Lincoln Ranch Biophysical Assessment
NW ¼ 14-041-28 W4M, Lacombe County, Alberta

Prepared for:
Riser Developments Ltd.

Prepared by:
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Sign-off Sheet

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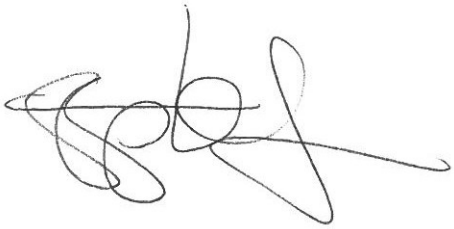

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1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was retained by Riser Developments Ltd. to conduct a biophysical assessment for Lincoln Ranch, a residential development and Golf Course proposed near Gull Lake, in Lacombe County, Alberta (Appendix A, Figure 1, Study Area). The Study Area is located within the NW ¼ 14-041-28 W4M, east of Range Road 282, south of Township Road 414, west of Highway 792, and north of Township Road 412.

1.1 BIOPHYSICAL ASSESSMENT SCOPE AND PURPOSE

Lacombe County generally restricts multi-lot development to areas that have been designated for such use in an area structure plan or other plan, which has been initiated and approved by County Council. The *Gull Lake Intermunicipal Development Plan* (Williams Engineering Canada Inc. 2010) was adopted in 2010 to guide future growth and development within the area of Gull Lake (including the Study Area). This biophysical assessment was prepared to support the Outline Plan for the proposed Lincoln Ranch development using the terms of reference in *Multi-Lot Development Proposals: Lacombe County's Guide to the Approval Process* (Lacombe County 2015). This document is intended to identify and evaluate natural features within the Study Area and to provide input for future planning of the area. As per the guide, this assessment includes a desktop review of the physical and biological conditions of the site as well as reconnaissance level field assessments to identify vegetation communities, wetlands, incidental wildlife observations and key wildlife habitat features and 'hot spots'. Recommendations for conservation of natural features are provided as well as best management practices for mitigating impacts to key ecological components.

1.2 CURRENT LAND USE AND PROPOSED PROJECT

The Study Area is approximately 64.4 hectares (ha) and current land use includes wetlands, pasture for livestock, agricultural land, and associated agricultural buildings. A rural residence and additional agricultural buildings are immediately adjacent to the Study Area in the west, within the NW ¼ 14-041-28 W4M. Additional rural residences and agricultural land lie to the north, east, and south. Gull Lake and Range Road 282 border the west side of the Study Area. Range Road 282 is a rural gravel road with drainage ditches on either side.

The Study Area will be developed in accordance with the *Lincoln Ranch Outline Plan* (Stantec 2016) as residential land focused on surrounding the proposed Lincoln Ranch Golf Course. It is anticipated that development in the Study Area will be low to high density residential lots with open space that will accommodate the golf course and three recreational park areas.

As specified by the *Lincoln Ranch Outline Plan* (Stantec 2016), stormwater runoff will be collected via overland drainage from the proposed development and surrounding properties,

and then conveyed to five stormwater management facilities (SWMF). The SWMFs will be positioned throughout the Study Area. All SWMFs will be constructed as wet ponds in accordance with the *Lacombe County Standards Manual* (Lacombe County 2011). Stormwater will be released at a controlled rate of 10.5 L/s/ha into two existing culverts that cross Range Road 282 (Stantec 2014) which drain into Gull Lake. Stormwater soakways, ponds, and the wet ponds will treat phosphorus and coliform inflows (Stantec 2016). Wetland vegetation around the wet ponds will further promote the uptake and neutralization of pollutants found in stormwater runoff (Stantec 2014). The proposed stormwater management facilities and ditches will meet Alberta Environment and Parks (AEP) requirements for removal of 85% of Total Suspended Solids (TSS) for particles greater than or equal to 75 microns in diameter (Stantec 2014).

2.0 REGULATORY CONTEXT

The protection, management, and development of the lands encompassed in the Study Area are subject to various municipal, provincial, and federal legislation, regulations, and policies. These are listed below and are intended to provide a summary of the most relevant regulatory documents, but should not be considered exhaustive.

Municipal

- Multi-Lot Development Proposals: Lacombe County's Guide to the Approval Process (Lacombe County 2015)

Provincial

- *Environmental Protection and Enhancement Act* (R. S. A. 2000, c. E-12)
- *Municipal Government Act* (R. S. A. 2000, c. M-26)
- *Public Lands Act* (R. S. A. 2000, c. P-40)
- *Water Act* (R. S. A. 2000, c. W-3)
- *Weed Control Act* (S. A. 2008, c. W-5.1)
- Weed Control Regulations (Alta. Reg. 19/2010)
- *Wildlife Act* (R. S. A. 2000, c. W-10)

Federal

- *Fisheries Act* (R. S. C. 1985, c. F-14)
- *Migratory Birds Convention Act, 1994* (S. C. 1994, c. 22)
- Migratory Birds Regulations (C. R. C. , c. 1035)

3.0 METHODS

The intent of this biophysical assessment is the identification and evaluation of natural features within the Study Area that should be considered for conservation during future development planning. To identify such areas, a desktop review and field assessment were conducted to identify and map natural features in the Study Area, as well as to identify areas of potential management concern. Data collected was then used to evaluate natural features using an ecological integrity analysis that determines the network component status of each natural feature, its ecological connectivity, and its ecological value.

Methods used in the desktop review, field assessment, and ecological integrity analysis are provided below.

3.1 DESKTOP REVIEW

The desktop review included a review of available and relevant biophysical information, a search of select provincial databases for species of management concern, and a review of historical aerial photographs. Methods used in the desktop review are summarized below.

3.1.1 Biophysical Environment

The biophysical components of the Study Area that were reviewed included:

- Vegetation
- Wildlife
- Climate
- Topography
- Geology
- Soils
- Hydrology and Hydrogeology

Information sources that were reviewed included publicly available databases and reports relevant to the biophysical components, as well as previous reports completed for the Study Area, including the reconnaissance assessment of the property completed by Management and Solutions in Environmental Sciences (2014).

A search of the Alberta Conservation Information Management System (ACIMS) tracking and watch lists (AEP 2015b) was completed to identify known rare plant species and rare ecological community types potentially occurring in the Study Area.

A search for occurrences of wildlife species of management concern within two km of the Study Area was completed through the Fish and Wildlife Information System (FWMIS) database (AEP 2016). A two km radius was used to capture species with larger home ranges (i.e. ungulates,

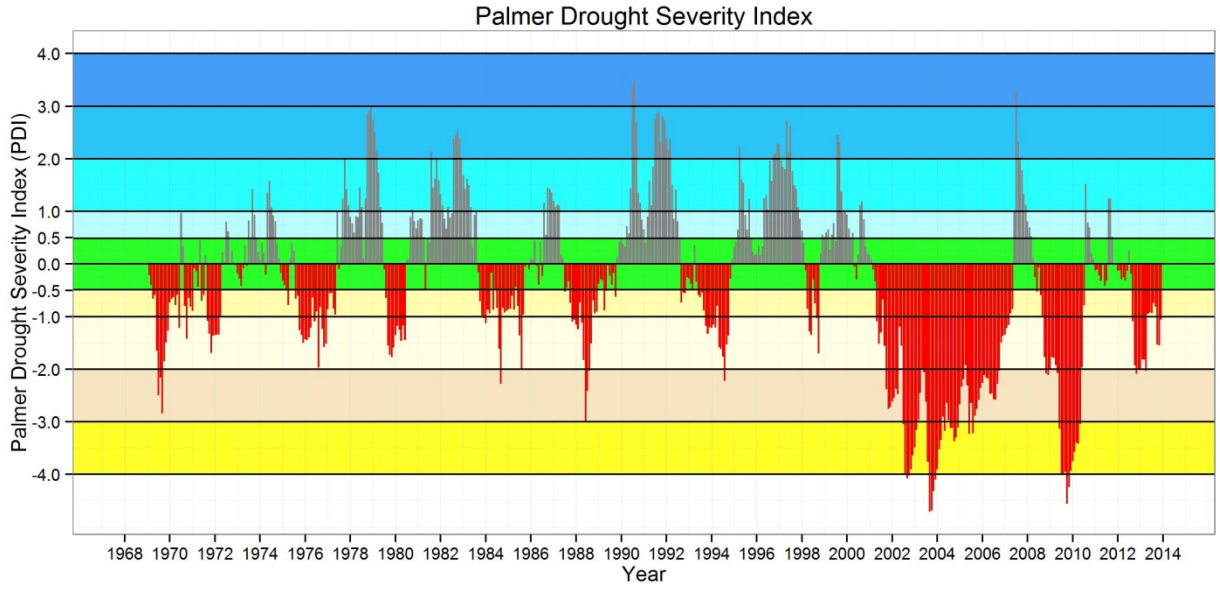
raptors) that may be present in adjacent areas and whose ranges may overlap with the Study Area. Species of management concern were summarized and referenced to provincial and federal ranking.

3.1.2 Historical Aerial Photograph Review

Select air photos dating from 1949 to 2013 (Table 3-1) were reviewed to identify anthropogenic activities and changes to identified natural features within the Study Area over time. All aerial photographs were chosen based on the Palmer Drought Severity Index (PDSI), which is calculated using precipitation, evapotranspiration, and soil storage and loss data from current and previous months (Palmer 1965). The PDSI is depicted as a graph that illustrates wet, average, and dry precipitation years (Graph 3-1). Aerial photographs that correspond to wet, average, and dry intervals were targeted, but mainly average and dry years were available from AEP. Photos from 1949 to 2009 were obtained from AEP Air Photo Distribution Office. The 2013 aerial photograph was obtained from USGS. The aerial photographs reviewed can be found in Appendix B.

Table 3-1 Historical Aerial Photograph Details

Date Taken	Roll, Line, and Photo Number	Scale of Photograph	Color or Black and White	Palmer Drought Index Conditions
September 22, 1949	AS-0150, Line 5209, Photo 166	1:40,000	B/W Super.	-
September 11, 1975	AS 1440, Line 7, Photo 68	1:31,680	B/W Pan-2405	Mild Drought
July 25, 1987	AS 3611, Line 26, Photo 16	1:30,000	B/W Pan-2405	Near Normal
June 4, 1993	AS 4431, Line 29, Photo 46	1:30,000	B/W PAN	Mild Drought
May 13, 1998	AS 4971, Line 26, Photo 132	1:30,000	B/W Agfa-50	Mild Drought
July 21, 2009	AS 5473B, Line 2E, Photo 46	1:20,000	B/W Kodak-2405	Severe Drought
October, 2013	N/A	N/A	Color	Mild Drought



Graph 3-1 Palmer Drought Severity Index

3.2 FIELD ASSESSMENT

The field assessment included preliminary mapping of potential upland and wetland features, a site visit to complete an upland characterization survey, a wetland survey, record incidental wildlife observations, and subsequent refinement of the preliminary mapping based on data obtained during the site visit. Methods used in the field assessment are provided below.

