Volume 2, Section 13 Snake Lake Reservoir Expansion Project

Environmental Impact Assessment
Land Use and Management

Submitted to:

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a division of Englobe

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On Behalf of:

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Executive Summary

Snake Lake Reservoir (SLR) is located within Townships 19 and 20, Ranges 16 and 17, west of the fourth meridian (W4M), 18 km southeast of Bassano and 23 km northwest of Brooks, Alberta. The Eastern Irrigation District (EID) proposes to develop the Project by constructing outer berms up to 20 m high in Sections 29, 30, 31, and 32 in Township 19, Range 16, W4M. This expansion will extend the reservoir approximately 3 km to the south and 3 km to the east within the Dry Mixedgrass Natural Subregion (DMNS; Government of Alberta [GOA], 2006). It is owned and operated by the EID under *Water Act* Licence No. 00071066-00-00 and regulated via Alberta's *Irrigation Districts Act*. The EID is licenced to use 938 million m^3 of water from the Bow River and uses an average (over 10 years) of 549 million m^3 per year (EID, 2020). The SLR Expansion Project (the Project) will not increase the EID's water allocation.

This assessment examines how human activities and infrastructure interact with the Project. It addresses current and past agricultural and industrial land uses and land use potential. Additionally, it examines how current and future land uses are managed and regulated. Land and resource uses are summarized to develop local and regional baselines for use in Environmental Impact Assessments (EIA) and cumulative effects assessments (CEA) of the Project in the regional landscape. Study areas include a Terrestrial Local Study Area (TLSA) including the Project area plus a 500 m buffer, and a Terrestrial Regional Study Area (TRSA), including the Project area plus a 15 km buffer.

This report summarizes relevant federal, provincial, and municipal legislation and guidelines that affect or permit changes to land and resource uses such as the *Water Act, Fisheries Act, Wildlife Act, Surface Rights Act, Historical Resources Act,* and the *Environmental Protection and Enhancement Act*. Information for this report was obtained through aerial imagery interpretation and review of spatial databases. Government information on land jurisdictions, roads, pipelines, and other infrastructure was extensively used. Additionally, field survey data collected by other disciplines in this EIA were used to help examine land use and management in the TLSA.

Most of the land within the TLSA is owned by the EID, which includes the expansion footprint area and the extant reservoir. Only county roads and road allowances, railway right-of-way, and private lands surrounding the rest of the site are not EID-owned. Public lands within the TRSA include roads, railway rights-of-way, road allowances, Crown grazing leases, and open water bodies or rivers. Agricultural land use (grazing) was the dominant use of the planned expansion area until 2022; now, grazing and cropland only occur on lands not owned by the EID in the TLSA surrounding the Project. Most private land in the TRSA is used for grazing with lesser areas of cropland and irrigated cropland.

There are no First Nation Reserves within the TLSA or TRSA. The Siksika Reserve No. 146 (Siksika Nation) is located to the east of the TRSA, near Bassano. It is unknown if there are Traditional Use sites in the Project area. According to the Historical Resources Act approval 4825-21-0010-003 (January 24, 2025), which followed submission of an Historical Resources Impact Assessment, "there are no Historical Resources Act requirements associated with Indigenous Peoples Traditional Use sites of a historic resource nature". Most of the Project area has not been accessible for Traditional Uses since the land was settled and Treaty 7 signed. However, public access to the extant reservoir lands and water and to the planned Project site and reservoir has

been available to First Nations and other public groups on public road allowances. Per the EID's Public Access Policy, the SLR is a publicly accessible site suitable for a variety of recreational activities including fishing, boating, trail activities, and birdwatching; however, hunting is not currently permitted at this site or in the expansion area. A public boat launch is present in the southwest end of the extant SLR, and access is available along the reservoir dam road. Several other water features offer recreation opportunities in the TRSA, where publicly accessible. There are five reservoir access points in the TRSA and 7 Bow River Access locations. EID owned grazing leases and Crown grazing lands may also be publicly accessed with permission of the lessee.

The Project does not occur within any of Alberta's Tourism Development Zones but is within the Canadian Badlands Tourist Region. There are no provincial or federal parks, protected areas, heritage rivers, or historic structures in the TLSA or the TRSA. Environmentally Significant Areas are present throughout the Project area. Historical field assessments revealed 22 new archaeological sites, 18 new fossil sites, and two new outcrops. The TLSA and TRSA are within the Wildlife Sensitivity Ranges for Burrowing Owl (*Athene cunicularia*), Sharp-tailed Grouse (*Tympanuchus phasianellus*), Golden Eagle (*Aquila chrysaetos*), Prairie Falcon (*Falco mexicanus*), Ferruginous Hawk (*Buteo regalis*), Sensitive Amphibians, and grassland songbirds. Sensitive aquatic species have historically been reported within the TRSA, including Bull Trout (*Salvelinus confluentus*), Rainbow Trout (*Oncorhynchus mykiss*), and Sauger (*Sander canadense*), although there have been no records of these species in the SLR.

Neither the TRSA nor TLSA contain renewable energy production infrastructure. However, powerlines and utilities cross 9.0 km and 362.0 km of the TLSA and TRSA respectively. In the TRSA, there are pipelines from 18 different owners and 4,145 leases (wellsites and other oil and gas developments). In 2024, Torxen decommissioned 29 gas wells and abandoned all pipelines within the Project footprint. A nationally regulated railway owned by Canadian Pacific-Kansas City crosses the TLSA and TRSA, but the proposed expansion area does not intersect it.

There are no active quarries or pits in the TLSA. Part of the Project area was tested for gravel extraction in the past. The TLSA contains a quaternary unconsolidated deposit, and a sand and gravel deposit. The TRSA has three different aquifers present: A quaternary unconsolidated deposit, and two quaternary sand and gravel deposits, all with varying extraction rates. In the regional study area, there are 9 surface water licences and 46 groundwater wells as per the Provincial Water Well Database. 18 dugouts occur in the TLSA, with 518 dugouts in TRSA.

Identified resources to be assessed for effects include:

- Traditional Land Uses
- Land Ownership
- Cultural/Historic Resources
- Agricultural Land
- Transport via Linear Developments
- Consumptive and Non-consumptive Land Uses
- Residential Land Uses
- Protected lands
- Commercial and Industrial Land Uses

Of the identified resources for Land Use and Management, Agricultural Land and Industrial Land were assessed as having high negative effects after any mitigations are applied. The loss of current pastureland will not be replaced as livestock grazing will no longer occur in the area even after restoration of the berms, soil storage area, and temporary workspaces. Loss of industrial lands is unavoidable as these features need to be removed to facilitate the reservoir development. There was also a medium negative effect assessed on changes to Crown land, related to the closure of 6.5 ha of road allowance in the Project area. The County of Newell will provide a long-term lease to the EID. This change was so small in area (regionally), that it was screened out of the assessment for cumulative effects. All other assessed Land Use and Management resources had neutral (Cultural/Historic Resources, Residential Land Uses, and Protected Lands) or net positive (Traditional Land Use and Other Consumptive and Non-Consumptive Land Uses).

Cumulative effect assessments determined for Agricultural Land uses a medium project contribution to a moderate cumulative effect. Given the EID maintains over 200,000 ha of native grasslands, additional mitigations to protect these lands were not examined. For Industrial Land Uses, construction of the SLR Expansion will result in a low negative project contribution to a low positive change in the regional area. As overall cumulative effect is positive, no action will be taken to mitigate Project effects to Industrial Land Uses, and it is predicted that the regional area will benefit from the Project due to increasing capacity for industrial agricultural operations.

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Abbreviations

ACSW	Alberta Ministry of Arts, Culture and Status of Women
Alberta EPA	Alberta Environment and Protected Areas
asl	Above Sea Level
CEA	Cumulative Effects Assessment
DMNS	Dry Mixedgrass Natural Subregion
EIA	Environmental Impact Assessment
EID	Eastern Irrigation District
ESA	Environmentally Significant Areas
FMA	Fur Management Area
FSL	Full Supply Level
FTOR	Final Terms of Reference
GOA	Government of Alberta
GOC	Government of Canada
HRA	*Historical Resources Act*
IRMS	Integrated Resources Management Strategy
MDP	Municipal Development Plan
PHRIA	Paleontological Historical Resources Impact Assessment
PP	Parkland-Prairie Management Zone
SLR	Snake Lake Reservoir
SSRP	South Saskatchewan Regional Plan
TEC	Alberta Transportation and Economic Corridors
TLSA	Terrestrial Local Study Area
TRSA	Terrestrial Regional Study Area
WMU	Wildlife Management Unit

13.1 INTRODUCTION

Snake Lake Reservoir (SLR) is located within Townships 19 and 20, Ranges 16 and 17, west of the fourth meridian, 18 km southeast of Bassano and 23 km northwest of Brooks, Alberta. It was constructed from 1995 to 1997 as an off-stream irrigation storage facility in a natural coulee with a downstream (east) and upstream (west) dam with natural slopes on north and south sides.

It is owned and operated by the Eastern Irrigation District (EID) under *Water Act* Licence No. 00071066-00-00 and regulated via Alberta's *Irrigation Districts Act* (Government of Alberta [GOA], 2000a). The EID is licenced to use 938 million m^3 of water from the Bow River and uses an average (over 10 years) of 549 million m^3 per year (ranging from 363 million m^3 to 663 million m^3), such that there is an average of 389 million m^3 of unused water available for offsite storage without requiring additional allocation (EID, 2020).

The EID proposes to develop the SLR Expansion Project (the Project) by constructing outer berms up to 20 m high in Sections 29, 30, 31, and 32 in Township 19, Range 16, W4M east of the present reservoir. This expansion will extend the reservoir approximately 3 km to the south and 3 km to the east. Portions of the base will be excavated so the new reservoir will hold water both below and above the natural land grade. The Project will provide additional water security during hot weather and droughts, when direct river withdrawals cannot be maintained. The proposed expansion will inundate an additional 763.6 ha of land east of the extant reservoir (Appendix K1, Figure K1-1).

The extant SLR [i.e., the dam (3.5 ha) and open water (299 ha)] covers 302.5 ha and has a storage volume of 19.25 million m^3 (15,600 acre-feet) at full supply level (FSL) of 781.70 m above sea level (asl). Water sourced from the Bow River at Bassano Dam is diverted into the reservoir from EID's East Branch Canal via a gated inlet chute combined with an online check structure. Outflow from the reservoir is through the East Dam Low Level Outlet, located near the north end of the East Dam. This water helps support 50,000 acres (20,000 ha) of downstream irrigated agriculture. The Project will increase the reservoir area by 827 ha to a total area of 1,136 ha. The EID also intends to increase the FSL to 782.0 m above sea level in both basins. Total water coverage will increase by 764 ha in the expanded reservoir, plus there will be an increase of 6 ha in the extant reservoir (after raising of FSL), resulting in a combined reservoir of 1,069 ha. The storage volume will increase by 68.1 million m^3 for a total of 87.4 million m^3 (Appendix F1, Figure F1-1). The dam and reservoir will be permanent features.

The Land Use and Management section examines how current human activities and infrastructure interact with the local and regional areas surrounding the proposed Project. It addresses current and past agricultural and industrial land uses and land use potential. Additionally, it examines how current and future land uses are managed and regulated, including integrated regional planning processes and guidelines. Land uses are listed and summarized to develop local and regional baselines for use in environmental and cumulative effects assessments of the Project.

13.2 PURPOSE

Land uses near the Project include private grazing lands, irrigation infrastructure, county roads, a railroad, croplands, oil and gas activities, and recreational activities, such as fishing, in the SLR. Assessment of Land Use and Management requires information from other EIA assessment

disciplines, including Vegetation and Wetlands, Aquatic Resources, Wildlife and Wildlife Habitat, Historic Resources, Traditional Ecological Knowledge and Traditional Land Use, and Socioeconomics.

This assessment meets the requirements under the Final Terms of Reference (FTOR; Volume 2, Appendix A). The FTOR requires assessments in local and regional study areas on:

- The ownership status of the subject lands, including lands owned by the government (Crown), local municipalities, and patented lands. Descriptions and mapping of the current land uses in the Project area, including private land, Crown land dispositions, and Crown land reservations.
- Description and mapping of the existing land and resource uses and potential conflicts that exist, considering oil and gas development, renewable energy production, agriculture, tourism, Indigenous Peoples' uses, and outdoor recreational activities.
- Identification and mapping of unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant sites, and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).
- Identification of land use policies and resource management initiatives that pertain to the Project and discuss how the Project will be consistent with the intent of these initiatives.
- Description and mapping of planned clearing activities showing the timing of activities.
- Description of any currently existing control measures.

The assessment will identify agricultural lands (cultivated croplands, and pasture) and specify which are irrigated. Other features and activities examined include oil and gas activities, renewable energy sites, quarries, tourism and recreation, infrastructure (e.g., buildings, railways, utilities, irrigation, communication towers), recently disturbed or reclaimed lands, public or non-profit institution lands, and lands with aggregate deposits and aquifers. Existing water approvals or licences will be examined along with water infrastructure, facilities, wells, ditches, and dugouts. Other site activities may include outdoor recreation, scientific studies, outdoor education, and Traditional Use activities.

This report summarizes relevant federal, provincial, and municipal legislation and guidelines that affect or permit changes to land and resource uses. Land use policies and resource management initiatives or strategies are also identified and discussed. Opportunities are also examined for integrated land management of roads, infrastructure, and recreation opportunities.

13.3 PROJECT SETTING

The reservoir expansion is located within the Dry Mixedgrass Natural Subregion in the Grassland Natural Region of Alberta (DMNS) (GOA, 2006). Terrain in the subregion has low relief and is level to undulating with characteristic features such as rolling hills, reworked eolian features (dunes), and glaciofluvial or fluvial deposits in depressional (valley) areas. The climate of this subregion is warm and dry, with a mean annual temperature of 4.2°C. In summer, mean temperature is 18.5°C, and in winter the mean temperature is -10.2°C. Mean annual precipitation is 333 mm, the lowest of any natural subregion in Alberta (GOA, 2006). Drought years have

occurred and are defined by prolonged reduction in precipitation and/or a sustained water deficit when evapotranspiration exceeds precipitation.

Native grasslands in the natural subregion have been subject to land use change for agricultural use including conversion to tame pasturelands, croplands, and irrigated croplands. Natural water systems have been supplemented by the development of a system of reservoirs and canals providing additional aquatic habitat areas. Agriculture is the principal land use in the DMNS. Grazing is the main agricultural activity, occurring in over about 55 percent of the area. Approximately 35 percent of the Natural Subregion is under dry-land farming (mainly wheat/fallow) while 10 percent is under irrigation, mainly in the Taber, Brooks, and Medicine Hat areas. Oil and gas exploration and development is extensive. Recreational land uses include hunting, camping, fishing, and nature appreciation (GOA, 2006).

The Project is located within the southwest portion of the Matzhiwin Creek sub-watershed within Newell County. This area supports agribusinesses including feedlots and intensive livestock operations for beef, swine, dairy, and poultry (Red Deer Watershed Alliance, 2009). Prominent linear developments within the area include pipelines, trails, and rural and urban roads. Among Red Deer River subwatersheds, Matzhiwin Creek has the highest well density (3.15 wells/km^2). The well densities in the Brooks-Cassils-Southesk-Lathom corridor ranges from 10-40 wells/km^2 (Red Deer Watershed Alliance, 2009).

13.4 REGULATORY CONTEXT

This Baseline assessment is guided by federal and provincial legislative requirements for the management and protection of land use and management resources.

13.4.1 Federal Regulatory Requirements

Fisheries Act

Provides legal protection for fish and fish habitat, and regulates the killing of fish, other than by fishing, and the harmful alteration, disruption, or destruction of fish habitat. It applies to fish habitat which is available in the reservoir (Government of Canada [GOC], 1985).

13.4.2 Provincial Regulatory Requirements

Provincial legislation and guidelines that apply directly to land use and management for the Project are described below.

Public Lands Act

The *Public Lands Act* provides mechanisms for private interests to use Crown lands in Alberta. This *Act*, however, does not have jurisdiction over certain types of Crown lands, like road allowances, which are regulated by Alberta Transportation and Economic Corridors (TEC), with uses administered by Municipalities. The Project and extant SLR occur on private lands; however, one road allowance bisects the Project area. Crown land occurs regionally including some grazing leases and large water bodies and watercourses. All permanent and naturally occurring bodies of water are owned by the Crown in right of Alberta (GOA, 2000b); however, the SLR does not meet this criterion as it is a man-made waterbody and is under Water Licence to the EID. It also does not apply to dugouts and natural wetlands on the SLR Expansion Area. A Wetland Permanence Review submitted to Alberta Environment and Protected Areas (Alberta EPA) Water Boundaries

Unit was assessed and no wetlands or ponds were found to meet the criteria to be claimed by the Crown as public lands. No approvals are needed under the *Public Lands Act*.

Land Stewardship Act

This *Act* enables the government to provide direction and leadership in identifying current and future land-use objectives of the province, including economic, environmental, and social objectives, while respecting private property rights (GOA, 2009a). The *Act* aims to coordinate decisions concerning land, species, human settlement, natural resources, and the environment, and consider the cumulative effects of human endeavours and other events. The *Act* has led to the development of the provincial Land Use Framework, under which the South Saskatchewan Regional Plan (SSRP; GOA, 2018a) was developed (see Section 13.4.4). This plan provides a set of strategies and objectives, which includes mandatory practices on Crown lands which act as best management practices on private lands or municipally owned/administered lands.

Fisheries Act

Recreational fishing in Alberta is regulated by the Alberta *Fisheries Act* and *Fisheries Regulations*, administered by the Fish and Wildlife Division of the Alberta Government (GOA, 2000c). The province has three management zones [Eastern Slopes, Parkland-Prairie (PP), and Northern Boreal], based on ecosystem type. The three zones are further partitioned into units, based on watersheds, so that fishing regulations meet waterbody and fish population needs for individual areas. The SLR occurs in the PP1 Watershed Unit. Recreational users on the Project site must follow the relevant fisheries regulations for this Unit and Zone.

Wildlife Act

Hunting and trapping are regulated by the Alberta *Wildlife Act* (GOA, 2000d), which is administered by the Fish and Wildlife Division of the Alberta Government. The Canadian Wildlife Service, under the *Migratory Birds Convention Act* (GOC, 1994), also addresses migratory bird hunting. Hunting Management in Alberta is divided amongst 5 Wildlife Zones and further divided into Wildlife Management Units (WMUs). Each WMU has rules describing the time of year, method of hunting, and quantity of a given species that can be hunted on a sustainable basis. Trapping Management in Alberta is divided into eight Fur Management Zones and 1,632 registered Fur Management Areas (FMAs). Under Alberta's trapline system, trapline owners are licensed to harvest in one or more of the registered FMAs through a registered Fur Management Licence (GOA, 2008a).

