Town of Sylvan Lake

Natural Areas Management Plan

RC BioSolutions Ltd.

Prepared For:
Town of Sylvan Lake
Planning & Development
5012 48 Avenue, Sylvan Lake, AB T4S1G6

April 2017

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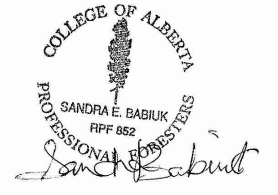
Town of Sylvan Lake



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Executive Summary

The community of Sylvan Lake continues to grow larger and more complex with new lands to the northeast and west being annexed into the town boundaries. This growth has created a long-term demand for more residential, commercial and industrial developments. Much of the land annexed into the Town of Sylvan Lake is undeveloped and contains important natural environmental areas such as wetlands, stream corridors, and large forested areas that have significant ecological value. These natural environmental areas, or environmentally significant areas (ESAs), support both regional and local environmental processes as well as contribute to a more desirable community in which to live.

This Natural Areas Management Plan (NAMP) outlines the methodologies and data sources used to identify and map the ESAs within the Town, and provides recommendations and best management practices to protect these areas. A combination of GIS analyses and field visits were used to identify environmental significant areas and rank them according to their ecological significance. This study was based on similar methods and inventories previously undertaken by the province in 2009 and 2014 as well as by Red Deer County in 2010. The result of this study resulted in the identification of 426 ESAs within the Town boundaries. The ESAs were identified to a fine scale and included small “micro-site” areas throughout the Town (e.g. small wetlands, windrows and forest patches).

The NAMP summarizes an approach for rating the value of ESAs within the Town of Sylvan Lake which can then be used within future annexed lands and land development areas to assess and rate ESAs. The rating of ESAs was based on ecological and hydrological significances which will assist the Town Council and other decision makers to gain essential information about the value of each ESA within the Town of Sylvan Lake. The relative value or rating of ESAs is beneficial in prioritizing ESAs for conservation in order to ensure impacts of future development on ESAs of high significance can be avoided or minimized.

Identified ESAs were classified into three ecological significance ratings including high, moderate, and low levels of significance. Ecological significance ratings were based on important and recognizable environmental elements which contribute to maintaining natural ecological functions such as patch size, patch shape, hydrology, and amount of disturbance caused by humans, etc. The above data analysis, ground-truth surveys, as well as stakeholder and public consultations resulted in 31 high, 122 moderate and 273 low rated ESAs within the Town of Sylvan Lake. Highly rated ESAs and a GIS model were used to develop a connectivity or linkage corridor identifying the potential ecological movement corridors through the study area.

This NAMP report also outlines recommended best management practices (BMPs) for Town-wide environmental conservation as well as suggested setbacks for ESAs and corridors. The intention of this natural areas management document is to guide and inform development planning in a manner that protects complexes of natural environmental features for their

ecological value in order to enable the Town of Sylvan Lake to manage its long-term growth in an environmental sustainable manner.

The suggested management recommendations described within the NAMP are not policy. Recommended setbacks and development requirements are guidelines that have been derived from scientific research and best management practices and policies of other municipalities in Canada and the USA.

Future developments should be viewed on a case by case basis and project specific approval will be at the discretion of the Town Council. The purpose of the management recommendations presented within this NAMP are not an exclusive source for planning development but rather a means to support and communicate planning and development design processes with the Town Council. Additional resources, standards, ecological surveys, and expert advice will most likely be needed to ensure overall environmental goals for the Town of Sylvan Lake are met.

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Appendices

Appendix A. Public Consultation
Appendix B. Detailed Environmentally Significant Areas Information

1. Introduction

The community of Sylvan Lake is located in Central Alberta approximately 17 km west of the City of Red Deer which is part of the Edmonton/Calgary corridor. Sylvan Lake is known as a popular summer resort destination as well as a desirable permanent residential community. The Town of Sylvan Lake currently has a population of approximately 14,310 residents (as of 2015 municipal census) with a 10% growth in population over the municipal census in 2013 (Town of Sylvan Lake, 2016). The community of Sylvan Lake continues to grow larger and more complex with new lands to the northeast and west which have been annexed into the town boundaries. This natural areas management plan includes all lands within the Town of Sylvan Lake "the Town", including recently annexed lands, here in referred to as the "study area''. The natural areas management plan will provide a tool to Town managers in making more informed decision regarding sustainable land use planning in order to make the Town of Sylvan Lake a more vibrant, healthy and anesthetically pleasing place to live and visit. This Natural Areas Management Plan is meant to reflect the Town's goal to "C*onserve natural resources and integrate nature into the Town*", as identified in the Town's Municipal Development Plan (PCPS, 2014).

The first part in developing a natural areas management plan involves identifying and mapping Environmental Significant Area/Areas (ESA/ESAs). ESAs are generally defined as areas that are vital to the long term maintenance of biological diversity, physical landscape features and/or other natural processes at multiple spatial scales (Jennings and Reganold, 1991). Many studies have been completed at a provincial level involving ESAs in Alberta. The most recent update of the provincial study was completed by Fiera Biological Consulting in 2014 and included four overall criterions with 10 sub-criterion and 25 indicators (Fiera, 2014). In 2011 an Environmental Significant Areas study was conducted by Golder Associates Ltd. for the County of Red Deer which included Sylvan Lake. This study resulted in 13 overall criterions to identify and map ESAs (Golder, 2010). In contrast to these earlier studies, this study incorporates specific goals and desired out comes of the Town, mapping ESAs at a town-wide scale, and refining criteria previously used to reflect the ecosystems occurring within the study area. Completing the study at a town-wide scale allows for inclusion of small scale features which are important for the overall landscape ecology integrity. As well this study incorporates general landscape pattern principles in order to rank ESAs in an effort to protect and conserve ESAs within the defined boundaries.

This natural areas management plan will be used to guide and inform the development of new area structure plans and outline plans, as well as update any existing plans where needed. The natural areas management plan will be used to inform future policies and regulations developed within the Town and will guide the management of environmental resources within the study area for current and future generations. The following report outlines the methodologies, guiding principles and data sources used to identify and map environmental significant landscape features in the Town of Sylvan Lake study area.

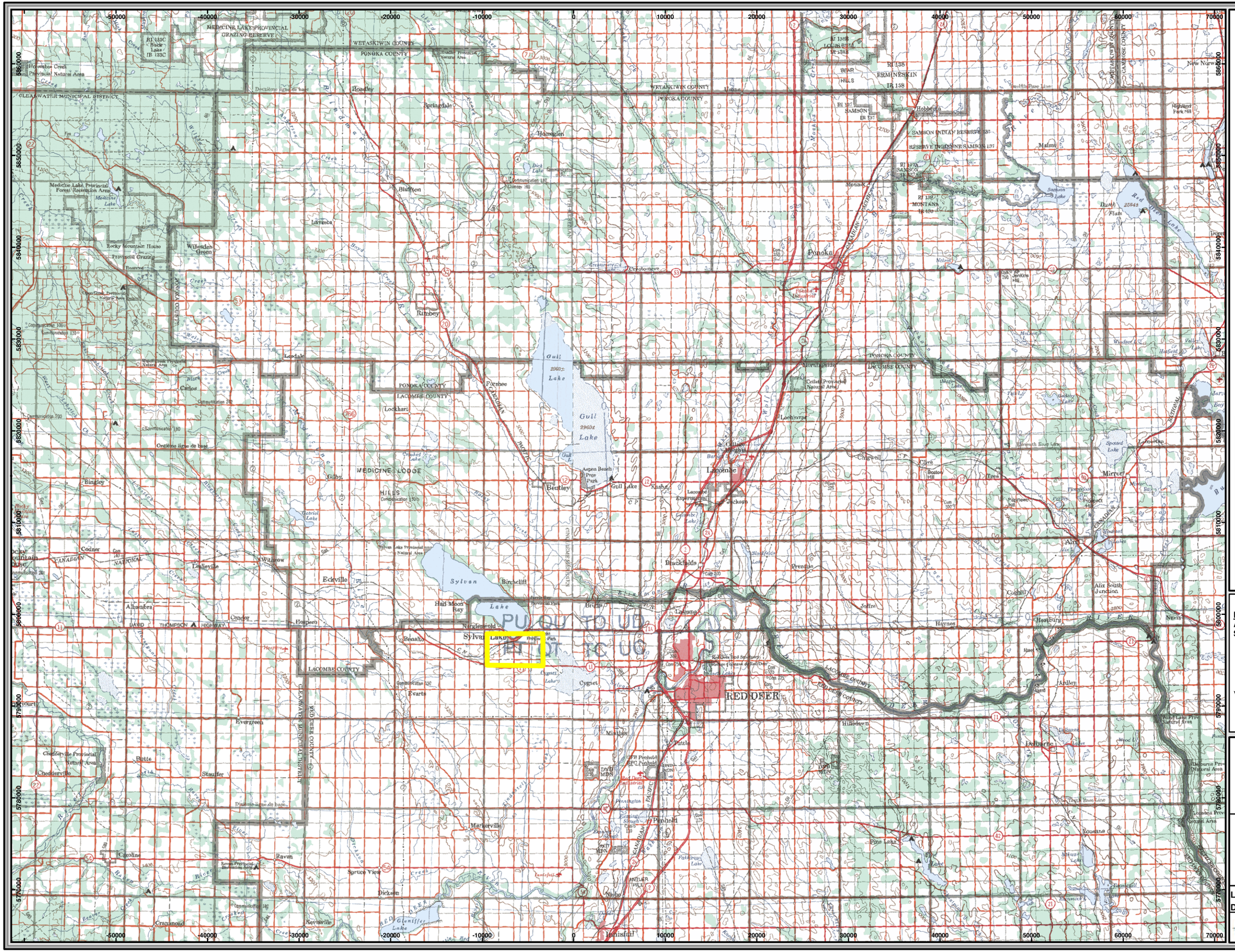
1.1 Study Objectives

The identification of ESAs can be used to prioritize natural area management strategies for areas that are under-protected or contain vulnerable, unique or rare resources and/or "irreplaceable" resources (Margules and Pressey, 2000). The objectives of this natural areas management plan include:

- Preparing a Natural Areas Management Plan for the Town based on findings from previous Environmentally Significant Areas reports for the Province and Red Deer County (Fiera Biological Consulting, 2009; Fiera Biological Consulting, 2014; Golder Associates, 2011) while tailoring ESA criteria, ESA rating and best environmental practices for Town-wide natural areas management and planning;
- Identifying and mapping all ESAs within the town boundaries;
- Prioritizing ESAs by conservation concern and "species at risk" in the Town, as well as general conservation setbacks and practices to preserve and protect these ESAs and species that inhabit them; and
- Recommending best management practices for the Towns ESAs.

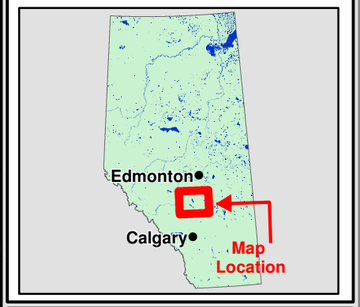
1.2 Study Area

The study area for the NAMP includes all lands within the Town of Sylvan Lake, Alberta (Figures 1.2-1 and 1.2-2). The study area is located within two mapped natural regions of Alberta including the Boreal Forest and the Parkland Natural Regions (Natural Regions committee, 2006).



LEGEND

- Road
- Railroad
- Watercourse
- Waterbody
- Wetland
- Study Area
- Township Grid



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

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Meters

Scale: 1:385,000
NAD 1983 3TM 114

A Town for all Seasons
Sylvan Lake

Town of Sylvan Lake
Natural Areas Management Plan

Study Area Location

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 1.2-1

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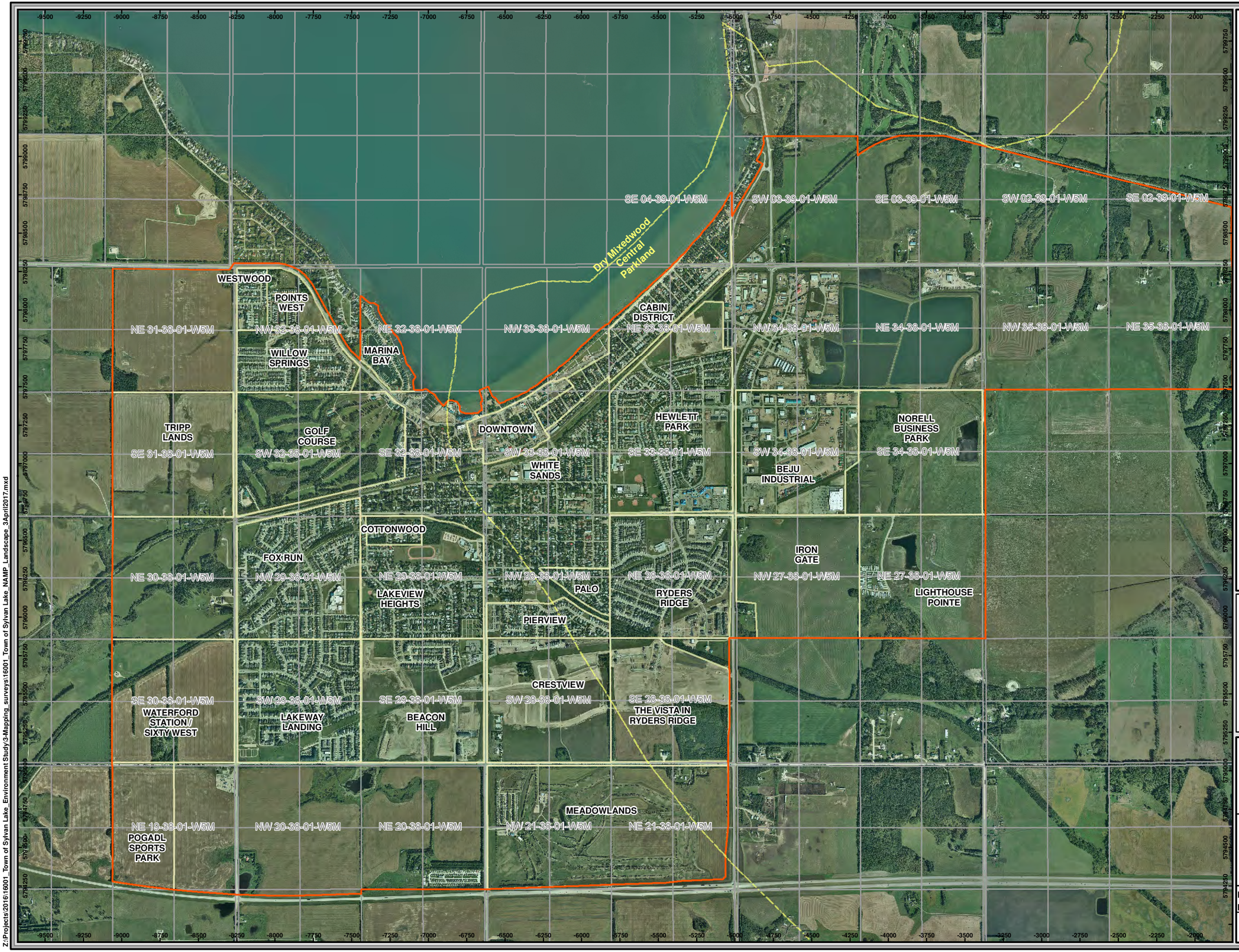
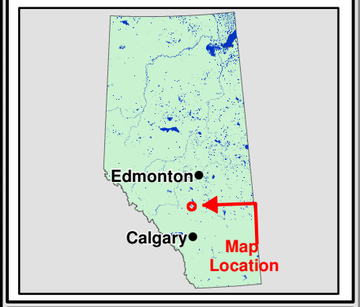


LEGEND

- Neighbourhood Boundary
- Natural Subregions of Alberta
- Town Boundary
- Township Grid



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 125 250 500 750 Meters

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NAD 1983 3TM 114

Sylvan Lake — A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

Study Area Overview

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 1.2-2

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1.2.1 Natural Regions

The project area falls within two natural regions of Alberta including the Boreal Forest and the Parkland Natural Regions (Natural Regions committee, 2006). The Boreal Forest Natural Region includes the Dry Mixedwood, Central Mixedwood, Lower Boreal Highlands, Upper Boreal Highlands, Athabasca Plain, Peace-Athabasca Delta, Northern Mixedwood, and Boreal Subarctic Natural Subregions. Northern Alberta is comprised mainly of the Boreal Natural Region which covers approximately 58% of the province. The Parkland Natural Region includes the Foothills Parkland, Central Parkland and Peace River Parkland Natural Subregions (Natural Regions Committee, 2006).

The Town of Sylvan Lake is located within both the Dry Mixedwood and Central Parkland Natural Subregions of Alberta (Natural Regions Committee, 2006). The Dry Mixedwood Subregion is considered a transition between the Central Parkland and the Central Mixedwood Subregions (Kupsch *et al*., 2013).

1.2.1.1 Dry Mixedwood

The Dry Mixedwood Natural Subregion has the warmest summers and highest growing degree day accumulations within the Boreal Natural Region (Natural Regions Committee, 2006). Summer mean temperature is 13.8 Degrees Celsius (°C) with winter temperatures averaging -10.5°C (Moisey e*t al.*, 2012). Average annual precipitation is 380 millimeters (mm) with approximately 70% of the precipitation happening during April to August (Natural Regions Committee, 2006). The modal plant community within this Subregion is dominated by trembling aspen (*Populus tremuloides*) in the overstory with understory species being quite variable containing rose (*Rosa* species), beaked hazelnut (*Corylus cornuta*), Saskatoon (*Amelanchier alnifolia*), tall forbs and bluejoint (*Calamagrostis canadensis*) (Moisey *et al*., 2012).

The Dry Mixedwood Natural Subregion is predominately trembling aspen forest and cultivated landscapes, with fens occurring as the characteristic wetland (Natural Regions committee, 2006).

1.2.1.2 Central Parkland

The Central Parkland Natural Subregion is considered one of the most diverse Subregions in Alberta (Kupsch *et al*, 2013). The Subregion is highly productive for annual crops due to adequate summer precipitation, a warm and long growing season and suitable soils (Natural Regions Committee, 2006). Precipitation patterns are very similar to those of the Dry Mixedwood Subregion (Natural Regions Committee, 2006). This Subregion is a mosaic of many different vegetation communities throughout the landscape including grasslands, mixed deciduous forests, mature trembling aspen forests, saline wetlands, shrublands and sparsely vegetated communities (Kupsch *et al*, 2013).

1.2.2 Vegetation

Vegetation communities within the study area are of a highly modified nature with native vegetation communities being uncommon and observed almost exclusively within the undeveloped lands within the Town boundaries. The undeveloped areas contain many agricultural fields which are either used as tame pasture or cultivated fields.

Cultivated land within the study area is mainly arable lands used for the production of forages (e.g. alfalfa (*Medicago sativa*), brome grass (*Bromus* species), timothy (*Phleum pratense*), wheatgrasses (*Elymus* species), clover (*Trifolium* species) wild ryes (*Elymus* species), and canola (*Brassica napus*). Cultivated land is the predominant land use observed within the undeveloped lands with some areas used as pasture. Improved pasture is typically dominated by introduced agronomic forage species such as Kentucky blue grass (*Poa pratensis*) and smooth brome (*Bromis inermis*). Other non-native species such as dandelion (*Taraxcum officinale*), orchard grass (*Dactylis glomerata*), clover (*Trifolium* species), creeping thistle (*Cirsium arvense),* and alfalfa also occur throughout the study area.

Many shelterbelts or linear treed areas occur within the undeveloped lands with the majority of them containing planted Manitoba maple (*Acer negundo*) and common caragana (*Caragana arborescens*). Linear treed areas occurring adjacent to roads contain mainly trembling aspen and balsam poplar (*Populus balsamifera*) with a native shrub layer. Along residential driveways and surrounding residents houses includes narrow rows of planted cottonwoods (*Populus* species) and white spruce (*Picea glauca*).

Patches of remnant forest occur throughout the undeveloped lands. The upland areas are dominated by mature trembling aspen in the overstory and Saskatoon, prickly rose (*Rosa acicularis),* snowberry (*Symphoricarpos albus*), and choke cherry (*Prunus virginiana*) within the shrub layer. Forbs and herbs found within these areas are tall lungwort (*Mertensia paniculata*), palmate-leaved coltsfoot (*Petasites frigidus var. palmatus*), norther bedstraw (*Galium boreale*), cream colored vetchling (*Lathyrus ochroleucus*), wild vetch (*Vicia americana*), wild strawberry (*Fragaria virginiana*) and wild sarsaparilla (*Aralia nudicaulis*). Within lower treed areas balsam poplar dominates the overstory with red-osier dogwood (*Cornus stolonifera*), currents (*Ribes* species), willow (*Salix* species), and wild red raspberry (*Rubus idaeus*) within the shrub layer.

Willow dominate the larger wetland perimeters with common cattails (*Typha latifolia*), water sedge (*Carex aquatilis*), hairy-fruited sedge (*Carex lasiocarpa*), small bottle sedge (*Carex utriculata*), awned sedge (*Carex atherodes*), wire rush (*Juncus balticus*), bulrushes (*Scirpus* species and *Schoenoplectus* species) occurring in the wetter portions of the wetland.

1.2.3 Geology and Landforms

The study area is underlain primarily by the Paskapoo formation (Peters and Bowser, 1960). The Paskapoo formation is relatively non-saline and is characterized as clayey, calcareous, soft gray colored sandstone and siltstone with a freshwater deposition (Peters and Bowser, 1960).

The parent materials within the study area are fairly uniform glacial till with the surface horizons usually somewhat sorted and relatively free of stones (Peters and Bowser, 1960). The study area is comprised mainly of morainal deposits with portions of glaciolacustrine overlying morainal parent materials. Parent materials within the study area are characterized by level to very gently undulating slopes (Peters and Bowser, 1960).

1.2.4 Soils

Detailed soil surveys within the regional area are limited; however, general descriptions for soil orders potentially occurring within the study area have been extrapolated from other existing published soil surveys and soils maps including Agricultural Regions of Alberta Soil Inventory Database (AGRASID) soil viewer (AGRASID, 2016), *Soil Series Information for Reclamation Planning in Alberta* (Pedocan Land Evaluation, 1993) and the *Soil Survey of Rocky Mountain House Sheet* (Peters and Bowser, 1960). Soil orders which are mostly to occur within the study area included Luvisols, Chernozems, Gleysols, and Regosols. Descriptions of the potential soil orders and great groups are provided in Table 1 below.

Table 1. Potential Soil Order Descriptions

Soil Order	Potential Great Groups within Study Area	Potential Parent Material within Study Area	Potential Soil Series	General Properties	Potential Sensitivity to Disturbance
Luvisols	• Dark Gray Luvisols, • Orthic Gray Luvisols	• Morainal	• Benalto • Brenton, • Winterburn-AA	Luvisolic soils develop typically under forested environments on well to imperfectly drained sites where the parent materials contain appreciable clay. Luvisols have elluvial A horizon (Ae) from which clay has been leached after snowmelt or heavy rains and illuvial horizons (Bt) in which clay has been deposited.	Fine textured (sand and silt) surficial material can be susceptible to wind and water erosion if left unvegetated.
Chernozems	• Orthic Black Chernozem, • Eluviated Black Chernozem, • Orthic Dark Gray Chernozem • Gleyed Dark Gray Chernozem	• Morainal, • Lacustrine, • Glaciolacustrine, • Fluvial	• Penhold • Cygnet • Lonepine, • Winterburn-AA, • Falun • Anton • Eckville-AA	Chernozemic soils are typically well to imperfectly drained having surface horizons darkened by accumulation of organic matter. These soils generally develop under grassland communities or of grassland/forest communities with a cool, subarid to subhumid climate.	Many of the soil series identified within the study area have the potential to have very thick topsoil layers (~40 cm). Care should be taken during soil stripping activities.
Gleysols	• Orthic Humic Gleysol,	• Undifferentiated • Glaciolacustrine	• Misc. Gleysol, • Tuttle • Raven	Gleysolic soils are usually classified as soils that are periodically or permanently saturated with water and are depleted of oxygen. Gleysolic soils mainly occur within shallow depressions and level landscapes where surface conditions which promote flooding and promote saturation with water for part or all of the year. Gleysolic soils characteristically exhibit poor drainage and a drab grey colour which is sometimes accompanied by brown/rust colored mottles.	These soils can be saturated for portions of the season and are susceptible to rutting and compaction.
Regosols	Regosol	• Alluvium		Regosolic soils are frequently referred to as weakly developed, lacking a recognizable B horizon and are predominately rapidly to imperfectly drained. The absence of a developed and recognizable B horizon is possibly a resulted of young material, instability of material, colluvium materials on unstable slopes, climate, dry cold conditions etc.	These soils were mainly identified near the lake shore. Otherwise these soils were not identified by resources anywhere else in the study area. These soils are slightly under developed and may be unstable.

1.2.5 Wildlife Resources

The combination of upland and lowland habitats within the Central Parkland and Dry Mixedwood Natural Subregions provide a variety of habitat for ungulates, carnivores, amphibians, reptiles and breeding birds (Natural Regions Committee, 2006). The low lying willow shrub communities, mixed deciduous forests and riparian communities with the Subregions provide suitable habitat for ungulates such as the white-tailed deer, mule deer and moose. Snowshoe hare, red squirrel, American porcupine, voles and mice are typical small mammal species found within the two Subregions (Natural Regions Committee, 2006). Other small mammals include striped skunk, woodchucks, shrews, ground squirrel and American badger (Natural Regions Committee, 2006).

Aquatic and wetland areas provide habitat for a variety of waterfowl and shorebirds including diving ducks, grebes, Black terns, gulls, sandpipers and sandhill cranes. The boreal chorus frog, wood frog, western toad, and Canadian toad are typical amphibian species known to occur in the two Subregions (Natural Regions Committee, 2006). Beaver and muskrat are also typical occurrences in aquatic communities were suitable habitat for foraging and overwintering occur. Coyotes and foxes are typical carnivores with cougar, lynx, black bears, wolves, and weasels occurring less frequently and more common in the boreal forests (Natural Regions Committee, 2006).

Due to the diversity of habitat within the study area from trembling aspen, mixedwood forests, willow shrubland, lake shores, wetlands and open grassland areas a wide variety of habitat is provided for breeding birds. The tracks of existing mixedwood and aspen forests in the study area provide nesting habitat for many songbirds and woodpeckers including a few sensitive listed species in Alberta such as the American kestrel, least flycatcher, western wood-pewee, pileated woodpecker and eastern phoebe.

The Fish and Wildlife Information Management System (FWIMS) online database was searched in March, 2016 and detailed occurrences for the area were requested from the Alberta Environment and Parks (AEP) wildlife biologist to provide any known wildlife occurrences within the study area. One species, the yellow rail, listed federally as Schedule 1, Special Concern and provincially as Undetermined was identified as occurring adjacent to the study area. Documented wildlife sightings in the study area are limited and very few wildlife surveys have been conducted within the vicinity of the town. A list of species of conservation note either observed or with the potential to occur within the town, which are listed by Species at Risk Act (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or identified as being of conservation importance in the province of Alberta (GOA, 2015) are presented within Table 2.

Table 2. Wildlife species observed or with the potential to occur in study area.

Scientific Name	Common Name	Alberta Status[1]	SARA Status[2]	COSEWIC Status[3]	Habitat	Natural Sub-region[5]
Aechmophorus occidentalis	Western Grebe	Sensitive, Threatened [4]	No schedule, No Status	Special Concern	Wetlands, lakeshores	CP,DM
Anaxyrus boreas	Western Toad	Sensitive	Schedule 1, Special Concern	Special Concern	ponds, streams, rivers and lakes	CP, DM
Anaxyrus hemiophrys	Canadian Toad	May Be At Risk, Data Deficient[4]	No schedule, No Status	Not at Risk	boreal forests, aspen parkland, lakes ponds, ditches, marshes and other temporary waterbodies	CP, DM
Asio flammeus	Short-eared Owl	May Be At Risk	Schedule 1, Special Concern	Special Concern	native grasslands, prairies and fields	CP, DM
Chordeiles minor	Common Nighthawk	Sensitive	Schedule 1, Threatened	Threatened	Open areas/vegetation free habitats (wetlands, clearings, bogs, marshes, pastures, grasslands)	CP, DM
Contopus cooperi	Olive-sided Flycatcher	May Be At Risk	Schedule 1, Threatened	Threatened	coniferous forests on the edges of bogs and wetlands	CP,DM
Coturnicops noveboracensis	Yellow Rail	Undetermined	Schedule 1, Special Concern	Special Concern	marshes dominated by sedges, true grasses, and rushes, damp fields, meadows, floodplains of rivers and streams, bogs, and salt marshes	CP, DM
Dolichonyx oryzivorus	Bobolink	Sensitive	No schedule, No Status	Threatened	tall grasslands, uncut [pastures, fields and meadows	CP
Falco mexicanus	Prairie Falcon	Sensitive, Species of Special Concern[4]	No schedule, No Status	Not at Risk	native grasslands, cultivated prairies and fields	CP, DM
Hirundo rustica	Barn Swallow	Sensitive	No schedule, No Status	Threatened	open habitats, fields, parks, marshes, meadows, ponds, commonly nests on man-made structures	CP, DM
Lithobates pipiens	Northern Leopard Frog	At Risk, Threatened[4]	Schedule 1, Special Concern	Special Concern	Wetlands, fish free streams	DM
Podiceps auritus	Horned Grebe	Sensitive	No schedule, No Status	Special Concern	Wetlands, lakeshores	CP,DM
Myotis septentrionalis	Northern Myotis	May Be at Risk, Data Deficient[4]	Endangered, Schedule 1	Endangered	Mature boreal forest, aspen parkland	DM
Riparia riparia	Bank Swallow	Secure	No schedule, No Status	Threatened	low areas along river, streams reservoirs	CP, DM
Taxidea taxus	American Badger	Sensitive, Data Deficient	No schedule, No Status	Special Concern	Open treeless habitats, prairies, open parkland and grasslands, fields	CP, DM

Note:
1. Listing in the General Status of Alberta Wild Species 2010 (GOA, 2014)
2. Listing under Schedule 1 of the Species at Risk Act (Government of Canada, 2012)
3. Assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2014)
4. Listing under the Species Assessed by the Alberta Conservation Committee (GOA, 2015)
5. CP = Central Parkland; DM = Dry Mixedwood

1.2.6 Watersheds and Aquatic Resources

1.2.6.1 Watercourses

There are several ephemeral draws and two permanent watercourses within the study area. The ephemeral draws are not considered to contain any fish habitat while the two permanent watercourses are considered to contain fish habitat.

One permanent watercourse is located on the east side of the study area and flows out of Sylvan Lake, parallels Highway 20 and 11A before flowing into Cygnet Lake. This watercourse is coded as a class C on the Alberta Environment and Parks Code of Practice maps for Red Deer (Alberta Sustainable Resource Development (ASRD), 2006). The Guide to the Code of Practice defines a class C watercourse as one that has moderate sensitivity with habitat areas that are sensitive enough to be potentially damaged by unconfined or unrestricted activities within the water body, with broadly distributed habitat supporting local fish species populations. However, there are no records on the Fish and Wildlife Information Management System (FWIMS) online database showing fish presence in this watercourse.

The other permanent watercourse (locally known as Golf Course Creek) is located on the west side of the study area and flows into Sylvan Lake at Marina Bay. This watercourse is not mapped on the Alberta Environment and Parks Code of Practice maps, but is mapped on the FWMIS Internet Mapping Tool. The watercourse is considered fish bearing within its lower reaches (Personal Communication, AEP Biologist - Jason Cooper).

1.2.6.2 Water bodies

The only large water body in the study area is Sylvan Lake. The following lake overview was composed based on information obtained from the Alberta Lake Management Society Lakewatch Report on Sylvan Lake (Alberta Lake Management Society, 2009). Sylvan Lake is a large, moderately deep, mesotrophic lake with an area of approximately (42.8 km^2). The lake has a maximum depth of approximately 18.3 m. Sylvan lake has a small watershed, with a catchment area approximately 2.5 times the lake surface area, and only has intermittently flowing inlets and outlets. As a result, lake levels are primarily controlled by precipitation and evaporation at the lake surface. The lake bottom slopes gradually from the northwest and southeast ends to the deepest part of the lake near the middle of the basin. The lake develops a thermocline in the summer between 12 and 14 m, resulting in dissolved oxygen levels decreasing to anoxic conditions within 2 m of the lake bed in deeper portions of the lake. Severe winter kills from lack of oxygen do not typically occur (Mitchell and Prepas 1990).

The Fisheries & Wildlife Management Information System (FWIMS) online database shows eight commonly documented species of fish within Sylvan Lake including five sport fish species, one sucker species, and two small bodied fish species. The lake supports a recreational fishery, with the most sought after fish species being walleye and northern pike. Among the sport fish species known to occur in the lake, one is a fall spawner (lake whitefish), one is a winter

spawner (burbot) with the remaining three (northern pike, walleye and yellow perch) being spring spawners. The three common non-sport fish species (emerald shiner, spottail shiner and white sucker) in Sylvan Lake spawn in the summer months (Nelson and Paetz, 1992).

1.2.6.3 Wetlands

Historically the study area occurred within a mosaic of wetland complexes which have since been lost to residential developments throughout the Town. Currently within the study area wetlands are predominantly mineral wetlands and include both marshes and swamps. There are not any known organic wetlands (bogs or fens) within the study area. Many of the ephemeral and temporary wetlands have been annually cultivated and contain mainly non-native invasive species.

There are many open water wetlands within the study area which provide valuable wildlife habitat and rare plant habitat. Many of these wetlands are known to provide habitat to sensitive species including the black tern. These areas are found within the southwest corner and northeast corner of the study area.

Larger treed swamps occur mainly in the northeast corner of the study area and are dominated by balsam poplar with cow parsnip (*Heracleum maximum*), purple avens (*Geum rivale*), small bottle sedge and awned sedge occurring in the understory.

1.2.7 Groundwater Resources

Sylvan Lake is largely fed by groundwater, and Baker (2009) stated that “groundwater through-flow is likely partly responsible for the relatively low trophic status of Sylvan Lake as compared to other lakes in south-central Alberta”.

There are seven shallow groundwater wells throughout the study area that supply potable water for the Town of Sylvan Lake and numerous other wells that supply the surrounding area.

1.2.8 Protected Areas

The only protected area in the study area is the Sylvan Lake Provincial Park. The park is located on the south east shore of Sylvan Lake, immediately north of the Town of Sylvan Lake. The park encompasses 1.6 km of shoreline between 33 street and 50 street and includes the pier on the west end. All rules and regulations under the *Provincial Parks Act* and a variety of other provincial and federal legislation apply to activities within the park boundaries.

1.2.9 Development Pressures

1.2.9.1 Residential and Lakeshore Developments

As the Town of Sylvan Lake grows the pressure for residential and commercial/industrial developments within the Town has increased. Lakeshore development pressure has also increased with newly built townhouses along the shoreline as well as other tourist attractions.

1.2.9.2 Agriculture

Many of the properties are still currently being used for agricultural purposes, especially those recently annexed into the Town. Typical crops include hay (alfalfa, brome grass, timothy, etc.), barley and wheat. Also many lands within the northeast of the study area are tame pasture used by livestock.

2. Methodology

2.1 Public Consultation

Two forms of public consultation were completed: an online survey and a meeting with undeveloped lands landowners. The online survey was completed in February 2016 which consisted of a variety of questions regarding Environmental Significant Areas and their importance to town residents. This survey was posted on the Town of Sylvan Lake's website and was available to the public. Survey questions are presented within Appendix A.

The meetings with the undeveloped land landowners were completed on March 30 and 31, 2016. A presentation outlining the project was presented to the landowners along with a questionnaire. Following the presentation, time was left for questions regarding the natural areas management plan and ESAs. Questionnaire questions area presented with Appendix A.

The results from the two public consultations were used to help identify and rate ESAs within the study area.

