# Environmental Screening Addendum - Prairie Gateway (Shepard Industrial Lands) Area Structure Plan

May 6, 2024

Prepared for:
Shepard Development Company

Prepared by:
Stantec Consulting Ltd.

Project Number:
116536040

# Limitations and Sign-off

This document entitled Environmental Screening Addendum - Prairie Gateway (Shepard Industrial Lands) Area Structure Plan was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Shepard Development Company (the “Client”) to support the regulatory review process for its Environmental Assessment (the “Application”) for the Prairie Gateway (Shepard Industrial Lands) Area Structure Plan (the “Project”). In connection therewith, this document may be reviewed and used by the City of Calgary and Rocky View County participating in the review process in the normal course of its duties. Except as set forth in the previous sentence, any reliance on this document by any other party or use of it for any other purpose is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The information and conclusions in the document are based on the conditions existing at the time the document was published and does not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by the Client or others, unless expressly stated otherwise in the document. Any use which another party makes of this document is the responsibility and risk of such party. Such party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other party as a result of decisions made or actions taken based on this document.

Prepared by: Digitally signed by Woodward, Michelle Date: 2024.05.06 13:44:19 -06'00'

Signature

Michelle Woodward, P.Biol (pending)
(ASPB #7220)
Environmental Scientist

Printed Name and Title

Reviewed by: Digitally signed by Elaine Little Date: 2024.05.06 13:31:14 -06'00'

Signature

Elaine Little, B.Sc.,
Principal,
Senior Environmental Planner

Printed Name and Title

Approved by: Chisholm, Meghan Digitally signed by Chisholm, Meghan Date: 2024.05.06 14:43:55 -06'00'

Signature

Meghan Chisholm, P.Biol
(ASPB #1759)
Principal, Environmental Scientist

Printed Name and Title

# Table of Contents



## List of Tables

## List of Figures (Appendix A)



## List of Appendices

# Acronyms / Abbreviations

| | |
|---|---|
| ABWRET-A | Alberta Wetland Rapid Evaluation Tool – Actual |
| ACIMS | Alberta Conservation Information Management System |
| AEP | Alberta Environment and Parks |
| ASP | Area Structure Plan |
| AWCS | Alberta Wetland Classification System |
| BIA | Biophysical Impact Assessment |
| COSEWIC | Committee on the Status of Endangered Wildlife in Canada |
| CMRB | Calgary Municipal Regional Board |
| The City | City of Calgary |
| CPKC | Canadian Pacific Kansas City |
| EPA | Alberta Environment and Protected Areas |
| ESRD | Alberta Environment and Sustainable Resource Development |
| FWIMT | Fish and Wildlife Internet Mapping Tool |
| ES | Environmental Screening |
| GOA | Government of Alberta |
| GOC | Government of Canada |
| ha | Hectare |
| km | Kilometre |
| RVC | Rocky View County |
| SARA | *Species at Risk Act* |
| Shepard | Shepard Development Corp. |
| Stantec | Stantec Consulting Ltd. |
| Tannas | Tannas Conservation Services Ltd. |
| WAIR | Wetland Assessment Impact Report |

# 1 Project Description

An Environmental Screening (ES) is required as outlined in the 2013 County Servicing Standards for Rocky View County (RVC). The purpose of the ES is to determine existing environmental conditions of the site, and to assess potential and actual environmental effects that may occur as a result of disturbance based on the proposed development.

## 1.1 Background

Tannas Conservation Services Ltd. (Tannas) completed an ES report in support of the Shepard Industrial Area Structure Plan (ASP) for Shepard Development Corp (Shepard). This assessment was conducted in 2021 and included a desktop review of land use, vegetation, wildlife environmentally sensitive areas, hydrology, wetlands, topography, geology and soils, historical resources, and existing policies. The ASP from 2021 was not approved due to discussions between RVC and the City of Calgary around servicing and development process.

In spring 2022, the ASP was going to be led by the City of Calgary and Stantec initiated discussions related to the Biophysical Impact Assessment (BIA) for the City of Calgary. Although there were ongoing discussions around the ASP boundary, Stantec completed a spring rare plant survey to avoid missing the timing windows. Following the spring rare plant survey, there were additional discussions between RVC and the City of Calgary and the ASP was put on hold and no additional field work was completed.

In 2023, agreements were reached between the City of Calgary and RVC and a new ASP boundary was established. The terms of reference for the ES addendum was provided on October 25, 2023 and final agreement to the scope of the ES addendum was reached on December 2, 2023. The scope outlined in the terms of reference is detailed in Section 1.2 below,

## 1.2 Location, Purpose, Size and Scope

The ASP boundary consists of agricultural and light industrial use land. The ASP boundary when the Tannas (2021) report was prepared was north of the Canadian Pacific Kansas City (CPKC) rail mainline right-of-way (CPKC corridor), east of Range Road 284, south of an abandoned CPKC rail right-of-way, and west of Range Road 282 undeveloped right-of-way (Tannas 2021) and encompassed 747 hectares (ha). The current ASP boundary studies within this addendum includes the CPKC corridor (approximately 114 ha). The total area of the new ASP boundary is approximately 907 ha.

Numerous forms of industrial development are expected across the ASP boundary. The ASP is intended to contribute to the development of the region’s rail served in-land port and industrial park. The ASP is expected to evolve into a world-class logistics centre that will support greater opportunities for regional employment, economic growth, shared servicing, and intermunicipal cooperation.

Stantec developed a proposed terms of reference for the ES addendum on October 25, 2023. The terms of reference was developed based on Appendix 900 A of the 2013 County Servicing Standards and the alteration of the ASP boundary. The Tannas (2021) report was completed for the lands north and south of

Township Road 232 (Appendix A, Figures 1 and 2). The study area from the Tannas (2021) report appears to generally align with the current proposed ASP boundary with the exception of the inclusion of the CPKC corridor along the south boundary. The terms of reference from October 25, 2023 identified the following items to be addressed in the ES addendum:

- The ASP boundary does not extend south to capture the CPKC corridor. The ES addendum scope includes updating the and the report would need to update findings to cover the CPKC corridor and updating changes to findings from Tannas (2021) where applicable.
- Tannas (2021) mapped wetlands within the initial ASP boundary but does not present information on wetland classification. Understanding the wetland classification can be useful for supporting decisions around wetland prioritization for retainment (if applicable) and integration with stormwater management. The scope of the ES addendum includes updating the desktop wetland mapping and classification using historical aerial photography and the limited filed information collected during the spring rare plant survey in 2022.
- Tannas (2021) does not confirm if there are wetlands deemed Crown claimable under Section 3 of the *Public Lands Act* (Alberta Environment and Parks [AEP] 2016). This is a critical piece of information as there are wetlands within the boundary that could meet the definition of "reasonably permanent" and understanding this will be important to inform land use planning. A waterbody permanence review will also be prepared and submitted under separate cover, but it was outlined in the terms of reference that a decision from the Province will not be returned to support the ASP.

This report focuses on confirming the information from the Tannas (2021) report and determining if the data in that report can be extrapolated to the CPKC corridor. In sections where findings differ or there are changes to the development, the report has been updated to discuss the changes or results. Report sections from Tannas (2021) where there were no changes have been omitted from this report. Specifically, sections on land use, geology, pedology, topography, historical resources and other features are omitted from this report.

## 1.3 Project Activities

Stantec reviewed the project activities listed in Tannas (2021) and find them to still be a complete representation of the project as proposed at the time this report was prepared.

# 2 Inventory

This section outlines the general inventory of the ASP and discusses the land use, biological resources, land features, historical resources and existing policies. This report is intended to be reviewed in conjunction with Tannas (2021).

## 2.1 Biological Resources

This section outlines the biological resources of the ASP related to vegetation, wildlife and environmental sensitive areas.

### 2.1.1 Vegetation

#### 2.1.1.1 Grassland Vegetation Inventory

A review of the Grassland Vegetation Inventory (GVI) database (Government of Alberta [GOA] 2019) was used to help determine vegetation/habitat types for the ASP boundary (Appendix A, Figure 3). Results generally align with the Tannas (2021) findings, with the exception of the primary GVI site type industrial (listed as developed in Tannas [2021]) comprising 46.07 ha of the ASP boundary, an increase of 43.33 ha due to the CPKC corridor inclusion. Table 2.1 lists the primary site types found in the ASP boundary.

**Table 2.1 Summary of primary GVI site types within ASP boundary**

| Primary Site Type | Description | Total ha | % of ASP Boundary |
|---|---|---|---|
| Crop | Crop (non-irrigated) | 662.82 | 73.19 |
| Industrial | Industrial | 46.07 | 5.09 |
| LenA | Lentic (Alkali) | 1.85 | 0.20 |
| LenS | Lentic (Seasonal) | 13.85 | 1.53 |
| LenSP | Lentic (Semi-permanent to permanent) | 3.03 | 0.33 |
| LenT | Lentic (Temporary) | 12.82 | 1.42 |
| LenW | Lentic (Open Water) | 4.01 | 0.44 |
| Pasture | Pasture | 121.67 | 13.43 |
| Settled | Settled | 39.53 | 4.36 |
| **Total** | | **907** | **100** |

#### 2.1.1.2 Annual Crop Inventory

The annual crop inventory is a digital map of croplands across Canada that is generated using a combination of satellite imagery and ground-truthed information provided by provincial crop insurance companies within Alberta. A review of the 2022 Annual Crop Inventory (Government of Canada [GOC] 2022) was used to preliminarily identify vegetation/habitat types for the ASP boundary and identify changes between the 2019 Annual Crop Inventory used in the Tannas (2021) report. According to the 2022 Annual Crop Inventory,

the majority of the ASP boundary are annual crops (85.79%), wetland (8.24%), urban/developed (2.20%) and water (1.42%), a break down of site types is provided in Table 2.2 and Figure 4 (Appendix A). In summary the 2019 and 2022 Annual Crop Inventories remained relatively consistent with the following changes identified:

- NE-9-23-28 W4M previously identified as Pasture/Forages is observed to be a type of Annual Crop in 2022;
- The area of the CPKC corridor within the ASP boundary is comprised of primarily Annual Crops type, with Wetland and Water types.

**Table 2.2 Summary of 2022 Annual Crop Inventory Site Types within ASP Boundary**

| Site Type | Total ha | % of ASP Boundary |
|---|---|---|
| Annual Crops | 777.95 | 85.79 |
| Broadleaf | 1.04 | 0.11 |
| Coniferous | 2.40 | 0.26 |
| Exposed land/barren | 8.16 | 0.90 |
| Grassland | 4.85 | 0.53 |
| Mixedwood | 0.11 | 0.012 |
| Pasture/forages | 1.27 | 0.14 |
| Shrubland | 3.50 | 0.39 |
| Urban/developed | 19.93 | 2.20 |
| Water | 12.87 | 1.42 |
| Wetland | 74.71 | 8.24 |
| **Total Area** | **907** | **100%** |

### 2.1.1.3 ACIMS Database Search

A search of the Alberta Conservation Information Management System (ACIMS) database (2022) conducted on January 15, 2024. There were no changes to the findings of the Tannas (2021) report.

### 2.1.1.4 Rare Plant Survey

Stantec was retained by Shepard to conduct field surveys required by the BIA in support of the ASP. Stantec had begun conducting the rare plant surveys in 2022, but due to the uncertainty of land jurisdiction between the City and RVC, project activities were paused.

A spring rare plant survey was conducted on June 28, 2022, by two Stantec qualified biologists. The rare plant survey followed the Alberta Native Plant Council (ANPC) guidelines for rare vascular plant surveys with the exception that only the early season survey was completed. A second late season survey will still need to be completed. The purpose of the survey was to characterize vegetation conditions, identify potential rare plant habitat (e.g., wetlands), and presence of regulated weeds at target locations. Due to the ASP boundary consisting of primarily cultivated or pasture fields, surveys were selected based on the likelihood of native plant species to be found (i.e., wetlands). A few surveys within pasture fields were

also selected to confirm low potential to support rare plants. A total of 16 Targeted Surveys were conducted. In each survey, the presence of each observed plant was recorded within the transect. Photographs and location data was collected, and samples were collected for further review. Rare plants were not observed during the spring field survey. Based on findings, the ASP boundary has low potential to support rare plants.

## 2.1.2 Wildlife

### 2.1.2.1 Sensitive Wildlife Database Search

A search of the Alberta Environment and Protected Areas (EPA) Fish and Wildlife Internet Mapping Tool (FWIMT) was conducted on January 15, 2024. The search included a five-kilometre (km) radius from the center of the ASP boundary. The search generated 20 results (Appendix B) and are listed below in Table 2.3. The species identified are the same as those from the search in the Tannas (2021) report plus the additions of barred owl (*Strix varia*), black swift (*Cypseloides niger*), eared grebe (*Podiceps nigricollis*) and grasshopper sparrow *(Ammodramus savannarum).* Specialized surveys are not anticipated with the addition of the four new species in the 2024 FWIMT search.

In addition to the changes in the species list described above, ranking of four species has changed from the 2021 report to the 2024 report as listed below:

- Barn swallow (*Hirundo rustica)* status was updated from Threatened to Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; GOC 2023a), and the General Status of Alberta Wildlife Species has changed it's rating from sensitive to may be at risk;
- Horned grebe (*Podiceps auratus)* COSEWIC status is currently under review (GOC 2023a);
- Short-eared owl *(Asio flammeus)* COSEWIC status was updated from Special Concern to Threatened (GOC 2023a).
- Osprey (*Pandion haliaetus)* osprey was listed as a species of concern in the original FWIMT search performed by Tannas but is now considered secure. Specialized surveys are not anticipated with the addition of the three new species in the 2024 FWIMT search.

**Table 2.3 Wildlife species detected within a 5 km radius from the center of the ASP boundary.**

| 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* | May Be at Risk | N/A | Special Concern | Threatened |
| Barred Owl | *Strix varia* | Sensitive | N/A | N/A | N/A |
| Black swift | *Cypseloides niger* | May be at Risk | N/A | Endangered | Endangered |
| 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 |
| Eared Grebe | *Podiceps nigricollis* | 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 |
| Grasshopper Sparrow | *Ammodramus savannarum* | Sensitive | N/A | Special Concern | Special Concern |
| Great Blue Heron | *Ardea herodias* | Sensitive | N/A | N/A | Special Concern |
| Horned Grebe | *Podiceps auritus* | Sensitive | N/A | Special Concern | Under Consideration of Addition |
| Pied-billed Grebe | *Podilymbus podiceps* | Sensitive | N/A | N/A | N/A |
| Short-eared Owl | *Asio flammeus* | May be at Risk | N/A | Threatened | 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 |

**Table 2.3 Wildlife species detected within a 5 km radius from the center of the ASP boundary.**

| Common Name | Scientific Name | AB General[1] | Wildlife Act[2] | COSEWIC Status[3] | SARA Status[4] |
|---|---|---|---|---|---|

Notes:

1. Listed provincially as at risk, may be at risk, or sensitive according to the General Status of Alberta Wild Species (GOA 2022).
2. Listed provincially as endangered or threatened under the Alberta *Wildlife Act* or special concern by the Alberta Endangered Species Conservation Committee (GOA 2023).
3. Listed federally as endangered, threatened, or special concern by the COSEWIC (GOC 2023a).
4. Listed federally as endangered, threatened, or special concern under Schedule 1 of the *Species at Risk Act* (SARA) (GOC 2023a).

Data was obtained through the Alberta Fish and Wildlife Mapping Tool (FWIMT) database on January 15, 2024

#### 2.1.2.2 Wildlife Sensitivity Layers

On January 15, 2024, the EPA FWIMT was used to identify any updated provincially designated Wildlife Sensitivity Layers within the ASP boundary. The Wildlife Sensitivity Layers identified in the Tannas (2021) report remain unchanged, with the exception of Ferruginous Hawk *(Buteo regalis)* being included in the Sensitive Raptor Range Layer (EPA 2024a). The Ferruginous Hawk requires open habitat, including grassland, shrub-steppe, or desert. Nesting is typically done on elevated features such as nest platforms, or trees (GOC 2023b). Ferruginous hawk has not been reported in the area based on results from the FWIMT screening (Table 2.3).

### 2.1.3 Environmentally Sensitive Areas

On March 25, 2024, the City of Calgary provided the shapefile from the Calgary Municipal Regional Board Environmentally Sensitive Area mapping. It was determined that there are no CMRB ESA within the ASP boundary. The closest ESA is located over 800 m to the west (Appendix A, Figure 5).

## 2.2 Hydrology, Waterbodies, And Wetlands

This section outlines the hydrology, waterbodies and wetland features of the ASP.

### 2.2.1 Hydrology

Stantec completed a master drainage plan (MDP) in 2024 for the ASP boundary. The following is a summary of information from the pre and post development models included in the report.

The pre-development conditions model identified 36 sub catchments within the MDP boundary (includes additional upstream land to the east of the ASP boundary). There is a ridge oriented southwest to northeast though the center of the ASP boundary and the direction of surface flow is generally southeast to northwest. Under existing conditions, The ASP lands largely pond stormwater in 5 main low areas referred to as “internal wetlands” within the MDP. These wetlands were identified as areas of local

groundwater recharge and approximately 40 ha of land drains north from the ASP lands to the north towards the Shepard Slough S2 (Stantec 2024).

The proposed stormwater management concept for the ASP lands consists of 4 main catchments with 8 Stormwater management facilities (SWMFs) (1a-d, 2a, 2b, 3a, 3b). Stormwater will flow by gravity pipes west to a proposed storm trunk following range road 284 and township road 231 and ultimately discharge into existing the Shepard Ditch south of the Shepard Wetland (Stantec 2024).

Each of the SWMFs are comprised of cells that are separated by berms that are intended to be a route for rail or roads to cross the waterbodies. The cells are connected by conduits under the berms. The 4$^{th}$ catchment within the ASP lands is only 2.0 ha, and under a development condition of 90% imperviousness, was found to produce a total volume discharge over the stretch of 55 years of continuous flow to approximately match the existing discharge volume to the wetlands to the north of the ASP lands (Stantec 2024).

Section 2.3.1 of the MDP includes a decision matrix that will be used in the future along with the BIA process to assist decisions around avoidance, minimization and replacement. Wetlands in the post-development hydrologic model are assumed to be removed for the purpose of the modelling in the MDP. However, this will need to be confirmed in the future based on field studies. The proposed stormwater management concept was also designed to allow for wetland WL1, located in the northwest part of the ASP boundary that discharges into the Shepard Wetland, to be retained if future studies confirm sustainability (Stantec 2024).

### 2.2.2 Wetlands

The section below details the methods and results used to update the wetland mapping and classification for the ASP.

#### 2.2.2.1 Methods

Desktop wetland mapping and vegetation characterization was completed for wetland features in the ASP boundary using Pathway 2 – Comprehensive desktop delineation as outlined in the Alberta Wetland Identification and Delineation Directive (GOA 2015). Wetlands identified from current and historical aerial photography were mapped and a preliminary classification was assigned based on image texture, colour, and water permanence following the *Alberta Wetland Identification and Delineation Directive* (GOA 2015). Historical aerial photography corresponding to dry and wet conditions were used to help identify wetlands and ephemeral waterbody boundaries, and to determine a preliminary classification for each.

Historical aerial photographs from 1948, 1950, 1962, 1966, 1970, 1974, 1979, 1981, 1984, 1989, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2018, 2022 were reviewed for presence of standing water, and areas lacking standing water, but with evidence of past standing water (i.e., bare ground, presence of salt or carbonates, patchy vegetation). The extent of these potential wetlands and ephemeral waterbodies was then mapped in an orthorectified geographic information system to a scale of 1:2,000 with a minimum polygon size of 0.02 ha.

Wetland or waterbody type was assigned using the *Alberta Wetland Classification System* ([AWCS] ESRD 2015). The overall type was determined by the vegetation zone representing the deepest and most permanent water, occupying greater than 25% of the total wetland or waterbody area.

Additionally, wetland observation data collected from the spring rare plant survey in 2022 was also used to support wetland classification decisions from desktop mapping where applicable.

#### 2.2.2.2 Results

The Tannas (2021) report identified 174 wetlands, but did not provide classification, or identify wetlands as temporary (II), seasonal (III), semi-permanent (IV) or permanent (V). In this addendum, 255 wetlands were identified for a total area of 214.82 ha within the ASP boundary (Appendix A, Figures 1 and 2). A table has been included in the appendix containing the unique identifying number, classification, area and potential to be crown claimed for each wetland within the ASP (Appendix D). Generally, these wetlands are mineral, graminoid marshes that range in permanence from ephemeral (surface water is present in most years, but only for a brief period of days after snowmelt or a heavy rainfall) to semi-permanent (typically surface water is present throughout the year except in years of drought [ESRD 2015]).