3.2.1 Preliminary Mapping

Prior to beginning the field assessment, the selected historical aerial photographs were reviewed for the presence of upland and wetland features within the Study Area. Any upland areas within the Study Area were identified, mapped, and classified in accordance with *A Preliminary Classification of Plant Communities in the Central Parkland Natural Sub-Region of Alberta* (Wheatley and Bentz 2002). Potential wetland features within the Study Area were identified and mapped following the *Alberta Wetland Identification and Delineation Directive* (AEP 2015a). Boundaries were drawn for each wet feature and an estimated wetland class (if applicable) was assigned using the *Alberta Wetland Classification System* (AWCS) (ESRD 2015).

3.2.2 Upland Vegetation Community Assessment

Once preliminary mapping was completed, an upland characterization survey of the Study Area was completed by two ecologists on May 30, 2016 to identify and describe upland plant communities.

The upland characterization survey confirmed the mapped boundaries and the classification of upland plant communities identified within the Study Area. The upland characterization survey was also conducted to note sensitive environmental conditions pertaining to upland vegetation, as well as allow for the development of appropriate mitigation, conservation, and natural feature management recommendations, as required.

During the upland characterization survey, information on plant species and ecological communities of management concern, if present, were collected. Species and communities of management concern include:

- Uncommon communities and/or those sensitive to watershed disturbance (i.e. old growth forest, wetlands) identified from upland ecosite phase and wetland class mapping
- Rare plants and rare ecological communities
- *Noxious* and *prohibited noxious* weeds (*Weed Control Act* [S. A. 2008, c. W-5.1])

Vegetation data gathered within the Study Area during the upland characterization survey included percent cover of characteristic tree, shrub, and herbaceous species. Additionally, general site information was recorded, including soil moisture regime, slope, aspect, slope position, structural stage, and overall stand health. At each survey site Global Positioning System (GPS) coordinates were recorded and representative site photos were taken. Notes on ecological communities or conditions that may require special consideration, if present, were also made.

A comprehensive species list was compiled from survey data, which was then referenced to the ACIMS tracking and watch lists (AEP 2015b) and *Species at Risk Act* (*SA*RA) (S. C. 2002, c. 29) to verify that all plants considered to be of management concern were identified. Species nomenclature within the comprehensive species list follows the Integrated Taxonomic Information System (2016) for scientific plant species names while common names conform to ACIMS (AEP 2015b).

3.2.3 Wetland Survey

A wetland survey was completed by two ecologists on May 30, 2016 in conjunction with the upland characterization survey. The wetland survey was conducted to delineate and classify wetlands within the Study Area. Guided by the preliminary mapping, the soils, hydrology, and vegetation of potential wetlands within the Study Area were investigated to confirm that the identified areas were in fact wetlands and to confirm wetland classification according to the AWCS (ESRD 2015).

Methods
April 2017

The following methods were used for the wetland survey:

Soils

- Using a shovel or hand auger, soils were examined to a depth of 29 centimeters (cm), which is the active rooting zone, in the outermost community of each potential wetland
- The depth, texture, color, structure, and abundance of redox features (i.e. gleying and mottles) in each soil horizon were recorded. Redox features in the upper soil profile develop under conditions of inundation or saturation over a long period of time and are therefore used to determine the extent of each wetland. The area was considered a wetland if redox features were observed within the top 29 cm and plant species characteristic of wet conditions were also observed

Hydrology

- Wetland hydrology indicators were assessed qualitatively by:
  - observing whether surface water was present at the site
  - looking for evidence of recent saturation or ponding
  - observing the topography of the site, including any landscape features that would lead to water accumulation
- Evidence of these features includes watermarks on woody vegetation or anthropogenic features, sediment or drift deposits, and algal crusts. Quantitative measurements of hydrological indicators include water depth and depth to saturation (i.e. depth at which soil pores are saturated) when water was present

Vegetation

- Vegetation communities larger than 10 m x 10 m (or equivalent) were sampled within each wetland using 1 m x 1 m subplots. Discontinuous communities were sampled by placing subplots in different patches of the same community. Each subplot was assessed for percent cover of dominant vascular species and percent cover of total vascular species, non-vascular species, litter, bare ground, and open water. Outside of the subplots, a random meander was conducted to document less common species, species of management concern, and rare plants. Unidentifiable species were collected for later identification.
- Regulated plant species (*noxious* and *prohibited noxious*) listed under the *Weed Control Act* (S. A. 2008, c. W-5. 1) and Weed Control Regulation (Alta. Reg. 19/2010) were documented within each wetland assessed

The boundary of assessed wetlands was walked in the field. GPS tracks were collected (one point every m) and used to assist with mapping refinement.

Following the field assessment, wetland function was assessed as per the Alberta Wetland Rapid Evaluation Tool – Actual guidance (Government of Alberta 2015) and value determinations were submitted to AEP.

3.2.4 Incidental Wildlife

Wildlife species observed incidentally (direct or indirect) during the field assessment were recorded. Direct evidence of wildlife use may include sightings. Indirect evidence of wildlife use may include scat, game trails, beds, browse marks, nests, dens, and tracks.

3.2.5 Mapping Refinement

Upon completion of the field program, historical aerial photographs and field data were reviewed to refine the extent of plant communities in the Study Area using a geographic information system (GIS). Mapping was completed at a scale of 1:5,000 with a minimum polygon size of 0.032 ha.

3.2.6 Species Nomenclature

Scientific species names for plants follow the Integrated Taxonomic Information System (ITIS) (2016). Where the *Species at Risk Act* (S. C. 2002, c. 29) or ACIMS (AEP 2015b) has used a differing taxonomy for species on rare tracking and watch lists, or invasive species with different taxonomy as identified in the *Weed Control Regulation* (Alta. Reg. 19/2010), species names follow naming conventions used in those documents. Common names for plant species conform to ACIMS.

Wildlife species names used in this report are adopted from the American Ornithologists' Union (Banks et al. 2006) for avian species and ITIS (2016) for mammal species.

3.3 ECOLOGICAL INTEGRITY ANALYSIS

The ecological integrity analysis included an assessment of network components, ecological connectivity, and ecological value rating for each identified natural feature. Methods used in the ecological integrity analysis are provided below.

3.3.1 Network Components

All natural features observed within the Study Area were given one of the following network component identifiers adapted from the *Edmonton State of Natural Areas Report* (Spencer 2006) and *Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation* (Bennett 2003).

Habitat Patches

Habitat patches are patches of vegetation greater than or equal to 1 ha that provide the necessary ecological resources for the support of small populations of plants and animals. Habitat patches can be separated by the surrounding background landscape (matrix) or connected through corridors (Spencer 2006).

Stepping Stones

Stepping stones can be considered patches of vegetation that provide some shelter and habitat, but are not of sufficient quality or size to provide the required ecological functions or to support all wildlife habitat requirements. Stepping stones are smaller in size than habitat patches and can be separated by the surrounding matrix or connected through corridors (Spencer 2006).

Corridors

Corridors are vegetated, often linear patches that facilitate movement from one area to another. They can be naturally vegetated or be of an anthropogenic nature and provide enough shelter from the surrounding matrix to allow movement between areas. However, corridors do not contain the necessary habitat or ecological properties to sustain wildlife populations (Spencer 2006).

Linkages

Linkages are contiguous units of manicured and naturalized vegetation that promote wildlife movement (i.e. vegetated right-of-way, other green space such as parks, golf courses) (Spencer 2006). Linkages, together with stepping stones, provide opportunities for wildlife movement between areas (Bennett 2003).

Barriers

Barriers are areas between natural features that prevent or deter wildlife movement between the patches (Bennett 2003). A barrier could be a large open expanse or a roadway between natural features. In some cases, roadways or highways have been shown to be more effective at preventing movement than a much wider expanse of low quality habitat, such as an agricultural area (Bennett 2003).

3.3.2 Ecological Connectivity

The ecological connectivity analysis included connectivity within the Study Area and between the Study Area and adjacent properties. The connectivity of the Study Area was ranked using a graded ranking system (Table 3-2). Professional judgment is incorporated into the ranking to determine the importance of each natural feature in relation to the others.

Table 3-2 Ecological Connectivity Rankings

Rank	Characteristics
1 – High	• Distance between natural features less than 100 m • No significant barriers to movement present (i.e. no collector or arterial roads, walls, large pockets of development) • Land between natural features is suitable for movement of wildlife • Connected habitat that contains sufficient resources to support wildlife (i.e. are large enough) • Low anthropogenic disturbance
2 – Moderate	• Distance between natural features between 100 and 250 m; or distance between habitat patches less than 100 m but a barrier to movement is present • Moderate barriers to movement are present (i.e. collector road) • Land between natural features is moderately suitable for movement of wildlife • Connected habitat that contains a moderate amount of resources to support wildlife • Moderate anthropogenic disturbance
3 – Low	• Distance between natural features greater than 250 m; or distance between natural features is less than 250 m, but a significant barrier to movement is present • Significant barriers to movement present (i.e. arterial road, undersized culvert) • Land between natural features is not suitable for movement of wildlife • Connected natural features do not contain resources to support wildlife • High anthropogenic disturbance

3.3.3 Ecological Value Rating

Ecological value ratings for each natural feature were determined on the basis of network component status, ecological connectivity, habitat size and shape, native species richness, weedy species richness and relative abundance, level of anthropogenic disturbance, and overall quality (Table 3-1).

Table 3-3 Ecological Value Ratings

Rank	Habitat Characteristics
1 – High	• Habitat patch • High degree of connectivity to natural features in the vicinity • No ecosystem fragmentation • High native species richness • Low or no weedy species richness • Low or no degree of anthropogenic disturbance • Provides significant habitat
2 – Moderate	• Stepping Stone • Moderate degree of connectivity to natural features in the vicinity • Moderate native species richness • Moderate weedy species richness • Moderate to low degree of anthropogenic disturbance • Provides moderate habitat

Rank	Habitat Characteristics
3 – Low	• Corridor, linkage, or barrier • Low degree or no connectivity to natural features in the vicinity • Low native species diversity • High weedy species diversity • Provides marginal habitat • High degree of anthropogenic disturbance

4.0 DESKTOP REVIEW RESULTS

The desktop review included a review of biophysical components of the environment that apply to the Study Area, a review of publicly available information and provincial databases, and a review of historical aerial photographs. Results of the desktop review are provided below.

