Klohn Crippen Berger

St. Mary River Irrigation District

Chin Reservoir Expansion - EIA

Volume 1

Introduction and Rationale

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Definition
AB	Alberta
ABMI	Alberta Biodiversity Monitoring Institute
ACA	Alberta Conservation Association
ACIMS	Alberta Conservation Information Management System
AEPA	Alberta Environment and Protected Areas
AER	Alberta Energy Regulator
AGRASID	Agricultural Region of Alberta Soil Inventory Database
AIDA	Alberta Irrigation Districts Association
AIM	Alberta Irrigation Modernization Program
AIPA	Alberta Irrigation Projects Association
Alberta Culture	Ministry of Alberta Arts, Culture and Status of Women
ALSA	Alberta Land Stewardship Act
ASIC	Alberta Soil Information Centre
AT	Alberta Transportation
AUC	Alberta Utilities Commission
BRID	Bow River Irrigation District
BTEX	Benzene, toluene, ethylbenzene and xylenes
CDA	Canadian Dam Association
CEPA	Canadian Environmental Protection Act
CIB	Canadian Infrastructure Bank
CLI	Canadian Land Inventory
COC	Chain of Custody
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPR	Canadian Pacific Railway Co.
CPUE	Catch Per Unit Effort
CWS	Canadian Wildlife Service
dam^3	Cubic decameters
DFO	Fisheries and Oceans Canada
DSG	Dam Safety Guidelines
E	Evaporation
EC	Electrical Conductivity
ECCC	Environment and Climate Change Canada
EDS	Electronic Disposition System
EIA	Environmental Impact Assessment
EID	Eastern Irrigation District
EMS	Environmental Management System
EPEA	Environmental Protection and Enhancement Act
EPT	Ephemeroptera, Plecoptera, and Trichoptera
ESA	Environmentally Significant Area
ESC	Erosion and Sediment Control
ESRD	Environment and Sustainable Resource Development
FMZ	Fish Management Zone
FSL	Full Supply Level
fToR	final Terms of Reference
FWMIS	Fisheries and Wildlife Management Information System

Abbreviation/Acronym	Definition
GDP	Gross Domestic Product
GIS	Geographical Information System
GoA	Government of Alberta
GoC	Government of Canada
GPS	Global Positioning System
GVI	Grassland Vegetation Inventory
HADD	Habitat Alteration, Disruption or Destruction
HCl	Hydrochloric Acid
HRA	Historical Resources Act
HRIA	Historical Resources Impact Assessment
HRMB	Historical Resources Management Branch
IAA	Impact Assessment Act
IAAC	Impact Assessment Agency of Canada
IDF	Inflow Design Flood
IDP	Intermunicipal Development Plan
KCB	Klohn Crippen Berger Ltd.
KI	Key Indicators
LEL	Low-level effect
LiDAR	Light Detection and Ranging
LLO	Low Level Outlet
LSA	Local Study Area
LSRS	Land Suitability Rating System
MBCA	Migratory Birds Convention Act
MD	Municipal District
MDL	Mean Drawdown Level
MDP	Municipal Development Plan
MID	Magrath Irrigation District
MNRF	Ministry of Natural Resources and Forestry
MPE	MPE Engineering Ltd.
MRRR	Milk River Ridge Reservoir
MWSG	Mapping System Working Group
NGOs	Non-Government Organizations
NRC	Natural Regions Committee
NRCB	Natural Resources Conservation Board
NRCBA	Natural Resources Conservation Board Act
P	Precipitation
PA	Project Area
PFRA	Prairie Farm Rehabilitation Administration
pHRIA	Paleontological Historical Resources Impact Assessment
PLA	Public Lands Act
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PPWB	Prairie Provinces Water Board
PRA	Public Recreation Area
Project	Chin Reservoir Expansion Project
pToR	proposed Terms of Reference
PVC	Polyvinyl chloride

Abbreviation/Acronym	Definition
QA	Quality Assurance
QAES	Qualified Aquatic Environmental Specialist
QC	Quality Control
RAP	Restricted Activity Period
RID	Raymond Irrigation District
RO	Runoff
RSA	Regional Study Area
RSR	Regional Suitability Rating (Soils)
SAGE	Southern Alberta Group for the Environment
SAR	Sodium Adsorption Ratio
SARA	Species at Risk Act
SCA	Soil Correlation Area
SCWG	Soil Classification Working Group
SDF	Spillway Design Flood
SID	Southern Irrigation District
SMRD	St. Mary and Milk Rivers Development
SMRID	St. Mary River Irrigation District
SSRB	South Saskatchewan River Basin
SSRP	South Saskatchewan Regional Plan
TAP	Traffic Accommodation Plan
TBR	Technical Baseline Report
TEC	Alberta Transportation and Economic Corridors
TEC	Alberta Transportation and Economic Corridors
TID	Taber Irrigation District
TLU	Traditional Land Use
ToR	Terms of Reference
TSS	Total Suspended Solids
UID	United Irrigation District
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey's Patuxent Wildlife Research Center
USLA	Universal Soil Loss Equation
UTM	Universal Transverse Mercator
VC	Valued Component
VEC	Valued Environmental Component
WCOs	Water Conservation Objectives
WID	Western Irrigation District
WMU	Wildlife Management Unit
WSC	Water Survey of Canada

UNITS OF MEASUREMENT

Unit	Measurement
ac ft	acre-foot
dam^3	cubic decametre
°	degrees
ha	hectare
km	kilometre
km/hr	kilometres per hour
m	metre
%	percent

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CLARIFICATIONS REGARDING THIS REPORT

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1 PROJECT HISTORY AND RATIONALE

1.1 Historical Overview of the Region

Irrigation development and water management has been part of Alberta's history for over 130 years. Currently, over a half million hectares of southern Alberta within the South Saskatchewan River Basin (SSRB) is irrigated (Paterson 2015). Irrigation allows for more than 60 crop varieties to be grown. Much of the irrigated crops are processed to provide value-added products which supply national and international supply chains. There is a strong link between irrigation and the economic and social viability of southern Alberta.

Water storage plays an essential role towards the assurance of a supply of water for the irrigation systems used throughout southern Alberta. In addition, water storage also plays a role in flood mitigation and economic and social resiliency to periods of drought. Therefore, water storage capacity needs to keep pace with the economic and social needs driven by the agricultural industry and the preparedness for the potential effects of climate change in the future.

1.1.1 Exploration

In 1857 to 1859, British explorer Captain John Palliser led a scientific expedition to report to the British Government on settlement and living conditions on the Canadian great plains region. He cautioned that the dry prairie region of southern Alberta and Saskatchewan was not suitable for agricultural settlement (Nemanishen 1998, SMRID 2000). That area became known as the "Palliser Triangle". During the same period, the Canadian Government sent geologist and naturalist Professor Henry Youle Hind to report on the potential value of western Canada to the Dominion. Hind agreed with Palliser about the arid, treeless land in the south not being suitable for agriculture. In the driest part of the arid Palliser Triangle is a smaller area centered on the Alberta-Saskatchewan border where the average annual precipitation is about 325 mm due to the "Rain Shadow" effect of the Cypress and Sweetgrass Hills. This area became known as the dry belt. Areas to the north where parkland forest provided suitable building materials, fertile soils, and more precipitation were identified as more suitable for settlement.

In 1867 the *British North America Act* was passed forming the Dominion of Canada with four provinces; Ontario, Quebec, New Brunswick and Nova Scotia. In 1869 the Hudson's Bay Company signed and sealed the deed of transfer surrendering Rupert's Land, its chartered territory, to the Dominion of Canada. Manitoba became a province in 1870 and British Columbia joined in 1871 on condition that the trans-Canada railway would be started in 2 years and completed within 10 years. It was the dream of Prime Minister John A. MacDonald to build a nation from sea to sea. Before settlement could begin, a number of prerequisites had to be put in place; the disposition of Indigenous land rights through treaties, completion of a transcontinental railway, favourable markets for agricultural produce, and improvements in dryland farming techniques and machinery.

From 1873-1875, George M. Dawson was surveying the region for the British North American Boundary Commission and noted three deterrents to the settlement of the prairies; distance from markets, a high prevalence of swarms of the now extinct rocky mountain locus (*Caloptenus spretus*),

and the lack of trees (Dawson 1875). Dawson also noted that areas south of the fertile forested areas contained poor soil, with "scanty herbage", with no wood, except on the northern exposure. His conclusion was that the region would best be utilized for cattle, but not crops. It is of interest that observations and predictions of further desiccation of the prairies were being made at the end of the 19th century (Dawson 1875).

1.1.2 Post-colonial Settlement

To encourage settlement, the Dominion Government passed the *Dominion Lands Act* in 1872. Anyone over age 21 could claim a quarter section for a $10 registration fee (dropped to 18 years old in 1873). Then if the settler broke the sod, put up a shelter and lived on the land for at least six months a year for three years, the land would belong to him. He could then buy another quarter section for about $2 per acre if he desired. The density of settlement did not vary according to the quality of the land or the suitability of the climate for sustained agriculture.

Between 1874 and 1877, Treaties 4, 6 and 7 were signed. The treaties paved the way for the construction of the transcontinental railway, development of other infrastructure, private land ownership, and agricultural settlement of present-day southern Alberta. Treaty 7 was signed in 1877 and covers most of southern Alberta. The five First Nations signatories were the Siksika (Blackfoot), Kainai (Blood), Piikani (Peigan), Stoney-Nakoda, and Tsuut'ina (Sarcee) (Tesar 2019).

A contract with the Canadian Pacific Railway Co. (CPR) was signed in October 1880. In return for building the railway, the CPR was generously endowed by the federal government with cash ($25 million), land grants (25 million acres), tax concessions, rights-of-way, and a 20-year prohibition on the construction of competing lines. The right-of-way for the railroad was established through the Palliser Triangle, thus providing an incentive for development in that area of the new west rather than in the more fertile parkland area to the north.

The CPR and the Government of Canada (GoC) actively encouraged settlement partly due to a concern that the sparse population of the Canadian prairies was not a favourable situation adjacent to the United States of America. Between 1896 and 1914, aggressive advertising and recruitment from European countries with well-established farming practices led to large waves of emigration from the Ukraine, Poland, Germany, France, Norway, and Sweden (Yarhi and Regehr 2020).

1.1.3 Irrigation

The increase in settlement led to an increase in the demand for wheat. Unfortunately, many of the experienced farmers who came to settle in the region came mainly from areas of higher rainfall. The application of agricultural practices more suitable to more humid conditions eventually proved to be unsuitable for the driest region of Alberta.

The lack of water in the region was an oversight of the *Dominion Lands Act* as little mention of water and or irrigation is included in the Act (SMRID 2000). It was the colonization of southern Alberta by ranchers and Mormon settlers immigrating from the United States that led to the establishment of irrigation practices on the prairies (SMRID 2000). The first documented irrigation system in Alberta is of America ranchers creating diversion ditches in 1878. The Mormon community at Cardston

introduced the concept of irrigation to other immigrants to southern Alberta in the 1880s and 1890s. Initially, the federal government was not interested in the development of irrigation as part of their immigration strategy, but a drought that coincided with the success of the Mormon irrigation systems triggered a change in the federal perspective. In 1894, the *Northwest Irrigation Act* was passed in part due to the apparent merits of irrigation, but largely due to the influence of William Pearce of the federal Department of the Interior. Pearce played a significant role in the evolution of resource development policies for western Canada as he knew that irrigated agriculture was fundamental to the settlement of the drought-prone Canadian prairies (SMRID 2000). Noteworthy elements of the Act included the unequivocally revoked or rescinded common law riparian rights; the declaration that water in all streams, lakes, ponds, springs, or other sources was the property of the Crown; and the requirement for individuals or corporations to obtain approvals for the right to use water (Paterson 2015).

The active participation of the federal government under the new Act intensified when news of American plans to divert the water of the St. Mary River at a location south of the US-Canada border became known (de Loë 1997, SMRID 2000).

With news of possible United States diversions of water, a shift from local, small-scale diversion projects to large-scale, government supported irrigation projects began with the St. Mary Project in 1898. The Department of the Interior had identified nearly 550,000 acres (222,577 ha) of irrigable lands across southern Alberta, stretching from Fort McLeod to Medicine Hat. The initial scale of the St. Mary Project was to use the waters of the St. Mary River to irrigate an area of around 75,000 acres (30,351 ha) southeast of Lethbridge.

The developing diversions within the watersheds shared between the United States and Canada led to the *Boundary Waters Treaty of 1909*. Settlers in Montana and Alberta were building competing canals to divert the waters of the St. Mary and Milk Rivers. The intent of the Treaty was to prevent and settle disputes over the use of the waters shared by the two countries (IJC 2022).

In 1911, Chin Lateral Canals #1 and #2 connected the St. Mary River to the newly dammed Chin Coulee. By 1915, 100,000 acres (40,469 ha) were irrigated between Magrath and Coaldale, with the capacity to irrigate another 72,000 acres (29,137 ha). At that time, the Alberta *Irrigation District Act* of 1914 allowed water users to organize into districts where water use could be managed by the users. In the Chin Coulee region, the Taber Irrigation District (TID) was first to exist in 1915, though water did not flow until the spring of 1921. The TID was followed by the Southern Irrigation District (SID) in 1919. The Magrath Irrigation District (MID) split out of the SID in 1924, as did the Raymond Irrigation District (RID) in 1925.

In 1930, the federal government transferred control of the natural resources to Alberta, though retained significant control over water resources under the terms of a new *Water Resources Act*. A provincial crown corporation, the St. Mary and Milk Rivers Development (SMRD), took over the St. Mary Project in 1946. The combined efforts of the SMRD and the federal Prairie Farm Rehabilitation Administration (PRFA) led to the construction of the St. Mary Dam, between 1946 and 1951 (de Loë 1997; SMRID 2000). With the addition of new canals and reservoirs in the region between 1950 and 1955, approximately another 200,000 acres (80,937 ha) of land could be irrigated.

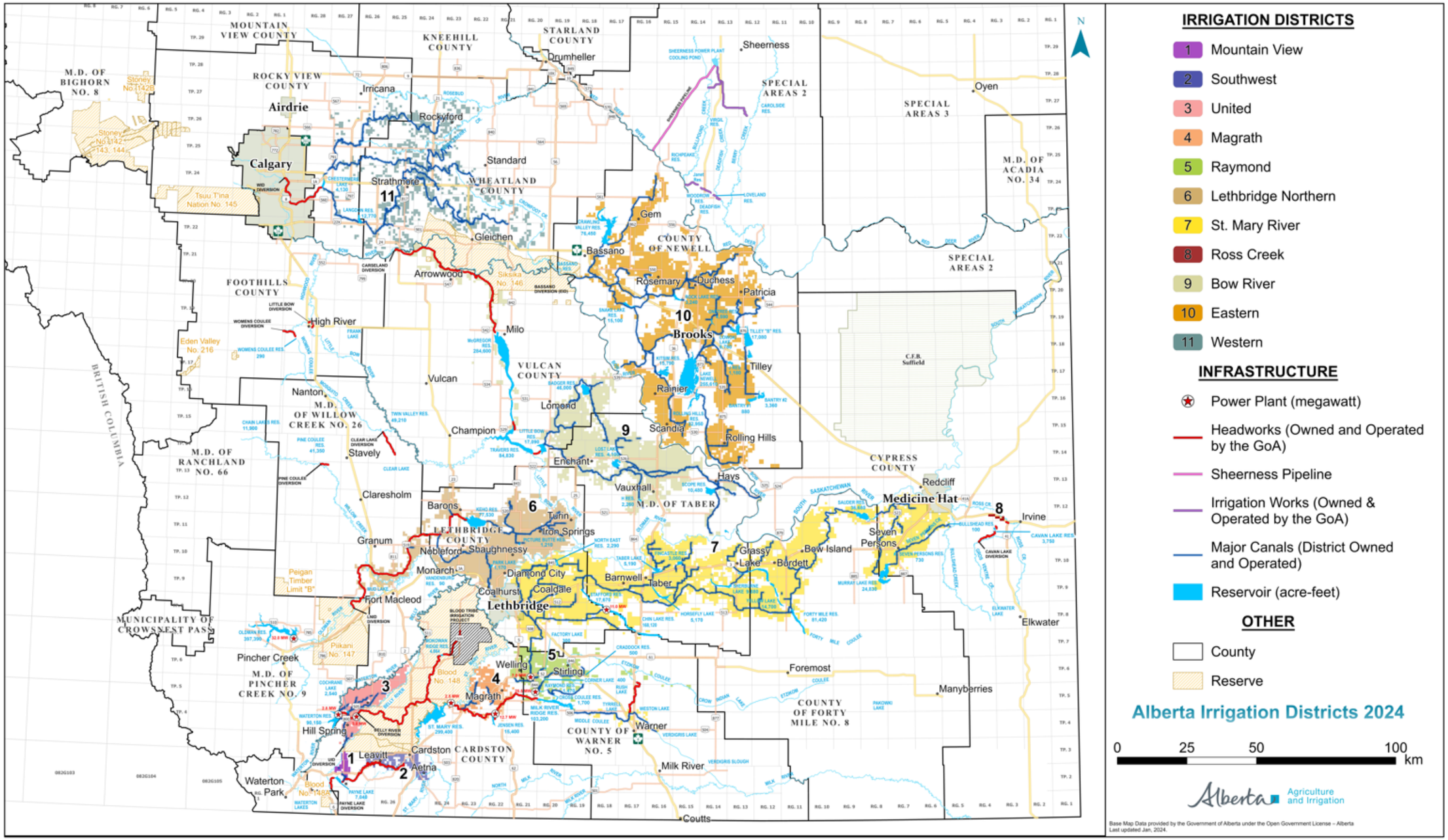
In 1968, the passing of the *Irrigation Act* led to the creation of the St. Mary River Irrigation District (SMRID) and the transfer of the management of the St. Mary Project from the SMRD to the SMRID. In 1969, the intergovernmental Prairie Provinces Water Board (PPWB) established the Master Agreement on Apportionment (1969) which required 50% of the flow by volume of eastward-flowing provincial watercourses must be passed from Alberta to Saskatchewan (PPWB 2019). The Alberta Irrigation Agreement of 1973 transferred control of the major eadworks, including the St. Mary Dam, from the federal government to provincial jurisdiction. The transfer led to large scale and much needed rehabilitation of aging St. Mary Project infrastructure. Early in the 1970s, concrete canal linings started to replace unlined canals and concrete was used to replace wooden control structures during rehabilitation. By the 1980s, polyvinyl chloride (PVC) lining was being installed in canals as a best practice to prevent seepage, and open canals began to be replaced with pipelines with the intent to reduce water loss to evaporation and reduce the cost of maintenance. Continued growth of the SMRID system in the 1970s and 1980s saw the development of the Verdigris Extension and the creation of the Forty-Mile Reservoir. The utilization of water moving through the St. Mary Project system to generate electricity came in the 1990s with the development of small power generating facilities, including one in operation at the Chin Reservoir with a generating capacity of 11 megawatts.

1.2 Irrigation Districts

Irrigation contributes approximately 20% of Alberta's gross agricultural production on about 5% of the province's cultivated land (Alberta WaterPortal 2012, Paterson 2015). Approximately 35% of the provincial gross domestic product associated with processing industries is directly tied to irrigated production (AAFRD 2004). Irrigation stabilizes agricultural production and can increase land productivity by 300% compared to comparable land in a dryland state (AAFRD 2004). Alberta's irrigation industry contributes approximately $3-5 billion annually to the provincial gross domestic product (GDP) (Alberta WaterPortal 2012, Paterson 2015). While it occurs on less than 5% of the cultivated land base in the province, irrigation districts generated an average of approximately 28% of Alberta's total agri-food GDP (Alberta WaterPortal 2023). Just prior to 2020, every cubic metre of water delivered for irrigation and other related uses generated approximately $3.00 to the provincial GDP and $2.00 in labour income (Paterson 2015). AAFRD (2004) estimated that without irrigation, the regional population would reduce by 65-75%, with adverse indirect effects such as a reduced tax base and support for rural and town services such as roads, schools, and hospitals.

Within the SSRB, there are 11 irrigation districts, in which approximately 525,000 ha of land receive irrigation water (Alberta WaterPortal 2022). Irrigation infrastructure in the SSRB includes 8,000 km of conveyance pipelines and canals, 52 irrigation storage reservoirs, and 4,900 km of drainage canals returning surplus water to source rivers (Alberta WaterPortal 2023). The Alberta Irrigation Projects Association (AIPA) acts as an umbrella group for the districts, coordinating joint activities, such as education and research (Alberta WaterPortal 2022). The Alberta Irrigation Districts Association (AIDA) works to sustain irrigated agriculture by coordinating joint efforts of Alberta's irrigation districts, advocating irrigation, and working collaboratively with stakeholders (AIDA 2022).

Figure 1.1 The Irrigation Districts of Alberta



1.2.1 The SMRID

The SMRID is the proponent of the expansion of Chin Reservoir (the Project):

St. Mary River Irrigation District (SMRID)
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The current Government of Alberta (GoA) licencing policy started coming into effect in the mid 1970s. By 1991, a licence agreement between the government and SMRID had been reached. The last updated licence in 1991 was for an allotment of 722,000 ac-ft (890,574 dam^3) of water from the Belly, Waterton, and St. Mary Rivers (GoA 2021) (Table 1.1). In 1999, Alberta's *Water Act* came into force which focusses more on the protection of water resources and less on the management of supply. A key component of the Act was the development of Water Conservation Objectives (WCOs) for the protection of aquatic and riparian ecosystems (Paterson 2015). Under Regulation 171/2007, no additional allocation of water is permitted for the Oldman River Sub-Basin. The remaining portion of water is to be only used for contributing towards the maintenance of WCOs, for meeting existing licences, for storage if it is for the protection of the aquatic environment and for improving the availability of water to existing licence holders and registrants, and for use by Indigenous groups (GoA 2007). The Government of Alberta owns and operates the onstream reservoirs and diversion structures that make up the Waterton – St. Mary Headworks. It is the Government of Alberta's responsibility to regulate flows to members of the St. Mary Project and to maintain the downstream flows required to meet the WCO's for the environment, municipalities, industry, Indigenous communities, other licences, and junior licences within the SSRB.

Table 1.1 Summary of SMRID Diversion Licences

Historic Licence No.	Diversion (ac-ft)	Diversion (dam^3)	Purpose
1899-02-07-01	168,173	207,438	Irrigation
1950-05-31-07	331,827	409,303	Irrigation
1991-08-23-09	222,000	273,833	Irrigation
1991-08-23-09	12,000	14,802	Other
Total Irrigation Diversion	722,000	890,574	
Total Other Diversion	12,000	14,802	

As of 2020, the 12 SMRID-owned reservoirs had a storage capacity of 443,548 dam^3 (359,590 ac-ft), including the 217,679 dam^3 (176,475 ac-ft) in Chin Reservoir (MPE 2020). The provincially owned Jensen, Milk River Ridge, St. Mary, and Waterton Reservoirs provide another 626,794 dam^3 (508,150 ac-ft) of storage.

Water allocated to the SMRID has the capability of irrigating approximately 412,000 acres (166731 ha). In 2022, the SMRID amalgamated with the TID, adding 158,000 ac-ft (194,890 dam^3) of capacity (Table 1.2) which is capable of irrigating 92,200 acres (37,312 ha).

In 2022, 1,489,667 acres (602,847 ha) were irrigated across all irrigation districts (GoA 2023a). The SMRID, now combined with the TID, irrigated 498,606 acres (201,779 ha), approximately 34% of the irrigated lands in southern Alberta.

Table 1.2 Summary of TID Diversion Licences

Historic Licence No.	Diversion (ac-ft)	Diversion (dam^3)	Purpose
1899-02-07-02	34,000	41,938	Irrigation
1950-05-31-17	33,500	41,322	Irrigation
1950-05-31-18	67,500	83,260	Irrigation
1950-05-31-19	15,000	18,502	Irrigation
1991-08-26-02	8,000	9,868	Other
Total Irrigation Diversion	158,000	194,890	
Total Other Diversion	8,000	9,868	

Within the SMRID (not including the addition of the TID), the irrigated acreage has grown by over 100,000 acres since the early 1980s. However, the percent of the licenced allocation diverted by the SMRID has not exceeded 78.1% (1987) and has averaged 57% between 1987 and 2020 (402,259 ac-ft; 496,179 dam^3) (GoA 2021). In 2022, the combined allotment for SMRID and TID was 880,000 ac-ft (1,085,464 dam^3), of which 584,200 ac-ft (720,600 dam^3) was diverted or 66.4% of the allotted amount under the SMRID and TID licences (GoA 2023a).

Alberta's 2014 Rural Economic Development Action Plan called for continued improvements to the efficiency of irrigation infrastructure in an effort to balance the enhancement of rural economic activity with the conservation of water (GoA 2014). Increased efficiencies for water use have come in the form of pipelines for water conveyance and pivot irrigation systems. Between 2011 and 2022, the SMRID replaced 226 km of canals with pipelines, with an additional 424 km planned (SMRID 2022a). The ever-increasing proportion of low-pressure, precision sprinkler pivot irrigation as the preferred method has introduced significant water conservation rates when compared to the practice of flooding fields; first used in the late 19th century and now only used in 1.5% of the SMRID (GoA 2021). The SMRID and GoA have provided efficiency education to their users and has introduced more stringent operating rules. The increased efficiencies of conveyance and application of water to crops has led to a reduction in the required volumes of water to support the district's irrigated lands. It is estimated that approximately 54,600 ac-ft (67,348 dam^3) of water is conserved per year relative to a system without upgraded conveyance and efficiencies in water use (Table 1.3), an amount which reduces annual diversion volumes (SMRID 2022a).

Table 1.3 Summary of Water Conservation from Improvements

Category	Estimated Water Savings	
Infrastructure Improvements (2011-present)	9,201 ac-ft	11,349 dam^3
On-farm improvements (2011-present)	16,292 ac-ft	20,096 dam^3
Alberta Irrigation Modernization Program projects (2020+)	29,057 ac-ft	35,841 dam^3
Totals	54,550 ac-ft	67,286 dam^3

1.2.2 SMRID Role in Southern Alberta

The SMRID licenses not only allow water for irrigation but for other uses such as municipal, industrial, recreational, and environmental purposes. The water of the SMRID is critical to the production of cereals such as barley, wheat, oats and rye; forage such as alfalfa, hay, corn silage and native pasture; oil seeds such as canola, flax and mustard; and specialty crops of which sugar beets, potatoes, and beans being the most common (GoA 2021). Irrigation is also a crucial component of supporting and enhancing livestock production in southern Alberta (Paterson 2015). Almost all the reservoirs within the SMRID are used for recreational purposes, including boating and fishing. Chin Reservoir is a popular recreation site and has a public camping and boat launch site.

See Volume 3 – Socio-Economic Assessment for a more detailed evaluation of the costs and benefits of the SMRID irrigation system and expansion of the Chin Reservoir, including discussions on power generation, recreation opportunities, habitat development, flood control, and indirect revenue generation.

1.3 History and Description of Chin Reservoir

As noted above, the off-stream storage at Chin Coulee has been present for over 100 years. The completion of the Chin #1 and #2 Lateral Canals and the dam construction within Chin Coulee at the start of the 20th century initiated the storage of water in the coulee. By mid-century, the water demands of the ever-expanding St. Mary Project required additional storage to convey water eastward. Both the West Dam and the Existing East Dam were designed by and built Between 1952 and 1955 under the supervision of the PFRA. While water control structures have been refurbished over time, no major modifications have been done to the embankments of the West and Existing East Dams since the completion of construction in 1955 (Matrix 2019, MPE 2020).

1.4 Climate Change

Climate projections for southern Alberta suggest a future that will be warmer, with changes in precipitation patterns and an increased frequency of extreme weather events (NRC 2004, Alberta WaterPortal 2017, Hayhoe and Stoner 2019). Expected are increased average annual precipitation (rain and/or snow), a change in the timing of peak precipitation, a change in the extreme highs and lows of stream flows, and frequent and severe extreme droughts and floods (Schneider 2013, Alberta WaterPortal 2017, Hayhoe and Stoner 2019). In general, the overall amount of precipitation is expected to increase in Alberta; however, when and in what form the precipitation will fall is predicted to change. Adverse effects of a drought and severe weather events on agriculture can include losses of vegetable crops, decline in the yields of cereal and forage crops, an increase in the prevalence of disease in crops, damage to crops and equipment from hailstorms, increased weed growth, and decreased herbicide and pesticide efficacy (NRC 2004).

Trends indicate that average temperatures are on the rise across all seasons, with greater increases in winter (between +0.5 and +1°C per decade) as compared to summer (between +0.1 and +0.3°C per decade (Hayhoe and Stoner 2019). The increases in Alberta are consistent with those observed across Canada, which also show greater temperature increases in winter as compared to summer.

The two typical climate scenarios used to assess future changes in climate use Representative Concentration Pathways (RCP). The RCP8.5 scenario is where carbon emissions continue as the world remains primarily dependent on fossil fuels. The RCP4.5 scenario is where carbon emissions are assumed to have peaked and are expected to decline as the world transitions to noncarbon energy sources (van Vuuren et al. 2011). Given the expected rise in climatic temperature associated with the RCP8.5 scenario, it is expected that the water-supplying snowpack in the Rocky Mountains would not be sustainable. Without the presences of an annual snowpack, it is expected that there would be a significant reduction in runoff supplying the rivers upstream of diversion for the Project (Hayhoe and Stoner 2019). For the EIA, an RCP4.5 scenario is still expected to lead to future climate change effects. However, the magnitude of the effects is expected to be less extreme than the RCP8.5 scenario.

1.5 Potential Changes in Precipitation and Temperature

Compared to baseline conditions, annual precipitation is projected to increase upstream of the diversion from Government of Alberta water resource infrastructure into the SMRID system (the diversion) (WaterSMART 2023). By 2021-2050, annual precipitation is projected to increase by roughly 100 mm/year relative to the 1991-2020 period. Increases are expected to be the greatest at lower elevations, due predominantly to the increase mostly occurring during the summer months, when convective storms have a less defined elevational gradient. By 2051-2080, annual precipitation is projected to decrease relative to 2021-2050, though relative to 1991-2020, annual precipitation is still projected to increase by approximately 100 mm/year (WaterSMART 2023).

While annual precipitation is expected to increase, the winter snowpack is predicted to decrease upstream of the diversion. A potential reduction in the snowpack is due to a prediction of an increase in air temperatures with climate change (1-3^{o}C) leading to less precipitation falling as snow, more periodic winter snowmelt events, and earlier spring snowmelt. With predicted increases in air temperatures and precipitation, earlier snow disappearance, and increased evapotranspiration in the watershed, the timing and magnitude of streamflow in major tributaries is projected to change. The freshet is expected earlier with relatively higher flows as snowmelt begins earlier in the spring (Kienzle et al. 2012, Sauchyn et al. 2016).

The proportion of annual streamflow coming from summer storm runoff is expected to increase with time, while the relative contribution of snowpack melt is expected to decrease with time (Leung and Ghan 1999, Lapp et al. 2005, WaterSMART 2023). Reduced snowmelt contributions would mean stream flows would become more dependent on rainfall events. Therefore, the time between spring precipitation events and peaks in flow associated with summer storm season are predicted to increase over time.

These factors are projected to be exacerbated further in the future. Climate models suggest that the future will bring fewer cold days, a higher frequency and warmer maximum temperatures, and more intense rainfall events, especially during the winter and spring seasons (The Resilience Institute 2021). Rainfall data analyses generated by climate models indicate that climate change will be associated with a shift in the intensity, duration, and frequency of rainfall events in Southern Alberta (The Resilience Institute 2021). The frequency of damaging heavy rainstorm events has increased by

up to 5% per decade over the past century and is expected to continue increasing in the future (Stone et al. 2000). The return period of heavy rain events is predicted to decrease by a factor of two by the year 2050 based on predictive models (Kharin et al. 2007). This means that a damaging 100-year return period event would be expected to occur in a 50-year return period. A 50% increase in the number of currently rare very wet days and a 20% increase the amount of precipitation on the wettest day of the year is expected with an increase of global mean temperature increase (Hayhoe and Stoner 2019). The incidence of severe drought is also expected to increase as a result of changing climate trends (IPCC 2007, Martz et al. 2007) and could occur twice as frequently by 2050 (Bruce 2011).

During the first half of the 21st century, runoff (mm/year) is projected to increase moderately, with decreases projected for higher elevation areas in the St. Mary and Belly River watersheds (WaterSMART 2023). For many areas, increases of 50-100 mm/year are projected. For some high elevation glacierized areas where accelerated melt is anticipated, increases of up to 200 mm/year are projected over the next few decades. Alberta is projected to rise by 4.2 °C by the end of the century under a high-emission scenario, and 2.8 °C under the more restrained emission scenario (Schneider 2013). However, although the number of extreme precipitation events per year is projected to increase, climate models predict a decline in precipitation during the summer and that Alberta will become considerably drier in the coming decades (Schneider 2013). The frequency and severity of extreme floods and droughts are predicted to increase in the prairie regions of Alberta, Saskatchewan and Manitoba (IPCC 2007, Martz et al. 2007, Sauchyn and Kulshreshtha 2008, Bonsal et al. 2013, Alberta WaterPortal Society 2017). Relative to current conditions, droughts have been predicted to occur twice as frequently by 2050 (Bruce 2011).

1.6 Changes to Water Supply and Demand

The projected changes in climate are expected to impact Alberta's natural environment, potentially affecting the province's agriculture, infrastructure, and natural resources, as well as the health and well-being of its residents (Hayhoe and Stoner 2019). Climate has the potential to affect both the supply of water and the demand on that water.

1.6.1 Potential Effects of Climate Change on Water Demands

In southern Alberta where the current growing season spans approximately four and a half months, each degree of global warming could extend the growing season by nearly a month (Hayhoe and Stoner 2019). This would result in an additional two and a half months of growth, leading to a total growing season of seven months if global temperatures increase by +4°C. From the allocated water in Alberta, approximately 65% is used in agriculture (crops and livestock production) (Alberta WaterPortal Society 2018). Almost all the water is directed to crop production, with small proportions used to water livestock and food processing. With an expected earlier and longer growing season, the demand for water will increase to sustain the agriculture sector.

As temperatures rise, evapotranspiration is expected to increase, leading to overall decreases in soil moisture, especially during the summer months. This trend could raise the risk of dry conditions during the growing season in Alberta. Demand for water will increase for irrigation to maintain crop

productivity; stress municipal water supplies and quality; put pressure on industries that depend on water for processing, manufacturing, power generation, and cooling; and limit water availability for natural ecosystems (Martz et al. 2007, GoA 2023b). This is true even if there are no significant changes in precipitation levels during the growing season (Hayhoe and Stoner 2019). Dryer soils would only aggravate conditions where a longer growing season was available and water demands were already relatively higher.

1.6.2 Potential Effects of Climate Change on Water Supply

The agricultural practices of southern Alberta depend on rivers originating to the West. The system is vulnerable to drought, which will be exacerbated when there is reduced streamflow in late summer and fall (Alberta Waterportal 2017). Approximately 65% of the average natural flow of the Oldman River and its tributaries has been allocated, with nearly 90% of these allocations dedicated to irrigated agriculture (Sauchyn and Kulshreshtha 2008). In the Oldman River and Bow River basins, new water license allocations are not available (Government of Alberta 2006). Water management objectives and priorities for sustaining aquatic ecosystems, and apportionment agreements are in place. All future agricultural development and sustainment of population growth must fit within existing allocations. There is to be no additional supply provided for irrigation systems in the South Saskatchewan River Basin (Government of Alberta 2006). The Irrigation Water Management Study Committee (2002) suggested that there may be capacity in the Oldman and Bow Rivers to increase diversion to irrigation. However, the likelihood of decreased streamflow introduces doubt into whether the extra capacity would be realized under future climate change conditions. It is understood by the SMRID that the supply of water to the irrigation system will not be increased from the current allocation by the Government of Alberta. Therefore, potential effects of the Project on the water supply for licensees, river flows, or the sustainability of waterbodies downstream of the diversion are not expected to be attributed to the Project.

1.7 Climate Change and Operation of the Reservoir

The irrigation industry, as the greatest single consumer of water in the region, will likely come under the greatest scrutiny and stress with climate change (Sauchyn et al. 2016). Between 1901 and 2001, western Canada experienced eight major droughts (Volume III – Socio-Economic Assessment). These droughts included the prairie-wide drought of the 1930s, as well as droughts in 1961, 1984, 1985, 2001, and 2002 (Wheaton et al. 2004). In the past thirty years, Alberta has faced severe floods and destructive droughts. Between 1999 and 2004, a North American drought became one of Canada's most expensive natural disasters. In 2009-2010, ten counties in Alberta declared a state of emergency due to drought, with Northern Alberta areas declaring agricultural disasters. These droughts resulted in an estimated $3.6 billion decrease in agricultural production in Canada and a $5.8 billion reduction in GDP for those years (Wheaton et al. 2005), with about 80% of the losses occurring in Alberta and Saskatchewan. Alberta's crop production losses were estimated at approximately $413 million in 2001 and $1.3 billion in 2002.

At the height of the droughts, farms can receive a portion of their allocated water (Sauchyn and Kulshreshtha 2008). The within-system allocation of water is the primary mitigation for shortages in

the supply of water. Even during climate extremes, an exceedance of the government allocation from the river systems is not possible. Therefore, the water provided to the SMRID needs to be distributed throughout the irrigation district without supplements from an increase above the allocated amount.

The results of the hydrological modeling conducted by WaterSMART (2023) demonstrated that under predicted climate change conditions, RCP's 8.5 and 4.5, along with two scenarios of glaciers present and absent, the water supply to the SMRID is predicted to remain sufficient to fill the expanded Chin Reservoir. In addition, shortages to irrigators are not likely to significantly increase under the scenarios. Under future climate change conditions, where air temperatures and extreme precipitation events are projected to increase across the watershed, increased runoff conditions are projected to occur early in the growing season, with a lower late-summer supply of water. Therefore, the addition of storage capacity will provide the means to capture the increased early runoff (including extreme events which currently would lead to flooding) and have a reliable source to continue to support irrigation throughout the growing season. The future operation will be possible without requiring additional allocation at the diversion (WaterSMART 2023).

The management of the future water supply, which will need to take into consideration water licensees, Indigenous Groups and WCOs, will rely heavily on the capture and subsequent controlled release (AMEC 2014). As noted by the authors, the conclusions provided in Sauchyn et al. (2016) are intended to guide policymakers and suggest implementing forecast-based rationing alongside expanded storage capacity could significantly alleviate water shortages.

In the St. Mary River Sub-basin, an expansion of Chin Reservoir is expected to reduce the frequency of deficits to irrigators (AMEC 2014). AMEC (2014) modeling showed that the expansion of the Chin Reservoir and coordination of its operations with government-managed reservoirs resulted in significantly reduced water shortages, an extended irrigable period during droughts, and decreased the risk of water shortages on municipal water supplies tied to the system.

With respect to the conservation of stored water, the physical characteristics of the Chin Reservoir are preferable to other alternatives described below. Sauchyn et al. (2016) noted that the Ideal characteristics for efficient water storage include deep reservoirs with relatively lower surface area, characteristics of the existing Chin Reservoir and the expansion. There are sections of Chin Reservoir where the depth of the reservoir is over 20 m, with distances between shores rarely exceeding 1 km (I-Boating 2024). The expansion will be much deeper than 20 m. These characteristics are similar to the Forty Mile Reservoir. In comparison, the depth of the larger Lake Newall is approximately half of Chin Reservoir, with a width of approximately 4 km (I-Boating 2024). Similarly, McGregor Reservoir is also half as deep as Chin Reservoir and the distances between shores exceeds 2.5 km. Relative to wider and shallower reservoirs and natural waterbodies in southern Alberta, the characteristics of the existing and expansion of Chin Reservoir is expected to have relatively lower water loss due to evaporation. There are few waterbodies in Alberta that have the same water retention capability as the deep and narrow Chin Reservoir.

1.8 Climate Change and Flood Mitigation

Described in greater detail in the Socio-Economic Assessment (Volume III), the increased capacity of the reservoir expansion would allow for greater mitigation of increased occurrence of floods. The total estimated infrastructure repair and replacement costs, plus lost revenue associated with the 2005 flood event in southern Alberta was estimated to be over $186M, which affected 58,000 ha of irrigated farmland and approximately 6500 ha of dryland farmland. It is estimated that the expansion of the Chin Reservoir could mitigate approximately 35% of a flood of similar proportions. It is therefore projected that the Project could potentially reduce flood damage costs and expenses by approximately $65M (Volume III). Over a 50-year project life, the Project has the potential lead to prevent the loss of approximately $326M.

With respect to the effect of a major flood events on individual, municipal, and agency infrastructure in the region served by the SMRID main canal, the total estimated infrastructure repair or replacement costs associated with the 2005 flood event amounted to approximately $11M. With the assumption that the Project could mitigate approximately 35% of the total flood damage for a single event, the Project would be expected to potentially reduce infrastructure damage costs by close to $4M. Over the 50-year project life, this expansion would lead to total savings of approximately $20M (Volume III).

1.9 Project Rationale

Due to the Regulation 171/2007 cap on water allotments, additional withdrawl of water from the Oldman River, Milk River, and South Saskatchewan River Sub-basins will not be possible to mitigate the potential effects of climate change in southern Alberta. The SMRID utilizes approximately half of their licenced allotment from the Oldman River Sub-basin. While there is capacity under the licence to withdraw additional water into the SMRID system to meet potential higher demands in the future, increased efficiencies in the supply and application of water have countered the increase in demand towards the utilization of the fully licenced amount. Advancements in conveyance and on-farm irrigation technologies are improving the efficiency of water use (Paterson 2019), as per the water conservation strategy of the South Saskatchewan Regional Plan (SSRP) (GoA 2018). However, with consideration of potentially extreme effects of climate change that may occur, foresight indicates that preparation for future demands on water storage and supply is a logical approach. One of the key strategies of Alberta Agriculture and Irrigation to enhance water security and meet future needs in the SSRB is to increase water storage through modification of existing reservoirs and the possibility of the development of new reservoirs (AARD 2014, AIDA 2019). The Project is a reoccurring and key component in multiple climate change resilience strategies proposed in the *South Saskatchewan River Basin Adaptation to Climate Variability Project* (AI-EES and WaterSMART 2014). A concept brought forward in the *Climate Vulnerability and Sustainable Water Management in the South Saskatchewan River Basin* project was to expand and balance the Chin Reservoir in the Oldman sub-basin to optimize the utility of an existing reservoir for the provision of irrigation water and to alleviate storage demands in other upstream reservoirs. This strategy would keep more water closer to the headwaters, and support ecosystems and human water uses throughout the system. Through the enhancement of the capacity and management of the Chin Reservoir, water resources can be

more effectively utilized, benefiting both the environment and water users in the region (WaterSMART 2016).

Key benefits of additional storage to southern Alberta irrigation include (AIDA 2019):

- Increased storage of water during high river flows would assist with water supply when river flows are low. The additional stored water will enable water managers to more effectively and efficiently allocate water throughout the irrigation season, benefiting both irrigators and other users.
- Storing additional water during prolonged periods of low water supply may decrease the need for an irrigation district to prioritize its license or mandate water rationing among district irrigators.
- Currently, a significant number of irrigated acres across multiple districts lack support from a storage reservoir. This lack of storage means that water security for these acres is compromised during periods of low supply. Expanded storage would support for these acres, and enhance water security for producers, industry, and municipalities.
- The increased storage capacity will make the SSRB more resilient to drought and flood events. Such events incur costs for residents, businesses, and governments at all levels. Additional storage may lessen the risk of these events and subsequently lower response and recovery costs.

In 2020, a historic modernization plan was announced by the GoC, the Province of Alberta, along with 10 of the irrigation districts. A financial investment of $933 million from all three levels has been provided towards infrastructure rehabilitation projects and the construction or enlargement of up to four off-stream irrigation storage reservoirs (GoA 2022). Breakdown of project funding includes 30% from the GoA, 50% from the GoC through the Canada Infrastructure Bank (CIB), and 20% from the involved irrigation districts. The districts are fully responsible for the repayment of the financing provided by the CIB through a long-term financing arrangement. This investment is to support the construction of four off-stream reservoirs and 56 modernization projects, which include converting open canals into underground pipeline systems (GoA 2020). These projects, managed by the irrigation districts, aim to increase water conveyance efficiency and enable more acres to be irrigated with the same water allocation.

Modernizing and building new irrigation infrastructure is intended to:

- increase irrigated acreage;
- increase primary crop production;
- improve water use efficiency;
- increase water storage capacity;
- enhance water security;
- provide flood protection; and,
- support long-term value-added processing activity.

The expansion of the Chin Reservoir is one of the strategies proposed by the SMRID to contribute towards a regional increase in storage capacity (Alberta WaterPortal 2022). The intent of the SMRID Chin Expansion (in addition to other strategies) is to boost the level of resilience of the agricultural sector, municipal water supply, and the environment against the effects of climate change and extreme drought events (AAF 2016).

1.10 South Saskatchewan Regional Plan

The South Saskatchewan Regional Plan (SSRP) is a land use planning document that provides a framework under the Alberta Land-Use Framework for managing growth and development in the SSRB. The plan covers a wide range of issues, including land use, water management, biodiversity conservation, and economic development.

One of the key objectives of the SSRP is to promote sustainable development in the region while protecting the environment and enhancing the quality of life for residents. The plan aims to achieve this by setting out policies and strategies for managing land use and natural resources in a way that balances economic, social, and environmental considerations.

The SSRP also identifies areas of ecological significance that should be protected and sets out guidelines for managing growth and development in these areas. It also includes provisions for monitoring and evaluating the plan's effectiveness and making adjustments as necessary.

Overall, the SSRP is intended to guide decision-making and promote sustainable development in the South Saskatchewan River Basin, ensuring that future generations can continue to enjoy the benefits of this unique and important region.

The SSRP recognizes the significance of Alberta's irrigation network as a crucial water source for over 50 municipalities, southern Alberta's non-agricultural industries, the sustenance of extensive wildlife habitat, and the provision of recreation opportunities. Additionally, it acknowledges the importance of irrigation-based agriculture, which contributes 20% of Alberta's Gross Domestic Product. This recognition underscores the importance of managing and sustaining Alberta's irrigation network for its multiple benefits to the region's economy, environment, and communities (GoA 2018).

A key objective of the SSRP is the support of a diverse and innovative irrigated agriculture and agri-food sector. The SSRP points to the strategies of *Alberta's Irrigation Strategy: A Strategy for the Future* (GoA 2023b). The guiding strategies include:

- Increase productivity of the water used by the irrigation industry;
- Improve efficiency of conveyance and on-farm use;
- Conservation of water and the diversion from rivers of only what water is required;
- Assess water supply reservoirs and the potential for increasing capacity to meet future demand; and,

- Minimize the impact of irrigation management practices on surface and groundwater quality.

1.11 Regulatory Framework

1.11.1 Alberta

Environmental Protection and Enhancement Act

The SMRID was advised that the proposed expansion of the Chin Reservoir qualified as a mandatory activity pursuant to Schedule 1(c) of the Environmental Assessment (Mandatory and Exempted Activities) Regulation. Pursuant to Section 44(1)(a) of the *Environmental Protection and Enhancement Act* (EPEA) (R.S.A. 2000, c. E-12), the SMRID was required to submit an Environmental Impact Assessment (EIA) for the project. The EIA report was to be prepared in accordance with the provisions of Division 1 of Part 2 of EPEA. The format of the EIA is based on the Government of Alberta's *Guide to Preparing Environmental Impact Assessment Reports in Alberta* (Government of Alberta 2013a). The EIA is to address the Final Terms of Reference (fToR) provided in Appendix I.

