Shepard Industrial Area Structure Plan

Environmental Screening

FINAL

Submitted To:

Shepard Development Corp.

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Submitted By:

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1.0 Project Description

Tannas Conservation Services Ltd. (TCS) was contracted by Shepard Development Corp. to provide an Environmental Screening (ES) for the Shepard Industrial Area Structure Plan (ASP) in Rocky View County, Alberta. The purpose of this ES is to complete desktop level investigations, determine the existing environmental conditions of the site, and to assess potential and actual environmental impacts that may occur as a result of disturbance based on the type and scope of the proposed development.

1.1 Location, Purpose, Size, and Scope

Shepard Industrial Area Structure Plan (ASP) area includes approximately 747 hectares (1,847 acres) of land in the southeast of Rocky View County. It is located immediately east of Range Road 284, north of the Canadian Pacific (CP) Rail mainline right-of-way, south of an abandoned CP rail right-of-way, approximately one-half mile north of TWP RD232, and west of the Range Road 282 undeveloped right-of-way (Figure 1).

The ASP area consists of primarily un-subdivided quarter sections, larger farming parcels, and a few smaller parcels, mostly light industrial uses. The area has been identified as a future growth corridor for industrial development in the Intermunicipal Development Plan (IDP) between Rocky View County and the City of Calgary. The Shepard Industrial Area will provide direct access to the future CP Rail Intermodal site. The overall goal for the Shepard Industrial ASP is to create a regionally significant industrial project that is a lasting legacy for the County and the Calgary Region.

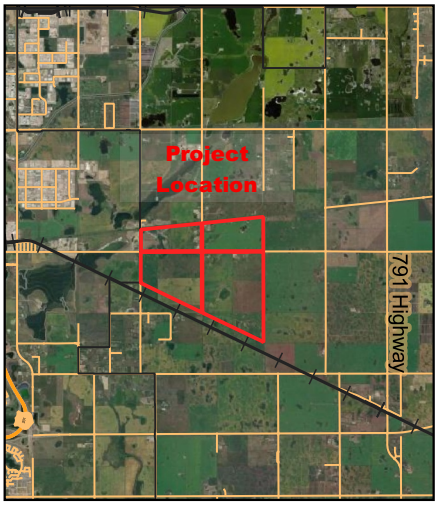


Figure 1

Shepard Industrial Area Structure Plan
Environmental Screening

Project Location and Regional Setting

Legend

Project Boundary

Scale: 1:20,000

0 100 200 300 400 m

ESRI Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

1.2 Project Activities

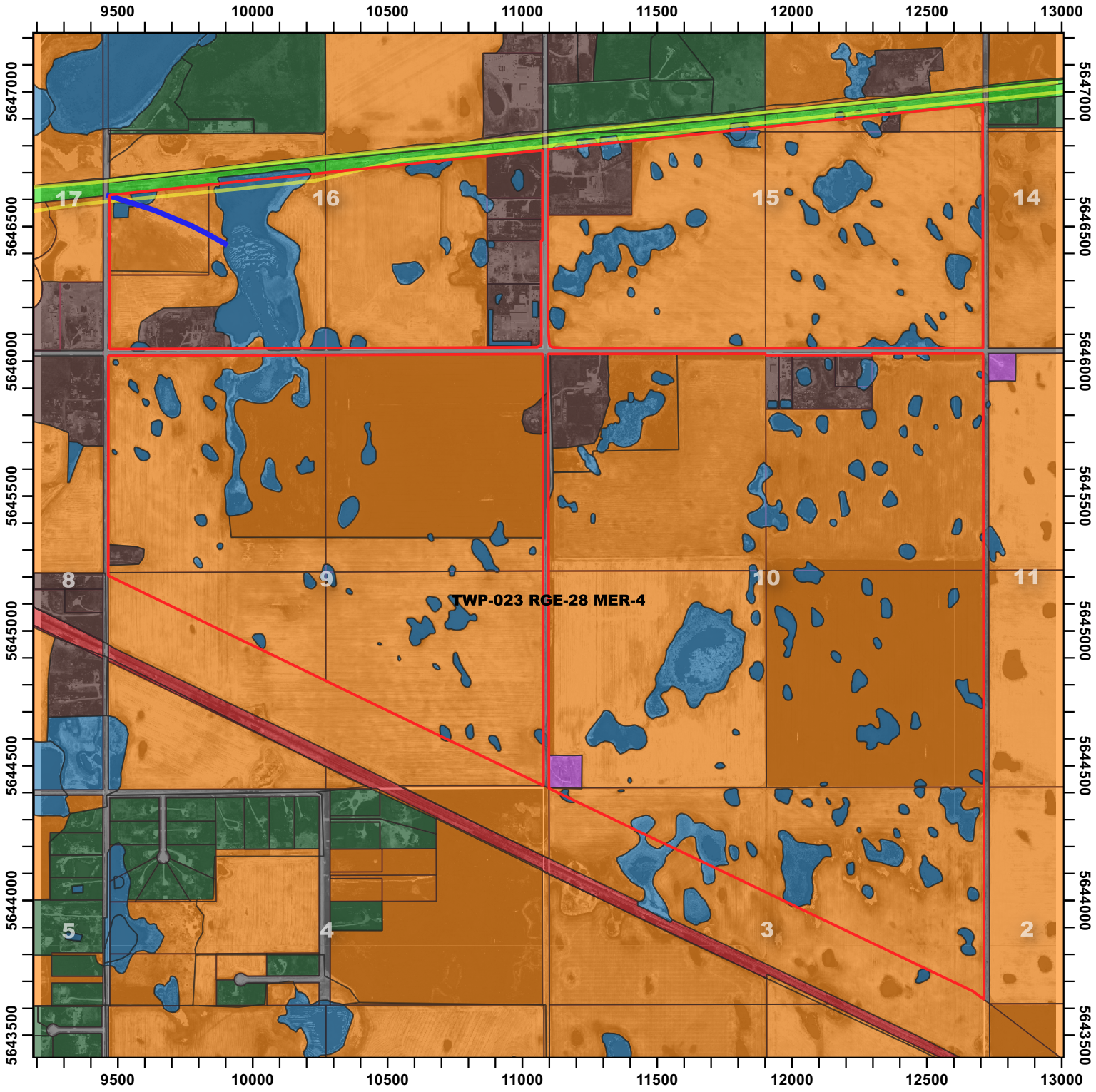
There are five phases for the proposed project (Appendix A). It is currently unknown the timeline for each of the project phases or when construction will begin, as the project is in the conceptual design phase. In general, soil excavation and vegetation removal will be necessary to develop the sewage, wastewater/stormwater drainage, and other utilities required for the industrial development. Once construction for the industrial development has been completed, follow-up maintenance that will be required includes: restoration (planting/re-seeding) of open areas outside of the permanent infrastructure, installation of green buffers, management of all vegetated areas (mowing and weed control), and monitoring water drainage system, as per the drainage plan produced by the developer. A stormwater management plan will be developed for the ASP to ensure peak run-off does not negatively impact on-site or off-site drainage.

2.0 Inventory

2.1 Land Use

The current land uses within the project footprint include agricultural (e.g. annual crop and pasture), wetlands, industrial (e.g. well-site), and developed lands (Figure 2). The developed land uses include commercial, light industrial, and agricultural outbuildings. The area is located just north of the Canadian Pacific (CP) Rail mainline right-of-way and is bordered on the north by an abandoned CP rail right-of-way that includes high voltage powerline easements. There are scattered wetlands throughout the project area, with a man-made drainage ditch conveying water in a northwest direction from the large wetland complex in the northwest portion of the area. This water subsequently drains into the Shepard Slough Complex.

Since the 1950's the project area has predominantly remained as agriculturally managed vegetation, with most fields cropped or used as pasture. Along Range Road 283 (north of Township Road 232), a few developed parcels were established between 1989 and 2008, and have industrial and commercial land uses. Wetlands are the main form of natural cover within the project area and are situated amongst the agricultural land. These wetlands have co-existed with agriculture and have not been altered much since the 1950s (earliest air photo reviewed). The proposed development will result in the conversion of the project area from mainly agricultural land to primarily industrial parcels, which will have a large overall change from managed vegetation and natural wetlands to developed lands.



Legend

- Project Boundary
- Ditch
- High-Voltage Powerlines

Landuse

- Abandoned Railroad
- Agricultural
- Developed
- Railroad
- Residential
- Road
- Waterbody
- Wellsite

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Figure 2

Shepard Industrial Area Structure Plan
Environmental Screening

Land Use Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

2.2 Biological Resources

2.2.1 Natural Subregion

The project is located within the Grassland Natural Region and Foothills Fescue Natural Subregion of Alberta (Natural Regions Committee 2006). The following description of typical plant communities within the subregion is summarized from the Natural Regions Committee (2006). This subregion is characterized by the mainly flat cultivated plains in the north and cool high-elevation upland grasslands in the south. The prevalence of grasses such as Parry oat grass (*Danthonia parryi*) and bluebunch fescue (*Pseudoroegneria spicata*) in reference plant community types distinguish this subregion from surrounding subregions. Shrubby cinquefoil (*Potentilla fruticosa*) is also common, especially on grazed sites. In general, the historically dominant vegetation in the uplands would have been a mixture of mountain rough fescue (*Festuca campestris*), bluebunch fescue, Parry oat grass, June grass (*Koeleria macrantha*), and western wheat grass (*Pascopyrum smithii*). Wetlands are typically confined to depressions in undulating to hummocky terrain. Typical wetland vegetation would include willow, sedge, and tufted hair grass communities.

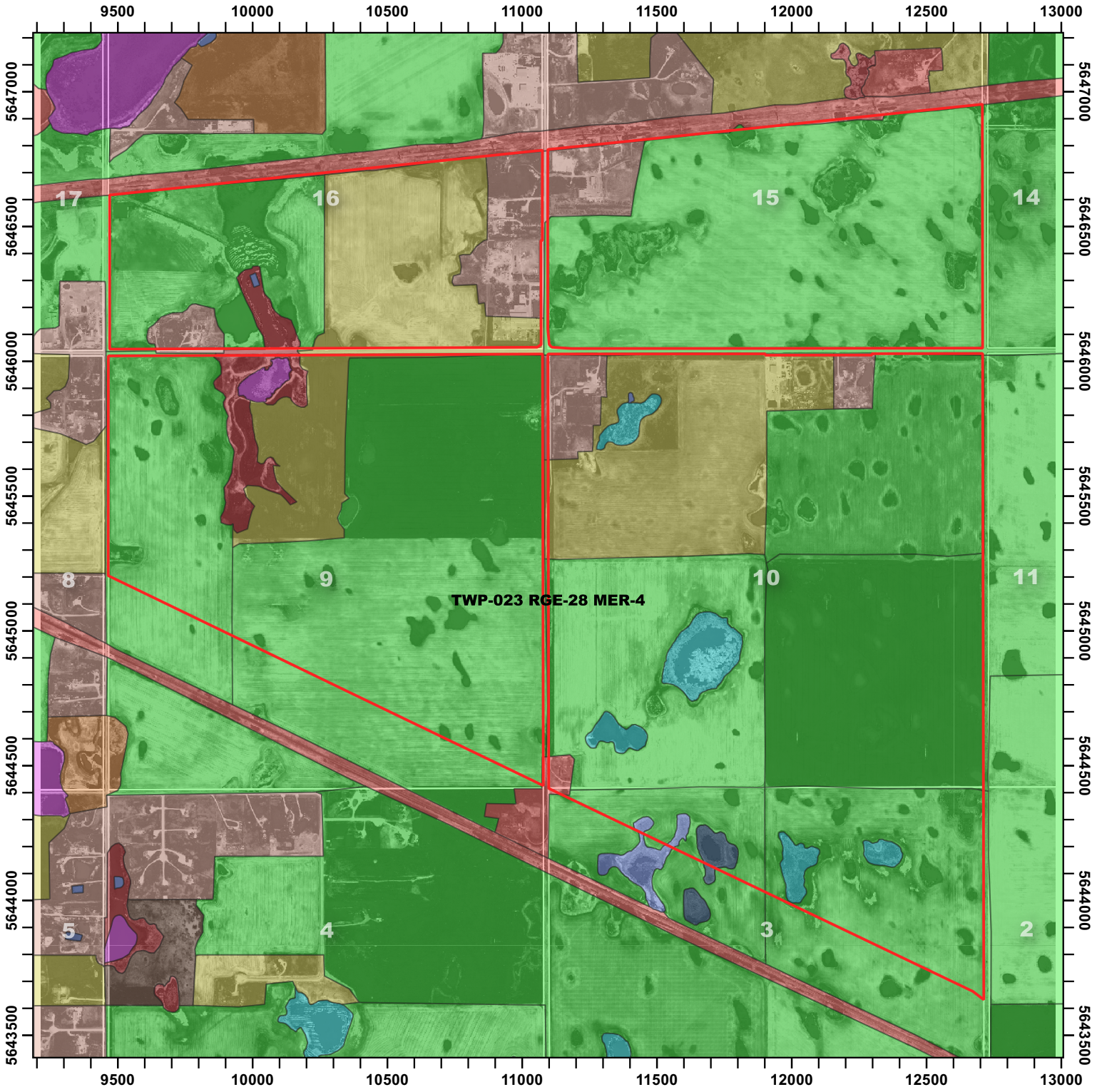
2.2.2 Vegetation

2.2.2.1 Grassland Vegetation Inventory

The Grassland Vegetation Inventory (GVI) database (Figure 3) (LandWise Inc. and the ASRD GVI Committee 2006) was utilized to determine vegetation/habitat types, as this was one of the only provincial datasets that covers natural vegetation types in this area (). Only the primary site type was used to categorize polygon categories in Table 1. About 75% of the Project Area was made up of non-irrigated cropland and about 16% of the area was categorized as tame pasture or hay. The remaining area was categorized as either rural (4.85%), developed (0.36%), or lentic (wetland) habitats (4.07% in total). Because the GVI dataset is from 2006, there are some inaccuracies with the data, and it should be used in combination with other datasets and ground-truthing to determine and accurate idea of vegetation and habitat types.

