

Project Summary Table

Proponent name:	Bow River Irrigation District (BRID)	Date: May 18, 2022	
Project name:	Deadhorse Reservoir	Company contact names and information:	Jeff Hust – Engineering (MPE Engineering Ltd.) jhust@mpe.ca (403) 317-3634 Richard Phillips (BRID) richardp@brid.ca (403) 654-2111
Name of company that will hold approval:	Bow River Irrigation District	Company website:	https://www.brid.ca/
Type of project (e.g., water management, hydroelectric, etc.):	Water Management	New project, expansion, additional phase or modification:	New project
Project location (legal land description and municipality):	Reservoir is located in 34-13-18-W4, 27-13-18-W4, 26-13-18-W4, 22-13-18-W4. And 23-13-18-W4 MD of Taber	Total project area (ha):	The project will create a reservoir with a surface area of 475 ha.
Indicate whether the project is on private, federal or provincial land:	SW 27-13-18 is municipal land, everything else is private land.	List any parks/protected areas/conservation areas that may be impacted:	None
Nearest First Nation Reserve(s) and Métis Settlements (name and km):	Blood No 148, approximately 60 km to the southwest of the Project. Siksika No 146 approximately 70 km to the northwest of the Project.	Nearest waterway/ water body (name and km):	Located on existing BRID Main Canal. Lost Lake, 4 km to the northeast of the Project.
Nearest provincial highway (# and distance):	Hwy 526, approximately 4 km to the north of the Project. Hwy 25, approximately 8 km to the west of the Project	Potential annual water usage and source:	The primary use of the stored water is for irrigation. Additional usage would be municipal and recreation . The source of the water is the BRID Main Canal under an existing water license.
Expected types of air emissions (e.g., SO₂, NO_x, CO₂, etc.):	None	Types of wastes generated and disposal location:	Significant operation waste not expected.

Brief Project Description

Background Information

Deadhorse Coulee is a natural coulee located approximately 10 km southeast of Enchant, AB. The Bow River Irrigation District (BRID) Main Canal runs through Deadhorse Coulee until it is diverted out of the coulee by an existing dam 1.5 km downstream of Range Road 18-1. There is no work being completed at the existing dam, its function is simply to divert water from Deadhorse Coulee into the BRID main canal. For the location of the project refer to Figure 1.

Deadhorse Reservoir is a proposed off-stream storage reservoir to be located in Deadhorse Coulee near the midpoint of the BRID Main Canal between Little Bow Reservoir and Scope Reservoir. The reservoir is new construction and it will act primarily as a balancing and re-regulating reservoir which will enable greater storage of operational spills and help the BRID better manage water usage. However, storage contained in the reservoir can be used to support irrigation demand as well. The location of the reservoir is within intensively cultivated agricultural land.

Deadhorse Reservoir would be created by damming Deadhorse Coulee. Two additional dams would be built on the North and South sides of the reservoir to enclose the reservoir. A gated cast in place concrete outlet structure will control flows from the reservoir into the BRID Main Canal. The reservoir will have a surface area of 470 ha at full supply level (814.50 m) with a storage volume of 24,860 dam³. The main dam will have a maximum height of 9.8 m and a length of 250 m, the north dam will have a maximum height of 10.2 m and a length of 4.8 km, and the south dam will have a maximum height of 5.0 m and a length of 2.3 km. All dams required for the project are less than 15.0 m in height. For a site plan of the reservoir and the dams refer to Figure 2.

Site Conditions

The Deadhorse Coulee is within the Vauxhall Plain ecodistrict of the Dry Mixedgrass Subregion of the Grassland Natural Region of Alberta. The Vauxhall Plain ecodistrict contains relatively thick glacial tills. A geotechnical investigation will be completed to confirm the soil makeup of the site.

Potential Effects on the Natural Environment

As part of the project an environmental assessment was complete for Deadhorse Reservoir by Bear Tracks Environmental in 2021. All surveys were completed as per the Sensitive Species Inventory Guidelines. The following information is taken from that report.

