ENERGY Alberta

Peace River Nuclear Power Project

Initial Project Description Summary: English

Report No. CA0038431-25003-R-Rev0

April 11, 2025

Table of Contents

1 INTRODUCTION 1-1

2 PART A – GENERAL INFORMATION 2-1

2.1 Project Overview 2-1

2.2 Proponent Contact Information 2-4

3 PART B – PLANNING PHASE RESULTS 3-1

3.1 Corporate Commitment to Engagement 3-1

3.2 Indigenous Engagement 3-1

3.2.1 Indigenous Engagement Tools and Methods 3-1

3.2.2 Identification of Potentially Impacted Indigenous Nations and Communities 3-2

3.2.3 Summary of Indigenous Engagement Activities 3-3

3.2.4 Preliminary Topics of Interest 3-3

3.2.5 Future Indigenous Engagement Activities 3-4

3.3 Public Engagement 3-4

3.3.1 Public Engagement Tools and Methods 3-4

3.3.2 Identification of Public Stakeholders 3-5

3.3.3 Summary of Public Engagement Activities 3-5

3.3.4 Future Public Engagement Activities 3-6

3.4 Assessments and Studies Relevant to the Project 3-6

4 PART C – PROJECT INFORMATION 4-1

4.1 Purpose of and Need for the Project 4-1

4.2 Impact Assessment Requirements 4-2

4.3 Activities, Infrastructure, and Physical Works 4-2

4.4 Project Production Capacity and Process 4-6

4.4.1 Maximum Production Capacity 4-6

4.4.2 Production Process Description 4-6

4.5 Preliminary Project Timelines 4-13

4.6 Alternative Means of Carrying Out the Project 4-13

4.7 Potential Alternatives to the Project 4-14

5 PART C & D – LOCATION INFORMATION AND CONTEXT 5-1

5.1 Proposed Location of the Project 5-1

5.2 Physical and Environmental Overview 5-3
5.2.1 Atmospheric Environment 5-3
5.2.2 Geological and Hydrogeological Environment 5-3
5.2.3 Surface Water Environment 5-4
5.2.4 Terrestrial Environment 5-5
5.3 Species at Risk 5-6
5.3.1 Fish and Fish Habitat 5-6
5.3.2 Vegetation 5-6
5.3.3 Birds and Migratory Birds 5-7
5.3.4 Wildlife and Wildlife Habitat 5-7
5.4 Land and Resource Use 5-7
5.4.1 Traditional Land and Resource Use 5-7
5.4.2 Agriculture 5-8
5.4.3 Tourism 5-8
5.5 Cultural Resources 5-8
5.6 Socio-Economic Environment 5-9
5.6.1 Population 5-11
5.6.2 Education 5-11
5.6.3 Health 5-11
5.6.4 Infrastructure and Services 5-12
5.6.5 Economy 5-13
5.6.6 Labour Force 5-13

6 PART E – FEDERAL, PROVINCIAL, INDIGENOUS, AND MUNICIPAL INVOLVEMENT AND EFFECTS 6-1

6.1 Federal Funding 6-1
6.2 Federal Lands 6-1
6.3 Federal, Provincial, Indigenous, and Municipal Government Jurisdictional Requirements 6-1

7 PART F – POTENTIAL EFFECTS OF THE PROJECT 7-1

7.1 Approach to Determining Potential Effects 7-1
7.2 Changes Related to Federal Legislation 7-1
7.2.1 Fish and Fish Habitat and Aquatic Species at Risk 7-2
7.2.2 Migratory Birds 7-3
7.3 Changes Related to the Biophysical Environment 7-4
7.4 Changes Related to the Socio-Economic Environment 7-5

7.4.1 Health, Social, and Economic Factors 7-6
7.4.2 Recreational Land Use 7-6
7.4.3 Gender-Based Analysis Plus 7-6
7.5 Federal Lands or Lands Outside of Alberta 7-7
7.6 Impacts to Indigenous Peoples 7-7
7.6.1 Traditional Land and Resource Use 7-7
7.6.2 Heritage and Cultural Resources 7-7
7.7 Impacts to Health, Social, and Economic Conditions of Indigenous Peoples 7-8
7.8 Greenhouse Gas Emissions Estimates 7-8
7.9 Waste and Emissions 7-10
7.9.1 Atmospheric Emissions 7-10
7.9.2 Liquid Effluents 7-10
7.9.3 Solid Wastes 7-10
7.10 Sustainability 7-11

8 REFERENCES 8-1

Figures

Figure 2.1-1: Project Site Context – Option 1 2-2
Figure 2.1-2: Project Site Context – Option 2 2-3
Figure 4.4-1: Peace River Nuclear Power Project MONARK Plant Visual Representation 4-10
Figure 4.4-2: Indicative Conceptual Site Layout 4-11
Figure 4.5-1: Overall Project Schedule 4-13
Figure 5.1-1 : Location of Local Communities, First Nation Reserves, and Métis Settlements 5-2
Figure 5.2-1: Socio-economic Regional Context 5-10
Figure 7.1-1: Project-Environment Interactions 7-1

Tables

Table 4.3-1: Site Preparation, Construction, Operations, and Decommissioning Activities 4-3
Table 7.3-1: Potential Changes to the Biophysical Environment 7-4
Table 7.8-1: Expected Greenhouse Gas Emission Sources by Project Phase 7-9
Table 7.8-2: Annual Greenhouse Gas Emissions – Site Preparation and Construction Phase 7-9
Table 7.8-3: Annual Greenhouse Gas Emissions – Operation Phase 7-10

Abbreviations

Abbreviation	Definition
CANDU	CANadian Deuterium Uranium
ha	Hectares
km	Kilometres
m	Metres
MWe	Megawatts (electrical)
MWth	Megawatts (thermal)
OCAP®	Ownership, Control, Access, Possession
%	Percent

1 INTRODUCTION

This Summary provides an overview of the Initial Project Description that has been prepared for the Peace River Nuclear Power Project (Project). The Initial Project Description provides introductory information about the Project, which is a proposed nuclear power generating facility by EAC Capital Limited Partnership (trade name Energy Alberta).

2 PART A – GENERAL INFORMATION

2.1 Project Overview

Energy Alberta is proposing to build a nuclear power generating plant in the Peace River region of Alberta. This plant will have four (4) CANDU MONARK reactors, each providing 1000MWe of electricity to the Alberta electrical grid. The goal is to meet Energy Alberta's growing energy needs and reduce greenhouse gas emissions. The Project aims to provide reliable power to Alberta and support the province's economic growth.

Energy Alberta will be applying for a licence to permit 4,800MWe, which includes electricity to the Alberta electrical grid, electricity that is used by each reactor, as well as potential for operational efficiencies to develop over time. This aligns with other nuclear power projects operating in Canada.

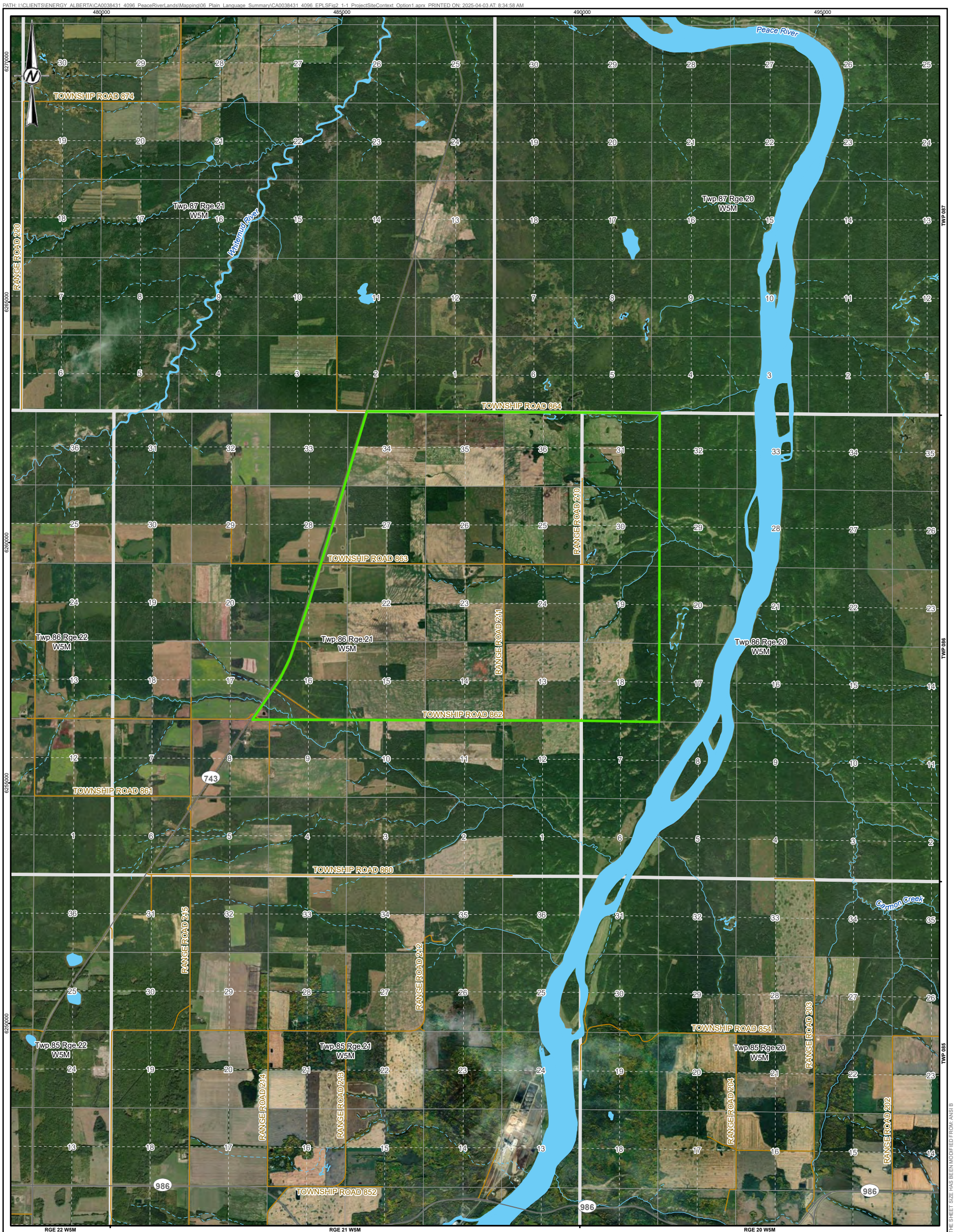
There are currently two locations under consideration for Project.

Option 1 (Figure 2.1-1**):** East of Highway 743 and south of Township Road 864, about 30 km north of the Town of Peace River. This site is within the County of Northern Lights.

Option 2 (Figure 2.1-2**):** North of Highway 986 and Township Road 854, next to Range Road 203, also about 30 km north of the Town of Peace River. This site is within the Northern Sunrise County.

The final decision on the site location will be made after evaluating technical and safety requirements, environmental impacts, Indigenous and social considerations. Energy Alberta plans to engage with Indigenous Nations and Communities, and local governments to gather input for evaluating site suitability. A final decision on the site is expected by late 2025.

PATH: I:\CLIENTS\ENERGY_ALBERTA\CA0038431_4096_PeaceRiverLands\Mapping\06_Plain_Language_Summary\CA0038431_4096_EPLSFig2_1-1_ProjectSiteContext_Option1.aprx PRINTED ON: 2025-04-03 AT: 8:34:58 AM



LEGEND

- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- WATERBODY

0 1.5 3

1:75,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
PROJECT SITE CONTEXT - OPTION 1

CONSULTANT

YYYY-MM-DD	2025-04-03
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

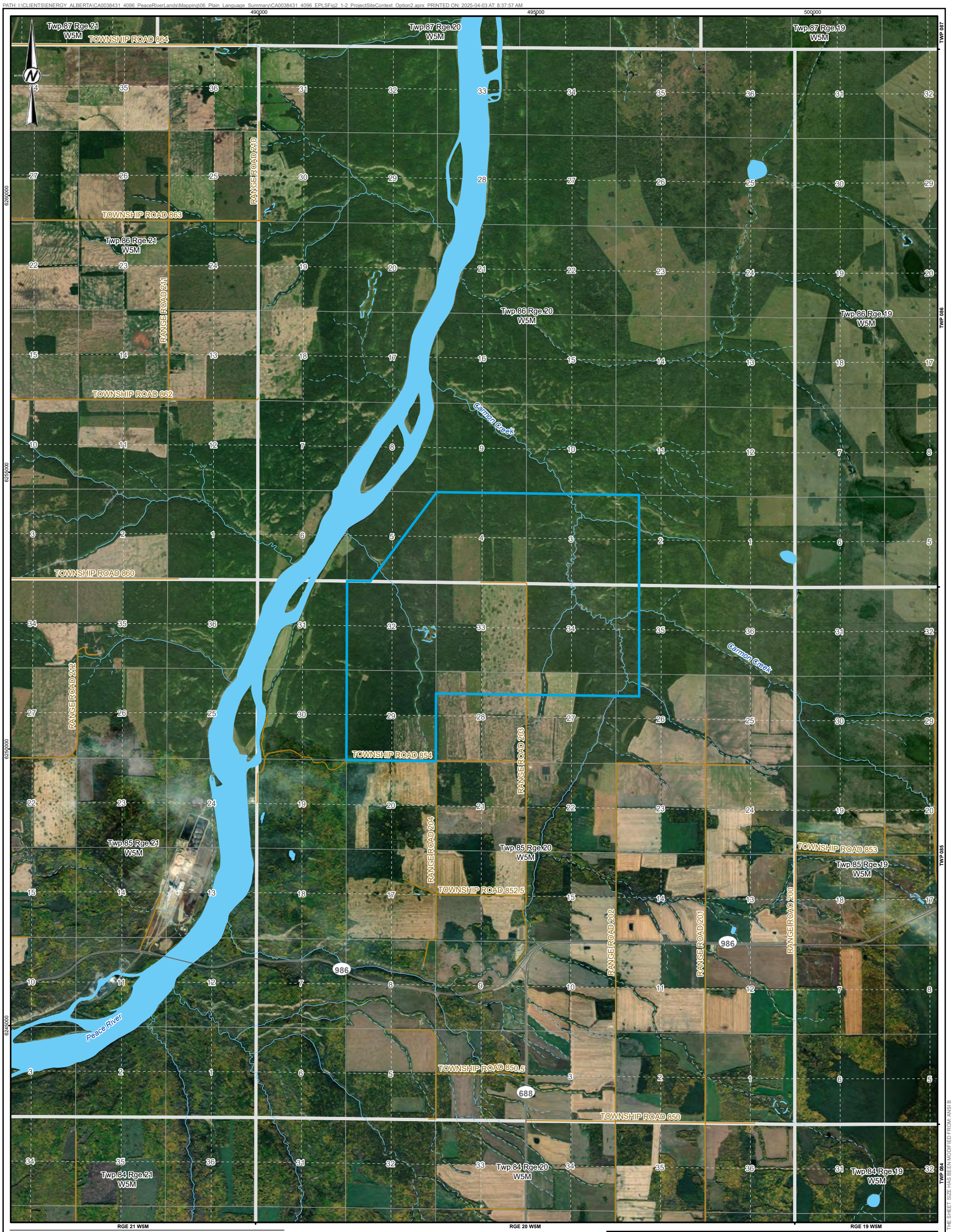
PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	2.1-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: I:\CLIENTS\ENERGY_ALBERTA\CA0038431_4096_PeaceRiverLands\Mapping\06_Plain_Language_Summary\CA0038431_4096_EPLSFig2_1-2_ProjectSiteContext_Option2.aprx PRINTED ON: 2025-04-03 AT: 8:37:57 AM