4.1 BIOPHYSICAL ENVIRONMENT

Biophysical components of the environment that were reviewed as part of the desktop review included vegetation, wildlife, climate, topography, geology, soils, and hydrology and hydrogeology. The results for each of these components are provided below.

4.1.1 Vegetation

The Study Area is located in the Central Parkland Natural Subregion. This subregion is the most densely populated region in Alberta and, as such, the majority of its native vegetation has been altered by human development. It consists of groves of aspen and balsam poplar intermixed with grasslands and depressional wetlands (Natural Regions Committee 2006). MSES (2014) identified the Study Area as pasture and croplands with limited native vegetation. Exposed soil was identified in the northeastern portion of the Study Area and additional ground disturbances were identified in the eastern half of the Study Area. Small stands of trees or shrubs were identified on the borders of the Study Area. Potential ephemeral or seasonal wetlands were noted in the Study Area.

4.1.2 Wildlife

Wildlife typically found in the Central Parkland Natural Subregion of Alberta includes species that frequent the grassland regions to the south and the boreal forest regions to the north. Bird species include red-tailed hawk (*Buteo jamaicensis*), broad-winged hawk (*Buteo platypterus*), least flycatcher (*Empidonax minimus*), rose-breasted grosbeak (*Pheucticus ludovicianus*), red-eyed vireo (*Vireo olivaceus*), and yellow warbler (*Setophaga petechia*). Wildlife species include North American porcupine (*Erethizon dorsatum*), showshoe hare (*Lepus americanus*), whitetail deer (*Odocoileus virginianus*), and ground squirrels (AOE No Date).

Reconnaissance surveys conducted in 2014 identified three species of birds and two species of mammals, all listed as *secure*, with no management concern:

- American crow (*Corvus brachyrhynchos*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Savannah sparrow (*Passerculus sandwichensis*)
- Coyote (*Canis latrans*)
- Deer (*Odocoileus spp.*)

Additionally, mounds belonging to either northern pocket gopher (*Thomomys talpoides*) or Richardson's ground squirrel (*Spermophilus richardsonii*) were observed in the Study Area. Both species are also not considered to be of management concern.

MSES (2014) also identified the potential for the following species of management concern to be present in the Study Area:

Common Name	Scientific Name	COSEWIC Status[1]	SARA Status[2]	Alberta Wild Species Status[3]	Wildlife Act Status[4]
Northern leopard frog	Lithobates pipiens	Special Concern	Special Concern Schedule 1	At Risk	Threatened
Canadian toad	Anaxyrus hemiophrys	Not at Risk	-	May Be at Risk	-
Plains garter snake	Thamnophis radix	Not Assessed	-	Sensitive	-
Sliver-haired bat	Lasionycteris noctivagans	Not Assessed	-	Sensitive	-
Hoary bat	Lasiurus cinereus	Not Assessed	-	Sensitive	-
Long-tailed weasel	Mustela frenata	Not Assessed	-	May Be at Risk	-
American badger	Taxidea taxus	Special Concern	-	Sensitive	-
Loggerhead shrike	Lanius ludovicianus	Threatened	Threatened, Schedule 1	Sensitive	-
Purple martin	Progne subis	Not Assessed	-	Sensitive	-
Sprague's pipit	Anthus spragueii	Threatened	Threatened, Schedule 1	Sensitive	-
Peregrine falcon	Falco peregrinus	Special Concern	Special Concern Schedule 1	At Risk	Threatened
Common nightwahk	Chordeiles minor	Threatened	Threatened, Schedule 1	Sensitive	-
Yellow rail	Coturnicops noveboracensis	Special Concern	Special Concern Schedule 1	Undetermined	-
Short-eared owl	Asio flammeus	Special Concern	Special Concern Schedule 1	May Be at Risk	-
Sensitive shorebirds		-	-	Sensitive	-
Sensitive songbirds		-	-	Sensitive	-

Notes:

[1] Government of Canada. 2009. Wildlife Species Search. [Online]. Accessed July 2016. http://www.cosewic.gc.ca/eng/sct1/index_e.cfm

[2] *Species at Risk Act*. S. C. 2002. c. 29.

[3] Alberta Government. 2016. Element Occurrence Data. [Online]. Accessed July 2016.

[4] Wildlife Regulation. Alta. Reg. 143/1997.

MSES (2014) recommended that additional wildlife surveys be completed including breeding bird surveys, pellet surveys, and amphibian surveys.

4.1.3 Climate

The climate of the area is temperate, with daily average temperatures ranging from approximately -10°C to +16°C, 529 mm per year average precipitation, and an average of 104 frost free days per year (Government of Canada 2016).

4.1.4 Topography

The Study Area was generally flat to undulating with a limiting slope of 4% (Alberta Agriculture and Forestry 2016) to the southwest and towards Gull Lake.

4.1.5 Geology

The regional geology of the Study Area and surrounding area is morainal and fluvial in origin on bedrock (Klohn Crippen Berger 2011), with discontinuous till 10 m to 15 m thick over bedrock of the Paskapoo Formation, which consists of sandstone, siltstone, mudstone, and occasional coal lenses (Waterline Resources Inc. 2007).

4.1.6 Soils

The soils within the Central Parkland Natural Subregion are dominated by Orthic Black Chernozems on upland sites (i.e. grasslands, forests), Solonetizic soils on lowland sites (i.e. low-lying areas), and Humic and Orthic Gleysols in wetlands (Natural Regions Committee 2006). Within the Study Area, the dominant soils are moderately to very coarse textured Orthic Black Chernozem sediments deposited by wind or water (Alberta Agriculture and Forestry 2016).

Based on a review of the *Level II Land Classification, Soil Survey and Groundwater Assessment Report* (Klohn Crippen Berger 2011), the Study Area's general soil profile consists of clay loam to loamy sand with the greatest proportion of the soil textures classified as loam and sandy loam. Topsoil in the Study Area ranged from 20 mm to 760 mm thick at all borehole locations completed during the geotechnical investigation. Layers of clay loam were encountered in seven of the nine test pits excavated, sandy loam in eight of the test pits, sand in two of the test pits, and loamy sand in five of the test pits completed during the investigation.

4.1.7 Hydrology and Hydrogeology

According to the *Groundwater Diversion License Application Degraff Built Green Resort* (Waterline Resources Inc. 2007), the surrounding area consists of fractured sandstone bedrock, which is confined by overlying shale units. Water well records in the vicinity were completed within 4.6 m to 54.9 m below ground level, primarily in sandstone and/or shale units of the Paskapoo Formation (Waterline Resources Inc. 2007). The groundwater evaluation originally

indicated there was moderate development potential in the Paskapoo Formation to sustain seasonal withdrawal rates of 14,000 m³/year (Waterline Resources Inc. 2007). In 2015, a supplementary hydrogeological evaluation was completed and it was determined that the aquifer could sustain year-round withdrawal rates of 36,500 m³/year (Stantec 2015).

4.2 ACIMS AND FWMIS SEARCHES

Provincial databases that were searched as part of the desktop review included ACIMS and FWMIS. Results of each of these searches are provided below.

4.2.1 ACIMS Search Results

No non-sensitive element occurrences, sensitive element occurrences, protected areas, or Crown reservations/notations were noted in the search results. ACIMS database search results are included in Appendix C.

4.2.2 FWMIS Search Results

Six fish species were identified in the FWMIS database search results conducted for the Study Area (Table 4-1). The FWMIS database search results for the Study Area are included in Appendix C.

Table 4-1 Results of FWMIS Database Search and Species Status Information

Species		Conservation Status			
Scientific Name	**Common Name**	**COSEWIC Status[1]**	**SARA Status[2]**	**Alberta Wild Species Status[3]**	**Wildlife Act Status[4]**
Catostomus commersonii	white sucker	Not listed	Not listed	Secure	Not listed
Coregonus clupeaformis	lake whitefish	Not listed	Not listed	Secure	Not listed
Esox lucius	northern pike	Not listed	Not listed	Secure	Not listed
Notropis hudsonius	spottail shiner	Not listed	Not listed	Secure	Not listed
Perca flavescens	yellow perch	Not listed	Not listed	Secure	Not listed
Sander vitreus	walleye	Not listed	Not listed	Not listed	Not listed

Notes:

[1] Government of Canada. 2009. Wildlife Species Search. [Online]. Accessed July 2016. http://www. cosewic. gc. ca/eng/sct1/index_e. cfm

[2] *Species at Risk Act*. S. C. 2002. c. 29.

[3] Alberta Government. 2016. Element Occurrence Data. [Online]. Accessed July 2016. http://www. albertaparks. ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/download-data. aspx#trackedWatch.

[4] Wildlife Regulation. Alta. Reg. 143/1997.

The Study Area did not contain fish bearing habitat. Gull Lake is known to contain fish; and likely provides habitat for the species identified in Table 4-2. However, they are not considered species of management concern. Therefore, they will not be discussed further in this report.

4.3 HISTORICAL AERIAL PHOTOGRAPH REVIEW

The historical aerial photographs revealed regular agricultural activity on the majority of the Study Area since 1949, and appeared to change constantly over time. Historically, the Study Area contained wet depressions that have been intermittently visible on the landscape. An ephemeral drainage channel (DR01) is present in the southeast corner of the Study Area and appears to have been part of a riparian complex located outside of the Study Area that was altered (i.e. ditched) between 1975 and 1987. In the 1993 aerial photograph an area of disturbance (i.e. clearing and soil storage) is evident in the southeast corner of the Study Area, created between 1987 and 1993. The disturbance is no longer visible in the 1998 aerial photograph. Given its size and shape, the area of disturbance could potentially be associated with an oil and gas lease. Between 1998 and 2009 a small patch of trees bordering a wetland in the northwest corner (WT01) was cleared, an approach was built, a fenced area was installed, and the area was cultivated. The fenced area could potentially be another oil and gas lease. Following 2009 the area is no longer cultivated and appears to have been returned to a tame pasture. Between 2009 and the date of the field investigation, a dugout was constructed in the northeast section of the Study Area and material from the dugout was used to construct a berm on the northeast boundary. In 1949, which is the earliest photograph available, a driveway and residence are present immediately adjacent to the Study Area within the NW ¼ 14-041-28 W4M, and remains until present day. The Study Area appears to be fairly dry in all of the photographs that were reviewed.

5.0 FIELD ASSESSMENT RESULTS

Results of the upland characterization survey, wetland survey, and incidental wildlife observations are provided below.