Table 1: Summary of primary GVI site types in the Project Area

Primary Site Type	Description	Total ha	% of Project Area
CN	Crop (Non-irrigated)	566.11	75.09%
Dev	Developed	2.74	0.36%
LenA	Lentic (Alkali)	1.85	0.25%
LenS	Lentic (Seasonal)	13.87	1.84%
LenSP	Lentic (Semi-Permanent to Permanent)	1.77	0.23%
LenT	Lentic (Temporary)	12.17	1.61%
LenW	Lentic (Open Water)	1.03	0.14%
PN	Tame Pasture or Hay (Non-irrigated)	117.86	15.63%
Ru	Rural	36.54	4.85%
Grand Total		**753.93**	**100.00%**



Legend

Project Boundary

Grassland Vegetation Inventory (GVI)

- Crop (Non-irrigated)
- Developed
- Lentic (Alkali)
- Lentic (Open Water)
- Lentic (Seasonal)
- Lentic (Semi-Permanent to Permanent)
- Lentic (Temporary)
- Loamy
- Rural
- Subirrigated
- Tame Pasture or Hay (Non-irrigated)

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Figure 3

Shepard Industrial Area Structure Plan
Environmental Screening

Grassland Vegetation Inventory Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

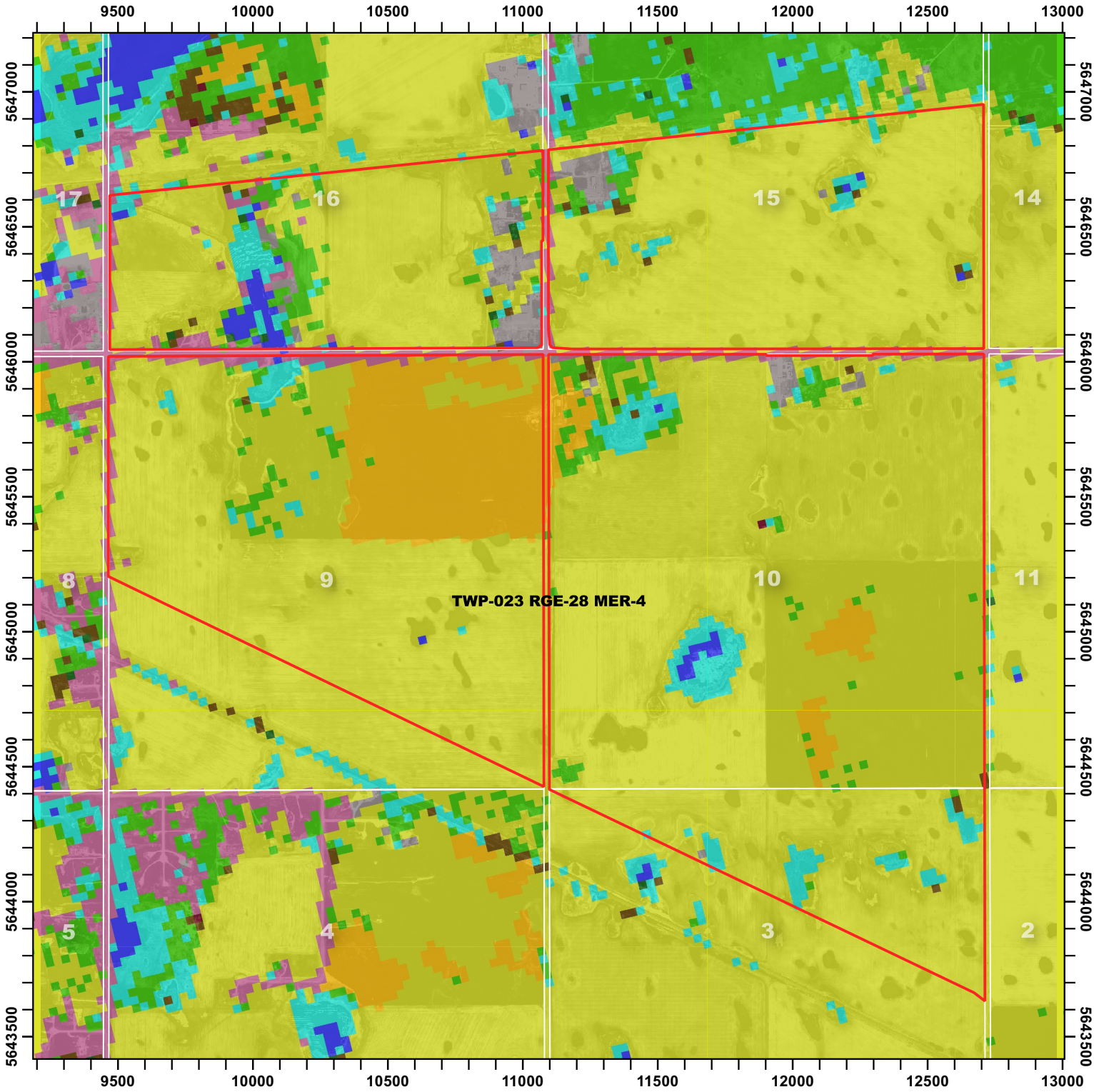
LandWise Inc. and the ASRD GVI Committee. 2006. Grassland Vegetation Inventory (GVI), Final Report. Part 3: Detailed Description of Site Types. 12 pp.

2.2.2.2 Annual Crop Inventory

The 2019 Annual Crop Inventory (Government of Canada 2019) was also utilized to preliminarily identify vegetation/habitat types for the project area (Figure 4). The annual crop inventory is a digital map of croplands (30 m resolution) across Canada that is generated using a decision tree methodology based on satellite imagery. In addition to satellite imagery, ground-truth information is provided by provincial crop insurance companies within Alberta. According to the 2019 Annual Crop Inventory, the majority of the project area is covered by annual crops (82.12%), followed by pasture/forages (7.23%), wetlands (3.63%), and grasslands (2.72%) (Table 2). Broadleaf trees, coniferous trees, and shrublands only make up 0.44% of the project area combined.

Table 2: Summary of 2019 Annual Crop Inventory site types in the Project Area

Site Type	Total ha	% of Project Area
Annual Crops	618.99	81.94%
Pasture / Forages	54.52	7.25%
Wetland	27.33	3.65%
Grassland	20.47	2.89%
Exposed Land / Barren	12.04	1.56%
Urban / Developed	11.80	1.56%
Water	5.31	0.69%
Shrubland	2.42	0.35%
Coniferous	0.81	0.10%
Broadleaf	0.09	0.01%
Grand Total	**753.93**	**100.00%**



Legend

- Project Boundary

Crop Inventory 2019

- Annual Crops
- Broadleaf
- Coniferous
- Exposed Land / Barren
- Fallow
- Grassland
- Mixedwood
- Pasture / Forages
- Shrubland
- Urban / Developed
- Water
- Wetland

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Figure 4

Shepard Industrial Area Structure Plan
Environmental Screening

Crop Inventory Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

Government of Canada. 2019. Annual Crop Inventory, 2019. Agriculture and Agri-Food Canada

2.2.2.3 Plant Community Composition

Using available vegetation databases in combination with aerial imagery and knowledge of the species found in the area, the plant communities likely to be present in the Project Area were determined. The vegetation present on site is almost exclusively managed non-native forage crops (hay) or annual cropland. There are also numerous wetlands throughout the Project Area. The upland communities on site likely consist of a mixture of timothy (*Phleum pratense*), smooth brome (*Bromus inermis*), alfalfa (*Medicago sativa*), quack grass (*Agropyron repens*), Kentucky bluegrass (*Poa pratensis*), and nuisance weeds. The current land use likely does not allow for native species to persist on the site, other than in wetlands.

For the future Biophysical Impact Assessment(s) (BIA(s)), the complete plant community assessment will need to be completed during the rare plant screenings (early and late season). Due to the majority of upland vegetation being managed, the requirement for vegetation surveys in these areas is reduced. However, vegetation surveys should still be conducted in areas where native vegetation is expected to be present, which is mainly in the scattered wetlands. The detailed vegetation assessment should consist of first creating a digital map for unique plant community polygons as a GIS exercise. Once each individual plant community, including wetlands, are mapped, ground truthing can occur (the ideal time would be May). To assess the plant community composition and health, field personnel should perform a meandering survey through each plant community polygon and record the following information: (1) a range/riparian health form (tame pasture; if present), (2) a complete species list (biodiversity), and (3) recorded cover density and distribution of all regulated weeds and rare species. Corrections will be made based on the field data where modifications to the desktop polygons are noted.

2.2.2.4 Rare Plant Definition

Under the National Wildlife Policy for Canada, indigenous plant species are considered wildlife and must be protected. Vegetation assessments and rare species habitat assessments, if required, will be completed during appropriate survey times according to the Government of Alberta standards. The rare plant surveys will be conducted according to the procedures outlined by the “Guidelines for Rare Plant Surveys” (Alberta Native Plant Council 2012).

For this assessment, rare plants refer to those listed on the provincial tracking list (Alberta Conservation Information Management System; ACIMS). Rare plants in Alberta are rated within the ACIMS database and follow the NatureServe ranking methodology (ACIMS (Alberta Conservation Information Management System) 2018):

S1: Five or fewer occurrences in the province or only a few remaining individuals or may be imperiled because some factor of its biology making it especially vulnerable to extirpation.

S2: Six to 20 occurrences or with many individuals in fewer occurrences; or may be susceptible to extirpation because of some factor of its biology.

S3: Twenty-one to 100 occurrences may be rare and local throughout its provincial range, or in a restricted provincial range (may be abundant in some locations or may be vulnerable to extirpation because of some factor of its biology).

S4: Apparently secure under present conditions, typically >100 occurrences, may be rare in parts of its provincial range, especially peripherally.

S5: Demonstrably secure under present conditions, >100 occurrences, may be rare in parts of its provincial range, especially peripherally.

Typically, S1, S2, and some S3 species are considered sufficiently rare to be tracked and therefore considered a rare species. Rare vascular plants within the region are commonly found across all moisture regimes, but are most common in very dry (xeric) and very wet sites. Additionally, locations are dependent on sunlight, soil type, and exposure. These features combine to create the following common habitats to find rare and endangered species:

- Groundwater seepage areas (springs, seeps)
- Stream banks
- Steep eroding slopes
- Sandstone outcrops
- Wetlands
- Disturbed ground
- Native grasslands

Within the Project Area, there are no groundwater seepage areas, stream banks, steep eroding slopes, native grasslands, or sandstone outcrops. There are numerous wetlands on site and disturbed ground.

2.2.2.5 ACIMS Database Search

A literature review was conducted to identify potential rare plants and plant communities that could occur within the project area. The primary sources for information used to develop this list included the Alberta ACIMS Rare Plant Tracking List and Community Tracking list (ACIMS (Alberta Conservation Information Management System) 2018).

According to ACIMS, five rare plant species or plant communities have been documented within 10 km of the project area (Table 3). One species of rare plant listed as sensitive was found within 20 km of the project area: western blue flag (*Iris missouriensis).* In this context, "Sensitive" refers to the fact that the exact location of the species is not made publicly available. Habitat preference for western blue flag is in moist meadows between transitional zones of drier upland slopes, wet meadows, or seepage springs. It generally occurs on flat topography or gentle slopes with abundant subsurface moisture, and it is often found around moist depressions with willow thickets (COSEWIC 2010). The project area could feasibly contain this species due to its abundance of wetland habitat.

Table 3: ACIMS tracked rare species within 10 km (for non-sensitive species) and 20 km (for sensitive species) of the Project Area.

Element Type	Common Name	Scientific Name	S Rank
Vascular Plant	Clammy hedge-hyssop	*Gratiola neglecta*	S3
Vascular Plant	Western false gromwell	*Lithospermum occidentale*	S3
Plant Community	Samphire emergent marsh	*Salicornia rubra emergent marsh*	S2
Vascular Plant	Blunt-leaved watercress	*Rorippa curvipes*	S3
Vascular Plant	Engelmann's spike-rush	*Eleocharis engelmannii*	S2
Vascular Plant (Sensitive)	Western blue flag	*Iris missouriensis*	S2

2.2.3 Wildlife

2.2.3.1 Wildlife Habitat

The Natural Regions and Subregions of Alberta report (Natural Regions Committee 2006) was reviewed to identify key wildlife habitat features that could occur in the project area, as well as wildlife species that are known to occur in the Subregion.

The Foothills Fescue Subregion is characterized by undulating grassland and rolling to hummocky uplands. Wildlife species that may be found in more heavily grazed areas include McCown's Longspur (*Rhynchophanes mccownii*), Chestnut-collared Longspur (*Calcarius ornatus*), and Horned Lark (*Eremophila alpestris*), whereas grasslands with lighter grazing pressure may host populations of Sharp-tailed Grouse (*Tympanuchus phasianellus*), Baird's Sparrow (*Ammodramus bairdii*), and Sprague's Pipit (*Anthus spragueii*; Natural Regions Committee 2006). Burrowing Owl (*Athene cunicularia*) ranges are also mostly contained within the Grassland Natural Region. Rivers, streams, and marshes can contain dabbling ducks, marsh birds, shorebirds, and amphibians such as Boreal chorus frogs (*Pseudacris maculata*; Natural Regions Committee 2006).