Based on the habitat conditions, sensitive habitat features, and species present during the field assessment, numerous wildlife species are likely to be impacted by development activities, including grassland birds, wetland/riparian birds, raptors, and amphibians. Much of the presumed disturbance will be in the form of habitat loss from the projected flood area, and not the result of direct impacts due to earth works and dam construction.

Of the total projected wetted area (475 ha), approximately 327.5 ha (68%) consist of cropland, 51.55 ha (10.7%) of wetland, 34.1 ha (7.1%) of native prairie, and 34.0 ha (7.1%) of tame pasture habitats that will be lost. Anthropogenic features, including approximately 9.1 ha (1.9%) of infrastructure, 16.5 ha (3.4%) of man-made water channels (canal), and 0.4 ha (0.1%) of man-made wetlands/dugouts occurring in proposed flood zone are expected to be lost as a result of project works. The majority (88.2%) of land cover expected to be impacted by flooding is comprised of non-native habitat types. Though altered landscapes, such as cropland and tame pasture/hayland, may still support native biota, species richness is significantly less when compared to native grassland ecosystems (Javorek et al. 2006).

Furthermore, habitat quality is degraded in these areas, as the availability of resources required for breeding, foraging, and for cover, is limited (Javorek et al. 2006). Impacts to local terrestrial wildlife habitat quality and quantity are therefore not anticipated to be significant. See Figure 3 for the land cover around Deadhorse Reservoir.

Although not quantified, the development of the reservoir will create approximately 475 ha of open water habitat that will be utilized by a variety of species for during various portions of their life cycle. The newly created reservoir is anticipated to create habitat for waterfowl and shorebird breeding and migration, breeding and overwintering for amphibians, breeding for wetland dependent passerine species, and year-round habitats supporting the life cycles of numerous fish species.

Disturbance of vegetation, including native and tame grasslands, shrubs, and trees in the project footprint during certain periods of the year (i.e., spring and early summer) has the potential to disrupt breeding and nesting activity of grassland and wetland/riparian bird species in the area, and may lead to nest abandonment, nest destruction, and incidental take. A number of species documented during survey activities are protected under the federal *Migratory Birds Convention Act (MBCA)* which prohibits the destruction of nests of specified avian species. Although not typically utilized for nesting as much as other habitat types, cultivated lands are also utilized by ground nesting avian species such as grassland passerines and waterfowl. For this reason, the timing of construction and flooding are important considerations in mitigating potential impacts on these species. Birds in the area generally breed between April 15th and August 15th (GOC 2018), with species such as burrowing owl breeding even earlier (April 1st to August 15th). It is therefore recommended that project construction and reservoir flooding take place outside of the breeding bird period, to appropriately mitigate negative effects to nesting birds.

Several species of raptors, and several raptor nests, were documented in the project study area during the field assessment, including the ferruginous hawk. Ferruginous hawks are ground-squirrel specialists, and typically are associated with large tracks of native prairie. Approximately 40% of lands within 1 km of the nest will be lost, which are primarily cultivated habitats typically not heavily utilized by ground-squirrels. It is presumed that these lands would not be the primary foraging grounds for these hawks and impacts to prey availability should be minimal. As per the SSIG guidelines (GOA 2013), the nesting sites of ferruginous hawk are considered to be active, with a corresponding protective development buffer, up until a period of two years of inactivity; after which protective timing constraints and associated setbacks no longer apply. It is therefore recommended that the activity of the nest (FEHA1) be monitored prior to construction, to determine nest activity during subsequent nesting periods. If the nest remains active prior to construction and flooding of the reservoir, obtaining a permit from AEP for the translocation of the nest to a suitable location (tree or newly erected nest platform at least 1000 m from the project and in an area with high prey availability) may be warranted to offset the disturbance of this sensitive habitat feature.

