Bremner Area Concept Plan
Biophysical Assessment

Prepared for:
Planning and Development Services, Strathcona County

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Final Draft October 2018

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1.0 INTRODUCTION

Strathcona County has initiated the planning and design for the Bremner Area Concept Plan (ACP) contained within the 16, 17, 18, 19, 20, 21, 22, 28, 29, and 30 sections of 53-22 West of the 4th Meridian. To support that effort a biophysical assessment has been completed that characterizes landscape features of the Subject Area as mainly undulating and hummocky agricultural and forested rural residential lands, which includes wetlands, uplands, streams and riparian areas.

1.1 Scope

The use of this biophysical assessment, as per Strathcona County Policy SER-009-032, is to provide a broad overview of the landscape features, wildlife and to identify areas for conservation based on their local, regional and provincial significance, for the Bremner ACP.

1.2 Development Project Description

In 2007 Council approved a new Municipal Development Plan (MDP) for the County that identified Bremner as an Urban Reserve Policy Area and required that prior to any further planning or subdivision in the area, a Growth Management Strategy would need to be completed. In 2009, the Capital Region Board reinforced the decision to grow within the Urban Reserve Policy Area by including it in one of seven "Priority Growth Areas" across the Capital Region.

In 2013, Council approved an amendment to the MDP that establishes a framework for the Bremner Growth Management Strategy and directed that one be prepared to guide the future development of the area. Both the Capital Region Growth Plan and the MDP call for sustainable development in Bremner and require residential densities to be higher than those of traditional suburban communities like Sherwood Park. The Bremner Growth Management Strategy was endorsed by Council on March 22, 2016.

On September 5, 2017, Council approved a new MDP. Section 4.4 is specific to the Bremner Urban Reserve Policy Area and sets the long term development goal:

> *Bremner will be a complete community that is green, connected and diverse. It will incorporate green infrastructure, open space and urban agriculture into each community and neighbourhood. Communities and neighbourhoods within Bremner will be designed for compact, mixed-use and transit oriented development. The design of communities and neighbourhoods will encourage all residents to utilize active transportation for their daily living by creating a distinct town centre and smaller village centres that will provide residents with a variety of services, amenities, education and employment opportunities in close proximity to where they live.*

The next step in planning for Bremner is to develop an Area Concept Plan and detailed engineering plans. An Area Concept Plan is a statutory plan that provides a comprehensive planning framework and generalized future land use concept that guides subsequent development plans.

1.3 Objectives

In the interest of sustaining our natural environment, Strathcona County's goal is to protect the integrity of our heritage and natural resources while providing opportunities for appropriate forms of use that will benefit the community. The broad overview of landscape features and wildlife information provided in this report will be used to ensure that our goals, as laid out in Strathcona County's Strategic Plan are met. These goals include:

- maintain viable, sustainable populations of native plants and wildlife in their natural habitats;
- preserve our agricultural heritage;
- maintain heritage resources and values, whether it be a building, monument or landscape feature;
- identify a network of conservation areas to promote the sustainable use of native habitat and heritage resources to enhance quality of life for all;
- restore and rehabilitate degraded ecosystems, where practical;
- develop and implement management plans to ensure long term viability of the natural and heritage resources; and
- educate the public on conservation and sustainability.

2.0 DEVELOPMENT CONTEXT

A Biophysical Assessment was conducted on the Subject Area located north of Hwy 16, south of Township Road 540 between Highway 21 and Secondary Highway 824 in Strathcona County in 2014 in support of the Urban Reserve Policy Area Growth Strategy. The objective of that assessment was to identify the natural features and their functions and values in order to provide Strathcona County's Council, planners and residents with information to make sustainable planning decisions. That assessment was conducted in compliance with Municipal Policy SER-009-032 Biophysical Assessment.

That 2014 Biophysical Assessment has been updated to reflect the change in land use planning area and to provide a finer level of detail for development of the ACP. This assessment was also conducted in compliance with Municipal Policy SER-009-032 Biophysical Assessment.

2.1 Location

The Bremner ACP Area consists of approximately 10 sections of land under private ownership. It is located directly northeast of Sherwood Park and approximately five kilometers south of Fort Saskatchewan and five kilometers east of the North Saskatchewan River. It is bounded by two primary highways; Highway 16 runs along the south border and Highway 21 borders to the west. It is bounded on the north by Pointe-Aux-Pins Creek and bounded on the east by Range Road 223 and Pointe-Aux-Pins Creek.

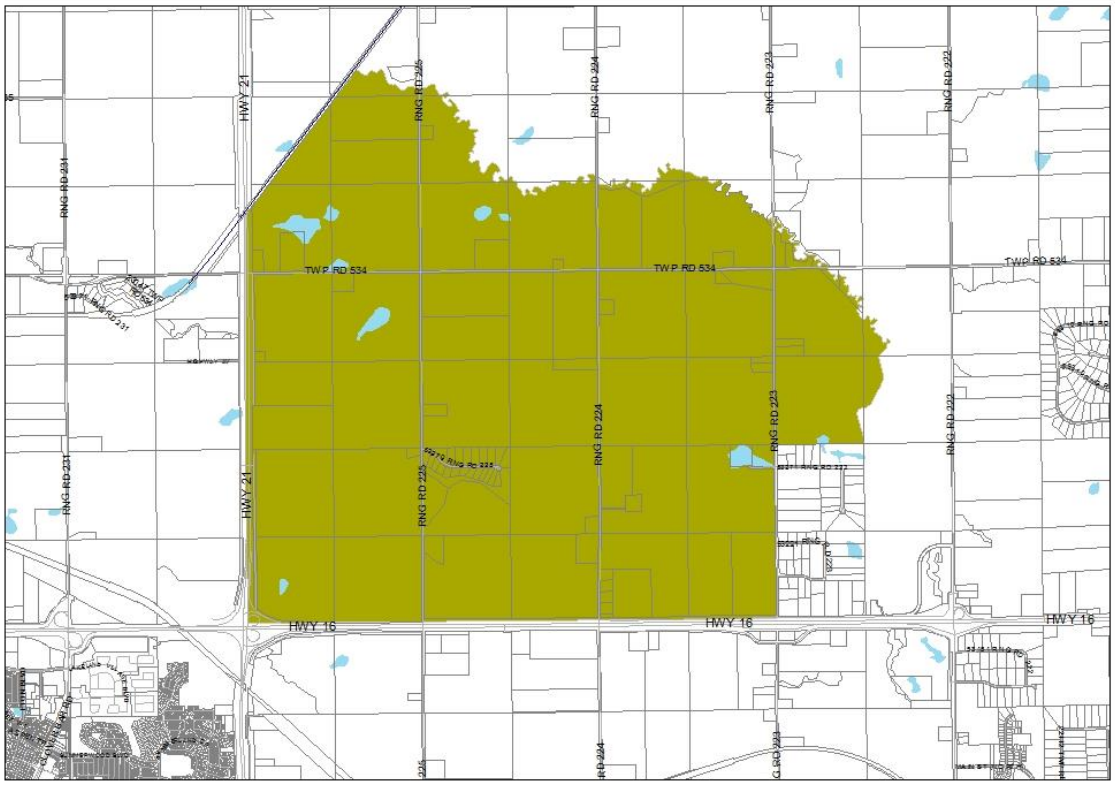

Figure 1: Bremner ACP Area.

2.2 Physiographic Description and Climate

The Province of Alberta has been divided into specific units that reflect natural features through a process termed land classification. The land classification units are based on natural features – geology, landform, hydrology, soils, climate, vegetation and animals. All these natural features act as a unit and are termed an ecosystem.

The Natural Regions and Subregions classification developed in 1977 (Natural Regions Committee 2006) is specifically, for natural area reserve planning. The purpose of the Natural Regions and Subregions classification is to account for the entire range of natural lands or ecosystem diversity in Alberta and is related to landscape and biodiversity conservation. This system has been adopted by the Alberta Parks Service. Based on the Natural Regions and Subregions classification, the Bremner ACP Area exists within the Parkland Natural Region, specifically the Central Parkland Subregion.

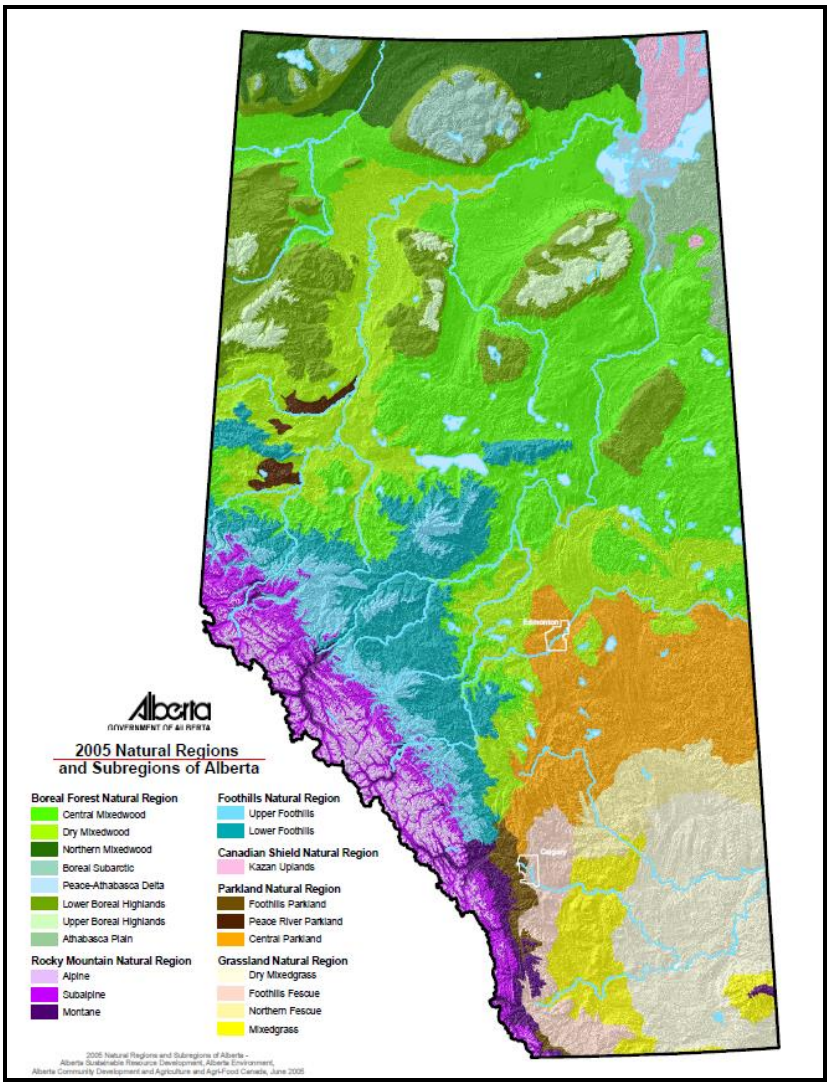

Figure 2: Natural Regions and Subregions of Alberta.

2.2.1 Parkland Natural Region – Central Parkland Subregion

The Parkland Natural Region can be applied to 10 to 15% of the landmass of Alberta. It forms a transition between the drier grasslands and the moister coniferous forests and is characterized by broad plains with deeply incised river valleys and rolling morainal terrain. The climate is influenced by prairie, boreal and mountain landscape and weather. A mix of aspen stands, shrubs and grasslands characterize the regional vegetation. There are three Subregions – Central, Foothills and Peace River.

The Central Parkland Subregion is characterized by level to undulating terrain with hummocky moraine landforms. Surficial deposits range from hummocky ground moraines to glaciolacustrine deposits. Moraines are most widespread. Numerous permanent streams, all part of the Saskatchewan River system, cut across the Subregion. Lakes and wetlands are slightly to strongly saline. Soils are generally Black and Dark Brown Chernozems under grasslands and Dark Gray Chernozems and Luvisols under aspen forest stands.

The climate of this Subregion is subhumid, continental with short, cool summers and long, cold winters. The mean May to September temperature is 13^{o}C with a growing period of 90 days. Annual precipitation averages

350 mm, with the majority coming as rain in June and July. Winters are dry with approximately 60 mm of precipitation.

The typical vegetation within this Subregion is aspen (*Populus tremuloides*) occurring in pure and mixed stands, and balsam poplar (*Populus balsamifera*) occurring on moister substrates. The associated understory species consist of a high number of shrubs, specifically snowberry (*Symphoricarpos albus*), rose (*Rosa acicularis*), choke cherry (*Prunus virginiana*) and Saskatoon (*Amelanchier alnifolia*), often existing as belts of shrubs extending from the forest stands.

Wildlife characteristic to this Subregion include grassland and forest species. Migratory waterfowl are characteristic to the wetlands and associated uplands. Mammals include beaver (*Castor canadensis*), moose (*Alces alces*), hare (*Lepus* spp.), white-tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*).

