected. The Project footprint does not contain aquatic habitat, and no activities will occur within or near fish-bearing waters. Avoidance of aquatic habitat eliminates the need for additional mitigation.

19.1.3 Migratory Birds

The Project is anticipated to have negligible effects on migratory birds and wildlife.

Potential interactions relate largely to vegetation and wetland clearing during construction, which may result in habitat loss and short-term sensory disturbance. Ground disturbance during the migratory bird nesting period may create a risk of incidental nest disturbance, which will be avoided through standard mitigation such as pre-construction nest sweeps in accordance with applicable federal guidance.

During operations, residual effects are expected to be minimal, limited to low-level sensory disturbance from noise and lighting. No barriers to wildlife movement are expected, and mortality risks from traffic or facility infrastructure are anticipated to be low.

Mitigation measures that will be implemented include:

- conducting nest and wildlife sweeps prior to vegetation removal,
- establishing buffers around active nests or sensitive habitats where required,
- using directional or shielded lighting to reduce light spill, and
- managing construction traffic and site access to reduce disturbance.

Decommissioning will involve temporary activities similar to construction, with effects expected to be low, short term, and reversible.

19.2 Overview of Other Environmental Effects

As demonstrated in Section 19, the potential changes to the environment in respect to the Project relate primarily to air quality during construction and operation.

The following informational regarding other changes to the environment is intended to provide a complete and thorough overview of the anticipated changes to the environment arising from the Project; however, none of these changes are anticipated to cause non-negligible adverse changes to the environment falling within Federal jurisdiction.

The assessment includes the entire data center campus (i.e., Project and data center).

19.2.1 Other changes to the environment

Air Quality

Effect Pathway

Construction

Air quality effects during construction will be limited and temporary. Exhaust emissions from diesel-powered equipment and fugitive dust generated by vegetation removal, soil stripping, grading, and vehicle movement on unpaved areas represent the primary pathways. These activities may generate total suspended particulate (TSP), particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), and trace combustion products typical of large construction projects.

Because detailed construction planning is not yet completed, emission quantities cannot be estimated at this stage; however, effects are expected to be short term and reversible.

Operation

During operation, air contaminant emissions will originate primarily from natural-gas combustion in lean-burn reciprocating engines. Key pollutants include oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), with negligible

emissions of metals or polycyclic aromatic hydrocarbons (PAHs). The entire data-centre campus (i.e., the Project and the data centre) has been considered in the Air Quality Assessment.

Preliminary maximum annual emissions—based on continuous operation (8,760 hours per year)—are:

- NO_x: 471 tonnes/year
- CO: 902 tonnes/year
- PM_{2.5}: 120 tonnes/year

(Stantec 2025a)

The Project will use clean-burning natural gas and advanced controls such as selective catalytic reduction (SCR) to meet federal and provincial emission requirements. If carbon capture is added in the future, it may slightly change the emissions profile.

Decommissioning

Air quality effects during decommissioning will be similar to or less than those expected during construction and are anticipated to be temporary.

Acoustic Environment

The entire data center campus (i.e., Project and data center) has been considered in the Noise Impact Assessment (Stantec 2025b).

Effects Pathway

Construction

Construction noise will originate from typical equipment and vehicle use during site preparation, excavation, road construction, foundation work, and installation of major equipment. Noise sources include excavators, graders, dozers, haul trucks, concrete trucks, mobile cranes, generators, and worker vehicles. These activities will cause short-term increases in sound levels, comparable to other construction projects in the region.

Construction noise will generally occur during daytime and is expected to cause only temporary nuisance-type effects.

Operation

Operational noise will result primarily from engines, exhausts, ventilation systems, coolers, pumps, and transformers.

As summarized in Section 14.1, a Noise Impact Assessment (NIA) was completed following AUC Rule 012. The NIA compared baseline, Project, Application Case, and Foreseeable Application Case conditions, using Project-Specific Sound Levels (PSLs) established for the IH-DIZ.