One Swainson's hawk nest and one great-horned owl nest were also identified within the project area (Figure 8). These features are also anticipated to be directly affected by project development. However, these raptor species tend to be more generalist in nature and will utilize a variety of landscapes for foraging. It is recommended that construction take place in the fall or winter, outside of the breeding/nesting/fledging season. Swainson's hawks and great-horned owls are 'Secure' in Alberta and a 100 m setback is recommended for nests during the nesting season, until the young have fledged. It is also recommended that a raptor nest survey be repeated prior to construction to ensure no additional raptors have established nests within the project area or will be impacted by active construction. As one of the two Swainson's hawk nests documented during the field assessment is located 800 m north of the project study area, no additional mitigation is recommended for this nest.

Multiple black-billed magpie nests (inactive at the time of survey) were observed within, and immediately adjacent to, the project area (Figure 8). As the black-billed magpie is within the Corvidae family, it is not included within the *MBCA* and is considered a nonlicense animal under the Alberta *Wildlife Act*. The nests of these species are therefore not protected provincially or federally. However, it is still recommended that

best management practices be applied, whereby the removal of trees and nests should be conducted outside the breeding and nesting period for birds in the region, to ensure no birds are harmed in the process (as well as to prevent the accidental take of other bird nests in these areas).

Areas of suitable burrowing owl habitat (e.g., grassland, flat to rolling topography, ground squirrel burrows [GOA 2013]) are present but scarce in the project area, and no burrowing owls or sign of burrowing owl activity was observed during the field assessment. While the likelihood of burrowing owls occupying the project footprint is low given the extent of cultivation in the project area, the project does fall within burrowing owl range, and burrowing owls have been historically documented in the vicinity. It is therefore recommended that dam construction and flooding take place from August 16th to March 31st, after the breeding and nesting period for the species.

Two species of amphibians were observed within the project study area. In addition, the project is located within sensitive amphibian range, with suitable habitat (e.g., wetlands and dugouts with emergent vegetation) present. As waterbody setbacks (e.g., 100 m) cannot be accommodated due to the nature of the project, alternative mitigation is recommended to minimize impacts to amphibians. It is recommended that silt fencing be installed around the work site to prevent amphibians from entering the work area. Silt fencing should be inspected by a qualified biologist to ensure correct installation. Any amphibians trapped by the silt fence should be removed and relocated by a qualified biologist. Open excavations should be inspected daily for trapped amphibians, and if any amphibians are found, they should be relocated by a qualified biologist. A spill contingency plan should also be in place, and all equipment and trucks should be equipped with spill kits. Fuel should be stored at least 100 m from waterbodies and hazardous materials should be stored in designated areas.

