ENVIRONMENTAL EVALUATION

TRANSALTA WATERCHARGER BATTERY ENERGY STORAGE FACILITY

Prepared for:
TRANSALTA CORPORATION

Prepared by:
MATRIX SOLUTIONS INC.

Version 1.0
December 2021
Calgary, Alberta

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EXECUTIVE SUMMARY

TransAlta Corporation (TransAlta) retained Matrix Solutions to prepare an environmental evaluation for the proposed WaterCharger battery storage project (the Project) to meet the requirements listed in Section 10.1 of the Alberta Utilities Commission's (AUC) *Rule 007: Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations, Hydro Developments and Gas Utility Pipelines* (AUC 2021).

The Project will operate as a battery energy storage facility consisting of modular battery units with a total capacity of 180 megawatts (MW). The Project will be charged by electricity generated by TransAlta's operational Ghost hydro-electric facility and will be connected to the existing Ghost 20S Substation.

The Project is located approximately 15 km west of the Town of Cochrane, Alberta, within Rocky View County (Figure 2-1). The Project development footprint is approximately 3.3 hectares (ha) and includes the physical disturbance area required for construction of the Project.

Project components include modular battery units, inverters, battery management system, thermal management system, transformers, switchgear, safety systems, protection and controls, and an access road. The Project foundations for the modular battery units (up to 7 m long by 2 m wide) will be shallow concrete slab-on-grade foundations or concrete slabs reinforced by steel piles, depending on the results of geophysical investigations. The Project infrastructure will be surrounded by a chain-linked fence topped with barbed wire.

The Project is not expected to have a significant adverse effects on valued components. This evaluation has considered the potential environmental effects and mitigation that would apply to Project construction, operation, and decommissioning and reclamation activities, and the residual effects that were identified were determined to be not significant.

The Project will be developed on private land owned by TransAlta. No watercourses, water bodies, aquatics species habitat, wetlands, rare plant species, or rare ecological communities are in the Project footprint. There is one wetland classified as a seasonal shrubby swamp adjacent to the south boundary of the Project footprint; however, there are no anticipated impacts to the wetland. Wildlife habitat in the Project footprint and 1,000 m buffer includes modified grassland with forested areas (e.g., nesting habitat for migratory birds), steep cliffs along the Bow River (e.g., nesting habitat for sensitive raptor species), and modified grassland along south-facing slopes (e.g., potential for sensitive snake species hibernacula). Three wildlife features potentially requiring development setbacks were identified during the wildlife surveys. Activity status and species using the features will be determined during pre-construction wildlife surveys and appropriate mitigation will be developed through consultation with Alberta Environment and Parks.

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APPENDICES

1 INTRODUCTION

TransAlta Corporation (TransAlta) retained Matrix Solutions Inc. to prepare an environmental evaluation for the proposed WaterCharger battery energy storage facility (the Project) to meet the requirements listed in Section 10.1 information requirement BF 22 of the Alberta Utilities Commission's (AUC) *Rule 007: Applications for Power Plants, Substations, Transmission Lines, Industrial System Designations, Hydro Developments and Gas Utility Pipelines* (AUC 2021).

This document includes the following sections as it pertains to the Project environmental evaluation:

- Project overview
- environmental evaluation methods
- pre-project environmental and land use conditions
- environmental effects assessment summary and conclusions

2 PROJECT OVERVIEW

2.1 Project Description

The Project is a battery energy storage system (BESS) facility consisting of modular battery units with a total capacity of 180 megawatts (MW). The Project will be charged by electricity generated by TransAlta's operational Ghost hydro-electric facility and connected to the existing Ghost 20S Substation. The Project will allow energy generated at the Ghost hydro-electric facility to be stored during periods of low demand to be dispatched to the electrical grid during periods of higher demand. The Project will provide reliable electricity service to the Alberta electrical grid and support the development of additional renewable energy for Albertans.

The Project is located in a portion of SE-13-026-06 W5M approximately 15 km west of the Town of Cochrane, Alberta, in Rocky View County, entirely on private land owned by TransAlta (Figure 2-1). The Project development footprint is approximately 3.3 hectares, on land that is currently owned by TransAlta and zoned as Agricultural, General District as per the Rocky View County's land use bylaw (Rocky View County 2021).

2.1.1 Project Infrastructure

The Project will consist of modular battery units, inverters, battery management system, thermal management system, transformers, switchgear, safety systems, protection and controls, and an access road (Figure 2-2). The Project infrastructure will be surrounded by a chain-linked fence topped with barbed wire. Details pertaining to the Project infrastructure are provided in the following subsections.

2.1.1.1 Modular Battery Units

The Project will include modular battery units containing arrays of lithium-ion (Li-ion) batteries and associated wiring and controls. The Project is considering a battery sub-chemistry of Lithium-Iron Phosphate (LFP). The Project will consider various technical factors when selecting the final battery vendor, including safety, life span, performance, and cost. The size and number of modular battery units is expected to vary by vendor, with the Project expecting up to 220 units to be installed. The final layout and number of battery units will be confirmed once the battery manufacturer is selected.

Each battery enclosure is classified as a NEMA R3 classified and impact and ingress protection. The system will also include enclosures housing a Power Conversion System (PCS) that will consist of a bi-directional inverter, protection equipment, direct current (DC) and alternating current (AC) circuit breakers, waveform filter equipment, and equipment terminals and connection cabling system. The energy conversion is enabled by a bi-directional inverter connecting the DC battery system to the AC electrical grid. The PCS converts the electric energy from AC to DC when the energy is transferred from the electric grid to the battery during a battery charging cycle, and from DC to AC when the energy is transferred back to the grid from the battery during a battery discharge cycle.

The dimensions of the modular battery units will vary by manufacturer and are expected to be a maximum of size of 7 m long, 2 m wide, and 2 m high. The modular battery units will house the required heating, ventilation, and air conditioning (HVAC) system. The foundations for the units will either be concrete slabs reinforced by steel piles or shallow concrete slab-on-grade, depending on the results of geophysical investigations.

2.1.1.2 Transformers

Transformers will convert the low voltage AC output of the inverter to a medium voltage level to increase the overall efficiency of the battery storage system and to protect the PCS in the event of system electrical faults. The transformers will be skid or pad mounted. The Generator Step Up transformer (GSU) will further increase the AC voltage to match the 138 kV grid voltage. The GSU transformer will be on slab foundation, located in or adjacent to the existing Ghost 20S substation.

2.1.1.3 Switchgear

The medium voltage (MV) switchgear will be indoor arc resistant metalclad for the switching and protection application with the option for integrated protection and control equipment. The switchgear will connect the battery storage system to the power distribution system and provide the required level of protection during electrical faults in the system. The switchgear detailed rating and specification will be prepared later in the Project development phases. The switchgear will be CSA-approved and compliant of all applicable Codes and Standards.

2.1.1.4 Safety and Control Systems

Safety and control systems are integral to the Project. Systems will include voltage and current protection through software controls and physical protection through component isolation. The BESS safety features and Battery Management Systems (BMS) work together to help prevent and protect against common industrial battery failure modes due to operational excursions, damage, or other external factors. If safe operating limits are exceeded, the BMS are designed to isolate the affected batteries and racks from the system. The BMS continues to monitor operating conditions and will return the battery to service when conditions safely allow.

BMS functions as a safety management system in such cases as under voltage, over discharge, overvoltage, over-temperature, and overcurrent of the battery. In case of failure, the system will give an alarm to the supervisory equipment, limit the charge and discharge current or power, and delay the disconnection of all contactors. This can protect the battery while safeguarding the power systems from becoming unstable.

The control system will have built-in, redundant protection functions at multiple equipment and software levels for:

- battery cell over/under temperature protection
- string over-voltage protection
- string over-current protection
- environment over/under temperature protection
- islanding (i.e., “anti-islanding” protection that will cause an automatic shutdown in the event of a power outage or other grid problem)
- smoke and fire detection

System-level protections designed to maintain battery health and safety include an automatic stop to battery operation at certain temperatures and high and low states of charge (i.e., near 100% and 0%).

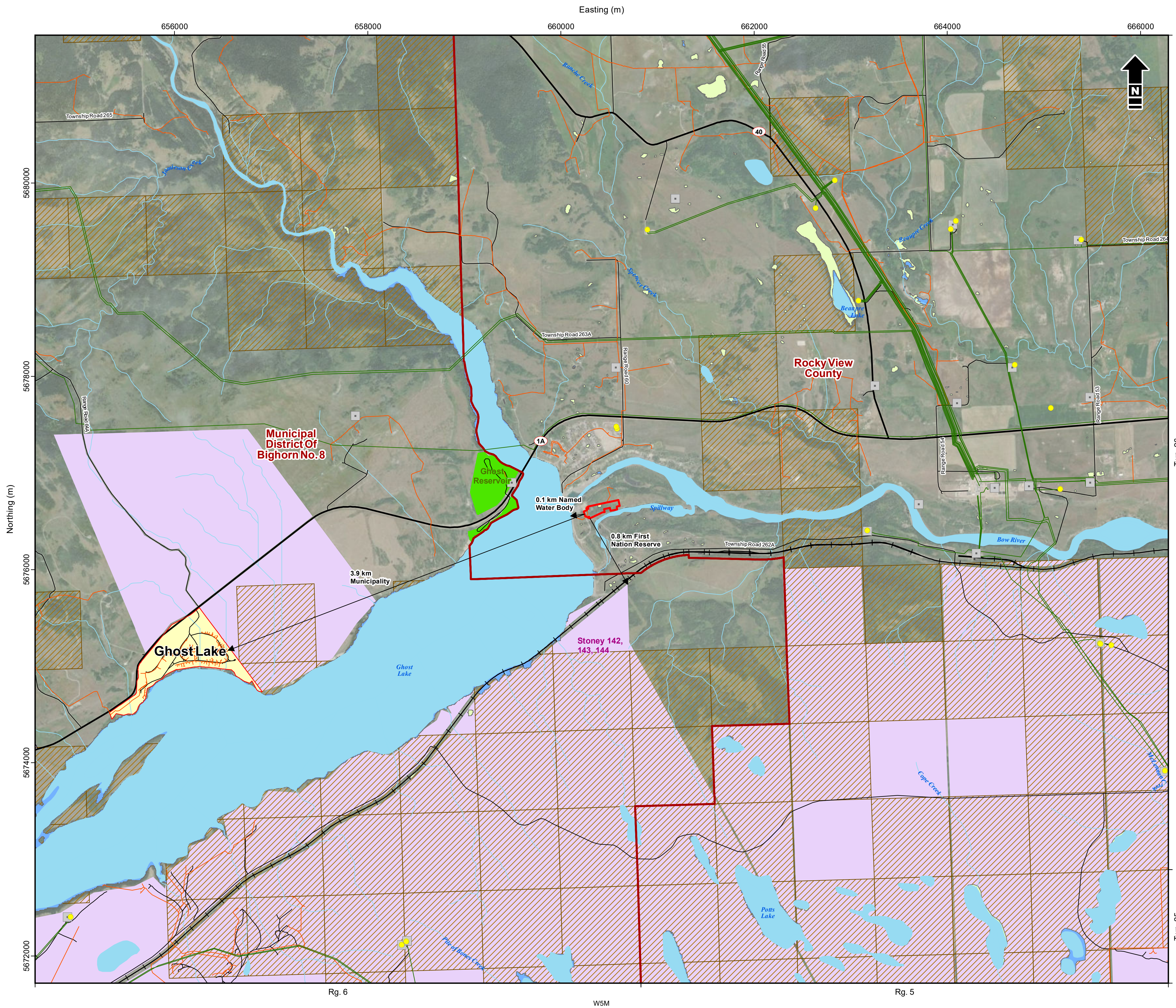
The control system will instantly detect and categorize all device or internal communication faults. All fault occurrences will generate alerts that will be sent to monitoring systems and to the battery storage system supplier’s portal, and notifications will be emailed to the Project operator. If any critical error occurs, the system stops charge/discharge operations within milliseconds and the DC contactor is opened to cut off any current flow.

The emergency shutdown system controller has a Human Machine Interface (HMI) that will enable an operator to view status information, including state of charge, charge/discharge modes, and the ability to input commands to operate the system in local mode. The HMI also enables a local operator to shut off the equipment in the event of an emergency.

The fire detection system will be comprised of smoke and heat detectors to enable detection of smoke or gasses indicative of a fault. In case of smoke detection, a designated alarm panel executes alarm/annunciation and initiates the shutdown sequence and isolation of the particular energy storage component.

2.1.1.5 Access Road

The Project will use an existing access road that crosses the Ghost hydro-electric facility and leads down to the Project footprint. The site maintenance road running through the centre of the Project will tie into the existing site access road.



Project Footprint
Community
Environmentally Significant Area
First Nation Reserve
Provincial Recreation Area
Water Body
Watercourse
Pipeline
Low Pressure Gas Pipeline
Railway
Highway
Road
Municipal District
Facility
Well (Surface Hole)

Alberta Merged Wetland Inventory

Marsh
Open Water

Footprint Area (ha): 3.34

Reference: Data obtained from AltaLIS © Government of Alberta, GeoBase® and GeoGratis © Department of Natural Resources Canada (all rights reserved) used under license. GDM midstream, transportation infrastructure data and IHS well data provided by IHS© 2021. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

1:40,000
metres
400 0 400 800
NAD 1983 UTM Zone 11N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Project Area

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	B. Robbie	M. Hansen

Figure 2-1

Project Footprint
Water Body
Watercourse

Footprint Component

Battery Energy Storage System Boundary
Temporary Construction Facilities Area
Access Road
Battery Enclosure
Inverter and Transformer

1:2,000 metres
20 0 20 40
NAD 1983 UTM Zone 11N

Reference: Data obtained from AltaLIS © Government of Alberta used under license. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Project Site Layout

Date:	Project:	Submitter:	Reviewer:
December 2021	32868	B. Robbie	M. Hansen

Figure 2-2

I:\Trans\Alta\32868\Figures\And\Tables\EA\2021\Report\Environmental\Evaluation\Figure-2-2-Project_Site_Layout.mxd - Talbot_L - 21-Dec-21, 03:48 PM - sylam - TID05

2.1.2 Pre-construction Phase

Site selection for the Project formed part of the front-end engineering and design (FEED) activities and was based on proximity to power generating infrastructure (the Ghost hydro-electric facility), an electrical substation (Ghost 20S Substation), power transmission lines, environmental considerations, access, and constructability considerations such as slope and terrain.

An environmental constraint analysis was completed for the Project using high-resolution imagery and desktop information for the following environmental and cultural features:

- environmentally significant areas (ESAs)
- land use
- residences
- historical resources
- native vegetation
- parks and protected areas
- wetlands
- water bodies and watercourses
- wildlife and wildlife habitat historical observations through a search of the Fish and Wildlife Internet Mapping Tool (FWIMT)
- provincially designated sensitive wildlife ranges and zones
- Agricultural Regions of Alberta Soil Inventory Database (AGRASID)

The desktop information was verified by data collected in the field during a site assessment to help guide Project design and inform site-specific infrastructure setbacks. The Project has been sited to avoid ESAs (Fiera 2014), parks and protected areas, and direct impacts to wetlands, watercourses, and water bodies.

Baseline environmental field surveys were conducted for the Project to inform FEED activities and to collect the required information for this environmental evaluation and are described in the environmental setting data collection methods subsections in Section 4.

2.1.3 Construction Phase

Project construction is expected to take approximately 9 months starting in March 2023 with an in-service date of December 2023. Equipment will be pre-fabricated offsite and will be transported to the site by truck and trailer. Some components will be assembled onsite. Construction activity, including waste storage, will be limited to the Project footprint.

Construction activities and timelines are outlined in Table 2-1. Vegetation clearing in the Project footprint during raptor and bird nesting periods could result in disturbance of nesting birds and higher

potential for mortality. To minimize the risk of disturbance and mortality of migratory and nesting birds, TransAlta will pre-clear the Project footprint by mowing ground vegetation in late summer or early fall 2022 (September or October) and clearing shrubs and trees in winter 2022/2023 prior to the start of the raptor nesting period (starts March 15) and before the start of the migratory bird nesting period (Zone B4; starts April 15). The remainder of the construction activities will start in March 2023.