The project area contains multiple marshes of different classes that likely contain quality habitat for wildlife, especially amphibians, waterfowl, and other migratory birds. Additionally, there are areas of perennial hayfield (NE-9-23-28-W4), which can contain forage and nesting habitat for many wildlife species. The value of these areas largely depends on their management (e.g. rotational grazing, timing of harvest, buffers around water bodies, vegetation community etc.), and a ground truthing assessment would have to be completed to determine how these areas are utilized by wildlife.

2.2.3.2 Sensitive Wildlife Database Search

The Fish and Wildlife Internet Mapping Tool (FWIMT; AEP 2018) was used to generate fish and wildlife reports for the approximate project area and a 5 km radius from the center of the project area. These reports show which sensitive wildlife species have been previously documented in the area. To identify which of these species may be of provincial or federal conservation concern, the status of all reported species was then classified according to the General Status of Alberta Wild Species report (Government of Alberta 2017a), the Alberta *Wildlife Act* and Regulations (Government of Alberta 1997; Government of Alberta 2000), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and Status under the federal *Species at Risk Act* (SARA) as provided in the Species at Risk Public Registry (Government of Canada 2020).

According to the FWMIS database, 17 sensitive wildlife species were found within a 5 km radius of the center of the project area (Table 4). Of these, the Barn Swallow (*Hirundo rustica*), Horned Grebe (*Podiceps auritus*), Short-eared Owl (*Asio flammeus*), Western Grebe (*Aechmophorus occidentalis*), and the American badger (*Taxidea taxus taxus*) have a designation under federal species at risk legislation. Only the Western Grebe is listed under the provincial *Wildlife Act* and is listed as a Threatened species. Many of the species listed are associated with wetland habitats and have the potential to utilize the Project Area.

Table 4: Wildlife species detected in the FWMIS database within a 5 km radius from the center of the project area.

Common Name	Scientific Name	AB General[1]	Wildlife Act[2]	COSEWIC status[3]	SARA status[4]
Amphibians					
Canadian Toad	*Anaxyrus hemiophrys*	May Be at Risk	N/A	Not at Risk	N/A
Birds					
Barn Swallow	*Hirundo rustica*	Sensitive	N/A	Threatened	Threatened
Black Tern	*Chlidonias niger*	Sensitive	N/A	Not at Risk	N/A
Black-crowned Night-heron	*Nycticorax nycticorax*	Sensitive	N/A	N/A	N/A
Black-necked Stilt	*Himantopus mexicanus*	Sensitive	N/A	N/A	N/A
Common Yellowthroat	*Geothlypis trichas*	Sensitive	N/A	N/A	N/A
Eastern Kingbird	*Tyrannus tyrannus*	Sensitive	N/A	N/A	N/A
Forster's Tern	*Sterna forsteri*	Sensitive	N/A	Data Deficient	N/A
Great Blue Heron	*Ardea herodias*	Sensitive	N/A	N/A	N/A
Horned Grebe	*Podiceps auritus*	Sensitive	N/A	Special Concern	Special Concern
Osprey	*Pandion haliaetus*	Sensitive	N/A	N/A	N/A
Pied-billed Grebe	*Podilymbus podiceps*	Sensitive	N/A	N/A	N/A
Short-eared Owl	*Asio flammeus*	May Be at Risk	N/A	Special Concern	Special Concern
Sora	*Porzana carolina*	Sensitive	N/A	N/A	N/A
Western Grebe	*Aechmophorus occidentalis*	At Risk	Threatened	Special Concern	Special Concern
White-faced Ibis	*Plegadis chihi*	Sensitive	N/A	N/A	N/A
Mammals					
American Badger	*Taxidea taxus taxus*	Sensitive	N/A	Special Concern	Special Concern

(1) General Status of Alberta's Wild Species (Government of Alberta 2017a)
(2) Status under the Alberta *Wildlife Act* and Regulations (Government of Alberta 1997; Government of Alberta 2000)
(3) Status listed by the Committee on the Status of Endangered Wildlife in Canada (Government of Canada 2020)
(4) Status under the federal Species at Risk Act (Government of Canada 2020)

2.2.3.3 Wildlife Sensitivity Layers

GIS software was utilized to identify if the project area is within any provincially designated Wildlife Sensitivity Layers. Wildlife Sensitivity Layers are developed from current scientific knowledge of wildlife range extents, and are based on data from aerial surveys, historical information, telemetry, and habitat types. These areas have been identified as important locations for the viability and productivity of Alberta's wildlife. Specific operating conditions and mitigation strategies may have to be followed for industrial activities in these layers to help mitigate any adverse effects on wildlife populations or their habitat.

The Project occurs within two Wildlife Sensitivity Layers: Sharp-tailed Grouse Survey Area and Sensitive Raptor Range for Prairie Falcon, Bald Eagle, and Golden Eagle (Government of Alberta 2019). There is very little habitat available within the project area that would be suitable for Sharp-tailed Grouse, as there are little to no undisturbed upland areas with appropriate vegetation. Prairie Falcons and Golden Eagles primarily nest on bluffs

and cliffs, while Bald Eagles nest in trees next to large bodies of water (Cornell University 2019). There does not appear to be suitable nesting habitat for sensitive raptors within the project area, though wildlife surveys should be completed prior to construction.

2.2.4 Environmentally Significant Areas

The Project Area was reviewed to determine if any Environmentally Significant Areas or other protected areas were within its boundary. ESAs have been defined as places that are vital to the long-term maintenance of biological diversity, soil, water, or other natural processes at multiple scales, that can be used as a strategic conservation tool for land use planning and policy (Fiera Biological Consulting Ltd. 2014). The project area was reviewed to determine if it contains any provincial Environmentally Significant Areas (ESAs) using the "Environmentally Significant Areas in Alberta" report (Fiera Biological Consulting Ltd. 2014). This report defined and mapped ESAs of international, national, and provincial significance, based on four main criteria:

- Criteria 1: Areas that contain focal species, species groups, or their habitats
    - 1a: Conservation hotpots (areas with rare, threatened, or endangered species)
    - 1b: Areas that contain focal species groups (amphibians, aquatic breeding birds, or fish)
    - 1c: Areas that contain focal species habitats (habitat for harlequin duck (*Histrionicus histrionicus*), grizzly bear (*Ursus arctos*), woodland caribou (*Rangifer tarandus*), greater sage-grouse (*Centrocercus urophasianus*), or arctic grayling (*Thymallus arcticus*))
- Criteria 2: Areas that contain rare, unique, or focal habitats
    - 2a: Rare habitats (vegetation communities, peatlands),
    - 2b: Unique habitats and landforms (natural springs, nationally/internationally recognized landforms)
    - 2c: Focal habitats (Class A and B watercourses, snake and bat hibernacula, waterfowl staging and foraging areas, or sharp tailed grouse (*Tympanuchus phasianellus*) leks
- Criteria 3: Areas with ecological integrity
    - 3a: Habitat patch size (terrestrial habitat patches)
    - 3b: Habitat intactness and connectivity (intact landscapes, watercourse connectivity, and lentic waterbody habitat intactness)
- Criteria 4: Areas that contribute to water quality and quantity
    - 4a: Rivers and streams (river and stream density, landscape intactness)
    - 4b: Wetlands and lakes (wetland landscape composition, water storage potential)

According to the provincial dataset developed by Fiera Biological Consulting Ltd. (2014), no quarter sections in the project area are classed as a provincial ESA (Table 5). The Project Area also does not contain any provincially designated parks or protected areas (Government of Alberta 2017b).

Table 5: ESA values for the project area quarter section.

Quarter Section	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Provincial ESA Value[1]	Qualifies as ESA?
SW-09-023-28-W4	0	0	0.045	0	0.045	NO
SW-15-023-28-W4	0	0	0.095	0	0.095	NO
SW-10-023-28-W4	0	0	0.075	0	0.075	NO
NE-09-023-28-W4	0	0	0.038	0	0.038	NO
SE-09-023-28-W4	0	0	0.038	0	0.038	NO
NW-09-023-28-W4	0	0	0.058	0	0.058	NO
NW-15-023-28-W4	0	0	0.045	0	0.045	NO
NE-15-023-28-W4	0	0.002	0.108	0	0.11	NO
SE-15-023-28-W4	0	0	0.108	0	0.108	NO
SW-11-023-28-W4	0	0	0.088	0	0.088	NO
SW-14-023-28-W4	0	0	0.075	0	0.075	NO
NW-14-023-28-W4	0	0	0.088	0	0.088	NO
NE-10-023-28-W4	0	0	0.088	0	0.088	NO
NW-03-023-28-W4	0.004	0	0.095	0	0.099	NO
NW-11-023-28-W4	0	0	0.025	0	0.025	NO
SE-10-023-28-W4	0	0	0.063	0	0.063	NO
SW-16-023-28-W4	0	0	0.095	0	0.095	NO
SE-16-023-28-W4	0	0	0.05	0	0.05	NO
NE-03-023-28-W4	0.002	0	0.058	0	0.06	NO
NW-02-023-28-W4	0	0	0.088	0	0.088	NO
NW-10-023-28-W4	0	0	0.075	0	0.075	NO

1. A minimum of 0.189 is required for a quarter section to qualify as an ESA.

2.2.5 Caveats on Land Title

Land titles were obtained for each property within the Project Area and were assessed for any applicable caveats (e.g. protective notation, natural area). No environmental concerns were identified based on the review of the current and historical land titles within the project area. However, several utility right of ways, sour gas wells, and gas pipelines are known to be within the project area.

2.3 Hydrology, Water Bodies, and Wetlands

2.3.1 Hydrology

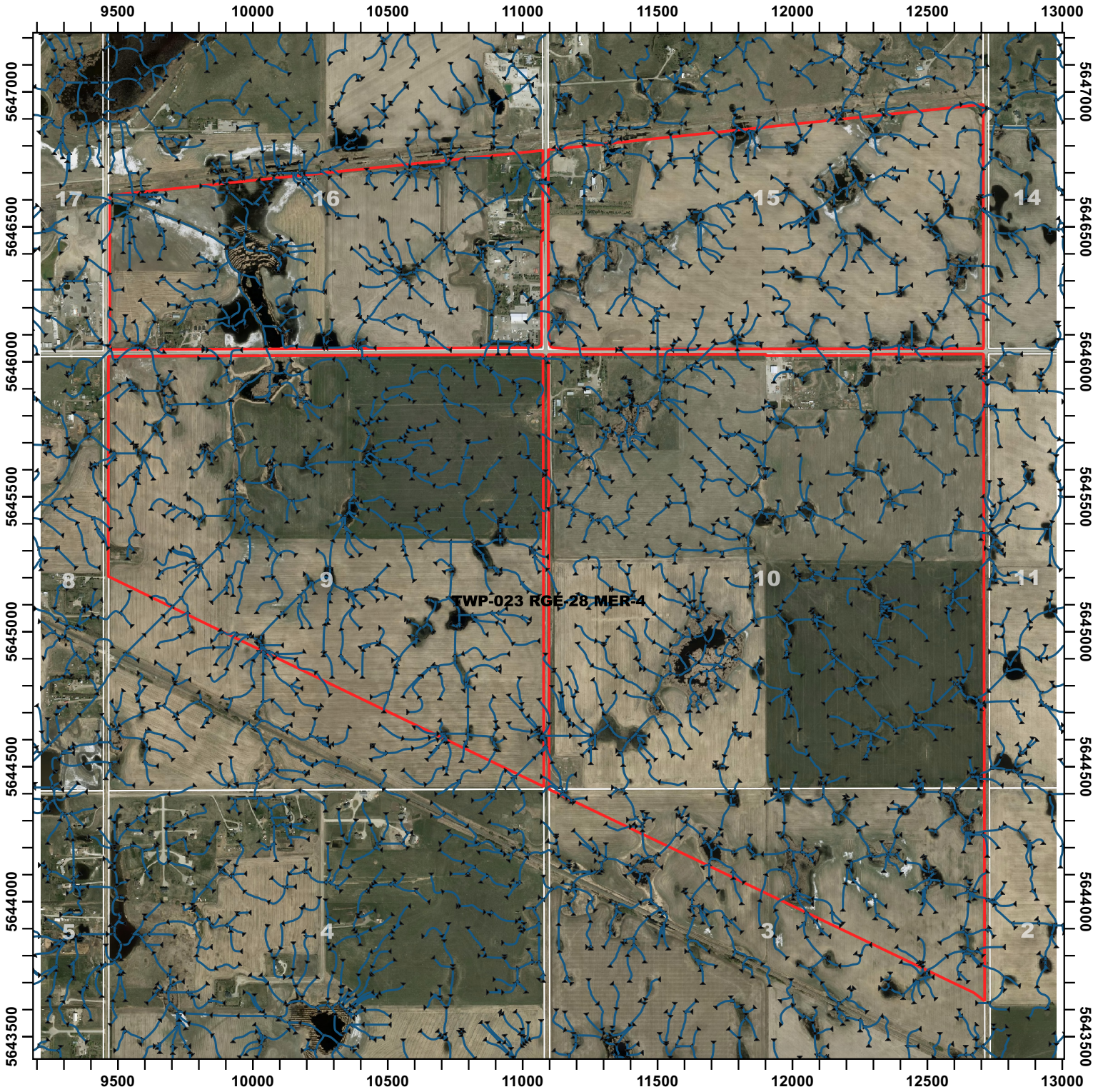
The Project Area is located in the Bow River Basin and Western Irrigation District to Highwood sub-basin. Anthropogenic activity is high in this sub-basin which includes the Calgary Weir, riverside pathways, highways, bridges, dog parks, and fishing locations (Bow River Basin Council 2010). The most relevant issues in this sub-basin are the effective management of wastewater effluent and storm water, as well as other human and industrial activities (Bow River Basin Council 2010). The main tributaries in this sub-basin are Fish Creek, Pine Creek, Chestermere Lake, and the Shepard Slough (Bow River Basin Council 2010).

