FRICORP ECOLOGICAL SERVICES

Environmental Impact Assessment for South Fergus MESP and Secondary Plan

Prepared for:

The South Fergus Property Group

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Environmental Impact Assessment for South Fergus MESP and Secondary Plan

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1. Introduction

FRi Ecological Services was retained by the South Fergus Property Group in March 2020 to undertake services will include fieldwork, analysis and impact assessment to satisfy the Wellington County Official Plan, the Municipal Official Plan for Centre Wellington, the Provincial Policy Statement (2020) and the Growth Plan for the Greater Golden Horseshoe (2019). The studies undertaken will also address applicable legislation including but not limited to the *Fisheries Act* and the *Endangered Species Act*.

The environmental services provided are part of the ongoing studies associated with the South Fergus Master Servicing and Secondary Plans. This environmental impact assessment will focus primarily on Provincially Significant Wetlands (PSW), Significant Woodlands, Habitat of Endangered Species and Threatened Species, Significant Wildlife Habitat (SWH) and Fish Habitat. Virtually all of these values occur in the identified Core Greenlands and the remainder of the study area is primarily agricultural.

The Existing Conditions Technical Memorandum identified PSW, significant woodlands, habitat for at least one threatened species, SWH and fish habitat values associated with the proposed development.

This report will assess and evaluate the potential impacts to these natural heritage features and functions and suggest appropriate avoidance and mitigation measures. The findings in this report also relies on the work of other subconsultants that are working on other aspects such as stormwater management and servicing reports.

The South Fergus Property Group has commissioned a number of consultants to facilitate the development. The project team includes:

- MHBC Planning Urban Design & Landscape Architecture (Urban Design and Project Management)
- Altus Group (Financial)
- Tatham Engineering (Engineering)
- AMICK Consultants (Archaeology)
- FRi Ecological Services (Environmental/Natural Heritage)

1.1. Project Scoping

The subject property is actually a group of properties that make up the South Fergus study area.

1.1.1. Study Area

The study area for the purposes of this report is reflected in **Figure 1** below.

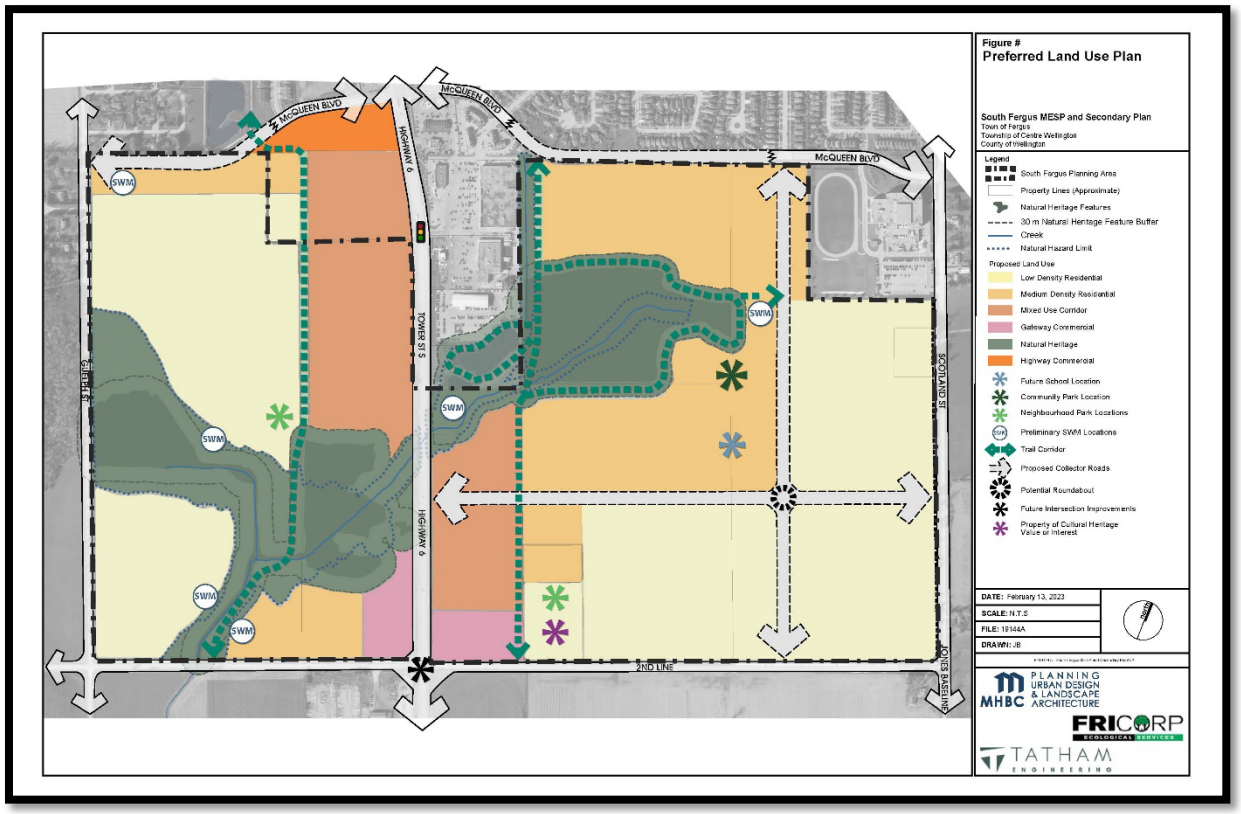

Figure 1 Preferred Land Use Plan

The study area is bounded by McQueen Blvd. to the north, Scotland Street/Jones Baseline to the east, Guelph Street to the west and 2nd Line to the south for an approximate area of 152 hectares. The study area is bisected by Tower Street South/Highway 6. The study area is referred to as the South Fergus Secondary Planning Area. The lands include mostly agricultural uses along with 3 residences and a central natural heritage system that includes a tributary of Swan Creek that is part of the Nichol Drain that flows from the northeast to the southwest. There are significant woodlands, wetlands and other natural heritage values associated with the lands adjacent to the waterway system.

1.1.2. Terms of Reference

An updated Terms of Reference (TOR) was prepared in January 2021 to direct the preparation of the Master Environmental Servicing Plan (MESP) and the Secondary Plan for the South Fergus Secondary Planning Area (**Appendix 1**). The MESP and its component parts have been developed in accordance with the

County of Wellington Official Plan, the Township of Centre Wellington Official Plan as well as Grand River Conservation Authority policy documents.

1.1.3. Collection and Review of Background Information

Existing background information on the natural heritage features and systems within the study area was collected and reviewed. Background sources reviewed included the following:

- Grand River Conservation Authority
- Ministry of Natural Resources and Forestry
- Ministry of Environment, Conservation and Parks
- Natural Heritage Information Centre
- Ontario Breeding Bird Atlas Square 17NJ53
- eBird
- iNaturalist
- Ontario Reptile and Amphibian Atlas
- Schedules A-1 and C of the Official Plan Centre Wellington
- Schedule A-1 and Appendix 3 of the Official Plan for Wellington County
- Nichol Drain No. 2 Subwatershed Study

Standardized survey protocols were used where applicable and available including:

- Marsh Monitoring Program for Surveying Amphibians (2008)
- Survey Methodology under the Endangered Species Act, 2007 Dolichonyx oryzixorous (Bobolink) (2011)
- Survey Protocol for Eastern Meadowlark (Sturnella magna) in Ontario (2013)
- Survey Protocol for Blanding's turtle (Emydoidea blandingii) in Ontario (2015)
- Chimney Swift (Chaetura Pelagica) Monitoring Protocol (2009)
- Forest Bird Monitoring Program (2008)
- Adapted Methods for Monitoring Fish Populations (2011)

A formal Preliminary Screening Form was sent to the Ministry of Environment, Conservation and Parks to confirm species at risk that may be present within the study area.