TABLE 2-1 Construction Activities and Timelines

Construction Activity	Description	Timeline
Pre-clearing/mowing ground vegetation	• The Project infrastructure extents will be surveyed and marked. • Ground vegetation (grass and smaller shrubs) will be mowed at the end of the growing season prior to the start of construction.	September or October 2022
Pre-clearing/shrub and tree clearing	• Larger shrubs and trees will be cleared during frozen ground conditions in winter prior to the start of construction.	December 2022 – February 2023
Construction Start	• Start construction • Site mobilization	March 2023
Surveying, Clearing, Grading	• The Project infrastructure extents will be surveyed and marked, the subgrade elevation will be verified, pile positions will be located, and underground wiring and cable locations will be marked. • The topsoil and upper subsoil will be salvaged and stockpiled for future use during decommissioning and reclamation of the Project. • Soil stockpiles will be stabilized to prevent erosion. • The Project footprint will be graded as required. • The access road will be cleared, graded, and compacted. • Erosion control measures will be installed after grading.	April 2023
Foundation Excavation and Installation	• If required, as determined by the results of the geotechnical investigations, steel piles to support the slab foundations will be drilled, installed, and capped. • Foundation areas will be excavated. • Pre-fabricated concrete slabs will be placed by crane either on the steel piles or directly on grade. • Some concrete may have to be poured and formed onsite.	June 2023
Equipment Delivery, Assembly, and Installation	• Equipment will be pre-fabricated offsite and transported by truck and trailer to the site. • Some components will be assembled onsite. • Equipment will be mounted on the foundations by crane. • Trenches for wiring and cables between the battery units, transformers, and switchgear will be excavated and the wiring and cables installed and connected to the system.	August 2023

Construction Activity	Description	Timeline
Site Finishing	• Gravel will be imported, installed, and compacted on the remainder of the operating area and access road. • A chain-link, barbed wire-topped fence will be erected around the site. A gate will be installed at the entrance of the site. • Landscaping	September 2023
Cleanup	• Construction waste will be removed from site and disposed of in an approved facility.	October 2023
Commissioning	• The facility components will be inspected, tested, and connected to the grid.	December 2023

2.1.4 Operations Phase

The Project will start to operate in December 2023 and will operate for up to 25 years. The Project will be an unmanned operation, managed remotely from TransAlta's Hydro Control Centre located in Calgary, approximately 50 km east of the Project. The Project components are designed to require minimal ongoing maintenance; however, preventative maintenance will be conducted as per the manufacturer's specifications. Unplanned maintenance may be required.

2.1.5 Decommissioning and Reclamation Phase

After the Project is no longer required and it is planned for operations to cease, the Project infrastructure will be dismantled and removed from the site, including the perimeter fence and gate. The gravel on the site will be salvaged, where practicable, and removed from the site. The site will be de-compacted and all salvaged soil stored in stockpiles in the outer lease area will be replaced and spread over the previous gravel pad area. A revegetation plan will be developed in consultation with stakeholders. The site will be reclaimed to equivalent land capability and similar land use as the surrounding area.

3 ENVIRONMENTAL EVALUATION METHODS

This environmental evaluation was prepared to address the information requirements listed in Section 10.1 of Rule 007 (AUC 2021). This evaluation considered the *Responsible Authority's Guide to the Canadian Environmental Assessment Act* (FEARO 1994) as a guideline to describe and evaluate the predicted residual effects (i.e., effects remaining after mitigation) of the Project. The environmental evaluation approach is also based on the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* (ESRD 2013a). The environmental evaluation involved the following steps:

1. Describe the current environmental setting for the Project.
2. Determine the environmental valued components (VCs) that may interact with the Project.
3. Consider the temporal and spatial boundaries of interactions between the Project and VCs.
4. Identify the potential effects of the Project on the existing environment for all phases including construction, operation, and decommissioning and reclamation.

5. Identify or develop feasible and proven mitigation to eliminate or reduce the potential effects.
6. Identify and evaluate any residual effects and determine their significance.
7. Identify monitoring activities to be implemented during the life of the Project to verify the effectiveness of the proposed mitigation.

3.1 Environmental Evaluation Team

An experienced technical team prepared and reviewed the environmental evaluation. The qualifications, credentials, and role of the technical team for the Project are provided in Appendix A.

3.2 Valued Components

The VCs are defined as environmental and cultural resources or features that are of public concern, important to landowners and stakeholders, protected by legislation, and that could be directly or indirectly affected by the Project. The VCs that were considered for this environmental evaluation are presented in Table 3-1. The VCs considered are from Rule 007 (AUC 2021) and included additional VCs that could be affected by the Project that are not included in Rule 007 (i.e., historical resources and land use). Table 3-1 also includes VCs that were not considered for this environmental evaluation including the rationale behind this determination.

TABLE 3-1 Valued Components Considered for Evaluation

Valued Component	Included in Evaluation	Rationale
Soil and Terrain	Yes	Soil quality (productivity) and quantity are important for maintaining productive ecosystems and regulated by the *Soil Conservation Act* and *Environmental Protection and Enhancement Act* (EPEA).
Vegetation Species and Communities, including Species at Risk and Weeds	Yes	Vegetation species and communities are important for biodiversity and conservation and are protected by legislation (Alberta *Wildlife Act* and *Species at Risk Act*). While the introduction and spread of weed species may be an adverse effect of the Project, mitigation measures will be included in the Project-specific environmental protection plan, and regulated weeds will be controlled as required by the Alberta *Weed Control Act.*
Surface Water, Fish and Fish Habitat	Yes	Surface water is an important water source and protect by legislation (*Water Act).* Fish and fish habitat are important for biodiversity and protected by legislation (Alberta *Wildlife Act, Fisheries Act*). There were no watercourses or aquatic species/habitat identified within the Project footprint; however, an unnamed watercourse is directly adjacent to the south boundary of the Project footprint and there could be indirect effects.
Groundwater	Yes	Groundwater wells and aquifers are an important water source to landowners and are protected by legislation (*Water Act* and EPEA).

Valued Component	Included in Evaluation	Rationale
Wetlands and Water Bodies	Yes	Wetlands and water bodies provide important hydrological and wildlife functions and are protected by legislation (*Water Act* and *Public Lands Act*).
Wildlife Species and Habitat, including Species at Risk and Special Status Species	Yes	Wildlife species and habitat are important for ecosystem diversity and conservation and are protected by legislation (Alberta *Wildlife Act*; federal *Migratory Birds Convention Act,* and *Species at Risk Act*).
Air Quality	No	There are no emission sources as part of the Project during operation. Dust, vehicle, and equipment emissions during construction can be a public concern but are temporary in nature. TransAlta will implement dust control measures during construction as required and revegetate topsoil piles as soon as practicable to reduce dust.
Historical Resources	Yes	Historical resources are culturally important and are protected by legislation (*Historical Resources Act).*
Land Use and Environmentally Significant Areas (ESAs)	Yes	Land use and ESAs are important to landowners and stakeholders, and certain attributes of ESAs may be protected by legislation.

3.3 Temporal and Spatial Boundaries

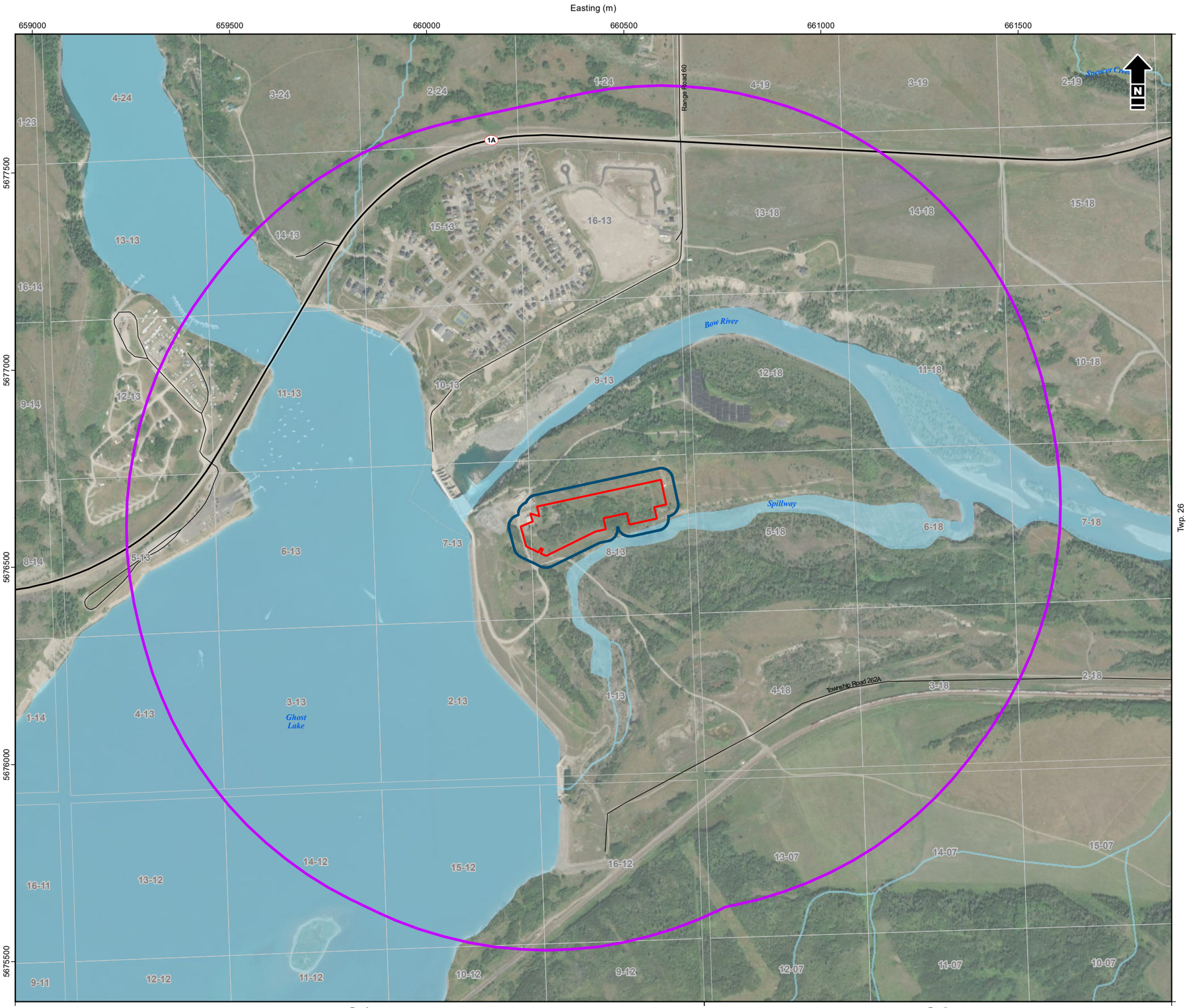
Temporal boundaries define the timeframes associated with Project-specific effects. The following temporal boundaries were used for this environmental evaluation:

- Construction:
    - Planned start clearing and grading and equipment placed in March through August 2023.
- Operation:
    - Planned operation to begin in Q4 2023.
    - Project life expected to be 25 years.
- Decommissioning and reclamation:
    - Future decommissioning and reclamation activities will take place in accordance with applicable legislation and regulations in place at the time. These activities will consist of dismantling and removing Project infrastructure and returning the site back to the original land use. As a result, effects for decommissioning and reclamation are assumed to be similar to or less than effects associated with construction.

The spatial boundaries used for the environmental evaluation are the Project footprint (to determine direct Project effects) and VC-specific assessment areas to determine indirect effects from the Project. The spatial boundaries are described in Table 3-2 and presented on Figure 3-1.

TABLE 3-2 Rationale for Assessment Areas

Term	Description	Area (ha)	Rationale
Project footprint	The is the area that will be disturbed during construction as shown in Figure 2-2.	3.34	Construction work and surface disturbance will result in direct effects to valued components and will be confined to the Project construction footprint. The battery energy storage system (BESS) boundary and temporary construction facilities area will be disturbed during construction. The BESS boundary is the area in which the Project will operate.
Local Assessment Areas			
Groundwater Assessment Area (GAA)	Project footprint + 1,000 m	407.61	Represents the Project footprint and a standard assessment area that considers potential indirect effects and direct effects to groundwater resources such as shallow aquifers. The 1,000 m buffer is included to incorporate the typical scale of local groundwater flow systems and to account for spatial uncertainty of available mapping and potential receptors including water well owners.
Surface water assessment area	Project footprint + 1,000 m	407.61	Represents the Project footprint and a standard assessment area that considers potential indirect effects and direct effects to surface water resources, and fish and fish habitat in the vicinity.
Terrestrial Assessment Area (TAA)	Project footprint + 30 m buffer	6.55	Represents the Project footprint and a standard buffer area that considers potential indirect effects to soils, vegetation, and wetlands.
Wildlife Assessment Area (WAA) and Land Use Assessment Area	Project footprint + 1,000 m	407.61	Represents the largest setback for wildlife described in the *Master Schedule of Standards and Conditions* (MSSC; AEP and AER 2021); considered to include the full extent of direct and indirect environmental effects (wildlife sensory disturbance) on wildlife.
Historical Resources Assessment Area	Project footprint	3.34	Construction work and surface disturbance in the Project footprint could result in direct effects to historical resources.



- Project Footprint
- Terrestrial Assessment Area - 30 m Buffer
- Groundwater, Surface water, and Wildlife Assessment Area - 1,000 m buffer
- Water Body
- Watercourse
- Highway
- Road

1:10,000 metres
100 0 100 200
NAD 1983 UTM Zone 11N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Assessment Areas

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	B. Robbie	M. Hansen

Figure 3-1

3.4 Environmental Setting Description

Information collected for the environmental setting was obtained from reviews of published scientific papers, government publications and databases, and Project-specific field programs. Details regarding information sources and field programs are provided within each VC subsection in Section 4 (Environmental Evaluation).

3.5 Potential Project Effects

The potential environmental effects of Project construction and operation were identified by evaluating how Project activities interact with the established baseline environmental setting based on experience with previous battery storage projects and experience gained through assessment of other projects with similar environmental conditions. A potential Project effect is considered to occur where future conditions are anticipated to differ as a result of the Project and also differ from the conditions otherwise expected from natural change before mitigation measures are applied.

3.6 Mitigation Measures

To reduce or eliminate potential environmental effects due to the Project construction and operation activities, a number of general and site-specific mitigation measures are recommended based on standard battery storage facility mitigation practices. Other mitigation measures are based on requirements and guidelines of federal and provincial regulatory agencies, current industry standards, and professional experience and judgement.

3.7 Prediction of Residual Effects

Residual effects are the net environmental effects remaining after mitigation measures have been implemented. The residual effects were identified and evaluated based on experience with previous battery storage projects, experience gained through assessment of other projects with similar environmental conditions, and the assumption that the proposed mitigation measures will be effectively implemented for the Project.

3.8 Evaluation of Significance

The significance of residual effects was determined using the parameters defined in Table 3-3. The parameters for determining confidence in the residual effects rating is also included in Table 3-3.

Conclusions for the effects criteria are qualitative based on professional judgement. The integration of the various effects criteria results in rating a residual effect as significant or not significant.

TABLE 3-3 Effects Assessment Criteria

Rating	Description
Direction: Describes the direction of the effect whether there is a net benefit, net loss, or a net balance.	
Positive	The effect has a net benefit; the effect is desirable.
Neutral	The effect has no net benefit or loss.
Negative	The effect results in a net loss; the effect is considered undesirable or adverse.
Magnitude: A measure of how adverse or beneficial the effect may be.	
Negligible	No discernible change from existing conditions.
Low	Change is detectable but within acceptable protective standards, if applicable.
High	Change exceeds protective standards, if applicable, and/or causes a detectable change to the resource beyond the range of tolerance.
Duration: Describes how long the effect will persist.	
Immediate	Effect occurs for 2 days or less.
Short-term	Effect occurs during the construction or operation phase for a duration of less than 1 year.
Medium-term	Effect occurs during the construction or operation phase for a duration of 1 to 10 years.
Long-term	Effect occurs during the construction or operation phase and persists for more than 10 years.
During reclamation cycle	Effect exists until the end of reclamation cycle.
End-of-life	Effect exists until after the end of Project life.
Frequency of Occurrence: Describes how often an effect occurs within a set time period.	
Incidental	Effect occurs only as a result of an unanticipated or infrequent event.
Isolated	Effect is confined to a specific time or Project activity.
Occasional	Effect occurs intermittently and sporadically over the assessment period.
Periodic	Effect occurs repeatedly but inconsistently during the assessment period.
Continuous	Effect occurs continually and consistently during the assessment period.
Spatial Extent: Describes the area within which the effect occurs.	
Project footprint (3.34 ha)	The land directly disturbed and occupied by the Project; refer to Table 3-2.
Local	Direct and indirect effects of the Project are anticipated to occur on the resource or environmental component within the VC-specific assessment area.
Regional	Direct and indirect effects of the Project are anticipated to occur beyond the VC-specific assessment area and at a broader, regional scale.
Reversibility: Describes the potential for the recovery or reversibility of an effect.	
Immediately	Reversible in less than 2 days.
Short-term	Reversible in less than 1 year.
Medium-term	Reversible in 1 to 10 years.
Long-term	Reversible in greater than 10 years.
End-of-life	Reversible at end of Project life.
Irreversible (permanent)	Effect is not reversible.
Probability of Occurrence: Describes the likelihood of an effect.	
Low	Unlikely to occur.
High	Likely to occur.

Rating	Description
Prediction Confidence: Describes the certainty associated with the significance evaluation and considers data quality, rigor of the assessment/measurement approach, and/or the certainty of prescribed mitigation measures.	
Low	Determination of significance based on an incomplete understanding of cause-effect relationships and coarse, low resolution, or incomplete data for the Project area.
Moderate	Determination of significance based on a good understanding of cause-effect relationships and coarse or low resolution data or high resolution quality data, but poor understanding of cause-effect relationships.
High	Determination of significance based on a good understanding of cause-effect relationships and good quality data for the Project area.
Significance: An overall measure of the magnitude, duration, frequency, timing, probability of occurrence, ecological and social context, geographic extent, and degree of reversibility of an effect on a VC.	
Significant	The overall effect is measurable and not reversible. An example of a significant effect would be a high probability of occurrence of an irreversible (permanent) or long-term residual effect of high magnitude that cannot be technically mitigated or economically compensated.
Not significant	The overall effect is not measurable and/or is reversible. An example of an effect that is not significant would be an effect with a low probability of occurrence, reversible, negligible, and low, medium, or high magnitude.