5.1 UPLAND VEGETATION COMMUNITY ASSESSMENT

The Study Area is dominated by tame pasture and cropland. No upland woody areas were noted. Each of these features is discussed below.

Tame Pasture (TP01) is approximately 21.3 ha. The second largest feature, it spans west side of the Study Area and was dominated by gramminoid species such as Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*) at the time of the field assessment. Common dandelion (*Taraxacum officinale*) was also present, but to a lesser degree. Creeping thistle (*Cirsium arvense*), a *noxious* weed under the Weed Control Regulations (Alta. Reg. 19/2010), was observed in low densities and was present sporadically throughout TP01. From a health standpoint, this feature also contained small areas of exposed soils, and was being heavily grazed. A photo of TP01 is included in Appendix D.

Cultivated Crop (CC01) is approximately 41.4 ha. This was the largest feature observed, dominating the entire east side of the Study Area. Within the north, this feature contained newly cultivated areas planted with wheat spp. (*Triticum spp.*) or barley spp. (*Hordeum spp.*). The southern half contained a crop of alfalfa (*Medicago sativa*). Creeping thistle (*Cirsium arvense*), was observed in low densities and was sporadically spaced throughout CC01. A photo of CC01 is included in Appendix D.

No rare plants were identified during the upland vegetation community assessment and potential for rare plants is negligible based on the existing vegetation communities that are primarily agricultural, non-native dominated plant communities, with low native plant biodiversity.

5.2 WETLAND SURVEY

One seasonal wetland (WT01), three temporary wetlands (WT04, WT06, and WT10), five ephemeral wetlands (WT02, WT05, WT09, WT14, and WT16), and one ephemeral drainage (DR01) were identified during the field assessment.

WT01 was the largest wet feature noted, and was located in the northwest corner of the Study Area. This feature had the highest species diversity and was dominated by graminoid species such as fowl bluegrass (*Poa palustris*), reed canary grass (*Phalaris arundinacea*), and sedge species small bottle sedge (*Carex utriculata*). It also contained a large cover of weedy species such as stinkweed (*Thlaspi arvense*) and common dandelion (*Taraxacum officiale*). WW01 had

undergone extensive grazing and pugging from recent livestock use. Based on the AWCS (ESRD 2015), WT01 is classified as a seasonal graminoid marsh. Photos of WT01 are included in Appendix D. AEP returned an ABWRET-A value of C for this wetland.

WT04 and WT06 were located in the northeast corner of the Study Area. WT04 was dominated by opportunistic common cattail (*Typha latifolia*), alsike clover (*Trifolium hybridum*); and graminoid species, including foxtail barley (*Hordeum jubatum*) and tufted hair grass (*Deschampsia cespitosa*). The cattail noted was visible only as a residue from the previous growing season, no evidence of seed heads was noted. At the time of the field assessment, WT06 had standing water. Both WT04 and WT06 were recently cultivated and contained large areas of exposed soil. Based on the AWCS (ESRD 2015), WT04 and WT06 are classified as temporary graminoid marsh. Photos of WT04 and WT06 are included in Appendix D. AEP returned an ABWRET-A value of D for both of these wetlands.

WT10 was located in the west side of the Study Area and was dominated by graminoid species, including Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), fowl bluegrass (*Poa palustris*), and herbaceous species such as alsike clover (*Trifolium hybridum*). WT10 had evidence of recent grazing by livestock. Based on the AWCS (ESRD 2015), WT10 is classified as a temporary graminoid marsh. Photos of WT10 are included in Appendix D. AEP returned an ABWRET-A value of C for this wetland.

WT02, WT09, and WT14 were located in the west side of the Study Area. WT02 was dominated by graminoid species including Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*) and herbaceous species such as common dandelion (*Taraxacum officiale)*. WT09 was dominated by Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*). Marsh yellow cress (*Rorripa palustris*) was present, but to a lesser degree. WT14 was dominated by fowl bluegrass (*Poa palustris*). Natural features WT02, WT09, and WT14 had evidence of recent grazing by livestock. Based on the AWCS (ESRD 2015), WT02, WT09, and WT14 are classified as ephemeral waterbodies and are not considered wetlands under the Alberta Wetland Policy. Photos of WT02, WT09, and WT14 are included in Appendix D.

WT05 was located in the northeast corner of the Study Area and at the time of the field assessment had water present. WT05 was dominated by weedy species such as stinkweed (*Thlaspi arvense*) and curled dock (*Rumex crispus*). Graminoid species, such as slender wheatgrass (*Elymus trachycaulus*) and tufted hair grass (*Deschampsia cespitosa*) were also present. This feature had been cultivated through the previous year. Based on the AWCS (ESRD 2015), WT05 is classified as an ephemeral waterbody and is not considered a wetland under the Alberta Wetland Policy. Photos of WT05 are included in Appendix D.

WT16 was located in the southeast corner of the Study Area and was dominated by herbaceous species, including white sweet-clover (*Melilotus alba*), common plantain (*Plantago major*) and common dandelion (*Taraxacum officiale*). WT16 had been cultivated the previous year and was reseeded with alfalfa (*Medicago sativa*). Based on the AWCS (ESRD 2015), WT16 is classified as

an ephemeral waterbody and is not considered a wetland under the Alberta Wetland Policy. Photos of WT16 are included in Appendix D.

DR01 was a small section of an intermittent drainage feature located in the southeast corner of the Study Area and was dominated by smooth brome (*bromus inermis*), manna grass (*glyceria grandis*), and hymp-nettle (*galeopsis tetrahit*). DR01 had a defined channel with a vertical bank, which appeared to anthropogenic in origin. The bank had exposed soils. Based on the *Code of Practice for Watercourse Crossing* (under the *Water Act* [R. S. A. 2000, c. W3]), DR01 is classified as a Class D watercourse.

No rare plants were identified during the wetland assessment and potential for rare plants is negligible based on the existing disturbances to wetlands, non-native dominated plant communities, and low native plant biodiversity.

5.3 WILDLIFE

Wildlife habitat suitability assessment indicates that the Study Area provides Nil or Low Suitability wetland, riparian, grassland, forest, and cliff/coulee habitat for wildlife. Habitat was assessed as Low Suitability for individual species including yellow rail, sharp-tailed grouse, upland sandpiper, loggerhead shrike, northern leopard frog and Canadian/western toad. Moderate suitability habitat is available for tree-nesting raptors, including red-tailed hawk and Swainson's hawk due th the presence of scattered mature balsams around the Study Area. Habitat suitability for short-eared owl was also assessed as moderate due to the presence of open haibtats.

Incidental wildlife observations (i.e. species, location observed, and evidence observed) that were made during the field assessment are included in Table 5-1. The majority of observations were made within TP01 and WT01, and included direct (i.e. sightings) and indirect (i.e. dens, calling) observations. All species are identified as '*secure*' in Alberta and none are listed as species of management concern.

Table 5-1 Incidental Wildlife Observations

Species		Location Observed	Evidence Observed
Scientific Name	**Common Name**		
Accipiter stratus	sharp-shinned hawk	WT01	Visual
Agelaius phoeniceus	red-winged blackbird	TP01	Visual
Anas platyrhynchos	mallard	WT14	Calling
Canis latrans	coyote	WT05	Scat
Odocoileus sp.	deer	CC01 DR01	Tracks
Corvus brachyrhynchos	American crow	WT01 TP01	Visual

Species		Location Observed	Evidence Observed
Scientific Name	**Common Name**		
Sterna hirundo	common tern	WT10	Visual
Tachycineta bicolor	tree swallow	WT10 TP01	Calling, Visual
Urocitellus richarsonii	Richardson's ground squirrel	WT01 WT14 CC01 TP01	Dens, Visual

Wildlife species of management concern identified by MSES (2014) as having potential to occur in the Study Area were evaluated based on existing data collected in the Study Area, species ranges, species habitat requirements, and observed site conditions. No wildlife species of management concern (SOMC) have been observed in the Study Area during two reconnaissance surveys (MSES 2014 and this assessment). Table 5-2 identifies the habitat requirements of each of the species identified by MSES (2014), their habitat requirements and the availability of that habitat in the Study Area. SOMC that may occur in the Study Area include plains garter snake, long-tailed weasel, American badger, Sprague's pipit, common nighthawk, short-eared owl, and sensitive songbirds that frequent crop and tame pasture.

Table 5-2. Wildlife Species of Management Concern Potential to Occur in the Study Area.

Common Name	Scientific Name	Habitat Requirements	Habitat Availability in the Study Area
Northern leopard frog	*Lithobates pipiens*	Permanent water	The Study Area is outside of Alberta's Sensitive Amphibian Range and the current range of Northern leopard frog.1,2. This species requires permanent water for breeding, and no permanent water has been identified in the Study Area.
Canadian toad	*Anaxyrus hemiophrys*	Primarily iver valleys and lakes, permanent water	This species requires permanent water for breeding, and no permanent water has been identified in the Study Area. Canadian toads may over-winter in the Study Area; however, there are limited practical survey methods for identifying overwintering areas.
Plains garter snake	*Thamnophis radix*	Near water, hibernacula in slumps or rocky outcrops	Limited hibernacula potential based on relatively flat terrain of the site; however, may use Study Area in other times of year.
Sliver-haired bat	*Lasionycteris noctivagans*	Primarily a forest dweller, roosts in trees and sometimes caves	No forests or substantial treed areas; therefore negligible potential for the species to occur in the Study Area, though may forage over open fields.
Hoary bat	*Lasiurus cinereus*	Primarily a forest dweller, roosts in trees	No forests or substantial treed areas; therefore negligible potential for the species to occur in the Study Area, though may forage over open fields.
Long-tailed weasel	*Mustela frenata*	Open county	May occur in the Study Area
American badger	*Taxidea taxus*	Open county	May occur in the Study Area

Common Name	Scientific Name	Habitat Requirements	Habitat Availability in the Study Area
Loggerhead shrike	*Lanius ludovicianus*	Shrub nester, forages in native prairie and pastures. Range is primarily east of Stettler and sightings north of the Red Deer are sporadic. In Red Deer region nests primarily in buffaloberry.	On the edge of the species range. No buffaloberry or substantial shrubby vegetation in the Study Area. May forage in Study Area and nest in adjacent shrubby vegetation.
Purple martin	*Progne subis*	Primarily a forest nester - using snags as nesting cavities, but also use birdhouses	No forests or snags identified in the Study Area. If suitable birdhouse is nearby may forage in pasture.
Sprague's pipit	*Anthus spragueii*	Open country, primarily grasslands, may use hayfields	On edge of range for the species, may nest in pasture
Peregrine falcon	*Falco peregrinus*	Nests on cliffs or buildings	No cliffs in Study Area. Nearest known nest is on the cliffs of the Red Deer River
Common nightwahk	*Chordeiles minor*	Open fields and clearings	May nest in grazed pasture in Study Area
Yellow rail	*Coturnicops noveboracensis*	Prefers large grass/sedge marshes. May nest in wet areas of hayfields if there is sufficent sedge/grass/rushes it is saturated throughout the summer.	Limited wetland and sedge habitat in the Study Area for this species as wetlands are seasonal.
Short-eared owl	*Asio flammeus*	Open country, marshes	May occur in the Study Area
Sensitive shorebirds	-	Typically nesting adjacent to or in permanent waterbodies.	No permanent water in Study Area.
Sensitive songbirds	-	-	Sensitive songbirds that may inhabit the Study Area are limited to those that frequent crop and hayfields; e.g. Sprague's pipit, Baird's sparrow.