Surface Rights Act

The *Surface Rights Act* establishes the mandate of the Land and Property Rights Tribunal to determine and grant right of entry on the surface of any land for any operation concerning mining, drilling, pipelines, and power transmission or telecommunication lines (GOA, 2000e). Right of entry must be granted by the owner and occupant of the land, or by the tribunal of the *Act*. Due to right of entry requirements, permission must be obtained from an owner of any of the above infrastructure before these features can be removed to facilitate reservoir development (because surface activities associated with reservoir construction, could compromise the operation of these features or violate subsurface rights. Additionally, this may apply to future subsurface activities, pipelines, transmission lines, or telecommunication lines, that may need to be installed in or surrounding the Project.

Historical Resources Act

The *Historical Resources Act* (HRA) discusses the use, designation, and protection of historic resources, (palaeontological, archaeological, historic or natural sites, and structures or objects). The *Act* governs research permits, chain of custody to archaeological and palaeontological resources, and transport of historic resources out of Alberta (GOA, 2000f). The Project may result in the degradation or loss of historical resources. Per the HRA, an Historical Resources Impact Assessment and a Paleontological Historical Resources Impact Assessment (PHRIA) was required, and Historical Resources Impact Mitigation was completed followed by issuance of an HRA Approval number 4825-21-0010-003 (January 24, 2025). This approval permits the EID to clear or build on site lands including excavation of the upper soil and mineral layers (quaternary deposits) above bedrock. Per the *Act*, and despite approval, activities are still subject to reporting of significant historic artifact finds. These requirements are further discussed in the Historic Resources section (see Volume 2 Section 14).

Environmental Protection and Enhancement Act

The *Environmental Protection and Enhancement Act* (GOA, 2000g) manages regulatory requirements for air, water, land, and biodiversity. The *Act* supports and promotes environmental protection, enhancement, and wise use of resources through a requirement of registration or approval of proposed activities. An EIA report (followed by an approval by the designated approval agency: in this case, the Natural Resources Conservation Board) must be received to ensure Project impacts are addressed and where residual effects will occur, are found to be in the public interest.

Irrigation Districts Act

This Act enables the establishment of irrigation districts in Alberta. Irrigation districts construct, operate, and maintain irrigation works under a Water Act Licence and promote the economic viability of the district. The act specifies how many irrigable acres are present in each district. The EID is governed by this Act (GOA, 2000a).

Hunting, Fishing and Trapping Heritage Act

This *Act* recognizes the importance of hunting, fishing, and trapping as traditional activities in Canada and aims to protect these heritage practices. The *Act* provides persons with the right to hunt, fish, and trap on Crown lands within provisions of the law while complementing the *Wildlife Act* (GOA, 2000d), *Fisheries Act* (federal), and the federal *Migratory Birds Convention Act* (GOC, 1994). These acts provide specific regulations for the conservation and management of the respective resources (GOA, 2008a).

Traffic Safety Act

The Alberta *Traffic Safety Act* governs various aspects of traffic safety, vehicle operation, and transportation regulation. It provides the legal framework for ensuring safe and orderly traffic flow on Alberta's roads and highways (GOA, 2000h). Guidelines and requirements under the *Traffic Safety Act establish* regulations and guidelines for traffic control, including within construction zones.

13.4.3 Municipal Regulatory Requirements

The Project is within the County of Newell (the County). Development in the County is regulated by zoning and development permit requirements as per Sec 619(1) of the *Municipal Government Act* (GOA, 2000i). Part 17, Division 1 of the *Municipal Government Act* states that authorizations

granted by Alberta EPA would prevail over compliance with the Municipal Development Plan and Bylaws (GOA, 2000i). Thus, municipal approval for Project development does not need to be obtained except in relation to use of county roads (see Volume 1, Section 5 – Transportation Infrastructure and Traffic Impact Assessment). However, the Project aligns with the local intended land use for the area as set out in the Land Use Bylaw, No. 2016-21 (County of Newell, 2024). The bylaw sets the broad policies and goals of the Municipal Development Plan into specific regulations and standards that guide land use decisions and development activities. This includes the establishment of land use districts to organize and manage land use in accordance with local planning goals, community needs, and development objectives. The Land Use District in or near the Project is designated as general agricultural use (County of Newell, 2024).

The County of Newell Municipal Development Plan (MDP), Bylaw No. 2057-23 guides physical development of the County from the present to 2045. The MDP provides clear direction regarding the County's social, environmental, and economic well-being over time (County of Newell, 2023). The Project aligns with the MDP by supporting the vision of sustainable growth and a high quality of life. The plan acknowledges that continued agricultural success is essential to achieving this vision. The Project directly contributes to this by providing additional water storage to facilitate irrigation for local agriculture during droughts. Furthermore, the plan promotes recreational and cultural activities, by acknowledging that local irrigation reservoirs can serve as gathering places for recreational activities, thereby enhancing the overall quality of life for residents.

A Road Allowance Closure Bylaw administered by the County will be required to remove the portion of a road allowance that transects the planned reservoir, as road construction will cease to be feasible once the reservoir is filled. First the municipality needs to write a bylaw and complete the first reading. Next the bylaw must be sent to adjacent landowners and there must be a public hearing. The closure request is then submitted by email to Alberta EPA for review; they will then provide referral comments, and request closure by Alberta Transportation and Economic Corridors (TEC). Once TEC provides ministerial approval, second and third reading of the bylaw can be completed by the County. Following bylaw approval, the land will be leased to the EID (County of Newell, 2023).

13.4.4 Land-use Policies, Initiatives, and Strategies

This section discusses the various land use policies, resource management initiatives, and strategies that relate to the Project, in addition to the Project's alignment with these initiatives.

Alberta Land-Use Framework

The Land-Use Framework guides land-use planning in Alberta, as it was designed to manage land and natural resources in alignment with the province's long-term economic, environmental, and social objectives (GOA, 2008b). The proposed Project aligns with the framework as it will provide economic gain to the agricultural sector in the EID.

South Saskatchewan Regional Plan

The SSRP guides sustainable development and manages growth in the South Saskatchewan Region (includes the South Saskatchewan, Bow, Red Deer, Milk River Basins, and the Alberta portion of Cypress Hills). It aims to balance economic, environmental, and social factors to support long-term prosperity and quality of life for residents through promoting responsible land use practices, while respecting ecological diversity, cultural heritage, and community resilience (GOA,

2018a). The plan sets out strategic objectives and policies to address key issues such as urban expansion, resource development, conservation of natural areas, and infrastructure investment.

The Project supports the outcomes and strategic directions of the SSRP by supporting the region's growing and diversified economy through the provision of a reliable water supply to support various sectors. This promotes economic stability while addressing environmental and social issues. The Project aligns with the need for watershed management by providing increased water storage by drawing water from the Bow River at times when it will put the least stress on aquatic ecosystems. The Project also supports healthy ecosystems and human well-being by effectively managing watersheds and incorporating principles of shared stewardship. Furthermore, it enhances quality of life for residents by creating additional opportunities for outdoor recreation. Lastly, the Project would anticipate and accommodate community development needs, strengthening communities and fostering social cohesion by providing a larger recreational area once completed. The Project will support biodiversity and a functioning ecosystem by providing additional habitat for aquatic species and with no net loss of wetland areas.

The SSRP applies to Crown land and is not directly applicable to the Project. While there is public land in the Project area (road allowance), this land is administered by the Municipal Government (i.e., County of Newell) and is not subject to the *Public Lands Act*. The SSRP may also be implemented on private lands through existing legislation such as the *Municipal Government Act* and through existing tools such as integrated landscape management plans and access management plans. Objectives of the plan may also be used to guide best management practices for the Project and/or may be written in to the approval conditions for the Project. This includes municipal development plans and land use bylaws, which align with the regional plan (GOA, 2018a).

Alberta Irrigation Strategy

The Project is consistent with the Alberta Irrigation Strategy, by enhancing water security to meet future needs in the South Saskatchewan Region (GOA, 2014). The reservoir Project is a proactive measure to safeguard water resources, given the challenges posed by climate change, by supporting the development of new water storage opportunities, reliability in high quality and sustainable water supply; thereby reducing water shortage risk, enhancing aquatic environmental protection, and mitigating effects due to climate change.

Water for Life: A Renewal

Water for Life: A Renewal (GOA, 2008c) is Alberta’s strategy for the management of Alberta’s water quantity and quality for the benefit of current and future Albertans. It focuses on water supply for residents, ensuring the health of aquatic environments, and addresses potential future water shortages relating to climate change. The goals of this Project align with Water for Life: A Renewal, particularly regarding healthy aquatic ecosystems, water quality, and water supply. The Project will allow the EID to have reserve water in times of drought, drawing from its existing storage instead of from the river (when river waters are low). Thus, reducing the likelihood of the EID requiring water from the river while drought conditions and riverine ecosystem maintenance is of concern. Additionally, water supplies will be sufficient to support sustainable economic development within the agricultural sector.

Economic Development in Rural Alberta Plan

The Economic Development in Rural Alberta Plan provides a 5-year commitment to guide rural economic growth, and to promote innovation, diversification, and sustainable, long-term, economic development (GOA, 2022). The Project aligns with the Economic Development in Rural Alberta Plan by supporting resiliency of the agricultural industry. The expanded reservoir will provide a secure water supply for irrigation, which is crucial for the industry's retention and long-term viability. It specifically aligns with the plan's strategic direction of rural business supports and entrepreneurship.

Alberta's Rural Development Strategy

Alberta's Rural Development Strategy was designed to focus the efforts of industry, business, and government toward realizing economic growth and building vibrant and sustainable rural communities (GOA, 2009b). The Project aligns with priority actions listed in Alberta's Rural Development Strategy by proactively reserving water supply to reduce the likelihood of hardship during times of water scarcity. This contributes to sustaining and enhancing the quality of life for rural Albertans that depend on the agricultural industry for economic benefit and sustenance.

Bow Basin Watershed Management Plan

The Bow Basin Watershed Management Plan provides guidance and recommendations to decision-making authorities, municipalities, natural resource managers, users, and residents regarding land and water resources in the watershed (Bow River Basin Council, 2012). The Project meets this plan by allowing the EID to better align water withdrawals from the Bow River during times with lower implications on the ecosystem and the services it provides (during times of high flow). Additionally, the Project supports the plan's 'no further net loss of wetlands' through compliance with the Alberta Wetland Policy (GOA, 2013a) and the Wetland Mitigation Directive (GOA, 2018b) which requires the replacement of lost wetland function to compensate for wetland losses.

Eastern Irrigation District Integrated Resource Management Strategy

The EID Integrated Resource Management Strategy (IRMS) was developed in collaboration between Alberta government agencies, the EID, and the southeast Alberta Regional Planning Commission, with the purpose of improving management of land and natural resources within the EID (GOA, 1995).

The vision of the plan is to maintain a healthy ecosystem while contributing to the development of a strong, diversified, and sustainable economy. The IRMS acts as a guide for resource managers, industry, and others who have resource management responsibilities in the planning area. The plan applies only to the EID-owned land, natural resources, public land, and water bodies that are part of the irrigation network in the planning area. It does not apply to land owned by federal or municipal jurisdictions or to any other private land in the planning area. The Project meets water use management objectives by seeking to maximize the beneficial and wise use of water within the irrigation network. The SLR Expansion aims to improve conservation of water and efficiency of water use for irrigation in the planning area. This plan encourages cooperation between the EID and provincial government to reach mutual advantageous resource management objectives.

The Project is consistent with this strategy by aligning with various resource management objectives. Specifically, managing the irrigation network to meet irrigation demand and associated

domestic water requirements as authorized within the EID's water licence. The creation of new wetlands and additional offsets to replace any habitat lost through Project construction supports objectives to minimize impacts on wetlands and habitat. Additionally, opportunities for public recreation and consumptive uses of wildlife at the expanded reservoir support numerous resource management objectives.

13.4.5 Topography, Elevation, and Drainage Pattern

Topography, elevation, and drainage pattern are discussed in Volume 2, Section 10; refer to Figure G1-8 of that section. The FTOR requires an examination of these surface characteristics in this assessment. At baseline, topographical features include a general slope from west to east across the Project site. Lands north of the Project site drain southeast into the eastern side of the Project lands. As a canal occurs in the north half of the study area, any water captured from the north will flow into the canal and out to the northeast. A major topographic feature is a meltwater channel the runs from west to east across the Project site, emptying into a drainage that crosses Range Road 164 and heads further southeast toward the San Francisco Lake area. Currently, water from a small canal also transfers water to maintain San Franscico Lake on behalf of Ducks Unlimited Canada.

Water in the south-central lands of the Project area flow north toward the meltwater channel, however much of this water gets captured in temporary to intermittent wetlands: some of which are connected to an old ditch that flows to the east. Finally, lands on the southwest end of the Project area drain to the south and those on the southeast end drain to the east. This water is eventually captured in a small canal that flows into San Francisco Lake. Changes to drainage pattern will occur with development of the Project, as the bulk of the Project area will be converted to reservoir and all water will flow into a canal heading northeast. However, a drainage ditch around the base of the new embankments will be constructed and water will be directed into the remnant of the meltwater channel and drain to the east and southeast to San Francisco Lake. Water from the north will also be captured in this drainage ditch. The remaining lands south of the embankments and beyond the new drainage ditch will continue to drain to the south and southeast.

13.5 LAND AND RESOURCE USE ISSUE SCOPING

Scoping for this EIA is a process that includes:

- identifying the Project activities that may alter or remove the resources or indicators;
- developing a list of resources or indicators for each discipline;
- identifying the risks, issues, or concerns regarding these effects; and
- determining what assessments to include (ones where high effects are likely) and which to exclude (effects are likely to be negligible or trivial).

Table 13-1 provides a summary of the issues scoping for Land Use and Management.

Table 13-1: Issue scoping for land-use and management

Project Activities and Risk	Resources	Potential Issues	Indicators or Measures	Screening	Applicability
Removal of Existing Land Areas and Uses on those Lands	Land Ownership	Development on the Project area may require a change of ownership status	Area owned by different land ownership classes (Crown, Private etc.; ha)	Land Ownership of the road allowance will affect total Crown land in the Project area. **Baseline and EIA.**	Local and Regional
	Traditional Land Uses	Loss of access to Traditional Land Use areas	Area of Traditional Land Ise areas accessible to Indigenous Communities (ha)	Publicly accessible land (road allowance) occurs on Project land and will need to be closed. Accessibility will increase once the reservoir expansion is completed. **Baseline and EIA.**	Local and Regional
	Cultural/Historic Resources	Loss of Cultural/Historic Resources	Number of Resource sites	Likely Cultural Resource sites identified in the area. Assess for baseline and EIA. **Baseline and EIA.**	Local and Regional
	Residential Land Uses	Loss or change of Residential Lands	Area of Residential Lands (ha) Count of Farmsteads and Acreages	Residential lands and buildings are present in the regional area but will not be affected by the Project. **Baseline only, not assessed.**	Local and Regional
	Protected Land	Loss or alteration of Parks, protected areas, and conservation easements	Area parks, protected areas, conservation easements and areas recognized provincially as Environmentally Significant Areas (ha)	No Parks or Protected Areas in either Terrestrial Local Study Area (TLSA) or Terrestrial Regional Study Area (TRSA). Conservation easement areas occur within the regional study are but will not be affected by the Project. **Baseline and EIA.**	Local and Regional
	Agricultural Land	Temporary or permanent removal or degradation of agricultural lands	Cultivated lands – dryland or irrigated (ha)	Cultivated Agricultural lands occur within the TRSA and a small portion of the TLSA but are outside of the Project footprint and will not be affected by the Project. **Baseline and EIA.**	Local and Regional

Project Activities and Risk	Resources	Potential Issues	Indicators or Measures	Screening	Applicability
		Permanent removal or degradation of grazing lands	Area (ha) Native and Tame Pasture	Project will remove several hectares of pastureland. **Baseline and EIA.**	Local and Regional
	Commercial and Industrial Land Uses	Temporary or permanent change in industrial land uses	Area used for commercial and industrial uses (ha)	Oil and Gas activities occur on Project area at Baseline. Assess changes related to removal of these resources **Baseline and EIA.**	Local and Regional
	Other Consumptive and Non-consumptive Land Uses[1]	Changes to Recreational Land Use Area and Access to these areas	Area available for public land use (ha) Campgrounds area (ha) Access points to water features (count) Reservoir (Fishing and Nature Viewing) Area (ha)	Recreational land areas may be affected by the development. **Baseline and EIA**.	Local and Regional
	Transport Via Roads, Power Lines, Pipelines, Canals and Ditches	Temporary or permanent disruption of transport via power lines and pipelines	Length (km) of pipelines, powerlines, and other linear disturbances	Project may affect length and area of this infrastructure and their activity. **Baseline and EIA.**	Local and Regional
	First Nation Reserves	Temporary or permanent change to First Nation Reserves	Area First Nation Reserves (ha)	No Reserves occur in the local or regional study areas. **Not assessed.**	N/A

[1] Including hunting, trapping, fishing, wild plant/berry harvesting, wildlife viewing, photography, scientific, monitoring, and educational studies, trail uses, boating and other recreational activities

Based on the screening exercise, in line with requirements in the FTOR, and the Guide to Preparing Environmental Impact Assessment Reports in Alberta (GOA, 2013b), the following resources are selected for baseline and impact assessment:

- Land Ownership
- Traditional Land Uses
- Cultural/Historic Resources
- Residential Land Uses
- Protected Lands
- Other Consumptive and Non-consumptive Land Uses
- Agricultural Land Uses
- Commercial and Industrial Land Uses
- Transport Via Roads, Power Lines, Pipelines, Canals and Ditches.

These additional resources were selected for Baseline Assessment only:

- Land management jurisdictions
- Land use policies and resource management initiatives

The following FTOR requirements are covered elsewhere in the EIA:

- Constraints to development are addressed in Volume 1, Section 3 – Constraints.
- Fire Management Plan is included in Volume 1, Section 11 – Mitigation Measures, Management Practices and Monitoring Plans.
- Surface water and disturbance interactions are addressed in Volume 1, Section 7 – Surface Waterbodies.
- Land clearing activities over time timing are discussed in Volume 1, Section 2 – Overview.

The following FTOR items were not relevant to this assessment and are not discussed:

- Procedures for compensating landowners for lands required for the Project and for associated damages or disturbances – not relevant as all activities will be on EID-owned lands.
- Existing (Baseline) access control measures – these are not relevant as there are no specific access control measures related to the proposed Project area.