3.9 Monitoring Activities

During construction, an Environmental Monitor and qualified Construction Manager will be onsite to verify compliance with regulatory environmental and construction requirements and specifications, as well as environmental requirements and mitigation measures as described in the Environmental Protect Plan (EPP) developed for the Project.

During operations, TransAlta will conduct environmental monitoring in accordance with the AUC approval conditions. TransAlta will track the effectiveness of the proposed mitigation and compliance with Project-specific operational monitoring and regulatory compliance requirements as part of the corporate environmental management system.

4 ENVIRONMENTAL EVALUATION

4.1 Soil and Terrain

4.1.1 Desktop Assessment

A desktop soil assessment was conducted and involved the review of the following information:

- *Agricultural Regions of Alberta Soil Inventory Database (AGRASID) 4.1*. (AF 2021)
- *Review of historical soil survey compiled for the Municipal District of Rocky View No*.44 Alberta (Turchenek and Fawcett 1994).

4.1.2 Field Assessment

Topsoil checks were completed on foot by a qualified soil scientist on September 20, 2021. A total of 24 soil inspections were completed within the Project footprint and terrestrial assessment area (TAA; Project footprint plus 30 m buffer; Table 3-2). Depth of soil inspections was to 30 cm or to auger refusal. Soils were classified according to the *Canadian System of Soil Classification* (SCWG 1998) and the *Alberta Soil Names File* (Bock 2016). Topsoil depths within the Project footprint range from 10 to 35 cm, and 11 soil inspections were not fully inspected due to auger refusal before reaching a max depth of 30 cm. It is possible that the soil inspections that had a maximum depth of 30 cm may have deeper topsoil than recorded. The auger refusal soil inspection locations (SILs) are highlighted as green points on Figure 4-1.

4.1.3 Existing Conditions

The Project is in the Foothills Parkland Natural Subregion of the Parkland Natural Region (Natural Regions Committee 2006). AGRASID classifies the soils in the Project footprint as Orthic Black Chernozems with Inclusions of Orthic Regosols located on lower slopes. The soil colour of the topsoil in the Project footprint is classified as very dark brown (10YR 2/2) according to the Munsell soil-colour charts book. Subsoil within the Project footprint is classified as brown to dark brown (10YR 4/3 and 10YR 3/3). Colour change between the topsoil and subsoil is indistinct. Soil texture in the Project footprint is classified as silt loam with coarse fragments defined as gravel less than 8 cm in size ranging from 5% to 10% of the soil profile.

4.1.3.1 Soil Sensitivity to Wind Erosion

Rating of sensitivity to wind erosion is derived through an equation that accounts for the surface roughness and aggregation, soil resistance to movement, drag velocity of surface wind, soil moisture, shear resistance, and available moisture of the soil surface (Coote and Pettapiece 1989). The resulting ratings are based on soil under agricultural production with no cover. Soils with a sandy texture are

more susceptible to wind erosion than those with a clay texture. The wind erosion risk classes are presented in Table 4-1.

TABLE 4-1 Wind Erosion Risk Classes

Wind Erosion Risk Classes	Soil Texture
High	Very fine sand, sand, coarse sand, loamy sand, gravely sand, dry humic organic materials
Moderate	Sandy loam, fine sandy loam, loam, silt loam, sandy clay loam, sandy clay, mesic organic material
Low	Silt, silty clay loam, clay loam, silty clay, clay, heavy clay, fibric organic material

Adapted from Coote and Pettapiece (1989)

The topsoil in the Project footprint has moderate wind erosion risk as a result of the silt loam surface texture.

4.1.3.2 Soil Sensitivity to Water Erosion

Water erosion risk is estimated through an equation that accounts for erosivity for rainfall and snowmelt, soil erodibility, slope length and steepness, crop cover and management, and conservation practices (Tajek and Coote 1993). Erosivity for rainfall and snowmelt (*R*) has been estimated for various parts of the province. Slope length is considered a topographical expression because very long slopes may increase erosion risk of fine-grained materials just as steep slopes also increase erosion potential. Soil erodibility (*K* factor) and length-slope (*LS* factor) have been estimated for various topographical expressions and slope length. The rating system used to evaluate soils is based on the approximate *R*, *K*, *LS* values presented by both Alberta Land Conservation and Reclamation Council (LCRC et al. 1993) and Tajek and Coote (1993) for various soil textures, slopes, and length of slopes found in each soil map unit. Medium-textured soils (silt loam), such as those present across the Project footprint, have a *K* factor of about 0.030 to 0.036. More sandy soils have a *K* factor of 0.015. The system used to rate erosion risk on the Project footprint is presented in Table 4-2.

TABLE 4-2 Water Erosion Risk Classes

Water Erosion Risk Classes	Slope Class	Slope Percent (%)	Slope Length (m)	LS Factor	K Factor
Low	1 to 3	<5	0 to 500	0.5 to 0.8	0.015 to 0.036
Moderate	4	5 to 9	50 to 500	0.8 to 2.2	0.015 to 0.036
High	5+	9+	50 to 500	2.2 to 3.5	0.015 to 0.036

Adapted from Tajek and Coote (1993) and LCRC et al. (1993) for Chernozemic soils.

The topography across the Project footprint is gently undulating with slope gradients ranging from 0% to 0.5% (Slope Class 1). The risk of water erosion for the Project footprint is low.

Easting (m)

660200 660300 660400 660500 660600 660700

Northing (m)

5676800 5676700 5676600 5676500 5676400

10-13 9-13 12-18 8-13 7-13 5-18 4-18

Bow River

Spillway

CM001 17cm
CM002 15cm
CM003 12cm
CM004 15cm
CM005 10cm
CM006 17cm
CM007 30cm
CM008 12cm
CM009 12cm
CM010 30cm
CM011 30cm
CM012 30cm
CM013 30cm
CM014 30cm
CM015 35cm
CM016 30cm
CM017 30cm
CM018 10cm
CM019 10cm
CM020 10cm
CM021 10cm
CM022 20cm
CM023 34cm
CM024 30cm

Twp. 26

Rg. 6 Rg. 5

W5M

Project Footprint
Terrestrial Assessment Area - 30 m Buffer
Water Body
Watercourse
Soil Inspection Location and Topsoil Depth
Soil Inspection Location with Auger Refusal

1:2,000 metres
20 0 20 40
NAD 1983 UTM Zone 11N

Reference: Data obtained from AltaLIS © Government of Alberta used under license. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Soil Inspection Locations

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	B. Robbie	M. Hansen

Figure 4-1

I:\TransAlta\32868\Figures And Tables\EA\2021\Report\Environmental Evaluation\Figure 4-1 Soil_Inspection_Locations.mxd - Tabloid_L - 30-Nov-21, 11:41 AM - sylam - TID005

4.2 Surface Water Quality, Hydrology, and Fish and Fish Habitat

4.2.1 Desktop Assessment

A desktop assessment of watercourses and water bodies within the surface water and aquatics assessment area was conducted through the following:

- 1:20,000 scale water body and watercourse datasets from the Government of Alberta (AltaLIS 2020)
- *Fish and Wildlife Management Information System* (FWMIS; AEP 2021a)
- *Code of Practice for Watercourse Crossings - Calgary Management Area Map* (ESRD 2012)
- Fisheries and Oceans Canada's (DFO) species at risk (SAR) Map (DFO 2021)
- Fish Sustainability Index (FSI) Map – Current Adult Density Ranking for Bull Trout (Government of Alberta 2018)
- Historical and current aerial imagery

The information collected from the desktop assessment was used to support the effects assessment. The results of the FWMIS database query and other source reviews were used to determine known or potential fish presence in the watercourse adjacent to the Project footprint. Information from the codes of practice were used with the historical fish data to support the effects assessment. The DFO SAR (DFO 2021) and the FSI (Government of Alberta 2018) maps were reviewed, and the information was used to assess the potential for Bull Trout (*Salvelinus confluentus*) to be present in the Project area.

4.2.2 Field Assessment

An aquatic assessment was conducted with the wildlife surveys on June 2 and 17, 2021, to survey existing conditions within the unnamed watercourse adjacent to the Project footprint. A 1,000-m long reach was surveyed by walking along the banks and documenting channel morphology and biophysical fish habitat features, including channel widths and depths, wetted widths and depths, bed and bank substrate composition and distribution, ground water inputs/seepages, and instream and overhead habitat cover elements.

4.2.3 Existing Conditions

The Project footprint is situated on a disturbed tract of land adjacent the north side of an unnamed watercourse. The watercourse appears to be an old channel associated with the Bow River. The Ghost Reservoir spillway releases water from the reservoir into the unnamed watercourse under high water runoff conditions. Water returns to the Bow River approximately 1,700 m downstream of the spillway. The watercourse is not mapped on the *Code of Practice for Watercourse Crossings – Calgary Management Area Map* (ESRD 2012); however, due to its proximity to the Bow River, it is designated as Class C with a restricted activity period from September 16 to April 15. The watercourse is mapped in FWMIS, but no fish sampling records are documented in these historical records.

Upon review of the DFO SAR map, there is no critical habitat within the unnamed watercourse; however, it is within Bull Trout distribution area. Bull Trout from the Saskatchewan - Nelson Rivers populations are listed as Threatened under the *Species at Risk Act (SARA)*. The current Bull Trout adult density is "very low" in the area according to FSI map. This indicates that there is a very low abundance of adult Bull Trout in this area, and it is unlikely that Bull Trout populations would be found within the unnamed watercourse below the spillway.

The watercourse had defined bed and banks with minimal surface flow velocities (<0.01 m/s) at the time of the site visit. The watercourse is fed primarily by overland surface runoff; no groundwater seeps or areas of upwelling were observed within the assessed reach. The watercourse is also subject to emergency water releases from the Ghost hydro-electric facility (Ghost Dam) and may collect more water during periods of snow melt and high precipitation. The channel is connected to Ghost Lake (i.e., the reservoir) approximately 1,000 m upstream of the Project footprint boundary via the spillway and connected to the Bow River approximately 700 m downstream from the Project footprint. Flow connectivity was inconsistent throughout the channel due to low water levels resulting in disconnected areas of water. A service road crosses the watercourse near the Project footprint (approximately 650 m below the spillway) with a culvert to convey flows.

The lower 1,000 m of the watercourse had a low gradient with pools and slow runs. Beaver activity (e.g., beaver dams) resulted in several impoundments through this reach. Algae was observed on the surface of the water and prevalent throughout the channel.

Channel bed substrates were comprised primarily of fine materials and a mix of large gravel, cobble, boulders, and bedrock. The banks adjacent to the Project footprint were moderately stable and comprised of fine materials, gravel, and cobble. The channel widths and wetted widths were varied, ranging from 5 to 10 m in width upstream of the Project footprint and more than 20 m wide in impounded sections near the Project footprint. The wetted depths were varied ranging from 0.1 to 1.0 m; the deeper water observed in the impounded sections. Overhead cover was limited and provided by mixedwood forest. Instream cover was provided by depth of water in impounded sections.

Young of the year and juvenile forage fish and sucker species were observed in the shallow margins along the banks. Four dead forage and sucker species were observed during the site visit. Fish habitat near the Project footprint is not considered sensitive and is unlikely to support the life processes of Bull Trout or other salmonids during periods of low water levels. Fish species residing in the Bow River may be able to enter the watercourse through the spillway or from the downstream confluence during releases or periods of high water, respectively. The spillway blocks upstream fish passage between the watercourse and Ghost Lake; however, fish may enter the watercourse from the lower end at the confluence of the Bow River when flows are at higher levels.

4.3 Groundwater

4.3.1 Desktop Assessment

Water well records within the groundwater assessment area (GAA; a 1 km radius from the centre of the Project footprint) were identified by searching Alberta Environment and Parks' (AEP) water well information database (Table 4-4; AEP 2021b). A search was also completed for active groundwater or surface water diversion licences. No field assessment was conducted for groundwater.

4.3.2 Existing Conditions

4.3.2.1 Aquifers

The Valley Train Aquitard/Aquifer is the uppermost unit underlying ground surface. It is described as a single hydrostratigraphic unit in this environmental evaluation due to the variable lithology and limited extent of sand dominated units throughout the area. It comprises fluvial and glaciofluvial unconsolidated sand and gravel deposits interbedded with silt and clay (Fenton et al. 2013). Based on publicly available mapping (Atkinson et al. 2020) and nearest water well records (GIC Well IDs 406010, 406065, 406066, 1475859; AEP 2021b) Valley Train Aquitard/Aquifer thickness is anticipated in the range between 6.5 and 45 m. The drillers logs from the nearest water wells within the GAA (GIC Well IDs 2085753, 406011, 386511; AEP 2021b) indicate lithology predominantly composed of sand and gravel sediments interbedded with clay and sandy clay.

Shallow groundwater flow is typically driven by ground surface topography, flowing from elevation highs towards major surface drainage features such as rivers or lakes. Based on topography, the interpreted flow direction of shallow groundwater in the Valley Train Aquitard/Aquifer within the Project footprint is generally to the north, towards the topographic low associated with the Bow River valley. Groundwater elevations are expected to fluctuate seasonally, usually with the highest levels after periods of heavy or prolonged precipitation and snowmelt and depending on river and reservoir stage. Depth to water reported in water wells interpreted to be completed within the Valley Train Aquifer was 6.2 m below ground surface (bgs) (Table 4-3).

Fluvial and glaciofluvial sediments are typically heterogeneous, with estimated hydraulic conductivities ranging over several orders of magnitude given the lithological variability and predominance of fine- or coarse-grained material. Regional studies indicate an apparent yield of over 100 m^3/day in the water wells completed in Valley Train Aquifer within the GAA (HCL 2002). Reported total dissolved solids concentrations in the Valley Train Aquifer within the GAA are generally less than 500 mg/L (HCL 2002). Groundwater is mainly bicarbonate-type water with no dominant cation.

The bedrock in the GAA comprises the folded strata of the Upper Cretaceous Brazeau Formation and Alberta and Smoky Groups (Prior et al. 2013). The Brazeau Formation is comprised of freshwater sandstones, laminated siltstones, and mudstones. The Alberta and Smoky Groups are formed by marine

shales and mudstones interbedded with minor sandstones (HCL 2002). The Brazeau Formation is comprised of freshwater sandstones, laminated siltstones, and mudstones. Regional studies (HCL 1999) group the Brazeau Formation and Alberta and Smoky Groups under the name of Disturbed Belt and describe porous and permeable parts of the Brazeau Formation and Alberta and Smoky Groups as Disturbed Belt Aquifer. The groundwater flow direction is uncertain; however, it is assumed to be north towards the incised valley of the Bow River. A summary of the Disturbed Belt Aquifer properties is provided in Table 4-3. The majority of groundwater in the bedrock aquifers is bicarbonate-type water with no dominant cation.

TABLE 4-3 Summary of Belly River Group Aquifers in Groundwater Assessment Area

Aquifer	Average Depth to Top (m)	Average Thickness (m)	Average Apparent Yield (m^3/day)	Average TDS Concentration (mg/L)
Disturbed Belt Aquifer	<30	>100	10 to 75	<100

TDS - total dissolved solids
Data compiled from HCL (2002).

4.3.2.2 Groundwater Users

Groundwater wells within the GAA are shown on Figure 4-2 and summarized in Table 4-4. There are records of 11 wells located within the GAA. The water well records have not been field-verified, and the reported well locations are often only accurate to the centre location of the reported legal site description or quarter section.

The majority of well records are reported to have a total depth of less than 50 m (Table 4-4). A hydrostratigraphic completion unit for each GIC well record was interpreted by comparing reported bedrock depth and reported completion interval (i.e., perforation interval, screen interval, or total depth of the well). If the completion interval was deeper than the reported depth to bedrock, the well record was interpreted to be completed within bedrock. If the completion interval was shallower than the reported depth to bedrock, then the well record was interpreted to be completed within the unconsolidated valley train. One well record (Water Well Number 8) was interpreted to be completed within the Valley Train Aquifer, six well records were interpreted to be completed within bedrock aquifers, and three well records were not identified.

A total of three active *Water Act* groundwater licences and one surface water licence were reported in the GAA (Figure 4-2, Table 4-5). Groundwater licences are for diversion from unnamed aquifers for recreation purposes (including fairgrounds, entertainment centres, sporting complexes, halls, zoos, restaurants, cafes, clubhouses, or stables). The surface license is for a hydro-power purpose.