Based on the reconnaissance level field data (MSES 2014 and this assessment), a review of SOMC habitat requirements and existing habitat identified in the Study Area, amphibian surveys and pellet group surveys are not warranted. As there is no semi-permanent or permanent water in the Study Area and amphibian habitat is assessed as being Low Suitability, no amphibian species of management concern are likely to occur in the Study Area. While badger and long-tailed weasel may occur in the Study Area, neither are likely to be detected through pellet group surveys. As no ungulates of management concern overlap with the Study Area, pellet group surveys are not warranted.

Limited bird SOMC may occur in the Study Area. As habitat in the Study Area (e.g. crop and pasture) is widely available in Lacombe County, loss of habitat associated with the Lincoln Ranch Development is not anticipated to cause a measurable change in bird populations in the Study Area. The primary impact of development on sensitive bird species is through potential mortality of birds during vegetation clearing. The primary mitigation for this impact is to clear

vegetation outside of the breeding bird period. This mitigation is a standard best management practice, is widely employed, and known to be effective. For these reasons, additional breeding bird surveys are not warranted.

6.0 ECOLOGICAL INTEGRITY ANALYSIS RESULTS

The ecological integrity analysis on the Study Area included determining the network component status identified the ecological connectivity of each natural feature, and the ecological value rating of each natural feature identified. Results of the ecological integrity analysis are provided below.

6.1 NETWORK COMPONENTS

The Study Area contains nine stepping stones (i.e. WT01, WT02, WT03, WT04, WT05, WT06, WT09, WT10, WT14, and WT16). Each of these features is illustrated on Figure 2 (Appendix A). No barriers to movement are present within the Study Area; however, Range Road 282 may provide a barrier to wildlife movement.

Although not categorized, TP01 and CC01 dominate the Study Area and create a matrix between the identified natural features within the Study Area and the surrounding landscape. Both of these features may provide diffuse movement potential for a wide assortment of wildlife species and could even provide habitat for small mammals and avian species that utilize grassland habitats.

6.1.1 Stepping Stones

All nine wetlands were identified as stepping stones. WT01 was greater than 1 ha; however, it lacked the shrubs or trees that could provide cover for wildlife. Therefore, it was categorized as a stepping stone. This feature may facilitate movement for riparian species between Gull Lake, the surrounding matrices, and natural features on a seasonal basis. The remaining wetlands (WT02, WT04, WT05, WT06, WT09, WT10, WT14, and WT16), TP01 and CC01 serve as stepping stones between Gull Lake to the west and the ephemeral drainage (DR01) to the east, as well as any other unidentified natural features outside the Study Area. All wetlands except WT01 and DR01 within the Study Area had low native species diversity and provided marginal habitat for wildlife due to species composition and lack of shrubs or trees that could provide cover.

6.1.2 Linkages

The ephemeral drainage (DR01) was identified as a linkage as it may facilitate wildlife movement within and outside the Study Area. Its contiguous nature and the presence of shrubs and trees provide limited cover along the drainage, making it suitable as a linkage.

6.1.3 Barriers

Barriers to movement are not present within the Study Area; however, Range Road 282 may present a barrier to wildlife movement into and out of the Study Area from the west.

6.2 ECOLOGICAL CONNECTIVITY

Overall, connectivity of natural features within and outside of the Study Area was ranked as low to moderate (Appendix A, Figure 3). From a regional perspective, high connectivity was identified along Gull Lake to the west and along an ephemeral drainage channel (DR01) located to the south and east of Study Area. However, within the Study Area, only two features, WT01 and portions of DR01 may draw wildlife. The rest of the Study Area is dominated by an agricultural matrix, which would only provide diffuse movement potential. WT01 was determined to have moderate connectivity to natural features adjacent to Gull Lake and could provide seasonal habitat for wildlife such as waterfowl and shore birds during the spring. However, as suggested earlier, the presence of Range Road 282 may create a barrier to terrestrial wildlife movement. Wildlife may follow the ephemeral drainage channel (DR01) into the southeast corner of the Study Area. However, this would be brief, as this feature continues through into the next quarter section in a northeasterly direction.

The remaining natural features within the Study Area were heavily disturbed and would not be differentiated from the agricultural matrix. Any wildlife entering the Study Area from the west (south of WT01), from the south, east, or north would be diffuse and opportunistic due to the lack of general cover and timing of resources available (i.e. foraging of crops in the fall).

6.3 ECOLOGICAL VALUE RATING

The Study Area contained two features ranked as having moderate ecological value (i.e. WT01 and DR01) and ten features with low ecological value (i.e. WT02, WT04, WT05, WT06, WT09, WT10, WT14, WT16, TP01, and CC01). No natural features were identified as having high ecological value. Ecological value ratings are illustrated in Figure 4 (Appendix A).

6.3.1 Moderate Ecological Value

WT01 is ranked as having moderate ecological value. It was the largest natural feature in the Study Area, and could act as a stepping stone between Gull Lake and any of the natural features outside of the Study Area located to the north, east or south. WT01 has relatively high native species richness; however, it has undergone extensive grazing and plugging from livestock, and woody vegetation removal was undertaken between 1998 and 2008. The presence of exposed soils has made it susceptible to the introduction of weedy species, such as stinkweed (*Thlaspi arvense*) and common dandelion (*Taraxacum officiale*). Based on the field observations, WT01 would be marginal breeding or nesting habitat for wildlife and wildlife diversity is low. Some small mammals and avian species that utilize grassland habitats could frequent WT01 throughout the growing season. However, when seasonally flooded, WT01 would have a greater potential for use during the spring and early summer. When standing water is present, this feature may present seasonal habitat opportunities for riparian species such as amphibians (i.e. boreal chorus [*Pdeudacris maculate*] and wood frogs [*Rana sylvatica*]) and waterfowl (i.e. mallards [*Anas platyrhynchos*]).

DR01 is also ranked as having moderate ecological value. DR01 was identified to be part of an ephemeral drainage channel that originates to the northeast, ultimately ending at Gull Lake. Although DR01 appeared to have low species diversity at the time of the field assessment and was altered between 1975 and 1987, it still contained shrub and tree species outside of the Study Area that may provide limited cover for wildlife such as song birds and small mammals. Medium to large wildlife may follow the ephemeral drainage channel (including DR01), as they move through the area.

6.3.2 Low Ecological Value

TP01 and CC02 were ranked as having low ecological value due to their low native species richness, lack of habitat for a wide range of wildlife species, high degree of historical anthropogenic disturbance and livestock disturbance, and presence of creeping thistle.

WT02, WT04, WT05, WT06, WT09, WT10, WT14, and WT16 were ranked as having low ecological value due to their low to moderate degree of intra-connectivity, low native species richness, the presence of weedy species, high numbers of non-native species, and high degree of disturbance (both anthropogenic and livestock-related). They were categorized as stepping stones, which may provide marginal habitat for wildlife. However, based on the community assemblages noted at the time of the field assessment, wildlife would likely not differentiate them from the surrounding agricultural matrix (TP01 and CC02).

7.0 CONSERVATION TOOLS

Conservation tools that may be used to retain all or portions of natural features within the Study Area include Environmental Reserve/Environmental Reserve Easement, Municipal Reserve, and Conservation Easement (Lacombe County 2015).

Based on the information obtained during the desktop review, field assessment, and the ecological integrity analysis, WT01 is suitable for conservation as Environmental Reserve (ER). However, retention should only be considered, if the feature can be restored and linkages to features such as Gull Lake can be enhanced. Restoration activities may include weed control and revegetation of native species (i.e. planting shrubby species to replace the woody vegetation lost between 1998 and 2008. The *Lincoln Ranch Outline Plan* (Stantec 2016) proposes the construction of a golf course; WT01 could be converted into a habitat patch with tree planting and the creation of a natural park to be utilized by both wildlife and future residents. With careful planning WT01 could be enhanced for wildlife use, and could provide greater opportunities for select wildlife movement across the Study Area.

DR01 is also suitable for conservation as ER as it serves as a hydrologic connection between upstream sources and Gull Lake and may provide a linkage for wildlife movement.

Wetlands WT02, WT04, WT05, WT06, Wt09, WT10, WT14, and WT16, Tame Pasture TP01, and Cultivated Crop CC01, which had low native species richness, historical disturbance, and marginal habitat, were ranked as having low ecological value. These features do not provide enough ecological value to warrant conservation. In addition, because the wetlands are ephemeral to temporary in nature, incorporating these features into the development plan from a drainage perspective presents challenges associated with matching pre-development drainage flows to the wetlands, which typically will only contain standing water following snow melt in the spring.

8.0 SUMMARY

Natural features observed within the Study Area consisted of one seasonal wetland (WT01), three temporary wetlands (WT04, WT06, and WT10), five ephemeral wetlands (WT02, WT05, WT09, WT14, and WT16), and one Class D ephemeral drainage (DR01). The Study Area was dominated by one tame pasture (TP01) and one cultivated crop (CC01), which are anthropogenic features that create a matrix between the noted natural features. The wetlands, drainage, tame pasture, and cropland all appear to have been impacted by anthropogenic disturbances. Connectivity within the Study Area was low, and connectivity within and outside the Study Area was low to moderate. High connectivity was identified along Gull Lake to the west and along DR01, located to the south and east of the Study Area. Seasonal wetland WT01 and ephemeral drainage DR01 were ranked as having moderate ecological value, and the remaining temporary and ephemeral wetlands were ranked as having low ecological value. WT01 and DR01 could be conserved as an ER within the proposed development. Due to their low ecological value ranking, the remaining wetlands, tame pasture, and cropland do not warrant conservation.