Schedule A-1 of the Official Plan of Centre Wellington identified the stream, wetland and forested corridor that drains from northeast to the southwest through the study area is identified as core greenlands. The wetland immediately to the west of Guelph Street has been identified as provincially significant.

1.2. Relevant Policies, Legislation, and Planning Studies

Table 1 provides an overview of policies that were considered, and which informed the field program and analysis with respect to this EIA. This section of the report provides a guide to the assessment of specific implications of these policies to the proposed development.

Table 1. Relevant Policies, Legislation, and Planning Studies

Policy/Legislation	Description	Relevance
Provincial Policy Statement (2020)	• Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS. • Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'. • The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (2015) provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.	The County has determined that there is a portion of Greenlands present within the study area that is afforded consideration within the PPS. In addition, the EIA assesses the potential for the other natural features identified in the PPS.
Endangered Species Act (2007)	• Section 9 protects the individual from harm • Section 10 protects habitat from damage or destruction • Protection is afforded to Threatened and Endangered species	The Preliminary Screening indicated the potential for Bobolink, Eastern Meadowlark, Chimney Swift, Barn Swallow and Bank Swallow
Migratory Birds Convention Act (1994)	• **The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment.**	**Environment Canada provides a map of nesting zones and calendars to develop appropriate timing for vegetation clearing**
Fisheries Act	• Manages threats to the	Considerations for

(1985)	sustainability and productivity of Canada's commercial, recreational and Aboriginal fisheries. • The Act prohibits "serious harm to fish", including destruction of habitat.	stormwater management, erosion and sediment control with regards to potential impacts to the tributary to Swan Creek. Opportunities to improve the condition of the creek.
County of Wellington Official Plan	• Part of the study area is designated as Core Greenlands • The Core Greenlands designation is related to the presence of wetlands, waterways and woodlands	Schedule A1 and Appendix 3 identify Core Greenlands and Provincially Significant Wetlands. Section 5.5.4 identifies woodlands over 1ha within urban areas as significant.
Township of Centre Wellington Official Plan	• Section E.1.3 Environmental Impact Assessments provides guidelines	Considerations for the content of the EIA

GRCA Regulation 150/06 (GRCA 2013)	• **Regulation issued under Conservation Authorities Act, R.S.O. 1990.** • **Through this regulation, the GRCA has the responsibility to regulate activities in natural and hazardous areas (i.e., areas in and near rivers, streams, floodplains, wetlands, and slopes).** • **GRCA requires that an Environmental Impact Study or EIA be undertaken in accordance with their EIS Guidelines and Submission Standards for Wetlands where**	**GRCA is part of the Technical Advisory Committee and has been consulted with regards to wetland boundary delineation.** **Portions of the study area fall within regulated areas.**

	development is proposed within 120m of PSW or 30m of non-PSW	

2. Field Methods

A comprehensive, multi-season field program was developed and detailed in the TOR (Appendix I). The field program was initiated in June 2015 and has continued to November 2017. **Table 2** provides a summary of the field surveys conducted. Field methods are presented below.

Table 2. Field Surveys Summary

Date	Air Temp. (°C)	Cloud Cover	Wind Direction	Wind Speed (kmh)	Precipitation	Activities	Hours
1APR20	11	Mainly Sunny	N	15	Nil	Reconnaissance, install bat/bird recorder, start ELC mapping, stick nest survey, turtle survey	7.0
16APR20	3	Mostly Cloudy	W	20	Nil	Change batteries in recorder, ELC mapping, amphibian surveys, turtle surveys	7.0
7MAY20	13	Mostly Cloudy	NNW	20	Nil	Change batteries in recorder, ELC mapping, amphibian and turtle surveys	6.0
27MAY20	29	Sunny	S	15	Nil	Forest Bird Monitoring, amphibian and turtle survey, Grassland Bird Survey, Chimney Swift, change batteries in recorder	4.0
24JUN20	20	Partly Sunny	WSW	20	Nil	Retrieve recorder, Forest Bird Monitoring, Grassland Bird Surveys, Chimney Swift	2.5
1JUL20	30	Sunny	N	10	Nil	ELC mapping, Chimney Swift	2.0
2JUL20	24	Sunny	NW	15	Nil	Forest Bird Monitoring, Grassland Bird Survey, Fish Habitat Survey	7.0
17AUG20	24	Partly Sunny	NW	10	Trace	ELC mapping	5.0
26NOV20	9	Overcast	W	15	Misty Drizzle	Hedgerow ELC and sticknest survey	5.0
3MAR21	4	Partly Sunny	NW	15	Nil	Spring wetland boundaries	2.0
4MAR21	0	Partly Sunny	N	20	Nil	Spring wetland boundaries, ELC mapping	4.5
2JUN21	24	Mostly Cloudy	S	15	Nil	Property addition ELC, Barn Swallow Nesting Survey, Wetland boundary refinement	1.0
3JUN21	20	Overcast	ESE	10	Light Rain	Barn Swallow Nesting Survey, Wetland boundary refinement	4.5
6JUL21	28	Partly Sunny	NW	20	Nil	Confirm wetland boundaries with GRCA staff and thermal imaging of stream	8.0
29SEP21	19	Sunny	NW	15	Nil	Detailed wetland boundary determination	6.0
30SEP21	15	Cloudy	N	13	Nil	Detailed wetland boundary determination	6.0

3. Natural Heritage Characterization

3.1. Soils, Terrain and Drainage

The-site soils range from sand and gravel to silty clay. The soils are composed of sand, silty sand and till near the surface in the agricultural areas. The wetland units are clayey silt to silty clay.

The lands within the Study Area generally drain overland as sheet flow to the tributary of Swan Creek (Nichol Drain No. 2). The drain runs southwest through the Study Area crossing Tower Street (Highway 6) and Second Line.

The surface runoff from the Study Area is conveyed through a municipal drain complex (Nichol Drain No. 2) that drains to Swan Creek, south of the Secondary Plan Area. Nichol Drain No. 2 conveys drainage generated on-site and surface runoff from external lands downstream. There is a series of existing stormwater facilities just east of Tower Street (Highway 6) that are near the source of Nichol Drain No. 2.

There are three wetland units that are part of the Speed-Lutteral-Swan Creek Wetland Complex that include both marsh and swamp wetland types.

3.2. Vegetation

There is a total of 15 ecosites within the study area. Each one will be discussed in brief detail below (**Figure 2**).

3.2.1. Ecosites

3.2.1.1. Agricultural

This is by far the most common ecosite within the study area. Much of this area continues to be under agricultural land use. Crops like soybean and corn are the most common. The monoculture produced by this land use does not have any natural analog and wildlife use mainly occurs at the edges.

3.2.1.2. Anthropogenic

There is an active farmhouse and outbuildings located on Guelph Street within the study area, a heritage farmhouse, barn and outbuildings on Second Line east of Highway 6 and a former residential site on the west side of Highway 6 across from the stormwater ponds.

