APPENDIX IR14-3 CANADA ENVIRONMENTAL ASSESSMENT ACT PROJECT DESCRIPTION FOR THE SPRINGBANK OFF STREAM RESERVOIR PROJECT

Appendix IR14-3 Canada Environmental Assessment Act Project Description for the Springbank Off Stream Reservoir Project
May 2019

Stantec

Springbank Off-Stream Reservoir Project

Canada Environmental Assessment Act

Project Description

April 18, 2016

Prepared for:
Alberta Transportation

Prepared by:
Stantec Consulting Ltd.

Stantec

Table of Contents

ABBREVIATIONS I

GLOSSARY II

1.0 GENERAL INFORMATION AND CONTACT(S) 1.1
1.1 NATURE AND PROPOSED LOCATION OF PROJECT 1.1
1.2 PROPONENT CONTACT INFORMATION 1.4
1.3 LIST OF JURISDICTIONS AND OTHER PARTIES CONSULTED 1.5
1.4 OTHER RELEVANT INFORMATION 1.7
1.4.1 Environmental Assessment and Regulatory Requirements of Other Jurisdictions 1.7
1.4.2 Regional Environmental Studies 1.10

2.0 PROJECT INFORMATION 2.1
2.1 PROPOSED DEVELOPMENT 2.1
2.2 DESIGNATED PHYSICAL ACTIVITY 2.4
2.3 COMPONENTS AND ACTIVITIES 2.4
2.3.1 Physical Works Associated with the Designated Project 2.4
2.3.2 Anticipated Size 2.12
2.3.3 Description of Project Activities 2.13
2.4 EMISSIONS, DISCHARGES AND WASTE 2.19
2.4.1 Atmospheric Contaminant Emissions 2.19
2.4.2 Sources and Location of Liquid Discharges 2.20
2.4.3 Types of Wastes and Plans for Their Disposal 2.20
2.5 CONSTRUCTION AND OPERATION PHASES AND SCHEDULING 2.21

3.0 PROJECT LOCATION 3.1
3.1 DESCRIPTION OF PROJECT LOCATION 3.1
3.2 LAND AND WATER USE 3.8

4.0 FEDERAL INVOLVEMENT 4.1
4.1 FEDERAL FINANCIAL SUPPORT 4.1
4.2 FEDERAL LANDS 4.1
4.3 FEDERAL LEGISLATIVE OR REGULATORY REQUIREMENTS 4.1

5.0 ENVIRONMENTAL EFFECTS 5.1
5.1 PHYSICAL AND BIOLOGICAL COMPONENTS THAT MIGHT BE ADVERSELY AFFECTED BY THE PROJECT 5.1
5.1.1 Environmental Overview Methods 5.1
5.1.2 Soils and Terrain 5.2
5.1.3 Hydrogeology 5.4
5.1.4 Vegetation 5.4
5.1.5 Wildlife 5.8

5.1.6 Surface Water and Aquatic Environment 5.11
5.1.7 Land Use and Management 5.14
5.1.8 Air Quality 5.14
5.1.9 Historical Resources 5.14
5.2 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FISH AND FISH HABITAT, LISTED AQUATIC SPECIES AND MIGRATORY BIRDS 5.19
5.2.1 Fish and Fish Habitat, as Defined in the Fisheries Act 5.19
5.2.2 Aquatic Species, as Defined in the Species at Risk Act (SARA) 5.21
5.2.3 Migratory Birds, as Defined in the Migratory Birds Convention Act 5.21
5.3 OTHER POTENTIAL CHANGES 5.22
5.3.1 Wetlands and Riparian Areas 5.22
5.3.2 Rare Plants 5.22
5.3.3 Other wildlife species 5.23
5.3.4 Surface Water and Aquatic Environment 5.24
5.3.5 Air Quality 5.25
5.3.6 Historical Resources 5.25
5.4 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FEDERAL LANDS OR LANDS OUTSIDE OF ALBERTA 5.27
5.5 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO ABORIGINAL PEOPLES RESULTING FROM CHANGES TO THE ENVIRONMENT 5.27

6.0 PROPONENT CONSULTATION AND ENGAGEMENT WITH ABORIGINAL GROUPS 6.1
6.1 LIST OF POTENTIALLY AFFECTED AND INTERESTED ABORIGINAL GROUPS 6.1
6.2 DESCRIPTION OF ENGAGEMENT OR CONSULTATION ACTIVITIES CARRIED OUT TO DATE WITH ABORIGINAL GROUPS 6.1
6.3 KEY COMMENTS AND CONCERNS BY ABORIGINAL GROUPS 6.2
6.4 CURRENT ABORIGINAL TRADITIONAL LAND USE 6.3
6.5 ABORIGINAL CONSULTATION AND INFORMATION GATHERING PLAN 6.3

7.0 CONSULTATION WITH PUBLIC AND OTHER PARTIES 7.1
7.1 STAKEHOLDERS AND RELATED CONSULTATION ACTIVITIES 7.1
7.1.1 Potentially Affected and Interested Stakeholders 7.1
7.1.2 Overview of Any Ongoing or Proposed Stakeholder Consultation Activities 7.4
7.1.3 Consultations with Other Jurisdictions 7.5

8.0 REFERENCES 8.1

LIST OF TABLES

Table 1-1 Jurisdictions Consulted by AT Regarding the Springbank Off-stream Reservoir Project 1.6
Table 1-2 Stakeholders and other Interest Groups Consulted by AT Regarding the Springbank Off-Stream Reservior Project 1.6
Table 2-1 Components of Proposed Development 2.2
Table 2-2 Historic Flood Events that Exceeded Design Objectives of 160 m^3/s 2.5
Table 2-3 Anticipated Size of the Springbank Off-Stream Reservoir Project 2.13
Table 2-4 Wastes and Waste Management Methods for the Project 2.21
Table 2-5 Project Schedule 2.21
Table 5-1 Recorded Archaeological Resources within the Project Area 5.15
Table 5-2 Recorded Historic Structures within the Project Area 5.16
Table 6-1 Aboriginal Groups Affected or Interested in the Project 6.1
Table 7-1 Stakeholders Who May be Potentially Affected and/or Interested in the Project 7.1

LIST OF FIGURES

Figure 1-1 Project Area 1.2
Figure 1-2 Regional Area 1.3
Figure 2-1 SR1 Springbank Off-Stream Reservoir Project Components 2.3
Figure 2-2 Daily Historic Flow Series on the Elbow River (Combined Station) 2.5
Figure 2-3 Off-stream Storage Reservoir 2.6
Figure 2-4 Diversion Structure 2.8
Figure 2-5 Diversion Structure and Diversion Channel 2.10
Figure 2-6 Earthfill Dam Section and Plan View 2.11
Figure 3-1 Looking Southeast towards Off-stream Storage Reservoir and Off-stream Storage Dam Locations 3.2
Figure 3-2 Looking South towards Off-stream Storage Reservoir, Off-stream Storage Dam and Diversion Channel Locations 3.3
Figure 3-3 Looking Southeast towards Off-stream Storage Reservoir, Off-stream Storage Dam and Diversion Channel Locations 3.4
Figure 3-4 Looking Northeast towards Diversion Structure, Diversion Channel, Off-stream Storage Reservoir and Off-stream Storage Dam Locations 3.5
Figure 3-5 Existing Features within the Project Area 3.6
Figure 3-6 Existing Features within the Regional Area 3.7
Figure 3-7 Land Use within the Project Area 3.9
Figure 5-1 Sandstone Outcrop Near Highway 22 ..... 5.3
Figure 5-2 Wetland and Riparian Areas 5.6
Figure 5-3 Native Prairie and Rare Plants 5.7
Figure 5-4 Key Wildlife and Biodiversity Zone and Environmentally Significant Areas 5.10
Figure 5-5 Surface Water 5.12
Figure 5-6 Sections of Historic Interest 5.18

LIST OF APPENDICES

APPENDIX A REGULATORY CORRESPONDENCE

APPENDIX B RARE PLANTS POTENTIALLY IN THE PROJECT AREA

APPENDIX C POTENTIAL WILDLIFE SOMC IN THE PROJECT AREA

Abbreviations

AEP	Alberta Environment and Parks
AT	Alberta Transportation
CEAA	*Canadian Environmental Assessment Act*
EIA	Environmental Impact Assessment
FSL	full supply level
HRV	Historic Resource Value
NRCB	Natural Resources Conservation Board
SARA	*Species at Risk Act*
SOMC	Species of Management Concern
SR1	Springbank Off-stream Reservoir Project
the Agency	Canadian Environmental Assessment Agency

Glossary

berm	A man-made earth barrier placed to protect an area from potential flooding
borrow material	Soil or sediment (i.e., sand and gravel) removed from a site for use in construction at another location
floodplain	An area of land adjacent to a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge
sluiceway	An artificial water channel into which the flow of water is controlled by a gate at the head of the channel
spillway	A structure used to direct the flowing water, at a controlled rate, from an area where it can be held, down a smooth decline to a downstream area

1.0 GENERAL INFORMATION AND CONTACT(S)

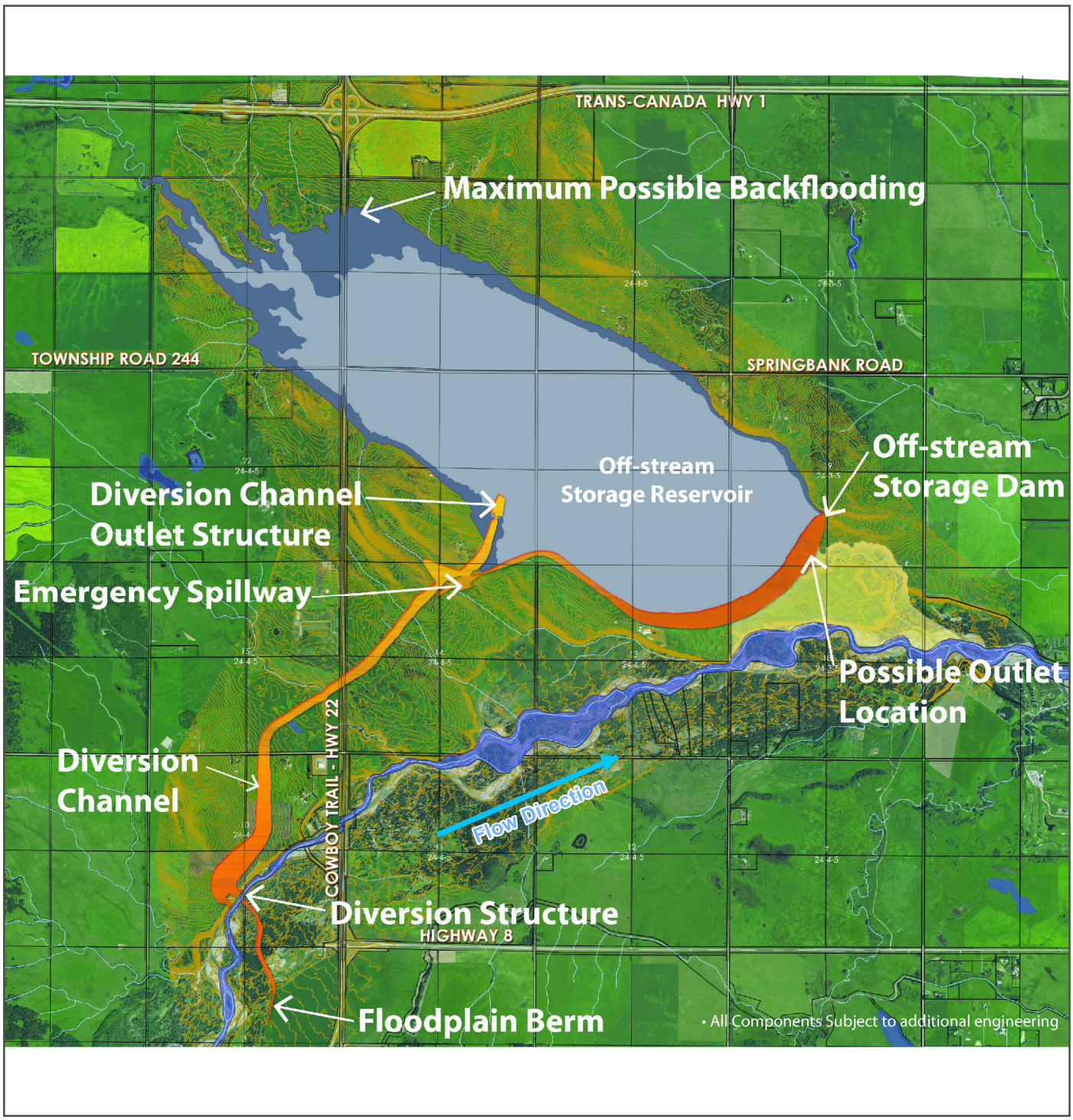
This Project Description has been prepared in accordance with the *Prescribed Information for the Description of a Designated Project Regulations* (SOR/2012-148, November 25, 2014) and the Guide to Preparing a Description of a Designated Project under the *Canadian Environmental Assessment Act*, 2012 (the Guide). The numbers and titles used as main headings in this document align with the Guide for ease of reference.

1.1 NATURE AND PROPOSED LOCATION OF PROJECT

The flooding that affected southern Alberta in June 2013 was unprecedented, forcing more than 56,000 Albertans from their homes. The Alberta Government has provided more than $191 million in disaster assistance to municipalities and First Nations for rebuilding efforts and approved just over $200 million in Flood Recovery Erosion Control grants to rebuild and reinforce river banks in flood-impacted communities.

To help reduce the effects of future extreme flood events on infrastructure, water courses and people in the City of Calgary and downstream communities, Alberta Transportation (AT) is proposing to construct the Springbank Off-stream Reservoir Project (the Project, SR1) The Project would be located in Rocky View County, 15 km west of Calgary, approximately 18.5 km upstream of the Glenmore Reservoir. The Project would be designed as a dry reservoir (there would be no permanent pool of water in the reservoir). The Project concept considers diverting extreme flood flow from the Elbow River into an Off-stream Storage Reservoir where it would be temporarily contained and later released back into the Elbow River after the flood peak has passed. Project components include a Diversion Structure constructed in the Elbow River, and a Diversion Channel excavated through the nearby uplands to transport floodwater into the Off-stream Storage Reservoir located on an Unnamed Creek valley to the north of the river. The storage site includes an earthfill dam to temporarily contain the diverted floodwater and an outlet structure incorporated into the dam to later release the stored water back into the Elbow River At full supply level (FSL) the Off-stream Storage Reservoir would cover approximately 789 ha of privately owned land south of Highway 1, north of Highway 8 and influence areas west and east of Highway 22 (see Figure 1-1). The Off-stream Storage Reservoir would be centred in Section 24 Township 24 Range 4 West of the Fifth Meridian. Figure 1-2 shows the regional setting for the Project.

W:\Clients\Alberta_Transportation\Springbank_Offstream_Storage\Figures\CEAA_Project_Description\110773396_285_LAA_Overview.mxd



ST-CAL-110773396-285 REVA

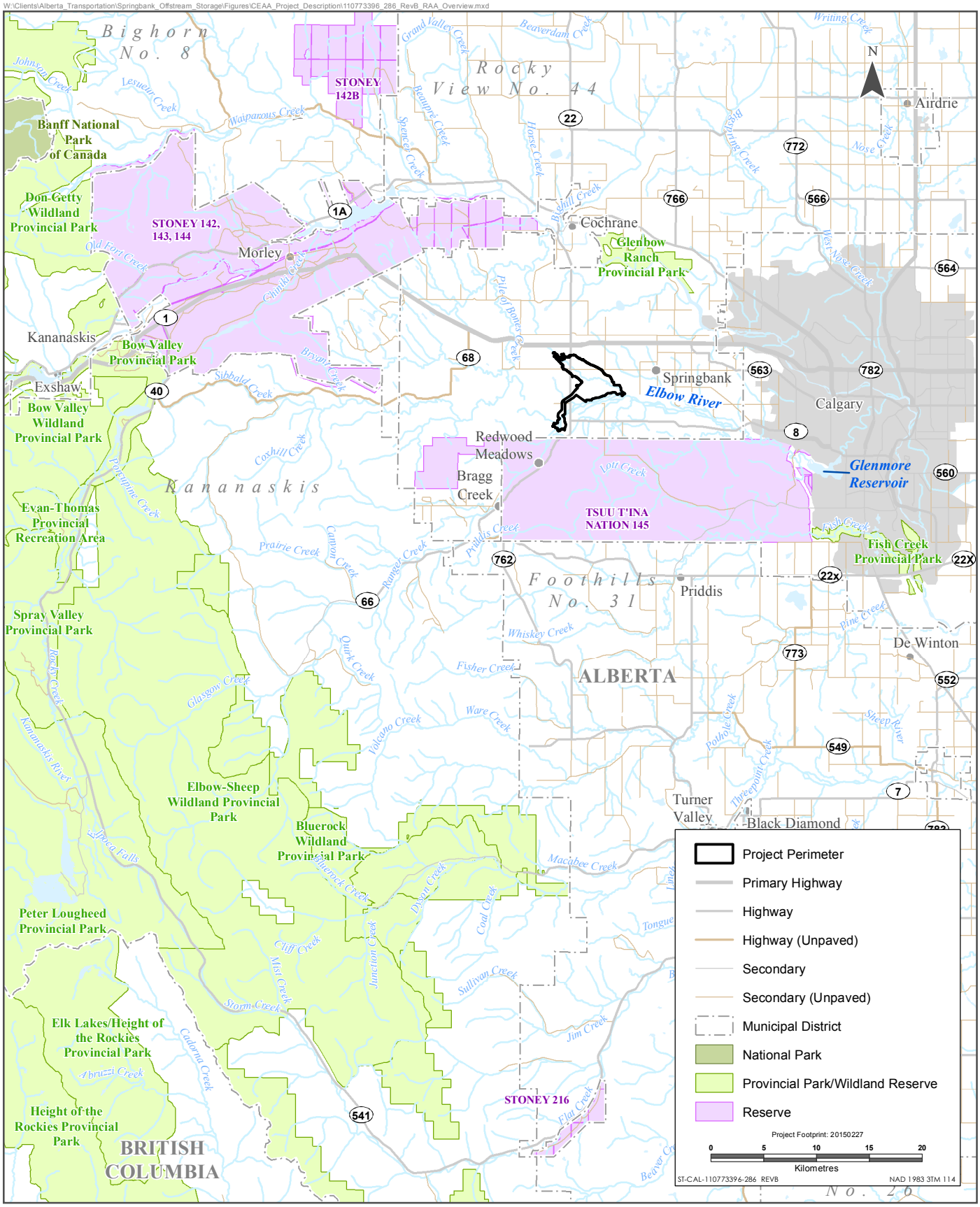
Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Project Area

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESERVOIR PROJECT

Figure 1-1



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Regional Area

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 1-2

The northwest and southeast corner points of the Project Area are as follows:

- NW: -34703.218 E, 5660917.356 N
- SE: -27570.395 E, 5652979.442 N
- NW: 51° 5’ 0.33” N, -114° 29’ 43.09” W
- SE: 51° 0’ 44.84” N, -114° 23’ 34.44” W

Coordinate values are in 3TM NAD83.

The Project Area would cover all or part of the following:

- W-5-24-3-W5M
- 6-24-3-W5M
- 7-24-3-W5M
- W-8-24-3-W5M
- W-17-24-3-W5M
- 18-24-3-W5M
- 19-24-3-W5M
- W-20-24-3-W5M
- W-29-24-3-W5M
- 30-24-3-W5M
- S-31-24-3-W5M
- SW-32-24-3-W5M
- 1-24-4-W5M
- 2-24-4-W5M
- 3-24-4-W5M
- E-4-24-4-W5M
- E-9-24-4-W5M
- 10-24-4-W5M
- 11-24-4-W5M
- 12-24-4-W5M
- 13-24-4-W5M
- 14-24-4-W5M
- 15-24-4-W5M
- E-16-24-4-W5M
- E-21-24-4-W5M
- 22-24-4-W5M
- 23-24-4-W5M
- 24-24-4-W5M
- 25-24-4-W5M
- 26-24-4-W5M
- 27-24-4-W5M
- E-28-24-4-W5M
- SE-33-24-4-W5M
- S-34-24-4-W5M
- S-35-24-4-W5M
- S-36-24-4-W5M

1.2 PROPONENT CONTACT INFORMATION

Name of the designated project: Springbank Off-stream Reservoir Project (SR1)

Name of the proponent: Government of Alberta

Address of the proponent: 3rd Floor Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta
T6B 2X3

Chief Executive Officer: Syed Abbas. P.Eng.
Alberta Transportation
Project Director, Major Capital Projects Branch
Phone: 780-644-7022
Fax: 780-415-0475
Email: syed.abbas@gov.ab.ca

Principal contact person: Mark Svenson, P.Biol.
Alberta Transportation
Environmental Coordinator, Provincial Transportation
Phone: 780-644-8354
Fax: 780-422-2027
Email: mark.svenson@gov.ab.ca

AT is the Project proponent and would seek and hold all approvals for SR1 until Project completion, at which time those approvals would transfer to Alberta Environment and Parks (AEP) as the owner and operator.

1.3 LIST OF JURISDICTIONS AND OTHER PARTIES CONSULTED

In planning and designing SR1, AT's goal is to provide a flood diversion option that has public input on the final design which will reduce social, economic and environmental effects. This will be achieved by an informed design process that includes decision-making through focused and coordinated stakeholder engagement and Aboriginal consultation on the Project.

AT consulted the Canadian Environmental Assessment Agency (the Agency) to introduce the Project and determine the need for a project description. The need was confirmed in a letter to AT dated August 14, 2014 (see Appendix A).

AT also consulted AEP (formerly known as Alberta Environment and Sustainable Resource Development) and was advised that the proposed Project is a mandatory activity for which an Environmental Impact Assessment (EIA) report is required. A copy of the letter to AT dated July 14, 2014 is provided in Appendix A. The Natural Resources Conservation Board (NRCB) was involved in the creation of the EIA terms of reference, and once the AEP has determined the EIA to be complete, the EIA will form part of AT's application to the NRCB for the Project. The NRCB will review the EIA, in coordination with AEP and other agencies, and determine if the Project is in the public interest.

Stakeholder consultation formally began on September 9, 2014. A series of meetings with municipal governments have been conducted and will be ongoing through project planning and design. Consultation in the area has occurred from early November 2014 and is ongoing. An open house with the general public was held on January 27, 2015 in Calgary and January 28, 2015 in Cochrane. Additional Open Houses were held March 10 and 17, 2015 at the Pinebrook Golf and Country Club and in Bragg Creek respectively. Consultation activities will continue over the course of development as required.

A list of the federal and provincial jurisdictions consulted for the Project is provided in Table 1-1. A list of the stakeholders and other interest groups consulted for the Project is provided in Table 1-2. A more detailed list of stakeholders is presented in Table 7-1 of Section 7.1, Staleholders and Related Consultation Activities.

Table 1-1 Jurisdictions Consulted by AT Regarding the Springbank Off-stream Reservoir Project

Federal Government	Canadian Environmental Assessment Agency Fisheries and Oceans Canada Transport Canada
Provincial Government	Alberta Natural Resources Conservation Board Alberta Environment and Parks Alberta Culture and Tourism

Table 1-2 Stakeholders and other Interest Groups Consulted by AT Regarding the Springbank Off-Stream Reservior Project

Municipal Government	Rocky View County City of Calgary
Local Landowners, Occupants and Residents	Landowners, residents and occupants within the Project Area, and in western Springbank directly east of the Project Area
Aboriginal Groups	Tsuu T'ina First Nation Stoney First Nation (Bearspaw, Chiniki and Wesley Bands) Siksika First Nation Piikani First Nation Blood Tribe
Regional Associations	Elbow River Watershed Partnership Bow River Basin Council Calgary Regional Partnership
Public	Open houses were held in Calgary, Cochrane, Springbank (Pinebrook Golf and Country Club) and Bragg Creek.

1.4 OTHER RELEVANT INFORMATION

1.4.1 Environmental Assessment and Regulatory Requirements of Other Jurisdictions

In addition to the requirement of a provincial EIA (Terms of Reference, dated February 5, 2015), the Project will be subject to approvals issued by the NRCB under the *Natural Resources Conservation Board Act*; as well as approval from AEP under the *Public Lands Act* and the *Water Act*, and Alberta Culture and Tourism (ACT) under the *Historical Resources Act*.

The Off-stream Storage Reservoir, Diversion and Outlet Works, and Off-stream Storage Dam for the Project are subject to the following regulatory agency approvals, licences or requirements:

1.4.1.1 Federal

- CEAA Project Description Review
  - Under the Canadian Environmental Assessment Act, a federal environmental assessment may be required for a Project if it falls under the description of a designated activity as listed in the *Regulations Designating Physical Activities* (CEAA 2012). To determine if a federal environmental assessment is needed, a description of the designated project must be submitted to the Agency for review and determination if a federal EA is required for the project. Under the *Regulations Designating Physical Activities,* SR1 may qualify as a project to be reviewed by the Agency (see Section 2.2).
- *Navigation Protection Act*
  - The Navigation Protection Act seeks to protect the public right of navigation in navigable waters. Navigable waters includes watercourses listed in a schedule to the Act, as well as any canal or other body of water created or altered as a result of the construction of any work and are those waterways where the public has a right to use the waterway as a route of travel under Common Law. The Elbow River is not a scheduled watercourse under the Navigation Protection Act, but the ability to navigate this water course, based on its existing use, must be maintained by designing a structure that is passable when travelling on the waterway or by providing a safe portage route around the structure.
- *Fisheries Act*
  - A federal *Fisheries Act* authorization for permanent alteration or destruction of fish habitat causing serious harm to a CRA fishery may be required for the Project. Subsection 35(1) of the *Fisheries Act*, prohibits the carrying out of a work, undertaking or activity that results in serious harm to fish that are part of, or support, a CRA fishery or to fish and fish habitat that support such a fishery. Under Subsection 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans (the Minister) may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish and fish habitats. The *Fisheries Act* Applications Regulations set out the

information requirements and documentation that must be submitted by an applicant requesting such an authorization.