2.2 Identification of Environmentally Significant Areas

Environmentally significant areas are defined as areas that are vital to the long term maintenance of biological diversity, physical landscape features and/or other natural processes at multiple spatial scales (Jennings and Reganold, 1991). To maintain consistency with other ESA studies completed in Central Alberta, the multi-criteria system adopted by the County of Red Deer (Golder, 2011) has been used to identify Environmentally Significant Areas within the study area. The criteria, defined in Golder (2011) and Sweetgrass (1990) are sound, ecologically based criteria. Thirteen overall criteria were used for Red Deer County (Golder,

2011), however due to the differences in project scale (county vs. town) many of the criteria were refined to represent the landscape within our study area. As such, this resulted in six overall criteria used to identify ESAs within the Town of Sylvan Lake. These included:

- Areas that contain focal species, species groups and their habitats,
- Areas of large intact patches of natural vegetation,
- Areas of connecting habitat and corridors,
- Areas important for maintaining water quality and quantity,
- Riparian areas; and,
- Areas of significant cultural, historic, or scenic value.

2.2.1 Remote Sensing

Many different data sources were used in order to map the environmentally significant areas within the study area. Depending on the criteria being mapped, different data sets along with aerial photographs and professional judgement were used to map the ESAs in the study area. Datasets used to identify ESAs within the study area are presented within Table 3.

Table 3. Summary of Geographic Information System (GIS) Data Used to Identify ESAs

Criteria	Indicators	Data Source
Areas that contain focal species, species groups and their habitats	Native Vegetation	Alberta Environment and Parks Central Parkland Vegetation Inventory, Aerial photographs (2008, 2011, 2014)
	Watercourses	Code of Practice Management maps, Fisheries & Wildlife Management Information System (FWIMS), Aerial photographs (2008, 2011, 2014)
	Rare, threatened or endangered species	Alberta Conservation Information Management System (ACIMS), Fisheries & Wildlife Management Information System (FWIMS)
Areas of large intact patches of natural vegetation	Terrestrial Vegetation Patches	Central Parkland Vegetation Inventory, Aerial photographs (2008, 2011, 2014)
Areas of connecting habitat and corridors	Native vegetation corridors	Central Parkland Vegetation Inventory, Aerial photographs (2008, 2011, 2014)
Areas important for maintaining water (surface and ground) quality and quantity	Wetlands	Alberta Merged Wetland Inventory, LiDAR, Aerial photographs (2008, 2011, 2014), Alberta Soils Information Viewer (AGRISID)
	Watercourses	National Hydro Network water features (polygons and line features, Code of Practice Management maps, Aerial photographs (2008, 2011, 2014)

Criteria	Indicators	Data Source
	Lakes	Aerial photographs (2008, 2011, 2014)
	Riparian areas	Alberta Merged Wetland Inventory, National Hydro Network water features (polygons and line features, Central Parkland Vegetation Inventory, Code of Practice Management maps, Aerial photographs (2008, 2011, 2014)
	Bedrock geology	Alberta Geology Survey
	Surficial geology	Alberta Soils Information Viewer (AGRISID), Alberta Geology Survey (AGS) Surficial geology line features, Alberta Geology Survey (AGS) surficial geology polygons
Riparian areas	Watercourses	Central Parkland Vegetation Inventory, Code of Practice Management maps, Aerial photographs (2008, 2011, 2014)
Areas of significant cultural, historic, or scenic value	Provincial parks Campgrounds	National protected places polygons

2.2.1.1 Wetlands

Due to the highly modified landscape in which the Town of Sylvan Lake occurs, the use of aerial photographs exclusively may not capture all ephemeral and temporary wetlands within this agriculture dominated landscape. As such, Light Detection and Ranging (LiDAR) was used to create a digital elevation model (DEM) of the study area and this DEM was then evaluated for depressions using the Whitebox Geospatial Analysis Tools (GAT) project. The Whitebox GAT project began in 2009 and is a public access Geographic Information System (GIS) and remote sensing software package for general applications of geospatial analysis and data visualization (Lindsey, 2014).

Within the Whitebox GAT project the Stochastic Depression Analysis tool was used. This tool mapped topographic depressions in a digital elevation model (DEM), using a stochastic simulation approach (i.e. Monte Carlo method) (Lindsay, 2014). The stochastic simulation approach is a re-implementation of the algorithm described by Lindsay and Creed (2006), which originally appeared in the Terrain Analysis System (TAS) software (Lindsey, 2014). Depressions are filled using the highly efficient Wang and Liu (2006) depression filling algorithm (Lindsay, 2014). The results from this tool were compared with data from AGRASID, the Central Parkland Vegetation Inventory, the National Hydro Network, etc., in order to determine the accuracy of the results.

Wetlands were classified using the Alberta Wetland Classification System (ESRD, 2015). Due to the rigorous and in-depth methods to classify wetlands under the new Alberta wetland policy, wetlands were classified to form only.

2.2.1.2 Terrestrial Resources

Terrestrial resources include native vegetation communities, wildlife habitat, and soil resources. In order to map these resources, aerial photographs were overlaid with appropriate data sources in order to determine if a terrestrial resource where present. Digital data used to identify terrestrial resources included, but not limited to, AGRASID, the Central Parkland Vegetation Inventory, results from FWMIS and Alberta Conservation Information Management System (ACIMS), Alberta Geological Survey (AGS) surficial geology line and polygon features, etc.

2.2.1.3 Aquatic Resources

Aquatic resources include watercourses and water bodies in addition to their riparian habitats. Digital data was overlaid with aerial photographs in order to determine the location of watercourses or water bodies within the study area. Data sources used will included Alberta Code of Practice maps, FWMIS, National Hydro network line work, etc.

2.2.1.4 Rare, threatened or endangered species

Rare, threatened or endangered species as well as their habitats were mapped using information from numerous sources including Central Parkland Vegetation Inventory, results from FWMIS, Important Bird Areas of Alberta, and all relevant AEP wildlife range and sensitive wildlife layers.

2.2.2 ESA Types/Groups

Identified ESAs were grouped based on vegetation communities, ecological functions and landuse. These groupings were used in developing suggested recommendations for conservation and preferred setbacks. Fourteen types of ESAs were mapped and a summary of these types is presented within Table 4 below.

Table 4. ESA Groupings and Types

ESA Grouping	Description
Forested (Deciduous)	This type is dominated by a tree canopy mainly comprised of trembling aspen and/or balsam poplar.
Forested (Mixedwood with Deciduous and Coniferous)	This type includes areas containing mixedwood forest of both trembling aspen and white spruce.
Grassland (Natural/Semi-natural)	This type includes any area which exhibits characteristics of natural to semi-natural grasslands of the central parkland or dry mixedwood regions. These areas are dominated by graminoids including plains rough fescue, western porcupine grass, northern wheat grass, slender wheat grass and a variety of perennial herbs. These areas have low to moderately well-developed shrub layer including rose, silverberry and willows.
Riparian (Lake)	This type of ESA is exclusively the riparian area of Sylvan Lake which is mainly disturbed from lake front developments.
Water body (Lake)	This includes areas which are part of Sylvan Lake mainly an inland marina development within the northwest portion of the study area.
Watercourse (Small Permanent)	Watercourses which exhibit characteristics of a small permanent watercourse including a defined channel and a width of approximately 0.4 m to 5 m.
Watercourse (Ephemeral)	This includes watercourses which lack a defined channel and are mainly vegetated. These drainages only flow during periods of high surface water flow (heavy rainfall, spring runoff, etc.).
Wetland (Shallow Open Water)	These are wetlands that typically have some open water zones for the majority of the years.
Wetland (Marsh)	These are mineral wetlands which are graminoid dominated with water levels near, at or above the ground surface for variable periods during the growing season.
Wetland (Swamp)	These are mineral wetlands that have at least 27% woody cover (trees or shrubs).
Wetland (Ephemeral)	Wetlands with surface water present in most years but only for a brief period of days after snowmelt or a heavy rainfall. Some water tolerant vegetation may be present, however they are not dominant and are mixed with upland species.
Windrow	Mainly linear areas which have been planted with Manitoba maple and caragana.
Drainage Ditch	Areas which have been made to drain surface water from adjacent developments. Many of these have somewhat naturalized and contain some native wetland vegetation such as cattail, bulrush and sedge.
Stormwater Pond/ Dugout	Includes stormwater ponds used for community runoff and dugouts within undeveloped lands which are used for livestock. Also includes large settling ponds on the east side of the study area.

2.3 Ecological Assessment

The Town of Sylvan Lake occurs within a highly modified landscape, most notably the decrease in amount of available habitat for a variety of species due to agriculture, residential and industrial development expansion. This modified habitat landscape pattern can have large implications to population survival.

Landscape pattern refers to the distribution of habitat and resources within a landscape (Harrison and Fahrig, 1995). Generalized landscape patterns and principles in landscape ecology are related to configuration and connectivity as well as fragmentation of the landscape (O2 Planning and Design, 2013a). Forman (1995) suggested that the following are indispensable features to provide and maintain an ecologically sustainable landscape:

- Patches: Large patches of natural vegetation,
- Corridors: linear areas of natural vegetation which provide connectivity between large patches,
- Riparian Areas; and,
- Stepping stones: smaller natural vegetation patches.

This generalized pattern approach uses the above listed features in certain “indispensable landscape patterns” which, if properly protected, will conserve the majority of essential ecological functions on the landscape (Forman, 1995) (Figure 2.3-1).

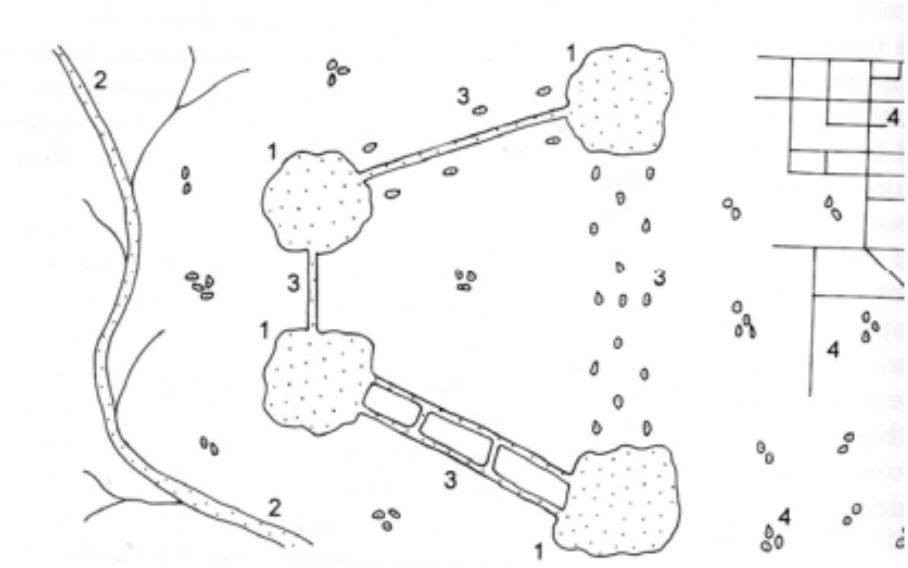


Figure 2.3-1. Forman’s Indispensable Landscape Patterns
1=few large patches of natural vegetation, 2=major stream or river corridor, 3=connectivity with corridors and stepping stones, 4=Heterogeneous bits of nature in the matrix (from Forman, 1995).

Protection of these ecological functions can strongly influence water quality, biodiversity, soil resources, habitat quality and other valued environmental features. The adaptation of the landscape pattern based indicators may not protect specific species habitat or specific ecosystem attributes, however if general patterns are maintained through the landscape, overall ecosystem function and quality can be maintained (O2 Planning and Design, 2013a). This is the justification behind prioritizing ESAs in the Town of Sylvan Lake and prioritizing conservation within the town.

2.3.1 Calculation of Ecological Significance Rating

In order to calculate the ecological significance rating, landscape principles and rating methods were combined from many studies completed for counties and towns within Alberta (O2 Planning and Design, 2013b; O2 Planning and Design, 2014; Fiera, 2014; Fiera, 2015; Golder, 2011; Summit, 2008). Using these methods as a guide, the following landscape features were identified as important elements in maintaining ecological function within the study area and were used to rate each ESA in terms of ecological significance.

- Natural/Semi Natural Grassland patches
- Riparian Corridors
- Wildlife Stepping Stones
- Native Trees and Shrubs
- Wetlands
- Human Disturbance
- Patch Size
- Patch Shape

A weighted rating approach was used in order to recognize that each ecological feature provides different ecological benefits and some benefits are more important than others (O2 Planning and Design, 2013b), as well as the degree of disturbance affects the overall function of a feature. Table 5 summarizes ecological features used to calculate each ESA ranking.

Table 5. Summary of Ecological Features Used to Calculate Ecological Significance

Ecological Importance Feature	Condition	Weighted Score
Natural / Semi Natural Grassland Patches	None	1
Riparian Corridors	Along watercourses and water bodies	3
Wildlife Stepping Stones	Includes wildlife corridors and patches of forests	2
Isolated Stepping Stones	No other forested areas within 100 m	1
Trees and Shrubs (Patches and Corridors)	Mature trees and shrubs present	2
	Shrubs only / logged forest / young forest	1
Native Vegetation (Patches, Corridors, Riparian Areas, Stepping Stones)	Perennial grasses, forbs and herbs.	1
Wetland – Open Water (Riparian Areas, Patches)	Wetland with open surface water present	3
Wetland (Riparian Areas, Patches)	Any other classified wetland	2
Wetland – Marsh (Completed disturbed or worked)	Wetlands which have been completely disturbed	1
Wetland Complex (Riparian Areas, Patches, Stepping Stones)	Two or more wetlands within 100 m with a combined area of 0.5 ha or more	2
Disturbance	<25% disturbance	3
	> 25% to 50% disturbance	2
	> 50% to 75% disturbance	1
	> 75% disturbance	0
Patch Size	> 10 ha	3
	2-10 ha	2
	<2 ha	1
Patch Shape	36-81% core area present	3
	13-36 % core area present	2
	0-13% core area present	1

2.3.1.1 Natural / Semi Natural Grassland Patches

These areas are very rare within the study area. Native perennial graminoids which establish within grasslands provide many functions including protection against soil erosion (wind and water), sediment trapping, nutrient intake and value habitat for flora and fauna. Natural / Semi-natural grassland patches were assigned a 1.

2.3.1.2 Riparian Corridors

Riparian areas are one of the most productive ecosystems on earth with high biodiversity as however they occupy only a small proportion of the landscape (AESRD, 2012). Riparian areas were assigned a score of 3 because of the numerous ecological functions they provide including improving water quality, providing erosion and flood protection, controlling runoff (including pollutants), allowing wildlife movement through the landscape and their potential to contain and support rare, sensitive and endangered species.

2.3.1.3 Wildlife Stepping Stones

Wildlife stepping stones where considered smaller patches of natural vegetation which were somewhat isolated from each other but would still promote some wildlife movement through the landscape. It has been increasingly recognized that high numbers of smaller patches or wildlife stepping stones throughout a landscape can help support overall landscape biodiversity (Environmental Canada, 2013). Connectivity was considering in this rating. If a stepping stone was within 100 m of another stepping stone or patch it was scored a 2. A stepping stone was considered isolated if there were no other patches within 100 m and was deemed to be less connected to the overall landscape and received a score of 1.

2.3.1.4 Trees and Shrubs

Due to the highly modified landscape in the study area, treed areas with a well-developed shrub understory are somewhat rare and unique. Areas containing both trees and shrubs were given a score of 2 as these areas are limited within the study area. Tree and shrub areas help to reduce wind erosion and air pollution, trap sediment, uptake nutrients and help control runoff. Forested areas are structurally diverse and provide habitat niches which can occupy a high diversity of species (Environment Canada, 2013). Areas which only contain shrubs or have been logged recently and are in a state of regeneration were given a lower score (1) as these areas are expected not to provide the habitat or diversity that mature treed areas would.

2.3.1.5 Native Vegetation

Patches of native vegetation are also rare and unique within the study area due to the agricultural and development pressures. Areas containing native vegetation were given a score of 1 partly due to the lack of native vegetation cover within the study area as well as the important functions native vegetation provides. Native vegetation can effectively bind with soils

protecting soil resources from wind and water erosion. Also native vegetation provides the habitat and forage required for wildlife where most non-native species are not utilized. Native vegetation provides the habitat to support rare and unique flora and fauna within the area.

2.3.1.6 Wetlands

Wetlands are both one of Earth's most productive and threatened ecosystems (Ducks Unlimited Canada, 2006). Wetlands occupy 14% of Canada's landscape and impact water storage, surface water runoff, water quality and quantity in addition to atmospheric exchanges of carbon and nitrogen (Price and Waddington, 2000). Wetlands preform many hydrological functions including storage and discharge of surface water, recharge of groundwater supplies, reduction in peak floodwater flows and prevention of erosion (Gabor et al., 2004).

Ecological functions of Alberta wetlands include providing habitat for plant and animal species, including threatened and endangered species. It is estimated that over 200 species of waterfowl, 16 species of mammals and 11 species of reptiles are directly dependent on wetlands within Alberta (Ducks Unlimited Canada, 2006). The unique environment found within wetlands provides perfect sites for element transformations and nutrient cycling (Schlesinger, 1991). The ability to reduce or remove chemicals and nutrients from water is one of the most important functions of Alberta's wetlands (Wray and Bayley, 2006). As such wetlands were chosen as a scored ecological feature.

Open water wetlands were given a score of 3 because of their importance in improving water quality and quantity, the surface-ground water connections, their potential to contain habitat for many migratory bird species, their ability to support rare vegetation species, their water storage capability and their ability to reduce flood and erosion effects. Other wetlands were assigned a 2 as they provide similar ecological functions as open water wetlands, however due to their variable water levels they may not provide the waterfowl habitat or may not be as diverse (both flora and fauna) as open water wetlands and as such were scored lower. Completely disturbed wetlands (tilled or seeded) were given a score of 1 as they still provide some functions of a natural wetland however the overall function of these wetlands is limited.

Wetland complexes were recognized as providing many ecological functions and improving the water storage capacity of the area. As such a wetland was considered to be within a wetland complex if there were two or more wetlands within 100 m with a combined area of 0.5 ha. Wetlands which were considered to be within a wetland complex were scored a 2.

2.3.1.7 Disturbance

The presence of human disturbance through vegetation clearing and soil disturbance creates fragmentation within an ecosystem and introduces non-native invasive species lowering the ability for the ecosystem to function normally. A score was given to each ESA depending on the

amount of disturbance that was observed within the ESA. Disturbance included trails, vegetation removal, soil disturbance, cut lines, ATV trails, cultivation, presences of noxious weeds, etc.

2.3.1.8 Patch Size

Minimum patch area requirements for specific species are highly dependent on species, quality of habitat and landscape context (Bentrup, 2008). Larger patches of native vegetation provide benefits such as species richness, habitat for interior species and natural hydrological processes that maintain water quantity, timing and ability downstream (O2 Planning and Design, 2013a). Larger patches are assumed to have the ability to support a higher diversity of species. As such patch size was used as an indicator of ecological significance.

2.3.1.9 Patch Shape

In many ecosystems, patch shape can influence woody plant establishment and growth (Hardt and Forman, 1989), small mammal movement (Buechner, 1989) and ungulate foraging strategies (Forman and Godron, 1986), which can have effects on the overall connectivity of the landscape. Edge effects are the main concern when dealing with urban natural features. Edge effects refer the influence of the transitional zone between two different ecological habitats on populations and/or communities within those habitats. Edge effects cause changes in temperature and moisture gradients, and humidity (B.C. Ministry of Forest, 1998). Some studies have found evidence that edge avoidance is linked to overall density of the species within the patch (Bollinger and Switzer, 2002). As such patch shape was analysed in terms of amount of core area present within each ESA.

Core area is defined as the interior area of a patch which is not affected by edge effects. The core area index was used which measured the percentage of each ESA that is comprised of core area. The patch grid extension for ArcMap was used (Rempel *et al.*, 2012) to calculate the core area index of each ESA. An edge effects distance of 30 m was used to calculate the core area within each patch as this is the distance in which edge effects impact most song birds and small mammals (Bentrup, 2008). A small core size means there is greater edge effects and less interior habitat available within the patch area.

2.3.2 Level of Significance

The purpose of the rating system is to sustain environmentally sensitive natural areas within an urban area and assist the Town of Sylvan in maintaining a balance between natural habitat preservation and urban human development. Avoidance of ESAs is always the preferred method of development however this is not always possible. The goal of this management plan is to prioritize the ESA areas based on the landscape principles explained above in order to determine areas that require conservation. Previous ESA studies ranked areas in terms of their national, provincial, regional or local significance. For this study, ESAs were ranked in terms of their local distribution, the landscape principles they meet, their function, and social importance.

The ESAs within the study area were ranked into three categories: high, moderate, and low significance. The summary of the category characteristics is presented within Table 6.

Table 6. Summary of ESA Significance Ratings

Importance Rating	Score	Management Recommendations	Characteristics
High Significance	11-16	Areas which are expected to be highly biologically diverse and should be selected for preservation	• Uncommon ecological area in the local area • High connectivity to ecosystems across the landscape • Low to no fragmentation and/or previous human disturbance • High habitat quality and high to moderate probability of containing rare, sensitive, or endangered species. • High biodiversity expected (large core area %) • High potential to sustain the natural area • Potential for recreational uses
Moderate Significance	6-10	Areas requiring further ecological assessment (including a more detailed biophysical report)	• Limited distribution of the ecological area in the local area • Low to moderate connectivity across the landscape • Low to moderate fragmentation and previous human disturbance • Moderate biodiversity expected (low core area %) • Low to moderate habitat quality and moderate probability of containing rare, sensitive or endangered species • Low to moderate potential to sustain the natural area
Low Significance	0-5	Areas appropriate for improvement, rehabilitation or development.	• No connectivity to other ecosystems • Highly impacted or modified by human activities • Low to no biodiversity expected • Low habitat quality with rare, sensitive or endangered species most likely not occurring

2.4 Environmentally Significant Areas Connectivity Assessment

GIS models are often used to identify lands which provide the best movement or linkages through matrix lands after the remaining matrix has become incompatible with natural feature movement (Beier *et al.*, 2008). Linkage Mapper (an ArcGIS toolbox) was used to identify and map the least-cost linkages between chosen core areas (McRae and Kavanagh, 2011). Core areas where chosen based on patch size, shape and disturbance. Core areas were mainly found to be the highly rated ESAs mapped during the ecological assessment. The Linkage Mapper is used to identify adjacent core areas and create maps of least-cost corridors between them (McRae and Kavanagh, 2011). The result of using the mapper assists users to identify which routes encounter more or fewer features that facilitate or impede movement between core areas (McRae and Kavanagh, 2011). The following steps below outline the general approach to connectivity mapping:

1. A land use cover classification polygon feature was created identifying and classifying all areas within the Town boundaries. The 2014 aerial photograph and ESA inventory map were used in order to digitize polygons of land use within the study area. This step resulted in the following land cover classes (Table 7).

Table 7. Mapped Land Cover Class Summary

Land Cover Class	Description
Anthropogenic	Areas which have been influenced by human activities including residential areas, roads, golf courses, parking lots, storm water ponds, drainage ditches, etc. Any area which has been modified entirely by human activities was included within this land cover class.
Annual Cropland	Areas in which agronomic vegetation species are seeded and harvested annual. The majority of this land cover class was mapped within the undeveloped land recently annexed into the Town.
Perennial Cropland and Pasture	Areas which are used as pasture or are used as hayland in alternating years.
Grassland	Natural to semi-natural grassland areas. Very few areas where mapped under this cover class.
Open Water Wetlands	Included all open water wetlands within the study area.
Wetland	All other wetlands which were identified during the ESA inventory mapping exercise.
Forested	All forested areas identified during the ESA inventory mapping exercise.

2. A resistance raster or friction surface was calculated using the land use cover classification using the friction values presented within Table 8. The friction value represents the likelihood that movement through each land cover types will be negatively impacted, due to increased mortality risk or reduced habitat quality from human disturbance. Wetlands and ephemeral watercourses which occurred within annual cropland that were already completely disturbed were assigned the same friction value as annual cropland.

Table 8. Friction Value Assigned to Land Cover Classes Summary

Land Cover Class	Friction Value Used	Friction Value Rationale
Anthropogenic	99	The strong friction or cost value associated with anthropogenic areas is due to the known effects of human footprints. These effects or impacts may include direct habitat loss, higher wildlife mortality from roads, habitat quality reduction through edge effects, increased noise, increased sediment runoff, etc. (Forman *et al*. 2003).
Annual Cropland	50	The strong friction value associated with annual cropland is due to the higher human use of these areas. Annual cropland often inhibits movement at certain times of the year during seeding and harvest as well does not provide high quality cover for wildlife throughout the year.
Perennial Cropland and Pasture	25	The moderately strong friction value associated with perennial cropland is due to the moderate amount of human disturbance assumed to occur within these lands as well as the lack of shrub and tree cover preferred for wildlife movement.
Grassland	3	It is assumed that movement through these areas is very favorable due to the higher vegetation cover and decreased human interactions. This friction value is slightly higher then forested due to the lack of tree and shrub cover.
Open Water Wetlands	1	It is assumed that movement through these areas is very favorable due to the higher vegetation cover and decreased human interactions.
Wetland	1	It is assumed that movement through these areas is very favorable due to the higher vegetation cover and decreased human interactions.
Forested	1	It is assumed that movement through these areas is very favorable due to the higher vegetation cover and decreased human interactions.

3. A Core area polygon feature was created using highly rated ESAs to represent the destination features or core areas within the Town boundaries. Large intact natural habitat adjacent to the study area boundaries were also included as core areas as it is assumed species from these large naturalized areas would move through the study area to other core areas and connectivity to these areas is important to note.

4. The resistance raster and core area polygon feature were then run through the Linkage Mapper model. The process resulted in least-cost paths to each core area which was then buffered by 50 m on each side (100 m wide corridor) to show corridors through the study area. If the corridor was intact and contained native vegetation, studies suggest that this corridor width is the minimum size to provide adequate cover for as many organisms as possible including invertebrates, plants, birds, small mammals, and large mammals (Bentrup, 2008).

It should be noted that Linkage Mapper was developed in order to automate some of the time-consuming steps of connectivity modeling, however connectivity modeling involves a great deal of research, data compilation, GIS analyses and careful interpretation of results (McRae and Kavanagh, 2011). The above approach used for this NAMP provides an overview only and should only be used for overall prioritization of identified and mapped ESAs within the study area. The more detailed connectivity models which study species-specific behaviour is beyond the scope of this connectivity assessment. The Linkage Mapper was used in an effort to provide possible corridors through the study area and thus aid decision makers in preservation efforts.

2.5 Field Reconnaissance

Field investigations were conducted to confirm desktop mapped ESAs, in order to aid in the characterization and classification of the ESAs, and to conduct a preliminary assessment of the current state of each mapped ESAs using the above defined criteria. Ground truthing was focused on highly rated ESAs with every effort made to visit all ESAs mapped.

Two qualified biologists visited each mapped ESA and assessed the overall ecological condition of the ESA. Any new ESAs observed during field investigations were mapped and assessed for overall condition. The field investigations assisted in the evaluation of the ecological importance rating given to the ESA and using professional judgement was rated according to on the ground condition and overall ecological function. Results from the field investigations were then used to refine the ESA inventory map.

Not every ESA was visited in the field due to the lack of landowner permission and time. However on areas which landowner permission was granted an effort was made to visit all the highly significant ESAs identified.

2.6 Study Limitations

The following limitations of this study should be considered:

- Field visit was to verify the presence of the ESA and not to complete a comprehensive biophysical of each area.
- Many of the areas were large and only a portion was visited.
- Detailed ecological assessments were not performed on the ESA areas.
- Detailed vegetation, soil, wildlife or wetland assessments were not completed.
- Due to the large amount of ESAs identified (over 400) and lack of landowner permission for some areas, not every ESA was visited in the field.
- Much of the study was completed as a desktop exercise.

3. Environmentally Significant Areas (ESA) Study Results

3.1 Environmentally Significant Areas (ESA) Mapping Results

Approximately 426 ESAs were mapped within the study area. The majority of these areas exist within the undeveloped lands within the west and northeast areas of the Town. A summary of the inventory results is presented within Table 9 below.

Table 9. Type and Quantity of ESAs in the Study Area

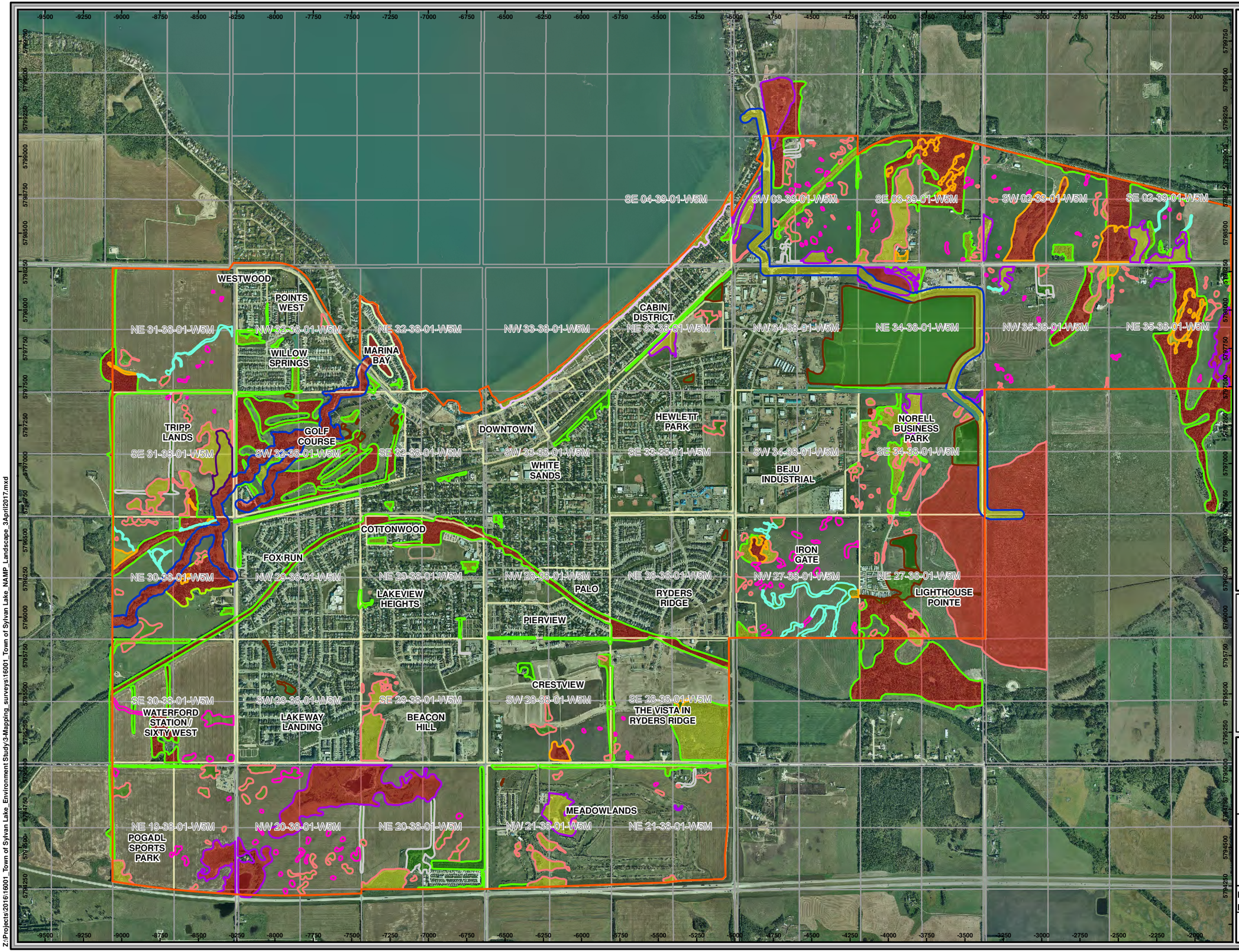
Ecological Significance Rating	ESA Type														
	Forested (Deciduous)	Forested (Mixedwood)	Grassland (Natural/Semi-natural)	Riparian (Lake)	Water body (Lake)	Watercourse (Small Permanent)	Watercourse (Ephemeral)	Wetland (Shallow Open Water)	Wetland (Marsh)	Wetland (Swamp)	Wetland (Ephemeral)	Windrow	Drainage Ditch	Stormwater Pond/ Dugout	Total
High	12	1	0	0	1	1	0	6	1	9	0	0	0	0	31
Moderate	53	0	1	1	0	1	1	12	44	9	0	0	0	0	122
Low	8	0	0	0	0	0	10	2	116	1	104	12	5	15	273
Total	**73**	**1**	**1**	**1**	**1**	**2**	**11**	**20**	**161**	**19**	**104**	**12**	**5**	**15**	**426**

Approximately 20% of mapped ESAs were ground truthed. Detailed information on ground truthed ESAs is presented within Appendix B.

Patches of trees that surrounded residences throughout the Town, particularly neighbourhoods in close proximity to the lake, were not mapped as ESAs. These areas were considered too small and too disturbed to be classified as ESAs. Manmade features such as stormwater ponds and drainage ditches were mapped, however were not considered to be ESAs as they are not naturally occurring features. All stormwater ponds, manmade ditches, and dugouts were rated as low and were noted within each quarter section.

All identified and mapped ESAs and the results of the connectivity assessment are presented within Figures 3.1-1 and 3.1-2. Figure 3.1-2 shows possible linkages or corridors between high quality and intact habitat. These corridors show the connectivity of highly rated ESAs through the study area and possible areas of conservation prioritization. A larger sized map of the study area including mapped ESAs and connectivity corridors is presented within Appendix C.

The study area results are presented by quarter section. In an effort to make each quarter section straightforward to reference, each quarter section has been numbered according to its corresponding figure number, which is presented in Figure 3.1-3.