Of the 255 wetlands, 99 were identified as ephemeral waterbodies, 70 were identified as temporary graminoid marshes (MGII), 74 as seasonal graminoid marshes (MGIII), eleven as semi-permanent graminoid marshes (MGIV) and one semi-permanent shallow open water (WAIV).

Wetlands identified in the CPKC corridor include eleven ephemeral waterbodies, nine MGIIs, eight MGIIIs and four MGIV (Figures 1 and 2).

While field verified wetland classification and delineation was not completed during the 2022 spring rare plant survey, data collected during the survey was used to support desktop wetland classification. Table 2.4, below, provides typical vegetation observed and representative site photographs for the different wetland classification types in the ASP.

**Table 2.4 Representative characterization of wetland types observed during the spring 2022 rare plant survey**

| Wetland Type | Dominant Vegetation | Representative Photographs of Wetland Types | |
|---|---|---|---|
| MGII | Common cattail (*Typha latifolia*), water smartweed (*Persicaria* amphibia), awned sedge (*Carex atherodes*) |  |  |
| MGIII | Common cattail (*Typha latifolia*), wild mint (*Mentha arvensis),* awned sedge (*Carex atherodes*) |  |  |
| MGIV | Common cattail (*Typha latifolia*), common great bulrush (*Schoenoplectus tabernaemontani*), awned sedge (*Carex atherodes*) |  |  |
| WAIV | N/A* | N/A* | N/A* |

Notes: No WAIV wetlands were surveyed at the time of the spring 2022 rare plant survey.
MG – graminoid marsh
W(A) – shallow open water
II – temporary
III- seasonal
IV- semi-permanent
V – permanent
N/A – not applicable

#### 2.2.2.3 Wetland Prioritization

An initial review of wetlands to help inform prioritization decisions for retention within the ASP was completed based on desktop review and the limited field information from spring 2022. Wetlands that were identified as having higher potential for retention consisted of:

1. Wetlands that are considered “reasonably permanent” (i.e., semi-permanent, permanent, and intermittent types) and have potential to be Crown claimed under Section 3 of the *Public Lands Act*. Confirmation of Crown claims will not be available during the ASP but a request will be submitted to EPA and the results used to update or modify the land use plan in the future as needed.
2. Wetlands that were ranked high in the WSP Golder technical memo from 2022 that was prepared in support of the East Calgary Regional Drainage Study.
3. Wetlands with high ecological connectivity to key natural areas outside of the ASP boundary (e.g. Shepard wetland complex) or with ecological connectivity to wetlands within the ASP boundary.
    a. Connectivity is related to the spatial arrangement of the individual network components, and are influenced by the distances between components, the presence of alternative pathways for movement and the continuity of individual components (Bennett 2003). It is heavily influenced by the spatial scale, life stage requirements and habitat requirements of species (Bennett 2003). In the context of this assessment “high” connectivity would be areas that are less than 100 m apart with no barriers (e.g. roads).

The WSP Golder technical memo from 2022 was prepared in support of the East Calgary Regional Drainage Study (Appendix B, B3). This memo provided a prioritization matrix to outline wetlands that should be considered for retention within future development planning. Criteria included:

- Wetland Size – considered high priority when area is >5 ha;
- Wetland and Adjacent Upland Quality – considered high priority when natural or modified habitat is present instead of development or agricultural land use;
- Complexity – considered high priority when more wetland types and/or classes is present;
- Connectivity – considers wetlands that are connected or part of a chain to be higher value; and
- Crown Claimability – considered high priority when potential for Crown claimed.

The WSP Golder (2022) memo identified several wetlands within the ASP boundary with high prioritization scores for consideration as environmentally significant features for future development. Generally, the high prioritization scores determined for seasonal, semi-permanent, and permanent type wetlands were due to important functions such as water storage, flood control, and wildlife habitat (WSP Golder 2022). Table 2.5 summarizes wetlands identified as the highest prioritization from the WSP Golder (2022) memo and their corresponding wetlands from this addendum (twenty-nine total). Seventeen wetlands were identified as having Crown claim potential and were ranked as high prioritization in the WSP Golder (2022) memo. Stantec generally agrees with the wetlands identified as highest prioritization from the WSP Golder (2022) memo, with the exception of:

- WL109 and 110 – spring 2022 rare plant survey observed WL109 as a MGII, additionally both wetlands are considered small in size and have minimal complexity. In addition, temporary wetlands are more difficult to retain within development than seasonal to permanent wetlands. Stantec recommends WL109 and WL110 wetland to be considered low priority for retention.
- WL66, 192, 200 and 201 – wetlands were identified as MGII in desktop mapping, are considered small in size and have minimal complexity. In addition, temporary wetlands are more difficult to retain within development than seasonal to permanent wetlands. Stantec recommends WL66, 192, 200 and 201 to be considered low priority for retention.

**Table 2.5. Summary of highest priority wetlands within the ASP boundary with concordance to the WSP Golder 2022 assessment**

| WSP Golder Wetland Polygon ID | WSP Golder Wetland Classification | ES Addendum Corresponding Wetland Polygon ID(s) | ES Addendum Wetland Classification |
|---|---|---|---|
| 257 | WIV | WL23<br>WL33<br>WL202<br>WL204<br>WL205<br>WL206 | MGIV<br>MGIV<br>MGIV<br>MGIV<br>MGIV<br>MGIII |
| 317 | WIV | WL154<br>WL208 | MGIV<br>MGIII |
| 349 | MGIII | WL109<br>WL110 | MGII<br>MGIII |
| 374 | MGIII | WL92 | MGIV |
| 375 | WIV | WL64<br>WL65<br>WL66<br>WL200<br>WL201 | MGIII<br>MGIII<br>MGII<br>MGII<br>MGII |
| 393 | WIV | WL150<br>WL246 | MGIV<br>MGIII |
| 394 | MGIII | WL192<br>WL88 | MGII<br>MGIII |
| 403 | WIV | WL190 | MGIV |
| 404 | WV | WL1<br>WL179<br>WL210<br>WL243<br>WL244 | WAIV<br>MGIV<br>MGIII<br>MGIII<br>MGIII |
| 408 | MGII | WL87 | MGIII |
| 409 | MGIII | WL74 | MGIII |
| 422 | MGIII | WL80 | MGIII |

NOTES: Differences in Stantec's wetland mapping and classification are due to scale of mapping used on historical aerial imagery observations indicating water permanency and wetland connectivity.

MG – graminoid marsh
W(A) – shallow open water
II – temporary
III- seasonal
IV- semi-permanent
V – permanent

*Observations documented during Stantec Spring rare plant survey; wetlands were not delineated during this time.

Future decisions around wetland retention will need to be informed by field studies as part of the BIA (see Section 3.4 for a list of recommended studies) and the outcome the Crown claim determination. It is assumed that the majority of wetlands south of Township Road 232 will not be suitable for retention based on conflicts with land use (industrial and the heavy rail). However, the MDP (Stantec 2024) includes a decision matrix in Section 2.3.1 that will be used to inform decisions around wetland retention, wetland minimization (e.g. incorporation into stormwater management facilities) and wetland replacement based on future technical studies.

## 2.3 Existing Policy

### 2.3.1 Federal

There are two updates to federal legislation as listed below:

- Under section 2.9.3.3 of the Tannas (2021) report, they note that the *Species at Risk Act* (SARA) only applies to species on federal lands. As a clarification, species listed under the *Migratory Birds Convention Act*, and *Fisheries Act* are protected anywhere they occur, including private lands, provincial lands and lands within a territory.
- With the inclusion of the CPKC corridor, that land is covered under federal jurisdiction and therefore are subject to jurisdictional requirements under the *Railway Safety Act*.

### 2.3.2 Municipal

With the collaboration between RVC and the City on the ASP, there are additional City Policies that will guide the ASP include (but are not limited to) the City of Calgary Municipal Development Plan as well as the City of Calgary Wetland Conservation Plan. See sections below for a summary of the policies.

#### 2.3.2.1 City of Calgary Municipal Development Plan

The *City of Calgary Municipal Development Plan* (City of Calgary 2020) is a strategic policy document that guides Calgary's growth and city building. The goals include building a globally competitive city that supports a vibrant, diverse and adaptable local economy, to shape a more compact urban forum, to create great communities, to create a more livable and functional city, to develop an integrated, multi-modal transportation system, and to conserve, protect and restore the natural environment.

Ecological Networks are included as a policy in the *City of Calgary Municipal Development Plan* (City of Calgary 2020). Ecological network is defined as a network of natural areas and open spaces that provides the necessary conditions required for ecosystems and species populations to survive in a human-dominated landscape (City of Calgary 2020). The objective of the policy is to integrate and connect ecological networks throughout the city by maintaining biodiversity and landscape diversity (City of Calgary 2020). The policy objective of ecological networks contributes in providing valuable resources for plant and animal species, the distribution of natural areas and open spaces support biodiversity and foster network resilience (City of Calgary 2020).

#### 2.3.2.2 City of Calgary Wetland Conservation Plan

The *Calgary Wetland Conservation Plan* (City of Calgary Parks 2004) outlines developmental approval policies for wetlands within the City of Calgary. The *Calgary Wetland Conservation Plan* acknowledges that balancing the conservation of wetlands within the context of urban development is a priority and incorporates principles and goals in relation to regional planning, habitat management, monitoring, research, and development programs.

Under the *Calgary Wetland Conservation Plan*, efforts should be made to avoid impacts to wetlands that are environmentally significant, and/or contribute to water quality, and can be integrated into the urban development while maintaining ecosystem survivability and sustainability. Ecological mitigation priorities are outlined for circumstances where disturbance of wetlands is unavoidable. Guidelines and approval policies are described to emphasize wetland conservation in every step of the development process from community plans on a regional scale to mitigation in construction plans (City of Calgary Parks 2004).

# 3 Effects, Mitigation, And Monitoring

## 3.1 Effect Assessment Methodology

Stantec reviewed the effect assessment methodology listed in Tannas (2021) and find them to still be a complete representation of the project as proposed at the time this report was prepared.

## 3.2 Effect Assessment Results

### 3.2.1 Potential Effect to Vegetation

Stantec reviewed the potential effect to vegetation listed in Tannas (2021) and find it to still be a complete representation of the project as proposed at the time this report was prepared.

### 3.2.2 Potential Effect to Wildlife

The ASP boundary consists of agricultural and light industrial use land (Appendix A, Figure 4), and is fragmented by roads and rail (Tannas 2021). Larger wetlands may offer higher quality habitat for wildlife (e.g., birds and amphibians), however the overall habitat quality for the ASP is considered low (Tannas 2021). Due to the current conditions of the ASP, surrounding areas, and low-quality habitat, wildlife inhabiting the ASP are likely to have regular exposure to anthropogenic disturbances and are of low diversity (Tannas 2021). Stantec recognizes that more work is required to make informed decisions regarding wetland retention and that future work will include field studies and the application of the decision matrix in the MDP, and whether they will be retained or not. A full BIA will be required and validated through field studies.

The effects discussed in Tannas (2021) included mortality and loss of wildlife habitat. Mitigation discussed in Tannas (2021) related to mortality risk included avoiding construction during nesting season and recommended wildlife sweeps starting April 14th. This mitigation is being updated to reflect new guidance as below:

- Construction or vegetation removal activities that have the potential to result in habitat disturbances or destruction activities should be avoided from March 15 to July 31, in consideration for birds that are provincially mandated species but are not protected under the *Migratory Bird Convention Act* (e.g. hawks, falcons) as well to minimize disturbance to early nesting species (e.g. owls).
- A wildlife sweep, to determine if any occupied nests or dens are present, must precede construction or vegetation removal activities that are planned during the nesting period of migratory bird species (April 1 to August 31) (ECCC 2024). Sweeps will only occur ahead of activities that have the potential to disturb or destroy wildlife habitat. In addition, if sufficient habitat is available for pileated woodpecker cavities, a wildlife sweep will be completed prior to vegetation removal, regardless of the time of year. Species-specific mitigation would be applied to any active nests during wildlife sweeps.

- Where feasible, wildlife sweeps should be conducted within 72 hours of clearing/disturbance and within no more than 7 days prior to construction or vegetation removal activities. Sweeps should be repeated if construction or vegetation removal activities cease for four or more days.
- If an occupied nest or den is observed, construction or vegetation removal activities must be stopped, and appropriate authorities contacted to implement mitigation measures including buffers.

With the application of mitigation described above, the potential effects on wildlife are expected to be local, short-term for construction related effects and long-term for habitat loss, negligible for construction related disturbance and moderate for habitat loss/fragmentation.

### 3.2.3 Potential Effect to Hydrology

Based on the results from the MDP (Stantec 2024), the hydrology within the ASP will change post-development. Agricultural land will be converted to hard surface, infiltration will decrease, and runoff will increase. As described in Section 2.2.1, the post-development scenario includes a series of 6 SWMF to retain and treat stormwater within the ASP boundary. Surface water will generally follow the same flow direction as the pre-development scenario (i.e., flow from southeast to northwest and discharge into the Shepard wetland). Based on the MDP (Stantec 2024), there is no net change in the peak flow to the Shepard wetland in the post-development scenario.

As outlined in Tannas (2021), potential effects form the development do include introduction of sediment or other contamination into the surface water. The mitigation to address this potential effect is the same as Tannas (2021) in that SWMF will be constructed and will be designed to meeting municipal and provincial standards for water quality improvements.

Potential effects on hydrology after the application of mitigation measures are restricted to the site, sub-regional, long-term, and moderate overall.

### 3.2.4 Potential Effect to Wetlands

It is understood that the overall development plan for the ASP is to create a regionally significant rail served in-land port and industrial park servicing RVC and the City. The established CPKC railway already bisects wetlands identified as high prioritization (WSP Golder 2022) in the south of the ASP boundary. The CPKC corridor will service the area, the development of the ASP into the in-land port is anticipated to severely fragment wetlands. The intention to designate this area as industrial land brings conflict to meaningful natural use and/or conservation efforts, as such wetlands retention. This is especially true south of Township Road 232 where it is expected that there will be several rail spurs leading from the CPKC corridor to warehouse facilities. There are restrictions on the placement and spacing of rail spurs and buildings which can reduce options for wetland retention. In addition, given the industrial activities and high traffic volume, retained wetlands could lead to increased wildlife mortality, if wildlife is attracted to the retained wetland. Retained wetlands may also draw people to the area for recreation, which would also be in conflict with the industrial land use due to potential safety concerns associated with industrial traffic, other hazards and lack of parking.

There are several wetlands that were considered higher priority for retention based on the desktop assessment. A BIA, with field data, will be required to support future development applications and the Conceptual Scheme. The BIA and the decision matrix in the MDP will be used to inform decisions around avoidance, minimization and replacement.

Tannas (2021) identified the potential effects on wetlands are related to wetland loss, which still applies to the ES addendum. Potential effects from wetland loss will be mitigated though in lieu fee payment to Alberta Environment and Protected Areas following the Wetland Policy and directives. In addition, stormwater management facilities will be constructed to manage stormwater flow, mitigate flooding and provide water quality improvements. Other mitigation that should be considered during the design phase include:

- Locating stormwater management facilities in the approximate location of existing wetlands to maintain existing topography where possible.
- Looking at options to integrate components of wetlands into stormwater management facilities.
- Designing stormwater management facilities as constructed wetlands following the *Alberta Guide to Wetland Construction in Stormwater Management Facilities* (GOA 2018).
- Considering salvage of wetland soils (assuming there are no weeds) and using those soils within the stormwater management facility construction to introduce a native seed bank.

If the response from the province on the waterbody permanence assessment identifies wetlands as Crown land under Section 3 of the *Public Lands Act*, the proposed development concept will need to be revised to consider options for retention of Crown wetlands. If there are Crown claimed wetlands that are retained, a pre and post development hydrological balance will need to be completed as part of the preliminary design phase. This is a key step for long-term sustainability of the natural feature. It may also be identified during this analysis that the hydrological balance cannot be matched due to grading or other site constraints. In these cases, a decision must be made about if the natural feature will be retained with the understanding that there will be a change in the form and function, if other operational methods will be used (e.g., pumping water into a wetland), or if another site is prioritized for retention.

With the application of mitigation described above, the potential effects on wetlands are expected to be local, long-term, and moderate overall.

### 3.2.5 Topography Effect

Stantec reviewed the topography effects listed in Tannas (2021) and find it to still be a complete representation of the project as proposed at the time this report was prepared.

### 3.2.6 Geographical and Geological Effect

Stantec reviewed the geographical and geological effects listed in Tannas (2021) and find them to still be a complete representation of the project as proposed at the time this report was prepared.

### 3.2.7 Pedological Effect

Stantec reviewed the pedological effects listed in Tannas (2021) and find it to still be a complete representation of the project as proposed at the time this report was prepared.

### 3.2.8 Historical Resources Effect

Stantec reviewed the historical resources effects listed in Tannas (2021) and find it to still be a complete representation of the project as proposed at the time this report was prepared.

### 3.2.9 Socio-Economic Effect

The Disturbance during the construction of the ASP is considered to have a low effect on neighbouring communities due to the area being isolated (Tannas 2021). Short term effects due to construction could include limited road access, excess construction waste and/or noise disturbance (Tannas 2021). Further development of the CPKC corridor is anticipated, including the development of a railyard and spur lines, which may result in an increase in noise disturbance long term and increased traffic volume. The proposed development will also convert agricultural land to industrial land. Other potential effects will include increased tax revenue to the municipalities, creation of jobs in the region, and a change in the transportation network to facilitate streamlined flow of goods.

Key mitigations measures will include land use planning during Conceptual Scheme to provide appropriate buffers between the industrial development and other residential development and establish appropriate land use, the completion of appropriate traffic studies and road upgrades to support the increased traffic, and the implementation of noise reduction mitigation as recommended by technical studies based on proposed developments.

Overall, the potential effects are expected to be positive given the tax revenue and job creation. Potential effects are sub-regional, long-term, and moderate overall.

## 3.3 Effect Assessment Summary and Conclusions

Table 3.1 summarizes the potential environmental effect on the valued ecosystem components (VECs) post application of mitigation measures and has been amended from the Tannas (2021) report. Existing data in Tannas (2021), updated desktop data and 2022 field data have not identified changes in the significances identified onto VECs as assessed in Tannas (2021) with the addition of the CPKC corridor.

The overall habitat of the ASP is low-quality. Wetlands within the ASP may offer higher quality habitat potential for wildlife and plants, however, the development plan of the ASP as a high industrial land use brings conflict to provide meaningful natural use and/or conservation efforts. Future field studies will be completed to assess wetlands and confirm decisions around wetland avoidance, minimization and replacement following the decision framework included in the MDP. Removal of wetlands may result in further habitat fragmentation, limit wildlife movement, and remove potential wildlife and plant habitat. While no rare plants were observed during the Stantec spring rare plant survey, final effects on wildlife and plants will not be known until appropriate field surveys have been conducted to implement mitigation measures if required. Mitigation of wetland removal may include in lieu fee payment to Alberta

Environment and Protected Areas, integration and/or construction of stormwater management facilities, and salvage of wetland soils to introduce a native seed bank.

Hydrology will change post-development through increased runoff volume (due to increased impervious surfaces) and local changes in the direction of flow within the ASP boundary to direct runoff into SWMF. Surface water will generally follow the same flow direction as the pre-development scenario (i.e., flow from southeast to northwest and discharge into the Shepard wetland). Based on the MDP (Stantec 2024), there is no net change in the peak flow to the Shepard wetland in the post-development scenario. The use of SMWF will control the peak flows and provide water treatment.

As outlined in Tannas (2021), Loss of soil structure and minor admixing are anticipated during the ASP development; while soil structure will eventually re-establish, the natural profile will not Mitigation on soil disturbance may include appropriate planning, use of knowledgeable/experienced supervisors and equipment operators, as well as using current best practices.

Socio-economic effects may include short term effects (e.g., noise and access issues) from construction and are expected to be negligible as the ASP is location is isolated (Tannas 2021). Long term effects may include neighbouring landowner conflicts, and increased traffic. However, significant economic benefits are expected.

Based on the results of the assessment, the primary residual effects from proposed development will be loss of wetlands and the economic benefits though tax revenue and job creation. With the implementation of the outlined mitigation measures and standard best practices, the residual effects of the Project these VECs are moderate but can be managed though standard practices including in lieu replacement for wetland loss.