Modeling results indicate that cumulative daytime and nighttime sound levels comply with applicable PSLs at all receptors. Low-frequency noise is not expected, and the Project meets all requirements of AUC Rule 012.

Mitigation

Construction

Standard mitigation measures will be implemented to minimize temporary construction noise, including:

- limiting high-noise activities to daytime where practicable,
- maintaining equipment and noise-abatement devices in good working order,
- minimizing idling,
- locating staging and laydown areas away from sensitive receptors,
- enclosing generators or compressors where required,
- avoiding simultaneous operation of multiple high-noise equipment when feasible, and
- notifying nearby residents prior to particularly loud activities.

A Construction Noise Management Plan may also be used to guide scheduling, mitigation, communication, and complaint response.

Operation

The NIA demonstrates compliance with all provincial requirements; however, additional design-phase measures may be used where appropriate, including:

- procuring equipment with low-noise specifications,
- using acoustic enclosures on dominant noise sources,
- applying attenuation on exhausts, ventilation openings, or cooling equipment, and
- incorporating noise-control materials into buildings and structures if needed.

Residual effects on the acoustic environment during operations are expected to be low and compliant with the established IH-DIZ noise limits.

Geology and Hydrogeology

Effect Pathways

Construction

The Project is underlain by unconsolidated clay, sand, till, and glaciofluvial deposits above the Belly River Formation. Groundwater levels in the area are relatively shallow, meaning interaction with groundwater during excavation is possible.

Construction activities such as excavation, trenching, and limited dewatering may temporarily influence shallow groundwater levels or flow rates. Disturbance to soil and parent material may alter localized hydraulic properties.

Accidental spills pose a potential risk to groundwater quality, particularly where shallow groundwater is present, and construction activities may encounter previously unidentified contaminated material.

Overall, potential construction-phase pathways include:

- changes to groundwater quality from accidental spills,
- disturbance of pre-existing contamination (if encountered),
- temporary alterations to shallow groundwater levels due to excavation or dewatering, and
- minor changes to subsurface hydraulic properties.

Construction dewatering will follow standard provincial best practices. Discharge water will be directed away from watercourses, wetlands, and drainage features. Drawdown is expected to be limited given the shallow excavations and short duration of dewatering.

Operation

Operational effects on groundwater are expected to be negligible.

Potential pathways include:

- accidental spills of fuels or chemicals, and
- minor alterations to shallow groundwater levels associated with water diversions or site drainage.

Stormwater will be managed within a lined on-site pond, preventing infiltration to groundwater.

Operational runoff will be isolated from groundwater. A site-specific spill response and reporting plan will be implemented prior to commissioning.

Decommissioning and Abandonment

Decommissioning activities may involve shallow excavation, limited dewatering, and removal of infrastructure. Potential pathways are similar to construction but temporary and low magnitude.

Mitigation

Construction

Standard construction practices and best-management procedures will limit potential interactions with groundwater. Key measures include:

- Implementing spill-prevention and spill-response procedures, including secondary containment during refueling and spill trays under stationary equipment.
- Immediately containing, removing, and remediating contaminants if a spill occurs, and meeting all reporting requirements.
- Implementing contamination-management procedures if previously unknown contaminated soil or groundwater is encountered.
- Managing dewatering to minimize drawdown, including monitoring water levels in excavations, limiting open-trench durations, and directing discharge away from wetlands, watercourses, and drainage pathways.
- Monitoring discharge areas for erosion, saturation, or unintended flow and adjusting dewatering rates as needed.

With these measures, construction-phase effects on groundwater quantity or quality are not anticipated.

Operation

During operations, groundwater protection will focus on monitoring and spill prevention. The groundwater monitoring network will be confirmed once the hydrogeological investigation is complete.

If required, the Detailed Project Description will include an evaluation of residual groundwater-related effects and monitoring requirements.

Decommissioning and Abandonment

Mitigation measures will be consistent with construction practices, including spill prevention, dewatering controls, and erosion/sediment management.