LEGEND

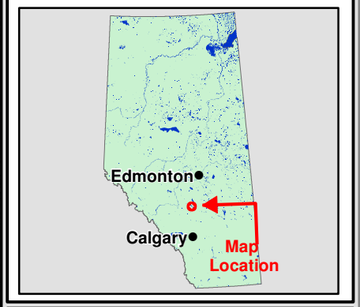
- Neighbourhood Boundary
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 125 250 500 750 Meters

Scale: 1:23,000
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

Town of Sylvan Lake ESA Inventory Map

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.1-1

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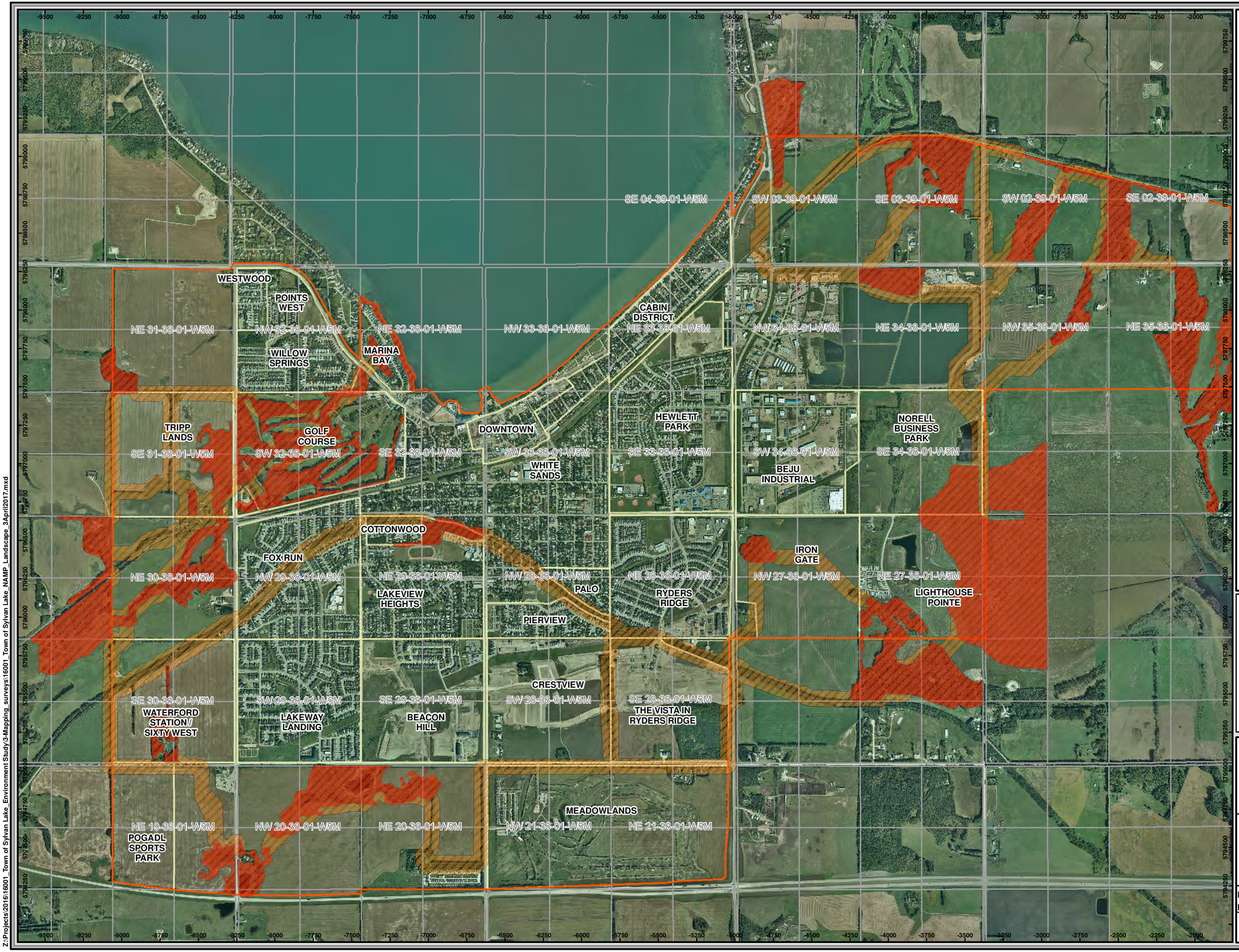
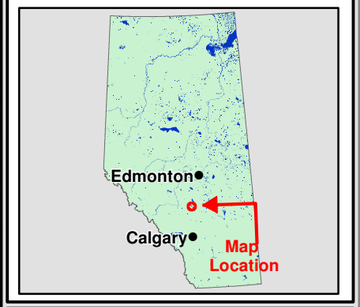


LEGEND

- Neighbourhood Boundary
- Core Areas
- ESA Connectivity Corridor
- Town Boundary
- Township Grid



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 125 250 500 750 Meters

Scale: 1:23,000
NAD 1983 3TM 114

Sylvan Lake — A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

Town of Sylvan Lake ESA Connectivity Corridor Map

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.1-2

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WESTWOOD
POINTS WEST
WILLOW SPRINGS
CABIN DISTRICT
TRIPP LANDS
GOLF COURSE
DOWNTOWN
HEWLETT PARK
BEJU INDUSTRIAL
NORELL BUSINESS PARK
COTTONWOOD
FOX RUN
LAKEVIEW HEIGHTS
RYDERS RIDGE
IRON GATE
LIGHTHOUSE POINTE
PIERVIEW
WATERFORD STATION / SIXTY WEST
LAKEWAY LANDING
BEACON HILL
CRESTVIEW
THE VISTA IN RYDERS RIDGE
POGADL SPORTS PARK
MEADOWLANDS

NE 31-38-01-W5M	NW 32-38-01-W5M	NE 32-38-01-W5M	NW 33-38-01-W5M	NE 33-38-01-W5M	NW 34-38-01-W5M	NE 34-38-01-W5M	NW 35-38-01-W5M	NE 35-38-01-W5M	SE 04-39-01-W5M
Figure 3.26-1	Figure 3.27-1	Figure 3.28-1	Figure 3.29-1	Figure 3.30-1	Figure 3.31-1	Figure 3.32-1	Figure 3.33-1	Figure 3.34-1	Figure 3.39-1
SE 31-38-01-W5M	SW 32-38-01-W5M	SE 32-38-01-W5M	SW 33-38-01-W5M	SE 33-38-01-W5M	SW 34-38-01-W5M	SE 34-38-01-W5M	SW 35-38-01-W5M	SE 35-38-01-W5M	SW 03-39-01-W5M
Figure 3.25-1	Figure 3.24-1	Figure 3.23-1	Figure 3.22-1	Figure 3.21-1	Figure 3.20-1	Figure 3.19-1	Figure 3.38-1	Figure 3.37-1	Figure 3.36-1
NE 30-38-01-W5M	NW 29-38-01-W5M	NE 29-38-01-W5M	NW 28-38-01-W5M	NE 28-38-01-W5M	NW 27-38-01-W5M	NE 27-38-01-W5M	SE 02-39-01-W5M		
Figure 3.12-1	Figure 3.13-1	Figure 3.14-1	Figure 3.15-1	Figure 3.16-1	Figure 3.17-1	Figure 3.18-1	Figure 3.35-1		
SE 30-38-01-W5M	SW 29-38-01-W5M	SE 29-38-01-W5M	SW 28-38-01-W5M	SE 28-38-01-W5M					
Figure 3.11-1	Figure 3.10-1	Figure 3.9-1	Figure 3.8-1	Figure 3.7-1					
NE 19-38-01-W5M	NW 20-38-01-W5M	NE 20-38-01-W5M	NW 21-38-01-W5M	NE 21-38-01-W5M					
Figure 3.2-1	Figure 3.3-1	Figure 3.4-1	Figure 3.5-1	Figure 3.6-1					

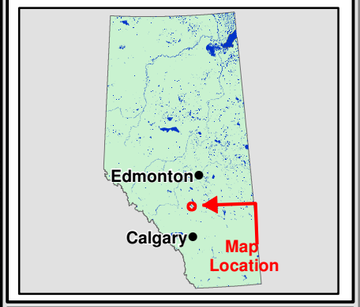
LEGEND

3.2-1 Figure Number

Neighbourhood Boundary

Town Boundary

Township Grid



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 125 250 500 750 Meters

Scale: 1:23,000
NAD 1983 3TM 114

Sylvan Lake — A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

Town of Sylvan Lake
Quarter Section
Figure Number

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.1-3

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3.2 NE 19-038-01-W5M

Access:

Access was granted on this quarter section

Description:

The quarter section is mainly used for agriculture and cultivated in the majority of years. A small gas plant and battery site occur within the northeast corner. One highly significant ESA occurs within the quarter section and three moderately significant ESAs. A large open water wetland occurs within the SE corner of the quarter section. Many sensitive species (e.g. black tern) are known to utilize this wetland in years of normal precipitation. The moderately important ESAs are linear strips of native vegetation that have been left along the north and west sides of the quarter section. These two strips are approximately 12 m and 20 m wide respectively. These strips contain native trembling aspen overstores with many native shrub and forb species. Also many snags were observed with cavities which may be used by many different bird species.

Management Considerations:

- Keeping one or both of the native vegetation strips should be considered in order to allow wildlife movement from the quarter section to other larger habitats
- Drainage should be maintained on site in order to avoid indirect impacts to the large wetland in the southeast corner.

ESA# 411
ESA# 58
ESA# 4
ESA# 2
ESA# 5
ESA# 64
ESA# 217
ESA# 415
POGADL SPORTS PARK
NE 19-38-01-W5M
ESA# 62
ESA# 149
ESA# 63
ESA# 60
ESA# 216
ESA# 1
ESA# 59
ESA# 3
ESA# 61
ESA# 216

-9250 -9000 -8750 -8500 -8250
5795000 5794750 5794500 5794250

LEGEND

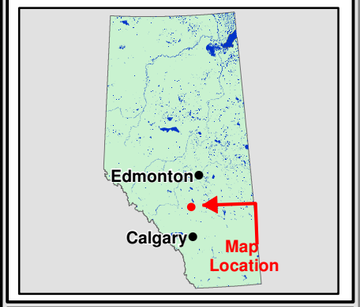
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 19-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.2-1

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3.3 NW 20-038-01-W5M

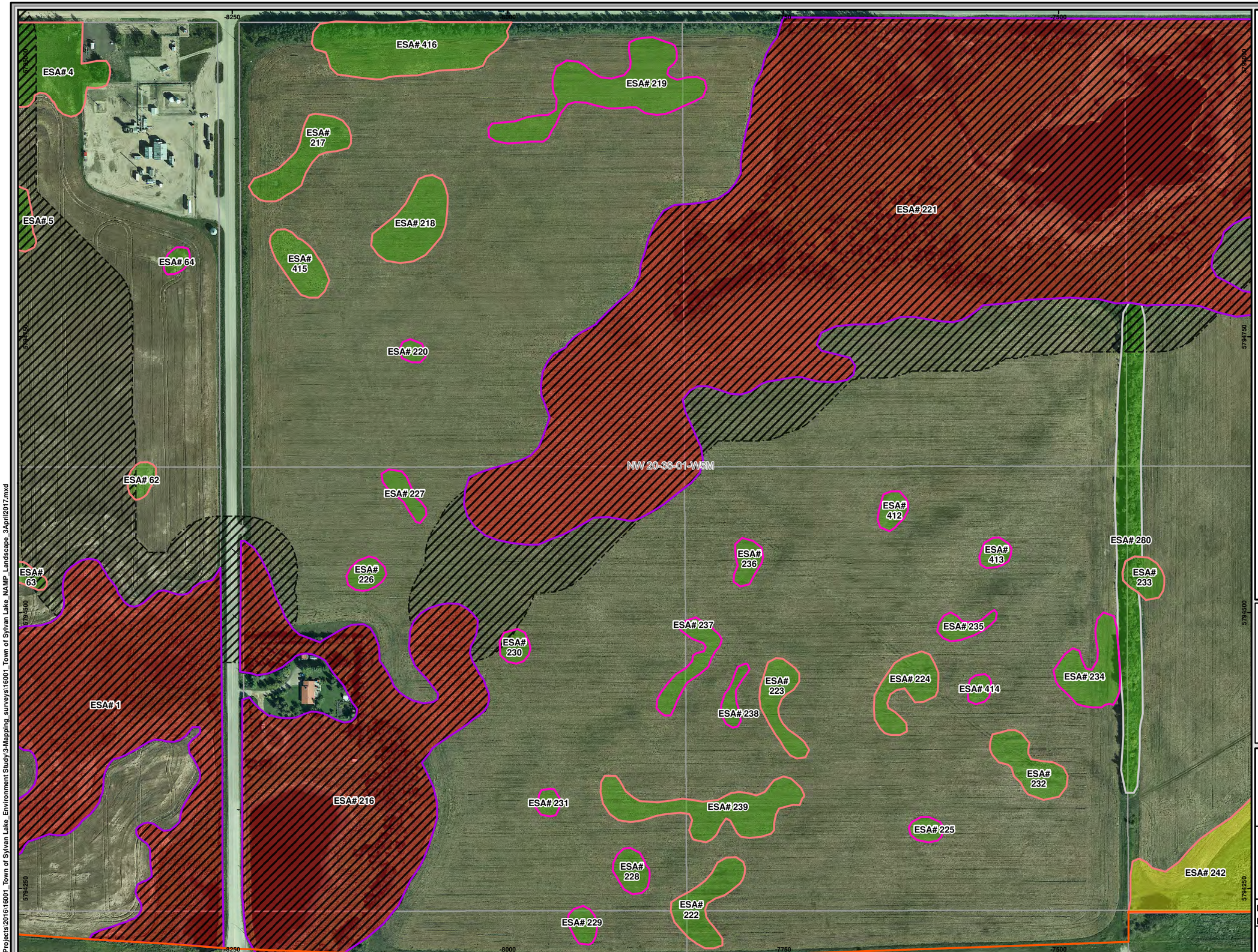
Access:
Access was granted on this quarter section

Description:

The quarter section is mainly used for agriculture and cultivated annually. Two large wetlands rated as highly significant have been mapped within the quarter section. Both these wetlands have been cultivated along the edges in dry years and both contain intact areas of native wetland vegetation and large areas of open water during years of normal precipitation. The wetland within the southwest corner is locally known to be used by black terns during the breeding season when open shallow water is present. The larger wetland within the northeast corner has a variety of waterfowl which nest annually and it contains favorable habitat for amphibians. This wetland also has a fringe of willows which serve as a browsing area for ungulates throughout the year. Many ephemeral and temporary marshes occur throughout the rest of the quarter section which have been cultivated annually. A strip of planted Manitoba maple and caragana occurs along the east edge of the quarter section. Limited song bird activity was observed within these types of corridors with the thick caragana understory which many inhibit wildlife movement through this strip.

Management Considerations:

- Keeping and enhancing both large wetlands should be considered.
- The large wetland in the northeast corner has had some soil piled and holes dugout within the west portion. Rehabilitation of this area should be considered in order to provide more desirable waterfowl, amphibian and ungulate habitat.
- Adding a walking trail around the large wetland in the northeast with educational signs about wetlands to increase local knowledge of wetlands and their benefits. Integration of public use and ecological preservation will provide benefits to the community and the environment.



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LEGEND

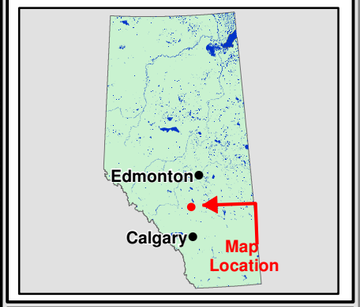
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 20-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.3-1

3.4 NE 20-038-01-W5M

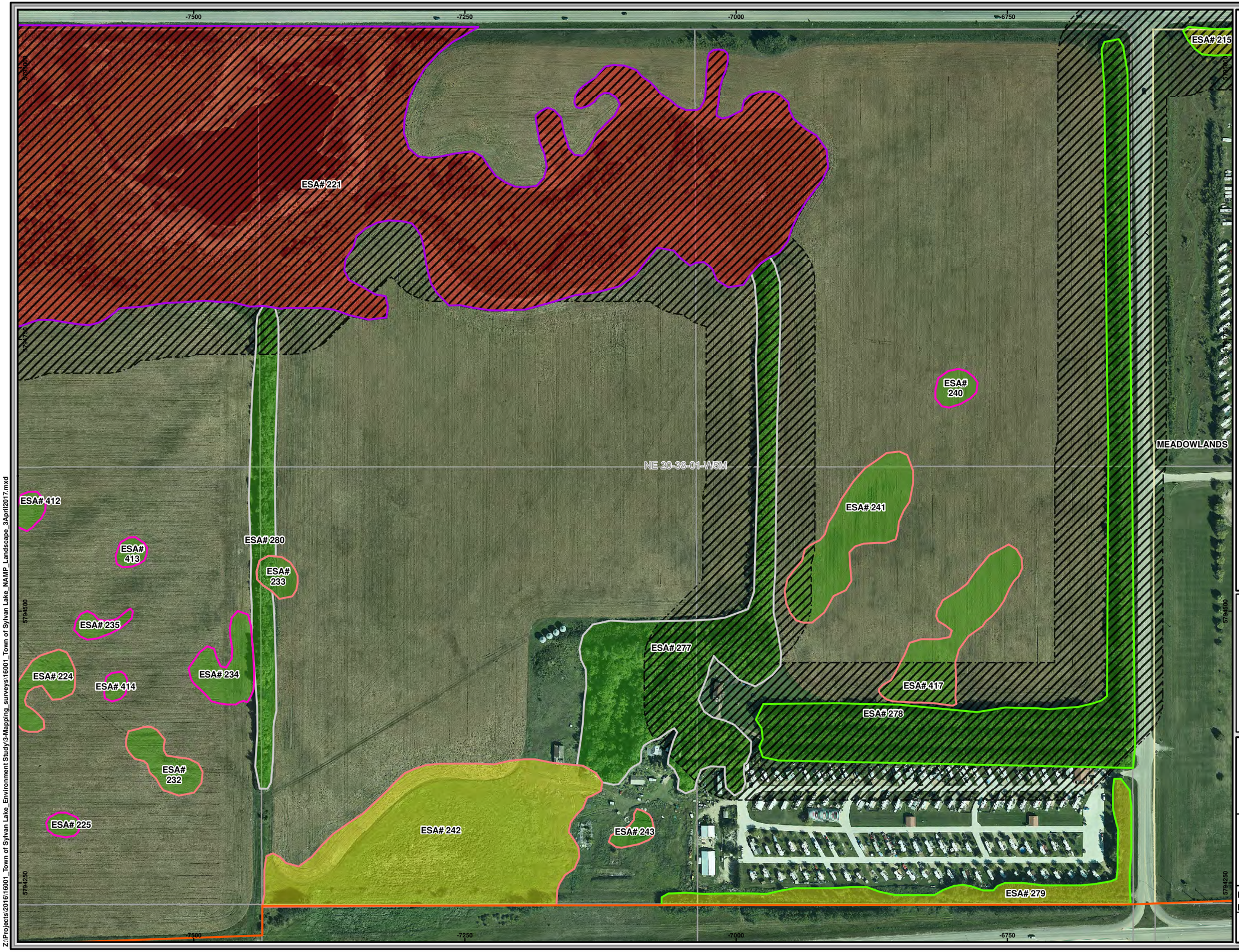
Access:
Access was granted on this quarter section

Description:

The quarter section is mainly used for agriculture and cultivated in the majority of years with an RV campground within the southeast corner. One highly ranked wetland occurs within the northwest corner and a moderately ranked wetland in the southwest corner with a moderately ranked strip of trembling aspen along the south side of the quarter section. All three areas contain persistent native vegetation. There are three corridors with north/south orientation which are dominated by Manitoba maple and caragana and area all ranked as low. Three rows of Manitoba maple and caragana has been planted north of the RV campground. Due to the thick caragana understory it provides limited native vegetation and wildlife usage.

Management Considerations:

- Keeping either ESA #280 or #277 is recommended in order to maintain a corridor for wildlife and vegetation to important habitats north and south.
- The large wetland in the northeast corner has had some soil piled and holes dugout within the west portion. Rehabilitation of this area should be considered in order to provide more desirable waterfowl, amphibian and ungulate habitat.
- Adding a walking trail around the large wetland in the northeast with educational signs about wetlands to increase local knowledge of wetlands and their benefits. Integration of public use and ecological preservation will provide benefits to the community and the environment.
- Drainage should be maintained on site in order to avoid indirect impacts to the wetlands on the west side of the quarter section.



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LEGEND

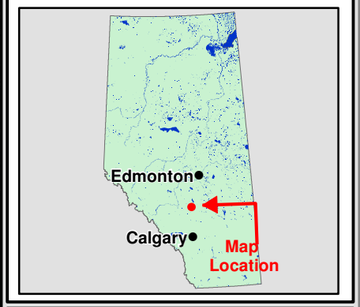
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 20-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.4-1

3.5 NW 21-038-01-W5M

Access:

Access was not granted on this quarter section.

Description:

This quarter section is mainly used as a golf course. Rows of trees have been planted along the fairways with limited understory as such these were not mapped as ESAs. Six wetlands have been mapped as moderately important along with two strips of native vegetation along the north side and south of memorial drive. The large wetland (#281) has been disturbed through dugouts to hold water. The remaining wetlands appear to be relatively undisturbed except for small trails. As access was not granted, these wetlands have been ranked as moderately significant requiring further ecological investigation.

Management Considerations:

- The linear corridors along the north edge should be maintained as they provide wildlife movement east and west to other larger habitats (large remnant forest occurs to the west).
- As this quarter appears to contain many wetland areas, drainage would need to be maintain and pre-development planning will be very important.

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LEGEND

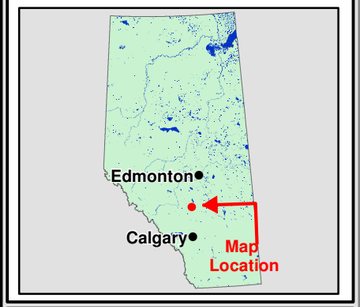
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 21-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.5-1

3.6 NE 21-038-01-W5M

Access:
Access was not granted on this quarter section.

Description:
The half of the quarter section is used for agriculture and cultivated in the majority of years with the other half used as a golf course. A residence is located on the northeast corner with a windrow surrounding the yard. A linear strip of trembling aspen and other native vegetation occurs along the north edge adjacent to Memorial Drive. Three small wetlands that have been disturbed through cultivation or golf course development occur throughout the quarter section. A moderately ranked wetland occurs along the south edge along highway 11.

Management Considerations:

- The strip of native vegetation along the north edge (#209) should be conserved as it links a large remnant forest to the east (not within the study area boundary) to the stepping stones throughout the town.
- The wetland on the south edge should be incorporated into any storm water management plan for the quarter section and enhanced.

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LEGEND

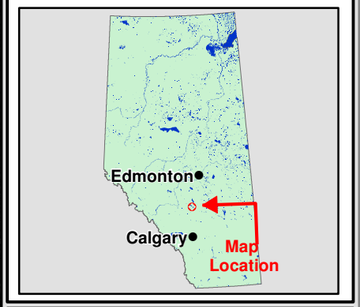
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake — A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 21-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.6-1

3.7 SE 28-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
The north portion of the quarter section has been mostly striped of soil and is in different stages of residential development. The south portion has both an agricultural field as well as a remnant patch of forest. This patch of forest (moderately important) was logged in the winter of 2014/2015 and is currently in a state of regeneration with young aspen and poplar establishing. Two corridors of native aspen forest (40 m wide x 330 m long) occur on the west side of the quarter and they have been rated as moderately important. A small swamp wetland occurs on the north edge of the larger forest patch; this area has been dugout recently and currently holds surface water. Many ephemeral wetlands occur in the southwest corner as well as a temporary marsh. All of these wetlands are cultivated annually. The old railway occurs within the northeast corner of the quarter.

Management Considerations:

- Conservation of the old railway should be priority.
- The two corridors along the west side should be considered for conservation as wildlife corridors due to the limited native vegetation throughout the study area.

PIERVIEW

RYDERS RIDGE

ESA# 382

ESA# 10

ESA# 187

ESA# 205

ESA# 206

CRESTVIEW

SE 28-38-01-W5M

THE VISTA IN RYDERS RIDGE

ESA# 381

ESA# 208

ESA# 374

ESA# 371

ESA# 370

ESA# 207

ESA# 372

ESA# 373

ESA# 375

ESA# 376

ESA# 377

ESA# 214

MEADOWLANDS

ESA# 209

5795750

5795500

5795250

-6000

-5750

-5500

-5250

-5000

5000

5250

5500

5750

LEGEND

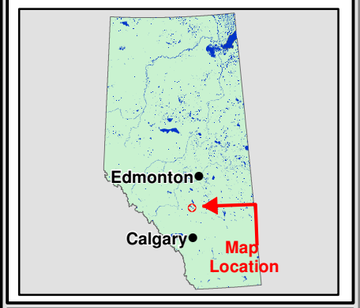
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 28-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.7-1

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3.8 SW 28-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
A large pipeline right of way occurs on the north portion of the quarter with the remaining area in different stages of development or agricultural. Along the north edge two small native vegetation corridors (#383: 7 m x 350 m and #382: 5 m x 450 m) occur. A patch of trees and shrubs occur in the northwest corner of the quarter. This area is mainly planted Manitoba maple, white spruce and caragana. Two corridors of native aspen forest (40 m wide x 330 m long) occur on the east side of the quarter. A highly rated wetland occurs on the south border. This area contains native vegetation and is one of the only relatively undisturbed wetlands in the area. Many temporary marsh wetlands and two ephemeral wetlands occur in the quarter however these are dominated by agronomic species and have been disturbed almost annually.

Management Considerations:

- The two native vegetation corridors on the north side of the quarter should be considered for conservation as they are directly connected to the larger patch of forest to the east.
- The two corridors on the east side should be considered for conservation as they provide wildlife movement north and south through the quarter.
- Drainage should be maintained on site in order to avoid indirect impacts to the wetland in the south.
- The temporary wetlands should be incorporated into the areas storm water drainage plan.

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LEGEND

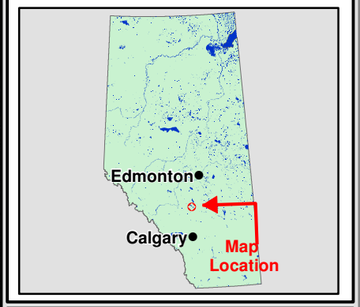
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Town of Sylvan Lake
Natural Areas Management Plan

SW 28-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.8-1

3.9 SE 29-038-01-W5M

Access:
Access was not granted on this quarter section.

Description:
A large pipeline right of way occurs diagonally across the middle of the quarter. The remaining areas of the quarter are in different stages of development with the southern portion containing areas of exposed soil. One large wetland occurs in the southwest corner. This wetland was historically connected to the wetland to the south and currently contains willows, cattails and sedges. Three small marsh wetlands occur within the quarter however appear to be previously disturbed.

Management Considerations:

- A more detailed ecological assessment of the wetland with the southwest is needed to determine the boundary extent as well as the impact of this wetlands loss.

FOX RUN

LAKEVIEW HEIGHTS

ESA# 419

PIERVIEW

ESA# 383

ESA# 362

ESA# 363

ESA# 364

ESA# 365

BEACON HILL

LAKEWAY LANDING

SE 29-38-01-W5M

ESA# 244

CRESTVIEW

ESA# 221

MEADOWLANDS

LEGEND

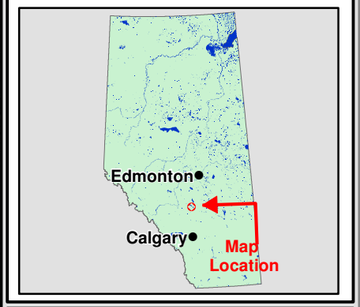
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



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N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 29-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.9-1

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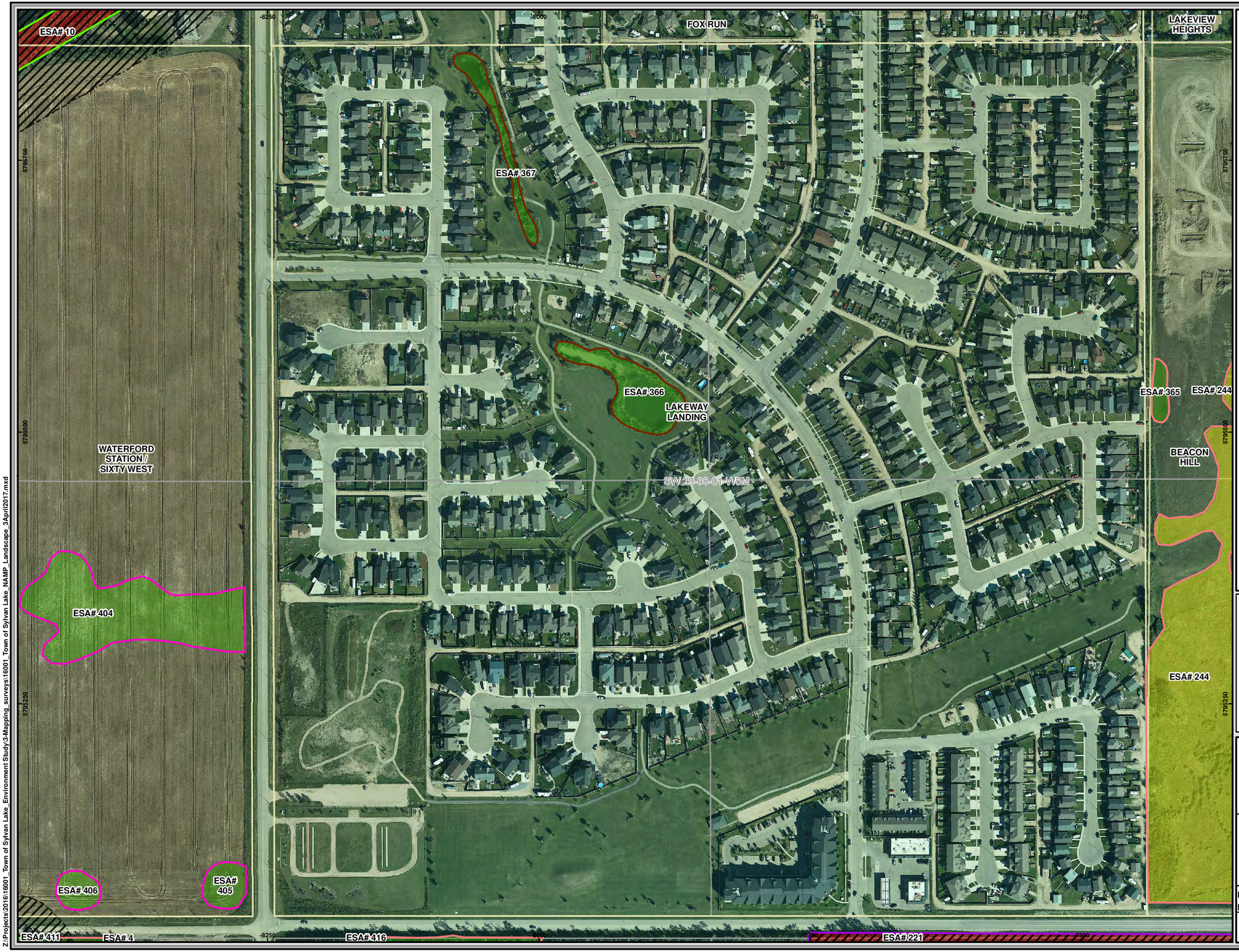
3.10 SW 29-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
This quarter section is entirely residential developments. There are two small stormwater ponds within the northwest corner of the quarter. These stormwater ponds have somewhat naturalized with willows, cattails and sedges occurring.

Management Considerations:

- These two storm water ponds should be considered for restoration and rehabilitation. These could be expanded with gently sloped sides and planted with native vegetation as compensation for other ESA losses.



LEGEND

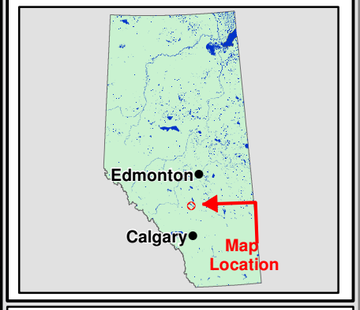
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



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N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SW 29-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.10-1

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3.11 SE 30-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
Majority of the quarter section is cultivated land with the northwest corner used for pasture. There is a well site within the northwest corner. A large patch of remnant forest occurs within the south portion. This area is has young aspen regeneration surrounding a mature forest. Many song birds and cavity nesting birds were heard and observed within this forest including a downy woodpecker fledgling on an aspen tree. This area provides valuable habitat for song birds and ungulates and is dominated by native vegetation. This area is connected through a small treed corridor to the old railway right of way which does not have a recreational trail within this quarter. There are treed corridors on the west side of the quarter connecting the large patch of forest with larger habitats north (area surrounding Golf Course Creek).

Management Considerations:

- Conservation of the large forested area (#150) should be priority.
- Conservation of the old railway should also be priority to maintain diversity in the study area.
- Maintaining areas for wildlife movement through the conservation of the corridors on the west side, along the north side and the corridor which connects the forest patch to the old railway should be considered.

ESA# 57
ESA# 151
ESA# 56
ESA# 10
ESA# 12
ESA# 403
ESA# 150
ESA# 404
ESA# 407
ESA# 406
ESA# 405
ESA# 149
ESA# 411
ESA# 4
ESA# 416
WATERFORD STATION / SIXTY WEST
SE 30-38-01-W5M
FOX RUN
LAKEWAY LANDING
POGADL SPORTS PARK
-9000
-8750
-8500
-8250
5795750
5795500
5795250

LEGEND

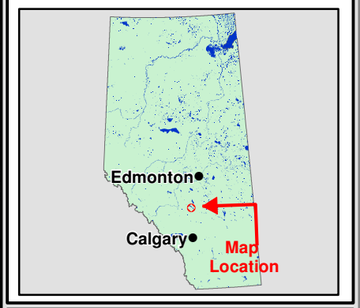
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
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N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 30-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.11-1

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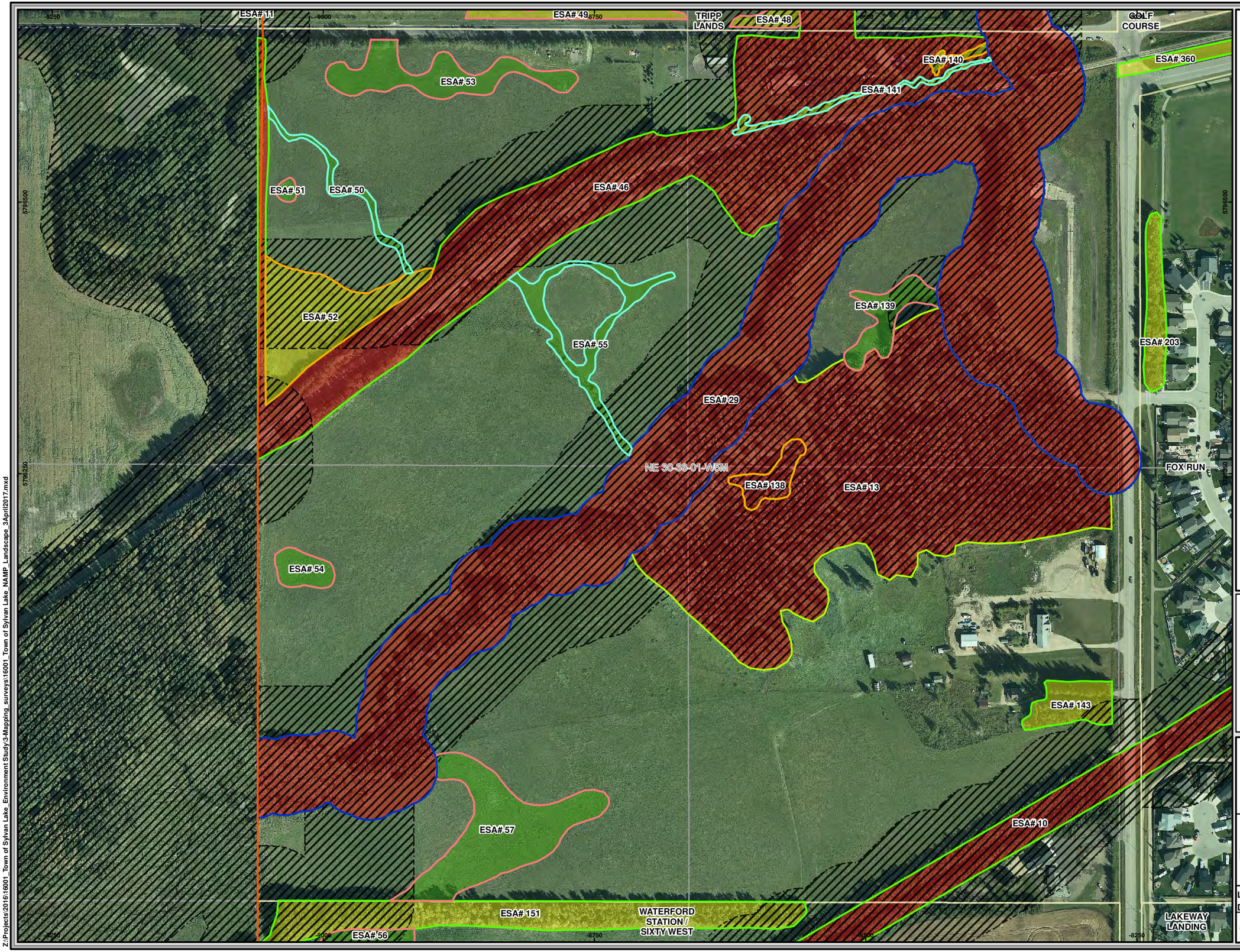
3.12 NE 30-038-01-W5M

Access:
Access was not granted on this quarter section.

Description:
This quarter section contains many very highly ranked and sensitive ESAs. Golf Course Creek, one of Sylvan Lake's only inlets, currently runs diagonally across the quarter. A large piece of remnant forest occurs which is connected to the riparian area of the creek. This forest appears to be a mixedwood forest which is rare within the study area and provides valuable habitat for many vegetation and wildlife species. Pileated woodpeckers have been observed within this patch of forest. The current railway also occurs within the north portion which contains strips of native vegetation. The old railway corridor occurs in the southeast corner. All of these natural areas connect to a much larger forest area to the west and they all provide a movement function within the study area. A swamp occurs in the northwest corner which is part of a larger wetland complex to the west. Two ephemeral drainages occur as well as many cultivated temporary wetlands.

Management Considerations:

- Conservation of the creek and riparian area should be priority.
- Conservation of the Mixedwood forest patch should also be priority due to the limited occurrence of this ecosystem within the study area and its value to wildlife and wildlife movement across the landscape.
- Conservation of the strip of vegetation along the current railroad should be considered as this area is connected to a larger ecosystem to the west as well connects the east portion of the study area.