3.2.1.3. Dry to Moist Old Field Meadow Type (CUM1-1)

This ecosite occurs in four locations and is essentially areas that are not currently under intensive agricultural practices and are dominated mainly by grasses and forbs. Given time they will likely develop into a cultural thicket.

3.2.1.4. Mineral Cultural Thicket (CUT1)

This area has likely transitioned from an old field meadow as shrub species have become established. A variety of shrub species are present.

3.2.1.5. Fresh to Moist White Cedar Coniferous Forest Type (FOC4-1)

This ecosite occurs mainly as a fringe around the edge of the easterly wetland feature. The white cedar transitions from the drier aspen sites along the edge.

3.2.1.6. Naturalized Spruce or Cedar Hedgerow (FOCM6)

This is mainly a planted hedgerow of Norway spruce with some Eastern white cedar mixed in. It is a relatively narrow hedgerow two trees wide.

3.2.1.7. Fresh to Moist Poplar Deciduous Forest Type (FOD8-1)

This ecosite occupies areas adjacent to wetland features in the central and eastern portion of the study area. It grades from the edge of the wetland into the upland area and is composed of trembling aspen and balsam poplar.

3.2.1.8. Naturalized Maple Hardwood Treed Hedgerow (FODM11)

This is mainly represented as a silver maple single row along Second Line and Scotland Street.

3.2.1.9. Naturalized Ash Hardwood Treed Hedgerow (FODM12)

This hedgerow ecosite is also along Second Line and the ash trees are in various levels of decline.

3.2.1.10. Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)

There is only one small area represented by this ecosite and although it functions somewhat like a MAM2-2 it is mainly colonized by the invasive species *Phragmites australis*.

3.2.1.11. Cattail Mineral Shallow Marsh Type (MAS2-1)

The water levels within this ecosite are largely determined by beaver activity in the system and since the start of our field investigations, the water levels have lowered considerably, as a result of removal or natural deterioration of beaver dams. This is essentially a monoculture of cattails.

3.2.1.12. Open Aquatic (OAO)

The three stormwater ponds that straddle the study area boundary on the east side of Highway 6 are man-made but are somewhat naturalized and functioning as an open aquatic habitat.

3.2.1.13. Black Ash Mineral Deciduous Swamp Type (SWD2-1)

This ecosite forms the bulk of the wetland habitat within the study area. The species mix varies from one location to another but functions as an ash swamp throughout. It seasonally floods and is mainly dry during the summer months.

3.2.1.14. Willow Mineral Thicket Swamp Type (SWT2-2)

This willow thicket swamp is an extension of the ash deciduous swamp on the westerly wetland. It seasonally floods like the remainder of the wetland feature.

3.2.1.15. Deciduous Thicket Hedgerow (THDM3)

This is essentially a shrub thicket hedgerow that borders the banks of the small stream within the study area. It occupies a very narrow band of less than 2m along the banks of the stream.

3.3. Provincially Significant Wetlands

The Speed-Lutteral-Swan Creek Wetland Complex is a large system that bisects the study area and has been designated provincially significant. It is a 5,683-ha complex of deciduous and coniferous swamp (95% of the complex) and marsh (5%) communities located within glacial meltwater channels associated with the Guelph Drumlin Field. Considerable portions of the wetland (60% of complex area) is underlain by organic soils, where carbon storage is expected to be proportionately high, and is sustained by and/or contributes groundwater to local watercourses known to contain brook trout.

Considerable effort was expended to ensure that the wetland boundaries were accurate and that the GRCA had reached a consensus with these boundaries. Following a July 6, 2021 site meeting with the GRCA, there were three specific areas of the wetland boundaries that required some refinement.

Figure 2. Ecosites showing amended wetland boundaries

Each of the boundaries that we had not reached a consensus, were further examined by establishing a number of transects perpendicular to the boundary to be confirmed. Along each transect a series of sample stations were established at 10m intervals along the transect. The first station was located within the wetland and extends out until non-wetland values were encountered.

At each station, a borehole was augered and a soil core was obtained. The depth to encountered groundwater was recorded where applicable. Evidence of gleying and/or mottling was noted in the depth profile. Evidence of groundwater near the surface and/or gleying or mottling near the surface were all indicators of hydric soils and likely wetland ecosites. To further confirm the wetland boundary, a one-metre radius was established around each station to create a 3.14m^2 sample plot. Within that sample plot vegetation layers that directly overlap the plot were assessed using the 50% wetland vegetation rule.

The intent of the "50% wetland vegetation" rule is to judge where plant species cover consists mostly of wetland plants. This is based on the inference that where wetland species make up most of the cover in an area, the area must contain wetter substrates and thus indicate wetland conditions. The order in which the vegetation should be assessed using the "50% wetland vegetation" rule, should follow the structural nature of the vegetation, from the upper layers to the ground and aquatic layers. The upper layers, especially the woody trees and shrubs, are typically longer lived and better reflect the long-term conditions of the site. When there are contradictory messages from different layers, we used the dominant layers as the primary indicator. For example, sometimes in altered wetlands, the trees will indicate wetland conditions, yet the ground cover layers may not. The tree layers will take precedence over the ground layers. The wetland plant list in Appendix 10 of the Ontario Wetland Evaluation System - Southern Manual Version 3.3 was used to determine obligate wetland species.

3.4. Core Greenlands

Schedule A-1 Land Use of the Official Plan (OP) for the Township of Centre Wellington identifies the wetlands and watercourses as part of the Core Greenlands (**Appendix 2**). Section C.3.1 identifies the Core Greenlands designation on the land use schedules as:

- Provincially significant wetlands;
- Habitat of endangered or threatened species; and/or
- Floodways and hazardous lands

Section C.3.2 indicates that all provincially and locally significant wetlands are included in the Core Greenlands designation as well. Section C.3.7 specifies that areas of natural and scientific interest (ANSI's) may be included in the Core Greenlands designation where they have been determined to be provincially significant or determined by the County to be regionally significant. Section C.3.9 directs that the Core Greenlands designation may include wooded areas, particularly where these are also associated with other Natural Heritage features such as wetlands. Otherwise, the Core Greenlands designation includes only upland woodlands over 10 hectares in area. However, Section 5.5.4 of the Wellington County Official Plan indicates that in the Urban System, woodlands over 1 hectare are considered to be significant by the County and are included in the Greenlands System.

3.5. Significant Woodlands

There are three areas that are identified as significant woodlands, roughly corresponding with the three wetland areas. The ecosites SWD2-1, SWT2-2 and FOD8-1 where they exceed an area of one hectare, qualifies as a significant woodland (**Figure 2**). All of these significant woodlands have multiple natural heritage values and form a component of the Core Greenlands.

3.6. Significant Valleylands

There are no significant valleylands within the study area.

3.7. Habitat of Endangered Species and Threatened Species

A Preliminary Screening Form was prepared and sent to the Ministry of Environment, Conservation and Parks. The confirmed species at risk that have potential for the study area are Bobolink, Eastern Meadowlark, Chimney Swift, Barn Swallow and Bank Swallow.