**Table 3.1 Summary of potential environmental effects and residual effects on the identified VECs (Tannas 2021) with updates based on the 2024 ASP boundary.**

| Valued Ecosystem Components | Potential Environmental Effects | Mitigation Measures | Significance | | | |
|---|---|---|---|---|---|---|
| | | | Extent | Duration | Magnitude | Residual Effect |
| 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. Based on the June 2022 survey, rare plant potential in the ASP boundary is low. | 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 | Complete wetland prioritization assessment with BIA and where land use conflicts do not exist, incorporate or retain wetlands | Local | Long-term | Moderate | Moderate |
| | Direct Effects (disturbance to breeding species & sensory disturbance) | Complete habitat destruction activities outside of the breeding window for migratory birds including early nesting species (March 15 – July 31). 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 | Increased surface water runoff | Follow stormwater management plan and recommendations in MDP (Stantec 2024). Peak flows will be managed by ponds and conveyance pathways will be constructed to the Bow River by way of storm pipes to the constructed Shepard Ditch. | Local | Long-term | Minor | Minor |
| | Change in water quality from introduction of sediment or pollutants to surface water | Follow ESC plan and provincial and municipal stormwater management facility design guidelines. | Local | Long-term | Minor | Minor |

| Valued Ecosystem Components | Potential Environmental Effects | Mitigation Measures | Significance | | | |
|---|---|---|---|---|---|---|
| | | | Extent | Duration | Magnitude | Residual Effect |
| Wetlands | Loss of wetlands | Incorporate wetlands into SWMF where possible.<br>Conserve wetlands soils and use in SWMF to incorporate native seed bank.<br>Appy in-lieu fee replacement for lost wetland functions. | Local | Long-term | Moderate | Moderate |
| | Change in Hydrology and Water Quality | Implement measures in the MDP (Stantec 2024) to limit the change.<br>Implement site-specific ESC measures around wetlands adjacent to construction activity.<br>Install SWMFs throughout the ASP Boundary to manage on-site surface water in accordance with the MDP (Stantec 2024). | Local | Long-term | Moderate | Moderate |
| Topography | No Anticipated Effects | None Required. | Local | Long-term | Minor | Minor |
| Geography and Geology | No Anticipated Effects | None Required. | Local | Long-term | Minor | Minor |
| 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. | Local | Long-Term | Minor | Minor |
| | Compaction, Clodding, and Rutting | Work should be limited during wet conditions. Appropriately sized equipment should be used based on the job task required and the scale. Heavy traffic areas 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. | Local | Long-Term | Minor | Minor |
| | 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. | Local | Long-Term | Minor | Minor |

| Valued Ecosystem Components | Potential Environmental Effects | Mitigation Measures | Significance | | | |
|---|---|---|---|---|---|---|
| | | | Extent | Duration | Magnitude | Residual Effect |
| | Sedimentation of the Wetlands | Silt fences, erosion matting, temporary seeding, etc. | Local | Long-Term | Minor | Minor |
| Historical Resources | Disturbance to historical resources | Document historic structures prior to any development related impacts. If any historical resources is discovered, halt work and contact the Historic Resources Management Branch for instructions. | Site | Long-Term | Minor | Minor |
| Socio Economic | Change in infrastructure (e.g., increased traffic volumes) | Transportation impact studies and roadway upgrades will be developed in conjunction with the future municipal land use planning and design process and approvals. | Sub-Regional | Long-Term | Moderate | Moderate |
| | Land use change (noise, conflicts between land use types). | Future planning process including the Conceptual Scheme will evaluate land uses and identify appropriate setbacks to limit conflicts between residential developments and industrial developments.<br>Future development will follow recommendations on noise mitigation as applicable. | Sub-Regional | Long-Term | Moderate | Moderate |
| | Financial (tax revenue, job creation) | None required. | Sub-Regional | Long-Term | Moderate | Moderate |
| Notes:<br>TBD* - To be determined at the time of the BIA | | | | | | |

## 3.4 Recommendations For Next Steps

Recommendations for next steps include:

- Submission of a waterbody permanence assessment for the ASP boundary. The assessment was submitted on February 9, 2024 to the province to confirm if there are wetlands that are to be claimed under Section 3 of the *Public Lands Act* (AEP 2016), results are pending. If any of the wetlands are determined to be Crown claimed, both a *Public Lands Act* and *Water Act* approval application and compensation will be required for their removal. For wetlands not determined to be Crown claimed, then only a *Water Act* approval and compensation will be required for their removal. If wetlands are to be retained, plans may be required to modify the pending hydrology study.
- Conduct a BIA following RVCs County Servicing Standards (2013) as required to support the ASP. The BIA report will include a detailed inventory of the ASP boundary for vegetation, wildlife (amphibians, mammals, and birds) and wetlands and will identify recommendations to support the ASP development. Suggested surveys for the BIA include:
  - Early and late season rare plant surveys following the Guidelines for Rare Vascular Plant Surveys in Alberta (Alberta Native Plant Council 2012).
  - Amphibian and rail surveys in accordance with the Sensitive Species Inventory Guidelines (GOA 2013) – completed as nocturnal auditory surveys to document breeding wetlands to inform mitigation for construction, additionally to aid in wetland prioritization.
  - Breeding bird surveys in accordance with the Sensitive Species Inventory Guidelines to document bird species and incidental wildlife observations (GOA 2013). Two surveys should be conducted 10 days apart between June 1st and July 7th to correspond with the breeding period of most birds (GOA 2013).
  - A raptor survey should be completed following the Sensitive Species Inventory Guidelines to identify raptor nests and document their activity status and condition. Surveys are typically completed May 1$^{st}$ to June 30$^{th}$.
  - General wildlife habitat reconnaissance to document incidental wildlife and habitat potential.
  - Weeds and wetlands assessments: field data should be collected following the Alberta Wetland Identification and Delineation Directive (GOA 2015). Field assessments will also need to complete the Alberta Wetland Rapid Evaluation Tool – Actual (ABWRET-A) data. Data collected will be analyzed and written into a Wetland Assessment Impact Report (WAIR) required by EPA. Results of the ABWRET-A will determine wetland value, and in turn compensation amounts required by EPA for wetland removal.

# 4 References

ACIMS (Alberta Conservation Information Management System). 2022. List of Elements in Alberta - Vascular Plants. Alberta Environment and Parks, Edmonton, Alberta. Accessed January 2024. Available at: https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/download-data/#trackedWatch.

Alberta Arts, Culture and Status of Women. 2023. Listing of Historic Resources. Accessed January 2024. Available at: Listing of Historic Resources (alberta.ca)

AEP (Alberta Environment and Parks). 2016. Guide for Assessing Permanence of Wetland Basins. Accessed January 2024. Available at: Guide for assessing permanence of wetland basins - Open Government (alberta.ca)

Alberta Native Plant Council. 2012. ANPC Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update. Alberta Native Plant Council, Edmonton, AB. Accessed January 2024. Available at: http://www.anpc.ab.ca/content/resources.php

Bennett, A.F. 2003. Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation. IUCN, Gland, Switzerland and Cambridge, UK.

City of Calgary. 2020. Municipal Development Plan.

City of Calgary Parks. 2004. Calgary Wetland Conservation Plan.

ECCC (Environment and Climate Change Canada). 2024. Migratory Birds. Accessed: April 2024. Available at: https://www.canada.ca/en/services/environment/wildlife-plants-species/migratory-birds.html

EPA (Alberta Environment and Protected Areas). 2024a. Fisheries and Wildlife Management Information System (FWMIS) Internet Mapping Tool. Accessed January 2024. Available at: FWMIS – Overview | Alberta.ca

EPA. 2024b. Wildlife Sensitivity Maps. Accessed January 2024. Available at: FWIMT_Pub (alberta.ca)

ESRD (Alberta Environment and Sustainable Resource Development). 2015. Alberta Wetland Classification System. Water Policy Branch, Policy and Planning Division, Edmonton, AB.

GOA (Government of Alberta). 2013. Integrated Standards and Guidelines, Enhanced Approval Process. Sustainable Resource Development – 2013 Update, Lands Division. Edmonton, AB. Accessed January 2024. Available at: 2013-sensitivespeciesinventoryguidelines-apr18.pdf (alberta.ca)

GOA. 2015. Alberta Wetland Identification and Delineation Directive. Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta.

GOA. 2018. Alberta Guide to Wetland Construction in Stormwater Management Facilities. Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta. Accessed: February 2024. Available at: https://open.alberta.ca/dataset/a64c945b-cb05-4f6b-bbc8-18f0c161377b/resource/2b24bd4c-4b17-4f24-be32-d08e9a62e2c9/download/guide-wetland-construction-stormwater-facilities-201812.pdf

GOA. 2019. Grassland Vegetation Inventory. Accessed March 2024. Available at: https://open.alberta.ca/opendata/gda-d3ab9031-8ec0-4589-9335-c1e50ae05992#summary

GOA. 2022. Alberta Wild Species General Status Listing 2020. Accessed January 2024. Available at: https://open.alberta.ca/dataset/6d247118-2097-43d5-8585-0d2592a48430/resource/8aa19314-dd40-4762-9414-5260aa20250f/download/epa-sar-alberta-wild-species-general-status-listing-2020.pdf

GOA. 2023. Species at Risk Assessed in Alberta. Accessed January 2024. Available at: https://open.alberta.ca/publications/species-assessed-by-the-conservation-committee-alberta-species-at-risk.

GOC (Government of Canada). 2022. Annual Crop Inventory, 2022. Agriculture and Agri-Food Canada. Accessed January 2024. Available at: https://search.open.canada.ca/openmap/ee44d2d4-f887-47d1-9a5b-4c9c7b43bb46

GOC. 2023a. Species at Risk Act Public Registry. Accessed January 2024. Available at: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html.

GOC.2023b. Ferruginous Hawk (Buteo regalis). Accessed January 2024. Available at: Ferruginous Hawk (Buteo regalis) - Species search - Species at risk registry (canada.ca)

RVC (Rocky View County). 2013. County Servicing Standards. Rocky View County, Alberta. Accessed January 2024. Accessed January 2024. Available at: https://www.rockyview.ca/Portals/0/Files/BuildingPlanning/Standards/Servicing-Standards.pdf

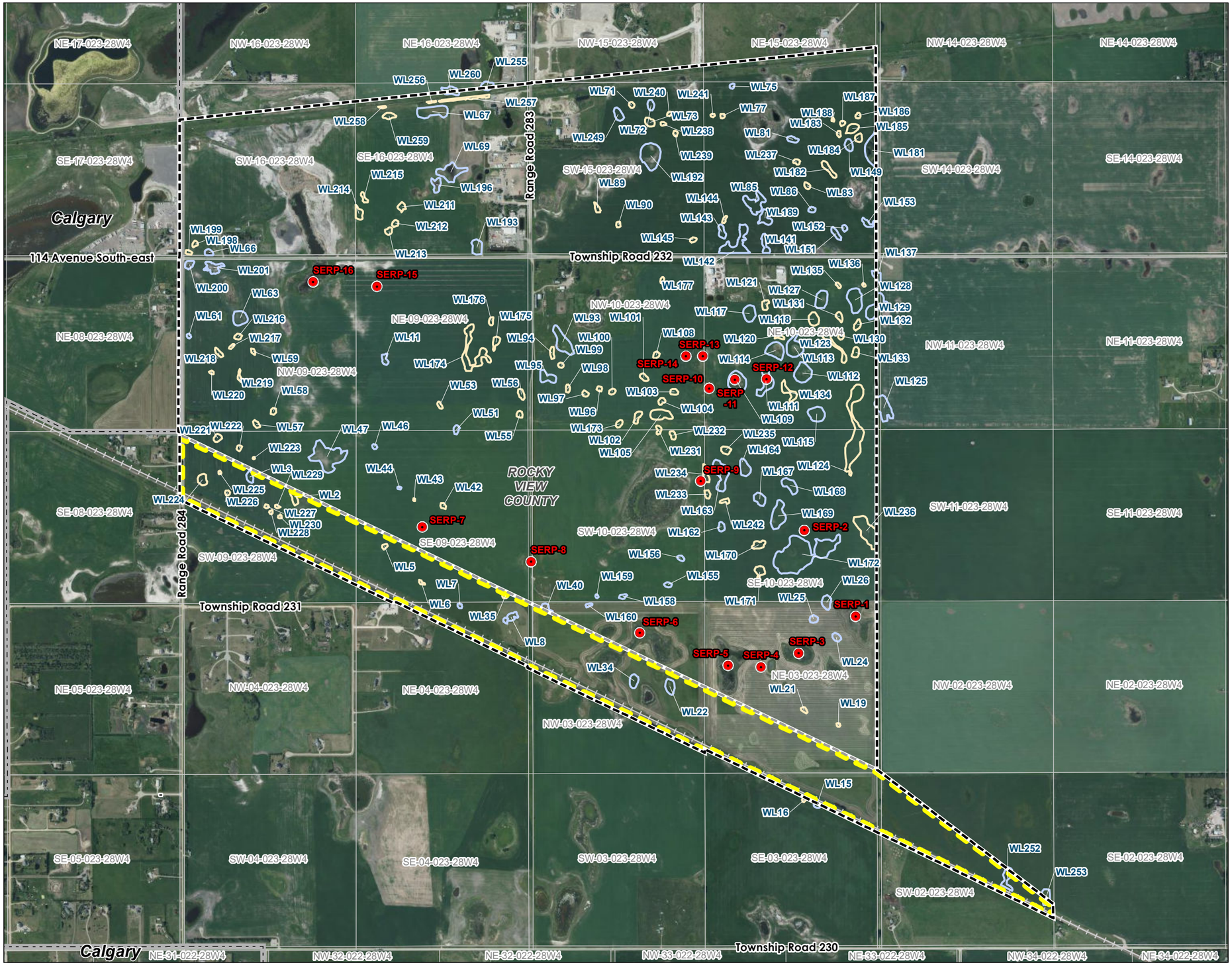
Stantec (Stantec Consulting Ltd). 2024. Prairie Gateway Master Drainage Plan – 90% DRAFT for Review. Calgary, Alberta.

Tannas Conservation Services Ltd. 2021. Shepard Industrial Area Structure Plan Environmental Screening. Cremona, Alberta.

WSP Golder. 2022. Technical Memorandum East Calgary Regional Drainage Study Grassland and Wetland Mapping. Calgary, Alberta.

# Appendices

# Appendix A Figures




Stantec

- Area Structure Plan (ASP) Boundary
- Canadian Pacific Kansas City (CPKC) Corridor
- Rare Plant Targeted Survey (SERP)

**Wetland Class**

- Ephemeral Waterbody
- Graminoid Marsh - Temporary (MGII)
- Railway
- Municipal Boundary
- Quarter Section

N

0 250 500 metres

(At original document size of 11x17)
1:18,500

***Notes***

1. Coordinate System: NAD 1983 3TM 114
2. Data Sources: Stantec Consulting Ltd, Government of Alberta, City of Calgary
3. Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
The City of Calgary


*Project Location*
SE Calgary
Alberta

Prepared by DSPRY on 2024-02-07
TR by KFOUQUETTE on 2024-02-07
IR Review by MCHISHOLM on 2024-02-07

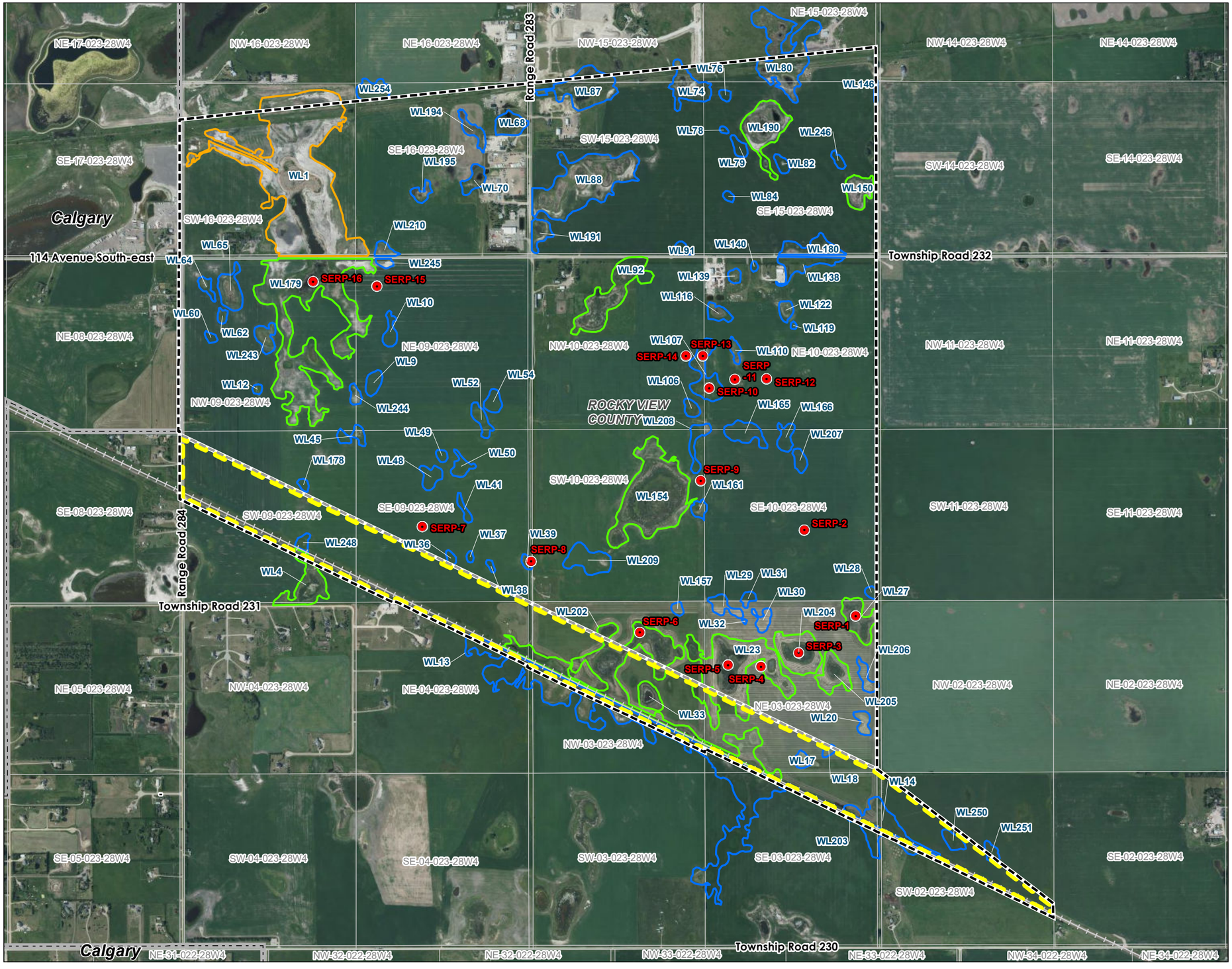
*Client/Project*
Shepherd Development Group
Environmental Screening Addendum
Prairie Gateway (Shepard Industrial Lands)
Area Structure Plan

116536040_001

*Figure No.*
**1**

*Title*
**Area Structure Plan (ASP) Overview - Ephemeral Waterbodies and Class II Wetlands**

W:\Clients\Shepard_Development_Corp\Shepard_Industrial_ASP\Figures\116536040_001_EW_II_Overview.mxd Revised: 2024-03-19 By: dspry




Stantec

- Area Structure Plan (ASP) Boundary
- Canadian Pacific Kansas City (CPKC) Corridor
- Rare Plant Targeted Survey (SERP)

**Wetland Class**

- Graminoid Marsh - Seasonal (MGIII)
- Graminoid Marsh - Semi-permanent (MGIV)
- Shallow Open Water - Semi-permanent (WAIV)
- Railway
- Municipal Boundary
- Quarter Section

N

0 250 500 metres

(At original document size of 11x17)
1:18,500

***Notes***

1. Coordinate System: NAD 1983 3TM 114
2. Data Sources: Stantec Consulting Ltd, Government of Alberta, City of Calgary
3. Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
The City of Calgary


*Project Location*
SE Calgary
Alberta

Prepared by DSPRY on 2024-02-07
TR by KFOUQUETTE on 2024-02-07
IR Review by MCHISHOLM on 2024-02-07