LEGEND

- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- OPTION 2 SITING AREA OF INTEREST
- WATERBODY

0 1.5 3

1:65,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
PROJECT SITE CONTEXT - OPTION 2

CONSULTANT
wsp

YYYY-MM-DD	2025-04-03
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	2.1-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

2.2 Proponent Contact Information

Proponent: Energy Alberta

Energy Alberta Executive Contact (Primary Contact):
Scott Henuset
President & Chief Executive Officer
E-mail: <email address removed>
Info@EnergyAlberta.com

Energy Alberta Support Contact:
Amy Langhorne
Title: Project Director
E-mail: <email address removed>
Info@EnergyAlberta.com

3 PART B – PLANNING PHASE RESULTS

3.1 Corporate Commitment to Engagement

Energy Alberta is committed to open, extensive, and thorough engagement as a vital component to the success of the Project. They aim to build and sustain meaningful relationships based on mutual respect and trust with Indigenous Nations and Communities, non-Indigenous stakeholders, local communities, and other affected parties. Energy Alberta recognizes the importance of engaging early and often to understand each group's unique interests. This commitment aligns with Energy Alberta's efforts to create a made-in-Alberta solution for long-term energy stability.

In alignment with its corporate, environmental, and social responsibilities, Energy Alberta is committed to engagement that meets or exceeds consultation and engagement requirements from both federal and provincial agencies. They will draw on current best practices for engagement in resource development. Ongoing dialogue and comprehensive engagement will continue throughout the Impact Assessment process and the lifecycle of the Project.

3.2 Indigenous Engagement

Energy Alberta's engagement efforts are intended to be inclusive of Indigenous Nations, Bands, Communities, Métis Settlements and Groups potentially impacted by the Project. The term "Indigenous Nations and Communities" is used throughout Project documentation to represent this inclusion.

Energy Alberta aims to build meaningful, mutually-beneficial relationships with Indigenous Nations and Communities. They are guided by principles such as respect for Indigenous rights and traditions, commitment to the United Nations Declaration on the Rights of Indigenous Peoples, open communication, environmental stewardship, and equitable economic opportunities. Energy Alberta are exploring the potential for economic participation of Indigenous Nations and Communities in the Project area. In doing so, Energy Alberta aims to build meaningful partnerships so that Indigenous Nations and Communities are active participants in the economic benefits and environmental stewardship of the Project.

3.2.1 Indigenous Engagement Tools and Methods

Energy Alberta has identified a range of specific tools and methods to facilitate meaningful engagement with Indigenous Nations and Communities, including:

- **Respect for Indigenous Decision-Making Processes**: Recognizing and honoring the unique decision-making processes of each Indigenous Nation and Community.
- **Community-Led Engagement**: Allowing Indigenous Nations and Communities to lead engagement activities.

- **In-Person Meetings and Workshops**: Facilitating face-to-face interactions to build trust and gather input.
- **Traditional Knowledge Integration**: Incorporating Indigenous knowledge into Project planning and decision-making.
- **Mediation and Conflict Resolution**: Addressing and resolving conflicts through respectful dialogue.
- **Language and Cultural Sensitivity**: Ensuring communication is culturally appropriate and accessible.
- **Capacity Building and Support**: Providing resources and support to enhance the capacity of Indigenous Nations and Communities to engage effectively.
- **Written Submissions and Documentation**: Collecting and considering written feedback and documentation from Indigenous Nations and Communities.

The approach to engagement will respect each Indigenous Nation and Community's unique protocols and cultural practices. Feedback collected will be considered and integrated into ongoing Project planning.

3.2.2 Identification of Potentially Impacted Indigenous Nations and Communities

Energy Alberta sought guidance from the Government of Canada First Nation Profiles Interactive Map and the Alberta Aboriginal Consultation Office to determine a preliminary list of Indigenous Nations and Communities that may be potentially impacted by, or have interest in, the Project. Early engagement has been initiated with the following Indigenous Nations and Communities (listed in alphabetical order):

- Athabasca Chipewyan First Nation
- Beaver First Nation
- Cadotte Lake Métis Nation
- Dene Tha' First Nation
- Driftpile Cree Nation
- Duncan's First Nation
- East Prairie Métis Settlement
- Fort Chipewyan Métis Nation
- Gift Lake Métis Settlement
- Horse Lake First Nation
- Kapawe'no First Nation
- Little Red River Cree Nation
- Loon River First Nation
- Lubicon Lake Band
- Mikisew Cree First Nation
- Otipemisiwak Métis Government
- Paddle Prairie Métis Settlement
- Peavine Métis Settlement
- Peerless Trout First Nation
- Sawridge First Nation

- Sturgeon Lake Cree Nation
- Sucker Creek First Nation
- Swan River First Nation
- Tallcree Tribal Government
- Treaty 8 Leadership
- Whitefish Lake First Nation
- Woodland Cree First Nation

As engagement progresses, the list of potentially affected Indigenous Nations and Communities may be updated based on interest and feedback from Indigenous Nations and Communities, and additional planning and guidance from regulators.

3.2.3 Summary of Indigenous Engagement Activities

Since early 2024, Energy Alberta has initiated contact with all Indigenous Nations and Communities listed and has undertaken engagement to varying degrees based on the Nation or Community's interest and availability. Activities include:

- Sending introductory letters and emails with Project information and mapping.
- Holding meetings to provide information about the Project scope, objectives, timelines, and team roles.
- Gathering initial feedback on the draft Initial Project Description.
- In-person discussions with Indigenous Nations and Communities at public open houses.

3.2.4 Preliminary Topics of Interest

Engagement with Indigenous Nations and Communities is ongoing, and some of the potentially impacted Indigenous Nations and Communities have expressed interest in a variety of topics related to the Project. Some of these topics of interest to Indigenous Nations and Communities include:

- community benefits and investments
- employment and training opportunities
- Indigenous economic inclusion and equity partnership
- impacts to the Peace River
- traditional land and resource use, archaeology and culturally sensitive sites
- waste management
- safety of the facility and the communities
- regulatory process

3.2.5 Future Indigenous Engagement Activities

Ongoing and comprehensive engagement will continue through the Impact Assessment over the life of the Project. Energy Alberta has identified the following activities for this next phase of Indigenous engagement:

- Provide notification packages to potentially impacted Indigenous Nations and Communities.
- Introductory meetings between Energy Alberta and potentially impacted Indigenous Nations and Communities.
- Confirm engagement preferences and procedures for ongoing engagement with potentially impacted Indigenous Nations and Communities.
- Provide updates of progress through the Impact Assessment phases.

3.3 Public Engagement

Energy Alberta strives for collaboration and long-term relationships that provide value to the Peace River Region. Public engagement activities are intended to provide information to the public, increase understanding of the Project, and gather input to be incorporated into Project plans. Public engagement will continue throughout the life of the Project with public input helping to inform its development.

3.3.1 Public Engagement Tools and Methods

Energy Alberta has identified a range of specific tools and methods for engaging with the public, including:

- Presentations and Meetings: Providing information and updates about the Project.
- Correspondence and Phone Calls: Direct communication with stakeholders.
- Newsletters, Brochures, Fact Sheets, and Information Postcards: Distributing written materials to inform the public.
- Advertisements (Written and Radio) and Other Media Coverage: Using various media channels to reach a wider audience.
- Podcast Talks, Speaking Engagements, Panel Discussions, and Interviews: Engaging with the public through interactive and informative sessions.
- Workshops, Open Houses (In-Person and Virtual), Community Dialogue Sessions, Conferences, Focus Groups, Working Groups, Site Visits, and Tours: Facilitating face-to-face and virtual interactions to gather input and provide information.
- Participation and/or Sponsorship of Community Events: Supporting local events to build relationships and engage with the community.

- Energy Alberta's Website: Providing online resources and updates about the Project. Feedback collected will be considered and integrated into ongoing Project planning.

3.3.2 Identification of Public Stakeholders

Energy Alberta engages with various public stakeholders to understand community considerations and concerns, including:

- Local Governments: Building positive long-term partnerships and understanding the capacity of local infrastructure and services to support the Project. Energy Alberta is also committed to providing economic benefits to the local community and area residents.
- Chambers of Commerce: Identifying opportunities and challenges to realizing economic benefits.
- General Public, Residents, and Landowners: Educating and enhancing understanding about the Project and its impacts and benefits.
- Business Associations: Sharing and hearing about emerging best practices through participation in industry events. In addition, Energy Alberta has engaged with the Peace Regional Energy Committee whose purpose is look at opportunities to bring all forms of power generation to the Peace Region.
- Non-Governmental Organizations and Environmental Groups: Involving Non-Governmental Organizations and environmental groups in the Impact Assessment process to inform development decisions.

3.3.3 Summary of Public Engagement Activities

Energy Alberta started its most recent engagement with the public and other interested parties early in 2024. Activities include:

- Meetings with Local Governments: Discussing community considerations and concerns.
- Engagement with the Peace River and District Chamber of Commerce, the Peace Regional Energy Committee, and Area Economic Development Board Representatives: Exploring economic opportunities and challenges.
- Early Engagement Efforts with Landowners and Area Residents: Securing necessary parcels of land to explore the feasibility of the two possible locations.
- Public Open House: Held on March 11, 2025, at the Weberville Community Hall, attended by approximately 350 individuals, including Indigenous Peoples, community members, and government officials. Energy Alberta subject matter experts engaged with attendees to introduce the Project, educate, and learn from participants. Representatives from the Canadian Nuclear Association, the Canadian Nuclear Safety Commission, and the Impact Assessment Agency of Canada were also available to share information.

The input and feedback gathered at all engagement activities be reviewed by Energy Alberta and used to inform future Project development and engagement activities.

3.3.4 Future Public Engagement Activities

For 2025 and beyond, Energy Alberta plans to continue ongoing public engagement, improve Project updates, and build relationships. Planned activities include:

- Notification Packages: Providing information to the public.
- Ongoing Introductory Meetings: Engaging with stakeholders.
- Public Open Houses (In-Person and Virtual): Facilitating interactions and gathering input.
- Workshops: Providing detailed information and gathering feedback.

Stakeholder engagement activities will continue to adapt as additional input from the public and other interested parties is received on how they would prefer to be engaged (e.g., feedback from the March Open House).

3.4 Assessments and Studies Relevant to the Project

There are no specific regional assessments required for the area around the Peace River Nuclear Power Project. However, the Project must consider the Strategic Assessment of Climate Change. This assessment looks at how the Project affects Canada's efforts to combat climate change, including the goal of achieving net-zero greenhouse gas emissions by 2050.

The following studies or plans may also be relevant to the development of the Project:

- County of Northern Lights Municipal Development Plan Bylaw #10-61-270 (County of Northern Lights 2021)
- Integrated Watershed Management Plan of the Peace and Slave Watersheds
- Peace River Water Use Planning
- Wood Buffalo National Park World Heritage Site Action Plan

These studies and plans help the Project development align with local development guidelines, sustainable water management practices, and environmental protection efforts.

4 PART C – PROJECT INFORMATION

4.1 Purpose of and Need for the Project

The Peace River Nuclear Power Project aims to provide Alberta with additional electricity to support the province's growing energy needs and contribute to economic growth. This Project will help both federal and provincial governments meet their greenhouse gas reduction goals.

Why is the Project Needed?

- Growing Electricity Demand: Alberta and Canada need more electricity. The Alberta Electric System Operator predicts a considerable increase in electricity demand by 2050, with average load growth of about 50% and peak load growth up to 100%.
- Net-Zero Emissions Goal: Canada and Alberta have committed to achieving a net-zero power grid by 2050, meaning they aim to eliminate carbon emissions from electricity generation.
- Reliable Power: The Project will provide a stable and continuous supply of electricity, known as baseload power, which is essential for the electrical grid.
- Support for Renewables: By providing reliable baseload power (the minimum amount of energy to power the electrical grid continuously), the Project will allow renewable energy sources like solar and wind to operate more effectively.

Additional Benefits

- Healthcare Support: The CANDU reactors can produce medical isotopes like cobalt-60, which are used for diagnostic imaging, cancer treatment, and sterilizing medical supplies.
- Economic Growth: The Project will boost Canada's economy by:
  - Gross Domestic Product Increase: Adding $40.9 billion to the Gross Domestic Product during construction and $49.5 billion during operations over the 70-year lifespan of the reactors.
  - Job Creation: Creating approximately 20,260 jobs per year during design and construction phases of the first deployment and sustaining about 3,500 full-time equivalent jobs per year during operations.
  - Tax Revenue: Generating $29.1 billion in additional tax revenue across all levels of government in Canada over the Project's lifespan.
  - Nuclear Supply Chain: Continue growing Canada’s nuclear industry and supply chain by creating and sustaining highly skilled jobs.

- Other potential benefits:
  - District heating.
  - Hydrogen production.
  - Data Centres.
  - Behind-the-meter supply to nearby industrial & agriculture activities.

Partnerships with Indigenous Nations and Communities

The growth of nuclear power in Canada provides opportunities for partnerships with Indigenous Nations and Communities. These partnerships can offer new economic opportunities, help develop technical skills and enhance business capacity.

4.2 Impact Assessment Requirements

Impact Assessments are done for projects that might have significant environmental effects and fall under federal jurisdiction. These projects are either listed in the Physical Activities Regulations or designated by the federal Minister of Environment and Climate Change Canada. The Impact Assessment Agency of Canada oversees these assessments.

The Project needs an Impact Assessments for two main reasons:

- It involves building a large nuclear facility with new reactors that produce more than 200 megawatts of thermal energy.
- It includes constructing storage facilities for used nuclear fuel and nuclear waste.