13.6 BASELINE ASSESSMENT METHODS

13.6.1 Study Areas

Baseline conditions were assessed at both a local scale and a regional scale by examining resources and indicators in defined study areas. These study areas are the same ones used for the terrestrial disciplines of vegetation and wildlife and are defined as:

- Terrestrial Local Study Area (TLSA) – proposed Project footprint and 500 m buffer (Appendix K1, Figure K1-1);
- Terrestrial Regional Study Area (TRSA) – Project boundary and 15 km buffer (Appendix K1, Figure K1-2)

The TLSA was used in the assessment of direct or indirect Project impacts on land use and resources for the EIA. The TLSA includes the Project footprint and an adjacent area which is more likely to experience effects from development of the Project. The TLSA covers 1,657.5 ha.

The TRSA was developed as a land base for the cumulative effects assessment to address how Project effects interact with past, present, and future activities on regional resources or indicators. The TRSA covers 88,404.9 ha. The 15 km buffer was chosen to address cumulative impacts on resources at appropriate geographic boundaries, and considers water drainage, ecoregions, wildlife habitat use (i.e., home ranges), and provincial management areas (e.g., wildlife management units [WMUs]). This allows the assessment to determine the potential regional impacts on environmental resources of the Project. These study areas have been parametrized with existing disturbances and land uses. The TLSA and TRSA are consistent with those used by the other terrestrial disciplines (i.e., vegetation and wetlands, wildlife).

13.6.2 Information and Data Sources

Information outlined throughout this report was obtained through aerial imagery interpretation and review of spatial databases for the study areas. Government information on land jurisdictions, pipelines, and other infrastructure were extensively used. Grassland Vegetation Inventory was assessed to identify agricultural land uses, while specific infrastructure sites, pipelines, powerlines, towers, buildings, and oil and gas sites were identified through a variety of proprietary and government spatial data layers and by aerial photography interpretation. Data sources are listed on maps developed for this assessment. Additionally, data collected through field surveys for other disciplines were used to help understand land use and management in the TLSA.

13.6.3 Land Ownership and Land Use

Lands within Alberta can broadly be designated as either public or private. Public lands are owned and managed by Government agencies or municipalities. Most provincially owned public land is considered Crown land and is subject to the *Public Lands Act*. Private and other public lands are not subject to the *Public Lands Act* but are still affected by requirements and approval needs under other provincial and municipal legislation (GOA, 2016).

13.6.4 Jurisdictions and Designated Land Use Classes

Jurisdictions that overlap the TLSA and TRSA include areas legislated for management of counties, irrigation districts, watersheds, rangeland, hunting, and tourism. These are further described below:

- Counties are rural municipal land units that include roads, farmland, hamlets, and rural residential subdivisions.
- Irrigation districts are established to construct, operate, and maintain irrigation works for the conveyance and delivery of water and promote the economic viability of the district (GOA, 2000a). Alberta contains 11 irrigation districts, with 3 in the Bow River and Red Deer River sub-watersheds. These irrigation districts are the Western Irrigation District, the Bow River Irrigation District, and the Eastern Irrigation District.
- Watersheds are areas of land that catch and drain water into a waterbody such as a river or lake (GOA, 2010). There are 7 main watersheds in Alberta: Hay River, Peace River, Athabasca River, Beaver River, North Saskatchewan River, South Saskatchewan River, and Milk River, which are subdivided into various levels of sub watersheds based on dominant tributaries (e.g., Bow River, Crowfoot Creek).
- Hunting management in Alberta is divided amongst five general zones and further divided into wildlife management units to manage wildlife resources. Each wildlife management unit has rules describing the time of year, method of hunting, and quantity of a given

species that can be hunted on a sustainable basis. Wildlife Management Units are managed under the *Wildlife Act* (GOA, 2000d).

- Alberta has assigned tourism development zones to strengthen economy, amplify culture, enhance the environment, and foster innovation (Travel Alberta, 2022). The Project occurs within the Alberta Canadian Badlands tourist region and within the Canadian Badlands tourism development zone.

Lands required for the Project were purchased by the EID from a private landowner prior to the start of on-site assessments and this application. As the EID owns the lands to be developed, there will be no impacts on other private landowners.

13.6.5 Parks, Protected Areas, and Unique Sites or Special Features

In Alberta, parks and protected areas include ecological reserves, heritage rangelands, national parks or provincial parks, natural areas, provincial recreation areas, wilderness areas, wilderness parks, and wildland parks. These exist to protect and maintain natural heritage, conserve wildlife resources, and to preserve and protect resources for enjoyment of the present population and future generations (GOA, 2024a). Sustainable and responsible land stewardship is managed by government departments or agencies, including features on Crown land and other public lands.

Special features are areas with one or more components of environmental diversity, including terrain, vegetation community, or species (GOA, 1998). These were mapped from data sources including Environmentally Significant Areas (ESA), sensitive wildlife ranges, Natural Subregions, wetlands, and drainages. Wildlife (Volume 2 Section 11) and Vegetation and Wetlands (Volume 2, Section 10) are addressed in other sections of the EIA.

13.6.6 Outdoor Recreational Land Areas

Outdoor recreational activities in Alberta include, but are not limited to, biking, hiking, skating, skiing/snowboarding, snowshoeing, camping, fishing, golf, horseback riding, boating/paddling, wildlife viewing, and hunting. These outdoor activities are dependent on access, landform, wildlife, hydrology, land ownership, municipal lands, acreages and farmsteads, and other factors. There is no source of information on the number of activities or frequency of uses; however, the locations available to users can be tracked through a combination of published recreational information, and review of roads and trials that can access Crown lands or other public use areas such as reservoirs, grazing leases, and rivers.

13.6.7 Subsurface Resources

Resources are classified as either surface or mineral (subsurface). Subsurface resources are usually held by the Crown in Alberta, however, a small portion, called freehold mineral rights, can be held by individuals, families, businesses, or federal government (Canadian Association of Petroleum Products, 2024). Minerals counted as subsurface resources, and regulated by the Alberta Energy Regulator, include clay, aggregates (e.g., sand, gravel, various sized rocks, and bedrock), building resources (e.g., slate), mineral ores, precious stones, and salts (Alberta Energy Regulator, 2023a). Some subsurface deposits store groundwater: these are called aquifers. Groundwater is a resource recharged through the hydrologic cycle. Groundwater wells are drilled to access water in aquifers for use in industry, agriculture, municipal, and household needs. These resources are only examined at the Baseline Case.

13.6.8 Accessibility for Traditional Land Uses

Before European settlement of what is now Alberta, Indigenous Peoples lived in and/or had access to lands for resource uses such as hunting, fishing, trapping, harvesting, camping, spiritual purposes, and other cultural uses. Following the Treaty era, Indigenous Peoples gave up land rights in areas designated for settlement but retained rights to access and use non-titled Crown lands for traditional and cultural activities (GOA, 1930). While the Snake Lake Expansion area occurs on titled, private lands, there is also a partially developed road allowance. While not administered under the *Public Lands Act*, road allowances are available for access by all. The extant reservoir and its dam-surface roads and boat launch site also provide public access as per the EID's Public Access Policy. While the Project will ultimately apply to have the road allowance closed and removed to facilitate the reservoir expansion, once constructed and operating, the reservoir berms and water surface will be treated as publicly available lands as per the EID's Access Policy (EID, 2010). Other areas with the local and regional study areas available for access include other irrigation infrastructure, other roads and road allowances, as well as natural permanent waterbodies and all watercourses, if there is a publicly available right-of-way to access these lands. For example, Antelope Creek Ranch, Crown lands on the west side of San Francisco Lake, may be accessed by the public (Antelope Creek Ranch, 2024).

Therefore, there is existing accessible land within and surrounding the Project area. Note that rights-of-way associated with railroads and utility corridors may also be available for public access, with permission from the lessee.

13.6.9 Infrastructure and Linear Developments

Infrastructure sites examined include any built features for industries (e.g., oil and gas features), communication facilities, roadways, and structures such as culverts and bridges, or public institutions, as well as constructed reservoirs and dugouts, ditches, and private and commercial buildings. Presence of these features, as identified through various sources and aerial imagery, was used to assess infrastructure. Additionally, the length of linear utilities, pipelines, ditches, canals, and roadways is addressed.

13.7 BASELINE RESULTS

13.7.1 Land Ownership and Use

Privately owned land dominates the TLSA (96%) and TRSA (86%) (Table 13-2). Most of the land within the TLSA is privately owned by the EID including all land in the Project area, except for a road allowance. Private lands held by the EID make up 58% of the TLSA and 13% of the TRSA. Public land in the TLSA is comprised of municipal roads on road allowances; however, there are no other Crown Lands in the TLSA (Appendix K1, Figure K1-3). Crown lands within the TRSA include roads (notably parts of Highways 1, 36, 550, and 862), associated rights-of-way, road allowances, Crown grazing leases, and open water bodies, and make up 2.9% of the TLSA and 5.0% of the TRSA. There are no First Nations Reserves within the TLSA or the TRSA. The Siksika Nation is located northwest of the TRSA, near Bassano, AB.

Table 13-2: Land ownership in the Local and Regional Study Areas

Land Ownership Class	TLSA Area (ha)	% of TLSA	TRSA Area (ha)	% of TRSA
Crown Lands (railway, highway, road allowance)[1]	47.3	2.9	4,449.4[2]	5.0
Municipal Lands	64.4	3.9	9,966.8	11.3
Private Lands	1,593.5	96.1	76,026.0	86.0
EID Grazing Leases	0.0	0.0	9,782.7	11.1
EID Reservoir Areas	34.5	2.1	839.5	0.9
Other EID Owned Lands	920.7	55.5	920.7	1.0
Total EID Land in Study Areas	955.2	57.6	11,542.8	13.1
Total	**1,657.9**	**100.0**	**88,404.5**	**100.0**

1. Linear Crown lands overlap with areas classified as municipal or private lands, so are not added into the Total Area
2. Includes 1,940.6 ha grazing lease area

13.7.2 Agriculture

Most of the TLSA (82%) is native grassland that has been used for livestock grazing. The remaining agricultural land includes 1.4% cultivated land and no irrigated lands (Table 13-3; Appendix K1, Figure K1-3; Appendix K2, Plate K2-1). Non-agricultural land classes (including developed or disturbed land, woodlots, residential lands, and water classes comprise 16.7% of the TLSA. Most of the TRSA (84.4%) is agricultural land including cropland (7.4%), irrigated cropland (3.3%), and pasture (73.7%; Appendix K1, Figure K1-4). The remaining 15.6% is non-agricultural lands dominated by water features. Note that lands in the TLSA were classified based on conditions in 2021, before recent exploratory and vegetation-clearing activities.

Table 13-3: Land use classes in the Local and Regional Study Areas

Land Use Class[1]	TLSA (ha)	% of TLSA	TRSA (ha)	% of TRSA
Native Grassland / Pasture	1357.3	81.9	65,167.3	73.7
Cultivated (Non-irrigated)	23.4	1.4	6,507.5	7.4
Cultivated (Irrigated)	0	0.0	2,924.8	3.3
Subtotal Agriculture	**1,380.7**	**83.3**	**74,599.6**	**84.4**
Woodlots	15.8	1.0	49.6	0.1
Irrigation Infrastructure	64.3	3.9	1,269.5	1.4
Commercial and Industrial Lands	11.9	0.7	604.9	0.7
Residential Lands Including Farmsteads[1]	0.0	0.0	888.3	1.0
Area Disturbances (Wellsite, Reclaimed Wellsites, Dugouts)	38.3	2.3	564.9	0.6
Linear Disturbances (Roads, Trails, Pipelines, Utility Lines, Ditches)	40.5	2.4	2,390.7	2.7
Water Features	106.3	6.4	8,037.4	9.1
Subtotal Non-agricultural Lands	**277.1**	**16.7**	**13,805.3**	**15.6**
Total	**1,657.8**	**100.0**	**88,404.9**	**100.0**

[1] identified on aerial imagery and reclassified from agricultural land uses

A network of irrigation infrastructure supports agricultural land uses. This includes canals, ditches, dams, and reservoirs (Appendix K2, Plate K2-2). Reservoirs in the TRSA are the existing Snake Lake Reservoir and Rock Lake Reservoir (GOA, 2024b). Lands for these facilities are privately owned by the EID.

13.7.3 Residential Properties and Acreages

There are no residential areas, farmsteads, or acreages within the TLSA (Appendix K1, Figure K1-5). Residential areas within the TRSA are primarily within Lathom Hutterite Colony, Village of Rosemary, and Hamlet of Cassils (Appendix K1, Figure K1-2). A few acreages and farmsteads are present, mainly within the northern and eastern areas of the TRSA (Appendix K1, Figure K1-6). The Village of Rosemary is in the northeast area of the TRSA and includes public land for a park and other uses (Appendix K1, Figure K1-4). The TRSA has areas utilized by public and non-profit institutions including schools, churches, parks/reserve sites, and a cemetery. A concentration of these facilities is in the Village of Rosemary, and are dispersed throughout the TRSA (Appendix K1, Figure K1-4). A total of 1,358 residential buildings and 378 public institutions occur in the TRSA (Table 13-4), covering 888 ha (Table 13-3).

13.7.4 Infrastructure and Disturbances

The TLSA and TRSA contains industrial activities including utilities, rail, and oil and gas sites. These are composed of area developments (wellsites, etc.), linear developments (rights-of way, rail lines, etc.), and industrial sites (Table 13-4). Commercial and industrial lands make up 11.9 ha of the TLSA and 605 ha of the TRSA (Table 13-3). Neither the TRSA nor TLSA contain renewable energy production infrastructure. Area disturbances cover 38.3 ha of the TLSA and Linear disturbances cover 40.5 ha (Table 13-3).

Within the TLSA, there are 51 reclaimed or active wellsites (Table 13-4; Appendix K1, Figure K1-5). These cover 41 ha (Table 13-3) and have a total length of 27.4 km (Table 13-5). Pipelines in the TLSA traverse the outer boundary of the proposed expansion. As part of a separate Project for this development, Torxen Energy is removing and remediating all existing oil and gas infrastructure, including pipelines, that occur within the expansion footprint (Appendix K2, Plate K2-3). There are three different owners of 28 petroleum wellsites in the TLSA (Appendix K1, Figure K1-5): Alex W. McCoy Associates Inc., Cenovus energy Inc., and Torxen Energy Limited. All wells and pipelines within the Project area have been abandoned and decommissioned (Alberta Energy Regulator, 2023b).

In the TRSA, there are sections of pipeline from 18 different owners and 4,145 leases [wellsites and other oil and gas developments (Table 13-4; Appendix K1, Figure K1-6)]. Most of these are owned by Torxen Energy Limited. Along with oil and gas activities, 140 spills (remediated) have been reported in the TRSA (Appendix K1, Figure K1-6). No spills have been recorded in the TLSA.

Table 13-4: Infrastructure and linear development features (counts)

Features	TLSA (count)	TRSA (count)
Residential and Farm Buildings	0	1,358
Wellsites: Reclaimed or Active	51	3,999
Other Oil and Gas Developments (Batteries/Compressors)	0	146
Reported Spills	0	140
Communication Tower Sites	0	3
Public Institutions (Schools, Churches, Cemeteries, etc.)	0	378

Source: AbaData

Table 13-5 Length of linear development features (km)

Subclasses	TLSA (km)	% of TLSA	TRSA (km)	% of TRSA
Pipelines	27.4	30.0	1,940.6	41.1
Powerlines and Utilities	9.0	9.9	362.0	7.7
Roads (Provincial Highways, Municipal, Private, Trails)	32.7	35.8	1,604.0	34.0
Canals	16.5	18.1	592.6	12.5
Ditches	3.7	4.1	155.6	3.3
Railway	2.0	2.2	68.3	1.4
Total	**91.3**	**100.0**	**4,723.1**	**100.0**

The Canadian Pacific-Kansas City railway crosses the northeast corner of the TLSA over 2.0 km, with 68.3 km in the TRSA (Appendix K1, Figure K1-5 and K1-6). The Project area does not intersect the railway. Powerlines and utilities cross 9.0 km and 362.0 km of the TLSA and TRSA respectively (Table 13-4; Appendix K1, Figure K1-5 and K1-6). There is an AltaLink powerline crossing the northwest corner of the proposed reservoir expansion area (Appendix K1, Figure K1-5; Appendix K2, Plate K2-4). The EID is currently working with AltaLink to develop a relocation plan. This powerline is being moved as a separate project such that it will surround the north, east and south sides of the planned expansion area. 32.7 km of roads occur within the TLSA, while there are 1,604 km within the TRSA (Appendix K1, Figure K1-6).

13.7.5 Aggregate Development

There are no active quarries or pits in the TLSA or the TRSA. However, land use data showed that 2.4 ha of the Project footprint was tested for the purposes of gravel extraction in the past. This test site is located on the east edge of the Project footprint. It has since been abandoned and partially revegetated, without plans for further development (Appendix K2, Plate K2-5).

13.7.6 Other

Other land uses include water wells, dams, ditches, dugouts (Appendix K2, Plate K2-6), buildings, communication towers, and irrigation infrastructure (Tables 13-4 and 13-5). Irrigation canals (East Branch Canal and Snake Lake Canal) are present within the TLSA. A portion of the SLR occurs in the northwest corner of the TLSA. The TRSA includes 19 water wells, 2 telecommunication towers, and several private and commercial buildings, mainly in the north to southeast areas of the TRSA (Appendix K1, Figure K1-6).

13.7.7 Jurisdictions and Designated Land Use Classes

Table 13-6 is a summary of land use jurisdictions, agencies, and various layer boundaries within the TLSA and TRSA.

Tourism Zones

Travel Alberta delineates Tourist Regions and Tourism Development Zones (Travel Alberta, 2022). The TLSA does not fall within any of Alberta's Tourism Development Zones but does fall within the Canadian Badlands Tourist Region (Appendix K1, Figure K1-7). In comparison, the north and east of the TRSA are within the Canadian Badlands Tourism Zone, which is split between Tourist Regions (i.e., Canadian Badlands and Historic Plains; Appendix K1, Figure K1-

8). These zones are known for tourism inspired by historical fossil bearing sites, prairies, camping, hiking, and river adventures (Travel Alberta, 2023).