- *Species at Risk Act*
  - The Species at Risk Act (SARA, 2014) contains prohibitions that make it an offence to kill, harm, harass, capture or take an individual of a species listed in Schedule 1 of SARA as Endangered, Threatened or Extirpated. These prohibitions may apply to the Project as six species that appear on Schedule 1 have the potential to occur in the Project Area.
- *Migratory Birds Convention Act*
  - Migratory birds and their nests are protected under the *Migratory Birds Convention Act* (MBCA; 1994). The *Migratory Birds Convention Act* provides protection to the nests and eggs of migratory birds by prohibiting "incidental take" through disturbance, destruction, taking of a nest, egg, or nest shelter of a migratory bird. Environment Canada has established timing restrictions to help identify when the risk of contravening the *Migratory Birds Convention Act* is particularly high. For the Project Area, Environment Canada advises against activities such as vegetation clearing, wetland draining, and construction in areas attractive to migratory birds between April 15 and August 15.

1.4.1.2 Provincial

- *Environmental Protection and Enhancement Act*
  - A provincial environmental impact assessment is required for submission as the Project is considered a mandatory activity as identified in Schedules 1 of the Environmental Assessment (Mandatory and Exempted Activities) Regulation (111/93).
    - (c)(ii) a dam greater than 15 metres in height when measured to the top of the dam from the lowest elevation at the outside limit of the dam, in the case of a dam that is not across a watercourse;
    - (d) a water diversion structure and canals with a capacity greater than 15 cubic metres per second;
    - (e) a water reservoir with a capacity greater than 30 million cubic metres
  - *Environmental Protection and Enhancement Act* Registration to construct, operate and reclaim the Project, to be issued by AEP under the *Activities Designation Regulation* (276/2003).
    - 3(a)(ii) "borrow excavation" means an excavation in the surface made solely for the purpose of removing borrow material for the construction of a dam, canal, dike, structure or erosion protection works associated with a provincial water management infrastructure project, and includes any associated infrastructure connected with the borrow excavation (Division 3 of Schedule 2);
- *Natural Resources Conservation Board Act*
  - The Project, being a non-energy project proposal, will also be referred to the Natural Resource Conservation Board (NRCB) as it is required under the *Environmental Protection and Enhancement Act* (2014) to submit an EIA to both AEP and the Science and Technology division of the NRCB for review. The NRCB will conduct an independent,

quasi-judicial review of the Project for a public interest determination. Section 4 of the Natural Resources Conservation Board Act lists the projects that are reviewable. SR1 falls under this listing as a water management project (*NRCBA* Sec. 4d). The NRCB's review will consider the potential effect of the proposed Project on the environment, the community and the economy. An approval issued by the NRCB under the Natural Resources Conservation Board Act must be authorized by the Alberta cabinet and is in addition to licences, permits or approvals required by other acts, regulations or by-laws.

- *Water Act*
  - Both approval and licensing under the *Water Act*, *Water (Ministerial) Regulation* will be required for activities that would occur during construction, and operation, of the Project such as:
    - Development of the dry reservoir and earth filled dam, which is considered a dam structure holding surface water
    - removal of any wetlands affected by the Project
    - installation of any flood control structures on the bed and shore of natural water body
- *Public Lands Act*
  - Under the *Public Lands Act*, AEP regulates access, occupation or work in or near waterbodies in Alberta, including the bed and shores of all naturally occurring rivers, streams, watercourses and lakes. Dispositions and/or reservations will be obtained for Project activities occurring on the bed and shores of the Elbow River or other watercourses in the Project Area.
- *Land Stewardship Act*
  - Under the Alberta *Land Stewardship Act*, a regional management plan for the region of the South Saskatchewan River watershed where the Project is located has been developed and approved. The South Saskatchewan Region has approximately 835,764 km^2 (13%) of Alberta's total land base (Government of Alberta 2014a). Through this plan, environmental management frameworks for air and surface water quality have been established that include environmental limits. Also, guidelines are provided to avoid native grassland conversion and improve connectivity of wildlife habitat. As part of the South Saskatchewan Regional Plan, a biodiversity management framework will be completed by the end of 2015. This framework will provide a new approach to support cumulative effects management of important elements of biodiversity that are affected by land-uses in the region.
- *Historical Resources Act*
  - A *Historical Resources Act* clearance application will be submitted to Alberta Culture and Tourism for review under the *Historical Resources Act*. The *Historical Resources Act* clearance application would encompass all parts of the Project, including the Off-stream Storage Reservoir, Diversion and Outlet Works, and Off-stream Storage Dam.

1.4.1.3 Municipal

- *Municipal Government Act*
  - Development of the Project is regulated by zoning and development permit requirements administered by the Rocky View County, under the *Municipal Government Act*. Preliminary discussions with Rocky View County have occurred regarding the development permit requirements and schedule. Considerations include access, road use, utilities and traffic impact.
  - Under the *Municipal Government Act*, a licence, permit, approval or other authorization granted by the NRCB or AEP prevails over any municipal development plan, area structure plan, land use bylaw or development decision by a development authority (*MGA* Sec. 619(1)).

1.4.2 Regional Environmental Studies

A number of environmental studies have been completed in the past several years for the region surrounding the Project location. Some of these studies were done to support reconfiguration of transportation corridors or flood mitigation strategies, including:

- Environmental Evaluation for the West Calgary Ring Road, February 2015
- Environmental Assessment for the Southwest Calgary Ring Road, updated December 2014
- West Calgary Ring Road Environmental Assessment, March 2010
- Southern Alberta Flood Recovery Task Force Flood Mitigation Measures for the Bow River, Elbow River and Oldman River Basins, Volume 4 – Flood Mitigation Measures, June 2014
- Highway 22:14 And 22:16 Highway Twinning and Interchange Reconfiguration Environmental Overview Assessment Report, December 2010

At this time there are no known regional environmental studies, as defined by CEAA 2012, being conducted for this area.

2.0 PROJECT INFORMATION

2.1 PROPOSED DEVELOPMENT

The Project consists of the construction and operation of an Off-stream Storage Reservoir to retain Elbow River flood flows during an event and release them after the threat of flood has subsided. Primary project components include a Diversion Structure located at the Elbow River, a Diversion Channel to transport diverted floodwater into the reservoir, an Off-stream Storage Dam to contain the diverted floodwater, and Outlet Works to return the stored water back to the river after the flood. Project components also include any re-alignments and/or modifications needed to protect roads from flooding during the use of the Off-stream Storage Reservoir. The reservoir area would be dry before and after the flood event, as permanent storage of water is not proposed.

The Project is one of several initiatives being undertaken by the Alberta Government to mitigate the effects of flooding within the province, and is one of three projects initially considered in the Calgary area. The other two projects included a dry dam built on the main channel of the Elbow River near its confluence with McLean Creek upstream of Bragg Creek, and an underground diversion tunnel running from Glenmore Reservoir and discharging into the Bow River.

SR1 would provide a means by which the flow rate in the Elbow River can be controlled during a flood event to protect residents and property in the City of Calgary and Rocky View County. Initial studies indicate that the Project would have fewer effects than the other options considered and has a more favorable cost benefit analysis.

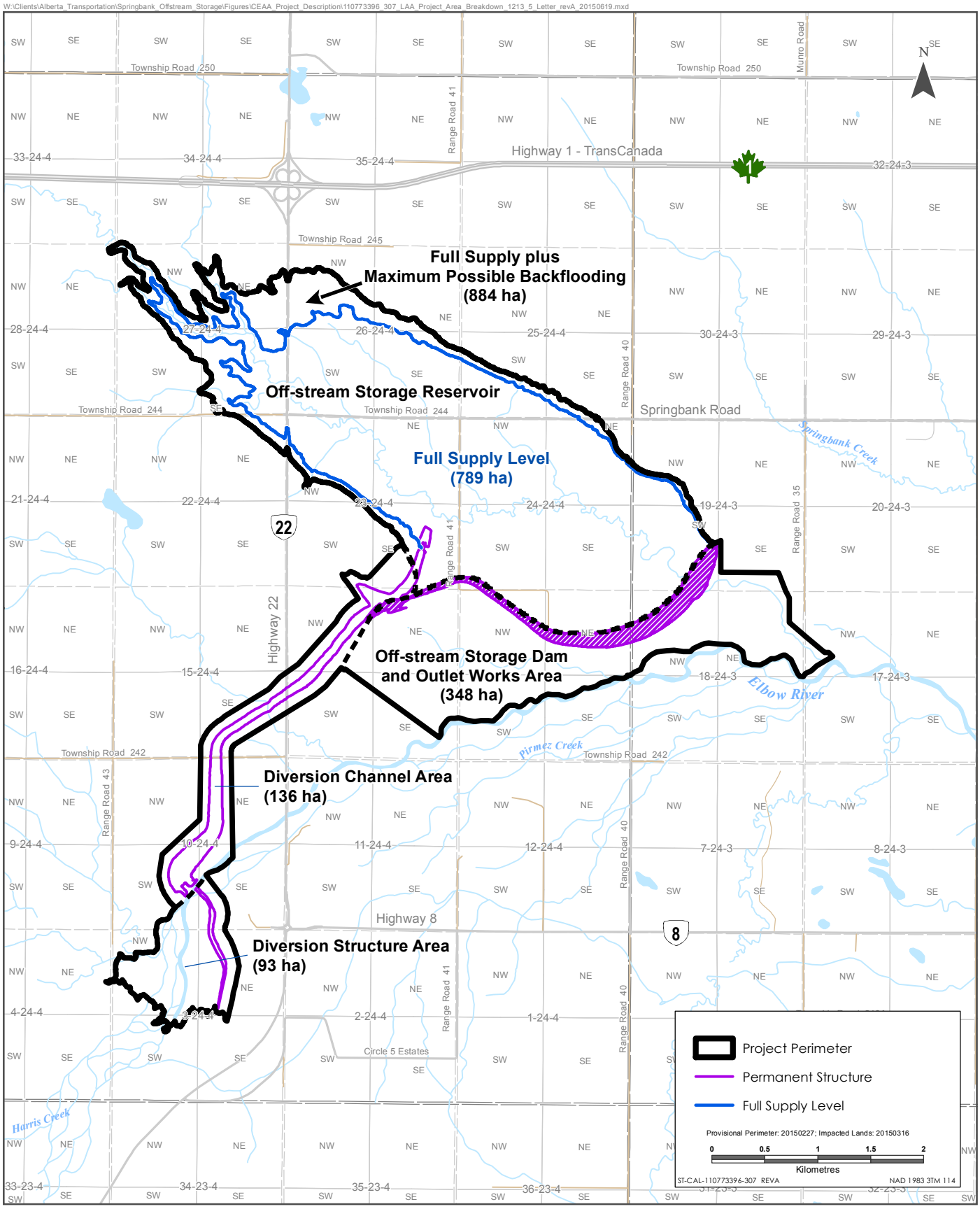
All Project components would be developed on land owned or acquired by the Government of Alberta.

A summary of each of the components can be found in Table 2-1.

A conceptual overview of the Project and its components can be seen in Figure 2-1.

Table 2-1 Components of Proposed Development

Component	Description[1]
Off-stream Storage Reservoir	A natural basin that would be used to hold floodwater. • Storage capacity at top of dam: 104,600,000 m^3 • Design flood storage capacity: 70,200,000 m^3 • Maximum depth: 25 m • Surface area at top of dam: 884 ha (includes backflooding area) • Surface area at design storage capacity (at FSL): 789 ha
Diversion Structure	A group of three structures that work together to divert floodwater into the Diversion Channel. Includes: • Diversion Inlet: Gated concrete structure – 46 m long, 11 m high and 33 m wide – Discharge capacity: 600 m^3/s • Sluiceway / Service Spillway: Gated concrete structure – 43 m long, 11 m high and 33 m wide • Floodplain Berm: embankment of earth – 1,200 m long, 51 m wide and 7.5 m high
Diversion Channel	A channel used to carry floodwaters from the Elbow River to the Off-stream Storage Reservoir. • Length: 4,700 m • Design carrying capacity: 600 m^3/s • Bottom width: 24 m • Side slopes: 3:1 • Water depth at 600 m^3/s: 6.4 m
Off-stream Storage Dam	An embankment of earth used to hold floodwater in the reservoir • Crest Length: 3,960 m • Structure height: 27 m • Maximum base width: 205 m • Side slopes: 3:1
Outlet Works[2]	Includes gates, the structure, the channel, and related appurtenances. The final design of the Outlet Works is subject to further assessment of floodwater release thresholds and additional engineering assessment and design.
Road Realignments/ Modifications[2]	Realignment and/or raising the height of the road surface of Highway 22 and Springbank Road
NOTES: [1] values are approximate and subject to change prior to completion of final design [2] design work has not been completed	



SR1 Springbank Off-Stream Reservoir
Project Components

Stantec

SR1 OFF-STREAM RESERVOIR - GOVERNMENT OF ALBERTA

Figure 2-1

2.2 DESIGNATED PHYSICAL ACTIVITY

In a letter dated August 14, 2014 (see Appendix A), the CEA Agency determined that the Project, as described, is a designated project and may require a federal environmental assessment. AT is required to submit a project description to the Agency to inform a decision as to whether an environmental assessment is required. The letter cited paragraph 6 of the Regulations Designating Physical Activities under the *Canadian Environmental Assessment Act* (CEAA 2012) which states:

> *"The construction, operation, decommissioning and abandonment of a new structure for the diversion of 10 000 000 m³/year or more of water from a natural water body into another natural water body"*

Paragraph 6 of the Regulations does not apply to SR1 for the following reasons:

1. The diversion of water greater than 10,000,000 m³/year would be an exceptional case, confined to extreme flood conditions. The Project is designed to divert water when necessary to reduce flows downstream of Glenmore Reservoir to less than 160 m³/s, which is the capacity of the low level outlet in Glenmore Dam. Based on records from 1908 through 2013, there have been only ten events that would have necessitated a diversion and only four events that would have required diversion of more than 10,000,000 m³ (1929, 1932, 2005 and 2013)(see Figure 2-2 and Table 2-2).

2. Water is not being diverted into another water body. It is being temporarily stored (estimated time, 45 days) for return to the Elbow River following the flood event.

2.3 COMPONENTS AND ACTIVITIES

2.3.1 Physical Works Associated with the Designated Project

The physical works for the Project, as identified in Table 2-1, and shown in Figure 2-1 are described in Sections 2.3.1.1 to 2.3.1.6. These physical works would be constructed by AT, and owned and operated by AEP.

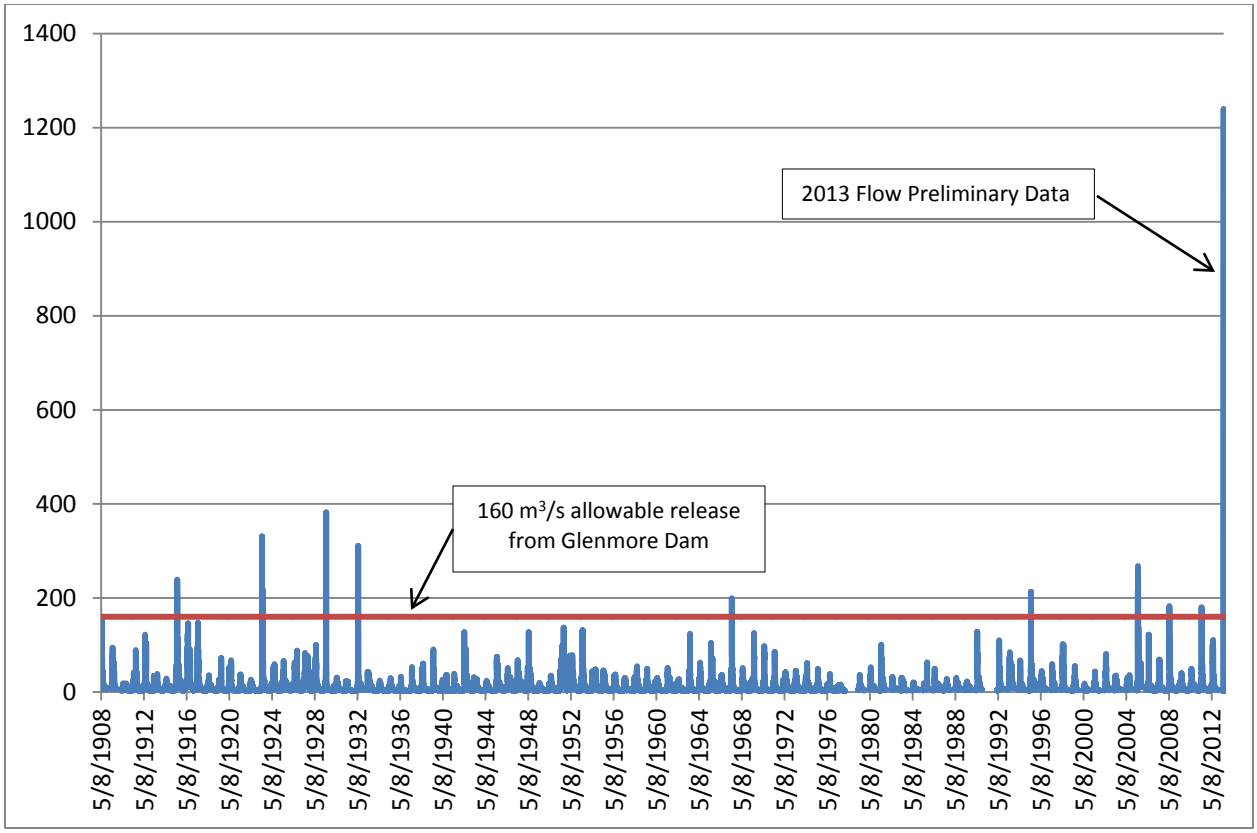


Figure 2-2 Daily Historic Flow Series on the Elbow River (Combined Station)

Table 2-2 Historic Flood Events that Exceeded Design Objectives of 160 m³/s

Event Year	Peak Total Inflow (m³/s)	Peak SR-1 Diversion Rate (m³/s)	Duration of SR-1 Diversion (hours)	Peak SR-1 Stage (m)	Peak SR-1 Storage (dam³)	Peak Storage Provided by Glenmore (dam³)
1915 (avg. daily)	239	79	44	1,196.1	7,483	-
1923 (avg. daily)	219	59	48	1,195.2	4,872	-
1929 (avg. daily)	382	221	60	1,201.1	23,448	-
1932 (avg. daily)	311	151	75	1,201.3	24,412	-
1967 (avg. daily)	199	38	17	1,191.4	1,264	-
1995 (avg. daily)	213	52	20	1,192.3	2,047	-
2005	338	178	77	1,198.3	13,494	-
2008	183	0	0	-	0	-
2011	180	0	0	-	0	-
2013	1,240	480	64	1,209.3	70,623	9,471

2.3.1.1 Off-stream Storage Reservoir

The Off-stream Storage Reservoir would utilize the natural topography of the Project Area to provide a basin within which diverted floodwater can be contained (see Figure 2-3).

During the design flood event, it is anticipated that the time required to fill the Storage Reservoir would be dependent on conditions during operation; but is expected to take approximately 44 hours. The reservoir would be considered full when the reservoir reaches its design capacity of 70,200,000 m^3 and the water level reaches 1,209.3 m elevation.

No structures, dwellings or facilities would be permitted within the Off-stream Storage Reservoir.

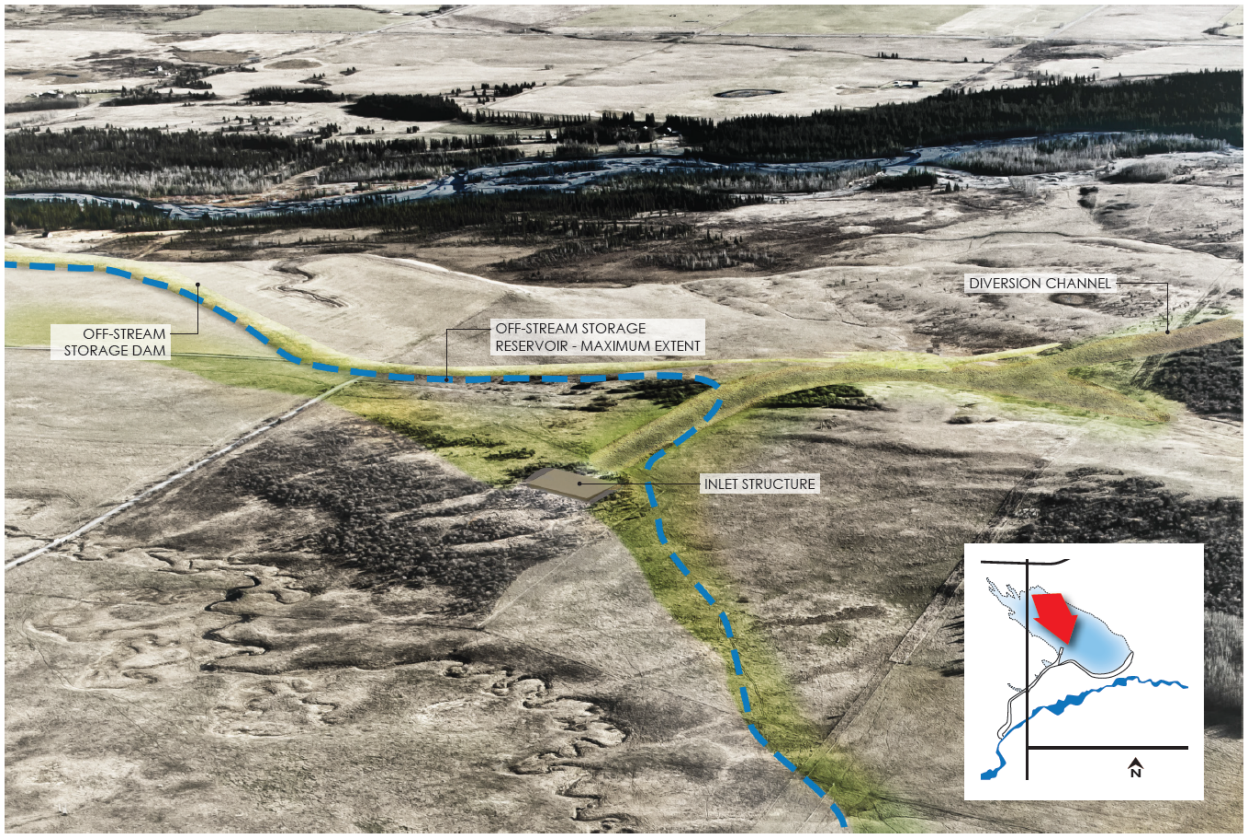


Figure 2-3 Off-stream Storage Reservoir

2.3.1.2 Diversion Structure

The Diversion Structure is made up of three separate structures that would work together to divert floodwater from the Elbow River into the Diversion Channel. The three structures are:

- a Diversion Inlet
- a Sluiceway and Service Spillway
- a Floodplain Berm and Diversion Emergency Spillway

A temporary laydown/stockpile area may be set up near the Diversion Structure, to support its construction.

2.3.1.2.1 Diversion Inlet

The Diversion Inlet is located at the entrance to the Diversion Channel on the north bank of the Elbow River (see Figure 2-4). The Diversion Inlet is a gated concrete structure that would control the diversion of river water flowing into the Diversion Channel during flood events.

The concrete structure includes an approach channel leading to four 10 m wide by 6 m high steel radial gates. The crest of the Diversion Inlet gate bays would be approximately 1.5 m above the river bed of the Elbow River to limit diversion in lesser flood events and for debris and sediment control and maintanence reasons. The gates would be closed during periods of non-operaiton. During a flood, the gates would be opened to allow the floodwater to enter the Diversion Channel.

Concrete wing walls would be built on either side of the Diversion Inlet to protect the river banks from erosion by floodwater.

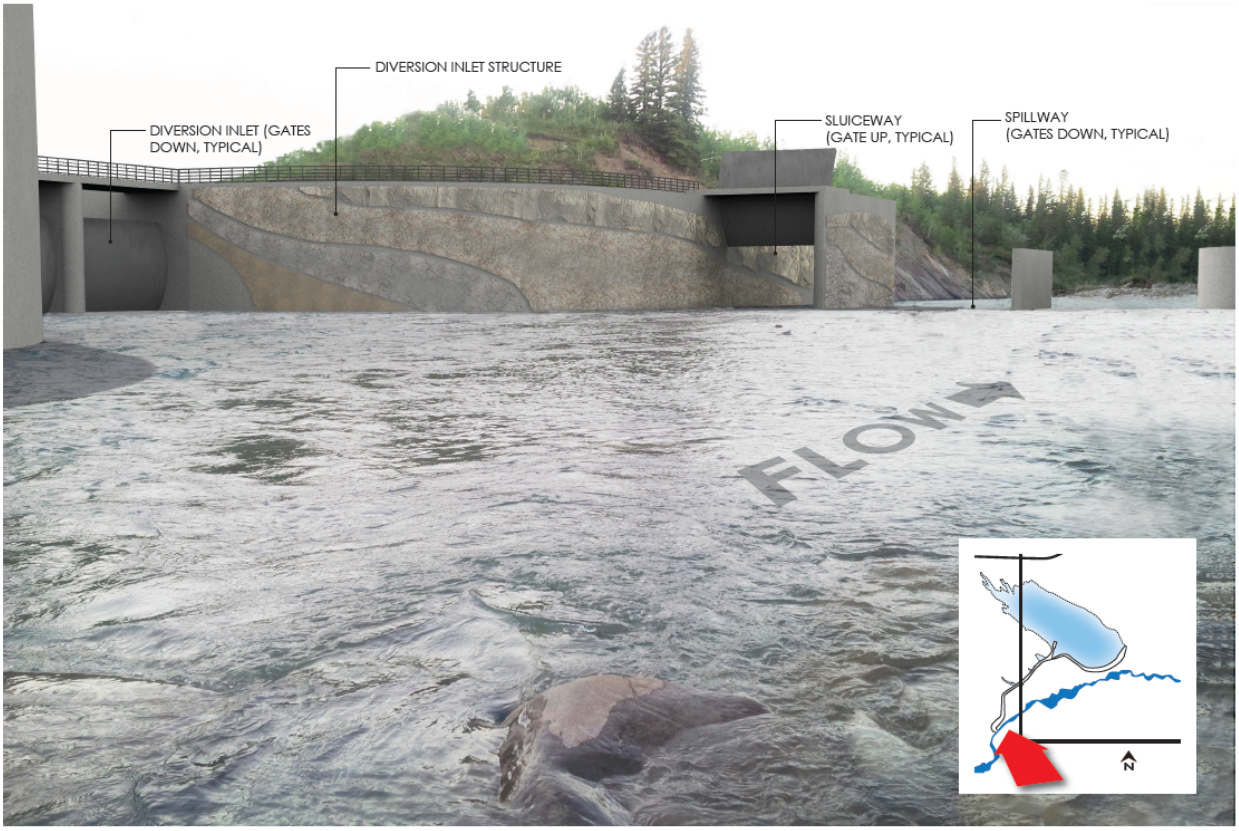


Figure 2-4 Diversion Structure

2.3.1.2.2 Sluiceway and Service Spillway

The Diversion Structure's Sluiceway and Service Spillway would be a gated concrete structure located within the Elbow River channel immediately downstream of the Diversion Inlet (see Figure 2-4).