The *EPEA* is Alberta's main legislation for addressing pollution, playing a crucial role in managing and preventing water pollution. Part 7 of the *EPEA* focuses on potable water management, prohibiting the release of substances into any waterworks system that could render potable water unfit for use. Part 8 requires hazardous substances to be stored and transported in a manner that prevents water contamination. In the event of contamination, the *EPEA* authorizes the Director to issue an environmental protection order to address the issue. Additionally, the *EPEA* prohibits the disposal of waste into or under water or ice unless an approved exemption applies.

Natural Resources Conservation Board

The Natural Resources Conservation Board (NRCB) is the provincial agency that administers the *Natural Resources Conservation Board Act* (*NRCBA*). The function of the Board is to make balanced decisions regarding the sustainable and responsible use of Alberta's natural resources (R.S.A. 2000, c. N-3).

The purpose of the *NRCBA* is to provide:

> *An impartial process to review projects that will or may affect the natural resources of Alberta in order to determine whether, in the Board's opinion, the projects are in the public interest, having regard to the social and economic effects of the projects and the effect of the projects on the environment*.

Reviewable projects include water management projects which are defined in the *NRCBA* as:

> *A project to construct a dam, reservoir or barrier to store water or water containing any other substance for which an environmental impact assessment report has been ordered, or*
>
> *A project to construct a water diversion structure or canal capable of conducting water or water containing any other substance for which an environmental impact assessment report has been ordered.*

Given the nature of the Project, the NRCB would assume the lead role for the regulatory review and approval process. The Alberta Acts and Regulations the NRCB is to take into consideration during deliberation include:

- *Water Act*: Regulates the allocation, protection, and conservation of water and applies to the proposed construction, operation, and maintenance of the reservoirs, dam facilities, canals, alteration of wetland habitat, and any loss or alteration of fish habitat (R.S.A 2000, c. W-3). The *Act* regulates activities conducted in water bodies, as defined by the *Act*, that may: alter flow, level, or location of water; cause erosion of the bed and banks or mobilization and transport of sediment; or cause an effect on water quality of the aquatic environment. A key purpose of the *Act* is to ensure the management and conservation of water resources to ensure a healthy environment. Adverse effects on the aquatic environment associated with work within reservoirs that form a component of an irrigation system has historically not been considered subject to review or approval under the *Water Act*. However, review requirements related to dam safety considerations would apply and are discussed separately.
- *Public Lands Act* (*PLA*): Prohibits the disturbance of the bed and shore of water bodies and other public lands administered by the Minister of Alberta Environment and Protected Areas (AEPA) (R.S.A. 2000, P-40). Components of the Project will require a formal application and written authorization from the Minister prior to construction.
- *Wildlife Act*: Prohibits the disturbance of wildlife and wildlife habitat as administered by the Fish and Wildlife Branch of AEPA (R.S.A. 2000, c. W-10).
- *Soil Conservation Act*: Imposes a duty to take appropriate measures to prevent soil loss or deterioration from taking place (R.S.A. 2000, c. S-15).
- *Weed Control Act*: Specifies measures to prevent the spread of invasive and noxious weed seeds and propagules (S.A. 2008, c. W-5.1).
- *Historical Resources Act* (*HRA*): Enacted to preserve, protect, and present historical and archaeological resources of provincial, national, and international significance (R.S.A. 2000, c. H-9). A component of the EIA for the Project will be a Historical Resources Impact Assessment (HRIA) as required by Alberta Arts, Culture and Status of Women (Alberta Culture).
- *Alberta Land Stewardship Act* (*ALSA*): Authorizes the provincial Cabinet to establish planning regions and adopt a statutory plan for each region. The South Saskatchewan River Regional Plan was a result of the *ALSA* (S.A. 2009, c. A-26.8).

1.11.2 Canada

Environment and Climate Change Canada

The powers, duties and functions of the Minister of Environment and Climate Change Canada (ECCC) extend to matters such as the preservation and enhancement of the quality of the natural environment, including water, air and soil quality, and the coordination of the relevant policies and programs of the Government of Canada. The powers, duties and functions of the ECCC extend to

renewable resources, including migratory birds and other non-domestic flora and fauna, meteorology, and the enforcement of rules and regulations.

Pertinent legislation that ECCC administers includes:

- *Species at Risk Act* (*SARA*): States that it is prohibited to kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species (S.C. 2002, c. 29). In addition, no person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.
- *Migratory Birds Convention Act* (*MBCA*): States that it is prohibited to disturb, destroy or take a nest, egg or nest shelter of a migratory bird or deposit or permit to be deposited oil, oil wastes or any other substances harmful to migratory birds in any waters or any area frequented by migratory birds (S.C. 1994, c. 22).
- *Canadian Environmental Protection Act*, 1999 (CEPA): An Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development (S.C. 1999, c. 33). Although the *Fisheries Act* is administered by Fisheries and Oceans Canada, CEPA covers the sections of the Act that deal with water pollution.

Fisheries and Oceans Canada

Fisheries and Oceans Canada is responsible for sustainable aquatic ecosystems and to support safe and secure Canadian waters while fostering economic prosperity of Canada's fisheries. The ministry is responsible for the administration of the *Fisheries Act*.

- *Fisheries Act*: Prohibits harmful alteration, disruption, or destruction of fish habitat (Section 35) or works that could cause death of fish by means other than fishing (Section 32) (R.S.C. 1985, c. F-14). Consultation with Fisheries and Oceans Canada (DFO) was conducted to determine if a formal authorization is required. Based on the proposed work plan, it is expected that adverse effects on fish and fish habitat could occur and that the works could potentially be considered to cause "harmful alteration, disruption, or destruction" of fish habitat, as defined in Section 35 of the *Fisheries Act* (R.S.C. 1985, c. F-14). It is anticipated that a Request for Review application will be submitted to engage DFO regarding permitting implications under the *Fisheries Act*. Authorization under the *Fisheries Act* could potentially be required. Given that a large net increase in habitat quantity and productive capacity are predicted, it is anticipated that offsetting measures would not be required to support Authorization of the proposed works.
- *Canadian Environmental Protection Act* (CEPA). The purpose of CEPA (S.C. 1999, c. 33) is to contribute to sustainable development through pollution prevention. CEPA is administered by DFO and provides the legislative basis for a range of federal environmental and health protection programs.

- *Species at Risk Act* (SARA). The purpose of SARA (S.C. 2002, c.29) is to prevent wildlife species from going extinct and to secure the necessary actions for their recovery. DFO is responsible for the management and administration of SARA for aquatic species at risk.

Transport Canada

Transport Canada regulates the transportation system across Canada so that it is safe and secure, efficient and environmentally responsible, and enables the efficient flow of people and goods. Transport Canada administers the *Canadian Navigable Waters Act* (R.S.C. 1985, c. N-22).

- *Canadian Navigable Waters Act*: Regulates activities that may cause the restriction of the public right to navigation on Scheduled Waters.

Impact Assessment Agency of Canada

As suggested in the *Guide to Preparing an Initial Project Description and a Detailed Project Description*, a high-level project description of the proposed Project was provided to the Impact Assessment Agency of Canada (IAAC) on March 7, 2022. The letter outlined the project components and requested feedback regarding the interpretation of Section 2, subsections 58-61 of the *Physical Activities Regulations* under the *Impact Assessment Act* (*IAA*) (S.C. 2019, c. 28, s. 1) with respect to the proposed Project. The letter outlined how the Project should not trigger an Impact Assessment given no new diversion is required, no increase of allocation under the existing licences is required, and no dams are to be constructed on a natural waterbody (as defined in Section 2, subsections 58-61). The Project is to expand an existing reservoir, and the expansion will not overprint an existing natural waterbody.

Based on the design of Project, the Project did not meet the definition of a designated project as described in the Physical Activities Regulations under the IAA. As such, the Agency determined that the Project was not a designated project under the IAA (Appendix II):

> *Based on the current information provided regarding the Project, it does not appear to meet the definition of a designated project as described in the Physical Activities Regulations under the Impact Assessment Act (the IAA). As such, the Agency has determined that the Project, as presented, is not a designated project under the IAA. However, please note that subsection 9(1) of the IAA gives the Minister of Environment and Climate Change Canada the authority to designate the Project if, in the Minister's opinion, the carrying out of Project activities may cause adverse environmental effects or public concerns related to those effects warrant the designation.*

1.12 Government Agency Consultation

1.12.1 Government of Alberta

Government consultation with AEPA (Regulatory Assurance Division) was initiated in 2021, prior to when the full regulatory framework was fully developed for the Project.

1.12.1.1 Alberta Environment and Protected Areas

A discussion of the work required under Alberta's *Water Act* (2000) was the initial step in the consultation process. Consultation was held with S. Mathyk, Lethbridge Regulatory Assurance Manager and J. Cayford, Water Administration Engineer. Modifications and maintenance to the Chin Chute and West Dam components of the Chin Reservoir infrastructure would be covered under existing licencing held by SMRID. The construction of the New East Dam and the expansion of the reservoir would need to be submitted to the GoA's environmental impact assessment process, starting with the submission of a Project Summary to the Regulatory Assurance Division's Approvals Unit.

A Project Summary was submitted to the Regulatory Assurance Division's Approvals Unit on November 5, 2021, under the *EPEA* and a letter outlining the requirement for an EIA was provided by the Approvals Unit to SMRID on February 23, 2022.

A draft proposed Terms of Reference (pToR) was submitted to the Approvals Unit for initial review on April 4, 2022. The pToR was finalized through consultation with AEPA and was submitted for public review and comment on November 16, 2022. Public notices to announce the availability of the pToR for public review were posted on the SMRID website and across the SMRID system in the following newspapers:

- Alberta Native News
- Lethbridge Herald
- Medicine Hat News
- The Taber Times

On January 23, 2023, AEPA confirmed that the public review period had closed. AEPA would then review and compile the public review comments and comments from subject matter experts. AEPA provided draft final Terms of Reference (fToR) for review by SMRID on July 17, 2023. SMRID completed a review of the draft fToR and provided comments to AEPA on September 11, 2023. AEPA finalized the fToR and provided them to SMRID on November 15, 2023. The SMRID posted the official fToR for the Project on the SMRID's website.

The expansion site plan was provided to the GoA Public Lands on September 10, 2021. Initially, it was thought that a historical dam site was located on public lands. On May 23, 2023, the government noted that the public lands noted in maps was a mapping error. A teleconference meeting was held between SMRID and GoA Public Lands on June 6, 2023 to discuss potential impacts to the Chin Coulee Provincial Recreation Area in 8-35-7-17-W4.

1.12.1.2 Alberta Forestry and Parks

With consideration of the proposed increase in the FSL of the reservoir, SMRID formally requested Alberta Forestry and Parks to refrain from entering long-term dispositions for lands adjacent to Chin Reservoir on July 17, 2023. The SMRID is in ongoing negotiations with Alberta Forestry and Parks to

develop a solution to the impacts to the Chin Coulee Provincial Recreation Area including a land swap, a purchase of the land, or the acquisition of a disposition.

1.12.1.3 Natural Resources Conservation Board

With the expected participation of the NRCB, initial contact was made with L. Friend on March 28, 2022, to discuss any requirements during the early development of the Terms of Reference and EIA content. Subsequent consultation was provided on November 14, 2022, to outline eventual EIA submission requirements.

1.12.1.4 Aboriginal Consultation Office

A Pre-Consultation Assessment request was submitted through the GoA's Electronic Disposition System (EDS) on March 22, 2022. An Adequate Decision was provided for works falling under the Alberta *Water Act* (FNC202202151). No consultation was required under *EPEA* or the *Water Act*.

1.12.1.5 Alberta Culture, and the Status of Women

An initial Historical Resources Application was submitted to the Historical Resources Management Branch (HRMB) by Bison Historical Services Ltd., on behalf of Klohn Crippen Berger Ltd. (KCB) and the SMRID, on August 8, 2021. The HRMB reviewed the application and issued a *HRA* Requirements document for the Project on September 10, 2021 that required both an archaeological HRIA and paleontological Historical Resources Impact Assessment (pHRIA). The HRMB required the assessment for:

- The proposed expansion footprint;
- Areas around the existing West Dam;
- Areas around the proposed site of the proposed New East Dam;
- Areas around the Existing Reservoir that may be affected by a raise in reservoir levels;
- Along proposed construction access roads; and
- At the locations of potential borrow pits.

On May 16, 2022, a permit application was submitted by Bison Historical Services Ltd. for the HRIA for the Project. The HRMB reviewed the HRIA permit application and issued ASA permit 22-047 for the HRIA on May 17, 2022. Fieldwork for the HRIA was conducted between May 26 to October 31, 2023. The final report for the HRIA was submitted to the HRMB on September 25, 2023. The Historical Resources Application process is summarized in Volume 2: Section 2.9.

1.12.2 Impact Assessment Agency of Canada

On April 12, 2022, the IAAC received a letter requesting the Project be designated under the *IAA*. The request was made to the Minister by Ecojustice on behalf of numerous members of non-government organizations (NGOs) and the public. A review of the request did not change the determination that

the Project did not qualify as a Physical Activity under the *IAA*. The Project was notified of the second and final decision on June 29, 2022. In the response, the IAAC noted:

> *The Minister took into consideration the information provided by St. Mary River Irrigation District (the Proponent), advice from federal authorities, input from Alberta Environment and Parks, concerns expressed in the requester's letter, and the concerns from Indigenous groups and the public that are known to the Impact Assessment Agency of Canada (the Agency).*

It was understood the provincial EIA process was robust to the extent to effectively assess the potential effects of the Project. The Project was still required to meet federal regulations as outlined in Section 1.11.2.

1.12.3 Municipal Governments

SMRID contacted and provided notification packages of the Chin Reservoir Expansion to the nearby municipalities. Consultations with the municipalities were conducted individually. All municipalities are in favour of the expansion.

1.12.3.1 County of Warner

SMRID presented at a council meeting of the County of Warner on September 20, 2022 (Appendix III). The meeting was in Council Chambers and was attended by Reeve R. Taylor. SMRID presented information regarding the proposed expansion of Chin Reservoir including a discussion of the New East Dam, improvements to additional SMRID infrastructure, potential impacts to recreation including Chin Park, and outlined the general timeline for the Project.

1.12.3.2 Municipal District of Taber

SMRID presented at a council meeting of the MD of Taber on October 11, 2022 (Appendix III). The meeting was in Council Chambers and was attended by Reeve M. Harris. The SMRID presented during a closed session as per Section 197(2) of the *Municipal Government Act* (R.S.A. 2000, c. M-26).

1.12.3.3 Lethbridge County

SMRID held an in-person meeting with Lethbridge County on November 30, 2022. The agenda of the meeting included a Chin Reservoir Project Overview, Regulatory Permitting, Project Schedule, Upcoming Work Planned (Appendix III).

1.12.3.4 Town of Taber

SMRID has plans to discuss the Project with the Town of Taber - Water/Wastewater group regarding the Town of Taber water intake design.

1.12.3.5 County of Forty Mile

A meeting was held on September 15, 2021 with county administrators. The discussion focused on the location of the Project relative to the County. It was determined that the Project is outside of their limits, and the discussion did not meet the criteria for a meeting with their council.

1.13 Stakeholder Engagement

Direct benefits of the Project are expected for citizens of Lethbridge, Coaldale, Hamlet of Chin, Barnwell, Taber, Grassy Lake, Burdett, Bow Island, Winnifred, Seven Persons, and Medicine Hat. Indirect effects of the anticipated economic boost are also expected beyond the SMRID's service area. In addition to irrigation, the SMRID maintains agreements to provide water for other uses such as municipal water supply, stock watering, commercial and industrial use, wildlife habitat maintenance and enhancement, and recreation (Table 1.4). In addition, the SMRID has support agreements with 1536 households to supply domestic water from the irrigation portion of the annual licensed volume.

Table 1.4 Non-Irrigation Water Supply Agreements

Agreement Type	Typical Annual Quantity of Agreements
Agriculture (e.gs. stock watering, feedlots, greenhouses)	229
Municipal (e.gs. communities, water coops, recreation)	111
Commercial / Industrial (e.gs. processing plants, gravel pits)	17
Fish and Wildlife Habitat	3

The SMRID leases grassland parcels out to livestock and has a partnership with Ducks Unlimited Canada (DUC). The partnership with DUC includes supplying water and lease land for wetland conservation projects. The SMRID also leases land to Alberta Conservation Association for conservation projects involving riparian restoration and grassland management. The SMRID works directly with the South East Alberta Watershed Alliance (SEAWA) on wildlife habitat conservation. Under the standard of the Alliance for Water Stewardship (AWS 2019), the SMRID supports sustainable communities, the environment, and agriculture through water stewardship projects such as the West Site Water Stewardship Plan developed for Agriculture's Water Future (AWF) Phase III. The project is a demonstration of how the SMRID supports sustainable communities and agriculture within the Oldman River Watershed. The SMRID's water stewardship efforts are intended to address the challenges of future water reliability (WaterSMART 2022). Additional participation in watershed stewardship includes SMRID participation as a member organization in the Oldman Watershed Council and supplies a board member to the Canadian Water Resource Association.

Potential interest in the Project by citizens and non-government organizations across southern Alberta is expected. Information distribution to date has included public engagement and stakeholder consultation through in-person meetings, virtual meetings, and multiple types of media.

1.13.1 Stakeholder Meetings

Stakeholder consultation was initiated with a meeting held in Taber, Alberta on March 11, 2022 (Appendix IV). In attendance were 17 landowners affected by the Project, four representatives from the SMRID, a representative from the TID, and the SMRID consultants from MPE Engineering Ltd. (MPE) and KCB. The agenda for the initial meeting included a briefing of the proposed Project, the regulatory framework for the Project, and a question-and-answer period. Attendees were provided

additional time to review the Project and ask additional questions during a poster session held after the presentation.

The SMRID outlined the proposed expansion to irrigators within the SMRID in the form of a plebiscite vote conducted on November 28, 2022. The result of the votes was 91% in favour of expansion (SMRID 2022b).

The SMRID held four Irrigation Expansion Plebiscite meetings which were open to the public and landowners to discuss changes to the expansion within the SMRID at the following times and places (SMRID 2022c):

- Taber Heritage Inn, 4830 46 Ave, Taber, AB on November 22, 2022.
- Bow Island Legion Hall, 202 5 Ave E, Bow Island, AB on November 23, 2022.
- Seven Persons Community Hall, Mildred St, Seven Persons, AB on November 24, 2022.
- Readymade Community Hall, Township Rd 90, Cranford, AB on November 25, 2022.

At the meetings, information regarding the proposed expansion of Chin Reservoir were provided for discussion. Topics discussed during the meetings included, but were not limited to, modeling and potential effects of climate change within, upstream, and downstream of the SMRID; flood mitigation; process and potential timeline for the expansion of acres; reservoir operations; and the process for qualifying for expansion acres. It was noted during meeting at Bow Island that the SMRID was not applying for an increase in water allotment. The goal of the expansion is to store more of the current allotment for increased ability to spread the existing allotment across the SMRID system.

1.13.2 Southern Alberta Group for the Environment

On March 31, 2021, the SMRID received an email outlining concerns with the Project from the Southern Alberta Group for the Environment (SAGE). Copied on the email were representatives from AEPA, Alberta Agriculture and Irrigation, Alberta Infrastructure and Communities, and the federal ministry of ECCC. Organizations represented by SAGE included Trout Unlimited Canada, Nature Alberta, Bow Valley Naturalists, Alberta Wilderness Society, and the Water Conservation Trust.

An in-person meeting was hosted by the Irrigation Districts of Alberta in Lethbridge, Alberta on May 12, 2022. In attendance were representatives from Irrigating Alberta Inc., SMRID, TID, United Irrigation District (UID), Eastern Irrigation District (EID), RID, Bow River Irrigation District (BRID), Western Irrigation District (WID), Alberta Agriculture and Irrigation, AEPA, Canadian Parks and Wilderness Society, and members of SAGE. Topics discussed included, but were not limited to, an overview of the Alberta Irrigation Modernization Program (AIM) and Modernization Projects, the potential for expansion of irrigated acres, a discussion of reservoirs, and EIAs.

Meeting notes from the May 12, 2022 meeting were emailed to SAGE on May 23, 2022. SAGE requested shapefiles of the boundaries of the irrigation districts for a presentation to the AIM Program and to estimate grassland areas within the districts. SAGE notified SMRID that they had registered to receive updates on the EIA decisions from AEPA and the NRCB.

1.13.3 Public Disclosure

An information package regarding the proposed changes and expansion was provided for public viewing at the SMRID office in Lethbridge, Alberta on October 13, 2022. An information guide was provided online on the SRMID website on October 25, 2022 (SMRID 2022a). As noted in Section 2.2, public notifications regarding the pToR for the EIA were published on November 15 and 16, 2022. The publication initiated a 50-day public review period for the pToR as set by AEPA, with an end date of January 3, 2023. The public notice of the pToR was published in the following newspapers:

- Alberta Native News
- Lethbridge Herald
- Medicine Hat News
- Taber Times

1.14 Indigenous Consultation

As noted in Section 2.2, an Adequate Decision was provided to the Project, and a "Level 0" Indigenous Consultation was the determination of GoA under both *EPEA* and the *Water Act* (FNC202202151) (Appendix V). In addition, as the Project was deemed not to be a designated project as described in the Physical Activities Regulations under the federal IAA, consultation was not required by IAAC under the IAA review process. A federal duty to consult may yet be triggered during federal approvals reviews as outlined in Section 1.11.2.

While Indigenous Consultation has not yet been required by regulators, the SMRID has volunteered to proceed with Indigenous Consultation with the Blood Tribe. The Blood Tribe is a near-neighbour of the SMRID and the developer of the Blood Tribe Agricultural Project which utilizes the same headworks system. The St. Mary Reservoir was constructed on the Blood Reserve and was a collaborative project, with the Chief Shot Both Sides participating in the opening ceremony in 1951.

Indigenous Consultation was initiated with Mike Oka of the Blood Tribe on October 12, 2022. Due to various circumstances, a site meeting was delayed until December 15, 2022. The meeting was attended by three members of the Blood Tribe and three representatives of SMRID. At the meeting, the Blood Tribe were provided with the background, purpose, and schedule for the Project. The background information included a site plan identifying the expanded area and other critical components and a slide show showing the HRIA work done to date (Appendix VI).

The Blood Tribe requested access the inundation area prior to flooding to conduct a site walk-through with elders. An agreement on access was reached, though access would depend on landownership status at the time of flooding. At the time of the meeting, the land was privately owned. SMRID committed to keep the Blood Tribe informed of the status of the landownership status and of the Project as a whole. The SMRID provided an invitation to the Blood Tribe for participation in an ongoing dialogue and discussions of project-related issues or concerns.

Approval requirements under the federal *Fisheries Act* (1985) and *Canadian Navigable Waters Act* (1985) may trigger consultation. Transport Canada and DFO will determine if the requirements of duty to consult has been met.

2 PROJECT DESCRIPTION

2.1 Existing Chin Reservoir

The off-stream storage at Chin Coulee has been present in southern Alberta for over 100 years (Map Figure 1). The West Dam (Map Figure 2) was constructed as a zoned earthfill dam at a height of 21.3 m and approximately 400 m in length with a concrete conduit with a flow capacity of 97.3 m^3/s (Lissel n.d., Matrix 2019). The upstream slope is protected from wave action by 450 mm of riprap on top of another 225 mm of gravel. The Existing East Dam, constructed in 1953 and 1954, is 564 m long with a maximum height of 13.7 m and is a homogenous earthfill dam (PRFA 1986, Matrix 2019). The minimum dam crest elevation is 864.16 m (Matrix 2019). As with the West Dam, the upstream slope is protected from wave action by 450 mm of riprap on top of 225 mm of gravel. The Existing East Dam does not have an outlet.

Water from the SMRID Main Canal flows into the reservoir via two flow paths approximately 1 km southeast of the West Dam. One via the Chin Chute, the other via the Chin Hydropower plant. The reservoir is approximately 24 km in length, with an operating width that varies between 300 m to 900 m depending on location and time of year.

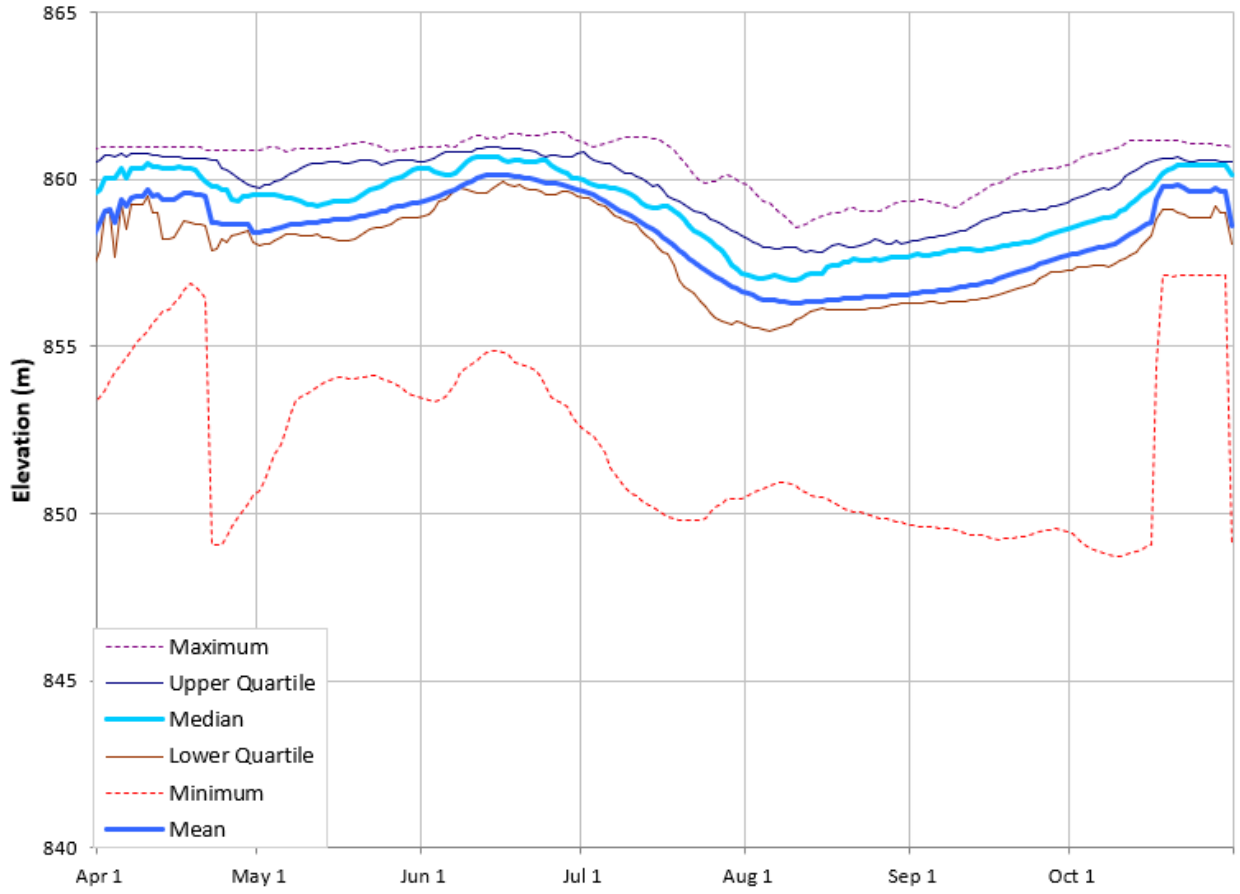
The Chin Reservoir has a current volume of 217, 679 dam^3 (176,475ac-ft) and live volume of 190,350 dam^3 (154,320 ac-ft) at an operating FSL of 861.36 m (MPE 2020). At the FSL, the surface area of the reservoir is approximately 1,600 ha.

Chin Reservoir operates in conjunction with Stafford Reservoir, located immediately downstream of the West Dam. The two reservoirs operate to maintain Stafford Reservoir at FSL (currently 846.58 m) during the irrigation season for recreation purposes. Stafford reservoir offers little storage for the SMRID. Chin Reservoir is supplied via the SMRID Main Canal with a minor component of local surface runoff. Most of the Main Canal flow is diverted through the Chin Hydropower Plant, and the remaining flow enters through the adjacent concrete Chin Chute (Map Figure 2). Controlled releases from Chin Reservoir for normal operations and flood management are controlled exclusively through the West Dam LLO. The LLO is a reinforced concrete structure consisting of a gate well and five rectangular conduits. West Dam and LLO are undergoing refurbishment and fall under a separate regulatory approval process. West Dam and LLO refurbishment are expected to occur prior to the commencement of construction of the Project.

Water is released from Chin Reservoir at the start and throughout the irrigation season to service the downstream water users (approximately April to October). During the fall, Chin Reservoir has the capacity to rise to a target winter elevation of 860.61 m for flood mitigation measures, while Stafford Reservoir level is allowed to drop below FSL. Concurrently, upstream and downstream canals are drained. The outlet discharge exceeds canal inflow from June to August, resulting in reservoir drawdown. Reservoir levels fluctuate between the FSL of 861.36 m and 855.5 m (lower quartile) to a minimum of around 849 m (Figure 2.1). The Mean Drawdown Level (MDL) was interpreted as the minimum of the mean annual reservoir level calculated based on review of historical reservoir water levels, which was equal to approximately 856.2 m. The typical operation that is described represents

an ideal condition in years when water supply is not limited, which is often not the case. SMRID operate the reservoirs in the irrigation system based on rule curves that represent target bands for operation. In years when the supply of water is limited, the reservoir level will fall on the lower end of the operating curve.

Figure 2.1 Existing Chin Reservoir - Mean and Range of Reservoir Levels - 1994 to 2009



SMRID's annual diversion volume has fluctuated over the years but has remained below 600,000 dam^3 (approximately 486,400 ac-ft) until recent years, and higher in 2017 and 2021. The percent use of licenced diversion volumes of SMRID, RID, and TID have, in general, remained between 40% and 60% over the years. The average total diversion volume over 1992-2021 period is 646,200 dam^3 (approximately 523,900 ac-ft).

2.2 Storage Alternatives Considered

Increased reservoir storage capacity has been identified to enhance the resilience of the SSRB, protecting it from climate variability and extreme weather events (AIDA 2019). The safeguarding of water security is expected to support economic growth and benefit agricultural producers, municipalities, residents, and the environment.

AMEC (2014) examined opportunities for new storage within the SSRB, specifically, close to 50 potential storage sites within the Oldman River Sub-basin. The rationale for new storage in the sub-basin is based on water allocation needs, the significant variability of water supply, and previous research indicating that new storage could enhance water security for WCOs and junior licensees. After the elimination of most options, three of the opportunities were modeled, including an expansion of storage at Chin Reservoir. AMEC (2014) noted that the additional off-stream storage at Chin Reservoir could maintain water quantities to meet irrigation needs within the SMRID, which would then allow for more flexible water management at St. Mary Reservoir to meet in-stream flow needs and existing consumptive uses, including junior priority uses, downstream of the Waterton – St. Mary Headworks. In the end, the Chin Reservoir was not the most recommended choice because it would not directly affect WCOs and junior licensees (AMEC 2014). The Belly Reservoir, a new on-stream storage project was identified as the most suitable option, with some minor in-stream water management benefits. However, the perspective of the study was focused on on-stream effects, and not the benefits of off-stream storage.

AIDA (2019) also considered many designs and locations for the expansion of water storage in the SSRB. Out of the 13 proposed additions or expansions of reservoirs in the SSRB, four were off-stream locations, which would offer benefits such as reduced environmental impacts or improved water management compared to on-stream reservoirs. While off-stream reservoirs do require the diversion of water from rivers, they offer the advantage of not flooding natural riverine and riparian habitats. The highest ranked proposal was the on-stream Eyremore Reservoir which would require the flooding of approximately 40 km of Bow River Valley downstream of the Bassano Dam. The next four highest ranked options included off-stream proposals, including the Chin Reservoir Expansion. The high ranking of the Chin Expansion provided support for the SMRID to investigate the feasibility of the option.

From multiple design concepts considered for the Chin Expansion, four general options with different reservoir FSLs were considered to increase the storage of the Chin Reservoir (MPE 2020). Considerations and constraints for increasing the FSL level included potential impacts to the Chin Hydropower Plant, to the Highway 36 Bridge, the current West Dam and LLO, and the flood handling ability of an expanded reservoir with an auxiliary spillway or incorporation of additional freeboard for flood storage. The general options included combinations of raising the FSL, keeping the West and Existing East Dams in their current location, and moving the dam east by 5 or 10 km.

“Option 4” would involve moving the East Dam 10 km to the east and retaining the current operating FSL of 861.36 m. “Option 7” would move the East Dam 5 km to the east and raise the FSL by 2.60 m to 864.00 m. The raise in FSL would require modifications to the West Dam, Chin Chute, and the Highway 36 Bridge. “Option 8” would have the East Dam move 10 km to the east and raise the FSL by 2.60 m to 864.00 m. As with Option 7, the raise in FSL would require modifications to the West Dam, Chin Chute, and the Highway 36 Bridge. For “Option 9” the East Dam would again move 10 km to the east, but the FSL 861.36 would not be changed. Option 8 presented the best scenario of volume of storage per investment dollar and was chosen as the Project.

2.3 General Project Understanding

The project understanding is based on the Preliminary Design Report prepared by KCB (KCB 2023). The construction of the project will occur in three phases: construction of the New East Dam, reservoir filling and then decommissioning of the Existing East Dam (the Project). The proposed New East Dam will be located approximately 10 km east of the Existing East Dam within Chin Coulee (Map Figure 3). Following the decommissioning of the Existing East Dam, the water level will be raised to a new FSL of 864.0 m.

2.3.1 New East Dam Construction

The construction of the new East Dam will be done in dry conditions. The construction of the east dam includes the excavation and construction of the auxiliary spillway. Riprap erosion protection will be installed on the reservoir side of the dam. A gravel road will be installed on top of the dam. The majority of dam fill material will be sourced from the excavation of the auxiliary spillway. A contingency borrow area has been allocated within the expanded reservoir footprint. Unlike at the Existing East Dam where fill was used from borrows east of the dam, dam fill will not be extracted from the coulee bottom east of the New East Dam footprint. Visible borrow pits will not be a remnant of the construction of the New East Dam. Specific materials such as riprap and gravel will be obtained from off-site sources (KCB 2023).

2.3.2 Reservoir Filling

The reservoir expansion area will be filled via a temporary gated outlet structure that will be installed near the north abutment of the existing East Dam. An earthen cofferdam will be constructed to isolate the upstream face of the existing east dam for installation of a temporary gated outlet through the embankment. The work will be scheduled to occur during a period of relatively low water level to limit the required height of the cofferdam. The outer face of the cofferdam will be armoured with riprap to limit the potential for wave erosion. Once the temporary outlet is installed, the cofferdam will be removed. The temporary outlet will extend through the dam embankment from the gatewell and extend beyond the downstream toe of the New East Dam. Water will be conveyed in an armoured channel into an existing borrow pit within the coulee bottom. Discharging water in this manner will avoid the requirement for protecting the downstream dam face from erosion and will reduce the potential for erosion at the discharge location by dissipating energy within the borrow pit. From the borrow pit, water will be conveyed into the existing channel that runs down the midline of the coulee. The temporary outlet will be removed during the decommissioning of the existing east dam. The filling schedule is presented in Section 3.1.5 below.

2.3.3 Existing East Dam Decommissioning

With the completion of the New East Dam, the existing East Dam will be decommissioned. Complete dam removal will not be conducted. The entire length of the dam is to be removed down to the top of the existing toe berms (857.1 m). The north portion of the dam will be excavated to a minimum elevation of 850.0 m (Map Figure 3). The greater details of the decommissioning process are provided in Section 2.5.5 (KCB 2023).

2.3.4 Operation of the Expanded Reservoir

The Expanded Reservoir will be operated at a higher FSL of 864.0 m (2.64 m higher than the existing FSL). The range of water level fluctuation during operation is expected to be broader than the existing condition, but will follow a similar seasonal operating regime. Reservoir operation is discussed in greater detail in Section 2.6.1.

2.4 Project Design Elements

The SMRID Main Canal Technical Committee (the Technical Committee) was tasked with evaluating the benefits and risks of a potential expansion of the Chin Reservoir. Potential Project scenarios were evaluated to determine how the expansion of Chin Reservoir could potentially increase irrigation capacity and provide water supply reliability within the SMRID, TID (now amalgamated with the SMRID), and RID (WaterSmart 2023). Model parameters included historical and entitlement inflows, the potential amount of expansion acres, and the potential increase in expansion volume of the Chin Reservoir. The Technical Committee concluded the most suitable scenario for expansion was an increase of 46,500 irrigation acres, coupled with a then proposed 75,511 ac-ft (93,141 dam^3) expansion in storage at Chin Reservoir (WaterSmart 2023).

At the proposed New East Dam location, Chin Coulee is characterized as being disturbed grassland and is used for livestock grazing. The coulee at this location measures approximately 80 m deep and 1 km wide. The coulee is U-shaped, with coulee walls at an approximate slope of 3.5H:1V and a coulee bottom sloped at approximately 7 to 15% towards the centre of the coulee. The coulee crest elevation ranges between approximately 905 m to 910 m with a coulee bottom elevation of approximately 827 m.

An overall general arrangement of the Project is shown in Map Figure 3. The extent of disturbance or change in landcover is approximately 825 ha (Table 2.1). The primary components of the proposed New East Dam construction are:

- A 41 m high by 750 m long zoned earthfill dam in Chin Coulee with dam crest of El. 868.0 m.
- A 50 m wide by 1,120 m long earth channel Auxiliary Spillway located on the south abutment of the New East Dam.
- A 7 m wide access road from an existing county road to the north abutment of the New East Dam (the aggregate of two possible options is included in the footprint).
- Decommissioning of the Existing East Dam and placement of the excavated dam material into the drainage pathway of a nearby secondary coulee (Dam Fill Waste Area) located adjacent to the south abutment of the Existing East Dam.

Table 2.1 The Areal Extents of General Project Components

Component (Permanent and Temporary)	Area (nearest ha)
Reservoir Expansion Area and the Rise in FSL around the Existing Reservoir at FSL (864.0 m)	745
Reservoir Expansion Area (inundated area between the Existing East Dam and the New East Dam)	656
Additional inundation around the Existing Reservoir	62
Non-inundated New East Dam footprint and Auxiliary Spillway	53
Access roads	5
Laydown Area (just the laydown area, not the borrow pit)	17
Dam Fill Waste Area (decommissioned dam material)	6
Temporary Work Areas around just the New East Dam within the Construction Site Limit	26

2.4.1 Reservoir Inflow/Outflow Requirements

The irrigation outlet structure at the West Dam is, and will be, the only controlled release from Chin Reservoir. No outlet structure is required at the New East Dam. The SMRID Main Canal discharge capacity at its FSL is 65 m^3/s (Matrix 2019). The operating discharge capacity of a new irrigation outlet structure proposed for refurbishment of the West Dam is expected to be 74 m^3/s and the discharge capacity at the reservoir FSL of 864 m (gates wide open) will be 110 m^3/s (MPE 2022).

2.4.2 Design Crest Elevation

The Canadian Dam Association (CDA 2013) states that the freeboard requirements for embankment dams should be set so that the embankment is protected against the most critical of the following cases:

- No overtopping by 95% of the waves caused by the most critical wind with a frequency of 1:1,000 years when the reservoir is at its maximum normal elevation (i.e., FSL 864 m);
- No overtopping by 95% of the waves caused by the most critical wind with a frequency of 1:2 years (for high, very high, or extreme consequence dams) when the reservoir is at its maximum level generated by the Inflow Design Flood (IDF); and
- No overtopping by 95% of the waves caused by the most critical wind with a frequency of 1,000 years when the reservoir is at its maximum level generated by the Spillway Design Flood (SDF).

The embankment freeboard required to contain wind-generated wave runup and wind setup for the 1:2, 1:100, and 1:1,000 year return period wind events were evaluated (KCB 2023). Wave runup is the wind-generated wave riding up the face of the embankment at a distance or height that depends on the characteristics of the wave and the slope and smoothness of the embankment face. Wind setup is the overall rise in the water surface that occurs in the downwind direction. Given the maximum reservoir level at the IDF, plus the wind-generated wave runup and setup during the 1:2 year wind, the required minimum top of the New East Dam has been set in the Preliminary Design Report at El. 868 m (Table 2.2).

Table 2.2 Top of New East Dam – 50 m Wide Auxiliary Spillway Channel

FSL (m)	Maximum Reservoir Level at SDF (m)	Maximum Reservoir Level at IDF (m)	Wave Runup + Setup		Minimum Top of New East Dam		
			1:2 Year Wind (m)	1:1,000 Year Wind (m)	FSL + 1:1,000 Wind Runup + Setup (m)	Max. SDF Level + 1:1,000 Wind Runup + Setup (m)	Max. IDF Level + 1:2 Wind Runup + Setup (m)
864	864.63	866.54	1.34	2.75	866.75	867.38	867.88

2.4.3 Dam Embankment Slope Protection

Armouring is required on the upstream face of the New East Dam to prevent damage due to wave erosion. The upstream face of the dam embankment consists of a 4H:1V slope from the dam crest (El. 868.0 m) to El. 856.0 m, and an 8H:1V slope below El. 856.0 m to the upstream toe berm (top of berm El. 842.0 m).

The 1:100 year overland wind speed is 115.4 kph, the effective fetch at the reservoir FSL of 864 m is 4.54 km, and the significant wave height for the 1:100 year wind is 1.74 m. The required riprap d_{50} is 640 mm (353 kg) (U.S. Army Corps of Engineers [USACE] 1984). To fulfill filter criteria, the 1,200 mm thick riprap will overlay 300 mm thick Riprap 6A, 300 mm thick Gravel Armour 5C, and 300 mm thick Bedding Gravel 5B.

Since reservoir levels are expected to greatly fluctuate during the irrigation season, a portion of the lower 8H:1V slope requires armouring to prevent damage due to wave erosion. USACE (1984) is applicable for slopes of 5H:1V or steeper. Peters and Towle (1979) established a relationship between relatively stable beach slopes and median grain size of the beach material. This relationship was used to design the protective armour for the lower 8H:1V slope. Based on the Peters and Towle relationship of beach slope to wind speed, the required d_{50} for an 8H:1V beach slope is approximately 40 mm which is comparable to Alberta Transportation's Gravel Armour 5C gradation (KCB 2023) which has been economically processed and successfully used for canal bank protection in the irrigation districts in southern Alberta for many decades.

2.4.4 Auxiliary Spillway Channel

The Project is designed to store a 1:1,000 year event. To facilitate passage of the large project IDF (2/3rd between the 1:1,000 year flood and the Probable Maximum Flood [PMF]), an auxiliary earth channel spillway is proposed around the south abutment of the New East Dam (Map Figure 3). The routed project IDF outflow (139 m^3/s) will be passed by the auxiliary spillway with 1.46 m dam freeboard to protect against overtopping due to wind-generated wave runup and setup (1:2 year wind).

The earth channel Auxiliary Spillway foundation soils consist of glacial till overlying bedrock. It is predicted that the glacial till could erode down to bedrock during the IDF. To prevent headcut erosion progressing upstream of the spillway crest, a buried riprap spillway crest section is proposed.

Glacial till excavated for construction of the Auxiliary Spillway is suitable for dam embankment fill.

2.5 Construction

2.5.1 Access Road

New vehicular access to the construction site of the New East Dam is required. The current placement of an access road will be a southern extension of Range Road 152, heading south from Township Road 74 to the edge of the coulee (Map Figure 3). The access into the coulee will be constructed along the alignment of a current offroad, two-track access route down to the construction site. An access road for use during the operation and maintenance of the New East Dam will reuse the construction access road as much as possible. The alignment of the permanent road will be developed once the dam has been constructed. The footprint of a second option for an access road location is included in the assessment as the alignment was not finalized at the time of the assessment. Together the area of the access road development is approximately 6 ha. The west access would be developed to the edge of the coulee through a cultivated field within an existing road allowance (Range Road 152), the east access road would pass through an area of disturbed grassland to the edge of the coulee within an existing road allowance (Range Road 151) (Map Figure 3).

The access road design speed is 50 km/h, based on Alberta Transportation and Economic Corridors (TEC)'s Highway Geometric Design Guide for Low Volume Rural Roads (TEC 2022). Table 2.3 presents the geometric design criteria for the access road to the New East Dam.

Table 2.3 New East Dam Access Road Geometric Design Criteria

Description	Design Criteria
Design Speed	50 km/h
Maximum Gradient	10 to 14%
Roadway Width (m) for Low Volume Roads	7
Minimum Crest Vertical Curvature, K	7
Minimum Sag Vertical Curvature, K	13
Maximum / Minimum Superelevation (m/m)	0.08 / 0.03
Minimum Radius of Curve	80 m
Normal Crown Rate on Gravel Surface Roads (m/m)	0.03
Length of Superelevation Runout, Lr	30 m
Subgrade Width	6 m
Road Surface	Road Gravel
Drain Ditch Bottom Width	2 m
Excavation Side Slope (Slope Height > 3 m)	4H:1V
Excavation Side Slope (Slope Height < 3 m)	3H:1V
Fill Side Slope	3H:1V

2.5.2 Construction Site Limits

The Construction Site Limits will include temporary works such as work laydown areas, construction site office locations, borrow areas, waste areas, onsite construction roads, access trails, and temporary stockpile areas (Map Figure 3).

Work Laydown and Construction Offices

Work laydown areas are required for the temporary storage of equipment and materials and construction site offices. The proposed work laydown areas and temporary workspaces are shown on Map Figure 3.

Temporary Construction Roads

The construction contractor will be responsible for the design, construction, and maintenance of temporary roads within the Construction Site Limits (Map Figure 3).

Borrow Area

Earthfill materials for constructing the New East Dam will be sourced from the excavations for the Auxiliary Spillway and the access road. A borrow area located immediately west of the New East Dam, within the footprint of the Reservoir Expansion Area (Map Figure 3), is proposed to provide additional earthfill for dam construction.

Temporary Stockpile Areas

Topsoil will be stripped from all areas disturbed by construction and will be temporarily stockpiled for reclamation purposes. Selected materials from the access road and Auxiliary Spillway construction will be hauled and placed directly as dam fill, without temporary stockpiling. Granular materials (i.e., fine and coarse filter, road gravel, gravel armour, riprap bedding gravel, and riprap) will likely be hauled from off-site gravel/rock pits and/or quarries and temporarily stockpiled on-site for subsequent loading and placement. Temporary stockpile areas will be located within the Construction Site Limits (Map Figure 3).

Construction Waste Areas

A significant proportion of the materials excavated from the access road and Auxiliary Spillway construction will be suitable for embankment fill. However, it is possible that some material may be deemed unsuitable. In addition, unsuitable material from the dam embankment foundation will be removed. Materials deemed unsuitable for earthfill will be placed in a borrow located within the Reservoir Expansion Area immediately west of the New East Dam (Map Figure 3).