Table 13-6: Land use jurisdictions and agencies in the Local and Regional Study Areas

Land Use Jurisdictions	Subclasses	TLSA Area (ha)	% of TLSA	TRSA Area (ha)	% of TRSA
Tourism Zones	-	0	0	37,342.8	42.2
Irrigation Districts (in boundary)	-	1,657.8	100	86,687.2	98.1
Wildlife Management Unit	Newell	0	0	26,931.3	30.5
	Majorville	1,657.8	100	58,225.9	65.9
	Royal	0	0	3,247.7	3.7
Rangeland Working Zone 20	-	1,657.8	100	88,404.9	100
Municipalities (in boundary)	County of Newell	1,657.8	100	86,936	98.3
	Vulcan County	0	0	1,468.9	1.7
Watersheds (HUC8)	Lower Bow River	0	0	17,185.1	19.4
	Onetree Creek	1,474.7	89	38,715.3	43.8
	Matzhiwin Creek	183	11	32,503.6	36.8
Natural Subregions	Mixedgrass	0	0	267.7	0.3
	Dry Mixedgrass	1,657.8	100	88,136.3	99.7
South Saskatchewan Regional Plan	-	1,657.8	100	88,404.9	100
Bow River Watershed Planning Area	-	0	0	16,503.2	18.7
Red Deer River Watershed Planning Area	-	1,657.8	,100	71,900.8	81.3
Sensitive Wildlife Ranges	Burrowing Owl	1,657.8	100	88,404.9	100
	Sensitive Raptor (Ferruginous Hawk)	1,657.8	100	88,404.9	100
	Sensitive Raptor (Prairie Falcon)	1,657.8	100	88,404.9	100
	Sensitive Raptor (Golden Eagle)	1,657.8	100	88,404.9	100
	Sensitive and Endangered Species: Grassland	1,657.8	100	88,404.9	100
	Sensitive Amphibian Range	1,657.8	100	79,586.3	90

Irrigation Districts

The TLSA and TRSA occur within the Eastern Irrigation District (EID No. 13). The EID encompasses the entire TLSA and 98.1% of the TRSA.

Wildlife Management Units

The Project area is within a Prairie Wildlife Management Unit (WMU). The wildlife within the boundaries of each WMU is managed by the Alberta EPA and may have different regulations. WMU 138 (Majorville) covers the entirety of the TLSA and the south to southwest portion of the TRSA. The remaining WMUs of the TRSA are No.142 (Newell) in the north to northeast, and No. 152 (Royal) in the northern tip of the TRSA (Appendix K1, Figure K1-8). Harvestable wildlife in the Project area includes big game, upland birds, and waterfowl (GOA, 2023). Detailed information on harvested species in the Project area is presented in Volume 2, Section 11. Hunting can be done on private lands with permission from the landowner, or on Crown grazing leases with permission of the lessee for land access. Hunting is regulated by the Alberta *Wildlife Act* (GOA, 2000d), and administered by the Fish and Wildlife Division. Each WMU has rules describing the time of year, method of hunting, and quantity of a given species that can be hunted on a sustainable basis. Hunting is not currently permitted in the expansion area. Big game animals found in the area include Pronghorn (*Antilocapra americana*), White-tailed Deer (*Odocoileus virginianus*), Mule Deer (*Odocoileus hemionus*), Moose (*Alces alces*), and Elk (*Cervus elaphus*). Hunting for these ungulates is restricted to special licence draws except for antlered White-tailed Deer, which requires a general licence.

Watersheds

The majority of the TLSA lies within the Onetree Creek sub-watershed, with the north of the TLSA residing within the Matzhiwin Creek sub-watershed. The Onetree Creek-Matzhiwin Creek sub-watersheds are a part of the larger Red Deer River watershed. The TRSA is divided between the Onetree Creek, Matzhiwin Creek, and Lower Bow River sub-watersheds (Appendix K1, Figure K1-7 and K1-8). The Lower Bow River sub-watershed is part of the Bow River watershed. Both the Red Deer River watershed and the Bow River watershed are part of the South Saskatchewan River basin, which ultimately drains into Hudson Bay via the Nelson River.

Other Jurisdictions

Both the TRSA and TLSA are within the Rangeland Working Zone 20. The Alberta Government describes rangeland zones as *"A Rangeland Management Zone is an administrative area designated by the Lands Division in which grazing and other agricultural uses related to public land are managed by regional branch offices. The boundaries are used to ensure referrals are sent to the correct locations."* The Rangeland Management Zones were formerly known as Alberta Sustainable Resource Development Rangeland Management Districts (GOA, 2024c). The TLSA is entirely within the County of Newell. Most of the TRSA is within the County of Newell, though a small portion in the east overlaps with Vulcan County (Appendix K1, Figure K1-8). Natural Regions and Subregions and sensitive wildlife zones are also listed in Table 13-6.

13.7.8 Parks and Protected Areas, Unique Sites, or Special Features

There are no provincial or federal parks, protected areas, or heritage rivers within the TLSA or TRSA (Appendix K1, Figure K1-3 and K1-4). Cultural/historic resource sites were identified on the TLSA and TRSA. A Historical Resources Impact Assessment has been completed on the TLSA, impact mitigation (archaeological digs and cataloguing artifacts) has occurred, and Clearance has been provided for most lands, allowing soils to be stripped and cleared or built over. Table 13-7 provides the area for these land use classes.

Table 13-7: Parks, protected areas, environmentally significant areas and cultural/historic resource sites in the Local and Regional Study Areas

Land Use Class	TLSA Area (ha)	% of TLSA	TRSA Area (ha)	% of TRSA
Environmental Reserves	0	0	2,793	3.2
Provincial/National Parks/Other Protected Areas	0	0	0	0
Environmentally Significant Areas	374.8	22.6	13,515.6	15.3
Cultural/Historic Resource Sites (count)	25	N/A	162	N/A

Environmental Reserves

There are no lands under trust or easement within the TLSA. The TRSA has two wildlife habitat properties under the Wildlife Trust Fund including Lore Lake and Antelope Creek Ranch (i.e., Environmental Reserves on Appendix K1, Figure K1-4).

Biodiversity Features

The TLSA and TRSA boundaries are within the Wildlife Sensitivity Ranges for Burrowing Owl (*Athene cunicularia*), Sharp-tailed Grouse (*Tympanuchus phasianellus*), Golden Eagle (*Aquila chrysaetos*), Prairie Falcon (*Falco mexicanus*), Ferruginous Hawk (*Buteo regalis*), and Grassland songbirds (see Appendix K1, Figure K1-7 and K1-8). Additionally, the boundary of the Project area is within the range for sensitive amphibians. Refer to Wildlife and Wildlife Habitat (Volume 2, Section 11) for more information. There are no Ramsar Sites or Internationally Important Bird Areas in the TLSA or the TRSA.

Environmentally Significant Areas

Environmentally Significant Areas (ESA) cover 22% and 15% of the TLSA and TRSA respectively (Table 13-7, Appendix K1, Figure K1-7 and K1-8). ESAs are present within the Project area (Appendix K1, Figure K1-7 and K1-8). ESAs represent places important to "the long-term maintenance of biological diversity, physical landscape features and/or other natural processes, both locally and within a larger spatial context" (Fiera Biological Consulting Ltd., 2014) and are:

- not protected by legislation, and
- are intended to be used in environmental planning, for example, to ensure environmentally sensitive areas are addressed in site studies.

ESAs in the TLSA are found predominantly through the centre of the proposed expansion area along the meltwater channel, with a small section to the southwest, and one in the northwest. ESAs are found predominantly along the western edge of the TRSA but are scattered throughout.

Historic Sites

There are no World Heritage Sites in the TLSA or the TRSA. There are archaeological and palaeontological sites in the assessment areas. The Historical Resource Value listings show the northwest extent of the Project area as a 4a, and 5a, with high potential to contain archaeological resources (GOA, 2021). Archaeological field assessments revealed 22 new sites of archaeological significance in the Project area. Paleontological field assessments in the Project area revealed the addition of 18 new fossil sites and 2 new outcrops. Refer to the Historic Resources section for more information (Volume 2, Section 14). Historical Resources Approval has been granted for this area following review and mitigations of Historical Resources Impact

Assessment (HRIA) and Palaeontological HRIA (PHRIA) submissions to the Ministry of Arts, Culture and Status of Women.

13.7.9 Outdoor Recreation Activities

The Project development area is not currently publicly accessible land, thus not available for recreational use. Table 13-8 show access points for outdoor Recreation and Traditional Use in the Local and Regional Study Areas.

Table 13-8: Outdoor recreation and Traditional Use access in the Local and Regional Study Areas

Land Use Class	TLSA (count)	TRSA (count)
Reservoir / Lake access points	1	5
Park / Bow River access points	0	7
Campground (Rosemary)	0	1

Recreation Opportunities in the TRSA

In the TRSA there are many opportunities for outdoor spaces to be used recreationally. The EID's Wildlife Guide provides information on outdoor recreation sites on the EID lands (EID, 2024). Many of the lakes/reservoirs, creeks, and rivers in the TRSA offer recreation opportunities where publicly accessible, including the SLR. The Bow River and Rock Lake are included in this list. There are 5 reservoir access points in the TRSA and 7 Bow River Access locations (i.e., roads that cross or come to the edge of the river; Table 13-7). Refer to the EID Access Policy for further information on what areas are accessible and what activities are allowable on their lands and reservoirs (EID, 2010). A campground is within the boundaries of the Town of Rosemary in the TRSA. Antelope Creek Ranch and Lore Lake are Environmental Reserves within the TRSA that offer opportunity for hunting, hiking, foraging, birdwatching, and snowshoeing. Antelope Creek Ranch is a working ranch located near San Francisco Lake which also offers outdoor education and scientific studies as an example of sustainable ranching and native habitat conservation space. Oakland is another Wildlife Habitat Property in the TRSA; it occurs southeast of the Project (EID, 2024).

Recreation Opportunities at the SLR

The extant SLR is a publicly accessible site suitable for a variety of recreational activities including fishing, boating, trail activities, and birdwatching. The Reservoir access point in the TLSA (Table 13-7) is a public boat launch present at the southwest end of the reservoir (Appendix K2, Plate K2-8). SLR has been frequented by birdwatchers; eBird – an online database where the public can enter bird observations – has logged observations from eight observers at the SLR, sighting a total of 117 species (eBird, 2024).

In a pamphlet distributed by the Alberta Irrigation Project Association (Alberta Irrigation Districts Association, 2024) the SLR is mentioned as a "fishing hole", alongside other irrigation-based waterbodies that Albertans can use for recreation. Notably, two outdoor recreation and angling community forums have discussions regarding SLR: Alberta Outdoorsmen Magazine (Sports Scene Publications, 2023) and Iceshanty (2024). Boards hosted by Alberta Outdoorsmen suggest it provides relatively good pike (*Esox lucius*) fishing (Appendix K2, Plate K2-7) - with "keepers" mainly being caught towards the end of summer. One individual reported a catch-per-unit-effort of 1.8 pike / hour, and a slightly lower rate for "keepers" at 1.1 pike / hour (15 fish, 9 "keepers",

between two anglers over 4 hours). Some winter angling has been attempted but the pike are smaller than the permitted size and notably "skinny". Hunting is not currently permitted at the SLR.

13.7.10 Access to Traditionally Used Sites

A Traditional Use field study has not been completed at this time, and it is unknown if Traditional Use sites are present in the Project area. The Project area occurs on privately owned land, which has been used for grazing and other land uses for many years and is currently owned by the EID. Most of the Project area has not been accessible for Traditional Uses since the land was settled and Treaty 7 signed; however, access into the Project area could be achieved along the partly developed Range Road 165 road allowance (Appendix K1, Figure K1-7) or along the edge of the extant reservoir and East Branch Canal Road. Additional access to the SLR for fishing and other traditional or recreational uses is maintained by the EID; refer to the EID Access Policy (2010) which describes what areas are accessible and what activities are allowable on their lands and reservoirs. The total area where Indigenous Peoples have access for Traditional Use or other activities includes Crown Lands, road allowances, and other lands that fall under the EID's Public Access Policy, including areas on and surrounding reservoirs and areas under grazing leases, which can be accessed with permission of lease holders

13.7.11 Subsurface Resources

The TLSA contains a quaternary unconsolidated deposit with an estimated aquifer withdrawal rate of 1-5 gallons/minute. There is a sand and gravel deposit that overlaps a large portion of the Project area (Alberta Geological Survey, 2016). The naturalized gravel pit discussed in section 13.6.5 was originally developed to access the sand and gravel deposit as a subsurface resource (Appendix K1, Figure K1-9). The TRSA occurs over three aquifers. The quaternary unconsolidated deposit with an estimated 1-5 gallons/minute (4-20 L/min) covers most of the area (Appendix K1, Figure K1-10). The next largest is a quaternary sand and gravel with an estimated 25-100 gallons/minute (100-400 L/min) in the northwest of the area. A small amount of quaternary sand and gravel with an estimated 5-25 gallons/minute (20-100 L/min) occurs in the eastern edge of the TRSA. Table 13-8 below shows the subsurface resources in both the TLSA and TRSA. No springs are currently mapped in the Springs of Alberta Database for the TLSA or TRSA (Stewart, 2009). However, some shallow springs are known from wetlands fieldwork on the southern (north facing) slopes along the meltwater channel in the TLSA.

Table 13-9: Subsurface resources in the Local and Regional Study Areas

Land Use Class	Subclasses	TLSA Area (ha)	% of TLSA[1]	TRSA Area (ha)	% of TRSA[2]
Aquifers Quaternary Sand and Gravel	High output (25-100 gal/minute)	0	0	10,354.9	11.7
	Medium output (5-25 gal/minute)	0	0	1,059.8	1.2
	Low output (1-5 gal/minute)	1,657.8	100	76,990.2	87.0
Aggregate Deposits		832.8	50.2	3,024.8	3.4
Springs		0	0	0	0

1. Based on the TLSA area of 1,657.5 ha
2. Based on the TRSA area of 88,404.9 ha

13.8 IMPACT ASSESSMENT

To assess the potential environmental impacts on Land Use and Management resulting from Project activities, activities are identified that can interact with the environment (Section 13.4.5.). Potential effects from those interactions, implementing appropriate mitigation measures to offset those effects and then assessing the residual effects remaining can determine the overall impact to the environment.

For a full description of the EIA Approach including the assessment methods and EIA criteria, see Volume 2, Section 2.

13.8.1 Measures to Mitigate Adverse Effects

Guiding principles for mitigation of effects on resources include:

- avoidance of resources during development planning is the first/best choice;
- where avoidance is impractical, onsite mitigations will be used to reduce the magnitude, duration, and direction of impacts;
- where onsite mitigations are not feasible, offsets can be considered; offsets are best located as near to the development site as possible; and
- where effects of mitigation are difficult to assess with certainty, local monitoring programs may be used to provide more information.

A detailed explanation of these mitigation measures are presented in Volume 1, Section 11. The following are activities and mitigation measures that will minimize effects to land use and management:

- Relocation of the existing powerline across the East Dam and canal road.
- Development of a drainage ditch along the outside edge of the new dam embankments.
- Removal and relocation of active and reclaimed oil and gas infrastructure.
- Mitigation measures to reduce loss of soil materials, pasture lands, and water bodies (see Volume 2, Sections 9, 10, and 11).

Access control measures will be deployed around the Project expansion area and a portion of the existing SLR during construction. These measures will be in place to protect public safety, and thus temporary impacts on access for land uses will not be mitigated.

13.8.2 Residual Impact Case

Tables 13-10 to 13-14 assess the effects on baseline land use and management resources due to Project activities in the TLSA and TRSA using quantitative measurements. The residual impact by Project effects is determined after applying mitigation measures. For many assessed indicators, there is no method to mitigate for changes in land uses, hence the construction (worst case) and operations (residual case) assessments rarely differ. Specific to land use assessment, the residual assessment also includes any changes to infrastructure because of the Project. These include construction reclamation of natural soils on the dam berms and temporary workspaces, with restoration of native grassland features to reduce pasture loss. There will also be development of a new 8.1 km long berm road on the north, east, and south sides of the expanded reservoir, development of a new 8.1 km drainage collection ditch around the base of the berms, plus a new 0.1 km drainage ditch into the remnant of the meltwater channel east of Range Road 164, and realignment of an AltaLink powerline (10.4 km) around the expanded reservoir.

13.8.3 Residual Impact Results

Residual impacts are expected on some Land Use and Management resources as land development for the planned Project area will be permanently alter pasture lands, existing infrastructure and disturbances, and waterbodies, as these are changing to new lands uses for a reservoir and embankments. As identified in Table 13-1 (Issue Scoping), the following resources were included in the residual assessment: Land Ownership, Traditional Land Uses, Cultural Historic Resources, Residential Land Uses, Protected Lands, Agricultural Land Uses, Commercial and Industrial Land Uses, Consumptive and Non-Consumptive Land Uses (recreational lands), and transport via roads, powerlines and pipelines, canals and ditches.

Land Ownership

Most of the land within the Project area is owned by the EID, however, a public road allowance crosses the Project area and will be removed (Table 13-10). Within the TLSA, most of the land is privately owned, whether by the EID or by surrounding landowners. The road allowance will be closed by the Government of Alberta and ownership transferred to the County of Newell. The county will then lease these lands to the EID to facilitate reservoir development. This results in a 13.7% loss of Crown lands in the TLSA, and a 0.4% increase in private lands. These changes are the same in the Project Construction Case and the Residual Case. Regionally, Crown land is reduced in area by <0.1%, resulting in 0.01% increase in private lands. This loss of road allowance land is a permanent effect of the Project; we expect this transfer will be approved by the government ahead of the Project. Due to the permanent nature of the change in ownership, this is assessed as a medium negative impact (Table 13-15).

Table 13-10: Change in the land ownership by area (ha) from Baseline to Project Cases

Land Uses	Baseline	Project Construction Case		Residual Effects Case after Mitigations	
	Area (ha)	Area (ha)	Change (%)	Area (ha)	Change (%)
TLSA					
Crown Lands (Railway, Highway, Crown Lease Lands, Road allowances) [1]	47.3	40.8	-13.7	40.8	-13.7
Municipal Lands	64.4	64.4	0.0	64.4	0.0
Private Lands	1,587.0[1]	1,593.5	0.4	1,593.5	0.4
EID Grazing Leases[2]	0.0	0.0	0.0	0.0	0.0
EID Reservoir Areas[2]	34.5	34.5	0.0	913.9	2,549.0
Other EID Owned Lands[2]	914.2[1]	920.7	0.7	41.3	-95.5
Total EID Land in Study Areas[2]	948.7[1]	955.2	0.7	955.2	0.7
Total Change in Land Ownership	1,657.8	1651.3	-0.4	1,651.3	-0.4
Available for Traditional Uses[3]	72.0	65.5	-9.0	944.9	1,212.4
TRSA					
Provincial Crown Lands	4,449.4	4,442.9	<0.1	4,442.9	<0.1
Municipal Lands	9,966.8	9,966.8	0.0	9,966.8	0.0
Private Lands	76,026.0	76,026.0	0.0	76,026	0.01
EID Grazing Leases[2]	9,782.7	9,782.7	0.0	9,782.7	0.0
EID Reservoir Areas[2]	839.5	839.5	0.0	1,718.9	104.8
Other EID Owned Lands[2]	914.2	920.7	0.7	41.3	-95.5
Total EID Land in Study Areas[2]	11,536.4	11,542.8	0.1	11,542.8	0.1
Total Change in Land Ownership	88,404.9	88,398.4	<0.01	88,398.4	<0.01
Available for Traditional Uses[3]	14,637.8	14,631.3	-0.04	15,394.9	6.0

1. Linear Crown lands overlap with areas classified as municipal or private lands
2. The EID lands are a subset of private lands
3. Crown lands + road allowances + grazing leases + reservoir lands and water

Traditional Land Uses

Indigenous Peoples Traditional Land Uses will continue to be permitted in the reservoir area; however, they will not be permitted during the construction stage of the Project (Table 13-10). Some short-term effects on access are likely to occur when the SLR will be joined to the new reservoir basin, as, for safety purposes, access will be limited to the drawn-down reservoir and working equipment area. The closure of the road allowance will limit access into the Project area during construction. Additionally, use of the existing reservoir or lands near the Project area may experience noise, light, and air emissions during construction. However, these effects are short-term and would not affect long-term access or Traditional Use once operations commence.