The Sluiceway and Service Spillway would consist of three gated passageways upon a concrete foundation.

The Sluiceway would be a 10 m wide passageway, with a 7.5 m high steel radial gate and the floor of the passageway would be approximately the same level as the river bed. The Sluiceway would allow river bed gravel and sediments to move through the Diversion Structure during flood operation. Normally the Sluiceway gate would be open; however, during flood events, the gate would be partially closed and work in combination with the Service Spillway gates to control upstream water levels. During operations, floodwater could be allowed to flow under the gate

to facilitate passage of sediment and reduce the potential of the Diversion Structure becoming blocked with sediment.

The Service Spillway is located to river right of the Sluiceway and would consist of two 15-m wide passageways, separated by a concrete wall, each with a 4 m tall overshot gate. The floor of the Service Spillway passageways would be approximately the same height as the river bed. Normally the Service Spillway gates would be open and nearly flush with the river bed. During a flood event, the Service Spillway gates would be raised or lowered to control upstream water levels and build hydrualic head to push flood waters into the Diversion Channel.

2.3.1.2.3 Floodplain Berm and Diversion Emergency Spillway

The Floodplain Berm and the Diversion Emergency Spillway would be located on the right floodplain (see Figure 2-5). During a flood, the Floodplain Berm would keep the backwater within the Elbow River channel and floodplain, and direct it through the Diversion Inlet. The berm would extend to the southern edge of the floodplain and would be high enough to prevent floodwater from flanking the Diversion Structure.

The Floodplain Berm would be an earth embankment approximately 1,200 m long with a maximum height of approximately 7.5 m. The berm crest elevation would be 1,220.6 m.

The Diversion Emergency Spillway would be a lowered section of the floodplain berm next to the Service Spillway. The 235-m long Diversion Emergency Spillway would be approximately 2.5 m high with a crest at 1,215.6 m elevation. The crest and downstream side of the Diversion Emergency Spillway would be armoured with articulated concrete matting to protect against erosion. The upstream side would be protected by riprap.

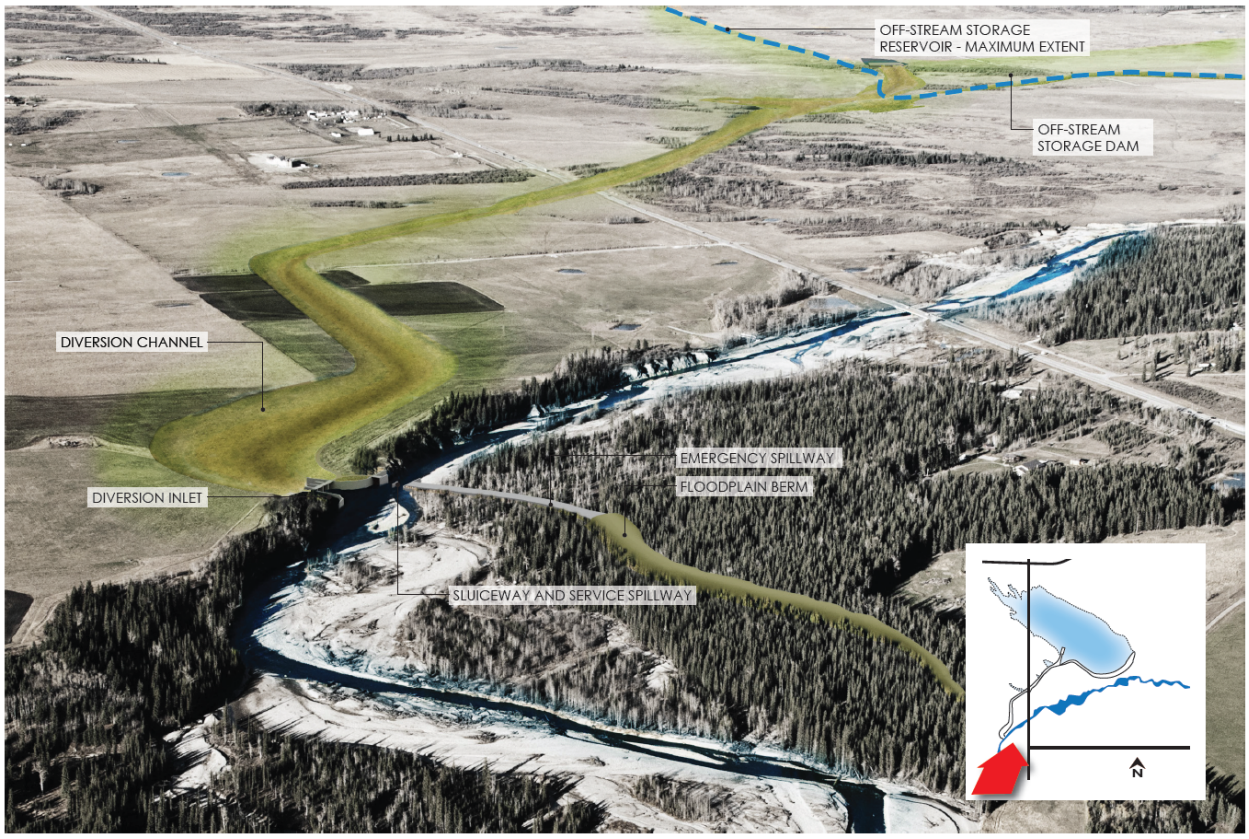


Figure 2-5 Diversion Structure and Diversion Channel

2.3.1.3 Diversion Channel

The Diversion Channel would carry floodwater from the Diversion Inlet to the Off-Stream Storage Reservoir (see Figure 2-5). The channel would be 4,700 m long with a 24-m wide bottom and side walls with a maximum slopes of 3:1. The Diversion Channel will have a slope of 0.1% towards the Off-stream Storage Reservoir and would carry water at a flow rate of up to 600 m^3/s. The depth of the Diversion Channel would be 6.9 m, allowing for a maximum height of 6.4 m for floodwater and at least 0.5 m of room between the water and the top of the channel wall. This design height would accommodate a 2013 level flood event.

Energy dissipation measures will be incorporated into the Diversion Channel and Outlet, the nature and arrangement of which are subject to additional engineering assessment and design.

2.3.1.4 Off-stream Storage Dam

The Off-stream Storage Dam, or earthfill dam, would be an earth embankment that would temporarily contain the diverted floodwater within the Off-stream Storage Reservoir (Figure 2-6). The earthfill dam would be approximately 3,960 m long, and would have a maximum height of 27 m and width of 205 m. The crest of the dam would be built to 1,213.5 m elevation with a 10 m top width. The sides of the dam would be constructed in a terraced profile with 3:1 slopes.

An internal drainage system, as well as monitoring instruments would be built into the dam structure.

A temporary laydown/stockpile area may be set-up within the nearby Off-stream Storage Reservoir area to support construction of the dam.

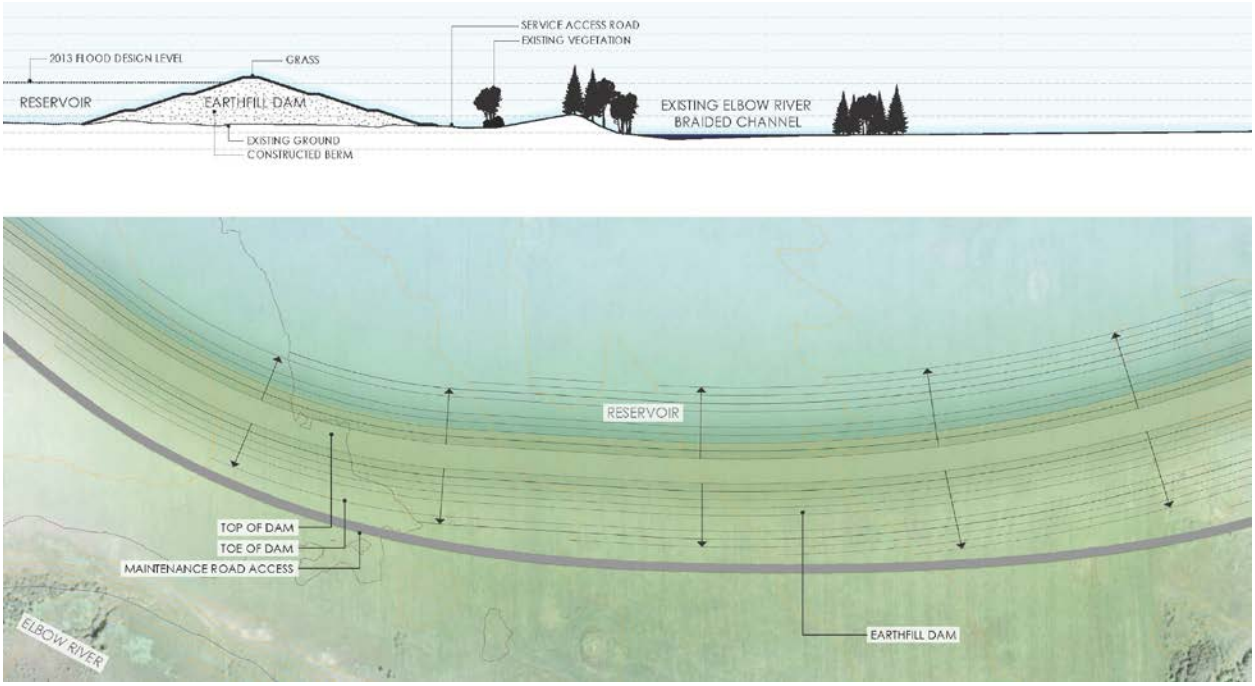


Figure 2-6 Earthfill Dam Section and Plan View

2.3.1.5 Outlet Works

The SR1 concept has floodwater from the Off-stream Storage Reservoir being released via a low level outlet releasing into an outlet channel. The actual arrangement of the Outlet Works is subject to additional engineering design and consultation with stakeholders on release rates and operations.

2.3.1.6 Road Realignments/Modifications

Construction and operation of the Project would affect existing roadways in the Project Area. It is anticipated that road improvements such as realignment, raising the roadway vertical profile, and/or a combination of the two may be required to protect Highway 22 and Springbank Road. Six alternative improvement options for Highway 22 and Springbank Road have been developed. The technically preferred option would include raising the gradeline of Highway 22 west of the existing Highway 22 lanes, retaining the existing Springbank Road, developing a new raised intersection of Highway 22 and Springbank Road , and upgrading Range Road 40 and Township Road 250 to serve as a detour around Springbank Road when the Off-stream Storage Reservoir is flooded. It is anticipated that Highway 22 would need to be raised by an average of 5 to 10 metres, and culverts would be provided in the raised road embankment to maintain a causeway during operation.

In addition, new bridge crossings would need to be constructed where Highway 22 and Township Road 242 would cross the Diversion Channel. The bridges would be built within the existing roadway rights-of-way.

The six proposed improvement plans have been provided to Rocky View County for their review and evaluation. No engineering or design activities have been undertaken as yet with regards to road realignments or modifications.

2.3.2 Anticipated Size

Figure 2-1 shows the Project's permanent structures and the Project Perimeter which defines the likely maximum extent that the Project could occupy. The anticipated size of the Project is summarized in Table 2-3. Refer to Section 2.1 for a description of the processes and the structures associated with the Project.

Table 2-3 Anticipated Size of the Springbank Off-Stream Reservoir Project

Project Component	Size (ha)	
	At Full Supply Level	At Full Supply Level and Possible Backflooding
Off-stream Storage Reservoir	789	884
Diversion Structure	93	93
Diversion Channel	136	136
Off-stream Storage Dam and Outlet Works	348	348
Total Area	1366	1461

2.3.3 Description of Project Activities

The activities to be performed in relation to the Project are:

- Construction of the components of the Project (Alberta Transportation's role) and
- Operation for the life of the Project (Alberta Environment and Parks' role).

The Project would be a permanent installation and would not be decommissioned.

2.3.3.1 Construction

It is anticipated that all construction activities that require earthwork would use heavy equipment, including bulldozers, excavators, graders, compactors and trucks. The construction activities at the Diversion Structure and Outlet Works are also expected to require the use of heavy earthwork equipment, as well as cranes and lifts.

2.3.3.1.1 Off-stream Storage Reservoir

Construction activities are not required to develop the Off-stream Storage Reservoir with the exception of some minor ditching to maintain drainage towards the earthfill dam. There are no plans to line the reservoir area and the existing vegetative cover would be kept in place. However, clearing of any existing structures and some activities supporting the construction of other Project components may occur within the reservoir area.

A temporary laydown/stockpile area to support construction of the dam may be set-up within the reservoir area. The laydown/stockpile area would most likely be located near the dam, and would be accessible from Springbank Road. A worksite trailer and employee parking area would also be located here. All material and equipment would be removed from the reservoir area at the end of construction, and the laydown/stockpile area would be replanted.

Depending upon the final Project design, there may be a need to excavate borrow material from the reservoir area. The amount of material required is not known at this time, but would be used in the construction of the dam. If borrow material is required from the Off-stream Storage Reservoir area, then during excavation, the borrow area would be stripped of vegetation and topsoil, the required material removed, then the area would be re-graded to drain properly, and the topsoil would be replaced and seeded. During re-grading, a channel would likely be developed to improve drainage and direct water flow towards the Outlet Works in the dam.

2.3.3.1.2 Diversion Structure

A temporary laydown/stockpile area for construction of the Diversion Structure may be set up near the southern end of the Diversion Channel. This area would be accessible from Township Road 242, and may contain a worksite trailer and employee parking area. All material and equipment would be removed from the laydown/stockpile area at the end of construction, and the laydown/stockpile area would be revegetated.

A gravel maintenance and access road would be constructed to access the Diversion Structure. It would connect to a maintenance and access road that would be built along the east side of the Diversion Channel.

Construction of the Diversion Structure would require temporary diversion of the Elbow River channel which will be carried out in consultation with AEP, DFO and Transport Canada.

2.3.3.1.2.1 Sluiceway and Service Spillway

The Sluiceway and Service Spillway would be made primarily of concrete with various materials comprising the gate systems and appurtenances. The reinforced concrete foundation of the structure would be constructed within the bed of the Elbow River with the superstructure (walls, gates, etc.) built upon the foundation.

2.3.3.1.2.2 Floodplain Berm

Trees and shrubs growing on the floodplain near the location of the floodplain berm would be cleared prior to construction.

The floodplain berm would be a constructed earthen embankment with vegetative and rock erosion protection. The Diversion Emergency Spillway would be a lowered section of the floodplain berm with erosion protection.

2.3.3.1.2.3 Diversion Inlet

The Diversion Inlet structure would be made of concrete and constructed similarly to the Sluiceway and Service Spillway structure. Steel gates would be mounted on concrete walls between the passageways in the structure. A deck would be placed on top of the concrete walls, and would support an access road and the hoists that would raise and lower the gates.

Concrete wing walls would be built on either side of the Diversion Inlet structure to protect the river bank from erosion.

2.3.3.1.3 Diversion Channel

The Diversion Channel would be constructed primarily through excavation. Limited areas will utilize fill to construct berms to contain the channel when crossing low lysing areas.

The Diversion Channel would cross several existing pipelines and a powerline.. AT is currently in discussion with owners of all the pipelines (active and abandoned) and powerlines in the Project Area to determine what the effects of Project construction would be on these structures and what measures may be required to protect them. Those crossing the Diversion Channel will most likely be buried under it.

Three small, ephemeral streams would be redirected through the Diversion Channel, to the Off-stream Storage Reservoir or under the Diversion Channel through siphon piping.

Excavated material from the channel would also be transported to the Diversion Structure and earthfill dam to support the construction of these components. This material would be trucked to these structures using a haul road located either within the Diversion Channel, or on the eastern side of the channel, depending upon the stage of construction. During the course of construction, a gravel maintenance and access road would be developed along the east side of the Diversion Channel. This road would connect to the local road network.

2.3.3.1.4 Off-stream Storage Dam

Subject to geotechnical investigation and analysis, the material excavated from the Diversion Channel would be used to construct the earthfill dam. The material would be transported to the Off-stream Storage Dam using the haul road that runs alongside the Diversion Channel or within the excavated drainage channel. If additional material is required to build the dam, it would be removed from borrow areas within the Off-stream Storage Reservoir, subject to geotechcnial investigaiton.

Impervious material would be used to construct the core of the dam, with less impervious material used to complete the rest of the structure. All material used in the construction of the dam would be compacted.

A temporary laydown/stockpile area supporting construction may be set-up next to the dam. Access to the dam and the laydown/stockpile site would likely come from Springbank Road.

During construction, a gravel maintenance and access road would be developed along the south and east side of the earthfill dam. This road would connect to the maintenance and access road constructed next to the Diversion Channel.

Once the dam is completed, it would be seeded with native species, so that grass would grow to cover the structure.

2.3.3.1.5 Outlet Works

The Outlet Works would be installed next to the natural channel for Tributary 2259 located at the eastern end of the dam, Once this structure is completed, the stream flow from Tributary 2259 would be diverted through the outlet structure. A gate house would be built at the dam to control the gate system for the outlet structure.

Energy dissipation or erosion protection will be provided where water is released into the Elbow River, if ngineering analysis deems it to be warrented. .

2.3.3.1.6 Road Realignments/Modifications

Construction activities related to Highway 22 and Springbank Road improvements, as well as the construction of any bridge structures over the Diversion Channel, have not been finaliazed. AT would be responsible for the care and control of Highway 22 and Springbank Road improvements, including for the future bridge, during the construction activities for these roadways.

2.3.3.2 Operation

2.3.3.2.1 Off-stream Storage Reservoir

During a flood event, the fill rate and volume of the reservoir would be monitored by instrumentation and operator observation at the site.

Floodwater stored in the reservoir would be released after the flood event has passed. It is estimated that it would take up to 30 to 45 days to drain the reservoir. Following the release of the floodwaters, debris and sediment left behind in the reservoir would be removed and disposed of at regulator-approved locations or addressed by other appropriate measures.

Ongoing discussions are being held between AT and landowners in the Project Area regarding use of the Off-stream Storage Reservoir during non-flood periods.

2.3.3.2.2 Diversion Structure

2.3.3.2.2.1 Sluiceway and Service Spillway

When not in operation the Sluiceway's radial gate will be open and the Service Spillway crest gates would be in their lowered position. This allows relatively unobstructed flow through the Service Spillway during non-flood operation periods. Routine inspections would be conducted for the gate system and its operation and maintenance would be undertaken as required.

Current design operations have the SR1 Diversion Structure operating when flows in the Elbow River exceed 160 m^3/s. When this threshold is exceeded , the Service Spillway gates would rise and the Sluiceway gate would lower to build backwater in the river and obtain the hydraulic head necessary to drive floodwaters into the Diversion Channel. As the backwater builds, the radial gates on the Diversion Structure would open to divert up to 600 m^3/s of flood water into the Diversion Channel. Water peak flow ratesexceeding the diversion rates would continue down the Elbow River. When the reservoir is full, the Service Spillway and Sluiceway gates would return to their normal open position.

Debris carried by the river is expected to flow over the Service Spillway gates.

It is anticipated that the gates would have the ability to be remotely operated, however there would be facilities at site to permit the gates to be operated locally and is its expected that the system will not be automated. Actual operations and protocols such as this are the subject of current engineering design efforts. It is anticipated that the Diversion Structure would be manned during a flood.

2.3.3.2.2.2 Floodplain Berm

The Floodplain Berm would help divert floodwaters towards the Diversion Channel during a flood event. Floodwater volumes exceeding design capacity may also flow over the Diversion Emergency Spillway section of the berm and continue down the Elbow River.

When not in use, the floodplain berm would be routinely inspected and repaired as needed. Vegetation growing on the berm would be maintained as would be done on other provincially owned dams in Alberta.

2.3.3.2.2.3 Diversion Inlet

During a flood event, hoists would be used to raise the gates in the Diversion Structure and allow floodwater into the Diversion Channel. Up to 600 m^3/s of floodwater would be diverted through the Diversion Inlet . While booms and deflectors may be used to manage debris entering the Diversion Inlet, it is anticipated that some debris caught up in the floodwater would enter the Diversion Channel and possibly the reservoir.

During non-flood periods, the gates would be in a closed position; preventing water, debris, wildlife, and persons entering the Diversion Channel via the Diversion Inlet. Routine inspections would be conducted for the gate system and its operation, and maintenance would be undertaken as required.

2.3.3.2.3 Diversion Channel

When flooding occurs, the flow of floodwater in the Diversion Channel would be observed and monitored.

Following a flood event, debris within the Diversion Channel would be removed, and repair of the erosion control measures would be conducted, if required. An access road next to the channel would be used to reach the areas that need repair and remove any debris. Surface runoff from storms or melting snow, as well as streamflow from watercourses intersected by the Diversion Channel, will flow into the channel and travel to the Off-stream Storage Reservoir where they would drain via the Outlet Works. During non-flood periods, the erosion control measures in the Diversion Channel would be periodically monitored for erosion or other damage, and repaired as necessary.

2.3.3.2.4 Off-stream Storage Dam

During a flood event, the Outlet Works would be closed or partially closed to keep water behind the Off-stream Storage Dam. Following the flood event, the gates or valves of the Outlet Works would be opened and the reservoir would be drained through the outlet to the Elbow River.

As the reservoir behind the Off-stream Storage Dam fills, and then drains, the geotechnical performance of the dam would be monitored using instrumentation and visual inspections.

During non-flood periods, the Outlet Works would remain open to maintain the stream flow of the tributary over which the dam was built. Water draining from the Diversion Channel would also flow through the Outlet Works. Routine inspections of the Off-Stream Storage Dam , as well as any maintenance necessary for the grass covering the earthfill dam, would occur during non-flood periods.

2.3.3.2.5 Outlet Works

The SR1 Concept has flow being released back into the Elbow River via an outlet to the existing channel. This outlet scheme may change as current engineering efforts include working with stakeholders to address release rate.

During a flood event the gates would be closed. Following the flood event the gates would be opened to release the stored floodwater. It is estimated that it may take 30 to 45 days to drain the Off-stream Storage Reservoir. The final release rates and durations are subject to additional assessment and engineering design.

During normal operations, the gate system would be left open to permit the flow of water from Tributary 2259 to continue to the river, as well as any water draining from the Diversion Channel. Routine inspections would be conducted on the Outlet Works.

2.3.3.2.6 Road Realignments/Modifications

During flood events, Springbank Road would be monitored to determine when the roadway should be closed and traffic detoured to Range Road 40 and Township Road 250.

Following a flood event, a road inspection would be required to assess any damage to the roadways and pavement structure, specifically Springbank Road. Depending on the impact of the flood event, remediation of Springbank Road could vary from complete loss for the pavement structure to an overlay. In addition, the bridge on Highway 22 and Township Road 242 over the Diversion Channel would need to be inspected.

No monitoring activities would be required for Highway 22 and Springbank Road during non-flood periods.

During operations, AT would retain care and control of Highway 22 and the bridges crossing the Diversion Channel. Care and control of Springbank Road, or any other county road affected by improvements to Highway 22 and Springbank Road, would become the responsibility of Rocky View County.

2.3.3.3 Decommissioning

As with most water management and other public infrastructure such as highways, this flood mitigation reservoir is intended to be a permanent installation; and thus, there is no plan for decommissioning.

2.4 EMISSIONS, DISCHARGES AND WASTE

2.4.1 Atmospheric Contaminant Emissions

2.4.1.1 Air

There would be no continuous air emissions associated with the Project. Intermittent air emissions during Project construction would consist of products of hydrocarbon combustion and particulate matter.

During construction, air emissions generated from the combustion of diesel and gasoline by the heavy equipment and construction vehicles would include carbon dioxide, carbon monoxide, volatile organic compounds, nitrogen oxides, sulphur oxides and particulate matter. As the construction equipment and vehicles would be spread out over the Project Area it is not

anticipated that their emissions would have a measurable effect on air quality. During the operations phase of the Project sources of hydrocarbon combustion emissions would be limited to maintenance vehicles.

Particulate matter, in the form of dust would be the main sources of air emissions for the Project. The dust would arise from excavation and construction activities; vehicle traffic during construction and operations; and wind erosion of the sediments that would be deposited in the Off-stream Storage Reservoir following a flood event. The amount of dust from the Project would depend on the area of soil or sediment exposed, the amount of material moved, and the moisture content of the material. Best management practices and guidelines for dust suppression would be followed.

2.4.1.2 Noise

Noise emissions for the Project would be primarily related to the use of heavy equipment and trucks to excavate, haul, grade and compact material during the construction of the Project components. The Project would comply with any noise level restrictions required by the County of Rocky View or any potential conditions within the development permit issued by the County for the Project.

2.4.2 Sources and Location of Liquid Discharges

Liquid discharges from the Project would include stormwater and water from small watercourses.

Stormwater and water from small watercourses would drain into the Diversion Channel and the Off-stream Storage Reservoir, and would eventually be released to the Elbow River via the Outlet Works. Sediments can be picked-up by these waters during and following construction activities, and have the potential to be deposited in the Elbow River. AT's standard construction practices for sedimentation and erosion control would be undertaken to mitigate the amount of material carried by storm and surface water.

2.4.3 Types of Wastes and Plans for Their Disposal

Domestic sewage from the worksite trailers located at each of the temporary laydown/stockpile areas would be collected in a septic holding tank at each site. The contents of the holding tanks would be pumped out periodically and disposed at a licenced disposal facility.

Solid wastes would be generated during the construction, and incidentally through operation of the Project. All wastes are identified in Table 2-4 and would be disposed of according to the applicable provisions of the Waste Control Regulation and the requirement for each waste classification outlined in the Alberta User Guide for Waste Managers (Alberta Environmental Protection 1996). Solid waste would be either recycled or disposed of through licenced waste

disposal companies at licenced facilities. A waste management plan would be developed as part of the Environmental Construction Operations Plan for the Project required by AT.