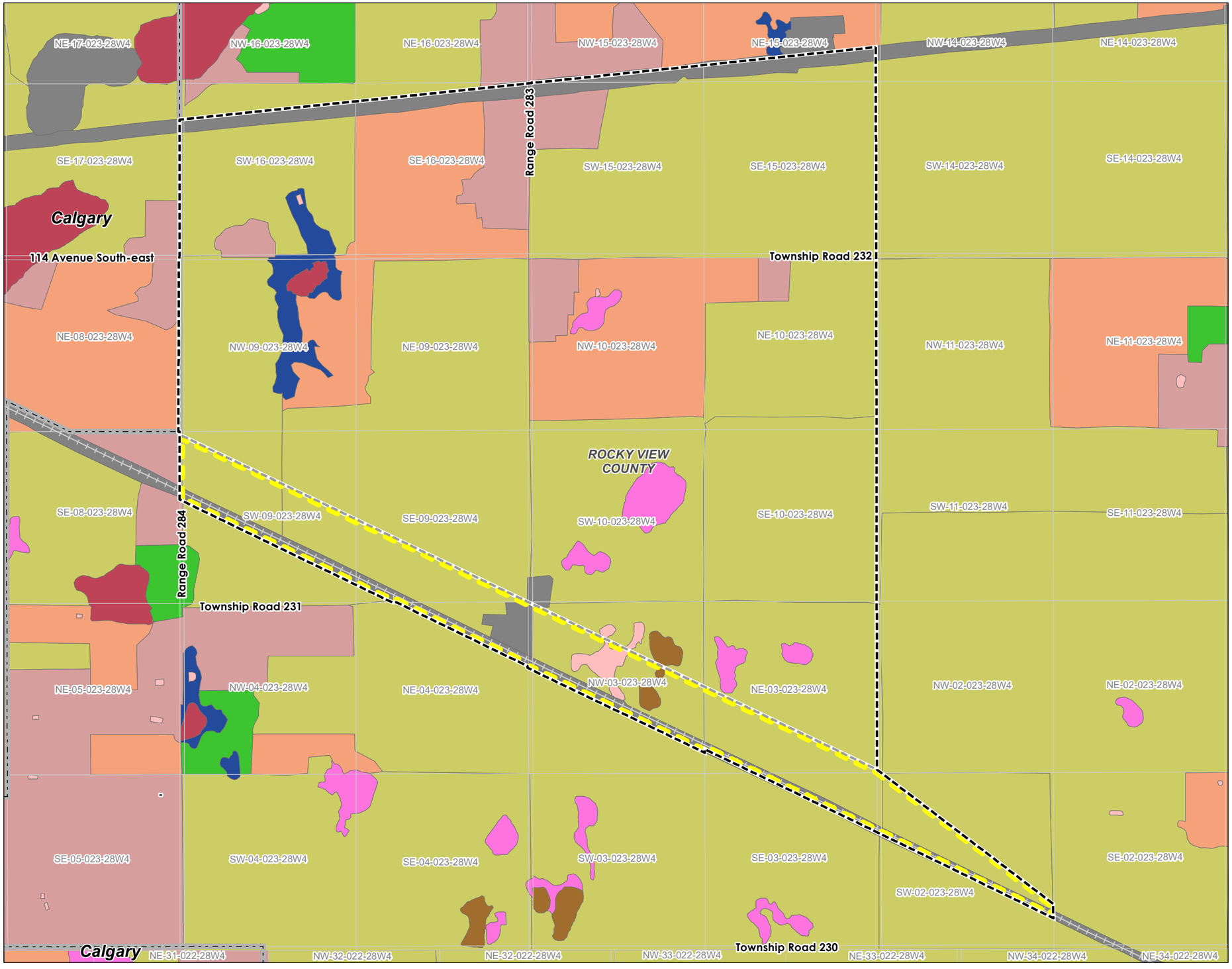
*Client/Project*
Shepherd Development Group
Environmental Screening Addendum
Prairie Gateway (Shepard Industrial Lands)
Area Structure Plan

116536040_002

*Figure No.*
**2**

*Title*
**Area Structure Plan (ASP) Overview - Class III and IV Wetlands**

W:\Clients\Shepard_Development_Corp\Shepard_Industrial_ASP\Figures\116536040_002_III_Above_Overview.mxd Revised: 2024-03-19 By: dspry




Stantec

- Area Structure Plan (ASP) Boundary
- Canadian Pacific Kansas City (CPKC) Corridor
- Railway
- Municipal Boundary
- Quarter Section

**Grassland Vegetation Inventory**

- Crop
- Industrial
- LenA - Lentic (Alkali)
- LenS - Lentic (Seasonal)
- LenSP - Lentic (Semi-Permanent to Permanent)
- LenT - Lentic (Temporary)
- LenW - Lentic (Open Water)
- Native Prairie
- Pasture
- Settled

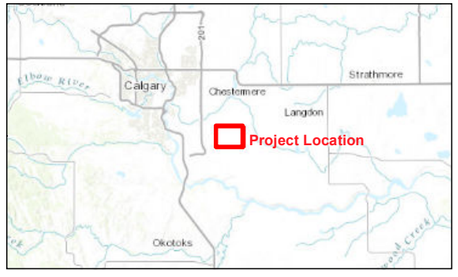
N

0 250 500 metres

(At original document size of 11x17)
1:18,500

***Notes***

**1.** Coordinate System: NAD 1983 3TM 114
**2.** Data Sources: Stantec Consulting Ltd, Government of Alberta, City of Calgary
**3.** Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community




*Project Location*
SE Calgary
Alberta

Prepared by DSPRY on 2024-02-07
TR by KFOUQUETTE on 2024-02-07
IR Review by MCHISHOLM on 2024-02-07

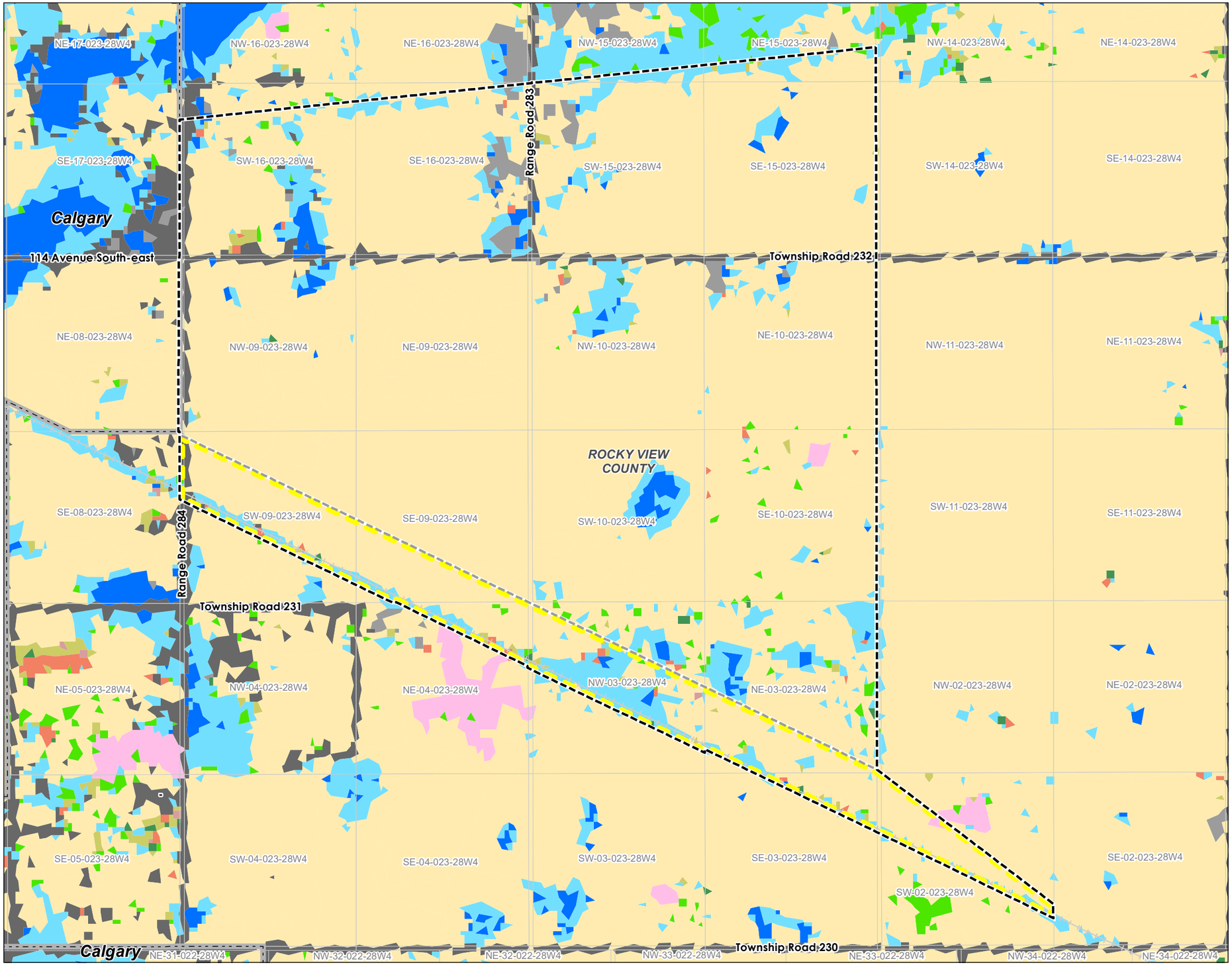
*Client/Project*
Shepherd Development Group
Environmental Screening Addendum
Prairie Gateway (Shepard Industrial Lands)
Area Structure Plan

116536040_005

*Figure No.*
**3**

*Title*
**Grassland Vegetation Inventory**

W:\Clients\Shepard_Development_Corp\Shepard_Industrial_ASP\Figures\116536040_005_GVI_Overview.mxd Revised: 2024-03-20 By: dspry




Stantec

- Area Structure Plan (ASP) Boundary
- Canadian Pacific Kansas City (CPKC) Corridor
- Railway
- Municipal Boundary
- Quarter Section

**Crop Inventory**

- Annual Crops
- Broadleaf
- Coniferous
- Exposed land/barren
- Grassland
- Mixedwood
- Pasture/forages
- Shrubland
- Urban/developed
- Water
- Wetland

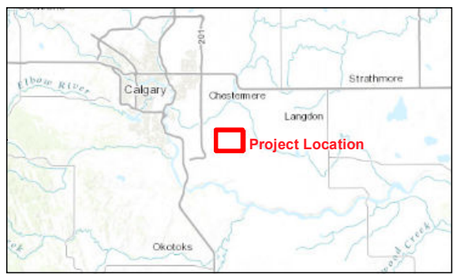
N

0 250 500 metres

(At original document size of 11x17)
1:18,500

***Notes***

**1.** Coordinate System: NAD 1983 3TM 114
**2.** Data Sources: Stantec Consulting Ltd, Government of Alberta, City of Calgary
**3.** Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community




*Project Location*
SE Calgary
Alberta

Prepared by DSPRY on 2024-02-07
TR by KFOUQUETTE on 2024-02-07
IR Review by MCHISHOLM on 2024-02-07

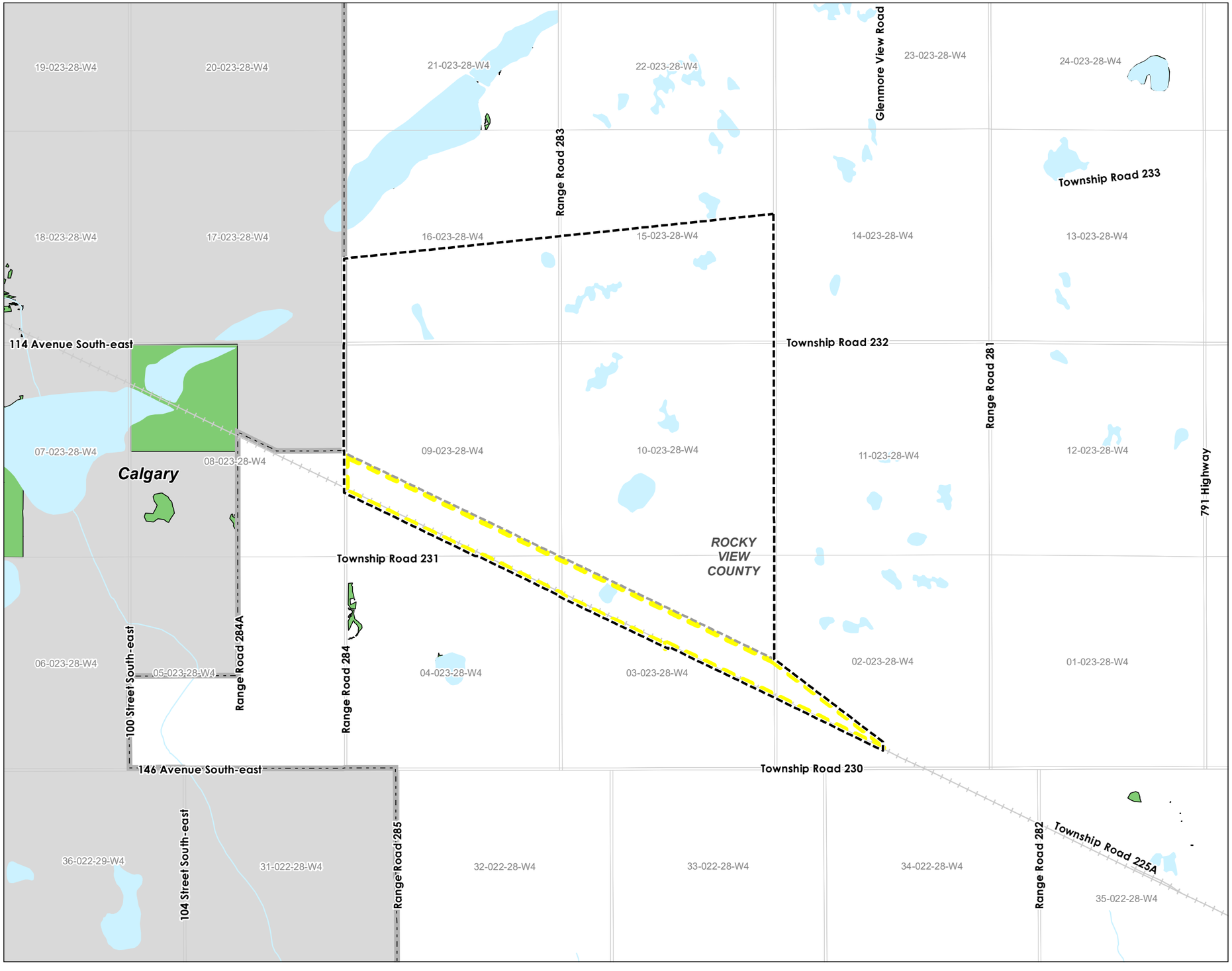
*Client/Project*
Shepherd Development Group
Environmental Screening Addendum
Prairie Gateway (Shepard Industrial Lands)
Area Structure Plan

116536040_006

*Figure No.*
**4**

*Title*
**Annual Crop Inventory (2021)**

W:\Clients\Shepard_Development_Corp\Shepard_Industrial_ASP\Figures\116536040_006_Annual_Crops_2021_Overview.mxd Revised: 2024-03-20 By: dspry




Stantec

- Environmentally Sensitive Area
- Area Structure Plan (ASP) Boundary
- Canadian Pacific Kansas City (CPKC) Corridor
- Railway
- Watercourse
- City
- Municipal Boundary
- Section
- Waterbody

N

0 250 500 metres

(At original document size of 11x17)
1:30,000

***Notes***

**1.** Coordinate System: NAD 1983 3TM 114
**2.** Data Sources: Stantec Consulting Ltd, Government of Alberta, City of Calgary
**3.** Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community


*Project Location*
SE Calgary
Alberta

Prepared by DSPRY on 2024-04-03
TR by MWOODWARD on 2024-04-03
IR Review by MCHISHOLM on 2024-04-03

*Client/Project*
Shepherd Development Group
Environmental Screening Addendum
Prairie Gateway (Shepard Industrial Lands)
Area Structure Plan

116536040_007

*Figure No.*
**5**

*Title*
**Calgary Municipal Regional Board**
**Environmentally Sensitive Area Mapping**

W:\Clients\Shepard_Development_Corp\Shepard_Industrial_ASP\Figures\116536040_007_ESA_Overview.mxd Revised: 2024-04-05 By: dspry

# Appendix B Reports

# Shepard Industrial Area Structure Plan

## Environmental Screening

# FINAL

Submitted To:

**Shepard Development Corp.**

#100, 5720 – 4th Street SE
Calgary, Alberta T2H 1K7

Submitted By:


## Tannas Conservation Services Ltd.

Box 31
Cremona, AB, T0M 0R0
www.tannasenvironmental.com


**February 2021**


**Lead Authors**

Daina Anderson, M.Sc.
Jamie Kalla, M.Sc., P.Biol.
Jesse Bird, B.Sc.

**Contributions By:**

Steven Tannas, Ph.D., P. Ag.
Krista Bird, Ph.D., P.Biol.

## Table of Contents

## List of Tables



## List of Figures



## List of Appendices

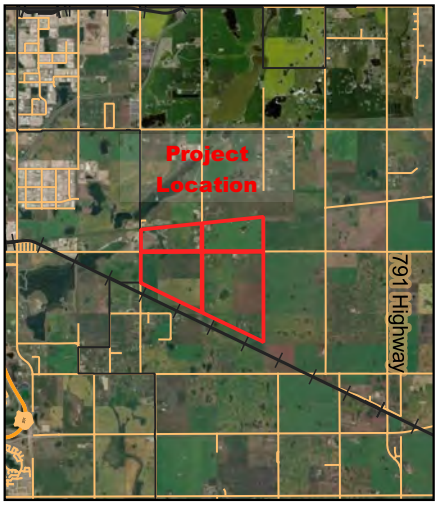
# 1.0 Project Description

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

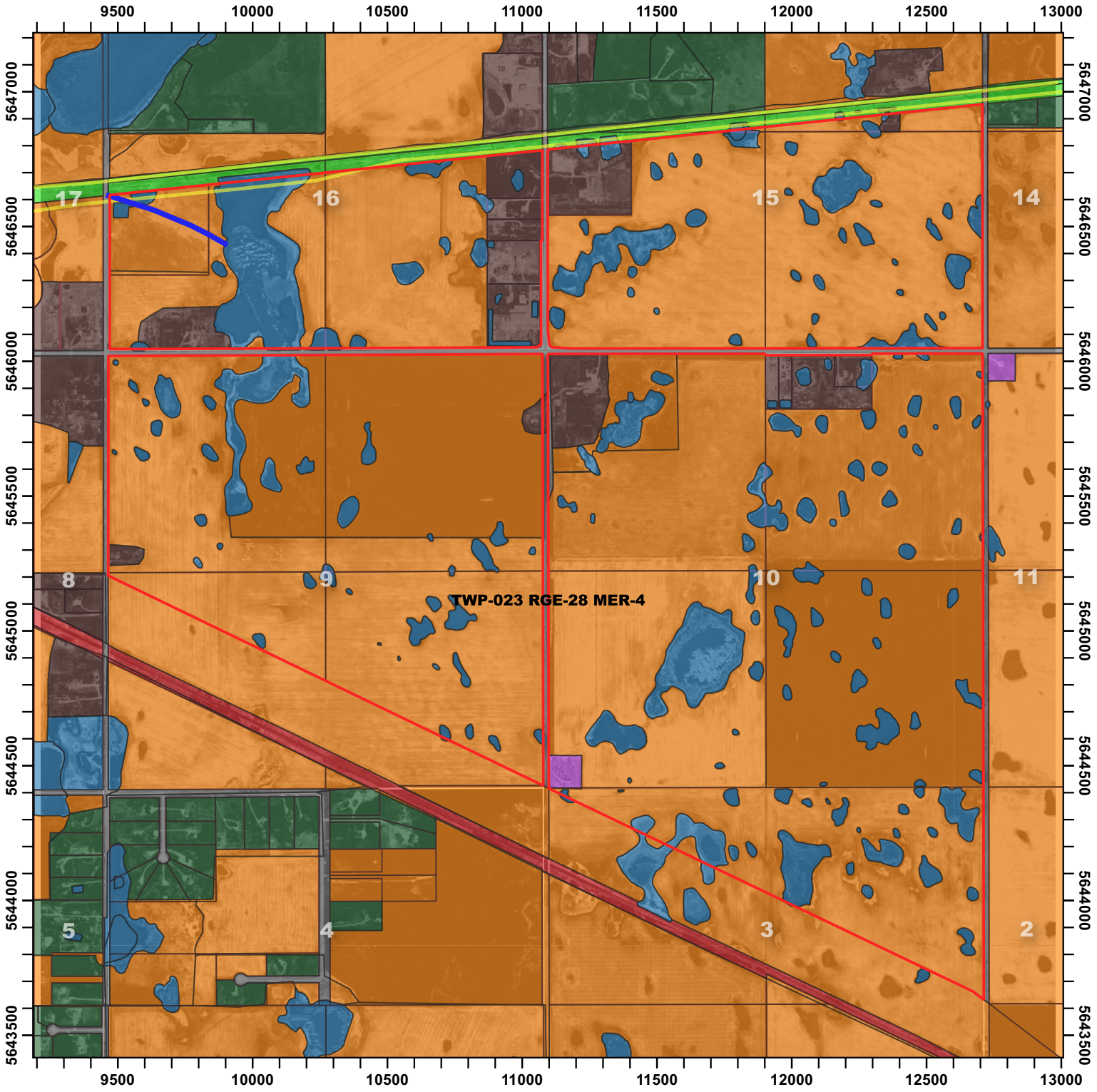
There are five phases for the proposed project (Appendix A). It is currently unknown the timeline for each of the project phases or when construction will begin, as the project is in the conceptual design phase. In general, soil excavation and vegetation removal will be necessary to develop the sewage, 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