LEGEND

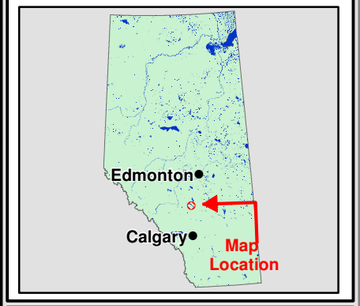
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 30-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.12-1

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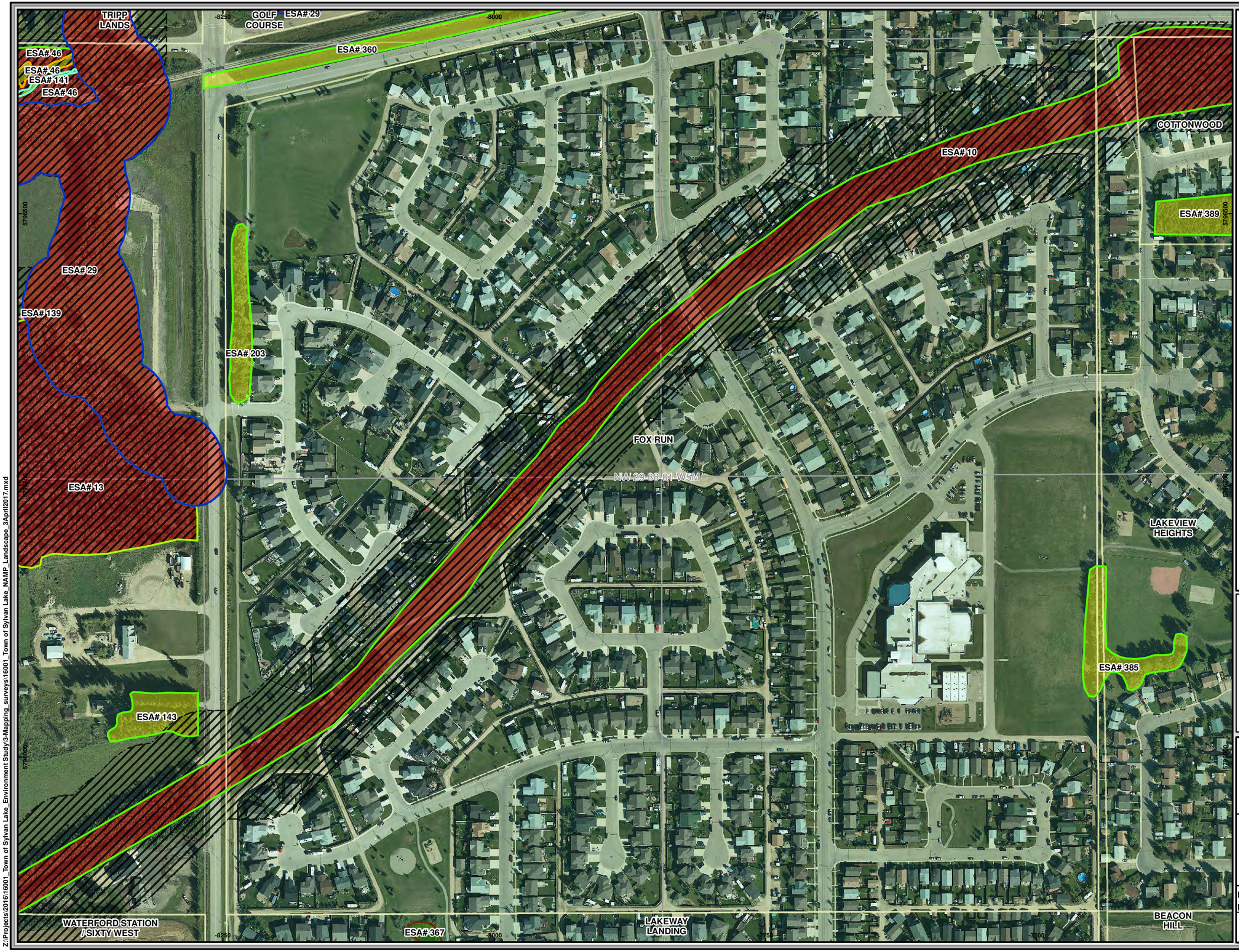
3.13 NW 29-038-01-W5M

Access:
Access was through public access areas (streets, allies, etc.).

Description:
The quarter section is mainly residential developments. The old railway that has naturalized vegetation occurs diagonally across the quarter. This is a very important corridor which spans across the entire town. Two small patches of native vegetation occur within the quarter.

Management Considerations:
- The old railway and recreational trail should be conserved on this site.
- Due to the limited native vegetation coverage throughout the quarter, the two small patches of vegetation should be considered for conservation as they serve as small stepping stones through the quarter section.



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LEGEND

- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
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- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
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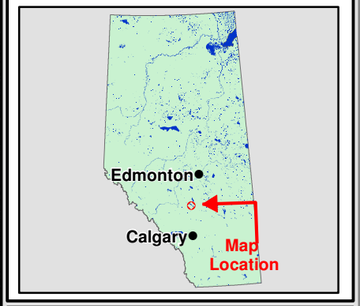
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



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N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 29-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.13-1

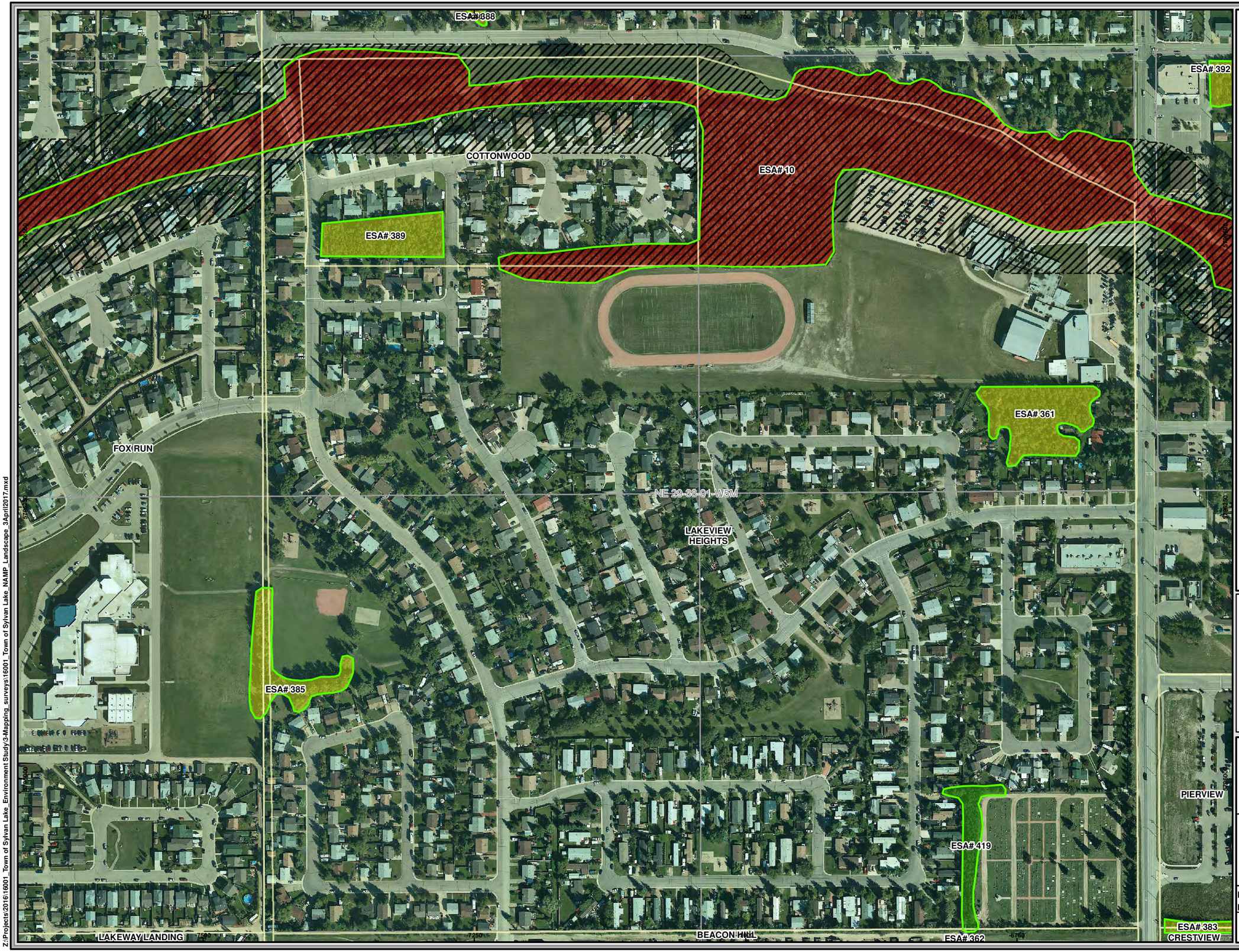
3.14 NE 29-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The old railway corridor occurs within the north portion of the quarter. There are larger areas of treed vegetation extending out from the original railway route. Two smaller patches of native vegetation occur approximately 40 m west and 200 m south of the old railway corridor.

Management Considerations:

- Conservation of the larger forested patches including the old railway corridor and the larger portions extending out from the corridor should be priority.
- Conservation of the small forested patches throughout the quarter should be considered due to the limited coverage of native vegetation in the quarter.



LEGEND

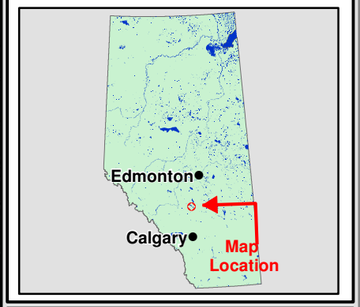
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90 Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 29-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.14-1

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3.15 NW 28-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
This quarter section is mainly residential developments with limited ESA resources throughout. The old railway runs diagonally through the quarter and has since been naturalized with a recreation trail along the centerline. This area is dominated by native vegetation and provides wildlife habitat to many species. One small area of native treed vegetation occurs within the northeast corner and is rated moderately important.

Management Considerations:

- Conserving and maintaining the native vegetation strip along the old railway as well as the recreation trail through it should be a priority.

HEWLETT PARK

ESA# 392

ESA# 10

ESA# 361

NW 28-38-01-W5M

RYDERS RIDGE

LAKEVIEW HEIGHTS

PALO

PIERVIEW

ESA# 419

ESA# 383

ESA#.382

ESA# 362

BEACON HILL

CRESTVIEW

THE VISTA IN RYDERS RIDGE

-6750 -6500 -6250 -6000 -5750

LEGEND

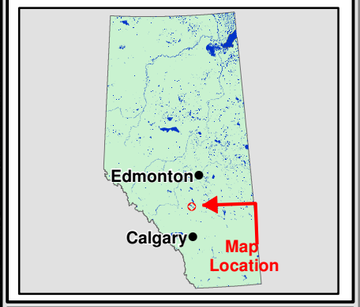
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

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Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 28-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.15-1

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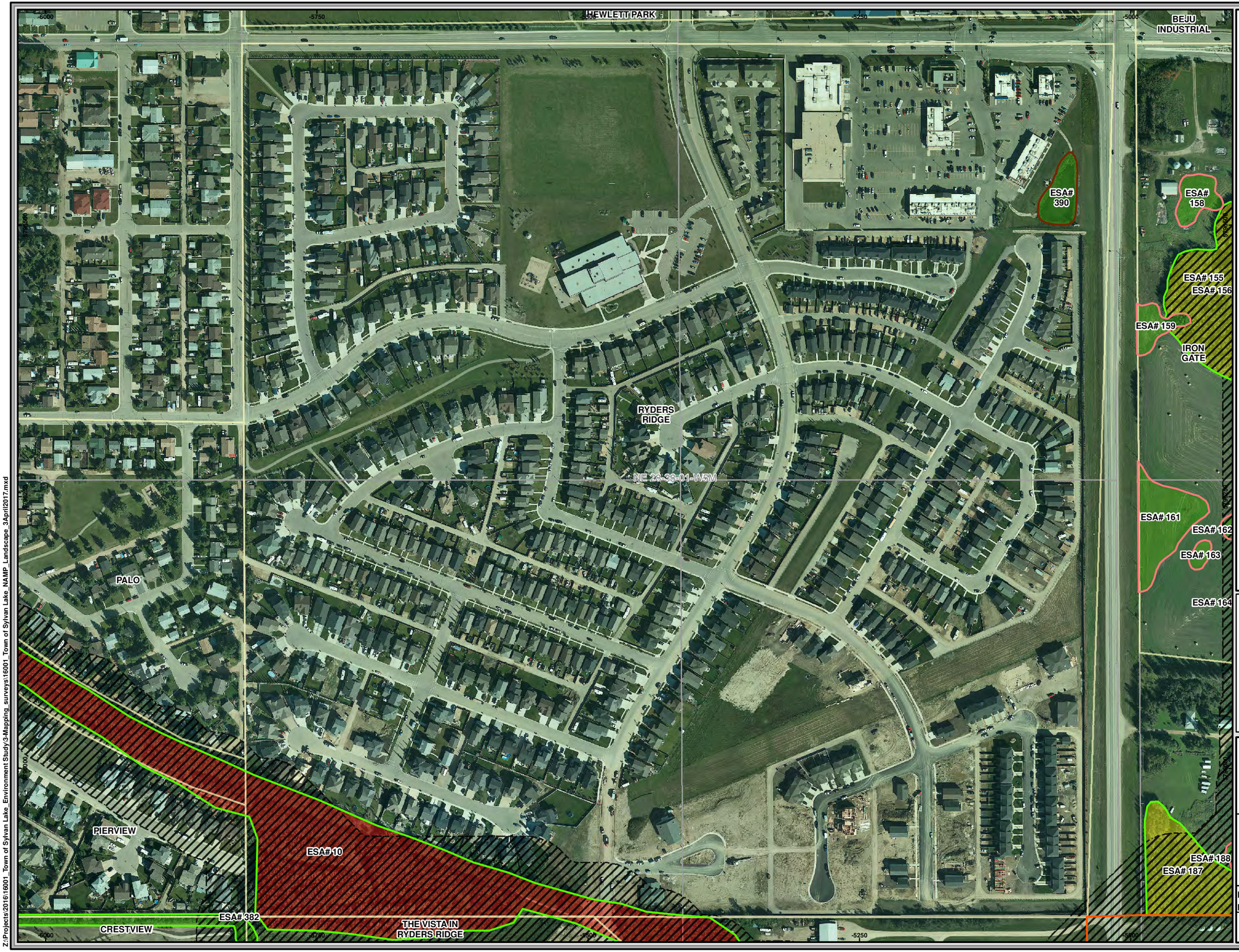
3.16 NE 28-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
This quarter section is mainly residential developments with limited ESA resources throughout. The old railway occurs within the southwest corner with a larger patch of treed vegetation. This area is dominated by native vegetation and provides wildlife habitat to many species.

Management Considerations:

- Conserving and maintaining the native vegetation strip along the old railway, the larger patch of remnant forest as well as the recreation trail should be a priority.



LEGEND

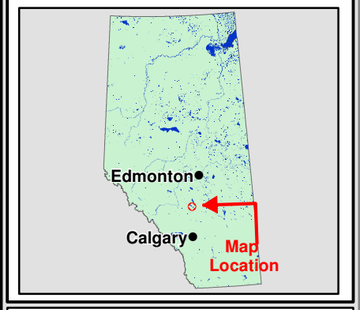
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 28-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.16-1

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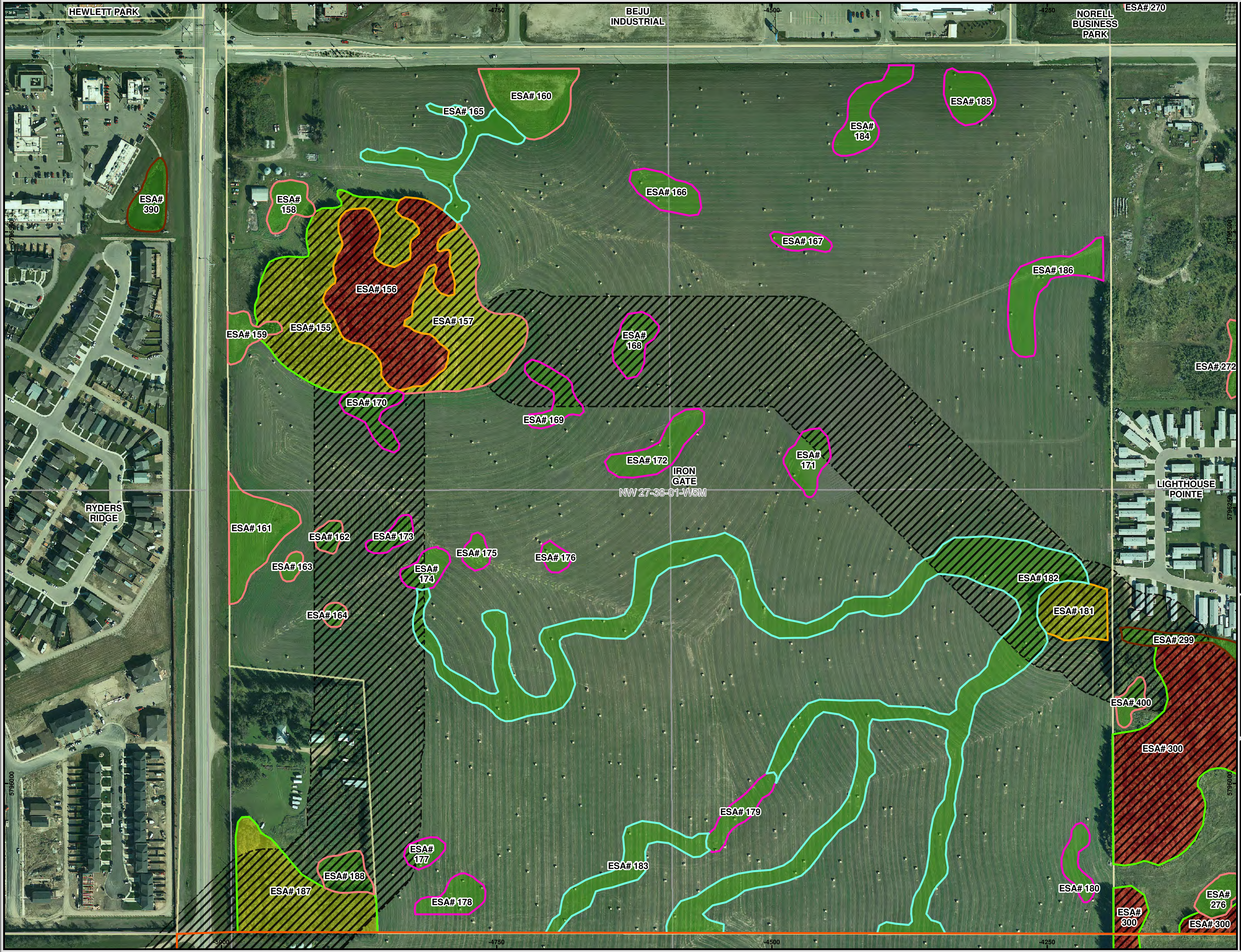
3.17 NW 27-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
The majority of the quarter section is used for agriculture (alfalfa field) and cultivated in the majority of years. One highly ranked ESA and four moderately ranked have been mapped. A patch of remnant aspen forest connected to two wetlands occurs within the northwest portion with another patch of remnant aspen and poplar forest on in the southwest corner. Both patches contain native vegetation and favorable songbird and ungulate habitat. A small swamp with balsam poplar overstory occurs on the east side with native vegetation and song birds were observed during the reconnaissance visit. The quarter section contains many temporary marshes (eight) and ephemeral wetlands (eighteen) throughout with an ephemeral drainage within the south portion.

Management Considerations:

- Conserving the two patches of remnant forest and wetland in the north (#187, #155-157) is recommended as these patches are the only native vegetation within the quarter section and they provide important song bird, amphibian and ungulate habitat. Removal of the two moderately significant ESAs will down grade the ecological significance of the highly rated ESA.
- The wetland in the north (#157) could be incorporated into the storm water drainage plan for the area and be enhanced.
- Boundaries of the wetland and shallow groundwater should be assessed when determining setback distances.
- The treed swamp area to the east (#181) should be conserved as it provides a stepping stone to the larger forest to the southeast.
- Due to the large amount of ephemeral wetlands and the long ephemeral drainage, a drainage management plan should be completed for the area prior to development.



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LEGEND

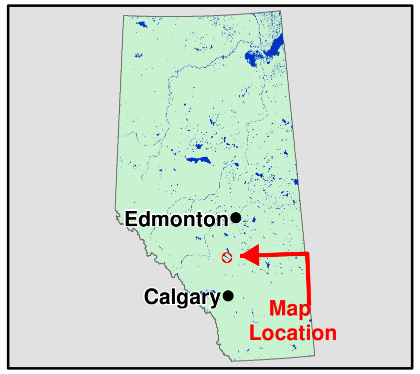
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

0 15 30 60 90 Meters

Scale: 1:3,250
NAD 1983 3TM 114

Town of Sylvan Lake
Natural Areas Management Plan

NW 27-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001
RC BioSolutions Ltd.	Figure No. 3.17-1

3.18 NE 27-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
The quarter section has a small residential development on the west side. Along the east side a large highly ranked wetland occurs. This wetland is connected to both the creek that discharges from Sylvan Lake as well as Cygnet Lake to the southeast. The wetland is dominated by water sedge, small bottle sedge and fowl bluegrass with a few sandpiper species observed including spotted sandpiper and killdeer. The west edges of this wetland have been used for hay in the later months of the year when it is drier. A highly ranked remnant patch of mature balsam poplar and aspen forest occurs in the southwest corner. This forest patch is connected to a very large forest to the south. Many large snags were observed throughout with shrubs for both nesting song birds and browsing opportunities for ungulates. Large ponds have been dug within the middle of the quarter section.

Management Considerations:

- The large wetland on the east side as well as the large remnant patch of balsam poplar forest should be considered for conservation. Both these areas provide valuable habitat for wildlife life and the habitat for rare plant establishment. These types of areas are limited within the current town boundaries.
- As the wetland to the east is connected to Cygnet Lake (a sensitive wetland area), the boundary of the wetland should be assessed on the ground and setbacks should start from the point where shallow ground water is no longer encountered.
- Enhancing and re-designing the storm water ponds already within the quarter section to more reflect a natural wetland (better side slopes, more native species within the wet meadow zone) would improve the functionality of these ponds.

BEJU INDUSTRIAL

NORELL BUSINESS PARK

ESA# 294

ESA# 295

ESA# 274

ESA# 273

ESA# 275

ESA# 184

ESA# 185

ESA# 186

ESA# 287

ESA# 272

ESA# 286

ESA# 195

ESA# 286

LIGHTHOUSE POINTE

ESA# 299

NE 27-38-01-W5M

IRON GATE

ESA# 182

ESA# 181

ESA# 400

ESA# 300

ESA# 402

ESA# 180

ESA# 276

ESA# 300

ESA# 401

5796500

5796250

5796000

4250

4000

3750

3500

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LEGEND

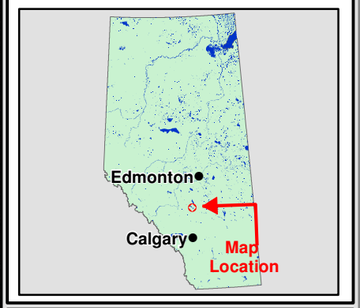
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90 Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 27-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.18-1

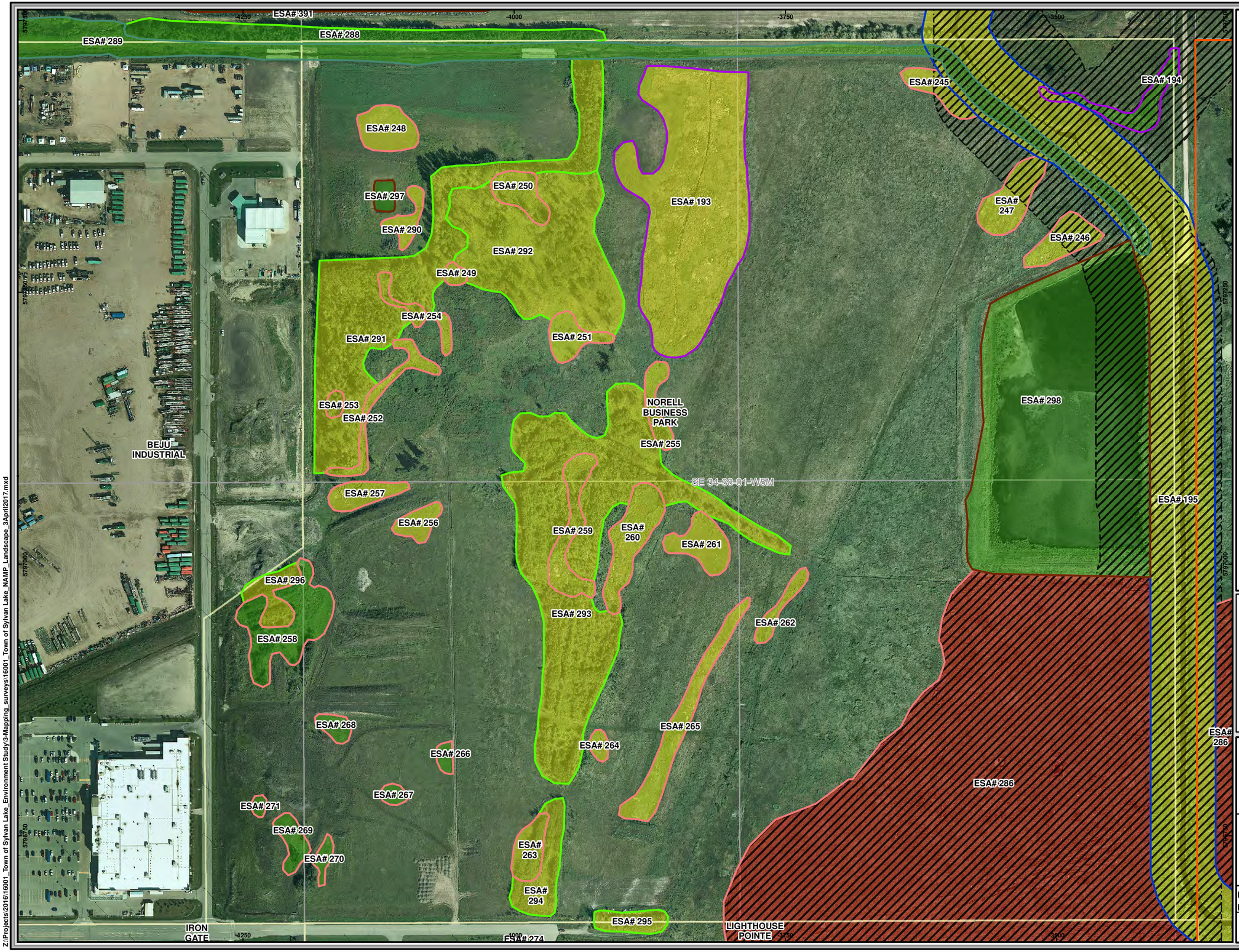
3.19 SE 34-038-01-W5M

Access:
Access was not granted on this quarter section.

Description:
The quarter section has been historically disturbed with soil piles along the west side. Many forested areas were mapped with #293 being logged previously and is in a state of regeneration. The forest in the northwest corner is a mature trembling aspen and balsam poplar forest. Many marsh wetlands were mapped within the quarter with a large wetland in the southeast corner which is connected to Cygnet Lake south of the study area. The unnamed creek which is Sylvan Lake's only outlet occurs on the east side of the quarter section. A large storm water pond occurs adjacent to the creek on the east side.

Management Considerations:

- Protection and conservation of the creek and its riparian area should be priority as the creek is Sylvan Lakes only outlet and may be fish bearing.
- Protection and conservation of the wetland is recommended due to the connectivity to Cygnet Lake. The flora and fauna diversity within this area should be protected.
- Conservation of the forest patches should be considered for conservation as they provide stepping stones to different habitats north and south of the quarter.



LEGEND

- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High

Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 34-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.19-1

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3.20 SW 34-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
This quarter section is dominated by industrial developments. A manmade drainage ditch along the north side has somewhat naturalized with cattails and reed canary grass dominating. Red-winged blackbirds and a sora have been heard within the drainage ditch. A small patch of treed vegetation was mapped within the southeast corner. This area is dominated by very young trembling aspen and balsam poplar. Three wetlands were mapped in the southeast corner. This area contains many soil piles and as such the condition of these wetlands is unknown but is suspected that they have been disturbed. No access was granted on the land that the wetlands occur.

Management Considerations:

- Further assessment of the young forest and wetlands in the southeast corner should be completed to fully assess conservation priority within this quarter section.

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LEGEND

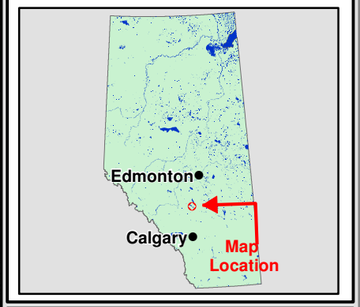
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SW 34-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.20-1

3.21 SE 33-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The majority of the quarter section is urban development with a small area on the east side which has not been developed. This area has been historically disturbed and is dominated by non-native species. One ESA was identified within the quarter. This temporary/seasonal wetland has been disturbed in the past and is currently in a modified state.

Management Considerations:

- Incorporating the wetland into the storm water management plan is recommended. This wetland should be considered for restoration of rehabilitation in order to increase diversity and water storage ability in the area.

LEGEND

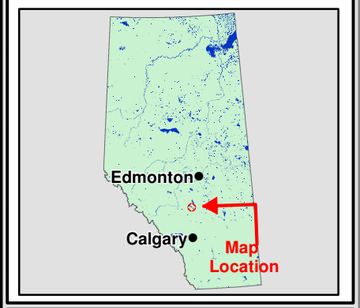
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
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N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake — A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 33-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 04 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.21-1

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3.22 SW 33-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The majority of the quarter section is urban development with only two ESAs identified. A small portion of the lake shore ESA occurs within the northwest corner. A linear treed corridor occurs within the northeast corner of the quarter section. This area provides some habitat and contains native vegetation.

Management Considerations:

- Development within the lake shoreline should be restricted. Increasing tree cover within this area would also provide bank stabilization and erosion where required.
- Conserving the treed corridor (#196) should be considered as this type of habitat is very limited throughout the existing residential areas and provides some movement through the urban matrix.

LEGEND

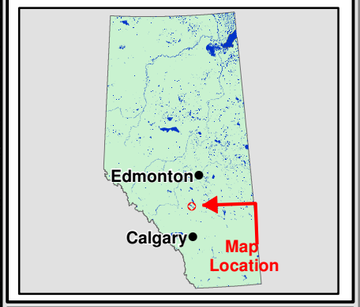
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
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N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

A Town for all Seasons
Sylvan Lake

Town of Sylvan Lake
Natural Areas Management Plan

SW 33-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.22-1

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3.23 SE 32-038-01-W5M

Access:

Access was through public access areas (streets, alleys, etc.). No access on the golf course was permitted.

Description:

This quarter section is dominated by residential and lakeshore developments. A portion of the quarter on the west is occupied by a golf course. Within this golf course large areas of native forest occur between fairways. A small patch of young aspen is located adjacent to the current railway. Also within the quarter section, two small patches of forest occur within residential yards.

Management Considerations:

- Conservation of the forest patches within the golf course is recommended due to the potential for diversity and habitat quality in this area, and the lack of these types of habitats within the study area.
- Conservation of the small forest patches is also recommend due to the lack of native vegetation coverage within the existing town developments.

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LEGEND

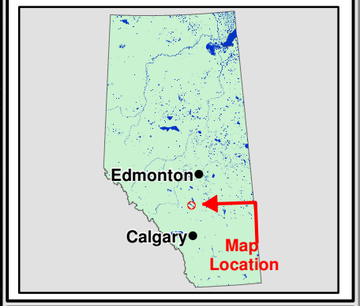
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 32-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. **3.23-1**

3.24 SW 32-038-01-W5M

Access:

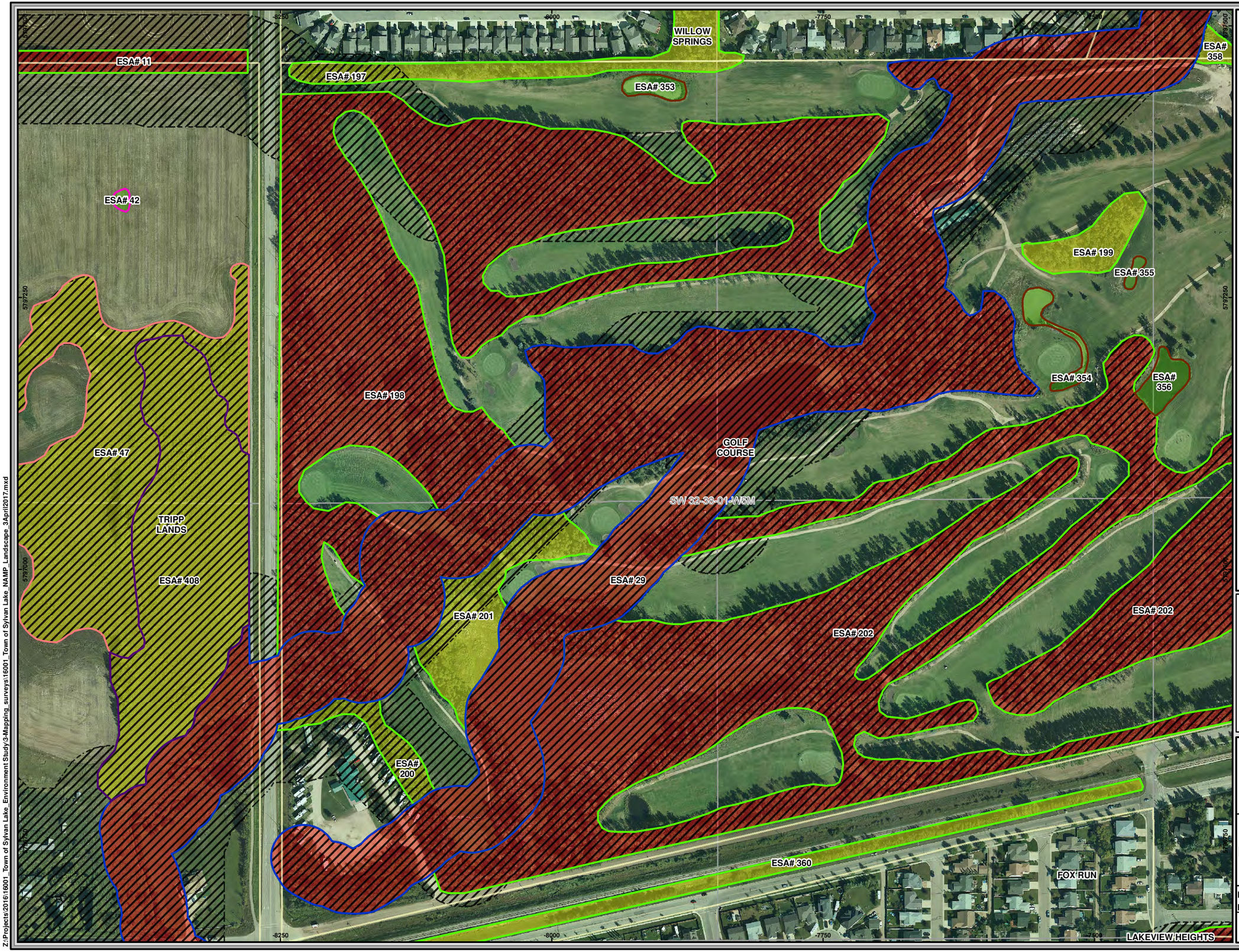
Access was through public access areas (streets, alleys, etc.). No access on the golf course was permitted.

Description:

The majority of the quarter section is a golf course. Throughout this golf course large patches of native vegetation have been maintained between fairways. Golf Course Creek runs diagonally through the quarter section with some alterations to the creeks drainage. The area contains ponds and small drainages for golf course purposes.