Table 2-4 Wastes and Waste Management Methods for the Project

Waste Stream	Management Method
Domestic waste	Contracted waste disposal
Recyclables (wood, paper, metal)	Contracted recycling
Hazardous waste	Licenced disposal facility
Waste oil	Licenced recycler
Flood debris	Contracted waste disposal
Sediment from the flood	Landfill tested and either integrated into the landscape or hauled to an appropriate facility

2.5 CONSTRUCTION AND OPERATION PHASES AND SCHEDULING

A general Project schedule is provided in Table 2-5.

Table 2-5 Project Schedule

Key Project Phase	Proposed Project Schedule
Environmental Impact Assessment	14 to 16 months
Land Acquisition	14 to 18 months
Regulatory Review Process	12 to 24 months
Cabinet Approval	2 to 6 months
Procurement	2 to 3 months
Construction	18 to 24 months
Operations	in perpetuity
Decommissioning and Abandonment	This flood mitigation reservoir would be a permanent installation and would not be decommissioned

SPRINGBANK OFF-STREAM RESERVOIR PROJECT
CANADA ENVIRONMENTAL ASSESSMENT ACT
PROJECT DESCRIPTION

Project Information
April 18, 2016

3.0 PROJECT LOCATION

3.1 DESCRIPTION OF PROJECT LOCATION

The Project is located 15 km west of the City of Calgary, in Rocky View County.

The northwest and southeast corner points of the Project Area are as follows:

- NW: -34703.218 E, 5660917.356 N
- SE: -27570.395 E, 5652979.442 N
- NW: 51° 5’ 0.33” N, -114° 29’ 43.09” W
- SE: 51° 0’ 44.84” N, -114° 23’ 34.44” W

Coordinate values are in 3TM NAD83.

A site plan of the Project can be seen in Figure 2-1. Photographs of the Project location are presented as Figures 3-1 through 3-4.

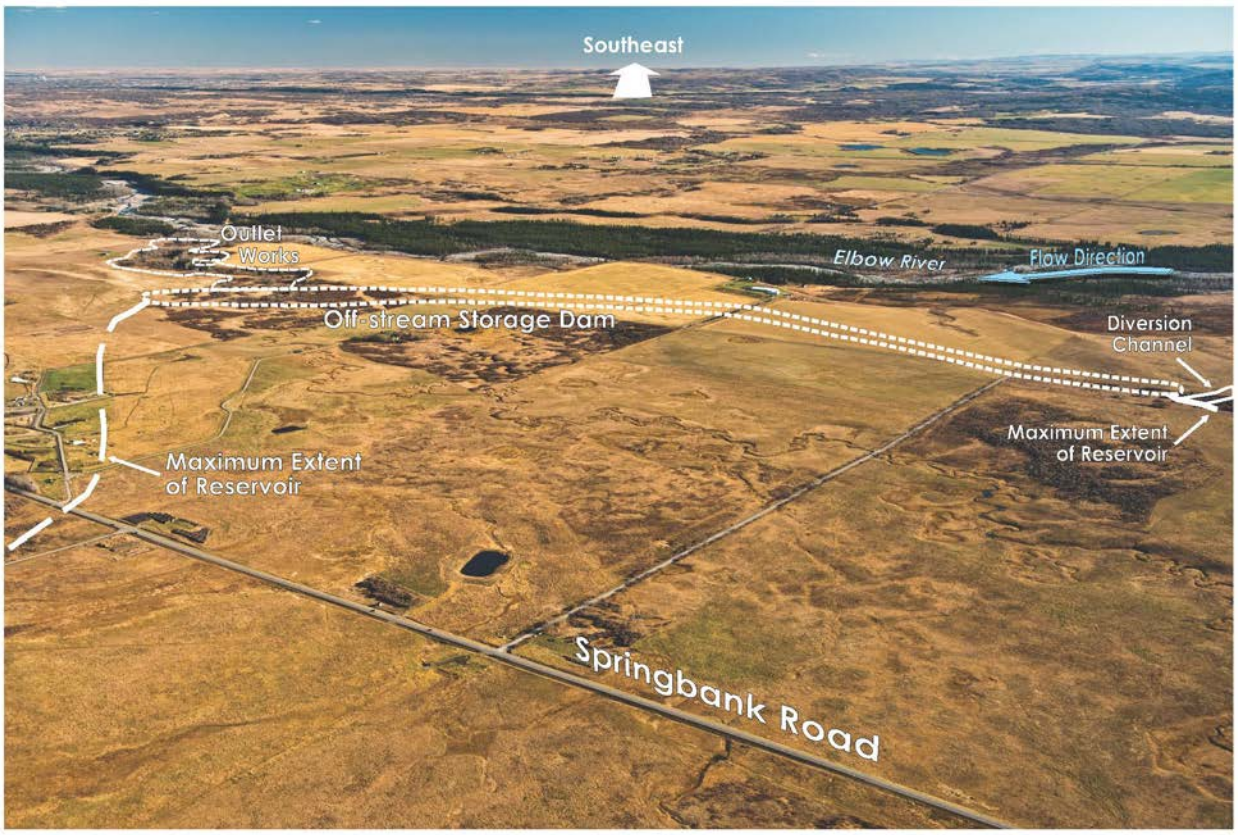


Figure 3-1 Looking Southeast towards Off-stream Storage Reservoir and Off-stream Storage Dam Locations

Figure 3-2 Looking South towards Off-stream Storage Reservoir, Off-stream Storage Dam and Diversion Channel Locations

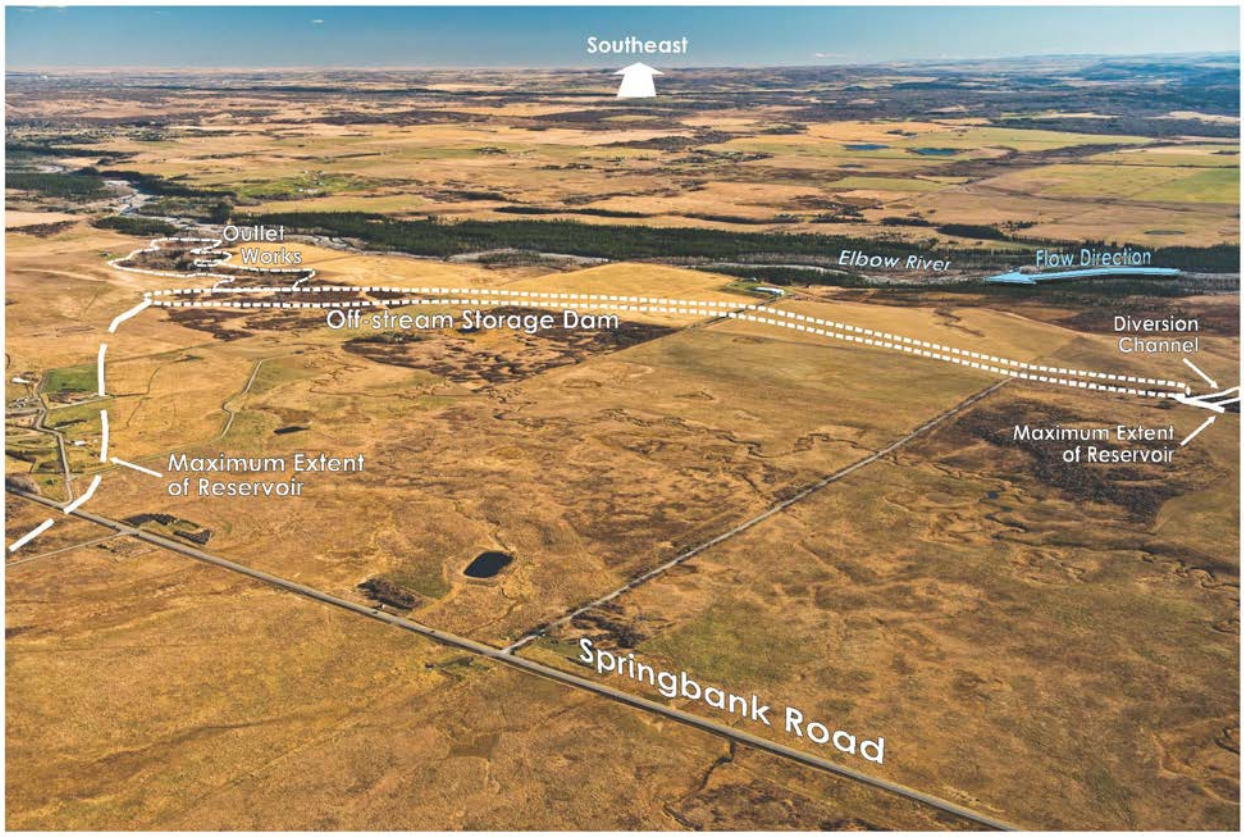


Figure 3-3 Looking Southeast towards Off-stream Storage Reservoir, Off-stream Storage Dam and Diversion Channel Locations

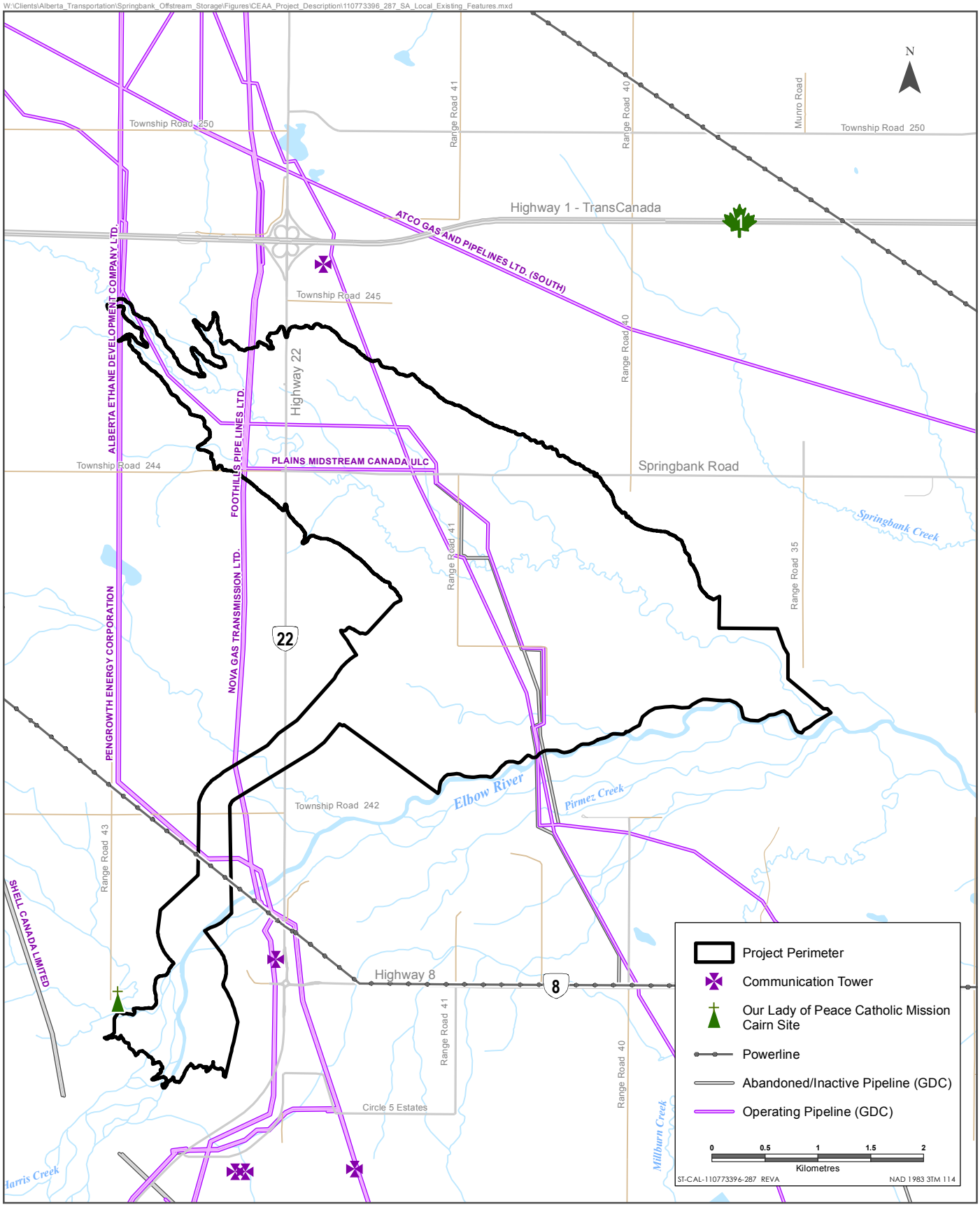
Figure 3-4 Looking Northeast towards Diversion Structure, Diversion Channel, Off-stream Storage Reservoir and Off-stream Storage Dam Locations

The Project would overlap with several existing features in the Project Area (see Figure 3-5), including:

- Highway 22 and Springbank Road
- Several operating and abandoned or inactive pipelines
- A power transmission line
- Environmentally significant areas
- Sections of historic interest

The nearest First Nation Reserve is the Tsuu T'ina Nation (Treaty 7) on Indian Reserve 145, located 395 m south of the Project perimeter (see Figure 3-6). The Stoney Nation (Treaty 7) is also close to the Project. The Stoney Nation has three reserve areas; Indian Reserves 142, 143 and 144, 142B, and 216. These reserves are located approximately 16.3 km west, 27.8 km northwest, and 61.5 km south of the Project respectively. Refer to Section 6 for additional information on First Nations.

The closest federal land is Banff National Park, approximately 53 km northwest of the Project (see Figure 3-6).



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

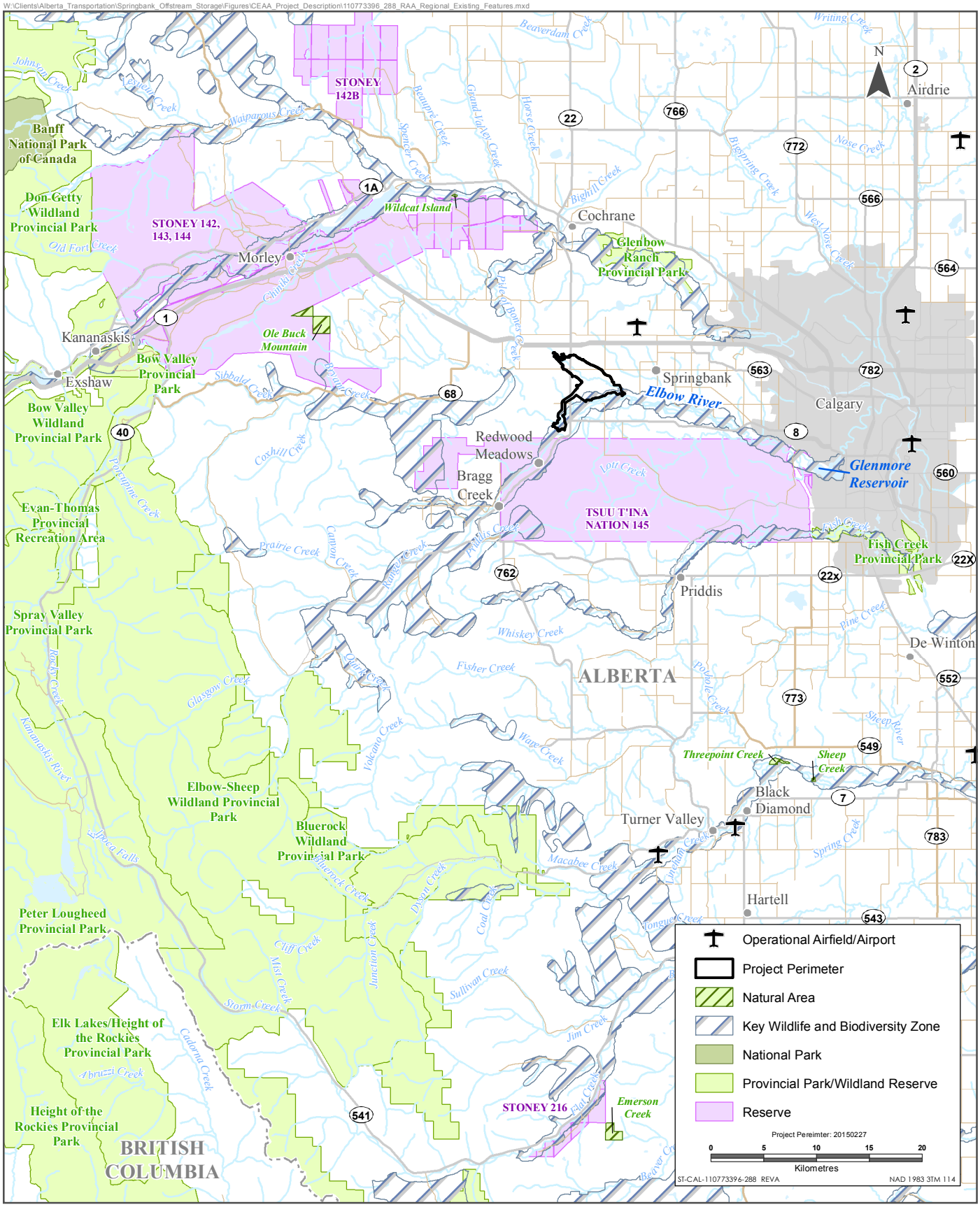
Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Existing Features within the Project Area

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 3-5



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Existing Features within the Regional Area

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 3-6

3.2 LAND AND WATER USE

Land within the Project Area is either privately owned or public land.

Most land is privately owned and lies within land use districts identified by the Rocky View County Land Use Bylaw (Bylaw C-4841-97). Rocky View County's Land Use Bylaw outlines the types of development allowed in each land use district and provides planning guidance for development in those areas. The land use districts within the Project Area include the:

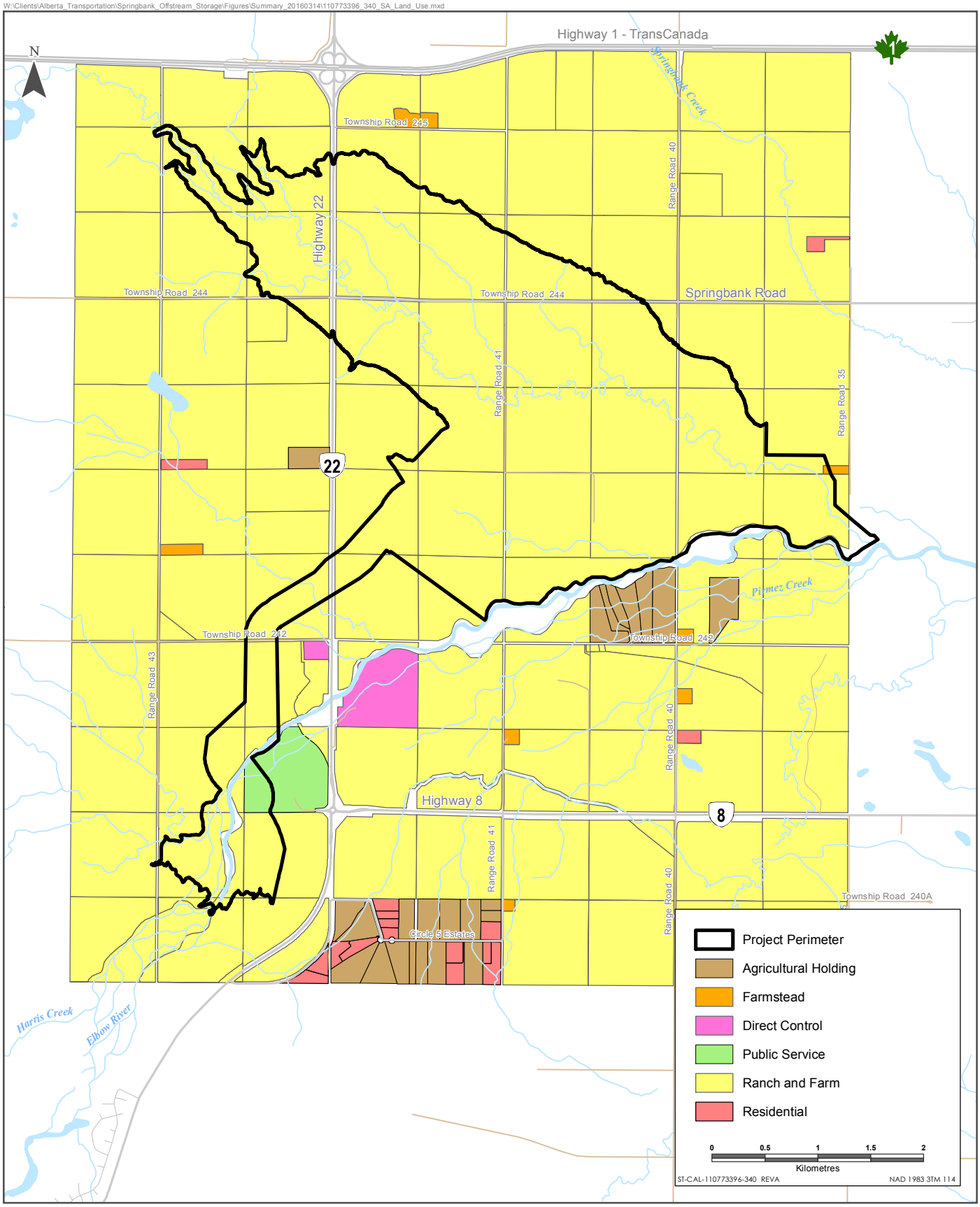
- Ranch and Farm District
- Agricultural Holdings District
- Farmstead District
- Residential District
- Public Services District
- Direct Control District

Most privately owned land within the Project Area is used for ranching and farming (see Figure 3-7). There are six farmsteads, eight residential areas and four agricultural areas. There are also three regions within the Project Area that are designated as either 'direct control' or 'public service' lands; these lands are owned by local organizations that operate summer camps at these properties. Land ownership of these properties generally includes only surface rights; however, several landowners also hold mineral rights for their properties. Most mineral rights cover all mines and minerals, but some are specific for coal, petroleum, oil sands or natural gas.

Prior to the start of construction, the Government of Alberta would purchase the privately owned land (surface rights only) that would be affected by the Project (see Figure 2-1). The properties purchased would occur within the Ranch and Farm, Farmstead and Public Service Districts (see Figure 3-7).

The purpose and intent of the Project is not consistent with those identified for the Ranch and Farm, Farmstead and Public Service Districts in the Rocky View County Land Use Bylaw. The development requirements for these districts are also not appropriate for the SR1. Should the Project be approved, however, authorizations granted by the NRCB and AEP would prevail over compliance to the Rocky View County Land Use Bylaw as per Part 17, Division 1 of the *Municipal Government Act*.

Public land in the Project Area is composed of the rights-of-way for roads and road allowances, and the bed and banks of the Elbow River and its tributaries.



Sources: Base Data - Government of Canada. Thematic Data - Government of Alberta

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Land Use within the Project Area

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 3-7

The Project may require access to, use of, or the exploration, development, and production of lands and resources currently used for traditional purposes by aboriginal peoples. While most of the Project will be constructed on land that has been privately owned since the late 1880s, construction activities within the Elbow River may affect how First Nations utilize the river and its resources at or downstream of the Project Area. AT's ongoing consultation with all Treaty 7 First Nations have not identified traditional use of the Project perimeter by First Nations individuals. Consultation will continue through the Project development and operation.

4.0 FEDERAL INVOLVEMENT

4.1 FEDERAL FINANCIAL SUPPORT

The Project does not include any proposed or anticipated federal financial support.

4.2 FEDERAL LANDS

No federal lands would be used for the purpose of carrying out the Project, nor would there be any granting of interest in federal land (i.e. easement, right-of-way, transfer of ownership).

4.3 FEDERAL LEGISLATIVE OR REGULATORY REQUIREMENTS

Outside of the Physical Activities Regulations under the *Canadian Environmental Assessment Act*, 2012, there are no confirmed federal legislative or regulatory requirements (including any federal permits, licences or other authorizations) applicable to the Project. An authorization under the Fisheries Act may be required.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT
CANADA ENVIRONMENTAL ASSESSMENT ACT
PROJECT DESCRIPTION

Federal Involvement
April 18, 2016

5.0 ENVIRONMENTAL EFFECTS

5.1 PHYSICAL AND BIOLOGICAL COMPONENTS THAT MIGHT BE ADVERSELY AFFECTED BY THE PROJECT

5.1.1 Environmental Overview Methods

In addition to a road-based reconnaissance of the Project Area conducted in November 2014, a desktop review of existing literature and publically available geospatial datasets was conducted to identify potential environmental considerations relevant to the Project. The desktop review included:

- The Agricultural Regions of Alberta Soil Inventory Database (ASIC 2014), Soil Survey of the Calgary Urban Perimeter (MacMillan 1987) and the Surficial Geology of the Calgary Urban Area report (Moran 1986).
- Documents and datasets used to identify wetlands, riparian zones, and historical rare plant locations:
  - Grassland vegetation inventory (ESRD 2013a)
  - Alberta Canadian wetland classification system merged wetland inventory (ESRD 2013b)
  - Rare plant and rare ecological community element occurrence data (Alberta Conservation Information Management System [ACIMS] 2014)
  - Orthophoto imagery from 2008 (Alberta Transportation 2008)
  - National Hydro Network (Geobase 2014)
  - Highway 22:14 and 22:16 Highway Twinning and Interchange Configuration Environmental Overview Assessment (EBA 2010)
- Groundwater Evaluation and Monitoring Plan Elbow River Watershed Subregion Townships 018 to 024, Ranges 29W4 to 09W5 Alberta (Waterline 2011)
- Documents and datasets used to identify wildlife Species of Management Concern (SOMC) and habitat features that may require regulatory consideration during Project construction, including:
  - Alberta Environment and Sustainable Resource Development (ESRD) wildlife sensitivity data sets (ESRD 2014a) for sensitive raptor range, sensitive amphibian range, sensitive snake species range, sharp-tailed grouse, and Key Wildlife and Biodiversity Zones
  - Important bird areas (IBA Canada 2014)
  - Environmentally significant areas in Alberta (Alberta Parks 2014; Fiera 2014)
  - Provincially protected areas including ecological reserves, wilderness areas, wildland provincial parks, wilderness parks, provincial parks, natural areas, heritage rangelands, and provincial recreation areas
  - Fish and Wildlife Management Information System (FWMIS) for SOMCs reported within the study area (ESRD 2014b; Jon Jorgenson, ESRD, pers. comm., 3 December 2014)

  - Previous reports for the study area: Highway 22:14 and 22:16 Highway Twinning and Interchange Reconfiguration Environmental Overview Assessment (EBA 2010).
- Documents and datasets used to identify surface waters, and fish and fish habitat, including:
  - The Highway 22 Environmental Overview Assessment (EBA 2010)
  - Fish and Wildlife Management Information System (FWMIS) for stream ID numbers (ESRD 2014b)
  - Water Act Code of Practice for Water Course Crossings (ESRD 2013c)
  - Satellite imagery (ESRI 2014)
- Archaeological records and documents were reviewed to provide archaeological and historic context and to interpret historical resource potential, including:
  - a site file search of archaeological and historic site records maintained by Alberta Culture and Tourism (formerly Alberta Culture)
  - the Listing of Historic Resources (Alberta Culture and Tourism, March 2015 edition)
  - previous archaeological consultants' final permit reports
  - geological mapping data
  - historic period Dominion Land Survey Plans of Township
  - field notes identifying historic period trails and early homestead/settlement locations
  - current air photos.