3.7.1. Bobolink and Eastern Meadowlark

Bobolinks are associated with open habitats, specifically grasslands, meadows and agricultural fields. They use fields with a mix of grasses and broad-leaved forbs like clover (*Trifolum* sp.); generally avoiding habitats with woody vegetation. A dense thatch layer is required for nests which are built out of sight close to the ground. Defended territories average 0.33 – 2 hectares, while much larger habitat patches are required to avoid predators and reduce brood parasitism by cowbirds. Literature suggests a minimum 5 hectares is required to support breeding, while sites 10 – 30 hectares are more likely to support successful nests. Areas that have little interior habitat, defined as 100 metres or more from an edge, are not likely to be suitable for breeding. Nesting occurs in mid-May and subsequent broods have usually fledged by early July. Nestlings in July are likely a result of a second brood or renesting. Bobolinks have usually left Ontario by the end of July on their migration south for the winter.[1] [2] [3] [4] [5]

[1] Martin, Stephen G. and Thomas A. Gavin. 1995. Bobolink (Dolichonyx oryzivorus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/176

[2] McCracken, J.D., R.A. Reid, R.B. Renfrew, B. Frei, J.V. Jalava, A. Cowie, and A.R. Couturier. 2013. Recovery Strategy for the Bobolink (Dolichonyx oryzivorus) and Eastern Meadowlark (Sturnella

The Eastern Meadowlark is most often found in grasslands, pastures, hay fields, old fields and native prairies in Ontario. They prefer habitats with good grass and litter cover, with defended territories averaging 2.8 – 3.2 hectares and are not deterred by the presence of shrubs and low woody vegetation.

They don't appear to be as area-sensitive as other grassland species like Bobolink. According to some researchers, Meadowlark breeding density doesn't seem to be influenced by patch size or edge density while others note that larger tracts of grasslands are preferred over smaller patches.

Nesting begins in early May; females construct the nest, usually partly covered or roofed by woven vegetation. The last broods leave the nest in early August. Simultaneous and shortly following this, meadowlarks leave breeding habitat for southern wintering areas. [6] [7] [8]
Grassland Bird Surveys were undertaken in the CUM1-1 Old Field Meadow ecosite on May 27, June 24 and July 2, 2020. Neither Bobolink nor Eastern Meadowlark

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magna) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. viii+ 88 pp.

[3] Ontario Ministry of Natural Resources. 2011. Draft Survey Methodology under the Endangered Species Act, 2007: D*olichonyx oryzivorus* (Bobolink). Ministry of Natural Resources Policy Division, Species at Risk Branch. 2pp.

[4] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BBLNK_EN.html

[5] Ontario Ministry of Natural Resources. 2013. General Habitat Description for the Bobolink (*Dolichonyx oryzivorus*)
http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_bblnk_en.pdf

[6] Jaster, Levi A., William E. Jensen and Wesley E. Lanyon. 2012. Eastern Meadowlark (Sturnella magna), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online:
http://bna.birds.cornell.edu/bna/species/160

[7]
http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_ESTRN_MDWLRK_EN.html

[8] Ontario Ministry of Natural Resources. 2013. General Habitat Description for the Eastern Meadowlark (*Sturnella magna*)
http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_est_mdwlrk_en.pdf

were detected during these surveys or through casual observations during other field investigations. The ecosite is relatively small and would not meet the interior habitat required for Bobolink. Follow-up surveys will occur in 2021 to definitely confirm presence or absence.

3.7.2. Chimney Swift

Chimney swifts are an aerial insectivore; commonly seen foraging over open areas and wetlands. According to the Chimney Swift COSEWIC Status Report (2007), cavity trees with a diameter breast height (DBH) greater than 50 cm are required for nesting. Common tree species hosting nesting or roosting sites are white pine, yellow birch and sometimes aspen. While not common, pileated woodpecker cavities are sometimes used for nesting and roosting. Communities supporting trees >50 cm DBH and pileated woodpecker cavities are typical of old growth forests.

More typically, swifts nest and roost in human-created structures such as brick chimneys. At times, especially during migration and inclement weather, roosts may host hundreds or even thousands of birds. Structures functioning as nest features are usually occupied by a single breeding pair. Breeding pairs exhibit high site fidelity for structures used as nests and roosts and will continue to use these features as long as they are functional. In Ontario, swifts return in late April through early May and breed May through July. Migration begins in late August and is usually complete by mid-October.

The loss of artificial nest features (brick chimneys) has resulted in significant population declines over a short time period. Secondarily, the loss of old growth forests and large cavity trees has resulted in fewer natural nesting (and roosting) structures. [9] [10] [11] [12] [13]

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[9] OMNR. 2013. General Habitat Description for the Chimney Swift. http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_chmny_swft_en.pdf

[10] http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=951

[11] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_CHMNY_SWFT_EN.html

[12] Cink, Calvin L. and Charles T. Collins. 2002. Chimney Swift (Chaetura pelagica), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/646

Chimney Swift surveys were conducted on May 27, June 24, and July 1 at the two residences/farms within the study area. No Chimney Swifts were detected.

3.7.3. Bank Swallow

As their Latin name suggests, Bank Swallows are most often found in riparian areas, specifically nesting along the steep, sandy banks of rivers. Less often, they use steep sandy slopes in aggregate pits/quarries and cut banks along roadways. They nest colonially, with males excavating a burrow prior to pair formation. Once pairs are formed, nest-building begins immediately in the excavated burrow.[14]

They are an aerial insectivore, eating a variety of insects on the wing; though sometimes they take land and water-based insects when they are available.[15] They forage in open areas, including lakes, ponds, rivers, meadows, fields, pastures, and bogs; occasionally over forests and woodlands. During the breeding season, adults are usually within 200 metres of their young for feeding purposes.

There is no suitable habitat for this species within the study area. No further study is required.

3.7.4. Barn Swallow

Barn swallows are an aerial insectivore, known to build nests on barns, bridges and other buildings especially in open areas near water. Open habitats including grasslands, fields, rights-of-way, shorelines and wetlands are particularly important for foraging. They live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures. Swallows prefer structures with rough-surfaced ledges where they can build their nests. The cup-shaped mud nests are the critical habitat feature used for egg laying, incubation, feeding, resting and rearing of young. Barn swallows will use artificial nest cups and ledges; and are known to use the same nests in subsequent years.

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[13] COSEWIC 2007. COSEWIC assessment and status report on the Chimney Swift Chaetura pelagica in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 49 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

[14] Garrison, Barrett A. 1999. Bank Swallow (Riparia riparia), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/414

[15] http://www.ontario.ca/page/bank-swallow

They are often found in colonies; breeding takes place from May through August.[16] [17] [18]

Permission was received in 2021 to inspect the buildings at both residential/farm locations at 7856 Second Line and surveys were conducted on June 3, 2021. The residence and outbuildings on Guelph Street yielded no observations of Barn Swallow or their nests.

The residence and outbuildings on Second Line were inspected as well. The first floor of the large barn at this location had upwards of 79 Barn Swallow nests. At least half of these appeared to be active. There were also a few inactive Cliff Swallow nests in the same building. There may be additional nests on the upper floor of the barn, but it was not inspected at this time. Barn Swallows were seen foraging over the fields adjacent to the barn in 2020 and again in 2021.

Subsequent to the preparation of this report, COSSARO downlisted Barn Swallow from threatened to special concern through Ontario Regulation 230/08 that was amended on January 25, 2023. As a result, Ontario Regulation 830/21 no longer applies to the Barn Swallow and the activity of removing the barn is not required.