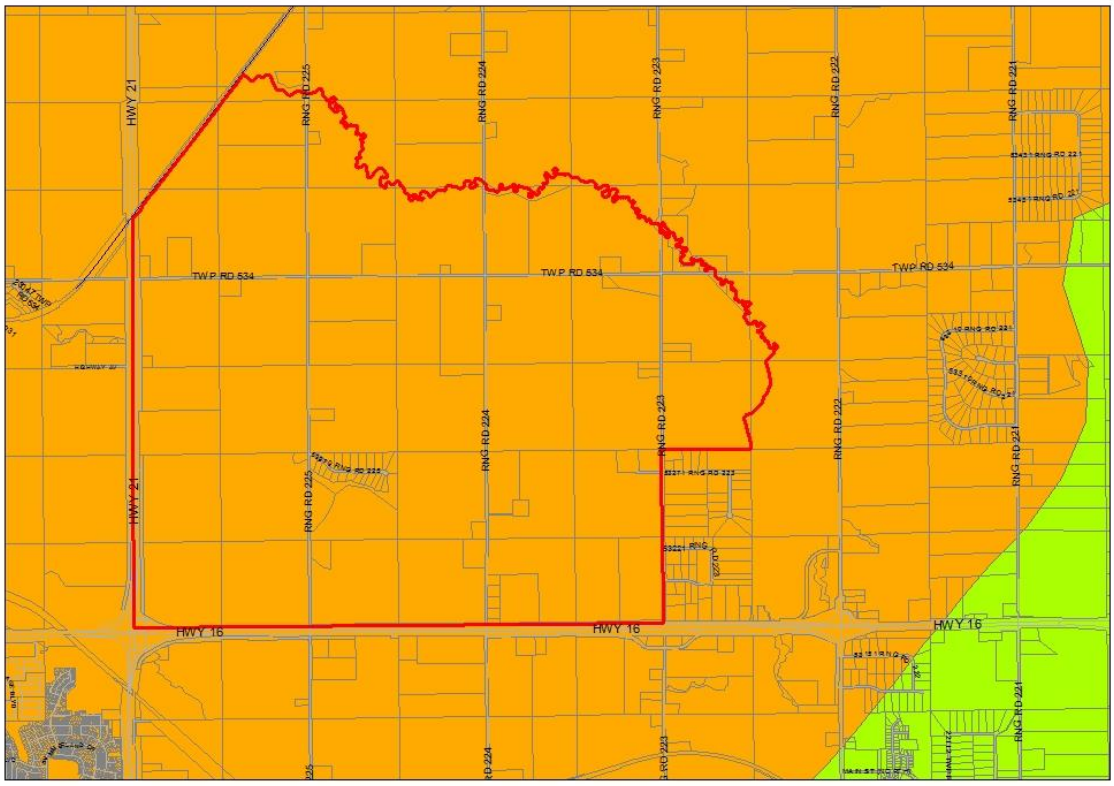

Figure 3: Bremner ACP Area within the Central Parkland Subregion (orange).

2.3 Study and Assessment Methods

A desktop study of previous environmental reports was conducted in addition to review of historical aerial photographs. Summaries of the review of historical air photos and environmental reports can be found in section 3.0.

Site surveys were completed by Jocelyn Thrasher-Haug, P.Ag, P.Biol. The survey was designed to determine site characteristics, through a floral and faunal survey and habitat identification. The surveys were conducted in August, 2017, at which time the plant communities and overall habitat were assessed. Wildlife observations were completed which included direct visual observations and indirect observations, such as browse and bedding indicators, vocalizations, tracks, and scat.

A significant limitation to the surveys was access. The majority of lands within the Bremner ACP Area are privately owned. Therefore, observations were made from publically owned lands.

2.4 Applicable Legislation

The following list includes legislation at the federal, provincial and municipal levels that is most common and applicable, but it is not an exhaustive list.

2.4.1 Federal Policy on Wetland Conservation (1991)

The Federal Policy on Wetland Conservation complements the goals of the North American Waterfowl Management Plan, federal policies on water conservation and fish habitat conservation and the International Ramsar Convention (Government of Canada, 1991). The objective of the Policy is to "promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future."

In order to meet this objective, the following goals have been identified:

- ***maintenance*** *of wetlands functions and values derived from wetlands throughout Canada;*
- ***no net loss of wetland functions*** *on all federal lands and waters;*
- ***enhancement and rehabilitation*** *of wetlands where the continuing loss or degradation of wetlands and their functions have reached critical levels;*
- ***recognition*** *of wetland functions in resource planning, management and economic decision-making with regard to all federal programs, policies and activities;*
- ***securement*** *of wetlands of significance to Canadians;*
- ***recognition of sustainable management practices*** *in sectors such as forestry and agriculture that make a positive contribution to wetland conservation while also achieving wise use of wetland resources; and*
- ***utilization*** *of wetlands in a manner that enhances prospects for their sustained and productive use by future generations.*

The Policy defines a wetland as:

> *…land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment.*

Although not a regulatory document, the Federal Policy on Wetland Conservation promotes wetland conservation through federal decision and responsibilities. The goals and objectives of the Federal Policy should be reflected in the management and development of the Bremner ACP Area.

2.4.2 Environmental Protection and Enhancement Act

The *Environmental Protection and Enhancement Act* (2000) aims to protect Alberta's air, land, and water by detailing what sort of activities require approvals and the associated requirements. The Act supports and

promotes the "protection, enhancement and wise use of the environment" while simultaneously recognizing the importance of:

- environmental protection for human and nature benefit;
- integrating environmental protection with economic decisions throughout the planning stages;
- sustainable development;
- preventing and mitigating the environmental impact development, government policies, programs, and decisions;
- government leadership; and
- shared responsibility to protect, enhance and wisely use the environment.

Depending on the type of activities proposed for the Bremner ACP Area, this Act should be consulted prior to commencing. Development should proceed in a way where the protection, enhancement and wise use of the environment can work symbiotically with the proposed land use.

2.4.3 Municipal Government Act

The *Municipal Government Act* (2000) is responsible for providing operational framework and governance model for all forms of local government in Alberta including specialized municipalities. It also lays the basis for how municipalities operate, how their councils function and how residents work with their municipality.

The Municipal Government Act (MGA) has three main areas of focus:

- governance;
- planning and development; and
- assessment and taxation.

The MGA also defines and uses of Environmental and Municipal Reserves which are as follows.

Environmental Reserve

… a subdivision authority may require the owner of a parcel of land that is the subject of a proposed subdivision to provide part of that parcel of land as environmental reserve if it consists of
(a) a swamp, gully, ravine, coulee or natural drainage course,
(b) land that is subject to flooding or is, in the opinion of the subdivision authority, unstable, or
(c) a strip of land, not less than 6 metres in width, abutting the bed and shore of any lake, river, stream or other body of water for the purpose of

(i) preventing pollution, or
(ii) providing public access to and beside the bed and shore.

… environmental reserve must be left in its natural state or be used as a public park.

Municipal Reserve

… a subdivision authority may require the owner of a parcel of land that is the subject of a proposed subdivision

(a) to provide part of that parcel of land as municipal reserve, school reserve or municipal and school reserve,
(b) *to provide money in place of municipal reserve, school reserve or municipal and school reserve, or*
(c) *to provide any combination of land or money referred to in clauses (a) and (b).*

Municipal reserve, school reserve or municipal and school reserve may be used by a municipality or school board or by them jointly only for any or all of the following purposes:

(a) a public park;
(b) a public recreation area;
(c) school board purposes;
(d) to separate areas of land that are used for different purposes.

The MGA enables municipalities to govern the development of lands within their boundaries in a manner that is logical, timely, economical and environmentally responsible. The MGA requires that municipalities with a population more than 3,500 adopt a MDP. See Section 2.4.7 for more information on the MDP.

2.4.4 Public Lands Act

The *Public Lands Act* (2000) deals with two factors relating to the management of water bodies: the ownership of the beds and shores of permanent water bodies, and the prohibition of certain activities that may cause injury to the beds and shores of permanent water bodies. According to the act, the province owns the bed and shores of "all permanent and naturally occurring bodies of water, and all naturally occurring rivers, streams, watercourses and lakes".

The *Surveys Act* (2000) defines bed, bank and shore. The bank, being defined as the line along the upper limit of the bed and shore formed by the normal, continuous action of presence of surface water on the lands, limits the extent of the Province's ownership. This is a natural boundary between the bed and shore and privately owned land. The location of the bank is not affected by drought or flooding. The bed of a water body is defined as the land on which the water sits. The shore is defined as that part of the bed that is exposed when water levels are not at the normal level.

Section 54(1) of the Public Lands Act contains a general prohibition that no person shall do anything that:

- *…may injuriously affect watershed capacity;*
- *…is likely to result in injury to the bed and shore of any river, stream, watercourse, lake or other body of water or land in the vicinity of that public land; or*
- *…is likely to result in soil erosion.*

Any unauthorized use of public land may be subject to a variety of penalties, including fines, disposition cancellation, ministerial orders to restore disturbed areas, or legal action imposed penalties.

Due to the sensitive nature of shore resources, most activities on the bed and shore require at least two provincial approvals through the Public Lands Act and the Water Act. Conditions are placed on all authorizations: (1) to ensure that compatible activities and resources are used properly, (2) to limit the chance of degrading aquatic and shore environments, and where necessary, (3) to mitigate, reclaim or restore an area where disturbance is unavoidable.

2.4.5 Water Act

The *Water Act* (2000) is the primary legislation that deals with water and water management. Water management is necessary in order to address demands on aquatic resources while ensuring that a clean abundant supply of water is available, including for its own protection. There are multiple scales at which water management can occur, whether involving a small area, such as lake management, or at a larger area, such as an entire watershed. Regardless of the level, public participation is a necessity in successfully managing water.

Ownership, activity regulation, water allocation and use, and the licensing and approval system are all components described in the Act. Through the Water Act the Crown owns the resource of water. The Water

Act applies over a water body's flood plain, bed and shore. The Water Act works to safeguard the aquatic environment which has been defined as:

> *…the components of the earth related to, living in or located in or on water or the beds or shores of a water body, including but not limited to*
>
> *(i) All organic and inorganic matter, and*
>
> *(ii) Living organisms and their habitat, including fish habitat, and their interacting natural systems.*

Section 36 of the Act describes which activities require approvals. Those activities that may impact water and the aquatic environment are required to obtain approval. It is an offence under the Water Act to commence or continue an activity unless an approval or other authorization under the Act has been issued; to contravene a term or condition of an approval or license; to contravene a water management order; or contravene an enforcement order. Penalties may include fines, water management orders, remedial orders, court orders and civil remedies.

2.4.6 Alberta Wetland Policy

The Alberta Wetland Policy looks at the entirety of Alberta, including crown land, white and green zones, and addresses all classes of wetlands. The new classification system was introduced in 2015 and describes five classes: bogs, fens, marshes, shallow open water, and swamps. These five classes align with the Canadian Wetland Classification System. Once categorized into one of five classes, wetlands are divided into **forms** based on vegetation structure. The forms are then divided into **types** based on the length of time that surface water is at or above the surface, along with basic water characteristics (acidity and salinity) as per Stewart and Kantrud classes for prairie wetlands.

Currently wetlands cover approximately 18% of the province, however it is estimated that 64% of wetlands in the White Area have been lost or impacted. The Alberta Wetland Policy in conjunction with the Water Act aim to protect the remaining wetland on private and public lands through the avoidance of damage or destruction of wetlands, the minimization of impact of wetlands, and/or the compensation for reclamation or development of wetlands.

Wetlands have a wide diversity of functions, including water quality improvement, flood and drought mitigation, shoreline protection, recreation activities, and habitat. Wetlands are defined as

> *land that is saturated with water long enough to promote the formation of water altered soils, growth of water tolerant vegetation, and biological activity adapted to a wet environment.*

The Policy strives to

> *maintain wetland areas in Alberta such that the ecological, social, and economic benefits that wetlands provide are maintained, thereby helping to ensure that Albertans have healthy watershed that provide safe and secure drinking water supplies, healthy aquatic ecosystems, and reliable, quality water supplies for a sustainable economy.*

However the Alberta Wetland Policy recognizes that wetlands vary in value due to differences in form, function, use, and location. Criteria include biodiversity, water quality improvement, flood reduction, human value, and abundance. The relative value of a wetland will impact wetland management decisions.

2.4.7 Municipal Development Plan

Strathcona County's Municipal Development Plan (MDP) Bylaw 20-2017 received third and final reading on September 5, 2017. The plan provides a comprehensive long term land use policy framework that guides present and projected growth and development over the next 20 years and beyond.

Section 4.4 speaks directly to the Bremner Urban Reserve Policy Area. Several Objectives are listed, with associated Policies relating to the natural landscape:

> *…ensure that Bremner Urban Reserve Policy Area respects the natural landscapes…*

2.4.8 Land Use Bylaw

Strathcona County's Land Use Bylaw (LUB) regulates the use, conservation and development of land, habitat, buildings and signs in pursuit of the objectives of Strathcona County's Municipal Development Plan.

The LUB's objectives are to maintain and enhance residents' quality of life by providing opportunities to attain individual and community aspirations to conserve and enhance the environmental quality in Strathcona County and to foster planned, efficient, economical and beneficial development that provides a diversity of choice, lifestyle and environment.

2.4.9 Municipal Wetland Conservation Policy

Strathcona County recognizes wetlands as important municipal infrastructure components for environmental, economic and social sustainability and will conserve their value for present and future generations. Conservation of the wetlands in urban and rural development areas is a priority for environmental, economic and human health. The Wetland Conservation Policy SER-009-036 has a goal of No Net Loss through the mitigation process of avoidance, minimization and compensation. The goal of No Net Loss of wetland functions is to balance the loss of wetland functions, through rehabilitation of former degraded wetlands or enhancement of healthy, functioning wetlands. As a last resort, compensation for lost functions will be sought through creation of wetlands where there was none before. The Policy strives to complement provincial legislation (*Water Act* and *Public Lands Act*) and the Federal Policy on Wetland Conservation.

Strathcona County will minimize or reverse Wetland Loss, conserve existing wetland resources, convey the importance of wetlands to developers, industry and the public through education initiatives, and restore watershed function through wetland restoration projects. All development initiated by a landowner or a third party must be compliant with the provincial Water Act and Public Lands Act as well as other provincial and federal laws and policies. All landowners are responsible for adherence to all relevant provincial and federal legislation/regulations.

2.4.10 Municipal Biophysical Assessment Policy

In order to meet the conservation goal as per the Strategic Plan, Strathcona County has developed the Biophysical Assessment Policy. A BA assesses the biological and physical elements of an ecosystem, including geology, topography, hydrology and soils. The County requires a BA of future development areas during the Area Concept Plan, Area Structure Plan, conceptual Scheme and/or subdivision application. The resulting report is used to prioritize and dedicate Environmental Reserve, Environmental Reserve Easement, Municipal Reserve and Conservation Easement lands based on municipal, community and environmental needs.

2.4.11 Municipal Dedication of Municipal Reserve, Environmental Reserve and Environmental Reserve Easement Policy

The Municipal Government Act provides authority to the Subdivision Authority of a municipality that it may require the dedication of Municipal Reserve and Environmental Reserve. The purpose of this Policy is to affirm that the Subdivision Authority of Strathcona County shall require the dedication of Municipal Reserve and Environmental Reserve when reserves are owing on lands that are the subject of a subdivision application.