Soils

Effect Pathways

The Project footprint is located on previously cultivated land within Soil Correlation Area 10 (Thick Black / Dark Gray–Gray Soil Zone of central and east-central Alberta) (Alberta Soil Information Centre 2016). Effects on soil quality and quantity may occur during construction, operation, and decommissioning.

Construction

Construction activities will require clearing, grading, trenching, and topsoil stripping. Topsoil will be salvaged and stored on site until reclamation during decommissioning. Exposed soils will be susceptible to wind and water erosion before vegetation is re-established.

Vehicle and equipment traffic, particularly under wet conditions, may cause compaction, rutting, and loss of soil structure. Soil handling and stockpiling may also result in admixing of horizons, especially where colour contrasts are subtle.

Alterations to microtopography and surface drainage can influence soil moisture and erosion potential. Accidental spills or disturbance of previously contaminated material—though unlikely in cultivated areas—could affect soil quality.

Overall, construction-phase pathways include:

- erosion of stockpiled or exposed soils,
- compaction and rutting from vehicle/equipment traffic,
- admixing of topsoil and subsoil during handling and grading,
- minor changes to drainage patterns or soil stability due to grading, and
- soil contamination from accidental spills or previously undiscovered contamination.

Operation

No new soil disturbance is anticipated during the operations phase. However, exposed areas remaining after construction may continue to experience wind and water erosion until fully stabilized.

Operational traffic (e.g., facility vehicles) may cause localized compaction, rutting, or degradation of soil structure, particularly under wet conditions. Accidental spills of fuels or chemicals may affect soil quality, although the risk is low with proper controls in place.

Decommissioning and Abandonment

Decommissioning activities will include equipment removal, re-grading, and topsoil replacement. Similar to construction, these activities may result in:

- erosion during re-grading and replacement of topsoil,
- compaction or rutting from vehicle/equipment movement,
- admixing of soil horizons during handling and replacement, and
- soil contamination due to accidental spills.

Effects are expected to be temporary and reversible with appropriate mitigation.

Mitigation

Construction

Standard soil-management and erosion-control practices will be implemented to limit effects on soil quality and quantity. Representative measures include:

- Salvaging and storing topsoil separately from subsoil in accordance with the Project's Topsoil Conservation and Use Plan.
- Suspending soil stripping during excessively wet or high-wind conditions.
- Restricting vehicle/equipment traffic during wet conditions to prevent compaction and rutting.
- Using appropriate handling to minimize admixing of contrasting soil horizons; oversight by a qualified soil professional where required.
- Avoiding placement of stockpiles in low areas prone to spring breakup or runoff.
- Stabilizing disturbed areas and stockpiles, employing erosion and sediment control measures, and repairing erosion or rutting as needed.
- Implementing spill-prevention and spill-response procedures; developing a soils contingency plan if suspected contamination is encountered.
- Restoring grades and drainage to pre-construction conditions or stable, approved configurations.

With these measures in place, construction-related effects on soils are expected to be low magnitude and reversible.

Operation

Mitigation measures similar to construction will apply during operations, including:

- Monitoring disturbed areas and stockpiles for erosion, sedimentation, and weed growth.
- Implementing erosion and sediment control plans where required.
- Maintaining spill-prevention and spill-response procedures to prevent soil contamination.
- Restricting vehicle movements to designated areas to limit compaction and rutting.

Residual effects on soils during operation are expected to be minimal.

Decommissioning and Abandonment

Soil-management practices used during construction will also be applied during decommissioning, including:

- Salvaging, storing, and replacing soils in the correct order (subsoil first, then topsoil).
- Minimizing admixing during soil handling and grading.
- Controlling erosion during re-grading and final reclamation.
- Managing vehicle/equipment traffic to reduce compaction and rutting.
- Implementing spill-prevention and response procedures.

Topsoil replaced during reclamation will be spread evenly and stabilized to support revegetation and long-term soil recovery.