During the operation of the reservoir, Indigenous Peoples will have much greater area to practice Traditional Land Uses, including access to the expanded reservoir itself and surrounding land. This expanded reservoir will also facilitate recreational opportunities for an increased number of users. Thus, the overall effect is positive in direction.

Cultural/Historic Resources

Historic Resources occur in the Project area at Baseline and will be removed, inundated or built on by the Project (96% loss). However, these areas have been fully mitigated through the Historical Resources Impact Assessment and impact mitigation process. See the Historic Resources Baseline for a description of Cultural/Historic Resources (Volume 2, Section 14). Other important cultural sites in the Project area, including public institutions (churches schools, cemeteries) will not be affected by the Project (Table 13-11). Parks and protected areas will not be affected (Table 13-12). There will be a loss of areas identified as ESAs; however, these land

areas are not intended to be protected from development, but rather as areas to help guide resource assessment, and were used as such in the planning for baseline assessments for wildlife, vegetation, wetlands, and other resources. The Project assessed loss was 68.2%, but it is unknown what the future reservoir will be assessed as. Current mapping (as seen in Figures K1-7 and K1-8) indicate the ESA status does not change for areas converted to reservoirs. Additionally, given the high ecological importance of aquatic features in this part of the province, it is possible the new reservoir would be assessed as an ESA. As all these changes are unlikely to result in any residual effects, this resource was assessed as a neutral impact.

Residential Land Uses

No farms or acreages will be directly impacted in the Project footprint (Table 13-11). Additionally, Air and Noise assessments (Volume 2, Sections 4 and 5) examined potential effects of air emissions, particulates, and noise intensity on residential sites within 5 to 6 km of the Project area. These assessments showed minor potential effects of particulate matter for the 1-hour PM 2.5 variable, but that all air emission variables and noise stayed within limits in the Project and cumulative effects cases examined. Additionally, these effects would only occur during the Project build and would be fully mitigated at the operations cases, resulting in no residual effects on residential properties. Additionally, there are no predicted effects on properties due to altered groundwater or surface water inundation (Volume 2, Sections 6 and 7). Therefore, the assessed environmental effect is neutral.

Table 13-11: Change in number of land use features from Baseline to Project Cases

Land Use Feature	Baseline Count	Project Construction Case		Residual Effects Case after Mitigations	
		Count	Change (%)	Count	Change (%)
TLSA					
SLR access points (boat launches)	1	1	0.0	1	0.0
Bow River access points	0	0	0.0	0	0.0
Cultural/ Historic Resources Sites	25	1	-96.0	Fully Mitigated[1]	
Wellsites	51	20	-60.8	20	-60.8
Other Oil and Gas Sites	0	0	0.0	0	0.0
Farm and Residential Buildings	0	0	0.0	0	0.0
Communication Towers	0	0	0.0	0	0.0
Public Institutions (Churches Schools, Cemeteries)	0	0	0.0	0	0.0
TRSA					
SLR access points (boat launches)	5	5	0	5	0
Bow River access points	7	7	0	7	0
Cultural/ Historic Resources Sites (count)	162	137	-15.4	Fully Mitigated[1]	
Wellsites	3,999	3,979	-0.5	3,979	-0.5
Other Oil and Gas Sites	146	146	0.0	146	0.0
Farm and Residential Buildings	1,358	1,358	0.0	1,358	0.0
Communication Towers	3	3	0.0	3	0.0
Public Institutions (Churches Schools, Cemeteries)	378	378	0.0	378	0.0

1. Historical Resources Impact Mitigation under HRA Number 4825-21-0010-003 has been accepted by the Ministry of Arts, Culture, and Status of Women as fully mitigating loss of historical resources sites per Historical Resources Act Approval 4825-21-0010-003 January 24, 2025.

Protected Lands

No protected lands (parks, environmental reserves, conservation easements) will be affected (Table 13-12). Residual effects are assessed as Neutral.

Table 13-12: Change in protected and recreational lands from Baseline to Project Cases

Land Use Feature	Baseline Area (ha)	Project Construction Case		Residual Effects Case after Mitigations	
		Area (ha)	Change (%)	Area (ha)	Change (%)
TLSA					
Campground	0.0	0.0	0.0	0.0	0.0
Environmentally Significant Areas (ha)	374.8	119.3	-68.2	unknown	
Environmental Reserves/Easements	0.0	0.0	0.0	0.0	0.0
Provincial Parks	0.0	0.0	0.0	0.0	0.0
TRSA					
Campground	1.3	1.3	0	1.3	0
Environmentally Significant Areas (ha)	13,515.6	13,260.2	-1.9	13,260.2	-1.9
Environmental Reserves/Easements	2,793.0	2,793.0	0.0	unknown	
Provincial Parks	0.0	0.0	0.0	0.0	0.0

Agricultural Land Uses

There will be no effects beyond the footprint on cultivated or irrigated lands. During construction, the cultivated area may experience a slight increase in air emissions, however, this is not anticipated to impact cultivation land use (Air Quality is discussed further in Volume 2, Section 4).

A total of 58.7% of land used for pastureland in the TLSA will be lost due to Project development (Table 13-13). All pasture lands will be permanently lost, as the constructed berms and temporary workspaces are not planned for future agricultural use.

Commercial and Industrial Land Uses

Project developments will result in permanent removal (Table 13-13) of area (wellsite, reclaimed wellsites, and dugouts; 54% loss) and linear developments (roads, trails, pipelines, utility lines, ditches; 31% loss). All industrial features within the planned Project footprint will be removed to facilitate Project development. Additionally, a powerline outside of the footprint will be rerouted to avoid the reservoir crossing that would otherwise be required. Table 13-11 shows there will be removal of 20 wellsites in the TLSA. No other Commercial or Industrial Land Uses will be affected. These effects are assessed as a High Negative impact.

Other Consumptive and Non-Consumptive Land Uses

The land uses discussed herein include consumptive activities (e.g., fishing, hunting, trapping, berry harvesting) and non-consumptive activities (e.g., general recreation such as boating, swanning, hiking, and nature viewing/bird watching). Some of these activities are not currently permitted on site, including hunting, trapping, and swimming; therefore, these uses will not change. Fishing will mostly not be affected during construction as access restrictions will not be needed for the existing reservoir except perhaps for a very short period when the reservoir is drawn down and construction needs to occur on the notch between reservoir basins. Additionally, quality of recreation activities may decrease during this phase, due to increased noise, light, and air emissions from the nearby reservoir construction site. The other uses described above will also be able to continue at most times. However, these effects are short-term and would not affect

access or recreation during operations. Following construction and into operations, the area over which these activities can occur will increase more than 1000% in the TLSA. During the operation of the expanded reservoir, land users will have a greater area to fish and recreate, including in the surrounding land. Once completed the reservoir berms and water surface will be treated as publicly available lands as per the EID's Access Policy (2010). This expanded reservoir will be able to facilitate recreation for an increased number of users. Overall, this impact is assessed as a high positive effect.

Table 13-13: Change in the Land Class Areas (ha) from Baseline to Project Cases

Land Uses	Baseline Area (ha)	Project Construction Case		Residual Effects Case after Mitigations	
		Area (ha)	Change (%)	Area (ha)	Change (%)
TLSA					
Pasture (ha)	1357.3	560.6	-58.7	560.6	-58.7
Cultivated (Non-irrigated) (ha)	23.4	23.4	0.0	23.4	0.0
Cultivated (Irrigated) (ha)	0	0	0.0	0	0.0
Irrigation Infrastructure (excluding expanded reservoir area) (ha)	64.3	51.8	-19.4	51.8	-19.4
Woodlots	15.8	4.2	-73.4	4.2	-73.4
Commercial and Industrial Lands	11.9	11.9	0.0	11.9	0.0
Residential Lands Including Farmsteads	0	0	0.0	0	0.0
Area Disturbances (Wellsite, Reclaimed Wellsites, Dugouts)	38.3	17.7	-53.8	17.7	-53.8
Linear Disturbances (Roads, Trails, Pipelines, Utility Lines, Ditches)	40.5	27.8	-31.4	38.3	-5.4
Water Features	106.3	39.6	-62.7	803.2	655.6
Total TLSA	**1,657.8**	**737.0**	**0.0**	**1,657.8**	**0.0**
TRSA					
Native Grassland/Pasture (ha)	65,167.3	64,352.3	-1.3	64,352.3	-1.3
Cultivated (Non-irrigated) (ha)	6,507.5	6,507.5	0.0	6,507.5	0.0
Cultivated (Irrigated) (ha)	2,924.8	2,924.8	0.0	2,924.8	0.0
Irrigation Infrastructure (not including new reservoir area) (ha)	1,269.5	1,257.0	-1.0	1,257.0	-1.0
Woodlots	49.6	39.1	-21.2	39.1	-21.2
Commercial and Industrial Lands	604.9	604.9	0.0	604.9	0.0
Residential Lands Including Farmsteads	888.3	888.3	0.0	888.3	0.0
Area Disturbances (Wellsite, Reclaimed Wellsites, Dugouts)	564.9	559.0	-1.0	559.0	-1.0
Linear Disturbances (Roads, Trails, Pipelines, Utility Lines, Ditches)	2,390.7	2,381.2	-0.4	2,391.7	0.0
Water Features	8,037.4	7,970.7	-0.8	8,734.3	8.7
Total TRSA	**88,404.9**	**88,404.9**	**0.0**	**88,404.9**	**0.0**

Transport via Power Lines and Pipelines

The AltaLink powerline located within the planned reservoir footprint will be relocated within the TLSA to facilitate development. Temporary disruptions to electricity transport along the powerline may occur during relocation. Pipelines that occur within the planned Project footprint will need to be removed or relocated to facilitate Project development. Removal of abandoned and discontinued pipelines will not affect land use. After relocation, the 37 pipelines currently within the TLSA will remain active. Road use will need to change as the current reservoir road will need to be restricted for access when the reservoir will be connected. At that time there will be changes to access, however, new access roads will be developed on the top of the berms. A portion of the Snake Lake Canal will be removed, and several onsite ditches will be removed, however, a new berm-base ditch will be developed to collect and direct seepage and runoff water away from the reservoir embankments to maintain dam stability. Table 13-14 shows the extent of linear feature changes which will range from >50% decrease in pipelines to >100% increase in power lines and ditches. There will be no changes to railway lines. Despite these large changes, the function of pipelines, power lines and roads and will not change, thus, these are assessed as a neutral effect.

Table 13-14: Change in length (km) of linear features

Land Uses	Baseline	Project Construction Case		Residual Effects Case after Mitigations	
	Length (km)	Length (km)	Change (%)	Length (km)	Change (%)
TLSA					
Pipelines	27.4	-14.6	-53.3	-14.6	-53.3
Powerlines and Utilities	9	-0.8	-8.9	9.6	106.7
Roads (Provincial Highways, Municipal, Private, Trails)	32.7	-9.1	-27.8	-1.0	-3.1
Canals	16.5	-2.6	-15.8	-2.6	-15.8
Ditches	3.7	-3.1	-83.8	5.1	137.8
Railway	2	0	0.0	0.0	0.0
Total	91.3	-30.2	-33.1	-3.5	-3.8
TRSA					
Pipelines	1,940.6	-14.6	-0.8	-14.6	-0.8
Powerlines and Utilities	362	-0.8	-0.2	9.6	2.7
Roads (Provincial Highways, Municipal, Private, Trails)	1,604	-9.1	-0.6	-1.0	-0.1
Canals	592.6	-2.6	-0.4	-2.6	-0.4
Ditches	155.6	-3.1	-2.0	5.1	3.3
Railway	68.3	0	0.0	0.0	0.0
Total	4,723.1	-30.2	-0.6	-3.5	-0.1

13.8.4 Residual Impact Characterization

The following table is an examination of Project impacts to Land Use and Management resources and the residual effects once mitigations have been implemented. Those resources showing a medium negative or greater impact will be further assessed in the cumulative effects assessment. Residual effects are expected with land development as the areas will be permanently altered from natural or pasture lands and waterbodies to a reservoir.

Table 13-15: Analysis of potential residual impacts on the Land Use and Management Resources

Resource	Impact description	Direction	Key Criteria			Modifiers		Residual Impact Rating
			Magnitude	Geographical Extent	Duration	Confidence	Ecological and Social Context	
Land Ownership	Crown lands include provincial highways, railway, crown leases and road allowances. The road allowance through the Project will be closed to facilitate development	Negative	Low	Footprint	Long-term	High	N/A	Medium Negative
Traditional Land Uses	Short-term effects on accessibility will occur and accessibility will increase once the reservoir expansion is completed	Positive	High	Footprint	Long-term	High	N/A	High Positive
Cultural/Historic Resources	Cultural resource sites were identified within the Project footprint	Neutral						Neutral
Residential Land Uses	Direct loss of residual properties due to construction or indirect effects from changes in air emission, noise, or water resources	Neutral						Neutral
Protected Land	Loss of protected areas in the local or regional areas	Neutral						Neutral
Agricultural Land	Loss of agricultural lands in the footprint or offsite effects due to project air emissions	Negative	High	Footprint	Long-term	High	N/A	High Negative
Commercial and Industrial Land Use	Loss of oil and gas pipelines, wellsites, and other facilities in the Project area to facilitate development	Negative	High	Local	Long-term	High	N/A	High Negative
Other Consumptive and Non-consumptive Land Uses	Change to areas used for recreational and consumptive activities	Positive	High	Footprint	Long-term	Medium	High Importance	High Positive
Linear Infrastructure/Features	Removal of linear features in and around the footprint may affect the transportation of electricity, water, people, or goods	Neutral						Neutral

13.9 CUMULATIVE EFFECTS ASSESSMENT

This section assesses how the Project may interact with other past, present, or future projects and activities, and their combined impact on Land Use and Management. For a full description of the Cumulative Effects Assessment Approach see Volume 2, Section 2.

Resources in which the Project is expected to result in high negative or medium negative residual impacts were assessed in the cumulative effects assessment. For Land Use and Management, this includes the following:

- Land Ownership (Medium Negative)
- Agricultural Land (High Negative)
- Commercial and Industrial Land Uses (High Negative)

13.9.1 Effects on Each Resource from Project Activities

Land Ownership

Permanent removal of a road allowance will result in a medium negative impact on public land in the TLSA. However, as show in Table 13-10, this loss represents 0.4% change in the TRSA. Further, while it is known this road allowance needs to be closed to facilitate Project development, there is no information available to track status of road allowances throughout the TRSA. Additionally, we know that the large areas of Crown land (Antelope Creek Ranch), as well as all large rivers, natural waterbodies, and railway/provincial highway right of way, will not be affected. Thus, cumulative effects on Crown Lands are likely negligible and assessment of cumulative effects on this resource is not warranted.

Agricultural Land

The Project footprint and temporary workspaces will remove pastureland permanently from production. These agricultural land uses will not be reclaimed once construction is completed as the land will not be used for agricultural purposes in the future. A CEA will be competed on this resource.

Commercial and Industrial Land Uses

The Project will permanently remove oil and gas activities on the footprint. A CEA will be competed on this resource.

13.9.2 Project Development Case

The Project Development Case for Land Use and Management was assessed through land use changes from 1950 to present day (historic), the Project (i.e., land use changes because of the proposed SLR Expansion), and reasonably foreseeable future projects (to 2050). Table 13-16 is a summary of the cumulative change from baseline of Project effects on Agricultural Land based on cultivated and pasture lands, as variously increased by putting more bare land into production, converting pasture to cropland, and removing pasture or crop for other industrial uses or activities. The assessment of cumulative effects on commercial and industrial uses was based on the summary of all industrial classes including general (oil and gas, gravel pits), wellsites, planned solar and planned confined agricultural activities (feedlots).

Table 13-16: Summary of the cumulative change from baseline of Project effects and foreseeable future projects in the Terrestrial Regional Study Area

Resource	Historical 1950 (ha)	Base Line 2024 (ha)	Project Activities (ha)	Future Activities (ha)	Change from Historical (ha)	Change from Baseline Due to Project (ha)	Change from Project Case Due to Future Projects (ha)	Total Cumulative Change (ha)
Agricultural Lands								
Cultivated (Crops)	9,483.2	29,352.8	29,339.6	25,119.5	+19,869.6	-13.2	-4,220.1	+15,636.3
Grassland/Pasture	68,800.1	45,391.5	44,688.1	42,964.0	-23,408.6	-703.4	-1,724.1	-25,836.1
Total Agricultural Lands	78,283.3	74,744.3	74,027.7	68,083.5	-3,539	-716.6	-5,944.2	-10,199.8
Industrial Lands								
Industrial (Oil and Gas, Gravel Pits)	0.0	607.2	604.9	499.5	+607.2	-2.4	-105.3	+499.5
Industrial – Agriculture (Feedlots)	0.0	0.0	0.0	1,968.7	0.0	0.0	+1,968.7	+1,968.7
Industrial – Solar	0.0	0.0	0.0	4,717.6	0.0	0.0	+4,717.6	+4,717.6
Wellsite	0.0	149.8	132.1	116.1	+149.8	-17.7	-33.7	+116.1
Total Industrial Land	0.0	757.0	737.0	7,301.9	+757.0	-20.1	+6,547.3	+7,301.9

13.9.3 Cumulative Effects on Agricultural Land Use

By using the earliest information available from 1950, the effects on agricultural land from past activities, current project activities and future activities can determine the cumulative effect on these resources and determine the overall significance of the impact. Table 13-17 below summarizes the cumulative effects on agricultural land.

Table 13-17: Rating the cumulative effects on agricultural land uses

Project Types	Effect of Project on Agricultural (Pasture) Land
Past Projects and Activities	Low (4.0% loss)
Snake Lake Reservoir	Negligible (0.8% loss)
Future Projects and Activities	Low (6.7% loss)
Overall Cumulative Effect	**Moderate (11.5% loss)**
Relative Project Contribution	**Medium (7.0% of Cumulative Effects Assessment)**

Past projects and activities removed 3,539 ha of agricultural lands (4.0 % of TRSA), with a larger loss of pasture (23,408.6 ha), versus a smaller gain of croplands (+19,869.6 ha). The SLR expansion will remove 716.6 ha of agricultural lands (13.2 ha croplands and 703.4 ha pasture) affecting <1% of pasturelands in the TRSA. Future projects in the TRSA will remove an additional 5,944.0 ha (6.7%) of agricultural lands (loss of 4,220.1 ha of croplands and 1,724.1 ha of pasture, based on our assessed planned development case including new solar and confined feeding operations that will remove agricultural lands). This is assessed in Table 13-17 as a Moderate Cumulative Effect. Note that while there is a loss of pasture, there is a corresponding gain in croplands, which are a higher value agricultural land use, and will thus reduce some of these effects. In addition, the confined feeding operations are also a higher value land use for agriculture. Thus,

while there is a loss of agricultural land area, the value of the lands is likely increased in the regional area.