TABLE 4-4 Water Wells Within 1 km of the Project Footprint

Water Well Number	Well ID*	Location	Well Owner	Direction From Site	Distance From the Site (km**)	Total Depth (m)	Top of Screen (m)	Bottom of Screen (m)	Top of Perforation (m)	Bottom of Perforation (m)	Bottom of Casing (m)	Depth to Water (m)	Bedrock Depth (m)	Date of Information	Proposed Use for Well	Type of Work	Interpreted Hydrostratigraphic Completion Unit
1	386511	SW-18-26-5-W5M	Mctavish, E.	E-SE	0.65	7.93	---	---	4.57	7.62	6.71	2.44	---	1985/08/20	Domestic	New Well	---
2	386512	NW-18-26-5-W5M	Mcpherson & Thom (Alta) Ltd	NE	0.86	37.49	---	---	3.35	37.49	6.10	2.65	2.13	1989/04/06	Domestic	New Well	Bedrock aquifer
3	406009	NE-12-26-6-W5M	Hunter, Murray	S	1.05	117.35	---	---	109.73	115.82	---	32.00	109.73	1977/02/14	Domestic	Deepened	Bedrock aquifer
4	406010	1-13-26-6-W5M	Dome Petro#Camp Well	S	0.40	36.58	---	---	---	---	35.05	25.60	34.14	1986/06/06	Industrial	New Well	Bedrock aquifer
5	406011	1-13-26-6-W5M	Dome Petro#Rig Well	S	0.40	35.05	---	---	---	---	35.05	18.90	---	1986/01/07	Industrial	New Well	---
6	406012	1-13-26-6-W5M	Dome Petro	S	0.40	31.09	---	---	---	---	31.09	18.90	---	1986/06/07	Industrial	New Well	---
7	406065	9-13-26-6-W5M	Alta Engineering #Hole 1	N	0.40	42.98	---	---	38.41	42.06	---	11.89	42.37	1985/05/15	Domestic	New Well	Bedrock aquifer
8	406066	9-13-26-6-W5M	Alta Engineering	N	0.40	28.04	6.71	9.75	---	---	6.71	6.71	27.43	1985/06/07	Domestic	New Well	Valley Train Aquifer
9	1475858	10-13-26-6-W5M	Cottage Club Ghost Lake	NW	0.81	100.58	---	---	38.10	41.15	48.46	13.72	27.74	2007/02/02	Domestic	New Well	Bedrock aquifer
10	1475859	10-13-26-6-W5M	Cottage Club Ghost Lake	NW	0.66	91.44	---	---	64.01	73.15	33.83	20.98	32.00	2007/01/25	Domestic	New Well	Bedrock aquifer
11	2085753	13-18-26-5-W5M	Mander Developments	NE	0.84	36.58	---	---	---	---	32.31	15.55	---	2015/06/22	Domestic	New Well	---

Notes:
--- not available
* Alberta Environment and Parks (AEP). 2021b. *Alberta Water Well Information*. Provided to Matrix Solutions Inc. by the Groundwater Information Centre (GIC) November 2021 Uploaded to Prometheus Matrix Field Data Portal. Accessed on November 23, 2021.
** When no specific project location available, site location is the centre of the legal site description (LSD) or the centre of the quarter section when LSD is not specified. The presence and location of these wells were not field-verified by Matrix personnel.

TABLE 4-5 Active Groundwater and Surface Water Licences Within 1 km of the Project Footprint

Licence Number	User Number	Applicant	Interim Licence Number	Approval ID	Water Allocation ID	Legal Location	Source	Quantity (m^3)	PUMP RATE (Surface Water - m^3/sec Ground Water - m^3/day)	Consumptive Use (m^3)	Specific Purpose	Licence Type	Licenced Date	Expiry Date
Groundwater Users														
1	20041230001	Alberta Tourism, Parks and Recreation	00212486 01 00	212486	165747	NW 13-026-06 W5M	Unnamed Aquifer - Unclassified	7000	39	7000	RCRTN	WALIC	04-Jun-15	03-Jun-25
2	20100630003	Cottageclub Ghost Lake Inc.	00283888 00 00	283888	208002	NE 13-026-06 W5M	Unnamed Aquifer - Unclassified	39800	130.9	39800	RCRTN	WALIC	29-Nov-10	28-Nov-20
3	20100630003	Cottageclub Ghost Lake Inc.	00283888 00 00	283888	208242	NE 13-026-06 W5M	Unnamed Aquifer - Unclassified	---	39.3	0	RCRTN	WALIC	29-Nov-10	28-Nov-20
Surface Water Users														
1	19410203001	Ta Alberta Hydro Inc.	00080704 00 00	80704	32676	SE 13-026-06 W5M	Bow River	10	215.212	0	HYDRPWR	WRLIC	14-May-47	---

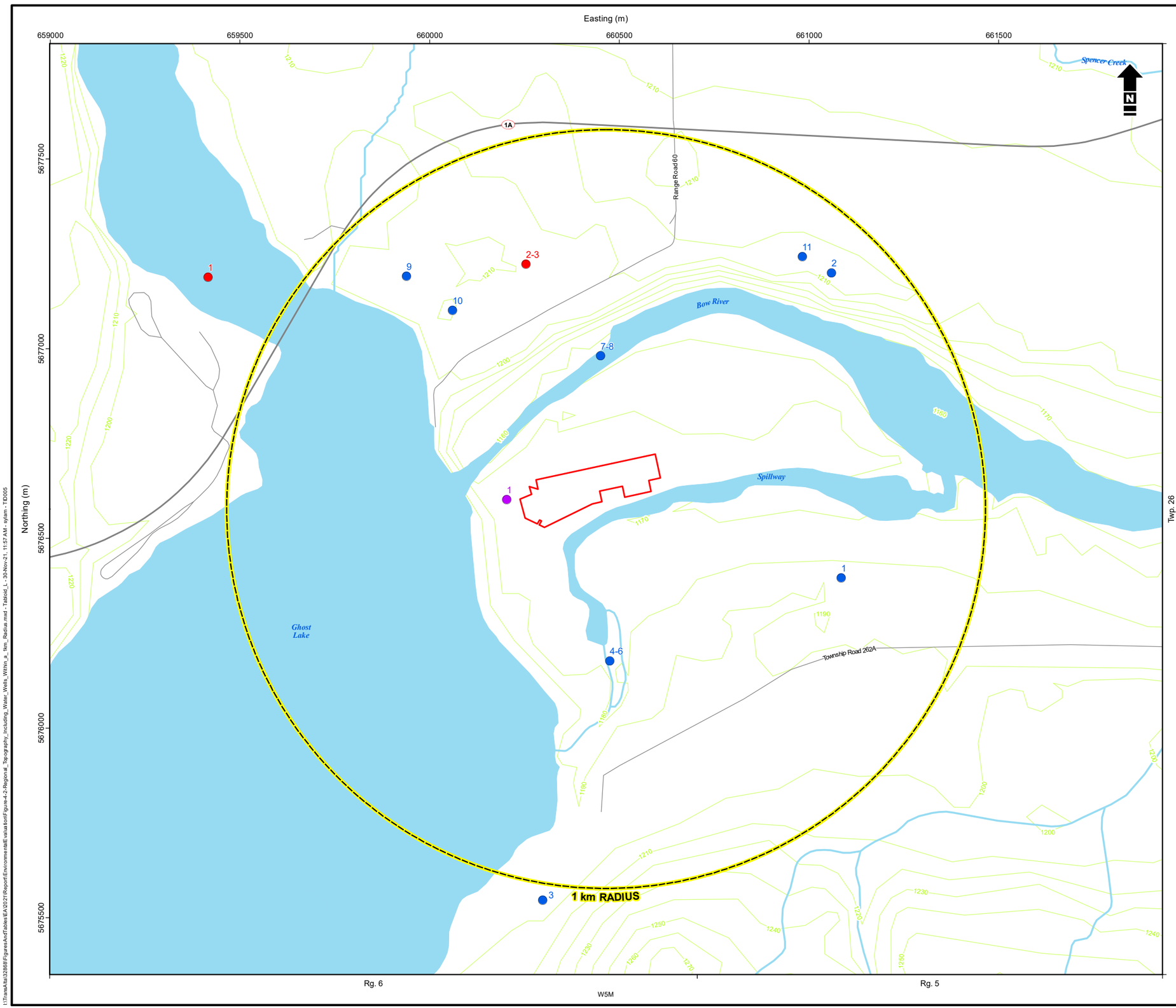
Notes:

--- not available

- Alberta Environment and Parks (AEP). 2021c. *Surface Water Users*. Informatics Branch, Corporate Services Division. Edmonton, Alberta. Information provided to Matrix Solutions Inc. November 23, 2021.

This information was extracted directly from an existing database and was not verified by Matrix personnel.

WALIC - *Water Act* Licence
WRLIC - Licences
HYDRPWR - Hydro-Power
RCRTN - Recreation (includes fairgrounds, entertainment centres, sporting complexes, halls, zoos, restaurants, cafes, clubhouses, stables)



Project Footprint
Water Body
Watercourse
Elevation Contour (10 m)
Highway
Road
Water Well (Not Field Verified)
User License - Surface Water
User License - Groundwater

Note:
Reported well and license locations are often only accurate to the centre location of the reported legal site description or quarter-section.

1:10,000 metres
100 0 100 200
NAD 1983 UTM Zone 11N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Regional Topography Including Water Wells Within a 1 km Radius

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	P. Abdrakhimova	B. Robbie

Figure 4-2

4.4 Wetlands and Water Bodies

4.4.1 Desktop Assessment

The desktop wetland identification, delineation, and classification work are based on guidelines provided in the *Alberta Wetland Identification and Delineation Directive* (AEP 2015) and the *Alberta Wetland Classification System* (AWCS; ESRD 2015) and included the following:

- conducting a review of Alberta Merged Wetland Inventory data (AEP 2020a)
- making a preliminary classification of wetlands according to the AWCS (ESRD 2015)

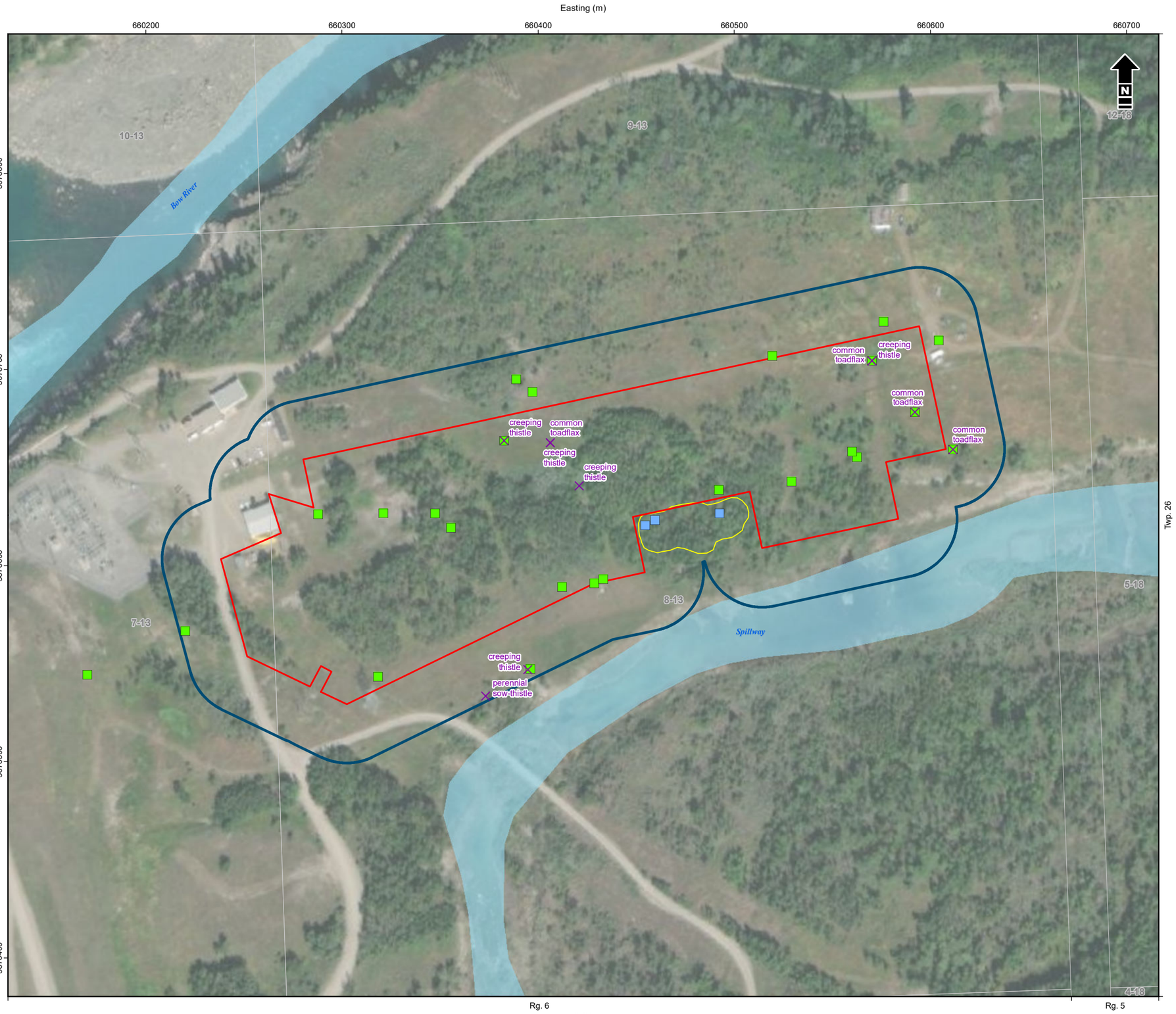
Desktop assessment of wetlands was completed for the TAA (Table 3-1; the Project footprint plus a 30 m buffer). Imagery from different times of the year and/or multiple years were reviewed to support identification and classification of the wetlands.

4.4.2 Field Assessment

Verification of wetlands and ephemeral water bodies within the TAA was completed on July 16 and September 20, 2021. A wetland ecologist surveyed wetlands and water bodies that were mapped during the desktop assessment to confirm wetland classification and delineation. Wetlands were classified according to the AWCS (ESRD 2015) and data were collected according to the *Alberta Wetland Identification and Delineation Directive* (AEP 2015).

4.4.3 Existing Conditions

One wetland was identified in the TAA but outside of the Project footprint and was classified as a seasonal shrubby swamp (ESRD 2015; Figure 4-3). The wetland's dominant species included willow species (*Salix spp*.), poplar *(Populus spp.),* currant (*Ribes sp.*), honeysuckle (*Lonicera spp.*), and fowl bluegrass (*Poa palustris*). No open or standing water was observed during the assessments; however, the wetland may collect water earlier in the growing season and during periods of snow melt and high precipitation.



Project Footprint
Terrestrial Assessment Area - 30 m Buffer
Shrubby Swamp
Water Body
Watercourse
Vegetation Survey Location
Wetland Survey Location
Weed Observation

1:2,000
metres
20 0 20 40
NAD 1983 UTM Zone 11N

Reference: Data obtained from AltaLIS © Government of Alberta used under license. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Vegetation and Wetland Assessment Area

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	J. Kemp	S. Brauer

Figure 4-3

4.5 Vegetation Species and Communities

4.5.1 Desktop Assessment

On July 15, 2021, Matrix completed an Alberta Conservation and Information Management System (ACIMS) desktop review of historic rare plant occurrences and potential rare plant occurrences within 5 km of the Project footprint (GoA 2021). Rare plants included species ranked as SX, SH, SU, S1, S2, and S3 (tracked or watched) by ACIMS, and endangered and threatened species, and species of special concern on Schedule 1 of SARA. The potential occurrence of rare ecological communities (RECs), as defined in Allen 2014 and listed as S1, S2, and S3 by ACIMS (GoA 2021), was also reviewed.

4.5.2 Field Assessment

Vegetation, rare plant, and weed surveys were completed on foot by a qualified vegetation and wetland ecologist on July 16 and September 20, 2021. Visual inspections were completed within each vegetation community to confirm community types present in the TAA. The methods and procedures used for the early rare plant survey were based on the recommendations and guidelines outlined in the *Alberta Native Plant Council (ANPC) Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update* (ANPC 2012). The September survey focused on rare plant potential, based on the late-season timing. Prohibited noxious and noxious weed species listed in the *Weed Control* Act were documented.

4.5.3 Existing Conditions

The Project is in the Foothills Parkland Natural Subregion of the Parkland Natural Region, which covers a total area of 3,921 km^2 with elevations ranging from 1,025 to 1,525 m. The subregion is characterized by rolling to hilly native grasslands with aspen woodlands or willow shrublands in low-lying areas. Water bodies with open water account for less than 1% of the subregion with the Bow River being the largest watercourse. Wetlands cover approximately 4% of the subregion, although seepage occurs frequently on lower slope positions. Over 60% of the subregion is mapped as native or improved rangeland used for grazing, with significant oil and gas exploration and development (Natural Regions Committee 2006).

The Project is in the limber pine (*Pinus flexilis*) zone, according to a review of the *Wildlife Sensitivity Maps - Data Sets* (AEP 2021d). Limber pine is listed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2020), but no limber pine was observed in the TAA during field surveys. Based on the ACIMS desktop search, marsh gentian (*Gentiana fremontii*) has been recorded within 5 km of the Project footprint. Marsh gentian is ranked as S3, which indicates that provincially, this species is known from 100 or fewer occurrences or is somewhat vulnerable due to other factors (e.g., restricted range).