Management Considerations:

- Conservation of the forest patches within the golf course is recommended due to the potential for diversity and habitat quality in this area, the lack of these types of habitats within the study area as well as the connectivity and large patch size present.
- Conservation of the creek and riparian area should also be priority.



LEGEND

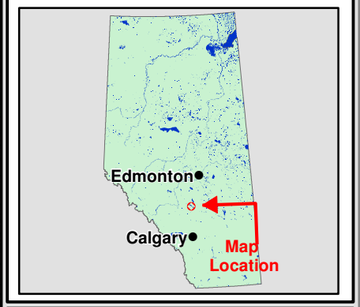
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SW 32-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.24-1

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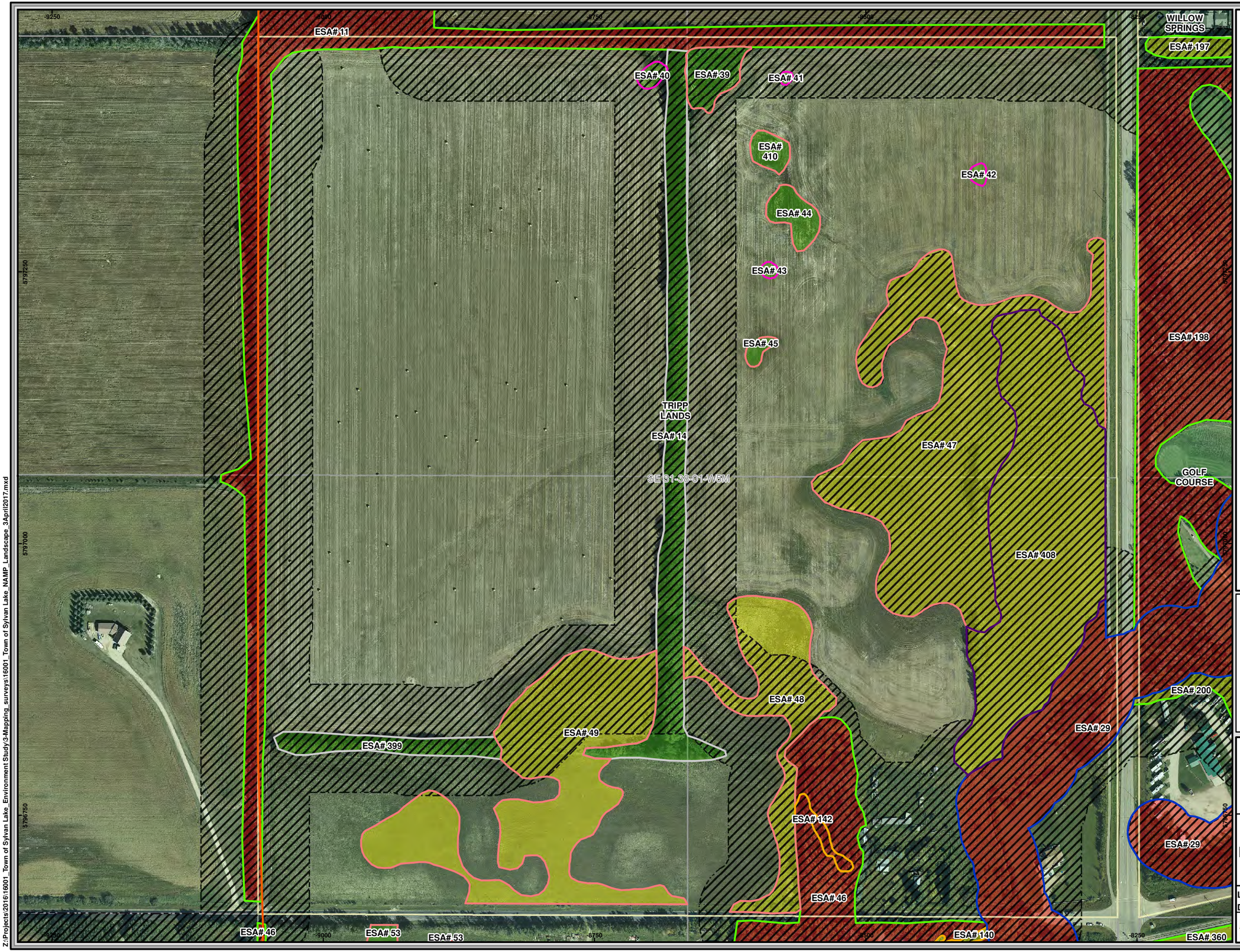
3.25 SE 31-038-01-W5M

Access: Access was granted on this quarter section.

Description:
This area contains many large ESAs. A patch of remnant forest occurs in the southeast corner. This area contains native vegetation and had a small swamp wetland within. A red tailed hawk nest was found on the northeast portion of the patch of forest (#46). This patch is connected to the forest to the south. Golf Course Creek occurs within the southeast corner of the quarter section. An alder flycatcher nest was observed within a shrub in the riparian area of the creek. The majority of the quarter section is cultivated with the southwest corner seeded to brome and bluegrass. Large temporary/seasonal marshes occur throughout with their margins cultivated in dry years. The only patch of known natural/semi-natural grassland occurs within this quarter section. A Manitoba maple and caragana corridor occurs in the middle of the corridor. This corridor is thick and may restrict larger mammal and ungulate movement through it. This area is used by song birds however, is not as diverse or as desirable as native vegetation corridors. Native vegetated corridors which are connected to the large patch of remnant forest in the quarter section to the north, occur along the west and north edges.

Management Considerations:

- Conservation of the patch of native forested vegetation should be priority (#46). A breeding bird survey should be completed prior to any construction or development activity due to the active nest within the area.
- Conservation of the creek and its riparian area is recommended due to limited coverage of this unique habitat within the study area.
- The native vegetated corridors along the west and north edge of the quarter section should be protected as they promote movement to a larger habitats to the south and east.
- The moderately rated ESAs (#47, #48, #49 and #408) require further assessment of their importance and ecological function.



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LEGEND

- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High

Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 31-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. **3.25-1**

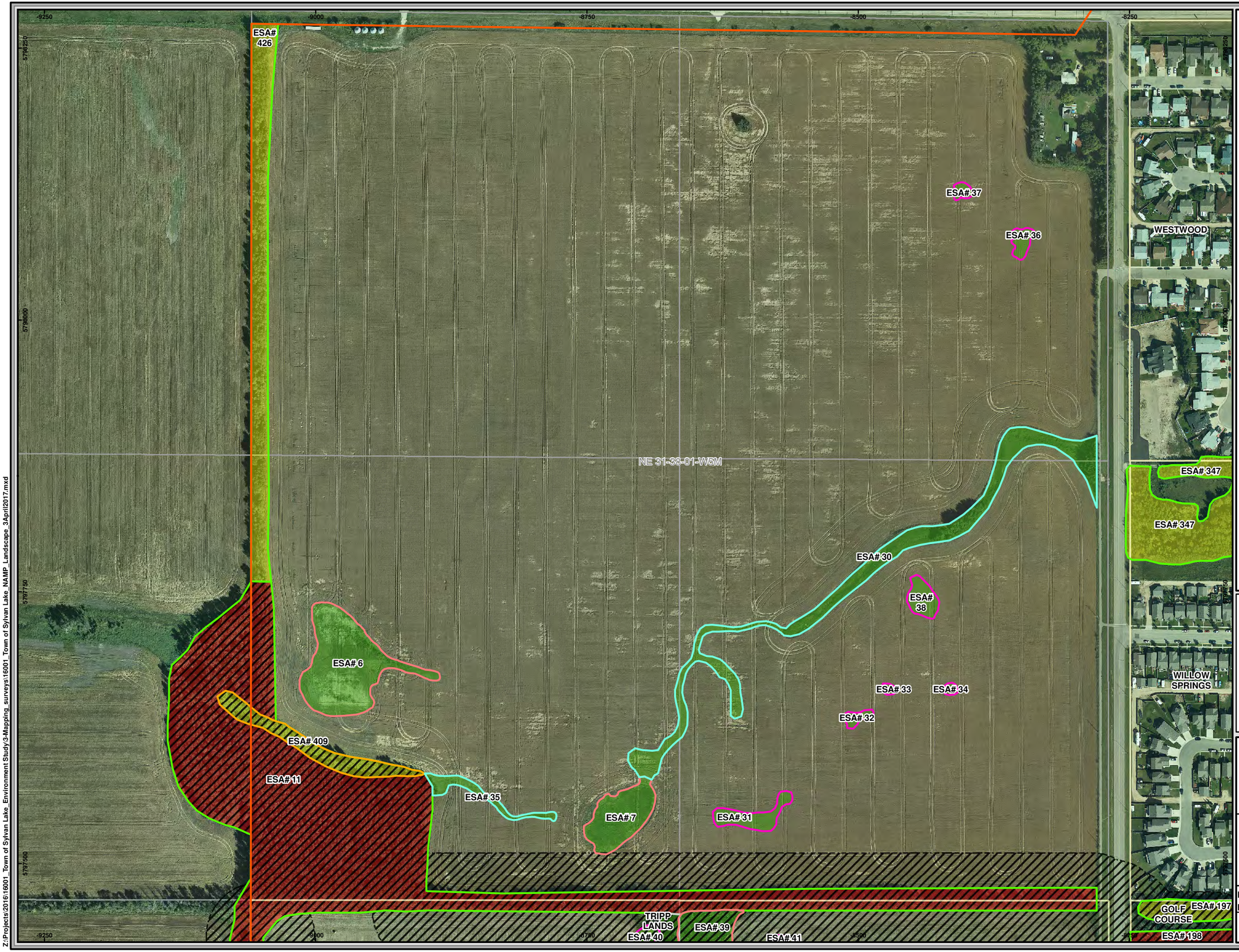
3.26 NE 31-038-01-W5M

Access:
Access was granted on this quarter section.

Description:
Within the southwest corner of this quarter a large patch of remnant forest occurs. Many nests and song bird activity was observed throughout this ESA. Two red-tailed hawks were observed soaring on the west side of this area which may indicate a nest is present. This quarter section contains native vegetation corridors along the west and south edges. Two marsh wetlands occur in the southern portion and two ephemeral drainages occur within the quarter. The drainage on the east side has been historically dugout in order divert water into the ditch. Many ephemerals wetlands, which have been cultivated annually, occur throughout the quarter section.

Management Considerations:

- Conservation of the large patch of native vegetation and connected corridors should be priority (#11).
- Native vegetation corridor which is on the west edge of the quarter should also be considered for conservation as this corridor provides movement north to other habitats.
- The two temporary marsh areas (#6 and #7) should be incorporated into the quarter sections storm water management plan.



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LEGEND

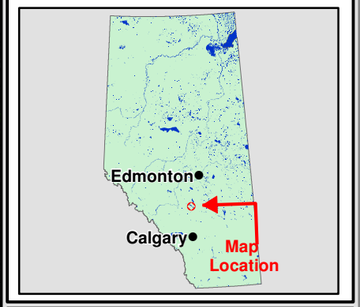
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Town of Sylvan Lake
Natural Areas Management Plan

NE 31-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

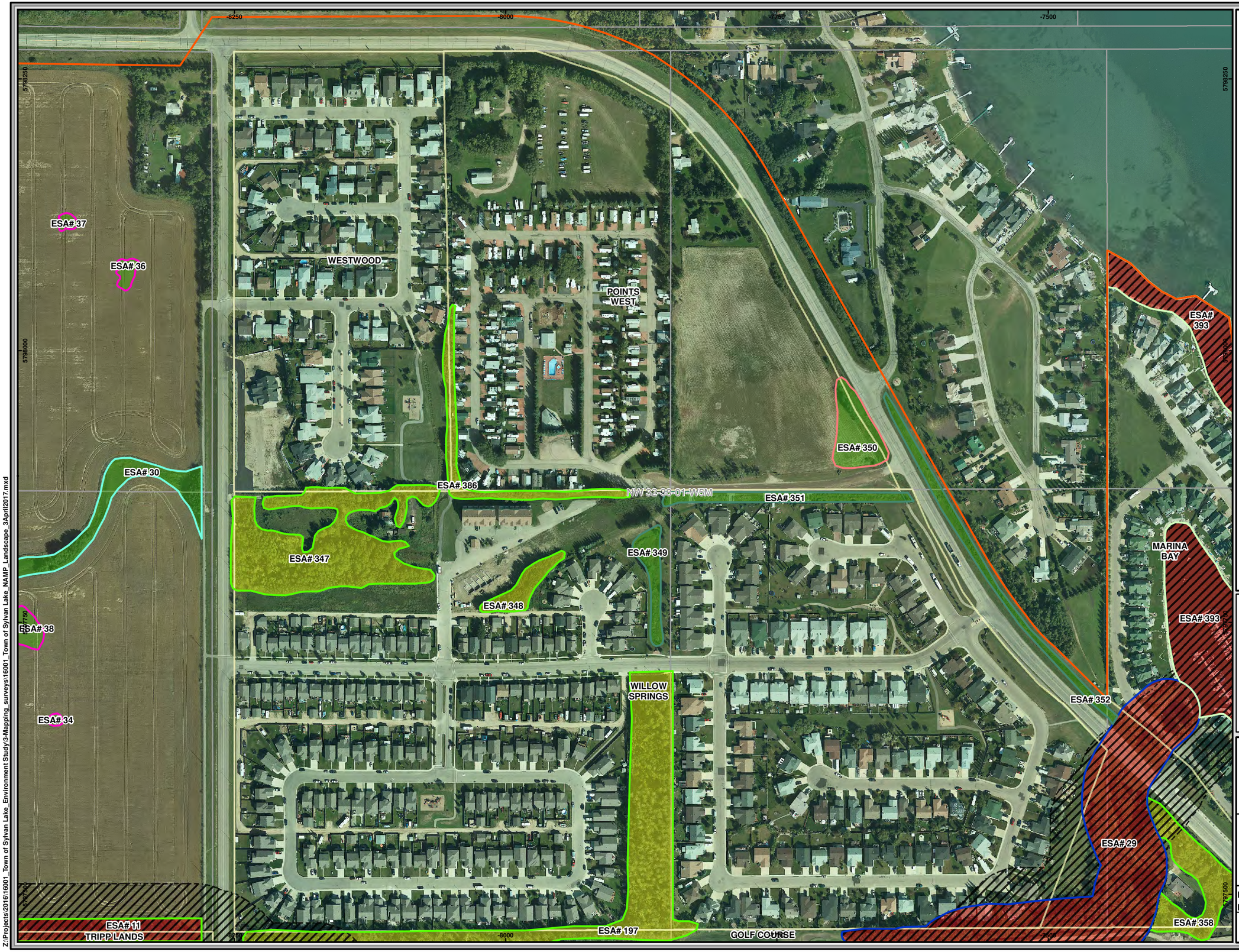
RC BioSolutions Ltd. | Figure No. 3.26-1

3.27 NW 32-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
This quarter section is dominated by urban development. Very small patches of native vegetation occur throughout the quarter. Golf Course Creek skirts the southeast corner of the quarter section. Many of the mapped ESAs occur within the back alleys of residential development. Three drainage ditches occur including # 349, 351, and 352. All three have some native vegetation within including cattails, bulrush and manna grass. One temporary/seasonal wetland is located within the northeast corner along lakeshore drive. This wetland has been previously disturbed and is currently dominated by non-native vegetation.

Management Considerations:
- Conservation of the creek and its riparian area is recommended due to limited coverage of this unique habitat within the study area.
- The small patches of native vegetation should be conserved as these areas provide stepping stones for species to move through the quarter section to the habitat located in Golf Course Creek and larger forested areas to the south.



LEGEND

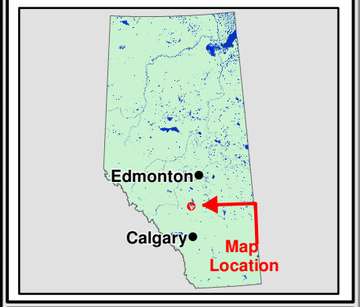
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 32-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.27-1

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3.28 NE 32-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The majority of this quarter section occurs within Sylvan Lake. Golf Course Creek occurs within the southwest corner where it flows into the Sylvan Lake at Marina Bay. Marina Bay provides fish habitat and is connected to the near shore area of Sylvan Lake. The near shore area is dominated by submergent vegetation which can provide spawning habitat for some fish species. Two small patches of forest occur within the quarter section which are both connected to the creeks riparian area and adjacent to marina bay.

Management Considerations:
- Conservation of the creek and its riparian area is recommended due to limited coverage of this unique habitat within the study area.
- Conservation of the fish habitat within Marina Bay and near shore area should also be priority.

-7500 -7250 -7000 -6750

5798250 5798000 5797750

POINTS WEST
ESA# 350
ESA# 351
ESA# 352
ESA# 393
MARINA BAY
WILLOW SPRINGS
ESA# 29
ESA# 359
ESA# 358
GOLF COURSE
NE 32-38-01-W5M

LEGEND

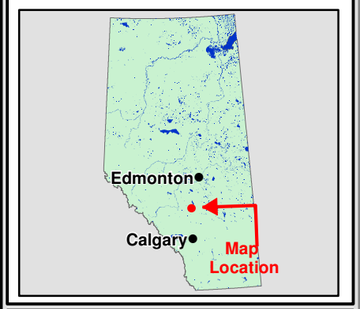
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

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Meters

Scale: 1:3,250
NAD 1983 3TM 114

Town of Sylvan Lake
Natural Areas Management Plan

NE 32-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.28-1

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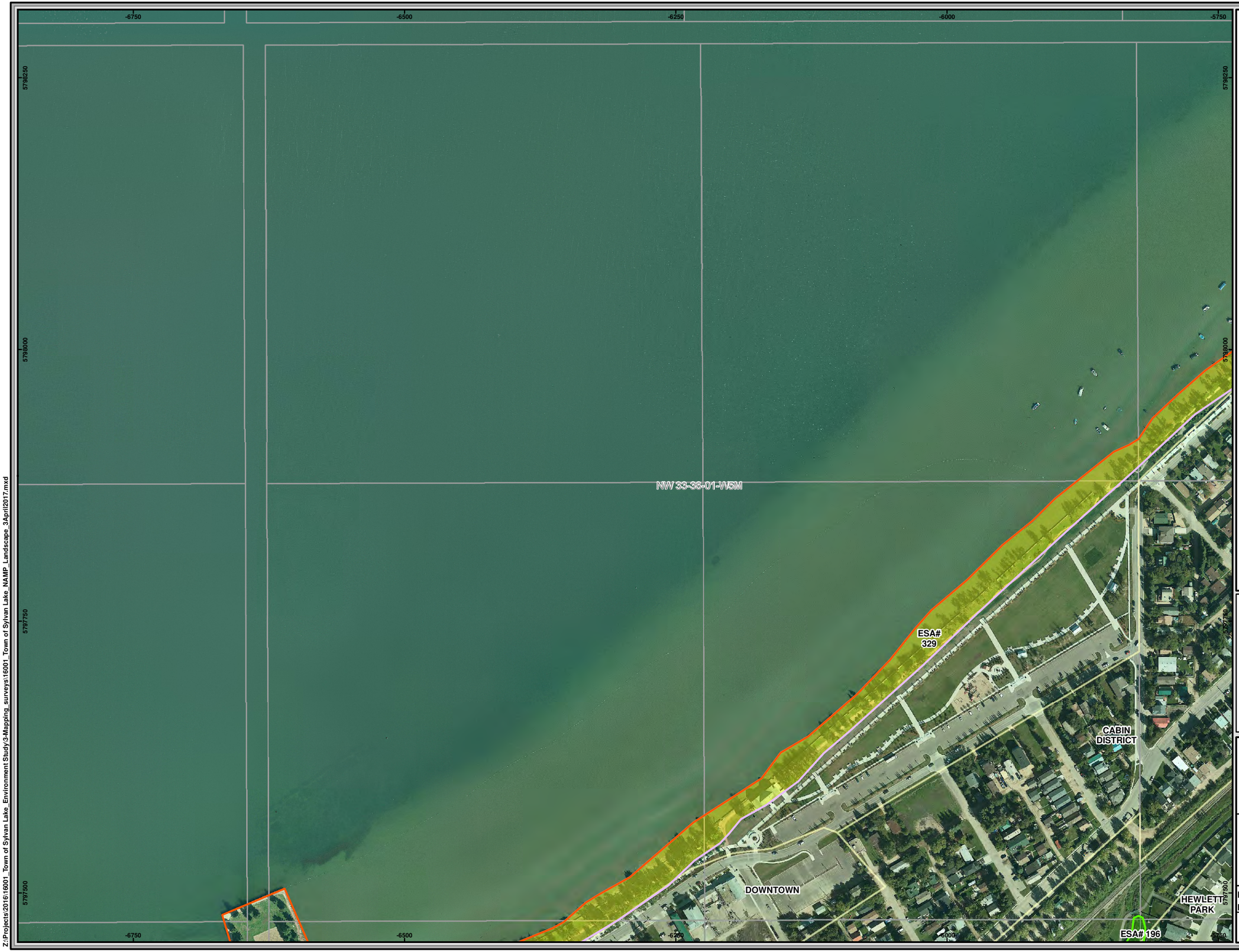
3.29 NW 33-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The majority of the quarter section is within Sylvan Lake. The only ESA identified and mapped within the quarter section is the lake shoreline. This area is within the Sylvan Lake Provincial Park is utilized for recreation purposes. This area is also important riparian area for the lake.

Management Considerations:

- Development within the lake shoreline should be restricted. Increasing tree cover within this area would also provide bank stabilization and erosion where required.



LEGEND

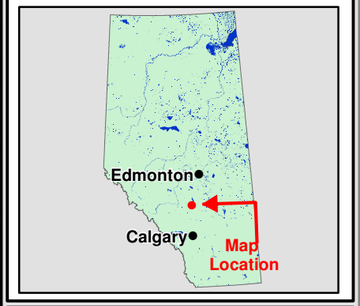
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 33-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. **3.29-1**

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3.30 NE 33-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
Within the northwest corner of the quarter is lake shoreline that occurs within the Sylvan Lake Provincial Park is utilized for recreation purposes. This area is also important riparian area for the lake. Also along the current railroad a corridor of native vegetation occurs. Three temporary/seasonal marshes occur in the northeast corner however these have since been lost to recent development. Also the semi-permanent wetland (#305) has also been lost to recent urban developments since the air photo was taken.

Management Considerations:

- Development within the lake shoreline should be restricted. Increasing tree cover within this area would also provide bank stabilization and erosion where required.
- The conservation of the strip of native vegetation along the railroad right of way is recommended as it provides movement through this quarter.

LEGEND

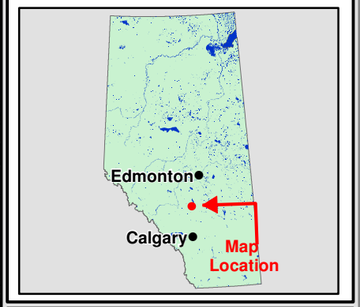
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

A Town for all Seasons
Sylvan Lake

Town of Sylvan Lake
Natural Areas Management Plan

NE 33-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.30-1

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3.31 NW 34-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The quarter section is dominated by industrial development including the Town's sanitary sewage lagoons occurring on the east side. The Town's sanitary sewage lagoons are made of six cells plus a separate cell for a snow dump. The only notable ESA identified within this quarter is part of the unnamed creek which is the only outflow from Sylvan Lake. It has been historically modified and the creek has been diverted through ditches along main access roads.

Management Considerations:

- Protection and conservation of the creek and its riparian area should be priority as the creek is Sylvan Lakes only outlet and may be fish bearing.

LEGEND

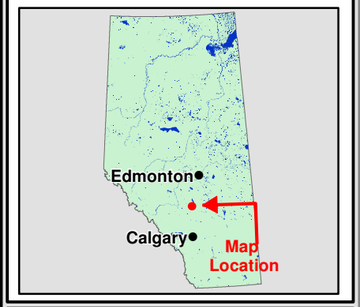
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90 Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake — A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 34-038-01-W5M ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.31-1

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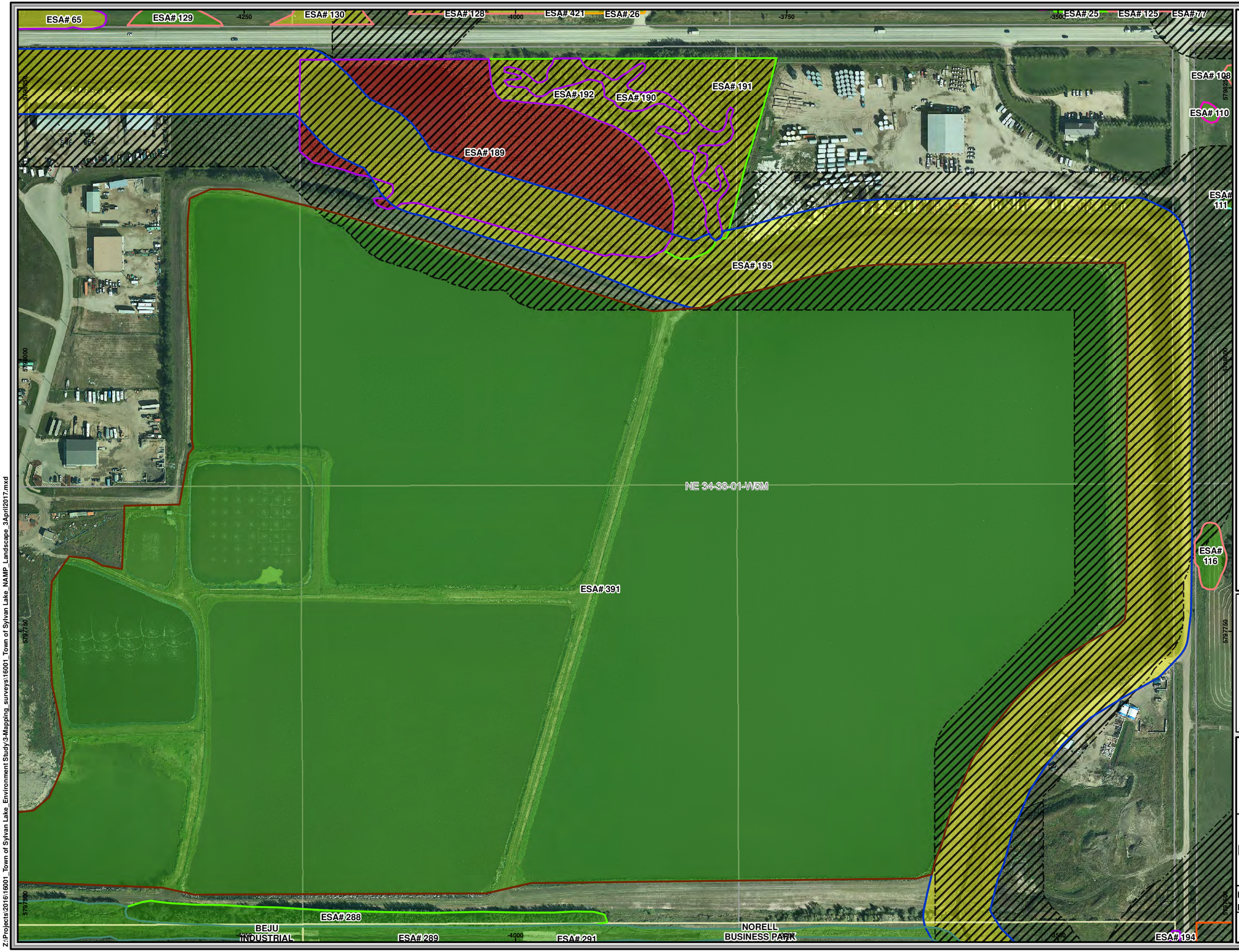
3.32 NE 34-038-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
The quarter section is dominated by the Town's sanitary sewage lagoons which are made of six cells plus a separate cell for a snow dump. The only outflow from Sylvan Lake occurs along the north and east side of the quarter. The unnamed creek (locally known as Sylvan Creek) has been historically modified and the creek has been diverted to go around the treatment lagoon, this creek eventually flows into Cygnet Lake to the south. The creek flows through a large open water wetland in the northwest corner. This wetland is known to have several waterfowl species nest within it annually. Red-necked grebes have also been observed within the wetland. This wetland is one of the Towns only open water wetlands and is surrounded by willow with cattails and sedges within the deeper portions. A mature trembling aspen forest occurs to the east of the wetland with a willow thicket in the middle.

Management Considerations:

- Protection and conservation of the creek and its riparian area should be priority as the creek is Sylvan Lakes only outlet and may be fish bearing.
- Protection and conservation of the wetland is recommended due to the limited number of open water wetlands remaining within the study area. The flora and fauna diversity within this area should be protected.
- Conservation of the forest patches and willow thicket should also be considered as these areas provide a variety of diverse habitats.



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LEGEND

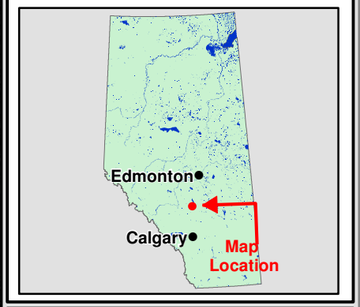
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

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Meters

Scale: 1:3,250
NAD 1983 3TM 114

Town of Sylvan Lake
Natural Areas Management Plan

NE 34-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.32-1

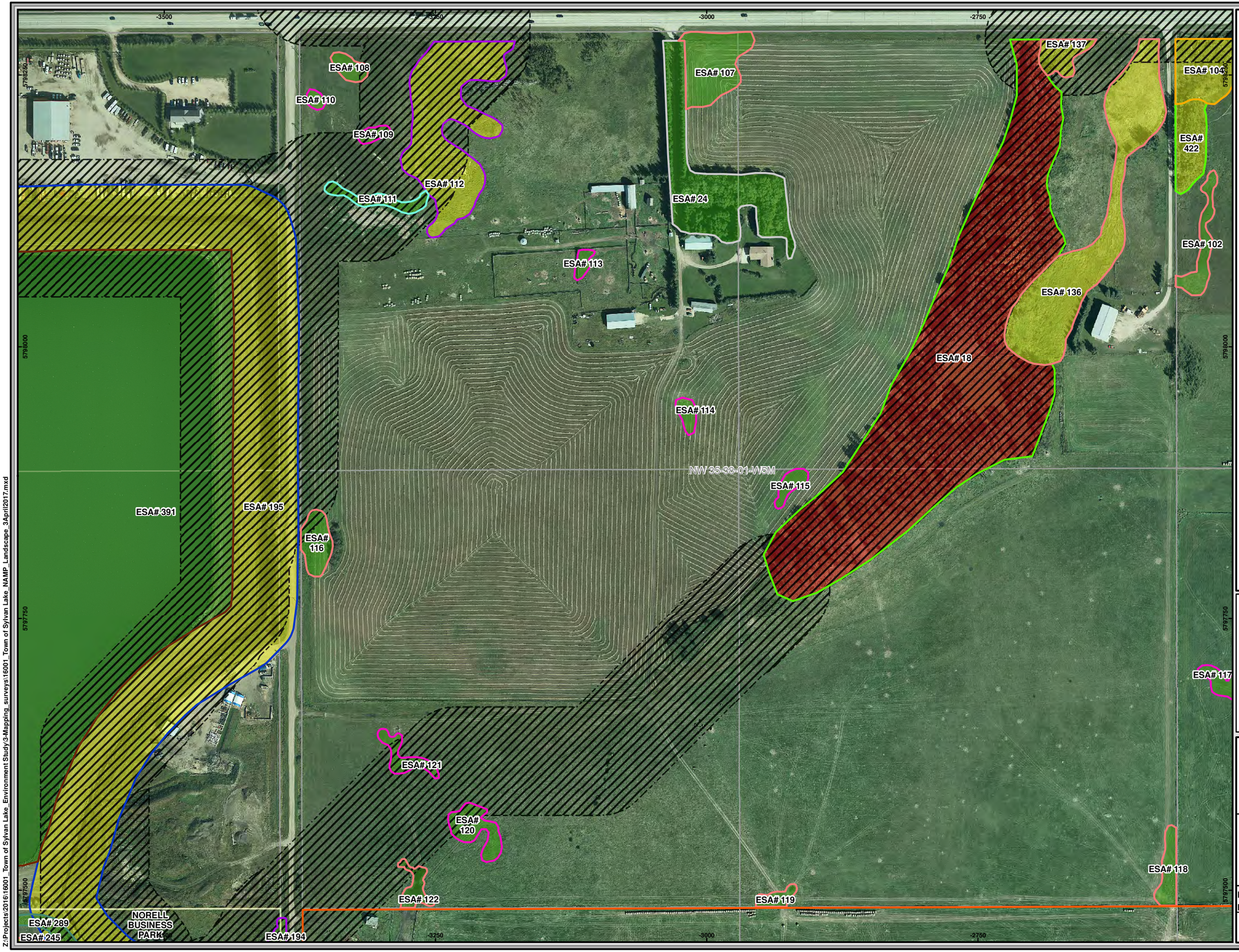
3.33 NW 35-038-01-W5M

Access:
Access was granted on the northeast portion.

Description:
This quarter section is dominated by tame pasture in the northwest corner and southeast. Cultivated fields occur within the middle with a large patch of remnant forest on the east side. This forest was observed to be grazed in some areas with limited understory however contains native vegetation within the northeast portion. Planted white spruce is located along a driveway which is then connected to a small patch of Manitoba maple and caragana. Many small marsh and ephemeral wetlands occur throughout however most have been disturbed to some degree. A larger marsh occurs in the northeast corner and a shallow open water wetland was mapped in the northwest corner.

Management Considerations:

- Further assessment of the two larger wetlands (#112 and #136) should be completed to fully assess these wetlands and there ecological function.
- The forest patch (#18) should be protected and conserved as it contains large mature native trees and is adjacent to larger habitats to the north, as well as provides refuge to wildlife using the wetlands.



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LEGEND

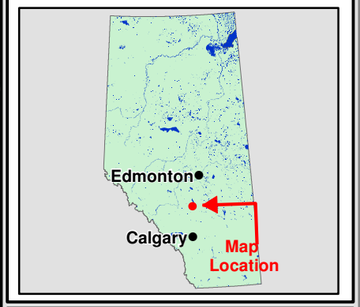
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

0 15 30 60 90
Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NW 35-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. **3.33-1**

3.34 NE 35-038-01-W5M

Access:
Access was granted on the quarter section.

Description:
This quarter section has many areas used for agriculture including pasture, cultivated fields and areas used for hay. A very large mature deciduous forest occurs within the east portion of the quarter and extends south to Cygnet Lake. Pileated woodpeckers were heard during the reconnaissance visit within this forested area. Low areas were mapped within the large patch of forest. An open water wetland occurs on the east edge of the quarter which contained many waterfowl species within it as well as small ducklings. A small shrubby swamp occurs within the northwest corner with a small patch of mature trembling aspen adjacent. There is a dugout (#105) which is used by waterfowl and a small corridor along the east side (#425).

Management Considerations:

- Conservation of the large mature forest patch (#17) should be priority. This area provides core area for species as well is connected to sensitive habitat to the south (Cygnet Lake) and the north.
- The wetland along the east edge (#100) should also be protected and conserved.

ESA# 9
ESA# 153
ESA# 152
ESA# 154
ESA# 137
ESA# 104
ESA# 423
ESA# 106
ESA# 103
ESA# 422
ESA# 105
ESA# 425
ESA# 96
ESA# 99
ESA# 424
ESA# 97
ESA# 102
ESA# 136
ESA# 98
ESA# 134
ESA# 135
ESA# 18
NE 35-38-01-W5M
ESA# 133
ESA# 17
ESA# 100
ESA# 117
ESA# 101
ESA# 118
ESA# 17

-2750 -2500 -2250 -2000 -1750

5798250 5798000 5797750 5797500

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LEGEND

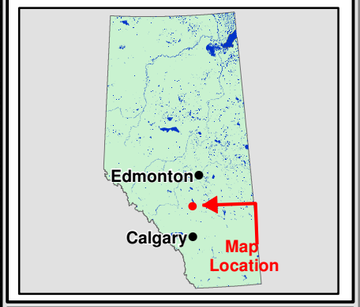
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

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Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

NE 35-038-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. **3.34-1**

3.35 SE 02-039-01-W5M

Access:
Access was not granted on the quarter section.