Tannas Conservation Services Ltd

# 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.

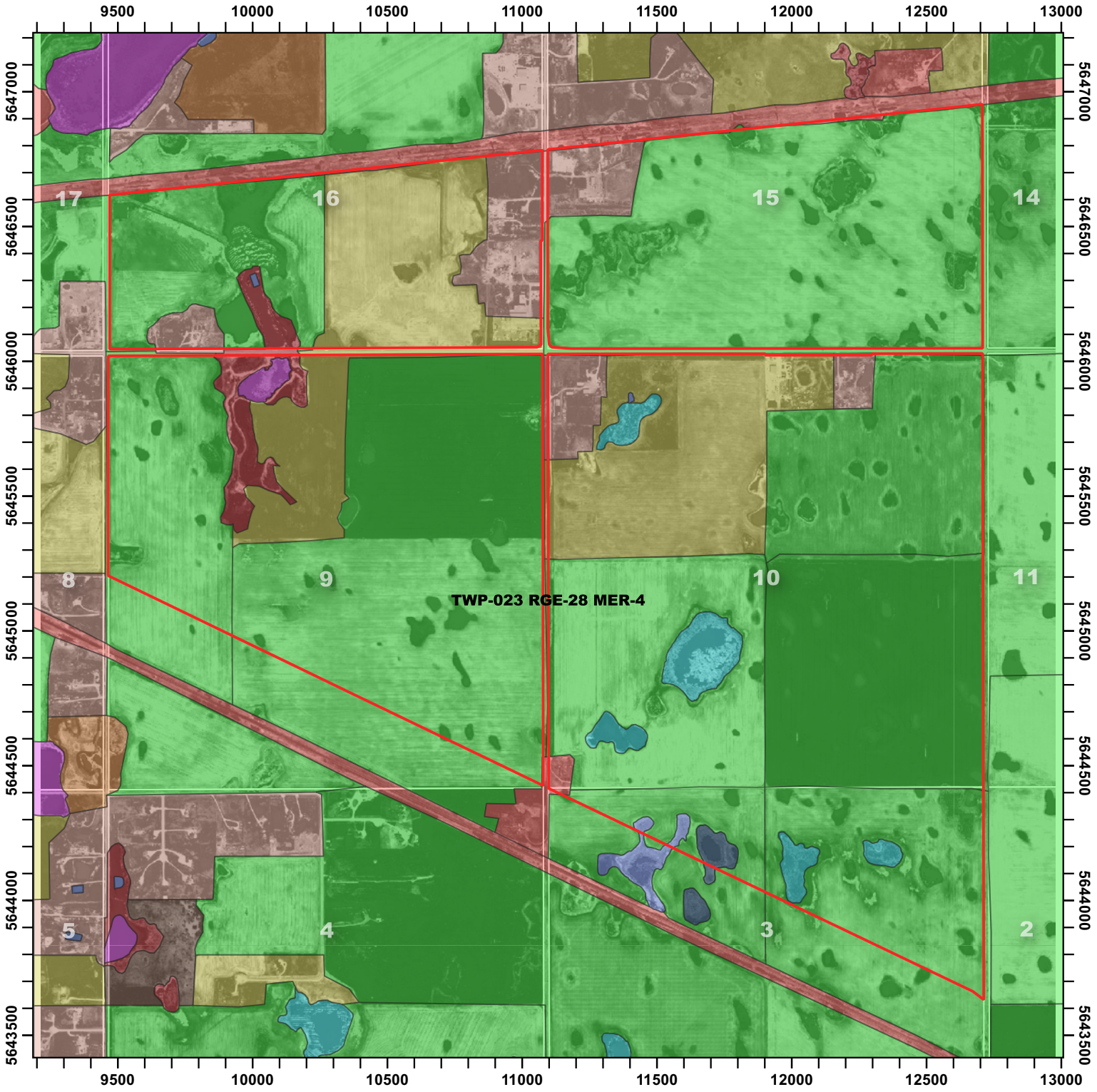
### 2.2.2 Vegetation

#### 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)

Tannas Conservation Services Ltd

# 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

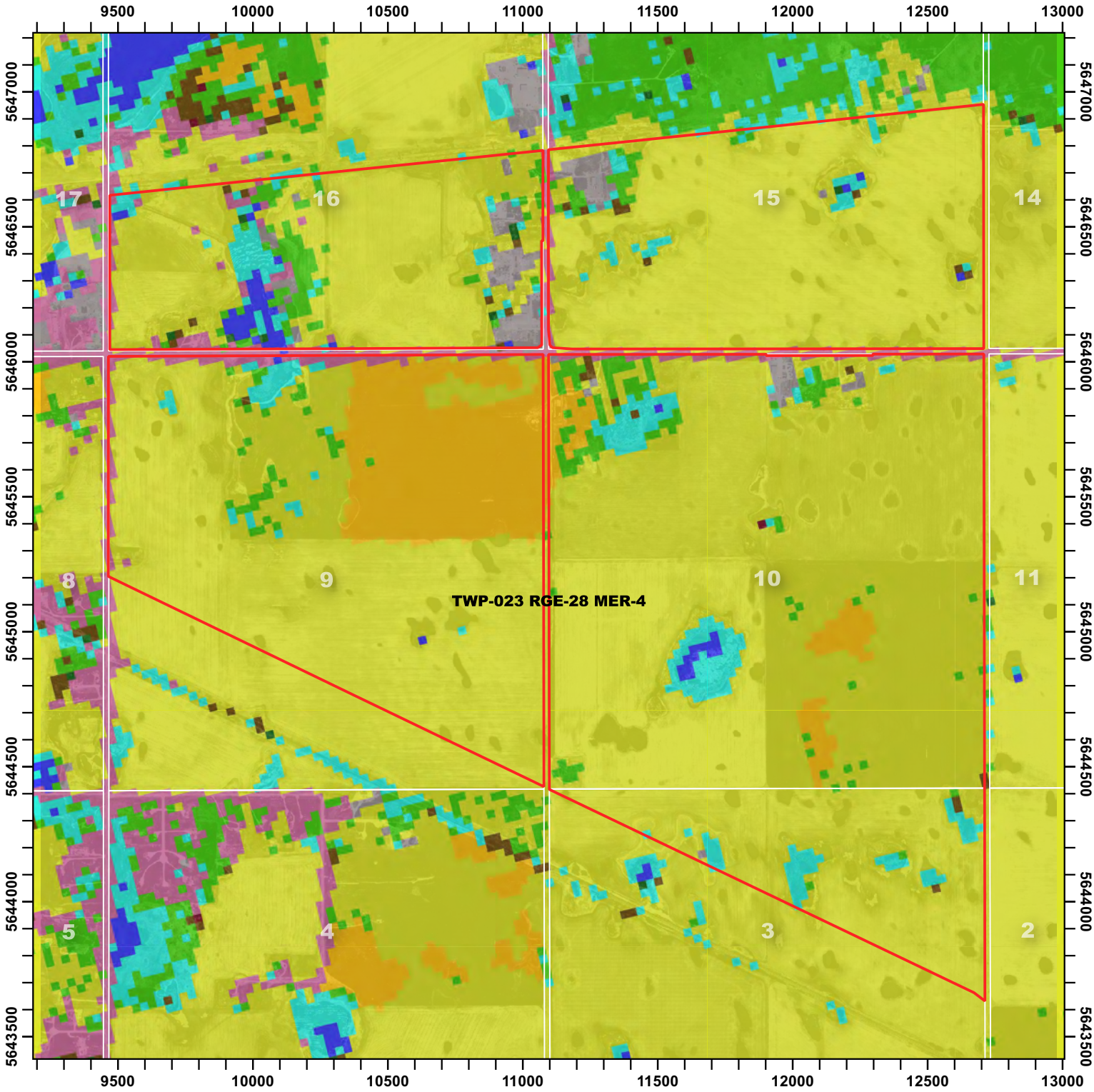
LandWise Inc. and the ASRD GVI Committee. 2006. Grassland Vegetation Inventory (GVI), Final Report. Part 3: Detailed Description of Site Types. 12 pp.

#### 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

Tannas Conservation Services Ltd

# 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

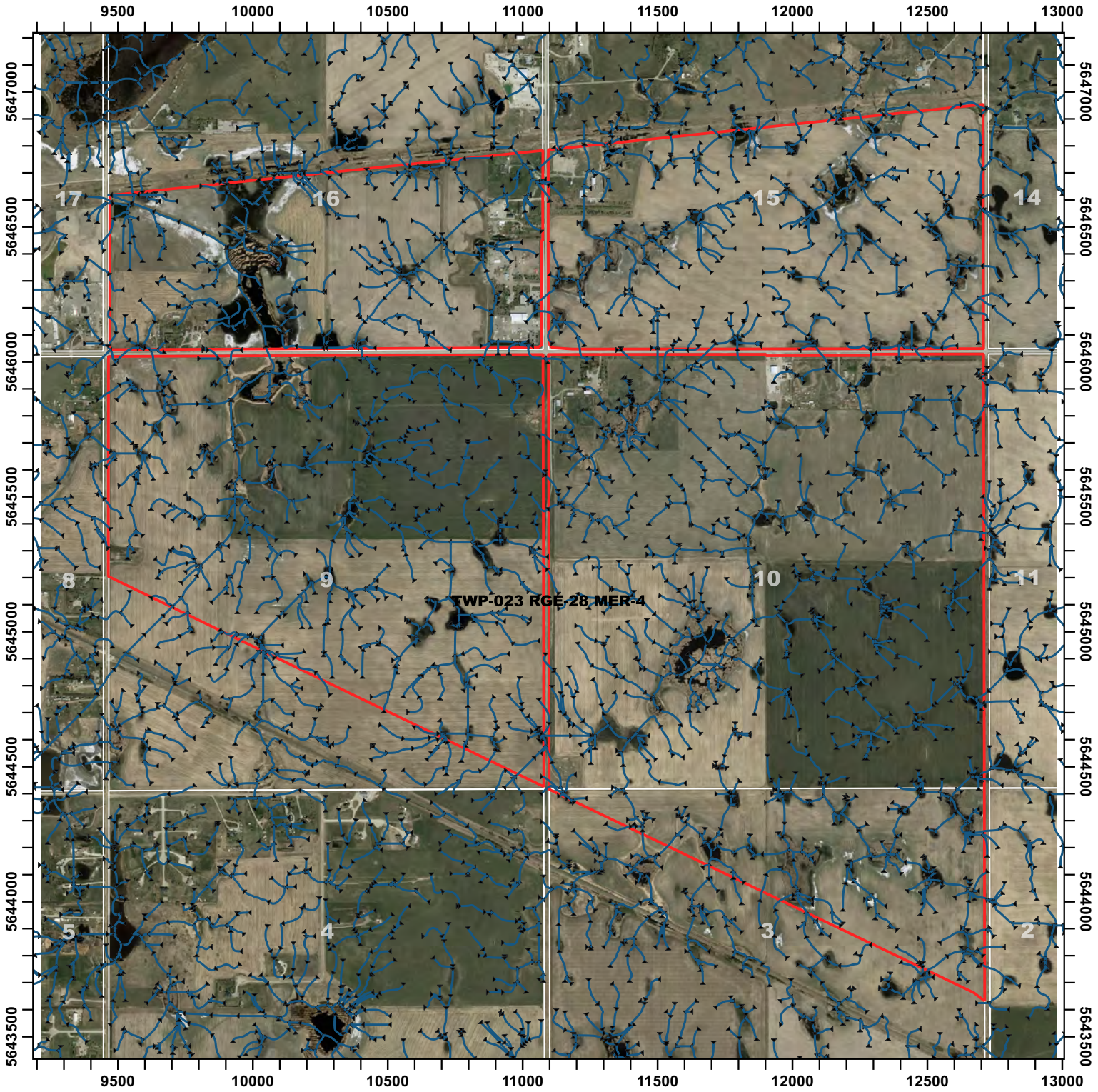
The Project Area is located in the Bow River Basin and Western Irrigation District to Highwood sub-basin. Anthropogenic activity is high in this sub-basin which includes the Calgary Weir, riverside pathways, highways, bridges, dog parks, and fishing locations (Bow River Basin Council 2010). The most 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

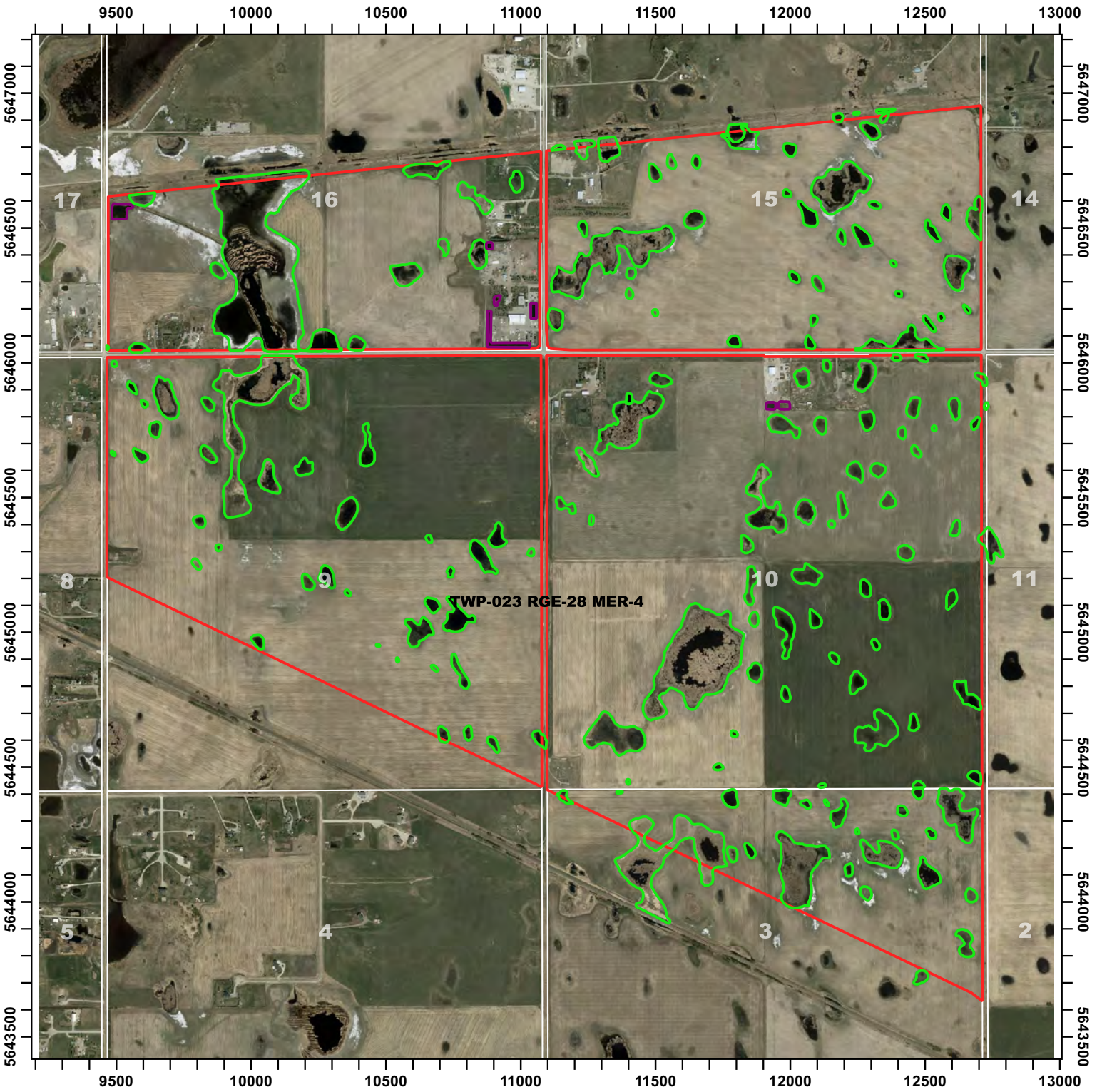
Tannas Conservation Services Ltd

### 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).

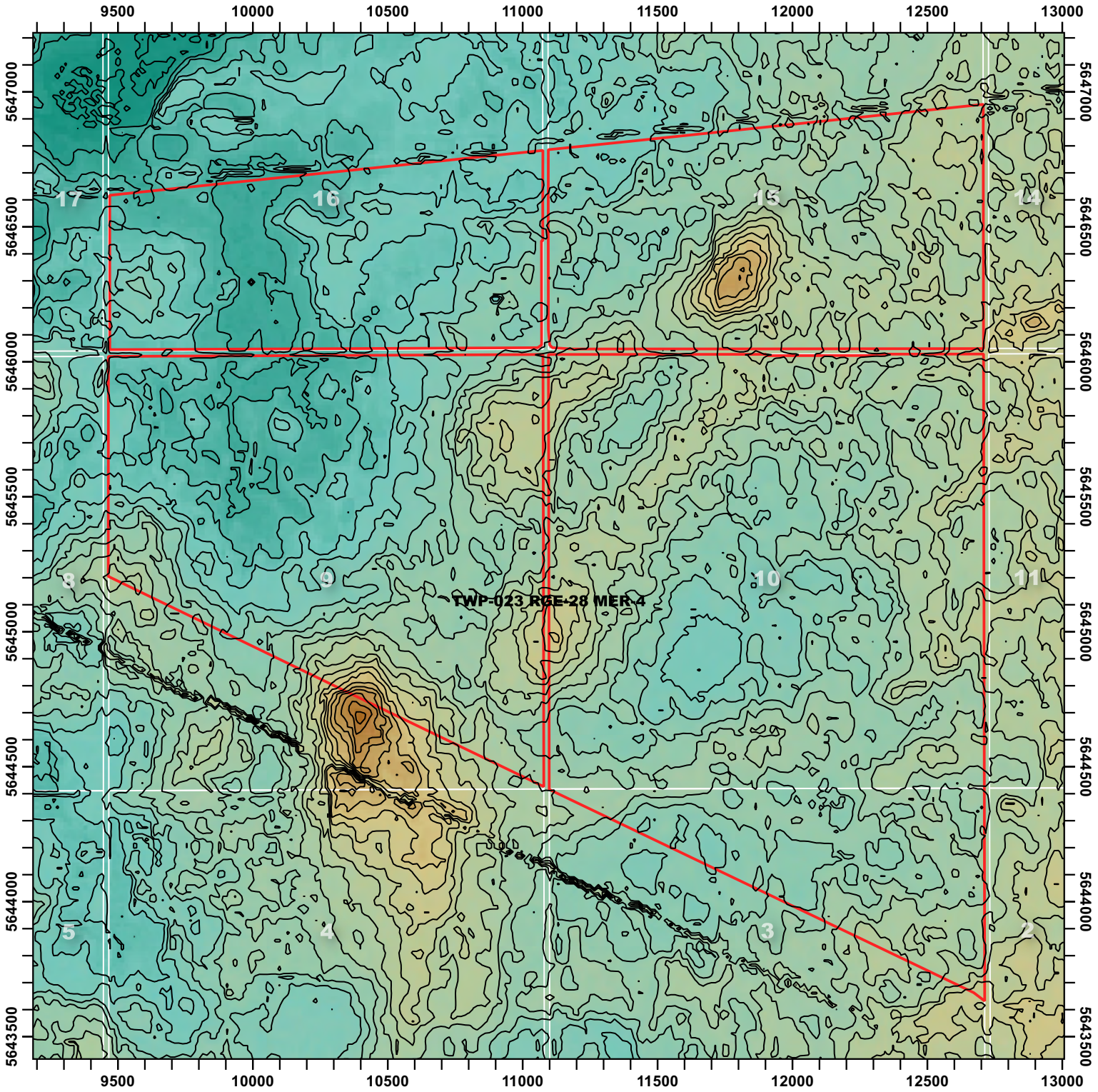
Based on contour lines and DEM (digital elevation model) data, the west side of the project area is sloped to the west and north, with some lower areas in the southeast. Section 10 drains in general to the southeast.