Along with establishing the guidelines and roles and responsibilities for the dedication of Municipal Reserve, Environmental Reserve and Environmental Reserve Easements, the goals of this policy are to incorporate reserve land into the County's green infrastructure inventory for public benefit and to ensure long term sustainability of the natural landscape. It also states that the use of Environmental Reserve lands are required to meet Alberta Environment & Parks goal of having adequate riparian buffers established between development and adjacent lakes, rivers, watercourses or wetlands.

3.0 DESKTOP STUDY RESULTS

3.1 Historical Aerial Photograph Review Summary

Selected aerial photographs dating from 1950 to the most current photograph (2015) were available in Strathcona County Planning & Development Services Department. A descriptive summary of all aerial photography for the area was previously provided in Appendix B of the Biophysical Assessment in support of the Bremner Growth Management Strategy. The table below is a brief summary of the entire area using the small scale aerial photographs that were available.

Table 1: Air Photo Summary

Year	Description
1950	Approximately 80% of the land has been cleared and is being used for agriculture. The uncleared areas include the valley of Pointe-Aux-Pins Creek which runs from the southeast corner of the subject area to the northwest corner. In addition to the treed areas around Point-Aux-Pins Creek there are nine relatively large remnant tree stands. The tributary to Oldman Creek in the southwest can be clearly identified along with a several tributaries along Pointe-Aux-Pins Creek. Several large wetlands and a couple of ephemeral drainage corridors can be seen on the subject area. Eight homesteads can be identified south of Pointe-Aux-Pins Creek and three homesteads can be identified north of the creek.
1976	The subject area is similar to the previous air photo with the exception that three rural residential developments have been constructed on the south side of Pointe-Aux-Pins Creek. More homesteads or first parcel out development has also occurred. It appears that a couple of the remnant tree stands have been removed for agricultural purposes.
1987	The subject area is similar to the previous air photo with the exception that more residences have been constructed in the rural subdivisions and a home can be identified on most of the quarter sections. More ephemeral wetlands and drainage areas can be can be identified throughout the subject area and those identified in the previous air photo appear to be slightly larger and wetter.
1996	The subject area is similar to the previous air photo with the exception that several more homes have been constructed near Highway 16. Wetlands and drainage corridors have faded back to similar levels from the 1976 air photo. The remaining forested areas appear to be slightly smaller.
2001	The subject area is similar to the previous air photo with the exception that residential development has increased slightly throughout the Bremner ACP Area. Several drainage corridors appear significantly wetter than in the previous air photo.
2003	The subject area is similar to the previous air photo with the exception that ephemeral and permanent wetlands appear larger and wetter than in previous photos.
2005	The subject area is similar to the previous air photo with the exception that ephemeral and permanent wetlands appear to be slightly wetter than the previous air photo. Additional drainage corridors can be identified as well.
2007	The subject area is similar to the previous air photo with the exception that the wetlands and drainage corridors have faded back slightly and appear smaller and drier than in the previous air photo.
2009	The subject area is similar to the previous air photo with the exception that the wetlands and drainage corridors have faded back to levels similar to 1996 and 1976.
2011	The subject area is similar to the previous air photo with the exception that the wetlands appear to be slightly wetter than in the previous air photo.
2013	The subject area is similar to the previous air photo with the exception that ephemeral and permanent wetlands appear slightly larger and wetter than in previous photos.
2015	The subject area is similar to the previous air photo.

3.2 Previous Environmental Assessments

3.2.1 Priority Environment Management Areas (Spencer Environmental Management Services Ltd. 2005)

In 2005, Strathcona County commissioned an Assessment of Environmental Sensitivity and Sustainability in Support of the MDP. The objective was to quantify and map environmental sensitivity of Strathcona County lands for future sustainable planning and development.

Landscape Management Areas were prioritized based on relative abundance of natural features and environmental sensitivity of lands. The abundance of resources is represented by one of four categories:

1. Protected Areas (Federal or Provincial designation)
2. High Sensitivity (> 3 natural resources)
3. Medium Sensitivity (1 – 2 natural resources), and
4. Low Sensitivity (0 natural resources).

The Bremner ACP Area has areas of High Sensitivity and Medium Sensitivity. Approximately one quarter of the lands have High Sensitivity. Areas of High Sensitivity include creeks, wetlands, intermittent streams, riparian areas and mature forest stands. Deforested agricultural land and deforested rural residential account for most areas of Medium sensitivity. Areas of Low Sensitivity are commonly related to areas that have been affected by intensive agricultural operations.

The vast majority of Pointe-Aux Pins Creek, its tributaries and riparian areas are identified as areas of High Sensitivity. A portion of the Oldman Creek tributary, in the southwest corner of the Bremner ACP Area, also has a relatively large amount of High and Medium Sensitivity lands surrounding it. These areas will require special planning considerations and management plans.

In this case, when relative abundance of natural resources is high or medium, development requires specific management in order to plan sustainable communities and conserve important natural features.

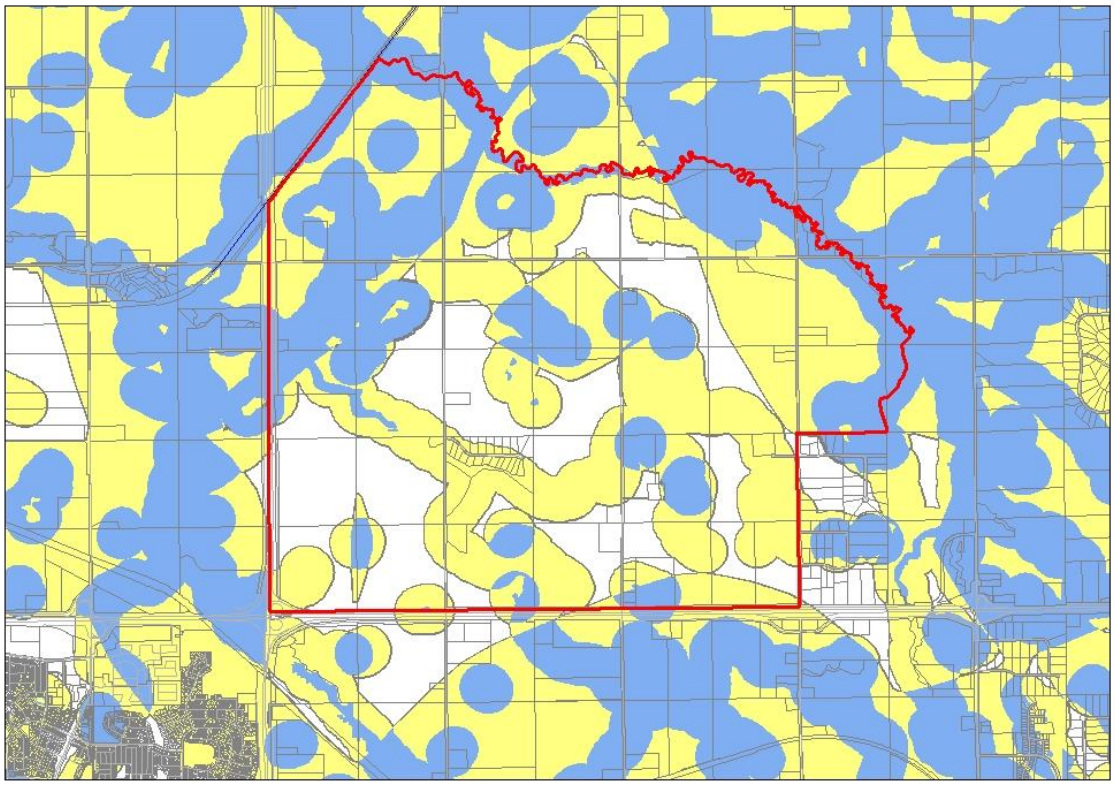

Figure 4: Bremner ACP Area within the Priority Environment Management Areas.
Blue indicates high environmental sensitivity, yellow indicates medium sensitivity, and white indicates low sensitivity.

3.2.2 Prioritized Landscape Ecology Assessment of Strathcona County (Geowest Environmental Consultants Ltd. 1997)

In 1996, Strathcona County identified the need for a comprehensive identification of natural features and wildlife habitats that can be applied consistently across the County landscape. The overall goal of the landscape ecology study was to complete a prioritized landscape and wildlife habitat inventory to be incorporated into the County's planning process. The resulting Prioritized Landscape Ecology Assessment is used to guide new development and subdivisions and to direct future habitat and landscape restoration projects.

The Prioritized Landscape Ecology Assessment identifies the Bremner ACP Area as having a variety of drainage, wetland and upland habitat units with several of those areas classified for restoration. Priority habitat generally corresponds to the non-arable lands that include the creeks, tributaries, riparian areas and the adjacent uplands as well as wetlands and remaining tree stands that provide wildlife corridor habitat.

This report also recognizes that ungulates rely on the riparian areas as dispersion and migratory corridors. To increase the chance of long term wildlife survival, the county needs to incorporate remaining habitat into local and regional land use plans and not simply designate fragmented patches as parks or protected areas. To achieve this it recommends the following:

- Increase the size and quality of the habitat patches in order to increase the local population size and to decrease the risk of extinction;
- Increase the number of habitat patches in order to improve the possibility for exchange and re-colonization, and to lower the stochastic (random) extinction of the regional population; and
- Decrease the resistance of the landscape by including corridors and reducing the effect of movement barriers, thus enhancing the possibility of dispersal.

The assessment acknowledges that Pointe-Aux-Pins Creek has one of the most diverse mosaics of different habitats within Strathcona County. The creek contains upland poplar, mixedwood and coniferous stands in conjunction with a diverse, dynamic, floodplain that create an ideal corridor for both plants and animals. In addition, the report states:

> The maintenance of wildlife corridors as a part of the natural landscape within Strathcona County is a critical step towards ensuring the persistence of a given suite of wildlife species in the region.

Below is the Prioritized Landscape Ecology Assessment's Wildlife Habitat Unit Map. The majority of the habitat units identified within the Bremner ACP Area correspond to creeks, their tributaries and remnant forest stands on or near those creeks and tributaries.

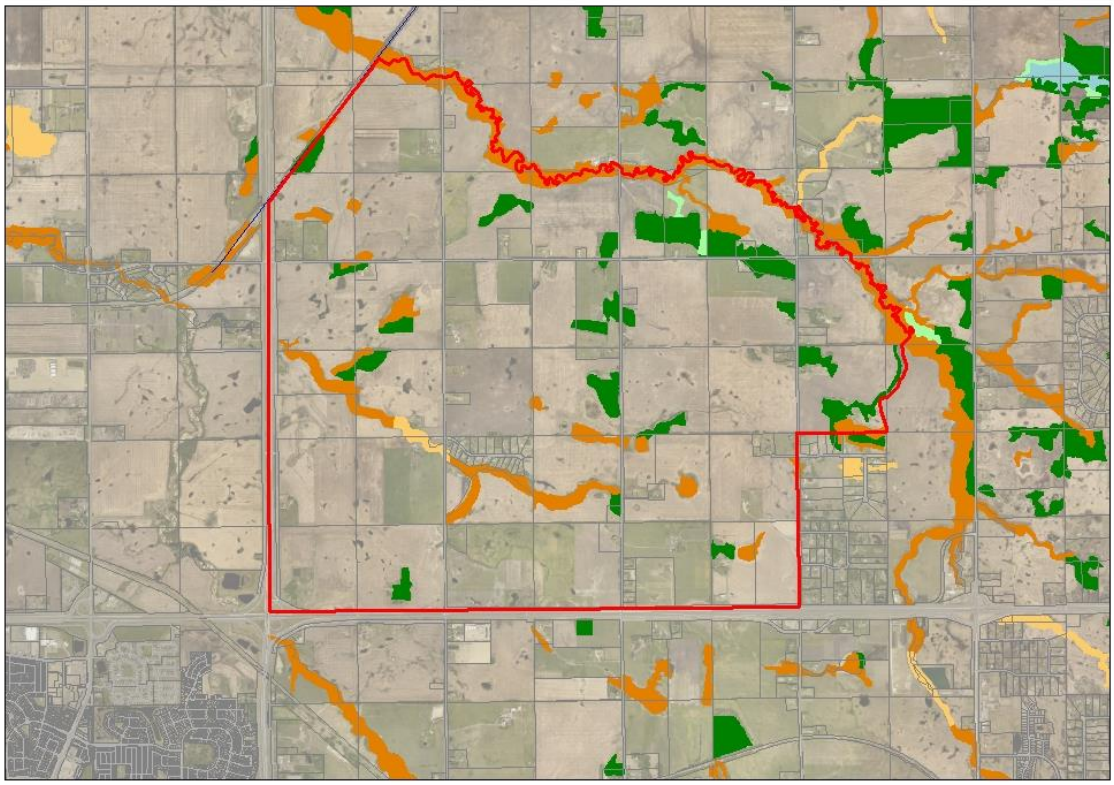

Figure 5: Bremner ACP Area within the Prioritized Landscape Ecology Assessment's Wildlife Habitat Unit Map. Dark green indicates upland forest and upland corridor habitat with light green representing where restoration of upland features is needed. Dark orange shows drainage corridor or wetland habitats and the light orange denotes wetland and drainage corridor habitats that need restoration.

3.2.3 Environmentally Sensitive Areas: County of Strathcona and M.D. of Sturgeon (Infotech Services 1989)

In 1988, the Edmonton Metropolitan Regional Planning Commissions (EMRPC) commissioned a study of environmentally sensitive areas within Strathcona County and the M.D. of Sturgeon. The resulting Environmentally Sensitive Areas: County of Strathcona and M.D. of Sturgeon was used to:

- provide an inventory of environmentally sensitive and significant areas
- evaluate and classify the relative sensitivity, and the significance of these areas as to their local, regional, provincial and national important
- formulate appropriate environmentally sensitive and significant areas land use planning principles, to guide the future planning and development, and
- refine, where necessary, the existing policies which deal with environmentally sensitive areas.