Description:
A portion of the quarter section to the north of the railway is not within the study area. A large patch of intact mature forest occurs along the west edge and is connected to a swamp wetland. Marsh wetlands occur to the east of the swamp with strips of mature trembling aspen bordering these wetlands. A strip of mature forest occurs along the current railroad right of way and is dominated by trembling aspen and balsam poplar. The remaining areas of the quarter are used for hay and cultivation with four wetlands and two drainages throughout. These areas have been disturbed in most years for agricultural purposes.

Management Considerations:

- Conservation of the large mature forest patch (#22) along with the strip of trees along the railway should be priority.
- Conservation and protection of the large swamp area (#9) connected to the patch of forest should also be priority.
- Further assessment of the wetlands and forested corridors to the west is required to better understand these areas ecological function.

-2750 -2500 -2250 -2000 -1750

5799000 5798750 5798500

ESA# 8
ESA# 85
ESA# 22
ESA# 84
ESA# 86
ESA# 89
ESA# 88
ESA# 87
ESA# 9
ESA# 23
SE 02-39-01-W5M
ESA# 94
ESA# 91
ESA# 92
ESA# 93
ESA# 90
ESA# 95
ESA# 152
ESA# 153
ESA# 21
ESA# 20
ESA# 154
ESA# 19

LEGEND

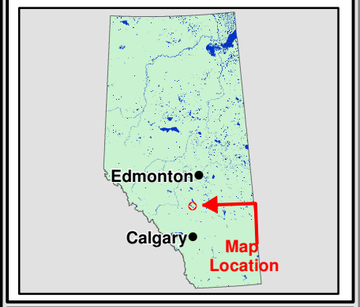
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

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Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 02-039-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.35-1

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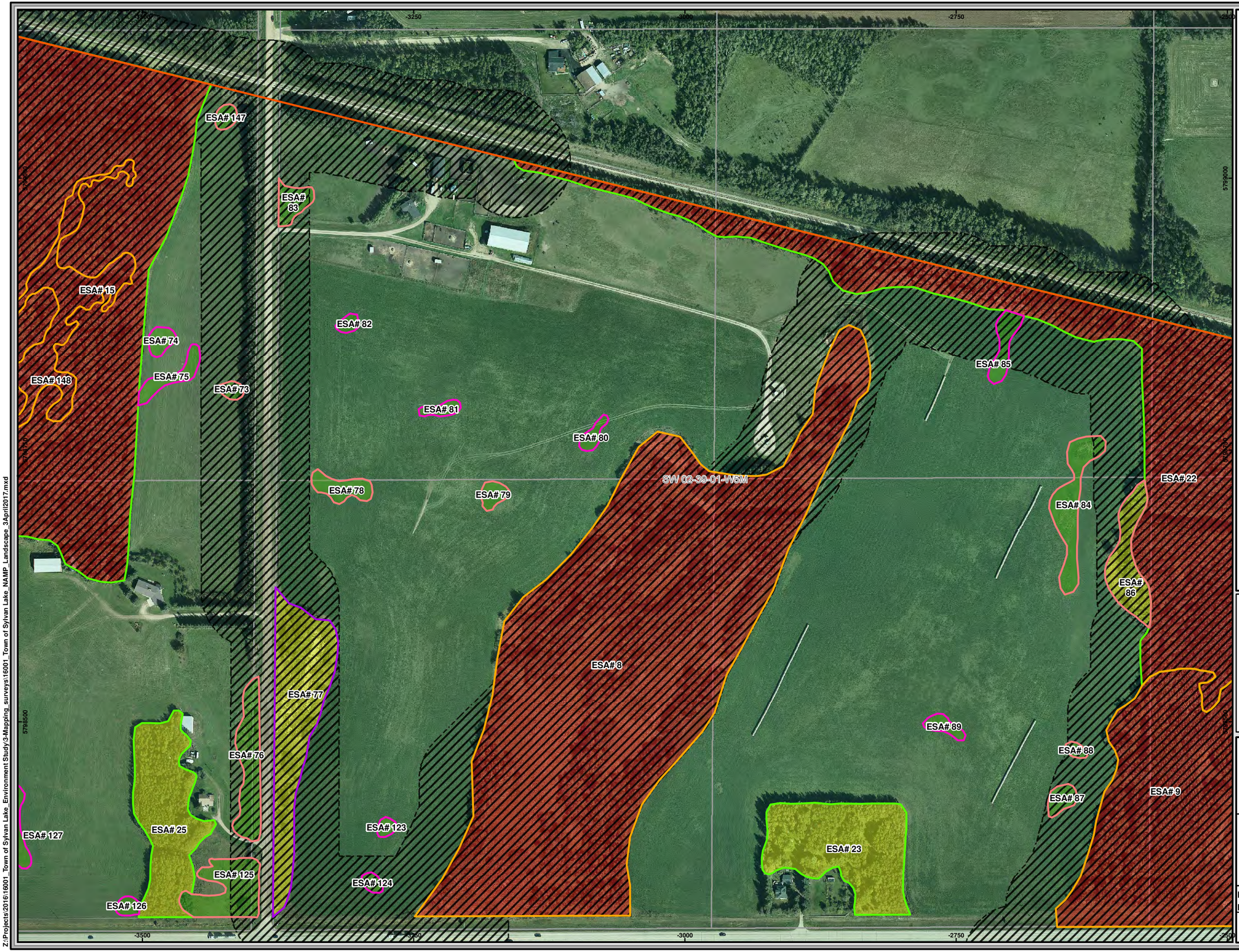
3.36 SW 02-039-01-W5M

Access:
Access was not granted on the quarter section.

Description:
The majority of the quarter section appears to be used as a hay field. A large intact swamp wetland was mapped within the quarter which contains willows and some larger balsam poplar. A strip of mature trees and native vegetation also occurs along the railroad right of way which provides movement to larger habitat to the west. A small patch of native treed vegetation occurs surrounding a residence. This area contained younger trembling aspen. A small open water wetland was identified on the west edge. This area contained patches of willows with sedges dominating the deepest portion. Many marsh and ephemeral wetlands occur within the hay field however are disturbed annually during harvest.

Management Considerations:
- Conservation of the large swamp wetland (#8) along should be priority.
- Conservation and protection of the large swamp area (#9) in the southeast corner which is connected to a patch of forest should also be priority.
- The strip of native vegetation along the railway should also be conserved as it provides a corridor to other habitat to the west.



LEGEND

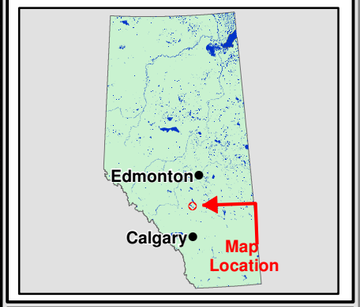
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

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Scale: 1:3,250
NAD 1983 3TM 114

Town of Sylvan Lake
Natural Areas Management Plan

SW 02-039-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.36-1

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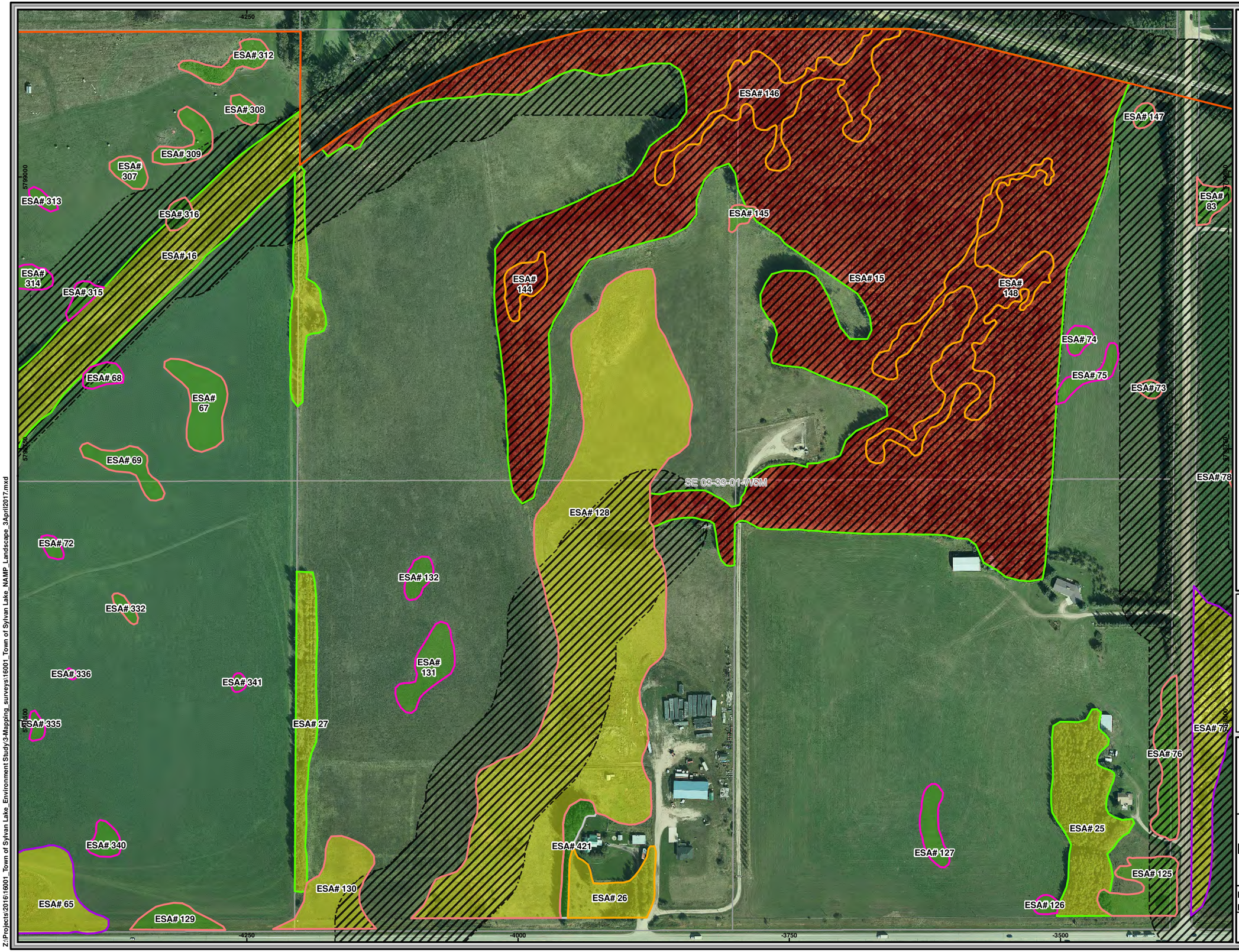
3.37 SE 03-039-01-W5M

Access:
Access was granted on the east side of the quarter section.

Description:
The quarter section has many areas that are used as hay fields. A large intact mature deciduous forest occurs on the east side. This forest is known to contain many song bird species (personal communication with landowner) including Baltimore oriole and has small depressions (swamps) throughout. A smaller patch of native forest occurs within the southeast corner along with a few marsh wetlands that have been disturbed in the past. A large marsh wetland was mapped in the west portion of the quarter section however the extent could not be verified as access was not granted on this part of the quarter. This wetland may have been previously disturbed as a dugout is visible on the air photo. Two approximately 20 m wide corridors were mapped on the west edge of the quarter with the north one connected to a larger corridor to the west.

Management Considerations:

- Conservation of the large intact forest (#15) should be priority within this quarter. This area provides ideal habitat for many wildlife species and is one of the largest areas of native vegetation within the study area.
- The smaller patch of forest (#25) should be considered for conservation and protection as it provides movement from the large area south to other habitat types.



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LEGEND

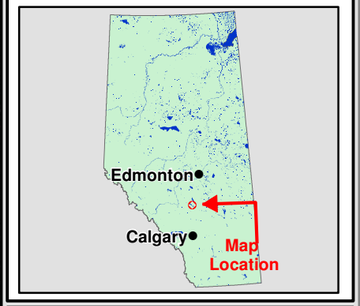
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

N W E S

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Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SE 03-039-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd.

Figure No. 3.37-1

3.38 SW 03-039-01-W5M

Access:

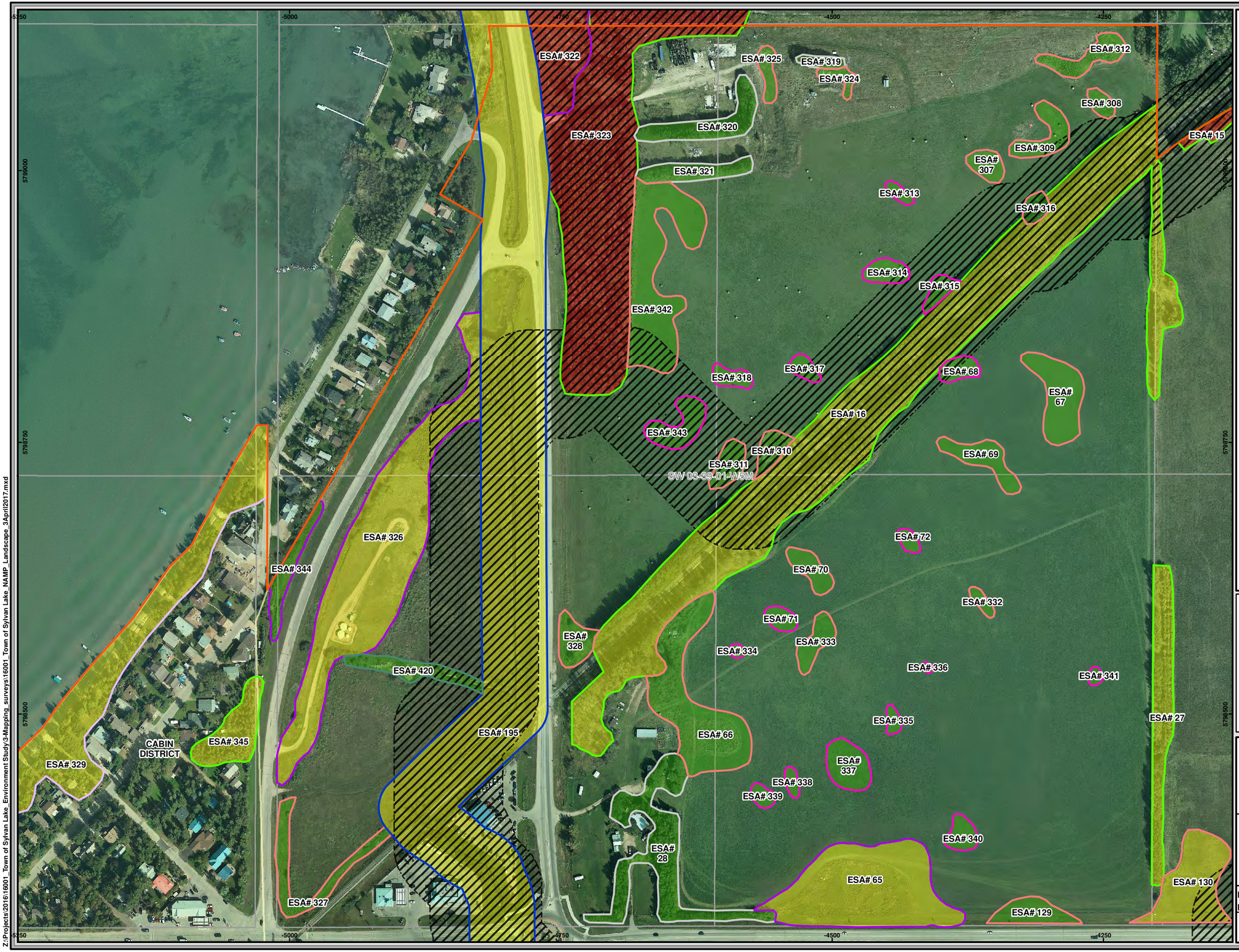
Access was granted in the southeast corner of the quarter section. Otherwise access was through public access areas (streets, alleys, etc.).

Description:

Much of the east portion of the quarter section has is used as hay fields. The current railroad right of way runs through the quarter with a thin strip of native treed forest. An unnamed outlet to Sylvan Lake occurs in the west portion of the quarter and has been diverted to flow within ditches of Highway 20. A large intact mature deciduous forest occurs in the northwest. This forest extends north outside of the study area and boarders a larger open water wetland. There are many small marsh and ephemeral wetlands throughout the hay fields which have been disturbed annually through cultivation and/or harvest.

Management Considerations:

- Conservation of the large intact forest (#323) and the adjoining wetland (#322) should be considered within this quarter. This area provides habitat for many wildlife species and is dominated by native vegetation.
- Protection and conservation of the creek and its riparian area should be priority as the creek is Sylvan Lakes only outlet and may be fish bearing.
- Protection and conservation of the native vegetated corridor along the current railroad should also be considered as it provides an area for wildlife movement to the large intact forest to the east.



LEGEND

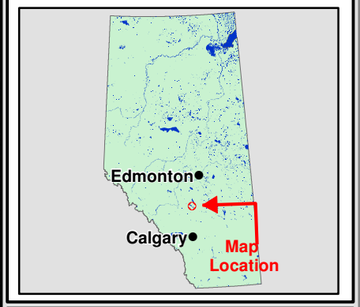
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
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Meters

Scale: 1:3,250
NAD 1983 3TM 114

Sylvan Lake
A Town for all Seasons

Town of Sylvan Lake
Natural Areas Management Plan

SW 03-039-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.38-1

3.39 SE 04-039-01-W5M

Access:
Access was through public access areas (streets, alleys, etc.).

Description:
Within the northwest corner of the quarter is lake shore line that occurs within the Sylvan Lake Provincial Park is utilized for recreation purposes. This area is also important riparian area for the lake. A small patch of native vegetation occurs in the southeast corner which adjacent to residential areas.

Management Considerations:

- Development within the lake shoreline should be restricted. Increasing tree cover within this area would also provide bank stabilization and erosion where required.
- The conservation of the patch of native vegetation on the east side is recommended as it provides movement to the east and larger habitat areas.

-6000 -5750 -5500 -5250 -5000

5799000

5798750

5798500

SE 04-39-01-W5M

ESA# 329

CABIN DISTRICT

ESA# 345

ESA# 344

ESA# 326

ESA# 327

LEGEND

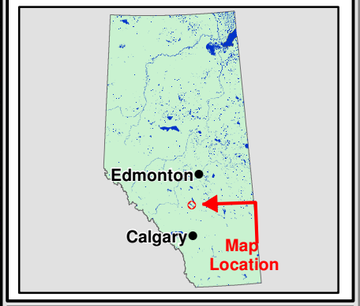
- Neighbourhood Boundary
- ESA Connectivity Corridor
- Town Boundary
- Township Grid

ESA Type

- Drainage ditch
- Forested (Deciduous)
- Forested (Mixedwood)
- Grassland (Natural/Semi Natural)
- Riparian (Lake)
- Stormwater Pond/Dugout
- Water body (Lake)
- Watercourse (Ephemeral)
- Watercourse (Small Permanent)
- Wetland (Ephemeral)
- Wetland (Shallow Open Water)
- Wetland (Swamp)
- Wetland (Marsh)
- Windrow

ESA Significance Rating

- Low
- Moderate
- High



Map Sources/Notes:
Aerial Photograph obtained from the Town of Sylvan Lake (2014, 0.2 m resolution)

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NAD 1983 3TM 114

Sylvan Lake
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Town of Sylvan Lake
Natural Areas Management Plan

SE 04-039-01-W5M
ESA Inventory Map Including ESA Rating

Lead: Richard Carson	Date: 05 Apr 2017
Drawn By: Sandra Babiuk	Project Number: 16001

RC BioSolutions Ltd. | Figure No. 3.39-1

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4. Natural Areas Management Plan

4.1 Environmental Regulatory Framework

There are many federal, provincial and municipal acts and regulations that have authority over environmental resources in the Town of Sylvan Lake and Alberta. Acts and regulations that may apply to developments within the Town as well as possible permits or approvals required for development, are presented within Table 10 below.

Table 10. Regulatory Requirements for new Developments in Alberta

Act	Purpose	Permits and Approvals
Federal Legislation		
Species at Risk Act (SARA)	The objective of the *Species at Risk Act* (SARA) is to prevent Canadian indigenous species, subspecies, and distinct populations from becoming extirpated or extinct. It also aids in the recovery of endangered or threatened species as well as preventing other species, through proper management, from becoming at risk.	Within SARA guidelines for enforcement in the event of contravention are provided but the Act does not require any permitting or approvals.
Migratory Birds Convention Act (MBCA)	The objective of the Migratory Birds Convection Act (MBCA) and its regulation is ensure that efforts are made to preserve and protect habitat necessary for the conversation of migratory birds within Canada; including but not limited to nesting and wintering grounds as well as migratory bird corridors, during activities such as tree clearing, wetland consolidation and any temporary and permanent disturbances occurring adjacent to or within migratory bird habitat. Environment Canada has identified an April 15th through to August 31st prohibition window within which any development activities should be avoided. There is no legal mechanism such as a permit or exemption to authorize the incidental destruction of migratory bird nests or eggs in relation to industrial or other resource development activities. However, non-compliance or violations of the MBCA and regulations can result in fines up to $1,000,000 and/or up to three years in jail for indictable offences. Prosecution can take place for damage, destruction or removal of both active and non-active nests.	To ensure compliance with the Migratory Bird Regulations presence of migratory birds and their nests should be determined by scientific surveys before activities are conducted. Activities should be avoided during key periods, such as the breeding bird season, to reduce the risk of disturbance or nest destruction. If activities are to occur within this period a breeding bird survey as well as permission from the local AEP wildlife office may be required.
Fisheries Act	The *Fisheries Act* states that “no person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery” (Section 35(1)) (Department of Fisheries and Oceans, 1991).	A *Fisheries Act* authorization is required for any activity that may contravene section 35(1) of the act. As part of the authorization, fish habitat offsetting would be required for any altered fish habitat.

Provincial Legislation		
Alberta Environmental Protection and Enhancement Act (AEPEA)	Alberta Environment is responsible for evaluating impacts that a project may have on the environment and for the administration of Alberta's laws governing environmental assessment. The Environmental Assessment Regulation and the Environmental Assessment (Mandatory and Exempted Activities) Regulation provide direction on matters related to the administration of the environmental assessment process.	Approval under this Act is accomplished through completing an Environmental Impact Assessment or Conservation Reclamation Plan. Each development should determine whether their project is except or requires approval under this act.
Alberta Water Act	The *Water Act* deals with the province water rights, activities that can disturb water and water resources planning and implementation. The government of Alberta owns all the water resources in the province whether located on private, municipal or Crown lands. Any activity or development with the potential to disturb any water body requires approval under the *Water Act*. The Act defines a water body as any location where water flows or is present, whether or not the flow or presence of water is continuous, intermittent or occurs only during a flood, and includes but is not limited to wetlands, ponds, lakes, watercourses and aquifers.	Any impacts to watercourses or water bodies within Alberta require approval under the *Water Act*.
Provincial Wetlands Policy	The goal of the Alberta Wetland Policy is to conserve, restore, protect and manage Alberta's wetlands to sustain the benefits they provide to the environment, society and economy. The policy is used to minimize the loss and degradation of wetlands, while allowing for continued growth and economic development in the province. The policy is governed under the *Alberta Water Act*.	Developments should have a qualified wetland scientist practitioner complete a Wetland Assessment and Impact Report to ensure compliance under this policy.
Alberta Wildlife Act	The purpose of the Act is to protect wild species within Alberta that have been designated as Endangered or Threatened within the province. Section 36 of the *Alberta Wildlife Act* states that without authorization, a person shall not wilfully molest, disturb or destroy a house, nest or den of prescribed wildlife or a beaver dam in prescribed areas or at prescribed times.	Permitting and approvals are not always required under the Wildlife Act, but violations can result in fines.
Alberta Public Lands Act	The purpose of this Act is to regulate and track the use of Public Land within the province. Authority to use crown land is granted through dispositions issued under the *Public Lands Act*. The approval of dispositions ensures that public land within the province is utilized in a manner that meets acceptable environment standards and complies with the legislation. The *Public Lands Act* may also apply to the bed and banks of watercourse as these lands are owned by the province and as such when any activity or disturbance to a wetland or watercourse may require approval under the *Public Lands Act*.	Approval under this Act is only required of the development will be on Public Land (crown land) which includes the bed and shore of watercourses, water bodies and wetlands.

Alberta Weed Control Act	This Act requires the owner and/or occupant of the land must control including to inhibit growth or spread and/or to destroy all noxious weeds. The Act also states that the owner of the land must destroy all prohibited weeds including killing of all growing parts and to render reproductive mechanisms non-viable.	Within the *Alberta Weed Control Act* it is the responsibility of the owner to control weeds however the Act does not require any permitting or approvals. Contravention of the Act can result in fines.
Alberta Conservation Information Management System (ACIMS)	Although not directly connected to any specific legislation, ACIMS tracks and ranks the condition, status and trends of selected species and plant communities (ACIMS 2013).	Permitting and approvals are not required under the ACIMS; however violations can result in fines.
Provincial Parks Act & Wilderness Areas, Ecological Reserve and Natural Areas Act – AEP and Community Development	Both acts are used to minimize the potentially harmful effects of land use activities on environmental resources in and adjacent to parks and other protected areas	These acts may apply to developments within the Sylvan Lake Provincial Park along the lake shore
Municipal Legislation		
Alberta Municipal Government Act	This act gives municipalities the authority to regulate and manage land use activities that may impact the local environment	Developments should ensure they are in compliance with this act.
Municipal Development Plans	This plan is adopted by Council and is a guiding overall vision and framework for future development within the Town	Developments should ensure they are in compliance with these plans.
Area Structure Plans (Municipal)	These plans area adopted by Council that provide an outline for future subdivisions, development, and other land use practices within a specific area characterized by a certain land use or environmental feature	Developments should ensure they are in compliance with these plans.
Land Use Bylaws (Municipal)	Divides the municipality into land use districts and sets forth rules dictating how land parcels can be used and developed, including zoning	Developments should ensure they are in compliance with these bylaws.

4.2 Management Considerations

The guiding principles for managing impacts to ESAs in order of preference will be to 1) avoid, 2) minimize and 3) restore. These guiding principles are based on those outlined in the Alberta Wetland Policy.

4.2.1 Recommended Development Setbacks

Setbacks are intended to avoid or minimize impacts to ESAs. Conservation setbacks are strips of vegetation placed in the landscape to benefit ecological processes and provide a variety benefits to the public (Bentrup, 2008). Conservation setbacks provide benefits such as protecting soil resources, improving air and water quality, enhancing fish and wildlife habitat as well as providing an aesthetically pleasing landscape.

Recommendations for development setbacks are based on a review of scientific literature and regulatory and planning documents from various authorities within Canada and the USA.

Recommended setbacks are presented within Tables 11 to 13. Complying with recommended setbacks does not exonerate the developer from complying with all federal and provincial acts and regulations for the disturbances of natural areas within Alberta. All developments within the Town boundaries must comply with all federal and provincial acts such as the Alberta *Water Act*, Alberta *Public Lands Act*, Alberta *Environmental Protection and Enhancement Act*, *Fisheries Act*, *Species at Risk Act*, *Migratory Birds Convention Act*, etc.

Recommended setbacks for watercourses and water bodies are those outlined in "*Stepping Back from the Water: A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settled Region"* (AESRD, 2012). Setbacks should be confirmed during a project site specific wetland impact assessment or fish and fish habitat assessment (watercourses) to ensure that water body boundaries are correctly mapped. A Wetland Assessment and Impact Report (WAIR) is required as per Alberta *Water Act* and 2015 Wetland Policy for any impact to a water body including wetlands.

Forested setbacks are suggested in an effort to minimize edge effects within patches to encourage more diverse habitat. Preserving understorey vegetation (native shrubs and grasses) within a setback offers wind resistance, minimizes the effects of excessive heat and moisture losses (B.C. Ministry of Forests, 1998), and inhibits edge species from penetrating interior habitat (Chen *et al.*, 1995). Setbacks which are vegetated with regenerating native trees, shrubs and grasses can decrease the depth of edge influences, thereby enlarging the quantity and improving the quality of interior habitat (B.C. Ministry of Forests, 1998). Feathered or curvilinear edges are recommended rather than abrupt, straight edges (Forman, 1995). This technique will help to produce forest edges that resemble natural disturbances more closely (B.C. Ministry of Forests, 1998). Soft edges help to provide a more gradual transition between habitat types and offer wildlife species a more protective cover against predation pressure (B.C. Ministry of Forests, 1998).

Table 11. Proposed Setbacks for High Significance Rated Environmentally Significant Areas in the Town of Sylvan Lake.

High Significance		
ESA Type	**Setback distance**	**Notes**
Semi-permanent/Permanent Wetlands, Creeks, Streams, Lakes, Swamp Wetlands, etc.	30 m [1,2,4]	• The setback may require modification due to shallow ground water, coarse textured sand and gravel substrate, slopes greater than 5% as well as the presence of non-native vegetation. Refer to *Stepping Back from the Water* by Alberta Environment and Parks for more detail. • Wetland Assessment and Impact Report is required as per Alberta *Water Act* and 2015 Wetland Policy for any impact to a water body including wetlands. Boundary and setback must be confirmed during the wetland assessment. • Any proposed impact to a watercourse requires a *Water Act* approval and a Fish and Fish habitat assessment to be completed.
Ephemeral and Temporary/Seasonal Wetland	10 m [2,4]	• Maintain and conserve native wetland or marshland plants • Conserve native riparian vegetation and natural flood regimes
Forested and Natural Areas (Deciduous, Mixedwood, Coniferous, Grasslands)	20 m [3,4]	• If any tree/shrub clearing or construction is to be completed within March 31st and August 15th a wildlife survey is required to be completed to ensure no nests or dens will be disturbed as regulated by the Alberta *Wildlife Act* (Provincial) and *Migratory Birds Convention Act* (Federal).
Corridors	10 m [3,4]	

1. Setback distance from the Town of Sylvan Lake Municipal Development Plan
2. Setback distance from the report *Stepping Back from the Water* by Alberta Environment and Parks
3. This setback is not guided by safety or fire regulations. Considerations regarding tree safety adjacent to residential areas are the responsibility of the developer.
4. Setbacks should be seeded with native perennial grasses and/or shrubs in order to provide some protection against edge effects.

Table 12. Proposed Setbacks for Moderate Significance Rated Environmentally Significant Areas in the Town of Sylvan Lake.

Moderate Significance		
ESA Type	**Setback distance**	**Notes**
Creeks, Streams, Lakes	30 m [1,2,4]	• The setback may require modification due to shallow ground water, coarse textured sand and gravel substrate, slopes greater than 5% as well as the presence of non-native vegetation. Refer to *Stepping Back from the Water* by Alberta Environment and Parks for more detail. • Wetland Assessment and Impact Report is required as per Alberta *Water Act* and 2015 Wetland Policy for any impact to a water body including wetlands. Boundary and setback must be confirmed during the wetland assessment. • Any proposed impact to a watercourse requires a *Water Act* approval and a Fish and Fish habitat assessment to be completed.
Semi-permanent/Permanent Wetlands, Swamp wetlands, etc.	20 m [2,4]	
Ephemeral and Temporary/Seasonal Wetland	10 m [2,4]	• Maintain and conserve native wetland or marshland plants • Conserve native riparian vegetation and natural flood regimes
Forested and Natural Areas (Deciduous, Mixedwood, Coniferous, Grasslands)	10 m [3,4]	• If any tree/shrub clearing or construction is to be completed within March 31st and August 15th a wildlife survey is required to be completed to ensure no nests or dens will be disturbed as regulated by the Alberta *Wildlife Act* (Provincial) and *Migratory Birds Convention Act* (Federal).
Corridors	5 m [3,4]	

1. Setback distance from the Town of Sylvan Lake Municipal Development Plan
2. Setback distance from the report *Stepping Back from the Water* by Alberta Environment and Parks
3. This setback is not guided by safety or fire regulations. Considerations regarding tree safety adjacent to residential areas are the responsibility of the developer.
4. Setbacks should be seeded with native perennial grasses and/or shrubs in order to provide some protection against edge effects.

Table 13. Proposed Setbacks for Low Significance Rated Environmentally Significant Areas in the Town of Sylvan Lake.

Low Significance		
ESA Type	**Setback distance**	**Notes**
Creeks, Streams, Lakes	30 m [1,2,3]	• The setback may require modification due to shallow ground water, coarse textured sand and gravel substrate, slopes greater than 5% as well as the presence of non-native vegetation. Refer to *Stepping Back from the Water* by Alberta Environment and Parks for more detail. • Wetland Assessment and Impact Report is required as per Alberta *Water Act* and 2015 Wetland Policy for any impact to a water body including wetlands. Boundary and setback must be confirmed during the wetland assessment. • Any proposed impact to a watercourse requires a *Water Act* approval and a Fish and Fish habitat assessment to be completed.
Semi-permanent/Permanent Wetlands, Swamp wetlands, etc.	20 m [2,3]	
Ephemeral and Temporary/Seasonal Wetland	10 m [2,3]	• If cultivated annually and dominated by agronomic species no setback is required, however should be incorporated into Storm Water Management Plan and drainage maintained on site where possible. • Wetland Assessment and Impact Report is required as per Alberta *Water Act* and New Wetland Policy for any impact to a water body including wetlands.
Forested Areas	None	• If any tree/shrub clearing or construction is to be completed within March 31st and August 15th a wildlife survey is required to be completed to ensure no nests or dens will be disturbed as regulated by the Alberta *Wildlife Act* (Provincial) and *Migratory Birds Convention Act* (Federal).
Corridors	None	

1. Setback distance from the Town of Sylvan Lake Municipal Development Plan
2. Setback distance from the report *Stepping Back from the Water* by Alberta Environment and Parks
3. Setbacks should be seeded with native perennial grasses and/or shrubs in order to provide some protection against edge effects.

4.2.2 Implementation

The Environmentally Significant Areas that have been identified and mapped within the study area have been categorized into the following ranks:

- High Significance: diverse natural areas selected for conservation and preservation.
- Moderate Significance: areas requiring further ecological assessment.
- Low Significance: areas that should be avoided, where possible.

Cumulative effects and timing should always be considered in development and operations plans prior to approving developments within ESAs. The following are recommended management strategies for the ranked ESAs and ESAs within the connectivity corridor. These recommended strategies will be incorporated into the future Town of Sylvan Lake Biophysical Impact Assessment Framework currently under development.

High Significance

- No development should occur within highly significance ranked ESAs
  - If development is proposed within the recommended setback or within a highly ranked ESA, a detailed biophysical impact assessment (provided by the developer) should be completed in order to determine the impact on the ESA, other ESAs in the area and the adjacent landscape.
  - The biophysical impact assessment should include at a minimum:
    - Detailed vegetation assessment
    - Detailed soil assessment
    - Wildlife and wildlife habitat assessment including a breeding bird survey
    - Fish and fish habitat assessment, if required
    - Potential impacts of development
    - Mitigation measures
  - If a biophysical impact assessment report completed by an environmental professional can demonstrate to the satisfaction of the Town Council that little or no impact will occur within the ESA or surrounding ESAs, development may proceed within the recommended setback and/or ESA, assuming all federal and provincial environmental permitting has been obtained.
  - The biophysical assessment submitted at the time of an Area Structure Plan or Outline Plan shall identify the value of wetlands consistent with the Alberta Wetland Policy.

Moderate Significance

- Development may occur within moderately significance ranked ESAs at the discretion of the Town

- If development is proposed within the recommended setback or within a highly/moderately ranked ESA, a detailed biophysical impact assessment (provided by the developer) may be required at the discretion of the Town.
- If a requested biophysical impact assessment report is completed by an environmental professional that can demonstrate to the satisfaction of the Town Council that little or no impact will occur within the ESA or surrounding ESAs, development may proceed within the recommended setback and/or ESA assuming all federal and provincial environmental permitting has been obtained.
- The biophysical assessment submitted at the time of an Area Structure Plan or Outline Plan shall identify the value of wetlands consistent with the Alberta Wetland Policy.