5.1.2 Soils and Terrain

Most of the Project Area consists of alternating bands of hummocky and undulating terrain that run northwest to southeast. Near the Elbow River, the terrain changes to that characteristic of a stream valley, with one or more terraces within the modern river channel. Near the southern end of the Project Area, on the south side of the Elbow River, there is an area that is also terraced but is not within the modern river channel.

Hummocky regions have low to moderate relief, with gentle slopes varying between 2-15%. Areas with low relief are generally underlain by till or glaciolacustrine sediments, while areas of moderate relief are underlain by till and glaciofluvial sediments. Soils in these regions are fine to moderately fine in texture.

Regions of undulating terrain are more level (0-5% slope) with areas of high relief. Subsurface sediments are primarily glaciofluvial overlying till, but may also be made of a mix of glaciofluvial and glaciolacustrine sediments overlying till. Soils in these regions usually have a fine texture, but may be fine to moderately coarse depending upon the underlying sediments.

Outcrops of bedrock can be found in the Project Area, they are moderately weathered and fractured. One outcrop that is in the Project Area is made of sandstone and occupies a ridgetop close to Highway 22 approximately 1300 m south of the Springbank Road. The interest value of this outcrop is increased by the presence of some grey boulders below the outcrop that are likely limestone glacial erratics (see Figure 5-1).

Figure 5-1 Sandstone Outcrop Near Highway 22

Within the stream/river valley, soils are coarse imperfectly drained Regosols and Humic Regosols with poorly drained Humic Gleysols and rapidly drained Regosols on gravel. Terraces not in the modern stream/river channel have soils that are moderately well drained Black Chernozemics with poorly drained Humic Gleysols in scattered wet depressions.

Most soils in the Project Area are susceptible to wind erosion. Soils in the terraces south of the modern stream/river channel are also susceptible to water erosion, while soils away from the river valley are prone to rutting and compaction.

5.1.3 Hydrogeology

The Quaternary deposits in the Project Area consist of glaciolacustrine and till (Fenton et al. 2013; Moran 1986). Post-glacial fluvial channel sediments can be found within the Elbow River valley, in the southern part of the Project Area. These sediments developed as the Elbow River exported eroded material from upstream areas and deposited coarse alluvium (sand and gravel) in the floodplain of the Elbow River valley.

The Quaternary deposits are underlain by bedrock from the Paskapoo Formation, Coalspur Formation and Brazeau Formation (Prior et al. 2013).

The deposition of alluvium over Quaternary deposits in the Elbow River valley resulted in formation of an alluvial aquifer, an important source of groundwater for the river and local residents (ERWP 2015). The alluvial aquifer provides temporary storage for water from the Elbow River during floods, and then releases that water back to the river. Groundwater from the alluvial aquifer is essential in maintaining baseflow of the Elbow River. Yields for the Elbow River alluvial aquifer range from 2-8 L/sec (Waterline 2011).

The Paskapoo Formation is the primary bedrock aquifer in the Elbow River watershed. Due to the stratigraphy of the layers of sandstone and shale present within this formation, multiple aquifers can be found at various depths in the rock (Waterline 2011). In the Project Area, the yield value for the Paskapoo Formation aquifer is 0.4-2 L/sec (Waterline 2011).

5.1.4 Vegetation

The Project Area is located in the Foothills Parkland Natural Subregion of Alberta, west of Calgary city limits. The rolling topography in this subregion has resulted in a mosaic of plant communities, three of which are dominant within the landscape: foothills rough fescue grasslands, beaked willow shrublands, and aspen groves (DeMaere et al. 2012). Disturbed areas within the subregion are largely a result of rangeland management as well as oil and gas development. While native prairie grasslands dominated by foothills rough fescue (*Festuca campestris*) have been converted into crops or pasture, agricultural practices are limited in this subregion by the short, cool growing season (DeMaere et al. 2012).

Upland native prairie grasslands were identified as occurring in the Project Area, as were wetlands and riparian areas.

5.1.4.1 Wetlands and Riparian Areas

Data from the Alberta Grassland Vegetation Inventory and the Alberta Canadian wetland classification system merged wetland inventory was used to map riparian and wetland areas within the Project Area (see Figure 5-2).

Riparian areas are mainly restricted to the banks of the Elbow River. Lentic wetlands (areas of still water) are scattered throughout the Project Area with a major concentration along the shallow valley where the proposed reservoir would be located. These areas are categorized as being either 5-50% or >50% wetland coverage. The wetland areas show the drainage pattern within the Project Area. These areas may be subject to further investigations during field studies as they are more likely to host rare plant species than the nearby upland prairie.

5.1.4.2 Rare Plants

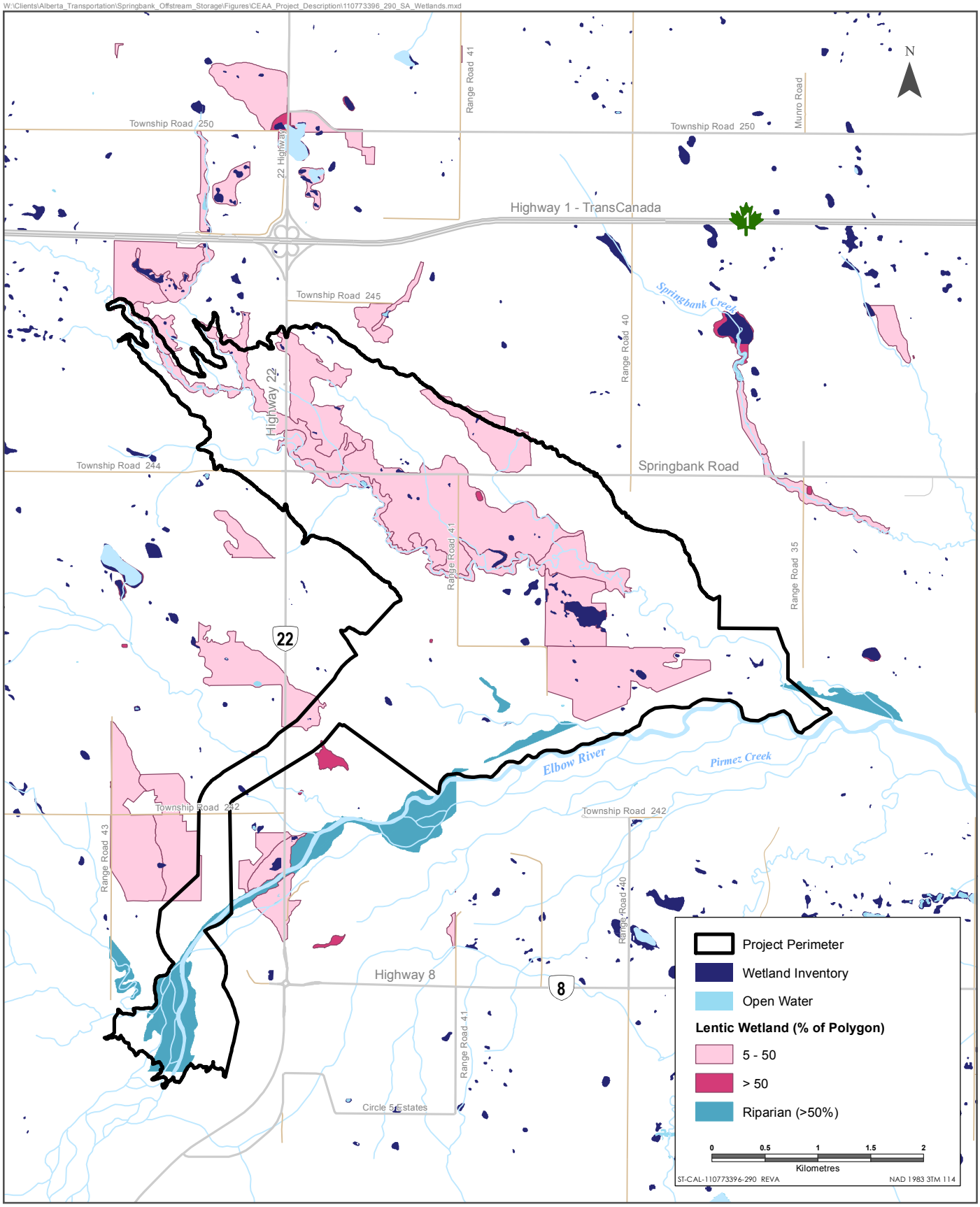
A search of the Alberta Conservation Information Management System database revealed a record of a rare plant species within the Project Area. One tracked species (soot lichen (*Cyphelium notrisii*)) was recorded approximately 2500 m northeast of the Project perimeter. This species has a rank of S2 indicating that it is rare in the province (<20 populations). The lack of historical rare plant occurrences elsewhere in the Project Area may be an indication of a lack of rare plant surveys rather than a lack of rare plants.

Other rare vascular plant species that might occur within the Foothills Parkland Subregion are listed in Table B-2, Appendix B. Of these species, only limber pine (*Pinus flexilis*) is listed as *Endangered* in the Alberta *Wildlife Act* [RSA 2000, c W-10]. Limber pine occurs on sandstone ridges next to the Trans-Canada Highway west of the Project Area and might also be present within the Project Area. Western blue flag (*Iris missouriensis*) is listed as *Special Concern* in the federal Species at Risk Act (SARA) [SC 2002 c 29] and has the potential to occur in wet meadow wetlands within the Project Area.

5.1.4.3 Native Grassland

Much of the Project Area is composed of upland native prairie grassland (see Figure 5-3). An area is classified as being native prairie when more than 30% of that area is composed of native prairie. This threshold aligns with the accepted threshold used in the range health assessment guidelines for Alberta (Adams et al. 2003).

There is also the potential for foothills fescue grassland to occur in the areas identified as native prairie. Fescue grassland and other rare ecological communities potentially present in the Project Area are listed in Table B-1, Appendix B.



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

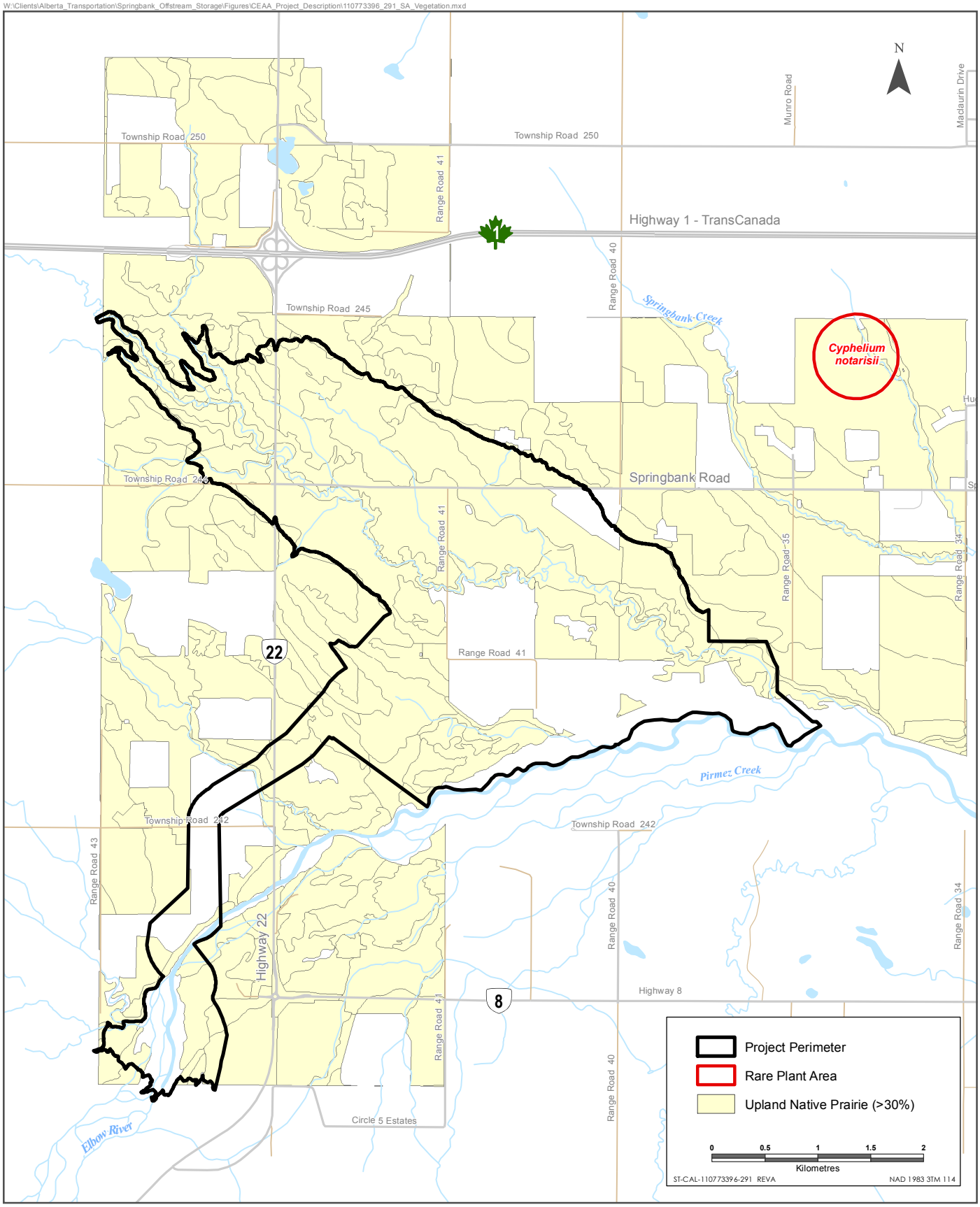
Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Wetland and Riparian Areas

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 5-2



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Native Prairie and Rare Plants

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 5-3

5.1.5 Wildlife

A wildlife desktop review was conducted for the Project Area to identify wildlife Species of Management Concern (SOMC) and habitat features (e.g., dens, hibernacula) that may require regulatory consideration during project construction. Species of Management Concern are those that are

- listed federally as "endangered", "threatened" or "special concern" on Schedule 1 of the *Species at Risk Act* (SARA; Government of Canada 2014a); or
- designated federally as "endangered", "threatened" or "special concern", or identified as "under review" for listing by COSEWIC (2014); or
- listed provincially as "endangered", "threatened" or "special concern" (ESRD 2014a), including species with legal protection under the Alberta *Wildlife Act*; or
- designated provincially as "at risk", "may be at risk" or "sensitive" according to the General Status of Alberta's Wild Species (ESRD 2012).

A review of wildlife species ranges (Naughton 2012; Pattie and Fisher 1999; Sibley 2003; Stebbins 2003; Federation of Alberta Naturalists 2007; eBird 2014) and the presence of available wildlife habitat indicate that a total of 76 wildlife SOMC (60 bird, 11 mammal, 3 amphibian and 2 reptile species) may occur (breed, migrate, winter and/or reside) in the vicinity of the Project Area (see Appendix C, Table C-1). Twelve of these SOMC are listed as "special concern", "threatened" or "endangered" under Schedule 1 of SARA (Table C-1).

Results from the FWMIS database did not reveal any previously documented SOMC within the Project Area; however, barn swallows (*Hirundo rustica*) were previously observed near a wetland located in the Project Area (EBA 2010). Barn swallows are designated as "threatened" under COSEWIC (2014) and are listed provincially as a "sensitive" species (ESRD 2012). The absence of recorded sightings in the vicinity of the Project Area may relate to the limited number of previous studies rather than a lack of SOMC present.

The Project and surrounding area lies within sharp-tailed grouse and sensitive raptor ranges. Sensitive raptors for the area are bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*) and prairie falcon (*Falco mexicanus*) (ESRD 2014c).

During consultation, landowners in the Project Area indicated that they have seen occasional sightings of grizzly bears (*Ursus artos*) in the area. Grizzly bears are one of the SOMC, and are designated as a species of "special concern" under COSEWIC (2014) and are listed provincially as an "at risk" species (ESRD 2012).

No sensitive snake ranges and no snake hibernacula (winter hibernation dens) or maternity dens, were identified in the Project Area through the FWMIS database search, though suitable habitat for hibernacula might exist along the Elbow River. The FWMIS search revealed no sensitive

amphibian ranges, important bird areas, provincially protected areas, ecological reserves, wilderness areas, wildland provincial parks, wilderness parks, provincial parks, natural areas, heritage rangelands, or provincial recreation areas in the Project Area.

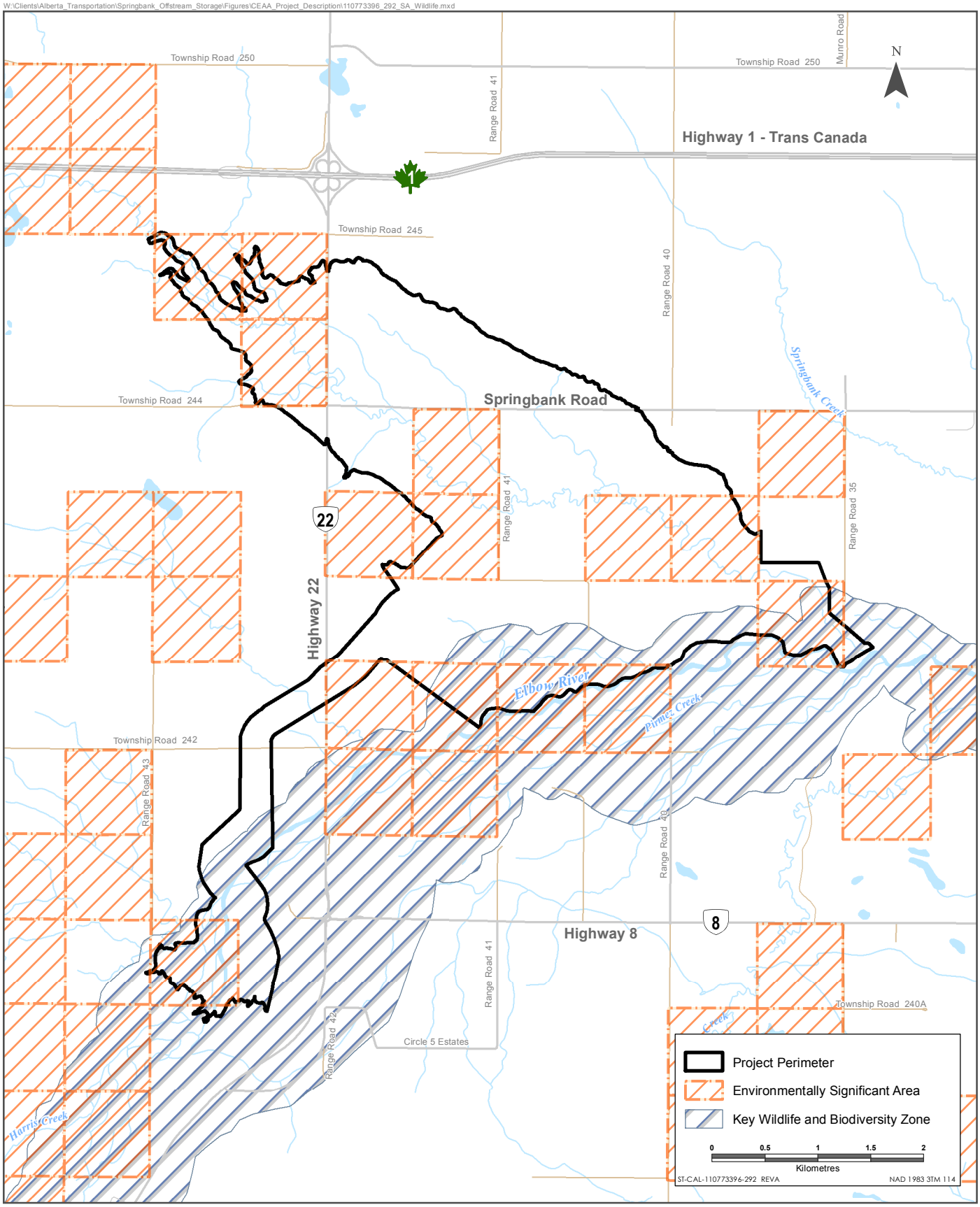
A portion of the Project Area along the Elbow River contains a Key Wildlife and Biodiversity Zone (ESRD 2014a) and Environmentally Significant Areas (Alberta Parks 2014; Fiera 2014) (Figure 5-4). Key Wildlife and Biodiversity Zones are areas considered to be key winter ungulate habitat and have high habitat potential for biodiversity. Typically, these zones are established along major river valleys (e.g., Elbow River) and are intended to prevent loss and fragmentation of habitat, prevent sensory disturbance to wildlife during periods of thermal or nutritional stress, and prevent the development of barriers to wildlife corridors (ASRD 2011). Environmentally Significant Areas are:

- important to the long-term maintenance of biological diversity, soil, water, or other natural processes, at multiple spatial scales, and
- areas that contain rare or unique elements or that include elements that may require special management consideration due to their conservation needs (Alberta Parks 2014).

Some of the wildlife SOMC that may occur within the Project Area have restricted activity periods associated with them. These timing restrictions apply to various land use/surface disturbance activities, including construction of permanent structures, and were developed to protect wildlife and maintain key wildlife areas or locations that play an essential role in a species survival (Government of Alberta 2011). Depending upon the species, the restricted period is generally between April 1 and July 31 or is year round. One species (grizzly bear) has a restricted activity period between October 1 and April 30, although grizzly bears are not expected to overwinter in the Springbank area and no dens location have been identified in the Project Area.

Project activity setback distances from the key wildlife areas or locations are the means used to protect SOMC during the restricted activity periods. Setback distances for birds range from 100 m to 1,000 m from their nesting sites, depending on species; and amphibians have a setback of 100 m from their breeding ponds. Setback locations for reptiles and mammals are generally based on their overwintering locations. Grizzly bears den sites have a 750 m setback.

Key Wildlife and Biodiversity Zones in the Project Area also have a restricted activity period, which occurs between December 15 and April 30, but do not have a setback distance associated with them.



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Key Wildlife and Biodiversity Zone and Environmentally Significant Areas

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESERVOIR PROJECT

Figure 5-4

5.1.6 Surface Water and Aquatic Environment

5.1.6.1 Surface Water

The Project is within the Elbow River Watershed, which is part of the Bow River Basin. The Elbow River flows eastward from Elbow Lake in the eastern slopes of the Canadian Rockies to the City of Calgary, where it flows into the Glenmore Reservoir and then merges with the Bow River. The Elbow River upstream of the Glenmore Reservoir is also known as the upper Elbow River.

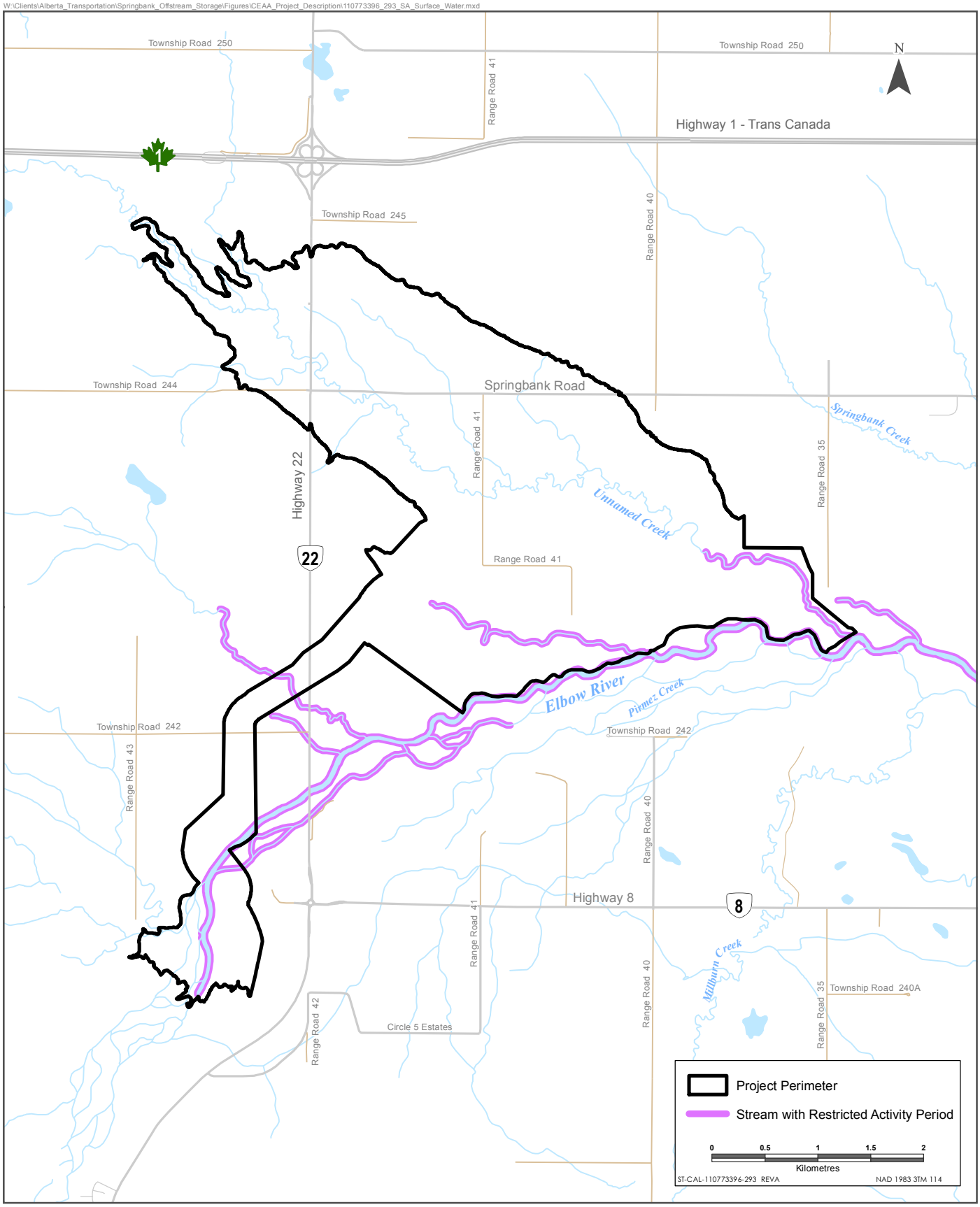
The main watercourses in the Project Area (Figure 5-5) are the Elbow River and three of its north bank tributaries: a stream (ID 1350) crossed by Highway 22 approximately 800 m north of the Elbow River, a second stream (ID 2259) crossed by Highway 22 near Springbank Road, and Springbank Creek to the northeast. In addition to these streams, a number of smaller tributaries, tributaries to tributaries and ephemeral draws extend from the Elbow River into the Project Area.