The assessment of the Bremner ACP Area determined that Pointe-Aux-Pins Creek is a locally significant feature based on its biophysical features which include the following:

- best example of ravine habitat in the County;
- diverse valley vegetation;

- the valley is deeply incised as it downcuts to the North Saskatchewan River;
- important wildlife corridor;
- wetland habitat is used by nesting ducks and juvenile and sub-adult great blue herons; and
- may contain sport fish in its lower reaches.

It also identified Pointe-Aux-Pins as an important watercourse in the central portion of the county that is highly sensitive to development and disturbance with valley walls that are prone to erosion.

3.2.4 A Survey of Wetland Wildlife Resources Strathcona County, Alberta (Griffiths 1987)

In 1987, a survey was initiated to provide information on Strathcona County wetlands, specifically waterbird, muskrat and beaver habitat. The resulting A Survey of Wetland Wildlife Resources was used to provide recommendations regarding wildlife conservation and management and recreational and educational uses to promote public appreciation of wetland resources.

The report rated Pointe-Aux-Pins Creek as a Critical Wetland and identified beavers, mallards, pintails, green-winged teals and blue herons all within the Creek and its riparian area as well as suitable nesting sites for bank swallows, kingfishers and two species of sandpipers. Critical Wetland habitat is defined as having one or more of the follow features:

- They are used by a considerable number of bird species of diverse affiliation (families), as well as muskrat and/or beaver; or by species which are relatively rare in the County and require specific habitat types.
- They are used by wetland wildlife, especially birds, for a variety of activities; or for one or two activities which are of great importance on a County or Regional basis because few or no other wetlands are suitable.
- They represent a type of wetland and associated birds which is not common in the County.
- They are presently not under pressure from human activity or development which would significantly lower their potential for wildlife.

The significant recommendations in relation to land use planning and development were as follows:

- the natural character and vegetation of the stream channel and its banks must be maintained; and
- in addition a buffer strip of 100 m along the top of each bank should be designated, and reforested with native vegetation if necessary; this should extend along the full length of the creek channel, not only in the named sections to provide a continuous wildlife corridor, and also protect the entire stream.

3.2.5 Significant Natural Features and Landscapes of Strathcona County (Westworth and Knapik 1987)

In 1987, a survey was initiated to provide information on outdoor recreation opportunities and to give protection to conservation resources. The resulting Significant Natural Features and Landscapes of Strathcona was used to:

1. provide an inventory of natural landscape and features of local, regional and provincial significance;
2. evaluate the relative sensitivity and importance of sites identified as significant landscapes and features; and
3. recommend guidelines for protection.

This report lists Pointe-Aux-Pins Creek as an area of local significance (site #29) due to the following factors:

- important drainage feature;
- valuable riparian habitat;
- wildlife travel corridor;

- contains interesting ravine feature; and
- may contain sport fish in lower reach.

The creek's relative sensitivity and importance is moderate to high and the management considerations listed are as follows:

- Primary requirement is maintenance of valuable riparian zones and establishment of shoreline buffers to preserve wildlife habitat values and reduce siltation.
- Further surveys and a management plan are required to identify ecologically significant reaches and develop guidelines for habitat protection and enhancement.

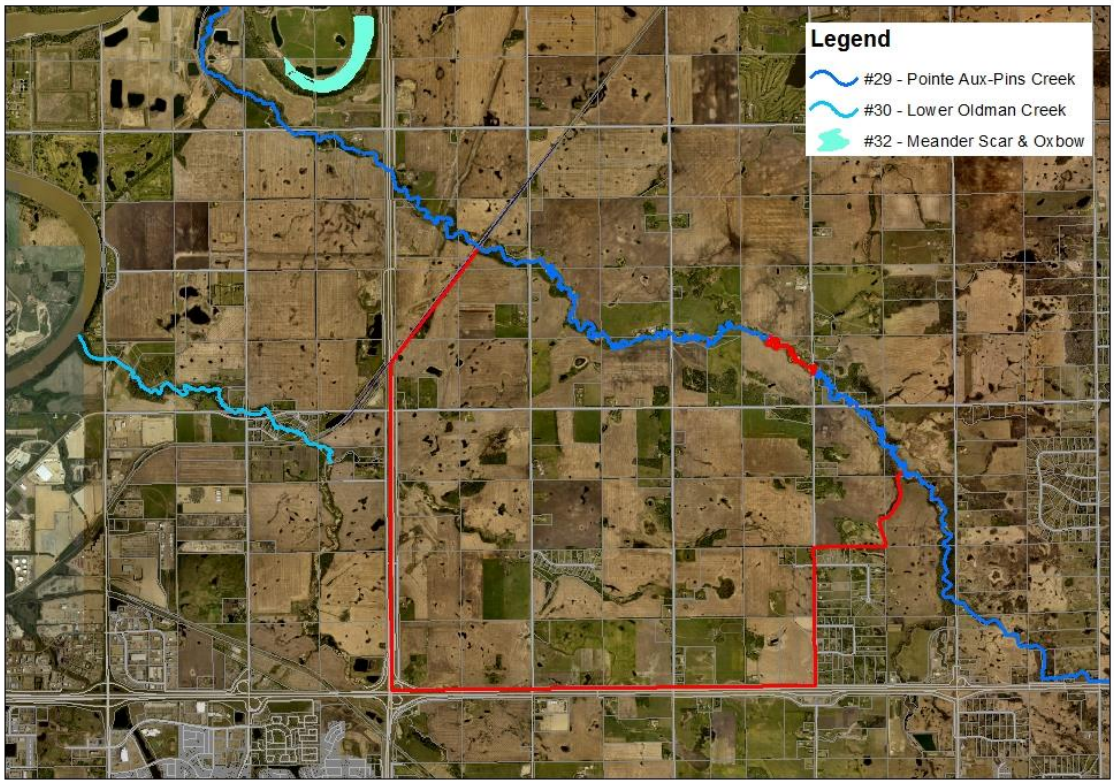

Figure 6: Significant Natural Features and Landscapes Map.

3.2.6 Part of the North Saskatchewan River Basin Regional Groundwater Assessment (Hydrogeological Consultants Ltd. 2001)

Groundwater in the study area comes mainly from the Bearpaw aquifer which is generally 80 to 100 meters thick and less than 100 meters below the surface. There is an estimated 10 to 50 meters cubed of water, per section, being pumped from this aquifer daily.

Within the county, groundwater in surficial deposits is generally high in total dissolved solids and sodium concentrations. The average total dissolved solids is 1164 mg/L and the average sodium concentration is 219 mg/L, both are above the Guidelines for Canadian Drinking Water Quality.

Most of the area on the northeast side of Pointe-Aux-Pins Creek is considered as an aquifer recharge area while the southwest side of the creek is a transitional zone with a couple of small areas that are considered discharge zones for aquifers.

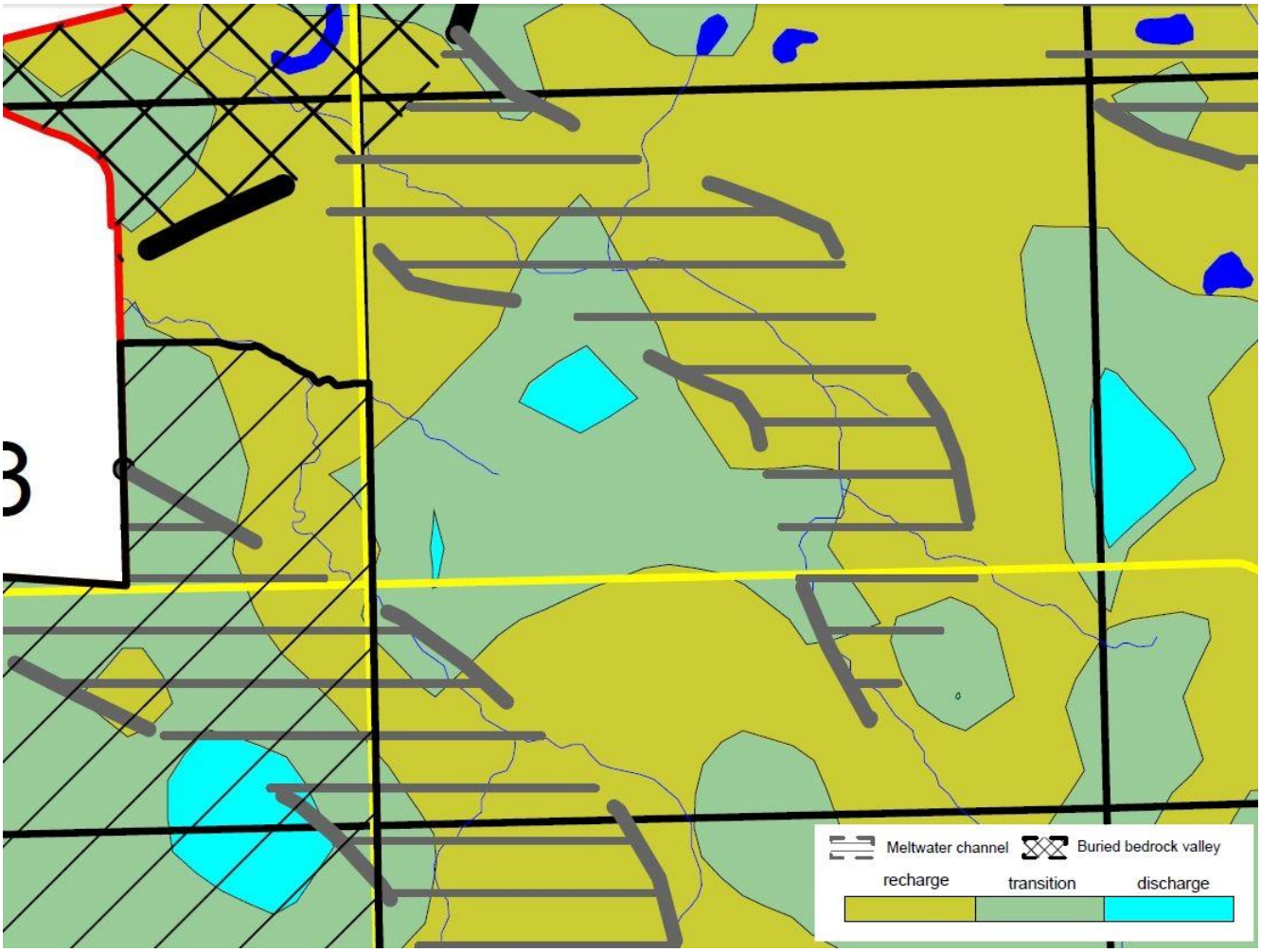

Figure 7: Groundwater Recharge, Discharge and Transition Zone Map.
The yellow horizontal line is HWY 16 and the vertical yellow line is HWY 21. The dark blue line running from southeast to northwest is Pointe-Aux-Pins-Creek. The yellow represents recharge areas, the green represents transition areas, and the light blue indicates discharge areas. The dark blue indicates water bodies.

3.2.7 Alberta Conservation Information Management System (ACIMS)

A search of the Alberta Conservation Information Management System did not identify any occurrences of sensitive or non-sensitive plants or wildlife species.

A lack of records does not necessarily mean that there are no rare elements in the Bremner ACP Area, it may indicate that no inventory or survey has been undertaken in that area. Detailed vegetation inventories will still need to be completed prior to Area Structure Plan and subdivision planning.

3.2.8 Alberta Fisheries & Wildlife Management Information System (FWMIS)

A search of the FWMIS (Fish and Wildlife Management Information System) found that no surveys had been conducted within the portion of Pointe-Aux-Pins Creeks contained in the Bremner ACP Area. However, survey

data immediately upstream and downstream of the study area was available. Fish species identified include Brook Stickleback (*Culeae inconstans*), Fathead Minnow (*Pimephales promelas*), Longnose Sucker (*Catostomus catostomus*), White Sucker (*Catostomus commersoni*) and Northern Pike (*Esox lucius*) which is a species of sport fish in Alberta.

3.3 Topography

The undulating and hummocky landscape of the Bremner ACP Area creates a diverse landscape with low to high relief land forms of varying elevations. Elevations ranges from 706 m near the southeast corner to 626 m in Pointe-Aux-Pins Creek just before it flows northwest under Highway 21 by Township Road 540 in the northwest corner. The landscape generally slopes towards Pointe-Aux-Pins Creek and elevations taper down westward towards the North Saskatchewan River Valley.

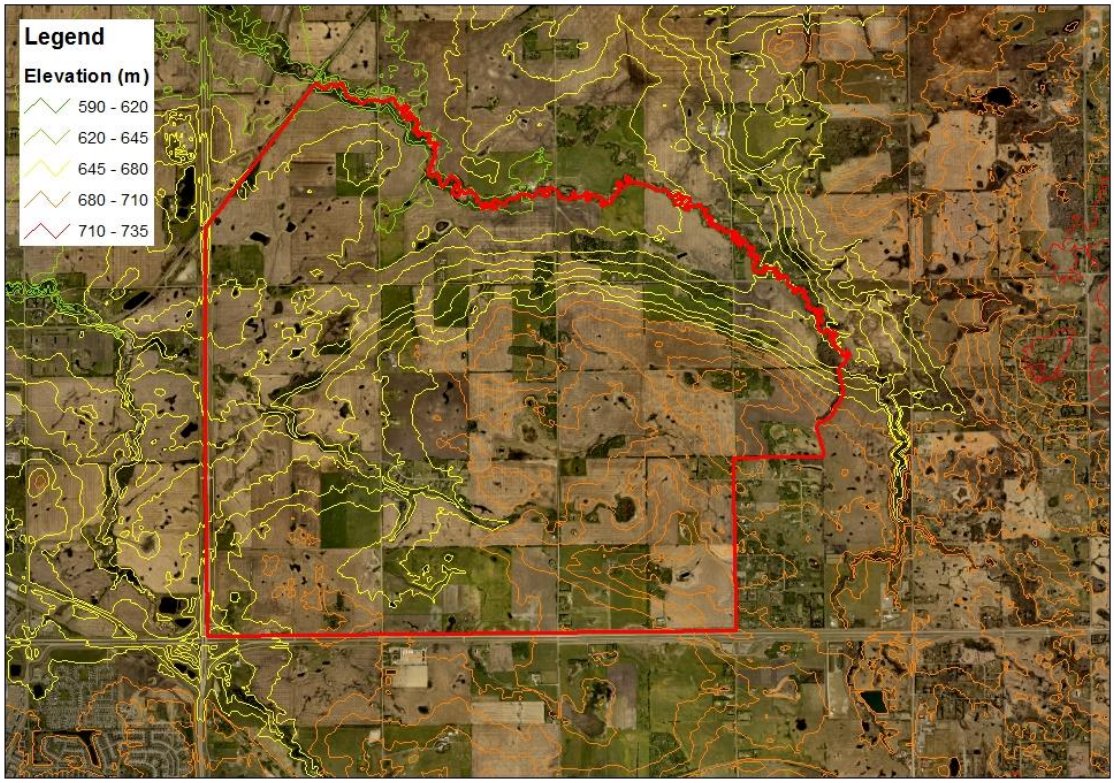

Figure 8: Bremner ACP Area Topographic Map.
Contour map illustrated by a colour gradient.