According to the FWMIS database (AEP 2018), five lakes, ponds, or reservoirs are located within the Project Boundary (Figure 5). All of these features are classified on FWMIS as perennial lakes and are the most likely features in the Project Area to be Crown Claimed by the Public Lands Group of Alberta Environment and Parks, but an assessment will need to be submitted to the AEP Water Boundaries unit to receive an official determination. The FWMIS database is not the final determination of a waterbody class, and a more detailed investigation would be required to determine if these features are open water wetlands, marshes, lakes, etc. Further detail on wetlands in the project area are discussed in Section 2.3.2.

The following catchment description is summarized from the *Shepard Industrial Area Structure Plan Stormwater Management Study* (IDEA Group Inc. 2020). Locally, the project area is divided into two distinct catchment areas that are separated by a ridge running from the southwest to the northeast of the project area. The northwest catchment area drains to the Shepard Slough Complex located west of the project area, which ultimately drains into the Bow River through the Shepard ditch. The majority of flow from this catchment drains through a man-made ditch in the northwest corner of the project area. The southeast catchment area has sufficient depressional areas to self-contain a 1:100 year storm event and is assumed to be mainly a zero-discharge area.

The hydrology mapping included in this report (Figure 5) is meant to be preliminary in nature and based on desktop review and a 15 m resolution DEM was used for modelling, which may not always accurately reflect field conditions. Refer to the *Shepard Industrial Area Structure Plan Stormwater Management Study* (IDEA Group Inc. 2020) for more detailed hydrological information.

The Project Area was searched for known spring locations using data from Stewart (2014) and was found to have none. This dataset is not an exhaustive list of possible spring locations, so future ground truthing would be required to confirm their absence.



Legend

- Project Boundary
- Flow Paths

Figure 5

Shepard Industrial Area Structure Plan
Environmental Screening

Hydrology Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

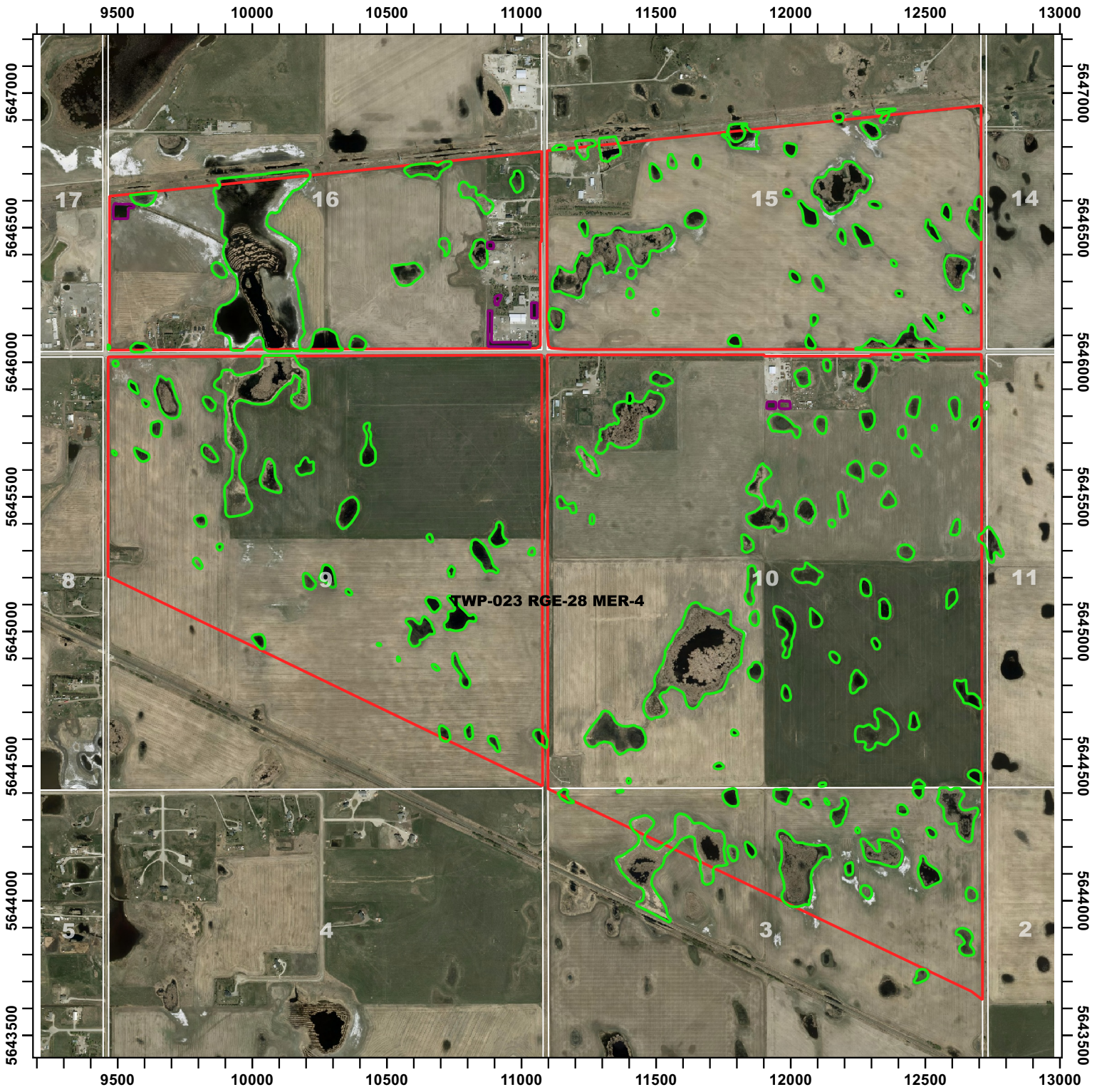
Tannas Conservation Services Ltd

2.3.2 Wetlands

The desktop assessment of the project area for wetlands was completed using the Alberta Wetland Identification and Delineation Directive (Government of Alberta 2015). Within the project footprint there were 174 wetlands (approximately 90 ha) identified using pathway 3 (desktop review) from the AEP Identification and Delineation Directive (Figure 6). These wetlands were initially classified using the Alberta Wetland Classification System (AESRD 2015). Generally, these wetlands are mineral, graminoid marshes that range in permanence from ephemeral (surface water is present for a few days after snowmelt or after storm events) to semi-permanent (typically surface water is present throughout the year except in years of drought). Six additional dugouts and/or ponds were identified within the project area that have been man-made or manipulated historically.

Ground truthing the wetlands will be required to finalize the classification of the wetlands. Additionally, a full permanency assessment will be required to determine the seasonality or permanence of the wetlands, which was not part of the scope of this assessment.

Removal of any of the identified wetlands will require *Water Act* approval and the seasonal and semi-permanent wetlands will require a permanency assessment under the Public Lands Act for removal. In addition, there is a possibility that ephemeral wetlands not visible in imagery also exist and these will also require *Water Act* Approval for their removal. Please note that removal of ephemeral wetlands requires *Water Act* Approval, but not compensation, as ephemeral water bodies are the only class that do not require compensation. The final boundaries of these wetlands may be modified slightly or additional wetlands encountered after a comprehensive permanency assessment is completed, and/or from ground truthing during field assessments.



Legend

- Project Boundary

Waterbodies

- Anthropogenic Waterbody
- Natural Waterbody

Figure 6

Shepard Industrial Area Structure Plan
Environmental Screening

Wetland Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Tannas Conservation Services Ltd

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

2.4 Topography

2.4.1 Local Topography

The local topography within the project area is a slightly rolling landscape ranging in elevation from about 1,018 m in the northwest part of the project area to 1,034 m in the southern part on the project area. Another high point occurs in the northeast project area at 1,031 m (Figure 7).

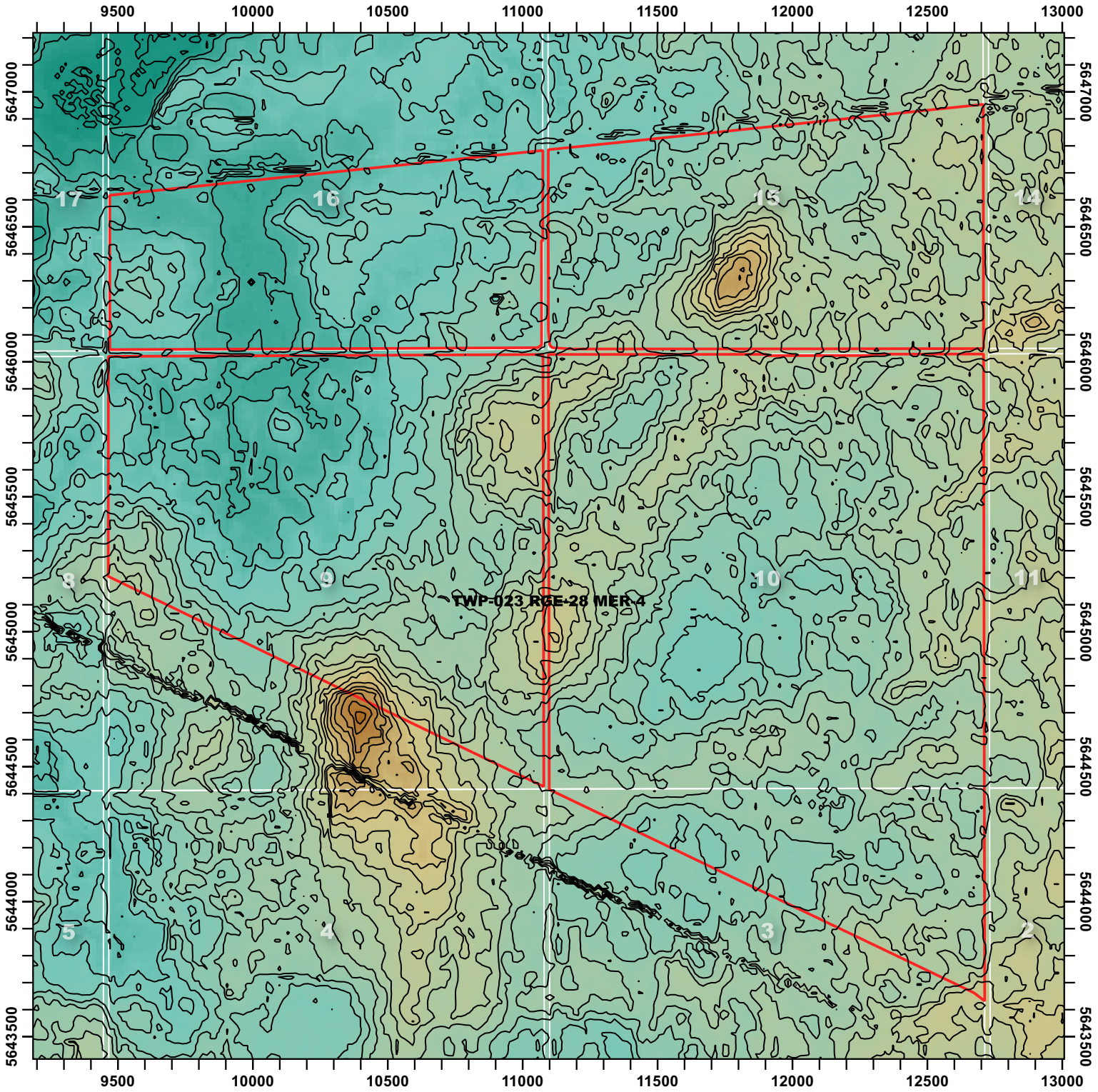
Based on contour lines and DEM (digital elevation model) data, the west side of the project area is sloped to the west and north, with some lower areas in the southeast. Section 10 drains in general to the southeast.

Geographic features such as escarpments, ravines, coulees, and other sharp changes in the topography are not present in the project area. An analysis of slopes of 15% or greater was conducted 500 m from the maximum project boundaries, and up to 1.5 km away in the southwest. The only area that had 15% slope was near the current railroad (SE section 9), which is possible, as a hilly area trends to the south, while being cross cut by the railroad. Field verification would determine if the slope is significant.

2.4.2 Regional Topography

The regional topography is relatively flat to undulating with slopes ranging from 0% to 5% (Figure 7). The project site is similar to the regional topography of the surrounding area. In general, the topography of the entire region is slightly rolling with small to large low-lying prairie pothole wetlands.

The general viewscapes of the project are of a gentle rolling landscape for the project site, with the City of Calgary to the west, with agriculture fields, waterbodies, and developed areas throughout the project site. The surrounding areas to the north, south, and east are similar to the project site, and somewhat the same to the west and northwest with the presence of larger water bodies and Ralph Klein Park.



Legend

- Project Boundary
- Topography (1.0m)

Elevations Range (meters)

- 1015
- 1020
- 1025
- 1030
- 1037

Tannas Conservation Services Ltd

Figure 7

Shepard Industrial Area Structure Plan
Environmental Screening

Topography Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

2.5 Geology

The surficial geology in the project area is mainly composed of stagnant ice moraine, which is composed of sediments deposited on the edge of a dying or retreating glacier. The sediment is mainly glacial till, but it also can be also composed of stratified glaciofluvial and glaciolacustrine sediments (Fenton et al. 2013).

Moraine deposits occur in the northwestern and western part of the project site. These sediments are deposited by glacial ice and may consist of clay, silt, sand, pebbles, and sometimes bedrock, stratified sediments, and lenses of glaciolaustrine and or glaciofluvial sediment (Hartman 2016).