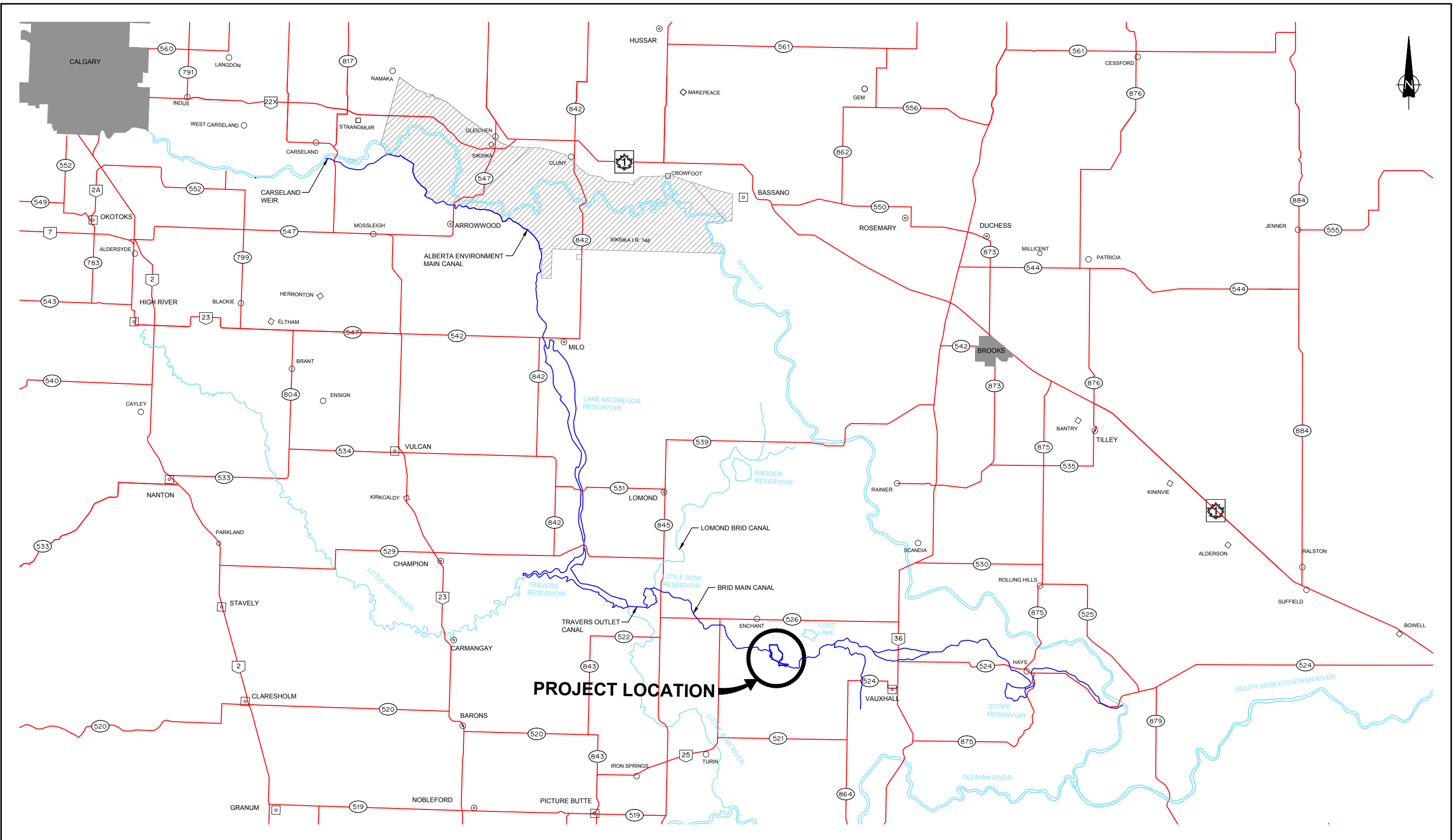
If draining of waterbodies are to occur, draining should be timed when amphibians are least likely to be present either in an active (e.g., breeding) or inactive (e.g., torpor) state (Randall et al. 2018). In the prairies, amphibians typically congregate in wetlands to breed between the April and June, where they metamorphose between sensitive life stages (GOA 2013). Young typically disperse from ponds in late summer and may potentially use ponds to overwinter in. It is therefore recommended draining activities, if required, occur in late summer/early fall to avoid disturbance to breeding and overwintering amphibians. Should drainage occur during an alternative period, an amphibian salvage plan should be developed in consultation with AEP to ensure that impacts to amphibians are mitigated. During the post-construction phase of the project, amphibians could be attracted to the constructed reservoir. Design considerations that would benefit amphibian species using these areas would include avoiding constructing steep side slopes in the reservoir which may trap amphibians (Randall et al. 2018).

Numerous wetlands of varying classifications were documented in the project study area. Due to the nature of the project, avoidance of these waterbodies is not feasible. Appropriate topsoil stripping and soil handling should be conducted during excavation within wetlands, if applicable, in order to minimize wind and water erosion, as well as reduce weed establishment. As there will be wetland loss, there will be a requirement for paid compensation for wetland replacement as per the Alberta Wetland Mitigation Directive (AEP 2018). Erosion and sediment control measures should also be implemented when working near the BRID canal system, as fish species may be present in the channel.