4.3 Activities, Infrastructure, and Physical Works

An Integrated Management System combines different management systems, such as quality, environment, engineering, procurement, and safety, into one unified framework. This approach makes processes more efficient and streamlined.

The Integrated Management System outlines how to implement compliance measures, continually improve processes, and promote a culture of health and safety. It includes program-level documents organized into categories that reflect the Canadian Nuclear Safety Commission safety and control areas and other regulatory interests.

An overview of activities and infrastructure (e.g., buildings) that are expected to happen in each Project phase is provided in Table 4.3-1. The intent of this overview is to provide some examples of the types of work that may occur and is not a complete or comprehensive list of all activities and infrastructure that are expected to happen. These activities and infrastructure are not listed in any particular order of priority or timing within each Project phase.

Table 4.3-1: Site Preparation, Construction, Operations, and Decommissioning Activities

Project Phase	Activities and Infrastructure
Site Preparation	Activities may include the following: ■ land clearing of the Project site ■ planning for access roads, construction areas, utilities, and other infrastructure ■ transporting materials, equipment, and personnel to site ■ excavating an area for the reactor building ■ operation of heavy equipment ■ applying environmental protection and mitigation measures ■ managing waste (non-hazardous, hazardous, and radioactive wastes) Infrastructure may include the following: ■ construction facilities (warehouses, administration, personal amenities) ■ water management infrastructure and control measures (erosion and site runoff) ■ installation of water intake structure and piping to supply water to the site ■ power, natural gas pipeline, water, and sewer service lines ■ management and storage facilities for waste (including non-hazardous, hazardous, and radioactive wastes)

Table 4.3-1: Site Preparation, Construction, Operations, and Decommissioning Activities

Project Phase	Activities and Infrastructure
Construction	Activities may include the following: ■ installation of on-site services and utilities ■ building the main plant buildings and remaining support facilities ■ installation of nuclear structures and components ■ transporting materials, equipment, and personnel to site ■ operation of heavy equipment ■ applying environmental protection and mitigation measures ■ managing waste (non-hazardous, hazardous, and radioactive wastes) Infrastructure may include the following: ■ permanent on site and off site roads or road improvement ■ communication, power, natural gas pipeline, water, and sewer service lines ■ water storage ponds and water intake ■ transmission switchyard ■ main plant buildings and support facilities (e.g., turbine building, security, maintenance shops, laboratory and testing facilities, waste management facilities, administration building, reactor and reactor auxiliary buildings ■ temporary worker's accommodation

Table 4.3-1: Site Preparation, Construction, Operations, and Decommissioning Activities

Project Phase	Activities and Infrastructure
Operations	Activities may include the following: ■ monitoring radioactive and non-radioactive levels ■ operating heat transport systems ■ operating cooling systems ■ operating sewage, stormwater, and water services ■ operating labs for monitoring and identifying waste processing ■ landscaping and vegetation maintenance ■ managing and storing low-, intermediate-, and high-level nuclear waste ■ managing and storing hazardous and radioactive materials Infrastructure may include the following: ■ structures to support outages, maintenance, and life extension (improvements and repairs) activities
Closure	Activities may include the following: ■ deconstructing nuclear reactors, structures, and support systems ■ transporting used fuel to storage on-site until it is shipped to off-site disposal ■ storing and transporting all radioactive and non-radioactive waste in licensed off-site facilities ■ removing surface contamination ■ restoring the site to a suitable condition ■ deconstructing, repairing, and preparing structures for closure ■ applying for release from regulatory control Infrastructure may include the following: ■ temporary facilities to support waste management, deconstruction, and abandonment of the Project site

4.4 Project Production Capacity and Process

4.4.1 Maximum Production Capacity

The Peace River Nuclear Power Project is estimated to have a production capacity of up to 4,800 MWe, derived from approximately 13,000 MWth. The plan is to use four CANDU MONARK reactors, each producing 1,000 MWe, with a total gross capacity of about 4,400 MWe. This capacity is within the Project's overall licensed limit, allowing for design optimizations and potential future enhancements to improve power output.

Each CANDU MONARK reactor is estimated to produce around 3,000 MWth of thermal power, giving a combined thermal capacity of 12,000 MWth for all four reactors. These values are approximate and may change as the design is finalized for the site. The final output will depend on cooling water conditions at the site. The net electrical output can be optimized by adjusting the design of turbines and condensers to suit site conditions and by optimizing "house loads" (the electrical power needed by the plant itself).

4.4.2 Production Process Description

4.4.2.1 The CANDU MONARK

The Peace River Nuclear Power Project plans to use CANDU MONARK reactors. These are the latest version of CANDU reactors, which have been developed based on the design and operating experience from 31 earlier CANDU reactors built worldwide. CANDU technology is a Canadian innovation created by Atomic Energy of Canada Limited in the 1950s. It is entirely owned, manufactured, and designed in Canada. This technology has been successfully used both in Canada and in other countries.

The MONARK reactor design builds on the knowledge and experience from existing CANDU nuclear power plants. It offers improvements in cost, safety, and performance while keeping the advantages of current CANDU plants, such as their safety features and high capacity factor (the amount of time they generate electricity for the grid).

Key Features of the MONARK Design

- Modular Horizontal Fuel Channel: Like all CANDU reactors, the MONARK uses a modular horizontal fuel channel surrounded by a heavy water moderator. This design helps reduce construction time.
- Easy Maintenance: The reactor is designed for easy maintenance with enhanced health monitoring, making the plant more reliable.
- Integrated Digital Strategy: The entire plant, including instrumentation and controls, benefits from an integrated and enhanced digital strategy for selecting and implementing platforms and networks.

- Traditional CANDU Features: The MONARK design builds on traditional CANDU features like simple fuel bundle design, on-power refuelling, and a separate low-temperature, low-pressure moderator with backup cooling systems.

Online Refuelling

- Continuous Operation: A distinctive feature of CANDU reactors is their ability to be refuelled while operating at full power. This enhances the reactor's efficiency and availability by eliminating the need for lengthy shutdowns during refuelling.
- Operational Advantage: This capability is particularly beneficial for industries like oil and gas operations, data centres, and other industrial uses, as it ensures continuous operations without needing grid power during refuelling outages.

Safety and Reliability

- Enhanced Safety Margins: The MONARK design enhances safety margins and reliability, making plant operations easier and improving overall safety.
- Proven Safety Systems: It builds on the proven safety systems of existing CANDU plants, such as two independent shutdown systems, and adds new passive safety mechanisms.

Capacity Factor

- High Efficiency: The capacity factor measures the actual energy produced by the plant over a period of time by the maximum possible energy it could have produced if it were running at full power all the time. CANDU reactors have an annual capacity factor well over 90%. For example, in 2024, the Pickering Nuclear Generation Station had a Unit Capacity Factor of 95.8%, and Cernavoda Unit 2's capacity factor was 93.6%.
- Stable Electricity Supply: The online refuelling capability of CANDU reactors ensures a stable supply of electricity, making them highly efficient and reliable.

The MONARK reactor design offers considerable improvements in cost, safety, and performance while maintaining the advantages of traditional CANDU reactors. Its modular design, easy maintenance, online refuelling, and enhanced safety features make it a reliable and efficient choice for the Project.

4.4.2.2 The Plant Design

The major nuclear systems of a MONARK plant are located in the reactor building and the reactor auxiliary building. These systems include:

- Reactor Assembly
- Heat Transport System
- Fuel Handling System

- Safety Systems
- Spent Fuel Handling and Storage Systems
- Waste Handling and Storage Systems

The MONARK plant's major nuclear systems are designed to provide efficient fuel handling, robust safety measures, and effective waste management, providing a reliable and safe operation of the nuclear power plant.

4.4.2.3 Site Design Data

All buildings and structures that are important for safety are designed to handle various site conditions. This includes being able to withstand earthquakes (seismic conditions), the characteristics of the soil and ground (geotechnical parameters), and weather conditions (meteorological conditions).

Cooling Water System

The Project will use cooling tower systems to manage and supply cooling water, with sufficient water supply from on-site large reservoirs, which will be gradually filled from the Peace River. The design includes two separate loops for normal and essential heat sinks, providing safety and reliability. The cooling water will be kept free from radioactive exposure.

The site cooling water system process involves cooling warm water from the plant using ambient air, maintaining water quality, and continuously supplying fresh water. The design includes large reservoirs to support water needs for electrical power generation and smaller reservoirs for emergency systems, providing reliable and safe operations.

Earthquakes

The design basis earthquake is a model of the most severe earthquake that could potentially affect the site, with a very low chance of occurring during the plant's lifetime. The MONARK reactor is designed to handle this type of earthquake based on general seismic data. Detailed analysis of the specific site will be done to see if any adjustments are needed to account for local earthquake conditions.

Tornados

Tornado protection is provided for all structures that are important for safety. The design basis tornado is defined by the highest wind speed and the largest air pressure drop that could occur. The MONARK reactor is built to withstand this worst-case tornado scenario without any system failures.

Exclusion Zones and Emergency Planning Zones

For public safety, all nuclear reactor sites in Canada must have an exclusion zone, also known as an Exclusion Area Boundary. This zone is required by the Canadian Nuclear Safety Commission and serves several purposes:

- Evacuation: Provides space for safe evacuation in case of an emergency.
- Land Usage: Controls how the land within the zone is used.
- Security: Ensures the area is secure and controlled.
- Environmental Factors: Protects the environment around the reactor.

The land within the Exclusion Area Boundary must be owned and controlled by the site license holder, and unauthorized persons are not allowed in this zone. For the MONARK plant, the minimum exclusion zone is 500 m radius around each reactor building, and this zone will be within the licensed site boundary fence.

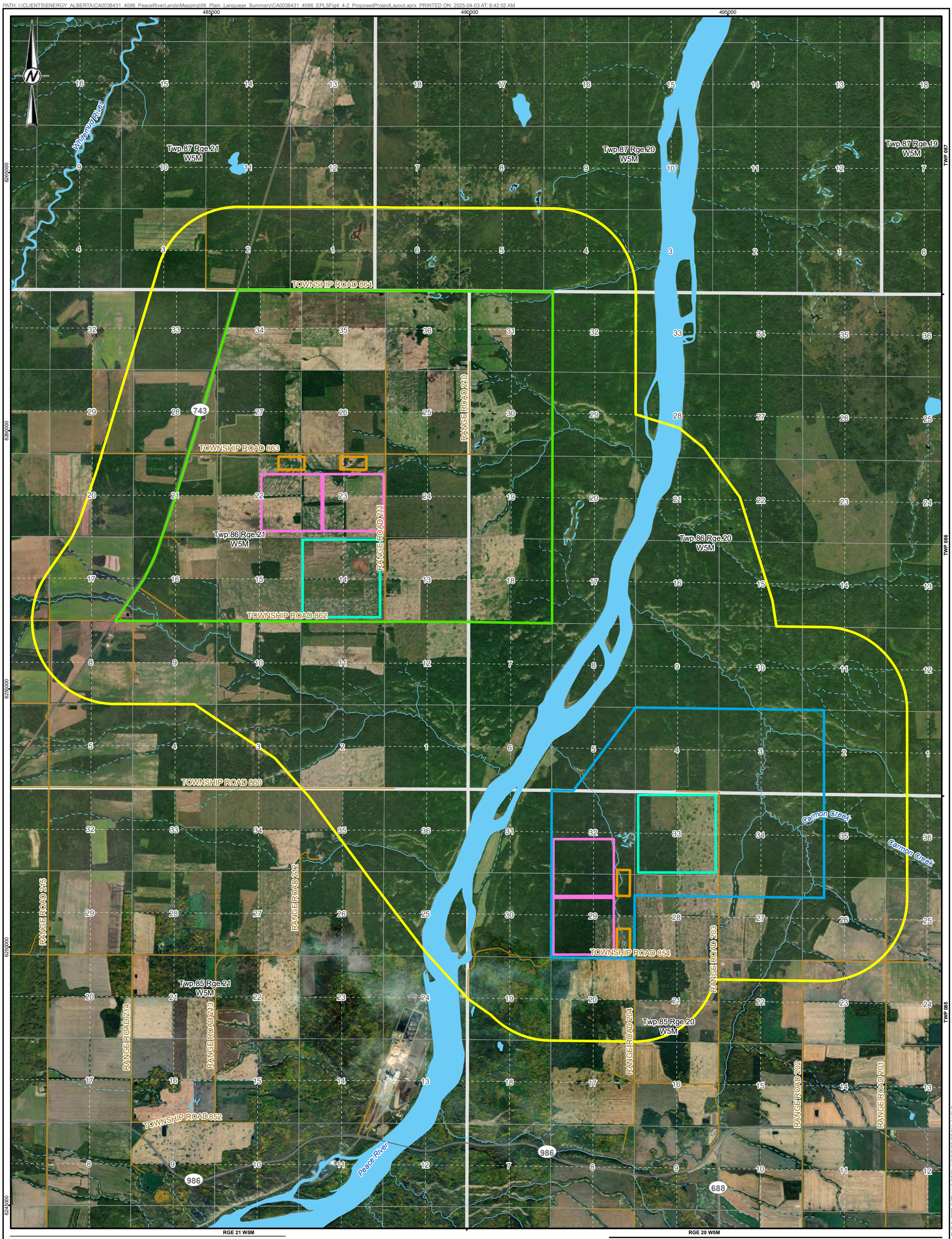
In addition to the exclusion zone, nuclear power plants have larger controlled areas called Emergency Planning Zones. These zones are designed to manage actions during the unlikely event of an off site release due to a severe accident. Emergency Planning Zones help protect the public from potential radiation exposure and allow for effective emergency management. The sizes of these zones are determined based on the specific technology, safety systems, and accident analysis for each plant.

Alberta does not currently have nuclear power, so these zones are not yet defined. However, the Province of Ontario provides an example with its Provincial Nuclear Emergency Response Plan, which defines similar zones for nuclear facility emergency planning.

4.4.2.4 Site Layout

A conceptual visualization of four CANDU MONARK is shown in Figure 4.4-1. The proposed Project layout is shown in Figure 4.4-2.