Vegetation and Wetlands

Effect Pathways

The Project site is predominantly cultivated land surrounded by agriculture and existing industrial development. Small areas of natural vegetation and wetlands occur within portions of the footprint and may be disturbed during Project construction.

Construction

Construction activities—including clearing, grading, topsoil stripping, and wetland alteration—will result in direct loss of native vegetation and wetland area within portions of the Project footprint.

Indirect effects may include weed introduction and spread from materials, equipment, and vehicle movement. Disturbance of wetland vegetation may also alter hydrology, storage capacity, or ecological function.

Overall construction-phase pathways include:

- Direct loss or alteration of native vegetation due to clearing and ground disturbance.
- Disturbance or removal of wetland vegetation, including localized changes to wetland function.
- Changes to hydrology where grading modifies surface-water flow or storage.
- Introduction or spread of invasive or noxious weeds via equipment, topsoil storage, or vehicle movement.

Operation

Operation of the facility will not create additional vegetation or wetland disturbance beyond what occurs during construction.

However, weeds may continue to establish and spread if not actively managed. Localized compaction or minor disturbance from routine vehicle traffic may influence vegetation in disturbed areas. No further direct effects on wetland area or function are anticipated.

Decommissioning

Removal of infrastructure and reclamation activities will provide opportunities to restore vegetation cover.

Depending on the final topography and hydrologic conditions created during reclamation, new wetland features may develop; however, this is not guaranteed.

Potential pathways during decommissioning include:

- Indirect changes to vegetation through weed introduction or spread from equipment.
- Increases in native vegetation cover following reclamation.
- Potential development of new wetland areas if suitable hydrologic conditions emerge.
- Short-term disturbance of soils and vegetation during final grading and stabilization.

Residual effects are expected to be temporary and reversible, except where wetlands were permanently removed during construction (which will be compensated under the Alberta Wetland Policy).

Mitigation

Construction

Mitigation measures will be implemented to reduce effects on vegetation and wetlands. Representative measures include:

- Ensuring equipment and materials arrive on site clean and free of weeds, soil pathogens, or contaminants.
- Identifying and flagging noxious and invasive weed areas prior to disturbance.
- Monitoring topsoil stockpiles for weeds and treating as needed.
- Limiting vegetation clearing to within surveyed and approved boundaries.
- Using minimal-disturbance techniques where grading is not required.
- Stabilizing disturbed surfaces (e.g., seeding, mulching) to minimize erosion and weed establishment.
- Avoiding unnecessary vehicle movement in wet or sensitive areas.
- Minimizing clearing and ground disturbance within wetlands.
- Obtaining all required Water Act approvals for wetland impacts and providing compensation where permanent loss occurs, consistent with the Alberta Wetland Policy.
- Installing erosion and sediment control measures to prevent siltation or hydrologic effects on adjacent wetlands.
- Maintaining cross-drainage and natural flow paths where temporary access routes intersect wetlands.
- With mitigation, residual construction effects will include long-term loss of vegetation in permanently developed areas and permanent loss of any wetlands removed during construction. All permanent wetland impacts will be compensated.

Operation

Mitigation during the operations phase will focus on weed control and preventing further disturbance, including:

- Monitoring disturbed areas and controlling weeds in accordance with applicable requirements.
- Restricting vehicle movement to established access routes.
- Maintaining erosion and sediment controls where necessary.
- Residual effects are expected to be low and reversible.

Decommissioning and Abandonment

Decommissioning mitigation will be similar to construction and will include:

- Weed prevention and management during reclamation.
- Minimizing vegetation disturbance during equipment removal.
- Stabilizing final grades and revegetating reclaimed areas.
- Restoring soils and drainage patterns to support native vegetation recovery.

Residual effects following reclamation are expected to be low magnitude and reversible, with potential for long-term improvement of vegetation cover.