Upon completion of the project, habitat in the project area will be altered from a largely terrestrial landscape to an aquatic one. The majority of the project footprint is highly disturbed (cultivated) and is of relatively low habitat value to wildlife. However, areas of tame and native grasslands, trees/shrubs, and wetland habitat support a diversity of plant and wildlife species. The proposed project will decrease the amount of available grassland habitat for some species, particularly grassland birds, as well as treed habitat for prairie raptors, and to an extent, wetland habitat for some riparian birds and amphibians. Though there may be some short-term displacement of wildlife throughout the construction process, long-term impacts to wildlife and suitable habitats as a result of reservoir flooding are not anticipated to be significant. The

application of appropriate environmental mitigation strategies during project planning and construction will reduce the likelihood of adverse impacts to wildlife and other environmental receptors. In summary, the following mitigation should be considered:

- Vegetation disturbance (e.g., mowing, stripping, tree removal, etc.) in upland habitats should occur from September 1st to April 1st to avoid the breeding bird window in this region of Alberta.
- Vegetation and/or soil disturbance in and around wetlands and draining of wetlands should occur in the fall prior to the winter to avoid sensitive time periods for breeding or overwintering amphibians. Works conducted in the month of September would generally avoid timeframes associated with breeding and or overwintering activities.
- A 1000 m setback is required for ferruginous hawk nests between the period of March 15th and July 15th, and a 100 m setback should be maintained between July 16th and March 14th. Construction activities should adhere to these timelines and buffers where appropriate if the nest is still deemed active.
- Monitoring of the ferruginous hawk nest should occur every two years, prior to construction. If nest remains active, consultation with AEP may be required to develop appropriate steps for the translocation of the nest.
- Silt fence and open trenches should be inspected for trapped amphibians daily when works are occurring within 100 m of wetland habitats. If relocation is required, amphibians should be moved by a qualified biologist.
- A spill contingency plan should be in place and fuel/hazardous material should be stored 100 m from waterbodies.
- Weed control measures should be in place as per the *Weed Control Act* to control the spread and establishment of prohibited and noxious weeds in and around the project.
- Topsoil stripping and soil handling measures must be in place during construction/excavation and should minimize wind and water erosion and reduce the establishment of weeds.
- Complete a Department of Fisheries and Oceans *Request for Review* prior to construction
- Conduct appropriate Environmental Site Assessments to ensure contaminated sites have been remediated prior to flooding.
- The area is within a Yellow Decontamination Zone (GoA 2021), therefore develop a decontamination plan for all equipment and potential exposure areas.
- Develop a Sediment and Erosion Control and Clean and Dirty Water Plan for the management of all water during each phase of construction.
- Develop a detailed ECO Plan which includes fish handling.
- Acquire regulatory permits and approvals.
- Obtain FRL for fish removal and relocation for isolations or fish removal from pooled areas where required.