2.5.3 Construction Materials

General material requirements will include impervious and random fill materials that will be free from organic, deleterious, and frozen materials (KCB 2023). Pervious fill and riprap materials will be obtained from approved sources and will be free from organic matter, frozen lumps, ice, snow, soft or disintegrated pieces or other unsuitable material. The particles of the pervious fill and riprap

material will be clean, hard, sound, durable, and comply with the gradation requirements as specified. Granular fill materials will not be gap graded and will have a smooth gradation curve with no excess or deficiency of any particular grain size within the required range. Where blending is required, the granular materials will be thoroughly mixed in such a matter that a homogeneous fill of the specified gradation is achieved prior to placing the material into the work area or stockpiles. Drainage sands and gravels will conform to the corresponding fine and coarse aggregate soundness requirements of CSA-A23.1 as determined by the requirements of the Magnesium Sulphate Soundness Test CSA-A23.2-9A (KCB 2023). Material excavated from the construction of the access road and Auxiliary Spillway will be used in the New East Dam construction.

2.5.4 Construction Schedule

The proposed staging of the dam embankment construction is over three years (KCB 2023); however, a four-year construction duration is assumed as the Stage 1 embankment construction may not be completed in the first year because the dam foundation preparation, cutoff trench excavation, grout curtain, and blanket drain construction may require the Stage 1 embankment construction to extend to the second year of construction. Staged embankment construction assumes four months of construction followed by a break of eight months to allow time for pore pressures to dissipate as the underlying soft alluvium clays consolidate and gain strength. Embankment construction in non-freezing conditions (i.e., June to September) is preferred to allow moisture conditioning during fill placement, improved productivity, less wastage, and lower costs. Material excavated from the construction of the access road and Auxiliary Spillway will be used in the New East Dam construction.

2.5.5 Reservoir Expansion Filling

The estimated storage volume in the Reservoir Expansion Area (i.e., between the Existing East Dam and the New East Dam) at El. 864 m is approximately 76,400 dam^3. If this volume was diverted from the Existing Reservoir in Year 1 of water diversion (September 1 to October 31 and 1 m reservoir drawdown from November 1 to March 31) (Table 2.4), the average discharge would be around 13 m^3/s (KCB 2023). In addition, diverting 76,400 dam^3 from the Existing Reservoir would result in approximately 5 m of reservoir drawdown in the reservoir which would be additional to the typical drawdown that historically occurs during the irrigation season. As a release discharge of 13 m^3/s would result in a larger, more costly temporary outlet structure and because the drawdown in the Existing Reservoir would be significant, it was concluded that the fastest that the Reservoir Expansion Area could be filled to an elevation of around 856 m is the end of July in the third year of water diversion (Map Figures 4a, b, c). Filling could take longer than this due to drought conditions and/or increased water demands that either result in lower reservoir levels or because water diversions to fill the enlarged portion of the reservoir need to cease to supply irrigation demand (KCB 2023).

The proposed average diversion discharge would be approximately 3.5 m^3/s. This proposed infilling schedule was adopted in the conceptual design of the temporary outlet structures and is deemed to be the fastest the Reservoir Expansion Area could be filled to facilitate removal of the Existing East Dam while mitigating the potential impact on fish spawning and migratory bird nests. To mitigate effects on fish and wildlife, and limiting the discharge to 3.5 m^3/s, the following filling schedule for the Reservoir Expansion Area is proposed:

- September 1 to October 31: No limit on release discharge or reservoir drawdown
- November 1 to March 31: Limit releases from the reservoir such that Chin Reservoir drawdown is less than 1 m from November 1 to March 31.
- April 1 to August 31: No releases.

Table 2.4 Proposed Reservoir Expansion Area Filling Schedule

Month	Assumed Chin Reservoir Level (m)	Temporary Gated Culvert Outlet Structure Discharge (m3/s)	Monthly Diverted Volume (dam3)	Cumulative Volume in Reservoir Expansion Area (dam3)	Approximate Reservoir Level in Reservoir Expansion Area (m)
Year 1 of Diversion					
September	>858	4.0	10,368	10,368	839.7
October	>857	3.9	10,446	20,814	843.8
November to March	857 to 856	0.5 (average)	5,700	26,514	845.7
Less Evaporation, Priming and Evapotranspiration Losses			-4,000	≈22,514	≈844.7
Year 2 of Diversion					
September	>858	4.0	10,368	32,882	847
October	>857	3.9	10,446	43,328	849.5
November to March	857 to 856	0.5 (average)	5,700	49,028	850.8
Less Evaporation, Priming and Evapotranspiration Losses			-4,000	≈45,028	≈849.8
Year 3 of Diversion					
September	>858	4.0	10,368	55,396	852
October	>857	3.9	10,446	65,842	854
November to March	857 to 856	0.5 (average)	5,700	71,452	855.2
Less Evaporation, Priming and Evapotranspiration Losses to August			-2,000	≈69,000	≈855

Source: KCB (2023)

Temporary Gated Culvert Outlet Structure

A temporary gated culvert is proposed to be constructed at the Existing East Dam to facilitate water diversion. Such a structure could facilitate an average release discharge of 3.5 m^3/s from the Existing Reservoir to the Reservoir Expansion Area. Given the proposed release discharge, the filling schedule would have the Reservoir Expansion Area filled to 856 m by the summer of the third annual filling cycle, the proposed level for the decommissioning of the Existing East Dam (KCB 2023).

2.5.6 Existing East Dam Decommissioning

The Existing East Dam will be decommissioned to connect the Reservoir Expansion Area to the Existing Reservoir. The chosen dam decommissioning option includes lowering the entire length of the Existing East Dam to the top of the existing toe berms (El. 857.1 m) (Map Figure 3) (KCB 2023). The target reservoir level on both sides of the Existing East Dam during decommissioning is around El. 856 m. At this reservoir level, approximately 1.1 m of the upstream and downstream toe berms would be above water. Removing the entire length of dam to the top of the toe berms can effectively be done under dry conditions; thereby, reducing construction and environmental risk. The estimated volume to remove the Existing East Dam to El. 857.1 m is approximately 112,000 m^3.

A portion of the northern length of dam will be removed to El. 850 m (Map Figure 3). A 100 m bottom width through this portion will provide more adequate room for reservoir connectivity and watercraft navigation (KCB 2023).

The removal of the dam to El. 857.1 m could be carried out with standard excavators, dozers, motor scrapers, and off-road trucks. Excavation of a portion of the dam from El. 857.1 m to 850 m could be excavated using larger excavators with extended booms or, if required, long stick excavators. The estimated volume of the northern section to be removed is approximately 110,000 m^3. The total excavation volume for the chosen dam decommissioning Is therefore expected to be 222,000 m^3. Turbidity curtains would be installed to isolate the excavation and prevent sediment laden water from entering into the waters of the reservoir.

2.6 Post Construction

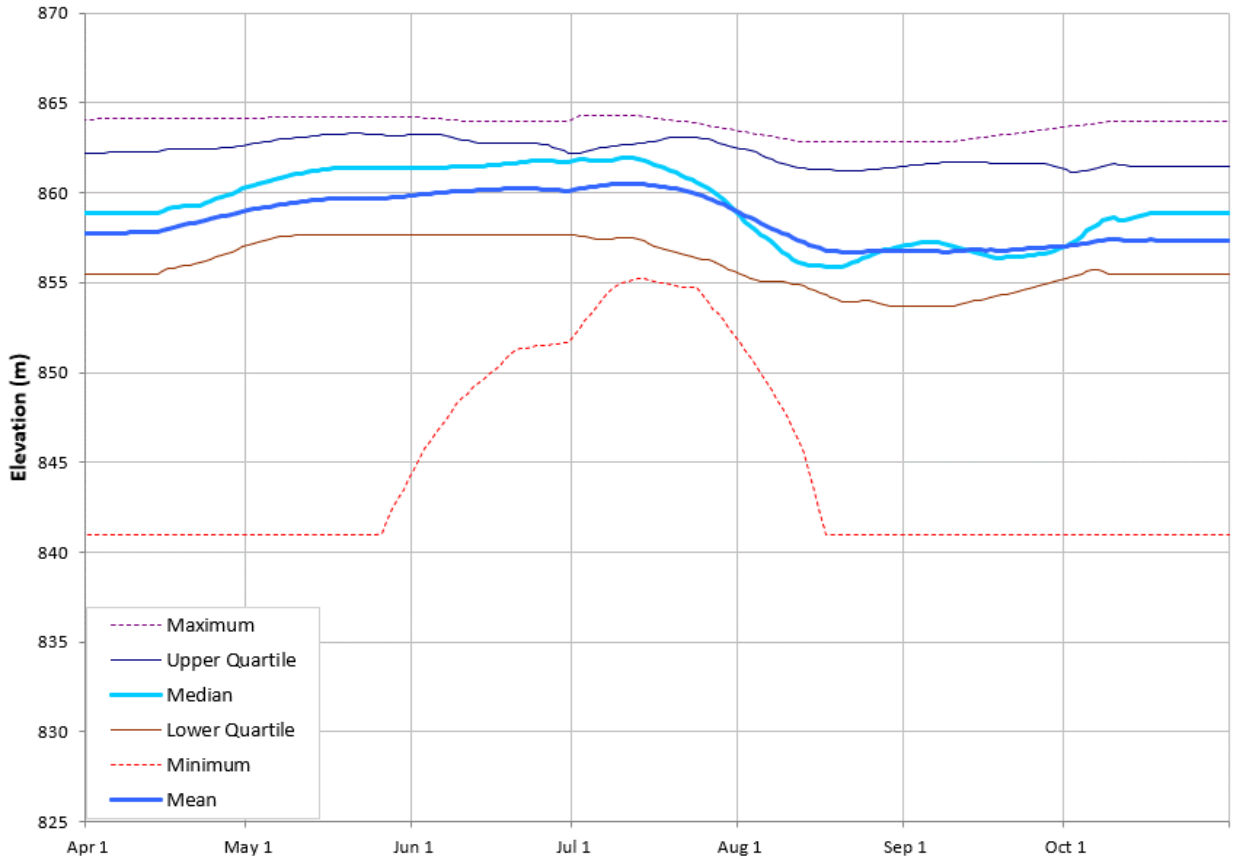
2.6.1 Reservoir Operation

The expanded reservoir will be filled to operating levels following the decommissioning of the existing East Dam. This second phase of filling will occur during the irrigation operating season (April – October). The connected existing and expanded portions of the reservoir will be filled to the new FSL.

The increase in FSL within the existing reservoir will coincide with a shift in water levels to maintain an operating regime similar to the existing condition, with a broader anticipated range of fluctuation. The predicted mean and range of reservoir water levels that would be expected if the Expanded Chin Reservoir was operated based on recorded inflow conditions from 1994 to 2009 (based on available record) is shown on Figure 2.2. As inflows from the Main Canal increase, the reservoir level will be raised in the spring to near the FSL (864.0 m) by approximately mid-June. The reservoir will then be drawn down through summer to meet downstream irrigation demands. Reservoir levels would be

expected to fluctuate between the FSL of 864.0 m and 851.5 m (lower quartile) to a minimum of around 849 m (Figure 2.2). The MDL was interpreted as the minimum of the predicted mean annual reservoir level, equal to approximately 856.7 m, which would typically occur in mid-August. When water is available, the reservoir level would be raised before the end of the irrigation operating season in October. The reservoir level will typically remain stable through the winter while the system is shut down. Once the irrigation system is re-commissioned in early spring, the water level will again begin to increase once inflows exceed outflows. As noted for the Existing Chin Reservoir operating condition, reservoir operation will vary depending on inflows and demands, and under drought conditions the reservoir level would be drawn down as far as the outlet structure invert elevation will allow.

Figure 2.2 Expanded Chin Reservoir - Mean and Range of Reservoir Levels - 1994 to 2009



2.6.2 Reservoir Slope Stability

Chin Reservoir has been in operation for over 60 years. The reservoir has been drawn down through the irrigation season (June to August) to varying levels and filled in the fall and spring every year (Figure 2.1). In 2022, the reservoir was drawn down over 6 m from early June to late July. The expanded reservoir will be operated similarly to the Existing Reservoir. As such, the stability (geometry) of the Existing Reservoir valley slopes provides a reliable indication of how the valley slopes may adapt to the higher FSL and the impoundment in the Expanded Reservoir. Based on

existing conditions around the Existing Reservoir, an area of possible slope instability was estimated at 4:1 and 5:1 slopes to approximate reservoir setback and land requirements for the Expanded Reservoir (Appendix IV *in* KCB 2023).

2.7 Existing Infrastructure

2.7.1 Altalink

On January 12, 2022, SMRID sent the Project expansion plans to Altalink for their review. Altalink noted they have a single transmission line crossing the expansion area. Altalink would need to remove the poles in the inundation area. On March 11, 2024, Altalink provided the conceptual cost for the removal of the poles and the provision of a solution for maintaining transmission.

2.7.2 Fortis

A Third-Party Authorization form was submitted to Fortis on September 21, 2021, noting a conflict between the Project and a transmission line. Communications with Fortis during early 2023 included discussions regarding possible solutions for moving the potentially affected transmission line.

2.7.3 Inter Pipeline

Contact was made with Inter Pipeline through the sharing of preliminary design drawings on November 4, 2021. On June 30, 2022, Inter Pipeline responded with questions regarding the Project. On December 9, 2022, Inter Pipeline sent notice that they were reviewing the Project and potential Project effects on their infrastructure. High-level costs estimates to accommodate Interpipeline were exchanged in June 2023. Consultation with Inter Pipeline is ongoing.

2.7.4 Highway 36 Bridge

July 2023, Alberta Transportation and Economic Corridors selected the design consultant for the design and construction of a new bridge for the Highway 36 crossing of Chin Reservoir. The design will need to take into account the increase in FSL to 864 m. The new bridge will be constructed, and the old bridge removed prior to the raise in the reservoir. The raise in the FSL will not adversely affect the Highway 36 Bridge, as the bridge will be constructed to withstand the higher FSL and potential movement of ice on the reservoir. The assessment of potential effects on roadway infrastructure and traffic is assessed in Volume 2: Section 5.1.

2.7.5 West Dam

The West Dam and outlet structure are nearly 70 years old. Should the Project not move forward, the dam will still require refurbishment, and the outlet structure will still need to be replaced. Given the timing of the Project, the refurbishment of the West Dam can include a raise in the dam crest to accommodate the Project's elevated FSL. Both the refurbishment of the West Dam and the replacement of the conduits and outlet structure are regulated under SMRID's existing water licence as per the Alberta *Water Act* (R.S.A 2000, c. W-3). Federal approvals for the West Dam refurbishment are being obtained independently from the Project. No effects to Stafford Reservoir will occur with the refurbishment of the West Dam or the raise in FSL in the Chin Reservoir.

2.7.6 Chin Chute

The proposed raise in FSL is also expected to affect the existing Chin Chute, one of the inlets from the SMRID Main Canal. The infrastructure of the chute requires replacement. The Project provides the impetus for replacement of the structure. The replacement Chin Chute structure is regulated under SMRID's existing water licence as per the Alberta *Water Act* (2000). Federal approvals for the chute refurbishment have been obtained independently from the Project. The construction and commissioning of the new Chin Chute is expected to be completed in 2025.

2.7.7 Chin Hydropower Plant

The Chin hydroelectric generation facility has a capacity of 11 MW and is located where the SMRID Main Canal enters Chin Reservoir just upstream of Chin Chute. The highest water levels in the reservoir can go without requiring significant modifications is 864.00 m. The efficiency and power production of the Chin Hydropower Plant at the FSL is expected to be reduced; however, the facility would not be flooded.

2.7.8 Town of Taber Municipal Water Intake

SMRID will assess the Town of Taber pumphouse and intake to determine if the structures will need to be raised to accommodate the new FSL of 864 m.

2.7.9 Skiff/12 Mile Water Co-op Pumphouse

SMRID will remove and replace the Skiff/12 Mile Water Co-op Pumphouse to a location to be determined. Discussions are ongoing with the respective water co-ops.

2.7.10 Private Water Intakes

SMRID will assess the Hillridge Farms and Oaklane Colony pumphouses and intakes to determine if the structures will need to be raised to accommodate the new FSL elevation (864 m). The Chin Ridge Seeds pumphouse and intake were constructed in 2023 at an elevation that accommodates the new FSL.

2.7.11 Oil and Gas Infrastructure

As per Directive 020 issued by the Alberta Energy Regulator (AER 2023), the oil and gas infrastructure found within the coulee is to be removed and wells are to be abandoned. In general, abandoned means the well has been sealed downhole at any previously completed interval, and any porous zone has been isolated to protect non-saline water (groundwater and surface water). Well casings need to be cut and capped below surface. Specific direction provided in Directive 020 are to be followed.

2.7.12 Water Wells

Water wells that will be inundated by the expansion of the reservoir will be decommissioned and abandoned. Well casings will be exposed and removed to a depth of 1 m below ground. The wells will be plugged with bentonite and capped prior to inundation.

2.7.13 Chin Park Campgrounds

There are two campgrounds located on south shore of the Chin Reservoir, immediately east and west of the Highway 36 Bridge approach. On the west side of Highway 36, a group campground is located on Provincial Crown Land and is designated the Chin Coulee Provincial Recreation Area. The campground is operated by the Kinsmen Club of Taber. On the east side of Highway 36, Chin Park is operated by County of Warner and is located on SMRID property. The lands of both campgrounds will be inundated. The buildings and infrastructure located on the properties will be removed prior to the inundation. SMRID is in continuing discussions with Alberta Forestry and Parks regarding the purchase or land swap for the Chin Coulee Provincial Recreation Area. The reestablishment the Chin Park campground above the new FSL is under consideration by SMRID.

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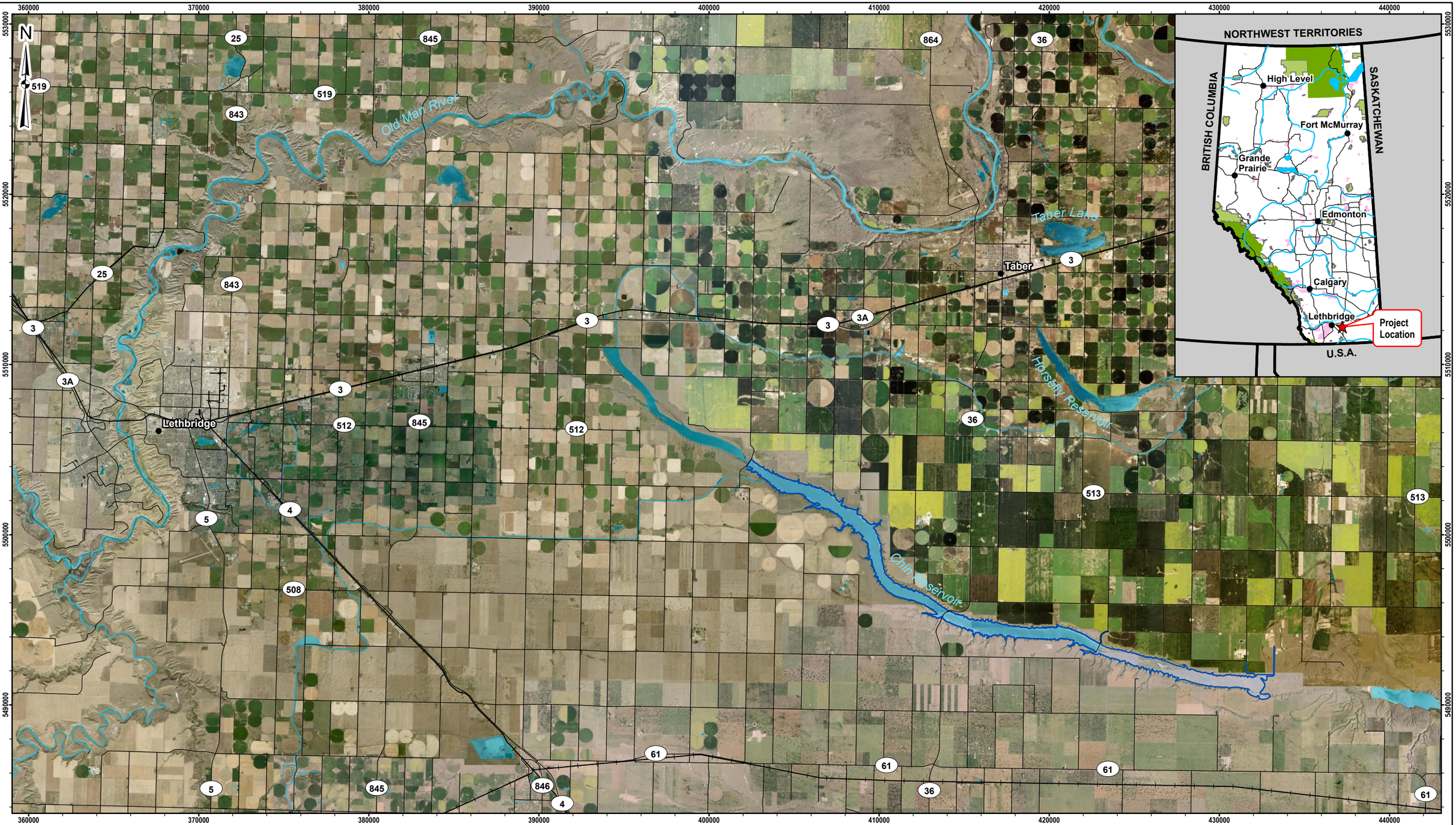
MAP FIGURES



Legend

- City or Town
- All Weather Road
- Railway
- Water Feature
- Project Area

0 10 Kilometres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: SOUTHERN ALBERTA, EARTHSTAR GEOGRAPHICS

CLIENT: SMRID

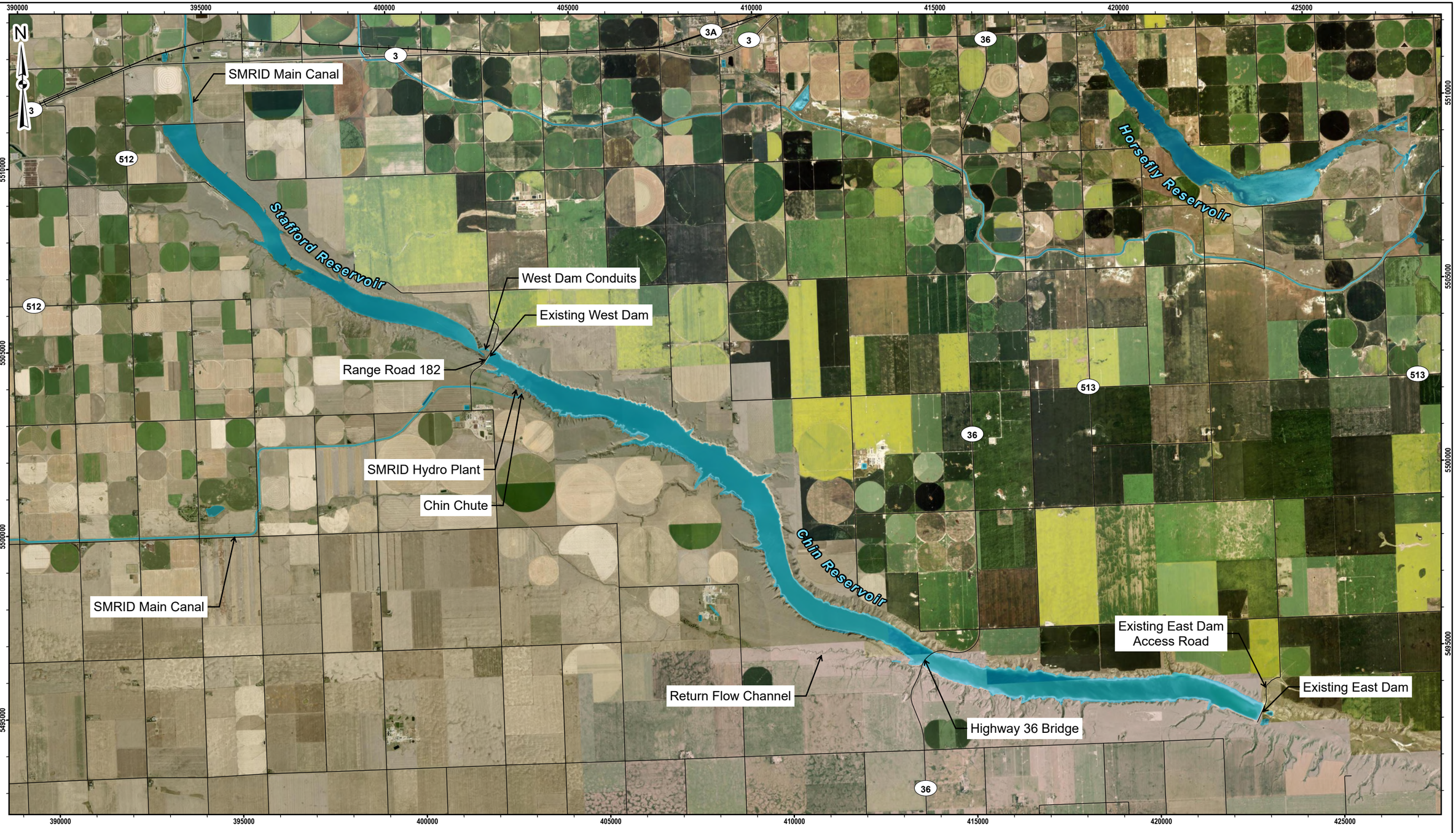
Klohn Crippen Berger

PROJECT: CHIN RESERVOIR EXPANSION PROJECT - ENVIRONMENTAL IMPACT ASSESSMENT

TITLE: REGIONAL LOCATION MAP

SCALE	PROJECT No.	FIG No.
1:215,000	A03701E01	1

File: Z:\AC\GY\Alberta\A03701E01 MPE Chin Res Environmental\400 Drawings\402 GIS\02_Pro_Files\ChinReservoir_EIA_230301\ChinReservoir_EIA_240517.aprx Creator: : AHarrison



Legend

- Railway
- All Weather Road
- Water Feature

0 5 Kilometres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: SOUTHERN ALBERTA, EARTHSTAR GEOGRAPHICS

CLIENT: SMRID

Klohn Crippen Berger

PROJECT: CHIN RESERVOIR EXPANSION PROJECT - ENVIRONMENTAL IMPACT ASSESSMENT

TITLE: EXISTING COMPONENTS

SCALE	PROJECT No.	FIG No.
1:100,000	A03701E01	2

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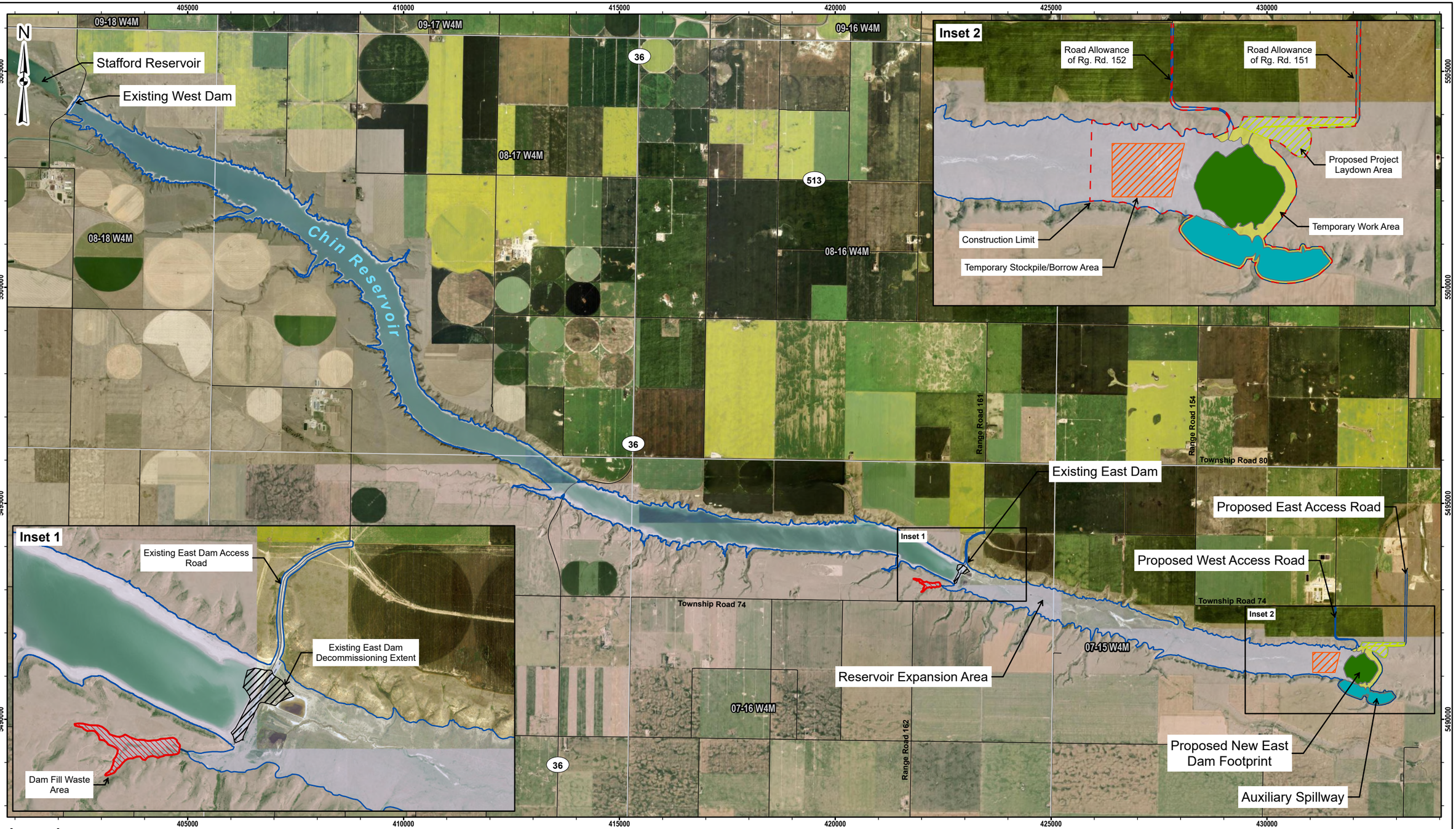


Legend

- All Weather Road
- Existing Dam Decommissioning Extent
- New East Dam Footprint
- New East Dam Auxiliary Spillway
- Dam Fill Waste Area
- Project Area (PA)
- Township Boundary (ATS)
- Temporary Work Areas
- Proposed Project Laydown Area
- Temporary Stockpile/Borrow Area

0 3 Kilometres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: TOWN OF PINCHER CREEK, MAXAR

CLIENT: SMRID

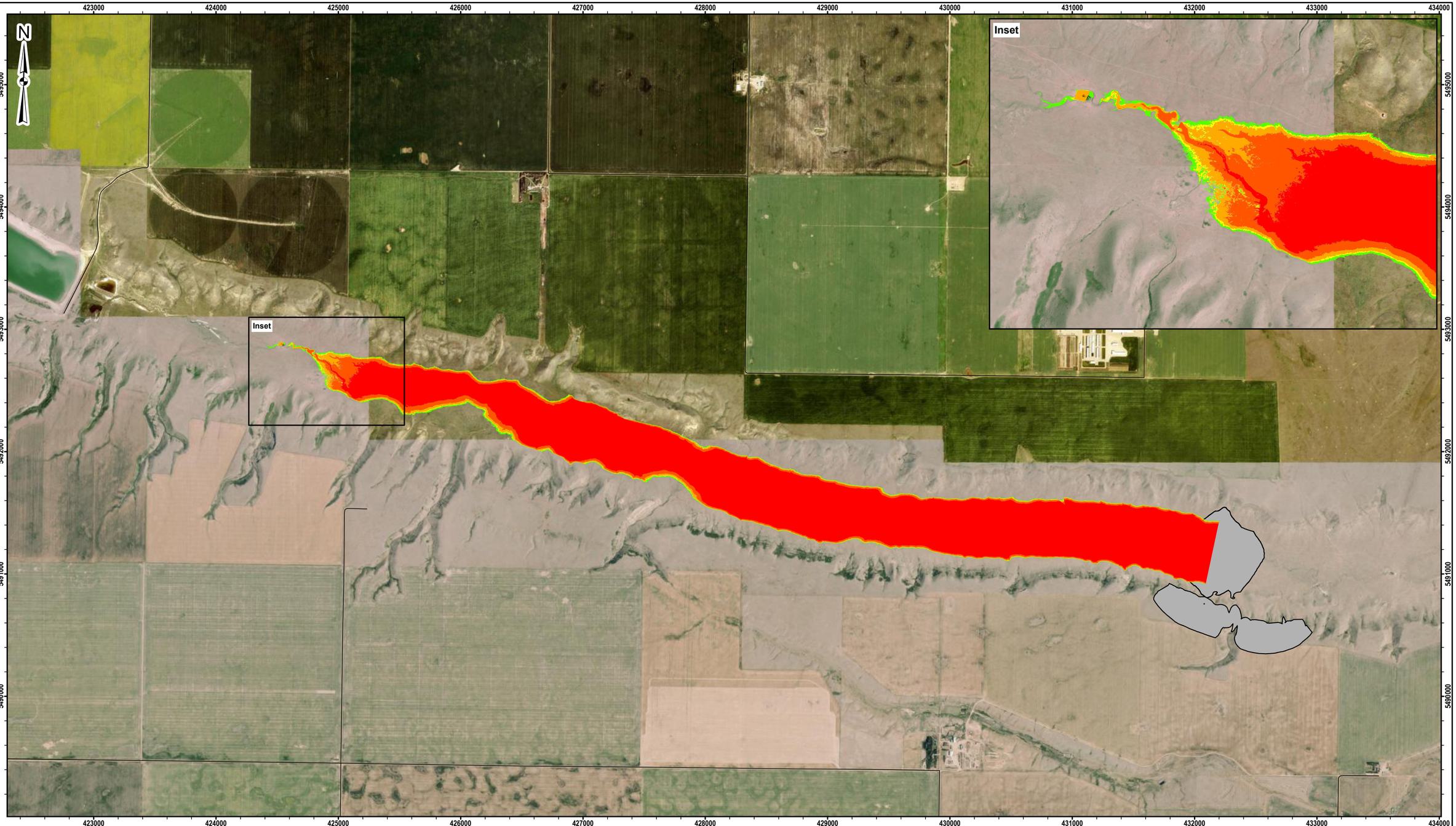
Klohn Crippen Berger

PROJECT: CHIN RESERVOIR EXPANSION PROJECT - ENVIRONMENTAL IMPACT ASSESSMENT

TITLE: PROJECT COMPONENTS OF THE PROJECT AREA

SCALE	PROJECT No.	FIG No.
1:85,000	A03701E01	3

File: Z:\AC\GY\Alberta\A03701E01 MPE Chin Res Environmental\400 Drawings\402 GIS\02_Pro_Files\ChinReservoir_EIA_230301\ChinReservoir_EIA_240517.aprx Creator: : AHarrison



Legend

- All Weather Road
- New East Dam and Spillway

Depth (m)

- < 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

0 1 Kilometres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: TOWN OF PINCHER CREEK, MAXAR

CLIENT: SMRID

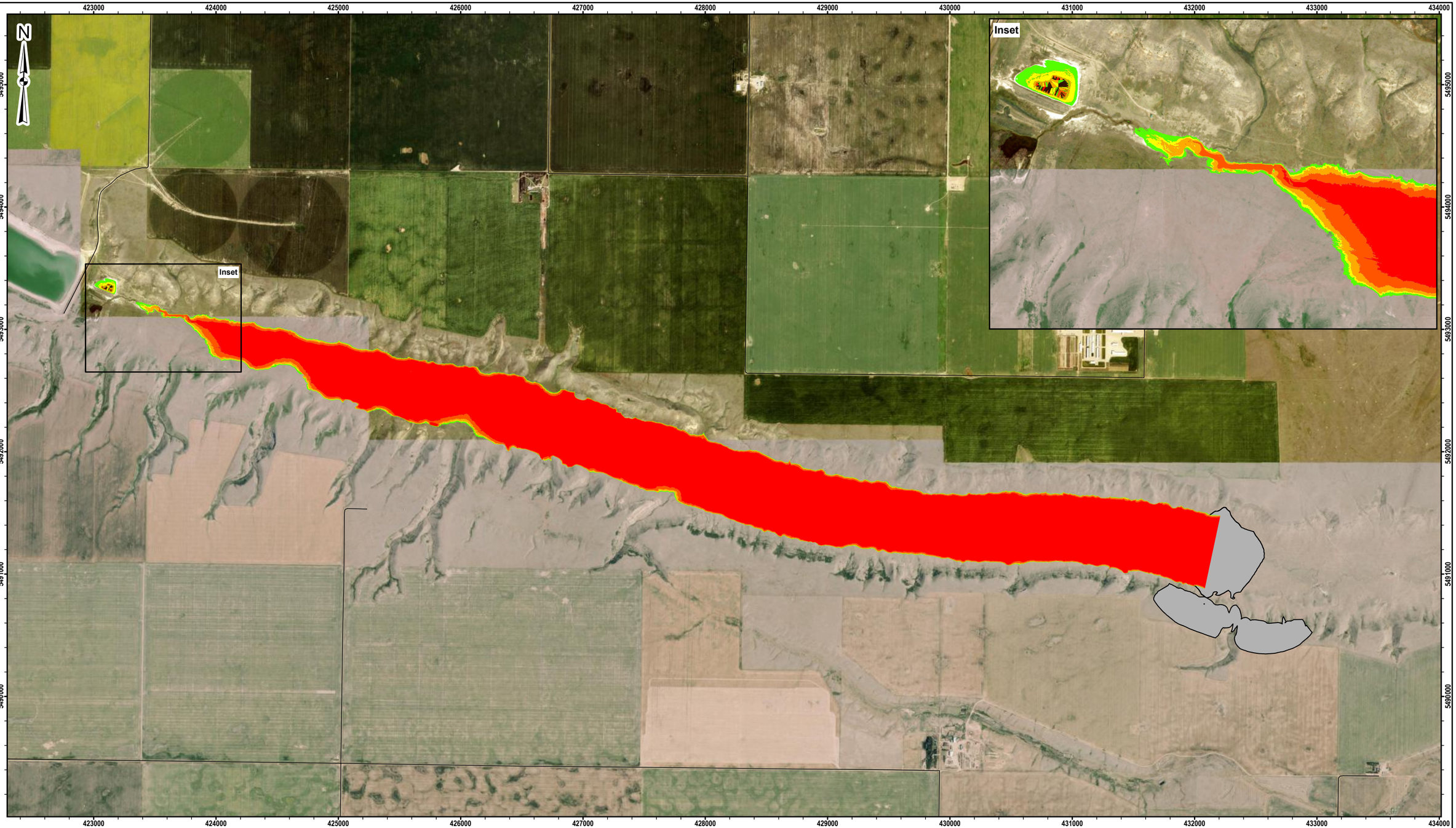
Klohn Crippen Berger

PROJECT: CHIN RESERVOIR EXPANSION PROJECT - ENVIRONMENTAL IMPACT ASSESSMENT

TITLE: INUNDATION SEQUENCE - EL. 844m

SCALE	PROJECT No.	FIG No.
1:30,000	A03701E01	4a

File: Z:\AICGY\Alberta\A03701E01 MPE Chin Res Environmental\400 Drawings\402 GIS\02_Pro_Files\ChinReservoir_EIA_230301\ChinReservoir_EIA_240517.aprx Creator: : AHarrison



Legend

- All Weather Road
- New East Dam and Spillway

Depth (m)

- < 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

0 1 Kilometres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: TOWN OF PINCHER CREEK, MAXAR

CLIENT: SMRID

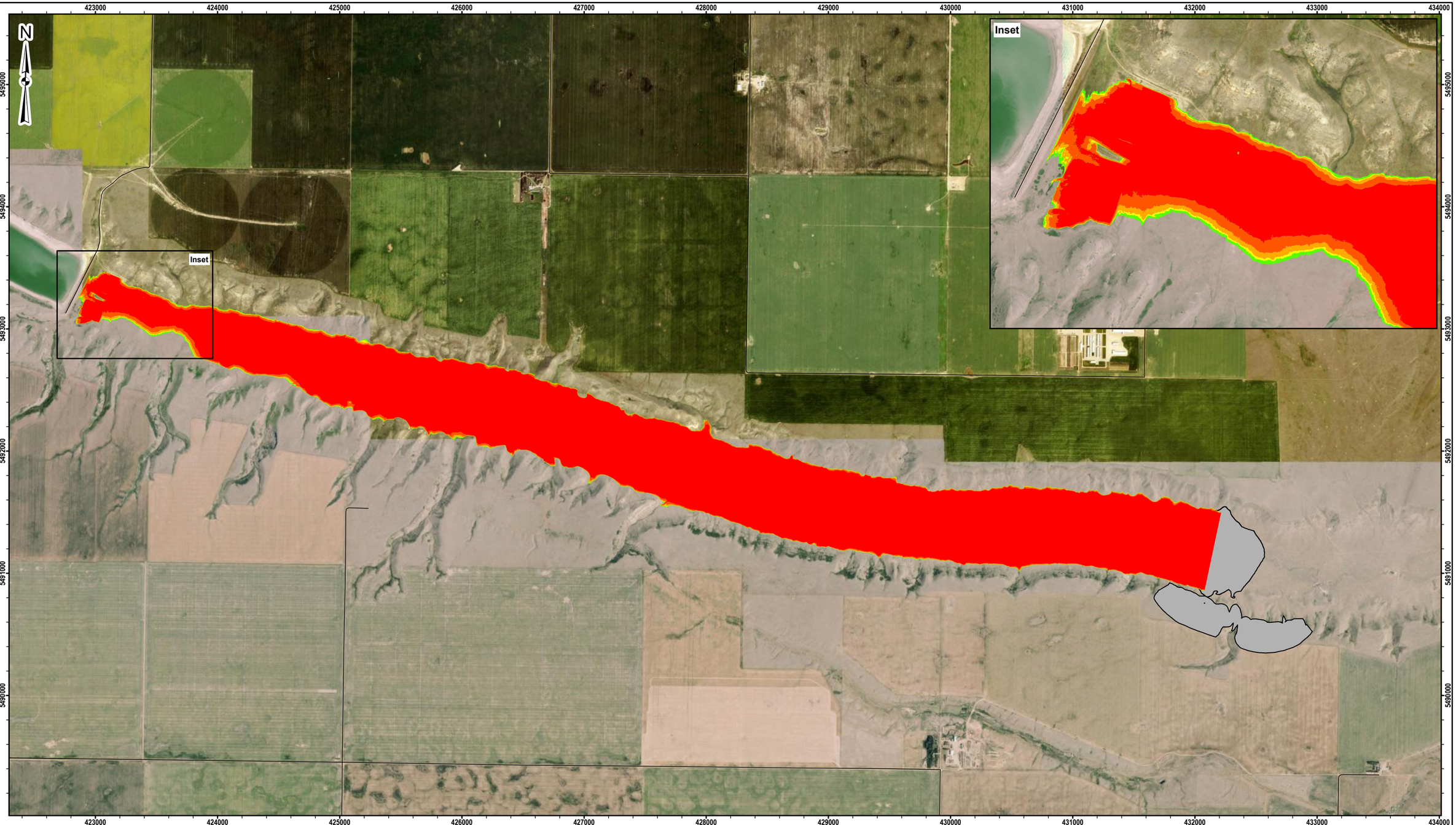
Klohn Crippen Berger

PROJECT: CHIN RESERVOIR EXPANSION PROJECT - ENVIRONMENTAL IMPACT ASSESSMENT

TITLE: INUNDATION SEQUENCE - EL. 849m

SCALE	PROJECT No.	FIG No.
1:30,000	A03701E01	4b

File: Z:\A\CGY\Alberta\A03701E01 MPE Chin Res Environmental\400 Drawings\402 GIS\02_Pro_Files\ChinReservoir_EIA_230301\ChinReservoir_EIA_240517.aprx Creator: : AHarrison



Legend

- All Weather Road
- New East Dam and Spillway

Depth (m)

- < 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

0 1 Kilometres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: TOWN OF PINCHER CREEK, MAXAR

CLIENT: SMRID

Klohn Crippen Berger

PROJECT: CHIN RESERVOIR EXPANSION PROJECT - ENVIRONMENTAL IMPACT ASSESSMENT

TITLE: INUNDATION SEQUENCE - EL. 855m

SCALE	PROJECT No.	FIG No.
1:30,000	A03701E01	4c

File: Z:\ACGY\Alberta\A03701E01 MPE Chin Res Environmental\400 Drawings\402 GIS\02_Pro_Files\ChinReservoir_EIA_230301\ChinReservoir_EIA_240517.aprx Creator: : AHarrison

APPENDIX I

Final Terms of Reference

FINAL TERMS OF REFERENCE
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR ST. MARY RIVER IRRIGATION DISTRICT
PROPOSED

CHIN RESERVOIR EXPANSION PROJECT

Located in Southern Alberta within
Lethbridge County, County of Warner, and the Municipal District of Taber

ISSUED BY: **Environment and Protected Areas**

DATE AMENDED: **November 30, 2023**

TABLE OF CONTENTS

PURPOSE OF THE TERMS OF REFERENCE

The purpose of this document is to identify for St. Mary River Irrigation District (SMRID), the public, Indigenous communities, and appropriate stakeholders, the information required by government agencies for an Environmental Impact Assessment (EIA) report prepared under the *Environmental Protection and Enhancement Act* (EPEA) for the Chin Reservoir Expansion Project (the Project).

PROJECT BACKGROUND

Chin Reservoir is an off-stream storage reservoir that is located roughly in the middle of SMRID system, approximately 30 kilometres (km) east of Lethbridge and 15 km south of Taber. The existing reservoir is located between NE-27-8-18-4 and SE-26-7-16-4. It is the largest off-stream reservoir within SMRID and has a current storage volume of 154,320 acre-foot (ac-ft) (190,350 cubic decameter [dam^3]) at the operating full supply level (FSL) of 861.40 metres (m).

Chin Reservoir is located in a major glacial melt coulee known as Chin Coulee. The reservoir is impounded by two dams on its east and west ends: Chin 1 (West Dam), and Chin 2 (East Dam). Chin Coulee continues to the west and east of both dams. West of the West Dam is Stafford Reservoir. An ephemeral creek channel extends eastward from the East Dam. Typically, the flow in the channel stops by mid-summer, stranding small pockets of water that, depending on the environmental conditions of a given year, may or may not dry up by the end of summer.

The two dams were completed in 1955 and no major modifications have been completed since their construction. In 1989, Forty Mile Coulee Reservoir, 50 km to the east of the Chin Coulee Reservoir, was added to SMRID for water storage for irrigation.

Since the addition of Forty Mile Coulee Reservoir, there has been a dramatic increase in the demand for water for irrigation purposes. To meet the increased demand for irrigation, SMRID has proposed to expand the existing Chin Reservoir. The Project is planned for privately held land where landowners continue to be included in the planning of the Project. The Project involves the creation of a new dam at the invert of the Chin Coulee which will result in a larger reservoir. The new dam and eastern limit are within SW 23-7-15-W4 and NW-14-7-15-W4 in the MD of Taber and Lethbridge County. The new dam will be approximately 40 m in height and is expected to inundate (flood) approximately 650 hectares (ha) of Chin Coulee east of the existing East Dam.