19.3 Marine Environment

No adverse effects to the marine environment are anticipated as a result of Project activities. The Project is located entirely within inland Alberta and has no interaction with marine ecosystems.

19.4 Interprovincial Waters

No adverse effects to interprovincial waters, boundary waters, or international waters are anticipated. The Project will rely on municipal water supply and does not involve water withdrawals, diversions, or discharges that would affect interjurisdictional water bodies.

20. Summary of Federal Jurisdiction Considerations

The Project is not expected to have effects on lands outside of Alberta or elsewhere in Canada. The Project is not located on federal lands, although there are Indigenous reserve lands in the vicinity of the Project (see Section 21). As such, no changes to the environment are expected to result on federal lands or in a province other than Alberta from the Project.

20.1 Extra-Provincial Lands

The Project is not expected to affect air, land, or water outside Alberta. The nearest Indigenous reserve lands (Alexander 134 at 45 km and Enoch Cree Nation No. 135 at 47 km) are sufficiently distant that no measurable effects are anticipated based on Project scale and anticipated effect pathways (GOA 2024c).

20.2 Federal Lands

The Project will not be carried out on federal lands and does not constitute a federal work or undertaking. No effects on federal lands are anticipated.

21. Potential Impacts on Traditional Land Use, Physical and Cultural Heritage, and Historical, Archaeological and Paleontological Resources

21.1 Indigenous Land Use

The Project lies within Treaty 6 territory, in a region where several Indigenous groups may exercise Treaty and traditional rights. Beacon identified the following groups as potentially interested in the Project:

Alexander First Nation; Alexis Nakota Sioux Nation; Beaver Lake Cree Nation; Cold Lake First Nations; Enoch Cree Nation #440; Ermineskin Cree Nation; Frog Lake First Nation; Heart Lake First Nation; Kehewin Cree Nation; Louis Bull Tribe; Friends of Michel Society (former Michel Indian Band); Montana First Nation; O'Chiese First Nation; Onion Lake Cree Nation; Paul First Nation; Saddle Lake Cree Nation; Samson Cree Nation; Sunchild First Nation; Whitefish Lake Indian Reserve #128 (Whitefish (Goodfish) Lake First Nation); Buffalo Lake Métis Settlement; Kikino Métis Settlement; Lac Ste. Anne Métis Community Association; Métis Nation of Alberta - Otipemisiwak Métis Government.

The Project is located on privately owned land zoned for heavy industrial use, with extensive historical cultivation and limited natural vegetation (Sturgeon County 2014; AEP 2022a). As a result, the potential for current traditional land use, such as hunting, plant harvesting, or cultural practices, within the Project area is low.

While Indigenous land use may occur regionally, direct overlap with the Project area is expected to be limited and primarily restricted to temporary construction-related access constraints. Beacon will continue engagement with Indigenous communities (IAAC 2024) to identify interests, gather input, and address concerns. Communication will continue during construction to avoid conflicts with land users where feasible.

Given land status, zoning, and existing industrial disturbance, no significant adverse effects to current use of lands and resources for Indigenous purposes are anticipated.

21.2 Historical Resources

Beacon has been granted a Historical Resources Act approval on December 05, 2025 (HRA Number: 4835-25-0120-001) by AACSW. Therefore, no residual effects on historical resources are anticipated. As with all projects regulated under the HRA, accidental or chance finds during construction or operation must be reported under Section 31 of the HRA (AACSW 2023b).

22. Potential Effects on Indigenous Health, Social, and Economic Conditions

The environmental impacts of Project construction and operation on lands outside the Project area and within the IH-DIZ are anticipated to be minimal; therefore, effects on Indigenous peoples are also expected to be minimal. Environmental changes, including those affecting soil, vegetation, wildlife, and heritage resources, are expected to remain largely confined to the Project area, and the Project is not anticipated to affect the aquatic environment.