More recent sediments of lacustrine deposits occur (are mapped) in the northwest water body of the project in SW-16-23-28-W4. Lacustrine deposits are sediments that are deposited along recent and modern lakes, which can include sand, silt, and clay, organic deposits in minor amounts, and some minor gravel (Hartman 2016).

Moran (1986) describes the surficial lithology as the Crossfield Drift (unit b) for the entire site. The far western lots of the project boundary are further separated. The western half of the lots contain pebble loam till, with mudflow sediment that was deposited from the top of a glacier. The terrain of the sediments is of undulating to hummocky glacial-collapse terrain. The rest of the project area east of the western-most lots are derived of sediments that are shallower than the west and have underlying sandstone, siltstone, and shale. It also has glacial sediment derived from glacier tops, but it is draped by glacial collapse terrain over bedrock. Glacial sediments are believed to be 7 m to 11 m in depth, but can exceed that in places.

Bedrock beneath the surficial sediments is composed of the Paskapoo Formation. The Paskapoo Formation is composed of grey to greenish-grey mudstone and siltstone. It is a commonly cross-stratified sandstone with minor conglomerate, and coal (Prior et al. 2013).

2.6 Pedology

Five soil series are located within the project site, where each lay stratigraphically on top of each other by age, in general, from youngest to oldest starting with the Delacour soil series.

The Delacour soil series occurs throughout the project site in places with higher elevations within the project site, that in are within upper slope and some mid slope areas. The Delacour soil series is a well-drained, moderately calcareous, non-saline, Orthic Black Chernozem that is moderately fine textured (sand clay loam, clay loam, and silty clay loam).

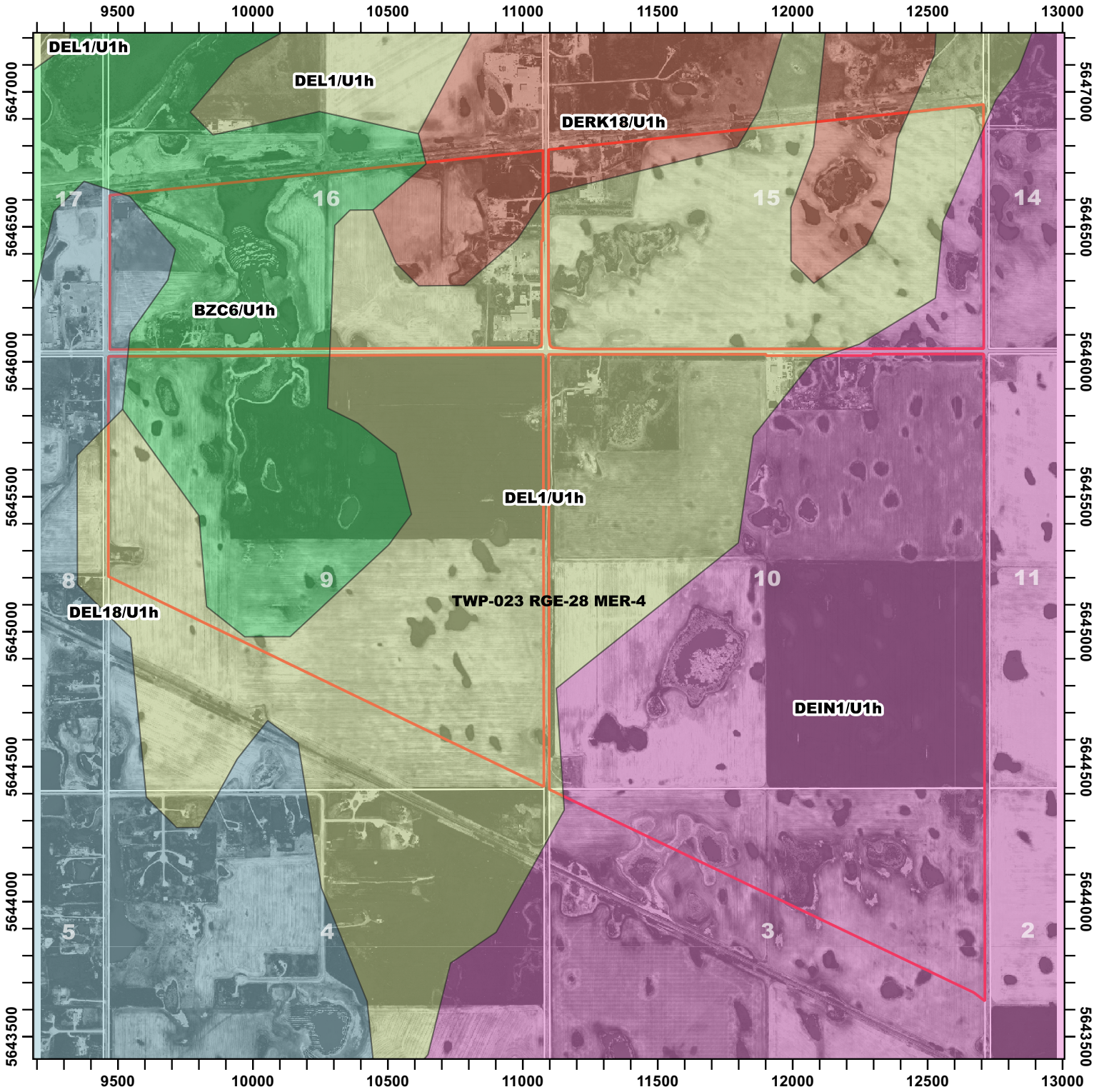
The Rockyview soil series also occurs throughout the project site beneath the Delacour soil series, but in areas that are mid-slope and lower slope areas. The Rockyview soil series is also a well-drained, Orthic Black Chernozem, but it a is strongly calcareous, non-saline, and is medium textured (silt loam and very fine sandy loam; Government of Alberta 2014).

Beneath the Rockyview soil series are the Beddington, Balzac, and Indus soil series. The Balzac soils series occurs in the western, northern, and central parts, that are in depressions of the project site (BZC6/U1h, DEL18/U1h, and DERK18/U1h) (Figure 8). The Beddington soil series occurs is also in DEL18/U1h, but occurs in within lower slopes that are stratigraphically in between the Rockyview and the Balzac soil series. To the east of the Beddington and Balzac soil series is the Indus soil series (DEIN1/U1h), which occurs within depressions of the project site (Government of Alberta 2014).

The Beddington soil series is a moderately well drained, moderately calcareous, moderately saline, Black Solodized Solonetz, that is moderately fine textured (sand clay loam, clay loam, and silty clay loam).

The Balzac soil series is a very poorly drained, strongly saline, strongly calcareous, Rego Humic Gleysol, that is finely textured (clay, silty clay and sandy clay).

The Indus soil series is a poorly drained, moderately calcareous, non-saline, Humic Luvic Gleysol, that is moderately fine textured (sand clay loam, clay loam and silty clay loam; Government of Alberta 2014).



Legend

Project Boundary

Soils

- BZC6/U1h
- DEIN1/U1h
- DEL1/U1h
- DEL18/U1h
- DERK18/U1h

Tannas Conservation Services Ltd

Figure 8

Shepard Industrial Area Structure Plan
Environmental Screening

Soils Overview

N

Scale: 1: 20,000

0 200 400 600 800 1,000 m

Imagery: Rockyview County 2018 Ortho Imagery

Coordinate System: NAD83 / Alberta 3TM ref merid 114 W

Government of Alberta. 2014. Alberta Soil Information Viewer. Agricultural Region of Alberta Soil Inventory Database (AGRASID). https://soil.agric.gov.ab.ca/agrasidviewer/

2.7 Historical Resources

The *Historical Resources Act,* RSA 2000, c. H-9 is administered by the Historic Resources Management Branch (HRMB) of Alberta Culture, Multiculturalism, and Status of Women. The Act protects all historical resources in Alberta, including paleontological, prehistoric, historic, archaeological, and certain cultural or natural objects, sites, or structures. The HRMB recommends that all ASPs and other long-term planning documents submit a Historic Resources Application for review. The results of this review can provide the applicant about any historic resource concerns in the planning area. A Historical Resources Overview (HRO) was prepared for the project area by Bison Historical Services Ltd. (2020) to support a Historic Resources Application made to HRMB.

The results of the HRO indicated that no previously recorded historical resources were located with the project footprint, but that historic structures were likely present based on a review of historical imagery. The HRO recommended that a Historical Resources Impact Assessment be conducted for the project based on the potential to impact historical structures. A *Historical Resources Act* approval with conditions was issued for the project in October 2020 (HRA Number: 4835-20-0078-001). The conditions of this approval are outlined in the mitigations section of this document.

2.8 Other Features

Within the project footprint, there is a mixture of open fields used for agricultural activities and anthropogenic features within developed acreages. Some of the anthropogenic features include homes, barns, garages, corrals, various other buildings pertaining to homestead/farming activities, dugouts, and structures for livestock. A number of small roads lead to various homes and buildings throughout the site. A high voltage powerline corridor exists along the northern boundary of the project area, and there are wooden power pole lines along Range Road 284 and Township Road 232.

2.9 Existing Policy

This section provides a summary of municipal policies and federal and provincial legislation that may be applicable to the project. The summary is intended as a guide, but the proponent must ensure that the proposed project adheres to all current policies, plans, and legislation at the time of development, as they are routinely updated and altered.

2.9.1 Municipal

2.9.1.1 Calgary Regional Interim Growth Plan

The Calgary Metropolitan Region Board (CMRB) prepared the Interim Growth Plan (IGP) to guide land-use, growth, and infrastructure planning on an interim basis before the approval of the long-term Growth Plan and Servicing Plan. Ten municipalities make up the CMRB, including Rocky View County. Any statutory plan passed or amended by a member municipality must comply with the IGP until the Growth Plan and Servicing Plan are adopted and approved. As per Policy 3.4.3.2 in the IGP, new freestanding settlement areas with 500 or greater dwelling unites shall protect environmentally significant areas.

2.9.1.2 Calgary – Rocky View County Intermunicipal Development Plan

The Intermunicipal Development Plan (IDP) was adopted by the M.D of Rocky View and the City of Calgary to identify areas of mutual interest that could have common policies in a joint planning area. The Project Area is

within the IDP. The northern portion of the Project Area is within the highway 560 (Glenmore Trail) Joint Industrial Corridor Key Focus Area, while the entire Project Area is within the Industrial City of Calgary Growth Area identified in the IDP.

2.9.1.3 Rocky View County Municipal Development Plan

The Municipal District of Rocky View is currently conducting an update/review of the Municipal Development Plan (MDP) which guides growth and development for the entire county. Any Area Structure Plans within the MDP must align with the MDP's established policies (once adopted). The Project Area is not covered under the new MDP specifically, but the location falls in an employment growth and future planning area.

2.9.1.4 Area Structure Plans

The Shepard ASP was passed by Calgary City Council in 2001 (amended 2014), but it does not cover the location of the Project Area. A new Shepard Industrial ASP is currently being developed that covers the Project Area specified in this report. Two other ASPs have been developed for nearby areas, including the South Shepard Area Structure Plan (The City of Calgary 2013), which is located to the southwest of the project area, and the Shepard Industrial Area Structure Plan (The City of Calgary 2009), which borders the project area on the west.

2.9.1.5 Rocky View County Servicing Standards

Internal access roads (new intersection, internal road, cul-de-sac, and emergency access), potable water works systems, fire suppression systems, wastewater, utilities, storm water/drainage systems, and landscaping must be constructed as per the Rocky View County Servicing Standards (Rocky View County 2013).

2.9.2 Provincial

2.9.2.1 Environmental Protection and Enhancement Act

The Environmental Protection and Enhancement Act, RSA 2000, c. E-12 (EPEA) supports and promotes the protection, enhancement and wise use of Alberta's environment. Only those activities designated in the EPEA Schedule of Activities are subject to EPEA. The development of certain projects requires either an Environmental Impact Assessment (EIA) report, approval, registration, or notification under EPEA. A list of mandatory activities that require an EIA is located in the Environmental Assessment (Mandatory and Exempted Activities) Regulation, Alta Reg 111/1993. This regulation also lists activities which are exempt from an EIA, or are discretionary (not on either list and require a decision by the Director). The Activities Designation Regulation, Alta Reg 276/2003 lists activities that require an approval, registration, or notification under EPEA. Whether or not activities on the subject property will need an application under EPEA will depend on the specifics of the development.

2.9.2.2 Municipal Government Act

Under the *Municipal Government Act,* RSA 2000, c. M-26, section 664(1), a municipality may require a portion land subject to a proposed subdivision to be retained in its natural state as environmental reserve if it consists of:

a) A swamp, gully, ravine, coulee, a natural drainage course.
b) Land that is unstable or subject to flooding.
c) A strip of land adjacent to the bed and shore of any water body, no less than 6 m in width. This includes any lake, river, stream or other body of water.

A municipal government can designate land as environmental reserve for the purpose of preserving natural land

features, to prevent pollution of the land or body of water, to endure public access to the waterbody, or to prevent development where natural features may pose a risk to personal safety or property.

2.9.2.3 Public Lands Act

All Crown land, including the bed and shores of all permanent watercourses and water bodies, are considered Alberta Public Lands unless they are owned by the Government of Canada. As such, approvals from AEP under the Public Lands Act, RSA 2000, c. P-40 are required for any activity on Public Lands or the bed or shore of Crown owned rivers, streams, or lakes. A list of activities that require a Public Lands Act approval is available from the AEP website.