13.9.4 Relative Project Contribution to Agricultural Change

Quantitatively, construction of the SLR Expansion will result in a loss of 716.6 ha of agricultural land, mainly in the form of pastureland, which compared to 10,199.8 ha of total cumulative loss is a 7% or medium contribution to the expansion project. While the Project has a medium contribution to a moderate cumulative effect, additional mitigation measures are not likely required as the EID currently maintains 217,000 ha community pastures of which 201,000 ha (EID, 2025) are native grasslands and the maintenance of these lands is guided by the Eastern Irrigation District Integrated Resource Management Strategy (GOA, 1995), which ensures these lands are protected.

13.9.5 Cumulative Effects on Commercial and Industrial Land Use

The effects on industrial lands from past activities, current Project activities and future activities can determine the cumulative effect on these resources and determine the overall significance of the impact. Table 13-18 below summarizes the cumulative effects on industrial land uses.

Table 13-18: Rating the cumulative effects on industrial land uses

Project Types	Effect of Project on Industrial Land
Past Projects and Activities	Negligible (0.9% gain)
Snake Lake Reservoir	Negligible (<0.1% loss)
Future Projects and Activities	Low (7.4% gain)
Overall Cumulative Effect	**Low Positive (8.4% gain)**
Relative Project Contribution	**Low Negative Effect (-0.3%)** (Project causes a loss, while industrial activities are gaining)

Past projects and activities added 757.0 ha of industrial lands (<1% of TRSA), initially including well sites and other industrial activities. The SLR expansion will remove 20.1 ha of these features affecting <1% of the TRSA. Future projects in the TRSA will add an additional 6,547.3 ha (7.4%) of agricultural lands (loss of wellsites and general industrial lands, while adding solar and confined feeding operations). This is assessed in Table 13-18as a Low Positive Cumulative Effect.

13.9.6 Relative Project Contribution to Industrial Land Use Change

Quantitatively, construction of the SLR Expansion will result in a loss of 20.1 ha of industrial land versus 7,301.9 ha gained in the regional area. This means there is a low negative Project contribution to a low positive change in the regional area. as overall cumulative effect is positive, no action will be taken to mitigate project effects to industrial land uses, and it is predicted that the regional area will benefit from the Project due to increasing capacity for industrial agricultural operations.

13.10 CONCLUSION

For the SLR expansion, the EID is the landowner excluding the Range Road 165 road allowance through the Project which will be closed and then leased to the EID. Pipelines and powerlines will be removed or relocated, respectively, during development of the Project.

Of the identified resources for Land Use and Management, Agricultural Land and Industrial lands were assessed as having high negative effects after any mitigations are applied. The loss of current pastureland will not be replaced as livestock grazing will no longer occur in the area even after restoration of the berms, soil storage area, and temporary workspaces. Loss of industrial lands is unavoidable as these features need to be removed to facilitate the reservoir development.

There was also a medium negative effect assessed on changes to land ownership, related the permanent loss of a portion of road allowance in the Project area. This change was so small in area, that it was screened from assessment for cumulative effects. All other assessed Land Use and Management resources had neutral (Cultural/Historic Resources, Residential Land Uses, and Protected Lands) or net positive (Traditional Land Use and Other Consumptive and Non-Consumptive Land Uses).

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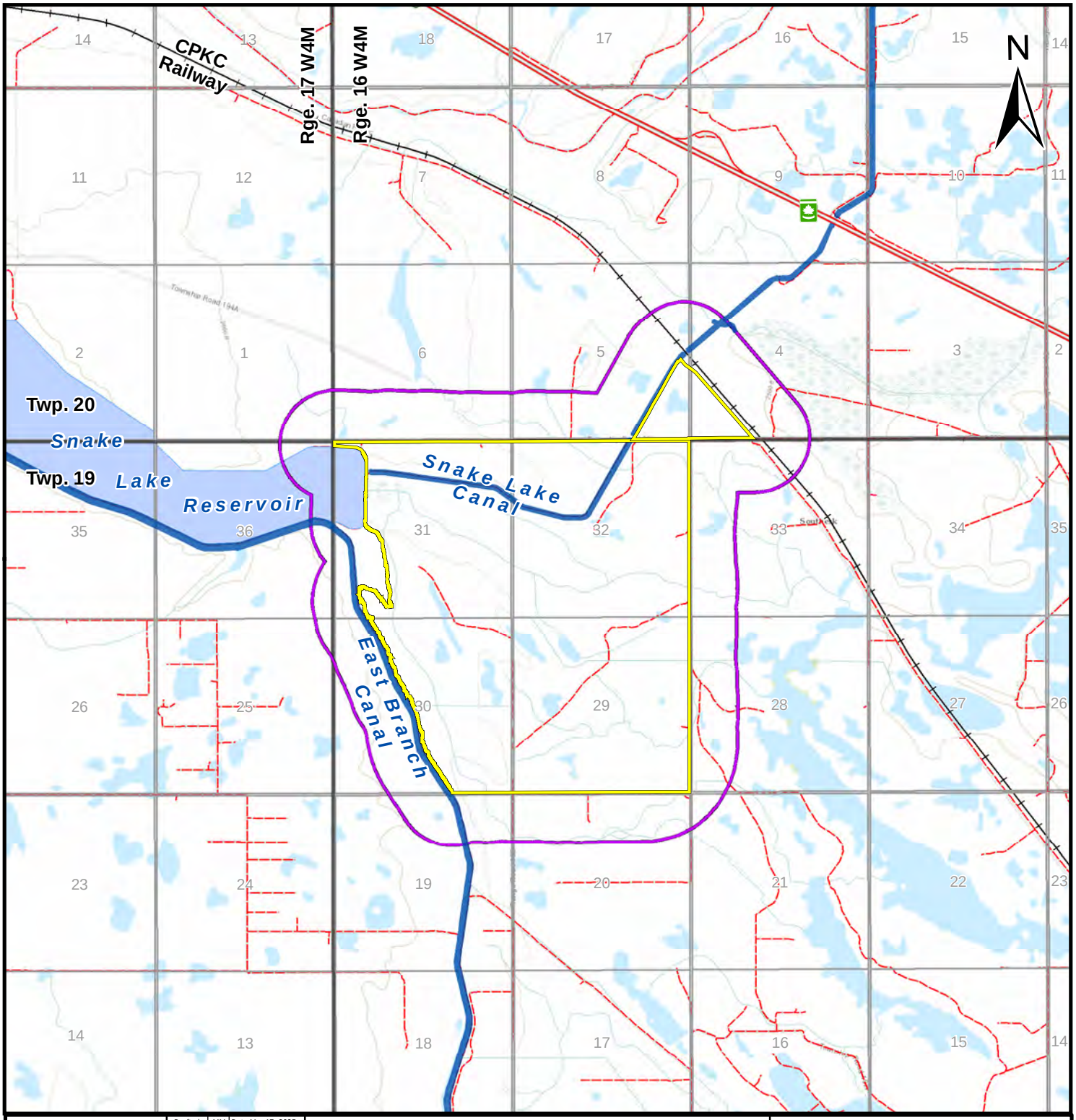

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Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Local Study Area
- Snake Lake Reservoir Expansion Project Area
- Reservoir
- Canal
- Unpaved Road
- Railway

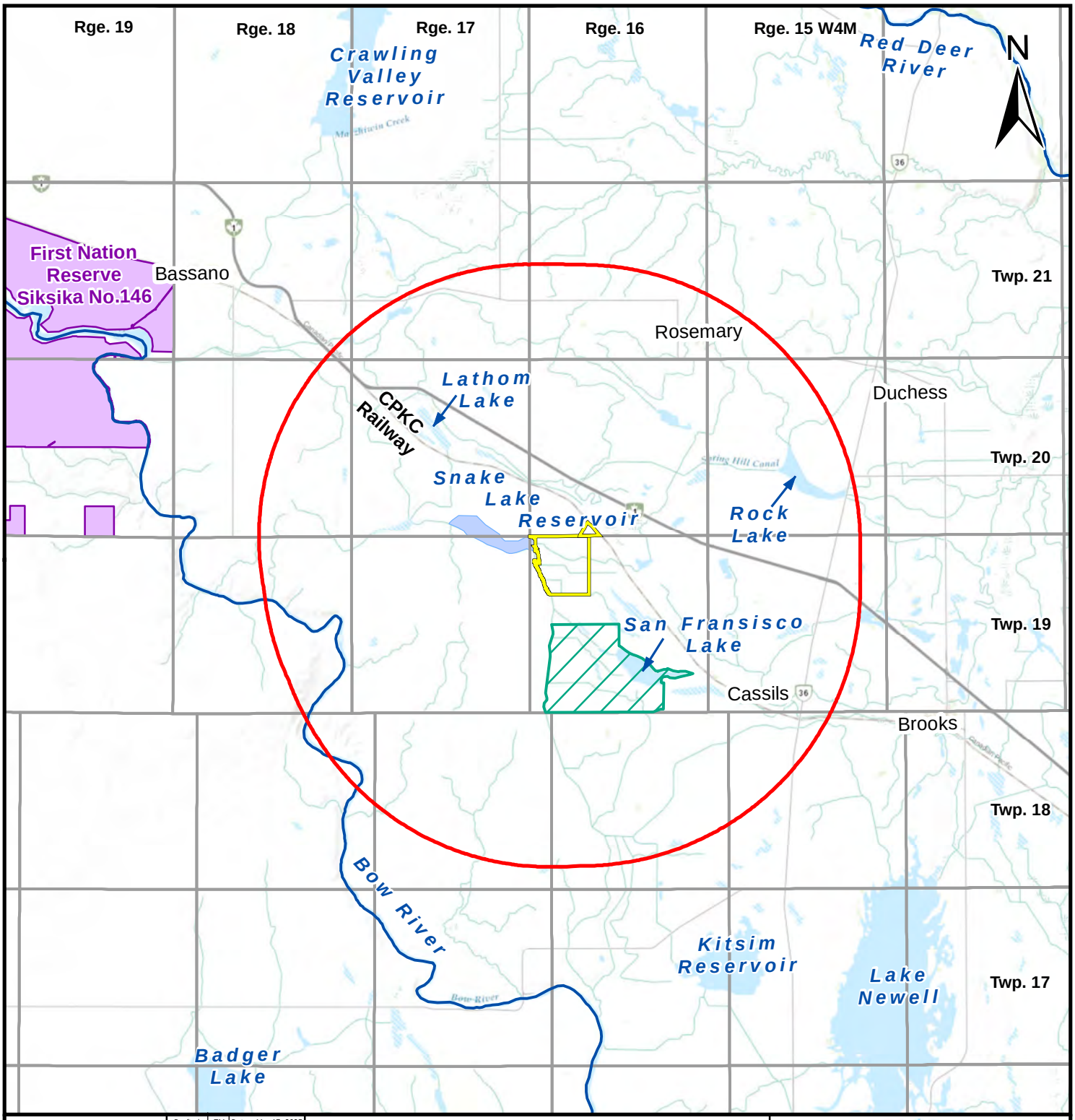
EID

Terrestrial Local Study Area

March 2025

REF.: AARES21-127
(Land Use)

K1-1



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Approved:	SJ	Revision:	00
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.
Grassland Vegetation Inventory (GVI) 2020.
Alberta Environment and Parks,
Government of Alberta.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Regional Study Area
- Snake Lake Reservoir Expansion Project Area
- First Nation Land
- Antelope Creek Ranch
- Reservoir

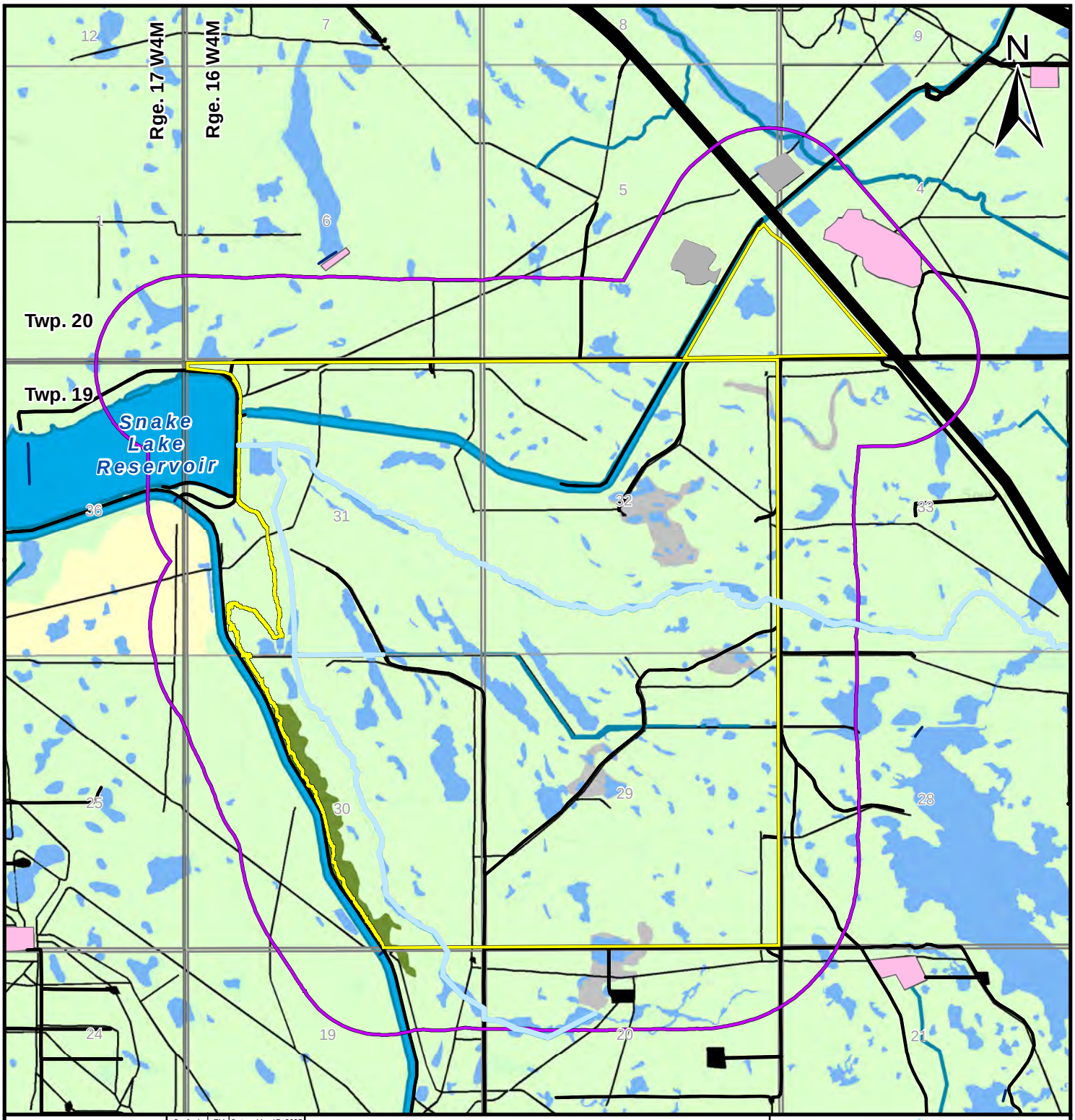
EID

Terrestrial Regional Study Area

March 2025

REF.: AARES21-127
(Land Use)

K1-2



SCALE: 1:30,000

200 0 200 400 M

Drafted:	EM	Date:	Mar 17, 2025
Approved:	SJ	Revision:	00
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.
Grassland Vegetation Inventory (GVI) 2020.
Alberta Environment and Parks,
Government of Alberta.

AAR Environmental Services

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Legend

- Terrestrial Local Study Area
- Snake Lake Reservoir Expansion Project Area
- Road Allowance
- Cropland
- Native Grassland
- Treed
- Irrigation Infrastructure (Canals, Dam, Reservoirs)
- Roads, Railway, Trails (Disturbance)
- Disturbance
- Industrial
- Wetland
- Ephemeral Draw

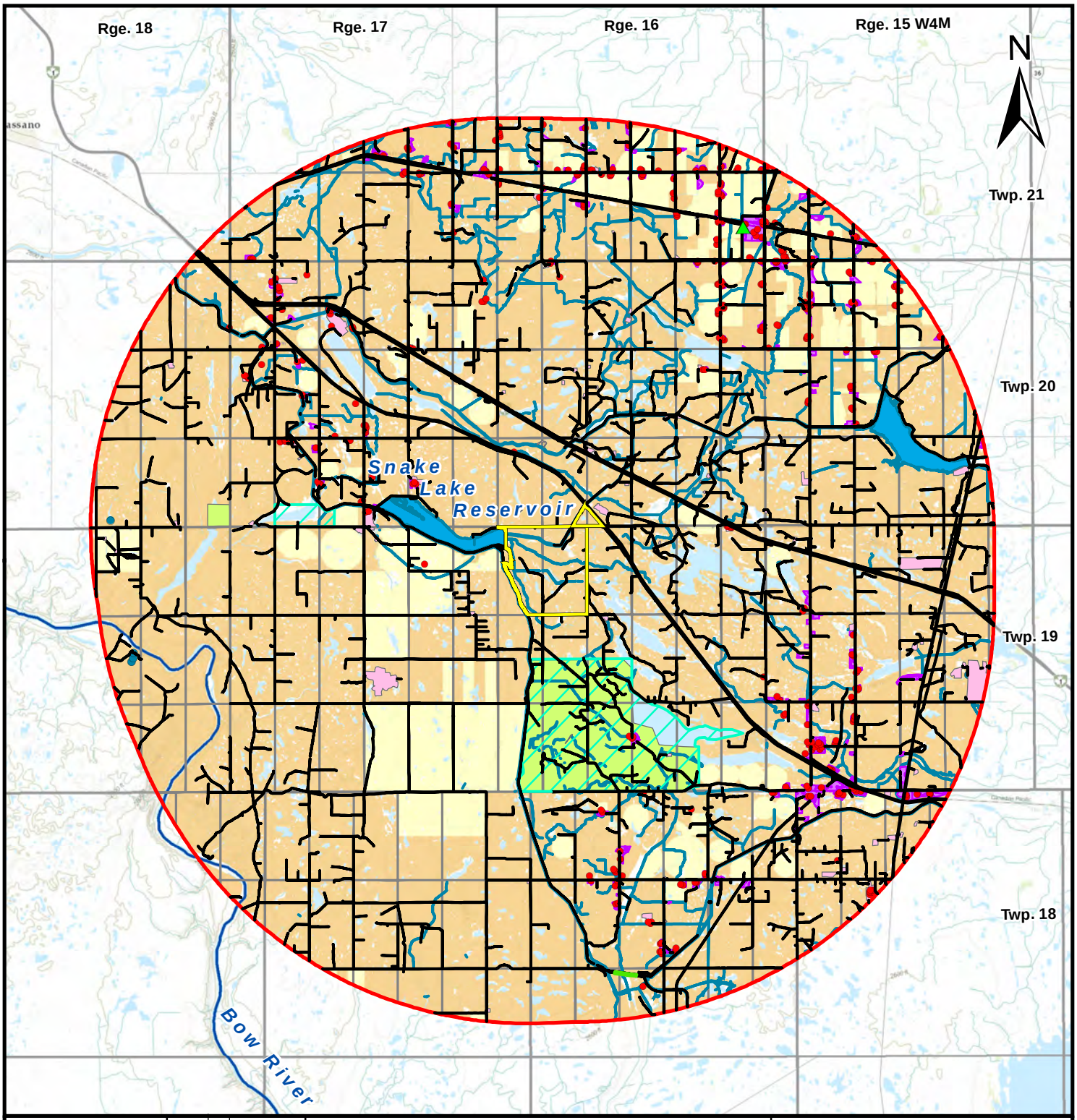
EID

Land Uses in the Terrestrial Local Study Area

March 2025

REF.: AARES21-127
(Land Use)

K1-3



SCALE: 1:200,000

1.5 0 1.5 3 Km

Drafted:	EM	Date:	Feb 13, 2025
Approved:	SJ	Revision:	00
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.
Grassland Vegetation Inventory (GVI) 2020.
Alberta Environment and Parks,
Government of Alberta.