3.8. Significant Wildlife Habitat

The key policy document for the review of Significant Wildlife is the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (2015). This document relies heavily on the ecosites present within the study area to develop a list of potential significant wildlife habitat features. FRi Ecological Services uses a filtering tool where the ecosites present are input and it provides a list of all potential significant wildlife habitat features that may be present. This filtered list is described in more detail in **Table 3.**

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[16] COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

[17] http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BRN_SWLLW_EN.html

[18] Ontario Ministry of Natural Resources. 2013. General Habitat Description for the Barn Swallow *Hirundo rustica*. http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@species/documents/document/mnr_sar_ghd_brn_swllw_en.pdf

3.8.1. Waterfowl Stopover and Staging Area (CUM1-1, CUT1, MAS2-1, SWD2-1)

The criterion for this value requires that aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use days. All of the listed ecosites are quite small in size with less than optimal waterfowl habitat. In all of the field visits conducted, there were fewer than 10 waterfowl observed. No further study required.

Table 3. Summary of Screened Potential Significant Wildlife Values

Significant Wildlife Habitat		Type	Ecosite	Present
1	Waterfowl Stopover and Staging Area	Seasonal Concentration Area	CUM1-1, CUT1, MAS2-1, SWD2-1	No
2	Shorebird Migratory Stopover Area	Seasonal Concentration Area	MAM2-2	No
3	Raptor Wintering Areas	Seasonal Concentration Area	FOC4-1, FOD8-1, CUM1-1, CUT1, SWD2-1	No
4	Bat Maternity Colonies	Seasonal Concentration Area	FOD8-1, SWD2-1	Potential
5	Turtle Wintering Areas	Seasonal Concentration Area	SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO	No
6	Lizard Hibernaculum	Seasonal Concentration Area	FOD8-1	No
7	Colonially – Nesting Bird Breeding Habitat (bank/cliff)	Seasonal Concentration Area	CUM1-1, CUT1	No
8	Colonially – Nesting Bird Breeding Habitat (Tree/Shrub)	Seasonal Concentration Area	SWD2-1	No
9	Colonially – Nesting Bird Breeding Habitat (Ground)	Seasonal Concentration Area	MAM2-2, MAS2-1,	No
10	Migratory Butterfly Stopover Area	Seasonal Concentration Area	CUM1-1, CUT1, FOC4-1, FOD8-1	No
11	Landbird Migratory Stopover Area	Seasonal Concentration Area	FOC4-1, FOD8-1, SWD2-1	No
12	Deer Wintering Concentration Areas	Seasonal Concentration Area	FOC4-1, FOD8-1, SWD2-1, CUT1	No
13	Old Growth Forest	Rare Vegetation Community	FOC4-1, FOD8-1, SWD2-1	No
14	Waterfowl Nesting Area	Specialized Habitat for Wildlife	SWD2-1, SWT2-2, MAM2-2, MAS2-1	No

	Significant Wildlife Habitat	Type	Ecosite	Present
15	Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Specialized Habitat for Wildlife	FOC4-1, FOD8-1, SWD2-1	No
16	Turtle Nesting Area	Specialized Habitat for Wildlife	MAS2-1	Yes
17	Amphibian Breeding Habitat (Woodland)	Specialized Habitat for Wildlife	FOC4-1, FOD8-1, SWD2-1	Yes
18	Amphibian Breeding Habitat (Wetlands)	Specialized Habitat for Wildlife	SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO	Yes
19	Woodland Area-Sensitive Bird Breeding Habitat	Specialized Habitat for Wildlife	FOC4-1, FOD8-1, SWD2-1	Potential
20	Marsh Bird Breeding Habitat	Habitat for Species of Conservation Concern	MAM2-2	No
21	Open Country Bird Breeding Habitat	Habitat for Species of Conservation Concern	CUM1-1	No
22	Shrub/Early Successional Bird Breeding Habitat	Habitat for Species of Conservation Concern	CUT1	No
23	Terrestrial Crayfish	Habitat for Species of Conservation Concern	SWD2-1, SWT2-2, MAM2-2, MAS2-1	Potential

3.8.2. Shorebird Migratory Stopover Area (MAM2-2)

The criterion for this value requires that aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use days. All of the listed ecosites are quite small in size with less-than-optimal waterfowl habitat. In all of the field visits conducted, there were fewer than 10 waterfowl observed. No further study required.

3.8.3. Raptor Wintering Area (FOC4-1, FOD8-1, CUM1-1, CUT1, SWD2-1)

Raptor wintering areas must be a minimum of 20ha in area and include at least 15ha of idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands. These conditions do not exist within the study area. No further study is required.

3.8.4. Bat Maternity Colonies (FOD8-1, SWD2-1)

This feature is associated with Big Brown Bats and Silver-haired Bats. Neither of these species were detected with the passive ultrasonic recorder that was deployed in May in these ecosites. The only species that was present was the Hoary Bat. However, there are some suitable roost trees within these ecosites. The recommended mitigation measure would be to protect the ecosite in its entirety. These ecosites will be retained for multiple values. No further study required.

3.8.5. Turtle Wintering Areas (SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO)

The only ecosite where turtles were observed was the stormwater ponds (OAO). One painted turtle and one snapping turtle were observed during the turtle basking surveys that were conducted over 4 site investigations. It is possible that this value does exist within the OAO ecosite. However, the criteria states that man-made ponds such as sewage lagoons or storm water ponds should not be considered significant wildlife habitat. No further study required.

3.8.6. Lizard Hibernaculum (FOD8-1)

The study area is out of the typical range of the Common five-lined skink. No further study is required.

3.8.7. Colonially – Nesting Bird Breeding Habitat (bank/cliff) (CUM1-1, CUT1)

There are no eroding banks, sandy hills, borrow pits, steep slopes, or sand piles that would be suitable for the species listed. However, one species listed, Cliff Swallow, may be present on the site. Three Cliff Swallow nests were observed in the same barn where Barn Swallows are currently nesting. The criteria states that man-made structures do not qualify as significant wildlife habitat.

3.8.8. Colonially – Nesting Bird Breeding Habitat (Tree/Shrub) (SWD2-1)

Early spring and late fall assessments were conducted in the woodlands specifically to identify any sticknests for raptors or herons. None were observed. No further study is required.

3.8.9. Colonially – Nesting Bird Breeding Habitat (Ground) (MAM2-2, MAS2-1)

There is no suitable habitat for this feature. No further study is required.

3.8.10. Migratory Butterfly Stopover Area (CUM1-1, CUT1, FOC4-1, FOD8-1)

A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present and will be located within 5 km of Lake Ontario. The study area does not meet this requirement. No further study is required.

3.8.11. Landbird Migratory Stopover Area (FOC4-1, FOD8-1, SWD2-1)

Woodlots will be a minimum of 10 ha in size and will be located within 5 km of Lake Ontario. The study area does not meet this requirement. No further study is required.

3.8.12. Deer Wintering Concentration Area (FOC4-1, FOD8-1, SWD2-1, CUT1)

Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on Ministry of Natural Resources and Forestry (MNRF) studies or assessment. Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. None of the woodlands have been identified by MNRF as significant. However, the woodlands have multiple values and will be retained.

3.8.13. Old Growth Forest (FOC4-1, FOD8-1, SWD2-1)

This criterion requires woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest and if dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat. This feature is not present within the study area. No further studies are required.