There are no lakes in the Project Area, but there are numerous wetlands.

5.1.6.1.1 Water Quality

The Elbow River is an important water source, as it is serves as a direct drinking water source to approximately 1 in 6 Albertans (Sosiak and Dixon 2004). This tributary to the Bow River also supports recreational, agricultural, urban and rural developments.

Water quality in the upper Elbow River and Glenmore Reservoir has been studied since the mid-1980s. Studies by Sosiak (1999) and Sosiak and Dixon (2004) show that the upper Elbow River has excellent water quality, however the more developed downstream reaches of the watershed experience deteriorating conditions as there is “increasing trends in concentration of phosphorus, nitrogen, total suspended solids and coliforms”, all of which are key water quality indicators (ERWP 2009).



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Surface Water

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESERVOIR PROJECT

Figure 5-5

5.1.6.2 Fisheries

5.1.6.2.1 Elbow River

The Elbow River is an alluvial bed river system, which can be divided into three major sections separated by impassible barriers to upstream fish movement. These sections are upstream of Elbow Falls, between Elbow Falls and the Glenmore Reservoir, and downstream of the Glenmore Reservoir to the confluence with the Bow River. With this type of river system, the river bed will shift during high water events, creating a series of pools and riffles along the river. The Project is entirely in the Elbow Falls and the Glenmore Reservoir section (Section).

The Project Section of the river bed is composed of mobile gravel and cobbles. The river bed near the Project Area is a mix of gravels depositing on the bed from upstream and lateral erosion as the river flows through the glacial and lacustrine deposits.

The Elbow River contains a variety of valued fish species including brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), bull trout (*Salvelinus confluentus*), burbot (*Lota lota*), cutthroat trout (*Oncorhynchus clarkii*), mountain whitefish (*Prosopium williamsoni*), rainbow trout (*Oncorhynchus mykiss*), white sucker (*Catostomus commersoni*), longnose sucker (*Catostomus catostomus*), and mountain sucker (*Catostomus platyrhynchus*). Gravel spawning beds (high content of gravel 2-64 mm in size) for salmonids (trout species), or scoured pools (>1.2 m deep) that provide high quality overwintering habitat to fish, can be found in the Elbow River

The Elbow River is a Class C watercourse with restricted activity periods of May 1 to July 15 and September 16 to April 15 under the *Water Act* Code of Practice for Watercourse Crossings (the Code) (ESRD 2013c). These are the time periods during which fish migration, fish spawning, egg incubation, fry emergence or early fry development are likely to occur.

5.1.6.2.2 Elbow River Tributaries

The FWMIS database contains no historical fish records for the Elbow River tributaries in the Project Area (ESRD 2014b). Based on a preliminary review of satellite imagery (ESRI 2014) and historical fish habitat information (ESRD 2014b), identified tributaries to the Elbow River appear intermittent or ephemeral and are unlikely to contain sensitive fish habitat. This is further supported by the Class D (low sensitivity) designations of tributary 2259 and Springbank Creek under the Code of Practice. However, the lower reaches of these and other tributaries (i.e., within 2 km of the Elbow River) may support Elbow River fisheries, and those portions (see Figure 5-5) are designated Class C under the Code. Accordingly, these 2 km reaches have restricted activity periods of May 1 to July 15 and September 16 to April 15.

5.1.7 Land Use and Management

The Project Area lies entirely on lands in Rocky View County. The nearest major urban centre is the City of Calgary, located 15 km east. Springbank, a rural community, lies between the City of Calgary and the Project Area. The Hamlet of Bragg Creek and the Townsite of Redwood Meadows are also nearby communities, located along the Elbow River southwest of the Project Area. The Tsuu T'ina Nation Indian Reserve is located to the south of the Project Area.

The primary land use in the immediate vicinity of the Project Area is ranching. Other land usage includes country residential, and agricultural holdings. There are also sections of land in the Project Area used by Scouts Canada and the Kiwanis Club of Calgary for private recreational camps. Scouts Canada announced that as of 1st October 2015 they will no longer be operating their Camp Gardner site. However, they hold the lease for the site (which is on Crown Land) until 2017, and are currently looking for a group or organization interested in taking on the lease, therefore activities may continue at the camp until 2017.

Several pipeline and utility rights-of–way cross the Project Area. The pipelines carry a variety of substances including high pressure and low pressure product, natural gas and sour gas.

5.1.8 Air Quality

Air quality information for the Project Area is not available.

The Project is located in a rural setting, where ranching and farming are the primary activities, and air emission sources are generally limited to local and highway traffic, vehicle refueling and residential heating. Airborne particulate matter (dust) generated from traffic travelling on dry gravel roads is one of the more predominant sources of air pollutants in the Project Area. Wind blowing across these same roads can also increase the ambient amount of dust in the air and can relocate concentrations of dust downwind.

5.1.9 Historical Resources

5.1.9.1 Archaeology

There are a number of historical resource sites in the Project Area. All subdivision development within the Project Area have a Historic Resource Value (HRV) of at least 5 for archaeology, indicative of the high potential for recovery of archaeological resources.

Twelve historical resource studies have been conducted within the vicinity of the Project Area, resulting in the identification of 10 archaeological sites (Table 5-1). All ten of these sites currently have HRVs of 0, indicating that they have been assigned low heritage value and are of no further concern from a planning perspective. However, they do identify the historical activity in the area. The low number of recorded sites in the Project Area may relate to the limited number

of previous studies rather than a lack of historical resources sites present. Furthermore, the earlier studies (ca. 1970-1980s) that were conducted in the Project Area did not include current methods of intensive subsurface testing programs or manual screening of sediments, or deep testing with a backhoe, which may also account for the low number of sites recorded during this period. Additionally, these studies are mainly linear in scope with relatively narrow footprints in relation to the Project Area.

Table 5-1 Recorded Archaeological Resources within the Project Area

Borden # and Site Type	Permits	HRV[1]	Relationship to Activity
EgPo-36 (campsite)	75-042; 78-020; 78-075; 84-021	0	in Project Area
EgPo-37 (campsite)	75-042; 78-075	0	in Project Area
EgPo-39 (isolated find)	78-20; 93-007; 94-104	0	in Project Area
EgPo-44 (isolated find)	78-053	0	in Project Area
EgPo-46 (isolated find)	84-021	0	in Project Area
EgPo-61 (isolated find; collection)	n/a	0	in Project Area
EgPo-67 (scatter)	92-001	0	in Project Area
EgPo-68 (campsite)	93-007	0	in Project Area
EgPo-69 (campsite)	11-040	0	in Project Area
EgPo-71 (structure)	11-040	0	in Project Area

NOTE:
[1] Listing of Historic Resources (Alberta Culture and Tourism, March 2015 edition)

Thirty-one archaeological sites, including some of high heritage value, were recorded on the south side of the Elbow River and along its tributary drainages within Sections 7, 8, 17 and 18 by Hanna (2002, 2003), indicating the high potential of the river and its drainages for historical sites.

There are 20 historic structure sites located within the Project Area, recorded by Quarter Section (see Table 5-2, Figure 5-6). Historic structures are structures that may be standing or partly standing, and are thought to be older than about 1960 (Alberta Culture and Tourism 2012). One of these structures, the Our Lady of Peace Roman Catholic Mission (est. 1872) is located close to the Diversion Structure and channel component of the Project and has an HRV of 2. It is a protected provincial historic resource.

Table 5-2 Recorded Historic Structures within the Project Area

Legal Location	Recorded Owner/Site Name	Date	No. of Recorded Structures
SW 25-24-4 W5	Louis Copithorne farm	ca. 1915	2
	Willow Brook Ranch	ca. 1950	18
NW 30-24-3 W5	Rex Young farm	ca. 1904	7
SW 30-24-3 W5	Robinson/Barkley residence	1923	1
SE 30-24-3 W5	Barkley/Robinson farm	ca. 1930s	6
SW 29-24-3 W5	William Copithorne farm	ca. 1919	12
NE 22-24-4 W5	Jumping Pound School	1893	1
	Paddy Drummond farm	1894	demolished
	Carter garage	1937	1
NE 24-24-4 W5	Val Vista Ranch	ca. 1936	10
SW 20-24-3 W5	George Rennick garage	n.d.	1
NE 15-24-4 W5	Wildwood Youth Hostel	1910	1
SE 15-24-4 W5	bungalow	1965	1
SW 14-24-4 W5	Norman ranch	1892	demolished
NW 10-24-4 W5	Jack Haviland residence	1928	1
NE 10-24-4 W5	Johnny Gauthier ranch	ca. 1928	10 including modern
NE 10-24-4 W5	Ted Gauthier ranch	ca. 1960s	4
SW 10-24-4 W5, NW 3-24-4 W5 - HRV 2h	Our Lady of Peace Roman Catholic Mission	1872	n/a – cairn marker
SE 10-24-4 W5	Kamp Kiwanis	ca. 1940s	numerous
W ½ 11-24-4 W5	Camp Gardner	ca. 1950s	numerous
SW 11-24-4 W5	Gardner/McDougall farm yard	ca. 1925	15 including modern
NE 3-24-4 W5	Vince Robinson farm	ca. 1885	7

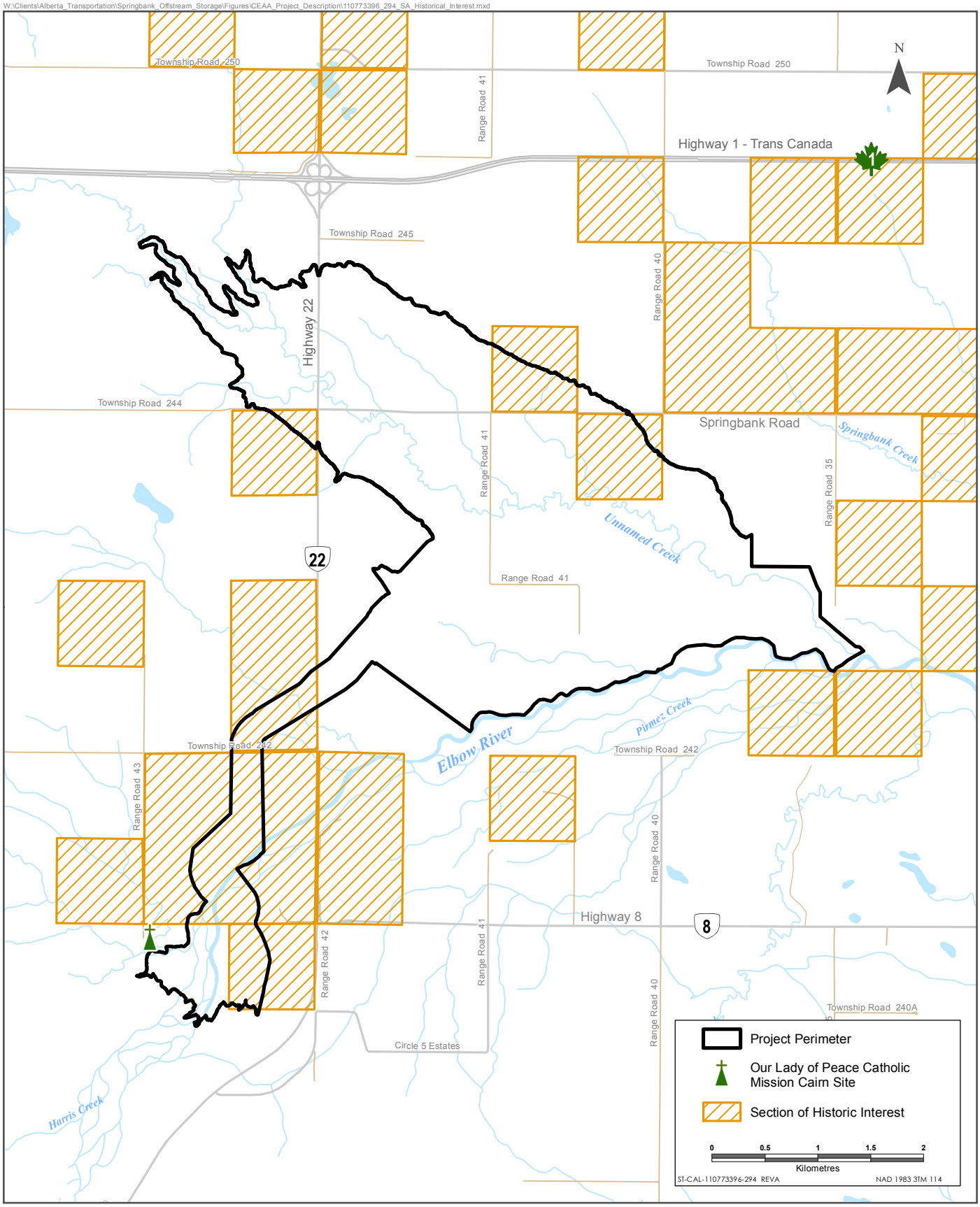
The Tsuu T'ina Nation Indian Reserve is located to the south of the Project Area. The Tsuu T'ina are members of Treaty 7, which was signed in 1877. The Project Area also has a relatively early history of Euro-Canadian settlement, in the late 1880s. The area was originally part of the Cochrane Ranch, and this, combined with its proximity to the railroad and the City of Calgary, made the area attractive for early settlement by ranching families.

Given the lengthy history of settlement in the Project Area, there is the potential that some unrecorded historic structure sites are also present within the Project Area. Several of the older, previously recorded sites may also have subsurface components, despite demolition of the aboveground structures.

The Calgary to Morleyville Trail is also noted on the historic plans for Township 24 Ranges 3 and 4 West of 5 Meridian (Dominion Lands Office 1884a, b). However, no trails are visible on current air photos. The Dominion Land Survey's 1927 Field Notes for Township 24 Range 4 mention a land owner located north of the Elbow River on the east side of Section 10-24-4 W5M. Current air photos illustrate that there are two yard sites in this general area and one may represent a later incarnation of the early yard site. No other trails or points of interest relevant to the Project were noted in these records.

5.1.9.2 Palaeontology

The Project Area is within the eastern limit of the disturbed belt for Cordilleran deformation, where strata of rock have been uplifted and tilted during the formation of the band of mountain ranges west of the Project Area. The geological formations that comprise the strata extend diagonally in bands with the older Cretaceous units (145-65 million years ago) in the southwest and younger Paleocene units (65-55 million years ago) in the northeast. The units include the Brazeau, Coalspur and Paskapoo formations (Hamilton et al. 1999). All units are fossiliferous and the Paskapoo Formation contains numerous early mammal sites in the Calgary and Cochrane areas. The closest fossil localities are the Nordic Ski Quarry, Bearspaw Dam sites and an unnamed site along the Elbow River in Fish Creek Provincial Park. There are no previously recorded fossil localities within the Project Area and no lands with HRVs for palaeontology. The bedrock outcrop along Highway 22 (Figure 5-1) is a useful geological reference section of the contact between the Brazeau and Coalspur formations (Wilson 2011).



Sources: Base Data - ESRI, Natural Earth. Thematic Data - ERBC

Disclaimer: This map is for illustrative purposes to support this Stantec project; questions can be directed to the issuing agency.

Sections of Historic Interest

Stantec

ALBERTA TRANSPORTATION SPRINGBANK OFF-STREAM RESEVOIR PROJECT

Figure 5-6

5.2 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FISH AND FISH HABITAT, LISTED AQUATIC SPECIES AND MIGRATORY BIRDS

Alberta Transportation is experienced in planning and constructing major projects in a manner that reduces environmental effects. AT has a comprehensive environmental management system and has developed numerous practices and procedures to identify environmental risks and protect the environment throughout the design, implementation, and operation of projects.

The effects of the Project on the environment will be evaluated during the Environmental Impact Assessment which is in progress. As Project planning proceeds, mitigation and restoration measures will be identified to offset or reduce the environmental effects of the Project. These measures will include:

- Use of the Environmental Construction Operations (ECO) Plan developed by AT in conjunction with the Cities of Calgary and Edmonton
- Implementation of AT's Standard Construction Practices
- Use of Best Management Practices
- The input of environmental information to the design of the Project

The Project has the potential to affect changes on the environment, some of which can affect fish and fish habitat, listed aquatic species and migratory birds; all environmental components that come under federal jurisdiction.

5.2.1 Fish and Fish Habitat, as Defined in the Fisheries Act

The Elbow River, and some of its tributaries, occur within the Project Area. A variety of fish species can be found in the Elbow River including brook trout, brown trout, bull trout, burbot, cutthroat trout, mountain whitefish, rainbow trout, white sucker, longnose sucker, and mountain sucker. Gravel spawning beds for many of these species, as well as scoured pools that provide high quality overwintering habitat for fish, can be found in the Elbow River. There may also be fish habitat within the lower reaches of the Elbow River tributaries within the Project Area that support the Elbow River fisheries.

Construction of the Project in near the Elbow River or the lower reaches of some of the rivers tributaries may affect fish habitat at and around the Diversion Structure, Diversion Channel, Off-stream Storage Dam and Outlet Works. If gravel spawning beds for salmonids, or scoured pools that provide high quality overwintering habitat for fish are present they could be lost or altered when parts of the Diversion Structure are installed within the Elbow River channel or when construction activities occur within tributaries. Other areas of fish habitat within or downstream of the Project Area have the potential to become degraded during construction due to sediments being washed into the river where they could settle over sensitive fish habitat such a spawning

beds. However, the implementation of mitigation measures as detailed in ATs standard construction practices, the potential for habitat degradation due to sediment release will be minimized. During operations, the Diversion Structure may alter the river downstream of the Project by changing the bed load movement and river channel modification that would occur under natural conditions. To reduce this effect, the Sluiceway of the Diversion Structure has been designed to allow for the passage of bedload; however the volume and velocity will differ from natural conditions. Fish and fish habitat surveys will be undertaken to confirm potential effects and provide information for mitigation design.

Fish migration in the Elbow River may be disrupted for a portion of the construction period in the Project Area as the Diversion Structure is installed within the river channel. The reduce and mitigate this potential effect, the Diversion Structure would be installed during periods of least risk to fish species. Once operational, there is the possibility that the Diversion Structure could be a barrier for the passage of some species during low flow periods. Fish that migrate during low flow periods may not be able to swim past the Diversion Structure. The speed of the water travelling over the smooth floor of the gated structure in the channel may be too high, or the depth of the water too shallow, to allow some species to pass. The Diversion Structure would be designed to reduce potential restrictions to fish movement.

In the event of an accidental spill of fuel or other compounds from equipment working in or near the Elbow River or its tributaries during construction, fish and fish habitat could be affected. Construction techniques would include best practices which incorporate measures to limit the potential for any accidental event.

During operations, some fish upstream of the Diversion Structure will be carried by the floodwater into the Off-stream Storage Reservoir and become temporarily stranded as the reservoir is drained. However, reservoir design would allow for fish to return to the river system once flood conditions have been alleviated.

Construction activities related to the realignment or modification of Highway 22 and Springbank Road have the potential to affect the fish or fish habitat in the Elbow River of the lower reaches of its tributaries through the erosion of sediment and accidental spills or leaks of fuel or other compounds from the construction equipment. However, due to the distance of the road construction activities from the watercourses, and AT's standard construction practices, it is considered unlikely that these activities would affect fish or fish habitat.

As Project planning proceeds, mitigation and restoration measures would be identified to offset or reduce potential effects of the Project on fish and fish habitat and would be integrated into the Project design. The Project would be evaluated for potential effects on fish and fish habitat when the location of the Project structures and geotechnical information are finalized. Effects on fish and fish habitat would be addressed in the Environmental Impact Assessment.

5.2.2 Aquatic Species, as Defined in the Species at Risk Act (SARA)

There are no known aquatic species at risk within the Elbow River or its tributaries in the Project Area.

5.2.3 Migratory Birds, as Defined in the Migratory Birds Convention Act

Forty-two Species of Management Concern that may occur in the vicinity of the Project Area are migratory birds as defined in the Migratory Birds Convention Act, 1994 (see Appendix C, Table C-1)

Of these species, piping plover (*Charadrius melodus circumcinctus*) and red knot (*Calidris canutus rufa*), common nighthawk (*Chordeiles minor*), olive-sided flycatcher (*Contopus cooperi*), loggerhead shrike (*Lanius ludovicianus excubitorides*), and Sprague's pipit (*Anthus spragueii*) are listed as endangered or threatened in the SARA schedule 1. Yellow rail (*Coturnicops noveboracensis*) and long-billed curlew (*Numenius americanus*) are also identified in the SARA schedule 1 as species of special concern. In addition, five other species in the Project Area; horned grebe (Podiceps auritus), bank swallow (Riparia riparia), barn swallow (Hirundo rustica), Baird's sparrow (Ammodramus bairdii) and bobolink (Dolichonyx oryzivorus), are in process of being considered for addition to the list of SARA scheduled species.

It is not expected that the realignment or modification of Highway 22 and Springbank Road would have an effect on migratory birds in the Project Area, as these activities would occur within the previously disturbed rights-of-way for each roadway. The construction of the Diversion Channel and the Off-stream Storage Dam, however, would occur in areas of wetland. Construction activities related to these components have the potential to cause the loss or alteration of wetland habitat that may be used by migratory birds but the extent of change would be limited through the use of wetland mitigation hierarchy (avoid, minimize, compensate).

During an extreme flood event, the collection of water in the Off-stream Storage Reservoir would inundate areas of land along tributary 2259. This could result in the loss of migratory bird nests within the Off-stream Storage Reservoir during to the flood, it would also temporarily reduce the availability of wetland habitat in the Project Area that may be suitable for breeding, nesting and brood rearing for waterfowl and other migratory birds for the period the floodwater is stored. Sediment and debris left behind following the release of floodwater from the Off-stream Storage Reservoir may reduce the availability of the wetlands in the Off-stream Storage Reservoir for one or more seasons depending on the depth of material left behind.

In the B3 nesting zone identified in the *Migratory Birds Convention Act* (location of the Project Area), Environment Canada advises against habitat destruction activities (e.g., vegetation clearing, draining, construction) in areas attractive to migratory birds between April 15 and August 15 (Government of Canada 2014b).

If construction for the Project is scheduled to occur during restricted activity periods for migratory birds, it would be necessary to develop mitigation plans.

The Project would be evaluated for potential effects on migratory birds when the location of Project permanent stuctures is finalized. Effects on migratory birds would be addressed in the Environmental Impact Assessment.

5.3 OTHER POTENTIAL CHANGES

5.3.1 Wetlands and Riparian Areas

Wetlands are protected in Alberta under the *Water Act* [RSA 2000, c W-3], which is administered by AEP. Both riparian areas and wetlands are sensitive to disturbance. AEP's preferred approach to wetland disturbance is avoidance; in cases where avoidance is not possible, wetland compensation is required. The Project construction and operational phase will affect wetland and riparian areas.

Construction of the Diversion Channel and the Off-stream Storage Dam may result in the temporary loss and temporary increase of some areas of wetland; and collection of water in the reservoir behind the dam would flood areas of wetland along tributary 2259 during an extreme flood event. Changes to wetlands from construction or operation of the Project may affect how the wetlands function.

The realignment or modification of Highway 22 and Springbank Road is not expected to have an effect on wetlands or riparian areas in the Project Area. These activities would occur within the existing disturbed rights-of-way for each roadway.

5.3.2 Rare Plants

A rare plant is defined as any species that occurs in the province in low numbers, has restricted range (or habitat), or is of conservation concern due to threats or trends in population (ANPC 2012). Two key pieces of legislation that protect rare plant species within the province are the Alberta *Wildlife Act* [RSA 2000, c W-10] and the federal *Species at Risk Act* (SARA) [SC 2002 c 29]. Rare plants also include species that are tracked or watched by the Alberta Conservation Information Management System.

Soot lichen (a rare plant tracked by the Alberta Conservation Information Management System) was found in the Project Area; it is a species that is considered rare in the province (<20 populations). Western blue flag (Iris missouriensis) is listed as Special Concern in the federal Species at Risk Act (SARA) [SC 2002 c 29] and has the potential to occur in wet meadow wetlands within the Project Area. Construction of the Diversion Channel and the Off-stream Storage Dam may result in the permanent loss of some wet meadow wetlands and potential Western blue flag populations they may contain. Realignment or modification activities for Highway 22 and Springbank Road would occur within their existing rights-of-way, and would not be anticipated to affect wetland areas or the rare plants that may occur within them.

5.3.2.1 Native Grassland

Remnant native fescue grasslands in Alberta are largely fragmented by roads, industrial activity and urban sprawl (Alberta Parks 2015). Fescue grasslands are important ecologically as a climax community providing habitat and winter forage for wildlife. This community also increases soil stability and is drought and fire resistant (Desserud 2006). Because of the decline of fescue grassland communities in Alberta and the difficulty of re-establishing them, numerous fescue dominated communities are tracked and watched by the Alberta Conservation Information Management System (2014). It is anticipated that some areas of ranchland may have established areas of native prairie where soil has not been disturbed by cultivation or invasive pasture grassland expansion. Areas of native prairie within the Project Area have the potential to include fescue grassland. Some of these areas of native prairie would be removed during the construction of the project components and increase the fragmentation of the grassland in the Project Area. It is not anticipated that the realignment or modification of Highway 22 and Springbank Road would affect areas of native prairie as these roadways are in previously disturbed rights-of-way.