Figure 4.4-1: Peace River Nuclear Power Project MONARK Plant Visual Representation



LEGEND

- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- OPTION 1 SITING AREA OF INTEREST
- OPTION 2 SITING AREA OF INTEREST
- PROJECT SITE / CONSULTATION BUFFER
- WATERBODY

PROPOSED PROJECT LAYOUT

- MAIN INFRASTRUCTURE (1170 m x 1100 m)
- SWITCH YARD (250 m x 500 m)
- WATER SUPPLY POND (1500 m x 1500 m)

0 1,250 2,500

1:70,000 METRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

REFERENCE(S)

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
PROPOSED PROJECT LAYOUT

CONSULTANT
wsp

YYYY-MM-DD	2025-04-03
DESIGNED	MS
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	4.4-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

The Project will have several key buildings and structures. For each twin-unit arrangement, the main facilities include:

- Reactor Buildings (2): Houses the reactors.
- Reactor Auxiliary Buildings (2): Supports the reactor operations.
- Turbine Buildings (2): Contains the turbines that generate electricity.
- Main Control Building: Central control for plant operations.
- Service Building: Provides various services for the plant.
- Maintenance Building: Used for maintenance activities.
- Normal Cooling Water Pumphouse: Facility that pumps and processes the water for used normal cooling and other plant services.
- Essential Cooling Water Pumphouse: Protected facility that pumps and processes the water used in equipment that requires guaranteed cooling.
- Diesel Generator Buildings (5): Four of these buildings support safety functions.
- Main Switchyard: Distributes electricity from the plant.
- Water Treatment Facility: Treats water for use in the plant.
- Auxiliary and Ancillary Structures: Additional support buildings.

The layout for a four-unit MONARK plant requires a minimum area of 640 ha. This area includes the Exclusion Area Boundary. An alternative site layout may be considered if more land is available. The final site layout will be determined as the Project progresses and more details are finalized. The layout will consider:

- Environmental and Radiological Safety: Confirming the site is safe for the environment and minimizes radiation exposure.
- Plant Performance: Optimizing the arrangement for efficient plant operations.
- Security and Safeguarding: Ensuring the site is secure and protected.

The Project will have several key buildings and structures designed to support efficient and safe operations. The site layout will be optimized for safety, performance, and security, with flexibility to adjust based on available land and Project needs.

4.5 Preliminary Project Timelines

The initial plan is to build the four units of the nuclear power plant sequentially as shown in Figure 4.5-1. For the Impact Assessment, the schedule shows the development of four consecutive units. However, the timing of unit 3 and 4 will be assessed during the execution of the Project and timing may change based on the future provincial power demand and economic climate.

Site preparation is expected to take about 3 years. The Project is expected to take about 10 to 12 years from the start to the operation of the first unit with the subsequent units coming online approximately 3 years after one another. The plant is expected to operate for around 70 years per unit. After the operational period, it will take about 20 years to decommission the units and close the site. The conceptual schedule for the overall Project is shown in Figure 4.5-1.

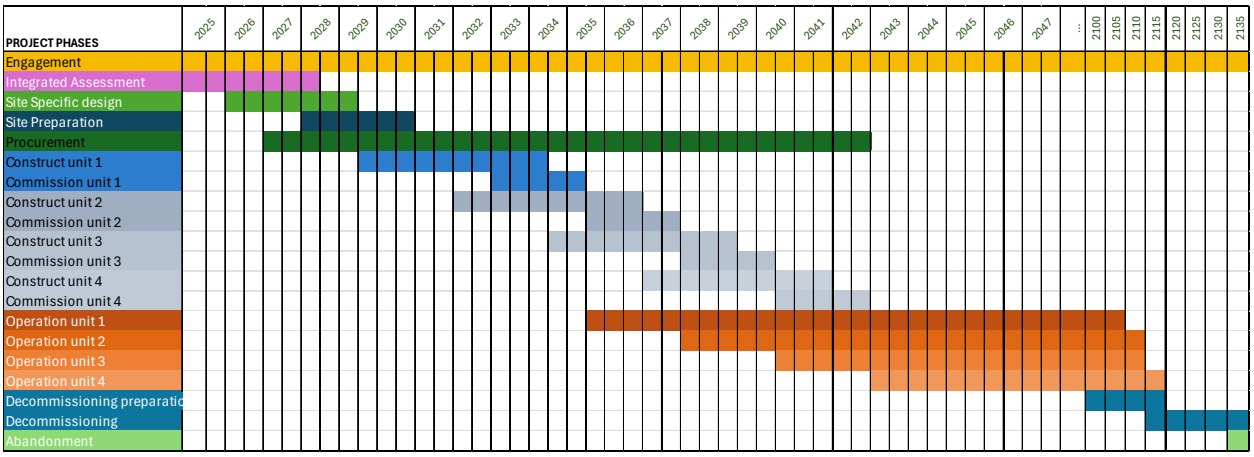


Figure 4.5-1: Overall Project Schedule

4.6 Alternative Means of Carrying Out the Project

"Alternative means" refers to different ways of carrying out the Project that are technically and economically feasible, using the best available technologies and considering their effects. The Impact Assessment Agency of Canada defines these alternative means.

Several alternative means are being considered for the Project. These will be identified as the planning and design of the facility progresses. The Impact Assessment will play a crucial role in determining the preferred alternatives. Currently, the following alternatives are anticipated to be considered:

- Alternative Locations for the Project Site: Exploring different locations where the Project could be built.

- Alternative Layouts of Facilities: Considering different ways to arrange the various facilities within the Project site.
- Alternative Workforce Accommodations: Exploring the different means of providing accommodations for the Project workforce.
- Other CANDU Nuclear Power Technologies: Evaluating different types of CANDU nuclear reactor technologies.
- Switchyard Designs: Looking at different designs for the switchyard, which is where electricity is distributed from the plant.
- Radioactive Waste Management Strategies: Assessing different methods for handling and storing radioactive waste.

4.7 Potential Alternatives to the Project

Alberta needs a diverse electricity grid to handle high demand periods. The CANDU MONARK reactor is a top choice for modern nuclear energy. It is reliable, compact, and environmentally friendly. With over 95% annual capacity, it provides consistent electricity with minimal downtime. Its small size allows efficient land use without sacrificing power generation. The reactor produces stable electricity for homes and industries, and it operates without greenhouse gas emissions, helping reduce carbon footprints and support global net-zero goals.

To meet Alberta's growing energy needs and reduce greenhouse gas emissions, solar and wind energy are important options. However, for reliable, long-term electricity, large nuclear power is the best choice.

Solar Power

- Footprint: Solar farms need a lot of land. To generate 4,400 MW, they need 8,900 to 17,800 hectares, compared to 640 hectares for a CANDU MONARK reactor.
- Land Use and Aesthetics: Solar farms can displace agriculture and natural habitats and may be considered unsightly.
- Environmental Impact: Building and maintaining solar farms can disrupt ecosystems and involve hazardous materials.
- Intermittent Supply: Solar power is not available at night or on cloudy days, making it less reliable. Alberta's solar farms have a capacity factor of less than 20%.
- Economic Concerns: Solar farms create few long-term jobs and have high initial and maintenance costs.
- Lifecycle Reliability: Solar panels last less than 40 years, while CANDU MONARK reactors last 70 years.

Wind Power

- Footprint: Wind farms also need a lot of land. To generate 4,400 MW, they need 3,560 to 71,250 hectares, compared to 640 hectares for a CANDU MONARK reactor.
- Land Use: Wind farms can displace agriculture and natural habitats.
- Wildlife Impact: Wind turbines can harm birds and bats.
- Visual Impact and Noise: Wind turbines can be unsightly and noisy.
- Intermittent Supply: Wind power depends on wind conditions and is less reliable. Alberta's wind farms have a capacity factor of 30 to 40%.
- Economic Concerns: Wind farms create few long-term jobs and have high initial and maintenance costs.
- Lifecycle Reliability: Wind turbines last 25 to 30 years, while CANDU MONARK reactors last 70 years.

5 PART C & D – LOCATION INFORMATION AND CONTEXT

5.1 Proposed Location of the Project

There are two possible options being considered for the Project site. Neither of these sites are located on federal Crown lands. There are First Nations reserves located within 100 km of the Project Sites.

Option 1 is sited on the west bank of the Peace River, approximately 28 km north of the Town of Peace River, in the County of Northern Lights (Figure 5.1-1). The nearest First Nation Reserve, Duncan's First Nation approximately 70 km southeast from the Project. Peavine Métis Settlement is the nearest Métis Settlement and is approximately 67 km to the Project site. Potential residences range from 29 m to 906 m to the Project site.

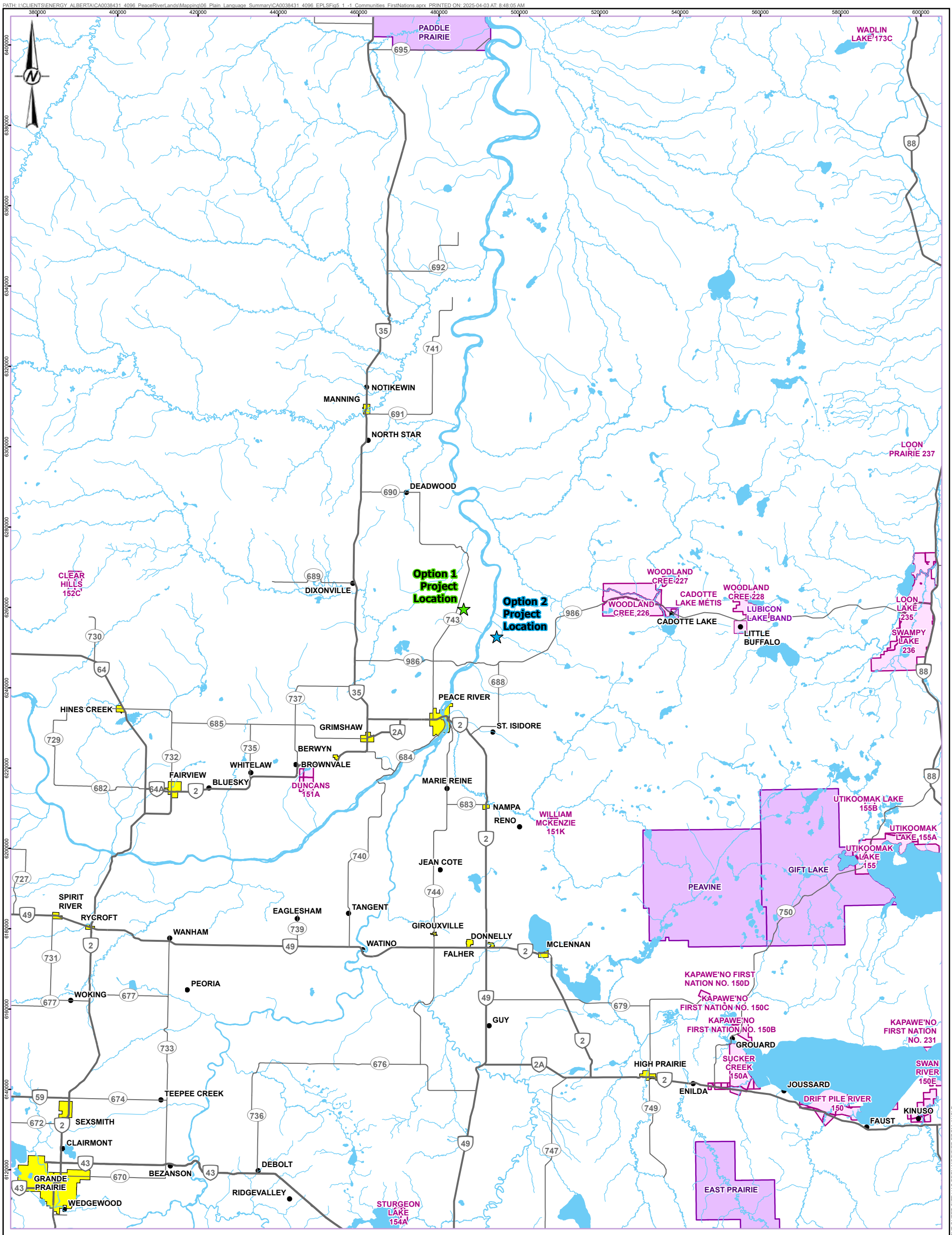
Option 2 is sited on the east side of the Peace River, also approximately 30 km north of the Town of Peace River, in the Northern Sunrise County (Figure 5.1-1). The nearest First Nation Reserve is Woodland Cree First Nation, approximately 27 km northeast from the Project. Peavine Métis Settlement is the nearest Métis Settlement and is approximately 57 km to the Project site. The closest potential residences are approximately 294 m and 953 m from the Project site (Figure 5.1-1)

The Project site during operations will cover about 6.4 square kilometres (640 hectares). This is the minimum area required for all the Project components. This area would be fenced and contain the reactors and all the supporting plant facilities required during operations. The site is in an agricultural region without major water bodies. It is flat and has been used for farming. The site is on a plateau, 210 m above the Peace River.

Energy Alberta is not aware of any active Indigenous land claims on the Project site. However, they recognize that the land may have been used for traditional purposes or may be of interest to Indigenous Nations and Communities. There are First Nations reserves located within 100 km of the Project sites. Energy Alberta is dedicated to fostering enduring, respectful relationships with Indigenous Nations and Communities in Canada that contribute to enabling Indigenous self-determination, sustainable development and lasting economic opportunities.

Early transmission studies and connection configuration options are being undertaken to determine the preferred transmission connection alternatives. The final design, routing and approvals will follow the Alberta Utilities Commission and Alberta Transmission Regulation process for new high voltage transmission infrastructure development.

PATH: I:\CLIENTS\ENERGY_ALBERTA\CA0038431_4096_PeaceRiverLands\Mapping\06_Plain_Language_Summary\CA0038431_4096_EPLSFig5_1_-1_Communities_FirstNations.aprx PRINTED ON: 2025-04-03 AT: 8:48:05 AM



LEGEND

- HAMLET
- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- INDIGENOUS RESERVE
- METIS SETTLEMENT
- POPULATED PLACE
- WATERBODY

0 20 40

1:900,000 KILOMETRES

NOTE(S)

1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
LOCATION OF LOCAL COMMUNITIES, FIRST NATION RESERVES AND MÉTIS SETTLEMENT

CONSULTANT

YYYY-MM-DD	2025-04-03
DESIGNED	MJ
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	5.1-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

5.2 Physical and Environmental Overview

The following overview of the current environmental conditions for the proposed Option 1 and Option 2 sites are based on publicly available information.

5.2.1 Atmospheric Environment

5.2.1.1 Air Quality

The local air quality in the Peace River Valley is typical for a rural, agricultural area. There are several emission sources, including oil production projects, a pulp and paper mill, and residential activities in nearby towns. The Project sites are part of the Peace River Area Monitoring Program, which covers Peace County and parts of Northern Lights and Northern Sunrise Counties. The nearest air monitoring station is in Grimshaw, about 40 km away. This station measures various air quality indicators.