9.0 RECOMMENDATIONS

The following general recommendations have been made to mitigate potential effects to the Study Area as a result of development of Lincoln Ranch:

- Post-development drainage flows to retained natural features should be maintained, where possible, so as to provide approximately the same amount of moisture to the vegetation as they receive under pre-development conditions
- Minimal native vegetation exists in the Property, with the exception of WT01. Where possible, WT01 should be retained or the topsoil and seed bank stockpiled and replaced in the stormwater management facility
- Where practical (e.g., along the planned trail), reclaimed areas should be planted with native vegetation appropriate for the area
- Stormwater management facilities should be naturalized to the degree practical to provide wildlife habitat for waterfowl, other aquatic wildlife, as well and native vegetation diversity
- Where possible topsoil from existing wetlands should be used in the construction of stormwater management facilities
- Prior to beginning development of the Study Area, the applicable regulatory authorities for the identified wetlands should be contacted, and the appropriate level of documentation submitted for approval prior to any disturbance or removal of these features.
  - It is likely that AEP will require compensation for disturbance of wetlands WT01, WT04, WT06, WT10, and ephemeral drainage DR01 (if removed); however, an approval will be required prior to disturbance
- Avoid clearing of vegetation during the breeding bird season to limit effects to breeding bird SOMC (e.g., Sprague's pipit, short-eared owl). If any vegetation clearing activities occur within the breeding bird season a nest search survey is recommended to reduce the potential of disturbances to nests protected under the *Wildlife Act* (R. S. A. 2000, c. W-10) and *Migratory Birds Convention Act* (S. C. 1994, c. 22)
- Waste should be properly stored in wildlife proof containers on site and disposed of at appropriate waste disposal sites to reduce potential for human-wildlife conflicts
- Open excavations will be fenced, where practical, and monitored for trapped wildlife.
- Erosion and sediment control (ESC) measures to protect soil from water and wind erosion should be considered. An ESC plan should be developed with protection of Gull Lake in mind, given that development plans propose draining stormwater to this water body
- Vehicles or equipment should not be washed within 30 m of a water body
- Fuel and/or hazardous material storage should be greater than 100 m from a water body
- Vehicle and equipment refueling or other maintenance should not occur within 100 m of a water body
- Water from any dewatering activities should be discharged in a manner so that it will not directly enter drainage courses, water bodies, or wetlands

- Creeping thistle, which is a *noxious* weed species, should be controlled or removed, as required in the *Weed Control Act* (S. A. 2008, c. W-5.1) and associated regulations
- If herbicide application is chosen as a method of weed control, all herbicides should be applied by a "Certified Applicator" as defined by *Pesticide (Ministerial) Regulation* (A. R. 43/1997)
- All collected storm water post-development should be treated before release to Gull Lake

10.0 REFERENCES

Alberta Agriculture and Forestry. 2016. Alberta Soil Information Viewer. [Online]. Accessed July 2016. http://www4. agric. gov. ab. ca/agrasidviewer/.

Alberta Environment and Parks (AEP). 2015a. Alberta Wetland Identification and Delineation Directive. [Online]. Accessed July 2016. http://aep. alberta. ca/water/programs-and-services/wetlands/documents/WetlandIdentificationDelineation-Jun2015. pdf.

Alberta Environment and Parks (AEP). 2015b. Search ACIMS Data. [Online]. Accessed July 2016. Available: http://www. albertaparks. ca/acims-data.

Alberta Environment and Parks (AEP). 2016. Access FWMIS data. [Online]. Accessed July 2016. Available: http://esrd. alberta. ca/fish-wildlife/fwmis/access-fwmis-data. aspx.

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

Alberta Government. 2016. Element Occurrence Data. [Online]. Accessed July 2016. http://www. albertaparks. ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/download-data. aspx#trackedWatch.

Alberta Online Encyclopedia (AOE). No Date. Central Parkland Wildlife. [Online]. Accessed July 2016. http://www. abheritage. ca/abnature/parklands/centralwild. htm.

Banks, R. C. , C. Cicero, J. L. Dunn, A. W. Kratter, R. C. Rasmussen, J. V. Remsen, Jr. , J. D. Rising, and D. F. Stoltz. 2006. Forty-Seventh Supplement to the American Ornithologists' Union Check-List of North American Birds. The Auk, 123(3): 926-936.

Bennett, A. F. 2003. Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation. IUCN Forest Conservation Programme, Conserving Forest Ecosystems Series No. 1. International Union for Conservation of Nature and Natural Resources. Cambridge, UK.

Environmental Protection and Enhancement Act. Revised Statutes of Alberta, 2000. Chapter E-12.

Fisheries Act. Revised Statutes of Canada, 1985. Chapter F-14.

Government of Canada. 2009. Wildlife Species Search. [Online]. Accessed July 2016. http://www. cosewic. gc. ca/eng/sct1/index_e. cfm.

Government of Canada. 2016. Canadian Climate Normals 1981-2010 Station Data, Red Deer Alberta. [Online]. Accessed July 2016. http://climate. weather. gc. ca/climate_normals/results_1981_2010_e. html?searchType=stnName&txtStationName=red+deer&searchMethod=contains&txtCentralLatMin=0&txtCentralLatSec=0&txtCentralLongMin=0&txtCentralLongSec=0&stnID=2133&dispBack=0.

Integrated Taxonomic Information System (ITIS). 2016. Integrated Taxonomic Information System. [Online]. Accessed March 2016. Available: www. itis. gov.

Klohn Crippen Berger. 2011. Level II Land Classification, Soil Survey and Groundwater Assessment Report, NW-14-041-28 W4M; Lacombe County, Alberta. Edmonton, Alberta.

Lacombe County. 2011. Standards Manual. Edition 2. January 2011. Lacombe County, Alberta.

Lacombe County. 2015. Multi-Lot Development Proposals: Lacombe County's Guide to the Approval Process. Lacombe County, Alberta.

Management and Solutions in Environmental Science (MSES). 2014. Reconnaissance Biophysical Survey Report for the Gull Lake Project. September 2014.

Migratory Birds Convention Act, 1994. Statutes of Canada, 1994. Chapter 22.

Migratory Birds Regulations. Consolidated Regulations of Canada. Chapter 1035.

Municipal Government Act. Revised Statutes of Alberta, 2000. Chapter M-26.

Natural Regions Committee. 2006. Natural Regions and Subregions of Alberta. Pub. No. T/852. Compiled by D. J. Downing and W. W Pettapiece. Government of Alberta. Edmonton, Alberta.

Palmer, W. C. 1965. Meteorological Drought. Research Paper No. 45. U. S. Weather Bureau. Washington D. C.

Pesticide (Ministerial) Regulation. Alberta Regulation 43/1997.

Public Lands Act. Revised Statutes of Alberta, 2000. Chapter P-40.

Species at Risk Act. Statutes of Canada, 2002. Chapter 29.

Spencer Environmental Management Services Ltd. (Spencer). 2006. Edmonton State of Natural Areas Report. Prepared for the City of Edmonton. Edmonton, Alberta.

Stantec Consulting Ltd. (Stantec) 2014. Lincoln Ranch Stormwater Management Report. Prepared for 1510060 AB Ltd. o/a Lincoln Developments. Red Deer, Alberta.

Stantec Consulting Ltd. (Stantec) 2015. New Water Act Diversion License (254779-00-00) Annual Water Volume Increase. Edmonton, Alberta.

Stantec Consulting Ltd. (Stantec) 2016. Lincoln Ranch Outline Plan. Prepared for Lincoln Developments. Red Deer, Alberta.

Water Act. Revised Statutes of Alberta, 2000. Chapter W-3.

Waterline Resources Inc. 2007. Groundwater Diversion License Application DeGraff Built Green Resort SE-22-041-28-W4M Gull Lake, Alberta. Calgary, Alberta.

Weed Control Act. Statutes of Alberta, 2008. Chapter W-5.1.

Weed Control Regulation. Alberta Regulation 19/2010.

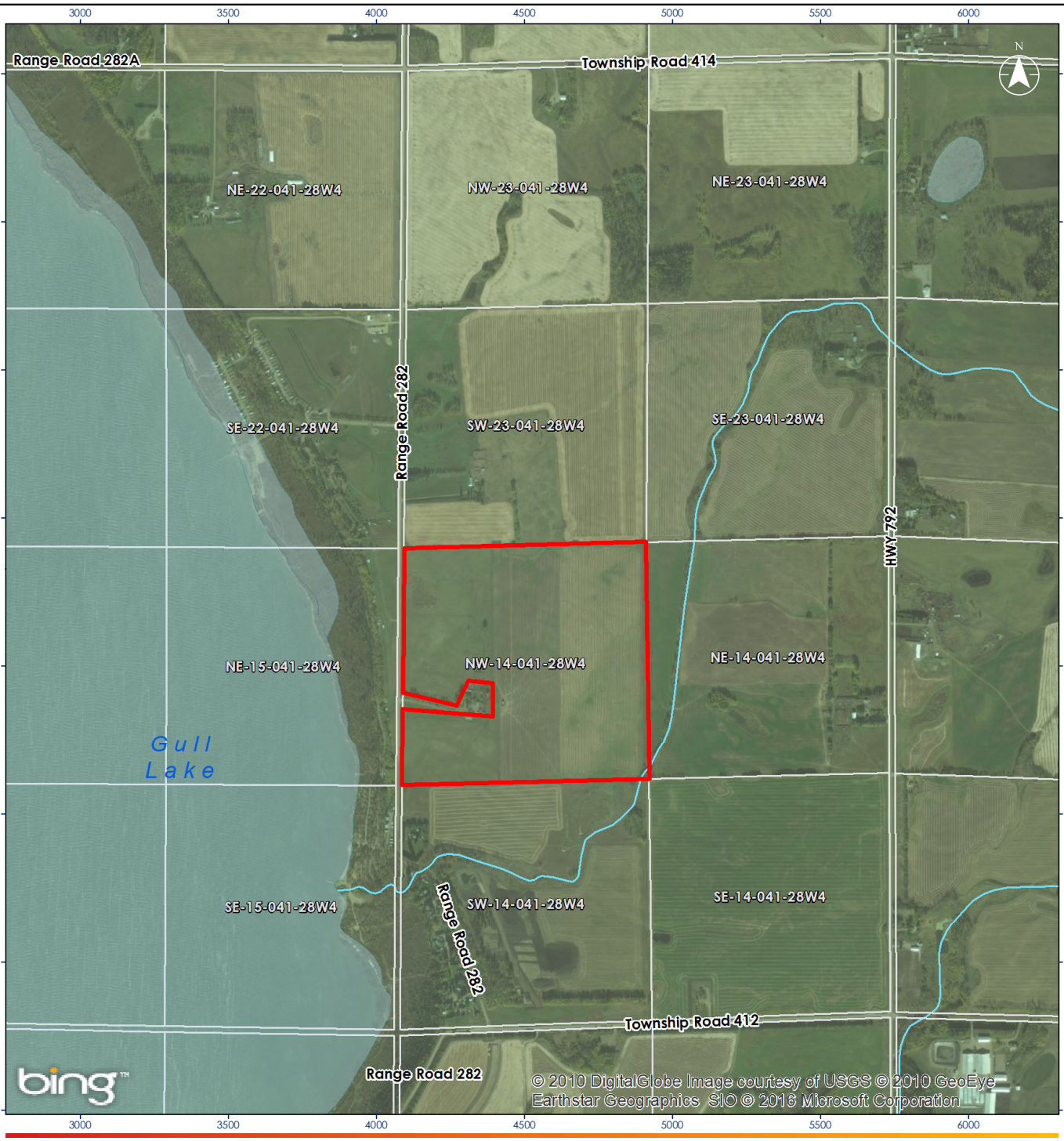
Wheatley, M. and J. Bentz. 2002. A Preliminary Classification of Plant Communities in the Central Parkland Natural Sub-Region of Alberta. Prepared for: Resource Data Branch, Public Lands Division, Alberta Sustainable Resource Development. Edmonton, Alberta.