2.9.2.4 Water Act

All water resources located within the province of Alberta are owned by the Provincial Government. AEP administers the Alberta Water Act, RSA 2000, c. W-3, which is the primary legislation governing the use and management of Alberta's water resources, including wetlands. Alberta's Water Act requires approval, code of practice notification, and/or attainment of a license before undertaking construction in a surface water body or activities related to a water body which have the potential to impact the aquatic environment.

A *Water Act* Code of Practice Notification is required for specific activities that adhere to the Codes of Practice. There are four types of activities that have an associated Code of Practice:

- Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body
- Code of Practice for the Temporary Diversion of Water for Hydrostatic Testing of Pipelines
- Code of Practice for Watercourse Crossings
- Code of Practice for Outfall Structures on Water Bodies

Specific construction and mitigation standards/conditions are outlined within the codes of practice that vary depending on the type of activity and the class of the waterbody being impacted. If the requirements outlined in the Code of Practice cannot be followed, the project must obtain approval under the Water Act.

Wetland management in Alberta is regulated through Section 36 of Alberta's *Water Act*. A *Water Act* approval is required prior to any works that may impact a wetland. AEP released Alberta's new Wetland Policy in September 2013, which applies to all wetlands in the province. Applicants proposing an activity in a wetland must submit a wetland assessment to the regulatory body with the application and other required plans. Most activities will require an Alberta Wetland Assessment and Impact Report (WAIR) to be prepared by an authenticating professional to be submitted with the application. Certain low risk activities allow an Alberta Wetland Assessment and Impact Form (WAIF) to be submitted in place of a WAIR. The Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) must be used when a WAIR is required to determine the relative value of the wetland, which is then used to inform decisions about avoiding high-value wetlands, and determines cost and replacement ratios for wetland replacement when avoidance is not possible. The Alberta Wetland Rapid Evaluation Tool – Desktop (ABWRET-D) can be used when a WAIF is required.

2.9.2.5 Weed Control Act

The Alberta *Weed Control Act*, SA 2008, c. W-5.1 regulates noxious weeds, prohibited noxious weeds, and weed seeds through inspection and enforcement measures, as well as outlines provisions for cases of non-compliance. The Act requires that a person must control noxious weeds and destroy prohibited noxious weeds that are on a property they own or occupy, as well as not facilitate the spread of weeds or weed seeds. The plant species

listed in Schedule 1 of the Weed Control Regulation, Alta Reg 19/2010 are designated as prohibited noxious weeds in Alberta, and those listed under Schedule 2 are listed as noxious weeds in Alberta.

2.9.2.6 Wildlife Act

Alberta's *Wildlife Act*, RSA 2000, c.W-10 protects the residences of wildlife on private and public lands. More specifically, a person must not wilfully molest, disturb or destroy a house, nest, or den of prescribed species. Section 96 of the Wildlife Regulation, Alta Reg 143/1997 outlines the wildlife species, areas, and time of year when the Act applies. All endangered wildlife, upland game birds, some migratory birds, snake and bat dens, and beavers (in some instances) are species of which Section 36 of the *Act* applies to. For most wildlife, disturbing the habitat of these animals is prohibited year-round throughout Alberta. AEP staff may recommend timing restrictions on activities to minimize disturbance to the nest of breeding wildlife and birds. The *Wildlife Act* also protects endangered plant species (both vascular and non-vascular) listed in the Wildlife Regulation.

2.9.3 Federal

2.9.3.1 Fisheries Act

The *Fisheries Act,* RSC 1985, c. F-14 applies to all Canadian fisheries waters and Fisheries and Oceans Canada (DFO) has the responsibility to administer and enforce the conservation and protection of fish habitat on private property, as well as on provincial and federal lands. Section 36(3) of the *Fisheries Act* prohibits the discharge of deleterious substances into a water body frequented by fish; Section; Section 35(1) prohibits any work or activity that results in harmful alteration, disruption, or destruction of fish habitat; and Section 34.4(1) states that no person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish.

DFO has provided a list of measures to protect fish and fish habitat that apply to clear span bridges, bridge maintenance, on-land mineral exploration activities, and decking repairs. If a project can't completely implement the measures, and doesn't fall under the standards and codes of practice, a request for project review must be sent to DFO. Activities that are covered under the standards and codes of practice include: beaver dam removal, culvert maintenance, fish protection screens, routine maintenance dredging, temporary cofferdams and diversion channels, and temporary stream crossings. If a project can follow all procedures, practices, and standards within the standards and codes of practice, a notification form must be submitted to DFO.

If a project does not meet the criteria established by DFO to avoid serious harm to fish and the effects cannot be mitigated by an applicable standards and codes of practice, a Request for Review must be submitted for consideration by the Minister of Fisheries and Oceans. If activities are determined to cause serious harm to fish, an Application for Authorization will be required that will include a fish and fish habitat report, available design information, a description of effects on fish and fish habitat, a description of measures and standards to avoid or mitigate serious harm to fish and an offsetting plan.

2.9.3.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act*, SC 1994, c. 22 (*MBCA*) and *Migratory Birds Regulations*, CRC, c. 1035 prohibit the harm of migratory birds, their nests, eggs, and habitat. Environment Canada recommends timing restrictions and setbacks to help identify when the risk of contravening the *MBCA* is particularly high. According to the Map of Nesting Zones in Canada (Government of Canada 2017), the project area is located in Nesting

Zone B4 within the Prairie Bird Conservation Region. In this nesting zone, birds are actively nesting between April 14 and August 28 (Government of Canada 2017), with some variation between different bird species and habitat types.

Environment Canada advises that habitat destruction activities (e.g. vegetation clearing, flooding, draining, construction, etc.) in areas attractive to migratory birds are prohibited during the active nesting period to reduce the risk of contravening the *MBCA*. In select cases where vegetation is open and nests can be readily identified (e.g. a few trees in a city park or isolated patch of trees), a wildlife sweep can be conducted by a qualified biologist prior to beginning activities to ensure no nests are within the area to be disturbed, and no contraventions under the *MBCA* occur.

The *MBCA* and its associated regulation specify that efforts should be made to preserve and protect habitat necessary for the conservation of migratory birds. This includes nesting and wintering grounds, migratory bird corridors, and encompasses such activities as tree clearing, wetland consolidation, and temporary and permanent disturbances occurring in proximity to migratory bird habitat.

2.9.3.3 Species at Risk Act

The *Species at Risk Act*, SC 2002, c. 29 (*SARA*) provides protection for species listed as "Endangered" or "Threatened" under the Act. Protections for these species under *SARA* only apply on federal lands (oceans and waterways; national parks; military training areas; national wildlife areas; some migratory bird sanctuaries; and First Nations reserve lands). *SARA* does not apply to lands held by the Province of Alberta or its private citizens unless "the laws of Alberta do not effectively protect the species or the residences of its individuals". The Minister may issue an order in council to protect federally listed species that occur on provincial or private lands, but this has not occurred within the project area.

3.0 Impacts, Mitigation, and Monitoring

3.1 Impact Assessment Methodology

For the proposed ASP, a general impact assessment methodology has been used to evaluate the impact of the proposed work on the following Valued Ecosystem Components (VECs): biological resources (vegetation and wildlife), hydrology, topography, geology, pedology, historical resources, and socio-economic impact. This assessment has been completed based on the minimal details available at this stage in the project planning, which is included within this report and the phased site plan found in Appendix A.

Effects on VECs were ranked spatially as within the site, local, or sub-regional and were ranked in duration as short-term, medium-term, or long-term (Table 6). The magnitude of the expected effect was ranked as negligible, minor, moderate, or major, and then the overall impact of all expected impacts to a VEC was given a ranking (Table 6). The ranking takes into account the potential impacts to VECs in the project area assuming that standard mitigations are put in place. Please note that as very minimal details are available at this stage in the project planning, TCS is making assumptions on the level of the impacts and the appropriate mitigations that will be required.

Table 6: Impact Significance Criteria Used

Spatial Extent	
Site	Within the physical boundaries of the site and all associated work space.
Local	Extending beyond the boundaries of the site, but remaining within a ~100 m buffer around the project area.
Sub-regional	Extending beyond the boundaries of the site, and into the applicable Natural sub-region of Alberta (Natural Regions Committee 2006).
Duration	
Short-term	A portion of the project footprint construction (less than one year).
Medium-term	The reclamation/restoration period (1 to 3 years).
Long-term	The time frame for the presence of the developments (greater than 3 years).
Magnitude	
Negligible	Effect is difficult to detect. There are no obvious changes to the natural resource.
Minor	Effect is easily detected. Only affects the natural resource within the local Project Area, and is likely to recover with minor mitigation.
Moderate	Effect on the natural resource is easily detected. It may result in changes in species population parameters within the sub-regional area within natural limits of variability (generally short to medium-term). Resources require considerable mitigation measures to recover.
Major	Effect is easily detected, and the natural resources within the affected sub-regional project area would be destroyed or displaced beyond the natural limits of variability.
Overall Impact	
No Impact	No negative impacts are expected.
Negligible	The extent, duration, and magnitude of impacts tend to be local, short-term, and negligible or minor.
Minor	Extents tend to be local or sub-regional, the duration tends to be short to medium term, and the magnitude negligible to moderate.
Moderate	The extents tend to be sub-regional to regional, the duration medium to long term, and the magnitude minor to moderate.
Major	The extent tends to be regional, duration long-term, and the magnitude moderate to major.

3.2 Impact Assessment Results

A summary of potential environmental impacts for each VEC, as well as standard mitigation measures and residual impacts (post-mitigation), are described in detail below. The significance of potential effects on each VEC is outlined in Table 7.

3.2.1 Potential Impact to Vegetation

The vegetation present in the Project Area is almost exclusively managed and non-native, with the exception of wetland areas. Therefore, the overall effect of upland vegetation removal is expected to be negligible (impacts to wetland vegetation are discussed in the wetlands section). Increased soil disturbance due to development will create a niche for weeds to establish and increase prevalence of invasive species. A weed control program must be developed that controls weeds both during construction activities and during the maintenance phase. The presence of bare ground should be minimized by limiting clearing to what is required by each phase, and areas to be revegetated should be seeded with a native seed mix appropriate to the site.

According to ACIMS, five rare plant species or plant communities have been documented within 10 km of the project area and one rare plant listed as sensitive was found within 20 km of the project area. It is possible that rare plants could be found within the project footprint, as there is suitable habitat available for many of these species within the wetlands and ephemeral water bodies. Due to the potential for rare plants in wetland and water body areas, rare plant surveys will need to be completed in spring/summer during the appropriate survey times according to Government of Alberta standards if this project proceeds. As per the County Servicing Standards (Rocky View County 2013), any on-site vegetation surveys are to be completed between May and September. If any rare plants are detected, specific mitigation measures will be determined based on the findings of the survey. If rare plants occur within impact zones, and the impact zones cannot be changed to in order to avoid the plants, plants can either be moved, collected for propagation, or seeds collected, depending on the species of rare plant. Impacts to rare species cannot be known until field surveys are conducted.

3.2.2 Potential Impact to Wildlife

The project area is already somewhat disturbed due to the presence of roads, acreages, farms, and other developments. As such, most wildlife in the area is already regularly exposed to regular human disturbance, a landscape fragmented by roads/rail, and a plant community invaded with non-native species. The proposed project will shift the primary land use from agriculture to industry, resulting in an overall loss of vegetated open space. The removal of upland vegetation may reduce breeding opportunities for grassland birds and small mammals, though much of the surrounding areas are likely of similar quality habitat.

Most of the land within the project footprint is pasture/hay or cropland, with few trees, which generally provides habitat for a low diversity of species. Larger wetlands on site and their surrounding buffer will have more potential to provide higher quality wildlife habitat, especially for some sensitive bird or amphibian species. As such, there appears to be little high-quality wildlife habitat within upland areas of the project footprint and maintaining large wetland areas or connected wetland complexes would be of priority to minimize negative impacts to wildlife habitat. Impacts to wildlife habitat are expected to be mainly local, long-term, moderate in magnitude, and moderate overall.

Direct impacts to wildlife will also depend on the timeline and methods of the construction. Any work between April 14th and August 28th that requires clearing (trees, shrubs, grassland, and wetlands) has the potential to disturb nesting birds and other wildlife. If limited clearing must proceed within this time window, a wildlife sweep by a qualified biologist will be required to ensure no direct disturbance to wildlife occurs. During construction of the project, there may also be a temporary increase in sensory disturbance to wildlife occupying the area. Mitigation measures such as timing construction to avoid breeding periods, wildlife sweeps, and limiting hours of operation to daylight hours will mitigate some of the direct impact to wildlife in the area. Direct impacts to wildlife are expected to be mainly local, short-term, minor in magnitude, and negligible overall, assuming standard mitigation measures are followed.

The special status wildlife species documented in the wildlife portion of the report are known to be in the region and therefore it is necessary for a wildlife sweep to occur prior to the initiation of construction activities occurring after April 14th. If species of concern are found on site during construction, then specific mitigation measures will be developed by a qualified wildlife biologist, to reduce the impact to these species. Impacts to sensitive wildlife species cannot be determined until field surveys are conducted to see if species at risk are located on site and what the final development plan will be.

The development will result in further fragmentation of wildlife habitat in the area, likely separating it into corridors or islands within the proposed man-made infrastructure. Though the surrounding area is currently composed of plenty of open space for wildlife to potentially avoid this infrastructure, cumulative impacts must be considered as these areas could be developed in the future. The establishment of potential environmental reserves should consider impacts to wildlife movement, prioritizing connected corridors or closely spaced islands with a variety of habitats for wildlife shelter. Impacts to wildlife movement will be somewhat dependent on the final project design (abundance, location, and quality of green space), but are expected to be sub-regional, long-term, and moderate overall.