BOW RIVER IRRIGATION DISTRICT
 DEADHORSE RESERVOIR
 LOCATION PLAN

SCALE: 1:300 000

DATE: MAY 2022

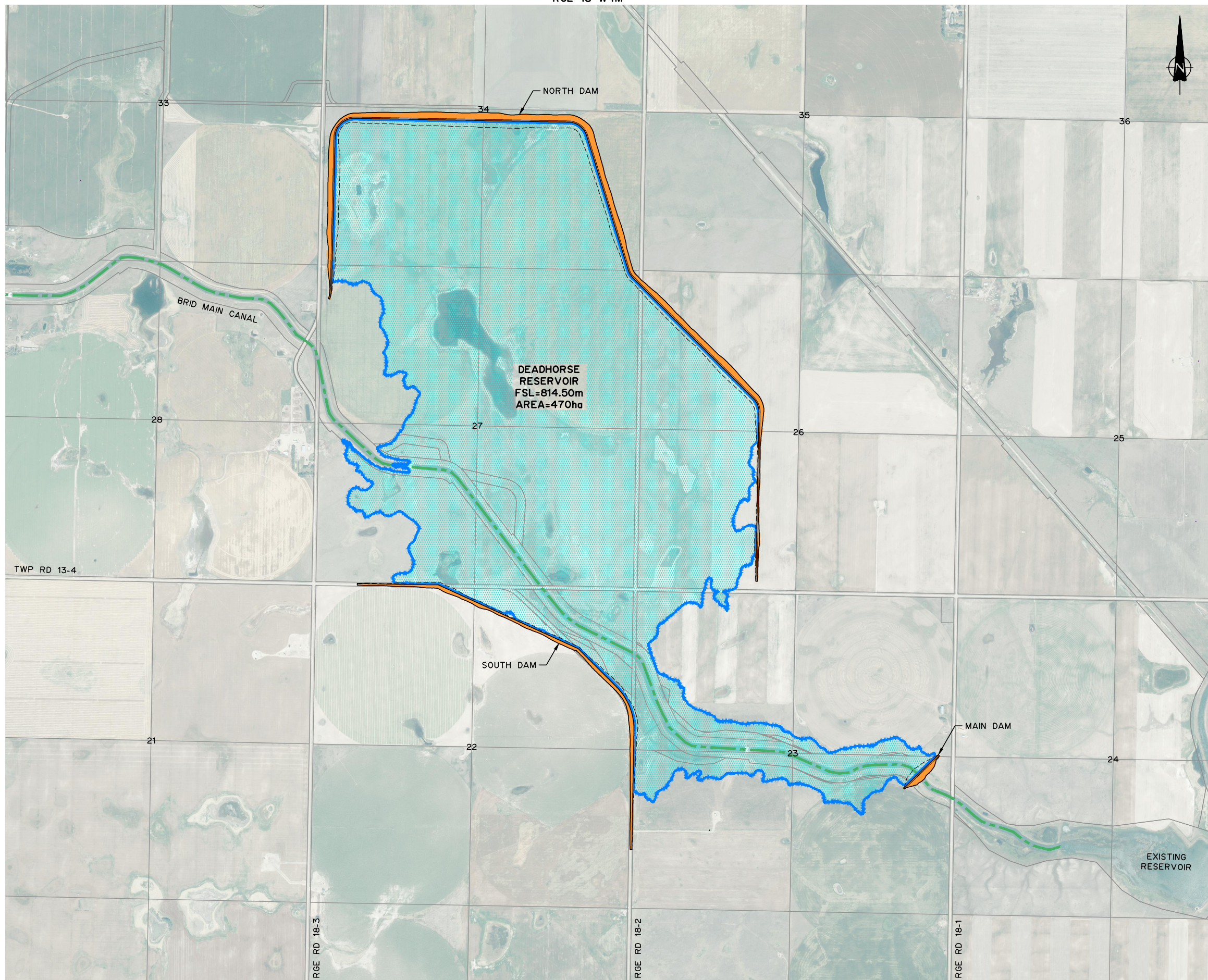
JOB: 1510-032-00

FIGURE: 1

RGE 18 W4M

LEGEND

PROPOSED DEADHORSE RESERVOIR



DEADHORSE
RESERVOIR
FSL=814.50m
AREA=470ha

THIS DRAWING MAY HAVE BEEN MODIFIED
FROM ITS ORIGINAL SIZE. ALL SCALE
NOTATIONS INDICATED ARE BASED ON
11"x17" FORMAT DRAWINGS