3.4 Surficial and Bedrock Geology

The surficial geology of the Bremner ACP Area consists of glacial deposits from the Late Cretaceous Edmonton Formation. The glacial deposits are ground moraine composed of clay, silt and sand with boulders and pebbles (Bayrock and Hughes 1962). The bedrock geology of the Edmonton Formation consists of sandstone, mudstone, shale; ironstone and coal beds (Green 1972) that were deposited by running water and till.

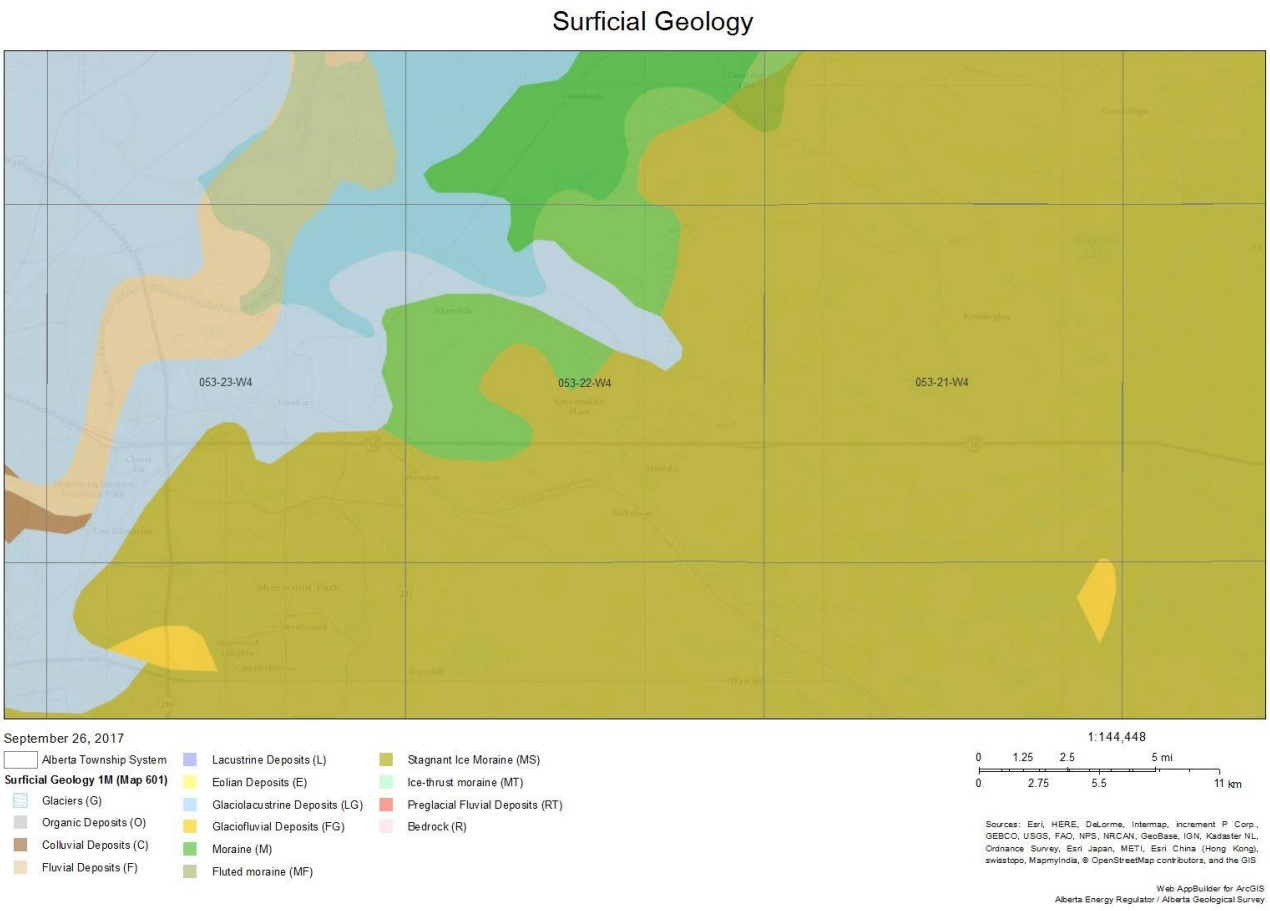

Figure 9: Bremner ACP Area Surficial Geology Map.

3.5 Soil

The Bremner ACP Area is located in the Thick Black Soil Zone of Alberta and the dominant soils are Eluviated Black Chernozems and Orthic Dark Gray Chernozems developed on moderately fine till or glaciolacustrine parent materials. Wetland areas are predominantly Gleysols with the possibility of some Organics. Areas adjacent to Pointe-Aux-Pins Creek contain Gleyed Black Chernozems and miscellaneous Gleysols.

The area contains 4 classes of soils as per the Canada Land Inventory's Soil Capability for Agriculture maps.

- Class 1 - Soils in this class have no significant limitations in use for crops.
- Class 2 - Soils in this class have moderate limitations that reduce the choice of crops, or require moderate conservation practices.
- Class 3 - Soils in this class have moderately severe limitations that reduce the choice of crops or require special conservation practices.
- Class 6 - Soils in this class are unsuited for cultivation, but are capable of use for unimproved permanent pasture.

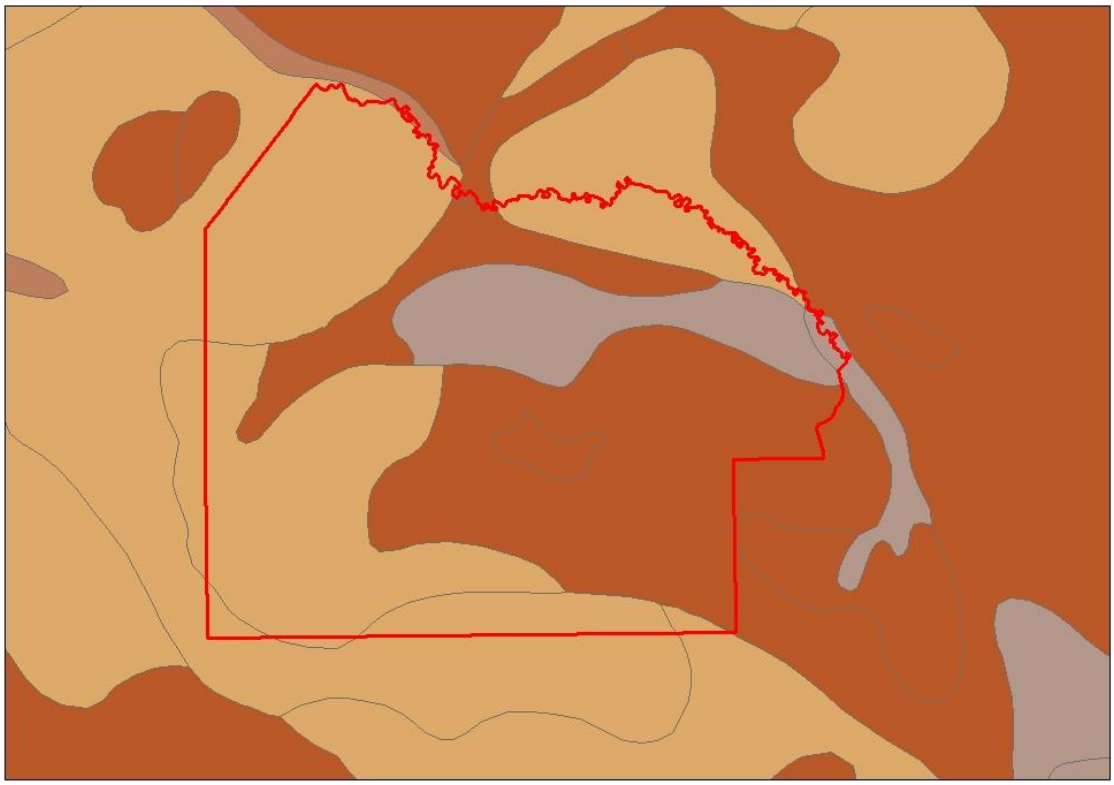

Figure 10: Bremner ACP Area within the Canada Land Inventory Soil Capability Map.
Tan represents Class 1 soils, red represents Class 2 soils, grey represents Class 3 soils, and brown represents Class 6 soils.

The Bremner ACP Area contains a significant amount of Class 1 and 2 agricultural soils that should be considered for conservation. The main limiting factor for soils within the study area was adverse topography and some soil limitations. An Agriculture Impact Assessment is being completed to address soil conservation in context of sustaining the agricultural industry in the region.

3.6 Hydrology

The Bremner ACP Area lies within the Beaverhill subwatershed which lies within the North Saskatchewan River watershed. The Beaverhill subwatershed covers approximately 440,000 hectares of land. Although there is some basic data about types of wildlife, vegetation and landforms, there is a lack of useful information about the health and current status of the subwatershed and the creeks within it.

Surface water drainage is generally directed towards Pointe-Aux-Pins Creek and its tributaries, or the Oldman Creek tributary. Approximately 20% of study area exists inside the Oldman Creek drainage basin and 80% of land is in the Pointe-Aux-Pins drainage basin. From the Bremner ACP Area, both creeks then flow northwesterly into the North Saskatchewan River.

Both Pointe-Aux-Pins Creek and the tributary to Oldman Creek have periodic and seasonal periods of low flow. These periods of low flow decrease both creeks' resiliency to negative inputs. Negative inputs from current

and future development include contaminated stormwater and contaminated overland runoff. No significant baseline information exists on historical pollution inputs or the expected effects of urban development near Pointe-Aux-Pins Creek. Further study should be conducted to determine the positive and negative effects of the expected increased water flow into these creeks from urban development. The best science available should be used to mitigate negative impacts on the creek systems and adjacent uplands.

Within the Bremner ACP Area there are also wetlands that do not appear to have surface water connections to the creeks or other water bodies, these wetlands likely serve as localized groundwater recharge points. Groundwater flows west northwest towards the North Saskatchewan River with probable estimates yields of 0.4-2 litres per second south of Township Road 534 and west of Range Road 224 intersections and possible yields of 0.1-2 litres per second north of Township Road 534 and east of Range Road 224 intersection.

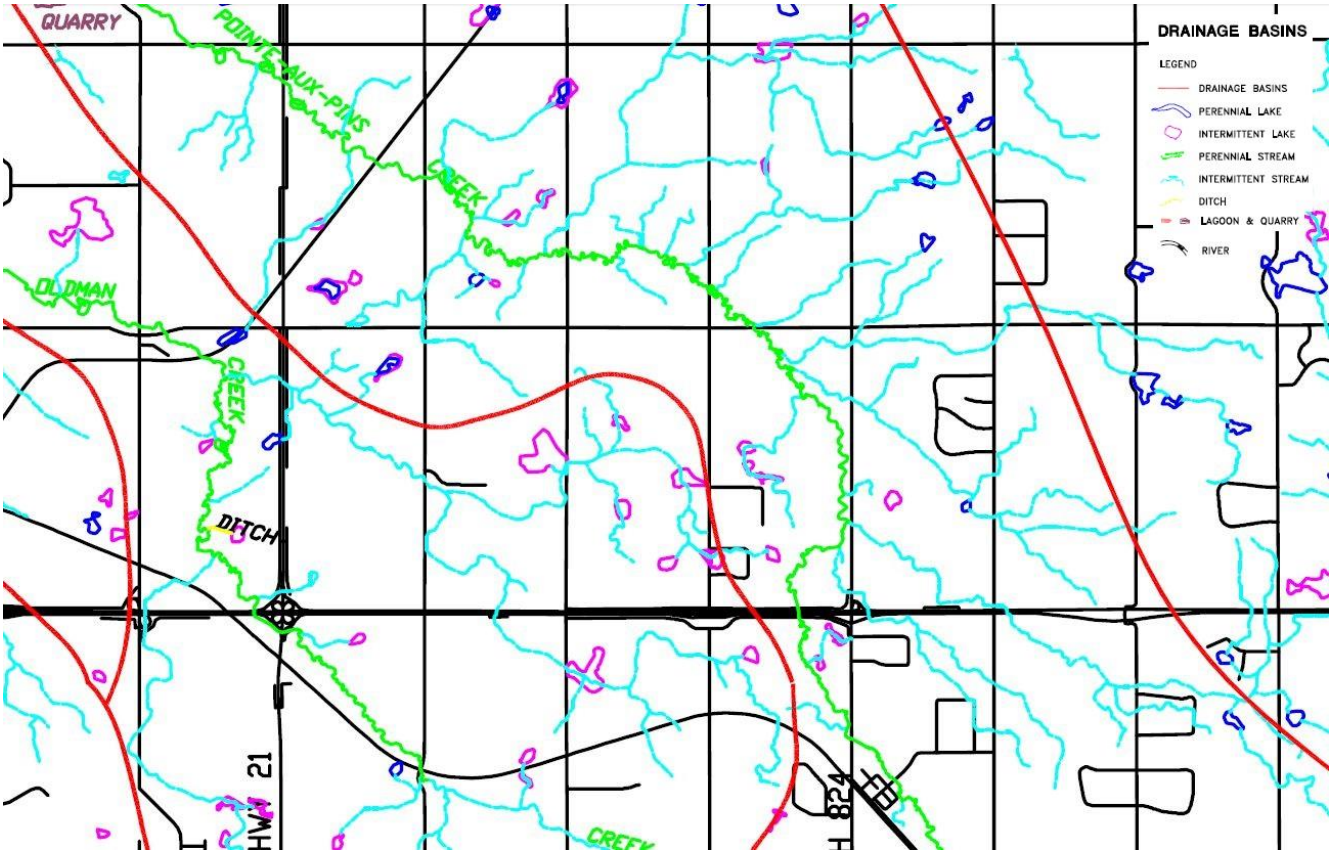

Figure 11: Drainage Basin Map.
The red lines denote drainage basins corresponding to the two creeks.