The Project would be evaluated for potential effects on vegetation quality when the location of Project permanent stuctures and geotechnical information are finalized. Effects on vegetation would be addressed in the Environmental Impact Assessment.

5.3.3 Other wildlife species

The Alberta *Wildlife Act* prohibits disturbance or destruction of a house or nest of prescribed wildlife (e.g., raptors, owls, game birds, etc.) (Government of Alberta 2014b). Sensitive ranges for raptors, such as bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*) and prairie falcon (*Falco mexicanus*) overlap with the Project Area. Vegetation clearing activities required during the construction of the Project components may affect the availability of suitable nesting sites (i.e. trees) for these species. Realignment and/or modifications to Highway 22 and Springbank Road may also affect the availability of nesting sites for these species. Operation of the SR1 during an extreme flood is not expected to adversely affect nesting sites for raptors.

Key Wildlife and Biodiversity Zones are areas considered key winter ungulate habitat with high habitat potential for biodiversity. Typically, these zones are established along major river valleys (e.g., Elbow River) and are intended to prevent loss and fragmentation of habitat, prevent sensory disturbance during periods of thermal or nutritional stress on wildlife, and prevent the development of barriers to wildlife corridors (ASRD 2011). Construction timing restrictions for the Key Wildlife and Biodiversity Zones in the Project Area would apply from December 15 to April 30, as per the recommended wildlife land use guidelines (ASRD 2011). Construction of the Project components may cause the loss of winter ungulate habitat and increase habitat fragmentation in the Project Area. Construction of the Project components may occur during time periods when some SOMC could be using key wildlife areas or sites within the Project Area. Construction activities related to the realignment and/or modifications of Highway 22 and Springbank Road are not expected to affect Key Wildlife and Biodiversity Zones in the Project Area; nor is the operation of the SR1.

The Project would be evaluated for potential effects on wildlife when the location of Project permanent stuctures and geotechnical information are finalized. Effects on wildlife would be addressed in the Environmental Impact Assessment.

5.3.4 Surface Water and Aquatic Environment

Surface water and water quality may be temporarily affected by construction of the Diversion Structure, Diversion Channel, Off-stream Storage Dam and Outlet Works as well as the operation of the Project.

During construction, activities occurring in or near the Elbow River and the lower reaches of its tributaries could cause increased sediment loads in these water courses due to the disturbance of their beds or banks, as well as from increased erosion of disturbed or cleared soils in the Project Area. However, with the implementation of mitigation measures as detailed in AT's standard construction practices, the potential for sediment release will be minimized. The high flow restrictions caused by the project will reduce flood sedimentation movement that is mobilized to the Glenmore reservoir. When sedimentation occurs in the Glenmore Reservoir it reduces the amount of water that can be retained and the lifespan of the reservoir.

During operations, sediment may settle out of the floodwater held in the Off-stream Storage Reservoir. When released, this water would tend to pick up sediments as it flows through the outlet channel and into the Elbow River. If outlet flows are increased above channel flow, increased scour in the outlet structure and the Elbow River downstream of the Project, as well as changes to the morphology of these watercourses may occur. However, appropriate outlet design and operation would be expected to mitigate the potential for scour effects in the outlet structure and Elbow River.

The temporary storage of the floodwater behind the dam may affect shallow groundwater quality and could affect potentiometric heads in hydrostratigraphic units in the Project Area. The additional hydraulic head associated with the volume of water to be stored in the reservoir may cause an increase in aquifer pressures and alter the local groundwater flow regime. Changes in the groundwater flow regime could in turn alter groundwater availability from nearby water wells.

The Project would be evaluated for potential effects on water quality when the location of Project permanent stuctures and geotechnical information are finalized. This would be part of the Environmental Impact Assessment.

5.3.5 Air Quality

Air quality within the Project Area may be temporarily affected by an increase in the amount of airborne particulate matter (dust) during Project construction, and realignment and/or modifications of Highway 22 and Springbank Road. AT's standard mitigation measures for the prevention and minimization of dust emisisons will be implemented during construction.

Air Quality may be affected during the operations of the Program. Sediment would settle out of the floodwaters held within the Off-stream Storage Reservoir. After the floodwaters have been released, the sediments remaining in the Off-stream Storage Reservoir, including on Springbank Road, would dry and be susceptible to wind erosion. Potential contaminants picked up by the floodwaters (e.g., raw sewage) would likely remain in the sediment left behind, and may be picked up and carried by the wind as well. Areas east of the Project Area may see a temporary increase in the amount of particulate matter in the air due to the prevailing westerly winds carrying material eroded from the sediments deposited in the Off-stream Storage Reservoir.

Greenhouse gases associated with the Project will be restricted to emissions from vehicles and machinery during Project construction and from maintenance and inspection vehicles during project operation.

5.3.6 Historical Resources

In Alberta, historical resources are protected under the Alberta *Historical Resources Act*, and are defined as precontact, historic, and palaeontological sites and their contents. Certain types of Aboriginal traditional use sites are also considered to be historical resources.

Because precontact archaeological, historical, palaeontological and traditional land use sites represent discrete episodes of past activities, they are non-renewable and, therefore, are susceptible to alteration or removal by development. Precontact and historical archaeological resources are made up of residues of past cultures. Although the cultural entities responsible for deposition of the archaeological material are unavailable for observation, the preserved context and associations in which the remains functioned can reveal many clues about past

human behaviour, adaptations and relationships to the natural world. The key to the interpretation of these resources, however, is in their pattern of cultural deposition, which is extremely fragile, ephemeral and the product of unique processes and conditions of preservation. Consequently, once they are disturbed, they cannot be replaced, recreated or restored. Due to the nature of their origin and preservation, historical resources are finite in quantity. As a result, historical resources are susceptible to destruction and depletion through natural and cultural disturbances.

5.3.6.1 Archaeology

While the Project Area has a high potential for the recovery of archaeological resources, the previously recorded archaeological sites within the Project Area all have HRVs of 0 and are considered to have low heritage value. The only known significant historical resource is the Our Lady of Peace Roman Catholic Mission cairn site, which is located approximately 30 m from the Project perimeter, near the south end of the Diversion Channel being constructed as part of the Project (see Figure 5-6). Construction activities would avoid the cairn.

There are numerous areas with moderate to high archaeological and/or historic period potential within the Project Area, particularly areas that are near or within:

- previously recorded archaeological sites
- previously recorded historic sites and structures (see sections of historic interest on Figure 5-6)
- water sources (rivers, drainages and sloughs)
- areas of native vegetation
- areas of topographic relief or variance.

A Historical Resources Impact Assessment would be carried out for Alberta Culture and Tourism, and any mitigation measures they identify would be implemented during Project construction and the realignment and/or modifications of Highway 22 and Springbank Road.

5.3.6.2 Palaeontology

Construction activities for the Project have the potential to disturb palaeontological resources.

The highest potential for palaeontological resources in the surficial sediments is in the fluvial and lacustrine deposits, which, elsewhere in the Calgary area, have yielded a Holocene invertebrate fauna (Bohach 2012; Frampton and Bohach 2014). Harris and Pip (1973) also documented late Quaternary mollusc localities in fluvial and lacustrine sediments within the foothills, including a site near Cochrane.

The Project would need to be evaluated for potential effects on paleontological resources when the location of Project permanent stuctures and geotechnical information are finalized. This would be part of the Historical Resources Impact Assessment.

5.4 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO FEDERAL LANDS OR LANDS OUTSIDE OF ALBERTA

As there are no federal lands within, or in the vicinity of the Project Area, it is not anticipated that there would be any changes caused to federal lands by the Project. The Project is not anticipated to have any adverse environmental effects outside of Alberta.

5.5 CHANGES THAT MAY BE CAUSED BY THE PROJECT TO ABORIGINAL PEOPLES RESULTING FROM CHANGES TO THE ENVIRONMENT

The Project will impact portions of the Elbow River, and the lower reaches of some of its tributaries, near to the Tsuu T'ina First Nation. The Tsuu T'ina, and other Treaty Seven First Nations, may use the Elbow River and its tributaries as areas where they may hunt or participate in other traditional activities. The Treaty Seven First Nations may also fish the waters of the Elbow River, or its tributaries, as part of their traditional rights. The Project has the potential to affect how these First Nations use the Elbow River for traditional activities or fish by building a structure within the Elbow River channel that could cause the loss or alteration of fish habitat.

The Project will be evaluated for potential effects on Aboriginal Peoples and their resources when the location of Project permanent stuctures and operational information are finalized. This will be part of the Environmental Impact Assessment.

6.0 PROPONENT CONSULTATION AND ENGAGEMENT WITH ABORIGINAL GROUPS

6.1 LIST OF POTENTIALLY AFFECTED AND INTERESTED ABORIGINAL GROUPS

The Alberta government has identified that the five First Nations of Treaty 7 are either potentially affected or may be interested in the Project (see Table 6-1).

Table 6-1 Aboriginal Groups Affected or Interested in the Project

Aboriginal Group	Distance from Project Area	Address
Tsuu T'ina First Nation	South 395 m	9911 Chiila Boulevard, Tsuu T'ina AB, T2W 6H6
Stoney First Nation (Bearspaw, Chiniki and Wesley Bands)	West 16.3 km NW 27.8 km South 61.5 km	P.O. Box 120, Morley AB, T0L 1N0
Siksika First Nation	East 78 km	P.O. Box 1100, Siksika AB, T0J 3W0
Piikani First Nation	South 155 km	P.O. Box 70, Brocket AB, T0K 0H0
Blood Tribe	South 171 km	P.O. Box 60, Standoff AB, T0L 1Y0

The Stoney and Tsuu T'ina First Nations are closest to the Project Area (see Figure 1-2).

6.2 DESCRIPTION OF ENGAGEMENT OR CONSULTATION ACTIVITIES CARRIED OUT TO DATE WITH ABORIGINAL GROUPS

AT engaged the Treaty 7 First Nations early in the consultation process and has sought to provide them with updated information on the Project as it became available. AT has also met with each Nation to further discuss the Project with them, and to listen to their issues and concerns. A summary of the consultation activities that have been undertaken with the Treaty 7 Nations follows.

On August 18, 2014 an initial letter outlining the Project was mailed out to each of the Tsuu T'ina, Stoney, Siksika, Piikani and Blood Nations. This was followed by a notification letter sent to each Nation by registered mail on September 5, 2014.

AT met with representatives of the Stoney First Nation October 20, 2014 to provide them with an overview of the Project. Similar meeting were held with the Siksika First Nation October 27, 2014; the Piikani First Nation November 7, 2014; the Tsuu T'ina First Nation November 13, 2104; and the Blood Tribe November 25, 2104.

Copies of the Draft Environmental Impact Assessment Terms of Reference for the Project, initially distributed by AEP for public comment, were emailed to each of the First Nations on October 23, 2014.

AT emailed an article on the Project to each First Nation in November 2014 for inclusion in each nation's newspaper. AT also emailed updated maps of the Project to the Piikani First Nation on October 26, 2014, and the Blood Tribe November 6, 2014.

On January 20, 2015, notification of public consultation meetings (Open Houses) to be held in Calgary (January 27) and Cochrane (January 28) were emailed to each First Nation as a courtesy.

A Project update was emailed to each of the Tsuu T'ina, Stoney, Siksika, Piikani and Blood Nations on February 9, 2015.

An update, including information about additional public Open Houses to be held at the Pinebrook Golf and Country Club (March 10) and Bragg Creek (March 17), and a link to the story boards from the January Open Houses was emailed to each First Nation. A representative from the Tsuu T'ina First Nation advised AT they could not attend the March 17 Open House and was provided an email update by AT on March 17, 2015.

A status update was emailed to each First Nation on June 15, 2015.

6.3 KEY COMMENTS AND CONCERNS BY ABORIGINAL GROUPS

To date, the following comments have been brought forward during the consultation with the Tsuu T'ina, Stoney, Siksika, Piikani and Blood Nations:

- The Project Area is part of the traditional territory of the First Nations
- The Project will impact treaty rights and traditional use in the Project Area
- There are concerns about the impacts of the Project at the Project site
- There are concerns about how water courses that flow through their territory and reserve will be managed in the future
- The Stoney First Nation wants an agreement regarding intellectual property and protocol concerns (SIL form)
- The Tsuu T'ina, Siksika, Piikani and Blood First Nations will be requesting capacity funding (to inspect the Project site, and complete a Traditional Use review)

AT has completed and returned the SIL form to the Stoney First Nation.

The Blood Nation has sent a formal letter of objection to the Project to the Alberta Minister of Aboriginal Relations.

6.4 CURRENT ABORIGINAL TRADITIONAL LAND USE

While the First Nations have indicated that the Project is within their traditional territory, the land within the Project Area has been privately owned since the late 1880s. No ongoing traditional use of the Project Area by Aboriginal groups has been identified to date.

6.5 ABORIGINAL CONSULTATION AND INFORMATION GATHERING PLAN

AT is committed to engaging the Treaty 7 Nations throughout the Project consultation process. Their plan for consulting with First Nations includes the following activities:

- Engagement and consultation activities beginning in Q3 2014
- AT providing Project information early in the engagement process to allow the First Nations to review and understand the information
- Following the initial dissemination of Project information, AT meeting with representatives of each First Nation to discuss the Project
- AT carefully documenting all contacts with the First Nations, as well as the issues and concerns raised by them
- AT preparing a final report outlining the efforts made to consult with the First Nations

AT will work with the Treaty 7 Nations to support traditional knowledge and traditional land use studies for inclusion in the EIA. The studies will initially involve engaging two of the Treaty 7 First Nations to identify the needs and expectations they have for the study. It is then anticipated that the First Nations will either provide information for the study to AT or may conduct the study themselves. A record of communication with the First Nations will be prepared and submitted as part of the aboriginal consultation reports.

Currently, AT is planning to consult with Métis or Métis organizations expressing an interest in the Project as they would with the public or other interested parties. Should it be determined that a Federal EA is required for the Project, AT will include Métis and Métis organizations as part of their consultation and engagement activities with aboriginal groups.

Proponent Consultation and Engagement with Aboriginal Groups
April 18, 2016

7.0 CONSULTATION WITH PUBLIC AND OTHER PARTIES

7.1 STAKEHOLDERS AND RELATED CONSULTATION ACTIVITIES

7.1.1 Potentially Affected and Interested Stakeholders

Non-aboriginal stakeholders who may be potentially affected and/or have expressed an interest in the Project are listed in Table 7-1.

Table 7-1 Stakeholders Who May be Potentially Affected and/or Interested in the Project

Local Landowners, Residents and Occupants	• Landowners, residents and occupants within the Project Area, and in western Springbank directly east of the Project Area
Local and Regional Businesses/Industry	• Alberta Ethane Development Company • Altalink • ATCO Gas • Foothills Pipe Lines Limited • Fortis Alberta • Nova Gas Transmission • Pengrowth Energy Corporation • Plains Midstream Canada ULC • Telus Communications • TransCanada Pipeline Limited • Shaw Communications
Regional Associations	• Bow River Basin Council • Calgary Regional Partnership • Elbow River Watershed Partnership • Springbank Community Planning Association • Alberta Irrigation Projects Association • Pirmez Creek Irrigation Society • Bow River Irrigation District • Western Irrigation District • Kananaskis Improvement District • Calgary Community Associations (Elbow Springs, Discovery Ridge, West Springs, Aspen Woods, Springbank Hill) • WaterSmart
Special Interest Groups	• Calgary River Communities Action Group • Don't Damn Springbank • Water Collaborative • Vulcan County

Landowners, residents and occupants include private residents, ranchers, farmers, natural gas and oil pipeline companies, electric and gas distribution utilities, various local businesses, and private recreational camps.

Those stakeholders who may potentially be affected and/or interested in the Project have been or will be included in discussions relating to the Project.

7.1.1.1 Overview of Stakeholder Consultation Activities to Date

AT has commenced consultation activities in accordance with the Final Terms of Reference issued by AEP February 5, 2015 under the *Environmental Protection and Enhancement Act*.

Consultation activities undertaken to date with respect to the Project include Project notification, meeting with stakeholders, open houses, and other activities. These consultation activities are summarized in the following sections.

7.1.1.1.1 Project Notification

During the week of January 12, 2015, an introduction to the Project was distributed to all landowners, occupants, and residents within the area affected by the Project via postal code drop. The introduction was also directly mailed or emailed to the stakeholders on the stakeholder distribution list. An invitation to the upcoming open houses in January 2015 was included with the introduction.

7.1.1.1.2 Stakeholder Meeting

In November and December 2014, separate meetings were held with three of the stakeholders to provide them an initial overview of the Project. These stakeholders were Rocky View County, the Bow River Basin Council and the City of Calgary. Initial issues of concern were also discussed at the meetings with Rocky View County and the City of Calgary.

On November 26, 2014, a meeting was held with Rocky View County to kick-off the Technical Review Committee for the Highway 22 Planning Study.

On December 11, 2014, AT met with the Calgary River Communities Action Group to update them on the Project, and to discuss issues of concern.

In mid-January 2015, meetings were held with Rocky View County and the Elbow River Watershed Partnership to provide these stakeholders with a Project update in advance of the Open Houses.

In late January 2015, technical discussions regarding the Project were undertaken with WaterSmart and the Bow River Basin Council.

A technical discussion about the Project was conducted with the City of Calgary on February 10, 2015; and AT met with Rocky View County to discuss preliminary engineering February 11, 2015.

On February 12, 2015 a meeting was held with the Calgary Regional Partnership to provide them with an overview of the Project, identify additional stakeholders and document early public input and issues of concern for the EIA.

Meetings were held with Telus and Plains Midstream in mid-February to discuss potential impacts of the Project on infrastructure in the Project Area.

On March 3, 2015, AT met with affected landowners to provide an overview of the Project, discuss the McLean Creek Environmental Review, review a cost benefit analysis of the projects and respond to questions regarding the Project.

An update meeting was held with the Calgary River Communities Action Group on March 5, 2015.

AT met with Bow River Basin Council on March 9, 2016.

AT met with Calgary River Communities Action Group on February 17, 2016

7.1.1.1.3 Project Open Houses

During the week of January 12, 2015, advertisements regarding the upcoming open houses were distributed to the Calgary Herald and the Calgary Sun, as well as the local newspaper for Rocky View County and Cochrane.

Open Houses were held in Calgary at the Mount Royal University on January 27, 2015, and at the RancheHouse in Cochrane on January 28, 2015. The Open House in Calgary was used to provide the public with an overview of the Project and its timelines, identify additional stakeholders, and document early public input on issues of concern for the EIA. The Cochrane Open House provided the public with an opportunity to participate in technical discussions regarding the Project.

Additional open houses were held at the Pinebrook Golf and Country Club on March 10, 2015, and the Bragg Creek Community Centre March 17, 2015. Both Open Houses were used to provide an overview of flood mitigation options for the Elbow River basin, a cost analysis of the options, Project details, and information on the environmental impact assessment of the Project. Additional stakeholders were also identified at these Open Houses, and early public input and issues of concern for the environmental impact assessment were documented.

7.1.1.1.4 Other Activities

Information on the Project can be found on the Projects website at http://alberta.ca/springbank-road.cfm.

7.1.1.2 Key Comments and Concerns by Stakeholders

Several issues have been raised by stakeholders during consultation and the public during the open houses. The key issues to date include:

- Why this project was selected and not another option like the Maclean Creek Dam
- How the Government of Alberta has approached the planning of this project
- What is the Project Timeline
- What is the Project Cost
- What will the effects be to the upstream communities (the Springbank Community)
- There is not enough information on why this project is proceeding at this point and the decision making process
- How soon can the project be in operation
- When will construction start

It is anticipated that as stakeholder consultation activities continue the key issues may change.

7.1.2 Overview of Any Ongoing or Proposed Stakeholder Consultation Activities

Additional upcoming meetings are being planned with stakeholders, including:

- TransCanada Pipeline Limited, Fortis Alberta, Pengrowth Energy Corporation, and the Alberta Ethane Development Company
- The Alberta Irrigation Projects Association, Pirmez Creek Irrigation Society, Bow River Irrigation District, and Western Irrigation District
- Vulcan County
- Townsite of Redwood Meadows
- Kananaskis Improvement District
- The Water Collaborative
- Don't Damn Springbank
- Members of the Legislative Assembly for ridings in the region
- Calgary Community Associations downstream of the Project (Elbow Springs, Discovery Ridge, West Springs, Aspen Woods, Springbank Hill)
- Affected landowners

7.1.3 Consultations with Other Jurisdictions

Consultation with AEP began in September 2014 to provide an introduction to the Project and obtain information on the regulatory process that was required to be followed. Consultation with AEP, with respect to the regulatory processes for the Project, is ongoing.

Consultation with the Agency began in February 2015 and consisted of providing an overview of the Project and discussions regarding the Agency's role in the environmental assessment. Alberta Transportation was instructed to provide a Project Description, following the Agency's guidelines, after which the need for an environmental assessment would be determined.

Consultation with Public and Other Parties
April 18, 2016

8.0 REFERENCES

Adams, B.W. *et al*. 2003. Rangeland health assessments for grassland, forest, and tame pasture. Revised August 2010. Alberta Sustainable Resource Development, Lands Division, Rangeland Management Branch, Edmonton AB. Pub. No. T/044. 128 pp.

Alberta Conservation Information Management System (ACIMS). 2014. Element occurrence data. Updated October 2014. Accessed in December 2014 at: http://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-(acims)/download-data.aspx

Alberta Culture and Tourism. 2012. Requirements for recording and reporting historic structures within the context of archaeological HRIAs. Edmonton, Alberta. Available at: http://www.culture.alberta.ca/documents/ArchaeologicalSurvey-Recording-Historic-Structure-Requirements-2012.pdf.

Alberta Culture and Tourism. 2015. Listing of historic resources, March 2015 edition. Historic Resources Management Branch. Edmonton, AB.

Alberta Environment and Sustainable Resource Development (ESRD). 2012. Alberta wild species general status listing – 2010. Revised Jan. 26, 2012. Accessed December 3, 2014. Available at: http://esrd.alberta.ca/fish-wildlife/species-at-risk/albertas-species-at-risk-strategy/general-status-of-alberta-wild-species-2010/documents/SAR-2010WildSpeciesGeneralStatusList-Jan2012.pdf

Alberta Environment and Sustainable Resource Development (ESRD). 2013a. Grassland vegetation inventory. Retrieved from geodiscover.alberta.ca.

Alberta Environment and Sustainable Resource Development (ESRD). 2013b. Alberta Canadian wetland classification system (CWCS) merged wetland inventory.

Alberta Environment and Sustainable Resource Development (ESRD). 2013c. Code of practice for watercourse crossings. Alberta Environment. Edmonton, Alberta.

Alberta Environment and Sustainable Resource Development (ESRD). 2014a. Wildlife sensitivity maps – data set. Accessed December 2014. Available at: http://esrd.alberta.ca/forms-maps-services/maps/wildlife-sensitivity-maps/default.aspx.

Alberta Environment and Sustainable Resource Development (ESRD). 2014b. Fish and Wildlife Management Information System (FWMIS) Internet Mapping Guide. Available at: https://maps.srd.alberta.ca/FWIMT_Pub/default.aspx?Viewer=FWIMT_Pub.

Alberta Environment and Sustainable Resource Development (ESRD). 2014c. Species assessed by Alberta's Endangered Species Conservation Committee: short list. Available at: http://esrd.alberta.ca/fish-wildlife/species-at-risk/documents/SpeciesAssessed-EndangeredSpecies-Jul18-2014.pdf.

Alberta Environmental Protection. 1996. Alberta User Guide for Waste Managers. Edmonton, Alberta.

Alberta Native Plant Council (ANPC). 2012. Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update. Alberta Native Plant Council, Edmonton, AB. Available at http://www.anpc.ab.ca/content/resources.php

Alberta Parks. 2014. Environmentally significant areas of Alberta update – September 2014. Accessed December 2014. Available at: http://www.albertaparks.ca/albertaparksca/library/environmentally-significant-areas-report.aspx

Alberta Parks. 2015. Fescue Grassland Management – Cypress Hills Provincial Park. Accessed January 2015. Available from http://www.albertaparks.ca/cypress-hills/park-research-management/fescue-grassland-management.aspx

Alberta Soil Information Centre (ASIC). 2014. Agricultural Regions of Alberta Soil Inventory Database (AGRASID) 4.0: Agricultural region of Alberta soil inventory database (Version 4.0). Edited by J.A. Brierley, T.C. Martin, and D.J. Spiess. Agriculture and Agri-Food Canada, Research Branch; Alberta Agriculture, Food and Rural Development, Conservation and Development Branch. Available at URL: http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/All/sag14653

Alberta Sustainable Resource Development (ASRD). 2011. Recommended Land Use Guidelines: Key Wildlife and Biodiversity Zones. Fish and Wildlife Division. Edmonton, AB.

Alberta Transportation. 2008. Orthophoto imagery (digital raster data).

Bohach, L.L. 2012. Palaeontological Monitoring for the Pine Creek Waste Water Treatment Plant, Final Report, Permit 11-015, Final Report. Prepared for the City of Calgary. Prepared by Stantec Consulting Ltd. January 2012.

Canadian Environmental Assessment Act (CEAA). 2012. Canadian Environmental Assessment Act, 2012. S.C. 2012, c. 19, s. 52. Last amended on December 31,2014. Available at: http://laws-lois.justice.gc.ca/eng/acts/c-15.21/index.html

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2014. Wildlife species search. Available at: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm.

DeMaere, C., M. Alexander, and M. Willoughby. 2012. Range plant community and range assessment guidelines for the Foothills Parkland Subregion of Alberta. Alberta Environment and Sustainable Resource Development, Lands Division, Pincher Creek AB. Pub. No. T/274. 136 pp.

Desserud, P.A. 2006. Restoration of rough fescue grassland on pipelines in southwestern Alberta. ESRD, Rangeland Management Branch, Public Lands Division, Lethbridge AB. Pub. No. T/121. 68 pp.

Dominion Lands Office. 1884a. *Plan of Township 24, Range 3, West of 5 Meridian*. Ottawa, ON.

Dominion Lands Office. 1884b. *Plan of Township 24, Range 4, West of 5 Meridian*. Ottawa, ON.

Dominion Lands Office. 1927. *Field Notes for Plan of Township 24, Range 4, West of 5 Meridian*. Ottawa, ON.