AAR Environmental Services

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Legend

- Terrestrial Regional Study Area
- Snake Lake Reservoir Expansion Project Area
- Public or Non-profit Institution Land (schools, cemeteries, churches)
- Campground
- Flood Protection Structures
- Road Allowance
- Cropland
- Environmental Reserves
- Agricultural Rangeland
- Industrial
- Roads, Railway, Trails
- Commercial
- Irrigation Infrastructure (Canals, Dam, Reservoirs)
- Crown Land

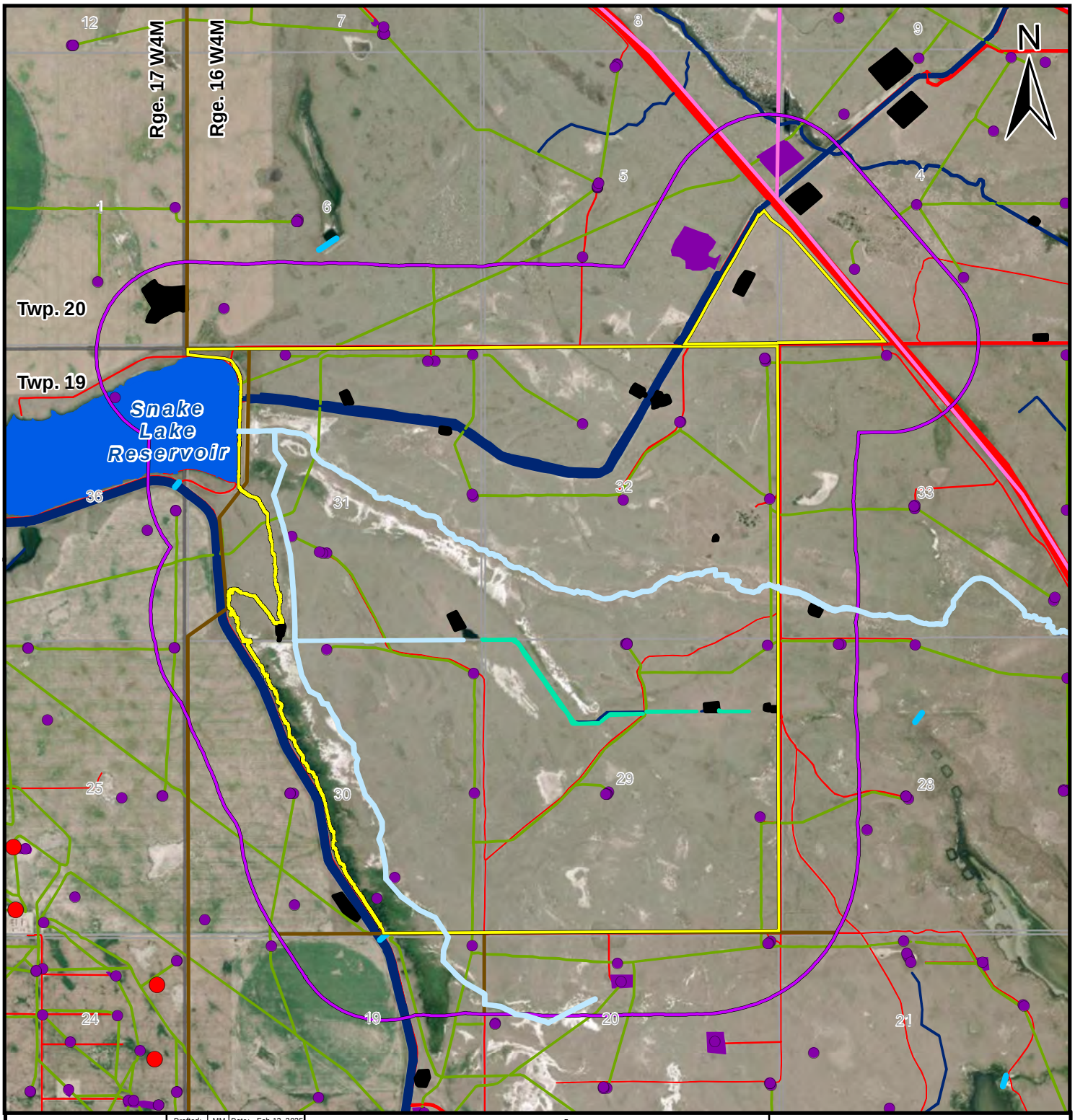
EID

Land Uses in the Terrestrial Regional Study Area

February 2025

REF.: AARES21-127
(Land Use)

K1-4



SCALE: 1:30,000

200 0 200 400 M

Drafted:	MM	Date:	Feb 13, 2025
Approved:	SJ	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
Imagery: ESRI. Date: 2021/07/10
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the imagery is from 2021 and although we have no reason to doubt the accuracy and completeness of it, users should be aware that discrepancies may be present

Legend

- Terrestrial Local Study Area
- Snake Lake Reservoir Expansion Project Area
- Petroleum Well
- Spills + Complaints
- Canals
- Power Line
- Ephemeral Draw
- Ditch
- Railway, Road, Trail
- Utilities
- Pipeline
- Dugout
- Reservoir
- Water Control Infrastructure
- Wellsite

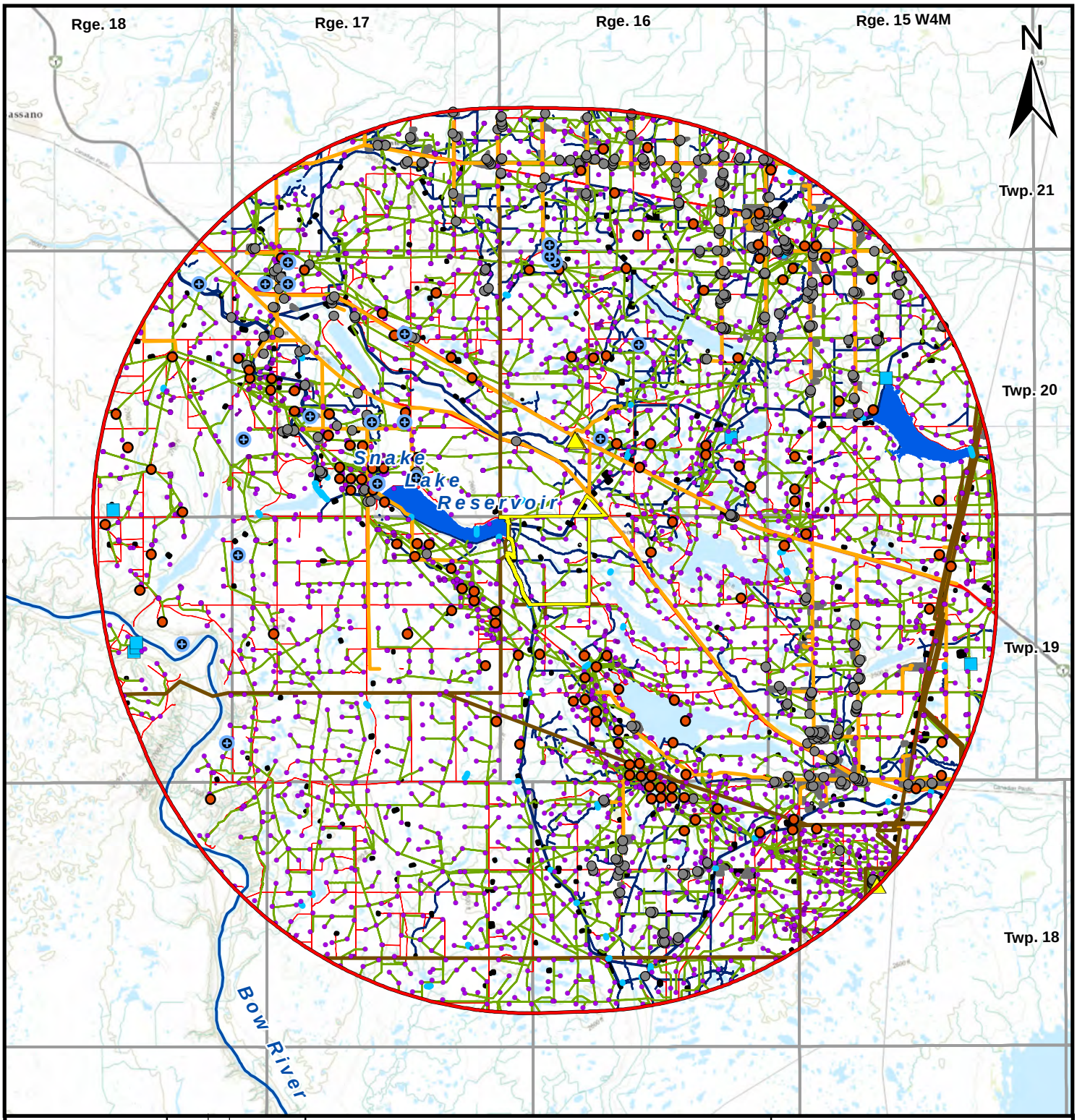
EID

Infrastructure and Miscellaneous Facilities in the Terrestrial Local Study Area

February 2025

REF.: AARES21-127
(Land Use)

K1-5



SCALE: 1:200,000 Km
1.5 0 1.5 3

Drafted:	EM	Date:	Feb 13, 2025
Approved:	SJ	Revision:	00
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Regional Study Area
- Snake Lake Reservoir Expansion Project Area
- Petroleum Well
- Water Wells
- Spills + Complaints
- Private and Commercial Buildings
- Communication Tower
- Power Line
- Abandoned Railway, Railway, Road, Trail
- Utilities
- Canals
- Reservoir
- Pipeline
- Wetlands and Lakes
- Dugout
- Residential
- Water Control Infrastructure
- Wellsite

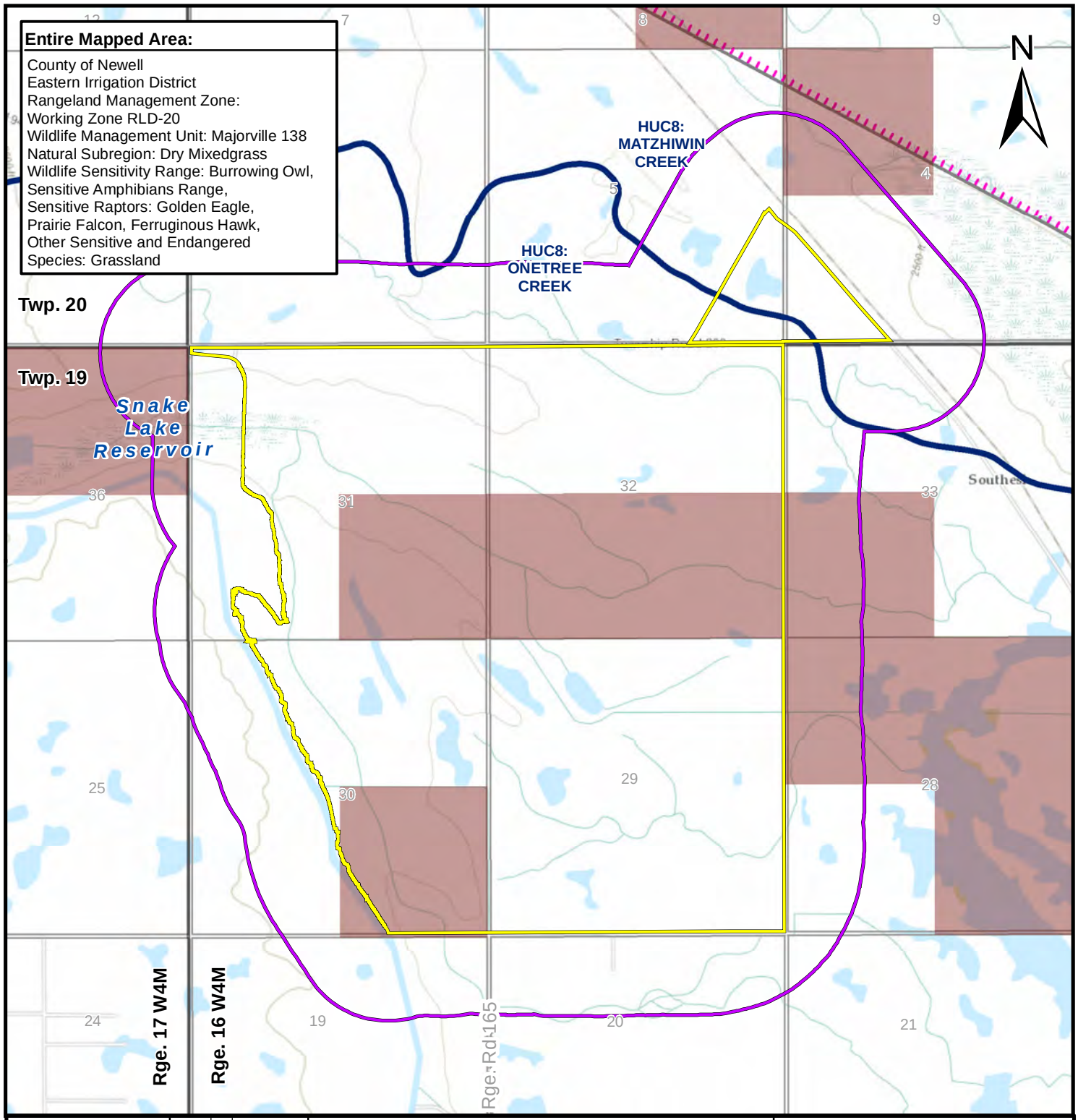
EID

Infrastructure and Miscellaneous Facilities in the Terrestrial Regional Study Area

February 2025

REF.: AARES21-127
(Land Use)

K1-6



SCALE: 1:30,000

200 0 200 400 M

Drafted:	EM	Date:	Feb 13, 2025
Approved:	SJ	Revision:	00
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.
Hydrologic Unit Code 8 Watersheds of Alberta (2020),
Alberta Environment and Protected Areas
Environmentally Significant Areas (2014),
Alberta Forestry and Parks
Government of Alberta

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Local Study Area
- Snake Lake Reservoir Expansion Project Area
- HUC8 Watershed Boundary
- Canadian Badlands Tourism Zone
- Provincial Road Allowance
- Environmentally Significant Area

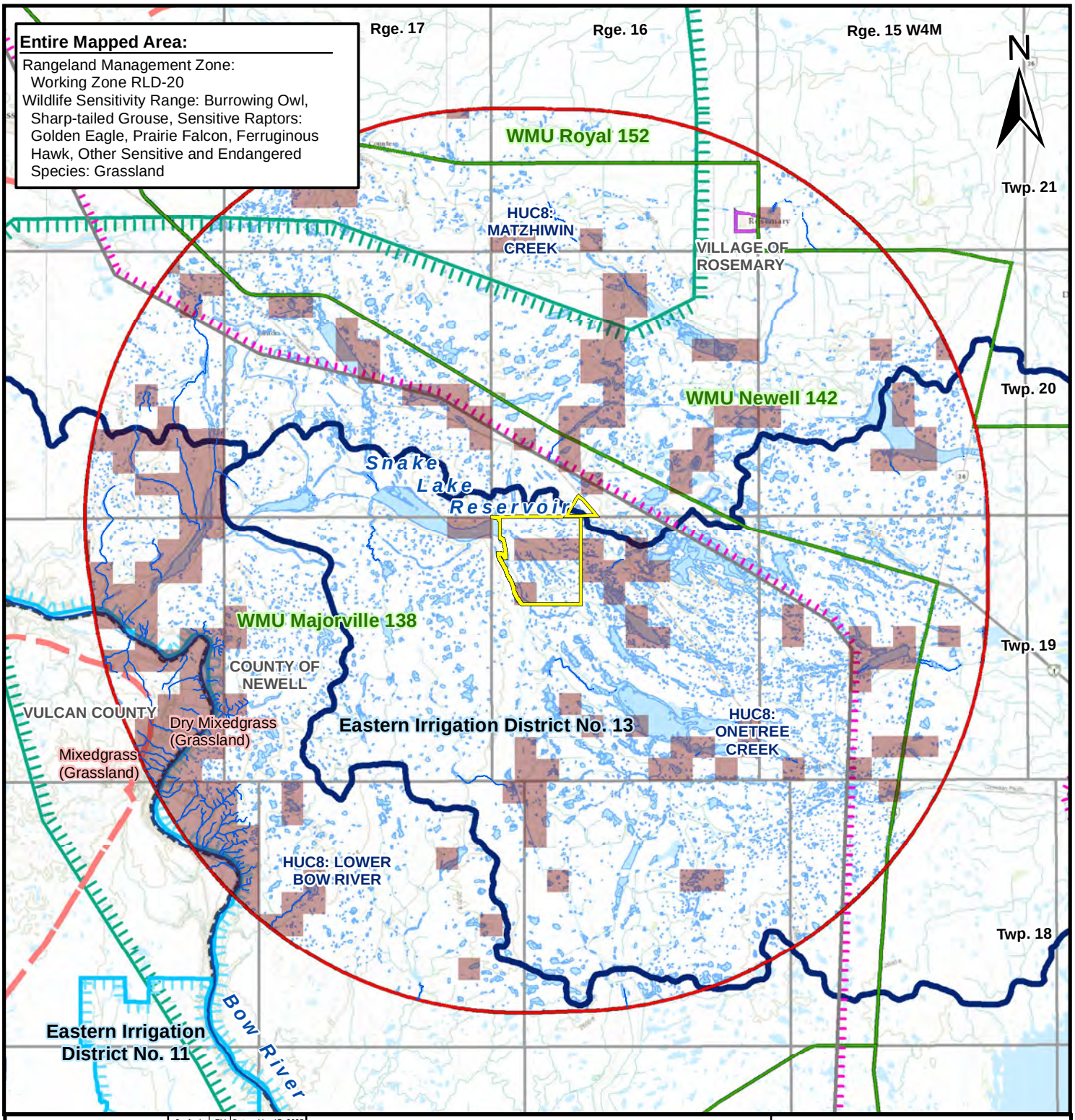
EID

Overlapping Jurisdictions and Natural Features in the Terrestrial Local Study Area