3.7 Wetlands

3.7.1 Wetland Definition

Wetlands are lands where saturated soils are the dominant factor in plant and wildlife diversity. The most important feature distinguishing wetlands from other habitats is that the soils are consistently or periodically saturated with or covered by water. The saturated soils and/or standing water creates physiological problems for vegetation and wildlife and typically only those plants and animals adapted to these specific conditions are dominant (hydrophytes).

"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil: and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year." (Cowardin et al. 1979).

As defined by the province, wetlands are low-lying areas of land covered by water long enough to support aquatic plants and wildlife for part of their life cycle. Wetlands can be peatlands or non-peatlands but can also be characterized by their permanence. Peatlands, as the name suggests, accumulate peat, which is the partially decomposed organic vegetation. Non-peatlands do not accumulate peat.

3.7.2 Wetland Function, Values and Benefits

Wetland functions and benefits refer to the natural processes associated with wetland ecosystems, including ecological, social, and economic functions.

Wetlands have been called "nature's kidneys" due to their ability to filter entities such as bacteria, nutrients, sediments and metals. They can also mitigate flood and drought effects due to their ability to retain water. Other ecological functions of wetlands include water recharge, habitat for wildlife, natural sinks for pollutants, nutrient source for connected waters, and soil and water conservation. Wetlands and the associated drainage corridors are often integrated into engineered hard infrastructure…then termed green infrastructure or low impact development opportunities.

Recreational activities such as fishing, hunting, bird watching, hiking, and photography are examples of the social value of wetlands. The productivity of wetlands, leading to fish populations and recreational activities is one example of how wetlands exhibit economic benefits as well.

3.7.3 Alberta Wetland Classification System

The Alberta Wetland Classification System recognizes five **classes** of wetland: bogs, fens, marshes, shallow open water and swamps (ESRD, 2015). These five classes align with the Canadian Wetland Classification System. Once categorized into one of five classes, wetlands are divided into **forms** based on vegetation structure (wooded – coniferous, - mixedwood, - deciduous, shrubby, graminoid and aquatic). The forms are then divided into **types** based on the length of time that surface water is at or above the surface, along with basic water characteristics (acidity and salinity) as per Stewart and Kantrud classes for prairie wetlands.

Table 2. Alberta Wetland Classification System.

Class	Form	Type
Bog	Wooded, coniferous Shrubby, graminoid	Acidic, freshwater
Fen	Wooded, coniferous Shrubby Graminoid	Poor fen, freshwater Moderately-rich fen, freshwater Extremely-rich fen, freshwater to slightly brackish
Marsh	Graminoid	Temporary hydroperiod; freshwater to slightly brackish Seasonal hydroperiod; freshwater to moderately brackish Semi-permanent hydroperiod; freshwater to brackish

Shallow Open Water	Submersed and/or floating aquatic Unvegetated	Seasonal hydroperiod; freshwater to moderately brackish Semi-permanent hydroperiod; freshwater to subsaline Permanent hydroperiod; slightly brackish to subsaline Intermittent hydroperiod; saline
Swamp	Wooded, coniferous Wooded, mixedwood Wooded, deciduous Shrubby	Temporary; freshwater to slightly brackish Seasonal; freshwater to slightly brackish Seasonal; moderately brackish to sub-saline

Please refer to Appendix A for maps of classified wetlands that had previously been provided in the Biophysical Assessment in support of the Bremner Growth Management Strategy.

3.7.4 Wetlands in the Bremner ACP Area

Similar to the results of the aerial photograph review, wetlands are a significant landscape feature across the Bremner ACP Area. According to Alberta's wetland inventory, there are marsh, open water and swamp wetlands within the Bremner ACP Area. While this inventory is not entirely comprehensive, it gives a good idea of the state of the wetlands within the area.

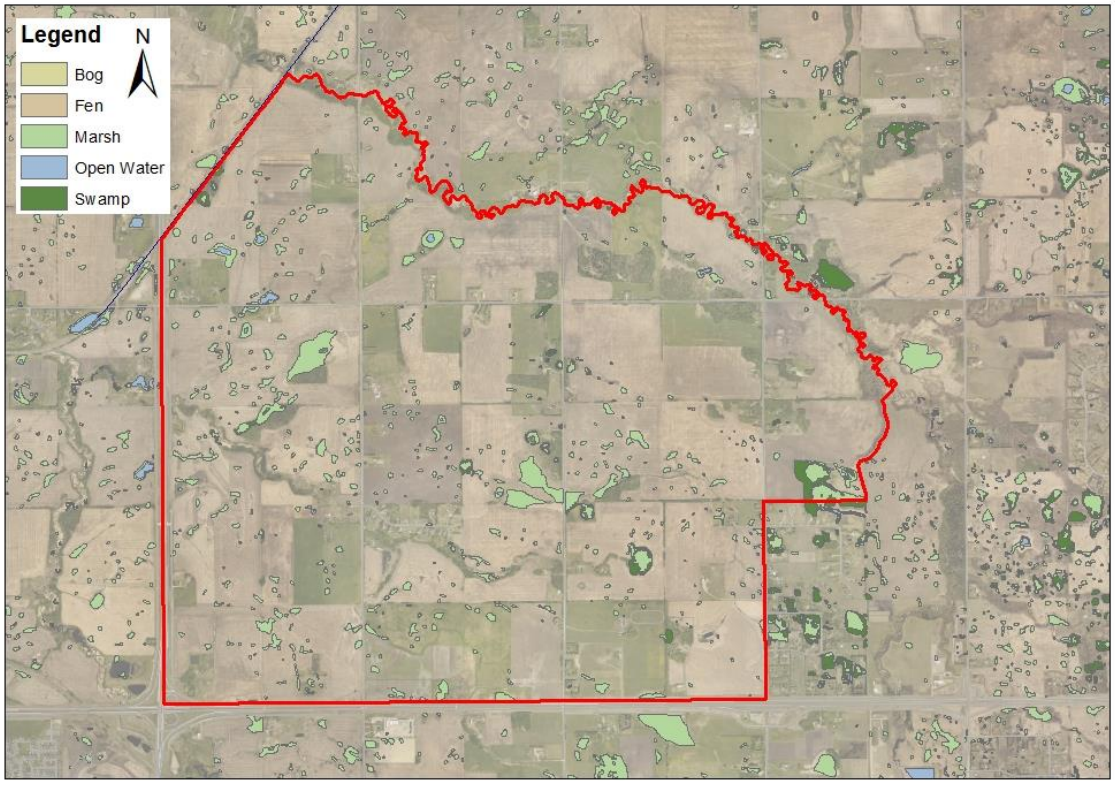

Figure 12: Bremner ACP Area within the Alberta Wetland Inventory Map.

3.8 Fish and Wildlife

An interview with an Alberta Environment & Parks wildlife biologist confirmed that white-tail deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*) and moose (*Alces alces*) are the most common ungulates in the study area but elk (*Cervus elaphus*) have also been identified during winter ungulate studies. These ungulates use Pointe-Aux-Pins Creek and the areas adjacent to the creek to travel to the North Saskatchewan River and beyond into their overwintering grounds. A 100 m buffer from top of bank was recommended by the provincial wildlife biologist in order to achieve an effective wildlife corridor for ungulate populations.

The only fish species visually identified within the Bremner ACP Area was the fathead minnow (*Pimephales promelas*), which was observed in Pointe-Aux-Pins Creek where it crosses Range Road 224.

Other common mammals using this area include beavers (*Castor canadensis*), muskrats (*Ondatra zibethicus*), snowshoe hares (*Lepus americanus*), bats (*Myotis lucifugus*), squirrels (*Tamiasciurus hudsonicus*), coyotes (*Canis latrans*), foxes (*Vulpes vulpes*), porcupines (*Erethizon dorsatum*), skunks (*Mephitis mephitis*) and various voles, mice and shrews.

Bird species identified during the desktop study include the great blue heron (*Ardea herodias*), sandpipers (*Tringa spp*.), great horned owl (*Bubo virginianus*), Swainson's (*Buteo swainsoni*) and red-tailed hawk (*Buteo jamaicensis*). It is important to note that over 120 species of birds are known to this live in or frequent this area during migration.

4.0 FIELD RECONNAISSANCE

Field reconnaissance took place on August 9, 22, 23 and 29, 2017. Due to access constraints, most quarter sections were observed from the roadsides and creeks. Given the large size of the study area and the purpose of this biophysical assessment, detailed species lists were not completed, rather observations specific to habitat complexity and connectivity were the focus.

Detailed biophysical assessments will need to be completed at the Area Structure Plan level to provide more detail and address site specific conditions.

4.1 Landscape Characteristics

The landscape consists mainly of undulating lacustrine and hummocky morainal plain areas with an eroded creek valley. The area has been mostly cleared for agricultural uses but significant pockets of remnant forest stands and wetlands and associated drainage corridors are also present.

4.2 Vegetation & Wildlife

Approximately 80 % of the Bremner ACP Area has been cleared of vegetation primarily for agricultural use, residential development and roads. Therefore, the clearings are large and the fragmented habitat patches are relatively small and poorly connected.

Pointe-Aux-Pins Creek is the only relatively undisturbed wildlife corridor (in comparison to other corridors in the region), on the east side of the North Saskatchewan River, from the Beaver Hills Moraine. Wildlife corridors are routes that allow wildlife to travel between different habitats. Wildlife move between large unfragmented habitat areas to locate suitable mates, dens and to exploit seasonal fluctuations in climate and food. Corridors provide various wildlife and vegetation species the opportunity to expand their home range, which provides the genetic diversity that is required to ensure sustainable populations over large areas.

Pointe-Aux-Pins Creek allows animals to move from east and west from Elk Island National Park and the Cooking Lake Blackfoot Provincial Recreation Area into the North Saskatchewan River Valley. This is a significant connection from the North Saskatchewan River into the Beaver Hills Moraine which is an area recognized for its distinct landscape that supports a diverse population of plants and animals including 48 different mammals, 152 species of birds and 8 different amphibians (Geowest Environmental Consultants Ltd. 1997).

A Survey of Wetland Wildlife Resources (Griffiths 1987) and Significant Natural Features and Landscapes of Strathcona (Westworth and Knapik 1987) both recognize the significance of Pointe-Aux-Pins Creek as wildlife corridor of regional importance. A minimum 100 m protected setback from top of bank is recommended to provide an adequate buffer to ensure the effectiveness of the wildlife corridor and to protect the creek itself.

Oldman Creek is similar in form and function to Pointe-Aux-Pins. It is situated to the south and west of the Bremner ACP Area, yet a tributary exists within the southwest portion of the Bremner ACP Area. The tributary itself is a localized wildlife corridor, while the overall connection to Oldman Creek supports a regionally important wildlife corridor. A minimum 50 m protected setback from top of bank is recommended to provide an adequate buffer to ensure the effectiveness of the wildlife corridor and to protect the tributary and the upstream creek.

Overall, the diversity of landscape and plant communities across the Bremner ACP Area is moderate. The remaining mature and regenerating young deciduous and mixedwood forest stands provide important wildlife habitat and stepping stones/corridors for larger species like deer and moose and black bear, while the

permanent wetlands offer habitat for reptiles, amphibians, and birds. The priority habitat primarily occurs along the two creek systems.

The mixedwood and deciduous forest stands existing as insular components across the Bremner ACP Area were primarily established communities of aspen (*Populus tremuloides*) and poplar (*Populus balsamifera*)with spruce (*Picea glauca*). A diverse shrub and forb understory, including currant (*Ribes* spp.), high-bush cranberry (*Viburnum trilobum*), red osier dogwood (*Cornus stolonifera*), rose (*Rosa acicularis*) and sarsaparilla (*Aralia nudicaulis*) was consistent throughout. The largest forest stands were associated with wetland and creek complexes, supplementing their function as habitat patches.

Several wildlife species were observed directly or indirectly during the site reconnaissance. Direct wildlife sightings of significance included red-tailed hawk (*Buteo jamaicensis*), great-horned owl (*Bubo virginianus*), red-sided garter snake (*Thamnophis sirtalis parietalis*), boreal chorus frogs (*Pseudacris maculate*) and tiger salamanders (*Ambystoma tigrinum*). Indirect sightings of significance included black bear (*Ursus americanus*) (scat), coyote (*Canis latrans*) (scat, prints), moose (*Alces alces*) (scat), porcupine (*Erethizon dorsatum*) (girdling), skunk (*Mephitis mephitis*) (odor), and tropical migrant songbirds (vocalization). All of these significant observations were associated with the creek corridors.

Photo 1: Drainage corridor extending across agricultural land towards the Oldman Creek tributary. View northeast across SW 19-53-22.

Photo 2: Marsh wetland located south of and adjacent to Township Road 534 in the NW 19-53-22.

Photo 3: Large upland forest stand within the NE 19-53-22. View northwest across NE 19-53-22.

Photo 4: Oldman Creek tributary looking upstream (east) from Range Road 225 adjacent to Tidan Heights.

Photo 5: Oldman Creek tributary looking downstream (west) from Range Road 225.

Photo 6: Pointe-Aux-Pins Creek looking upstream (south) at Township Road 534.

Photo 7: Pointe-Aux-Pins Creek looking downstream (north) at Township Road 534.