Three noteworthy aspects of the operation of the SMRID system limit the potential effects of the Project. The first is that the water in the SMRID system is drawn from the Milk River Ridge Reservoir and not directly from a river. The water diverted to the Milk River Ridge Reservoir cannot increase due to the constraints of the existing infrastructure managed and controlled by the Government of Alberta. Decisions regarding water conservation objectives and instream objectives are under the jurisdiction of the Government of Alberta. Second, while the goal is to increase storage capacity, the additional water required for the additional reservoir capacity would be filled without the need for SMRID to exceed the water allocation of their existing water licence. Finally, water released downstream of the Chin Reservoir cannot increase due to the constraints of the existing conveyance infrastructure.

SCOPE OF THE EIA REPORT

SMRID shall prepare and submit an EIA report that examines the environmental and socio-economic effects of the Project.

The EIA report shall be prepared considering all applicable provincial and federal legislation, codes of practice, guidelines, standards, policies, and directives.

The EIA report shall be prepared in accordance with these Terms of Reference and the environmental information requirements prescribed under EPEA and associated regulations, and the *Impact Assessment Act*, if applicable. The EIA report will form part of the application to the Natural Resource Conservation Board (NRCB). An EIA report summary will also be included as part of the NRCB Application.

SMRID shall refer to the *Guide to Preparing Environmental Impact Assessment Reports in Alberta* published by Alberta Environment and Protected Areas (the Guide) and these Terms of Reference when preparing the Environmental Impact Assessment report. In any case where there is a difference in requirements between the Guide and these Terms of Reference, the Terms of Reference shall take precedence.

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT AND INDIGENOUS ENGAGEMENT

[A] Document the public engagement program implemented for the Project including:

a) a list of meetings and the specific comments or issues raised at the meetings;
b) a list of other consultation methods including communication via websites, radio, television, newspaper, and the intended audience reached;
c) a description and documentation of concerns and issues expressed by the public, SMRID's analysis of those concerns and issues and the actions taken to address those concerns and issues; and
d) a description of how the public input was incorporated into the Project development, impact mitigation and monitoring.

[B] Document the Indigenous consultation program implemented for the Project including:

a) a list of meetings and the specific comments or issues raised at the meetings;
b) a description and documentation of concerns and issues expressed by Indigenous communities and groups, SMRID's analysis of those concerns and issues, and the actions taken to address those concerns and issues;
c) a description of how Indigenous values are considered in the framework of decision making;
d) how Indigenous knowledge helped shape project development, impact mitigation, monitoring and reclamation; and
e) the consultation undertaken with Indigenous communities and groups with respect to traditional ecological knowledge and traditional use of land and water.

[C] Describe plans to maintain the public engagement and Indigenous consultation process following completion of the EIA report to ensure that the public and Indigenous peoples will have an appropriate forum for expressing their views on the ongoing development, operation, and reclamation of the Project.

[D] Provide the presentation materials and associated documents (e.g., agendas, minutes, briefings) used for public meetings and Indigenous consultations.

2 PROJECT DESCRIPTION

2.1 Overview

[A] Provide a brief project description in sufficient detail to provide context for the EIA, including:

a) proponent information;
b) the need for the Project and why this project was chosen over other projects;
c) roles of various government departments and agencies and non-governmental organizations;
d) which communities would benefit from the Project; and
e) the development plan and schedule.

[B] Describe how the Project links to and realizes the outcomes of the Alberta Irrigation Modernization Program.

[C] Describe the benefits of the Project, including jobs created, local training, employment and business opportunities, and royalties and taxes generated that accrue to:

a) the Proponent;
b) local and regional communities, including Indigenous communities;
c) the local authority;
d) Alberta; and
e) Canada.

[D] Describe the priority rights of SMRID for the licensed allocation of water in comparison to upstream users, and how decisions are made with respect to annual diversions from the source of the SMRID water supply (i.e., Milk River Ridge Reservoir).

[E] Describe how the existing Chin reservoir affects downstream users, including junior license holders, municipal and industrial uses, and Indigenous communities. Discuss:

a) past and existing contracts that SMRID has entered into with non-irrigators to supply water for domestic, commercial, or industrial uses; and
b) whether alternative (non-irrigation) water contracts have been explored for water above current SMRID requirements up to SMRID total license allocation.

[F] Detail historic and planned water conservation practices adopted by SMRID and the outcomes on the water balance, including:

a) total water volume realized through efficiency gains over the past ten years;
b) how past water savings gained through efficiency improvements are currently stored and/or returned to natural systems; and
c) a description of the need for additional storage considering past and future gains realized through conservation and efficiency practices.

[G] Discuss the current need for the Project including:

a) the need for drought mitigation and climate resiliency;
b) rural and regional economic development objectives;
c) changes in agricultural practices on lands using the water supply from SMRID and on lands currently without a secure water supply; and
d) enhancement of public recreational opportunities.

[H] Describe and provide maps and/or drawings of the components of the Project, including, but not limited to:

a) the proposed dam structure;
b) existing East Dam;
c) existing infrastructure, leases, and clearings;
d) proposed facilities, buildings and infrastructure (e.g., pipelines and utilities);
e) temporary structures;
f) transportation and access routes;
g) containment structures;
h) sources of aggregate resources, borrow material and other construction material and locations of any stockpiles that will be developed if known;
i) waste and debris storage area and disposal sites;
j) borrow pits;
k) the water supply system, and the existing Waterton-St. Mary Headworks System;
l) water conveyance structures;
m) reservoirs;
n) total potential areas to be flooded in extreme (e.g., 1 in 100-year and 1 in 300-year) flood scenarios; and
o) water wells/intakes, pipelines, and storage structures.

[I] Discuss the alternatives for the Project and the rationale for not selecting the identified alternatives.

[J] Discuss the implications of a delay in proceeding with the Project, or any phase of the Project, or not going ahead with the Project.

[K] Discuss the overall positive and negative economic, environmental, and social impacts of the Project.

[L] Provide the adaptive management approach that will be implemented throughout the life of the Project. Include how monitoring, mitigation and evaluation were incorporated.

[M] Provide a list of commitments SMRID has made. This would include any mitigation, monitoring and operational commitments made as part of this assessment.

2.2 Constraints

[A] Discuss the process and criteria used to identify constraints to development, and how the Project was designed to accommodate those constraints. Including the following:
a) any applicable *Alberta Land Stewardship Act* Regional Plan, sub-regional plan;
b) any approved water management plan enacted under the *Water Act*;
c) watershed plan;
d) apportionment agreement with downstream provinces, and how the apportionment commitments are met;
e) management plan implemented by Watershed Planning and Advisory Councils and/or Watershed Stewardship Groups;
f) applicable municipal plans;
g) the Government of Alberta Rural Economic Development Action Plan;
h) Indigenous traditional land and water use;
i) land use policies and resource management initiatives that pertain to the Project;
j) the environmental setting;
k) results of project-specific and regional monitoring; and

l) potential for changes in the regulatory regime.

[B] Describe the process and criteria used and options considered to select sites for project components, including:
a) the dam;
b) water conveyance structures;
c) the source of water;
d) borrow sites; and
e) material disposal sites, including materials from the existing East Dam.

[C] Provide a list of project components for which locations will be determined later. Discuss the selection criteria that will be used to determine the specific location of these.

[D] Describe the potential effects of raising the full supply level on the West Dam, Chin Chute, Chin Power Plant, Chin conduits, and the Stafford Reservoir.

[E] Describe roads, pipelines, well sites, power lines, or other infrastructure that may be affected by the Project.

[F] Document communication with the owner of the infrastructure regarding potential impacts and relocation requirements and other measures required to mitigate permanent or short-term impacts.

[G] Describe proposed protection, relocation, or reconstruction of infrastructure and measures proposed to mitigate impacts during construction.

[H] Describe public lands that may overlap with the Project.

[I] Describe the cumulative effects of the Project in combination with any other activities in the Regional Study Area.

2.3 Regional and Cooperative Efforts

[A] Discuss SMRID's involvement in regional and cooperative efforts to address environmental and socio-economic issues associated with regional development.

[B] Describe opportunities for sharing infrastructure (e.g., access roads, utility corridors, water infrastructure) with other resource development stakeholders. Provide rationale where these opportunities will not be implemented.

[C] Discuss potential cooperation with other parties regarding water related infrastructure and management including, but not limited to, water supply, water intakes, pipelines, water storage and withdrawals, flow monitoring and reporting and ecological monitoring.

2.4 Transportation Infrastructure

[A] Assess the geotechnical impacts of the Project on rate of retrogression and overall stability of the Highway 36 Chin Coulee landslide (identified as site S005 in Transportation and Economic Corridors' Geohazard Risk Management Program).

[B] Describe the potential effects of raising the full supply level on the Highway 36 causeway.

[C] Discuss the potential impacts of the Project to Highway 36, as well as the bridge crossing the Chin reservoir, including:

a) freeboard impacts, wave/wind run-up impacts, ice impacts, bank erosion impacts, scour impacts, and structural capacity; and
b) conceptual solutions to address any adverse effects. Include a cost assessment that considers initial costs and predicted operation and maintenance costs.

[D] Prepare a Traffic Impact Assessment as per the latest Transportation and Economic Corridors' *Traffic Impact Assessment Guidelines* (https://open.alberta.ca/publications/traffic-impact-assessment-guidelines), including the following:
a) describe and map the Project boundary, internal road network, and any existing or proposed access location to/from the provincial highway system;
b) discuss the options considered for the proposed highway access locations and provide rationale for selecting the preferred option;
c) discuss compatibility of the preferred option with Transportation and Economic Corridors' future highway plans;
d) describe existing and future background traffic and development traffic, and consider the cumulative effects from other existing and planned developments that are or will be using the same highways and highway accesses;
e) consider the potential traffic impacts for all stages of the Project (e.g., construction, operations, expansion, shutdown, etc.), and determine any necessary improvements to maintain the safe operations of the highway intersection and access road infrastructure; and
f) provide a schedule for undertaking the necessary improvements prior to commencing the Project.

[E] Describe any project infrastructure (e.g., utilities and facilities that cross or in close proximity to a provincial highway) that may impact the provincial highways, and any effects from the Project (e.g., smoke, dust, light, noise, precipitation, etc.) that may impact the highway users, and provide solutions.

[F] Provide a summary of any discussions with Alberta Transportation and Economic Corridors in regard to the Project and its traffic impacts.

[G] If the Project involves the transport of dangerous goods by trucks, include the following:
a) state the classes, divisions, and characteristics of the dangerous goods; and
b) state where the dangerous goods will be transported to.

2.5 Air Emissions Management

[A] Discuss the selection criteria used, options considered, and rationale for selecting mitigation measures to minimize air emission and ensure air quality management.

[B] Provide emission profiles (type, rate, and source) for the Project's construction and operating emissions including point and non-point sources, area, mobile and fugitive emissions. Discuss:
a) odorous and visible emissions from the Project;
b) greenhouse gas emissions during all stages of the Project. Identify the primary sources and provide calculations;
c) amount and nature of criteria air contaminants emissions; and
d) control technologies and mitigative measures used to reduce emissions.

2.6 Dam Safety

[A] Describe how the Project will adhere to the Alberta Dam and Canal Safety Directive and include:

a) the Project components and scope;
b) the overall approach for design and technical specification;
c) any hypotheses and assumptions used;
d) data collection methods, models and studies;
e) the degree of uncertainty, reliability and sensitivity of models used to reach conclusions; and
f) any gaps in knowledge and understanding related to key conclusions, including steps to address these gaps.

[B] Describe the physical characteristics of the proposed reservoir, including:

a) normal operating range;
b) spatial extent/overlap into other tributaries, if any;
c) surface area at the maximum normal reservoir level;
d) normal operating water volume; and
e) the volume between the maximum normal reservoir level and the minimum normal reservoir level.

[C] Describe the consequence classification of the Project and its appurtenant structures.

[D] Describe preliminary design of the proposed structures, including:

a) characteristics of the proposed site, including field and lab test results and geotechnical properties;
b) principal dimensions of the structures and related works including spillway/ outlet structures;
c) anticipated quantities of materials required for construction;
d) seepage control and drainage provisions for both the dam and rim of the proposed reservoir extension;
e) stability under usual and unusual loading conditions; and
f) freeboard requirements.

[E] Describe expected performance of the dam and its appurtenant structures during and after extreme weather events (e.g., floods, earthquakes, etc.) including:

a) ability of the structures (e.g., earth dams, diversions, flow control) to withstand those events and potential challenges and mitigation measures;
b) potential challenges that could impact the safety of the proposed structures; and
c) proposed measures to mitigate challenges identified.

[F] Describe construction activities of the proposed structures including:

a) site clearing and grubbing;
b) construction and operation of any temporary structures required (e.g., cofferdam, river diversion, etc.) if any;
c) excavation and stockpiling of suitable material, including drilling, blasting, sorting and screening in rock quarries, and moisture conditioning of impervious material;
d) excavated slope stabilization and foundation preparation;
e) placing impervious lining and erosion protection;
f) installation of instrumentation, mechanical and electrical equipment; and

g) testing and commissioning.

[G] Describe decommissioning, removal and/or reclamation of the existing or temporary structures including:
a) removal of temporary structures (e.g., coffer dams etc.); and
b) breach/removal of any existing structures.

[H] Describe the operation of structures including:
a) approach used for first filling of the reservoir;
b) debris management during reservoir filling;
c) shoreline stabilization during reservoir filling, including potential impacts with higher reservoir water levels on the reservoir shoreline;
d) operation, maintenance and surveillance needs for safe operation of the structures;
e) expected fluctuations in the reservoir and its impacts; and
f) approach to manage the reservoir in usual and unusual conditions.

[I] Provide details regarding potential accidents or malfunctions, including:
a) identification of potential accidents and malfunctions that could occur during all stages of the Project's construction (e.g., cofferdam leakage or failure or other dam safety incidents);
b) description of the effects of a failure by tabulating the flow arrival time at downstream of the structures until the estimated contents of the reservoir are within the estimated 100-year flood level; and
c) assessment of the potential for cascade failure and the impacts of such a cascade failure if there are other dam or canal structures located downstream.

2.7 Water Management

2.7.1 Water Supply

[A] Describe the water supply requirements for the Project as it relates to the source of water for the reservoir, including:
a) the water requirements and sources for normal operation of the reservoir. Identify the volume of water to be diverted from each source;
b) the variability in the amount of water required on an annual and seasonal basis as the Project is implemented;
c) the expected water balance prior to and resulting from the Project including, but not limited to:
    i) total annual diverted volumes of water,
    ii) volume of water lost from canals and reservoirs,
    iii) volume of return flows,
    iv) licensed volumes used for other purposes than irrigation (e.g., agricultural and industrial water convenance agreements),
    v) volume of remaining license water available for crop use, and
    vi) volumes of consumptive use;
d) a complete water balance for the reservoir (including existing and proposed using historical hydrologic data [especially watershed natural runoff yield and natural flow]);
e) a discussion of assumptions made or methods chosen to arrive at the water balances; and

f) the expected cumulative effects on water losses/gains resulting from the Project's operations.

[B] Describe the water supply requirements for the Project as it relates to process and/or potable water needs during construction, operation and/or decommissioning, including:

a) the process water, potable water, and non-potable water requirements and basin water supply sources for construction and normal operation of the reservoir. Identify the volume of water to be withdrawn from each source and potential changes in the operation of upstream water supply reservoirs;
b) potable water treatment systems for all stages of the Project;
c) type, quantity, and process of potable water treatment chemicals used; and
d) measures for ensuring efficient use of water such as water use minimization, recycling, conservation, and technological improvements.

2.7.2 Surface Water

[A] Describe the surface water management strategy for all stages of the Project, including:

a) plan for diverting water during decommissioning of the existing East Dam and subsequent filling of the expanded reservoir upon completion of the new dam;
b) design factors considered, such as:
    i) site drainage,
    ii) run-on management,
    iii) road run-off,
    iv) erosion/sediment control,
    v) geotechnical stability concerns,
    vi) surface water protection and groundwater interaction,
    vii) waterbody dewatering,
    viii) groundwater seepage, and
    ix) flood protection;
c) permanent or temporary alterations or realignments of watercourses, waterbodies, and wetlands (including the relevance of the Alberta Wetland Policy); and
d) the pre- and post-disturbance alignment and condition of ephemeral and permanent streams, wetlands and waterbodies including those created by the Project.

[B] Describe and map roadway, pipeline, powerline and other utility crossings of watercourses, wetlands, or waterbodies.

2.7.3 Wastewater Management

[A] Describe the types and characteristics of wastewater that will be generated during the Project.

[B] Describe the wastewater management strategy for each wastewater type generated during all stages of the Project, including:

a) the criteria used, options considered and rationale for the selection of wastewater treatment and wastewater disposal and a discussion of why the other options were not chosen;
b) the proposed mitigation and monitoring measures (water management and wastewater management treatment systems) to protect water quality; and
c) design of facilities that will collect, treat, store and release wastewater streams.

2.8 Waste Management

[A] Describe the types and characteristics of waste that will be generated during all stages of the Project.

[B] Discuss the selection criteria used, options considered, and rationale for waste disposal during construction and decommissioning. Include:

a) the location and availability of on- and off-site waste disposal; and
b) site suitability from a water quality protection perspective, geotechnical perspective and with regard to existing and potential human activities.

[C] Characterize and quantify the anticipated dangerous goods, hazardous, non-hazardous, and recyclable wastes generated by all phases of the Project, and describe:

a) the composition and volume of specific waste streams and discuss how each stream will be managed; and
b) plans for pollution prevention, waste minimization, recycling, and management to reduce waste quantities for all stages of the Project.

[D] Describe the nature and amount of on-site hydrocarbon storage. Discuss containment and other environmental protection measures.

2.9 Conservation and Reclamation

[A] Provide a conceptual conservation and reclamation plan for all phases of the Project. Describe and map as applicable:

a) borrow pits;
b) waste material disposal sites;
c) temporary roadways or utility corridors;
d) any other disturbance;
e) current land use and capability and proposed post-development land use and capability;
f) anticipated timeframes for completion of reclamation stages including an outline of the key milestone dates for reclamation and how progress to achieve these targets will be measured;
g) constraints to reclamation such as timing of activities, availability of reclamation materials and influence of natural processes and cycles including natural disturbance regimes;
h) a revegetation plan for the disturbed terrestrial, riparian, and wetland areas;
i) reclamation material salvage, storage areas, and handling procedures; and
j) existing and final reclaimed site drainage plans.

[B] Discuss, from an ecological perspective, the expected timelines for establishment and recovery of vegetative communities and wildlife habitat, the expected success of establishment and recovery, and the expected differences in the resulting communities.

[C] Describe how SMRID considered the use of progressive reclamation in project design and reclamation planning.

[D] Discuss uncertainties related to the conceptual reclamation plan.

3 ENVIRONMENTAL ASSESSMENT

3.1 Air Quality and Noise

3.1.1 Baseline Information

[A] Identify residences or other facilities that could be affected by air emissions, dust, noise or vibration from construction, operation, and decommissioning.

[B] Discuss baseline air quality conditions including appropriate ambient air quality parameters and baseline noise conditions.

[C] Discuss baseline soil drifting from the footprint of the reservoir during current reservoir draw-down.

3.1.2 Impact Assessment

[A] Identify construction and operational components of the Project that have the potential to increase noise levels or affect air quality.

[B] Discuss the nature, severity, extent, and duration of activities likely to produce noise, vibration, dust, or affect air quality that could impact residences, livestock, other facilities or receptors during construction and operation.

[C] Assess the probability of soil drifting during reservoir draw-down from the expanded reservoir.

[D] Discuss the frequency, severity, and potential impacts of dust generation.

[E] Describe how air quality, dust, and noise impacts resulting from the Project will be mitigated.

[F] Discuss the Project's relative contribution to cumulative effects on regional air quality and noise.

3.2 Hydrogeology

3.2.1 Baseline Information

[A] Provide an overview of the existing geologic and hydrogeologic setting. Document new hydrogeological investigations, including methodologies, analysis, results, and interpretations undertaken as part of the EIA, and:

a) present regional and project area geology to illustrate depth, thickness and spatial extent of lithology, stratigraphic units, and structural features; and
b) describe and review the geology of the region and project area, including both surficial and bedrock units (both aquifer and non-aquifer units).

[B] Present regional and project area hydrogeology describing:

a) the major aquifers, aquitards and aquicludes (quaternary and bedrock), their spatial distribution, properties, hydraulic connections between aquifers, hydraulic heads, gradients, groundwater flow directions and velocities, include maps and cross sections;
b) the chemistry of groundwater aquifers including baseline concentrations of major ions, metals and hydrocarbon indicators;

c) the potential groundwater discharge zones, potential sources and zones of groundwater recharge, areas of groundwater-surface water interaction and areas of quaternary aquifer-bedrock groundwater interaction; and
d) an inventory of water well development and groundwater use.

[C] Provide a detailed review and inventory with site reconnaissance for the entire project area to determine what boreholes are present, including:
a) a determination of which party will be responsible for the cost of decommissioning and if replacement is required. Identify where the new wells will be installed;
b) an outline of how decommissioning will be completed. Identify what regulatory authorizations are required for the replacement of existing water wells; and
c) details of the compensation requirements if new wells cannot be installed.

[D] Describe the potential for current seeps or flows from watercourses (permanent and intermittent) bringing overland agricultural contaminated runoff into the current channel or the proposed reservoir expansion.

3.2.2 Impact Assessment

[A] Describe project components and activities that have the potential to affect groundwater resource quantity and quality at all stages of the Project.

[B] Describe the nature and significance of the potential project impacts on groundwater with respect to:
a) inter-relationship between groundwater and surface water in terms of surface water quantity and quality;
b) implications for terrestrial or riparian vegetation, wildlife and aquatic resources including wetlands;
c) changes in groundwater quality, quantity, and flow;
d) conflicts with other groundwater users, and proposed resolutions to these conflicts;
e) groundwater protection including reclaiming wells in the Project area prior to construction of the Project;
f) potential implications of seasonal variations;
g) groundwater withdrawal for project operations, including expected alterations in the groundwater flow regime during and following project operations; and
h) a discussion of the groundwater vulnerability below the proposed reservoir expansion and along the meltwater valley channel.

[C] Detail the proposals, and/or mitigation strategies to protect the potential contamination of groundwater aquifers.

[D] Discuss the Project's relative contribution to cumulative effects on regional groundwater with respect to:
a) changes in regional groundwater quality and quantity; and
b) conflicts with regional groundwater users.

3.3 Hydrology

3.3.1 Baseline Information

[A] For the local and regional study areas:

a) describe the rationale used to define the local and regional study areas considering the location and range of probable project and cumulative effects;
b) provide maps illustrating the boundaries of the local and regional study areas;
c) describe meteorological conditions;
d) describe and map the surface hydrology; and
e) describe the sediment yield.

[B] Provide an inventory of surface water users who have existing approvals, permits or licenses in the local and regional study areas, including traditional agricultural and household users.

[C] Describe baseline surface water quantity characteristics, including:
a) seasonal variation, low, average, and peak flows for watercourses; and
b) low, average, and peak levels and trends for the waterbodies impacted by the Project.

3.3.2 Impact Assessment

[A] Identify project activities that may affect surface water during all stages of the Project, including site preparation, construction, operation, decommissioning and reclamation.

[B] Discuss potential hydrological changes (in terms of quantity, extent, and duration) to watersheds due to the project implementation, including changes in:
a) surface and near-surface drainage conditions;
b) channel regime (during minimum, average and peak flows);
c) water levels in water bodies and water courses;
d) evaporation, transpiration and seepage amounts;
e) sediment transport and yield; and
f) open-water surface areas.

[C] Describe the extent of hydrological changes that will result from potential changes to groundwater and surface water movement, and:
a) include changes and timing of those changes to the quantity of surface flow and water levels in watercourses (during minimum, average and peak flows) and water levels in waterbodies, and wetlands;
b) assess the potential impact of alterations in flow and water levels on local or regional hydrology and identify temporary and permanent alterations or disturbances;
c) assess changes in runoff rates and volumes before, during and after construction of the Project; and
d) identify changes in erosion including changes in sedimentation in watercourses resulting from the Project.

[D] Describe how water conservation objectives may be adversely affected with the development of the Project.

[E] Describe the impacts on other surface water users resulting from the Project. Identify any potential water use conflicts.

[F] Discuss how potential impacts of temporary and permanent roads on wetland hydrology will be minimized and mitigated.

[G] Describe mitigation measures to address surface water quantity impacts during all stages of the Project including:

a) alteration in flow regimes;
b) potential flood events; and
c) potential water use conflicts.

[H] Discuss the Project's relative contribution to cumulative effects on regional water quantity (e.g., timing, volume, peak and minimum flow rates of water courses, waterbody levels).

[I] Discuss the impact of low flow conditions and in-stream flow needs on water supply and water and wastewater management strategies.

3.4 Surface Water Quality

3.4.1 Baseline Information

[A] Describe the baseline water quality of water courses and water bodies (current Chin Reservoir and downstream (natural or man-made) bodies of water). Discuss the effects of seasonal and flow variations, other controlling factors, and temporal and spatial trends. Include water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under current conditions. Consider appropriate water quality parameters (e.g., metals, nutrients, pesticides, temperature, BOD/TOC, bacteria, aquatic and benthic invertebrates, aquatic plants, algae, dissolved oxygen, etc.) Provide a summary of existing information available from literature review(s).

[B] Describe and map the current point and identify non-point sources in the Project area.

[C] Describe all the current water uses of the Chin Reservoir (e.g., flood storage, fish habitat, hydroelectric, municipal discharge, recreation, etc.)

3.4.2 Impact Assessment

[A] Identify project activities that may affect surface water during all stages of the Project (including site preparation, construction, operation, maintenance, decommissioning and reclamation). Determine the local and regional extent of potential impacts as well as their frequency, duration, magnitude, and seasonality.

[B] Describe and predict the potential impacts of the Project (during site preparation, construction, operation, maintenance decommissioning and reclamation) on surface water quality of the current Chin Reservoir and downstream (natural or manmade) bodies of water using modelling or other scientifically defensible approach, including:

a) changes in water quality that may exceed the Environmental Quality Guidelines for Alberta Surface Waters, the Canadian Water Quality Guidelines, the Federal Environmental Quality Guidelines or mainstem reaches in the Surface Water Quality Management Framework included as part of the South Saskatchewan Regional Plan;
b) changes in concentrations, loading amounts, and timing of key water quality parameters including routine parameters that could impact the current Chin Reservoir and downstream (natural or manmade) bodies of water, including:
    i) impacts on their use as a drinking water supply, recreation, agriculture, domestic use, aesthetics, and other water uses,
    ii) potential implications to water quality on the current Chin Reservoir and downstream (natural or manmade) bodies of water due to the water drawn during the initial filling of the Project,

iii) potential implications to aquatic resources (e.g., aquatic and benthic invertebrates, biota, vegetation, algae, biodiversity, habitat),
iv) changes in water quality due to seasonal and flow variation;
v) groundwater and surface water interactions,
vi) changes in the quality of surface water runoff,
vii) implications to the health and extent of riparian lands,
viii) impacts in the event of a catastrophic failure of the structure, and
ix) impact on creek banks during flood events;

c) the level of uncertainty derived from the models and tools used in the analysis; and
d) any limitations of expected water quality on municipal/domestic use, recreational use, fisheries, stock watering or other uses.

[C] Describe the water quality expected in the Project and downstream (natural or manmade) bodies of water. Include water quality for high flow events (1 in 20-year and 1 in 100-year and 1 in 300-year) under expected reservoir conditions.

[D] Describe the potential and implications for metals (e.g., lead, arsenic, cadmium, selenium, and mercury) methylation in the Project to:

a) enter the aquatic food chain, including downstream in the Project and downstream (natural or manmade) bodies of water; and
b) impact treatment of water from the Project and downstream (natural or manmade) bodies of water for drinking water purposes.

[E] Describe the potential and implications for organic carbon and nutrient management in the Project, based on the proposed operating regime to:

a) Impact treatment of water the Project and downstream (natural or manmade) bodies of water for drinking water purposes (e.g., disinfection by-products); and
b) impact productivity of aquatic vegetation (e.g., macrophyte, algae).

[F] Describe the potential and implications for cyanobacteria/microcystin in the proposed Chin Reservoir to:

a) impact treatment of water from the Project and downstream (natural or manmade) bodies of water for drinking water purposes; and
b) impact recreation of the Project and downstream (natural or manmade) bodies of water.

[G] Describe the potential and implications for release and contamination of hydrocarbons and associated materials from pipelines and other oil and gas infrastructure, farm infrastructure and/or contaminated surface soil or subsoil in the area, on water quality and aquatic environment.

[H] Describe mitigation measures to address surface water quality impacts during all stages of the Project including:

a) alteration in flow regimes;
b) potential flood events;
c) potential water use and operations conflicts; and
d) increased loading of water quality parameters of concern.

[I] Provide a summary of the management plan to prevent or reduce impacts to surface water, and a spill response plan should an accidental release occur.

[J] Discuss the contribution of the Project to cumulative effects on water quality, including downstream (natural or manmade) bodies of water, and discuss the implications to the South Saskatchewan Region - Surface Water Quality Management Framework and any other regional initiatives.

[K] Discuss the impact of low flow conditions and in-stream flow needs on water quality and water and wastewater management strategies.

3.5 Aquatic Ecology

3.5.1 Baseline Information

[A] Describe and map the fish, fish habitat, and other aquatic resources (e.g., aquatic, and benthic invertebrates) for water bodies and watercourses and other waters affected by the Project that may provide habitat for fish. Describe the species composition, distribution, relative abundance, quantitative population estimates, seasonal movement trends, and general life history parameters.

[B] Identify fish species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Protected Areas);
b) listed as threatened or 'Endangered' under the *Alberta Wildlife Act*;
c) listed as 'Threatened' or 'Endangered' under Schedule 1 the federal *Species at Risk Act;*
d) listed as 'Threatened' or 'Endangered' by Committee on the Status of Endangered Wildlife in Canada (COSEWIC); and
e) species of cultural significance.

[C] Quantitatively describe the current extent of aquatic habitat. Describe and map fish habitat and aquatic resources in water bodies and watercourses and identify:

a) key indicator fish species and provide the rationale and selection criteria used;
b) habitat used by fish, whether seasonally or year-round, for water bodies and watercourses and other connected water bodies that may provide habitat for fish, including critical or sensitive areas such as spawning, rearing, and over-wintering habitats;
c) water quality parameters in water bodies and watercourses that may affect suitability for fish; and
d) current and potential use of the fish resources by Indigenous peoples or sport fisheries.

3.5.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to fish, fish habitat, and other aquatic resources, including but not limited to:

a) change in habitat suitability and availability during construction and operation of the Project;
b) survival of eggs and fry, chronic or acute health effects, and increased stress on fish populations from release of contaminants, sedimentation, flow alterations, temperature and habitat changes;
c) changes to riparian areas that could affect aquatic biological resources and productivity;

d) changes to benthic invertebrate communities that may affect food quality and availability for fish;
e) the potential for increased fragmentation of aquatic habitat;
f) potential water quality and quantity changes;
g) acidification and/or eutrophication;
h) groundwater-surface water interactions; and
i) potential for thermal plumes to affect aquatic habitat.

[B] Identify the key indicator fish species and provide the rationale and selection criteria used.

[C] Discuss the design, construction, and operational factors including specific diversion and reservoir operations that will be incorporated into the Project to minimize impacts to fish and fish habitat and protect aquatic resources.

[D] Identify plans proposed to offset a reduction in the productivity of fish habitat. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat protection.

[E] Discuss the potential impacts of new water control structures on seasonal fish movements relative to baseline conditions.

[F] Discuss the potential effects on fish and fish habitat during the filling of the expanded reservoir and decommissioning of the existing East Dam.

[G] Discuss the potential for aquatic invasive species to occur and the potential for the Project to affect occurrence or distribution of these species. Describe measures to monitor for and remove aquatic invasive species should they be encountered during project works.

[H] Discuss the potential increase in fishing pressures that could arise from the improved access from the Project in the region and how the sport fishery could change.

[I] Identify plans proposed to offset any loss in the productivity of fish habitat. Indicate how environmental protection plans address applicable provincial and federal policies on fish habitat including the development of a no net loss fish habitat objective.

[J] Describe the effects of surface water withdrawals and water diversions including the impacts to:
a) St. Mary, Oldman, Waterton, and Belly Rivers, and
b) cumulative effects on fish, fish habitat and other aquatic resources.

[K] Discuss changes in the aquatic environment with predicted climate change scenarios, with and without the Project in the local and regional study areas.

3.6 Terrain and Soils

3.6.1 Baseline Information

[A] Describe and map the terrain and soil resources, including:
a) surficial geology and topography;
b) soil types and their distribution;
c) soils that could be affected by the Project;
d) specific locations of erosion sensitive and saline-sodic soils; and
e) an inventory of geohazards, such as erosion, landslides, floods etc.

3.6.2 Impact Assessment

[A] Describe project activities and other related issues that could affect soil quality (e.g., wetting/drying/rewetting of soil, salinization, silt accumulation, soil crusting, compaction, anaerobic decomposition of organic matter, contaminants) and:

a) indicate the amount (ha) of surface disturbance from the Project construction, operation, and decommissioning activities;
b) indicate the size and location of soil types and land capability classes that will be disturbed;
c) describe potential sources of soil contamination (e.g., industry infrastructure and activities, agricultural infrastructure and activities, contaminated sites, etc.), along with the appropriate remedial measures;
d) describe the impact of the Project on soil types and reclamation suitability and the approximate volume of soil materials that are salvaged for reclamation. Discuss constraints or limitations to achieving vegetation/habitat reclamation based on anticipated soil conditions (e.g., compaction, contaminants, salinity, soil moisture, nutrient depletion, erosion, etc.);
e) discuss potential changes to the rate and type of soil erosion;
f) discuss potential changes to slope instability, wind erosion, and other geohazards; and
g) discuss the relevance of changes for the local landscape on biodiversity, productivity, ecological integrity, aesthetics, and future use.

[B] Discuss the potential impacts caused by the mulching and storing woody debris considering, but not limited to, vulnerability to fire, degradation of soil quality and increased footprint.

[C] Provide a mitigation plan including:

a) possible measures to minimize surface disturbance;
b) possible actions to mitigate effects of constraints or limitations to habitat reclamation;
c) possible actions to address impacts to land capability; and
d) any other measures to reduce or eliminate the potential impacts that the Project may have on soil capability and/or quality and include:
    i) soil mapping and typical profiles,
    ii) losses of agricultural soils,
    iii) erosion issues, and
    iv) characteristics related to handling, reclamation of site disturbances.

3.7 Vegetation

3.7.1 Baseline Information

[A] Describe and map the vegetation communities, native grasslands, wetlands, wetland habitat, riparian lands, rare plants, invasive species, and communities of rare and scarce distribution. Identify the occurrence, relative abundance and distribution and identify any species that are:

a) listed as “at Risk, May be at Risk and Sensitive” in the *General Status of Alberta Wild Species* (Alberta Environment and Protect Areas);

b) listed as threatened or 'Endangered' under the *Alberta Wildlife Act*;
c) listed as 'Threatened' or 'Endangered' under Schedule 1 of the federal *Species at Risk Act*;
d) listed as 'Threatened' or 'Endangered' by COSEWIC;
e) species tracked by the Alberta Conservation Information Management System (ACIMS) as being SU, S1, S2, S3;
f) rare ecological communities as tracked by ACIMS, and
g) traditionally used species.

[B] Discuss the potential of each ecosite phase or ecological range site to support rare plant species, plant species of cultural significance, and plant communities of limited distribution. Consider their importance for local and regional habitat, rare plant habitat and the hydrologic regime.

[C] Describe the regional relevance of landscape units that are identified as rare.

[D] Describe and quantify the current extent of habitat fragmentation.

[E] Describe and quantify the local and regional relevance of native grassland, and:
a) discuss the distribution and relative abundance of native grassland units;
b) discuss locations and size of native grassland units;
c) characterize the flora and fauna of the native grassland units; and
d) evaluate and discuss native grassland integrity.

3.7.2 Impact Assessment

[A] Identify the area of each vegetation community mapped, including various native grassland plant communities, that would be permanently lost due to the Project.

[B] Identify and quantify areas that will be temporarily lost to the Project and will be reclaimed (e.g., access routes).

[C] Discuss the predicted changes to upland, native grassland, riparian, and wetland habitats resulting from increased fragmentation.

[D] Identify areas that will be avoided during construction.

[E] Discuss the potential project impacts on rare plants, endangered species, or rare ecological communities, and describe any required regulatory authorizations and/or possible mitigation plans/strategies needed to address these impacts.

[F] Describe and assess the potential impacts of the Project on vegetation communities considering:
a) both temporary (include timeframe) and permanent impacts;
b) the potential for introduction and colonization of weeds and non-native invasive species and how those species will be managed;
c) potential increased fragmentation and loss of upland, native grassland, riparian and wetland habitats;
d) implications of vegetation changes for other environmental resources (e.g., terrestrial and aquatic habitat diversity and quantity, water quality and quantity, erosion potential); and
e) the species that will be used in reclaiming areas disturbed during construction and for erosion control and site stabilization.

[G] For temporary disturbances, discuss from an ecological perspective, the expected timelines for establishment and recovery of vegetative communities and the expected differences in the resulting vegetative community structures.

[H] Describe how the Alberta Wetland Policy was considered in the assessment of impacts, including but not limited to:

a) avoidance, minimization, reclamation or replacement of wetlands in accordance with the Alberta Wetland Mitigation Directive;
b) temporary and permanent alterations (direct and indirect) to wetlands classified under the Alberta Wetland Classification System;
c) any expected changes in wetland class or type and cause for this change; and
d) consideration of cumulative effects in the watershed to wetlands.

[I] Discuss the effect of a loss or development of wetlands and riparian areas, including how the loss or development will affect land use.

[J] Discuss the regional significance of the indirect effects of the conversion of native grassland pasture to tame pasture or cultivated lands with an increase in water availability.

3.8 Wildlife and Wildlife Habitat

3.8.1 Baseline Information

[A] Describe and map current and potential wildlife resources (amphibians, reptiles, birds, and terrestrial and aquatic mammals). Describe species relative abundance, distribution and their use and potential use of habitats. Also identify species that are:

a) listed as "at Risk, May be at Risk and Sensitive" in the *General Status of Alberta Wild Species* (Alberta Environment and Protected Areas);
b) listed as threatened or 'Endangered' under the Alberta *Wildlife Act*;
c) listed as 'Threatened' or 'Endangered' under Schedule 1 of the federal *Species at Risk Act;*
d) listed as 'Threatened' or 'Endangered' by COSEWIC;
e) migratory bird species listed under the *Migratory Birds Convention Act*; and
f) species of cultural significance.

[B] Describe and map existing wildlife habitat and habitat disturbance including assessment activities. Identify habitat disturbances that are related to existing and approved projects.

3.8.2 Impact Assessment

[A] Describe and assess the potential impacts of the Project to wildlife, wildlife habitats, and biodiversity considering:

a) how the Project will affect wildlife relative abundance, habitat availability, habitat fragmentation, mortality, movement patterns, and distribution for all stages of the Project, including a prediction of future use due to habitat alteration;
b) how improved or altered access may affect wildlife, including future prediction of wildlife use and movements, potential obstruction of movements, and increased vehicle wildlife collisions;
c) how altered habitat conditions (loss, change, fragmentation) may effect wildlife and biodiversity values. Consider habitat change (e.g., riparian), the availability of

habitat and the influence of anthropogenic features and infrastructure on wildlife movements and predator-prey relationships;
d) the contribution of the Project to changes in regional biodiversity and the impact to local and regional ecosystems;
e) potential effects on wildlife resulting from changes to air and water quality, including both acute and chronic effects to animal health;
f) how the risk to wildlife and habitat can be managed, including the use of setbacks; and
g) the resilience and recovery capabilities of wildlife populations and habitats to disturbance.

[B] Provide a strategy and mitigation plan to avoid or minimize effects on wildlife and wildlife habitat for all stages of the Project considering:
a) consistency of the plan with applicable regional, provincial and federal wildlife habitat objectives and policies;
b) a schedule for the return of habitat capability to areas temporarily affected by the Project;
c) the use of setbacks to protect habitat and connectivity of habitat for species of conservation concern;
d) anticipated access controls or other management strategies to protect wildlife during construction and operation;
e) measures to prevent human-wildlife encounters and consequent destruction of wildlife; and
f) habitat fragmentation and habitat connectivity resulting from linear features (e.g., above ground canals, roads etc.) and other project infrastructure and activities.

[C] Identify opportunities for habitat creation or enhancement which may occur as a result of the Project.

[D] Identify the key wildlife and habitat indicators used to assess project impacts. Discuss the rationale for their selection.

3.9 Climate Change

3.9.1 Baseline Information

[A] Describe climate norms and variability as they relate to agricultural productivity in the Project area.

[B] Identify elements of the Project that are sensitive to changes or variability in climate parameters, including frequency and severity of extreme weather events and discuss the potential impacts over the life of the Project.

3.9.2 Impact Assessment

[A] Describe and assess the greenhouse gas emissions during construction, operation, and decommissioning phases of the Project.

[B] Estimate the impacts of the Project to carbon sequestration capacity, including impacts on sequestration in soil and water systems across the expanded reservoir.

[C] Discuss the benefits and consequences of the Project on the affected area with regards to its ability to counteract climate change impacts and the associated risks.

[D] Evaluate the feasibility of the Project under scenarios of climate change, including and explanation of :

a) how drier conditions would affect the long-term viability of local agriculture with and without the Project;
b) how potential adverse effects of excess rainfall events will be mitigated by the Project; and
c) how changes to the volume and timing of spring runoff and river flows may affect the supply of water from the St. Mary's River and/or the Milk River Ridge Reservoir and the risks posed to water availability for the Chin Reservoir.

[E] Review and discuss potential changes in local climate under multiple climate projections, and:

a) identify representative climate change scenarios that reflect a full range of future climate variability (e.g., wet and dry conditions); and
b) evaluate relative changes in climate indices (e.g., annual/seasonal precipitation and temperature) between baseline and future periods.

[F] Describe potential effects of climate change on water demands and supply, including:

a) changes in water demand for irrigation;
b) potential changes in flow and impacts on downstream watercourses and waterbodies; and
c) a description of adaptations (e.g., reservoir operation) to climate change for sustainable water resource management.

3.10 Land Use and Management

3.10.1 Baseline Information

[A] Describe and map the ownership status of the subject lands, including lands owned by the Crown, local municipalities, and patented lands. Describe and map the current land uses in the Project area, including private land, Crown land dispositions, and Crown land reservations.

[B] Describe and map the existing land and resource uses and potential conflicts that exist considering oil and gas development, renewable energy production, agriculture, tourism, Indigenous uses, and outdoor recreational activities.

[C] Identify and map unique sites or special features such as Parks and Protected Areas, Heritage Rivers, Historic Sites, Environmentally Significant Areas, culturally significant sites, and other designations (e.g., World Heritage Sites, Ramsar Sites, Internationally Important Bird Areas).

[D] Identify land use policies and resource management initiatives that pertain to the Project and discuss how the Project will be consistent with the intent of these initiatives.

[E] Describe and map land clearing activities, showing the timing of the activities.

[F] Describe existing access control measures.

3.10.2 Impact Assessment

[A] Identify the potential impacts of the Project on land uses, including:
- a) unique sites or special features;
- b) effects caused by changes in public access, including secondary effects related to increased hunter, angler and other recreational access, and access to traditional use sites;
- c) the implications of relevant land use policies and resource management initiatives for the Project, including constraints to development; and
- d) the anticipated changes (type and extent) to the topography, elevation, and drainage pattern within the Project area.

[B] Identify existing private land uses that would be impacted by the Project and describe the:
- a) area of land affected and the nature of the impact;
- b) opportunities for mitigation and compensation, including the cost of implementation; and
- c) procedures that will be followed in compensating landowners for lands required for the Project and for associated damages or disturbances.

[C] Discuss possible mitigation strategies to address:
- a) the need for, and plans to address, access management during and after project operations (public, traditional use);
- b) the process for addressing the needs of other land users in the Project area; and
- c) project effects that may lead to changes in land use.

[D] Provide a fire control plan highlighting;
- a) fire prevention, detection, reporting, and suppression measures, including proposed fire equipment; and
- b) measures taken to ensure continued access for firefighters to adjacent wildland areas.

4 HISTORIC RESOURCES

4.1 Baseline Information

[A] Provide a brief overview of the regional historic resources setting, including a discussion of the relevant archaeological, historic and palaeontological records.

[B] Describe and map known historic resource sites in the Project area, considering:
- a) site type and assigned Historic Resource Values; and
- b) existing site-specific *Historical Resources Act* requirements.

[C] Provide an overview of previous Historic Resources Impact Assessments that have been conducted within the Project area, including:
- a) a description of the spatial extent of previous assessment relative to the Project area, noting any assessment gap areas; and
- b) a summary of *Historical Resources Act* requirements and/or clearances that have been issued for the Project to date.

[D] Identify locations within the Project area that are likely to contain previously unrecorded historic resources. Describe the methods used to identify these areas.

[E] Describe consultation with Alberta Arts, Culture and Status of Women concerning the program and schedule of *Historical Resources Act* requirements for the Project, including:
a) any historic resources issues raised during consultation on the Project; and
b) any *Historical Resources Act* programs required to evaluate and mitigate the impacts on historic resources.

4.2 Impact Assessment

[A] Provide a summary of the results of any Historic Resources Impact Assessments that have been conducted for the Project.

[B] Describe the Project components and activities, including all ancillary activities, that have the potential to affect historic resources at all stages of the Project.

[C] Describe the nature and magnitude of the potential project impacts on historic resources, considering:
a) effects on historic resource site integrity; and
b) implications for the interpretation of the archaeological, historic and palaeontological records.

5 TRADITIONAL ECOLOGICAL KNOWLEDGE AND TRADITIONAL LAND USE

[A] If consultation with Indigenous groups reveals traditional use areas and spiritual sites within lands affected by the Project, provide:
a) a map and description of traditional land use areas including fishing, hunting, trapping, water use (e.g., for drinking, cooking and navigation) and nutritional, medicinal, or cultural plant harvesting by affected Indigenous peoples (if the Indigenous community or group is willing to have these locations disclosed); and
b) a map of cabin sites, spiritual sites, cultural sites, graves and other traditional use sites considered historic resources under the *Historical Resources Act* (if the Indigenous community or group is willing to have these locations disclosed), as well as traditional trails and resource activity patterns.

[B] Discuss the species, abundance and availability of vegetation, fish and wildlife used for food, traditional, medicinal, and cultural purposes in the identified traditional land use areas, considering all project related impacts.

[C] Discuss access for traditional uses during all stages of the Project.

[D] Describe how TEK and Traditional Land Use information was incorporated into the Project, EIA development, the conservation and reclamation plan, monitoring and mitigation.

[E] Determine the impacts of the Project on traditional, medicinal, and cultural land use and identify possible mitigation strategies.

6 PUBLIC HEALTH AND SAFETY

6.1 Public Health

[A] Describe aspects of the Project's activities and emissions during construction and operation that may have implications for public health or the delivery of regional health services.

[B] Conduct a human health risk assessment following guidance from Alberta Health for project components that have implications for public health and describe the results.

[C] Document health concerns raised by stakeholders during consultation on the Project.