3.8.14. Waterfowl Nesting Area (SWD2-1, SWT2-2, MAM2-2, MAS2-1)

This criterion requires the presence of 3 or more nesting pairs for listed species excluding Mallards, or; 10 or more nesting pairs for listed species including Mallards. One nesting pair of Mallards and two nesting pairs of Canada Geese were confirmed for the site. This does not meet the threshold of significance. No further studies are required.

3.8.15. Bald Eagle and Osprey Nesting, Foraging and Perching Habitat (FOC4-1, FOD8-1, SWD2-1)

There is a man-made osprey nesting platform on the south side of Second Line just west of Highway 6. There was a nesting pair using the site in 2020 and they were observed foraging within the study area as well. However, the criteria specifies that nests located on man-made objects are not to be included as significant wildlife habitat (e.g. telephone poles and constructed nesting platforms). No further study is required.

3.8.16. Turtle Nesting Area (MAS2-1)

Only one location has been identified as a confirmed turtle nesting area. Two snapping turtle nests were observed between the stormwater ponds (OAO) in the granular substrate used for the access road. No other turtle nesting sites have been confirmed.

3.8.17. Amphibian Breeding Habitat (Woodland) (FOC4-1, FOD8-1, SWD2-1)

The woodlands all meet the minimum size requirement and the call recorders as well as casual observations confirm at least three species (wood frog, spring peeper, gray tree frog) from the designated list confirming that this would be considered significant wildlife habitat.

3.8.18. Amphibian Breeding Habitat (Wetland)(SWD2-1, SWT2-2, MAM2-2, MAS2-1, OAO)

At least three of the listed species (American toad, gray treefrog, green frog) appear to be breeding in numbers that would qualify these ecosites as significant

wildlife habitat. Again, these calls were confirmed through the call recorders, amphibian surveys and casual observations.

3.8.19. Woodland Area-Sensitive Bird Breeding Habitat (FOC4-1, FOD8-1, SWD2-1)

Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30 ha and interior forest habitat is at least 200 m from forest edge habitat. None of the woodlands meet the habitat description but two listed species (Winter Wren, Yellow-bellied sapsucker) were present during the breeding season. This would not be considered significant wildlife habitat since it does not meet the criterion.

3.8.20. Marsh Bird Breeding Habitat (MAM2-2)

The Phragmites dominated mineral meadow marsh is very small and poor quality. Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species is necessary to be considered significant wildlife habitat. None of the listed species are present. No further study is required.

3.8.21. Open Country Bird Breeding Habitat (CUM1-1)

The criterion requires large grassland areas (includes natural and cultural fields and meadows) >30 ha and presence of nesting or breeding of 2 or more of the listed species. The CUM1-1 ecosite is well below the minimum threshold size and there is no evidence of 2 or more nesting pairs of the listed species. A single calling male Vesper Sparrow was observed early in the breeding season within this ecosite but was not heard again later in the breeding season.

3.8.22. Shrub/Early Successional Bird Breeding Habitat (CUT1)

The criterion requires large field areas succeeding to shrub and thicket habitats>10ha in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or live-stock pasturing) in the last 5 years. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. The cultural thicket that is present is much smaller than the minimum requirement and it has been used for agricultural purposes on and off over the years. No further study required.

3.8.23. Terrestrial Crayfish (SWD2-1, SWT2-2, MAM2-2, MAS2-1)

The criterion requires the presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. None have been observed to date.

3.9. Significant Areas of Natural and Scientific Interest

There are no significant areas of natural and scientific interest within the study area.

3.10. Fish Habitat

The tributary to Swan Creek is part of the Nichol Drain system. Fish community investigations were undertaken on July 2, 2020. At the time of the survey, portions of the watercourse were dry or just isolated pools about 100m upstream of Second Line. Common shiner, Northern redbelly dace and creek chub were captured. None of these species would be indicative of a coldwater thermal regime. However, Swan Creek and its tributaries are classified as a coldwater system and certain reaches of Swan Creek support brook trout populations. Agricultural activities have occurred right up to the top of the bank in many locations. There is localized erosion of the banks and sediment deposition in some areas. There is a culvert under Highway 6, another culvert supporting an agricultural access in one of the fields and the last culvert conveys flow under Second Line. Thermal imaging of reaches of the tributary were completed on July 6, 2021 to identify any groundwater seepages and discharges into the stream. None were identified.

3.11. Summary of Natural Heritage Features and Systems

With the exception of the Barn Swallow nesting site, all of the natural heritage values were associated with the Core Greenlands area where multiple and overlapping values exist. The remainder of the study area is mainly active agricultural lands with crops such as soybean and corn crops. There are no natural functional buffers currently for the natural heritage systems that are present. There are opportunities to improve the natural heritage systems by creating a naturalized buffer area and create natural spaces that are not required for development.

4. Impact Analysis

The details of the undertaking are shown on **Figure 1**, the Preferred Land Use Plan, prepared by MHBC (February 13, 2023).

The proposed development consists of a mixture of residential, commercial and institutional. The residential development includes low density, medium density and mixed-use features. The commercial development includes gateway commercial, highway commercial and mixed-use features. The development will also include a community park, neighbourhood parks and recreation trails. The institutional development will be a future school location. The development will be served by a network of internal roads and services along with stormwater management facilities incorporated into the plan. The natural heritage features and systems contained within the Core Greenlands will be retained, buffered and enhanced where opportunities exist.

Potential impacts arising from the proposed development were determined by evaluating the details of the proposed undertaking and the characteristics of the area. The following is a description of the types of impacts that will be discussed:

- Direct impacts to the natural features associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking;
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality;
- Induced impacts associated with impacts after the development is constructed, such as subsequent demand on the resources created by increased habitation/use of the area and vicinity; and
- Cumulative impacts associated with impacts to lands in close proximity to the subject area.

4.1. Direct Impacts and Mitigation

The following areas are proposed to be retained in the Preferred Land Use Plan:

- The entire Core Greenlands that includes wetland, woodland and fish habitat features (**Figure 3**);
- The house located on the property identified as being of cultural heritage value or interest (7856 Second Line);
- The portion of the Naturalized Spruce or Cedar Hedgerow (FOCM6) that lies north of the Core Greenlands connecting to McQueen Blvd. west of Tower Street South will be retained as part of the proposed trail corridor;

- The Naturalized Spruce or Cedar Hedgerow (FOCM6) that lies directly north of the existing Stormwater Management Ponds on the east side of Tower Street South that connects to McQueen Blvd. will be retained as part of the proposed trail corridor;
- The Naturalized Spruce or Cedar Hedgerow (FOCM6) that lies directly north of 2nd Line that forms the western boundary of the property of cultural heritage value or interest will be retained as part of the proposed trail corridor;
- The majority of the Naturalized Maple Hardwood Treed Hedgerow (FODM11) and Naturalized Ash Hardwood Treed Hedgerow (FODM12) that borders Guelph Street, 2nd Line and Scotland Street/Jones Baseline with the exception of localized road improvements and intersection treatments; and
- A 30m buffer adjacent to the Core Greenlands area has been recommended to be established and retained.