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).

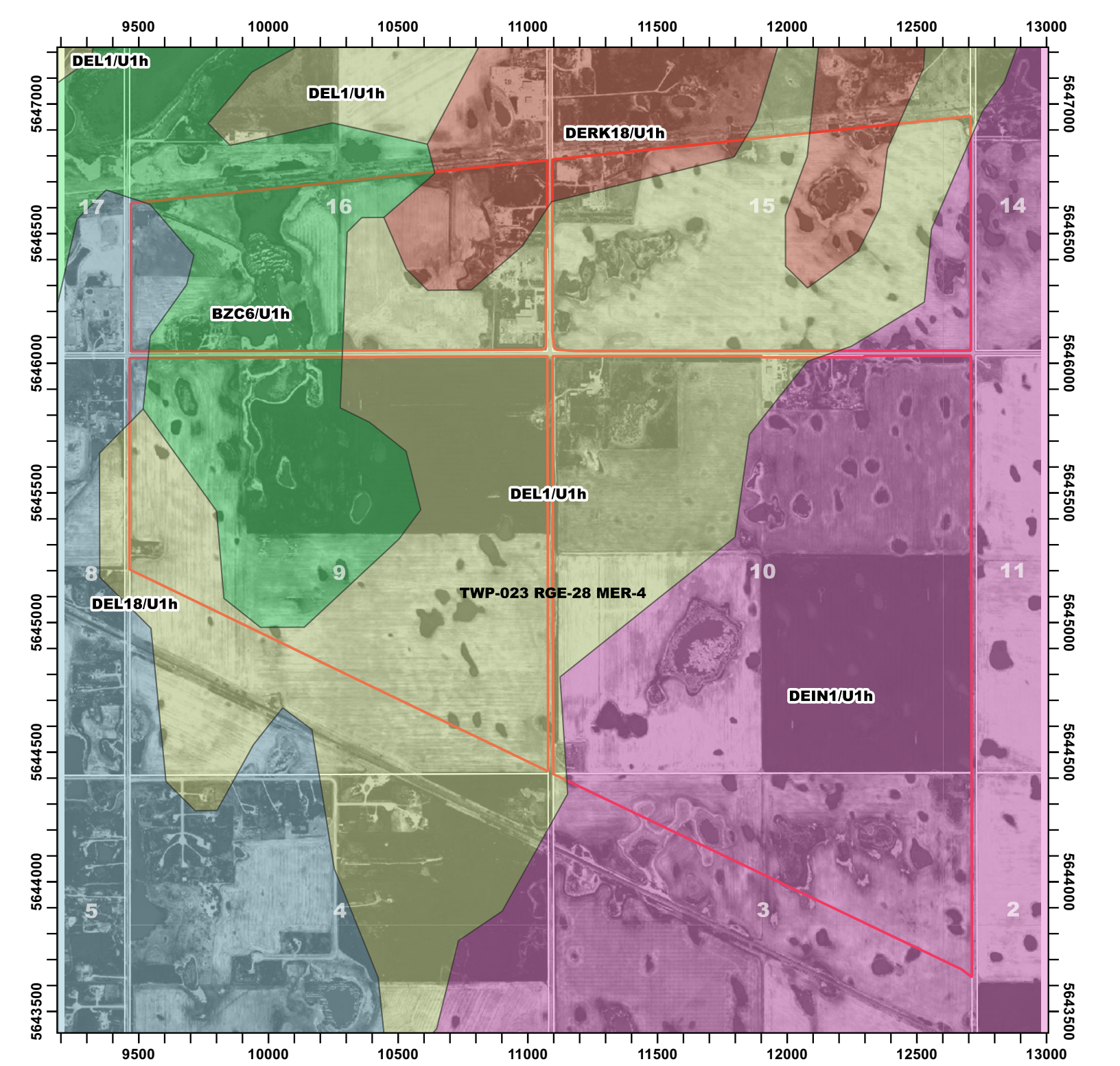
The Rockyview soil series also occurs throughout the project site beneath the Delacour soil series, but in areas that are mid-slope and lower slope areas. The Rockyview soil series is also a well-drained, Orthic Black Chernozem, but it a is strongly calcareous, non-saline, and is medium textured (silt 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 14$^{th}$ and August 28$^{th}$ 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 14$^{th}$. 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.

Respectfully submitted:


Jamie Kalla, M.Sc., P.Biol.
Intermediate Wildlife, Vegetation, & Wetland Biologist and Regulatory Specialist
Tannas Conservation Services Ltd.


Daina Anderson, M.Sc., P.Biol.
Intermediate Vegetation & Wetland Biologist
Tannas Conservation Services Ltd.

Jesse Bird, B.Sc.
Intermediate Environmental Scientist & GIS Specialist
Tannas Conservation Services Ltd.

Reviewed by:


Krista Bird, Ph.D., P.Biol.
Senior Wildlife Biologist & Regulatory Specialist
Tannas Conservation Services Ltd.


Steven Tannas, Ph.D., P.Ag.
Senior Vegetation & Wetland Ecologist and TCS President
Tannas Conservation Services Ltd.

## References

ACIMS (Alberta Conservation Information Management System). 2018. List of Elements in Alberta - Vascular Plants. Alberta Environment and Parks, Edmonton, Alberta. [accessed 2020 Mar 7]. https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/download-data/#trackedWatch.

AESRD. 2015. Alberta Wetland Classification System. Edmonton, AB: Water Policy Branch, Policy and Planning Division.

Alberta Environment and Parks (AEP). 2018. Fisheries and Wildlife Management Information System (FWMIS) Internet Mapping Tool. [accessed 2019 Mar 8]. http://xnet.env.gov.ab.ca/imf/imfAlbertaUserAgreeSubmit.jsp?site=fw_mis_pub.

ANPC. 2012. Guidelines for Rare Vascular Plant Surveys in Alberta 2012 UPDATE. Edmonton, AB: Alberta Native Plant Council. [accessed 2019 Mar 8]. http://www.anpc.ab.ca/content/resources.php%0A.

Bison Historical Services Ltd. 2020. HISTORICAL RESOURCE OVERVIEW Shepard Industrial ASP. Calgary, Alberta.

Bow River Basin Council. 2010. State of the Watershed: Summary Booklet. [accessed 2019 Apr 30]. https://brbc.ab.ca/resources/publications.

Cornell University. 2019. The Cornell Lab of Ornithology, All About Birds. [accessed 2019 Nov 15]. https://www.allaboutbirds.org/.

COSEWIC. 2010. COSEWIC Assessment and Status Report on the Western Blue Flag Iris missouriensis in Canada. Ottawa, Ontario: Committee on the Status of Endangered Wildlife in Canada.

Fenton MM, Water EJ, Pawley SM, Atkinson N, Utting D., McKay K. 2013. Surficial Geology of Alberta. Map 601. Alberta Geological Survey. Alberta Energy Regulator.

Fiera Biological Consulting Ltd. 2014. Environmentally Significant Areas in Alberta: 2014 Update. 51 pp.

Government of Alberta. 1997. Wildlife Act, Wildlife Regulation (A.R. 143/1997). Alberta, Canada: Alberta Queen's Printer. [accessed 2019 Jan 1]. http://www.qp.alberta.ca/documents/Regs/1997_143.pdf.

Government of Alberta. 2000. Wildlife Act (R.S.A. 2000, c.W-10) Current as of February 20, 2018. Alberta, Canada: Alberta Queen's Printer. [accessed 2019 Jan 1]. http://www.qp.alberta.ca/documents/Acts/W10.pdf.

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

Government of Alberta. 2015. Alberta Wetland Identifiction and Delineation Directive. Edmonton, Alberta: Water Policy Branch, Alberta Environment and Parks.

Government of Alberta. 2017a. Alberta Wild Species General Status Listing - 2015. Document current as of March 1, 2017. [accessed 2018 Jul 1]. https://open.alberta.ca/publications/alberta-wild-species-general-status-listing-2015.

Government of Alberta. 2017b. Downloadable Data Sets - Protected Areas (Shapefile). [accessed 2020 Oct 30]. https://www.albertaparks.ca/albertaparksca/library/downloadable-data-sets/.

Government of Alberta. 2019. Wildlife Sensitivity Maps. [accessed 2019 Sep 30]. https://www.alberta.ca/wildlife-sensitivity-maps.aspx.

Government of Alberta. 2020a. Listing of Historic Resources. September 2020. [accessed 2020 Nov 2].

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

Government of Alberta. 2020b. Listing of Historic Resources: Instructions for Use. [accessed 2020 Nov 2]. https://open.alberta.ca/publications/listing-of-historic-resources-instructions-for-use.

Government of Canada. 2017. General nesting periods of migratory birds, updated 2017-05-25. [accessed 2018 Dec 1]. https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html.

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

Government of Canada. 2020. Species at Risk Public Registry. [accessed 2020 Aug 1]. https://species-registry.canada.ca.

Hartman GMD. 2016. Surficial geology of the Calgary-Lethbridge corridor, Alberta (NTS 820, 82P, 82J, 82I, 82G and 82H); Alberta Energy Regulator, AER/AGS Map 579, scale 1:250 000.

IDEA Group Inc. 2020. SHEPARD INDUSTRIAL AREA STRUCTURE PLAN: STORMWATER MANAGEMENT STUDY. ROCKY VIEW COUNTY, ALBERTA.

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

Moran SR. 1986. Surficial Geology of the Calgary Urban Area. Alberta Research Council Bulletin 53. 46 pp.

Natural Regions Committee. 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. T/852. [accessed 2019 Apr 30]. https://www.albertaparks.ca/media/2942026/nrsrcomplete_may_06.pdf.

Prior GJ, Hathway B, Glombick PM, Pana DI, Banks CJ, Hay DC, Schneider CL, Grobe M, Elgr R, Weiss JA. 2013. Bedrock Geology of Alberta. Map 600. Alberta Geological Survey. Alberta Energy Regulator.

Rocky View County. 2013. County Servicing Standards. Approved by Resolution No. 199-13, on May 28, 2013. 260 pp.

Stewart RE, Kantrud HA. 1971. Classification of natural ponds and lakes in the glaciated prairie region. Washington, D.C., U.S.A: Northern Prairie Wildlife Research Center, Division of Wildlife Research. Resour Publ.

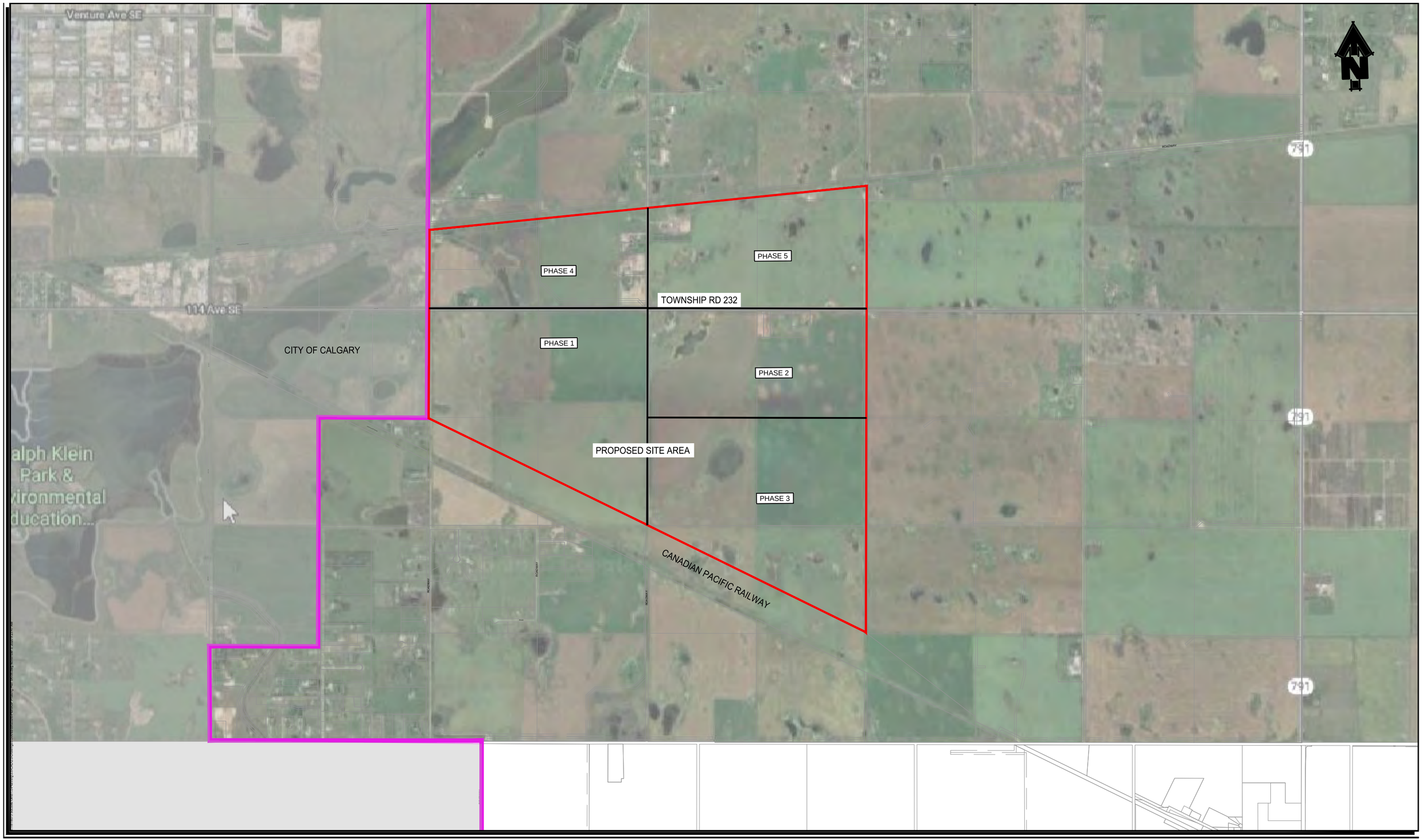
Stewart SA. 2014. Alberta springs compilation (tabular data, tab-delimited format); Alberta Energy Regulator, AER/AGS Digital Dataset 2014-0025. [accessed 2020 Oct 30]. https://ags.aer.ca/publication/dig-2014-0025.

The City of Calgary. 2009. Shepard Industrial Area Structure Plan, amended 2013. Land Use Planning & Policy Division.

The City of Calgary. 2013. South Shepard Area Structure Plan, amended 2019. Land Use Planning & Policy Division.

# 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

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

Drawing

SK-06

# TECHNICAL MEMORANDUM

**DATE** July 29, 2022 **Project No.** 22521541

**TO** Craig Kipkie M.Sc. P.Eng,; Olga Abramovich P. Eng.; Valerie Veenstra P.Biol.
KWL; City of Calgary

**CC** Jennifer Lange P.Biol.

**FROM** Derek Rennie M.Sc. P.Biol. **EMAIL derek.rennie@wsp.com**

**EAST CALGARY REGIONAL DRAINAGE STUDY GRASSLAND AND WETLAND MAPPING**

## INTRODUCTION

This memo documents wetlands and grasslands mapped within the East Calgary Regional Drainage Study (the Study [RFSO No. 19-2039]) prepared for Kerr Wood Leidal Associates Ltd. (KWL) to support their post-development stormwater conceptualization. The scope of this work includes wetland delineation and classification (ESRD 2015; GOA 2015) and grassland delineation and the processing of wetlands through a wetland prioritization matrix (Table 1). The Study area provided by KWL encompasses approximately 2,837 ha spanning across the 22nd and 23rd townships of the 28th range west of the fourth meridian east of Calgary.

## METHODS

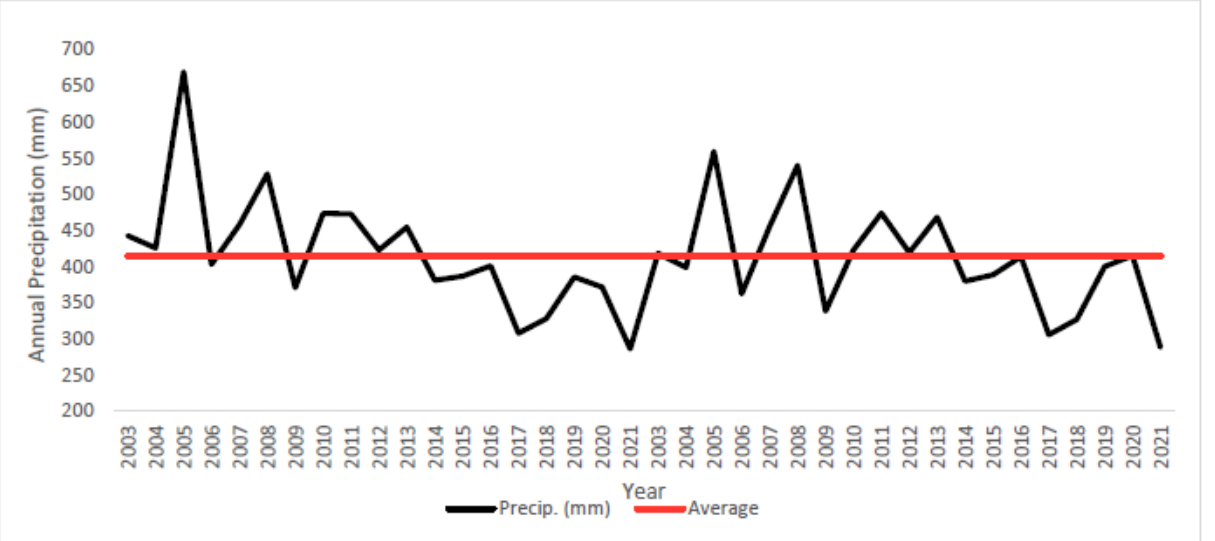
### Catchment Modelling

Catchments were delineated from a 1 m resolution digital elevation model (DEM) (after applying the Fill Spatial Analysis tool) using the Flow Direction and Basin Spatial Analysis tools (ESRI Canada Ltd. 2022). These catchment areas were vectorized into a polygon that was presented along with the wetland and grassland mapping products.

### Wetland Delineation and Classification

Wetlands were delineated from ESRI World Imagery satellite imagery available across the Study area, captured on September 22, 2021, and from orthophotography provided by KWL and captured during the growing seasons of 2018 and 2020. World Imagery was utilized for convenience and coverage of the project area, while the orthophotography years reflect average (2020) and lower (2018) years of precipitation for the City of Calgary region (Figure 1). Wetlands were delineated at 1:5,000 scale in accordance with the Alberta Wetland Delineation Directive and classified using the Alberta Wetland Classification System (ESRD 2015; GOA 2015).

**Figure 1: East Calgary Regional Drainage Study Precipitation for Townships 22 and 23 and Range 28, West of the Fourth Meridian.**




## Grassland Delineation

Putative native grasslands were delineated from the imagery sources described in Section 0 and mapping was informed using Grassland Vegetation Inventory (GVI) and Agriculture and Agri-Food Canada (AAFC) Crop Inventory mapping, where the available imagery was reviewed for evidence of cultivation, haying, or pasture (AAFC 2021, GOA 2019). While all aerial interpreted landcover mapping requires ground truthing, this is particularly true for grassland mapping where the genuine classification and status of any mapped grassland locations are highly contingent on the vegetation species growing in the polygon.

## Wetland Prioritization Matrix

Wetlands in the Study area were processed through a prioritization matrix developed in consultation between KWL, City of Calgary and WSP to highlight wetlands that should be prioritized for retention in future development planning. After wetland delineation and classification, wetlands were processed post-hoc through a wetland prioritization matrix that ascribed an output score for the criteria provided in Table 1 and described below.

### *Wetland Size*

Wetlands were stratified based on size where wetlands smaller than one hectare were given a score of zero, wetlands between one and five hectares were given a score of one and wetlands larger than five hectares were given a score of two. The expectation is that larger wetlands are typically easier to retain in an urban setting and have fewer negative impacts from edge effects than smaller ones and are ascribed a higher prioritization score.

### *Wetland and Adjacent Upland Quality*

Agriculture and Agri-Food Canada produces a remote sensed annual crop inventory that is produced from annual optical and radar-based satellite imagery from 2009 to 2021 (12 years of analysis) (AAFC 2021). Utilizing an additive summary of these annual crop inventory raster datasets, it is possible to establish a cultivation frequency within the wetland boundary and in the 30m upland areas surrounding the delineated wetlands in the Study area.

Wetland quality was stratified based on frequency of cultivation between 2009 and 2021. Wetlands cultivated for more than nine years from 2009 to 2021 were considered as the highest intensity of cultivation and given a score of zero, while wetlands cultivated for less than four years between 2009 to 2021 were considered the most natural and were given a score of two. All remaining wetlands cultivated between these two scores were considered intermittently cultivated and given a score of one. Likewise, 30m buffers of the upland areas surrounding the wetlands in the Study area were assessed using the same scoring methods (i.e., more than nine considered high intensity cultivation and scored zero).