[D] Document health concerns identified by Indigenous communities or groups resulting from impacts of existing development and of the Project, specifically on their traditional lifestyle. Include an Indigenous receptor type in the assessment.

[E] Describe mitigation plans for adverse impacts to public health resulting from the Project.

6.2 Public Safety

[A] Describe aspects of the Project that may have implications for public safety. Specifically:

a) describe the emergency response plan including public notification protocol and safety procedures to ensure public safety and minimize adverse environmental effects, including emergency reporting procedures for spill containment and management;
b) document any safety concerns raised by stakeholders during consultation on the Project and the actions taken to address those concerns;
c) describe how local residents will be contacted during an emergency and the type of information that will be communicated to them;
d) describe the existing agreements with area municipalities or industry groups such as safety cooperatives, emergency response associations, regional mutual aid programs and municipal emergency response agencies or other industry partner emergency response/spill response agreements; and
e) describe the potential safety impacts resulting from higher regional traffic volumes.

[B] Discuss mitigation plans to safeguard workforce and public safety for the construction and operation of the Project.

7 SOCIO-ECONOMIC ASSESSMENT

7.1 Baseline Information

[A] Describe the existing socio-economic conditions in the region and in the communities in the region.

[B] Describe factors that may affect existing socio-economic conditions including:

a) population changes;
b) workforce requirements for all stages of the Project, including a description of when peak activity periods will occur;
c) planned accommodations for the workforce for all stages of the Project. Discuss the rationale for their selection;
d) the SMRID's policies and programs regarding the use of local, regional and Alberta goods and services;

e) the Project schedule; and
f) the overall engineering and contracting plan for the Project.

[C] Describe the socio-economic contribution of current agricultural operations (irrigated and non-irrigated) in the local and regional study areas including:
a) historic and current livestock operations;
b) historic and current cropping patterns;
c) historic and current irrigated acreages; and
d) other agricultural uses (e.g., greenhouses).

[D] Describe the current impacts of drought on agricultural operations in the local and regional study area including:
a) revenue losses (e.g., productivity loss and forced timing of sale of products);
b) drought-related costs (e.g., emergency water supply, and trucking of livestock and feed);
c) impacts to operations (e.g., forced herd reduction);
d) costs related to drought recovery; and
e) long term community impacts.

[E] Describe the process used to establish rates ($/unit water) for supplying water to irrigated crop producers, and include:
a) current water rates (2020-2022); and
b) forecast water rates following the Project.

[F] Describe the socio-economic impacts of the current wetlands within the Project area.

7.2 Impact Assessment

[A] Describe the socio-economic impacts of construction and operation of the Project on:
a) land owners;
b) agricultural productivity;
c) local and regional infrastructure and community services;
d) availability and quality of health care services;
e) local training, employment and business opportunities;
f) housing;
g) recreational activities; and
h) First Nations and Métis (e.g., traditional land use and social and cultural implications).

[B] Provide a discussion as to which communities will benefit from the Project.

[C] Discuss opportunities to work with Indigenous communities and groups, other local residents, and businesses regarding employment, training needs and other economic development opportunities arising from the Project.

[D] Provide the estimated total project cost, including a breakdown for engineering and project management, equipment and materials, and labour for both construction and operation stages, including maintenance of the Project. Indicate the percentage of expenditures expected to occur in the region, Alberta, Canada, outside of Alberta, and outside of Canada.

[E] Provide an estimate of the costs and benefits of providing livestock watering facilities supported from the Project as it relates to improved range management and livestock production.

[F] Provide an estimate of the Project's impact on current irrigators (e.g., increased output, more stable output, increased demand, water rates) and impact on average annual farm income.

[G] Provide details on the total number of existing and new irrigable acres to be serviced by the Project, including the costs and benefits of expanding irrigable acres.

[H] Discuss considerations made by irrigation districts when evaluating requests to add new irrigated parcels.

[I] Provide an estimate of the nature and cost of the development of recreational infrastructure.

[J] Provide a benefit/cost analysis of the Project, including costs of construction, operation, and maintenance, increase value of agricultural production, indirect and induced benefits (livestock production, food processing etc.), recreational activities and sport fisheries. Present a sensitivity analysis of assumptions used to generate these values.

[K] Identify non-quantifiable benefits and costs expected during the life of the Project. Discuss how these might affect the overall project benefit/cost analysis.

[L] Provide an estimate of the wetland losses and gains related to the Project and the economic costs and benefits considering Alberta's current wetland policy.

8 MITIGATION MEASURES

[A] Discuss mitigation measures planned to avoid, minimize, or eliminate the potential impacts for all stages of the Project.

[B] Identify the mitigation objectives for each associated impact and describe those mitigation measures that will be implemented. Provide rationale for their selection, including a discussion on the effectiveness of the proposed mitigation.

9 RESIDUAL IMPACTS

[A] Describe and characterize the residual impacts of the Project following implementation of SMRID's mitigation measures and SMRID's plans to manage those residual impacts.

10 ACCIDENTS AND MALFUNCTIONS

[A] Describe the potential challenges that could impact the safety of the proposed structures and proposed mitigation measures (e.g., during excavations, during reservoir filling, debris management, operations, maintenance and surveillance philosophy, performance under extreme weather events [floods, tornados, etc.], emergency preparedness and response, etc.).

11 MONITORING

[A] Describe the surface water quality monitoring program that will be implemented to assess the future impacts of construction and operation (including maintenance) of the expanded reservoir and decommissioning of the existing East Dam. Consider appropriate water quality parameters (e.g., metals, nutrients, pesticides, temperature, BOD/TOC, bacteria,

aquatic and benthic invertebrates, aquatic plants, algae, dissolved oxygen, etc.) and their spatial (e.g., lateral and depth) and temporal (e.g., seasonal) flow variations.

[B] Describe SMRID's current and proposed monitoring programs, including:

a) how the monitoring programs will assess any project impacts and measure the effectiveness of mitigation plans. Discuss how SMRID will address any project impacts identified through the monitoring program;
b) how SMRID will contribute to current and proposed regional monitoring programs;
c) monitoring performed in conjunction with other stakeholders, including Indigenous communities and groups;
d) new monitoring initiatives that may be required as a result of the Project;
e) regional monitoring that will be undertaken to assist in managing environmental effects and improve environmental protection strategies;
f) how monitoring data will be disseminated to the public, Indigenous communities, or other interested parties; and
g) how the results of monitoring programs and publicly available monitoring information will be integrated with SMRID's environmental management system.

APPENDIX II

Impact Assessment Agency of Canada - Project Review Decision

Impact Assessment Agency of Canada | Agence d'évaluation d'impact du Canada

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

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

June 29, 2022

ELECTRONIC MAIL

David Westwood
General Manager
St. Mary River Irrigation District
525 40th St. South
Lethbridge, AB
T1J 4M1
smrid@smrid.ab.ca; dwestwood@smrid.ab.ca

Dear David Westwood,

On April 12, 2022, the Minister of Environment and Climate Change (the Minister) received a request to designate the proposed Chin Reservoir Expansion and Modernization Project (the Project) under subsection 9(1) of the *Impact Assessment Act*.

On June 29, 2022, the Minister decided that the Project does not warrant designation. In making the decision, the Minister took into consideration the information provided by St. Mary River Irrigation District (the Proponent), advice from federal authorities, input from Alberta Environment and Parks, concerns expressed in the requester's letter, and the concerns from Indigenous groups and the public that are known to the Impact Assessment Agency of Canada (the Agency).

The Minister's response to the request, with reasons, and the Agency's Analysis Report, are available on the Canadian Impact Assessment Registry Internet site (Reference number 83562): *https://iaac-aeic.gc.ca/050/evaluations/proj/83562*.

Further questions can be directed to Andy Clarke at 587-541-3290 or by email at andrew.clarke@iaac-aeic.gc.ca.

Sincerely,

<transmitted electronically>

Sean Carriere
Regional Director, Prairie and Northern Region

ATTACHMENT: April 21, 2022
Provincial Advice Record: Designation Request under IAA
Response requested by May 12, 2022
Chin Reservoir Expansion and Modernization Project

Ministry	Alberta Environment and Parks (AEP)
Lead Contact	Lori Havanka, Approvals Program Manager
Full Address	9915 – 108 Street Petroleum Plaza Building, South Tower Edmonton, AB T5K 2G8
Email	Lori.Havanka@gov.ab.ca
Telephone	780-644-4983
Alternate Ministry Contact	Meghan Jurijew, Environmental Assessment Coordinator; meghan.jurijew@gov.ab.ca

Please fill out the form in relation to the proposed Chin Reservoir Expansion and Modernization Project.

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1. In general terms, please confirm and describe your ministry's role (if applicable) in the review of the Project.

   - AEPs Environmental Assessment (EA) team will be responsible for the management of the Environmental Impact Assessment (EIA) process and review and coordination of the environmental impact assessment report. This includes any coordination with the Impact Assessment Agency of Canada.
   - Alberta Environment and Parks (AEP), Regulatory Assurance Division – South Region (RAD-S)is the primary provincial regulator of the project with respect to water diversion and use, activities required to construct and operate the associated works, and Dam and Canal safety requirements under the *Water Act*, Water Ministerial Regulations, and associated codes of practice, guidelines, etc.

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2. Please provide the contact information of the person or persons responsible for managing your ministry's oversight of the Project (if different from lead contact above).

   - Refer to response 1.

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3. Describe the provincial legislative or regulatory process or approvals administered by your ministry that may assess or manage the potential adverse effects of the Project. For each mechanism or approval, please provide information regarding the following:

- Name of the process or authorization (e.g. certificate, licence, permit or approval) and the associated legislative framework;
- Whether (for each) the authorization would set conditions and if yes, what issues would those conditions address;
- Whether (for each) the authorization would require public and/or Indigenous consultation and if yes, provide information on the approach to be taken; and
- Whether (for each) your ministry has guidance material that would be helpful to the proponent or the Agency (please provide these as attachments or hyperlinks in your response).

Environmental Impact Assessment

- Environmental Assessment is required where the complexity and scale of a proposed project, technology, resource allocation, or siting considerations create uncertainty about the exact nature of environmental effects, or result in a potential for significant adverse environmental effects.
- All environmental impact assessment (EIA) reports regardless of the type of project must address and assess how potential impacts of a proposed project are to be mitigated and managed. The EA process is to predict the environmental, social, economic and cultural consequences of a proposed activity and to assess plans to mitigate any adverse impacts resulting from the proposed activity.
- Environmental assessment is regulated by Part 2, Division 1 of the *Environmental Protection and Enhancement Act* (EPEA) and the Environmental Assessment (Mandatory and Exempted Activities) Regulation (links below).
- The Project in question is a Mandatory Activity under Schedule 1(c) of the Environmental Assessment (Mandatory and Exempted Activities) Regulation meaning that an EIA report is required.
- Section 49 of the *Environmental Protection and Enhancement Act* sets out the base information that must be included within an EIA report.
- The information requirements for a specific project are identified in the Terms of Reference.
    - The proponent prepares a proposed terms of reference that is advertised for public comment. At the same time AEP is engaging subject matter experts across the Government of Alberta to also review the document,
- After the public comment period closes all comments received are reviewed and considered, and AEP issues the final Terms of Reference (TOR) which outlines the information that must be included in the EIA report.
- EIA Reports must include three assessment cases (baseline, project, cumulative affects) and three study areas (project, local, regional). Additional information can be found in the Guide to Preparing EIA Reports in Alberta.
- Once the EIA report is submitted, it is reviewed by a team of subject matter experts to ensure the information satisfies the Terms of Reference. If deficiencies are found, or clarifications required, a supplemental information request is sent to the proponent to address.
- Once the information requirements of the Terms of Reference are met, AEP will deem the EIA report as complete and refer the project to the appropriate public interest board to make the public interest decision.
    - This specific project will be referred to the Natural Resources Conservation Board (NRCB). As part of its process, the NRCB will determine whether or not a public hearing is required.
- If the NRCB decides the proposed project can proceed, a decision document will be issued that includes enforceable conditions/requirements. The conditions/requirements can be added to any area such as to *Water Act* approvals.
- AEP is currently working with Alberta Indigenous Relations to determine whether the project requires Indigenous Consultation. When a decision is made, this will be communicated to the proponent.

Licence under the *Water Act*:

- The property in and the right to the diversion and use of all water in the Province is vested in Her Majesty in right of Alberta.
- The diversion of water and operation of works requires a licence under the *Water Act*.
- The proponent holds multiple pre-existing licences under the *Water Act* that account for the allocation of water and operation of works associated with the proposed project.

- Water Licences set out terms and conditions, and attach approved plans that address the following:
    - Source, points of diversion and points of use of all diversions;
    - Purpose, timing, volume and rate of use;
    - Appurtenance of the works;
    - Engineered designs of the works;
    - Operations and maintenance of the works;
    - Dam and Canal safety of the works; and,
    - Any specific conditions or plans required to address
        - Instream flow requirements or restrictions
        - Other design or operational requirements unique to the works or location of the works that should be considered under the intent, scope and authority of the *Water Act*.
- One or more proponent (licensee) initiated amendments to the pre-existing licences will be required prior to operation of the proposed project, to address changes to the current licence conditions related but not limited to the engineered design plans for the works, operation of the works and Dam and Canal safety of the works.
- There is either a public notice of application or public notice of decision for these types of applications for amendments to Licences under the *Water Act*. The notice is typically posted on the AEP Online Public Notice Viewer, in the local municipality, and in a locally available news source. The notice provides directly affected stakeholders the ability to submit Statements of Concern, or to appeal the final decision on the application.

Approval under the *Water Act*:

- The proposed project includes placing, constructing, operating, maintaining, removing or disturbing works, and considered along with the *Water Ministerial Regulations*, is an activity that requires an approval under the *Water Act.*
- Given the above, the proponent will be required to obtain one or more approvals under the *Water Act* prior to commencement of the proposed project.
- Approvals set out terms and conditions, and attach approved plans that address the following:
    - The timing and location of all activities;
    - Engineered designs for the activities;
    - Construction practices;
    - Mitigations for potential impacts associated with the elements of proposed project that form part of an 'activity' definition under section 1(b) of the *Water Act*; and,
    - Any specific conditions or plans required to address features of the proposed activity that should be considered under the intent, scope and authority of the *Water Act*.
- Proposed approval projects are reviewed by the Alberta Government Aboriginal Consultation Office (ACO) to verify the recommended requirement or adequacy of First Nations conclusion. This review is either initiated by the proponent directly with the ACO, or approval applications are referred to the ACO by AEP once received.
- There is either a public notice of application or public notice of decision for all applications for approvals under the *Water Act*. The notice is typically posted on the AEP Online Public Notice Viewer, in the local municipality, and in a locally available news source. The notice provides directly affected stakeholders to submit Statements of Concern, or to appeal the eventual decision of AEP.

Links:

https://www.alberta.ca/water-legislation-and-resources.aspx

https://www.alberta.ca/indigenous-consultations-in-alberta.aspx

Environmental Protection and Enhancement Act

Environmental Assessment (Mandatory and Exempted Activities) Regulation

Guide to Preparing Environmental Impact Assessment Reports in Alberta

Guide to Providing Comments on Proposed Terms of Reference

Standardized Terms of Reference

Summary of Environmental Assessment Activity – Current Projects

Summary of Environmental Assessment Activity – Historical Projects

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4. Confirm whether any authorization listed above would contemplate the following matters and if yes, discuss, in general, the benchmarks or standards to which projects of this nature may be held (be specific in relation to each point below that may be applicable to your ministry's mandate):

General Info:

- Section 38 (2) of the *Water Act* specifies the following matters and factors that must be considered and may be considered by the Director under the Act when making an approval decision:

  In making a decision under this section, the Director

  (a) must consider, with respect to the applicable area of the Province, the matters and factors that must be considered in issuing an approval, as specified in an applicable approved water management plan,

  (b) may consider any existing, potential or cumulative
  (i) effects on the aquatic environment,
  (ii) hydraulic, hydrological and hydrogeological effects, and effects on household users, licensees and traditional agriculture users, that result or may result from the activity, and

  (c) may consider
  (i) effects on public safety, and
  (ii) any other matters applicable to the approval that, in the opinion of the Director, are relevant.

- Table 2 of the The South Saskatchewan River Basin (SSRB) Approved Water Management Plan specifies additional Matters and Factors that must be considered in making decisions on applications for licences, preliminary certificates or approvals affecting surface water in the SSRB. https://www.alberta.ca/south-saskatchewan-river-basin-water-management-plan.aspx

a. Impacts on water quality

- This will be addressed in both the EIA report and the Water Act approval application. In addition, there are also general approval condition prohibitions related to the release of deleterious substances.

b. Impacts on water quantity

- This will be addressed in both the EIA report and the Water Act approval application for the Project.

c. Effects to fish and fish habitat.

- This will be addressed in the EIA report and the Water Act approval application for this Project.

d. Effects to species at risk

- This will be addressed in the EIA report and the Water Act approval application for this project.

e. Loss of native grassland and/or wetland due to conversion to agricultural usage or flooding

- This will be addressed in the EIA report.
  Specific to wetlands, Alberta has a robust wetlands policy that must be followed if there are any impacts to wetlands. https://open.alberta.ca/publications/9781460139417.
- Alberta has specific considerations related to native grasslands under the South Saskatchewan Regional Plan.

  Links:
  https://www.alberta.ca/native-grassland.aspx

  This will be addressed in the EIA for this Project.

f. Potential impacts to Indigenous peoples resulting from any change to the environment on physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance

- Section 49 of EPEA requires EIA reports to include a description of potential positive and negative environmental, social, economic and cultural impacts of the proposed activity, including cumulative, regional, temporal and spatial considerations;
- Proponents are required to address lands with an identified Historic Resource Value within the project area. This is done under the *Historical Resources Act*, and may require the submission of a Historic Resources Application. Historic Resources include archaeological sites, palaeontological sites, Indigenous traditional use sites of a historic resource nature, and historic structures.
- AEP is currently working with Alberta Indigenous Relations to determine whether the project requires Indigenous Consultation. When a decision is made, this will be communicated to the proponent.

  Links:
  https://www.alberta.ca/listing-historic-resources.aspx

g. Changes to the health, social, or economic conditions of Indigenous peoples

- Section 49 of EPEA requires EIA reports to include (g) an identification of issues related to human health. This is further explained in the Guide to Preparing EIA Reports in Alberta.
- AEP is currently working with Alberta Indigenous Relations to determine whether the project requires Indigenous Consultation. When a decision is made, this will be communicated to the proponent.

h. Potential impacts on Aboriginal and Treaty Rights

- Section 49 of EPEA requires EIA reports to include a description of potential positive and negative environmental, social, economic and cultural impacts of the proposed activity, including cumulative, regional, temporal and spatial considerations;

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5. Have you received public comments/concerns in relation to the Project? If yes, provide an overview of the key issues and the way in which (in general terms) your ministry intends to address (or would normally manage) these matters.

- AEP has received letters from a group of interested parties with respect to environmental assessment, and regulatory and funding process concerns related to the project.
    - The interested parties are represented by Ecojustice.
    - The concerns include considerations for cumulative effects, environmental flows left for the aquatic environment, climate change and the processes by which grant funding was allocated to the projects.
- AEP met with representatives of the interested parties, and has responded in writing with details clarifying AEPs specific regulatory and provincial environmental assessment roles. This includes confirmation that all regulatory and environmental assessment process apply to proposed projects regardless of funding, and that no applications for the proposed major off-stream storage projects have been received.
- AEP has outlined the legislated public review process related to applications under the *Water Act* and EA process, such that the parties may engage in the process should a regulatory application for the project be received by the department.

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6. Have you received Indigenous community comments/concerns in relation to the Project? If yes, provide an overview of the key issues and the way in which (in general terms) your ministry intends to address (or would normally manage) these matters.
    - Not at this time.

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7. Do you have any other information about the Project in relation to potential adverse effects or impacts to the public, or Indigenous peoples and their rights as protected under section 35 of the *Constitution Act, 1982*?

    - Not at this time. However, should information becomes available that indicates the proposed project would potentially impact Aboriginal and Treaty Rights, that information would be used to inform both Consultation requirements and the impacts assessment within the EIA report.

Lori Havanka
Name of responder

Approvals Program Manager
Title of responder

May 12, 2022
Date

VANCOUVER CALGARY TORONTO OTTAWA HALIFAX

ecojustice

Zachary Biech
1910 – 777 Bay Street
P.O. Box 106
Toronto, ON M5G 2C8
Tel: 416-368-7533 ext. 547
Fax: 416-363-2746
zbiech@ecojustice.ca
File No.: 2080

April 12, 2022

Sent via email: **ministre-minister@ec.gc.ca; information@iaac-aeic.gc.ca**

Hon. Steven Guilbeault
Minister of Environment and Climate Change
Fontaine Building 12th floor
200 Sacré-Coeur Blvd
Gatineau QC K1A 0H3

Dear Minister Guilbeault:

Re: Request for Designation of Chin Reservoir Expansion and Modernization Project

Request for Designation

I am writing on behalf of our clients Alberta Wilderness Association, Bow Valley Naturalists, Society of Grasslands Naturalists, Sierra Club Canada Foundation – Prairie Chapter, Canadian Parks and Wilderness Society – Southern Alberta Chapter (CPAWS), Southern Alberta Group for Environment (SAGE), Nature Alberta, Arlene Kwasniak, and David Swann (together the "Interested Parties"). The Interested Parties hereby request that the Minister exercise his discretion pursuant to section 9(1) of the Impact Assessment Act to designate the Chin Reservoir Expansion and Modernization Project (the "Project").

The Interested Parties became aware of the Project from several sources, starting with public media releases (09 October and 21 December, 2020), and then in a Government of Alberta (GOA) technical fact sheet (09 October, 2020), informal discussions with irrigation district representatives in the summer of 2021, and information posted on the Alberta Water Portal (Why Alberta Irrigation Matters, 05 August 2021).

The Interested Parties make this request in accordance with the Impact Assessment Agency of Canada's "Operational Guide: Designating a Project under the *Impact Assessment Act*".

Project Description

Project name: Chin Reservoir Expansion and Modernization Project

Project proponent: St. Mary River Irrigation District

Proponent contact information:

525 40th St. South
Lethbridge, AB T1J 4M1
403 -328-4401
smrid@smrid.ab.ca

Project details:

According to the Alberta Water Portal Society,

> This project will expand Chin Reservoir, which is an existing off-stream reservoir on the St. Mary main canal located in TWP 8, RGE 17 and RGE 18 and TWP 7, RGE 16 and RGE 17 – W4M. It is planned to relocate the east dam to Section 23 TWP 7-RG 15 – W4M, to be located approximately 30 kilometres southeast of the town of Taber. In addition to increasing water storage, an important aspect of the project is modernizing the existing ancillary reservoir structures for aligning with provincial dam safety regulations and increasing the flood handling capacity of the reservoir. This includes construction of a new east dam, replacement of the existing cast-in-place outlet at the west dam and replacement of the Chin chute inlet spillway. The west dam will also have to be raised and the road over the crest of the dam re-done.
>
> The reservoir capacity will be increased by raising the height of the existing dams and re-locating the east dam by 10 kilometres, which will add 75,000 to 100,000 acre-feet of storage, with a flooded area of approximately 650 hectares required for the new section.[1]

The Project's construction is expected to take place from 2023-2025.

The Project is one activity of a broader, coordinated irrigation expansion and modernization program proposed by Irrigating Alberta Inc., itself an entity wholly owned and controlled by ten of Alberta's irrigation districts, including the St. Mary River Irrigation District. This broader program consists of the modernization of 85 components of irrigation infrastructure and the construction or expansion of four off-stream reservoirs, including the Chin Reservoir Expansion and Modernization Project. The broader program would be the largest expansion of irrigation infrastructure and irrigated lands in Alberta's history, including over 200 kilometers of new or converted pipelines and canals, over 1,850 hectares of new reservoir footprint, and over 95,000 hectares of newly irrigated land. The broader program of physical activities has total funding of $933 million, 50% of which is being provided by the Government of Canada through the Canada Infrastructure Bank. The Government of Alberta is providing 30% of the funding and the

[1] Online at <https://albertawater.com/latest/8795-st-mary-river-irrigation-district-projects-overview/>.

involved irrigation districts are providing 20% of the funding. The Project's cost is expected to be $133 million.

To be clear, this request for designation is only for the Chin Reservoir Expansion and Modernization Project, and not for the entire expansion and modernization program which Irrigating Alberta Inc. is undertaking. However, the Chin Reservoir Expansion and Modernization Project exists within the broader context of the overall expansion and modernization program, and its potential effects must be viewed in light of their contribution to the broader program, which is likely to have a very significant cumulative impact on the already stressed South Saskatchewan River Basin and its subbasins.

Project Effects Warranting Designation

1. Is the project near a threshold set in the Project List?

   Answer: No. However, the Project involves the construction of both the new east dam in an existing natural glacial drainage channel and the expansion of the existing west dam. Therefore, the Project does not fall comfortably under either of the activity descriptions in sections 58 and 59 of the *Physical Activities Regulation*. However, the Project is the largest expansion of the Chin Reservoir since its original construction in 1911 and results in an expanded reservoir with a footprint of 2,610 hectares.

2. Is the project near or in an environmentally or otherwise sensitive location?

   Answer: Yes. The Project is located within the Oldman River subbasin, which is a stressed watershed already suffering from increasingly high water demand. A new reservoir on this system could add further pressures to instream flow, aquatic life and biodiversity, and regional water security.

   One of the stated goals of the Project, and the broader Alberta irrigation expansion and modernization program to which it belongs, is to support the future development of irrigated land which implies enabling conversion of dryland cropland and native grasslands to irrigated agricultural lands. The Project footprint also largely consists of wetlands and native grasslands, which are especially important habitats for Alberta's species at risk and migratory birds. The Government of Alberta has identified the conservation of native grasslands as crucial to protecting the ecological integrity of Alberta's natural environments.[2] Less than half of Alberta's natural grasslands remain intact, and are already under extreme and increasing cumulative pressures, including the onset of climate change. The *Principles for Minimizing Surface Disturbance in Native Grassland* ("*Principles*") recognize agricultural conversion as one of the activities resulting in cumulative effects on native grassland ecosystems.[3] The *Principles* state that Alberta's remaining native grasslands are environmentally significant in protecting wildlife habitat, natural landscapes and undisturbed archaeological sites, and provide

[2] Alberta Environment and Parks, "Guidelines for native grasslands", online at <https://www.alberta.ca/land-conservation-and-reclamation-guidelines-for-native-grasslands.aspx>.
[3] *Principles* at 3, 4, 6

ecological services such as groundwater recharge, carbon storage, wildlife habitat and biodiversity.[4]

The Project footprint also includes important permanent and temporary wetland habitats and habitat for many waterfowl and migratory bird species, including the Thick-billed (McCown's) Longspur. The cumulative pressures on these sensitive ecosystems in Alberta are already immense.

Furthermore, the Project and the broader expansion program could contribute to the susceptibility of soils for increased erosion in the semi-arid Southern Alberta region. Potatoes, soybeans and sugar beets, high value crops usually grown under irrigation in southern Alberta, are harvested late in the fall, thereby limiting the ability to establish a cover crop for overwintering. As Canada is a signatory to the 2022 *Communique from the Global Forum for Food and Agriculture - Sustainable Land Use: Food Security Starts with the Soil*, the Minister should consider this risk posed by the Project and the broader expansion program.

Because of the sensitivity of the ecosystems in the Project footprint and the significant gaps in publicly available information about the Project's potential impacts, the Interested Parties submit that the Minister should exercise his discretion to designate the Project under the *Impact Assessment Act*. By designating the Project, the Minister can ensure that native grasslands and species at risk throughout the Project area receive proper consideration and appropriate protection.

3. Does the project involve new technology or a new type of activity?

   Answer: No.

4. Does the project have the potential to cause adverse effects that are of concern to you and fall within federal jurisdiction?

   Answer: Yes. The potential adverse effects are as follows:

   - effects on fish, fish habitat, and aquatic species, as defined in subsection 2(1) of the *Species at Risk Act*:

     Many aquatic habitats could be implicated in the Project's activities. Critical habitats for fish species at risk include Rocky Mountain Sculpin critical habitat along Lee Creek and the St. Mary River adjacent to the Blood Indian Reserve. Riparian habitat availability and the inadequacy of reservoirs for habitat offsets must also be considered for aquatic species at risk, including for the Rocky Mountain Sculpin.[5] Additionally, the Project's activities must also be assessed

[4] *Ibid* at 4.
[5] See Chapter 3 of the Government of Canada's *Rocky Mountain Sculpin, Eastslope Populations (Cottus sp.) Recovery Strategy* at 3.4.2, online at <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/rocky-mountain-sculpin-eastslope-populations/chapter-3.html>.

with a view to avoiding exacerbating the already significant problem of invasive fish and aquatic vegetation species in Alberta's fisheries.

- effects on species at risk:

  The Project may have impacts on several species at risk, either directly or through its contribution to cumulative impacts to the South Saskatchewan River Basin resulting from Irrigating Alberta Inc.'s broader irrigation expansion and modernization program. A non-exhaustive list of the species at risk which may be impacted includes:

  - Burrowing Owl (*Athene cunicularia*):
    - *SARA* federal status: Endangered
    - *Wildlife Act* provincial status: At Risk
    - Burrowing Owl habitat includes open grasslands, agricultural fields and scrubland in southeastern Alberta.[6] Nest sites have been found and monitored within the Eastern Irrigation District.[7] Loss and degradation of suitable nesting and foraging habitat is the single most threat to the survival and recovery of the Burrowing Owl, including through the conversion of native grassland to agricultural crop fields.[8]
  - Tiny Cryptantha (*Cryptantha minima*):
    - *Species at Risk Act* ("*SARA*") federal status: Threatened
    - Tiny Crypthantha is an annual plant species associated with river systems, mainly the South Saskatchewan River valley in eastern Alberta. It is also found in the vicinity of the lower Bow and Oldman Rivers.[9] The Tiny Cryptantha exists on sandy uplands and valley breaks and slopes that could be impacted by flooding for reservoir construction or expansion. It could also be impacted by conversion of native grasslands.
  - Thick-billed (McCown's) Longspur (*Rhyncophases mccownii*):
    - *SARA* federal status: Threatened
    - *Wildlife Act* provincial status: May Be at Risk.

[6] Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Burrowing Owl* Athene cunicularia *in Canada*, (Ottawa: 2017) at 11.
[7] Alberta Sustainable Resource Development and Alberta Conservation Association, *Status of the burrowing owl (*Athene cunicularia*) in Alberta, Update 2005*, (Edmonton: 2005), at 7-10.
[8] *Ibid* at 12-13.
[9] Environment Canada, *Amended Recovery Strategy for the Tiny Cryptantha (*Cryptantha minima*) in Canada*, (Ottawa: 2012) at 2-3.

- This bird species breeds in grassland habitats in southeastern Alberta. The species is associated with native and non-native grasslands and is negatively associated with human-modified habitats such as crops, hayfields and road.[10]

- Greater Short-horned Lizard (*Phrynosoma hernandesi*):
  - *SARA* federal status: Endangered
  - *Wildlife Act* provincial status: At Risk
  - This species is found at four disjunct areas in southeast Alberta including the South Saskatchewan River valley and the Chin Coulee/Forty Mile Coulee Complex.[11] Construction of dams and irrigation infrastructure, and conversion of native habitat to crop production are listed as threats to the species.[12] In particular, expansion of the Chin Reservoir as part of the proposed activities in the St. Mary River Irrigation District may affect the species' known habitat.

- Great Plains Toad (*Anaxyrus cognatus)*:
  - *SARA* federal status: Special Concern
  - *Wildlife Act* provincial status: Sensitive
  - This species occurs on native prairie habitat and has been found in the Suffield area and in the Tilley-Lake Newell-Vauxhall-Taber area.[13] In Canada, the species is exclusively associated with grasslands in the southern Prairie Provinces.[14] The species may be impacted by habitat fragmentation from cropland and irrigation.[15] The relatively large tracts of intact native grasslands in Alberta serve as reservoirs for the population.[16]

- Northern Leopard Frog (*Lithobates pipiens*):
  - *SARA* federal status: Special Concern
  - *Wildlife Act* provincial status: At Risk

[10] Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the McCown's Longspur* Rhynchophases mccownii, (Ottawa: Environment Canada, 2016) at 7-9.
[11] Environment Canada, *Recovery Strategy for the Greater Short-horned Lizard (*Phrynosoma hernandesi*) in Canada*, (Ottawa: 2015) at 4.
[12] *Ibid* at 7.
[13] Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Great Plains Toad* Anaxyrus cognatus *in Canada*, (Ottawa: 2010) at 8.
[14] *Ibid* at 9.
[15] *Ibid* at 31-32.
[16] *Ibid* at 32.

- Within Alberta, the prairie/western boreal population of Northern Leopard Frog is primarily associated with major river drainages and areas of intact native prairie in the southeastern portion of the province, including the lower reaches of the Bow River and Oldman River, and the South Saskatchewan River.[17] Conversion of wetlands in native prairie to cultivation and contamination of wetlands by agricultural herbicides and pesticides are threats to the Northern Leopard Frog.[18]

- Rocky Mountain Sculpin (*Cottus* sp.):
  - *SARA* federal status: Threatened
  - *Wildlife Act*, provincial status: At Risk
  - Within Alberta, the Rocky Mountain Sculpin distribution is limited to the St. Mary River system above the St. Mary Reservoir, and the upper Milk and North Milk rivers.[19] The species may have been extirpated from the lower St. Mary River by the construction of the St. Mary Reservoir.[20] Changes within the Leavitt Irrigation District that impact the St. Mary River above the Reservoir could impact the critical habitat.

- Lake Sturgeon (*Acipenser fulvescens*):
  - *SARA* federal status: not listed (under consideration for addition)
  - COSEWIC status: Endangered
  - *Wildlife Act*, provincial status: At Risk
  - Lake Sturgeon are found in the South Saskatchewan River in Alberta and upstream as far as the Oldman Dam on the Oldman River and the Bassano Dam on the Bow River.[21] Reductions in stream flow related to dam operation, and from water extraction, are among the biggest challenges to increasing Lake Sturgeon numbers in Alberta.[22] The

[17] Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Update Status Report on the Northern Leopard Frog,* Lithobates pipiens, *Rocky Mountain Population, Western Boreal/Prairie Populations and Eastern Populations in Canada*, (Ottawa: 2009) at 12-13.
[18] *Ibid* at 32, 36-37.
[19] Fisheries and Oceans Canada, *Recovery Strategy for the Rocky Mountain Sculpin* (Cottus sp.), *Eastslope Populations, in Canada*, (Ottawa: 2012) at 8.
[20] *Ibid* at 8, 17.
[21] Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Lake Sturgeon* Acipenser fulvescens *Western Hudson Bay populations, Saskatchewan-Nelson River populations, Southern Hudson Bay-James Bay populations, Great Lakes-Upper St. Lawrence populations, in Canada*, (Ottawa: 2017) at 15; Alberta Lake Sturgeon Recovery Team, *Alberta Lake Sturgeon Recovery Plan, 2011-2016*, (Edmonton: Alberta Environment and Sustainable Resource Development, 2011) at 11 [Alberta Recovery Plan].
[22] Alberta Recovery Plan, *supra* note 21 at 36-37.

impact of water extraction for irrigation is a significant effect on Lake Sturgeon in the South Saskatchewan river system.[23]

A more comprehensive list of potentially impacted species is included as Appendix 1 to this request. A complete project description and impact assessment, including field survey by qualified biologists, are required to identify all the species at risk which could be adversely impacted by the Project.

- effects on migratory birds;

  As discussed, the Project footprint includes important permanent and temporary wetland habitats and habitat for many waterfowl and migratory bird species, including the Thick-billed (McCown's) Longspur. The Project footprint also includes native grasslands, which are similarly important habitats for Alberta's migratory bird species. Furthermore, the creation of the reservoir, as part of the broader Alberta irrigation expansion and modernization program, would contribute cumulatively to the expansion of total irrigated lands in Alberta into these important habitats throughout southern Alberta, and could have adverse effects on the overall security of the South Saskatchewan River Basin in which these habitats exist.

- changes to the environment on federal lands:

  Federal lands, including reserve lands and Canadian Forces Base Suffield, may experience downstream effects from Project activities. These potential impacts include possible waterflow impacts on the riparian corridors within the Canadian Forces Base Suffield National Wildlife Area ("NWA"), which could in turn create impacts on species at risk in the NWA.[24] These potential impacts also include large withdrawals and altered flow regimes on riparian and aquatic ecosystems through the Blood Reserve No. 148 (St. Mary & Belly Rivers), the Piikani Reserve No. 147 (Oldman River) and the Siksika Reserve No. 146, including the Blackfoot Crossing historic site (Bow River).

- changes to the environment that occur in a province or territory other than the one where the Project is taking place:

  The Project may reduce instream flows in the Oldman and South Saskatchewan Rivers through increased diversions from the rivers and reduced return flows to the rivers. The Project also has the potential to impact water quality in the impacted water systems. The impacted rivers flow beyond Alberta into Saskatchewan, and are connected to river systems extending into the United States. The potential impacts from the Project in Alberta therefore also continue

[23] *Ibid* at 37-38.
[24] See the Government of Canada's online description of the Canadian Forces Base Suffield National Wildlife Area: <https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/locations/canadian-forces-base-suffield.html>.

downstream into Saskatchewan. The Project would also contribute to the broader Alberta irrigation expansion and modernization program, which likewise has significant potential impacts on instream flow levels in the Bow, Oldman, and South Saskatchewan Rivers. The interconnected nature of these river systems and subbasins within the South Saskatchewan River Basin therefore similarly have the potential for adverse effects of an interprovincial and international nature.

Because of reduction of instream flows and potential impacts on water quality the Project could affect Alberta and Canada's obligations under the Agreements on Apportionment between Alberta, Saskatchewan, and Canada. Under the Agreement between Alberta and Saskatchewan, Alberta is obligated to permit a quantity of water equal to one half of the natural flow of a number of watercourses, including the South Saskatchewan River, to flow into Saskatchewan. The agreement is managed and monitored by the Prairie Provinces Water Board, which includes senior officials from the Federal Departments of Environment and Climate Change, and Agriculture and Agri-Food.

The *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)* ("*SSRB Water Management Plan*") found that the lower reaches of the Waterton, St. Mary, Belly, Oldman, and Bow Rivers were at least moderately impacted, some heavily impacted and a few degraded by water diversions in these rivers.[25] Accordingly, in 2007, the Government of Alberta issued the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* closing those watersheds to new surface water allocations and reserving all unallocated water for:

1. use by a First Nation;

2. a water conservation objective;

3. storage, if it is for the protection of the aquatic environment and for improving the availability of water to existing licence holders;

4. outstanding water licence applications at the time of the order.[26]

The *SSRB Water Management Plan* also recommended a water conservation objective ("WCO") for these sub-basins of 45 per cent of the natural flow rate, or the existing instream objective increased by 10 per cent, whichever is greater at any moment in time.[27] Recent information from Alberta Environment and Parks and Environment and Climate Change Canada for the Oldman and Bow sub-basins indicate that historically the WCO is seldom met 100 per cent of the time in

[25] Alberta Environment, *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)*, (Edmonton: 2006) at 4, 7 [*SSRB Water Management Plan*].
[26] *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order*, AR 171/2007, ss 2, 4, 6, 8.
[27] *SSRB Water Management Plan*, *supra* note 25 at 8.

any given year.[28] In many years, the WCO is met less than 50 per cent of the year, particularly in the summer months. Recorded and calculated flows at various points on the Bow, Oldman and South Saskatchewan Rivers in 2021 indicate that actual flows are well below natural flows due to the diversions for irrigation and other uses, and WCOs, where specified, are often not met.[29]

The Project will not increase the Irrigation District gross allocations under existing licences. However, the irrigation districts have historically used about 66 per cent of their gross allocation.[30] The publicly available Project description does not specify whether the Project will result in the Irrigation District increasing its actual diversions in total or at certain points of the year to fill the additional reservoir capacity. Further, the publicly available Project description does not indicate whether all of the additional area to be irrigated will actually be irrigated based on efficiency and conservation efforts, or whether some additional area to be irrigated will depend on increased diversions.

Furthermore, monitoring pursuant to Alberta's *Water Quality Management Framework* in recent years has found significant exceedances for water quality triggers for chloride, nitrate, total nitrogen, ph, sulphate, specific conductivity, total dissolved solids and/or *E. coli* at various monitoring sites.[31] Canal conversion to pipelines, new pipeline construction, reservoir expansion and construction, reservoir operation, changes to instream flows and the expansion of irrigated lands all have the potential to adversely affect water quality in the impacted water systems.

- changes to the environment that occur outside of Canada;

The Project is connected to river systems which extend into the United States. The Project's potential impacts on instream flows are therefore of an interprovincial and international nature. The modelled water balance should also take into account the impact of the Project on Alberta's obligations under the *Master Agreement on Apportionment between Alberta and Saskatchewan* and on Canada's obligations under the *Boundary Waters Treaty* of 1909 and the 1921 Order of the International Joint Commission on the apportionment of flows in St. Mary and Milk rivers. The International Joint Commission also launched a study

[28] Appendix 2 to this document: Cheryl Bradley, "Irrigation Expansion Project: Water Conservation Objectives (WCO) and Instream Objectives (IO) for Potentially Impacted River Reaches", (Lethbridge: October 2021).
[29] Appendix 3 to this document: Cheryl Bradley, "Yearly Graph of Flows in Potentially Affected River Reaches for 2021 (April – October)", (Lethbridge: October 2021).
[30] Government of Alberta, *South Saskatchewan Regional Plan, 2014-2024*, (Edmonton: February 2017) at 26.
[31] Government of Alberta, *South Saskatchewan Region Surface Water Quality Management Framework for the Mainstem Bow, Milk, Oldman and South Saskatchewan Rivers (Alberta)*, (Edmonton: 2014) at 27-35 ["*Water Quality Management Framework*"]; Nadine Taube and Jason Kerr, *2018-2019 Status of Surface Water Quality, South Saskatchewan Region, Alberta for April 2018 – March 2019*, (Edmonton: Alberta Environment and Parks, 2020) at 16; Cecilia Chung, J. Patrick Laceby and Jason G. Kerr, *2019-2020 Status of Surface Water Quality, South Saskatchewan Region, Alberta for April 2019 – March 2020*, (Edmonton: Alberta Environment and Parks, 2021) at 17.

in 2021 to explore options to improve access to apportioned water by each country, in recognition of climate change and challenges to apportionment since the original order was issued. As the study has not yet been completed, it would be prudent to examine the public interest aspects of engaging in expensive reservoir construction projects and irrigation expansion before the study is complete.

Also, the Project may cause an increase in Canada's Greenhouse Gas (GHG) emissions, in a manner inconsistent with Canada's international and domestic commitments to reduce GHG emissions. To ensure that this concern for the Project's potential adverse effects is taken into account, the Interested Parties submit that a designation order under the *Impact Assessment Act* is warranted.

A growing body of scientific literature is revealing that irrigation agriculture can be a major emitter of GHGs from changes to soil biology and from reservoirs, and can therefore contribute to global climate change. Cultivation of native grasslands results in significant release of GHGs. The Project therefore creates a risk of such an increase in GHG emissions and in Canada's contribution to global climate change. The Project, in its role as part of the broader Alberta irrigation expansion and modernization program, would also contribute to the expansion of irrigated lands, and to the changes in soil biology, crop mixes, fertilizer use, livestock production, use of fossil fuels and reservoir levels across the South Saskatchewan River Basin.

Considering the national and global scope of these potential climate change implications and Canada's international and domestic commitments to reduce GHG emissions, the Project thus engages federal jurisdiction and necessitates a designation order under the *Impact Assessment Act* to ensure that the Project's GHG emissions are properly considered.

- changes to the environment that could affect the Indigenous peoples of Canada:

  The *Principles* state that undisturbed grassland areas of Alberta are rich in cultural resources including archeological resources, paleontological resources, historic sites and Indigenous traditional use sites. Historically, the conversion of natural grasslands to agricultural lands destroyed important cultural sites for the Indigenous peoples. Specifically, water management infrastructure such as reservoirs, landscaping, riprapping, dredging and channeling, can complicate and constrain both access to and evaluation of archaeological sites.

  Therefore, expanded reservoir construction and the subsequent conversion of native grassland to irrigated lands have the potential to impact important Indigenous archaeological and cultural sites. Considered in the colonial context of cumulative impacts on archaeological and cultural resources including the near extinction of the plains bison due to overhunting, the conversion of native grasslands to agricultural lands, and the cumulative impacts of agriculture,

petroleum development, mining and other land uses, the incremental impact of further irrigation development must be seriously scrutinized.

There could also be impacts on Indigenous water rights. This is especially so since the South Saskatchewan River Basin is fully or nearly fully allocated, and there will be likely water shortages in some watercourses. Alberta uses a legislated "first in time, first in right" prior allocation system for determining priorities for water use. If there is not sufficient water for all users, only the users with the most senior water licences will have a right to withdraw water. Although it is clear that First Nations have asserted and continue to assert water rights, these rights generally are not reflected in water licences. The Interested Parties hold that it would violate the spirit and substance of reconciliation to permit this Project to proceed without examination of potential impact on Indigenous water rights and interests.

Therefore, in the spirit of Canada's commitment to reconciliation with Indigenous peoples, the Interested Parties submit that the Minister should designate the Project under the *Impact Assessment Act* to ensure the Project properly considers the impact on these archaeological and cultural resources.

- changes occurring to the health, social or economic conditions of the Indigenous peoples of Canada:

  The potential impacts on the cultural and ecological resources of Indigenous peoples as described above have ramifications for the social and economic well-being of Indigenous peoples. The integrity of Indigenous cultural and ecological resources are critical components of Indigenous peoples' societal structure, identity, and economic vitality. Considering the detrimental legacy of colonial land-use and cultural genocide on Indigenous peoples' socioeconomic health, the Project must be assessed through the lens of reconciliation and in recognition of the immutable link between the cultural and ecological resources of the land and the well-being of Indigenous peoples.

5. Does the project have the potential to cause adverse effects that are directly related or incidental to a federal authority either (i) making a decision that would permit the carrying out, in whole or in part, of the project or (ii) providing financial assistance for the purpose of enabling the project to be carried out, in whole or in part?

   Answer: Yes. As discussed above, the Canada Infrastructure Bank has decided to provide significant financial support to the Alberta irrigation expansion and modernization program for the purpose of enabling the Project, among others, to be carried out. The Chin Reservoir Expansion and Modernization Project, and its potential adverse effects, is entirely funded through the Alberta irrigation expansion and modernization program. The potential adverse effects of the Project, described throughout this request, would thus be directly or incidentally related to a federal authority, namely the Canada Infrastructure

Bank, providing financial assistance for the purpose of enabling the Project to be carried out.

6. Does the project have the potential to cause adverse impacts on the section 35 rights of the Indigenous peoples of Canada?

   Answer: Yes. As described above, Indigenous peoples may suffer adverse effects to cultural and ecological resources and water rights as a result of the Project. Insofar as Indigenous peoples' access to cultural, archaeological, and ecological resources within the Project footprint or in areas which may be impacted by the Project or the broader expansion and modernization program are protected under s. 35 Aboriginal or Treaty rights, they could potentially suffer the adverse effects of the Project and of the broader expansion and modernization program to which the Project would contribute.