Photo 8: Pointe-Aux-Pins Creek looking upstream (east) at bridge crossing at Range Road 224

Photo 9: Pointe-Aux-Pins Creek looking downstream (west) at bridge crossing at Range Road 224

Photo 10: Pointe-Aux-Pins Creek looking upstream (east) at Range Road 223

Photo 11: Pointe-Aux-Pins Creek looking upstream (east) at Range Road 223

Photo 12: Pointe-Aux-Pins Creek culvert crossing at Range Road 225

Photo 13: Pointe-Aux-Pins Creek looking downstream (west) at Range Road 225

Photo 14: Pointe-Aux-Pins Creek looking upstream (east) at Range Road 225

5.0 CONSERVATION RECOMMENDATIONS

5.1 Urban Reserve Policy Area Conservation Recommendations (2014)

The following is a list of recommendations for conservation for the Bremner Urban Reserve Policy Area (2014).

1. A minimum 100 meter setback from the top of bank from Pointe-Aux-Pins needs be established for all development. Any development proposals near Pointe-Aux-Pins Creek must be accompanied by an ungulate impact study looking at the regional and provincial cumulative impacts on ungulates populations and health.

2. No development should be permitted within the Pointe-Aux-Pins Soapholes considering the rarity of the feature and its extreme sensitivity; this natural feature should be conserved.

3. A soil conservation study needs be undertaken to assess which agricultural areas are sustainable and should be conserved.

4. A detailed Biophysical Assessment needs to be completed for each quarter section prior to planning at the Area Structure Plan level.

5. Wetlands that could not be assessed from the roadside were labeled as high priority and will need to be reassessed during the detailed Biophysical Assessments.

6. The following map of Environmental and Municipal Reserve locations is provided for consideration during land use planning

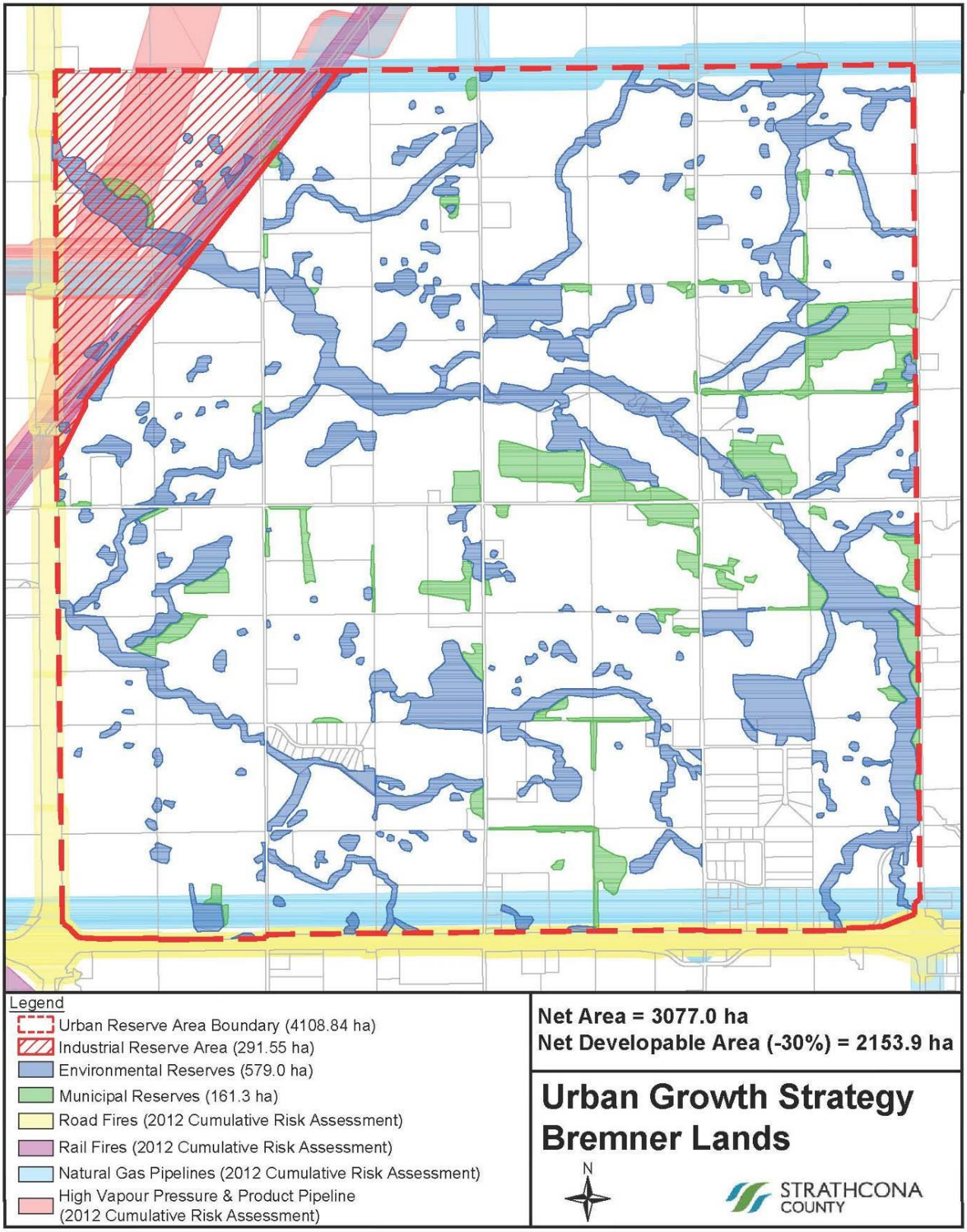

Figure 13: Bremner Urban Reserve Policy Area Environmental and Municipal Reserve Recommendations

5.2 Bremner ACP Conservation Recommendations

The following is a list of recommendations for conservation planning with respect to the Bremner ACP Area.

1. A minimum 100 meter setback from the top of bank from Pointe-Aux-Pins Creek should be established for all development.

2. Any development proposals near Pointe-Aux-Pins Creek should be accompanied by an ungulate impact study identifying mitigation measures to ensure connectivity across the landscape and decrease human/wildlife interactions.

3. A minimum 50 meter setback from the top of bank from Oldman Creek tributary should be established for all development.

4. A detailed Biophysical Assessment should be completed prior to planning at the Area Structure Plan level when full land access is available.

5. Several wetlands with distinct connections to the creeks and upland habitats were prioritized for conservation. This is a subset of the existing wetlands observed and identified through aerial photographs and provincial mapping. Planning at the Area Structure Plan level will require compliance reporting for both the municipal and provincial wetland policies.

6. Several uplands with distinct connections to the creeks and wetland habitats were prioritized for conservation. These uplands should be conserved and integrated into the open space system.

7. Incorporating natural landscape features (drainage corridors, wetlands, planted shelter belts) for green infrastructure should be considered.

As per the MDP, top of bank is defined as “the top of a water body’s valley or ravine. Where a bank is not well defined (i.e. in the case of lakes and wetlands) the top of bank shall be equivalent to the 1:100 year floodplain.”

The following map identifies priority creek, wetland and upland habitats for conservation based on size, connectivity and diversity. The specific planning tools to be assigned as per the MGA can be determined in coordination with the open space component.

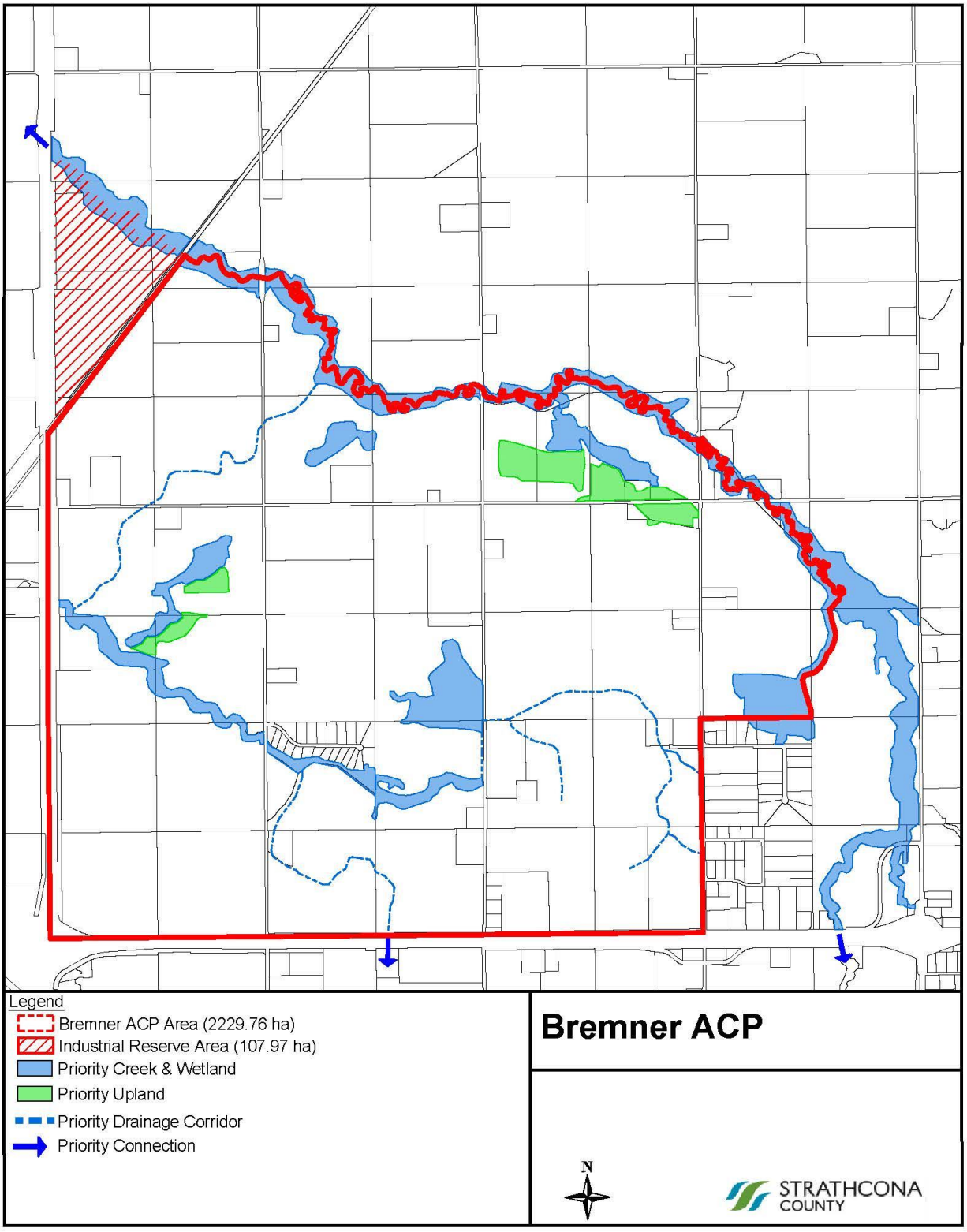

Figure 14: Bremner ACP Conservation Priorities

6.0 LIMITATIONS AND QUALIFICATIONS

In conducting the investigation and rendering our conclusions, Strathcona County gives the benefit of its best judgment based on its experience and in accordance with generally accepted professional standards for this type of investigation. This report was submitted with the best information to date and on the information provided. The conclusions made within this report are a professional opinion, not a certification of the sites environmental condition, no other warranty, expressed or implied is made. This report has been prepared for the exclusive use of Strathcona County for the purposes of assessing the current state of the natural areas at the Subject Area. Any use which any third party makes of this report, or any reliance on or decisions to be made on it, are the responsibility of such third parties. Strathcona County accepts no responsibility for damages, if any, suffered by any other third party as a result of decisions made or actions based on this report.

Our conclusions are limited by the following:

- Site assessments were completed at the time specified; and
- The investigation was limited to those parameters specifically outlined in this report.
- Most observations were made from the roadsides as access was not available to the majority of the study area.

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Biologist, Manager of Environmental Planning
Planning and Development Services
Strathcona County
September 2017

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APPENDIX A – WETLAND MAPPING

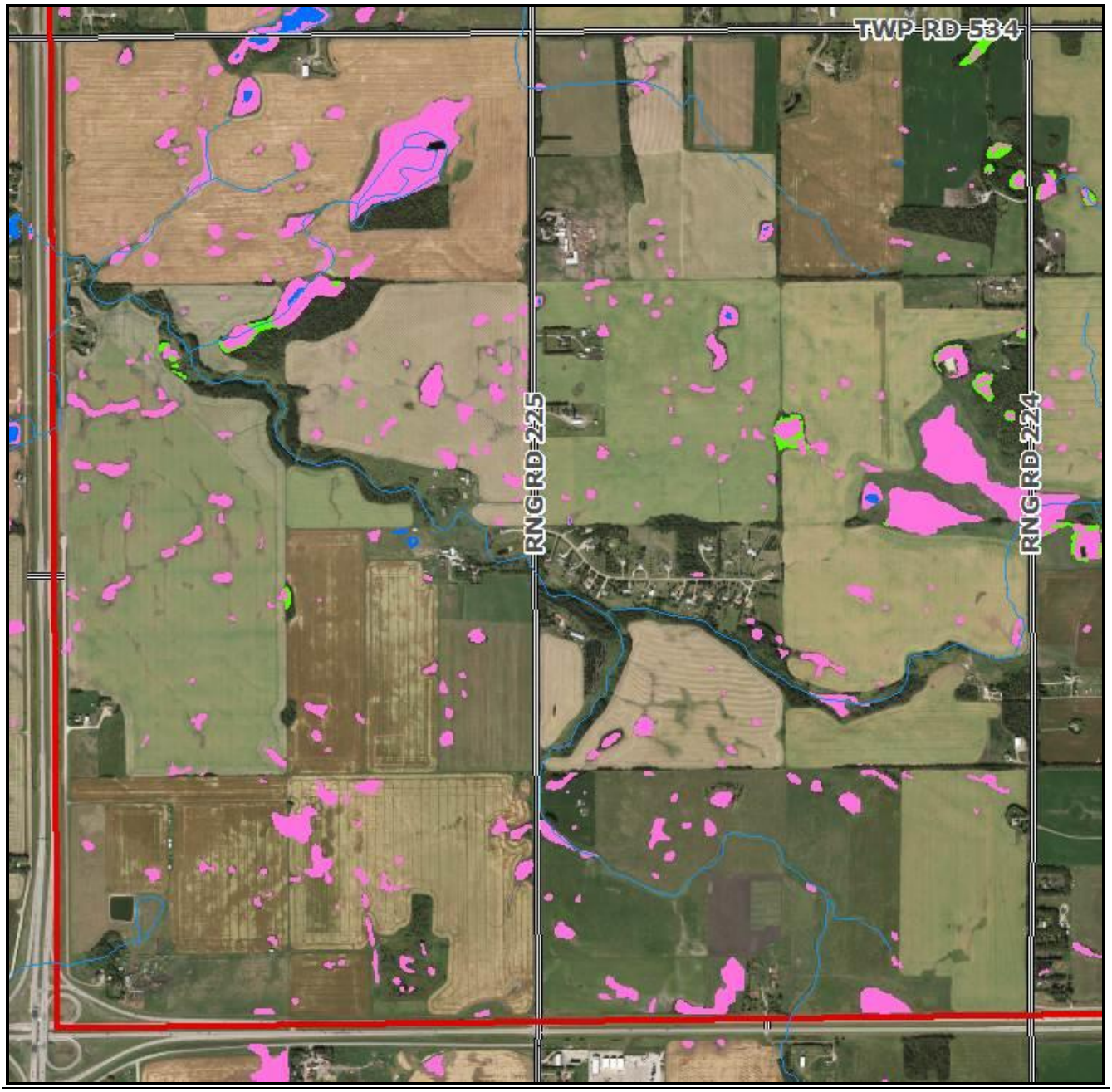

Figure 1 – Wetlands and drainage corridors within the southwest ¼ of the Urban Reserve Policy Area. Dark blue represents shallow open water, pink represents shallow marsh, light green represents swamp and solid light blue line indicates drainage corridor.