TWP 13

TWP RD 13-4

SOUTH DAM

MAIN DAM

EXISTING
RESERVOIR



BOW RIVER IRRIGATION DISTRICT

DEADHORSE RESERVOIR
SITE PLAN

DESIGNED	J.W.H.	JOB	1510-032-00
DRAWN	R.B.H.	SCALE	1:20 000
DATE	SEPTEMBER 2021	DRAWING	2

1	21-09-29	FOR APPROVAL
ISSUE	YY-MM-DD	REVISION

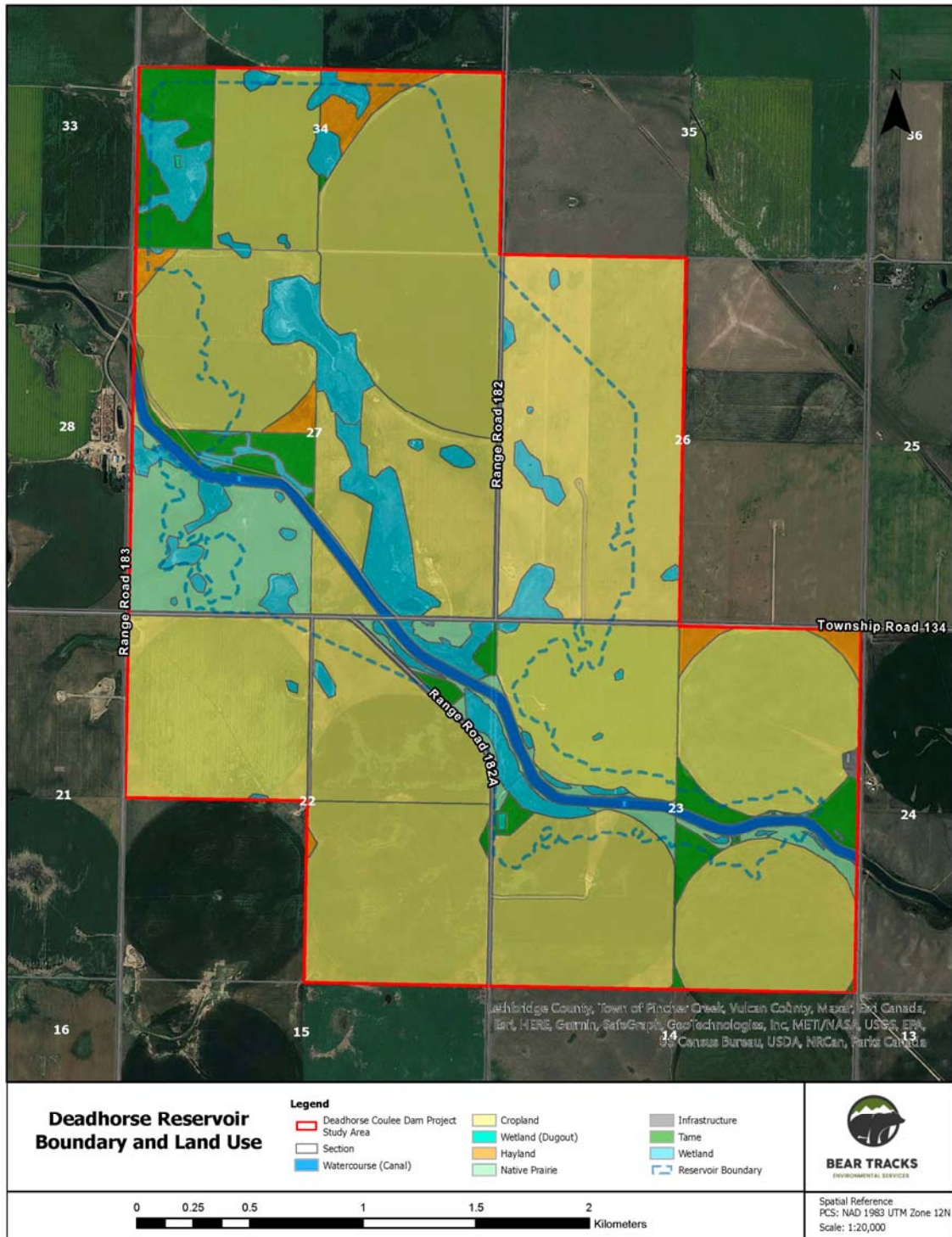


Figure 3. Land cover types delineating within the project study area.



Photo 1: Main Dam Looking Downstream on Main Canal January 2022



Photo 2: Looking Upstream to Reservoir Site, October 2016



Photo 3: Cultivated Land Adjacent to Main Dam, October 2016



Photo 4: Reservoir Inlet Structure and Future Reservoir Area, March 2019