There were two dominant plant communities in the TAA (Figure 4-3):

- Grassland (Modified) – mix of native and non-native species, dominated by snowberry (*Symphoricarpos albus*), silverberry (*Elaeagnus commutata*), golden bean (*Thermopsis rhombifolia*), common yarrow (*Achillea millefolium*), pasture sagewort (*Artemisia frigida*), rough cinquefoil (*Potentilla norvegica*), smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), red fescue (*Festuca rubra*), and other native or introduced species.

- Wooded (Deciduous Dominant) – native vegetation community, forest dominated by aspen (*Populus tremuloides*), poplar (*Populus balsamifera*), buffaloberry (*Shepherdia canadensis*), and common yarrow (*Achillea millefolium*).

No rare plants or RECs were observed in the TAA (Figure 4-3) during the surveys. Based on the vegetation communities and species observed, the habitat has low potential for rare plants.

No prohibited noxious weeds were observed in the TAA. Multiple noxious and non-native invasive species were observed during the 2021 field assessments throughout the TAA, including, creeping thistle (*Cirsium arvense*), common toadflax (*Linaria vulgaris*), and perennial sow-thistle (*Sonchus arvensis*), listed as noxious weeds under the *Alberta Weed Control Regulation* (Province of Alberta 2016) These noxious weed occurrences are shown on Figure 4-3 and summarized in Table 4-6.

TABLE 4-6 Noxious Weeds Observed in the Terrestrial Assessment Area

Common Name	Scientific Name	Alberta Weed Control Act Listing	Weed Occurrences Within the TAA
common toadflax	*Linaria vulgaris*	Noxious	4
creeping thistle	*Cirsium arvense*	Noxious	5
perennial sow-thistle	*Sonchus arvensis*	Noxious	1

Note:
TAA – terrestrial assessment area

4.6 Wildlife Species and Habitat

4.6.1 Desktop Assessment

A desktop assessment of government and scientific research studies and government database queries was conducted to identify wildlife species, including wildlife SAR, and sensitive wildlife areas that may occur in the wildlife assessment area (WAA; Project footprint plus 1,000 m buffer; Table 3-1).

Wildlife SAR are defined as those species listed by:

- the *Wild Species Status Search, 2020 Status Listing* (AEP 2021e) as "At Risk," "May be at Risk," and "Sensitive"
- the Alberta *Wildlife Act* (Province of Alberta 2021) as "Endangered," "Threatened," and "Special Concern"
- the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as "Endangered," "Threatened," and "Special Concern" (Government of Canada 2021a)
- the *Species at Risk Act (SARA)* (Government of Canada 2021b) as "Endangered," "Threatened," and "Special Concern" on Schedules 1, 2, or 3

Identification of sensitive wildlife areas and wildlife species presence was primarily derived from the following sources:

- historical wildlife observation data from the FWIMT (AEP 2021f)
- provincially designated sensitive wildlife ranges, zones, and water bodies (AEP 2021d)
- species range maps (Naughton 2012; Russell and Bauer 2000)

4.6.2 Field Assessment

Four wildlife surveys were completed for the Project:

- Nocturnal auditory amphibian surveys (3 surveys)
- Wildlife reconnaissance surveys (2 surveys)
- Remote camera deployment (1 survey)
- Sharp-tailed grouse surveys (2 surveys)

Nocturnal auditory amphibian surveys were completed on June 2, June 8, and June 14, 2021, focused on identifying potential amphibian breeding wetlands and/or water bodies within the Project footprint and a 100 m buffer (Figure 4-4). Amphibian surveys were conducted following protocols outlined in the *Sensitive Species Inventory Guidelines* (SSIG; ESRD 2013b).

Wildlife reconnaissance surveys were conducted on June 17 and September 29, 2021 within the Project footprint and a 100 m buffer (Figure 4-4) to identify wildlife habitats and document important wildlife features (e.g., nests, dens, and mineral licks) that have setbacks outlined in the MSSC (AEP and AER 2021). The MSSC does not apply to developments on private land but has been used as a source for best management practices to minimize impacts to wildlife from the Project.

Two remote cameras were deployed on September 29, 2021 to determine status (e.g., active, inactive, species use) at a den identified by survey crews within the Project footprint (Figure 4-4). The den has two openings; one remote camera was deployed at each opening. Cameras were programmed to take five photographs with every trigger (day and night) and a timelapse photograph every day at 1:00 pm. Camera maintenance was conducted on November 8, 2021, to replace batteries and SD cards and to download initial photographs. The cameras were left in place to continue monitoring the den.

Sharp-tailed grouse surveys were conducted on September 15 and 29, 2021 in suitable habitat (e.g., native and/or modified grassland and tame pasture) within the WAA (Figure 4-4) to record evidence of leks or lekking behaviour, as leks may require development setbacks (MSSC; AEP and AER 2021). Sharp-tailed grouse surveys are typically conducted in the spring during the peak lekking season; however, Matrix consulted with AEP regional biologist (Boukall 2021a, Pers. Comm.) to obtain permission and clarify protocols for completing the surveys in the fall outside of the standard survey window included in the SSIG (ESRD 2013b). The survey timing was approved with the requirement of completing the survey over a larger area (i.e., 1,000 m buffer rather than the standard 500 m buffer; Figure 4-4).

4.6.3 Existing Conditions

4.6.3.1 Desktop Assessment

The Project footprint and WAA is within the sharp-tailed grouse survey area, sensitive raptor range (i.e., bald eagle, golden eagle, and prairie falcon), mountain goat and sheep areas – disease buffer, and a Key Wildlife and Biodiversity Zone. No SAR were historically detected within the WAA (FWIMT data; AEP 2021f). FWIMT SAR historically observed within 5 km of the Project include western grebe, trumpeter swan, and grizzly bear (AEP 2021e; Appendix B). There are several SAR with ranges that overlap the WAA that could occur where suitable habitat is present (e.g., potential for golden eagle and prairie falcon nesting on steep cliffs along the Bow River; Figure 4-4; Appendix B).

4.6.3.2 Field Assessment

Nocturnal Auditory Amphibian Surveys

During the nocturnal auditory amphibian surveys, boreal chorus frog was the only amphibian species heard calling from within the Project footprint and a 100 m buffer. One wetland, a seasonal shrubby swamp, was identified in the TAA (Section 4.4.3; Figure 4-3) although it is unlikely to contain suitable habitat for amphibian breeding. The spillway does contain some breeding habitat for amphibian species. No amphibian SAR were heard during the nocturnal auditory amphibian surveys.

Wildlife Reconnaissance Surveys

During the wildlife reconnaissance surveys, information was collected to understand wildlife habitat in the WAA. The WAA includes tame pasture, deciduous, coniferous, and mixedwood forest, and modified grassland and is located south of the Bow River, with the Ghost Reservoir to the west, and a spillway with ponding water to the south. Wildlife habitat within the WAA includes modified grassland with forested areas (e.g., nesting habitat for migratory birds), steep cliffs along the Bow River (e.g., nesting habitat for sensitive raptor species), and modified grassland along south-facing slopes (e.g., potential for sensitive snake species hibernacula; Figure 4-4; Figure 4-5).

Two wildlife SAR were detected during the wildlife reconnaissance surveys: bald eagle and golden eagle (Figure 4-4). Bald eagle and golden eagle are listed provincially as Sensitive (AEP 2021e) and federally as Not at Risk by COSEWIC (COSEWIC 2020; Appendix B). Three features potentially requiring setbacks were identified during the wildlife reconnaissance surveys (Figure 4-4):

- One beaver lodge located within 100 m of the Project footprint, activity status unknown. If the lodge is determined to be active during subsequent pre-construction surveys, a setback of up to 100 m may apply (AEP 2021d).

- One inactive stick nest located in the Project footprint; species and activity status could not be determined at time of survey. If the nest is determined to be active during subsequent pre-construction surveys, a setback of 100m to 1,000 m may apply, depending on species use (e.g., red-tailed hawk nests have a 100 m setback, whereas bald eagle nests have a 1,000 m setback; MSSC; AEP and AER 2021).

- One den located in the Project footprint; species and activity status could not be determined at time of survey. Additional data collected during the remote camera survey provided information on current use. If the den is determined to be active during subsequent pre-construction surveys, a setback of 100 m may apply while the den is active (AEP 2021d).

Remote Camera Survey

A total of 2,411 photographs were collected from the remote cameras between September 29 and November 8, 2021 and the photographs were analyzed to determine if species use and activity status at the den site. Coyotes were the most frequently observed species and were detected on 9 days out of 41 monitoring days. All coyotes captured on the remote cameras were adults and observations included anywhere between one and four individuals, most often investigating, and excavating the den openings and occasionally entering and exiting. The photographs from this monitoring period are not from the active denning season (i.e., approximately March to May when raising young), and the den would currently be considered inactive (e.g., the den is not required at this time by the coyotes). However, the initial photographs and activity detected does suggest that this den could be used as an active coyote den during denning seasons. The *Wildlife Act* protects all active dens unless authorization to disturb or

remove the den is obtained and the standard setback applied to an active den of any species is 100 m. The cameras remain in place and TransAlta will continue to monitor this site for activity and consult with AEP to determine appropriate mitigation measures including a reduced setback or a permit to proceed with destruction of the den.

Sharp-tailed Grouse Surveys

No sharp-tailed grouse or signs of sharp-tailed grouse leks were observed during the fall surveys. However, some habitat with lekking potential is located within the WAA (e.g., modified grassland, tame pasture).

Incidental Species at Risk

When observed, incidental wildlife species were recorded during surveys completed for the Project. One wildlife SAR, an unknown garter snake species, was detected during the September vegetation survey (Figure 4-4). All three species of garter snake in Alberta (i.e., plains garter snake, red-sided garter snake, wandering garter snake) are listed provincially as Sensitive (AEP 2021e) and are not listed federally under COSEWIC or SARA (Government of Canada 2021a).

Other non-SAR wildlife species detected without nests or important habitat features (e.g., dens), not exhibiting nesting behaviour, or outside of the Project footprint (i.e., within the WAA) include American crow, American robin, black-billed magpie, black-capped chickadee, brown-headed cowbird, Canada goose, clay-coloured sparrow, cliff swallow, common raven, chipping sparrow, double-crested cormorant, hermit thrush, Lincoln's sparrow, mourning dove, spotted sandpiper, Swainson's hawk, tree swallow, warbling vireo, white-crowned sparrow, yellow warbler, an unknown falcon, an unknown raptor, and mule deer.

Easting (m)

660000 660100 660200 660300 660400 660500 660600 660700 660800

Northing (m)

5676900 5676800 5676700 5676600 5676500 5676400 5676300

10-13 9-13 12-13 7-13 8-13 5-18 2-13 1-13 4-18

Range Road 60

Bow River

Spillway

Ghost Lake

Camera 2

Camera 1

Twp. 26

Rg. 6 Rg. 5

W5M

N

- Project Footprint
- Project Footprint - 100 m Buffer
- Project Footprint - 500 m Buffer
- Wildlife Assessment Area - 1,000 m Buffer
- Key Wildlife and Biodiversity Zone
- Water Body
- Watercourse
- Highway
- Road
- Wildlife Camera
- Amphibian Survey Location
- Sharp-tailed Grouse Survey Location

Wildlife Species At Risk Observations

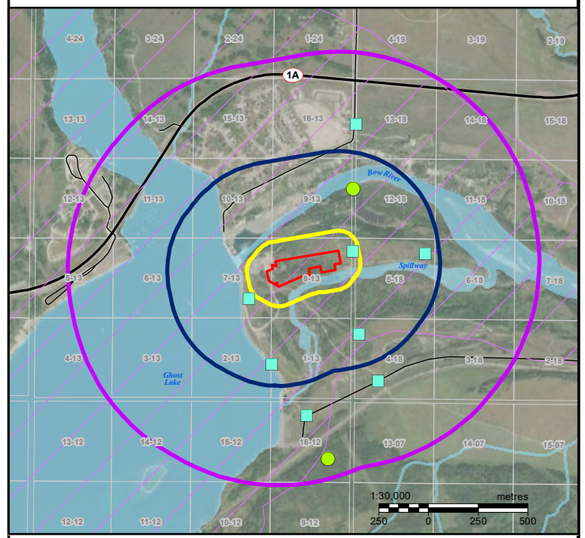
- Bald Eagle
- Golden Eagle
- Unknown Garter Snake Species

Important Wildlife Features

- Potential Snake Hibernacula Area
- Beaver Lodge
- Inactive Stick Nest
- Unknown Den

Wildlife Sensitivity Zones within Figure Extent

- Mountain Goat and Sheep Areas - Disease Buffer
- Raptor Ranges (Bald Eagle, Golden Eagle, Prairie Falcon)
- Sharp-tailed Grouse Survey



1:3,000 metres
25 0 25 50

NAD 1983 UTM Zone 11N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Wildlife Assessment Area

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	S. Holmes	C. Corbett

Figure 4-4

4.7 Historical Resources

4.7.1 Desktop Assessment

TransAlta submitted a letter to the Historic Resources Management Branch of Alberta Culture, Multiculturalism, and Status of Women (ACMSW) on October 4, 2021. The letter advised that the Project had a high potential to impact archaeological resources, and that a historical resources impact assessment (HRIA) would likely be required. TransAlta requested that the historic resources consultant for the Project (Circle CRM Group Inc.) proceed with the HRIA as soon as possible prior to the onset of winter conditions. TransAlta received *Historical Resources Act* Requirements (HRA Number 4940-21-0075-001) on October 25, 2021, confirming that pursuant to Section 37(2) of the *Historical Resources Act*, a HRIA was required for all portions of the Project footprint.

4.7.2 Existing Conditions

The HRIA was completed for the Project footprint on November 25 and 26, 2021 under Permit 21-207. The crew found some shallow historic scatters and random bone fragments during the HRIA; however, there were no findings that warranted the delineation of a historical site or further work at the site. *Historical Resource Act* approval will be recommended by the historic resources consultant that completed the HRIA and the results of the HRIA will be reported to ACMSW in December 2021.

4.8 Land Use and Environmentally Significant Areas

4.8.1 Desktop Assessment

Current land uses (i.e., land cover) and designated ESAs in the WAA were determined through a review of publicly available information, The *Environmentally Significant Areas in Alberta: 2014 Update Final Report* (Fiera 2014) and aerial imagery. Observations from field surveys were also used to inform land cover. Land cover classes were interpreted based on available imagery and AltaLIS 20K watercourse base maps and mapped within the WAA (Table 4-7). A desktop wetland assessment was not completed outside of the 30 m TAA.

TABLE 4-7 Land Cover Classes Descriptions

Land Cover Class	Description
Pasture (Tame)	Agricultural land used for cattle grazing, no sign of annual or perennial cultivation in imagery reviewed, soil may have been broken at some point.
Grassland (Modified)	Area is dominated by grass species (50%), woody species cover is < 25% of the total area, no sign of agricultural activity (i.e., grazing or cultivation). Soil may have been broken but is in a perennial grass state at the time of land use mapping. Native grassland species may be present but are <30% of total ground cover.
Wooded (Coniferous Dominant)	Coniferous woody species (shrubs and trees) dominate 50% of total polygon area.
Wooded (Deciduous Dominant)	Deciduous woody species (shrubs and trees) dominate 50% of total polygon area.
Wooded (Mixedwood)	Mixed woody species (coniferous and deciduous) dominate 50% of total polygon area.
Water Body	Includes open form water bodies (e.g., open water >2 m deep, man-made water bodies, dugouts), and watercourses mapped in AltaLIS 20K watercourse base maps.
Unproductive	Areas that lack vegetation permanently, current land use is cleared, paved, or gravel. Some areas may have permanent infrastructure.

4.8.2 Existing Conditions

The predominant land cover classes in the WAA are water bodies (e.g., Ghost Lake and Bow River; 131 ha or 32%), modified grassland (88 ha or 22%), and unproductive (e.g., substation, campgrounds, residential area; 63 ha or 15%; Table 4-8; Figure 4-5).

TABLE 4-8 Land Cover Classes Within the Wildlife Assessment Area

Land Cover Class	Land Cover Class Area (Ha)	Proportion of WAA (%)
Tame Pasture	18	4
Modified Grassland	88	22
Wooded (Coniferous Dominant)	27	7
Wooded (Deciduous Dominant)	57	14
Wooded (Mixedwood)	24	6
Unproductive	63	15
Water Body	131	32
TOTAL	**408**	**100**

Note:
WAA – wildlife assessment area

Easting (m)

659000 659500 660000 660500 661000 661500

Northing (m)

5677500 5677000 5676500 5676000 5675500

Twp. 26

Rg. 6 Rg. 5

W5M

Range Road 60

Township Road 262A

Bow River

Spillway

Ghost Lake

Unproductive

Water Body

Grassland (Modified)

Wooded (Coniferous Dominant)

Wooded (Mixwood)

Wooded (Deciduous Dominant)

Pasture (Tame)

Project Footprint
Terrestrial Assessment Area - 30 m Buffer
Wildlife Assessment Area - 1,000 m Buffer
Shrubby Swamp
Land Cover
Environmentally Significant Area
Watercourse
Highway
Road

Reference: Environmentally Significant Areas provided by Fiera Biological Consulting Ltd. used under license. Data obtained from AbaLIS © Government of Alberta used under license. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

1:10,000 metres
100 0 100 200
NAD 1983 UTM Zone 11N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

TransAlta Corporation
WaterCharger Battery Energy Storage Facility

Project Area Land Cover

Date:	Project:	Submitter:	Reviewer:
November 2021	32868	J. Kemp	S. Brauer

Figure 4-5

ESAs represent places in Alberta that are 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 2014). The ESAs are an amalgamation of environmental datasets; indicators within each dataset are ranked based on multi-discipline criteria and presented at a quarter section resolution. ESAs are not protected by legislation; they are a tool for environmental planning through identification of potentially sensitive areas. The primary intended use of the ESA dataset is to inform land use and watershed planning for those areas identified as having high environmental significance (Fiera 2014). Two ESAs are within the WAA (Fiera 2014) but do not overlap the TAA.