The following areas are proposed to be removed in the Preferred Land Use Plan:

- Two existing residences located on Guelph Street and on Scotland Street;
- All of the Agricultural Lands as identified in **Figure 2**;
- A portion of the Naturalized Spruce or Cedar Hedgerow (FOCM6) along the new alignment of McQueen Blvd. immediately east of Guelph Street;
- Two existing locations of Dry to Moist Old Field Meadow Type (CUM1-1) within the medium density residential block south of McQueen Blvd. east of Tower Street South and in the central part of the mixed use corridor immediately west of Tower Street South;
- The Naturalized Spruce or Cedar Hedgerow (FOCM6) surrounding the existing residence on Scotland Street; and
- The barn that has been identified as Barn Swallow nesting habitat at the residence on 2nd Line.

The proposed Stormwater Management facilities in some cases will be situated within the 30-metre buffer and will be designed to create some naturalized habitat that will buffer the Core Greenlands from the residential, commercial and institutional land uses.

4.1.1. Core Greenlands Buffer

It is recommended that a 30-metre contiguous buffer be applied to the Core Greenlands area that includes the protected Natural Heritage Systems (**Figure 3**). Currently the agricultural land uses extend directly to the edge of the Core Greenlands with no transition between the natural heritage features and the agricultural land use. A 30-metre buffer is generally accepted as a functional buffer. Most 30-metre buffers originate from the approximate maximum height of

native trees in Ontario. This creates a shading and thermal regime that is capable of protecting the Core Greenlands vegetation and provide adequate shielding for wildlife using the Core Greenlands.

A revegetation plan for the 30-metre buffer as well as a naturalization plan for the Stormwater Management facilities that will be partially situated within the buffer provides an opportunity to enhance the Core Greenlands features and functions that does not currently exist. Currently the agricultural land use is unbuffered to the adjacent Core Greenlands. The 30-metre buffer also provides an opportunity to create a low-impact trail corridor adjacent to the Core Greenlands for natural heritage appreciation.

4.1.2. Bird Nest Destruction

The Migratory Birds Convention Act protects migratory birds, their eggs and nests from being harmed or destroyed. During this period they recommend that no clearing of vegetation occur within these habitats. Environment Canada identifies the study area as Nesting Zone C2 with a corresponding nesting period of April 1 to August 31[19]. Nest searches, as a measure to mitigate impact to nesting birds during the core breeding period should not occur within "complex" habitats such as woodlands where the likelihood of observing all nests and eggs is low while the potential to disturb nesting birds is high. However, nest searches, as a means of mitigation during the core breeding period, may be undertaken in "simple" habitats such as hedgerows, bridges and other constructed features where the potential to observe all active nests is relatively high. This timing restriction will also apply to the removal of the barn that functions for nesting Barn Swallows.

[19] https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html#toc0

Figure 3. Natural Heritage Systems protected with a 30m Buffer

4.2. Indirect Impacts and Mitigation

Potential sources of indirect impacts associated with the proposed development include potential changes to groundwater and surface water flow patterns, changes to water quality, sedimentation and erosion, and impacts to wildlife.

4.2.1. Surface Flow and Groundwater Water Balance

A stormwater management strategy (**Figure 3**) has been prepared by Tatham Engineering entitled South Fergus MESP & Secondary Plan Surfacewater Resources, Flood Plain Hydraulics & Erosion Assessment Existing Conditions (July 26, 2021). This report is guided by the following documents:

- Nichol Drain No. 2 Subwatershed Study, R.J. Burnside & Associates Limited, 1996;

- Development Manual (Draft), Township of Centre Wellington, 2018;
- Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation, Grand River Conservation Authority, 2015;
- Policies and Procedures for Compliance with the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation, Grand River Conservation Authority, 2009;
- Technical Guide – River & Stream System: Flood Hazard Limit, Ontario Ministry of Natural Resources, 2002; and
- Technical Guide – River & Stream Systems: Erosion Hazard Limit, Ontario Ministry of Natural resources, 2002.

Based on the current Preferred Land Use Plan and utilization of the above stormwater management recommendations, it is not anticipated that there will be any significant impacts to the natural features on the subject property.

The stormwater management approach is to discharge stormwater from the SWM facilities into Nichol Drain No. 2. The exceptions are SWMF 403 which will drain into the upstream tributary and SWMF 406 which will drain northerly to existing facilities at McQueen Blvd. Surface runoff from the study area is conveyed through a municipal drain complex (Nichol Drain No. 2) that drains into Swan Creek, south of the Secondary Plan area. Surface runoff from the Cherry Hill Estates subdivision is conveyed via storm sewer and the municipal road allowance to the drainage channel constructed at the rear of the Highway Commercial lands fronting Tower Street South (Highway 6). The drainage channel conveys runoff to the water quantity and quality control SWMF constructed west of Nichol Drain No. 2, immediately east of Tower Street South (Highway 6) as part of the Highway Commercial development.

The SWMF was designed to provide the requisite water quantity and quality controls for the Cherry Hills Estates subdivision, the Highway Commercial lands and a portion of the future development lands within the Secondary Plan area.

Within the Secondary Plan area, there are three culvert crossing located on Nichol Drain No. 2, two road crossings and a farm access crossing as follows:

- Tower Street South (Highway 6) - 1820 mm × 3020 mm concrete box culvert;
- Farm Access – 1200 mm diameter CSP culvert; and
- 2nd Line - 1800 mm × 3000 mm concrete box culvert.

Although not explicitly stormwater infrastructure, the on-site wetlands also provide water quantity and quality control. The wetlands attenuate peak flows by storing runoff and releasing it into the downstream drainage system at reduced

rates. In storing the water, the wetland also provides time for sediment and contaminates to settle out of the runoff and nutrient uptake through wetland vegetation, treating the runoff.

4.2.2. Changes to Water Quality and Infiltration

The proposed stormwater management facilities shall be consistent with Level 1 "Enhanced" water quality control in the form of 80% total suspended solids (TSS) removal is required for all discharges to the two municipal drains.

Forebays constructed at each inlet of the SWMFs will provide sufficient water quality treatment for the runoff generated by the areas proposed in the Secondary Plan area. Forebays have been sized to provide adequate settling and dispersion lengths and storage volumes for the sediments being conveyed in the runoff.

The maintenance of infiltration and water balance has also been a consideration in the development of the stormwater strategy for the area. Based on the background groundwater and hydrogeological work completed and included under separate cover infiltration targets have been established for each development area. Low impact development techniques such as soakaway pits and rain gardens on lots and common space areas can be implemented to achieve the necessary balance. Given the predominance of relatively high groundwater levels in many areas infiltration targets and implementation strategies should be revisited at the time of detailed design to confirm feasibility.

4.2.3. Sediment and Erosion

The MNRF Technical Guide – River and Stream Systems: Erosion Hazard Limit defines the erosion hazard limit for an unconfined system as 20 times the bankfull channel width centered on the meander belt axis. The Fluvial Geomorphological Characterization and Erosion Threshold Assessment provides a preliminary assessment of potential geomorphic change and erosion potential of Nichol Drain No. 2. The geomorphological characterisation indicates the channel reaches through the Secondary Plan area are susceptible to erosion and channel instability. The erosion hazard limits have therefore been established as 20 times the assessed bankfull width of each respective channel reach in accordance with the MNRF guidelines. The proposed vegetated 30-metre buffer will provide enhanced mitigation that does not currently exist.