In 2023, regional air quality was affected by wildfire smoke, leading to many exceedances of air quality guidelines for fine particulate matter. The Grimshaw Station recorded the highest particulate matter levels in Alberta due to wildfires.

5.2.1.2 Noise

Sources of noise are mainly natural, including wind. The Option 1 and Option 2 sites are located in rural farming areas and sources of noise are mostly industrial operations, oil and gas production, and traffic.

5.2.2 Geological and Hydrogeological Environment

5.2.2.1 Geology

Most of the ground surface associated with the proposed areas for both site options are from the meltwaters from receding glaciers after the last Ice Age (e.g., clay, shale, organics, gravel). The depth of the surface materials are greater for Option 2 compared to Option 1.

5.2.2.2 Hydrogeology (Groundwater)

Aquifers are the primary source of groundwater and provide a source of water for residences in the area. The main aquifers of the regional Project area are the Grimshaw Gravel and the Basal Gravel aquifers. While there are groundwater wells near the Option 1 and Option 2 sites that possibly take water from these aquifers, it is not expected that this groundwater is originating from underneath either of the two site options (Slomka et al. 2018). The Project will carry out studies to determine groundwater sources.

5.2.2.3 Seismicity (Earthquakes)

Based on historical earthquakes for the last several decades, there were 712 earthquakes due to natural tectonic activity (caused by the Earth's plates shifting) and there were 504 earthquakes due to human activity (e.g., petroleum production near Fort St John) within approximately 300 km around the Option 1 and 2 Project sites. Much of the natural historical earthquake within and around the region is located within or near the Canadian Rocky Mountains and the associated foothills, to the west and southwest of the Option 1 and 2 sites. Potential hazards from earthquakes are relatively low based on data from Natural Resources Canada.

5.2.3 Surface Water Environment

5.2.3.1 Hydrology

The Project siting options are located in the Peace River Watershed. The Peace River is the major river in the area. It flows in a north-easterly direction, originating from Williston Reservoir (located approximately 170 km upstream of the Alberta/British Columbia border) to the Athabasca River in Wood Buffalo National Park in northwestern Alberta. The largest major stream in the area is the Smoky River, which connects to the Peace River just upstream of Peace River. The Williston Reservoir, formed by the building of the Bennett Dam, was filled from 1968 to 1971. The Peace Canyon dam is located 20 km downstream of the Bennett Dam. The Peace River has been regulated by British Columbia Hydro since 1972.

5.2.3.2 Surface Water and Sediment Quality

Direct discharge of effluent into the Peace River in the vicinity of the Project site options include effluent from the Town of Peace River and the bleached kraft pulp mill operated by Daishowa-Marubeni International Ltd. Indirect releases (e.g., surface runoff) into the Peace River include those from agricultural practices, oil and gas exploration, pipelines, and forestry activities.

Water quality for the Peace River has typically been rated as 'good' (GOA 2017a). This means that concentrations of most water quality parameters (e.g., copper, iron, nitrogen) remained in low amounts in the water. Seasonal and annual variation has been observed for parameters and surface runoff associated with rainfall and snowmelt, which can lead to additional releases of contaminants to rivers.

The amount of sediment in Peace River is considered to be high. Sediment is highest in spring due to the increased rainfall events that carries sediments from the land into the Peace River. Sediment is lowest in the summer and fall due to the decreased rainfall events.

5.2.3.3 Fish and Fish Habitat

The potential Project site options have been located to avoid waterbodies that have the potential to provide fish habitat. Besides the Peace River, which will be used to support the water needs of the Project, there are several small streams (known as tributaries) to the Peace River that overlap with Option 1 and Option 2 sites, including Carmon Creek and one unnamed stream to the Peace River.

A total of 32 fish species have been documented within the Peace River. Sportfish species include Burbot, Goldeye, Northern Pike, Mountain Whitefish, Walleye, and Yellow Perch. Large-bodied, non-sport fish species include Longnose Sucker and White Sucker. Small-bodied/forage fish species include Flathead Chub, Lake Chub, Spottail Shiner, and Trout-Perch. Carmon Creek has small-bodied forage species including Brook Stickleback, and sport fish including Northern Pike and Walleye. No records of fish presence are available for the unnamed tributaries overlapping with Option 1, and the unnamed stream to the Peace River that overlaps with Option 2; however, fish and fish habitat may still be present within these waterbodies and will require further investigation

5.2.4 Terrestrial Environment

5.2.4.1 Terrain and Soils

The Option 1 and Option 2 sites are in the Boreal Forest Natural Region of Alberta (Natural Regions Committee 2006). The landscape within the Option 1 is level to gently undulating; however, the northwestern corner of Option 1 is adjacent to the steep slopes of the Peace River Valley. The landscape within Option 2 is gently sloping from the west to the east and towards the Peace River Valley.

5.2.4.2 Vegetation

The Option 1 and Option 2 sites are in the Dry Mixedwood Natural Subregion of the Boreal Forest Natural Region of Alberta (Downing and Pettapiece 2006). This subregion is generally characterized as having low relief, with level to undulating surfaces. Aspen is an important species in this subregion, occurring in both pure and mixed stands. Balsam poplar occurs on moister sites, usually in depressions or along streams, but may occur in upland aspen forests. White spruce and balsam fir can be expected to replace aspen and balsam poplar as stands mature; however, frequent fire seldom permits this to occur and pure deciduous stands are common in the southern part of the Dry Mixedwood Subregion. Dry, open and sandy upland areas are dominated by jack pine, and peatlands are dominated by black spruce and tamarack.

Over 50% of the Peace River and central Alberta portions of the Dry Mixedwood Natural Subregion have been cultivated (Alberta Parks 2014). As a result, because Option 1 and Option 2 sites are mainly agricultural land, non-native and other invasive (for example weeds) species are likely present at both sites.

5.2.4.3 Wildlife and Wildlife Habitat

Several terrestrial wildlife may occur in the region. Most wildlife species in the region depend mainly on forested habitats. Due to the agricultural development and lack of large forests in the area surrounding the Project siting options, most forest living wildlife species are not expected to make use of the two options for the Project site. Wildlife use of the Option 1 and Option 2 sites are likely limited to species that are tolerant of human disturbance (e.g., mice, coyotes, deer, bird species like crows and ravens).

Key Wildlife and Biodiversity Zones are sites that help improve biodiversity for select species, such as providing winter habitat for large animals. A Key Wildlife and Biodiversity Zones is located near the Option 1 site and overlaps with a part of the Option 2 site (AEPA 2024). Option 1 also overlaps with a grizzly bear Support Zone, which is an area intended to help maintain grizzly bears populations (AEP 2020).

5.3 Species at Risk

5.3.1 Fish and Fish Habitat

Ten fish species in the Peace River system are listed as at risk provincially or federally. However, none of the fish species within 5 km of the Project site are listed as endangered, threatened, or of special concern.

Arctic Grayling are provincially designated as "May Be at Risk" but not listed federally. Lake Trout are provincially designated as "Sensitive" but not listed federally. Bull Trout (Western Arctic populations) are provincially designated as "At Risk" and federally listed as "Special Concern." Bull Trout are found upstream in the Peace River, not within 5 km of the Project site, and no critical habitat is identified downstream of the Town of Peace River.

Rainbow Trout (Athabasca River populations) are provincially designated as "At Risk" and federally listed as "Endangered." Native Rainbow Trout in Alberta are only found in the upper Athabasca River watershed, not in the Peace River. Introduced Rainbow Trout in Alberta are listed as "Secure," and no critical habitat is identified in the Peace River.

5.3.2 Vegetation

There are potentially of 101 rare vascular plant species (e.g., trees, shrubs, flowers, grasses) and 65 rare non-vascular plants (e.g., mosses, algae, lichens, fungi) occurring in the Boreal Forest of Alberta (Moss 1983; Gould 2006). However, because the Option 1 and Option 2 sites are located on farming lands, there are no records of plant species on the provincial and/or federal species at risk lists (Rintoul 2008; Meijer 2008).

5.3.3 Birds and Migratory Birds

The Project is located in the Dry Mixedwood Natural Subregion of Alberta's Boreal Forest, which is home to various wildlife species. Several bird species considered "sensitive" may live in this area, such as trumpeter swans at Lac Cardinal. A detailed list of sensitive species will be provided in the Project's Impact Assessment after bird and habitat surveys are completed.

For Option 1, no sensitive bird species ranges overlap the site. For Option 2, the site is 4 to 9 km from sharp-tailed grouse sensitive ranges, and their breeding habitats may be present. Trumpeter swans have been observed on the site, and they are considered "Sensitive" in Alberta.

5.3.4 Wildlife and Wildlife Habitat

Provincially, species at risk are listed by the Alberta Endangered Species Conservation Committee and Scientific Subcommittee as 'Threatened', 'Endangered', or 'Special Concern'. Federally, Committee on the Status of Endangered Wildlife in Canada assesses species and recommends them for listing under the *Species at Risk Act*. The *Species at Risk Act* protects critical habitats of listed species and applies mainly to federal lands.

There are no records of listed species at the Option 1 and Option 2 sites.

Option 1

- Potential for bats (little brown myotis and northern myotis). A Recovery Plan protects the highest priority habitats.
- Overlaps with grizzly bear Support Zone, which helps maintain grizzly bears, especially females with cubs. Grizzly bears are listed as 'Special Concern' federally.
- Chinchaga caribou range is 30 km northwest of Option 1.
- Red Earth caribou range is 90 km east of Option 1 and 85 km northeast of Option 2.

Option 2

- Does not intersect sensitive species ranges.

5.4 Land and Resource Use

5.4.1 Traditional Land and Resource Use

Energy Alberta recognizes that Indigenous Peoples have a deep connection with the land and valuable knowledge about the local environment. Traditional Land and Resource Use is important in Impact Assessments and reconciliation with Indigenous Peoples. Energy Alberta will work with Indigenous Nations and Communities to understand how the Project might affect their traditional territory (e.g., activities like hunting, fishing, and gathering).

Energy Alberta will offer opportunities for Indigenous communities to assess Project impacts on land access, traditional activities, and cultural practices through their own studies. These studies will include maps and descriptions of culturally important areas and mitigation recommendations.

Data will come from Indigenous communities potentially affected by the Project, located in Treaty 8 and Otipemisiwak Métis Government (formerly the Métis Nation of Alberta. Previous studies and testimonies will inform the process but not replace new Indigenous Knowledge.

Energy Alberta will respect Indigenous governance, rights, and practices when requesting and using Indigenous Knowledge. They will engage with Indigenous communities to understand Project impacts on health, heritage, and traditional land use, following OCAP® principles. Building relationships with Indigenous communities ensures their knowledge informs every phase of the Impact Assessment.

5.4.2 Agriculture

The number of farms and area of agricultural land have increased in the area, which shows the importance of agriculture within the region. The main crop types produced in the region include barley, canola, wheat, and oats. Livestock, specifically cattle and pigs, have increased in the region.

5.4.3 Tourism

The County of Northern Lights has provincial parks, lakes, and local museums (Mighty Peace Tourism 2025). Tourism activities include hiking, hunting, horseback riding, camping, bird watching, and golfing. During the winter, the region offers opportunities for snowshoeing, cross-country skiing, snowboarding, sledding, ice fishing, and watching northern lights.

5.5 Cultural Resources

Currently, there are no known historical resources sites recorded in the "Listing of Historic Sites" (ACSW, April 1st, 2024), previously recorded archaeological sites, or the study areas of previous Historic Resource Impact Assessment studies within the Option 1 or Option 2 area. Option 1 is located mainly within agricultural lands, clear of forest cover; however, it is possible that areas of these lands are native vegetation (e.g., native prairie). A Historical Resources Overview will provide an analysis of the Project's potential to impact any known or unknown historical resources that may be present, along with recommendations for additional studies, if needed.

There are known historical resources sites recorded in the "Listing of Historic Sites" (ACSW, April 1st, 2024) within the Option 2 site. Option 2 has a high resource sensitivity zone, meaning there is a high potential for the area to contain a paleontological resource (such as fossils). An archaeological site is also located within the Option 2 site; however, the archaeological site has a heritage resource value of 0 and is unlikely to require further study.

5.6 Socio-Economic Environment

The Project is located in either the County of Northern Lights (Option 1; Figure 2.1-1) or Northern Sunrise County (Option 2; Figure 2.1-2). It is surrounded by several municipalities, including the Municipal District of Peace, Town of Grimshaw, Clear Hills County, Municipal District of Fairview, Town of Fairview, Birch Hills County, Northern Sunrise County, Town of Peace River, Municipal District of Smoky River, and Town of Falher (Figure 5.2-1). The term "region" refers to these sites and the surrounding areas, including Indigenous reserves and Métis settlements. The nearest major city is Grande Prairie, about 200 km away.