Low Significance

- Low ranked ESAs are areas that have been historically disturbed by humans almost entirely and have limited function. ESAs rated as low are still considered important environmentally; however in their current ecological state these areas provide limited function to the overall landscape.
- Low rated ESAs should be considered for rehabilitation or enhancement as compensation for the impact of other ESAs. If rehabilitation or enhancement is not an option development can occur and should follow all widely accepted best management practices as all federal and province approvals have been obtained.

Connectivity Corridor

- ESAs within the connectivity corridor should be conserved regardless of their rank in order to maintain connectivity of ESAs within the Town.
- If development is proposed within the corridor, a detailed biophysical impact assessment (by the developer) may be requested in order to determine the impact on the corridor and connectivity through the study area.

4.3 Recommendations for Potential Restoration and Reclamation Policies

Many of the low significance rated ESAs have the potential for restoration and reclamation. If a developer wishes to impact any ESA the following policies could be adopted by the Town:

- Where impacts on ESAs are unavoidable, ensure mitigation or compensation occurs.
- Where impacts to wetlands is unavoidable, compensation should occur as close to the original watershed as possible.
- Replace or restore lost habitat.
- Restore connectivity by reclaiming disturbances.
- Restore and reclaim ESAs which occur within the connectivity corridor.

- Retain a qualified environmental specialist to analyze, inspect and monitor relevant pre-disturbance, construction, operation and reclamation activities, etc.
- Provide incentives, education and outreach to landowners.

4.3.1 Limitations of Management Considerations

The suggested management recommendations are not policy. Recommended setbacks and development approvals are suggestions that have been derived from scientific research, best management practices and policies of other municipalities in Canada and the USA.

Each development should be viewed on a case by case basis. Developers should plan well in advance and use these guidelines together with site specific knowledge of the site, the landscape and the Town's goals to create a design that optimizes benefits and minimizes potential impact to environmental significant areas.

Management recommendations should not serve as an exclusive source for design information but rather a means to support and communicate design process with the Town. Additional resources, standards, ecological surveys and expert advice should be consulted as appropriate.

4.4 Best Management Practices

Planning prior to project implementation is essential to construction and reclamation success. The following general best management practices will help to educate construction personnel and/or contractors on their responsibility to recognize potential environmental issues and identify potentially adverse effects to environmental resources during any development and ensure they abide by generally accepted Best Management Practices (BMP). The following are some general best management practices commonly used.

4.4.1 Aquatic Resources (Watercourses, Water bodies and Wetlands)

- A Wetland Assessment and Impact Report (WAIR) should be conducted.
- Site-specific mitigation measures should be development prior to construction.
- Aim to avoid impacting watercourses, water bodies and wetlands, where impact is unavoidable aim to minimize impacts to wetlands.
- Restore and maintain riparian buffers as large as possible with native persistent vegetation.
- Minimize the use of pesticides, fertilizers and other contaminants adjacent to watercourses, water bodies, and wetlands.
- Sedimentation control planning - Appropriate types and amounts of equipment, materials and trained personnel must be available at the work site at all times during the entire crossing construction to control potential sedimentation resulting from the works. Silt

fences should be installed downslope of all exposed cuts and around spoil piles to reduce sediment from entering a watercourse/water body.

- Spill containment planning - A spill containment plan should be developed and implemented when working near watercourses/water bodies.
- Secondary containment – when working within 100 m of a watercourse or water body, any gasoline powered equipment such as pumps and generators should be entirely enclosed or set within a secondary containment structure that is large enough to completely contain all harmful materials should a spill, leak or overflow occur.
- Restricted activity periods should be observed when working in or near a permanent watercourse.
- Post construction clean-up – Stockpiles of exposed soil should be displaced or removed from the site to an area where they will not re-enter a watercourse, water body, or wetland.

4.4.2 Forested Areas and other Natural Areas

4.4.2.1 Vegetation

- Pre-project planning to identify potential environmental impacts and mitigation measures should be completed.
- Conduct site specific pre-disturbance and biophysical impact assessments.
- Retain trees and other green spaces in area structure plans.
- Vegetation clearing and soil striping should be scheduled during favorable soil construction (dry or frozen conditions).
- Prior to construction the work areas should be clearly flagged and traffic limited to the designated marina boundaries and temporary works space (TWS) areas to reduce loss of surrounding native riparian vegetation communities.
- Coarse woody debris produced through clearing of tree and shrub areas should be mulched and/or utilized on-site, where possible.
- Vegetation should not be removed within temporary work areas in order to reduce dust and the risk of rutting and compaction of soils within the temporary work space.
- All equipment will be inspected for fuel leaks, hydraulic leaks and other sources of potential soil contaminants prior to entering the site.

4.4.2.2 Soil Resources

- A topsoil/ subsoil salvage plan should be prepared and should be validated on site with a pre-construction site evaluation.
- Construction should be scheduled to occur in accordance within favorable weather and site conditions (e.g. dry or frozen conditions, low wind, etc.) to reduce the risk of topsoil loss as well as soil rutting and compaction etc. In the event of wet weather and saturated soils are observed, equipment travel on the site should be restricted until soils are sufficiently dry or frozen.

- Soil handling should be minimized where possible to avoid unnecessary admixing of topsoil and subsoils.
- Soil stockpiles should be placed in an area that will not block the natural drainage pattern
- Topsoil and subsoil should be stored separately. Topsoil should be placed on topsoil. Spoil should not be stored on topsoil to avoid mixing of unfavorable subsoils with topsoil.
- Stubble should be retained to aid in dust control and to reduce soil compaction on the site where possible.

4.4.2.3 Weed Control

- An effective weed control program is essential to ensure the success of desirable species establishment.
- All equipment and vehicles used on any development project should be clean and free of dirt and vegetative material to control the introduction of weeds.
- Where required for sediment and erosion control, only weed-free products (e.g. straw bales, tackifiers, mats, etc.) should be used.
- Desirable plant species should be planted directly following soil replacement in an effort to out compete the weeds for water nutrients and light.
- Spraying upland areas with pre-existing weed infestation prior to soil disturbance to avoid further spread of weed species.
- Continued monitoring of problem vegetation to identify areas requiring further reclamation, weed control and erosion protection measures, will be implemented where needed.

4.4.2.4 Wildlife and Wildlife Habitat

- Reduced speed limits should be enforced on construction roads between work spaces.
- Keep vehicles on established access roads and minimize foot traffic in undisturbed areas to reduce habitat disturbance.
- Garbage and food should be properly handled and disposed of during construction.
- No feeding of wildlife encountered on site during and after construction.
- Existing infrastructure will be used where possible.
- Wildlife will not be harassed. Should any human/wildlife conflict arise (i.e.: encounters with predatory or dangerous wildlife) AEP Fish & Wildlife should be notified.
- The duration of construction should be minimized where possible.
- Avoid clearing any vegetation during the migratory bird nesting period (April 15 to August 31).
- Restrict construction to daylight hours to avoid wildlife mortality and collisions at night where visibility is limited.
- Storage periods for topsoil and subsoil salvage should be kept to a minimum in order to reduce the potential impact on wildlife movements.
- Minimize the edge effect on existing habitat by providing a transition buffer between project development and habitat.
- Wildlife surveys should be conducted before any clearing of vegetation is to occur to avoid disturbance of nests or dens of wildlife species.

- Schedule construction during the winter months around wetlands to reduce effects on breeding amphibians and breeding amphibian habitat.
- Based on wildlife surveys, timing restrictions and setbacks may be required for construction.
- A wildlife habitat survey should follow any unintentional disturbance to wetlands (either indirect or direct) to incorporate wildlife and wildlife habitat needs into restoration activities.
- Maintaining existing tracks of wildlife corridors should be incorporated into area structure plans. Particularly where large tracks of forest corridors are adjacent to wetlands and riparian areas to maintain movement for wildlife throughout the year.
- Dead snags and existing dead stumps should be left within forest corridors adjacent to construction where it does not pose a danger tree risk to public.
- Should any previously unobserved protected species (federal or provincial) be identified at any time during construction activities, it is recommended that activity be halted and a wildlife biologist be consulted in conjunction with AEP Fish & Wildlife.

5. References

Alberta Conservation Information Management System (ACIMS), March 2016: Alberta Tourism, Parks, Recreation and Culture. http://tpr.alberta.ca/parks/heritageinfocentre/datarequests/default.aspx

Alberta Sustainable Resource Development (ASRD). Alberta Environment. 2006. Code of Practice for Watercourse Crossings. Red Deer Management Area Map. Government of Alberta. Last accessed on October 26, 2008.

Alberta Environment and Sustainable Resources Development (AESRD). 2012. Stepping Back from the Water: A Beneficial Management Practices Guide for New Development Near Water Bodies in Alberta's Settle Region. Edmonton, Alberta.

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

Alberta Lake Management Society (ALMS). 2009. Alberta Lake Management Society Volunteer Lake Monitoring Program – Sylvan Lake 2009 Report. Edmonton, Alberta.

Agricultural Regions of Alberta Soil Inventory Database (AGRASID). 2016. The Alberta Soil Information View. http://www4.agric.gov.ab.ca/agrasidviewer/. Accessed (insert date) Baker, J.L. 2009. Groundwater Contribution to Sylvan Lake, Alberta, Canada. Thesis summited to the Faculty of Graduate Studies, University of Calgary, Calgary, Alberta.

Barker, A.A., Riddell, J.T.F., Slattery, S.R., Andriashek, L.D., Moktan, H., Wallace, S., Lyster, S., Jean, G., Huff, G.F., Stewart, S.A. and Lemay, T.G. 2011: Edmonton–Calgary Corridor groundwater atlas; Energy Resources Conservation Board, ERCB/AGS Information Series 140, 90 p.

B.C. Ministry of Forests. 1998. Extension Note. Biodiversity and Interior Habitats: The Need to Minimize Edge Effects. Part 6 of 7. B.C. Ministry of Forests Research Program. Victoria, B.C.

Beier, P., K.R. Majka and W.D. Spencer. 2008. Forks in the Road: Choices in Procedures for Designing Wildland Linkages. San Diego, CA. Conservation Biology, Volume 22, No. 4. pp 836-851.

Bentrup, G. 2008. Conservation buffers: design guidelines for buffers, corridors, and greenways. Gen. Tech. Rep. SRS-109. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station. 110 p.

Bollinger, E. K., and P. V. Switzer. 2002. Modeling the impact of edge avoidance on avian nest densities in habitat fragments. Ecological Applications 12:1567-1575.

Buechner, M. 1989. Are small-scale landscape features important factors for field studies of small mammal dispersal sinks? Landscape Ecology 2:191-199.Ducks Unlimited Canada, 2006: Natural Values: Linking the Environment to the Economy. www.ducks.ca/conserve/wetland_values/conserve.html

Chen, J., Franklin, J.F., Spies, T.A., 1995. Growing-season microclimatic gradients from clearcut edges into oldgrowth Douglas-Fir forests. Ecol. Appl. 5, 74–86.

Committee on the Status of Endangered Wildlife Species in Canada (COSEWIC). 2014. Wild Species Search Database. http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed July 14, 2016.Ducks Unlimited Canada, 2006: Natural Values: Linking the Environment to the Economy. www.ducks.ca/conserve/wetland_values/conserve.html

Environment Canada. 2013. How Much Habitat is Enough? Third Edition. Environment Canada, Toronto, Ontario.

Fish and Wildlife Management Information System (FWMIS), May 2016: Alberta Environment and Sustainable Resource Development. http://www.srd.alberta.ca/FishWildlife/FWMIS/Default.aspx

Fiera (Fiera Biological Consulting Ltd.). 2009. Environmentally Significant Areas Provincial Update 2009. Report prepared for Alberta Tourism, Parks, and Recreation, Edmonton, Alberta. Fiera Biological Consulting Report #8054

Fiera (Fiera Biological Consulting Ltd.). 2014. Environmentally Significant Areas in Alberta: 2014 Update. Report prepared for the Government of Alberta, Edmonton, Alberta. Fiera Biological Consulting Report Number 1305. Pp. 51.

Fiera (Fiera Biological Consulting Ltd.). 2015. Leduc County Environmentally Significant Areas Study. Report prepared for Leduc County. Fiera Biological Consulting Report #1358.

Forman, R. T. T., D. Sperling, et al. 2003. Road Ecology: Science and Solutions. Island Press, Washington, D.C.

Forman, Richard T. 1995. Land Mosaics: the ecology of landscapes and regions. Cambridge: Cambridge University Press.

Forman, R. T. T., and M. Godron. 1986. Landscape Ecology. John Wiley & Sons, New York. 619 pp.

Gabor, T.S., A.K. North, L.C.M. Ross, H.R. Murkin, J.S. Anderson and M. Raven. 2004: Natural Values - The Importance of Wetlands and Upland Conservation Practices in Watershed Management: Functions and Values for Water Quality and Quantity.

Golder Associates. 2011. Red Deer County: Environmentally Significant Areas Inventory. Prepared for Planning and Development Services Red Deer County, Alberta.

Government of Alberta (GOA). 2014. General Status of Alberta Wild Species. Wild Species Search Status. http://aep.alberta.ca/fish-wildlife/species-at-risk/wild-species-status-search.aspx. Accessed July 14, 2016.

GOA. 2015. Species Assessed by the Conservation Committee: Alberta Species at Risk. June 4, 2015.

Government of Canada. 2012. Species at Risk Public Registry. Schedule 1 Species List. Accessed July 14, 2015.Hardt, R. A., and R. T. T. Forman. 1989. Boundary form effects on woody colonization of reclaimed surface mines. Ecology 70:1252-1260.

Harrison, S., and L, Fahrig. 1995. Landscape pattern and population conservation. Mosaic Landscapes and Ecological Processes. Chapman & Hall, London. ISBN 0 412 45460 2.

Jennings, M.D., and J.P. Reganold. 1991. Hierarchy and Subsidy-Stress as a Theoretical Basis for Managing Environmentally Sensitive Areas. Landscape Urban Planning 21: 31-45.

Kupsch, T., K. France, H. Loonen, A. Burkinshaw, M.G. Willoughby, and R.L. McNeil. 2013. Range Plant Communities and Range Health Assessment Guidelines for the Central Parkland Subregion of Alberta: Central Parkland Range Plant Community Guide Second Approximation. Alberta Environment and Sustainable Resource Development. Red Deer, Alberta. Pub.No.:T/265.

Lindenmayer, David B, and Joern Fischer. 2006."How Landscape Change Affects Organisms: A Conceptual Framework." In Habitat Fragmentation and Landscape Change, by David B Lindenmayer and Joern Fischer, 26-35. Washington, DC: Island Press.

Lindsay, J.B., and F., Creed. 2006. Distinguishing actual and artefact depressions in digital elevation data. Computers & Geosciences 2006, 32, 1192-1204.

Lindsay, JB. 2014. The Whitebox Geospatial Analysis Tools project and open-access GIS. Proceedings of the GIS Research UK 22nd Annual Conference, the University of Glasgow, 16-18 April, DOI: 10.13140/RG.2.1.1010.8962. Available online: http://www.uoguelph.ca/~hydrogeo/Whitebox/index.html

Margules, C.R., and R.L. Pressey. 2000. Systematic Conservation Planning. Nature 405: 243-253.

McRae, B.H. and D.M. Kavanagh. 2011. Linkage Mapper Connectivity Analysis Software. The Nature Conservancy, Seattle WA. Available at: http://www.circuitscape.org/linkagemapper

Mitchell, P. and E. Prepas. 1990. Atlas of Alberta Lakes. University of Alberta Department of Biological Sciences. The University Press, Edmonton, Alberta.

Moisey, M., J. Young, D. Lawrence, C. Stone, M.G. Willoughby. 2012. Guide to Range Plant Community Types and Carrying Capacity for the Dry and Central Mixedwood Subregions in Alberta (7th Approximation). Alberta Environment and sustainable Resource Development. Lands Division. Pub No. T/276.

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.

Nelson J.S. and M.J. Paetz. 1992. The Fishes of Alberta. The University of Alberta Press, Edmonton, Alberta.

O2 Planning and Design. 2013a. Landscape Patterns Environmental Quality Analysis. Prepared for Department of national Defense: Canadian Forces Base Suffield, U.S. Fish and Wildlife Service: Great Northern and Plains, Prairie Potholes Landscape Conservation Cooperatives, Alberta Environment and Sustainable Resource Development, Crown Managers Partnership, Prairie Conservation Forum and The Oldman Watershed Council.

O2 Planning and Design. 2013b. Ecological Inventory Expansion and Environmental Best Practices Report. Prepared for the City of Airdrie.

O2 Planning and Design. 2014. Parkland County Environmental Conservation Master Plan: Phase 1 Background Technical Report. Prepared for Parkland County, Alberta.

Parkland Community Planning Services (PCPS). 2008. Sylvan Lake Growth Strategy. Prepared for the Town of Sylvan Lake. Red Deer, Alberta. 44 pp.

Parkland Community Planning Services (PCPS). 2014. Town of Sylvan Lake Municipal Development Plan. Prepared for the Town of Sylvan Lake. Red Deer, Alberta. 85 pp.

Pedocan Land Evaluation Ltd. 1993. Soil Series Information for Reclamation Planning in Alberta. Volumes 1 & 2. Alberta Conservation and Reclamation Report No. RRTAC 93-7. Queens Printer. Edmonton, AB.

Peters, T.W. and W.E. Bowser. 1960. Soil Survey of Rocky Mountain House sheet. Alta, Soil Surv. Rep. No. 19, University of Alberta Bulletin No. SS-1. Edmonton, Alberta.

Price J.S and J.M. Waddington, 2000: Advances in Canadian wetland hydrology and biogeochemistry, 1995-1998. Hydrological Processes 14: 1579-1589.

Rempel, R.S., D. Kaukinen., and A.P. Carr. 2012. Patch Analyst and Patch Grid. Ontario Ministry of Natural Resources. Centre for Northern Forest Ecosystem Research, Thunder Bay, Ontario.Schlesinger, W.H., 1991: Biogeochemistry: An analysis of global change. Academic Press, Toronto.

Summit Environmental Consultants Ltd. 2008. Environmentally Significant Areas: Mountain View County. Prepared for Mountain View County, Didsbury, Alberta.

Sweetgrass Consultants Ltd. 1997. Environmentally Significant Areas of Alberta. Prepared for Resource Data Division Alberta Environmental Protection Edmonton, Alberta.

Town of Sylvan Lake. 2000. Sylvan Lake Management Plan: 2000 Update. Sylvan Lake, Alberta.

Town of Sylvan Lake. 2010. Sylvan Lake Municipal Sustainability Plan. Sylvan Lake, Alberta.

Town of Sylvan Lake. 2016. Town of Sylvan Lake website: http://www.sylvanlake.ca/, accessed July 2016.

Wray, H.E. and S.E. Bayley, 2006: A Review of Indicators of Wetland Health and Function in Alberta's Prairie, Aspen Parkland and Boreal Dry Mixedwood Regions. Prepared for The Water Research Users Group, Alberta Environment. Prepared by Heather E. Wray and Suzanne E. Bayley, University of Alberta.

6. Glossary of Terms

clay	A natural, fine grained material less than 0.002 mm in diameter. It has a soil texture that develops plasticity with a small amount of water.
coarse fragments	Rock or mineral particles that are larger than 2 mm in diameter. These may include gravel, cobble and stones.
colour	See Munsell colour system.
consistence	The degree of cohesion or adhesion of the soil mass and/or its resistance to deformation or rupture. Terms used for describing consistence at various soil moisture contents include wet soil (nonsticky to very sticky), moist soil (loose, very friable to very firm), and dry soil (loose, soft to extremely hard).
corridor	Corridors are linear landscape elements that can be defined on the basis of structure or function. Forman and Godron (1986) define corridors as “narrow strips of land which differ from the matrix on either side. Corridors may be isolated strips, but are usually attached to a patch of somewhat similar vegetation
cover, percent cover	An estimation of the total ground area that is covered by an individual plant species when its leaves, stems, flowers etc. are projected onto the ground surface.
depressional	A hollow, basin, or flat, low-lying area with an elevation lower than that of the surrounding area.
disturbed area, disturbed land	An area where the vegetation, topsoil or overburden has been historically removed or replaced.
dominant plant species	The species that contributes the greatest percent cover in a plant community type.
drainage	The removal of excess surface water or groundwater from the land by natural runoff and percolation, or by means of surface or subsurface drains.
ecoregion	An area characterized by distinctive regional climate as expressed by vegetation.
erosion	The wearing away, or detachment and movement, of the land surface or soil by running water, wind, gravity, ice or other geological agents.
forb	An herbaceous plant which is not a grass, sedge or rush.
graminoid	A vascular plant that is grass-like in form including rushes, sedges, grasses etc.
grass	Plant of a large family characterized by rounded and hollow jointed stems, narrow sheathing leaves, flowers borne in spikes, and hard-grained seeds.
herb	Any flowering plant except those developing persistent woody bases and stems.
indicator plants	Plants characteristic of specified soil or site conditions.
level	A flat or very gently sloping, unidirectional surface with a generally constant slope (less than 2%) not broken by marked elevations and depressions.
litter	The accumulation of leaves, needles, twigs and other woody materials on the surface of the soil.
lowland	Land that is saturated with water long enough to promote wetland or aquatic processes. Indicators for lowland include poorly drained soils and hydrophytic vegetation.

matrix	The matrix is the most extensive and most connected landscape element type, and therefore plays the dominant role in the functioning of the landscape (Forman and Godron 1986). In this report the matrix refers to urban developments and agricultural fields.
mineral soil	A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter. Mineral soil usually contains less than 30% organic matter but may contain an organic surface layer up to 30 cm thick.
mixedwood	A stand type that is a blend of deciduous and coniferous trees that has between 20 and 80 % total conifer type in the canopy.
moss	A small leafy plant lacking any true vascular system or roots.
noxious weed species	Weed species that are already established in many regions of the province and have the ability to spread rapidly, cause severe crop losses and severe financial impacts if not controlled. Under the Alberta Weed Control Act, all noxious weeds must be controlled to prevent the spread, growth, ripening or scattering of weeds and/ or seeds.
nutrient regime	The amount of essential nutrients that are available for plant growth. Determining a soil nutrient regime for any given site (on a relative scale from very poor to very rich) requires the consideration of many environmental and biotic parameters.
patch	Patches are relatively homogeneous areas of natural habitat
percentage cover	See cover, percentage cover.
productivity, soil productivity	The capacity of a soil, in its normal environment, to produce a specified plant or sequence of plants under a specified system of management.
Prohibited noxious weed	Under the Alberta Weed Control Act, prohibited noxious weeds must be destroyed to prevent the spread, growth, ripening or scattering of the restricted weeds and/ or seeds.
range plant community	A distinctive type of land with specific physical characteristics that differs from other types of land in its ability to produce a distinctive kind and amount of vegetation community
reclamation	The process of reconverting disturbed land to its former or an equally productive state.
sedge	Grass-like herb that grows in marshy places and has an angular stem.
sediment	Solid particles of material that have been derived from rock weathering. They are transported and deposited from water, ice or air as layers at the earth's surface.
shrub	A woody perennial plant differing from a tree by its low stature and by usually producing several basal shoots instead of a single trunk.
slope	The degree of deviation of a surface from horizontal, measured in a numerical ratio, percent and degree.
soil	The naturally occurring, unconsolidated mineral or organic material at least 10 cm thick that occurs at the earth's surface and is capable of supporting plant growth.
soil classification	The systematic arrangement of soils into categories according to their inherent characteristics, or on some interpretation of those properties for various uses. Broad groupings are made on the basis of general characteristics and subdivided according to more detailed differences in specific properties.
stepping stone	Smaller patches of natural habitat which species can use to move through the matrix.

Appendix A

Public Consultation

RC BioSolutions Ltd.
#3 Lindman Close
Sylvan Lake, Alberta T4S 2M5
Telephone (403) 887-0455
Fax (403) 887-0412

RC BioSolutions Ltd.

www.rcbio.ca

Town of Sylvan Lake –
Environmental Management Plan - Public Meeting Questionnaire

1. Do you live on your property for more than 50% of the year:
   - ☐ Yes
   - ☐ No

2. How long have you owned and lived on your property?
   - ☐ Less than two years
   - ☐ 2 to 5 years
   - ☐ 6 to 10 years
   - ☐ 11 to 20 years
   - ☐ Over 20 years

3. If you own land in the Town of Sylvan Lake or within the newly annexed lands how would you classify it? (Check all that apply)
   - ☐ Residential – dwelling with little or no surrounding land (<1 acre)
   - ☐ Rural – dwelling with surrounding land (>1 acre)
   - ☐ Agricultural – cultivated annually
   - ☐ Agricultural – pasture
   - ☐ Forested
   - ☐ Recreational
   - ☐ Commercial
   - ☐ Other: Please specify _____

4. Which of the following wildlife (and their associated habitat) do you believe should be considered when identifying and mapping Environmentally Significant Areas (ESAs) in the Town of Sylvan Lake? Check all that apply.
   - ☐ Ungulates (Elk, Deer, Moose)
   - ☐ Large Mammals (e.g. bears, cougars, etc.)
   - ☐ Rabbits and Rodents (e.g. Snowshoe hare, porcupine, squirrel, beaver, muskrat, voles, etc.)
   - ☐ Weasels and related mammals (e.g. weasels, martin, badger, skunk, otter, etc.)
   - ☐ Birds of Prey (e.g. Red-tailed Hawk, Bald Eagle, Swainson's Hawk, etc.)
   - ☐ Shorebirds (e.g. sandpipers, plovers, etc.)
   - ☐ Song birds (e.g. warblers, sparrows, finches, etc.
   - ☐ Waterfowl (e.g. Northern Pintail, Ruddy Duck, grebes, etc.)
   - ☐ Amphibians (e.g. Western Toad, Boreal Chorus Frog, etc.)
   - ☐ Reptiles (e.g. Garter snake)
   - ☐ Species at Risk (Piping Plover, Northern Leopard Frog, Western Grebe, Prairie Falcon)
   - ☐ Other: Please Specify _____

5. The following is a list of some of the characteristics used to determine and identify ESAs within the town boundaries (not complete list). Please add characteristics you feel should be used to identify ESAs within the town.
   - ☐ Rare, endangered and sensitive species and their habitat
   - ☐ Wildlife movement corridors
   - ☐ Native vegetation communities that are characteristic of the Central Parkland Subregion
   - ☐ Areas that protect watershed health and function
   - ☐ Areas that contribute to water quality and quality
   - ☐ Wetlands
   - ☐ Watercourses and Waterbodies (streams, creeks and lakes)
   - ☐ Riparian areas
   - ☐ Areas that provide outdoor recreation use
   - ☐ Other:

     _____
     _____
     _____

6. The following is a list of measures used to rank the significance and to determine conservation objectives of ESAs within the Town of Sylvan Lake. Please add any measures you feel should be included in determining the rank of ESAs within the town.
   - Function (does the ESA contain valuable wildlife or plant habitat? does the ESA provide connectivity between other natural habitats?)
   - Quality (is the ESA highly diverse? are neighbouring land uses similar?)
   - Disturbance (are there noxious weeds or invasive non-native plants present? is it fragmented by roads or rights-of-way?)
   - Abundance (is this type of ESA common or uncommon in the town boundaries?)
   - Distribution (where does this ESA area occur?)
   - Other: _____

     _____

7. Are there any specific features or areas within the Town of Sylvan Lake that you feel should be listed as ESA's? Please describe them and their location:

   _____
   _____
   _____
   _____
   _____

8. On a scale of 1 (least important) to 5 (most important), rate the following potential ESA characteristics regarding how important they are to you (Place a number next to each ESA type):
   - Undisturbed Native Grassland ___
   - Disturbed Grassland ___
   - Tame Pasture ___

- Old Growth Forest (>80 years) ___
- Natural Deciduous forest ___
- Natural Conifer forest ___
- Disturbed Forest ___
- Natural Wetland (marsh, bog, pond) ___
- Previously Disturbed Wetland ___
- Natural Riparian Area (near a lake, stream or creek) ___
- Recreational Area (disturbed vegetation area) ___
- Other: Please Specify _____

9. For those areas that will be identified and mapped as ESA's, management recommendations will be included within the completed Environmental Management Plan. Recommendations may include:
   - Limiting or altering access,
   - Limiting disturbance within a certain buffered area of highly valued ESAs
   - Compensation for disturbance of lower valued ESAs
   - Enhancement requirements of lower valued ESAs as a result of disturbance
   - Timing restrictions for certain activities, or
   - Other case-specific alternatives.

   Do you have any examples of how you would like to see ESA's managed and conserved in the Town of Sylvan Lake?

   _____
   _____
   _____
   _____

10. Additional comments

    _____
    _____
    _____
    _____

Additional comments, questions or concerns can be emailed to Sandra.babiuk@rcbio.ca or kkalirai@sylvanlake.ca. Thank you for taking the time to participate in this questionnaire. An online public survey is also available at http://www.sylvanlake.ca/public-notices.html?start=4 regarding the Town of Sylvan Lake Environmental Management Plan.

Appendix B

Detailed Environmentally Significant Areas Information

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
1	Wetland (Shallow Open Water)	NE 19-038-01-W5M	4.6	12	•	•		•			• Black terns (Sensitive) are known to nest in this wetland during normal precipitation years. • Connected to a large wetland to the east
2	Wetland (Marsh)	NE 19-038-01-W5M	0.73	3				•			
3	Wetland (Marsh)	NE 19-038-01-W5M	1.3	9	•		•	•			• Connected to a wetland complex to the west • Connected to corridor to the north • Trees around SW corner • Cattails within • No standing water
4	Wetland (Marsh)	NE 19-038-01-W5M	0.73	3				•			• Mainly disturbed with limited native vegetation
5	Wetland (Marsh)	NE 19-038-01-W5M	0.30	2				•			
6	Wetland (Marsh)	NE 31-038-01-W5M	0.61	3				•			• Cultivated and seeded to agronomic species • Cattail, horsetail, and foxtail barley present on hill draining into depression
7	Wetland (Marsh)	NE 31-038-01-W5M	0.27	3				•			• Not currently cultivated, but dominated by brome, dandelion, and clover. • Some doc and a corner with cover of thislte
8	Wetland (Swamp)	SW 02-039-01-W5M	8.58	15	•	•	•	•			• Small poplar surrounding wetland • Sedges and cattails • Willow throughout
9	Wetland (Swamp)	SE 02-039-01-W5M SW 02-039-01-W5M	4.77	16	•	•	•	•			
10	Forested (Deciduous)	SE 30-038-01-W5M NW 28-038-01-W5M NE 30-038-01-W5M NE 28-038-01-W5M SE 28-038-01-W5M NW 29-038-01-W5M NE 29-038-01-W5M SE 32-038-01-W5M	21.50	11	•	•	•				• Large naturalized area – old railway • Shrub layer with buffaloberry, rose, Saskatoon • Known to be used by red fox for denning
11	Forested (Deciduous)	NE 31-038-01-W5M SE 31-038-01-W5M	7.02	12	•	•	•				• Trail cleared through forest, no soil disturbance • Tall aspen, native shrub and forbs throughout • Meadow rue, wintergreen, violet, cowparsnip, vetch, rose, Northern gooseberry, dogwood, snowberry, mountain ash, Norther bedstraw, hazelnut
12	Forested (Deciduous)	SE 30-038-01-W5M	0.56	5			•				• Very thin area • Aspen 5 to 7 m wide • Large mature trees

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
13	Forested (Mixedwood)	NE 30-038-01-W5M	6.42	11	•	•	•		•		
14	Windrow	SE 31-038-01-W5M	1.55	4	•		•				• Dominated by brome in understory and aspen in overstory • Several small snags with cavities • Large cotton woods present and caragana in understory • Minimal use corridor for ungulates due to thick understory • Some nesting habitat for small songbirds, but not as diverse as natural deciduous
15	Forested (Deciduous)	SE 03-039-01-W5M	16.65	14	•	•	•				• small
16	Forested (Deciduous)	SW 03-039-01-W5M	3.98	8		•	•				• Young trees
17	Forested (Deciduous)	NE 35-038-01-W5M	24.21	13	•	•	•				• Large mature trees • Regen on edges • Pileated woodpecker heard
18	Forested (Deciduous)	NW 35-038-01-W5M	4.64	11	•	•	•				
19	Forested (Deciduous)	SE 02-039-01-W5M	0.38	8			•				
20	Forested (Deciduous)	SE 02-039-01-W5M	0.14	7			•				
21	Forested (Deciduous)	SE 02-039-01-W5M	0.15	7			•				
22	Forested (Deciduous)	SE 02-039-01-W5M SW 02-039-01-W5M	7.25	12	•	•	•				• Deciduous trees along railway • Good wildlife corridor
23	Forested (Deciduous)	SW 02-039-01-W5M	1.00	9		•	•				• Young tress surrounding mature trees • Some pine trees along highway
24	Windrow	NW 35-038-01-W5M	0.81	5			•				
25	Forested (Deciduous)	SE 03-039-01-W5M	0.84	8		•	•				• Mature aspen & poplar
26	Wetland (Swamp)	SE 03-039-01-W5M	0.34	8			•	•			• Willow, young aspen
27	Forested (Deciduous)	SE 03-039-01-W5M	0.45	6			•				• Thin native strip of trees