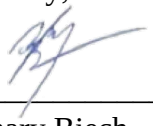
Conclusion

For the above reasons, the Interested Parties submit that the Project: is near or in an environmentally or otherwise sensitive location; has the potential to cause adverse effects that are of concern to us and fall within federal jurisdiction; has the potential to cause adverse effects that are directly related or incidental to a federal authority providing financial assistance for the purpose of enabling the project to be carried out in whole or in part; and have the potential to cause adverse impacts on the section 35 rights of the Indigenous peoples of Canada.

The Interested Parties therefore request that the Minister designate the Chin Reservoir Expansion and Modernization Project under section 9(1) of the *Impact Assessment Act*.

We make this request without prejudice to the Interested Parties' position that the broader Alberta irrigation expansion and modernization program should be considered as one single project. The Interested Parties invite the Minister to exercise his discretion to join the physical activities which comprise the broader Alberta program in any designation and assessment the Minister may deem necessary. The Interested Parties also submit that, for the purposes of impact assessment, it would be most prudent to consider all the broader Alberta program's physical activities and their cumulative effects together as much as possible.

Sincerely,



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Zachary Biech
Barrister & Solicitor, Ecojustice

Appendix 1: Species at Risk Potentially Affected by the Proposed Irrigation Expansion Project

The following are species (n=29) listed under the federal *Species At Risk Act, Schedule 1* and under the provincial *Wildlife Act, Wildlife Regulation, Schedule 6* whose ranges overlap wholly or in part with irrigation districts in southern Alberta and for whom threats identified in status reports include loss, fragmentation and degradation of native prairie habitats by cultivation and other agricultural activities, pesticide use and/or water management including dams and diversions.

Mammals

American Badger *(Taxidea taxus)*

SARA federal status: Special Concern

American Badger occurs in grasslands with soils that can be burrowed into without collapsing and abundant prey. Cultivated fields are largely avoided although field edges may be used. Decline in habitat and road-kill are the main threats.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the American Badger* Taxidea taxus *in Canada* (Ottawa: 2013)

Birds

Baird's Sparrow (*Ammodramus bairdii*)

SARA federal status: Special Concern

This bird species mainly breeds in large patches of mixed grass prairie with sparse shrubs, moderate grass heights, and some litter. Tame pasture provides less productive habitat. Major threats to Baird's Sparrow survival are habitat loss and degradation due primarily to conversion of native grassland to cropland and alteration of grazing practices and fire regimes. Use of pesticides to control grasshoppers reduces reproductive success.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC assessment and status report on the Baird's Sparrow* Ammodramus bairdii *in Canada*, (Ottawa: 2012).

> Environment and Climate Change Canada, *Management Plan for the Baird's Sparrow (*Ammodramus bairdii*) in Canada [Proposed]* (Ottawa: 2021)

Bank Swallow (*Riparia riparia*)

SARA federal status: Threatened

Vertical banks in sand-silt substrates, including riverbanks, aggregate pits and road cuts provide breeding habitat for Bank Swallow. Nearby habitats such as grasslands, meadows and pastures are used for aerial foraging. Threats identified as contributing to species decline include loss of breeding and foraging habitat through activities such as erosion control projects, flood control (dams) and conversion of pastureland to cropland. Widespread pesticide use may cause decreases in the abundance or diversity of flying insects.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC assessment and status report on the Bank Swallow* Riparia riparia *in Canada*, (Ottawa: 2013).

Barn Swallow (Hirundo rustica)

SARA federal status: Threatened

Cliffs and rock overhangs were preferred nesting sites before colonization. Human-made structures, including barns and bridges, are now preferred nest sites. Threats include declining populations of insect prey, increasing frequency of severe temperature fluctuations during spring migration and the breeding season, and loss of suitable nesting sites.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC assessment and status report on the Barn Swallow* Hirundo rustica *in Canada*, (Ottawa: 2021).

Bobolink (*Dolichonyx oryzivorus*)

SARA federal status: Threatened

Bobolink habitat includes wet prairie, hayfields, pastures, abandoned fields with tall grasses, and no-till cropland. Nest sites were originally in tall-grass prairie. Bobolink have been found nesting on the Antelope Creek Ranch within the Eastern Irrigation District. Main threats are incidental mortality from agricultural operations, habitat loss caused by conversion of forage crops to row crops, habitat fragmentation and pesticide use.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC assessment and status report on the Bobolink* Dolichonyx orysivorus *in Canada*, (Ottawa: 2010).

Burrowing Owl (*Athene cunicularia)*:

SARA federal status: Endangered

Wildlife Act provincial status: Endangered

Burrowing Owl habitat includes open grasslands, agricultural fields and scrubland in southeastern Alberta. Nest sites have been found and monitored within the Eastern Irrigation District. Loss and degradation of suitable nesting and foraging habitat is the single most threat to the survival and recovery of the burrowing owl, including through the conversion of native grassland to agricultural crop fields.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Burrowing Owl* Athene cunicularia *in Canada,* (Ottawa: 2017)

> Alberta Sustainable Resource Development and Alberta Conservation Association, *Status of the burrowing owl (*Athene cunicularia) *in Alberta, Update 2005,* (Edmonton: 2005)

Chestnut-collared Longspur (*Calcarius ornatus*)

SARA federal status: Threatened

This bird species breeds in native grassland habitats in southeastern Alberta. The primary threat to the species is degradation and fragmentation of native grassland especially through conversion to annual cropland.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC assessment and status report on the Chestnut-collared Longspur* Calcarius ornatus *in Canada*. Committee on the Status of Endangered Wildlife in Canada. (Ottawa: Environment Canada, 2019)

> Environment and Climate Change Canada. *Amended Recovery Strategy for the Chestnut-collared Longspur* (Calcarius ornatus) *in Canada*. Species at Risk Act Recovery Strategy Series. (Ottawa: 2018)

Common Nighthawk *(Chordeiles minor*)

SARA federal status: Threatened

Common Nighthawk is an aerial insectivore that feeds on a wide variety of insects at dusk or dawn and nests directly on the ground in a wide range of open habitats during mid-June to late August. Threats may be related to widespread declines in insects caused by the extensive use of pesticides as well a habitat loss and modification from intensive agriculture.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Common Nighthawk (*Chordeiles minor*) in Canada* (Ottawa: 2019)

Ferruginous Hawk (*Buteo regalis*)

SARA federal status: Threatened

Wildlife Act provincial status: Endangered

In Alberta, Ferruginous Hawk occur in prairie landscapes that are predominantly grassland. Richardson's ground squirrel is the hawk's main prey. Reproductive success is partly dependent on access to safe ground or elevated nesting sites. Conversion of native grassland to cropland is a continuing threat.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Ferruginous Hawk* Buteo regalis *in Canada*, (Ottawa: 2021).

Horned Grebe (*Podiceps auritus*)

SARA federal status: Special Concern

Horned Grebe generally breeds in freshwater on small semi-permanent or permanent ponds and occasionally marshes and shallow bays on lake borders. Emerging vegetation provides nest materials, concealment and anchorage, and protection for the young. Threats to the species include loss of wetlands to agriculture and degradation of nesting sites from the accumulation of fertilizers used in agriculture.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC assessment and status report on the Horned Grebe* Podiceps auritus, *Western population and Magdalen Islands population, in Canada*, (Ottawa, 2009).

Lark Bunting (*Calamospiza melanocorys*)

SARA federal status: Threatened

Lark Bunting occur in grasslands, tame pastures, croplands and roadside ditches in southeastern Alberta. Habitat loss and degradation due to agriculture are considered the primary threat along with effects of pesticides.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Lark Bunting* Calamospiza melanocorys *in Canada*, (Ottawa: 2018).

Loggerhead Shrike Prairie subspecies (*Lanius ludovicianus excubitorides*)

SARA federal status: Threatened

Breeding habitat for Loggerhead Shrike in southern Alberta includes grasslands, tame pasture and old fields with scattered tall shrubs and low trees. Habitat loss and degradation are correlated with population declines. Recovery efforts in Alberta include conserving nesting habitat and planting thorny buffaloberry shrubs.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Loggerhead Shrike (*Lanius ludovicianus*) in Canada*, (Ottawa: 2015).

Environment Canada, *Recovery Strategy for the Loggerhead Shrike Prairie subspecies (*Lanius ludovicianus excubitorides*) in Canada*, (Ottawa: 2015)

Long-billed Curlew (*Numenius americanus*)

SARA federal status: Special Concern

Long-billed Curlew nest in native grassland and use some agricultural areas for feeding and raising young. Cultivation, urban encroachment and fragmentation of native prairie are primary threats to the species.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Long-billed Curlew (*Numenius americanus*) in Canada*, (Ottawa: 2011).

Environment Canada, *Management Plan for the long-billed Curlew (*Numenius americanus*) in Canada,* (Ottawa: 2013)

Short-eared Owl (*Asio flammeus*)

SARA federal status: Special Concern

In Alberta Short-eared Owl breeds in open grasslands and tame pastures where there is abundance of small mammals for prey. Threats to survival include loss of native grassland and human activity including mowing and harvesting of hay.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Short-eared Owl (*Asio flammeus*) in Canada*, (Ottawa: 2022).

Sprague's Pipit (*Anthus spragueii*)

SARA federal status: Threatened

Sprague's Pipit nests in large areas of native grassland in southeastern Alberta. It is rarely found in cultivated lands or areas where native grasses are heavily grazed or have been replaced with introduced forages. Habitat loss and degradation are the primary causes of decline. Use of pesticides to control grasshoppers may be a threat.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Sprague's Pipit (*Anthus spragueii*) in Canada*, (Ottawa: 2010).

Environment Canada, *Amended Recovery Strategy for Sprague's Pipit (*Anthus apragueii*) in Canada,* (Ottawa: 2012).

Thick-billed (McCown's) Longspur (*Rhyncophases mccownii*):

SARA federal status: Threatened

Wildlife Act provincial status: May Be at Risk.

This bird species breeds in grassland habitats in southeastern Alberta. The Thick-billed Longspur is associated with native and non-native grasslands and is negatively associated with human-modified habitats such as crops, hayfields and roads.

Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the McCown's Longspur* Rhynchophases mccownii, (Ottawa: Environment Canada, 2016)

<u>Reptiles</u>

Greater Short-horned Lizard (*Phrynosoma hernandesi*):

SARA federal status: Endangered

Wildlife Act provincial status: Endangered

This species is found at four disjunct areas in southeast Alberta including the South Saskatchewan River valley and the Chin Coulee/Forty Mile Coulee Complex. Construction of dams and irrigation infrastructure, and conversion of native habitat to crop production are threats to Greater Short-horned Lizard. In particular, expansion of the Chin reservoir as part of the proposed activities in the St. Mary River Irrigation District may affect the species' known habitat.

Environment Canada, *Recovery Strategy for the Greater Short-horned Lizard (*Phrynosoma hernandesi*) in Canada,* (Ottawa: 2015)

Bull Snake (*Piruophis catenifer sayi*)

SARA federal status: Special Concern

Within Alberta, Bull Snake occurs along the South Saskatchewan River valley downstream of the forks of the Bow and Oldman Rivers including Suffield National Wildlife Area as well as south of Medicine Hat to the US border. The species is associated with sandy grassland habitat close to valley and coulee features such as slump blocks, sinkholes, scarps and rocky outcrops where there are fissures that serve as hibernacula. They also use mammal burrows. Bull Snakes are not found in crop fields or irrigated hay fields.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Bull Snake* Piruophis catenifer sayi *in Canada*, (Ottawa: 2017)

Prairie Rattlesnake (*Crotalus viridis*)

SARA federal status: Special Concern

Prairie Rattlesnake is strongly associated with major river valleys in the prairies including the Bow, Oldman and South Saskatchewan rivers. Hibernacula consist of holes or cracks in south- and east-facing slopes. The species forages in river valley habitats as well as upland grasslands and tame pastures. They can migrate long distances including through cultivated areas. Key threats to survival are large-scale habitat loss from cultivation, road mortality and intentional persecution.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Prairie Rattlesnake* Crotalus viridis *in Canada*, (Ottawa: 2010)

Amphibians

Great Plains Toad (*Anaxyrus cognatus)*:

SARA federal status: Special Concern

This species occurs on native prairie habitat and has been found in the Suffield area and in the Tilley-Lake Newell-Vauxhall-Taber area. In Canada, Great Plains Toad is exclusively associated with grasslands in the southern Prairie Provinces. The species may be impacted by habitat fragmentation by cropland and irrigation. The relatively large tracts of intact native grasslands in Alberta serve as reservoirs for the population.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Great Plains Toad* Anaxyrus cognatus *in Canada*, (Ottawa: 2010)

Northern Leopard Frog (*Lithobates pipiens*):

SARA federal status: Special Concern

Wildlife Act provincial status: Threatened

Within Alberta, the prairie/western boreal population of Northern Leopard Frog is primarily associated with major river drainages and areas of intact native prairie in the southeastern portion of the province, including the lower reaches of the Bow River and Oldman River, and the South Saskatchewan River.61 Conversion of wetlands in native prairie to cultivation and contamination of wetlands by agricultural herbicides and other pesticides are threats to the Northern Leopard Frog.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Update Status Report on the Northern Leopard Frog*, Lithobates pipiens, *Rocky Mountain Population, Western Boreal/Prairie Populations and Eastern Populations in Canada*, (Ottawa: 2009), at 12-13.

Fish

Bull Trout (*Salvelinus confluentus*), Saskatchewan-Nelson Rivers populations

SARA federal status: Threatened

Wildlife Act provincial status: Threatened

Bull trout populations in the Bow, Oldman, Waterton, Belly and St. Mary rivers historically extended into the prairies but were fragmented by construction of on-stream dams with the result that viable populations now tend to occupy only foothills and mountain reaches upstream of dams where fish have access to spawning and rearing habitat. Annually Bull Trout congregate below the Oldman Dam that has no fish passage. Some are captured and then released above the dam and some enter the unscreened main diversion canal of the Lethbridge Northern Irrigation District and are lost to the population. Mortality of Bull Trout in the St. Mary, Belly and Waterton river drainages is also attributed to entrainment in irrigation canals or blockage of upstream movement.

> Alberta Sustainable Resource Development and Alberta Conservation Association. *Status of the Bull Trout (*Salvelinus confluentus*) in Alberta: Update 2009*, Wildlife Status Report No. 39, (Edmonton: 2009).

Lake Sturgeon (*Acipenser fulvescens*):

SARA federal status: not listed (under consideration for addition)

COSEWIC status: Endangered

Wildlife Act, provincial status: Threatened

Lake Sturgeon are found in the South Saskatchewan River in Alberta and upstream as far as the Oldman Dam on the Oldman River and the Bassano Dam on the Bow River. Reductions in stream flow related to dam operation, and from water extraction, are among the biggest challenges to increasing Lake Sturgeon numbers in Alberta. The impact of water extraction for irrigation is a significant effect on Lake Sturgeon in the South Saskatchewan River system.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Lake Sturgeon* Acipenser fulvescens *Western Hudson Bay populations, Saskatchewan-Nelson River populations, Southern Hudson Bay-James Bay populations, Great Lakes-Upper St. Lawrence populations, in Canada*, (Ottawa: 2017)

> Alberta Lake Sturgeon Recovery Team, *Alberta Lake Sturgeon Recovery Plan, 2011-2016*, (Edmonton: Alberta Environment and Sustainable Resource Development, 2011)

Rocky Mountain Sculpin (*Cottus* sp.):

SARA federal status: Threatened

Wildlife Act, provincial status: Threatened

Within Alberta, the Rocky Mountain Sculpin distribution is limited to the St. Mary River system above the St. Mary Reservoir, and the upper Milk and North Milk rivers. The species may have been extirpated from the lower St. Mary River by the construction of the St. Mary Reservoir. Changes within the Leavitt Irrigation District that impact the St. Mary River above the Reservoir could impact the critical habitat.

> Fisheries and Oceans Canada, *Recovery Strategy for the Rocky Mountain Sculpin* (Cottus sp.), *Eastslope Populations, in Canada*, (Ottawa: 2012)

Invertebrates

Bert's Predaceous Diving Beetle (*Sanfilippodytes berate*)

SARA federal status: Endangered

Habitat for this invertebrate is limited to springs and seepage areas in the Oldman River valley including near Fort MacLeod on the banks of the Oldman River at high water mark and in Head Smashed in Buffalo Jump. Threats to survival are livestock trampling of springs habitats and altered water levels because of withdrawals and impoundments for irrigation agriculture and other developments as well as droughts.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Bert's Predaceous Diving Beetle* (Sanfilippodytes bertae) *in Canada*, (Ottawa: 2010)
>
> Environment and Climate Change Canada, *Recovery Strategy for the Bert's Predaceous Diving Beetle* (Sanfilippodytes bertae) *in Canada*, (Ottawa: 2017)

Verna's Flower Moth (*Schinia verna*)

SARA federal status: Endangered

This species is endemic to the Canadian prairies. Only a few occurrences have been recorded in Alberta including near Jenner on the Red Deer River and Medicine Hat on the South Saskatchewan River. Verna's Flower Moth inhabits sparsely vegetated native grassland where stands of their host plant, pussytoes (*Antennaria*) are common. Loss and fragmentation of prairie grassland as a result of agricultural development are the primary threats.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on the Verna's Flower Moth* (Schinia verna) *in Canada*, (Ottawa: 2017)

Plants

Dwarf Woolly-heads (*Psilocarphus brevissimus*), Prairie population

SARA federal status: Special Concern

The prairie population of this annual species occurs in ephemeral wetlands and margins of sloughs. Threats to Dwarf Woolly-heads include habitat destruction associated with agricultural and industrial development. Occurrences have been documented within the Eastern Irrigation District including in the vicinity of Snake Lake Reservoir.

> Committee on the Status of Endangered Wildlife in Canada, *COSEWIC Assessment and Status Report on Dwarf Woolly-heads* (Psilocarphus brevissimus) *in Canada*, (Ottawa: 2006)

Slender Mouse-ear-cress (*Halimolobos virgata*)

SARA federal status: Threatened

In Alberta Slender Mouse-ear-cress occurs in a few very localized areas including along Matzhiwin Creek within the Eastern Irrigation District. It inhabits vernally moist upland sites in flat to gently undulating grassland with sandy to loamy soils. Habitat loss due to cultivation is a threat.

> Environment Canada. *Recovery Strategy for the Slender Mouse-ear-cress (*Halimolobos virgata*) in Canada*, (Ottawa: 2012)

Tiny Cryptantha (*Cryptantha minima)*:

SARA federal status: Threatened

Wildlife Act, provincial status: Endangered

Tiny Crypthantha is an annual plant species associated with river systems, mainly the South Saskatchewan River valley in eastern Alberta. It is also found in the vicinity of the lower Bow and lower Oldman rivers. Tiny Cryptantha exists on sandy uplands and valley breaks and slopes that could be impacted by flooding for reservoir construction or expansion. It could also be impacted by the conversion of native grasslands.

Environment Canada, *Amended Recovery Strategy for the Tiny Cryptantha (*Cryptantha minima) *in Canada*, (Ottawa: 2012)

Appendix 2: Cheryl Bradley, "Irrigation Expansion Project: Water Conservation Objectives (WCO) and Instream Objectives (IO) for Potentially Impacted River Reaches"

Irrigation Expansion Project
Water Conservation Objectives (WCO) and Instream Objectives (IO) for Potentially Impacted River Reaches
October 2021

Definitions for WCO and IO, excerpted from the *Approved Water Management Plan South Saskatchewan River Basin (2006)* (Glossary), are:

Water Conservation Objective (WCO) – As defined in Alberta's *Water Act*, a Water Conservation Objective is the amount and quality of water necessary for the protection of a natural water body or its aquatic environment. It may also include water necessary to maintain a rate of flow or water level requirements.

From the *Water Act: "Water Conservation Objective" means the amount and quality of water established by the Director under Part 2, based on information available to the Director, to be necessary for the*
i) Protection of a natural water body or its aquatic environment, or any part of it;
ii) Protection of tourism, recreational, transportation or waste assimilation uses of water; or
iii) *Management of fish or wildlife and may include water necessary for the rate of flow of water or water level requirements.*

A licence may be issued by the Director to the Government of Alberta for the purpose of implementing a Water Conservation Objective.

Instream Objectives – Regulated flows that should remain in the river via dam operations or as a restriction on licences. Below dams, Instream Objectives are in place throughout the SSRB, although some offer only limited protection of the aquatic environment. Instream Objectives have usually been set in response to fish habitat instream needs (the Fish Rule Curve) and/or water quality.

Recommended WCOs in the *Approved Water Management Plan South Saskatchewan River Basin (2006)* for the Bow, Oldman and South Saskatchewan River Sub-basins (p. 8) are described as follows:

"The recommended WCOs will serve as an administrative tool that will foster opportunities to increase flows. These opportunities could include holdbacks from transfers, voluntary actions by licence holders, cancellations and purchases of transfers. These WCOs will serve on an interim basis until monitoring, research and public consultation identify a long-term WCO.

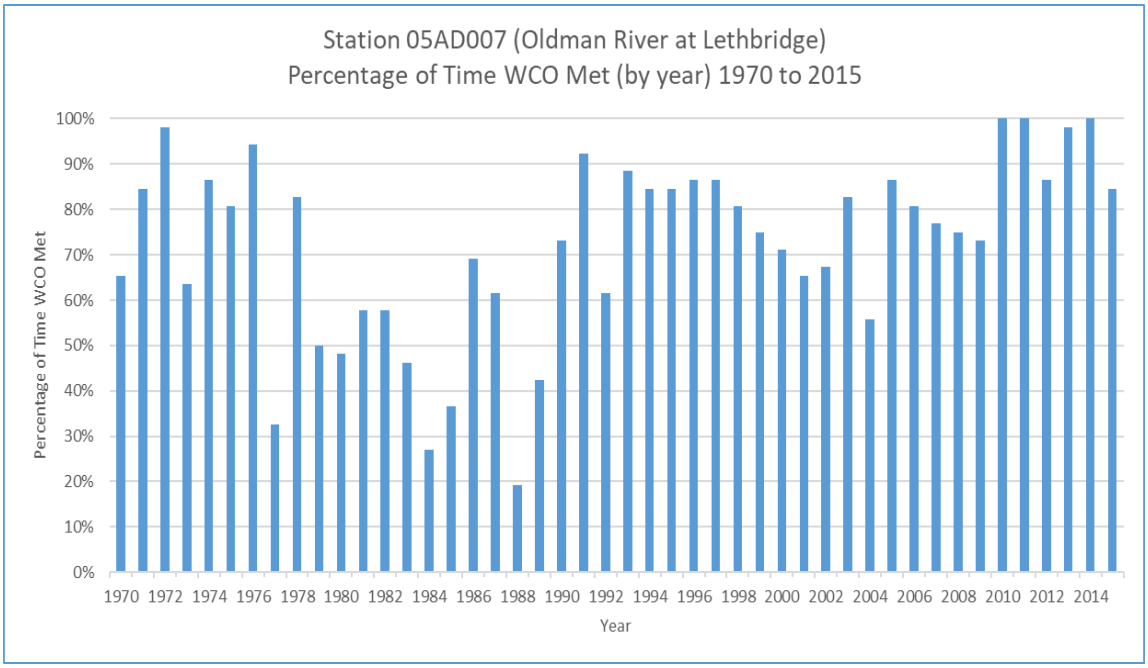
The recommended WCOs are either 45% of the natural rate of flow, or the existing instream objective increased by 10%, whichever is the greater at any point in time."

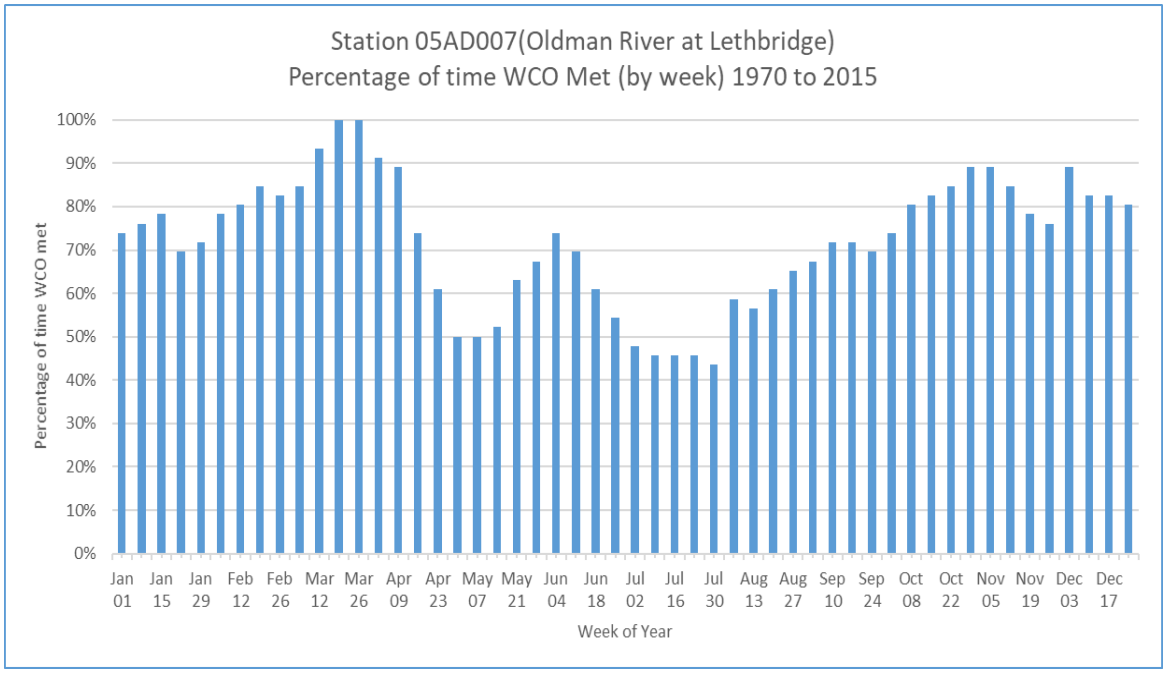
WCOs are considerably less than Instream Flow Needs (IFN) determined for protection of the aquatic environment in Instream Flow Needs Determinations for the South Saskatchewan River Basin, Alberta, Canada (2003). When the IFN values are compared to the actual river flows under current allocations and commitments, the conclusion is that in the Bow, Oldman, St. Mary, Belly and Waterton Rivers, the IFN values are generally much greater than existing flows, and restoring flows to IFN values would be impossible with the present degree of allocation. In these rivers, the aquatic environment is believed to be in a state of long term declining health.

Oldman River Mainstem Reaches from the Oldman Reservoir to the Mouth

"Each reach has an IO that is the greater of either the 80% habitat fish rule curve (80 FRC) or the water quality (temperature and oxygen) protection IO flows." (SSRB WMP p. 45).

The WCO therefore would be the greater of 45% of natural flow or 80 FRC and water quality protection base flow plus 10%.





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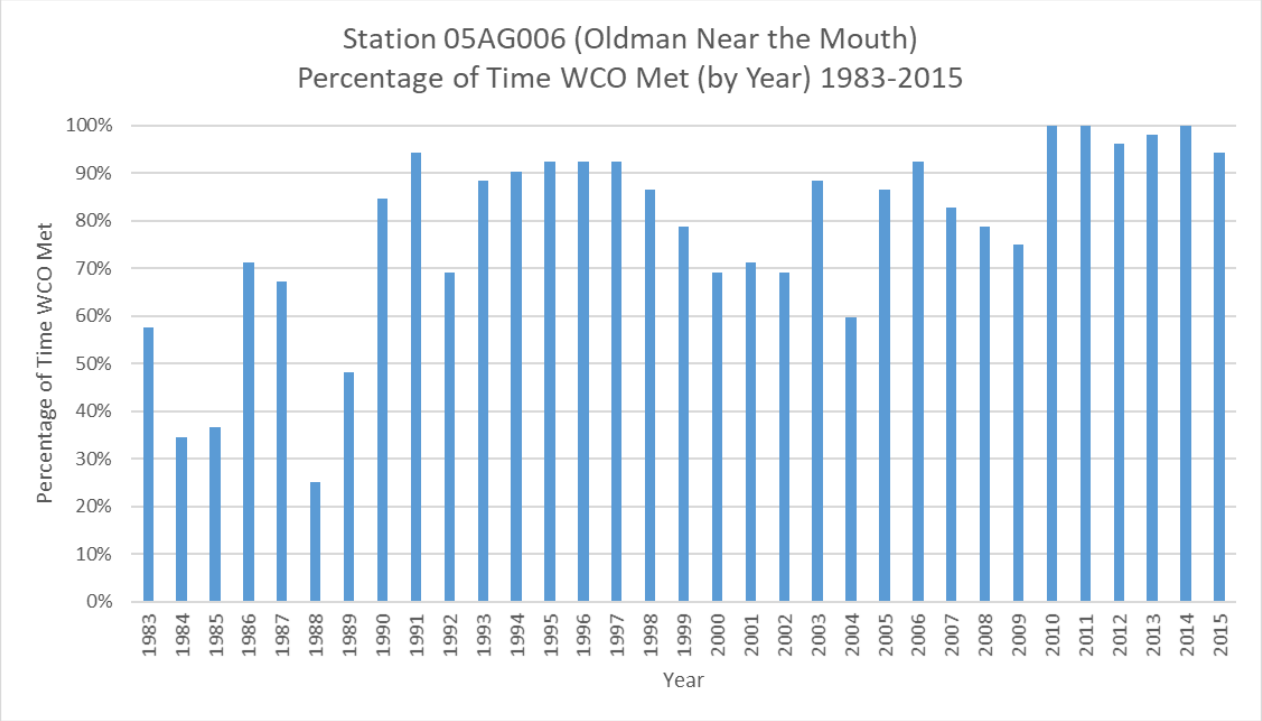
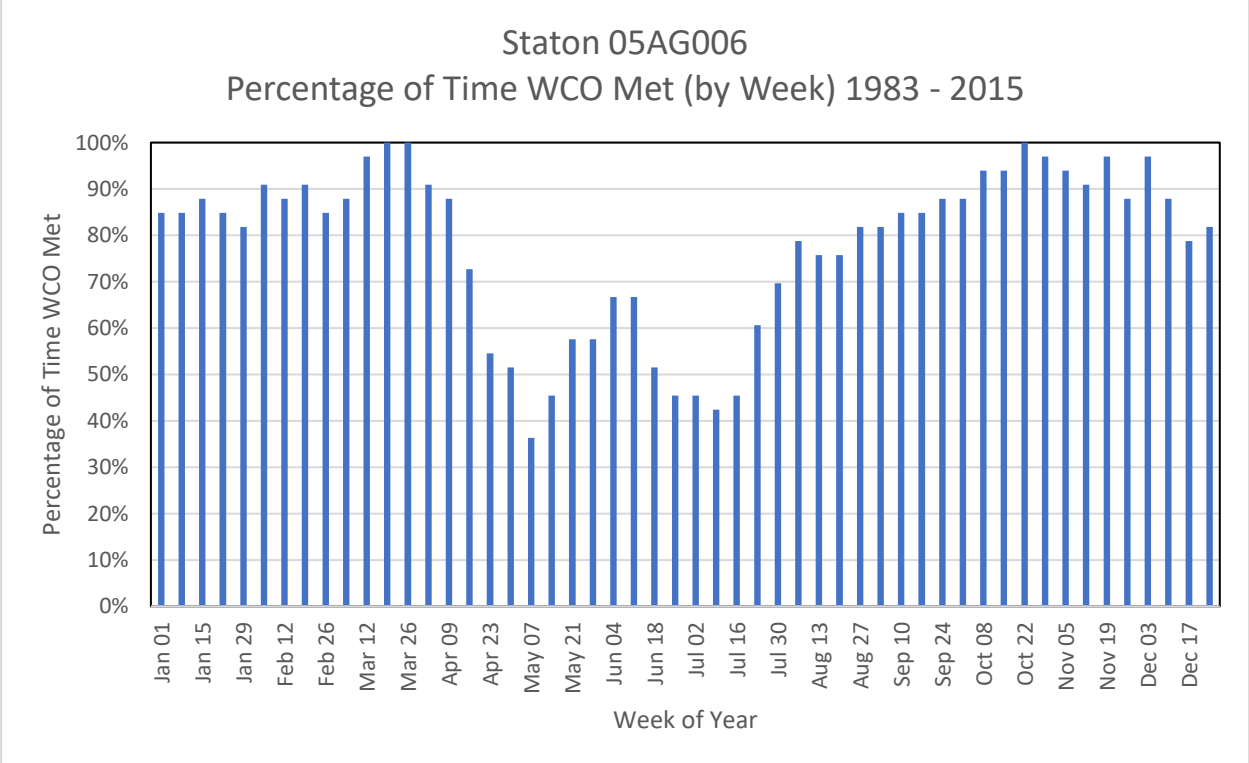
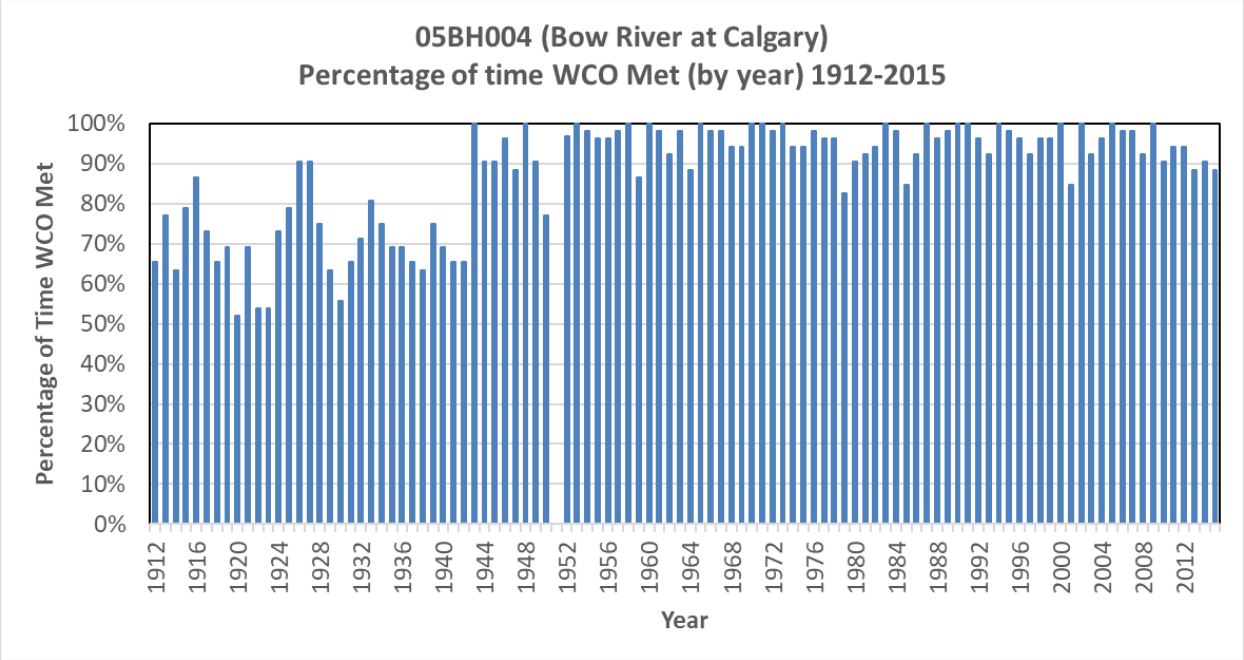

Station 05AG006 (Oldman Near the Mouth)
Percentage of Time WCO Met (by Year) 1983-2015
Percentage of Time WCO Met
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year

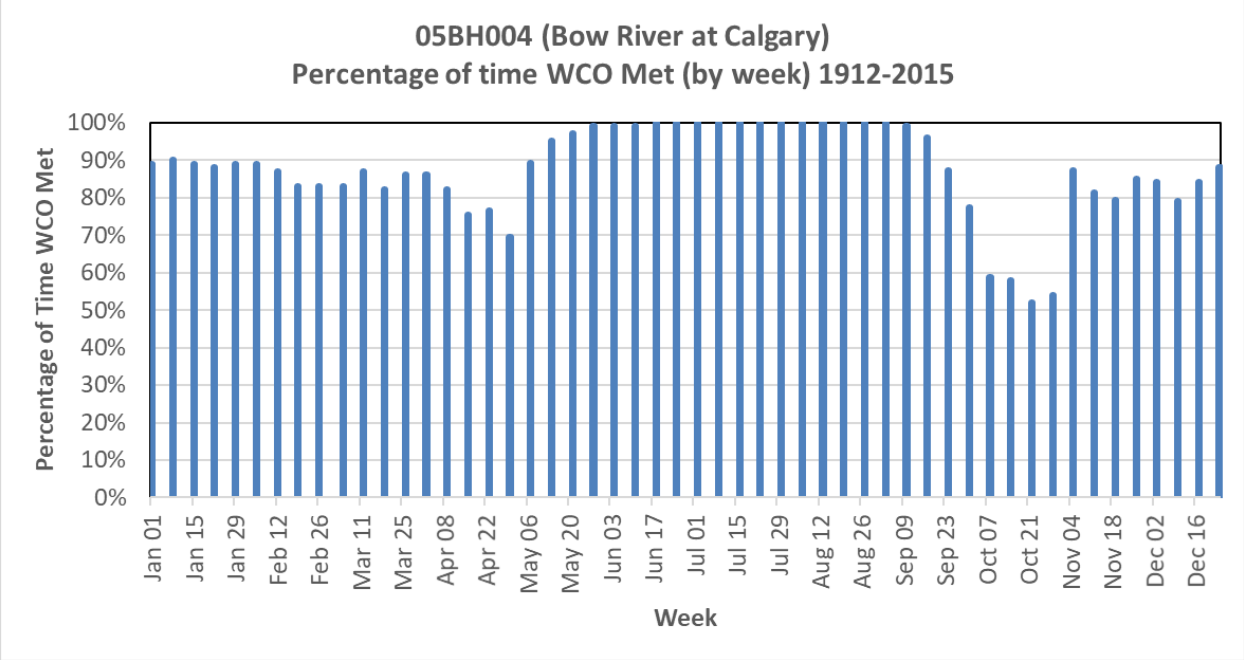

Staton 05AG006
Percentage of Time WCO Met (by Week) 1983 - 2015
Percentage of Time WCO Met
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan 01
Jan 15
Jan 29
Feb 12
Feb 26
Mar 12
Mar 26
Apr 09
Apr 23
May 07
May 21
Jun 04
Jun 18
Jul 02
Jul 16
Jul 30
Aug 13
Aug 27
Sep 10
Sep 24
Oct 08
Oct 22
Nov 05
Nov 19
Dec 03
Dec 17
Week of Year

Bow River Mainstem Reaches from Ghost Reservoir to Bassano Dam

"Each reach has an IO which is based on a relationship known as the 80% habitat fish rule curve. The IOs in these reaches are based on habitat only and do not include water quality (temperature and dissolved oxygen) protection parameters." (SSRB WMP p. 45)

The WCO therefore would be the greater of 45% of natural flow or 80 FRC and water quality protection base flow plus 10%.





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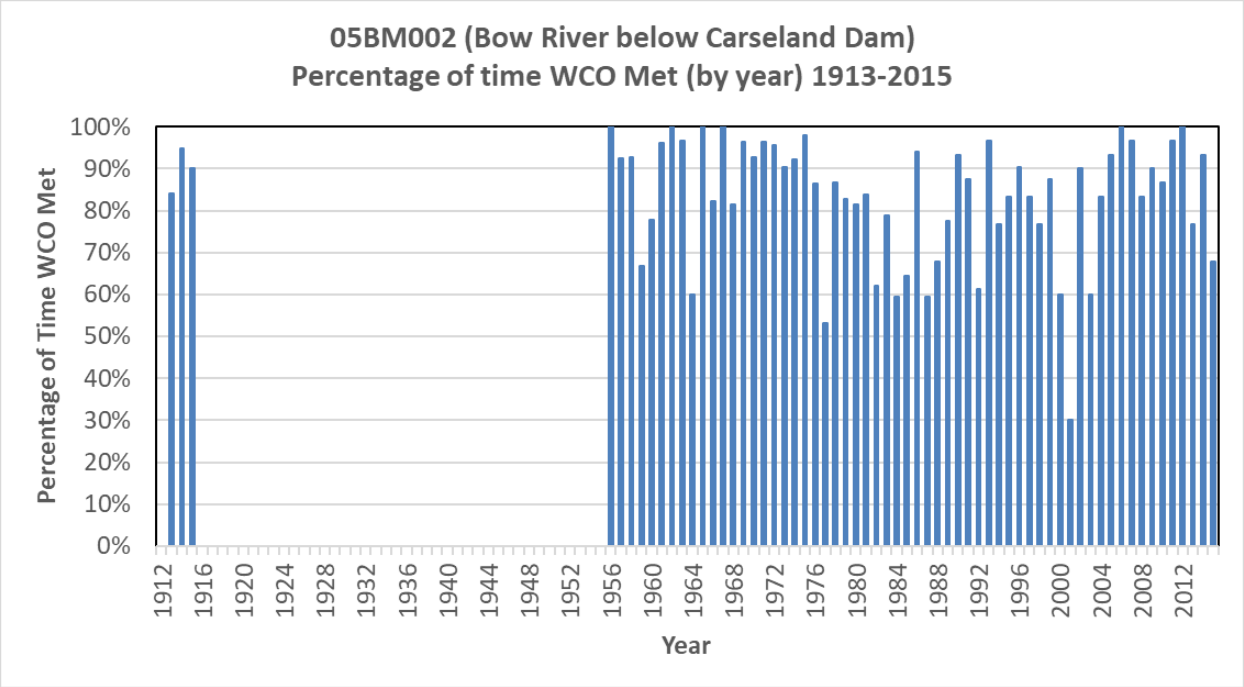
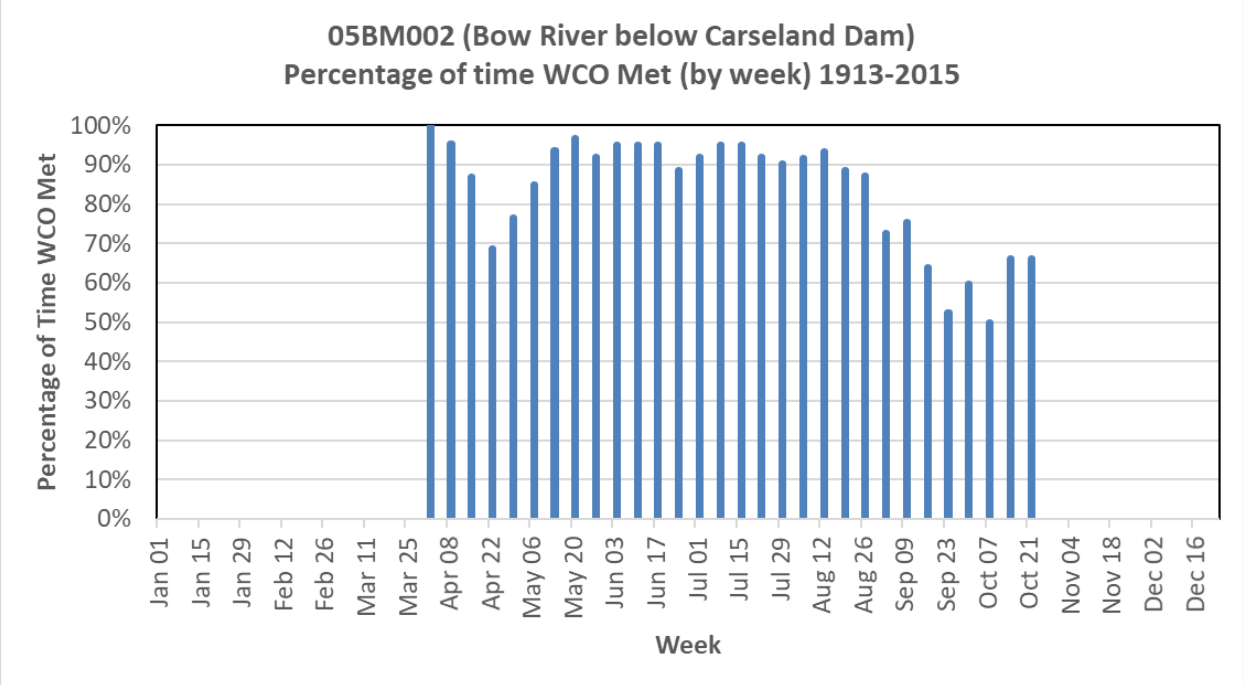

05BM002 (Bow River below Carseland Dam)
Percentage of time WCO Met (by year) 1913-2015
Percentage of Time WCO Met
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1912
1916
1920
1924
1928
1932
1936
1940
1944
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008
2012
Year

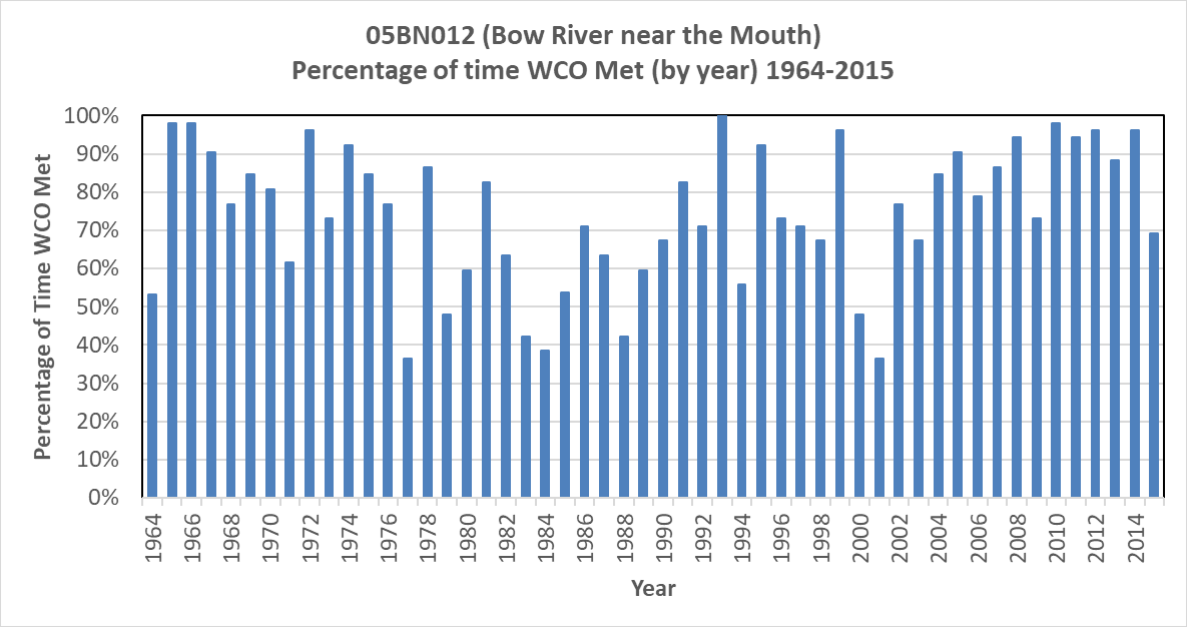

05BM002 (Bow River below Carseland Dam)
Percentage of time WCO Met (by week) 1913-2015
Percentage of Time WCO Met
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Jan 01
Jan 15
Jan 29
Feb 12
Feb 26
Mar 11
Mar 25
Apr 08
Apr 22
May 06
May 20
Jun 03
Jun 17
Jul 01
Jul 15
Jul 29
Aug 12
Aug 26
Sep 09
Sep 23
Oct 07
Oct 21
Nov 04
Nov 18
Dec 02
Dec 16
Week

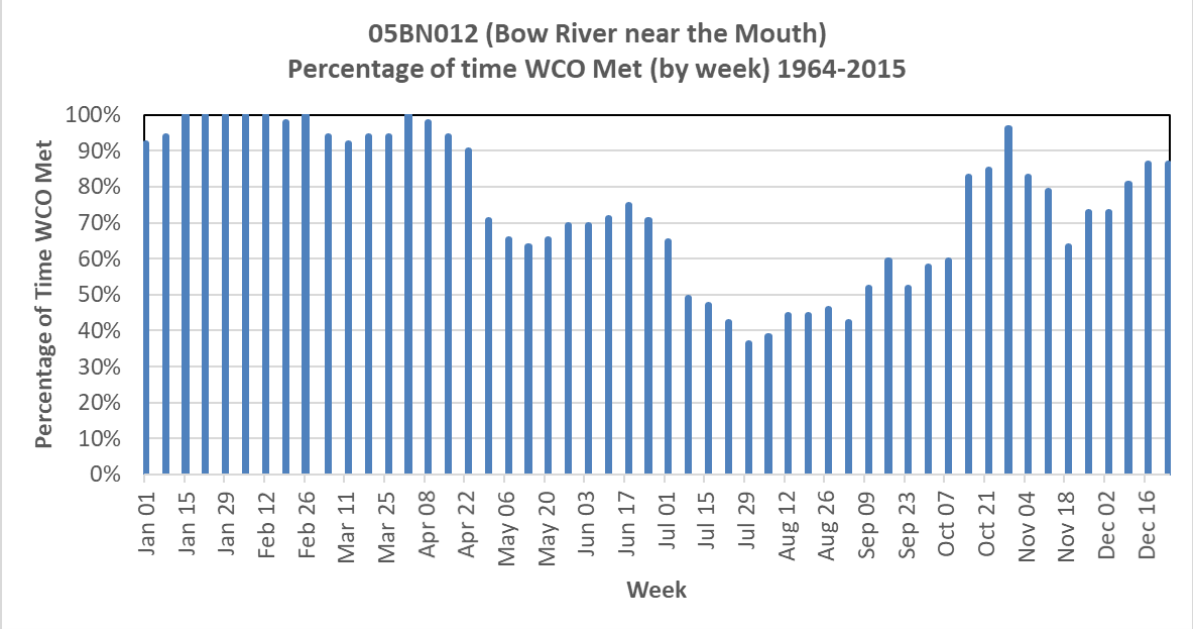
Bow River below Bassano Dam

"The reach below Bassano to the mouth of the river has three IO values:

- 39.6 m^3/s (1,400 ft^3/sec) for all licences except the Eastern Irrigation District (EID);
- 2.83 m^3/s (100 ft^3/sec) for EID's 1963 licence (1903 priority);
- 11.3 m^3/s (400 ft^3/sec) for EID's 1998 licence." (SSRB WMP p. 45)

The WCO therefore would be the greater of 45% of the natural flow or 11.3 m^3/s plus 10%.