It is recommended that prior to development, wildlife surveys be conducted due to the presence of wetlands and 17 sensitive wildlife species being found within 5 km of the site during a FWMIS search. Recommended surveys include:

- Amphibian surveys for all wetlands, water bodies, or riparian areas.
- Breeding bird surveys across the Project Area, including a search for swallow nests in existing structures if any are proposed for repair/demolition.
- Incidental wildlife surveys to identify other species that may utilize the project area such as American badgers.
  Habitat surveys to assess the general quality of different habitats within the Project Area.

3.2.3 Potential Impact to Hydrology

Hydrology within the Project Area will be impacted by development, though the exact details cannot be known until more detailed designs are completed. As the site is being converted to industrial use, the prevalence of impervious surfaces in the area will increase and natural surface water absorption will likely be very limited. This impact could be reduced by designating more areas as open vegetated space or retaining more wetlands on the landscape. A comprehensive stormwater management plan will need to be developed for the area to manage surface water and prevent flooding. Management plans must be designed to not exceed the capacity of any outlets and provide sufficient water storage post-development in order to not negatively impact the downstream system. Impacts to surface water infiltration are expected to be local, long-term, and minor overall assuming standard mitigation measures are put in place.

The conversion of the area to industrial lots could increase the potential for sedimentation and other contaminants to enter water bodies in or near the Project Area. This potential effect would be present both during construction and afterwards, although the potential for erosion would be greatly reduced after revegetation is completed. All wet ponds will be required to meet water quality standards outlined in the City of Calgary Stormwater Management & Design Guidelines, including minimum requirements to remove suspended solids. Sediment forebays, sedimentation vaults and oil/grit separators may be required to minimize potential pollution. The impacts of potential sedimentation and pollutants is expected to be local, long-term, and minor overall, assuming standard mitigation measures are put in place.

3.2.4 Potential Impacts to Wetlands

Based on the development conceptual scheme, the impact on wetlands could range from minimal to moderate, depending on if there are any allowances for wetland avoidance. Ideally, wetlands and dugouts should be avoided to minimize impacts. However, due to the abundance of wetlands within the project area, it is anticipated that complete avoidance will not be feasible based on the change to industrial land use.

Wetland removal will be the most significant environmental impact for the project since the upland areas are not pristine wildlife habitat. A field assessment will have to be done to confirm wetland class, permanency, and status (man-made or natural) of all wetland areas prior to development, but to be conservative, it will be assumed that all non-ephemeral water bodies may be removed and require compensation.

It is recommended, where feasible, that wetlands, especially large complexes, be retained to maintain area hydrology, wildlife habitat, and limit the compensation requirements to AEP. Rocky View County may require dedication of wetlands as Environmental Reserves or Environmental Reserve Easements at the time of subdivision. Man-made water features, such as dug outs, can be removed without compensation to AEP.

Prior to the development of any of the proposed industrial lots proceeding, a number of assessments will be required. First, a wetland permanency assessment would be submitted to the Water Boundaries Unit under Alberta Environment and Parks (AEP) Public Lands to determine if any of the wetlands are Crown Claimed. If any are Crown Claimed, a joint *Public Lands Act* and *Water Act* Approval application will be required for their removal. If none are Crown Claimed, only a *Water Act* Approval application would be required for their removal. Please note that if a wetland within the project area has been removed historically, without authorization (as determined from the AEP and AER Authorization Viewer), compensation may be required to be paid for the removal of all non-ephemeral wetlands, both current and historical. The wetland permanency assessment will require a detailed desktop assessment delineating the boundaries of each seasonal and semi-permanent wetland using multiple years of imagery taken in years with average, lower than average, and higher than average precipitation. This is to identify temporal changes in wetland occurrences, extents, and land use within the project area.

Obtaining a *Water Act* Approval to remove wetlands will require a wetland field assessment that will be analyzed and written into a Wetland Assessment and Impact Report (WAIR), required by AEP (Government of Alberta 2015). This entire project area will require a spring ground truthing assessment to confirm the presence or absence of wetlands, rare plants, and sensitive wildlife. Based on current AEP approval timelines, this should occur at least one year prior to wanting to fill in the wetlands. Field data needs to be collected using:

- The Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A)
- The Alberta Wetland Classification System (AESRD 2015)
- Classification of Natural Ponds and Lakes in the Glaciated Prairie Region (Stewart and Kantrud 1971), used as a supplemental guide;
- Wetland field assessments will be completed by a qualified wetland professional during the spring (reviewed by authenticating professional). The field assessments will involve ground-truthing and evaluating wetland areas, that were delineated from aerial photographs. The potential for the wetland to be affected by the proposed development, either directly or indirectly, also needs to be determined.

The *Water Act* Approval application consists of the WAIR (including compensation and mitigation), a *Water Act* Application form, various consent letters, stormwater approvals (EPEA), and final engineering design drawings. Please note that ephemeral wetlands require a *Water Act* Approval application for their removal, but no compensation is mandated. All other wetland classes require compensation.

Due to the presence of wetlands and the potential for sensitive wildlife and plants, a Biophysical Impact Assessment (BIA) is recommended to be completed before development occurs, but after a final development design is determined.

3.2.5 Topography Impact

This project will have minor impacts to the topography at the regional scale, due to the already present, relatively flat conditions. It is assumed that grading, soil stripping, and infill would occur. There will likely be an impact at the local scale. Due to the lack of ravines, coulees, and or escarpments (of greater than 15% slope), no mitigation measures are currently required at an Environmental Assessment stage (Table 7).

3.2.6 Geographical and Geological Impact

This project will have negligible impacts to the geography and geology, due to its specific landscape position and the landscape features around the project area. No unique landforms were identified. No major disruption, in general, of regional drainage patterns are expected due the relative flat nature of the geographic landforms. Localized minor impacts would be expected. Also, due to no known mapped bedrock surface exposures, no mitigation measures are required for geographical and geological impacts (Table 7).

3.2.7 Pedological Impact

Soils onsite have been previously disturbed in some areas and are undisturbed (native profile) in others (associated with some wetlands), with the exception of historical agricultural activities such as plowing and cultivation. Development of the area will result in soil disturbance throughout the development footprint. Development requires stripping of topsoil and subsoil material, as well as potential excavation, removal, and/or recontouring of lower subsoil parent material, depending on the development requirements. As a result, there is significant risk for loss of soil volume and quality, destruction of soil structure, erosion, admixing, and compaction. Loss of soil structure and at least minor admixing is generally unavoidable regardless of attempts to mitigate. While soil structure will eventually redevelop in disturbed soils, the natural profile cannot be re-established. Admixing is also irreversible. A small amount of soil loss is also unavoidable due to the nature of soil handling and the development process. Other potential impacts to soil, including: clodding, compaction, erosion, significant soil loss, severe admixing, and reduced soil quality, can be mitigated by appropriate planning, using current best practices, and knowledgeable/ experienced supervisors and equipment operators.

On a larger scale such as the project area, development throughout can impact the subsurface and surface drainage through various means including: recontouring, compaction, culvert/ditches, etc. Should drainage be impeded or redirected, ponding or flooding may occur in undesirable locations onsite or may affect properties located up or down-slope of the property. Though the dominant series within the area are not saline, there are two saline series (Balzac and Beddington) that occur, which may be adversely affected, should drainage impacts occur onsite. Soils within discharge areas may receive additional salt inputs, which would further reduce the quality of those soils. In addition, disturbing the Bnt horizon within an area of Solodized Solonetz (Beddington) will also change the drainage with the destruction of the hardened, columnar subsoil layer. While these soils are not typically considered high quality due to the presence of salts, they do create a unique environment and habitat and there is not currently a technology which exists to re-establish a solonetzic soil. Generally, destruction of the Bnt horizon should improve infiltration and decrease soil salinity, thus making the soil more desirable for use. However, the salts will percolate through the profile and travel to areas of discharge which will salinize those locations. This may result in areas not previously influenced by salts becoming salinized, or areas already affected becoming further salinized.

The presence of water over an extended period of time is required to develop a Gleysolic soil (Indus and Balzac soil series). As a result, there is the potential for saturated soils and free water to be encountered should these soils be disturbed. Whether the soil is saline or not, the working with equipment and wet soil can be difficult and

can severely affect soil structure and create significant compaction and soil clodding issues. Ideally soils are dried prior to handling.

To mitigate potential impacts associated with development, current best management practices for ground disturbance and construction should be used. Development typically requires that topsoil is stripped, removed from the site, and relocated to create space to work within and to build infrastructure. This may also be the case for subsoil depending on the development plans. When soil is handled by equipment, a portion of loss is expected as it is pushed or carried. Any time soil is disturbed, its quality is impacted as its structure is destroyed. Quality of topsoil may particularly be affected due to impacts to soil structure, microbiota, organic matter content, moisture content, etc. Disturbed soil stored in windrows is at higher risk for erosion during high wind and precipitation events, especially if windrows are dry, un-vegetated, and/or perpendicular to the prevailing winds. Soil storage also results in a degradation of organic matter, nutrient content, and seed bed viability over time.

Disturbing soil results in admixing of different soil horizons. While a small amount of admixing is expected and unavoidable, efforts should be made to reduce admixing as much as possible. This includes separate stripping, storage and transportation. Soils of significant different quality should also be managed separately. For example, topsoil from saline and/or sodic areas should not be mixed with high quality topsoil (salinity values are low), as the entirety of the topsoil material becomes degraded. These areas would need to be identified by a soil/reclamation specialist in the field.

During stripping, care must be taken to ensure the soil horizon layers are being appropriately separated (two lift stripping). If colour change between topsoil and subsoil is obvious from the vantage of the equipment operator, this may be more straight-forward than if the topsoil, subsoil and lower subsoil are similar in colour. Guidance may be provided by a soil/reclamation specialist. Soils within the project area will likely generally have a distinct contrast between the black topsoil and brown-orangish brown, subsoil below, with the exception of gleyed soils, which may be more similar in colour between topsoil and subsoil. The subsoil however, may be similar in colour to parent material below it and distinguished by structure. Over/under stripping causes admixing, which cannot be mitigated once it has occurred (soils cannot be separated once mixed together). This results in a significant reduction in soil quality (salinity, texture, organic matter, etc.) and greatly decreases soil quality and usability, especially with topsoil. Topsoil in the area is generally considered high quality (outside of saline areas) and admixing will significantly degrade the topsoil and limit its usage for other purposes, as well as price should it be sold. Admixing can also be caused by rutting, careless soil handling, etc. Admixed topsoil is very difficult to repurpose and find a buyer for relocation, which results in a highly valuable resource essentially being used as subsoil or backfill.

Soils, including topsoil, subsoil, and lower subsoil, which are repeatedly travelled on by vehicles or heavy equipment, or driven on during wet conditions, are at risk of becoming compacted. Compaction can be challenging to mitigate depending on the soil type, moisture conditions and end land use. Working during wet soil conditions can severely affect soil structure and create significant compaction issues and soil clodding. Compacted soils can result in reduced water permeability and thus surface water ponding, or surface drainage impairment, and are difficult to revegetate.

During development numerous mitigative methods should be used to minimize the risk of impacting soils. Topsoil and subsoil should be stripped in separate lifts and stored separately with a minimum of 1 m spacing between the base of the stockpiles. If possible, stockpiles should be oriented parallel with the direction of the

prevailing winds to reduce the effect of wind erosion on the piles. If stockpiles are to remain onsite short-term (< one month), they should be monitored regularly for potential wind or water erosion and kept moist to prevent loss. Stockpiles which may be onsite for longer periods should be revegetated with an appropriate seed mix to reduce erosion potential, prevent establishment of weeds within the piles, and for esthetics. If seeding is undesirable, a hydromulch, or other erosion control material (e.g. erosion matting), could be applied to the stockpiles. Stockpiles should be inspected regularly for evidence of erosion, especially following significant rain or wind events. Stockpiles should also be inspected regularly for weeds and controlled as required (hand pulling, spraying, etc.). The less time soils are stockpiled the better as soil organic matter, microbiota, and seed bank all reduce as time passes.

To reduce the risk of impacts, the distance soils are moved (by equipment, not trucks), and the number of times they are moved should be minimized, and work during wet conditions should not be conducted. This prevents unwanted rutting, admixing, soil clodding, and compaction. The appropriate sized equipment should also be used based on the job task required and the scale. Areas used heavily for traffic should have topsoil and subsoil removed prior to use. Compaction can be alleviated by reducing the weight of equipment driving on the site and by having a designated area for driving. This focuses the compaction to a localized area limiting the size of the affected area and mitigative efforts can be more efficient. Should compaction occur, it should be mitigated before proceeding to the next phase of construction. For example, after recontouring the parent material, the surface should be de-compacted by using a ripper (or equivalent), and smoothed again (back blading), prior to placing subsoil.

Through the duration of the project, regular inspections should be completed to identify soil issues, including potential erosion, or areas at risk of erosion. For areas of the site or features at risk of erosion, prevention is key as loss of soil may require purchase later on should you require the volume. Use of water for wetting, erosion matting, hydromulch, etc. should be used to minimize soil movement and loss. The method and material used should be site-specific. Dust control, i.e. prevention of soil wind erosion, also improves air quality for those onsite and in the surrounding communities.

Both heavy and agricultural equipment can be used to mitigate impacts to soil. A wide variety of implements are available for use with a range of abilities to meet site-specific needs. Impacts should be mitigated as they are identified as it is very difficult to mitigate a subsurface issue once surface soils have been placed. In some cases, re-stripping may be required to alleviate issues and this provides more opportunity for further impacts (such as admixing) and increases costs. To mitigate impacts to soil as best as possible, a combination of various methods and equipment types, frequent inspection, and adaptive management is most successful.