EBA. 2010. Highway 22:14 and 22:16 highway twinning and interchange reconfiguration environmental overview assessment. Prepared for ISL Engineering and Land Services Ltd. Calgary, AB.

eBird. 2014. An online database of bird distribution and abundance [web application]. eBird, Cornell Lab or Ornithology, Ithaca, NY. Accessed December 2014. Available at: http://www.ebird.org.

Elbow River Watershed Partnership (ERWP). 2009. Elbow River Basin Water Management Plan. Available at: http://wsow.brbc.ab.ca/reports/ERBWMP_Final.pdf.

Elbow River Watershed Partnership (ERWP). 2015. What is the Alluvial Aquifer? Factsheet. Available at: http://erwp.org/index.php/educational-documents/4-alluvial-fact-sheet-1.

ESRI 2014. World imagery basemap. Accessed on December 3, 2014 using ArcGIS Explorer build 2500.

Federation of Alberta Naturalists. 2007. The atlas of breeding birds of Alberta – a second look. Federation of Alberta Naturalists. Edmonton, AB.

Fenton, M.M., E.J. Pawley, S.M. Atkinson, N. Utting, D.J McKay. 2013. Surficial geology of Alberta. Alberta Geological Survey Map 601.

Fiera Biological Consulting Ltd (Fiera). 2014. Environmentally significant areas in Alberta: 2014 update. Report prepared for the Government of Alberta, Edmonton, AB. Fiera Biological Consulting Report Number 1305. 51 pp.

Frampton, E.K. and L.L. Bohach. 2014. Palaeontology Deep Testing Report, City of Airdrie, Community Area Structure Plan – Davy Lands, Permit 14-063, Final Report. Prepared for Hopewell Residential LP. Prepared by Stantec Consulting Ltd. December 2014.

GeoBase. 2014. National Hydro Network (Shapefile). Retrieved from http://geobase.ca/geobase/en/data/nhn/index.html;jsessionid=52A0E86BA3A6EEE08FBF13673C6FC00A.geobase1.

Government of Alberta. 2011. Recommended land use guidelines for protection of selected wildlife species and habitat within Grassland and Parkland Natural Regions of Alberta. Alberta Sustainable Resource Development. Edmonton, AB.

Government of Alberta. 2014a. South Saskatchewan Regional Plan 2014-2024. Available at: https://landuse.alberta.ca/LandUse%20Documents/SSRP%20Final%20Document_2014-07.pdf

Government of Alberta. 2014b. *Wildlife Act Wildlife Regulation* Alberta Regulation 143/1997. Available at: http://www.qp.alberta.ca/documents/Regs/1997_143.pdf

Government of Canada. 1994. *Migratory Birds Convention Act*, 1994. Available at: http://laws.justice.gc.ca/eng/acts/M-7.01/

Government of Canada. 2014a. Species at risk public registry. Accessed December 2014. Available at: http://www.registrelep-sararegistry.gc.ca/species/default_e.cfm

Government of Canada. 2014b. General nesting periods of migratory birds in Canada. Accessed December 2014. Available at: http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1

Hamilton, W.N., C.W. Langenberg, M.C. Price and D.K. Chao. 1999. Geological map of Alberta. Alberta Energy and Utilities Board and Alberta Geological Survey. 1:1,000,000 map.

Hanna, D. 2002. Historical resources impact assessment, River Spirit Golf Club – NE 8 & SE 17-24-3-W5M, final report (Permit 02-069). Consultant's report on file, Historic Resource Management Branch, Edmonton, AB.

Hanna, D. 2003. Historical resources impact assessment, Gardner Lands Subdivision, Parts of 7, 8, 17 and 18-24-3-W5M final report (Permit 03-271). Consultant's report on file, Historic Resource Management Branch, Edmonton, AB.

Harris, S.A. and E. Pip. 1973. Molluscs as indicators of late- and post-glacial climatic history in Alberta. Canadian Journal of Zoology 51:209-215.

Important Bird Areas (IBA) Canada. 2014. Important bird areas in Canada. Available at: http://www.ibacanada.ca

Jon Jorgenson, ESRD, Senior Wildlife Biologist, Resource Wildlife Program, pers. comm., 3 December 2014.

MacMillan, R.A. 1987. Soil Survey of the Calgary Urban Perimeter. Bulletin No. 54. Alberta Research Council, Terrain Sciences Department, Edmonton, Alberta.

Moran, S.R. 1986. Surficial geology of the Calgary Urban Area. Bulletin No. 53. Alberta Research Council, Terrain Sciences Department, Edmonton, Alberta.

Naughton. D. 2012. The natural history of Canadian mammals. Canadian Museum of Nature. University of Toronto Press. Toronto Buffalo London.

Pattie, D. and C. Fisher. 1999. Mammals of Alberta. Lone Pine Field Guides. Edmonton, AB.

Rocky View County. 2014. Rocky View County Land Use Bylaw C-4841-97. Updated November 12, 2014. Available at: http://www.rockyview.ca/Portals/0/Files/Government/Bylaws/RVC-Land-Use-Bylaw.pdf.

SARA (*Species at Risk Act*). 2014. Recovery strategy for the westslope cutthroat trout (*Oncorhynchus clarkii lewisi*), Alberta populations in Canada. Recovery strategy series adoption or incorporation under Section 44 of SARA. Accessed September 2, 2014 at: http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_truite_fardee_wstslp_cutthroat_trout_0314_e.pdf

Sibley, D.A. 2003. The Sibley field guide to birds of western North America. Alfred A. Knopf. New York, NY.

Sosiak, A. 1999. Evaluation of Recent Trends in Water Quality in the Elbow River Upstream from Glenmore Reservoir. Alberta Environment, Water Management Division.

Sosiak, A. and J. Dixon. 2004. Impacts on Water Quality in the Upper Elbow River. City of Calgary and Alberta Environment. Calgary, Alberta.

Stebbins, R.C. 2003. Western reptiles and amphibians. Third edition. Peterson. Houghton Mifflin Company. New York, NY.

Waterline Resources Inc. (Waterline). 2011. Groundwater Evaluation and Monitoring Plan Elbow River Watershed Sub-regions Twps 018 to 024, Rges 29W4 to 09W5 Alberta. Prepared for Alberta Environment. Calgary, Alberta.

Wilson, S.M. 2011. The palaeontological historical resource impact assessment of the Alberta Transportation Highway 1 and 22 Interchange Functional Planning Study, Rocky View County, West Region. Permit Number 2011-002. Consultant report prepared by Nautilus Palaeontology Inc.

APPENDIX A
REGULATORY CORRESPONDENCE

Canadian Environmental Assessment Agency | Agence canadienne d'évaluation environnementale

Prairie and Northern Region
Suite 1145, 9700 Jasper Avenue
Edmonton, Alberta T5J 4C3

Région des Prairies et du Nord
Pièce 1145, 9700 rue Jasper
Edmonton (Alberta) T5J 4C3

August 14, 2014

Agency File No.: 005524

Mr. Syed Abbas
Alberta Transportation
2nd Floor, Twin Atria Building
4999-98 Avenue
Edmonton, Alberta T6B 2x3

Sent via email: syed.abbas@gov.ab.ca

SUBJECT: Springbank Off-Stream Storage Project

Dear Mr. Abbas:

The Canadian Environmental Assessment Agency (the Agency) has determined that the proposed Springbank Off-Stream Storage Project (the Project) is a designated activity pursuant to paragraph 6 of the *Regulations Designating Physical Activities* (the Regulations) under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

6. The construction, operation, decommissioning and abandonment of a new structure for the diversion of 10 000 000 m3/year or more of water from a natural water body into another natural water body.

Under CEAA 2012, a federal environmental assessment may be required for designated projects. Under subsection 8(1) of CEAA 2012, the proponent of a designated project is required to submit a description of the designated project to the Agency to inform a decision as to whether an environmental assessment of the designated project is required. The prescribed information for the designated project description is set out in the *Prescribed Information for the Description of a Designated Project Regulations.* Further information regarding CEAA 2012, and how to prepare and submit a project description, is available on the Agency's website at: www.ceaa-acee.gc.ca.

Please do not hesitate to contact me at (780) 495-2580 or via e-mail at sean.carriere@ceaa-acee.gc.ca should you have any questions.

Sincerely,

Sean Carriere
Project Manager
Canadian Environmental Assessment Agency
Prairie and Northern Region

Canada

Alberta Environment and Sustainable Resource Development

Operations
Provincial Programs
111 Twin Atria Building
4999 - 98 Avenue
Edmonton, Alberta T6B 2X3
Canada
Telephone: 780-427-5828
www.esrd.alberta.ca

July 14, 2014

Syed Abbas
Alberta Transportation
3rd Floor, Twin Atria Building
4999 – 98 Avenue NW
Edmonton, AB
T6B 2X3

Dear Mr. Abbas:

Further to your email of July 11, 2014, I wish to advise you that the proposed Springbank Off-Stream Storage Project is a mandatory activity pursuant to Schedules 1(c)(ii), (d) and (e) of the *Environmental Assessment (Mandatory and Exempted Activities) Regulation*. Alberta Transportation is required, pursuant to Section 44(1)(a) of the *Environmental Protection and Enhancement Act* (EPEA), to prepare and submit an Environmental Impact Assessment (EIA) report for this project. The EIA report is to be prepared in accordance with the provisions of Division 1 of Part 2 of EPEA.

If you have any questions or require further direction about the Environmental Assessment process, please contact Camille Almeida at 780-422-2207.

At this time I would recommend you contact Shauna Sigurdson (780-495-2236) with the Canadian Environmental Assessment Agency to discuss the potential submission of a federal project description and any federal environmental assessment requirements under the *Canadian Environmental Assessment Act, 2012.*

Alberta Transportation should also note that Alberta Environment and Sustainable Resource Development's section (Part III) of the *Government of Alberta 's First Nations Consultation Guidelines on Land Management and Resource Development* may apply to this project and accordingly, Alberta Transportation may be required to submit a First Nations Consultation Plan to the Aboriginal Consultation Office of Aboriginal Relations. For more information about the First Nations consultation process, please contact Magdalena Jordan at 403-592-2999.

Sincerely,

Corinne Kristensen
Senior Manager, Environmental Assessment
Provincial Programs
(Designated Director, *Environmental Protection and Enhancement Act*)

cc: S. Whittaker (NRCB)
K. Wilkinson (ESRD)
A. Curtis (AC)
S. Sigurdson (CEAA)
M. Jordan (AR)
R. Poon (ESRD)

APPENDIX B
RARE PLANTS POTENTIALLY IN THE PROJECT AREA

Appendix B RARE PLANTS POTENTIALLY IN THE PROJECT AREA

Table B-1 Rare Ecological Communities That May Occur within the Foothills Parkland Natural Subregion

Scientific Name	Common Name	Rank	Cover Type	Likelihood of Occurrence*
Amelanchier alnifolia / Pseudoroegneria spicata shrubland	saskatoon / bluebunch wheat grass shrubland	S2S3 G3G4Q	shrubland	C
Arctostaphylos uva-ursi / Pseudoroegneria spicata dwarf shrubland	common bearberry / bluebunch wheat grass dwarf shrubland	S2S3 G2G3	dwarf shrubland	C
Betula occidentalis grassland riparian shrubland	water birch grassland riparian shrubland	S2S3	shrubland	P
Betula occidentalis montane shrubland	water birch montane shrubland	S1S2 G3G4	shrubland	C
Elaeagnus commutata riparian shrubland	silverberry riparian shrubland	SU G2Q	shrubland	P
Elymus lanceolatus - Stipa comata	northern wheat grass - needle-and-thread	S2	herbaceous	C
Festuca campestris - Pseudoroegneria spicata grassland	mountain rough fescue - bluebunch wheat grass grassland	S1S2 G4	herbaceous	C
Festuca hallii - Stipa curtiseta grassland	plain's rough fescue - western porcupine grass grassland	S2S3	herbaceous	P
Populus tremuloides / Rubus parviflorus	aspen / thimbleberry	S2	forest/ woodland	P
Ruppia cirrhosa aquatic community	widgeon-grass aquatic community	S1	aquatic	P
Salix bebbiana / Cornus stolonifera	beaked willow / red-osier dogwood	S3?	shrubland	C
Salix bebbiana / Rubus idaeus / Geranium richardsonii	beaked willow / wild red raspberry / wild white geranium	S2	shrubland	C
Schizachyrium scoparium – Calamovilfa longifolia	little bluestem - sand grass	S2	herbaceous	C

NOTES:
* C – confirmed in subregion; P – potentially present in subregion

Table B-2 ACIMS Tracked and Watched Vascular Plant Species with the Potential to Occur within the Foothills Parkland Natural Subregion

Scientific Name	Common Name	*Species at Risk Act*[1]	Alberta *Wildlife Act*[2]	Alberta General Status of Wild Species (2010) [3]	RANK[4]
Agrostis exarata	spike redtop	-	-	May Be At Risk	S2 G5
Allium geyeri	Geyer's onion	-	-	May Be At Risk	S2 G4G5
Alopecurus alpinus	alpine foxtail	-	-	N/A	S2? G5
Arnica longifolia	long-leaved arnica	-	-	Sensitive	S2 G5
Artemisia borealis	northern wormwood	-	-	May Be At Risk	S2 G5T5?
Brickellia grandiflora	large-flowered brickellia	-	-	Sensitive	S1S2 G5
Camassia quamash var. quamash	blue camas	-	-	May Be At Risk	S2 G5T3T5
Carex adusta	browned sedge	-	-	May Be At Risk	S1 G5
Carex aperta	open sedge	-	-	Sensitive	S1 G4
Carex vesicaria	blister sedge	-	-	Undetermined	S1 G5
Cirsium scariosum	thistle	-	-	Undetermined	S2? G5
Conimitella williamsii	conimitella	-	-	May Be At Risk	S2 G4
Crepis intermedia	intermediate hawk's-beard	-	-	May Be At Risk	S2 G5
Cypripedium montanum	mountain lady's-slipper	-	-	May Be At Risk	S2 G4
Ellisia nyctelea	waterpod	-	-	May Be At Risk	S2 G5
Erigeron flagellaris	creeping fleabane	-	-	May Be At Risk	S1S2 G5
Festuca subulata	fescue	-	-	May Be At Risk	S1 G5
Gentiana calycosa	mountain gentian	-	-	Secure	S1 G4
Gentiana fremontii	marsh gentian	-	-	May Be At Risk	S2 G4
Glyceria elata	tufted tall manna grass	-	-	Sensitive	S2 G4G5
Gnaphalium microcephalum	common cudweed	-	-	N/A	SH G5
Iliamna rivularis	mountain hollyhock	-	-	May Be At Risk	S2 G5
Iris missouriensis	western blue flag	Special Concern	-	Sensitive	S2G5
Listera caurina	western twayblade	-	-	May Be At Risk	S1 G4
Lithophragma parviflorum	small-flowered rockstar	-	-	May Be At Risk	S2 G5

Table B-2 ACIMS Tracked and Watched Vascular Plant Species with the Potential to Occur within the Foothills Parkland Natural Subregion

Scientific Name	Common Name	*Species at Risk Act*[1]	Alberta *Wildlife Act*[2]	Alberta General Status of Wild Species (2010) [3]	RANK[4]
Lupinus minimus	least lupine	-	-	May Be At Risk	S1S2 G3G4
Melica smithii	melic grass	-	-	May Be At Risk	S1S2 G4
Melica spectabilis	onion grass	-	-	May Be At Risk	S2 G5
Mertensia lanceolata	lance-leaved lungwort	-	-	May Be At Risk	S2 G5
Mimulus guttatus	yellow monkeyflower	-	-	Secure	S2S3 G5
Montia linearis	linear-leaved montia	-	-	May Be At Risk	S1 G5
Nemophila breviflora	small baby-blue-eyes	-	-	May Be At Risk	S1S2 G5
Oenothera flava	low yellow evening-primrose	-	-	May Be At Risk	S2S3 G5
Pellaea gastonyi	Gaston's cliff brake	-	-	May Be At Risk	S1 G2G3
Pellaea glabella ssp. simplex	smooth cliff brake	-	-	N/A	S2 G5T4?
Penstemon fruticosus var. scouleri	shrubby beardtongue	-	-	Sensitive	S2 G5T5
Pinus flexilis	limber pine	-	Endangered	May Be At Risk	S2 G4
Poa gracillima	Pacific bluegrass	-	-	N/A	S2 G4
Polypodium hesperium	western polypody	-	-	Sensitive	S1 G5
Potamogeton nodosus	longleaf pondweed	-	-	May Be At Risk	S1 G5
Potentilla finitima	sandhills cinquefoil	-	-	N/A	S1 G2G4Q
Potentilla macounii	Macoun's cinquefoil	-	-	May Be At Risk	S1 G1G2
Potentilla villosa	hairy cinquefoil	-	-	Undetermined	S2 G5
Prenanthes sagittata	purple rattlesnakeroot	-	-	May Be At Risk	S2 G3G4
Ruppia cirrhosa	widgeon-grass	-	-	Sensitive	S1 G5
Selaginella wallacei	Wallace's little club-moss	-	-	Sensitive	S1 G5
Sisyrinchium septentrionale	pale blue-eyed grass	-	-	Sensitive	S3 G3G4
Suckleya suckleyana	poison suckleya	-	-	May Be At Risk	S1S2 G5
Symphyotrichum eatonii	Eaton's aster	-	-	May Be At Risk	S2 G5

Table B-2 ACIMS Tracked and Watched Vascular Plant Species with the Potential to Occur within the Foothills Parkland Natural Subregion

Scientific Name	Common Name	*Species at Risk Act*[1]	Alberta *Wildlife Act*[2]	Alberta General Status of Wild Species (2010) [3]	RANK[4]
Torreyochloa pallida var. pauciflora	few-flowered salt-meadow grass	-	-	Undetermined	S1 G5T5
Townsendia exscapa	low townsendia	-	-	May Be At Risk	S2 G5
Trisetum canescens	tall trisetum	-	-	May Be At Risk	S2 GNR
Trisetum cernuum	nodding trisetum	-	-	May Be At Risk	S2 GNR
Trisetum wolfii	awnless trisetum	-	-	May Be At Risk	S1 G4
Veronica catenata	water speedwell	-	-	N/A	S2S3 G5
Veronica catenata	water speedwell	-	-	N/A	S2S3 G5

NOTES:

[1] Government of Canada 2014a

[2] Legal designation under the Wildlife Act was taken from the Wildlife Regulation [Alta Reg 143/1997]

[3] ESRD 2012

[4] Alberta Conservation Information Management System (ACIMS) 2014

APPENDIX C
POTENTIAL WILDLIFE SOMC IN THE PROJECT AREA

Appendix C POTENTIAL WILDLIFE SOMC IN THE PROJECT AREA

Table C-1 Wildlife Species of Management Concern Potentially Occurring within the Study Area

Common Name	Scientific Name	AB		SARA[3]	COSEWIC[4]	MCBA[5]
		ESRD[1]	AWA[2]			
Birds						
trumpeter swan	*Cygnus buccinators*	SC	SC		NAR	✓
northern pintail	*Anas acuta*	S				✓
green-winged teal	*Anas crecca*	S				✓
lesser scaup	*Aythya affinis*	S				✓
Harlequin duck	Histrionicus histrionicus	S	SC			✓
sharp-tailed grouse	*Tympanuchus phasianellus*	S				
pied-billed grebe	*Podilymbus podiceps*	S				✓
horned grebe	*Podiceps auritus*	S		IP	SC	✓
western grebe	*Aechmophorus occidentalis*	TH	TH		in prep	✓
American white pelican	*Pelecanus erythrorhynchos*	S			NAR	
American bittern	*Botaurus lentiginosus*	S				✓
great blue heron	*Ardea herodias*	S				✓
black-crowned night-heron	*Nycticorax nycticorax*	S				✓
white-faced Ibis	*Plegadis chihi*	S				
osprey	*Pandion haliaetus*	S				
bald eagle	*Haliaeetus leucocephalus*	S			NAR	
northern harrier	*Circus cyaneus*	S			NAR	
northern goshawk	*Accipiter gentilis (atricapillus)*	S			NAR	
broad-winged hawk	*Buteo platypterus*	S				
Swainson's hawk	*Buteo swainsoni*	S				
golden eagle	*Aquila chrysaetos*	S			NAR	
yellow rail	*Coturnicops noveboracensis*	UD		SC (1)	SC	✓
Virginia rail	*Rallus limicola*	UD				✓
sora	*Porzana carolina*	S				✓
sandhill crane	*Grus canadensis*	S				✓

Table C-1 Wildlife Species of Management Concern Potentially Occurring within the Study Area

Common Name	Scientific Name	AB		SARA[3]	COSEWIC[4]	MCBA[5]
		ESRD[1]	AWA[2]			
black-necked stilt	*Himantopus mexicanus*	S				✓
piping plover	*Charadrius melodus (circumcinctus)*	AR	EN	EN (1)	EN	✓
upland sandpiper	*Bartramia longicauda*	S				✓
long-billed curlew	*Numenius americanus*	S	SC	SC (1)	SC	✓
red knot	*Calidris canutus (rufa)*	MAR		EN (1)	EN	✓
Caspian tern	*Hydroprogne caspia*	S			NAR	✓
black tern	*Chlidonias niger*	S			NAR	✓
Forster's tern	*Sterna forsteri*	S				✓
black-billed cuckoo	*Coccyzus erythropthalmus*	UD				✓
northern pygmy-owl	*Glaucidium gnoma*	S				
barred owl	*Strix varia*	S	SC			
great gray owl	*Strix nebulosa*	S			NAR	
short-eared owl	*Asio flammeus*	MAR		SC (1)	SC	
common nighthawk	*Chordeiles minor*	S		TH (1)	TH	✓
red-naped sapsucker	*Sphyrapicus nuchalis*	UD				✓
pileated woodpecker	*Dryocopus pileatus*	S				✓
American kestrel	*Falco sparverius*	S				
peregrine falcon	*Falco peregrinus*	AR	TH	SC (1)	SC	
prairie falcon	*Falco mexicanus*	S	SC		NAR	
olive-sided flycatcher	*Contopus cooperi*	MAR		TH (1)	TH	✓
western wood-pewee	*Contopus sordidulus*	S				✓
least flycatcher	*Empidonax minimus*	S				✓
cordilleran flycatcher	*Empidonax occidentalis*	UD				✓
eastern phoebe	*Sayornis phoebe*	S				
loggerhead shrike	*Lanius ludovicianus (excubitorides)*	S	SC	TH (1)	TH	✓
bank swallow	*Riparia riparia*			IP	TH	✓
barn swallow	*Hirundo rustica*	S		IP	TH	✓
Sprague's pipit	*Anthus spragueii*	S	SC	TH (1)	TH	✓
common yellowthroat	*Geothlypis trichas*	S				✓
western tanager	*Piranga ludoviciana*	S				✓

Table C-1 Wildlife Species of Management Concern Potentially Occurring within the Study Area

Common Name	Scientific Name	AB		SARA[3]	COSEWIC[4]	MCBA[5]
		ESRD[1]	AWA[2]			
Brewer's sparrow	*Spizella breweri*	S				✓
Baird's sparrow	*Ammodramus bairdii*	S		IP	SC	✓
bobolink	*Dolichonyx oryzivorus*	S		IP	TH	✓
rusty blackbird	*Euphagus carolinus*	S		SC (1)	SC	
Baltimore oriole	*Icterus galbula*	S				✓
Mammals						
eastern red bat	*Lasiurus borealis*	S				
hoary bat	*Lasiurus cinereus*	S				
silver-haired bat	*Lasionycteris noctivagans*	S				
little brown myotis	*Myotis lucifugus*			IP	EN	
long-eared myotis	*Myotis septentrionalis*	MAR		IP	EN	
long-legged myotis	*Myotis volans*	UD				
Canada Lynx	*Lynx canadensis*	S		NAR	NAR	
bobcat	*Lynx rufus*	S				
grizzly bear	*Ursus artos*	AR	TH	IP	SC	
prairie long-tailed weasel	*Mustela frenata longicauda*	MAR			NAR	
American badger	*Taxidea taxus taxus*	S	DD		SC	
Amphibians						
western toad (Calling)	*Anaxyrus boreas*	S			SC	
northern leopard frog	*Lithobates pipiens*	AR	TH	SC (1)	SC	
western tiger salamander	*Ambystoma mavortium*			IP	SC	
Reptiles						
terrestrial (wandering) garter snake	*Thamnophis elegans vagrans*	S				
plains garter snake	*Thamnophis radix*	S			candidate	

Table C-1 Wildlife Species of Management Concern Potentially Occurring within the Study Area

Common Name	Scientific Name	AB		SARA[3]	COSEWIC[4]	MCBA[5]
		ESRD[1]	AWA[2]			

NOTES:

[1] – ESRD 2012 (UD – undetermined, S – sensitive, MAR – may be at risk, AR – at risk) (http://esrd.alberta.ca/fish-wildlife/species-at-risk/albertas-species-at-risk-strategy/general-status-of-alberta-wild-species-2010/documents/SAR-2010WildSpeciesGeneralStatusList-Jan2012.pdf)

[2] – Alberta *Wildlife Act* (DD – data deficient, SC – special concern, TH – threatened, EN – endangered) (http://esrd.alberta.ca/fish-wildlife/species-at-risk/documents/SpeciesAssessed-EndangeredSpecies-Jul18-2014.pdf)

[3] – *Species at Risk Act* schedule (1, 2, 3, IP – in progress, NAR – Not As Risk, SC – special concern, TH – threatened, EN - endangered) (http://www.sararegistry.gc.ca/sar/listing/default_e.cfm)

[4] – COSEWIC status assessment (NAR – not at risk, candidate – high/mid-priority on candidate species list, in prep – status report in preparation, in review – status report under review in 2014, SC – special concern, TH – threatened, EN – endangered) (COSEWIC. 2014. Canadian Wildlife Species at Risk. Committee on the Status of Endangered Wildlife in Canada. (http://www.cosewic.gc.ca/eng/sct0/rpt/rpt_csar_e.pdf)

SARA/COSEWIC/AWA status last updated July 2014; other references last checked March 2012

[5] – Migratory Birds Convention Act, 1994 (✓ – identifies a species that belongs to one of the families of birds identified in the Schedule as being a migratory game bird, migratory insectivorous bird or other migratory nongame bird) (http://laws-lois.justice.gc.ca/PDF/M-7.01.pdf)