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
28	Windrow	SW 03-039-01-W5M	0.62	4			•				
29	Watercourse (Small Permanent)	NE 30-038-01-W5M SE 31-038-01-W5M NW 32-038-01-W5M NE 32-038-01-W5M SE 32-038-01-W5M SW 32-038-01-W5M	26.79	14	•	•	•	•	•	•	• Canary reed grass and willow along banks • Nest 5 m from creek • Some large poplar along edge
30	Watercourse (Ephemeral)	NE 30-038-01-W5M	0.80	3				•	•		• Dugout for drainage • Partially treed with young trees • No standing water • Artemisia sp throughout • Brome • Small patch of aspen with some poplar
31	Wetland (Ephemeral)	NE 30-038-01-W5M	0.11	2				•			
32	Wetland (Ephemeral)	NE 30-038-01-W5M	0.03	2				•			
33	Wetland (Ephemeral)	NE 30-038-01-W5M	0.01	2				•			
34	Wetland (Ephemeral)	NE 30-038-01-W5M	0.01	2				•			
35	Watercourse (Ephemeral)	NE 30-038-01-W5M	0.09	2				•	•		
36	Wetland (Ephemeral)	NE 30-038-01-W5M	0.04	2				•			
37	Wetland (Ephemeral)	NE 30-038-01-W5M	0.02	2				•			
38	Wetland (Ephemeral)	NE 30-038-01-W5M	0.08	2				•			
39	Wetland (Marsh)	SE 31-038-01-W5M	0.24	4				•			• Was most likely a wetland prior to planting trees • Sedges, water sedge, doc, reed canary grass, spike rush
40	Wetland (Ephemeral)	SE 31-038-01-W5M	0.05	2				•			• Lots of bare ground present • Clover, lams quarters, brome along edge • Willow within portions • Sedge sp along edge closest to forest
41	Wetland (Ephemeral)	SE 31-038-01-W5M	0.01	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
42	Wetland (Ephemeral)	SE 31-038-01-W5M	0.02	2				•			
43	Wetland (Ephemeral)	SE 31-038-01-W5M	0.02	2				•			
44	Wetland (Marsh)	SE 31-038-01-W5M	0.17	3				•			• Cultivated throughout, seeded to canola, some horsetail
45	Wetland (Marsh)	SE 31-038-01-W5M	0.04	2				•			• Cultivated throughout, seeded to canola
46	Forested (Deciduous)	NE 30-038-01-W5M SE 31-038-01-W5M	6.15	11	•	•	•		•		• Includes railway corridor • Large poplar trees with some aspen • Red tailed hawk nest
47	Wetland (Marsh)	SE 31-038-01-W5M	3.73	10	•	•		•			• Dense willow cover on north end • Native wetland vegetation
48	Wetland (Marsh)	SE 31-038-01-W5M	1.17	9		•		•			• Willow, Poa palustris, sedge, rush, mint, cattails • Silverweed along edge of trees • brome • Red-winged blackbird observed
49	Wetland (Marsh)	SE 31-038-01-W5M	2.70	8		•		•			
50	Watercourse (Ephemeral)	NE 30-038-01-W5M	0.12	3				•			
51	Wetland (Marsh)	NE 30-038-01-W5M	0.03	3				•			
52	Wetland (Swamp)	NE 30-038-01-W5M	0.87	8		•	•	•			
53	Wetland (Marsh)	NE 30-038-01-W5M	0.54	5				•			
54	Wetland (Marsh)	NE 30-038-01-W5M	0.15	3				•			
55	Watercourse (Ephemeral)	NE 30-038-01-W5M	0.36	3				•			
56	Wetland (Marsh)	SE 30-038-01-W5M	0.32	3				•			
57	Wetland (Marsh)	NE 30-038-01-W5M	1.02	4				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
58	Wetland (Ephemeral)	NE 19-038-01-W5M	0.11	2				•			
59	Wetland (Ephemeral)	NE 19-038-01-W5M	0.14	2				•			
60	Wetland (Ephemeral)	NE 19-038-01-W5M	0.22	2				•			
61	Wetland (Marsh)	NE 19-038-01-W5M	0.09	2				•			
62	Wetland (Marsh)	NE 19-038-01-W5M	0.06	2				•			
63	Wetland (Marsh)	NE 19-038-01-W5M	0.06	2				•			
64	Wetland (Ephemeral)	NE 19-038-01-W5M	0.04	2				•			
65	Wetland (Shallow Open Water)	SW 03-039-01-W5M	1.04	7		•		•			
66	Wetland (Marsh)	SW 03-039-01-W5M	0.69	3				•			
67	Wetland (Marsh)	SW 03-039-01-W5M	0.28	2				•			
68	Wetland (Ephemeral)	SW 03-039-01-W5M	0.07	2				•			
69	Wetland (Marsh)	SW 03-039-01-W5M	0.15	2				•			
70	Wetland (Marsh)	SW 03-039-01-W5M	0.10	2				•			
71	Wetland (Ephemeral)	SW 03-039-01-W5M	0.05	2				•			
72	Wetland (Ephemeral)	SW 03-039-01-W5M	0.03	2				•			
73	Wetland (Marsh)	SE 03-039-01-W5M	0.03	2				•			
74	Wetland (Ephemeral)	SE 03-039-01-W5M	0.05	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
75	Wetland (Ephemeral)	SE 03-039-01-W5M	0.09	2				•			
76	Wetland (Marsh)	SE 03-039-01-W5M	0.27	5				•			
77	Wetland (Shallow Open Water)	SW 02-039-01-W5M	0.92	8	•	•		•			• Some standing water • Cattails, sedges
78	Wetland (Marsh)	SW 02-039-01-W5M	0.10	2				•			
79	Wetland (Marsh)	SW 02-039-01-W5M	0.05	2				•			
80	Wetland (Ephemeral)	SW 02-039-01-W5M	0.04	2				•			
81	Wetland (Ephemeral)	SW 02-039-01-W5M	0.04	2				•			
82	Wetland (Ephemeral)	SW 02-039-01-W5M	0.03	2				•			
83	Wetland (Marsh)	SW 02-039-01-W5M	0.09	5				•			
84	Wetland (Marsh)	SW 02-039-01-W5M	0.27	2				•			
85	Wetland (Ephemeral)	SW 02-039-01-W5M	0.10	2				•			
86	Wetland (Marsh)	SW 02-039-01-W5M	0.28	6		•	•	•			
87	Wetland (Marsh)	SW 02-039-01-W5M	0.06	2				•			
88	Wetland (Marsh)	SW 02-039-01-W5M	0.02	2				•			
89	Wetland (Ephemeral)	SW 02-039-01-W5M	0.05	2				•			
90	Watercourse (Ephemeral)	SE 02-039-01-W5M	0.18	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
91	Wetland (Ephemeral)	SE 02-039-01-W5M	0.02	2				•			
92	Wetland (Ephemeral)	SE 02-039-01-W5M	0.03	2				•			
93	Wetland (Marsh)	SE 02-039-01-W5M	0.07	2				•			
94	Wetland (Marsh)	SE 02-039-01-W5M	0.04	2				•			
95	Watercourse (Ephemeral)	SE 02-039-01-W5M	0.12	2				•			
96	Wetland (Marsh)	NE 35-038-01-W5M	0.09	5				•			
97	Wetland (Marsh)	NE 35-038-01-W5M	0.10	5				•			
98	Wetland (Marsh)	NE 35-038-01-W5M	0.30	5				•			
99	Wetland (Marsh)	NE 35-038-01-W5M	0.04	6				•			
100	Wetland (Shallow Open Water)	NE 35-038-01-W5M	3.74	11	•	•		•			• Standing water • Colts foot, sedges • Large open water with waterfowl nesting • Young fledglings present
101	Wetland (Ephemeral)	NE 35-038-01-W5M	0.06	2				•			
102	Wetland (Marsh)	NE 35-038-01-W5M	0.13	5				•			• Native wetland vegetation, some in deepest portion
103	Wetland (Marsh)	NE 35-038-01-W5M	0.05	2				•			
104	Wetland (Swamp)	NE 35-038-01-W5M	0.34	7		•		•			• Willow and sedges • Some poplar • Young aspen forest, grazed
105	Wetland (Shallow Open Water)	NE 35-038-01-W5M	0.26	7				•			• Dugout within wetland with areas to nest
106	Wetland (Marsh)	NE 35-038-01-W5M	0.08	5				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
107	Wetland (Marsh)	NW 35-038-01-W5M	0.33	2				•			
108	Wetland (Marsh)	NW 35-038-01-W5M	0.06	2				•			
109	Wetland (Ephemeral)	NW 35-038-01-W5M	0.03	2				•			
110	Wetland (Ephemeral)	NW 35-038-01-W5M	0.02	2				•			
111	Watercourse (Ephemeral)	NW 35-038-01-W5M	0.09	2				•			
112	Wetland (Shallow Open Water)	NW 35-038-01-W5M	0.99	8		•		•			
113	Wetland (Ephemeral)	NW 35-038-01-W5M	0.03	2				•			
114	Wetland (Ephemeral)	NW 35-038-01-W5M	0.04	2				•			
115	Wetland (Ephemeral)	NW 35-038-01-W5M	0.05	2				•			
116	Wetland (Marsh)	NW 35-038-01-W5M	0.13	2				•			
117	Wetland (Ephemeral)	NE 35-038-01-W5M	0.11	2				•			
118	Wetland (Marsh)	NW 35-038-01-W5M	0.10	2				•			
119	Wetland (Marsh)	NW 35-038-01-W5M	0.04	2				•			
120	Wetland (Ephemeral)	NW 35-038-01-W5M	0.14	2				•			
121	Wetland (Ephemeral)	NW 35-038-01-W5M	0.08	2				•			
122	Wetland (Marsh)	NW 35-038-01-W5M	0.07	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
123	Wetland (Ephemeral)	SW 02-039-01-W5M	0.02	2				•			
124	Wetland (Ephemeral)	SW 02-039-01-W5M	0.03	2				•			
125	Wetland (Marsh)	SE 03-039-01-W5M	0.29	5				•			
126	Wetland (Ephemeral)	SE 03-039-01-W5M	0.03	2				•			
127	Wetland (Ephemeral)	SE 03-039-01-W5M	0.12	2				•			
128	Wetland (Marsh)	SE 03-039-01-W5M	5.95	9		•	•	•			• Cattails • Dugout has been constructed in the middle
129	Wetland (Marsh)	SW 03-039-01-W5M	0.14	4				•			
130	Wetland (Marsh)	SE 03-039-01-W5M SW 03-039-01-W5M	0.43	7			•	•			
131	Wetland (Ephemeral)	SE 03-039-01-W5M	0.21	2				•			
132	Wetland (Ephemeral)	SE 03-039-01-W5M	0.07	2				•			
133	Wetland (Swamp)	NE 35-038-01-W5M	1.52	9		•		•			
134	Wetland (Swamp)	NE 35-038-01-W5M	0.04	9			•	•			
135	Wetland (Swamp)	NE 35-038-01-W5M	0.04	9			•	•			
136	Wetland (Marsh)	NW 35-038-01-W5M	1.12	7		•		•			
137	Wetland (Marsh)	NW 35-038-01-W5M	0.12	7				•			
138	Wetland (Swamp)	NE 30-038-01-W5M	0.18	11	•	•	•	•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
139	Wetland (Marsh)	NE 30-038-01-W5M	0.28	3				•			
140	Wetland (Swamp)	NE 30-038-01-W5M	0.04	9		•	•	•			
141	Watercourse (Ephemeral)	NE 30-038-01-W5M	0.11	9			•	•			
142	Wetland (Swamp)	SE 31-038-01-W5M	0.09	11	•			•			• Soft ground and smaller trees • Poa sp dominates
143	Forested (Deciduous)	NE 30-038-01-W5M	0.28	6		•	•				
144	Wetland (Swamp)	SE 03-039-01-W5M	0.14	11			•	•			
145	Wetland (Marsh)	SE 03-039-01-W5M	0.04	2				•			
146	Wetland (Swamp)	SE 03-039-01-W5M	0.76	11		•	•	•			
147	Wetland (Marsh)	SE 03-039-01-W5M	0.04	2				•			
148	Wetland (Swamp)	SE 03-039-01-W5M	0.95	11		•	•	•			
149	Forested (Deciduous)	NE 19-038-01-W5M	1.33	8	•		•				• Corridor connected to larger habitats to the north
150	Forested (Deciduous)	SE 30-038-01-W5M	4.56	12	•	•	•				• Young forest around edges, small aspen • Some planted ornamentals along south edge of clearing • Good deer habitat • Thick mature aspen near old railway
151	Forested (Deciduous)	SE 30-038-01-W5M	1.73	8	•	•	•				• 10 m wide strip of vegetation, grazed • Large aspen with some snags
152	Forested (Deciduous)	SE 02-039-01-W5M	0.87	8		•	•				
153	Wetland (Shallow Open Water)	SE 02-039-01-W5M	2.01	9			•	•			
154	Wetland (Shallow Open Water)	SE 02-039-01-W5M	1.98	7			•	•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
155	Forested (Deciduous)	NW 27-038-01-W5M	1.20	9	•	•	•				• Young aspen surrounding mature • Some brome and disturbed spots • Some native vegetation • Cavities throughout
156	Wetland (Swamp)	NW 27-038-01-W5M	1.20	12		•	•	•			
157	Wetland (Marsh)	NW 27-038-01-W5M	0.81	9		•	•	•			
158	Wetland (Marsh)	NW 27-038-01-W5M	0.14	3				•			
159	Wetland (Marsh)	NW 27-038-01-W5M	0.12	3				•			
160	Wetland (Marsh)	NW 27-038-01-W5M	0.41	5				•			
161	Wetland (Marsh)	NW 27-038-01-W5M	0.39	5				•			
162	Wetland (Marsh)	NW 27-038-01-W5M	0.06	2				•			
163	Wetland (Marsh)	NW 27-038-01-W5M	0.04	3				•			
164	Wetland (Marsh)	NW 27-038-01-W5M	0.04	3				•			
165	Watercourse (Ephemeral)	NW 27-038-01-W5M	0.33	2				•			
166	Wetland (Ephemeral)	NW 27-038-01-W5M	0.17	2				•			
167	Wetland (Ephemeral)	NW 27-038-01-W5M	0.08	2				•			
168	Wetland (Ephemeral)	NW 27-038-01-W5M	0.16	2				•			
169	Wetland (Ephemeral)	NW 27-038-01-W5M	0.16	2				•			
170	Wetland (Ephemeral)	NW 27-038-01-W5M	0.16	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
171	Wetland (Ephemeral)	NW 27-038-01-W5M	0.17	2				•			
172	Wetland (Ephemeral)	NW 27-038-01-W5M	0.23	2				•			
173	Wetland (Ephemeral)	NW 27-038-01-W5M	0.08	2				•			
174	Wetland (Ephemeral)	NW 27-038-01-W5M	0.11	2				•			
175	Wetland (Ephemeral)	NW 27-038-01-W5M	0.06	2				•			
176	Wetland (Ephemeral)	NW 27-038-01-W5M	0.05	2				•			
177	Wetland (Ephemeral)	NW 27-038-01-W5M	0.07	2				•			
178	Wetland (Ephemeral)	NW 27-038-01-W5M	0.15	2				•			
179	Wetland (Ephemeral)	NW 27-038-01-W5M	0.14	2				•			
180	Wetland (Ephemeral)	NW 27-038-01-W5M	0.11	2				•			
181	Wetland (Swamp)	NW 27-038-01-W5M	0.30	8			•	•			
182	Watercourse (Ephemeral)	NW 27-038-01-W5M	3.24	3				•			
183	Watercourse (Ephemeral)	NW 27-038-01-W5M	0.33	2				•			
184	Wetland (Ephemeral)	NW 27-038-01-W5M	0.23	2				•			
185	Wetland (Ephemeral)	NW 27-038-01-W5M	0.18	2				•			
186	Wetland (Ephemeral)	NW 27-038-01-W5M	0.34	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
187	Forested (Deciduous)	NW 27-038-01-W5M	0.76	7	•	•	•				
188	Wetland (Marsh)	NW 27-038-01-W5M	0.14	5				•			
189	Wetland (Shallow Open Water)	NE 34-038-01-W5M	4.06	16	•	•	•	•			
190	Wetland (Shallow Open Water)	NE 34-038-01-W5M	0.52	10	•		•	•			
191	Forested (Deciduous)	NE 34-038-01-W5M	0.91	8	•	•	•				
192	Forested (Deciduous)	NE 34-038-01-W5M	0.81	8	•	•	•				
193	Wetland (Shallow Open Water)	SE 34-038-01-W5M	2.23	10	•	•		•			
194	Wetland (Shallow Open Water)	SE 34-038-01-W5M	0.21	5				•			
195	Watercourse (Small Permanent)	NW 34-038-01-W5M NE 34-038-01-W5M SE 34-038-01-W5M SW 03-039-01-W5M	27.14	9	•	•	•	•	•	•	
196	Forested (Deciduous)	NW 33-038-01-W5M SE 33-038-01-W5M SW 33-038-01-W5M	1.51	5	•	•	•				
197	Forested (Deciduous)	NW 32-038-01-W5M SW 32-038-01-W5M	1.57	9	•	•	•				
198	Forested (Deciduous)	SW 32-038-01-W5M	10.23	12	•	•	•				
199	Forested (Deciduous)	SW 32-038-01-W5M	0.40	8			•				
200	Forested (Deciduous)	SW 32-038-01-W5M	0.32	7	•		•				
201	Forested (Deciduous)	SW 32-038-01-W5M	0.95	7	•		•				
202	Forested (Deciduous)	SE 32-038-01-W5M SW 32-038-01-W5M	12.82	12	•	•	•				

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
203	Forested (Deciduous)	NW 29-038-01-W5M	0.27	6			•				
204	Wetland (Swamp)	SW 28-038-01-W5M	1.13	13		•	•	•			
205	Wetland (Marsh)	SW 28-038-01-W5M	0.10	7				•			
206	Forested (Deciduous)	SE 28-038-01-W5M SW 28-038-01-W5M	1.35	8		•	•				
207	Forested (Deciduous)	SE 28-038-01-W5M SW 28-038-01-W5M	1.21	8		•	•				• Large mature trees with snags
208	Forested (Deciduous)	SE 28-038-01-W5M	12.98	9	•	•	•				• Recently logged, now young regen aspen
209	Forested (Deciduous)	NE 21-038-01-W5M	1.69	7		•	•				
210	Wetland (Marsh)	NE 21-038-01-W5M	0.27	5				•			
211	Wetland (Marsh)	NE 21-038-01-W5M	0.10	5				•			
212	Wetland (Marsh)	NE 21-038-01-W5M	0.03	5				•			
213	Wetland (Ephemeral)	NE 21-038-01-W5M	0.04	2				•			
214	Forested (Deciduous)	NW 21-038-01-W5M	0.85	7			•				
215	Forested (Deciduous)	NW 21-038-01-W5M	0.76	7			•				
216	Wetland (Shallow Open Water)	NW 20-038-01-W5M	4.93	13	•	•		•			• Known location for Black Tern nest in normal wet years • Large intact open water wetland • Wetland is drier than normal years
217	Wetland (Marsh)	NW 20-038-01-W5M	0.28	4				•			
218	Wetland (Marsh)	NW 20-038-01-W5M	0.34	4				•			
219	Wetland (Ephemeral)	NW 20-038-01-W5M	0.67	4				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
220	Wetland (Ephemeral)	NW 20-038-01-W5M	0.04	2				•			
221	Wetland (Shallow Open Water)	NW 20-038-01-W5M NE 20-038-01-W5M	22.47	16	•	•		•			• Large intact open water wetland • Known location of waterfowl nesting • NW pars has some disturbance from digging • Willow can provide good ungulate feeding areas in summer and winter • Abundant native wetland vegetation
222	Wetland (Marsh)	NW 20-038-01-W5M	0.25	2				•			• Horsetail, foxtail, barley, green foxtail • Cultivated annually
223	Wetland (Marsh)	NW 20-038-01-W5M	0.19	2				•			
224	Wetland (Marsh)	NW 20-038-01-W5M	0.24	2				•			
225	Wetland (Ephemeral)	NW 20-038-01-W5M	0.06	2				•			
226	Wetland (Ephemeral)	NW 20-038-01-W5M	0.08	2				•			
227	Wetland (Ephemeral)	NW 20-038-01-W5M	0.08	2				•			
228	Wetland (Ephemeral)	NW 20-038-01-W5M	0.10	2				•			
229	Wetland (Ephemeral)	NW 20-038-01-W5M	0.07	2				•			
230	Wetland (Ephemeral)	NW 20-038-01-W5M	0.07	2				•			
231	Wetland (Ephemeral)	NW 20-038-01-W5M	0.04	2				•			
232	Wetland (Marsh)	NW 20-038-01-W5M	0.23	2				•			
233	Wetland (Marsh)	NE 20-038-01-W5M	0.11	2				•			
234	Wetland (Ephemeral)	NW 20-038-01-W5M	0.30	2				•			
235	Wetland (Ephemeral)	NW 20-038-01-W5M	0.08	2				•			
236	Wetland (Ephemeral)	NW 20-038-01-W5M	0.08	2				•			
237	Wetland (Ephemeral)	NW 20-038-01-W5M	0.16	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
238	Wetland (Ephemeral)	NW 20-038-01-W5M	0.07	2				•			
239	Wetland (Marsh)	NW 20-038-01-W5M	0.49	2				•			
240	Wetland (Ephemeral)	NE 20-038-01-W5M	0.10	2				•			
241	Wetland (Marsh)	NE 20-038-01-W5M	0.79	2				•			
242	Wetland (Marsh)	NE 20-038-01-W5M	2.98	9		•	•	•			• Reed canary grass throughout, some willow
243	Wetland (Marsh)	NE 20-038-01-W5M	0.08	2				•			
244	Wetland (Marsh)	SE 29-038-01-W5M	5.62	10		•		•			• Shrubs and trees • Soil piles within wetland
245	Wetland (Marsh)	SE 34-038-01-W5M	0.12	6				•			
246	Wetland (Marsh)	SE 34-038-01-W5M	0.18	6				•			
247	Wetland (Marsh)	SE 34-038-01-W5M	0.24	6				•			
248	Wetland (Marsh)	SE 34-038-01-W5M	0.19	6				•			
249	Wetland (Marsh)	SE 34-038-01-W5M	0.03	6				•			
250	Wetland (Marsh)	SE 34-038-01-W5M	0.15	6				•			
251	Wetland (Marsh)	SE 34-038-01-W5M	0.14	6				•			
252	Wetland (Marsh)	SE 34-038-01-W5M	0.15	6				•			
253	Wetland (Marsh)	SE 34-038-01-W5M	0.03	7				•			
254	Wetland (Marsh)	SE 34-038-01-W5M	0.10	6				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
255	Wetland (Marsh)	SE 34-038-01-W5M	0.11	6				•			
256	Wetland (Marsh)	SE 34-038-01-W5M	0.09	6				•			
257	Wetland (Marsh)	SE 34-038-01-W5M	0.13	6				•			
258	Wetland (Marsh)	SE 34-038-01-W5M SW 34-038-01-W5M	0.45	3				•			
259	Wetland (Marsh)	SE 34-038-01-W5M	0.25	6				•			
260	Wetland (Marsh)	SE 34-038-01-W5M	0.30	6				•			
261	Wetland (Marsh)	SE 34-038-01-W5M	0.19	6				•			
262	Wetland (Marsh)	SE 34-038-01-W5M	0.08	6				•			
263	Wetland (Marsh)	SE 34-038-01-W5M	0.14	6				•			
264	Wetland (Marsh)	SE 34-038-01-W5M	0.04	6				•			
265	Wetland (Marsh)	SE 34-038-01-W5M	0.35	6				•			
266	Wetland (Marsh)	SE 34-038-01-W5M	0.04	3				•			
267	Wetland (Marsh)	SE 34-038-01-W5M	0.04	3				•			
268	Wetland (Marsh)	SE 34-038-01-W5M	0.06	3				•			
269	Wetland (Marsh)	SE 34-038-01-W5M SW 34-038-01-W5M	0.10	3				•			
270	Wetland (Marsh)	SE 34-038-01-W5M	0.04	3				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
271	Wetland (Marsh)	SW 34-038-01-W5M	0.02	3				•			
272	Wetland (Marsh)	NE 27-038-01-W5M	0.14	5				•			
273	Wetland (Marsh)	NE 27-038-01-W5M	0.06	5				•			
274	Wetland (Marsh)	NE 27-038-01-W5M	0.08	5				•			
275	Wetland (Marsh)	NE 27-038-01-W5M	0.10	5				•			• Site within topsoil pile
276	Wetland (Marsh)	NE 27-038-01-W5M	0.11	5				•			
277	Windrow	NE 20-038-01-W5M	2.72	5			•				• Aspen, poplar, maple, and caragana
278	Forested (Deciduous)	NE 20-038-01-W5M	3.20	5			•				• Maple, caragana, poplar, spruce, willow • Magpies observed
279	Forested (Deciduous)	NE 20-038-01-W5M	0.76	6			•				
280	Windrow	NE 20-038-01-W5M	0.87	4			•				• Manitoba maple and caragana
281	Wetland (Shallow Open Water)	NW 21-038-01-W5M	4.24	10	•	•		•			
282	Wetland (Marsh)	NW 21-038-01-W5M	0.04	6				•			
283	Wetland (Marsh)	NE 21-038-01-W5M	0.25	6				•			
284	Wetland (Shallow Open Water)	NE 21-038-01-W5M	0.07	6				•			
285	Windrow	NE 21-038-01-W5M	0.33	4			•				
286	Wetland (Marsh)	NE 27-038-01-W5M SE 34-038-01-W5M	30.00	14	•	•	•	•			• Water sedge and blue grass • One sandpiper observed
287	Wetland (Marsh)	NE 27-038-01-W5M	0.13	5				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
288	Forested (Deciduous)	NW 34-038-01-W5M NE 34-038-01-W5M	0.66	5							
289	Drainage ditch	NW 34-038-01-W5M SW 34-038-01-W5M	1.05	0							
290	Wetland (Marsh)	SE 34-038-01-W5M	0.09	6							
291	Forested (Deciduous)	SE 34-038-01-W5M	1.84	8							
292	Forested (Deciduous)	SE 34-038-01-W5M	1.55	7	•	•	•				
293	Forested (Deciduous)	SE 34-038-01-W5M	2.61	10	•	•	•				
294	Forested (Deciduous)	SE 34-038-01-W5M	0.25	7			•				
295	Forested (Deciduous)	NE 27-038-01-W5M SE 34-038-01-W5M	0.13	6			•				
296	Forested (Deciduous)	SW 34-038-01-W5M	0.16	6			•				
297	Stormwater Pond/Dugout	SE 34-038-01-W5M	0.05	0							
298	Stormwater Pond/Dugout	SE 34-038-01-W5M	4.42	0							
299	Stormwater Pond/Dugout	NE 27-038-01-W5M	5.64	0							• Drainage from west • Portions are a dugout • willows
300	Forested (Deciduous)	NE 27-038-01-W5M	30.42	13	•	•	•				• abundant tall mature trees • many cavities observed • red tail hawk in vicinity, potential nest • mainly poplar to aspen
301	Stormwater Pond/Dugout	NE 33-038-01-W5M	0.72	0							
302	Wetland (Marsh)	NE 33-038-01-W5M	0.03	5				•			
303	Wetland (Marsh)	NE 33-038-01-W5M	0.45	5				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
304	Wetland (Marsh)	NE 33-038-01-W5M	0.13	5				•			
305	Wetland (Shallow Open Water)	NE 33-038-01-W5M	1.38	7				•			
306	Forested (Deciduous)	NE 33-038-01-W5M	1.17	6	•	•	•				
307	Wetland (Marsh)	SW 03-039-01-W5M	0.08	2				•			
308	Wetland (Marsh)	SW 03-039-01-W5M	0.05	2				•			
309	Wetland (Marsh)	SW 03-039-01-W5M	0.14	2				•			
310	Wetland (Marsh)	SW 03-039-01-W5M	0.08	3				•			
311	Wetland (Marsh)	SW 03-039-01-W5M	0.10	2				•			
312	Wetland (Marsh)	SW 03-039-01-W5M	0.14	3				•			
313	Wetland (Ephemeral)	SW 03-039-01-W5M	0.03	2				•			
314	Wetland (Ephemeral)	SW 03-039-01-W5M	0.08	2				•			
315	Wetland (Ephemeral)	SW 03-039-01-W5M	0.06	2				•			
316	Wetland (Marsh)	SW 03-039-01-W5M	0.05	3				•			
317	Wetland (Ephemeral)	SW 03-039-01-W5M	0.05	2				•			
318	Wetland (Ephemeral)	SW 03-039-01-W5M	0.06	2				•			
319	Windrow	SW 03-039-01-W5M	0.04	5			•				

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
320	Windrow	SW 03-039-01-W5M	0.24	5			•				
321	Windrow	SW 03-039-01-W5M	0.16	5			•				
322	Wetland (Shallow Open Water)	SW 03-039-01-W5M	6.07	11	•	•	•	•			
323	Forested (Deciduous)	SW 03-039-01-W5M	5.08	11	•	•	•	•			• Mature trees • Lots of snags • Some low spots throughout
324	Wetland (Marsh)	SW 03-039-01-W5M	0.05	3				•			
325	Wetland (Marsh)	SW 03-039-01-W5M	0.06	3				•			
326	Wetland (Shallow Open Water)	SW 03-039-01-W5M	1.81	6		•		•			
327	Wetland (Marsh)	SW 03-039-01-W5M	0.22	3				•			
328	Wetland (Marsh)	SW 03-039-01-W5M	0.12	3				•			
329	Riparian (Lake)	NW 33-038-01-W5M NE 33-038-01-W5M SW 33-038-01-W5M SE 04-039-01-W5M	5.31	8				•	•	•	
330	Wetland (Marsh)	SE 33-038-01-W5M	0.80	3				•			
331	Wetland (Shallow Open Water)	NE 33-038-01-W5M	0.21	5				•			
332	Wetland (Marsh)	SW 03-039-01-W5M	0.03	2				•			
333	Wetland (Marsh)	SW 03-039-01-W5M	0.10	2				•			
334	Wetland (Ephemeral)	SW 03-039-01-W5M	0.01	2				•			
335	Wetland (Ephemeral)	SW 03-039-01-W5M	0.03	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
336	Wetland (Ephemeral)	SW 03-039-01-W5M	0.01	2				•			
337	Wetland (Ephemeral)	SW 03-039-01-W5M	0.15	2				•			
338	Wetland (Ephemeral)	SW 03-039-01-W5M	0.03	2				•			
339	Wetland (Ephemeral)	SW 03-039-01-W5M	0.04	2				•			
340	Wetland (Ephemeral)	SW 03-039-01-W5M	0.07	2				•			
341	Wetland (Ephemeral)	SW 03-039-01-W5M	0.02	2				•			
342	Wetland (Marsh)	SW 03-039-01-W5M	0.72	2				•			
343	Wetland (Ephemeral)	SW 03-039-01-W5M	0.15	2				•			
344	Wetland (Shallow Open Water)	SW 03-039-01-W5M	0.14	5				•			
345	Forested (Deciduous)	SE 04-039-01-W5M	0.26	6			•				
346	Forested (Deciduous)	SE 32-038-01-W5M	0.12	7			•				
347	Forested (Deciduous)	NW 32-038-01-W5M	1.19	8	•	•	•				
348	Forested (Deciduous)	NW 32-038-01-W5M	0.14	8	•		•				
349	Drainage ditch	NW 32-038-01-W5M	0.15	0							
350	Wetland (Marsh)	NW 32-038-01-W5M	0.27	3				•			
351	Drainage ditch	NW 32-038-01-W5M	0.21	0							

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
352	Drainage ditch	NW 32-038-01-W5M	0.26	0							
353	Stormwater Pond/Dugout	SW 32-038-01-W5M	0.10	0							
354	Stormwater Pond/Dugout	SW 32-038-01-W5M	0.14	0							
355	Stormwater Pond/Dugout	SW 32-038-01-W5M	0.03	0							
356	Stormwater Pond/Dugout	SE 32-038-01-W5M SW 32-038-01-W5M	0.16	0							
357	Stormwater Pond/Dugout	SE 32-038-01-W5M	0.23	0							
358	Forested (Deciduous)	NE 32-038-01-W5M SE 32-038-01-W5M	0.43	7			•				
359	Forested (Deciduous)	NE 32-038-01-W5M	0.15	6			•				
360	Forested (Deciduous)	NW 29-038-01-W5M SW 32-038-01-W5M	0.98	6	•		•				• Known to be used by red fox • Young trees
361	Forested (Deciduous)	NE 29-038-01-W5M	0.54	7		•	•				
362	Windrow	SE 29-038-01-W5M	0.10	4			•				
363	Wetland (Marsh)	SE 29-038-01-W5M	0.10	4				•			
364	Wetland (Marsh)	SE 29-038-01-W5M	0.02	4				•			
365	Wetland (Marsh)	SE 29-038-01-W5M	0.08	2				•			
366	Stormwater Pond/Dugout	SW 29-038-01-W5M	0.42	0							
367	Stormwater Pond/Dugout	SW 29-038-01-W5M	0.19	0							

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
368	Wetland (Marsh)	SW 28-038-01-W5M	0.66	5				•			• Observed northern harrier
369	Wetland (Marsh)	SW 28-038-01-W5M	0.38	3				•			
370	Wetland (Ephemeral)	SW 28-038-01-W5M	0.04	2				•			
371	Wetland (Ephemeral)	SW 28-038-01-W5M	0.03	2				•			
372	Wetland (Ephemeral)	SE 28-038-01-W5M	0.03	2				•			
373	Wetland (Marsh)	SE 28-038-01-W5M	0.13	2				•			
374	Wetland (Ephemeral)	SE 28-038-01-W5M	0.02	2				•			
375	Wetland (Ephemeral)	SE 28-038-01-W5M	0.02	2				•			
376	Wetland (Ephemeral)	SE 28-038-01-W5M	0.07	2				•			
377	Wetland (Marsh)	SW 28-038-01-W5M	0.12	2				•			
378	Wetland (Marsh)	NW 21-038-01-W5M	0.16	2				•			
379	Wetland (Marsh)	NW 21-038-01-W5M	1.25	7		•		•			
380	Forested (Deciduous)	NW 21-038-01-W5M	0.41	5			•				
381	Wetland (Swamp)	SE 28-038-01-W5M	0.30	3				•			
382	Forested (Deciduous)	NW 28-038-01-W5M SW 28-038-01-W5M	0.49	5			•				
383	Forested (Deciduous)	NW 28-038-01-W5M SW 28-038-01-W5M	0.33	6			•				

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
384	Forested (Deciduous)	SW 28-038-01-W5M	0.59	5			•				• Planted conifers and maple
385	Forested (Deciduous)	NW 29-038-01-W5M NE 29-038-01-W5M	0.36	6			•				
386	Forested (Deciduous)	NW 32-038-01-W5M	0.27	6			•				
387	Forested (Deciduous)	SE 32-038-01-W5M	0.31	6			•				
388	Forested (Deciduous)	SE 32-038-01-W5M	0.20	7			•				
389	Forested (Deciduous)	NE 29-038-01-W5M	0.40	7		•	•				
390	Stormwater Pond/Dugout	NE 28-038-01-W5M	0.16	0							
391	Stormwater Pond/Dugout	NW 34-038-01-W5M NE 34-038-01-W5M	51.63	0							
392	Forested (Deciduous)	NW 28-038-01-W5M	0.22	7			•				
393	Water body (Lake)	NE 32-038-01-W5M	4.46	12	•		•	•			
394	Wetland (Marsh)	NW 21-038-01-W5M	1.49	9	•	•		•			
395	Wetland (Marsh)	NW 21-038-01-W5M	0.20	6				•			
396	Wetland (Marsh)	NW 21-038-01-W5M	0.11	7				•			
397	Wetland (Marsh)	NW 21-038-01-W5M	0.77	7				•			
398	Stormwater Pond/Dugout	NW 21-038-01-W5M	0.03	0							
399	Windrow	SE 31-038-01-W5M	0.34	4			•				• Manitoba maple with caragana understory • 10 m wide natural, 15 m wide maple
400	Wetland (Marsh)	NE 27-038-01-W5M	0.07	5				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
401	Wetland (Marsh)	NE 27-038-01-W5M	1.12	8				•			• Mint, sedge, current, smaller poplar • Reed canary grass, stinging nettle • Large willows along perimeter • Downey woodpecker observed
402	Wetland (Marsh)	NE 27-038-01-W5M	0.16	7				•			
403	Wetland (Ephemeral)	SE 30-038-01-W5M	0.49	2				•			
404	Wetland (Ephemeral)	SE 30-038-01-W5M	1.21	2				•			
405	Wetland (Ephemeral)	SE 30-038-01-W5M	0.15	2				•			
406	Wetland (Ephemeral)	SE 30-038-01-W5M	0.12	2				•			
407	Wetland (Ephemeral)	SE 30-038-01-W5M	0.29	2				•			
408	Grassland_Natural/Semi Natural	SE 31-038-01-W5M	3.42	9	•	•	•				• Rose, willow, grass, Canada goldenrod, northern bedstraw, vetch, raspberry • Looks like native grassland with some non-native veg • Dandelion, poplar
409	Wetland (Swamp)	NE 31-038-1-W5M	0.27	8			•	•			• Cow parsnip sp., reed canary grass, purple avens • Red tailed hawk
410	Wetland (Marsh)	SW 31-038-1-W5M	0.11	3				•			• Completely cultivated with some bare ground, some horsetail
411	Forested (Deciduous)	NE 19-038-01-W5M	0.64	8	•		•				• Corridors connecting to habitats to the north and east. • Large snags and cavities observed along the corridor • Large mature trees, native shrubs layer
412	Wetland (Ephemeral)	NW 20-038-01-W5M	0.07	2				•			
413	Wetland (Ephemeral)	NW 20-038-01-W5M	0.06	2				•			
414	Wetland (Ephemeral)	NW 20-038-01-W5M	0.05	2				•			
415	Wetland (Marsh)	NW 20-038-01-W5M	0.20	4				•			
416	Wetland (Marsh)	NW 20-038-01-W5M	0.75	4				•			
417	Wetland (Marsh)	NE 20-038-01-W5M	0.67	2				•			

ESA Number	ESA Type	Location	Area (ha)	Ecological Importance	ESA Criteria						Comments
					Focal species, species groups and their habitats	Large intact patches of natural vegetation	Connecting habitat and corridors	Water quality and quantity	Riparian areas	Cultural, historic, or scenic value	
418	Wetland (Marsh)	SW 28-038-01-W5M	0.31	2				•			
419	Forested (Deciduous)	NE 29-038-01-W5M	0.23	5			•				
420	Drainage ditch	SW 03-039-01-W5M	0.17	0							
421	Windrow	SE 03-039-01-W5M	0.12	4			•				• Planted spruce
422	Forested (Deciduous)	NE 35-038-01-W5M	0.21	6			•				
423	Wetland (Marsh)	NE 35-038-01-W5M	0.06	2				•			
424	Wetland (Marsh)	NE 35-038-01-W5M	0.02	2				•			
425	Forested (Deciduous)	NE 35-038-01-W5M	0.37	7			•				• Young aspen
426	Forested (Deciduous)	NE 30-038-01-W5M	0.86	8			•				• Strip of native mature vegetation. Connected to a larger patch of forest habitat (#11)