While impacts on air quality, noise, and human health may extend beyond the Project area, they are not expected to exceed regulatory standards once appropriate mitigation measures are applied. Socio-economic effects will also extend beyond the Project area but are expected to be positive due to the Project’s economic benefits, and any impacts on social services can be managed through existing infrastructure. Effects on Indigenous peoples—including health and socio-economic conditions, physical and cultural heritage, historically or archaeologically significant sites, and current traditional land use—are expected to be negligible.

Beacon acknowledges that the Project is within an area where Indigenous groups may exercise rights. Beacon will continue engagement and, if potential effects are identified, will assess the need for additional mitigation. Effects on Indigenous peoples, including land use, socio-economic conditions, health, and cultural heritage, are expected to be negligible, given the Project’s industrial zoning, private-land status, and low traditional-use potential.

Beacon will continue Indigenous engagement and support long-term opportunities for economic participation.

23. Estimate Of Any Greenhouse Gas Emissions Associated with The Project

GHG emissions will occur during construction, operation, and decommissioning.

Construction Phase:

Estimated construction emissions total ~4,500 tonnes CO₂e , occurring over the multi-year construction period.

Operations Phase:

Table 23.1.1 Operational GHG Emissions (Maximum Estimated)

Pollutant	GHG Emissions (kilotonne/year)	GHG Emission Intensity (t/GWh)
CO ₂	3004	628
CH ₄	34.1	
N ₂ O	1.67	
CO ₂ e	4,401	

Notes:

CO₂ (carbon dioxide), CH₄ (methane), and N₂O (nitrous oxide) are greenhouse gases emitted during Project operations. Total greenhouse gas emissions are expressed as carbon dioxide equivalent (CO₂e), which represents the combined climate impact of these gases using their respective global warming potentials (GWPs). CO₂e values were calculated using GWPs from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (IPCC 2014), consistent with the Strategic Assessment of Climate Change (Government of Canada 2020).

The Strategic Assessment of Climate Change requires projects with a lifetime beyond 2050 to detail how the Project will achieve net-zero emissions by 2050. There are several potential pathways for the Project to achieve net-zero emissions by 2050, including the incorporation of a small amount of renewable (carbon-negative) natural gas or hydrogen into the Project fuel mix, or through offsets. Additionally, the Project has been designed with flexibility to allow for the integration of carbon capture and storage infrastructure in the future, including consideration of space allocation that could support future Carbon capture and storage (CCS).

Decommissioning Phase:

Emissions will be similar to, or lower than, construction emissions.

24. Types of Waste and Emissions Generated

The Project will generate air emissions, noise, liquid discharges, and solid/hazardous wastes during all phases.

24.1 Air

Air emissions will arise from:

- combustion emissions from construction and operational equipment (e.g., NO_x, CO, and PM_{2.5})
- fugitive dust during land clearing, grading, and traffic on unpaved surfaces

These emissions will be managed through equipment standards, operational practices, dust control measures, and facility design.

Dust will be highest during site preparation. Operational emissions will be minimized using clean-fuel combustion and engineered emission controls.

24.2 Noise

Noise sources include:

- construction equipment, consistent with major industrial projects,
- operational equipment such as engines, radiators, pumps, ventilation, and transformers.

Noise Impact Assessment concluded that the Project design complies with AUC Rule 012 (AUC 2024b).

Noise complaints will follow the AUC Rule 012 resolution process.

24.3 Liquid Discharges

Liquid discharges include:

- stormwater runoff,
- dewatering water from excavation,
- domestic wastewater.

Beacon intends to connect to Sturgeon County's sanitary sewer system. If unavailable, wastewater will be stored and hauled to licensed facilities.

24.4 Other Wastes

The Project will generate:

- domestic refuse and industrial garbage,
- recyclables (wood, metal, plastics, paper),
- waste oil,
- hazardous wastes (solvents, paints, batteries, bulbs, herbicides), and
- relief-valve discharges.

All wastes will be stored in appropriate, labelled receptacles or containment areas and removed from site for disposal at licensed facilities in accordance with applicable regulations.

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