Wildlife Act. Revised Statutes of Alberta, 2000. Chapter W-10.

Wildlife Regulation. Alberta Regulation 143/1997.

Williams Engineering Canada Inc. 2010. Gull Lake Intermunicipal Development Plan. Preapred for Lacombe County, Ponoka County, Summer Village of Gull Lake, Summer Village of Parkland Beach. Red Deer, Alberta.

APPENDIX A
FIGURES



Study Area
Quarter Section
Watebody
Watercourse

0 200 400 600 metres
1:20,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 3TM 114
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved. AltaLIS Ltd.
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Stantec

Project Location
NW ¼ 14-041-28 W 4M
East of Gull Lake, Alberta

113929396
Prepared by MK on 2016-07-19
Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
1

Title
Site Location Plan

\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\ArcMap_v_10_1\fig_1_site_location_plan_v10_1.mxd Revised: 2016-08-11 By: mkuhl

Study Area
Watercourse
Drainage

Natural Feature

Ephemeral Wetland
Marsh (Seasonal Water Permanence)
Marsh (Temporary Water Permanence)
Cultivated Crop
Tame Pasture

0 100 200 metres
1:5,000 (at original document size of 8.5x11)

Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

113929396
Prepared by MK on 2016-07-27
Review by JC on 2016-07-27

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
2

Title
Natural Features

Notes
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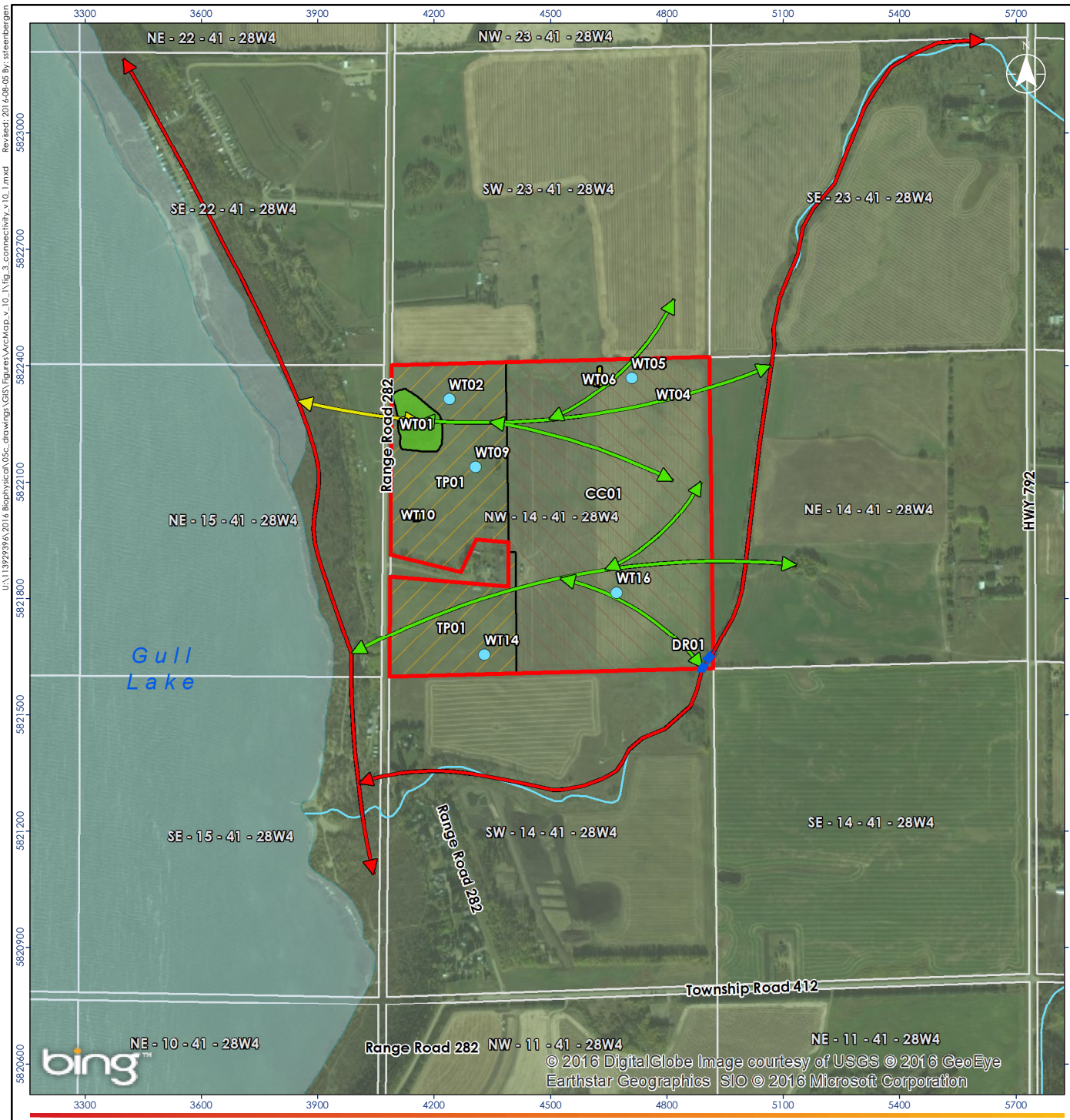

Study Area
Quarter Section
Watebody
Watercourse
Drainage

Natural Feature

Ephemeral Wetland
Marsh (Seasonal Water Permanence)
Marsh (Temporary Water Permanence)
Cultivated Crop
Tame Pasture

Connectivity

High
Moderate
Low

0 250 500 metres

1:15,000 (at original document size of 8.5x11)

Notes

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Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

113929396
Prepared by MK on 2016-07-27
Review by JC on 2016-07-27

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
3

Title
Connectivity

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- Study Area
- Watercourse
- Drainage
- Ephemeral Wetland

Ecological Value

- Low
- Moderate

0 100 200 metres

1:5,000 (at original document size of 8.5x11)

Notes

1. Coordinate System: NAD 1983 3TM 114
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Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

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Prepared by MK on 2016-07-27
Review by JC on 2016-07-27

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
4

Title
Ecological Value

\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\ArcMap_v_10_1\fig_4_ecological_value_v10_1.mxd Revised: 2016-08-11 By: mkuhl

APPENDIX B
HISTORICAL AERIAL PHOTOGRAPHS

\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\historic\subsite_1949.mxd Revised: 2016-08-04 By: mkuhl

Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Project Location
NW ½ 14-041-28 W4M
East of Gull Lake, Alberta

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Prepared by MK on 2016-07-19
Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
1949

Title
Historical Aerial Photograph Review

Notes
1. Coordinate System: NAD 1983 3TM 114
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved. AltaLIS Ltd.
3. Imagery: Alberta Environment and Parks, AS0150-166, 1949-09-22

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\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\historic\subsite_1975.mxd Revised: 2016-08-04 By: mkuhl

Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

113929396
Prepared by MK on 2016-07-19
Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
1975

Title
Historical Aerial Photograph Review

Notes
1. Coordinate System: NAD 1983 3TM 114
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved. AltaLIS Ltd.
3. Imagery: Alberta Environment and Parks, AS1440-068, 1975-11-09

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\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\historic\sublste_1987.mxd Revised: 2016-08-04 By: mkuhl

Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

113929396
Prepared by MK on 2016-07-19
Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
1987

Title
Historical Aerial Photograph Review

Notes
1. Coordinate System: NAD 1983 3TM 114
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved. AltaLIS Ltd.
3. Imagery: Alberta Environment and Parks, AS3611-016, 1987-07-25