Land within the WAA is designated Agricultural, General District as per the Rocky View County's land use bylaw (Rocky View County 2021). TransAlta has submitted a Re-designation application to Rocky View County requesting a Direct Control District (NEW) bylaw for the Project site to accommodate the operation of a battery energy storage project. The land in the Project footprint is currently leased and used for camping and livestock (horse) grazing and boarding.

The WAA is within the South Saskatchewan Regional Plan (SSRP) identified in the Alberta Land-Use Framework. The SSRP became effective on September 1, 2014, and was amended on May 31, 2018 (GoA 2018), and is a statement of policy to guide the Crown, decision-makers, and local government bodies in the planning region. TransAlta will comply with the SSRP and continue to adhere to all conditions of the approvals issued by AUC, and other regulatory bodies.

5 EFFECTS ASSESSMENT SUMMARY

Based on the environmental evaluation methods outlined in Section 3, each VC was assessed in relation to the proposed Project components and activities. The results of the environmental evaluation including potential effects, mitigation measures, residual effects, and evaluation parameters to determine the significance of residual effects for the VCs are summarized in Table 5-1.

As indicated in Table 3-1, air quality was excluded from the environmental evaluation as there are no emission sources anticipated as part of the Project during operations.

TABLE 5-1 Effects Assessment Summary

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
Soil and Terrain	Construction	Loss of topsoil and upper subsoil or reduction in soil quality	Erosion and Sediment Control (ESC) measures will be implemented during Project construction, until revegetated areas are stable, and erosion and sediment controls are no longer needed. These controls will include: • Where topsoil stripping is required, topsoil will be stockpiled 100 m from any water body and only used in final grading and revegetation. • If subsoil stripping is required, subsoil will be stored on previously stripped areas or geotextile material. Sufficient space (minimum of 1 m) will be left between the edge of the topsoil storage pile, the subsoil storage pile, and excavation areas, to ensure the materials do not slough into each other or back into the excavation. • Regularly maintain and/or clean (i.e., remove sediment accumulation from silt fencing or sediment traps) ESC measures for effectiveness. • If the winds are high such that visible wind erosion is occurring, and other mitigations are not practical and functional, soil handling activities will be postponed. All soils in the Project footprint have a moderate risk to wind erosion. • Soil salvage will be conducted during construction. Soils will be salvaged using appropriate excavation, handling, and stockpiling and will be used for reclamation. • Prior to construction, soil conditions (i.e., moisture levels) that may require special consideration or handling will be identified. • Where construction activities occur but stripping or grading is not required, the integrity of the sod and topsoil will be conserved through minimized fencing and working during frozen conditions. If work cannot be completed during frozen conditions, matting or geotextiles will be used.	Loss of topsoil and upper subsoil	Direction: Negative Magnitude: Low Duration: During reclamation cycle Frequency: Continuous Extent: Project footprint Reversibility: End-of-life Probability: High Confidence: High Significance: Not significant The loss of soil and reduction of soil quality from soil salvage during construction of the Project is considered negative as soil will be disturbed and potentially altered for construction and operation of the Project. The Project has been designed to minimize the area required for operations and therefore has reduced the area requiring soil salvage. The magnitude of residual effects is low if mitigation measures are implemented and adverse changes to the resource are controlled. The residual effect is continuous and will persist until the end of the reclamation cycle. The extent is restricted to the Project footprint. Residual effects are reversible at end-of-life during reclamation and are required to achieve equivalent land capability and reclamation certification. Probability and confidence are high as soil salvage and storage is required for Project construction.
Soil and Terrain	Construction	Reduction of soil quality from compaction due to construction equipment and machinery	• Prior to construction, soil conditions (i.e., moisture levels) that may require special consideration or handling will be identified. • During construction, direct employees and contractors/suppliers will remain within the designated Project construction area. If tracked or wheeled equipment is required outside of this area, low ground pressure tires, matting, or wide-pad tracks will be used. • Low ground pressure tires or wide-pad tracks will be used during construction to minimize ground disturbance. • Vegetation and soil disturbance will be minimized by restricting grading to the area required for the access and safe operation of equipment and vehicles. • If work cannot be completed during frozen conditions, matting or geotextiles will be used in areas identified to require special consideration or handling. • Operating construction vehicles during wet soil conditions or high rain fall events will be avoided when soil compaction may be increased. • Soil salvage will be paused during time of heavy rainfall.	Soil compaction during construction	Direction: Negative Magnitude: Low Duration: During reclamation cycle Frequency: Continuous Extent: Project footprint Reversibility: End-of-Life Probability: High Confidence: High Significance: Not significant Reduction in soil quality from compaction is considered negative as soil will be disturbed and potentially altered during construction and operation of the Project. The magnitude of residual effects is low if mitigation measures are implemented and adverse changes to the resource are controlled. The residual effect is continuous and will persist until the end of the reclamation cycle. The extent is restricted to the Project footprint. Residual effects are reversible at end-of-life during reclamation. Probability and confidence are high as construction will occur on subsoil.

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale

Soil and Terrain	Construction and Operation	Reduction of soil quality from accidental spills, leaks from battery modules or other equipment, or other releases of contaminants	Industry best management practices for spill prevention and spill response will be implemented to prevent or minimize the release of deleterious substances from construction machinery and the BESS equipment. Spill prevention measures will include:
			• Primary and secondary leak containment are integrated into the design of the battery cells, modules, and surrounding metal enclosures:
			  ○ Individual battery cells contain an electrolyte in a viscous gel or paste. The cell contains the electrolyte, the anode/cathode, and separator. The cell itself is fully enclosed. The individual cells are contained in a fully sealed module.
			  ○ The module itself will provide primary containment in the unlikely event a cell were to leak electrolyte.
			  ○ The modules are contained in racks, with the racks being placed inside a sealed, NEMA-rated enclosure (container). The enclosure would provide further secondary containment to the cells/modules.
			• Emergency spill kits will be kept onsite at designated centralized areas and will contain at a minimum, the following:
			  ○ personal protective equipment
			  ○ sorbent pads or dikes and shovels
			  ○ emergency contact list for appropriate agencies
			  ○ flashlights
			• Secondary containment (drip trays) will be used to prevent leaks of contaminants into soil during servicing.
			• Bulk fuel, servicing vehicles, and vehicles with box-mounted fuel tanks will carry spill prevention, containment, and spill cleanup materials appropriate to clean up a spill to the volume of fuels or hazardous materials they contain.
			• Heavy equipment and light vehicles will have access to spill cleanup materials.
			• All fuel transfer vehicles will have spill kits, and additional spill kits will be located at designated centralized areas.
			• All fuel tanks will comply with environmental standards. Fuel tanks will be installed and maintained in an approved manner under appropriate regulation with all necessary containment, drip collection, nozzle requirements, and spill kits.
			• An impervious barrier will be used underneath equipment and vehicles when servicing and refueling.
			• All hazardous materials will be stored and secured in approved containers and labelled according to Workplace Hazardous Materials Information System (WHMIS) and Transportation of Dangerous Goods (TDG) regulations. All safety data sheets (SDS) will be available for each product stored onsite, and all oils, grease, gasoline, diesel, and other hazardous materials will be stored at least 100 m away from any wetland, drainage, or other water body. All hazardous waste and waste materials will be stored in a secure designated area (laydown yard), away from environmentally sensitive features.
			• All hazardous and waste materials will be disposed of regularly, in approved containers or waste facility. This may include regional
				No predicted residual effects
				
				Due to the proposed spill prevention measures, the likelihood of a spill is low and immediate response would limit the extent of contamination and would be immediately cleaned up.
					Not applicable

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			landfills, recycling centres, construction/demolition disposal or recovery sites, product suppliers, and/or hazardous waste management facilities. During construction, fuel, lubricating fluids, hydraulic fluids, antifreeze, herbicides, biocides, or other chemicals will not be released on the ground or into any wetland. All garbage will be collected and disposed of in an appropriate manner. • In the event of a spill, the containment, cleanup, remediation, disposal, and reporting of all spills of waste / hazardous waste materials will be completed as promptly as possible. • If the spill exceeds the threshold for mandatory reporting, the spill will be reported to the Alberta Environmental hotline 1-800-222-6514 (24-hour emergency line) or 1-877-944-0313 (non-emergency inquiries) to self-report a spill, release, or environmental emergency.		

Surface Water	Construction and operation	Reduction of water quality from accidental spills, leaks from battery modules or other equipment, or other releases of contaminants	• Primary and secondary leak containment are integrated into the design of the battery cells, modules, and surrounding metal enclosures:
			  ○ Individual battery cells contain an electrolyte in a viscous gel or paste. The cell contains the electrolyte, the anode/cathode, and separator. The cell itself is fully enclosed. The individual cells are contained in a fully sealed module.
			  ○ The module itself will provide primary containment in the unlikely event a cell were to leak electrolyte.
			  ○ The modules are contained in racks, with the racks being placed inside a sealed, NEMA-rated enclosure (container). The enclosure would provide further secondary containment to the cells/modules.
			• Emergency spill kits will be kept onsite at designated centralized areas and will contain at a minimum, the following:
			  ○ personal protective equipment
			  ○ sorbent pads or dikes and shovels
			  ○ emergency contact list for appropriate agencies
			  ○ flashlights
			• Equipment used in and near watercourses will be mechanically sound, having no leaking fuel tanks or hydraulic systems or unmanaged seeping mechanical parts.
			• Designated fueling stations and storage areas (for any hazardous materials) will be located at least 100 m from any watercourse, wetland, known groundwater source or private well.
			• Vehicle fueling will occur at least 100 m from any watercourse or wetland.
			• Construction material, excess material, construction debris, and empty containers will be stored at least 30 m away from the banks of watercourses.
				No predicted residual effects
				
				Due to the proposed spill prevention measures, the likelihood of a spill is low and immediate response would limit the extent of contamination and would be immediately cleaned up.
					Not applicable

Surface Water, Fish and Fish Habitat	Construction	Reduction of water quality or stress to fish from deleterious substances	• TransAlta and the Construction Contractor will ensure no noticeable soil erosion or significantly increased levels of suspended sediment in any watercourse above background levels. • Any exposed, erodible soil within 30 m of a watercourse will be stabilized at the end of each working day, as appropriate, and permanently stabilized upon completion of construction.	No predicted residual effects. No instream work is proposed, and the mitigation and preventative measures will limit soil erosion into the adjacent watercourse.	Not applicable

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			• There will be regular inspection of all sediment and erosion control measures on a weekly basis during construction and before (if reasonably predicted) and after rain events. • Equipment necessary for ESC measures will be onsite during construction to address high precipitation events, or increases in water levels (e.g., spillway water release) and additional requirements that may be anticipated to arise. • Excavated soils or other material near the streambank will be stabilized with suitable materials to prevent erosion and subsequent potential sediment deposition into the watercourse.		
Fish and Fish Habitat	Construction	Spread of whirling disease (i.e., disease affecting salmonid species) from equipment, vehicles, or machines working in water during a potential high-water event in the watercourse south of the Project footprint.	• Construction operations when working in or near water will follow the protocol outlined in Appendix D: Decontamination Instructions for Industrial and Construction operations in the *Decontamination Protocol For Work In or Near Water* (AEP 2020b. Equipment and machinery from within Alberta require Level 1 decontamination to be used at site or to leave the site. If equipment and machinery is brought in from outside the province it requires Level 3 decontamination.	No predicted residual effects. Due to the decontamination protocols and prevention measures, the likelihood of transferring whirling disease to another watershed is low and would limit the extent of contamination.	Not applicable

Groundwater	Construction and operation	Reduction of groundwater quality from accidental spills, leaks from battery modules or other equipment, or other releases of contaminants	Industry best management practices for spill prevention and spill response will be implemented to prevent or minimize the release of deleterious substances from construction machinery and the BESS equipment. Spill prevention measures will include:
			• Primary and secondary leak containment are integrated into the design of the battery cells, modules, and surrounding metal enclosures:
			  ○ Individual battery cells contain an electrolyte in a viscous gel or paste. The cell contains the electrolyte, the anode/cathode, and separator. The cell itself is fully enclosed. The individual cells are contained in a fully sealed module.
			  ○ The module itself will provide primary containment in the unlikely event a cell were to leak electrolyte.
			  ○ The modules are contained in racks, with the racks being placed inside a sealed, NEMA-rated enclosure (container). The enclosure would provide further secondary containment to the cells/modules.
			• Emergency spill kits will be kept onsite at designated centralized areas and will contain at a minimum, the following:
			  ○ personal protective equipment
			  ○ sorbent pads or dikes and shovels
			  ○ emergency contact list for appropriate agencies
			  ○ flashlights
			• Secondary containment (drip trays) will be used to prevent leaks of contaminants into soil during servicing.
			• Designated fueling stations and storage areas (for any hazardous materials) will be located at least 100 m from any watercourse, wetland, known groundwater source or private well.
			• Bulk fuel, servicing vehicles, and vehicles with box-mounted fuel tanks will carry spill prevention, containment, and spill cleanup materials appropriate to clean up a spill to the volume of fuels or hazardous materials they contain.
				No predicted residual effects
				
				Due to the proposed spill prevention measures, the likelihood of a spill is low and immediate response would limit the extent of contamination and would be immediately cleaned up.
					Not applicable

Groundwater	Construction and operation	Changes to groundwater quality due to preferential contaminant flow pathway created in disturbed zone in direct contact with piles driven into the ground.		No predicted residual effects. Due to the proposed spill prevention measures, the likelihood of a spill is low and immediate response would limit the extent of contamination and would be immediately cleaned up.	Not applicable

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			• Heavy equipment and light vehicles will have access to spill cleanup materials. • All fuel transfer vehicles will have spill kits, and additional spill kits will be located at designated centralized areas. • All fuel tanks will comply with environmental standards. Fuel tanks will be installed and maintained in an approved manner under appropriate regulation with all necessary containment, drip collection, nozzle requirements, and spill kits. • An impervious barrier will be used underneath equipment and vehicles when servicing and refueling. • All hazardous materials will be stored and secured in approved containers and labelled according to WHMIS and TDG regulations. All SDS will be available for each product stored onsite, and all oils, grease, gasoline, diesel, and other hazardous materials will be stored at least 100 m away from any wetland, drainage, or other water body. All hazardous waste and waste materials will be stored in a secure designated area (laydown yard), away from environmentally sensitive features. • All hazardous and waste materials will be disposed of regularly, in approved containers or waste facility. This may include regional landfills, recycling centres, construction/demolition disposal or recovery sites, product suppliers, and/or hazardous waste management facilities. During construction, fuel, lubricating fluids, hydraulic fluids, antifreeze, herbicides, biocides, or other chemicals will not be released on the ground or into any wetland. All garbage will be collected and disposed of in an appropriate manner. • In the event of a spill, the containment, cleanup, remediation, disposal, and reporting of all spills of waste / hazardous waste materials will be completed as promptly as possible. • If the spill exceeds the threshold for mandatory reporting, the spill will be reported to the Alberta Environmental hotline 1-800-222-6514 (24-hour emergency line) or 1-877-944-0313 (non-emergency inquiries) to self-report a spill, release, or environmental emergency.		
Groundwater	Construction	Changes to groundwater quantity (dewatering of the excavation area, reduction in or obstruction of horizontal flow across the area of the aquifer with the driven piles, which can reduce groundwater flow to areas downstream of the Project Footprint	• Prior to construction, groundwater conditions (i.e., groundwater levels, presence of perched water table and depth to bedrock) will be assessed as a part of geotechnical investigation to determine the potential risk of encountering groundwater during excavations. • If groundwater is encountered in the excavation areas for foundations, cable and wires, water will be pumped onto stable well-vegetated areas or into settling ponds, filter bags, tarpaulins, sheeting, rocks, sand bags, or other appropriate sediment filtering devices in a manner that does not cause erosion or sediment to re-enter a water body in accordance with Directive 055: Storage Requirements for the Upstream Petroleum Industry (ERCB 2001). • Obtain approval from the Environment Monitor for the location of all water discharge locations. • Ensure pumps are placed above ordinary high-water mark on an impermeable barrier. • Ensure pumps are stabilized and have the capacity and hoses are of adequate length to allow excavation water to be discharged at the	Reduction of groundwater flow to the area downgradient of the Project Footprint	Direction: Negative Magnitude: Low Duration: Short-term Frequency: Isolated Extent: Local Reversibility: Short-term Probability: Low Confidence: Low Significance: Not significant Reduction in groundwater quantity is considered negative due to direct impact of the groundwater diversion due to dewatering of excavation area. The magnitude of residual effects is low if mitigation measures are implemented and adverse changes to the resource are controlled. The residual effect is short-term and will persist until the end of the construction phase. The extent is restricted to the