RAINBOW LAKE
HIGH LEVEL
Bushe River
Hay River
Boyer River
Dunlop River
Little Buffalo River
Basset Lake
Bede Creek
Bear River
MACKENZIE COUNTY
Haig River
Fontas River
Wabasca River
Cautley Creek
Keg River
Mikkwa River
Wadlin Lake
Kemp River
Botha River
COUNTY OF NORTHERN LIGHTS
ALBERTA
Buffalo River
Chinchaga River
Meikle River
Hotchkiss River
Peace River
Wolverine River
Cache Creek
Bison Lake
Panny River
Lafond Creek
Sawn Lake
Doig River
Notikewin River
Haig Lake
Loon River
Osborn River
CLEAR HILLS COUNTY
Little Cadotte River
NORTHERN SUNRISE COUNTY
MUNICIPAL DISTRICT OF OPPORTUNITY NO. 17
Option 1 Project Location
Option 2 Project Location
Clear River
Whitemud River
Cadotte River
Eureka River
Cadotte Lake
Montagneuse River
Lubicon Lake
Lubicon River
Hines Creek
PEACE RIVER
Cardinal Lake
Heart River
MUNICIPAL DISTRICT OF PEACE NO. 135
FAIRVIEW
MUNICIPAL DISTRICT OF FAIRVIEW NO. 136
Utikuma River
Hamelin Creek
Ksituan River
Lac Magloire
Bearhead Creek
South Heart River
Utikuma Lake
Nipisi River
Nipisi Lake
SADDLE HILLS COUNTY
MUNICIPAL DISTRICT OF SPIRIT RIVER NO. 133
BIRCH HILLS COUNTY
Kimiwan Lake
MUNICIPAL DISTRICT OF SMOKY RIVER NO. 130
Pouce Coupé River
Saddle (Burnt) River
Little Smoky River
Winagami Lake
Bad Heart River
Lesser Slave Lake
MUNICIPAL DISTRICT OF LESSER SLAVE RIVER NO. 124
Peerless Lake
Trout Lake
Utikuma Lake
Peerless Trout Lake
Beaverlodge River
Puskiwaskau River
SEXSMITH
BIG LAKES COUNTY
COUNTY OF GRANDE PRAIRIE NO. 1
Bear Lake
GRANDE PRAIRIE
Puskwaskau Lake
West Prairie River
East Prairie River
Driftpile River
Swan River
Redwillow River
Wapiti River
MUNICIPAL DISTRICT OF GREENVIEW NO. 16
Sturgeon Lake
Snipe Lake
Pelican Lake
Goose River

LEGEND

- HAMLET
- OPTION 1 PROJECT LOCATION
- OPTION 2 PROJECT LOCATION
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- INDIGENOUS RESERVE
- METIS SETTLEMENT
- MUNICIPAL DISTRICT BOUNDARY
- WATERBODY

0 25 50
1:1,250,000 KILOMETRES

NOTE(S)
1. PROJECTED COORDINATE SYSTEM: NAD 1983 UTM ZONE 11N

CLIENT
ENERGY ALBERTA

PROJECT
PEACE RIVER NUCLEAR POWER PROJECT

TITLE
SOCIO-ECONOMIC REGIONAL CONTEXT

CONSULTANT
wsp

YYYY-MM-DD	2025-04-03
DESIGNED	MJ
PREPARED	KW
REVIEWED	CB
APPROVED	MM

PROJECT NO.	CONTROL	REV.	FIGURE
CA0038431.4096		0	5.2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25mm
0

5.6.1 Population

The region is undergoing a population decline and has an older population compared with the provincial average. This means that most municipalities in the region have a larger number of residents that are at age 65 years and older. In addition, the majority of the municipalities in the region have a larger Indigenous population compared with the provincial average. The Indigenous population in the region is predominantly Métis followed by First Nations, and a small minority of Inuit in the County of Northern Lights.

5.6.2 Education

The region has five school districts: Peace River School District No. 10, Northland School District No. 61, Peace Wapiti School District No. 76, and High Prairie School District No. 48, and the Conseil Scolaire du Nord-Ouest which operate about 91 schools and centres for elementary and secondary school education. Other educational institutions include the Northwestern Polytechnic (post-secondary institution), Northern Lakes College, and Athabasca University (GOA 2025).

The region has educational achievement levels below the provincial average. It is common that residents older than 15 years of age do not have any form of certificate, diploma, or degree (Statistics Canada 2022). High school is commonly the highest education. Apprenticeships (on-the-job training and classroom learning), trades education, and college education are more common compared to university or other higher education after high school. The distance and access to these schools may have contributed to the lower attendance rates. In addition, jobs in the region may not necessarily require a degree from a college or university.

In this region, it is more common for women to have certificates, diplomas, or degrees (including from college or university) compared to men, who more commonly have completed apprenticeships. These trends are consistent with trends observed in the rest of the province.

5.6.3 Health

The main factors of health include income and social status; employment and working conditions; education; childhood experiences; physical environments; social supports and coping skills; healthy behaviours; access to health services; biologic and genetic make-up; gender; culture; and race/racism (GOC 2025).

Indigenous Peoples in Alberta are impacted more by cancers caused by infectious agents (viruses and bacteria) compared to non-Indigenous Peoples. These cancers include cervical, liver, and stomach (AFNIGC 2023). Life expectancy for Indigenous Peoples in Alberta have fallen in recent years from 67 to 60 years for Indigenous men and 73 to 66 years for Indigenous women (APTN 2023). The mortality rate was 4.5 times higher for Indigenous Peoples in Canada compared to non-Indigenous Peoples, and rates of unintentional opioid poisoning deaths are over eight times higher among Indigenous Albertans than non-Indigenous Albertans (AFNIGC 2024).

Considering all populations, hypertension (high blood pressure) is the most common long-term disease in the region, and occurrences are similar to the provincial rate (GOA 2022). This is followed by diabetes, ischemic heart disease (reduced blood flow to the heart), and chronic obstructive pulmonary disease (damage to the lungs), all of which have higher rates than the provincial rates.

The region reported higher mortality rates compared with the provincial average. The primary causes of death were neoplasms (tumors), diseases of the circulatory system, and external causes (injury), all of which occurred at higher than the provincial rates.

5.6.4 Infrastructure and Services

Infrastructure

Infrastructure near the Option 1 and Option 2 sites include the Regional Water Treatment Plant located in the Town of Manning (Town of Manning 2025). Water is sourced from the Notikewin River, the River Pump House, West Reservoir, and North Reservoir. Additionally, the Town of Manning has a wastewater collection and treatment system.

The Municipal District of Peace River No. 135 encompasses five water cooperatives. Water cooperatives are other services that manage water sources. For the region, this includes Shaftesbury Water Co-op, Weberville Water Co-op, East Grimshaw Water Co-op, West Grimshaw Water Co-op, and Griffin Creek Water (MDPR 2025).

Health Services

The region has five health facilities, located in the Town of Peace River, Town of Grimshaw, Town of McLennan in Municipal District of Smoky River No. 130, Town of Fairview, and Town of Manning in the County of Northern Lights (AHS 2025), which provide a variety of health services ranging from emergency care to mental health services. Health centres are also available in numerous Indigenous communities.

Services specific to Indigenous Peoples are offered through Indigenous Wellness Core programs in the Town of Peace River and Town of McLennan (AHS 2025). Indigenous Wellness Core programs provide accessible and culturally appropriate services for First Nations, Métis, and Inuit Peoples. The program aims to support cultural awareness and sensitivity, helps patient navigate through the healthcare system, provides referrals to addiction and mental health supports, and monitors the health of the Indigenous population in northern Alberta.

Emergency and Protective Services

The region has a regional fire hall and emergency medical services, as well as police services operated by the Royal Canadian Mounted Police. There is also a municipal Emergency Management Agency and a Disaster Services Joint Agency, which develop and manage emergency plans.

Transportation

The region is connected to other communities by many provincial highways. Access to the proposed Project site is provided from Highway 743, located immediately west of the Town of Peace River.

The County of Northern Lights owns and operates the Manning Municipal Airport. The region also has the Spirit River Airport, which is used for medical services, crop dusting applications, and general flying activities (Spirit River 2025). The Grande Prairie Airport offers direct flights to the cities of Calgary and Edmonton (Grande Prairie Airport 2024). There is also direct access to the Canadian National Rail and transport routes that connect to major provincial centres.

5.6.5 Economy

Farming, forestry, hunting, and fishing make up most of the economy in the region, which is above the provincial average (Statistics Canada 2022). Most of the farming includes grain farming, mixed farming, game farming, cattle farming, and beekeeping (MDPR 2025). The region also has a lumber mill, oil and gas plants, a pulp mill, transportation services, oilfield services, and industrial storage facilities. Tourism is promoted with nearly 24 hours of daylight during the summer months.

Farming, forestry, fishing, and hunting are the primary areas of employment in the region, which is above the provincial average (Statistics Canada 2022). The health care and social assistance industries are the next largest employers followed by the retail industry. The construction industry is also an important employer in the region.

The majority of the region has employment rates below the provincial average (Statistics Canada 2022; Statistics Canada 2024). Men have a higher participation rate in the labour force compared to women in the region although both rates fall below the provincial average (Statistics Canada 2022). While men have a higher income than women, both genders have incomes below the provincial average.

5.6.6 Labour Force

In 2021, agriculture, forestry, fishing, and hunting employed many people in most municipalities, ranging from 3.3% in Grimshaw to 50% in Birch Hills County. Health care and social assistance were the next largest employers, followed by retail trade and construction.

Labour force participation rates varied from 57% in Birch Hills County to 72.7% in Smoky River, mostly below the provincial average. Employment rates ranged from 56% in Birch Hills County to 68% in Smoky River. Unemployment rates were generally lower than the provincial rate of 11.5% in 2021, which dropped to 5.9% by 2023.

Men had higher participation rates and incomes than women, except in Falher. Men's median and average incomes were higher than women's but below provincial averages. Northern Sunrise County had the highest average income due to strong economic drivers like oil and gas, forestry, agriculture, and tourism. Other municipalities had lower average incomes.

6 PART E – FEDERAL, PROVINCIAL, INDIGENOUS, AND MUNICIPAL INVOLVEMENT AND EFFECTS

6.1 Federal Funding

The Project is currently receiving funding from the Government of Canada through the Natural Resources Canada Electricity Pre-Development Program. This program is expected to continue to provide funding during the pre-development phase of work for the Project. There is potential for future federal funding, but this has not been confirmed at this time.

6.2 Federal Lands

The Project will be constructed on lands owned by Energy Alberta. There will be no federal lands used for the purpose of carrying out the Project.

6.3 Federal, Provincial, Indigenous, and Municipal Government Jurisdictional Requirements

A number of agencies and regulators potentially have powers, duties, or functions in relation to the assessment of the Project's potential environmental impacts. Energy Alberta will confirm any approval requirements with federal and provincial agencies as part of the Impact Assessment.

Under the *Impact Assessment Act*, the Canadian Nuclear Safety Commission is the lifecycle authority; however, other federal agencies and departments that may also be involved in the Impact Assessment process include:

- Environment and Climate Change Canada
- Health Canada
- Natural Resources Canada
- Parks Canada
- Transport Canada

The Project would also require a licence issued by the Canadian Nuclear Safety Commission under the federal *Nuclear Safety and Control Act*.

Provincially, the need for an environmental assessment is determined by Alberta's *Environmental Protection and Enhancement Act*. Provincial agencies and regulators that may be involved in the provincial environmental process include:

- Alberta Environment and Protected Areas
- Alberta Arts, Culture and Status of Women
- Alberta Utilities Commission
- Alberta Aboriginal Consultation Office
- Alberta Transportation and Economic Corridors
- Alberta Emergency and Disaster Planning
- Alberta Jobs, Economy and Trade

There are currently no known Impact Assessment requirements for local governments.

7 PART F – POTENTIAL EFFECTS OF THE PROJECT

7.1 Approach to Determining Potential Effects

The Project has the potential to interact and affect the biophysical and socio-economic environments of the region. For an interaction to occur there must be a source (i.e., a Project component, works, or activity) that interacts with biophysical and socio-economic environments (Figure 7.1-1).

Figure 7.1-1: Project-Environment Interactions

These interactions are used to develop and understanding of how the proposed Project activities and infrastructure could affect the biophysical and socio-economic environments. They are also used to guide the design of baseline programs that are used to describe the existing environment and technical studies that support the assessment of potential impacts. Once the interactions are identified, mitigation measures are considered to avoid or limit the potential impacts on the biophysical and socio-economic environments.

The following sections provide examples of anticipated interactions and mitigation measures. This list of interactions will be expanded upon through engagement with Indigenous Nations and Communities, the public, and regulators. Environmental design features and mitigation will also require input from Indigenous Nations and Communities, the public, and regulators

7.2 Changes Related to Federal Legislation

Changes to the environment that are governed by federal legislation, as a result of the Project, may be caused to:

- fish and fish habitat, as defined in the *Fisheries Act*
- aquatic species, as defined in the *Species at Risk Act*
- migratory birds, as defined in *Migratory Birds Convention Act*

7.2.1 Fish and Fish Habitat and Aquatic Species at Risk

Fisheries and Oceans Canada issues permits to protect fish and their habitats under the *Fisheries Act* and *Species at Risk Act*. The *Fisheries Act* prohibits causing the death of fish (other than fishing) and harming fish habitats. Any Project work that might harm fish or their habitats needs Fisheries and Oceans Canada review. The *Fisheries Act* also prohibits depositing harmful substances in water where fish live. If such substances are deposited, it must be reported immediately, and efforts must be made to minimize harm.

A review found no species at risk or critical habitats near the either of the Project sites. The unnamed watercourse in Option 2 and the Peace River near the Project are not within the range of any federally listed species. Therefore, a *Species at Risk Act* permit is not expected to be needed for Project activities affecting aquatic species.

The following summarizes some of the anticipated impacts to fish and fish habitat and mitigation measures to avoid/limit impacts.

Site Preparation

- Potential impacts: Alteration/loss of fish habitat due to changes in water and sediment quality, disruption of natural drainage patterns, improper waste management.
- Mitigation measures: Water management systems, scheduling work to avoid sensitive periods, dust suppression, proper waste management.

Construction

- Potential impacts: Alteration/loss of fish habitat, disruption of natural drainage patterns, fish mortality, changes to shoreline stability, sensory effects from blasting.
- Mitigation measures: Avoiding sensitive habitats, erosion and sediment control, water management systems, dust suppression, proper waste management, following Fisheries and Oceans Canada guidelines.

Operations

- Potential impacts: Alteration/loss of fish habitat, changes in water temperature and quality, decreased flow and water levels, improper waste management.
- Mitigation measures: Erosion and sediment control, recycling process water, maintaining site drainage, treating wastewater, progressive reclamation, dust suppression, proper waste management.

Decommissioning

- Potential impacts: Alteration/loss of fish habitat due to site water run-off and erosion.
- Mitigation measures: Preliminary Decommissioning Plan, removal of materials, reclamation and revegetation, post-construction inspections and monitoring.

7.2.2 Migratory Birds

The *Migratory Birds Convention Act* protects migratory birds and their nests. It applies to most migratory birds, but not to species like grouse, quail, hawks, owls, eagles, and some blackbirds. The 2022 update to the Migratory Birds Regulations protects the nests of 18 species, including the pileated woodpecker. However, their roosting and feeding cavities are not protected. Pileated woodpecker nests must be registered and confirmed as unoccupied for over 36 months before removing the tree containing the nest.

The following summarizes some of the anticipated impacts to migratory birds and mitigation measures to avoid/limit impacts.

Site Preparation

- Potential Changes: Loss/alteration of soils and vegetation, destruction of nests and birds, sensory disturbances, changes in habitat quality due to water run-off and erosion, improper waste management.
- Mitigation: Optimize cleared areas, avoid sensitive periods, pre-clearing wildlife sweeps, water management systems, dust suppression, proper waste management.

Construction

- Potential Changes: Changes to habitat from water intake infrastructure, decreased flow and water levels, sensory disturbances, increased bird mortality, improper waste management.
- Mitigation: Avoid sensitive periods, noise suppression, schedule work to avoid high flow volumes, limit vehicle speed, water management systems, reclamation and revegetation, proper waste management.

Operation

- Potential Changes: Sensory disturbances, changes in hydrological processes, decreased flow and water levels, changes in habitat quality, improper waste management.
- Mitigation: Noise suppression, recycle process water, limit vehicle speed, water management systems, treat wastewater, reclamation and revegetation, proper waste management.