### *Complexity*

The ABWRET-D wetland submission process requires that wetland components are dissolved into an overall wetland complex where component wetlands are documented as attributes for the complex (GOA 2015). A count of the component wetland classes and/or types was summarized for each wetland and utilized as a measure of complexity where more components indicate higher wetland complexity.

Wetland complexes with a singular wetland class and type were considered the simplest and given a score of zero, while wetlands with more than two component classes and/or types were considered the most complex and given a score of two. Wetlands with two component classes and/or types were considered intermediate and given a score of one.

### *Connectivity*

Adjacent wetlands were summarized and ascribed a count of the number of other wetlands within 60m of the boundary. Sixty meters was considered a reasonable search distance to consider two wetlands as having some putative connectivity.

Isolated wetlands were considered to have limited connectivity to other wetlands and were given a score of zero, while intricately connected wetlands with more than two adjacent wetlands were the most connected and given a score of two. Wetlands with two neighboring wetlands within 60m were considered intermediately connected and given a score of one.

### *Crown Claimability*

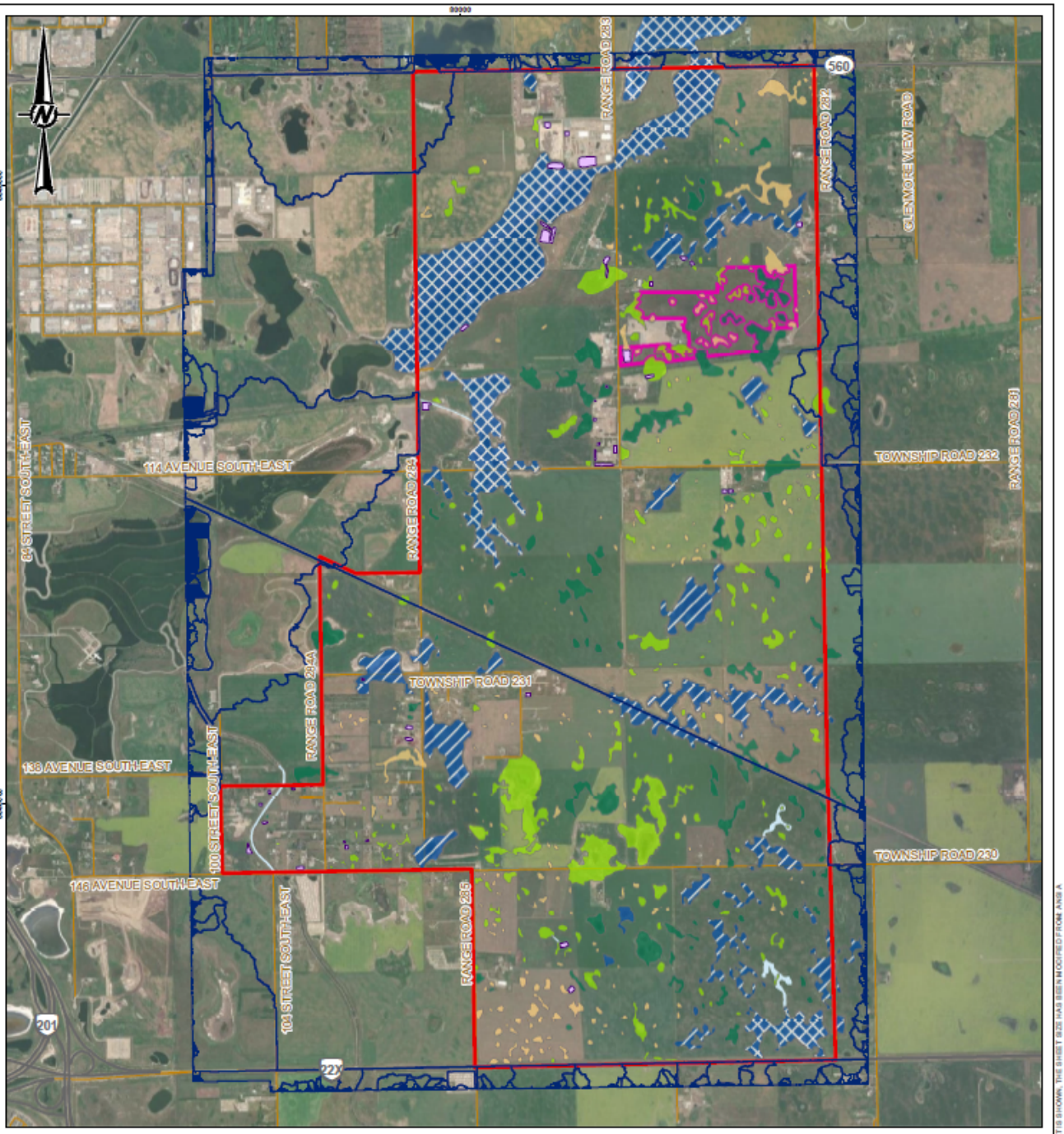
Crown claimable wetlands are wetlands with a defined bed and bank and have higher Alberta regulatory stringency and desktop determined wetland classification and permanence is provided in Figure 2. In practice, wetlands with permanence classes of IV and V (i.e., semi-permanent and permanent, respectively) are considered crown claimable, however, permanence class of III (seasonal) is unlikely to be crown claimable, while the permanence classes of I and II (ephemeral and temporary) will not be crown claimable. All wetlands with any component permanence classes of IV and V were considered crown claimable and were given a score of two, while permanence class III was considered unlikely to be crown claimable and given a score of one. All other wetlands and ephemeral waterbodies were given a score of zero and will not be subject to the Alberta regulatory stringency of crown claimable wetlands.

**Table 1: East Calgary Regional Drainage Study Area Wetland Prioritization Matrix.**

| Category | Low Score (0) | Medium Score (1) | High Score (2) |
|---|---|---|---|
| Wetland size | <1 ha | 1-5 ha | >5 ha |
| Wetland quality | Wetland cultivated 10 or more years in the last 12 | Wetland cultivated in 4 to 9 years in the last 12 | Wetland cultivated in 3 or less years in the last 12 |
| Adjacent (30 m) Upland Quality | Industrial, commercial, residential | Agriculture – cultivated or cropped | Natural or modified habitat (e.g., grassland, pasture, shrubland, tree stand) |
| Complexity of the Wetland | Singular Class and Type | Two Classes and/or Types | >Two Classes and/or Types |
| Connectivity | Isolated wetland | Connected to one other wetland | Connected to more than one other wetland or part of a chain of connected wetlands |
| Potential crown claimed wetland | No | NA | Yes |

### *Cumulative Scoring*

The final output scores from the wetland prioritization matrix were summed and presented as a final wetland prioritization score presented in Figure 3 which highlights wetlands of high prioritization versus wetlands of low or intermediate prioritization. Drainages, anthropogenic and natural waterbodies were not considered in this prioritization scheme and are highlighted in Figure 3 as these features still contribute to the hydrology in the Study area.




**LEGEND**

- PROJECT FOOTPRINT
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- ANTHROPOGENIC WATERBODY (gt 2m)
- CATCHMENT
- PUTATIVE GRASSLAND

**WETLAND CLASS AND PERMANANCE**

- EPHEMERAL WATERBODY (I)
- GRAMINOID MARSH (II)
- GRAMINOID MARSH (III)
- SHALLOW OPEN WATER (III)
- SHALLOW OPEN WATER (IV)
- SHALLOW OPEN WATER (V)

0 1 2

1:45,000 KILOMETRES

**REFERENCE(S)**

ALBERTA DIGITAL BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, ALTALIS LTD.© GOVERNMENT OF ALBERTA 2022. ALL RIGHTS RESERVED. OR IHS MARKIT CANADA ULC. IMAGERY COPYRIGHT © 20210616, 20210722 ESRI AND ITS LICENSORS. SOURCE: MAXAR. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT
CITY OF CALGARY

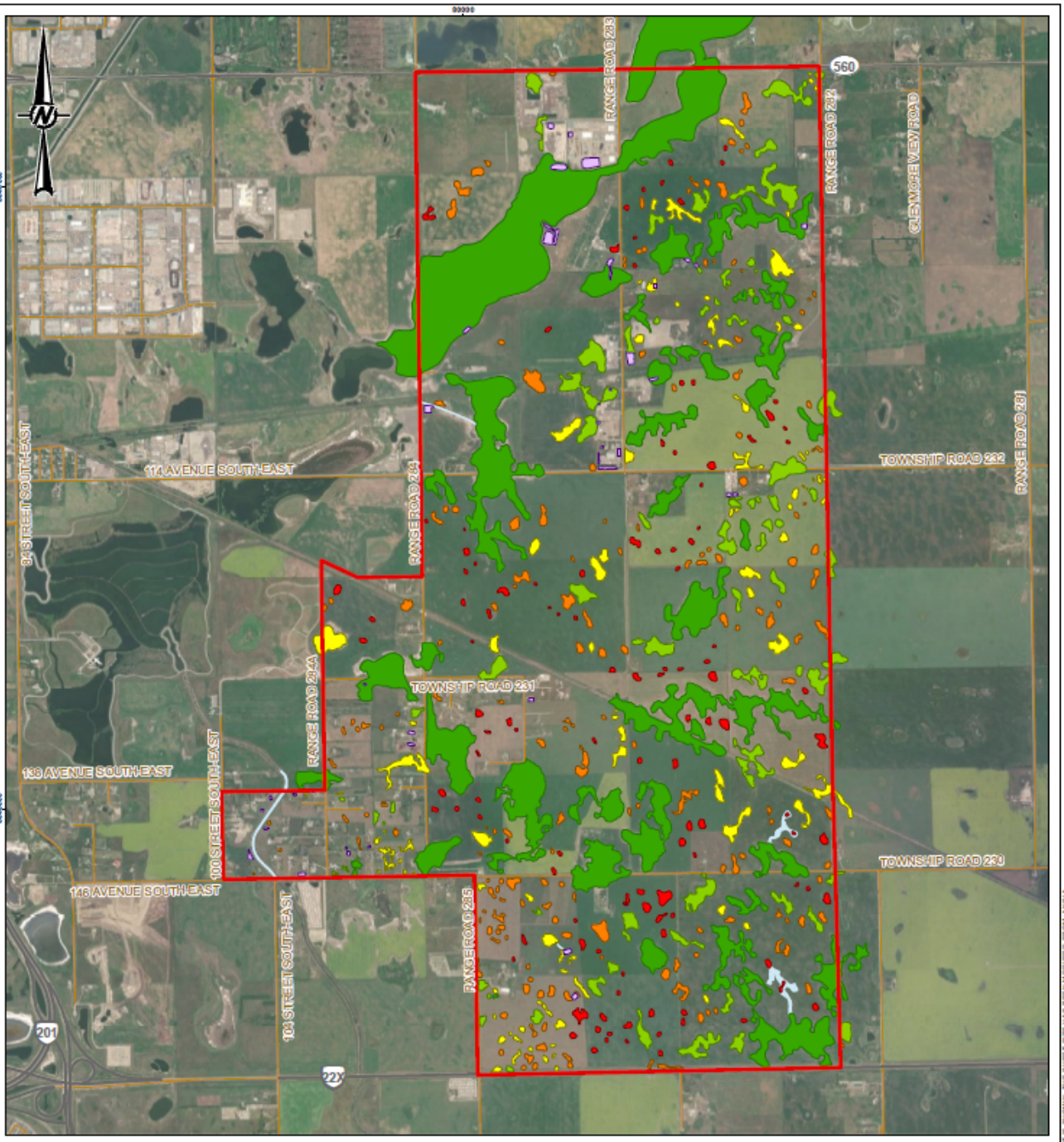
PROJECT
EAST CALGARY REGIONAL DRAINAGE

TITLE
**PROJECT OVERVIEW – WETLAND CLASS AND PERMANANCE**

CONSULTANT
WSP GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-07-28 |
| DESIGNED | DR |
| PREPARED | AL |
| REVIEWED | DR |
| APPROVED | JL |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| 22521541 | 2000 | 0 | 2 |




**LEGEND**

- PROJECT FOOTPRINT
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- ANTHROPOGENIC WATERBODY (gt 2m)

**WETLAND PRIORITIZATION MATRIX SCORE**

- 0 - 1
- 2 - 3
- 4
- 5 - 6
- 7 - 11

0 1 2

1:45,000 KILOMETRES

**REFERENCE(S)**

ALBERTA DIGITAL BASE DATA MAY BE OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED, ALTALIS LTD.© GOVERNMENT OF ALBERTA 2022. ALL RIGHTS RESERVED. OR IHS MARKIT CANADA ULC. IMAGERY COPYRIGHT © 20210616, 20210722 ESRI AND ITS LICENSORS. SOURCE: MAXAR. USED UNDER LICENSE, ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT
CITY OF CALGARY

PROJECT
EAST CALGARY REGIONAL DRAINAGE

TITLE
**PROJECT OVERVIEW – WETLAND PRIORITIZATION MATRIX**

CONSULTANT
WSP GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-07-29 |
| DESIGNED | DR |
| PREPARED | AL |
| REVIEWED | DR |
| APPROVED | JL |

| PROJECT NO. | CONTROL | REV. | FIGURE |
|---|---|---|---|
| 22521541 | 2000 | 0 | 3 |

# RESULTS AND DISCUSSION

Delineation and classification of wetlands and grasslands in the Study area identified 545 unique landcover polygons of which 301 are wetland complexes as presented in Table 2. The Study area was delineated into two distinct catchment areas along the east/west railroad alignment that separates the Study area into a north and south portion (Figure 3). Very few catchments were noted across the north and south annexation areas, likely a function of a flat topography across the Study area, changes to hydrology due to the bisecting railway, changes to hydrology due to road developments and limitations due to the DEM resolution used in the catchment modelling.

Delineated wetland polygons were dissolved into 301 wetland complexes across the Study area with wetland prioritization matrix scores varying from zero to 11 with an average of 5.3 (Table 3). Wetlands in the Study area had high scores for connectivity and complexity, where these two criteria had the highest average prioritization score (1.5 and 1.4; Table 3), of which, shallow open water wetlands had the highest average connectivity and complexity prioritization scores (Table 3). Wetland and upland quality had the lowest average scores (0.6 and 0.4; Table 3), which is understandable given the extent of agricultural activity across the Study area (AAFC 2021). Likewise, ephemeral waterbodies have expected low scores across the prioritization matrix largely in part due to their size, low complexity, isolation and unsuitability for crown claimability (Table 3). A converse trend is observed with higher permanence graminoid marshes and shallow open water, where their inherent size, complexity, connectivity, and permanence naturally trend to higher scores.

Based on the prioritization matrix outcomes, clear areas of high prioritization in the East Calgary Regional Drainage Study area are evident surrounding the large, higher permanence wetland complexes while areas of low prioritization are evident around the smaller, lower permanence ephemeral waterbodies (Figure 3). Wetlands have been decreasing in the province and a particular loss of small and large wetlands have been noted by some researchers (Serran and Creed, 2015, Waz and Creed, 2017). Serran and Creed (2015) have noted a 16.2% historical loss of wetlands that are <0.04ha, while in the Nose Creek watershed (encompassing portions of Calgary), Waz and Creed (2017) identified a temporary loss of 61% of wetlands and a permanent loss of 11% with preferential impacts to large (>0.8ha) and small (<0.3ha) wetlands.

This loss of small and large wetlands has led to a homogenization of wetland sizes on the landscape (Waz and Creed, 2017) with expected impacts to biodiversity and hydrological function (Baulch et al. 2021). Wetland sizes have diversity in the way they interact with groundwater where wetlands involved in groundwater recharge are often ephemerally or seasonally flooded in elevated portions of the landscape and may be over-represented in lower scoring wetlands of our prioritization matrix (Baulch et al. 2021).

The provided wetland prioritization matrix offers a clear framework for triaging impacts on the landscape and the application of this tool should be done so with nuance for the importance of diversity in wetland size and permanence on the landscape (Baulch et al. 2021). Thirty percent of the wetlands in the Study area are seasonal graminoid marshes which have the third lowest prioritization score (4.1, Table 2, Table 3). Nine percent of the wetlands in the study area are shallow open water wetlands and all three permanence classes have the highest scores in the prioritization matrix, ascending from Class III (5.5), Class IV (7.3) to Class V (9.7) (Table 2, Table 3). The high prioritization scores determined for Class III, IV and V wetlands emphasizes the important function of semi-permanent and permanent wetlands in water storage, flood control and wildlife habitat and these classes qualify as environmental reserve for putative development in the Study area (Table 2, Table 3).

**Table 2: East Calgary Regional Drainage Study Area Wetland Summary Statistics**

| Landcover Class | | Permanence | North Annexation Area | South Annexation Area | Both Annexation Areas |
|---|---|---|---|---|---|
| Graminoid Marsh | Graminoid Marsh | II | 93 | 83 | 2 |
| | Graminoid Marsh | III | 49 | 42 | 2 |
| Shallow Open Water | Shallow Open Water | III | - | 2 | - |
| | Shallow Open Water | IV | 9 | 15 | 1 |
| | Shallow Open Water | V | 2 | 1 | - |
| | | *wetlands subtotal* | *153* | *143* | *5* |
| Grassland | Putative Grassland | - | 1 | - | - |
| Non-Wetlands | Ephemeral Waterbody | I | 81 | 116 | - |
| | Waterbody | - | 2 | - | - |
| | Anthropogenic Waterbody | - | 23 | 16 | - |
| | Drainage | - | 1 | 4 | - |
| | | *non-wetlands subtotal* | *108* | *136* | - |
| **Total** | | | **261** | **279** | **5** |

**Table 3: East Calgary Regional Drainage Study Area Wetland Prioritization Matrix Scoring Statistics.**

| Dominant Wetland Class and Type | Wetland Size | | | Wetland Quality | | | Upland Quality | | | Complexity | | | Connectivity | | | Crown Claimability | | | Prioritization Score | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max | Min | Mean | Max |
| Ephemeral Waterbody (I) | 0.0 | <0.1 | 2.0 | 0.0 | 0.5 | 2.0 | 0.0 | 0.5 | 2.0 | 0.0 | <0.1 | 2.0 | 0.0 | 1.2 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | 6.0 |
| Graminoid Marsh II | 0.0 | 0.2 | 2.0 | 0.0 | 0.5 | 2.0 | 0.0 | 0.5 | 2.0 | 0.0 | 0.4 | 2.0 | 0.0 | 1.2 | 2.0 | 0.0 | 0.1 | 1.0 | 0.0 | 2.9 | 9.0 |
| Graminoid Marsh III | 0.0 | 0.4 | 2.0 | 0.0 | 0.3 | 2.0 | 0.0 | 0.3 | 2.0 | 0.0 | 0.9 | 2.0 | 0.0 | 1.2 | 2.0 | 1.0 | 1.0 | 1.0 | 1.0 | 4.1 | 9.0 |
| Shallow Open Water III | 0.0 | 0.5 | 1.0 | 0.0 | 0.5 | 1.0 | 0.0 | 0.0 | 0.0 | 2.0 | 2.0 | 2.0 | 1.0 | 1.5 | 2.0 | 1.0 | 1.0 | 1.0 | 5.0 | 5.5 | 6.0 |
| Shallow Open Water IV | 0.0 | 1.3 | 2.0 | 0.0 | 0.6 | 2.0 | 0.0 | 0.2 | 1.0 | 0.0 | 1.6 | 2.0 | 0.0 | 1.6 | 2.0 | 2.0 | 2.0 | 2.0 | 3.0 | 7.3 | 10.0 |
| Shallow Open Water V | 2.0 | 2.0 | 2.0 | 0.0 | 1.0 | 2.0 | 0.0 | 0.7 | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 8.0 | 9.7 | 11.0 |
| **Average** | **0.3** | **0.9** | **1.8** | **0.0** | **0.6** | **1.8** | **0.0** | **0.4** | **1.3** | **0.7** | **1.4** | **2.0** | **0.5** | **1.5** | **2.0** | **1.0** | **1.0** | **1.2** | **2.8** | **5.3** | **8.5** |

# CERTIFICATION OF WORK

WSP Golder prepared this report solely for the use of the intended recipient, Kerr Wood Leidal Associates Ltd., in accordance with the professional services agreement between the parties. In the event a contract has not been executed, the parties agree that the WSP General Terms for Consultant shall govern their business relationship which was provided to you prior to the preparation of this report.