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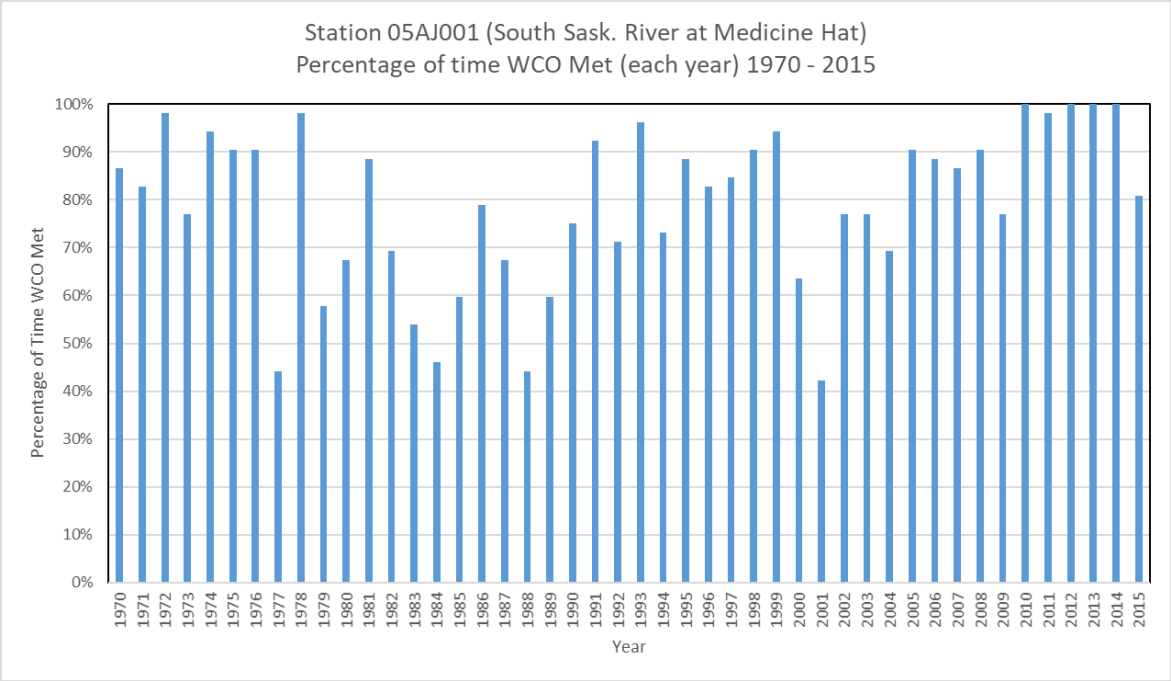
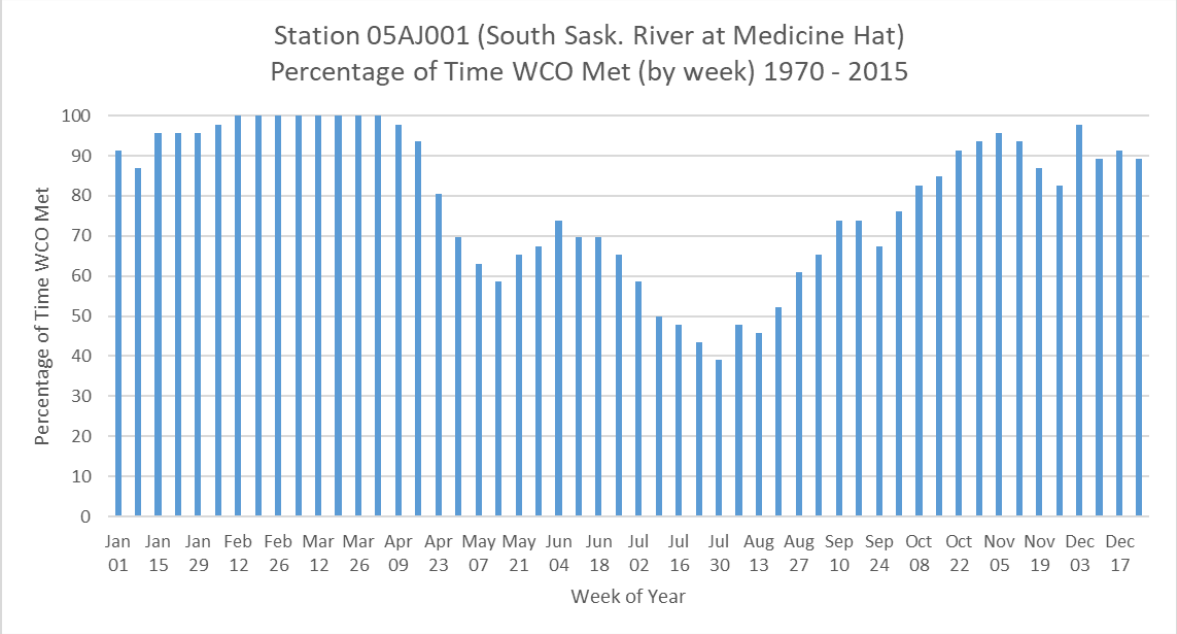
South Saskatchewan River

"From the confluence of the Bow and Oldman rivers to the Saskatchewan border, an IO of 42.5 m^3/s (1,500 ft^3/sec) is attached to licences." (SSRB WMP p. 45)

The WCO would therefore be the greater of 45% of natural flow or 46.75 m^3/sec (42.5 m^3/sec plus 10%).





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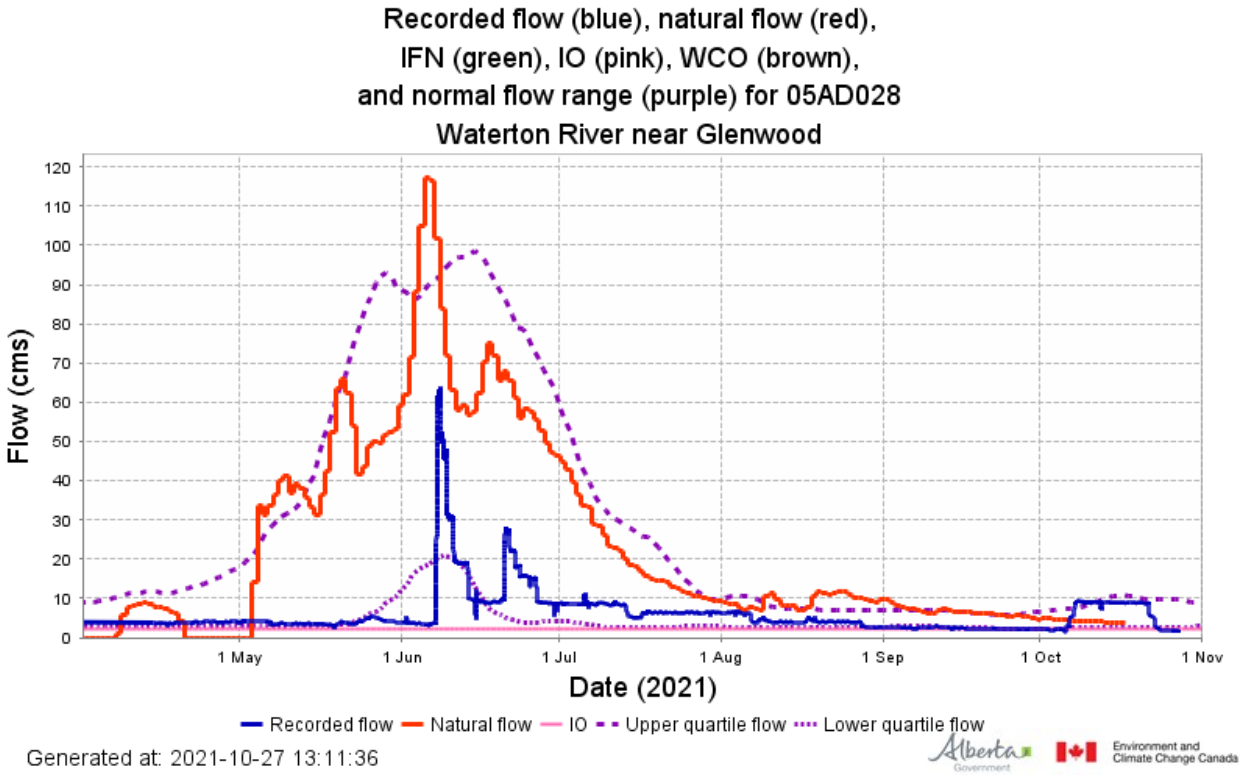
Appendix 3: Cheryl Bradley, "Yearly Graph of Flows in Potentially Affected River Reaches for 2021 (April – October)"

Irrigation Expansion Project

Yearly Graph of Flows in Potentially Affected River Reaches for 2021 (April – October)

These graphs downloaded from the Alberta River Basins website (rivers.alberta.ca) provide an indication of instream objectives (IO) and water conservation objectives (WCO) compared to natural flows for river reaches in the SSRB potentially impacted by the proposed irrigation expansion. Note that for the most part IOs are flat lines representing a very small percentage of natural flow for most of the irrigation season. Where there are WCOs modeled on the 80% Fish Rule Curve there appear to be attempts to manage onstream infrastructure to approximate them, although not exactly.

These charts are particularly insightful as they represent conditions in a dry year. River reaches where recorded flow is most noticeably lower than natural flow (less than 50%) are the Waterton River below Waterton Dam, the Belly River below the diversion weir, the St. Mary River below the St. Mary Dam, the Oldman River below its confluence with the St. Mary River, the Bow River below Bassano Dam and the South Saskatchewan River at Medicine Hat.



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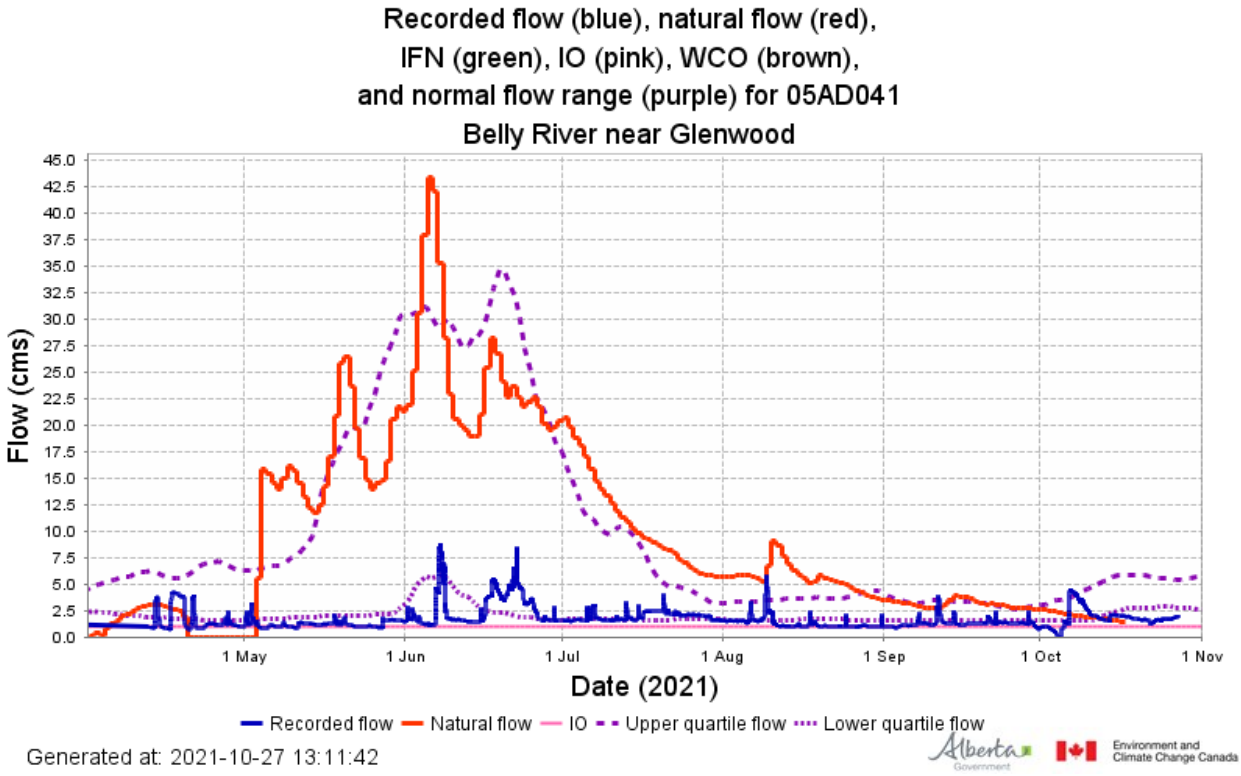
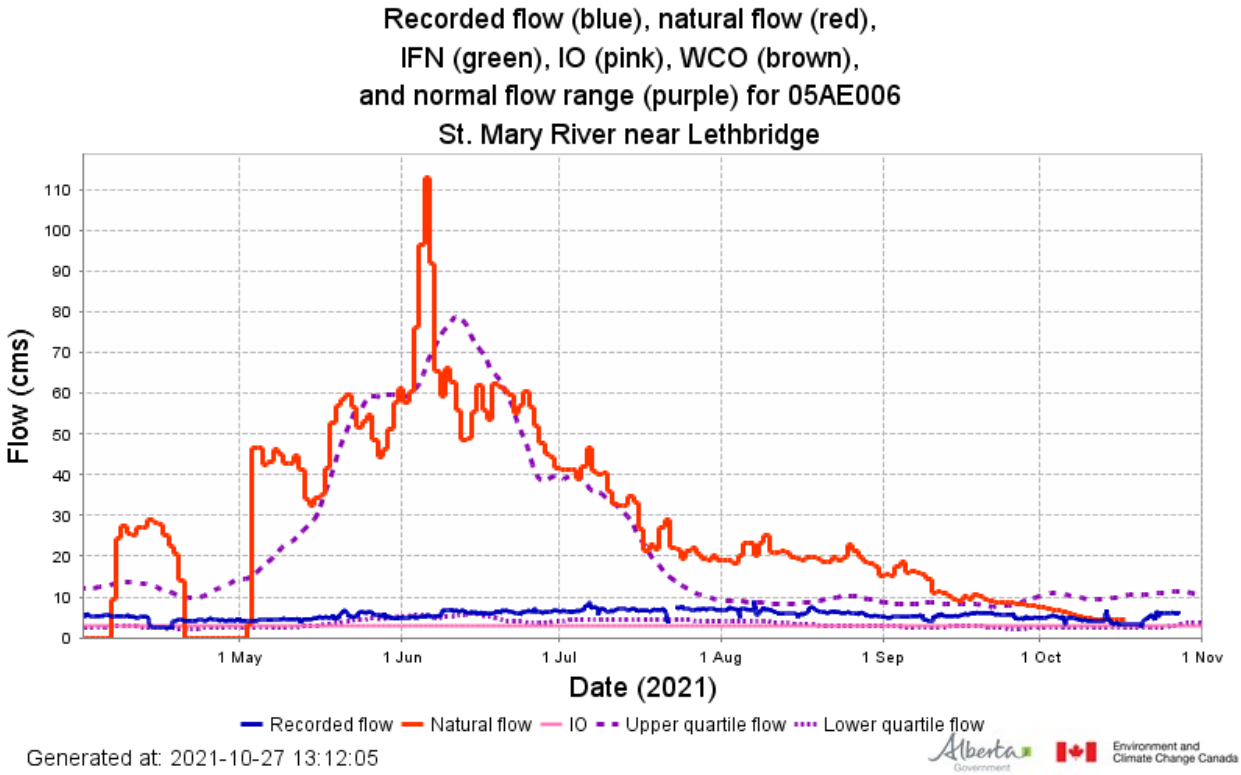

Recorded flow (blue), natural flow (red),
IFN (green), IO (pink), WCO (brown),
and normal flow range (purple) for 05AD041
Belly River near Glenwood
Flow (cms)
45.0
42.5
40.0
37.5
35.0
32.5
30.0
27.5
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
1 May
1 Jun
1 Jul
1 Aug
1 Sep
1 Oct
1 Nov
Date (2021)
Recorded flow
Natural flow
IO
Upper quartile flow
Lower quartile flow
Generated at: 2021-10-27 13:11:42
Alberta Government
Environment and Climate Change Canada


Recorded flow (blue), natural flow (red),
IFN (green), IO (pink), WCO (brown),
and normal flow range (purple) for 05AE006
St. Mary River near Lethbridge
Flow (cms)
110
100
90
80
70
60
50
40
30
20
10
0
1 May
1 Jun
1 Jul
1 Aug
1 Sep
1 Oct
1 Nov
Date (2021)
Recorded flow
Natural flow
IO
Upper quartile flow
Lower quartile flow
Generated at: 2021-10-27 13:12:05
Alberta Government
Environment and Climate Change Canada

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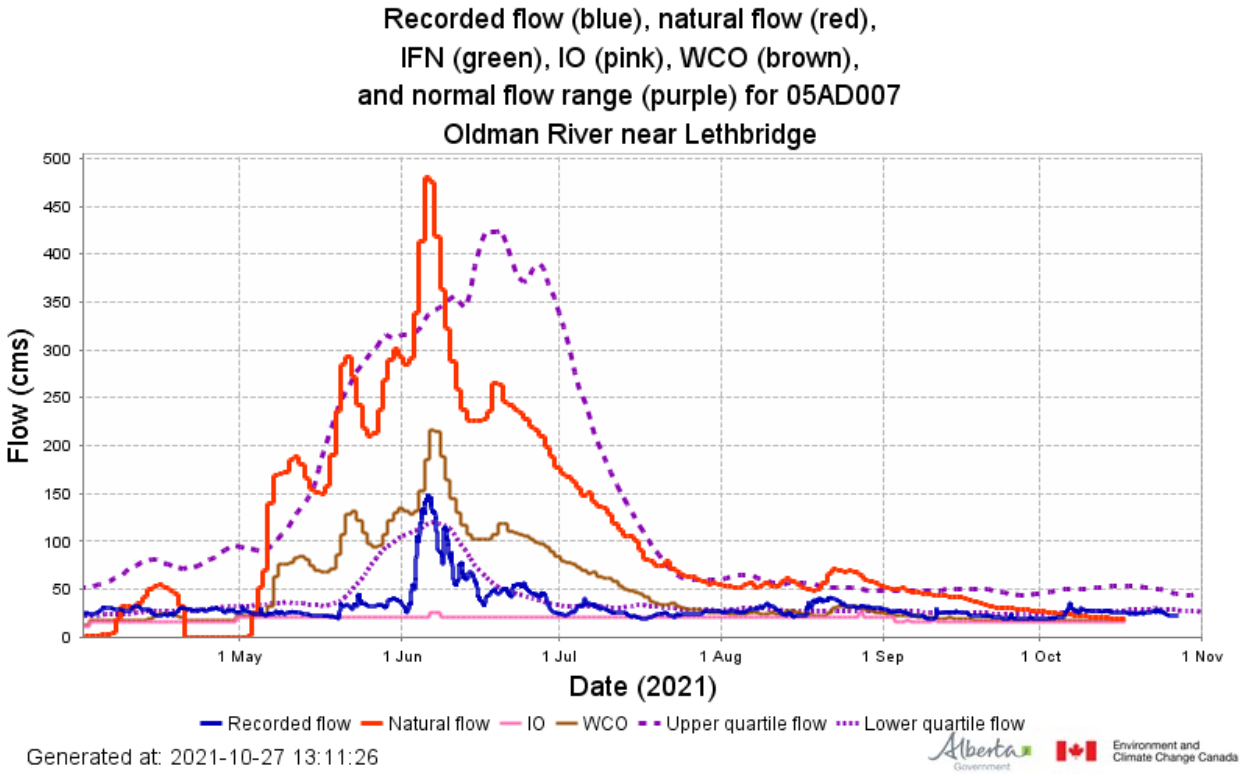
Recorded flow (blue), natural flow (red),
IFN (green), IO (pink), WCO (brown),
and normal flow range (purple) for 05AD007
Oldman River near Lethbridge
Flow (cms)
500
450
400
350
300
250
200
150
100
50
0
1 May
1 Jun
1 Jul
1 Aug
1 Sep
1 Oct
1 Nov
Date (2021)
Recorded flow
Natural flow
IO
WCO
Upper quartile flow
Lower quartile flow
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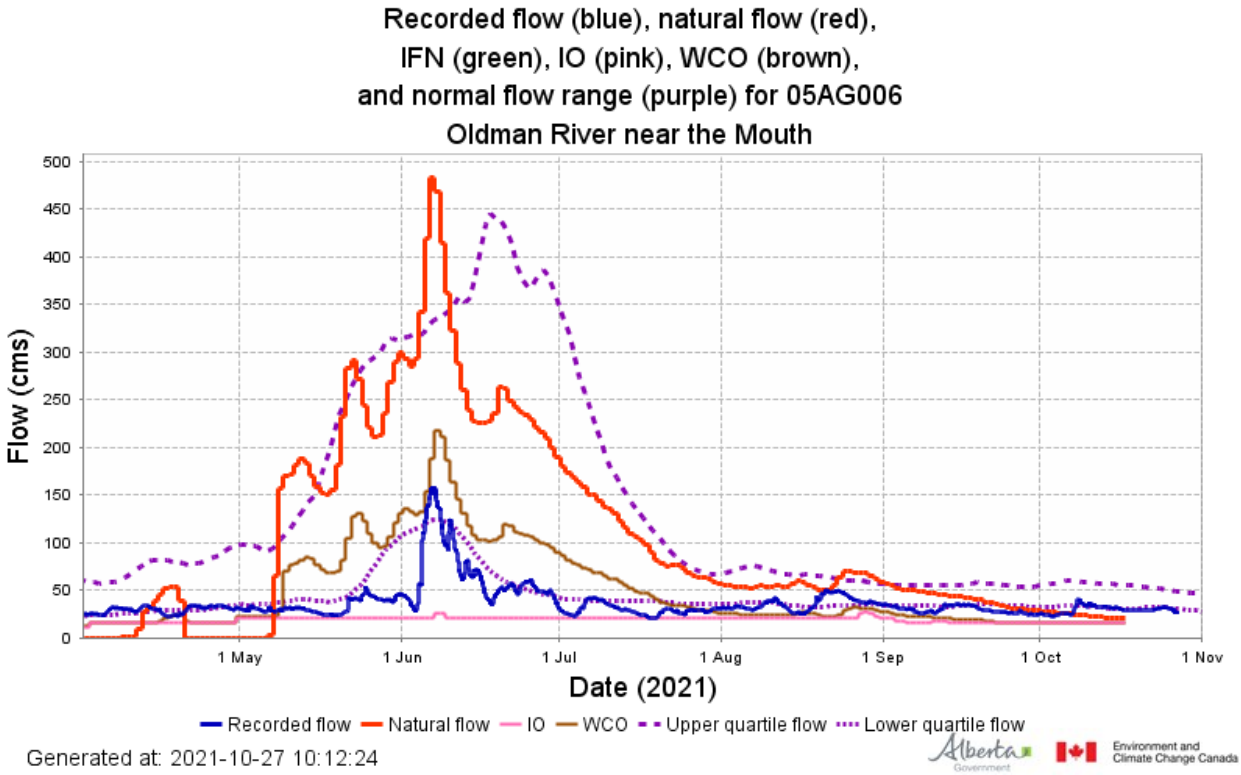
Alberta Government
Environment and Climate Change Canada


Recorded flow (blue), natural flow (red),
IFN (green), IO (pink), WCO (brown),
and normal flow range (purple) for 05AG006
Oldman River near the Mouth
Flow (cms)
500
450
400
350
300
250
200
150
100
50
0
1 May
1 Jun
1 Jul
1 Aug
1 Sep
1 Oct
1 Nov
Date (2021)
Recorded flow
Natural flow
IO
WCO
Upper quartile flow
Lower quartile flow
Generated at: 2021-10-27 10:12:24
Alberta Government
Environment and Climate Change Canada

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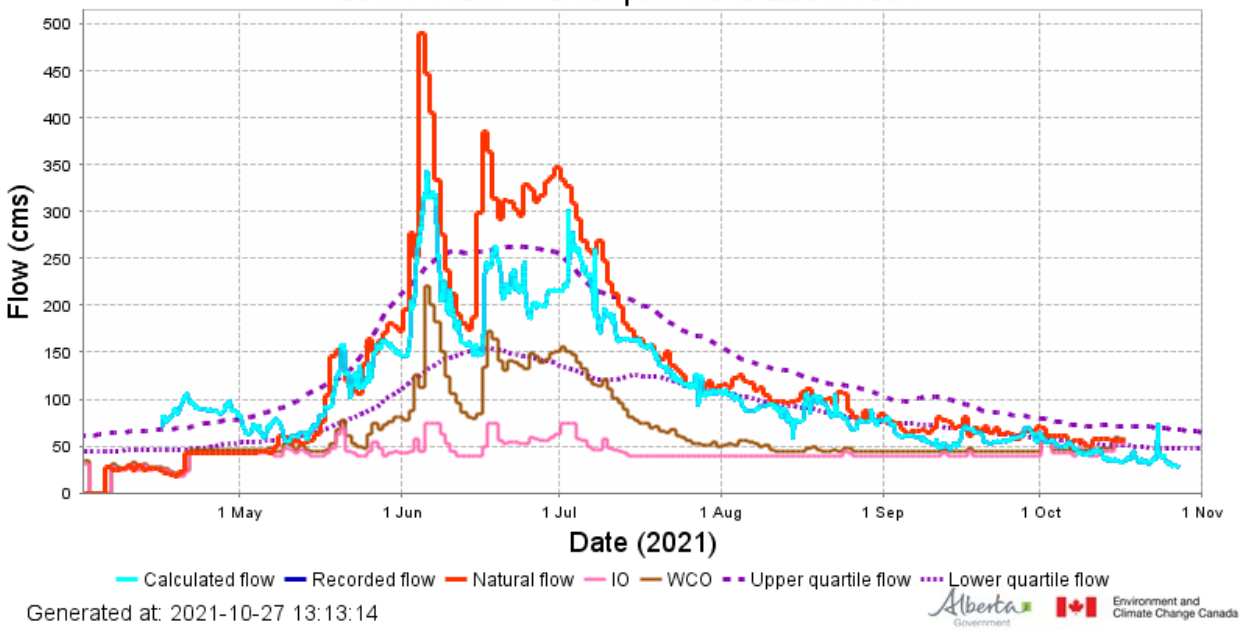
Recorded flow (blue), calculated flow (turquoise),
natural flow (red), IFN (green), IO (pink), WCO (brown),
and normal recorded flow range (purple) for 05BHU02
BowR Reach 4 - BearspawRes to ElbowR conf



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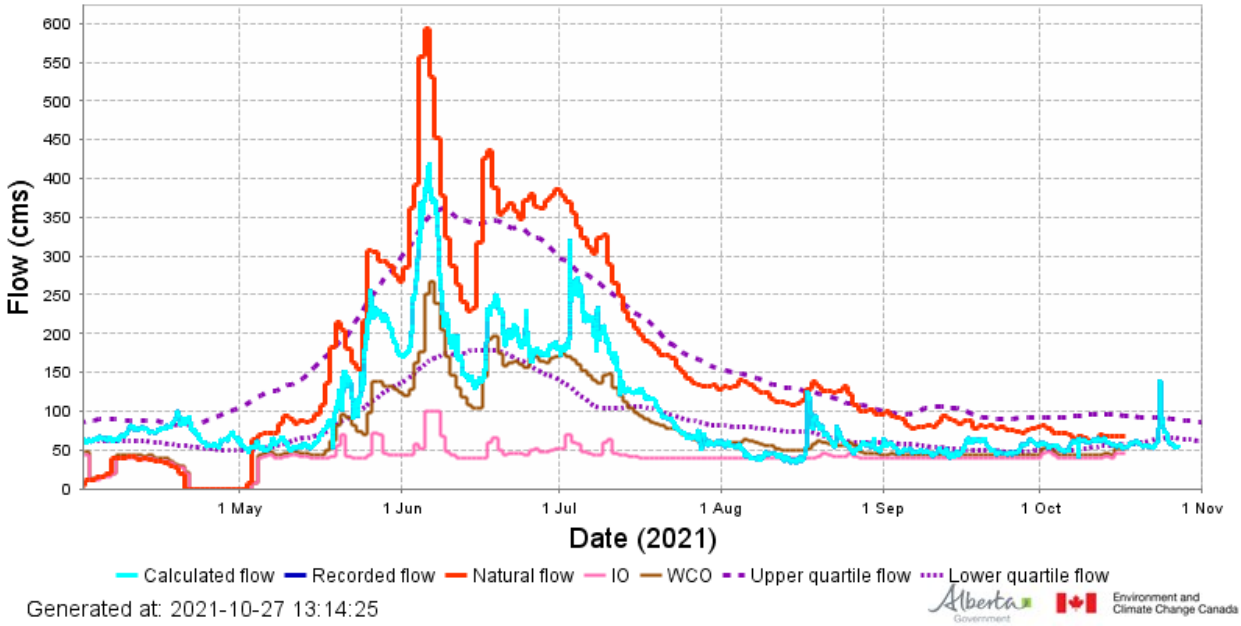
Alberta Government
Environment and Climate Change Canada

Recorded flow (blue), calculated flow (turquoise),
natural flow (red), IFN (green), IO (pink), WCO (brown),
and normal recorded flow range (purple) for 05BMU04
BowR Reach 1 - Carseland Weir to Bassano Dam



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Alberta Government
Environment and Climate Change Canada

ecojustice

Recorded flow (blue), calculated flow (turquoise),
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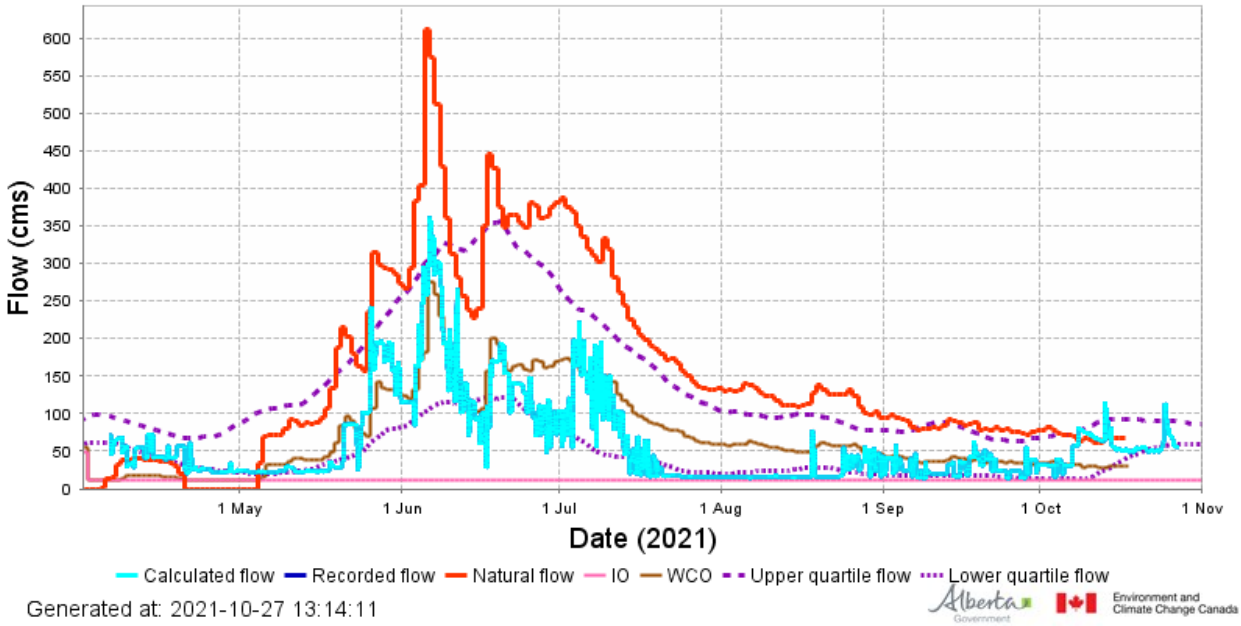
and normal recorded flow range (purple) for 05BM004
Bow River below Bassano Dam



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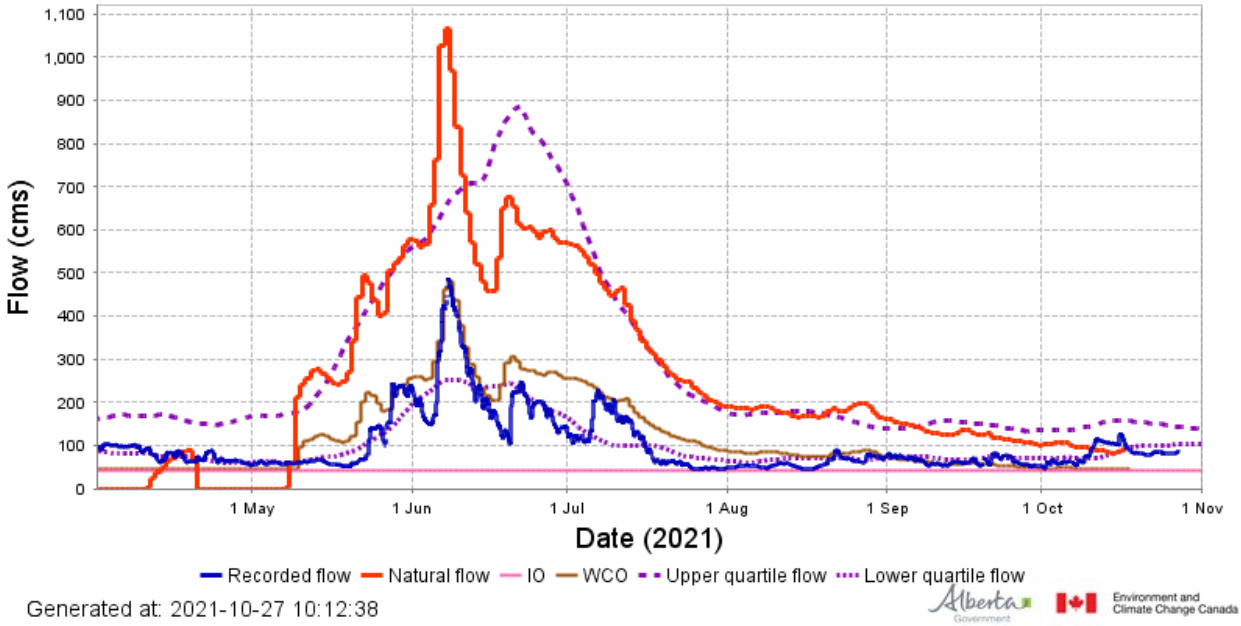
Alberta Government
Environment and Climate Change Canada

Recorded flow (blue), natural flow (red),
IFN (green), IO (pink), WCO (brown),
and normal flow range (purple) for 05AJ001
South Saskatchewan River at Medicine Hat



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Alberta Government
Environment and Climate Change Canada

ecojustice

Impact Assessment Agency of Canada | Agence d'évaluation d'impact du Canada

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

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

April 21, 2022

ELECTRONIC MAIL

David Westwood
General Manager
St. Mary River Irrigation District
525 40th St. South
Lethbridge, AB
T1J 4M1
smrid@smrid.ab.ca; dwestwood@smrid.ab.ca

Dear David Westwood,

On April 12, 2022, the Minister of Environment and Climate Change (the Minister) received a request to designate the proposed Chin Reservoir Expansion and Modernization Project (the Project) under subsection 9(1) of the *Impact Assessment Act* (IAA). The letter requesting designation (enclosed) and a description of the Project will be posted to the Canadian Impact Assessment Registry internet site, publicly available at https://iaac-aeic.gc.ca/050/evaluations.

Under subsection 9(1) of the IAA the Minister may, by order, designate a physical activity that is not prescribed in the *Physical Activities Regulations*. The Minister may do this if, in the Minister's opinion, the physical activity may cause adverse effects within federal jurisdiction or adverse direct or incidental effects (resulting from federal decisions), or public concerns related to those effects warrant the designation. In accordance with subsection 9(4) of the IAA, it is expected that the Minister will respond, with reasons, to the request by July 11, 2022.

The Impact Assessment Agency of Canada (the Agency) will review information about the Project; any concerns expressed from the public and Indigenous groups; and expert advice from federal authorities and input from provincial ministries, in order to inform the Minister on whether to designate the Project. If designated, to proceed with the Project, St. Mary River Irrigation District would be required to submit an Initial Project Description to the Agency, thereby commencing the planning phase of the IAA. In that case, the planning phase would include the Agency determining whether a federal impact assessment is required.

Additional information regarding the process for designation requests can be found at the following link: *https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/designating-project-impact-assessment-act.html*.

In accordance with subsection 9(3) of the IAA, and to inform its advice to the Minister, the Agency is requesting that you provide information you have about the Project, along with relevant documents. By **May 12, 2022**, please provide available information regarding potential adverse effects to:

- fish and fish habitat;
- migratory birds and species at risk;
- potential adverse changes to the environment that would occur on federal lands and lands outside Alberta or Canada;
- greenhouse gas emissions including loss of carbon sequestration; and
- potential adverse impacts resulting from any change to the environment, on Indigenous peoples (e.g., changes to the environment impacting physical and cultural heritage, current use of lands and resources for traditional purposes, and structures, sites or things of historical, archaeological, paleontological or architectural significance) or changes to their health, social or economic conditions.

Please also include available information regarding potential adverse effects (changes to the environment or to health, social or economic conditions) that are directly linked or necessarily incidental to a federal authority's exercise of a power, performance of a duty or function, or provision of financial assistance, that would enable the carrying out of the Project, in whole or in part.

In particular, the Agency requests available information regarding:

1. Information about key project activities, maps and layouts of the location of project components, land tenure, zoning, and estimated timelines for planning, construction, operation, decommissioning and abandonment.

2. A list of all regulatory approvals (federal, provincial, municipal, other) and any federal financial assistance that would be required for the Project and the associated project components or activities.

3.
   a) For each regulatory approval that would be required, please provide the following information:
      i. Name of the licence, permit, authorization or approval, the associated legislative framework, and the responsible jurisdiction.
      ii. The status of attaining any regulatory approvals.

iii. Whether it would involve an assessment of any of the effects outlined in the paragraphs above, and if so, a general description of the assessment that you intend to undertake and if applicable, any benchmarks or standards you intend to meet. Would conditions be set and if yes, what effects would those conditions address?

iv. Whether public and/or Indigenous consultation would be required and if yes, provide information on the approach you intend to take (if any steps have been taken, please provide a summary, including issues raised as well as your responses). If the Project is anticipated to result in permanent changes or cumulative effects, how you intend to manage those impacts.

4. For all federal licences, permits, authorizations, approvals, and/or financial assistance that may be provided for the Project, describe any anticipated adverse direct or incidental effects (including changes to health, social and economic conditions) that may occur as a result.

5. What steps have you taken to consult with the public? What steps do you plan to undertake during all phases of the Project? Are you aware of any public concerns in relation to this project? If yes, provide an overview of the key issues and the way in which (in general terms) you intend to address these matters?

6. What steps have you taken to consult with Indigenous communities? What steps do you plan to undertake during all phases of the Project? Are you aware of any Indigenous community concerns in relation to this project? If yes, provide an overview of the key issues and the way in which (in general terms) you plan to address these matters?

7. Do you have any other comments in relation to environmental effects or impacts to the public or Indigenous peoples and how you intend to address and manage those?

8. Explain your views on whether the Project should be designated under the IAA.

St. Mary River Irrigation District is strongly encouraged to contact the Agency in the next few days to discuss the information required and ensure that it can be provided within the timeline.

Please provide information regarding this file to the Agency's Prairie and Northern Regional Office by email to pnr-rpn@iaac-aeic.gc.ca, which will also be posted on the Project's Registry page.

Important Note: All records produced, collected or received in relation to the designation request process – unless prohibited under the *Access to Information Act* or *Privacy Act* – will be considered public and may be released. Should you wish to provide any comments or documents that contain confidential or sensitive information that you believe should be protected from release to the public, please contact the Agency before submitting the information. Information marked as confidential will not be accepted without prior contact made with the Agency.

Further questions regarding this request can be directed to me at 587-341-3290 or andrew.clarke@iaac-aeic.gc.ca.

Sincerely,

< signed electronically >

Andrew Clarke
Environmental Assessment Officer, Prairie and Northern Region

Enclosure (1):

1) Letter requesting designation for Chin Reservoir Expansion and Modernization Project

Please note: If you would prefer this document, and any future correspondence, in an official language other than what has been provided, please advise Andrew Clarke	Remarque : Si vous préférez que ce document, ainsi que toute correspondance ultérieure, soit rédigé dans une autre langue officielle que celle qui vous a été fournie, veuillez en informer Andrew Clarke.

APPENDIX III

Municipality Consultations

COUNTY COUNCIL

September 20, 2022

A County Council meeting was held in Council chambers on September 20, 2022. In attendance were D. Cody, R. Ford, P. Jensen, R. Taylor, J. Heggie, M. Rockenbach, S. Rodgers, S. Hathaway (CAO), and N. Paul (Municipal Clerk).

Reeve R. Taylor called the meeting to order at 8:57 a.m.

MINUTES
(22-09-13)

D. Cody moved to approve the minutes of the Council meeting held September 06, 2022, as presented.

Carried.

AGENDA
(22-09-14)

R. Ford moved to add Fire Bans and approve the agenda as amended.

Carried.

ACTION TRACKING
(22-09-15)

J. Heggie moved to accept the action tracking as information.

Carried.

Accountant S. Leusink entered the meeting at 9:07 a.m.

BANK RECONCILIATION
(22-09-16)

M. Rockenbach moved to accept the bank reconciliation dated August 31, 2022, as information.

Carried.

FINANCIAL STATEMENT
(22-09-17)

P. Jensen moved to accept the financial statement dated August 31, 2022, as information.

Carried.

CHEQUE REGISTER
(22-09-18)

R. Ford moved to accept the August 2022 cheque listing for $687,142.18 as information.

Carried.

S. Leusink left the meeting at 9:18 a.m.

Ag Fieldman J. Meeks entered the meeting at 9:24 a.m.

DIVISIONAL REPORTS
(22-09-19)

S. Rodgers moved to accept the divisional reports as information.

Carried.

T. Geremia from SMRID and J. Olitch from MPE entered the meeting at 9:39 a.m.

RECESS

R. Taylor called for a recess at 9:39 a.m.
R. Taylor called the meeting back to order at 9:43 a.m. and introductions were made.

D. Cody re-entered the meeting at 9:44 a.m.

DELEGATION

Representatives from the Chin Reservoir Expansion Project, T. Geremia and J. Olitch presented information about the future Chin Reservoir dam project. Topics included the location of the new east dam, improvements at the west dam, potential impacts to recreation including Chin Park, and proposed timelines for the project.

T. Geremia and J. Olitch left the meeting at 10:24 a.m.

J. Meeks left the meeting at 10:26 a.m.

CORRESPONDENCE
(22-09-20)

M. Rockenbach moved to accept the correspondence as information.

Carried.

ORGANIZATIONAL MEETING
(22-09-21)

R. Ford moved to set the Organizational meeting date for October 18, 2022, before the Council meeting.

Carried.

RMA CONVENTION
(22-09-22)

S. Rodgers moved to register two members for the EOEP courses.
Carried.

STIRLING FIRE ICF
(22-09-23)

M. Rockenbach moved to sign the agreement after amending as discussed.
Carried.

RCMP "K" DIVISION
(22-09-24)

D. Cody moved to accept this item as information.
Carried.

FIRE BAN
(22-09-25)

R. Ford moved to lift the Fire Ban for the County of Warner.
Carried.

(22-09-26)

R. Ford moved for administration to bring back a Fire Ban Schedule.
Carried.

ADJOURNMENT
(22-09-27)

P. Jensen moved to adjourn at 10:59 a.m.
Carried.

Reeve

Chief Administrative Officer

Municipal District of Taber

Meeting Minutes

October 11, 2022 - Regular Meeting of Council - 09:00 AM

Minutes of the Regular Meeting of Council of the Municipal District of Taber held in the Council Chambers of the Administration Building at Taber, Alberta on Tuesday, October 11, 2022.