Decommissioning

- Potential Changes: Sensory disturbances, changes in habitat quality due to water run-off and erosion.
- Mitigation: Preliminary Decommissioning Plan, remove construction/demolition materials, reclamation and revegetation, post-construction inspections and monitoring.

7.3 Changes Related to the Biophysical Environment

The biophysical environment includes air quality, groundwater, surface water, terrain and soils, vegetation, and wildlife and their habitats. Table 7.3-1 lists examples of expected interactions and mitigation measures for these components. This list will be expanded through input from Indigenous Nations and Communities, the public, and regulators. Environmental design and mitigation measures will also need their input. The Impact Statement will thoroughly assess potential changes and include monitoring programs to confirm the impact predictions.

Table 7.3-1: Potential Changes to the Biophysical Environment

Project Phase	Potential Change Prior to Mitigation	Standard Mitigation Example
Site Preparation	■ Increased air quality and fugitive dust emissions, and acoustic levels ■ Loss/alteration of soils, vegetation, and wildlife habitat ■ Injury/mortality to animals with low mobility ■ Introduction/spread of noxious, exotic, and invasive plant species ■ Altered groundwater permeability and flow ■ Sensory disturbance to wildlife and residences ■ Changes in surface water and sediment quality ■ Improper waste management	■ Optimize use of cleared areas and existing infrastructure ■ Dust suppression techniques ■ Avoid restricted activity periods; pre-clearing wildlife sweeps ■ Schedule work to avoid high flow volumes ■ Water management systems ■ Proper waste management
Construction	■ Loss/alteration of riparian and wildlife habitat ■ Sensory disturbance to wildlife and residences Introduction/spread of noxious, exotic, and invasive plant species ■ Dewatering for reactor building excavation ■ Changes to water quantity and flow dynamics ■ Changes to wetlands, riparian areas, and wildlife habitat ■ Dust deposition affecting water, soils, vegetation, and wildlife habitat ■ Increased wildlife mortality from vehicle collisions ■ Disruptions to natural drainage patterns ■ Improper waste management	■ Avoid restricted activity periods; pre-clearing wildlife sweeps ■ Noise suppression on vehicles ■ Schedule work to avoid high flow volumes ■ Dust suppression techniques ■ Limit vehicle speed ■ Water management systems ■ Treat and test infiltration water ■ Progressive reclamation and revegetation ■ Proper waste management

Table 7.3-1: Potential Changes to the Biophysical Environment

Project Phase	Potential Change Prior to Mitigation	Standard Mitigation Example
Operations	■ Changes to hydrological processes, water and sediment quality, riparian areas, and wildlife habitat ■ Sensory disturbance to wildlife and residences ■ Dust deposition affecting water, soils, vegetation, and wildlife habitat ■ Increased wildlife mortality from vehicle collisions ■ Improper waste management ■ Attraction of wildlife to the site	■ Avoid restricted activity periods; pre-clearing wildlife sweeps ■ Noise suppression on vehicles ■ Schedule work to avoid high flow volumes ■ Dust suppression techniques ■ Limit vehicle speed ■ Water management systems ■ Treat and test wastewater ■ Recycle and reuse process water ■ Progressive reclamation and revegetation ■ Proper waste management ■ Wildlife-proof containers for domestic waste
Decommissioning / Closure	■ Sensory disturbance to migratory bird habitat ■ Changes in habitat quality due to water run-off and erosion	■ Preliminary Decommissioning Plan ■ Remove construction/demolition materials ■ Reclamation and revegetation ■ Post-closure inspections and monitoring

7.4 Changes Related to the Socio-Economic Environment

The Project could interact with the broader community, including Indigenous Nations and Communities, in various ways. Employment opportunities might lead to population changes, putting pressure on services and infrastructure, even if some of the population increase is temporary. Since the Project is in small rural towns and requires a large workforce, socio-economic impacts are expected. These include effects on health, community well-being, access to services, healthcare, employment, income distribution, housing affordability, economic sustainability, environmental factors, and social equity.

The Impact Statement will review these interactions and assess both positive and negative effects. It will identify measures to maximize positive impacts and minimize negative ones. Temporary worker accommodation facilities will likely be needed to mitigate some effects of population influx, but they could also disrupt communities. The locations and impacts of these accommodations will be discussed with communities through engagement activities.

7.4.1 Health, Social, and Economic Factors

The Project could positively impact the local economy by creating jobs for residents, from construction workers to specialized technicians. It will boost local businesses by increasing demand for goods and services and improve infrastructure like roads and utilities. Decommissioning and restoration activities will also provide ongoing employment and support local businesses.

The Project will stimulate economic growth and improve livelihoods over many years. Nuclear energy production will offer a reliable electricity source, enhancing energy security and reducing fossil fuel dependence. This clean energy transition will produce minimal greenhouse gas emissions, helping address climate change.

However, construction could increase demand for housing and services, and generate noise, dust, and vibrations affecting community quality of life. Some community members might feel less safe with an operating nuclear power plant nearby. The Impact Statement will thoroughly review these interactions and assess both positive and negative effects on health, social, and economic factors in the region.

7.4.2 Recreational Land Use

The Project might affect recreational land use due to land acquisition, activity restrictions near the facility, and changes to the landscape. This could reduce recreational opportunities or alter existing amenities, impacting the experience for residents and visitors. However, the Project could also positively impact recreational areas by creating jobs, attracting new users, funding conservation initiatives, and boosting local economies.

Northern Alberta offers many year-round recreational activities. By addressing both challenges and opportunities, the Project could enhance recreational land use and community well-being. The Impact Statement will assess potential effects and help develop mitigation plans to support recreational land use.

7.4.3 Gender-Based Analysis Plus

A Gender-Based Analysis Plus framework will be used for the Project to meet federal requirements. The Gender-Based Analysis Plus identifies who is impacted by the Project and how they may experience impacts differently, considering factors like sex, gender, age, ethnicity, indigeneity, socio-economic status, and health.

Research shows links between resource projects and risks of gender-based violence for Indigenous, Métis, and Inuit women. The Gender-Based Analysis Plus involves engaging with diverse groups to identify impacts and develop mitigation measures.

Socio-economic data will be detailed enough to analyze disproportionate effects. Qualitative information on equality, diversity, inclusion, and related issues will be collected from studies and consultations. Effects will be described based on data and community concerns.

7.5 Federal Lands or Lands Outside of Alberta

The Project is located in Alberta and no changes to the environment, in another province, or outside of Canada, or on federal lands are anticipated. The Project is located along the Peace River, which is part of the Great Slave Lake Drainage system and flows through Alberta to the Northwest Territories.

7.6 Impacts to Indigenous Peoples

Potential environmental impacts can affect Indigenous and Treaty Rights and ways of life, especially changes that alter how Indigenous Nations and Communities interact with the environment. Information on the impacts on their physical and cultural heritage, traditional land and resource use, and significant historical or cultural elements is not yet available. This information will be shared once it is obtained through engagement with Indigenous communities, as long as they are willing to share it publicly.

7.6.1 Traditional Land and Resource Use

Indigenous Nations and Communities with historical land and resource use or interest in the Project are identified in Section 3.2.2. The Project site is mostly on agricultural land, not federal Crown lands. Activities like traffic, lights, and noise can affect wildlife habitat and use of the landscape, impacting hunting, fishing, plant gathering, and other cultural uses.

The Project's water infrastructure will be near the Peace River and may cross provincial Crown land. The Impact Assessment will evaluate regional impacts on water quality, wildlife and fish habitat, landscapes, and other environmental features important to Indigenous use of the land. Cumulative impacts and the ability to transfer cultural knowledge to youth are significant concerns.

Energy Alberta is committed to engaging with Indigenous Nations and Communities, supporting studies to understand past and present land and resource use.

7.6.2 Heritage and Cultural Resources

Historic resources in Alberta are protected by the *Historical Resources Act*, managed by Alberta Culture and Status of Women. The Listing of Historic Resources identifies lands with or believed to have historic resources. Projects overlapping with these lands need *Historical Resources Act* approval.

Projects requiring an Impact Assessment or approval by the Canadian Energy Regulator or Alberta Utilities Commission also need *Historical Resources Act* approval, regardless of listed lands. This approval may involve assessing, mitigating, and clearing archaeological, paleontological, historic, and cultural sites.

7.7 Impacts to Health, Social, and Economic Conditions of Indigenous Peoples

Economic development can lead to population changes that impact health, social, and economic aspects of Indigenous communities. The regional economy is smaller and less diversified than the provincial economy, focusing on primary and resource sectors. Unemployment rates are slightly lower than Alberta's, but population growth has been modest, with declines in most communities.

Indigenous communities may face increased demand for health services, childcare, and housing due to population changes. Costs of consumables could rise, affecting food security and health. Temporary worker accommodations can create jobs but need careful management to avoid negative interactions.

People may feel less secure with a nuclear facility nearby, but ongoing engagement and information can improve perceptions over time. The Project is expected to boost the regional economy by creating jobs and purchasing goods and services. Many jobs will require skilled personnel, offering above-average incomes. The construction period will provide training opportunities, potentially bringing back previous out-migrants, including Indigenous people.

Increased economic activity will benefit local residents but may also raise wages and prices. Energy Alberta is committed to engaging with Indigenous communities to identify employment and economic opportunities, supporting positive economic benefits and partnerships.

7.8 Greenhouse Gas Emissions Estimates

Nuclear power emits just a few grams of carbon dioxide (CO_2) equivalent per kilowatt hour (kWh) of electricity produced. Based on the United Nations Intergovernmental Panel on Climate Change study, this equates to 12g CO_2 equivalent/kWh for nuclear (World Nuclear Association 2024).

The greenhouse gas emissions produced as a result of the Project will be evaluated as part of the Impact Assessment. Limited information is currently available to estimate greenhouse gas emissions for the Project; however, Table 7.8-1 provides a limited summary of expected emissions sources for each Project phase.

Table 7.8-1: Expected Greenhouse Gas Emission Sources by Project Phase

Project Phase	Potential Source of Effect
Site Preparation and Construction	■ land clearing (one time vegetation loss and annual carbon sink loss) ■ mobile emission sources (e.g., heavy-duty excavation equipment) ■ stationary emission sources (e.g., contractor trailer generators)
Operations	■ mobile emission sources (e.g., light-duty maintenance truck) ■ stationary emission sources (e.g., utility emissions such as electricity usage and natural gas) ■ facility testing emissions (nuclear and/or non-nuclear)
Decommissioning / Closure	■ mobile emission sources (e.g., heavy-duty demolition equipment) ■ stationary emission sources (e.g., contractor trailer generators)

Further, Tables 7.8-2 and 7.8-3 provide very preliminary estimates of greenhouse gas emissions during site preparation, construction and operation phases. The data provided is very preliminary and subject to change. As such only two years of site preparation and three years of construction data have been included in Table 7.8-2. The greenhouse gas emissions produced during the Project phases will be refined and evaluated in the Impact Assessment.

Table 7.8-2: Annual Greenhouse Gas Emissions – Site Preparation and Construction Phase

Source	Emission Rate (tonnes/y)				
	Site Preparation		Construction		
	Year 1	Year 2	Year 3	Year 4	Year 5
Carbon Dioxide (CO_2)					
Parking Lot Tailpipe	31	31	297	297	290
Haul Truck Tailpipe	856	505	614	614	316
Paved Road Tailpipe	138	100	475	475	400
Stationary Equipment	-	1211	1733	1733	523
Non-Road Tailpipe	376	400	586	586	302
Total	1401	2247	3705	3705	1831
Methane (CH_4) – given as equivalent CO_2 values					
Parking Lot Tailpipe	0.1	0.1	0.9	0.9	0.9
Haul Truck Tailpipe	0.4	0.2	0.3	0.3	0.1
Paved Road Tailpipe	0.1	0.1	1.0	1.0	0.9
Stationary Equipment	0.0	1.7	2.4	2.4	0.7
Non-Road Tailpipe	0.2	0.2	0.3	0.3	0.2
Total	**0.8**	**2.3**	**4.8**	**4.8**	**2.8**
Total CO_2 (eq) tonnes	**1402**	**2249**	**3710**	**3710**	**1834**

Table 7.8-3: Annual Greenhouse Gas Emissions – Operation Phase

Source	CO_2 (tonnes/y)	CH_4 (as CO_2 [e])) (tonnes/y)	Total CO_2 (eq) (tonnes/y)
Emergency Power Generator	893	-	**893**
Auxiliary Steam Boiler	1315	0.1	**1315**
On-Site Roads	52	0.0	**52**
Site Total	**2260**	**0.1**	**2260**

7.9 Waste and Emissions

Potential waste and emissions that may occur as a result of the Project to the air, in or on water, and in or on land, during any phase of the Project are summarized below. Emissions and waste management options including handling, disposal, and storage will be further evaluated in the Impact Assessment.

7.9.1 Atmospheric Emissions

Air contaminants may be released to the environment from vehicles and equipment exhaust, power generation, and explosives used in blasting. These contaminants may include nitrogen oxides, sulphur dioxide, carbon monoxide, hydrazine, morpholine, radiological emissions, ammonia, and dust.

7.9.2 Liquid Effluents

The potential effluents (liquids that are discharged or released) that may occur as a result of the Project include the following:

- contaminants (e.g., fuels or oils) released to the environment through accident or malfunction
- morpholine and hydrazine
- treated wastewater entering the environment
- radiological effluents

7.9.3 Solid Wastes

Potential sources of solid waste that may occur as a result of the Project may include the following:

- recyclable waste (e.g., glass, plastic, metal, cardboard, paper, wood, batteries, and electronics)
- organics and food wastes (e.g., compost)
- hazardous waste (e.g., oils, chemicals, lighting lamps)

- radiological waste (e.g., low-, intermediate-, and high-level radiological waste)
- landfill waste (e.g., for items that are neither hazardous, recyclable, compostable, nor radiological)

7.10 Sustainability

The *Impact Assessment Act* includes provisions on sustainability and respecting Indigenous rights. The Impact Statement will analyze how the Project affects sustainability, using both qualitative and quantitative data. Engagement with Indigenous Peoples, the public, and other stakeholders will help develop a sustainability framework based on their values and needs.

The framework will evaluate the ecological resilience of renewable resources, like water supply, fish species, wetlands, and timber. The assessment will determine if Project impacts are positive or negative for these key values and issues, considering both biophysical and socio-economic effects.

8 REFERENCES

Government Acts and Regulations

Activities Designation Regulation. Alta Reg 276/2003 under the Environmental Protection and Enhancement Act. Current to February 25, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2003_276.cfm&leg_type=Regs&isbncln=9780779850648&display=html.