The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the present report are based on the observations and/or information available to WSP Golder at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by WSP Golder and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

WSP Golder reserves the right to amend or supplement this report based on additional information, documentation or evidence.

WSP Golder makes no other representations whatsoever concerning the legal significance of its findings.

The intended recipient is solely responsible for the disclosure of any information contained in this report. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP Golder does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report.

WSP Golder has provided services to the intended recipient in accordance with the professional services agreement between the parties and in a manner consistent with that degree of care, skill and diligence normally provided by members of the same profession performing the same or comparable services in respect of projects of a similar nature in similar circumstances. It is understood and agreed by WSP Golder and the recipient of this report that WSP provides no warranty, express or implied, of any kind. Without limiting the generality of the foregoing, it is agreed and understood by WSP and the recipient of this report that WSP makes no representation or warranty whatsoever as to the sufficiency of its scope of work for the purpose sought by the recipient of this report.

In preparing this report, WSP has relied in good faith on information provided by others, as noted in the report. WSP has reasonably assumed that the information provided is correct and WSP is not responsible for the accuracy or completeness of such information.

Benchmark and elevations used in this report are primarily to establish relative elevation differences between the specific testing and/or sampling locations and should not be used for other purposes, such as grading, excavating, construction, planning, development, etc.

Design recommendations given in this report are applicable only to the project and areas as described in the text and then only if constructed in accordance with the details stated in this report. The comments made in this report on potential construction issues and possible methods are intended only for the guidance of the designer. The number of testing and/or sampling locations may not be sufficient to determine all the factors that may affect construction methods and costs. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

The original of this digital file will be kept by WSP for a period of not less than 11 years. As the digital file transmitted to the intended recipient is no longer under the control of WSP, its integrity cannot be assured. As such, WSP does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient.

This limitations statement is considered an integral part of this report.

## CLOSURE

We trust the above report is suitable for the purposes of the project. If you have any questions regarding the content of this report, please contact Jennifer Lange at 780-401-8281 or by email at Jennifer.Lange@wsp.com.

**GOLDER ASSOCIATES LTD.**

Derek Rennie M.Sc. P.Biol.
*Ecologist*

Corey De La Mare
*Fellow, Terrestrial Ecologist, P.Biol.*


Jennifer Lange M.Sc. P.Biol.
*Senior Vegetation* Ecologist

Aaron Lai B.Sc. EIT
*GIS Analyst*

DR/JL/CDLM/tt

# REFERENCES

Agriculture and Agri-Food Canada. 2021. Annual Crop Inventory. [accessed June 2021]. https://open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9

Alberta Environment and Sustainable Resource Development (ESRD). 2015. Alberta Wetland Classification System. Water Policy Branch, Policy and Planning Division, Edmonton, AB.

Baulch, H., C. Whitfield, J. Wolfe, N. Basu, A. Bedard-Haughn, K. Belcher, R. Clark, G. Ferguson, M. Hayashi, A. Ireson, P. Lloyd-Smith, P. Loring, J.W. Pomeroy, K. Shook & C. Spence. 2021. Synthesis of science: findings on Canadian Prairie wetland Drainage. Canadian Water Resources Journal.

Serran, J.N. & I.F. Creed. 2015. New mapping techniques to estimate the preferential loss of small wetlands on prairie landscapes. Hydrological Processes.

Government of Alberta (GOA). 2015. Alberta Wetland Identification and Delineation Directive. Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta.

GOA. 2019. Grassland Vegetation Inventory (GVI). Accessed June 2021. https://geodiscover.alberta.ca/geoportal/rest/metadata/item/9dea946a24314ca399b89723fcd857fc/html

Waz, A., I.F. Creed. 2017. Automated Techniques to identify Lost and Restorable Wetlands in the Prairie Pothole Region. Wetlands. 37:107-1091.

# Appendix C Background Searches

# Appendix D Wetland Table

# Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

## Species Summary Report

**Report Date:** 15-Jan-2024 09:36

### Species present within the current extent

| Fish Inventory | Wildlife Inventory | Stocked Inventory |
|---|---|---|
| No Species Found in Search Extent | BADGER | No Species Found in Search Extent |
| | BARN SWALLOW | |
| | BARRED OWL | |
| | BLACK SWIFT | |
| | BLACK TERN | |
| | BLACK-CROWNED NIGHT-HERON | |
| | BLACK-NECKED STILT | |
| | CANADIAN TOAD | |
| | COMMON YELLOWTHROAT | |
| | EARED GREBE | |
| | EASTERN KINGBIRD | |
| | FORSTER'S TERN | |
| | GRASSHOPPER SPARROW | |
| | GREAT BLUE HERON | |
| | HORNED GREBE | |
| | PIED-BILLED GREBE | |
| | SHORT-EARED OWL | |
| | SORA | |
| | WESTERN GREBE | |
| | WHITE-FACED IBIS | |

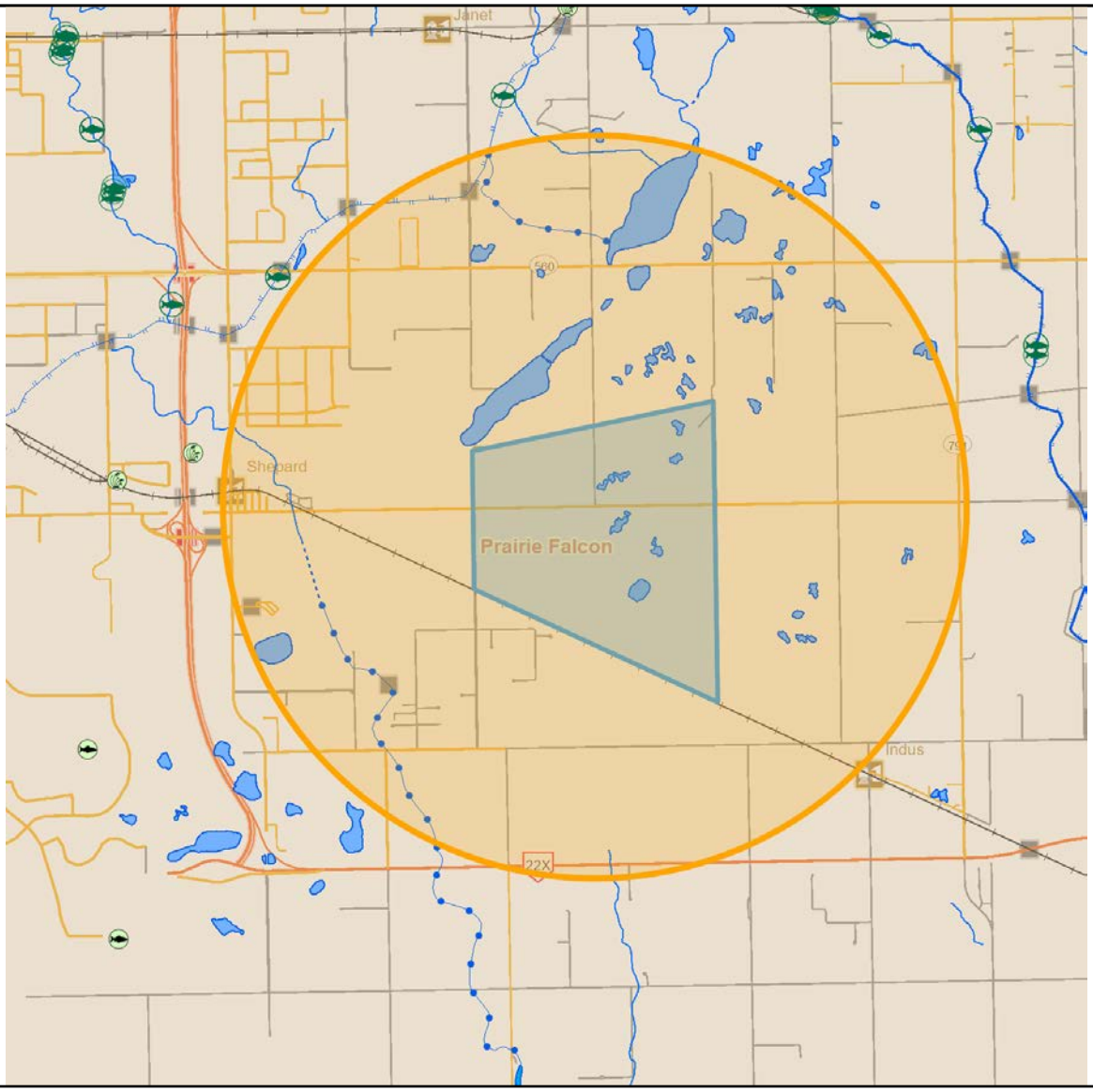
### Buffer Extent

| Centroid (X,Y) | Projection | Centroid (Qtr Sec Twp Rng Mer) | Radius or Dimensions |
|---|---|---|---|
| 581290, 5642702 | 10-TM AEP Forest | SW 15 23 28 4 | 5 kilometers |

### Contact Information

For contact information, please visit:
https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx

15-Jan-2024 09:36 **Map Results**



## ES Addendum Identified Wetlands

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 1 | WAIV | 26.65 | Yes |
| 2 | EW | 0.16 | - |
| 3 | MGII | 0.13 | - |
| 4 | MGIV | 2.74 | Yes |
| 5 | EW | 0.05 | - |
| 6 | EW | 0.03 | - |
| 7 | MGII | 0.04 | - |
| 8 | MGII | 0.18 | - |
| 9 | MGIII | 0.67 | - |
| 10 | MGIII | 0.67 | - |
| 11 | MGII | 0.11 | - |
| 12 | MGIII | 0.17 | - |
| 13 | MGIII | 17.69 | - |
| 14 | MGIII | 2.39 | - |
| 15 | MGII | 0.07 | - |
| 16 | EW | 0.02 | - |
| 17 | MGIII | 0.46 | - |
| 18 | MGIII | 0.25 | - |
| 19 | EW | 0.03 | - |
| 20 | MGIII | 0.62 | - |
| 21 | EW | 0.06 | - |
| 22 | MGII | 0.24 | - |
| 23 | MGIV | 10.06 | Yes |
| 24 | MGII | 0.11 | - |
| 25 | MGII | 0.11 | - |
| 26 | MGII | 0.22 | - |
| 27 | MGIV | 2.10 | Yes |
| 28 | MGIII | 0.24 | - |
| 29 | MGIII | 0.84 | - |
| 30 | MGIII | 0.60 | - |
| 31 | MGIII | 0.33 | - |
| 32 | MGIII | 0.04 | - |
| 33 | MGIV | 1.13 | Yes |
| 34 | MGII | 0.20 | - |
| 35 | EW | 0.05 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 36 | MGIII | 0.23 | - |
| 37 | MGIII | 0.14 | - |
| 38 | MGIII | 0.14 | - |
| 39 | MGIII | 0.26 | - |
| 40 | MGII | 0.13 | - |
| 41 | MGIII | 0.37 | - |
| 42 | EW | 0.06 | - |
| 43 | EW | 0.01 | - |
| 44 | MGII | 0.02 | - |
| 45 | MGIII | 0.69 | - |
| 46 | MGII | 0.04 | - |
| 47 | MGII | 1.32 | - |
| 48 | MGIII | 0.80 | - |
| 49 | MGIII | 0.24 | - |
| 50 | MGIII | 0.67 | - |
| 51 | MGII | 0.09 | - |
| 52 | MGIII | 0.80 | - |
| 53 | EW | 0.05 | - |
| 54 | MGIII | 0.66 | - |
| 55 | EW | 0.07 | - |
| 56 | EW | 0.11 | - |
| 57 | EW | 0.07 | - |
| 58 | EW | 0.06 | - |
| 59 | EW | 0.04 | - |
| 60 | MGIII | 0.21 | - |
| 61 | MGII | 0.03 | - |
| 62 | MGIII | 0.26 | Yes |
| 63 | MGII | 0.37 | - |
| 64 | MGIII | 0.44 | Yes |
| 65 | MGIII | 1.62 | Yes |
| 66 | MGII | 0.09 | - |
| 67 | MGII | 0.61 | - |
| 68 | MGIII | 1.27 | - |
| 69 | MGII | 0.64 | - |
| 70 | MGIII | 0.93 | - |
| 71 | EW | 0.05 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 72 | MGII | 0.12 | - |
| 73 | EW | 0.15 | - |
| 74 | MGIII | 2.25 | - |
| 75 | MGII | 0.04 | - |
| 76 | MGIII | 0.23 | - |
| 77 | EW | 0.04 | - |
| 78 | MGIII | 0.10 | - |
| 79 | MGIII | 0.47 | - |
| 80 | MGIII | 6.56 | - |
| 81 | MGII | 0.11 | - |
| 82 | MGIII | 0.41 | - |
| 83 | EW | 0.06 | - |
| 84 | MGIII | 0.19 | - |
| 85 | MGII | 0.54 | - |
| 86 | MGII | 0.07 | - |
| 87 | MGIII | 3.95 | - |
| 88 | MGIII | 8.86 | Yes |
| 89 | EW | 0.08 | - |
| 90 | EW | 0.04 | - |
| 91 | MGIII | 0.36 | - |
| 92 | MGIV | 4.73 | Yes |
| 93 | MGII | 0.62 | - |
| 94 | EW | 0.09 | - |
| 95 | MGII | 0.28 | - |
| 96 | EW | 0.04 | - |
| 97 | EW | 0.06 | - |
| 98 | EW | 0.06 | - |
| 99 | EW | 0.05 | - |
| 100 | EW | 0.06 | - |
| 101 | EW | 0.09 | - |
| 102 | EW | 0.13 | - |
| 103 | EW | 0.08 | - |
| 104 | EW | 0.07 | - |
| 105 | EW | 0.39 | - |
| 106 | MGIII | 0.48 | - |
| 107 | MGIII | 2.29 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 108 | EW | 0.07 | - |
| 109 | MGII | 0.63 | - |
| 110 | MGIII | 0.41 | - |
| 111 | MGII | 0.53 | - |
| 112 | MGII | 0.55 | - |
| 113 | MGII | 0.56 | - |
| 114 | MGII | 0.48 | - |
| 115 | MGII | 0.42 | - |
| 116 | MGIII | 0.68 | - |
| 117 | MGII | 0.35 | - |
| 118 | EW | 0.23 | - |
| 119 | MGIII | 0.07 | - |
| 120 | EW | 0.09 | - |
| 121 | EW | 0.11 | - |
| 122 | MGIII | 0.50 | - |
| 123 | EW | 0.34 | - |
| 124 | EW | 1.58 | - |
| 125 | MGII | 0.62 | - |
| 126 | MGII | 0.17 | - |
| 127 | MGII | 0.37 | - |
| 128 | MGII | 0.60 | - |
| 129 | MGII | 0.54 | - |
| 130 | EW | 0.07 | - |
| 131 | EW | 0.09 | - |
| 132 | EW | 0.11 | - |
| 133 | EW | 0.12 | - |
| 134 | EW | 0.23 | - |
| 135 | EW | 0.04 | - |
| 136 | EW | 0.02 | - |
| 137 | MGII | 0.13 | - |
| 138 | MGIII | 1.51 | - |
| 139 | MGIII | 0.32 | - |
| 140 | MGIII | 0.12 | - |
| 141 | MGII | 0.19 | - |
| 142 | MGII | 0.74 | - |
| 143 | MGII | 0.15 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 144 | EW | 0.04 | - |
| 145 | EW | 0.05 | - |
| 146 | MGIII | 0.14 | - |
| 149 | MGII | 0.16 | - |
| 150 | MGIV | 1.55 | Yes |
| 151 | MGII | 0.13 | - |
| 152 | MGII | 0.05 | - |
| 153 | MGII | 0.12 | - |
| 154 | MGIV | 10.40 | Yes |
| 155 | MGII | 0.06 | - |
| 156 | MGII | 0.06 | - |
| 157 | MGIII | 0.27 | - |
| 158 | MGII | 0.05 | - |
| 159 | MGII | 0.02 | - |
| 160 | MGII | 0.04 | - |
| 161 | MGIII | 0.46 | - |
| 162 | MGII | 0.10 | - |
| 163 | MGII | 0.62 | - |
| 164 | MGII | 0.30 | - |
| 165 | MGIII | 1.47 | - |
| 166 | MGIII | 0.75 | - |
| 167 | MGII | 0.23 | - |
| 168 | MGII | 0.32 | - |
| 169 | MGII | 0.61 | - |
| 170 | EW | 0.17 | - |
| 171 | EW | 0.19 | - |
| 172 | MGII | 2.93 | - |
| 173 | EW | 0.08 | - |
| 174 | EW | 0.81 | - |
| 175 | EW | 0.13 | - |
| 176 | EW | 0.06 | - |
| 177 | EW | 0.05 | - |
| 178 | MGIII | 0.22 | - |
| 179 | MGIV | 17.68 | Yes |
| 180 | MGIII | 1.66 | - |
| 181 | MGII | 0.68 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 182 | EW | 0.18 | - |
| 183 | EW | 0.04 | - |
| 184 | EW | 0.10 | - |
| 185 | EW | 0.19 | - |
| 186 | EW | 0.05 | - |
| 187 | EW | 0.04 | - |
| 188 | EW | 0.02 | - |
| 189 | MGII | 0.27 | - |
| 190 | MGIV | 3.90 | Yes |
| 191 | MGIII | 0.95 | - |
| 192 | MGII | 0.89 | - |
| 193 | MGII | 0.28 | - |
| 194 | MGIII | 0.87 | - |
| 195 | MGIII | 0.54 | - |
| 196 | MGII | 0.20 | - |
| 198 | EW | 0.06 | - |
| 199 | EW | 0.05 | - |
| 200 | MGII | 0.13 | - |
| 201 | MGII | 0.29 | - |
| 202 | MGIV | 12.19 | Yes |
| 203 | MGIII | 1.11 | - |
| 204 | MGIV | 3.38 | Yes |
| 205 | MGIV | 1.96 | Yes |
| 206 | MGIII | 0.71 | - |
| 207 | MGIII | 0.53 | - |
| 208 | MGIII | 0.92 | - |
| 209 | MGIII | 2.03 | - |
| 210 | MGIII | 0.50 | - |
| 211 | EW | 0.10 | - |
| 212 | EW | 0.07 | - |
| 213 | EW | 0.08 | - |
| 214 | EW | 0.16 | - |
| 215 | EW | 0.08 | - |
| 216 | EW | 0.07 | - |
| 217 | EW | 0.03 | - |
| 218 | EW | 0.08 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 219 | EW | 0.06 | - |
| 220 | EW | 0.03 | - |
| 221 | EW | 0.10 | - |
| 222 | EW | 0.05 | - |
| 223 | EW | 0.01 | - |
| 224 | EW | 0.18 | - |
| 225 | EW | 0.02 | - |
| 226 | EW | 0.05 | - |
| 227 | EW | 0.03 | - |
| 228 | EW | 0.02 | - |
| 229 | EW | 0.03 | - |
| 230 | EW | 0.03 | - |
| 231 | EW | 0.08 | - |
| 232 | EW | 0.08 | - |
| 233 | EW | 0.08 | - |
| 234 | EW | 0.16 | - |
| 235 | EW | 0.13 | - |
| 236 | EW | 0.85 | - |
| 237 | EW | 0.06 | - |
| 238 | EW | 0.04 | - |
| 239 | EW | 0.04 | - |
| 240 | EW | 0.03 | - |
| 241 | EW | 0.02 | - |
| 242 | EW | 0.07 | - |
| 243 | MGIII | 0.95 | - |
| 244 | MGIII | 0.40 | - |
| 245 | MGIII | 0.28 | - |
| 246 | MGIII | 0.30 | - |
| 248 | MGIII | 0.37 | - |
| 249 | MGII | 0.19 | - |
| 250 | MGIII | 0.65 | - |
| 251 | MGIII | 0.45 | - |
| 252 | MGII | 0.30 | - |
| 253 | MGII | 0.22 | - |
| 254 | MGIII | 1.23 | - |
| 255 | MGII | 0.17 | - |

| Wetland ID | Wetland Classification | Area (Ha) | Potential To be Crown Claimed |
|---|---|---|---|
| 256 | EW | 0.03 | - |
| 257 | EW | 0.20 | - |
| 258 | EW | 0.02 | - |
| 259 | EW | 0.13 | - |
| 260 | MGII | 0.23 | - |

Notes:

MG – graminoid marsh

W(A) – shallow open water

II – temporary

III – seasonal

IV – semi-permanent

V – permanent

– No potential to be Crown claimed

Tannas (2021) does not present information on wetland classification, as such it is not confirmed if there are wetlands deemed Crown claimable under Section 3 of the *Public Lands Act* (Alberta Environment and Parks [AEP] 2016)