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			desired location(s). • Avoid placing pumps within 50 m of a watercourse, drainage, wetland, or water body. • Monitor the water discharge site to ensure that erosion, saturation of the discharge site or flooding does not occur. Suspend dewatering and apply erosion control measures, reduce the flow, or move the discharge site if it appears that the above effects could occur.		Project footprint and local areas downgradient of Project footprint. Residual effects are reversible at end of construction phase, no long-term changes in water balance are expected due to the infiltration of the pumped-out water in the discharge areas. Probability is low based on the hydrogeological site setting indicating position of water table anticipated below expected excavations and piles depth. Confidence is low due to uncertainty in water table position within the Project footprint (will be assessed as part of geotechnical investigation).
Wetlands and Water bodies	Construction and Operation	Changes to water quality and quantity within the wetland	• The wetland within the TAA is outside of the Project footprint and will not have direct impacts from Project construction or operations. No construction activities will occur within a wetland. • Construction and related activities will be limited to within the Project footprint. • The Construction Manager will confirm any flagging required for environmental protection (e.g., wetland boundary, archaeological resources) is completed prior to commencement of construction. • An undisturbed vegetated buffer strip, ideally 10 m in width, should be maintained around the wetland south of the Project footprint, if possible, to provide avoidance of unintentional direct impacts. The boundaries of the vegetation buffer will be flagged. • If the 10 m vegetation buffer is not required and not flagged, the boundaries of the wetland located south of the Project footprint will be flagged to alert Contractors to the presence of the wetland. • Equipment used in and near watercourses or wetlands will be mechanically sound, having no leaking fuel tanks or hydraulic systems or unmanaged seeping mechanical parts. • Construction machinery will be cleaned of mud and vegetation prior to entering and leaving wetlands within the construction area during groundbreaking activities (e.g., grubbing and grading), to minimize the spread of invasive plant species. • Temporary ancillary elements requiring additional lands not identified during wetland investigations will be surveyed for wetlands prior to disturbance. • All ESC measures will be prepared in advance of construction and will be implemented and monitored to manage runoff from construction areas. • TransAlta and the Construction Contractor will ensure no noticeable soil erosion or significantly increased levels of suspended sediment in any wetland above background levels. • Any exposed, erodible soil within 30 m of a wetland will be stabilized (mulched) at the end of each working day, as appropriate, and permanently stabilized upon completion of construction. • New drainage channels will be routed away from wetland areas. • Designated fueling and storage areas will be at least 100 m from wetlands. • Equipment maintenance and refueling required in the field will not occur within 30 m of a wetland.	No predicted residual effects. Due to avoidance of the wetland and implementation of additional mitigation measures, no residual effects are anticipated.	Not applicable

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			• Regularly maintain and/or clean (i.e., remove sediment accumulation from silt fencing or sediment traps) ESC measures for effectiveness. • ESC measures will be inspected on a regular basis to identify areas in need of repair or further mitigation. • Inspections will occur after each significant rainfall event or weekly, whichever is more frequent, and complete deficiencies such as repair, cleaning, or additional ESC measures, will be completed or installed in a timely manner.		
Wetlands and Water bodies	Construction and Operation	Change in wetland vegetation community structure	• No construction activities will occur within a wetland. The wetland within the TAA is outside of the Project footprint and will not have direct impacts from Project construction or operations. • Construction and related activities will be limited to within the Project footprint. • An undisturbed vegetated buffer strip, ideally 10 m in width, should be maintained around the wetland south of the Project footprint, if possible, to provide avoidance of unintentional direct impacts. The boundaries of the vegetation buffer will be flagged. • If the 10 m vegetation buffer is not required and not flagged, the boundaries of the wetland located south of the Project footprint will be flagged to alert Contractors to the presence of the wetland.	No predicted residual effects. Due to avoidance of the wetland and implementation of additional mitigation measures, no residual effects are anticipated.	Not applicable
Vegetation Species and Communities	Construction and Operation	Spread and establishment of weedy species	• Inform contractors about the importance of weed control and their responsibilities, as well as which species are present onsite. • Complete equipment cleaning and disinfection best management practices prior to the transport of equipment and machinery to the Project. • Vehicles and equipment will use only designated roadways and access routes during construction. • Equipment shall not be used or moved if there is a risk to spreading noxious weeds or prohibited noxious weeds. • Construction contractors will not use lands outside the Project footprint for construction activities without TransAlta approval. • Weed inspection forms will be completed by contractors and periodically submitted to the County, if required, by the Environmental Monitor. • Revegetate soil stockpiles as soon as possible with species that provide erosion control. • A certified weed-free mix must be used during the reclamation of disturbance caused from construction activities. • Complete regular inspections of the site (late spring and mid-summer) to assess weed presence during construction. • Any prohibited noxious weeds identified during construction activities (and operations) will be destroyed as per the *Weed Control Act*. • Control of weeds will occur through a variety of approaches (cultural, mechanical, biological, chemical) depending on the specific plant species infestation and timing during the Project's life. • Weed control will be timely (i.e., will occur within the same growing season and at the appropriate growth stage for the species) and records of weed control activities will be kept.	Spread and establishment of weedy species in TAA.	Direction: Negative Magnitude: Low Duration: During reclamation cycle Frequency: Continuous Extent: Local Reversibility: End-of-life Probability: High Confidence: High Significance: Not significant An increase in weed populations or spreading of weeds is possible due to the current presence of noxious weeds in the TAA and the effect would be negative in direction with a high probability and high confidence of occurring. With implementation of proposed weed management measures, the magnitude will be low. Weed management will be required during construction and operations of the Project (continuous frequency) and will impact the TAA (local). This effect is reversible at end-of-life with reclamation to equivalent land capability.

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			• During weed control, reduce uncontrolled overspray and unnecessary damage to native vegetation.		
Vegetation Species and Communities	Construction	Loss or alteration of native vegetation cover	• Contractor(s) will flag the clearing limits prior to clearing activity. • Contractor(s) will not clear trees or other vegetation outside of flagged clearing limits. • During construction, direct employees and contractors/suppliers will remain within the designated Project construction area. If tracked or wheeled equipment is required outside of this area, low ground pressure tires, matting, or wide-pad tracks will be used. • Project footprint will be reclaimed to equivalent land capability at end-of-life.	Loss of native vegetation cover (2.6 ha; 4.6% reduction in native vegetation communities in the WAA)	Direction: Negative Magnitude: Low Duration: During reclamation cycle Frequency: Continuous Extent: Project footprint Reversibility: End-of-life Probability: High Confidence: High Residual Effect: Not significant with implementation of mitigation measures and reclamation to equivalent land capability at end-of-life. The loss or alteration of native vegetation cover during Project construction is considered negative in direction with high probability and high confidence. The magnitude is low because all Project related disturbance will occur within the extent of the small Project footprint and there is a small (4.6%) reduction in native vegetation communities within 1 km of the Project footprint as a result of the Project. The effect will be continuous until the post reclamation stage. The effect will be reversed at Project end-of-life during reclamation.

Vegetation Species and Communities	Construction and Operation	Reduction of vegetation cover and/or health due to accidental spills, leaks from battery modules or other equipment, or other releases of contaminants on vegetation	Industry best management practices for spill prevention and spill response will be implemented to prevent or minimize the release of deleterious substances from construction machinery and the BESS equipment. Spill prevention measures will include:
			• Primary and secondary leak containment are integrated into the design of the battery cells, modules, and surrounding metal enclosures:
			  ○ Individual battery cells contain an electrolyte in a viscous gel or paste. The cell contains the electrolyte, the anode/cathode, and separator. The cell itself is fully enclosed. The individual cells are contained in a fully sealed module.
			  ○ The module itself will provide primary containment in the unlikely event a cell were to leak electrolyte.
			  ○ The modules are contained in racks, with the racks being placed inside a sealed, NEMA-rated enclosure (container). The enclosure would provide further secondary containment to the cells/modules.
			• Emergency spill kits will be kept onsite at designated centralized areas and will contain at a minimum, the following:
			  ○ personal protective equipment
			  ○ sorbent pads or dikes and shovels
			  ○ emergency contact list for appropriate agencies
			  ○ flashlights
			• Bulk fuel, servicing vehicles, vehicles with box-mounted fuel tanks will carry spill prevention, containment, and spill cleanup materials appropriate to clean up a spill to the volume of fuels or hazardous
				No predicted residual effects
				
				Due to the small size of the Project, the limited amount of equipment onsite, and the proposed spill prevention measures, the likelihood of a spill is low and immediate response would limit the extent of contamination and would be immediately cleaned up.
					Not applicable

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			materials they contain. • Heavy equipment and light vehicles will have access to spill cleanup materials. • All fuel transfer vehicles will have spill kits, and additional spill kits will be located at designated centralized areas. • All fuel tanks will comply with environmental standards. Fuel tanks will be installed and maintained in an approved manner under appropriate regulation with all necessary containment, drip collection, nozzle requirements, and spill kits. • An impervious barrier will be used underneath equipment and vehicles when servicing and refueling. • All hazardous materials will be stored and secured in approved containers and labelled according to WHMIS and TDG regulations. All SDS will be available for each product stored onsite, and all oils, grease, gasoline, diesel, and other hazardous materials will be stored at least 100 m away from any wetland, drainage, or other water body. All hazardous waste and waste materials will be stored in a secure designated area (laydown yard), away from environmentally sensitive features. • All hazardous and waste materials will be disposed of regularly, in approved containers or waste facility. This may include regional landfills, recycling centres, construction/demolition disposal or recovery sites, product suppliers, and/or hazardous waste management facilities. During construction, fuel, lubricating fluids, hydraulic fluids, antifreeze, herbicides, biocides, or other chemicals will not be released on the ground or into any wetland. All garbage will be collected and disposed of in an appropriate manner. • In the event of a spill, the containment, cleanup, remediation, disposal, and reporting of all spills of waste / hazardous waste materials will be completed as promptly as possible. • If the spill exceeds the threshold for mandatory reporting, the spill will be reported to the Alberta Environmental hotline 1-800-222-6514 (24-hour emergency line) or 1-877-944-0313 (non-emergency inquiries) to self-report a spill, release, or environmental emergency.		
Wildlife species and habitat	Construction	Disturbance of migratory and nesting birds	• Construction activities that pose a high risk to nesting birds (e.g., mowing ground vegetation and clearing shrubs and trees) will be conducted outside of the raptor nesting period (March 15 through July 15; ESRD 2013b) and the migratory bird nesting period (Zone B4; April 15 to August 31; ECCC 2018). • If construction occurs within these windows, a nest sweep will be conducted no more than 7 days prior to construction to identify active nests. • If an active nest is found, it will be subject to site-specific mitigation measures. Measures may include a protective nest setback, modifying the construction schedule to avoid activities until fledging has concluded, or non-intrusive nest monitoring. • Work will be conducted in compliance with the *Migratory Birds Convention Act*. • In case of persistent wildlife encounters, TransAlta personnel shall notify AEP of the situation.	Disturbance of nesting birds	Direction: Negative Magnitude: Low Duration: Short-term Frequency: Isolated Extent: Local Reversibility: Reversible in the short-term Probability: Low Confidence: Moderate Significance: Not significant with implementation of mitigation measures Due to the small size of the Project and the timeline for mowing ground vegetation (September or October 2022) and shrub and tree clearing (winter 2022/2023), there is a low probability of occurrence. The magnitude is low since disturbance of nesting birds would be limited in number

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
					and extent due to the proposed mitigation to mow and clear outside the sensitive raptor and migratory bird nesting periods. The frequency is isolated as it is associated with a specific Project activity (construction), and the extent would be limited to the local area. The effect is rated as short-term based on construction timelines. Impacts to nesting birds would be reversible in the short-term and is dependent on implementation of mitigation.
Wildlife species and habitat	Construction	Wildlife mortality or injury	• A wildlife sweep for important wildlife features (e.g., amphibian species at risk breeding sites, overwintering dens) will be conducted prior to clearing during appropriate seasonal timing to understand the status of any features identified. During sensitive periods (i.e., raptor and migratory bird nesting periods in spring and summer) the wildlife sweep should be completed within 7 days of construction activities. In less sensitive seasons (i.e., fall and winter), the wildlife sweep can be completed at a more flexible schedule (i.e., generally within 10 days of construction activities). If important habitat features are identified, additional site-specific mitigation measures may be required. • Based on available snake hibernacula habitat adjacent to the south and west of the Project footprint and the observation of a snake at site, a snake hibernacula survey should be conducted in the spring (typically late-April) prior to the start of construction to survey for active snake hibernacula. Snake hibernacula can have a year-round setback of up to 200 m at this site (Boukall 2021b, Pers. Comm.). • If a snake hibernacula is found during the snake hibernacula survey or snake mortality become a concern at site, TransAlta will implement measures from the snake protection plan from the Project-specific environmental protection plan (Appendix E of the EPP; Matrix 2021). • A beaver lodge was observed within 100 m of the Project footprint during the wildlife surveys. The activity status of the lodge could not be determined at the time of the survey. If the beaver lodge is determined active during subsequent pre-construction surveys, a setback of 100 m may apply. • One inactive stick nest was observed in the Project footprint during wildlife surveys. The species and activity status could not be determined at time of survey. If the nest is determined active during subsequent pre-construction surveys, a setback of 100 m to 1,000 m may apply, depending on species use. • The inactive stick nest in the Project footprint can be removed while it is unoccupied as per AEP direction (Boukall 2021b, Pers. Comm.). The nest is unlikely to be occupied prior to the start of the raptor nesting period on March 15. • One den was observed in the Project footprint. Use of the den by coyotes was observed; however, based on the timing of observations (e.g., November), the den is not currently an active natal den. If the den is determined to be active during subsequent pre-construction surveys, a setback of 100 m may apply while the den is active (AEP	Wildlife mortality or injury	Direction: Negative Magnitude: Low Duration: Short-term Frequency: Isolated Extent: Local Reversibility: Reversible in the short-term Probability: Low Confidence: High Significance: Not significant with implementation of mitigation measures Due to the small size of the Project and the timeline for construction, there is a low probability of occurrence. The magnitude is low since wildlife mortality would be limited in number and extent due to the proposed mitigation. The frequency is isolated as it is associated with a specific Project activity (construction), and the extent would be limited to the local area. The effect is rated as medium-term based on construction timelines. Wildlife mortality or injury would be reversible in the short-term and is dependent on implementation of mitigation.

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
			2021d). If the den is determined to be inactive, a setback is not required (Boukall 2021b, Pers. Comm.). • Based on the current footprint, all potential Crown owned land to be crossed during Project construction is within 100 m of existing arterial all-weather roads. Therefore, adherence to the timing restriction for the Key Wildlife and Biodiversity Zone (i.e., January 15 to April 30) is not required, provided that ground conditions during construction are favorable. Construction may continue until adverse ground conditions are encountered. • On private land, clearing activities within the Key Wildlife and Biodiversity Zone will be scheduled outside of the timing restriction of January 15 to April 30, where practicable. • All parties onsite must carry out their garbage and food debris daily (to limit wildlife encounters), avoid obstruction of access trails, and take all necessary precautions to prevent pollution or obstruction of watercourses. • Prominent “Stop” signage will be installed at intersections, where not already present. • Project construction personnel will not harass, feed, or interact with wildlife. • In case of persistent wildlife encounters, TransAlta personnel shall notify AEP of the situation. • In the event of a spill, the containment, cleanup, remediation, disposal, and reporting of all spills of waste / hazardous waste materials will be completed as promptly as possible. • If the spill exceeds the threshold for mandatory reporting, the spill will be reported to the Alberta Environmental hotline 1-800-222-6514 (24-hour emergency line) or 1-877-944-0313 (non-emergency inquiries) to self-report a spill, release, or environmental emergency. • Project related wildlife injury or mortality (e.g., wildlife vehicle collisions) will be reported to the appropriate regulators (e.g., AEP, ECCC).		