Aeronautics Act. R.S.C., 1985, c. A-2. Last amended December 18, 2018; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/a-2/index.html.

Canadian Environmental Protection Act, 1999. S.C. 1999, c. 33. Last amended December 16, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/c-15.31/FullText.html.

Canadian Navigable Waters Act. R.S.C., 1985, c. N-22. Last amended November 27, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/n-22/.

Canadian Nuclear Safety Commission Cost Recovery Fees Regulations. SOR/2003-212 under the Nuclear Safety and Control Act. Last amended June 12, 2015; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-212/index.html.

Class I Nuclear Facilities Regulations. SOR/2000-204 under the Nuclear Safety and Control Act. Last amended September 22, 2017; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/regulations/SOR-2000-204/page-1.html.

Environmental Assessment (Mandatory and Exempted Activities) Regulation. Alta Reg 111/1993 under the Environmental Protection and Enhancement Act. Current to February 25, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=1993_111.cfm&leg_type=Regs&isbncln=9780779846092&display=html.

Environmental Protection and Enhancement Act. RSA 2000, c E-12. Last amended December 5, 2024; current to December 12, 2024. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=E12.cfm&leg_type=Acts&isbncln=9780779851249&display=html.

Explosives Act. R.S.C., 1985, c. E-17. Last amended February 26, 2015; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/E-17/index.html.

Fisheries Act. R.S.C. 1985, c. F-14. Last amended August 28, 2019; current to June 12, 2023. Ottawa, ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/f-14/.

Fisheries (Alberta) Act. RSA 2000, c F-16. Last amended December 15, 2022; current to December 15, 2022. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=F16.cfm&leg_type=Acts&isbncln=9780779839353.

General Nuclear Safety and Control Regulations. SOR/2000-202 under the Nuclear Safety and Control Act. Last amended June 12, 2015; current to January 22, 2025. Ottawa, ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-202/index.html.

Historical Resources Act. RSA 2000, c. H-9.Last amended December 9, 2020; current to November 16, 2022. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=H09.cfm&leg_type=Acts&isbncln=9780779837267.

Hydro and Electric Energy Act. RSA 2000, c H-16. Last amended December 15, 2022; current to March 6, 2024. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=H16.cfm&leg_type=Acts&isbncln=9780779846245.

Impact Assessment Act. S.C. 2019, c. 28, s. Last amended November 27, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://www.laws-lois.justice.gc.ca/eng/acts/I-2.75/page-1.html.

Migratory Birds Convention Act, 1994. S.C. 1994, c. 22. Last amended December 12, 2017; current to April 1, 2024. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/m-7.01/.

Nuclear Non-Proliferation Import and Export Control Regulations. SOR/2000-210 under the Nuclear Safety and Control Act. Last amended May 13, 2010; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/sor-2000-210/index.html.

Nuclear Safety and Control Act. S.C. 1997, c.9. Last amended January 1, 2017; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/acts/N-28.3/index.html.

Nuclear Security Regulations. SOR/2000-209 under the Nuclear Safety and Control Act. Last amended June 12, 2015; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/regulations/sor-2000-209/page-1.html.

Occupational Health and Safety Act. SA 2020, c. O-2.2. Last amended December 7, 2023; current to December 7, 2023. Edmonton AB: Alberta King's Printer.https://kings-printer.alberta.ca/1266.cfm?page=O02P2.cfm&leg_type=Acts&isbncln=9780779845408.

Occupational Health and Safety Regulation. Alta Reg 184/2021 under the Occupational Health and Safety Act. Current to February 25, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2021_184.cfm&leg_type=Regs&isbncln=9780779826803.

Packaging and Transport of Nuclear Substances Regulations, 2015. SOR/2015-145 under the Nuclear Safety and Control Act. Current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2015-145/index.html.

Public Lands Act. RSA 2000, c P-40. Last amended December 5, 2024; current to December 12, 2024. Edmonton AB: Alberta King's Printer.https://kings-printer.alberta.ca/1266.cfm?page=P40.cfm&leg_type=Acts&isbncln=9780779850778.

Radiation Protection Regulations. SOR/2000-203 under the Nuclear Safety and Control Act. Last amended January 1, 2021; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/sor-2000-203/index.html.

Safeguards and Nuclear Material Accountancy. 2018. REGDOC-2.13.1. Current to February 20, 2025. https://www.cnsc-ccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-13-1/

Species at Risk Act. S.C. 2002, c.29. Last amended November 27, 2024; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws.justice.gc.ca/eng/acts/S-15.3/.

Water Act. RSA 2000, c W-3. Last amended December 5, 2024; current to December 12, 2024. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=W03.cfm&leg_type=Acts&isbncln=9780779850785.

Weed Control Act. RSA 2008, c W-5.1. Last amended December 7, 2023; current to December 7, 2023. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=W05P1.cfm&leg_type=Acts&isbncln=9780779845521.

Weed Control Act Regulation. Alta Reg 19/2010 under the Weed Control Act. Current to August 9, 2016. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2010_019.cfm&leg_type=Regs&isbncln=9780779792474.

Wildlife Act. RSA 2000, c W-10. Last amended December 15, 2022; current to December 15, 2022. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=W10.cfm&leg_type=Acts&isbncln=9780779844401.

Literature Cited

AEP (Alberta Environment and Parks). 2020. Alberta grizzly bear recovery plan. Alberta Species at Risk Recovery Plan No. 37. Edmonton AB. [accessed February 16, 2025]. https://open.alberta.ca/dataset/5bc2f11a-7360-48fe-a768-73127d24f039/resource/0f4abf49-9bdd-42a8-892f-a74f1a143770/download/aep-alberta-grizzly-bear-recovery-2020.pdf.

AEPA (Alberta Environment and Protected Areas). 2023. Wild species status search. [accessed February 16, 2025]. https://www.alberta.ca/lookup/wild-species-status-search.aspx.

AEPA. 2024. Fish and wildlife internet mapping tool. Government of Alberta. Edmonton, AB. [accessed February 16, 2025]. https://geospatial.alberta.ca/FWIMT_Pub/Viewer/?TermsOfUseRequired=true&Viewer=FWIMT_Pub.

AFNIGC (Alberta First Nations Information Governance Centre). 2023. Alberta First Nations Health Status Report. [accessed March 7, 2025]. https://abfnhealth.afnigc.ca/the-report/chronic-disease/.

AFNIGC. 2024. Alberta Opioid Response Surveillance Report: First Nations Peoples in Alberta. [accessed March 7, 2025]. https://open.alberta.ca/dataset/dda35281-eeb4-42d6-a146-6f34d408ac92/resource/8ee1addc-8496-4709-b40f-7cb1063b0d36/download/mha-alberta-opioid-response-surveillance-report-first-nations-peoples-2024.pdf?utm_source=st.%20albert%20gazette&utm_campaign=st.%.

AHS (Alberta Health Services). 2025. Indigenous wellness core. [accessed February 16, 2025]. https://www.albertahealthservices.ca/findhealth/Service.aspx?id=7805&serviceAtFacilityID=1086995#contentStart.

APTN (Aboriginal Peoples Television Network). 2023. First Nations life expectancy plummets in Alberta due to opioids death. [accessed March 7, 2025]. https://www.aptnnews.ca/national-news/first-nations-life-expectancy-plummets-in-alberta-due-to-opioid-deaths/

ECCC (Environment and Climate Change Canada). 2020. Strategic assessment of climate change. [access February 25, 2025]. https://www.canada.ca/en/services/environment/conservation/assessments/strategic-assessments/climate-change.html.

Exner-Pirot H, McCormick, J. 2024. How Indigenous participation can help drive the new nuclear age. The Hub. April 3, 2024. [accessed February 16, 2025]. https://thehub.ca/2024/04/03/heather-exner-pirot-and-jesse-mccormick-how-indigenous-participation-can-help-drive-the-new-nuclear-age/.

GOA (Government of Alberta). 2013. Alberta wetland policy. [accessed February 26, 2025]. https://open.alberta.ca/dataset/5250f98b-2e1e-43e7-947f-62c14747e3b3/resource/43677a60-3503-4509-acfd-6918e8b8ec0a/download/6249018-2013-alberta-wetland-policy-2013-09.pdf. 26 p.

GOA. 2017a. Alberta river water quality index graphs, April 1996–March 2016. [accessed February 26, 2025]. https://open.alberta.ca/dataset/0013f39f-f399-40b3-9c34-7cf8c0212272/resource/43f28f4b-54d2-4147-8a0f-3e8177c7e5f3/download/waterquality%20indexgraphs-1996-2016-jun2017.pdf. 1 p.

GOA. 2017b. Alberta caribou ranges. [accessed February 25, 2025]. https://open.alberta.ca/publications/alberta-caribou-ranges-map.

GOA. 2022. Community profile: Peace River health data and summary. 5th ed. [accessed February 16, 2025]. https://open.alberta.ca/dataset/e1de1b92-100a-4be5-b2c1-121bf8d9925e/resource/3ad81f51-ad03-4ea3-8fb2-2d731995bf41/download/hlth-phc-peace-river-2022.pdf. 64 p.

GOA. 2024a.Emissions reduction and energy development plan. [accessed August 30, 2024]. https://open.alberta.ca/dataset/7483e660-cd1a-4ded-a09d-82112c2fc6e7/resource/75eec73f-8ba9-40cc-b7f4-cdf335a1bd30/download/epa-emissions-reduction-and-energy-development-plan.pdf. 66 p.

GOA. 2024b. Occupational health and safety code. Alta Reg 191/2021 under the Occupational Health and Safety Act. Current to January 14, 2025. Edmonton AB: Alberta King's Printer. https://kings-printer.alberta.ca/1266.cfm?page=2021_191.cfm&leg_type=Regs&isbncln=9780779851003.

GOA. 2025. Athabasca University. [accessed February 16, 2025]. https://study.alberta.ca/plan-your-studies/universities-colleges-technical-institutes/universities/athabasca-university/.

GOC (Government of Canada). 2000a. Canadian Nuclear Safety Commission by-laws. SOR/2000-212 under the Nuclear Safety and Control Act. Current to January 22, 2025. [accessed March 5, 2025]. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-212/index.html.

GOC. 2000b. Canadian Nuclear Safety Commission rules of procedures. SOR/2000-211 under the Nuclear Safety and Control Act. Last amended September 18, 2007; current to January 22, 2025. Ottawa ON: Minister of Justice. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-211/page-1.html.

GOC. 2025. Social Determinants of Health and Health Inequalities. [accessed March 3, 2025]. https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html

Gould J. 2006. Alberta Natural Heritage Information Centre tracking and watch lists – vascular plants, mosses, liverworts and hornworts. Edmonton AB: Alberta Community Development, Parks and Protected Areas Division. [accessed February 16, 2025]. https://open.alberta.ca/publications/0778547183. 30 p.

Grande Prairie Airport. 2024. Arrivals and departures. [accessed February 16, 2025]. https://grandeprairieairport.com/.

Jacques Whitford Limited. 2006. Final report – environmental impact assessment Dunvegan hydroelectric project. Prepared for Glacier Power Ltd. Project No. ABC50541. October 2006. [accessed February 16, 2025]. https://open.alberta.ca/dataset/42bba1b2-5726-4920-bb04-96e2c20929e1/resource/b678f36f-013b-4f60-b2a1-4cbaef10619d/download/a-title-pages.pdf.

MDPR (Municipal District of Peace River No. 135). 2025. Water co-operatives. [accessed February 16, 2025]. https://mdpeace.com/home/area-overview/water-co-operatives/.

Meijer M. 2008. Alberta Sustainable Resource Development. ANHIC [Alberta Natural Heritage Information Centre] search request. Email to Young L, Golder Associates Ltd. October 22, 2008.

Mighty Peace Tourism. 2025. Five best attractions in the County of Northern Lights. [accessed February 16, 2025]. https://mightypeace.com/blogs/5-best-attractions-in-the-county-of-northern-lights/.

MMIWG (National Inquiry into Missing and Murdered Indigenous Women and Girls). 2019. Reclaiming power and place: the final report of the national inquiry into missing and murdered Indigenous women and girls. Volumes 1a and 1b. [accessed February 16, 2025]. https://www.mmiwg-ffada.ca/final-report/. 1,080 p.

Moss EH., 1983. Flora of Alberta. 2nd ed. (revised by Packer JG). Toronto ON: University of Toronto Press. 687 p.

Natural Regions Committee. 2006. Natural regions and subregions of Alberta. Complied by Downing DJ, Pettepiece WW. Government of Alberta. Pub. No. T/852. [accessed February 16, 2025]. https://open.alberta.ca/dataset/dd01aa27-2c64-46ca-bc93-ca7ab5a145a4/resource/98f6a93e-c629-46fc-a025-114d79a0250d/download/2006-nrsrcomplete-may.pdf. 264 p.

PIWC (Pauktuutit Inuit Women of Canada). 2021. Addressing Inuit women's economic security and prosperity in the resource extraction industry. [accessed February 16, 2025].https://pauktuutit.ca/project/addressing-inuit-womens-economic-security-and-prosperity-in-the-resource-extraction-industry/. 70 p.

Rintoul J. 2008. Alberta Sustainable Resource Development. ANHIC [Alberta Natural Heritage Information Centre] search request. Email to Gregory M, Golder Associates Ltd. January 9, 2008.

Slomka JM, Hartman GMD, Klassen J. 2018. Architecture and geometry of basal sand and gravel deposits, including the 'Grimshaw gravels', northwestern Alberta (NTS 84C and 84D). Alberta Energy Regulator, AER/AGS Open File Report 2018-04. [accessed February 16, 2025]. https://ags.aer.ca/publication/ofr-2018-04.

Spirit River. 2025 . Spirit River Airport. [accessed February 16, 2025]. https://www.townofspiritriver.ca/location/spirit-river-airport/.

Statistics Canada. 2022. Census profile. 2021 census of population. [accessed February 16, 2025]. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E.

Statistics Canada. 2024. Labour force characteristics by province, monthly, seasonally adjusted. [accessed February 16, 2025]. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410032701.

Town of Manning. 2025. Water treatment plant. [accessed February 16, 2025] https://manning.ca/residents/water-treatment-plant/.

WCS (Water Survey of Canada). 2024. Historical hydrometric data. [accessed February 16, 2024] https://wateroffice.ec.gc.ca/search/historical_e.html.

World Nuclear Association. 2024. Carbon dioxide emissions from electricity. [accessed March 11, 2025, 2024] https://world-nuclear.org/information-library/energy-and-the-environment/carbon-dioxide-emissions-from-electricity