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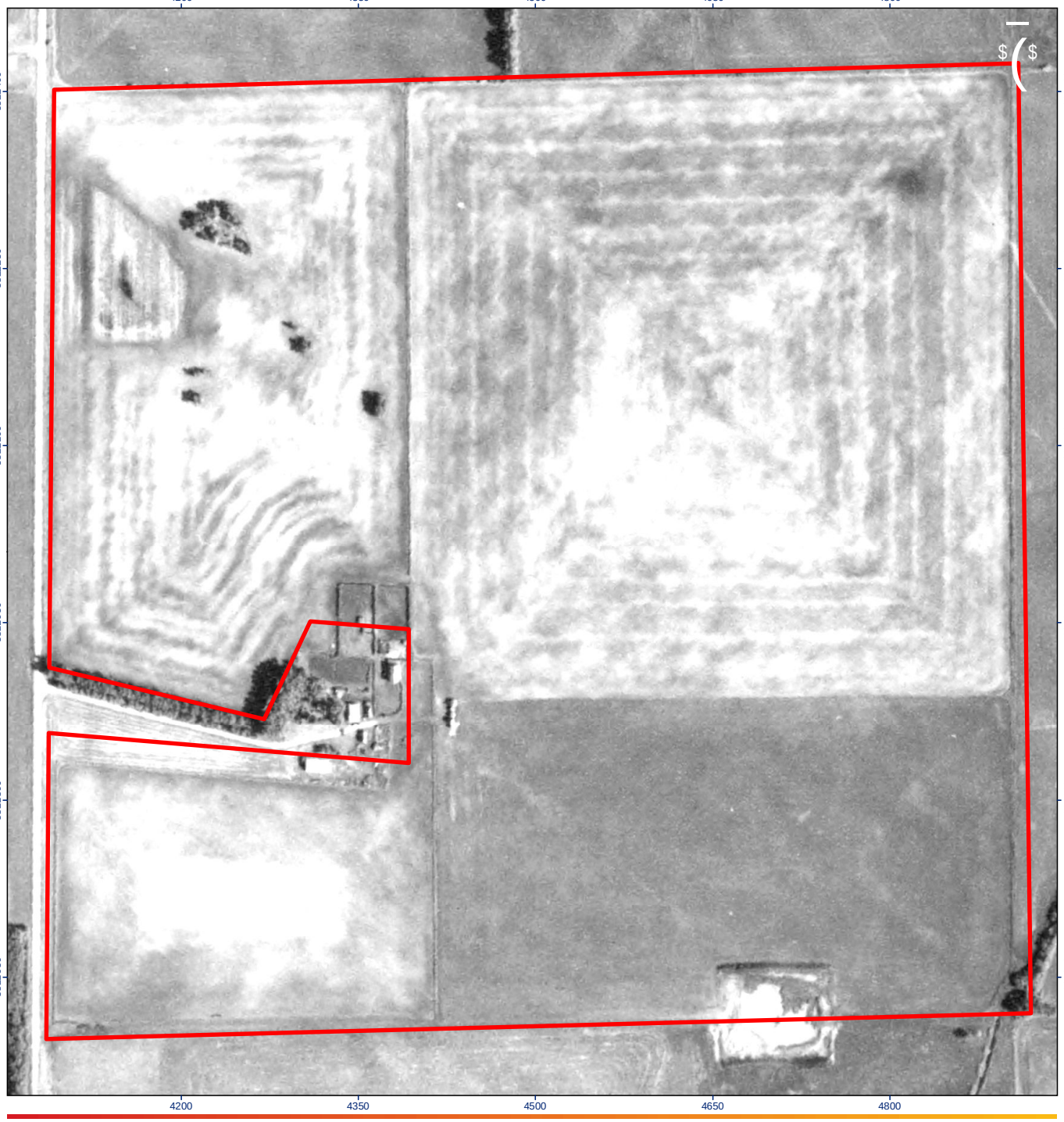
\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\historic\su bsite_1993.mxd Revised: 2016-08-04 By: mkuhl



Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Notes
1. Coordinate System: NAD 1983 3TM 114
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved. AltaLIS Ltd.
3. Imagery: Alberta Environment and Parks, AS4431-046, 1993-06-04

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Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

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Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
1993

Title
Historical Aerial Photograph Review

\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\historic\sublsite_1998.mxd Revised: 2016-08-04 By: mkuhl

Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

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Prepared by MK on 2016-07-19
Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
1998

Title
Historical Aerial Photograph Review

Notes
1. Coordinate System: NAD 1983 3TM 114
2. Base features: Geogratis, ©Department of Natural Resources Canada, All rights reserved. AltaLIS Ltd.
3. Imagery: Alberta Environment and Parks, AS4971-132, 1998-05-13

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\\Cd1044-f06\shared_projects\113929396\2016 Biophysical\05c_drawings\GIS\Figures\historic\subsite_2009.mxd Revised: 2016-08-04 By: mkuhl

Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Notes
1. Coordinate System: NAD 1983 3TM 114
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3. Imagery: Alberta Environment and Parks, AS5473-046, 2009-07-21

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Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

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Prepared by MK on 2016-07-19
Review by JC on 2016-07-19

Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
2009

Title
Historical Aerial Photograph Review

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Study Area

0 50 100 150 metres

1:5,000 (at original document size of 8.5x11)

Stantec

Project Location
NW ¼ 14-041-28 W4M
East of Gull Lake, Alberta

113929396
Prepared by MK on 2016-07-19
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Client/Project
Riser Developments Ltd.
Lincoln Ranch Development
Biophysical Assessment

Figure No.
2013

Title
Historical Aerial Photograph Review

Notes
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APPENDIX C
DATABASE SEARCH RESULTS

Table of Results Print Preview

Date: 27/7/2016
Requestor: Consultant
Reason for Request: Environmental Assessment
SEC: 14 **TWP:** 041 **RGE:** 28 **MER:** 4

Non-sensitive EOs: 0 (*Data Updated:July 2015*)

M-RR-TTT-SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ

Sensitive EOs: 0 (*Data Updated:July 2015*)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ

Protected Areas: 0 (*Data Updated:May 2015*)

M-RR-TTT-SS	PROTECTED AREA NAME	TYPE	IUCN

No Protected Areas Found

Crown Reservations/Notations: 0 (*Data Updated:May 2015*)

M-RR-TTT-SS	NAME	TYPE

No Crown Reservations/Notations Found

Fish and Wildlife Internet Mapping Tool (FWIMT)

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

Species Summary Report

Report Created: 27-Jul-2016 10:30

Species present within the current extent :

Fish Inventory	Wildlife Inventory	Stocked Inventory
LAKE WHITEFISH	No Species Found in Search Extent	No Species Found in Search Extent
NORTHERN PIKE		
SPOTTAIL SHINER		
WALLEYE		
WHITE SUCKER		
YELLOW PERCH		

Buffer Extent

Centroid (X,Y):	Projection	Centroid: (Qtr Sec Twp Rng Mer)	Buffer Radius:
572274, 5818489	10-TM AEP Forest	NW 14 41 28 4	2 kilometers

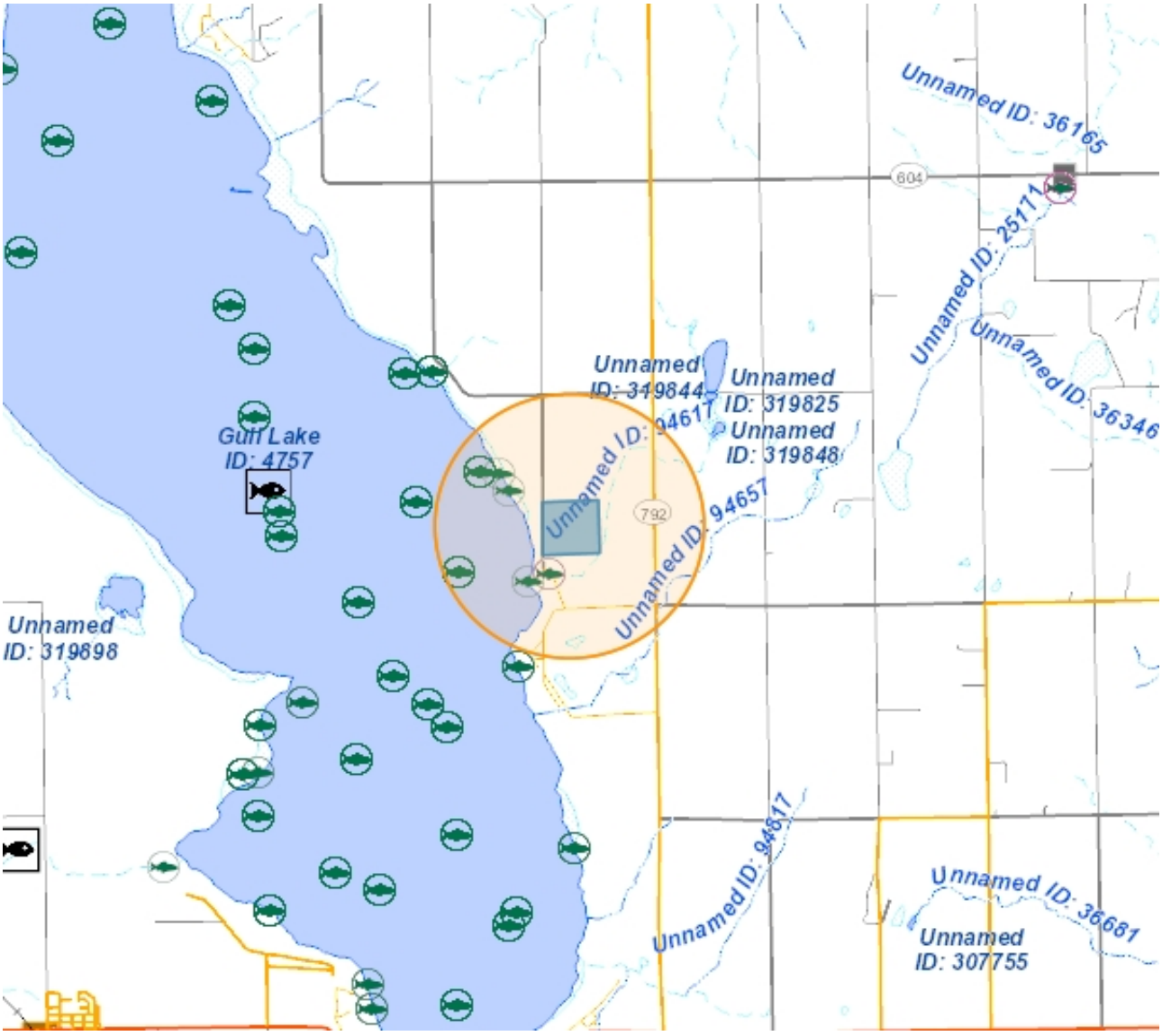
Contact Information

For contact information, please visit:

http://aep.alberta.ca/about-us/contact-us/fisheries-wildlife-management-area-contacts.aspx

27-Jul-2016 10:30

Map Results



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APPENDIX D
SITE PHOTOGRAPHS

Photo 1: Looking south at Tame Pasture TP01 (May 31, 2016)

Photo 2: Looking south at Cultivated Crop CC01(May 31, 2016)

Photo 3: Looking north at Cultivated Crop CC01(May 31, 2016)

Photo 4: Looking south at Wetland WT01 (May 31, 2016)

Photo 5: Ground cover and litter in Wetland WT01 (May 31, 2016)

Photo 6: Looking north at Wetland WT04 (May 31, 2016)

Photo 7: Ground cover and litter in Wetland WT04 (May 31, 2016)

Photo 8: Looking north at Wetland WT06 (May 31, 2016)

Photo 9: Ground cover and litter in Wetland WT06 (May 31, 2016)

Photo 10: Looking south at Wetland WT10 (May 31, 2016)

Photo 11: Ground cover and litter in Wetland WT10 (May 31, 2016)

Photo 12: Looking north at Wetland WT02 (May 31, 2016)

Photo 13: Ground cover and litter in Wetland WT02 (May 31, 2016)

Photo 14: Looking east at Wetland WT09 (May 31, 2016)

Photo 15: Ground cover and litter in Wetland WT09 (May 31, 2016)

Photo 16: Looking south at Wetland WT14 (May 31, 2016)