Depending on the end land use of the development, monitoring for soil parameters can vary significantly. If topsoil depths or vegetation productivity are important to the end land use, depths and physical qualities should be verified. Regardless of the project, inspection for potential subsidence, new erosion, and of the condition of existing erosion prevention materials, as well as mitigation of any identified issues, is prudent.

3.2.8 Historical Resources Impact

A *Historical Resources Act* approval with conditions was issued for the project in October 2020 (HRA Number: 4835-20-0078-001). For all historical resource types, the proponent must comply with the *Standard Requirements under the Historical Resources Act: Reporting the Discovery of Historic Resources*, which stipulates that if historic resources are discovered during the course of development activities, it must be reported to the Heritage Division of Alberta Culture, Multiculturalism and Status of Women before continuing work. The

conditions of the approval for the project stipulated that there were no additional *Historical Resources Act* requirements associated with archaeological, palaeontological, aboriginal traditional use, or Provincially Designated Historic resources. *Historical Resources Act* approval was conditionally granted for the project so long as all historic structures are documented prior to any development-related impacts, specifically the farmstead located in SW-16-23-28-W4. These structures must be documented in accordance with the procedures and requirements outlined in the *Requirements for Recording and Reporting Historic Structures* (January, 2017). If all measures outlined in the *Historical Resources Act* approval are adhered to, the negative impacts to historical resources are expected to be limited to within the site, long-term, minor in magnitude, and minor overall.

3.2.9 Socio-Economic Impact

The potential for the project to disturb neighbouring communities during construction is fairly low as the area is quite isolated. There is still some potential to impact the few neighbouring lots during construction via noise disturbance, limited access through certain roads, and/or excess trash or construction waste present on site. Transportation disruptions along Township Road 232 and Range Road 284 should be minimized as much as is feasible. In the long-term, the development is likely to have a positive economic effect, but there is some potential for conflict with neighbouring landowners if there is resistance to being located to an industrial area. These impacts cannot be known without a more detailed dedicated study, which is beyond the scope of this assessment. When taking into account socio-economic impacts during construction, the impacts are expected to be local, short-term, and negligible overall.

Table 7: Summary of potential environmental impacts on the identified VECs (after mitigation measures are applied)

Valued Ecosystem Component	Potential Environmental Impacts	Mitigation Measures	Significance			
			Extent	Duration	Magnitude	Overall Impact After Mitigation
Vegetation	Vegetation Removal	Seed revegetated areas with a native seed mix appropriate to the site. Minimize vegetation removal to the disturbance footprint and implement buffers where applicable. Minimize bare ground, clearing only what is required for each phase.	Local	Long-Term	Minor	Negligible
	Rare Plants	Rare plant surveys must be conducted in wetland areas.	TBD*	TBD*	TBD*	TBD*
	Invasive Species	Promptly seed disturbed areas, control for weeds during and after construction.	Local	Medium-Term	Minor	Negligible
Wildlife	Habitat Loss	Prioritize conservation of wetlands, wetland complexes, and native vegetation	local	Long-Term	Moderate	Moderate
	Direct Impacts (disturbance to breeding species & sensory disturbance)	Complete habitat destruction activities outside of the breeding window for migratory birds (April 14 – August 28). Operate only during daylight hours to allow for nocturnal movement.	Local	Short-Term	Minor	Negligible
	Habitat Fragmentation	Prioritize creating green space with connected corridors or closely spaced islands.	Sub-regional	Long-Term	Moderate	Moderate
	Species at Risk	Species at risk surveys must be conducted.	TBD*	TBD*	TBD*	TBD*
Hydrology	Restriction of surface water infiltration	Develop stormwater management plan.	Local	Long-Term	Minor	Minor
	Sedimentation and introduction of water quality pollutants	Follow ESC plan, ECO plan, and stormwater guidelines.	local	Long-Term	Minor	Minor
Wetlands	Wetland Removal	In-lieu fee replacement for lost wetland functions.	Local	Long-Term	Moderate	Moderate
	Hydrology and Water Quality	Implement site-specific ESC measures around wetlands adjacent to construction activity; Installation of localized stormwater management facilities throughout the project area to manage on-site surface water.	Local	Long-Term	Moderate	Moderate
Topography	No Anticipated Impacts	None required	Local	Long-Term	Minor	Minor
Geology	No Anticipated Impacts	None required	Local	Short-Term	Negligible	Negligible

Pedology (Soils)	Soil Admixing	Separate stripping, storage and transportation. Soils of significantly different quality should be managed separately.	Local	Long-Term	Minor	Minor
	Reduced Soil Quality	Topsoil and subsoil should be stripped in separate lifts and stored separately with a minimum of 1 m spacing between the base of the stockpiles.				
	Compaction, Clodding, and Rutting	Work should be limited during wet conditions. Appropriate sized equipment should be used based on the job task required and the scale. Areas used heavily for traffic should have topsoil and subsoil removed prior to use. Reduce the weight of equipment driving on the site and have a designated area for driving.				
	Erosion by Wind and Water	Monitoring of stockpiles. Stockpiles which may be onsite for longer periods should be revegetated with an appropriate seed mix to reduce erosion potential. If seeding is undesirable, a hydromulch, or other erosion control material (e.g. erosion matting), could be used. Stockpiles should be inspected regularly for evidence of erosion, especially following significant rain or wind events.				
	Sedimentation of the wetlands	Silt fences, erosion matting, temporary seeding, etc.				
Historical Resources	Disturbance to historical resources	Document historic structures prior to any development-related impacts. If any historical resource is discovered, halt work and contact HRMB for further instruction.	Site	Long-Term	Minor	Minor
Socio-Economic	Visual and Traffic Disturbance	Notify all locals of work prior to the construction start date. Implement daily site clean-up standards to reduce construction trash.	Local	Short-Term	Negligible	Negligible

*TBD (To Be Determined) indicates that these factors will not be known until a field assessment is completed

3.3 Impact Assessment Conclusions

The project area is already somewhat disturbed due to the presence of roads, acreages, farms, and other developments. The proposed project will shift the primary land use from agriculture to industry, resulting in an overall loss of vegetated open space. The removal of upland vegetation may reduce breeding opportunities for grassland birds and small mammals, though much of the surrounding areas are likely of similar quality habitat. Larger wetlands on site and their surrounding buffer will have more potential to provide higher quality wildlife habitat, especially for some sensitive bird or amphibian species. Maintaining large wetland areas or connected wetland complexes would be of priority to minimize negative impacts to wildlife habitat. Final impacts to sensitive wildlife and rare plants will not be known until after surveys are conducted and it is determined if sensitive species utilize the project area.

Due to the presence of wetlands and the potential for rare plants associated with the wetlands, wetland and rare plant surveys will be necessary before development can proceed. Retaining the bigger wetlands would reduce the compensation requirements to AEP, would retain wildlife habitat, and would retain rare plants, if present. If wetlands are removed, site-specific stormwater facilities will be required to capture the surface runoff from the site. If wetlands are to be removed, multiple regulatory applications and approvals will be required including a permanency assessment, ABWRET-A submission, and a Water Act approval submission, which will include compensation for lost wetland area.

For development to proceed, soils must be disturbed. As a result, loss of soil structure and at least minor admixing is unavoidable regardless of attempts to mitigate. While soil structure will eventually redevelop in disturbed soils, the natural profile cannot be re-established. Admixing is also irreversible. A small amount of soil loss is also unavoidable due to the nature of soil handling and the development process. Other potential impacts to soil, including: clodding, compaction, erosion, significant soil loss, severe admixing, and reduced soil quality, can be mitigated by appropriate planning, using current best practices, and knowledgeable/ experienced supervisors and equipment operators.

Short-term impacts such as noise and access issues from construction are expected to be negligible due to the isolated location of the project. The long-term socio-economic impacts of the project are less certain, as neighbouring landowners could have conflicts with the industrial land use, but the development is likely to have a positive economic effect in the area.

3.4 Recommendations

Due to the potential for impact on wetlands, wildlife, and vegetation, it is recommended that a BIA (or BIAs for each project phase, if the area is to be composed of more than one project) be completed when the development proceeds. If any wetlands are to be impacted, a WAIR and *Water Act* Approval application will be required. As such, several field surveys and assessments will be required, which will include:

- Wetland delineation and permanency assessments (with submission to the AEP Public Lands Water Boundaries Unit).
- Full wetland surveys using the AEP ABWRET-A system, followed by a submission under the *Water Act* to pay compensation for all non-ephemeral wetlands removed (both planned and historic). All historically removed wetlands will have to be reported to AEP once the full extent is known if there are no *Water Act* approvals for prior wetland removal within the Project Area.

- A Biophysical Impact Assessment be completed prior to development proceeding with an emphasis on
    - Wetlands surveys (see above).
    - Vegetation surveys (rare plants).
    - Wildlife surveys (breeding birds, amphibians, incidental wildlife, and wildlife habitat).
- Documentation of all historic structures prior to any development-related impacts is required.

Certification Page

I hereby certify that:

The requested surveys and reporting were completed by qualified professionals (Daina Anderson, Jamie Kalla, Jesse Bird, and Krista Bird) who considered all factors and influences that are within the scope of this assessment.

No person at Tannas Conservation Services Ltd., or associated sub-consultant working on this project have any contemplated interest in the property being assessed.

This report has been completed in conformity with the standards and ethics of the Alberta Institute of Agrologists and the Alberta Society of Professional Biologists.

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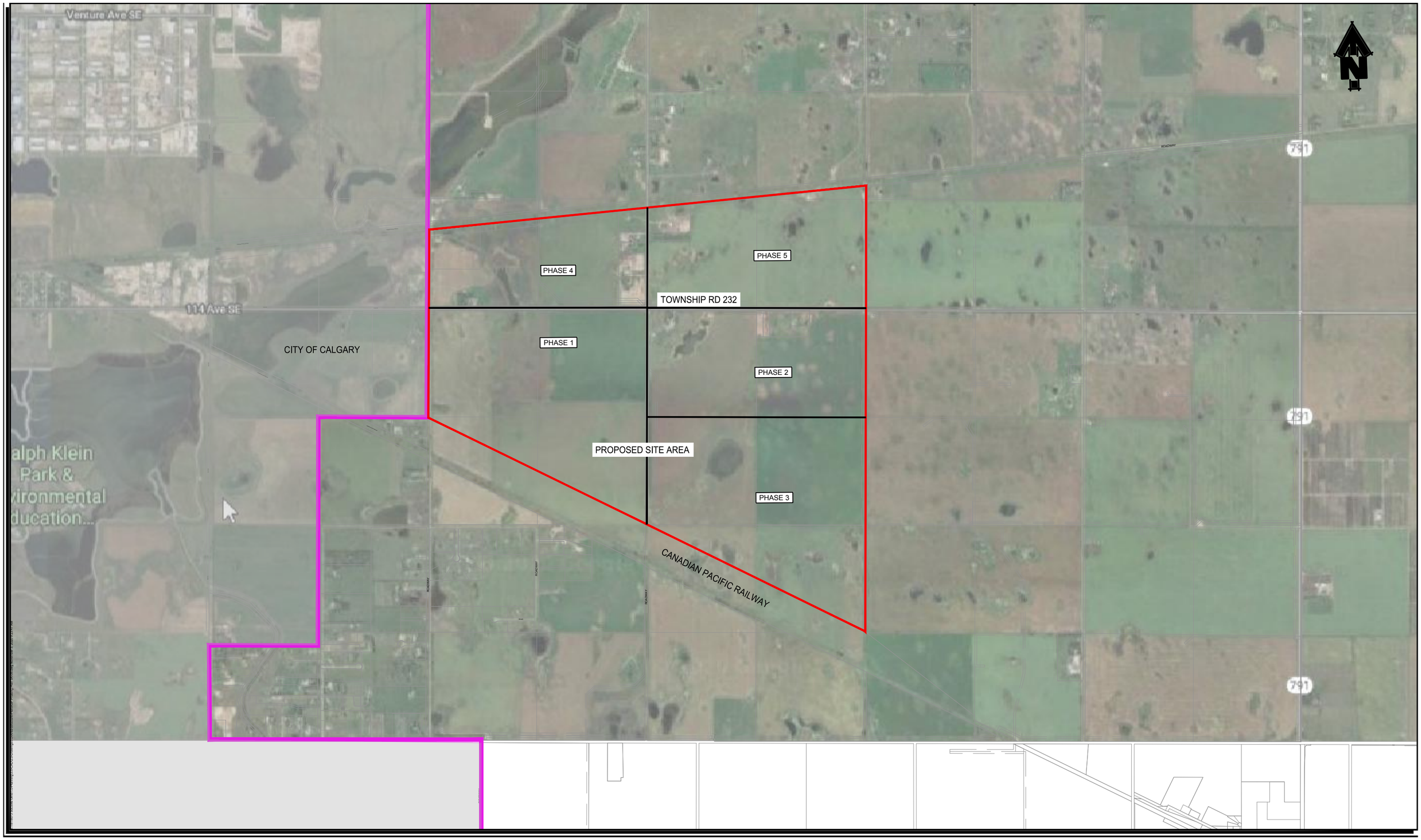
Appendix A

Conceptual Scheme



Owner

SHEPARD

Consultant

IDEA INNOVATION ENGINEERING DESIGN BUILD ARCHITECTURE GROUP

Legend

CITY OF CALGARY LIMITS

PROPOSED SITE AREA

Project
SHEPARD INDUSTRIAL ASP

Drawing Title
PHASING PLAN

Project Lead
JB

Project #
18073

Scale
1:25,000

Date (YY-MM-DD)
20-11-03

	Issued For/Revisions	
No.	Description	Date YY.MM.DD
1	ISSUED FOR INFORMATION	20.11.03

Drawing

SK-06