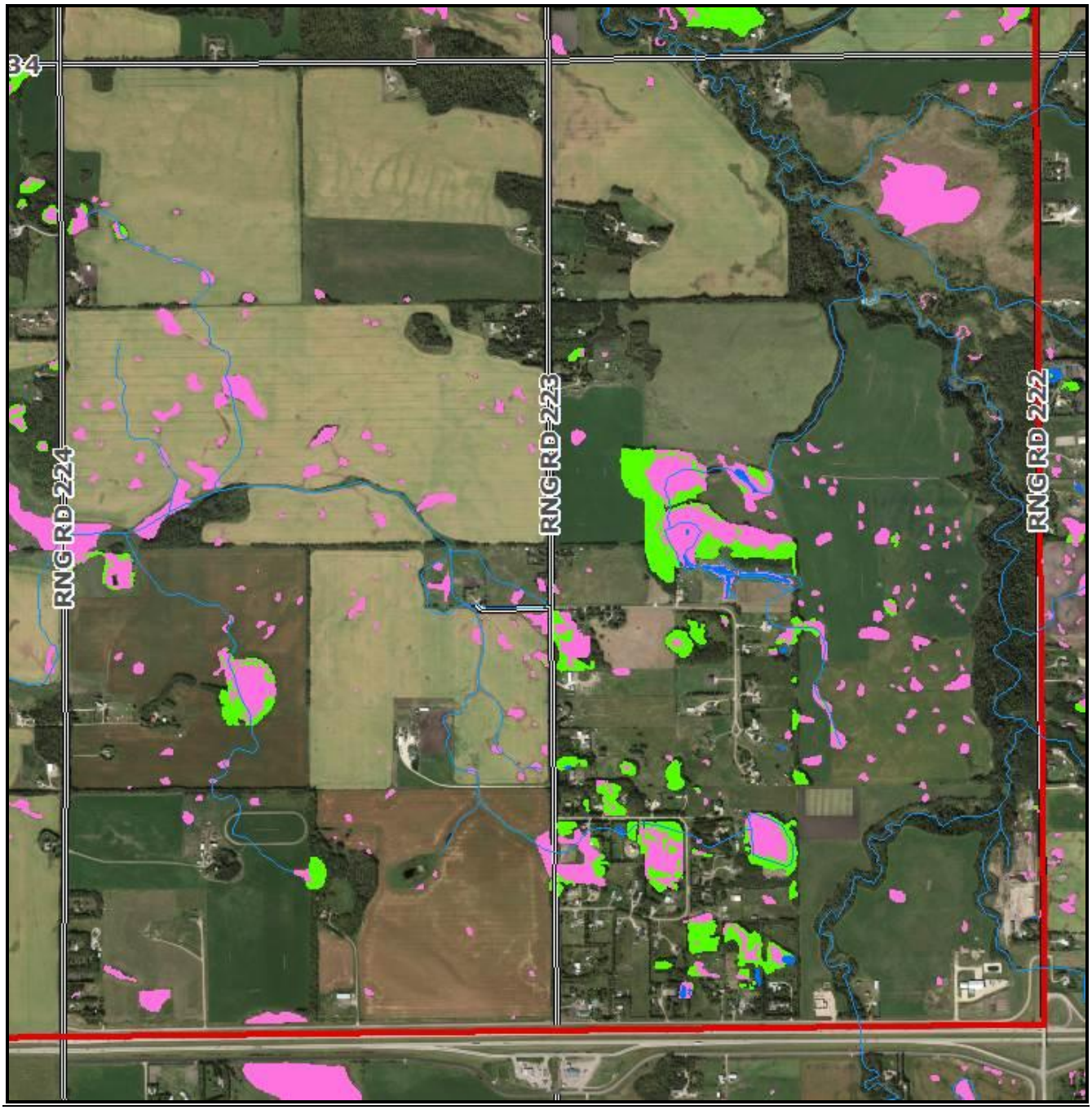

Figure 2 – Wetlands and drainage corridors within the southeast ¼ of the Urban Reserve Policy Area. Dark blue represents shallow open water, pink represents shallow marsh, light green represents swamp and solid light blue line indicates drainage corridor.

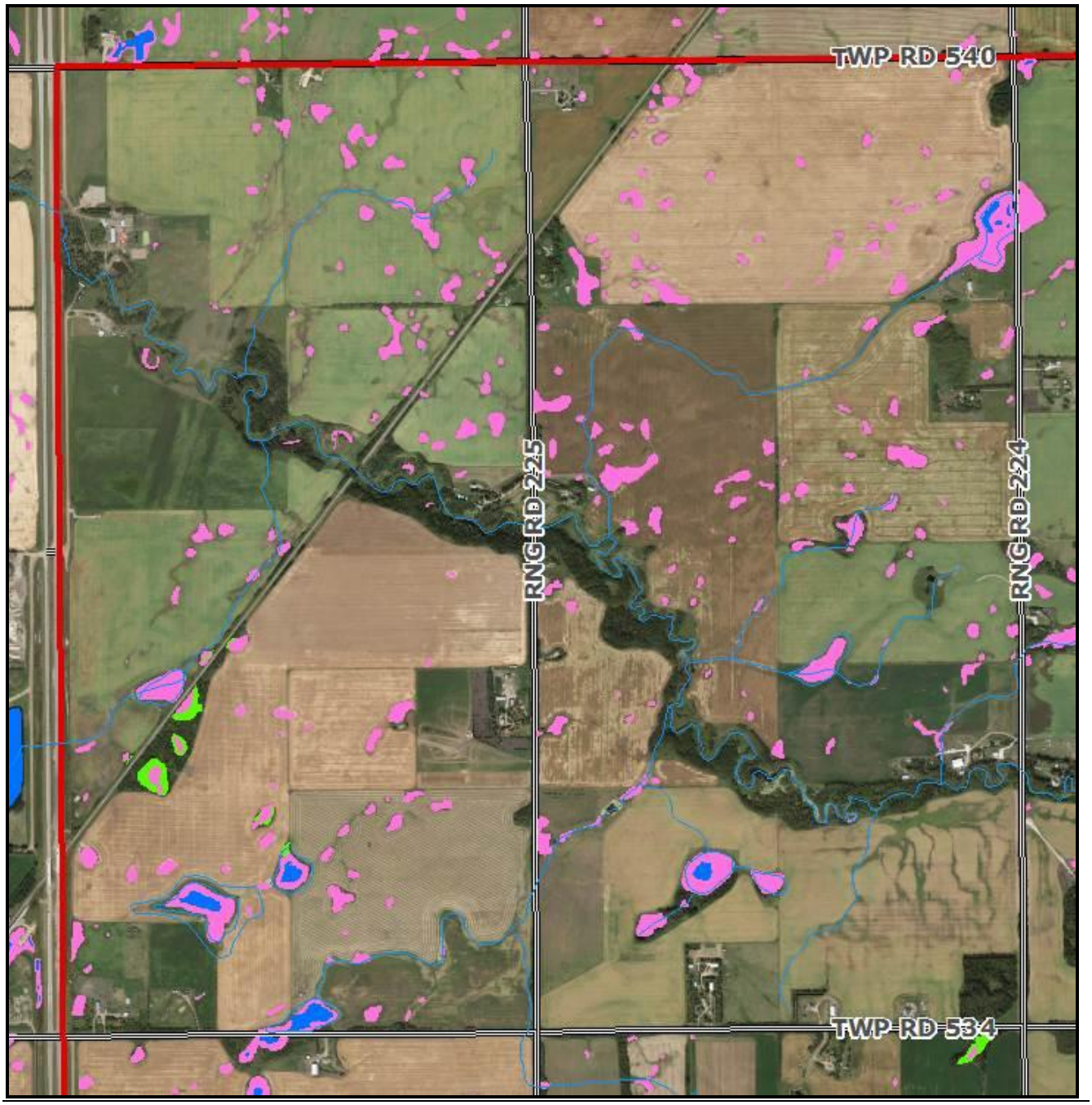

Figure 3 – Wetlands and drainage corridors within the northwest ¼ of the Urban Reserve Policy Area. Dark blue represents shallow open water, pink represents shallow marsh, light green represents swamp and solid light blue line indicates drainage corridor.

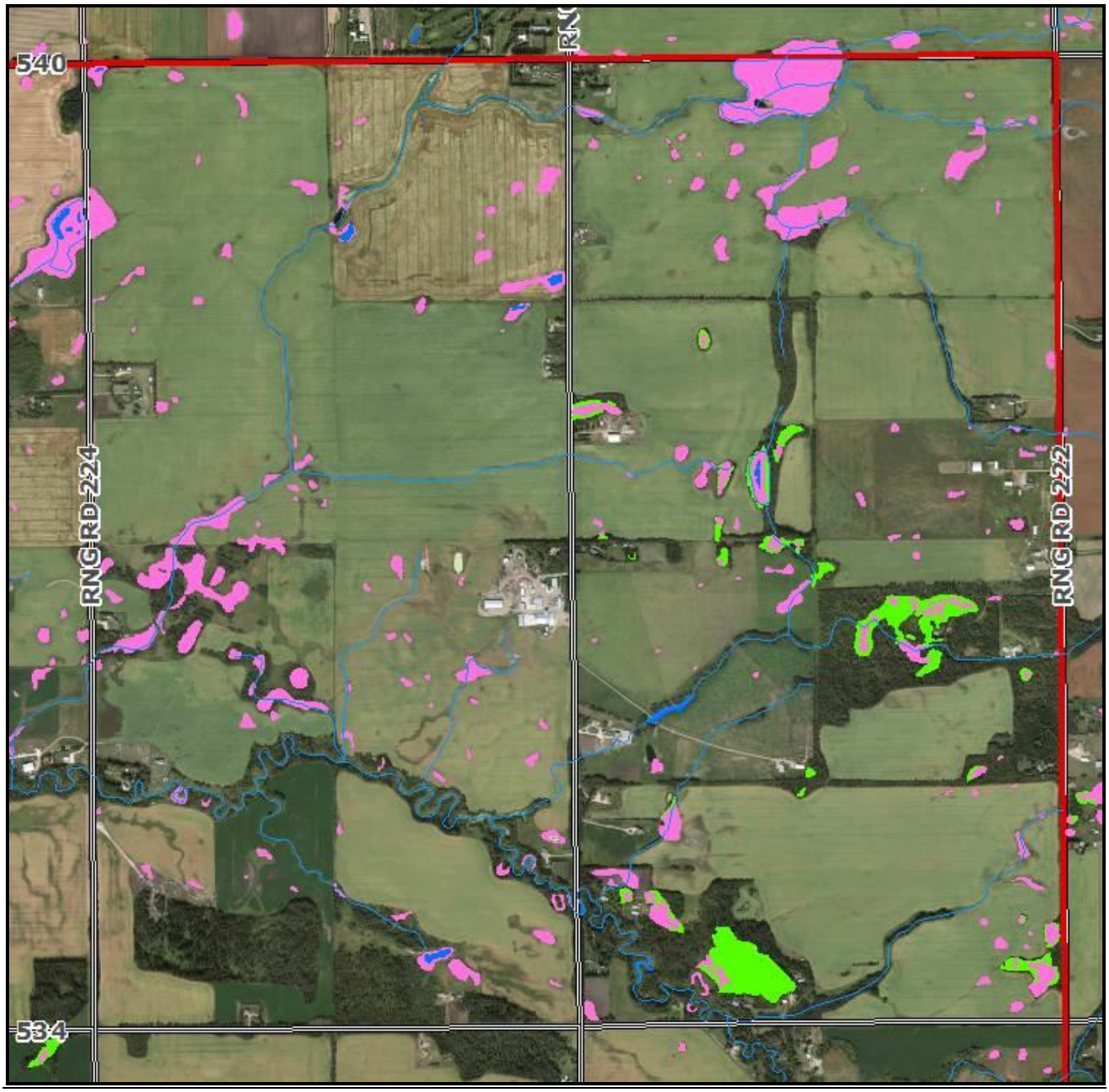

Figure 4 – Wetlands and drainage corridors within the northeast ¼ of the Urban Reserve Policy Area. Dark blue represents shallow open water, pink represents shallow marsh, light green represents swamp and solid light blue line indicates drainage corridor.