Present:	Merrill Harris	Reeve
	Tamara Miyanaga (Via zoom) - departed at 2:39PM	Deputy Reeve
	John DeGroot	Councillor
	Murray Reynolds	Councillor
	John Turcato	Councillor
	Brian Hildebrand	Councillor
	Chantal Claassen	Councillor
Also Present:	Arlos Crofts	CAO
	Lace Lutz	Executive Assistant
	Bryan Badura	Director of Corporate Services
	Brian Peers	Director of Municipal Lands & Leases
	Bryce Surina	Director of I.T. & G.I.S.
	Corey Greene	Director of Public Works (Interim)
	Ginger Rose	Director of Hamlets & Utilities
	Travis Geremia	SMRID
	Jeff Olitch	MPE
	Phil Roberts	Valo Networks - CEO
	Andy Metzger	EQUS - CEO

1. Call To Order

Reeve Harris called the meeting to order at 9:03AM.

2. Agenda

2.1 Changes to Agenda

Resolution No: C-2022-310 Councillor Brian Hildebrand

That; the Agenda be amended to move closed item 12.1 to open session.

DEFEATED

2.2 Acceptance of Agenda

Resolution No: C-2022-311 Councillor Murray Reynolds

That the agenda be accepted as presented.

CARRIED

3. Protocol Items

3.1 Announcements/Recognitions

4. Confirmation of Minutes

4.1 August 19, 2022 - Special Meeting of Council Minutes

Resolution No: C-2022-312 Councillor John Turcato

That; the minutes of the August 19, 2022 Special meeting of Council be accepted as presented.

CARRIED

4.2 September 13, 2022 - Regular Meeting of Council Minutes

Resolution No: C-2022-313 Councillor Chantal Claassen

That; the minutes of the September 13, 2022 Regular meeting of Council be accepted as presented.

CARRIED

4.3 September 27, 2022 - Special Meeting of Council Minutes

Resolution No: C-2022-314 Councillor John Turcato

That; the minutes of the September 27, 2022 Special meeting of Council be accepted as presented.

CARRIED

5. Public Engagement Process

5.1 Call for People to Speak

No one was present to speak.

6. Declarations of Conflict

7. Consent Agenda

Resolution No: C-2022-315

MOVED By Councillor Brian Hildebrand

That the Consent Agenda be accepted for information.

CARRIED

7.1 Correspondence

7.2 Other

7.3 Request for Exemption

8. Memos

8.1 Upcoming Events and Meetings

Resolution No: C-2022-316 Councillor John Turcato

That the Upcoming Events & Meetings memo be accepted for information.

And; That; the following dates be included and suggested:

November 7th - Budget Discussion

November 2nd - Renuwell ribbon cutting ceremony and Lunch

Last Week of November - Joint meeting of Councils to discuss regional approach to areas of municipal interests

CARRIED

8.2 AG Disaster Declaration

Resolution No: C-2022-317 Councillor John Turcato

That; Council repeal the Agricultural Disaster declaration.

CARRIED

8.3 AltaLink 610L Project

Resolution No: C-2022-318 Reeve Tamara Miyanaga

That; the MD of Taber advocate to AltaLink to ensure that the transmission lines have the least impact on residents and homes.
And; do not negatively impact agricultural land and operations.

CARRIED

8.3.1 Amendment

Resolution No: C-2022-319

MOVED By Councillor Brian Hildebrand

To; add the verbage "(in form of written and verbal correspondence)" after advocate.

CARRIED

9. Requests for Decision - Non-Bylaw

9.1 Quarterly Strategic Priority Confirmation and Review

Resolution No: C-2022-320 Councillor Brian Hildebrand

That; Council approve the amended Strategic Priorities Chart (September 2022) as presented.

CARRIED

9.2 Donation Request Applications

Resolution No: C-2022-321 Councillor Brian Hildebrand

That; Council accept the Taber Cowboy Poetry & Western Music application in the amount of $5,000.00.

CARRIED

9.2.1 Donation Request Applications

Resolution No: C-2022-322

MOVED By Deputy Reeve John DeGroot

That; Council accept the Taber Junior Livestock Classic application in the amount of $2,000.00.

CARRIED

9.3 Regional Community Standards Appointment

Resolution No: C-2022-323 Councillor Chantal Claassen

THAT; Council appoint, pursuant to Section 555 (1) of the *Municipal Government Act of Alberta,* as the Municipal District of Taber designated “Bylaw Enforcement Officer”and “Bylaw Officer”, the Taber Police Service current members as listed (Graham Abela, Steven Meggison, David Gyepesi, Mathieu Champagne, Jason Vowles, Andrew Evanson, Timothy Johnson, David Dube, Christopher Nguyen, Juanita Fudge, Gregory Schneider, Lexi Brevik, Leighton Motz, Mike Kitto, Todd Boychuk, Eric Neufeld, Mathew Orme, and Austin Weersink).

CARRIED

9.4 2023 COPTER Applications

Resolution No: C-2022-324 Councillor John Turcato

THAT; Property tax exemptions be granted for the assessment years 2022, 2023 and 2024 and taxation years 2023, 2024 and 2025 to all of the organizations listed, who have applied for exemption under the Community Organization Property Tax Exemption Regulation.

CARRIED

10. Consent Agenda Exemptions

11. Council Requests for Information & Motions

Resolution No: C-2022-325

MOVED By Reeve Tamara Miyanaga

That; the MD of Taber continue supporting agricultural and economic development.
And; that Council support paying the per diem amount to Councillor Turcato with regard to his attendance at the SupplySide West 2022 Conference in Las Vegas from October 31th - November 4th 2022.

CARRIED

12. Closed Session

Resolution No: C-2022-326

MOVED By Councillor Murray Reynolds

To enter closed session at 10:18AM.

CARRIED

12.1 Closed Session Pursuant to Section 197(2) of the Municipal Government Act and Section 24 of Division 2 of Part 1 of FOIPP - Advice from officials - Council Code of Conduct Bylaw

12.2 Closed Session Pursuant to Section 197(2) of the Municipal Government Act and Section 16 and 24 of Division 2 of Part 1 of FOIPP - Disclosure harmful to Business Interests of a Third Party and Advice from officials - Water Commission Operating Agreements

12.3 Reconvene Regular Session

Resolution No: C-2022-327 Councillor Brian Hildebrand

To rise from Closed Session and return to the Regular Session of Council at 11:22AM.

CARRIED

13. Resolutions Arising from Closed Session

13.1 Water Commission Operation Agreements

Resolution No: C-2022-328 Councillor John Turcato

THAT; Administration provide consultation which includes the proposed Water Treatment Plant Operation Agreements, to the Vauxhall & District Regional Water Services Commission and the Highway 3 Regional Water Services Commission, as referenced in Attachment A and Attachment B.

13.2 Recess for Lunch

The meeting recessed for lunch at 11:23AM.
The meeting reconvened at 1:00PM.

14. Closed Session Cont.

Resolution No: C-2022-329

MOVED By Councillor Murray Reynolds

To enter Closed Session at 1:00PM.

CARRIED

14.1 Closed Session Pursuant to Section 197(2) of the Municipal Government Act and Section 21 of Division 2 of Part 1 of FOIPP - Disclosure harmful to Intergovernmental relations - Irrigation Expansion

14.2 Closed Session Pursuant to Section 197(2) of the Municipal Government Act and Section 24 of Division 2 of Part 1 of FOIPP - Advice from officials - Broadband Strategy Updates & Presentation

15. Resolutions Arising from Closed Session Cont.

Resolution No: C-2022-330

MOVED By Councillor Chantal Claassen

To rise from Closed Session and return to the Regular Session of Council at 3:10PM.

CARRIED

15.1 Broadband Strategy Update

Resolution No: C-2022-331 Councillor John Turcato

THAT; Council accept the Broadband Strategy updates as information contributing to strategic priorities.
AND; accept the presentation from CONNECT as information and further direct administration to inquire with CONNECT on costs related to completing a Roadmap for network development.

CARRIED

16. Adjournment

Resolution No: C-2022-332

MOVED By Councillor John Turcato

That the meeting adjourn at 3:12PM.

CARRIED

APPENDIX IV

Public Consultation Records

Chin Reservoir Expansion – Environmental and Regulatory

Introduction

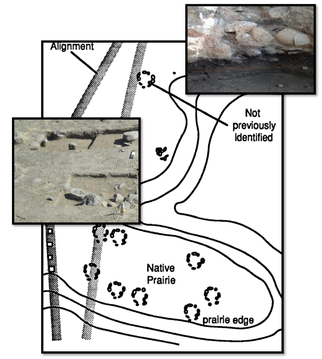
In preparation of obtaining government approvals for the expansion project, it was decided to proactively start the collection of environmental and historical resource data. The expected environmental sensitivities include soil conservation, rare plants, wetlands, wildlife species at risk, fish and fish habitat, surface water, groundwater, and historical resources.

Wildlife

Wildlife surveys were conducted between April and October. Work included nocturnal amphibian surveys, rattlesnake surveys, breeding bird surveys, burrowing owl surveys, along with the incidental tracking of occurrences of mammal observations (Figures 1 and 2).

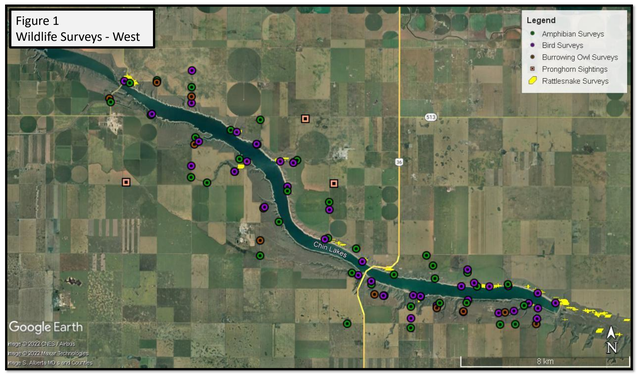
Vegetation and Wetlands

Rare plant surveys were conducted during the early flowering (spring) and late flowering (summer) seasons to detect plant species at risk.
The preliminary mapping of vegetation communities was updated or verified by field data collected at vegetation plots adjacent to soil investigation locations. Upland, riparian, and wetland plant communities were examined.
(Figure 3).



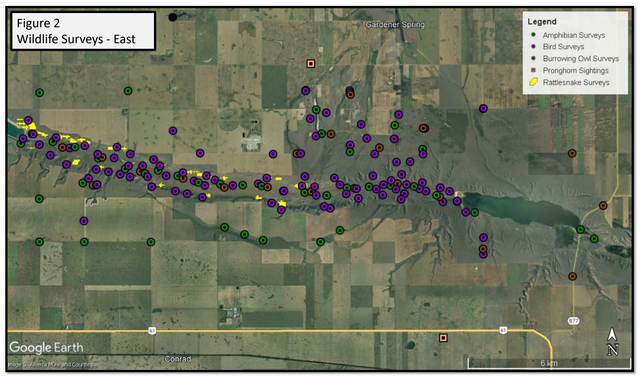
Historical Resources

Based on the high volume of significant sites within close-proximity to the Project footprint as well as the presence of several high potential areas in both existing reservoir portion and the new portion, the Ministry of Culture requires a Historical Resources Impact Assessment (HRIA) for both archeological and paleontological resources.



Surface Water Quality

Concurrent with fish sampling, water samples were collected for the establishment of the existing water quality. Water samples were collected in deep locations within the centerline of the reservoir. Water samples were also collected within the ephemeral stream and wetlands downstream of the existing East Dam.

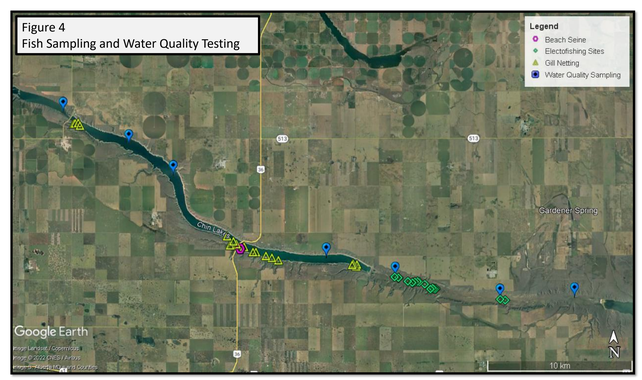


Soils and Terrain

Using available historical soil survey information and air photo interpretation, a preliminary soil and terrain model consisting of soil map units of similar landscape and soil development conditions was prepared for the reservoir expansion area.
Information collected at shallow soil pits (dug to 1 m or less in depth using a shovel and hand auger) and from soil samples submitted for laboratory analysis were used to verify or update the preliminary soil and terrain model. A minimum of one soil investigation location was targeted in each soil map unit.
(Figure 3).

Fish and Fish Habitat

Fish sampling was conducted in the existing reservoir and downstream of the existing East Dam. Methods have included electrofishing, beach seine nets, and gill netting out in the open water (Figure 4).



Where Are We Now?

In February 2022, the SMRID was notified by Alberta Environment that the Project will require an Environmental Impact Assessment (EIA).

The Terms of Reference (TOR) for the EIA are currently being developed. While the TOR are finalized, the impact assessment can be started using the data collected in 2021 and 2022. The EIA will evaluate the potential effects of the Project on identified sensitive environmental elements. The goal of the assessment is to recognize the potential effects and develop mitigation strategies to reduce or remove those potential environmental effects. The demonstration of an understanding of the potential effects and then mitigating them through design, operation, and or conservation is the ideal pathway towards obtaining government approvals.

SMRID
St. Mary River Irrigation District

Klohn Crippen Berger

MPE Engineering Ltd.

MPE Engineering Ltd.

CHIN RESERVOIR EXPANSION
LANDOWNER MEETING
SIGN IN SHEET

Date: March 11, 2022

ATTENDANCE

Name
(please print)

TRAVIS GEREMIA - SMRID	JEFF OLITCH - MPE
CHUCK SCHACK - KCB	Ross Owen
Chris Schaapel - KCB	Danny Paul
Jason Duxbury - KCB	Ben Hofer
Kyle Goodwin	Joe Waldner
DAVID WESTWOOD - SMRID	Toby Waldner
Stacey Russell - SMRID	
Jake E Waldner Prairie Home	
JACOB J. Hofer - Prairie Home	
DAVID J HOFER Prairie Home	
BRETT WILSON	
LARRY WILSON	
Tim Hubble.	
Kim & Rochelle Owen	
Richard & Rosemary Owen.	
Lawrence Barany	
Kelly Barany	

Taber Expansion Information Session(90-100)

November 22, 2022

Q. Cheryl Bradley – Is the data from past events used for the modeling, is this considered appropriate for the modeling? Was there any modeling down based on expected climate change? Re: stress on the source for the rivers.

A. TH – Looking at the effects of climate change on the modelling, still in the works and not yet ready for release. There will be enough stream flow for rivers and expansion. Have looked at it in a preliminary way and taking climate change into consideration. GF - 1988 and 2021, we have been able to mitigate via the drought season but also for the protection of the river during flood events. Our reservoirs will get us through the first drought but it's to assist with multiple years. The system did what it was supposed to do in the last set of dry years which included the last set of expansion acres.

Q. M. Camps. Are there other areas where flood mitigation is being considered and more so when the canals will be converted from open to closed?

A. Depends on the situation, we are well aware that during the construction, the channel is considered and those down stream.

Q. Jim Rabusic – The IJC, are we at risk for change on that agreement.

A. DW – We are part of the committee going through a review and determination of the allocations between the US and Canada. That review is going to take 4 years to include public and stake holders input on the review. We have Richard Phillips on that panel. Both parties have come and to date there are no changes, we don't know what the future will hold. If somehtthng were to happen to our allotment, we would take that into consideration

Q. Bareman - Lottery clarification, what can be put on that parcel? It makes it sound that it can only go on to one parcel. It has to be attributed to an appropriate parcel or parcels up to 150.

Q. Don hubble – lottery I want a 100 acres. It has to be designated on a specific parcel

A. If you have 4 quarters and want parts on each, we have to do a capacity check to ensure capability. If it doesn't can we change it? If you are not sure, you should check first whether there is capacity available to you.

Q. Murray Penner – Can I appoint my son to do the application if I'm out of the country

Clarification of the vote and who can vote by DW.

Comment - Leron – if the expansion does what the previous did, it will be a good thing for the district. If you are like me where we are at an end of a line, there are some difficulties where we run dry and that is my only specific concern. Hope that there isn't allowance of additional acres when a line is at capacity.

GL – to give similar service as much as possible equally, there is

Bill Torsius – Will there be public consultation with each expansion? I'm on the same line as Leron, and some issues. DW – whenever new additions are asked to come on, it is always publicized.

Discussions will be had if there are challenges in specific areas.

Allison Davies: Why weren't we given extra inches if the water was there?

DW - We don't all operate the same, some operate with a cap and others don't. We review information from water supply and potential weather forecasts, and then we determine what is the appropriate allocation. What we have seen in the last few years, 16 inches, and we raised to 18 this year in early August, 16 is working currently in the district and meeting the demand to the existing users.

MW – We are using 16 inches at all, July is sometimes tight but in general, we are not using the 16 inches.

Klaus – Why is the government interested in flood control, please clarify.

DW – Less storage leads to overland flooding and costs the govt. millions, the capability for us to take the water, if possible, to help mitigate spring run off or a flood event. We always have to keep flood mitigation in mind in the balancing of our reservoirs.

GF – storms ie. 2010, 2011 2018, it can hit anywhere, and reservoirs assist with this, ie. Horsefly spillway will help with potential overrun in the future.

$4000 phase 1, what is the potential for phase 2, clarify, $4000 on the first 15000 acres and reevaluations will occur as we go along the way.

GF – lesson learned, we left money on the table when it should have moved to market values in the end.

Leron – griped about the price and bought the most acres

Allen Jensen – Our district is lacking to delivery water to all users by May 1

DW – We try to start mid April but to get the water to the end of the district, takes time and we are big, always weather dependent, sometimes ice in the canal, as well construction and repairs and maintenance could still be occurring, there is a balance there, the last couple of years have started earlier but it will always depend on the factors at play. Location is a benefit and we have no control over that. Some will get water before others. The start, we know is always so important, we try our best.

Ken Perl - The main canal – there's enough water in the system in the reservoir, but not enough to get it to the chin chute.

JT - Chin is our balancing reservoir – there is not that much demand in the beginning and therefore we fill chin in the beginning

Chin chute needs rehabilitation along with the

John bareman – how much km of pipe allows you towater so many acres

Th – it depends

Bareman - Will the acres be parked if not enough take up?

Can't give the water away twice- you will be charge the annual water rate, even if you don't develop it in the year.

Murray Penner - Alternate parcel question? Capacity would have to be reviewed every year depending on where you are trying to move it

Don Hubble - Roughly when will this be happening?

DW – January, depending on results of vote.

So if the vote doesn't pass, then there isn't any expansion.

Absolutely none. Even though the models show that there is room? Yes absolutely none.

Then what happens with the chin expansion?

Could put chin in peril.

Is there any possibility of expansion possibility upstream of Stafford? Yes throughout will be based on capacity and availability.

Ken Rabusic - If we can't build chin, can the first 40000 still happen, yes but we would still need a yes vote.

Is there any reason why we do the 80000 vs just the 40000?

CN – WE signed on with the govt as one package and believed that we should do it as one. You have to count on the board and that they will release them in a prudent fashion.

GL - We need to know what this group feels about this expansion at Chin and the associated acres.

Bill – can we say yes to 40 and not to 80? If there is a yes or no?

GF – we an always have another vote if the circumstances don't work out but we felt that doing the expansion all at once

Jim Rabusic - Will the expansion proceeds be allocated due to a formula?

DW – explains the repayment plan per the cib agreement.

JR – The expansion of the chin reservoir – is that segregated? The new capital asset charges will be financing the chin reservoir? Yes but also to modernization projects. One pool.

Bareman – does this go back to the loan. Yes the new acres goes towards the loan

Is the % govt portion money n the bank, will it change if govts change?

DW – per the agreement. It does not matter, who the political party is, the govt is behind this project.

Ed hofsink - If it doesn't g through what effect will it have on annual fees?

It wouldn't be good.

Guys are really worried about capacity down stream

GF - We have a cost share agreement to run 40 mile pumps to run them more efficiently.

GF - We need the reservoir upstream to protect everyone, can't build downstream and push back up

GL – In reality Irrigation rates should be higher even if the vote ends up as a no vote.

Capacity has not been addressed well enough for the smaller users.

BT – is there more Irrican opportunities with the chin reservoir?

Bareman - Is there any Main canal rehabilitation plan? Re bank overruns?

We are not running at 100%

John bareman – main canal from ridge, irrigation turbines, Irrican history, others are green with envy about what we have here, shouldn't let it go.

George Lohues

Mike Wind

Cory Nelson

Brian Ober

Grant Henderson

Gary Franz

Bow Island Expansion Information Session (55)

November 23, 2022

George Lohues, Grant Henderson, Kyle Gouw, Mike Wind, Cory Nelson, Gary Franz, Brian Ober

Q. When people apply for acres, a qtr in block 3, are you going to be telling them if they can actually service that quarter before hand? Will capacity questions be answered ahead of time?

A. We would look at each application before they get in and would depend on staff time. We will try to eliminate if capacity is an issue. Call to the office and we will do our best to return information as timely as possible. It will depend on the situation and how heavy the demand will be.

Q. Bernie leczesky - What is that $4000/acre for? Is it for the infrastructure on the line?

A. it is for the right to irrigate, it does not contribute to the turnout or infrastructure

Glen young – who is responsible for the turnout?

The farmer is responsible and always has been.

Owen Fieldberg - Is it possible to get more information about the expansion? The package on the website has more detailed information.

If I'm not going to be here next week, can I assign someone to vote on my behalf?

For individuals no, for corporations, yes.

Form 7 explained

Q. Applying for water in phase 1, I have quarters on my own and doesn't have water with smrid.

A. Dryland farmers are eligible.

Q. Is there a time limit when you have to use the water?

A. no you can have the rights, but you do not have to start however you will be charged for those water rates whether you are using them are not.

Q. Does the 4000/acre will actually fund the project? If we don't sell all the acres, will my rates be affected?

A. the first 15000 acres is $4000/acre. AIM funding explained by DW. Bank was flexible with respect to repayment. We'll start charging you interest when you start drawing the money but repayment will occur once revenue begins.

Q. Is there a chance that my yearly rate will go up if expansion doesn't occur or we couldn't sell enough water rights.

A. there is a bigger chance if the vote ends up as a no as we have already signed up for all of the modernization projects.

Q. Will there be preference given to…

Whatever you apply for, you have to provide proper soils, water that is used is what has to be charged.

Q. If we go over budget on the projects, can we get more $ out of cIB or will it come out of reserves?

A. When we made this deal, they were in a tough financial situation, the atmosphere now is a little different but we will approach them about cost overruns.

Q. Is there a certain number of irrigators for the vote to pass.

A. 50% of the vote plus 1

Q. Govt. participation, how solid are these agreements if another govt comes into power.

A. We approached govt about this, they said to us that once something has been passed with treasury, it is going to happen. Yes contract is all through to 2028. Not just the SMRID but the Ab Irrigation association, we do a lot with the NDP, the opposition ministers and educating them, and they are very positive towards irrigation as well, this project would not be seen as a mistake. They are just as excited. Shannon Phillips very positive about irrigation.

Q. When you do submit, can you submit on different parcels? Could there be a plan B?

A. WE don't have an answer to that but phase 2 will be catering to larger projects. You can make your application for the 150 acres now and have them sitting there but they have to be on proper parcels with appropriate soils and capacity. Only if your system is on a AIM project, we will allow those people that they can pay the down payment and wait for the project to finish to continue development.

IE. So this will be the exception to the 1 year rule?

We've learned from the last time and we need to do this as fair as possible.

Q. What happens if the first 15000 goes fast, what happens next?

A. The intent is to do phase 1 to cover as many small parcels as possible. If only 10000 acres sells then the 5000 would likely go into the next phase or another lottery. When we did 1800 last time to they sell out, we left money on the table. We assume that the 15000 acres will go fast.

Q. Will they be available for the 2023 famr year?

A. Our goal is to be able but the rules have to be followed and expedited as quickly as possible.

Q. When will phase 2 start? The next year?

A. Unknown at this time. How many rounds of phase 1 will we need to do, need to look at capacity, we don't know yet. Phase 2, if there is not enough interest, will likely more be align with Chin timeline. Will have to look at what is happening.

It might take 10 or 15 or 20 years.

Every year the water rate will be assessed.

Q. the modelling, is it a fair assessment, based on historical date, our cropping has changed, and with apa and land swapping, the higher use crops will be using mor and more water especially in my area, will that be taken into account? I think it will be a steep acceleration.

KG - I agree with you a 100 percent, that is why we need to go at this slowly, at the end of the day, we have to watch what happens. We wanted to do this without the government help to keep this industry viable thinking that we may not have gotten it. $23/acre on an annual basis, we are planning as best we can. Irrican only passed by 53% when they put that in and see how well it is working now. Our predecessors did the right thing. Water allocation was 16 inches and we used 12.5 inches, we are using less water and has to continue and we need to be more efficient with the water and appease the masses and the environmentalists. It is in our expansion guide, our acuatll annual usage is 13 inches at the farm gate. We didn't include any of the IRP projects moving forward and we intend to reinvest this money into projects to create more water savings.

Ell - Water use modelling and the change in the next 5 years I think is going to be very different.

LY - Investing in the technology will make things more efficient. If they used technology down in California, they could drop the use on apple orchards from 40 inches to 18 inches if they went to drip irrigation.

Q. So we go vote, when will we know if it passes

A. we'll count on Tuesday, and send a message mid day next week.

Then let us catch our breath and we will then decide when the 30 day window will open.

By then we can apply for the lottery, and then draw by the lottery, and then have easements and reclassify land. Per the office that is not what was said, they said the land had to be classified first before going to the lottery. Might have been trevor that told linda that.

To get your water you have to have soils tested etc.

Some are going and getting soils done in anticipation of this process and possibly takes 3 months to wait for results.

Spread the word and please come vote.

Bow Island Expansion Information Session (50)

November 23, 2022

George Lohues, Grant Henderson, Mike Wind, Cory Nelson, Gary Franz

Q. What's going to happen when there is restricted water times?

A. It's the same as it is now, we are not eliminating the risk, we are carrying the same amount of risk and won't increase the risk of that. If you have canals that are seeping and going out to the end, we are using the water instead of letting it go.

Q. Isnt there a certain amount that has to be diverted to the river?

No. we don't have a certain amount to divert andno credit for what goes back, at the front end water is automatically .

Q. Instead of using the 16 inch, can't we increase to 17 or 18 as a lot of acres aren't utilized if we didn't expand?

A. various growers use different volumes, we strive for 18 but sometimes we are cautious to ensure there is water for the following year, but 16 has been the average and most times 16 isn't the average of use, it's actually lower. The system has delivered quite well even after the last expansion of 04000 acres especially in the last few dry years and happy how it has performed in the last 4 years.

Q. The last several years have been extremely dry and will that be the new normal? When the year is drier, 13 inches isn't enough and you have to make that up. Can we look at the betterment and utilization of water as increasing that in dry years?

A. The expectation is to utilize the water and not to sit on it. We are not using 16 – 18 inches, we are actually using 13 inches due to increased efficiencies. The varieties of changed and use less water and is happening a lot in many commodities. Forage and timothy and hemp and pushing the limits of that too and I could rent so that I could get access if I need.

Q. You're managing at 16 inches at the beginning of the year and then adjust to 18 when we could have really used it at the beginning.

It is a year-by-year thing and dependent on weather and availability.

Q. Do you guys need $4000/acre to keep going? As a 3rd or 4th generation ranchers, this isn't feasible, in the middle it works, but it doesn't here. I don't get the best water, this is the best quality this past year but before now, it's been garbage. I understand it's hard to treat water from the reservoir.

GL - I'm sympathetic to your thoughts, I have calculated, and it's because we represent everyone, we have to get what the water is worth. The realty is we can't have a 2 price system. What we are doing with that money is to get that money work towards quality. Can't do it if we under sell it and that would take money out of your pocket, for everyone that doesn't expand, if we sell the acres cheap, it comes out of the pocket that didn't expand and giving it away to the ones that can. It's a hard truth, supply and demand with economics. I understand the tail end is different than that at the headworks, but we've had this question come, Division, why do I have to pay 23/acre when it's easier to get water to me than to the guy at the other end. Everyone has to be equal. Every time the price of land goes up down there.

It's the generations that make this go, it's a tough pill to swallow.

Q. Can they be leased purchased over a 20 year period of time to allow generational people like them to carry on?

CN - I have APA, for rotation and I couldn't buy them so I rent them all the time, that's another option, I can speculate that 2000- 3000 are speculating and you could rent those acres and it's far cheaper than to purchase. It is an option.

Q. So instead, if I lease them with the option to buy, say I want 600 acres and my biggest thing, is that I want to buy out as I'm going, can I buy out along the way?

GL - Your land is going to go up in value, you may not choose to rent out to a potato guy, but you will have more opportunity to borrow money. Water rights are attached to land and banks are going to want the security in some way.

DW – The next publicly announced price in the BRID was $3000/acre and was sold out quickly

Dave Sargeant - Have you considered the overall impact to land values going forward, this is a serious increase.

It's more of a response to an increase, it means the value of the water is already there. We are just catching up.

Q. Do you have anything regarding how much more productivity there is with irrigation vs. dry land? There needs to be a buyer, if they is someone paying for that than I understand. The preservation of the family farm, will a reduced interest rate be given to them?

When I started farming, I got a 6% loan but interest was 18% at the time. Have some talks with ADC or ?

Last study that we looked at, 4.5% of the arable land creates 28% of the GDP, it's the crop mix that changes to give better returns.

Q. Has the SMRID considered variable irrigation studies? Innovative suggestions that could make things so much more efficient.

Dave Sargeant – the dealings with the provincial govt, would then tax the water usage?

Mike Wind – the result is the tax from the sale of production.

DS – It's not much different than oil and gas. They could implement an additional tax.

Q. I get the impression, you are pricing it more on ? what if would have been 3000, does that mean it doesn't cover the cost of the modernization projects, therefore the result would mean increased water rates?

Yes

Q. How do you see the water quality coming out of ridge reservoir, do you see a difference between the Jensen dam vs. the ridge reservoir. We are seeing water quality differences. Are any other irrigators seeing this?

JT. We have a rep from ridge, he feels the water quality in ridge reservoir has improved over the last few years.

GF and CN - I think when we talk about water quality, it depends on the systems you are on and we are doing our best to get treatments done as best as possible. WE are trying to be able to offer that to our water users, to try and reduce usage stops. It's not that we will make the water perfect, but we are striving to make improvements. Cn explains the difference in systems that he partakes.

Is the lottery across the entire district? Yes it's across the entire district as much as possible.

Do you have the price set for Chin Expansion? We might get lucky here but get hooped later.

WE are going to do this cautiously and prudently. Who know what changes will happen.

But don't you think each block should have fair acres in the lottery.

A few years ago and we were wanting a few acres but was all sold out in my area but still available in block 1, why couldn't the transfer from block 1 to here I am. So, how many acres are allocated for down here.

A. A significant amount of acres is going to have to come from chin, but there will be availability through the whole district. The water savings is coming from the modernization projects.

Q. So when you do the lottery and the allocation then, will 150 take precident over 75 -80 acres.

No everyone has the same chance.

Q. why did it have to be all in one and not the modernization vs the expansion.

Q. you said you have 15000 available now so why can't you sell that.

We can't unless we increase the limit. On any expansion, a plebiscite is required.

Why can't we raise the levels now.

We have to keep artificially low in case of weather events.

Chinconduits have to be replaced, renovating that is an unbelievably high cost, and this is another way to pay for that. For the renovation of the chin conduits and modernization projects and the dam, no the current users.

Rick Belau - If there is a no vote here, it will send a message to the province about what we want for this are, it will be detrimental to many things, such as the twinning and other projects. If you can have industry come in and raise your tax base, it will lesson the pain overall and help overall.

Q. Please outline the risks to the ones not planning to expand?

A. The modelling is showing no increase in risk, the biggest winner is the one who doesn't that will get all the benefits and revenue generated to subsidize the modernization projects and dam.

If you are successful in the lottery and come with the deposit of 10%, and if it subject to an aim project to wait, you get to wait on that time period. They will have a longer time to wait. Has to be an aim program project.

GL I had applied before at 1800.00 and was turned down and now I'll have to pay 4000/acre.

I think the next 15000 acres should be prepared and ready to go. ??

Dave Sargeant – As an organization, what does SMRID pay in property taxes?

How will the lottery be done? Process Is being developed.

What if only 10000 acres are sold of 15000, what is repayment like. David explains cib repayment.

When is the application process? Not yet ready to release a date, some time in 2023.

Bow Island Expansion Information Session (78)

November 23, 2022

George Lohues, Grant Henderson, Mike Wind, Cory Nelson, Gary Franz, Brian Ober

Q. What's the interest rate? 1% for 35 years, David explains flexible terms

Q. Assuming the district does well, can we accelerate the repayment? Yes

Q. How many years after phase one will you start phase 2? It's difficult to figure out that timeline, there are many different scenarios, we have to give how much initial interest there is for small lots, phase 2 is intended to target the bigger project. We are trying to protect everyone in the industry. The main thing is that the board is going to check it every year, we will be cautious and prudent about the release of acres. We didn't know if we could get all the pipe we wanted, but all of a sudden the pipe supplier is slowing us a down a little. You really have to monitor how the progress is going. There was a large resin plant that burnt down and that has slowed things down as well

Q. One of the comment is made is that we are on the hook if we go over budget, how is that looking with respect to inflation. We got good pricing in the beginning and it is starting to escalate now and we think it's going to come back a bit but that is the deal we came up with the GOA and CIB, we will revisit it and we have spoken them regarding the inflation from the original proposals. They understand that the economy has changed and realize that the discussions will need to be socialized as things unfold. Like any good contract, they will re visit, and with the inflation, the govt will have the discussions as we revisit. We will definitely be talking to them about that.

Q. Was the vote for 0 or 40000 or 80000 acres. It is from 504,200 to 584,200.

Q. Is that $4000/acre a cap for the 15000 acres? The price will be evaluated every year, but the first 15000 acres will be at $4,000/acre. Once that is done, we will be reviewing the price. The last expansion, we left monies on the table and lessons learnt therefore more reviews will be occurring as this goes. You can go to your board members and discuss at the AGM every year if you have concerns.

Q. If the expansion will affect the allocation? We spent a lot of time with the modeler Watersmart, will not eliminate risk, but not going to impact what we have today. We are not increasing the risk. We will continue to put pipe in the ground to increase our savings and efficiency gains.

Comment: the board for having such a thorough presentation for us and using conservative figures to do so, commend going after the opportunity when it was given, shown good foresight and created all of this for the future of our kids. We take good opportunities and run with it.

We want to test something, we go to southern alberta and we will try it out.

Q. the main canal, what does that look like for capacity, can more flow go through it. So the main canal has capacity right from the start to the end and on the main canal. We can't put all that water through there, but instad of it going to the river, we are putting it in the pivot instead, the stuff from chin, not all will go to the main canal, a portion will have to stay up on the upper end for these areas, Part of the chin expansion, the chin spillway is necessary to feed for irrigation when needed and cant go through the power plant. We will be able to do it a lot faster than we do today. We did good modelling, water in chin in spring, when we are pulling water ahrd out fo those reservoirs, we already have the water in chin

to help with balancing and use. Rain refills reservoirs If chin was on the to end, it would have a different affect but it's perfect in the middle.

Does it give us more security to store more in the winter. Yes, it's the water now that gets ready for next year, we are always thinking for preparation for the following year. The beginning it always starting with last years water unless you are pulling right from the main. Jan has to keep chin lower in case of rains in June, if its longer, than he can keep it higher and allows us to store more water even in times to have to protect that dam.

Is the water quality going to be treated more? We do treat and try to keep algae in check, we are setting aside funds to develop more methods to reduce algae movement.

Q. The chin expansion. How much of that water will stay back there when, the announced acre feet is usable water, there is a lot of dead storage, the 103 is the amount of above dead storage,and it's a bonus for recreation.

Q. Once that dam is built, can we upscale production at the plants? We are building in capacity for the possibility for another power plant at chin conduits.

A. Anything like a nice recreation area like rolling hills that EID has done? We are looking into partners to contemplate.

Q. when we increase the number of acres and storage capacity of chin. When I go by st mary dam, it always looks low. Am I missing something here. Kudos to the operators of the St.mary dam that prevents spilling, they can only store water as fast as it gets it, it does spill. Depends on the time of year.

Q. What kind of equity, do we have to revisit the agreement with the IJC. David answers. Would they have the power to change that on their own? No, it's not easy as it affects all the waters along the Canadian USA border.

Q. Irrigating in the Magrath Irrigation district, I don't assume that the allotments will change. No changes. WE are not asking for a change in the license, just the amount of water we can spread across.

Applications with capacity issues explained. On your application, you need to name the location that you are the registered land owner of where you want to put those acres, you can't buy them prospectively, you have to own them. You have to get your soils done, you have to get your easements done and the rights have to be paid.

Do you have to so many positive votes? No 50% +1 of the ones that vote.

What is your level of concern, re: slowing start dates down, ie. Environmental groups. We are explaining to environmentalists the issues and we are working closely with the assessments. Confident that it's going to run its course and nothing has come to our attention. No federal impact assessment needed, relying on provincial impact assessment.

Is the election a concern.

If I want to apply for acres on a project that hasn't started yet.

If you have to run across your neighbors land, do I have to pay for the pipeline in? yes that is still your responsibility.

APPENDIX V

Impact Assessment Agency of Canada - Project Review Decision

Approvals Unit
Regulatory Assurance
Regulatory Programs
2nd Floor, South Petroleum Plaza
9915 108 Street NW
Edmonton, Alberta T5K 2G8
Canada
Telephone: 780-427-5828
www.alberta.ca

June 7, 2022 File Number for Consultation: FNC202202151

Travis Geremia
St. Mary River Irrigation District
Via e-mail: tgeremia@smrid.ab.ca

Dear Mr. Geremia:

Re: Pre-Consultation Assessment Decision – St. Mary River Irrigation District – Chin Reservoir Expansion – East Dam

In accordance with the Government of Alberta's *Policy on Consultation with First Nations on Land and Natural Resource Management* (2013) and the Government of Alberta's *Guidelines on Consultation with First Nations on Land and Natural Resource Management* (2014), Alberta Environment and Parks (AEP) has reviewed this file and the Pre-Consultation Assessment request provided by St. Mary River Irrigation District regarding their proposed project.

Based on the information provided, AEP has determined no consultation is required for the Water Act approval as applied for under FNC202202151, or the environmental impact assessment report.

If new information becomes available regarding the approval required under the *Water Act* and there are changes to scope, scale, duration and intensity a new Pre-Consultation Assessment may be required.

This decision pertains only to the approvals under the *Water Act*. If additional approvals are required another Pre-Consultation Assessment may need to be completed.

Should you have any questions, please contact me at 780-644-4983 or via email at Lori.Havanka@gov.ab.ca.

Sincerely,

Lori Havanka
Approvals Program Manager
Approvals Unit, Regulator Assurance Section
Alberta Environment and Parks

cc: Jeff Olitch, Engineer, MPE Engineering Ltd., jolitch@mpe.ca

Jason Duxbury, Senior Terrestrial Ecologist, Regulatory Approvals & Permitting Team Lead, Klohn Crippen Berger Ltd., jduxbury@klohn.com
Kathleen Perchaluk, Consultation Advisor, Aboriginal Consultation Office, Kathleen.Perchaluk@gov.ab.ca

APPENDIX VI

Project Presentation Regarding Historical Resources Assessment

Chin Reservoir Expansion HRIA

Bison
Historical Services Ltd.

SMRID MPE Klohn Crippen Berger

Chin Reservoir Expansion HRIA

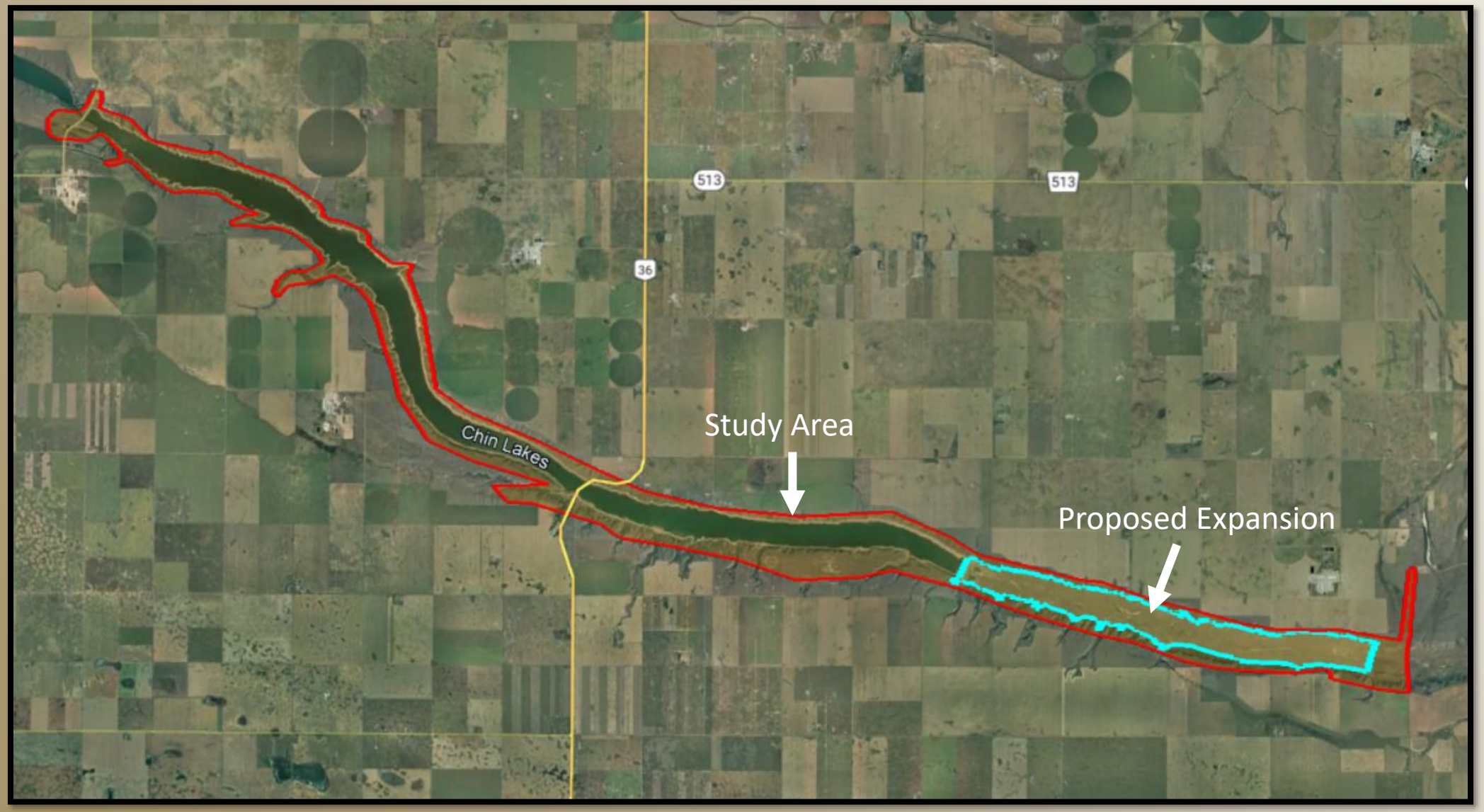
- Historical Resource Impact Assessment
- Required by Alberta Culture and Status of Women
- Conducted by Bison Historical Services Ltd.

Bison Historical Services Ltd.

SMRID MPE Klohn Crippen Berger

Chin Reservoir Expansion HRIA

Study Area



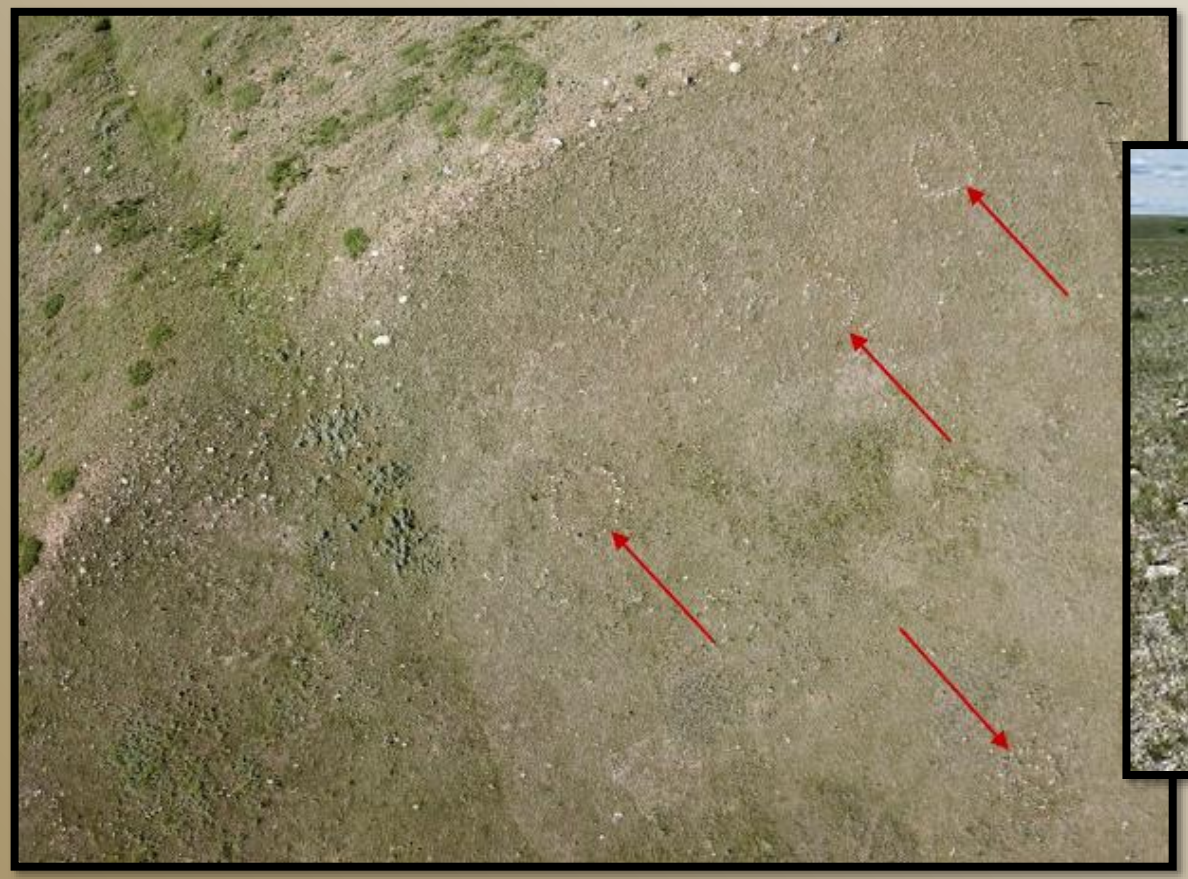
Chin Reservoir Expansion HRIA

- Conducting Archaeological Studies
- Conducting Paleontological Studies
- Field work completed, report due in November
- All work to meet Alberta Culture standards and requirements.
- Alberta Culture is the gatekeeper of the findings. (The EIA team cannot release findings)

SMRID MPE Klohn Crippen Berger

Chin Reservoir Expansion HRIA

Preliminary findings



SMRID MPE Klohn Crippen Berger