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
Wildlife Species and Habitat	Construction	Avoidance or disturbance of wildlife species from temporary noise	• When possible, construction activities will be scheduled to occur during daylight hours to avoid excessive noise and/or light disturbances to wildlife. • All equipment will be maintained in good working order, including noise suppression equipment. • Heavy machinery will have noise abatement equipment installed. • Impulsive sources (e.g., hammering and pile driving, if required) will be avoided at night and in the early morning, Sundays, holidays, and on weekends during summer months (June through August).	Avoidance or disturbance of wildlife species from temporary noise	Direction: Negative Magnitude: Low Duration: Short-term Frequency: Isolated Extent: Local Reversibility: Reversible in the short-term Probability: Low Confidence: High Significance: Not significant with implementation of mitigation measures Due to the timeline for construction, there is a low probability of occurrence. The magnitude is low since avoidance or disturbance to wildlife species would be limited in number and extent due to the proposed mitigation. The frequency is isolated as it is associated with a specific Project activity (construction), and the extent would be limited to the local area. The effect is rated as short-term based on construction timelines. Avoidance or disturbance would be reversible in the short-term and is dependent on implementation of mitigation
Wildlife Species and Habitat	Operation	Avoidance or disturbance of wildlife species from intermittent equipment noise	• Sound levels during Project operation have been predicted to be below the AUC Rule 012 permissible sound levels.	Avoidance or disturbance of wildlife species from intermittent equipment noise	Direction: Negative Magnitude: Low Duration: end-of-life Frequency: Periodic Extent: Local Reversibility: Reversible at end-of-life Probability: High Confidence: High Significance: Not significant with implementation of mitigation measures The predicted noise sound levels are below the AUC Rule 012 permissible sound levels, so there is a high probability of occurrence. The magnitude is low since the predicted noise sound levels are expected to be low. The frequency is periodic, and the extent would be limited to the local area. The effect is rated as end-of-life as the effect will persist throughout operations. Avoidance or disturbance would be reversible at end-of-life and is dependent on implementation of mitigation.

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
Wildlife Species and Habitat	Construction	Disturbance to wildlife from light pollution	• Construction site lighting and building lights used during construction of the Project will be minimized, where possible, while also considering safety requirements.	Disturbance to wildlife from light pollution	Direction: Negative Magnitude: Low Duration: Short-term Frequency: Isolated Extent: Local Reversibility: Reversible in the short-term Probability: High Confidence: High Significance: Not significant with implementation of mitigation measures Due to the limited equipment and lighting during construction, there is a high probability of occurrence. The magnitude is low since there will be limited lighting onsite. The frequency is isolated as it is associated with a specific Project activity (construction), and the extent would be limited to the local area. The effect is rated as short-term based on construction timelines. Disturbance would be reversible in the short-term and is dependent on implementation of mitigation.
Wildlife Species and Habitat	Operation	Disturbance to wildlife from light pollution	• Facility site lighting and building lights used during operations of the Project will be minimized and down shielded, where possible, while also considering safety requirements.	Disturbance to wildlife from light pollution	Direction: Negative Magnitude: Low Duration: End-of-life Frequency: Continuous Extent: Local Reversibility: Reversible at end-of life Probability: High Confidence: High Significance: Not significant with implementation of mitigation measures Due to the limited equipment and lighting onsite, there is a high probability of occurrence. The magnitude is low since there will be limited lighting onsite. The frequency is continuous, and the extent would be limited to the local area. The effect is rated as end-of-life as the effect will persist throughout operations. Disturbance would be reversible at end-of-life and is dependent on implementation of mitigation.

Valued Component	Project Activity	Potential Effects	Mitigation Measures	Residual Effects	Residual Effect Rating and Significance Rationale
Historical Resources	Construction	Loss of or damage to historical resources from ground disturbance or compaction	• A HRIA was completed for the Project on November 25 and 26, 2021 under Permit 21-207. There were no findings that warranted the delineation of a historical site or further work at the site. *Historical Resource Act* approval will be recommended by the historic resources consultant that completed the HRIA and the results of the HRIA will be reported to ACMSW in December 2021. • Any temporary or permanent ancillary elements required for the Project that are not within the Project footprint, and that have not yet been identified, will be subject to an archaeological survey prior to their development. • If, at any time during construction, objects of potential archaeological significance or skeletal remains are uncovered, the Construction Manager will be notified immediately. All work shall cease in the immediate area of discovery. • TransAlta and the Construction Manager will then notify ACMSW. If the discovery includes human skeletal remains, the nearest detachment of the RCMP or municipal police force will also be contacted. If the artifacts are determined to be aboriginal in nature, then a representative of the local First Nations will be contacted. • A 5 m protective barrier (fence) will be established around the find. If any additional groundbreaking work within a 10 m buffer of the find is necessary, then monitoring of this activity by a Permitted Archaeologist will be required.	No predicted residual effects A HRIA has been conducted for the Project footprint and there were no findings that warranted the delineation of a historical site or further work at the site. *Historical Resource Act* approval will be recommended for the site and HRIA reporting will be submitted to ACMSW in December 2021.	
Land Use and Environmentally Significant Areas	Construction and Operation	Restrictions on occupant's use of land for camping and livestock boarding and grazing	• TransAlta will continue to lease the portion of the quarter section that is outside the Project footprint until the lease expires.	Restricted access to land for camping and livestock boarding and grazing	Direction: Negative Magnitude: Low Duration: End-of-life Frequency: Continuous Extent: Project footprint Reversibility: Reversible at the end of reclamation cycle Probability: High Confidence: High Residual Effect: Not significant Although the Project footprint is on landed currently owned by TransAlta, the land is currently leased and being used by the lessee for camping and livestock (horse) boarding and grazing. These activities will no longer be possible in the Project footprint during construction and operation; therefore, the effect is negative. The magnitude of the effect is low since the lessee can camp elsewhere and move livestock to other grazing or boarding areas and is not the owner of the Project footprint land. TransAlta will continue to lease the portion of the leased land that is outside the Project footprint. The Project footprint will be returned to an equivalent land use after reclamation and could then be used for livestock grazing and boarding so the effect is reversible at the end of reclamation.

6 CONCLUSION

The Project is not expected to have a significant adverse impact on environmental features. This evaluation has considered the potential environmental effects, mitigation, and monitoring that would apply to Project construction and operation activities, and the potential and residual effects identified were determined to be not significant. The Project will be developed on private land owned by TransAlta. There are no watercourses, water bodies, wetlands, rare plant species, or RECs in the Project footprint.

Potential impacts to terrain and soils will be minimized through implementation of mitigation measures such as salvaging topsoil and upper subsoil from the site for use during site reclamation, and postponing work under wet or windy conditions. There are predicted residual effects for terrain and soil. Loss of topsoil and upper subsoil and soil compaction within the Project footprint are predicted to be of low magnitude and not significant.

Potential impacts to terrain and groundwater will be minimized through implementation of mitigation measures such as pumping groundwater from excavation areas and trenches to heavily vegetated areas to allow groundwater to be reintroduced into the groundwater table without the risk of overland travel. There is a predicted residual effect for groundwater for reduction of groundwater flow to the area downgradient of the Project footprint; however, the magnitude of this residual effect is predicted to be of low magnitude and not significant.

Potential impacts to vegetation species and communities will be minimized through implementation of mitigation measures such as educating contractors about the importance of weed control, proper equipment cleaning, working only within the Project footprint, revegetation of stockpiles, and using certified weed-free mix. There are predicted residual effects for vegetation species and communities. Spread and establishment of weedy species and the loss of native vegetation cover are predicted to be of low magnitude and not significant.

Potential impacts to wildlife species and habitat will be minimized through implementation of mitigation measures such as vegetation clearing occurring outside of specific wildlife timing windows, conducting pre-construction sweeps, following the *Migratory Birds Convention Act*, reduction of equipment noise, and type of facility lights used for operation. There are predicted residual effects for wildlife species and habitat. Disturbance of nesting birds, wildlife mortality and injury, avoidance, or disturbance of wildlife species from temporary noise and intermittent equipment noise, and disturbance to wildlife from light pollution are predicted to be of low magnitude and not significant.

There is a predicted residual effect for land use. Restricted access to land in the Project footprint for camping and livestock boarding and grazing is predicted to be of low magnitude and not significant.

There are no predicted residual effects for surface water, fish and habitat, wetlands and waterbodies, and historical resources.

7 REFERENCES

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APPENDIX A
Environmental Evaluation Team

APPENDIX A: ENVIRONMENTAL EVALUATION TEAM

TABLE A-1 Qualifications of the Environmental Evaluation Technical Team

Name and Credentials	Role	Qualifications
Brett Robbie, C.E.T.	Project manager and author for the environmental evaluation.	Over 10 years of environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects.
Medina Hansen, M.Sc., PMP	Technical accountable for the Project. Completed the scoping and technical review of the environmental evaluation.	Over 26 years of experience in the environmental field and 16 years of environmental consulting experience. Previous experience managing and directing power project applications regulated by the Alberta Utilities Commission (AUC) and experience providing technical review of multiple AUC Rule 007 applications and environmental evaluation reports.
Claire MacMillan, B.Sc., A.I.T.	Discipline lead and author for the soil and terrain section of the environmental evaluation.	Over 2 years of experience in environmental consulting experience working on predisturbance soil and terrain assessments on similar environmental assessments, evaluation and monitoring projects.
Adam Rathier, B.Sc., P. Biol., R.P.Bio.	Discipline lead and author for the surface water and fish and fish habitat sections of the environmental evaluation.	Over 10 years of environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects.
Polina Abdrakhimova, Ph.D.	Discipline lead and author for the groundwater section of the environmental evaluation.	Over 7 years of research experience in the environmental field and 1 year of environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects.
Shilo Brauer, M.Sc., P. Biol.	Discipline lead and author for the wetlands and vegetation and communities sections of the environmental evaluation.	Over 10 years of environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects.
Corey Corbett, M.Sc., R.P.Bio., P.Biol.	Discipline lead and author for the wildlife species and habitat section of the environmental evaluation.	Over 11 years of environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects.
Sean Dawson, M.Sc., P.Eng.	Discipline lead and author for the air quality section of the environmental evaluation.	Over 12 years of research and environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects.

Name and Credentials	Role	Qualifications
Tyler Hodgson, P.Ag.	Discipline lead and author for the land use and environmentally significant areas section of the environmental evaluation.	Over 11 years of environmental consulting experience working on similar environmental assessments, evaluation, and monitoring projects. Authored multiple land use assessments for various project types including oil and gas, transmission lines, and pipelines.

APPENDIX B
Wildlife Species at Risk Potentially Occurring in the Region

TABLE B-1 Wildlife Species at Risk Potentially Occurring in the Region Including Provincial and Federal Species at Risk Status and FWIMT Observations up to 5 km From the Project Footprint

Common Name	Scientific Name	AEP[1]	Wildlife Act[2] and ESCC[3]	COSEWIC[4]	SARA[4]	Observed Historically Within 5 Km (FWIMT[5])
Amphibians and Reptiles						
Western/Barred tiger salamander	*Ambystoma mavortium*	Secure	–	Special Concern	Schedule 1 – Special Concern	–
Western toad	*Anaxyrus boreas*	Sensitive	–	Special Concern	Schedule 1 – Special Concern	–
Canadian Toad	*Anaxyrus hemiophrys*	May be at Risk	Data Deficient	Not at Risk	–	–
Northern leopard frog	*Lithobates pipiens*	At Risk	Threatened	Special Concern	Schedule 1 – Special Concern	–
Wandering garter snake	*Thamnophis elegans*	Sensitive	–	–	–	–
Red-sided/common garter snake	*Thamnophis sirtalis*	Sensitive	–	–	–	–
Plains garter snake	*Thamnophis radix*	Sensitive	–	–	–	–
Birds						
Trumpeter swan	*Cygnus buccinator*	Sensitive	Special Concern	Not at Risk	–	Y
White-winged scoter	*Melanitta fusca*	Sensitive	Special Concern	–	–	–
Pied-billed grebe	*Podilymbus podiceps*	Sensitive	–	–	–	–
Horned grebe	*Podiceps auritus*	Sensitive	–	Special Concern	Schedule 1 – Special Concern	–
Eared grebe	*Podiceps nigricollis*	Sensitive	–	–	–	–
Western grebe	*Aechmophorus occidentalis*	At Risk	Threatened	Special Concern	Schedule 1 – Special Concern	Y
American white pelican	*Pelecanus erythrorhynchos*	Sensitive	–	Not at Risk	–	–
American bittern	*Botaurus lentiginosus*	Sensitive	–	–	–	–
Great blue heron	*Ardea herodias*	Sensitive	–	–	–	–
Black-crowned night-heron	*Nycticorax nycticorax*	Sensitive	–	–	–	–
White-faced ibis	*Plegadis chihi*	Sensitive	–	–	–	–
Yellow rail	*Coturnicops noveboracensis*	Undetermined	–	Special Concern	Schedule 1 – Special Concern	–
Sora	*Porzana carolina*	Sensitive	–	–	–	–

Common Name	Scientific Name	AEP[1]	Wildlife Act[2] and ESCC[3]	COSEWIC[4]	SARA[4]	Observed Historically Within 5 Km (FWIMT[5])
Sandhill crane	*Grus canadensis*	Sensitive	–	–	–	–
Black-necked stilt	*Himantopus mexicanus*	Sensitive	–	–	–	–
Upland sandpiper	*Bartramia longicauda*	Sensitive	–	–	–	–
Black tern	*Chlidonias niger*	Sensitive	–	Not at Risk	–	–
Forster's tern	*Sterna forsteri*	Sensitive	–	Data Deficient	–	–
Sharp-tailed grouse	*Tympanuchus phasianellus*	Sensitive	–	–	–	–
Bald eagle	*Haliaeetus leucocephalus*	Sensitive	–	Not at Risk	–	–
Northern goshawk	*Accipiter gentilis*	Sensitive	–	Not at Risk	–	–
Broad-winged hawk	*Buteo platypterus*	Sensitive	–	–	–	–
Golden eagle	*Aquila chrysaetos*	Sensitive	–	Not at Risk	–	–
Northern pygmy-owl	*Glaucidium gnoma*	Sensitive	–	–	–	–
Barred owl	*Strix varia*	Sensitive	Special Concern	–	–	–
Great grey owl	*Strix nebulosa*	Sensitive	–	Not at Risk	–	–
Short-eared owl	*Asio flammeus*	May be at Risk	–	Threatened	Schedule 1 – Special Concern	–
American kestrel	*Falco sparverius*	Sensitive	–	–	–	–
Peregrine falcon *anatum* subspecies	*Falco peregrinus anatum*	At Risk	Threatened	Not at Risk	Schedule 1 – Special Concern	–
Prairie falcon	*Falco mexicanus*	Sensitive	Special Concern	Not at Risk	–	–
Common nighthawk	*Chordeiles minor*	Sensitive	–	Special Concern	Schedule 1 – Threatened	–
Pileated woodpecker	*Dryocopus pileatus*	Sensitive	–	–	–	–
Olive-sided flycatcher	*Contopus cooperi*	May be at Risk	–	Special Concern	Schedule 1 – Threatened	–
Western wood-pewee	*Contopus sordidulus*	May be at Risk	–	–	–	–
Eastern phoebe	*Sayornis phoebe*	Sensitive	–	–	–	–
Eastern kingbird	*Tyrannus tyrannus*	Sensitive	–	–	–	–
Loggerhead shrike	*Lanius ludovicianus*	Sensitive	Special Concern	Threatened	Schedule 1 – Threatened	–
Purple martin	*Progne subis*	Sensitive	–	–	–	–
Bank swallow	*Riparia riparia*	Sensitive	–	Threatened	Schedule 1 – Threatened	–

Common Name	Scientific Name	AEP[1]	Wildlife Act[2] and ESCC[3]	COSEWIC[4]	SARA[4]	Observed Historically Within 5 Km (FWIMT[5])
Barn swallow	*Hirundo rustica*	May be at Risk	–	Special Concern	Schedule 1 – Threatened	–
Brown creeper	*Certhia americana*	Sensitive	–	–	–	–
Sprague's pipit	*Anthus spragueii*	Sensitive	Special Concern	Threatened	Schedule 1 – Threatened	–
Common yellowthroat	*Geothlypis trichas*	Sensitive	–	–	–	–
Western tanager	*Piranga ludoviciana*	Sensitive	–	–	–	–
Bobolink	*Dolichonyx oryzivorus*	Sensitive	–	Threatened	Schedule 1 – Threatened	–
Mammals						
Little brown myotis	*Myotis lucifugus*	May be at Risk	–	Endangered	Schedule 1 – Endangered	–
Western small-footed bat	*Myotis ciliolabrum*	Sensitive	Special Concern	–	–	–
Long-legged bat	*Myotis volans*	Undetermined	–	–	–	–
Silver-haired bat	*Lasionycteris noctivagans*	Sensitive	–	–	–	–
Eastern red bat	*Lasiurus borealis*	Sensitive	–	–	–	–
Hoary bat	*Lasiurus cinereus*	Sensitive	–	–	–	–
Long-tailed weasel	*Mustela frenata*	May be at Risk	–	Not at Risk	–	–
American badger *taxus* subspecies	*Taxidea taxus taxus*	Sensitive	Data Deficient	Special Concern	Schedule 1 – Special Concern	–
Canada lynx	*Lynx canadensis*	Sensitive	–	Not at Risk	–	–
Bobcat	*Lynx rufus*	Sensitive	–	–	–	–
Grizzly bear	*Ursus arctos*	At Risk	Threatened	Special Concern	Schedule 1 – Special Concern	Y

Notes:

[1] *Wild Species Status Search, 2020 Status Listing*, Alberta Environment and Parks (AEP; 2021e)

[2] *Wildlife Act* (Province of Alberta 2021)

[3] *Species Assessed by Alberta's Endangered Species Conservation Committee, Alberta Species at Risk*, Endangered Species Conservation Committee (ESCC 2017)

[4] *Species at public registry* (Government of Canada 2021)

[5] Fish and Wildlife Internet Mapping Tool (FWIMT; AEP 2021f)

- Not assessed