February 2025

REF.: AARES21-127
(Land Use)

K1-7



SCALE: 1:200,000

Km
1.5 0 1.5 3

Drafted:	EM	Date:	Mar 17, 2025
Approved:	SJ	Revision:	00
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.
Sensitive Amphibian Range (2024); Alberta Merged Wetland Inventory (2020); Environmentally Significant Areas (2014); Wildlife Management Units (2024); and Hydrologic Unit Code 8 Watersheds of Alberta; Government of Alberta. Alberta Irrigation Districts, Alberta Agriculture & Rural Development (2009) AltaLIS (2023), Municipal Boundaries and Natural Areas

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Regional Study Area
- Snake Lake Reservoir Expansion Project Area
- Alberta Irrigation District Boundary
- HUC8 Watershed Boundary
- Natural Subregions Boundary
- Rural Boundary
- Canadian Badlands Tourism Zone
- Environmentally Significant Area
- Sensitive Amphibians Ranges
- Village Boundary
- Wetlands and Drainages
- Wildlife Management Zones

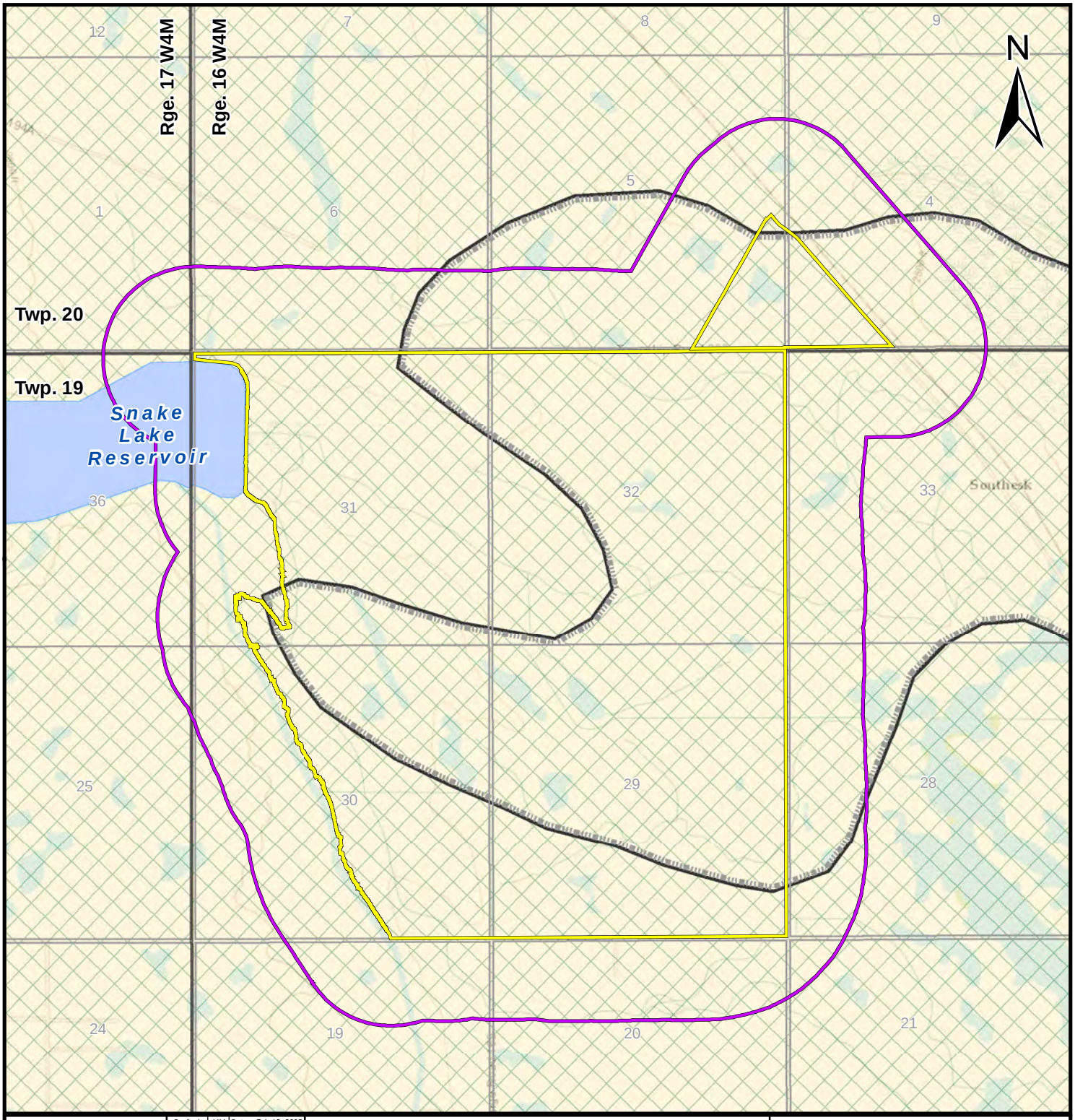
EID

Overlapping Jurisdictions and Natural Features in the Terrestrial Regional Study Area

March 2025

REF: AARES21-127
(Land Use)

K1-8



SCALE: 1:30,000

200 0 200 400 M

Drafted:	MM	Date:	Feb 13, 2025
Approved:	SJ	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

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Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Local Study Area
- Snake Lake Reservoir Expansion Project Area
- Reservoir
- Quaternary Unconsolidated Deposits, Qualitative Est. 1-5 Gallons/Minute
- Sand and Gravel Deposit

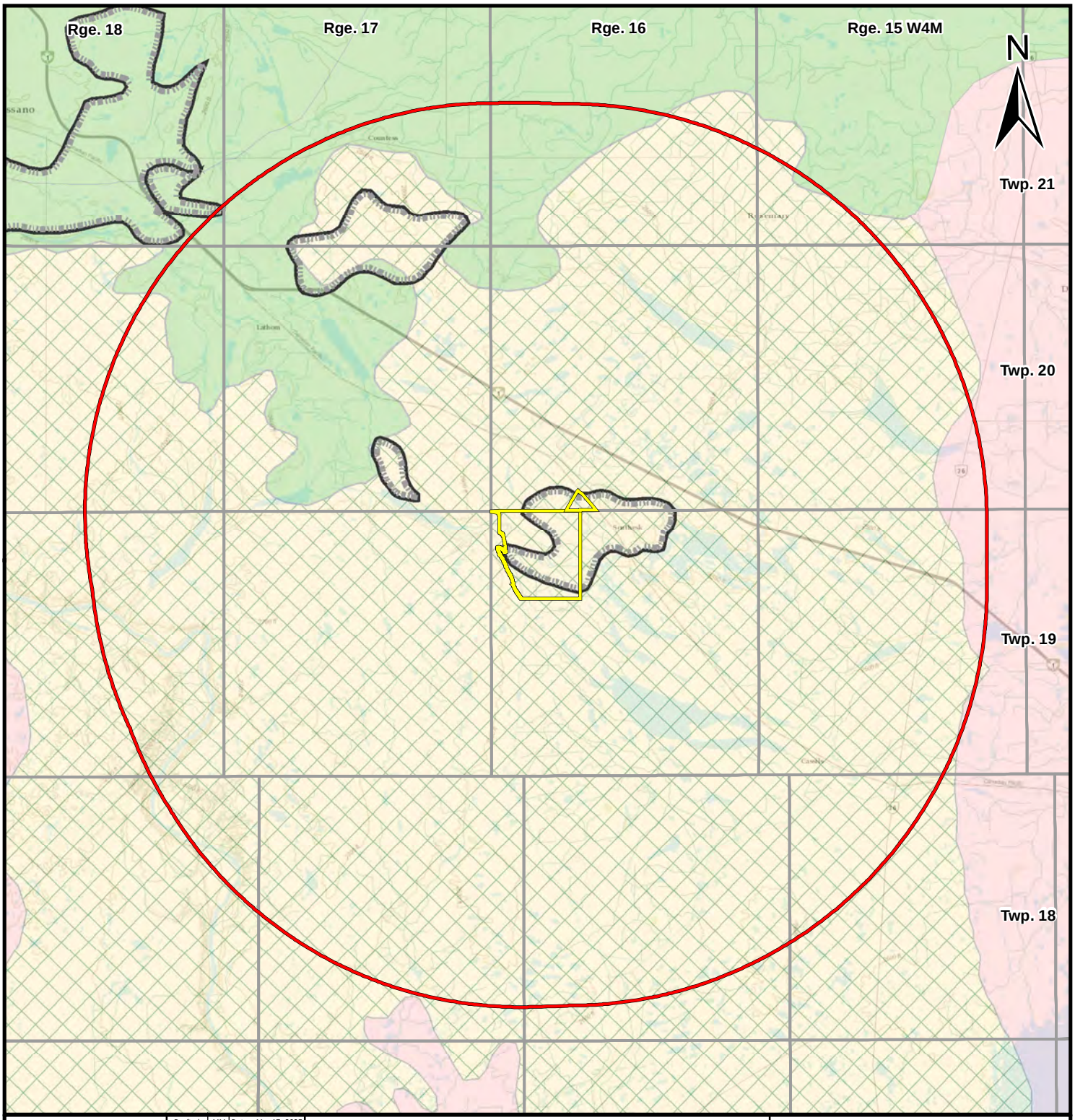
EID

Subsurface Resources in the Terrestrial Local Study Area

February 2025

REF.: AARES21-127
(Land Use)

K1-9



SCALE: 1:200,000

Km
1.5 0 1.5 3

Drafted:	MM	Date:	Mar 17, 2025
Approved:	SJ	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Regional Study Area
- Snake Lake Reservoir Expansion Project Area
- Quaternary Sand & Gravel, Quantitative Est. 25-100 Gallons/Minute
- Quaternary Sand & Gravel, Qualitative Est. 5-25 Gallons/Minute
- Quaternary Unconsolidated Deposits, Qualitative Est. 1-5 Gallons/Minute
- Sand and Gravel Deposit

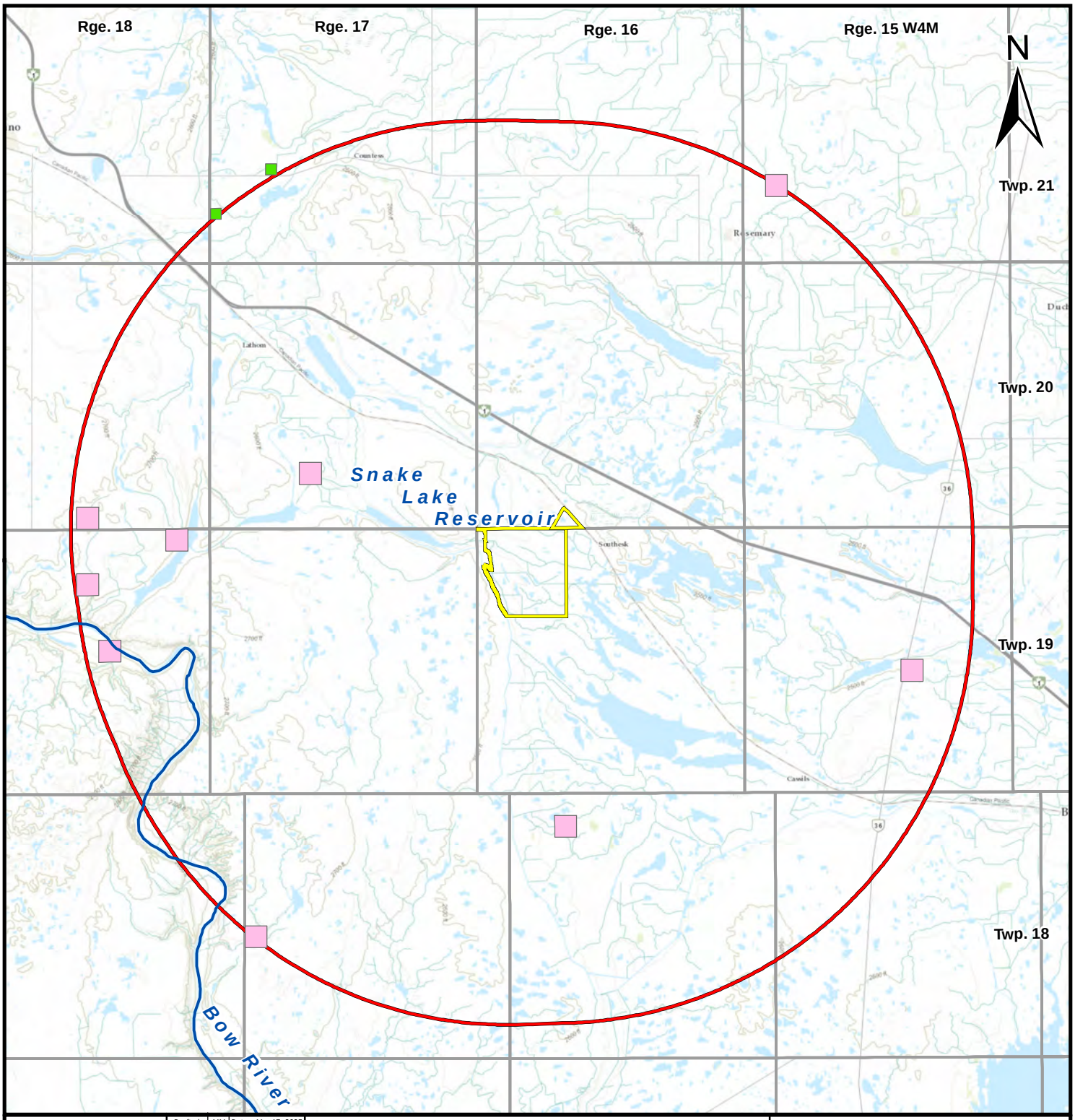
EID

Subsurface Resources in the Terrestrial Regional Study Area

March 2025

REF.: AARES21-127
(Land Use)

K1-10



SCALE: 1:200,000

Km
1.5 0 1.5 3

Drafted:	MM	Date:	Mar 17, 2025
Approved:	SJ	Revision:	0
Route Source:		Date:	Feb 18, 2022
CAD Survey		Revision:	0

Data Sources:
ESRI World Topographic Map
ATS Grid: AltaLIS 2007.

AAR Environmental Services

Please contact AARES for all other sources.

Please note that the topographic map is from 2010 (NRCAN) and although we have no reason to doubt the accuracy and completeness of it, users should be aware discrepancies may be present.

Legend

- Terrestrial Regional Study Area
- Snake Lake Reservoir Expansion Project Area
- Surface Diversions
- Well Diversions

EID

Water Licences in the Terrestrial Regional Study Area

March 2025

REF.: AARES21-127
(Land Use)

K1-11

Appendix K2: Photo Plates

Plate K2-1: Before 2023, the dominant land use of the Terrestrial Local Study Area was cattle grazing on native pasture (July 24, 2021).

Plate K2-2: The Snake Lake Canal moves water from the Snake Lake Reservoir into a distribution canal to the north and east (July 28, 2023).

Plate K2-3: Disturbances and infrastructure related to oil and gas developments occur on the Terrestrial Local Study Area. These sites are planned for removal and remediation (July 27, 2023).

Plate K2-4: A powerline within the Project footprint and Terrestrial Local Study Area (June 21, 2021).

Plate K2-5: A reclaimed gravel quarry occurs in the east side of the Terrestrial Local Study Area. This area provides nesting and cover habitat for many bird species (April 10, 2023).

Plate K2-6: Dugout holding water in the Terrestrial Local Study Area (September 28, 2023).

Plate K2-7: The Snake Lake Reservoir supports recreational fishing, as seen here with a Northern Pike (*Esox lucius*) captured during aquatic survey (September 29, 2023).

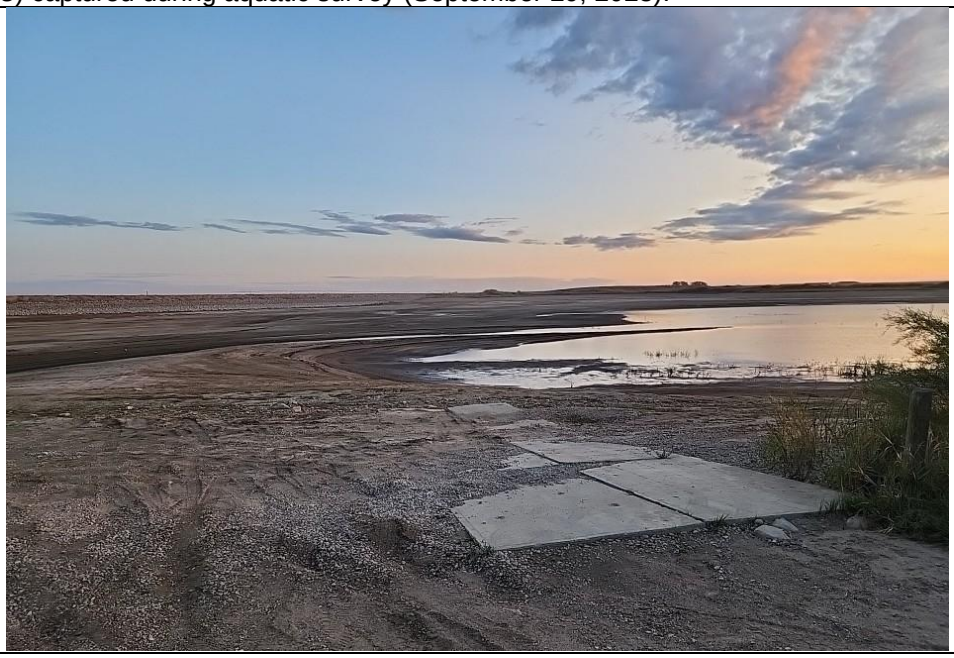


Plate K2-8: Snake Lake Reservoir and boat launch for recreational users (September 29, 2023).