A sediment and erosion control plan will be developed in accordance with appropriate guidelines and will include:

- Placement of all sediment control fencing where required;

- Construction of permanent and temporary stormwater management ponds which will serve as sedimentation basins for the site during the construction period;
- Construction of temporary swales to direct runoff to sedimentation basins, with rock check dams as required to control velocities;
- Stripping and strategic placement of topsoil stockpiles. Placement of sediment control fencing around all stockpile areas; and
- Re-vegetation of topsoil piles as soon as possible after construction, including those areas not slated for construction within 30 days.

An environmental monitoring program is recommended to ensure that the sediment and erosion control measures are installed, maintained and functioning as intended.

4.2.4. Indirect Impacts to Wildlife

Potential indirect impacts to wildlife may arise from noise and dust associated with construction activities and unnatural lighting resulting from the development. Noise associated with construction is anticipated to be temporary; therefore significant effects on wildlife from noise are not expected.

During construction activities such as tree clearing, grubbing, excavation and grading, dust can potentially lead to the following issues:

- Large amounts of dust may induce changes in vegetation due to increased heat absorption and decreased transpiration;
- High levels of dust can fall into aquatic or wetland systems, causing adverse effects to plants and/or wildlife that are not adapted to high levels of sedimentation, and
- Dust produces an immediate visual impact.

Impacts of dust will be mitigated through the strategic placement of topsoil stock piles and immediate re-vegetation of completed areas following construction.

During site preparation and construction activities involving a lot of noise, wildlife may temporarily avoid the area. Timing of construction activities will be appropriate as to not interfere with peak mammal and bird breeding seasons.

Detailed lighting designs should be provided at the detailed design stage. Lighting designs should include directional lighting for all areas of road and developments that are within 30m of the Core Greenlands and natural heritage features to eliminate light wash. Building design practices should also be considered that reduce window strikes for bird species.

The watermain system will include locations where it will be necessary to cross the Nichol Drain No. 2 (**Figure 4**). A Request for Review will be submitted to Fisheries and Oceans Canada that will include timing restrictions, reduced disturbance zones and revegetation and regrading of banks to restore the drain system and protect fish habitat.

4.2.5. Induced Impacts and Mitigation

There may be an increase in the potential for interaction between humans and domestic pets and wildlife, as well as an increase in human access into the retained and restored naturalized areas. These can result in vegetation trampling, plant removal, dumping of refuse, creation of unauthorized trails, tree damage, introduction of non-native plant species and wildlife predation and harassment by domestic pets. However, since there are existing homes in the area and associated housing already present, these impacts are not expected to be significant. The provision of a designated trail corridor as part of the plan will also assist in minimizing any potential impacts.

In addition, natural areas will be protected by restricting access and human activities within the natural areas. Signage will direct residents to respect the naturalized areas. Further measures such as rear lot fencing and environmental brochures for homeowners will assist in preventing human induced impacts to the naturalized areas.

The existing agricultural areas currently provide an anthropogenic food source for a variety of wildlife including white-tailed deer, raccoons and rodents. The removal of this land use will also remove this anthropogenic food source. There may be short-term adjustments in the wildlife population induced by the removal of this artificial food source.

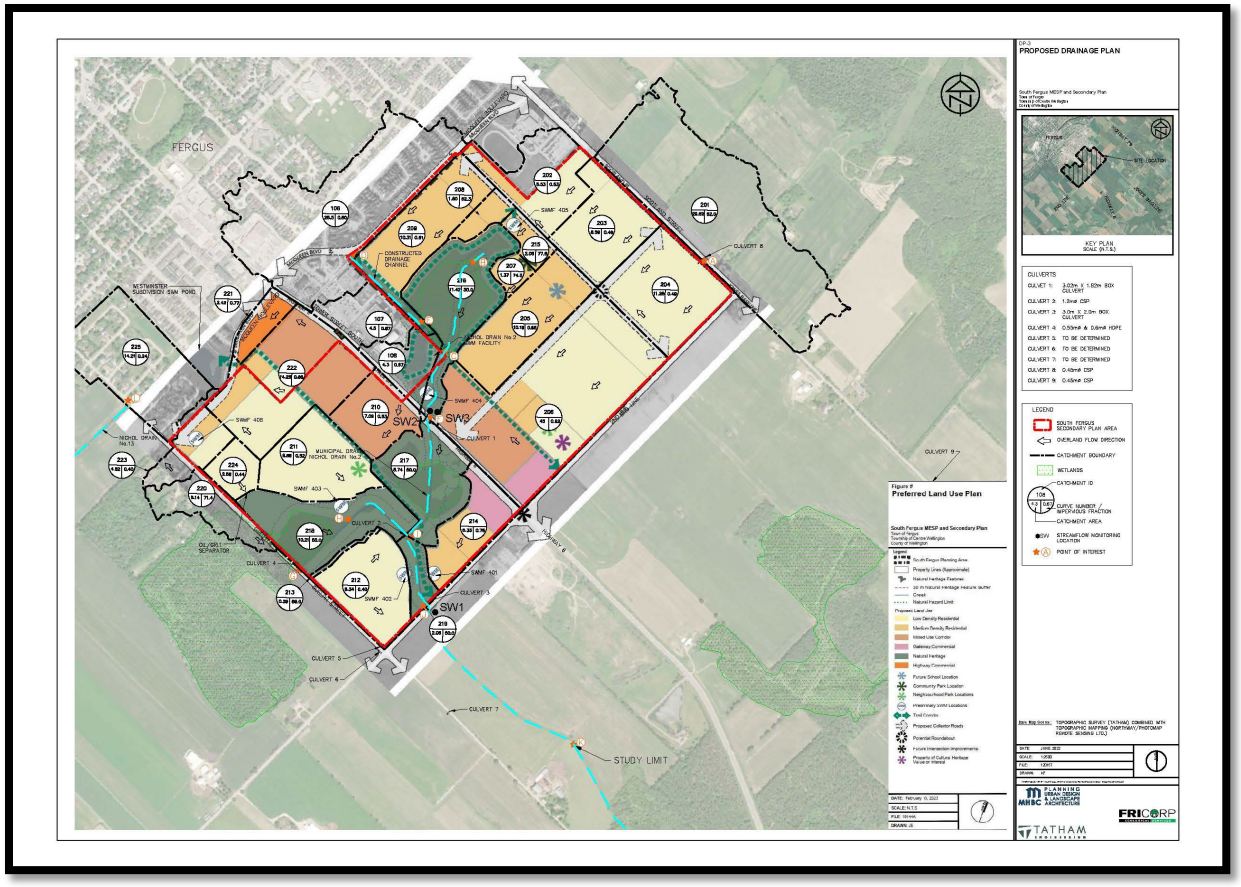


Figure 4. Drainage Plan

4.2.6. Cumulative Impacts

The lands in the vicinity of the subject property consist of low-density residential areas, agricultural lands, and Core Greenlands that continue south and west of the Study Area. In order to evaluate the potential for cumulative impacts resulting from this development, we have looked beyond the boundaries of the subject property to the neighbouring lands. This approach looks at the character and potential changes that are occurring or may occur in the future on surrounding lands. It is important to recognize the ecological significance of the natural features on the subject property within the larger landscape context and identify potential cumulative effects from the proposed development.

Construction practices are not expected to directly disturb the Core Greenlands within the study area or the contiguous components west and south of the Study Area. Recommendations for the establishment of enhanced buffers will mitigate any potential loss of function or connectivity to adjacent Core Greenlands and natural heritage systems.

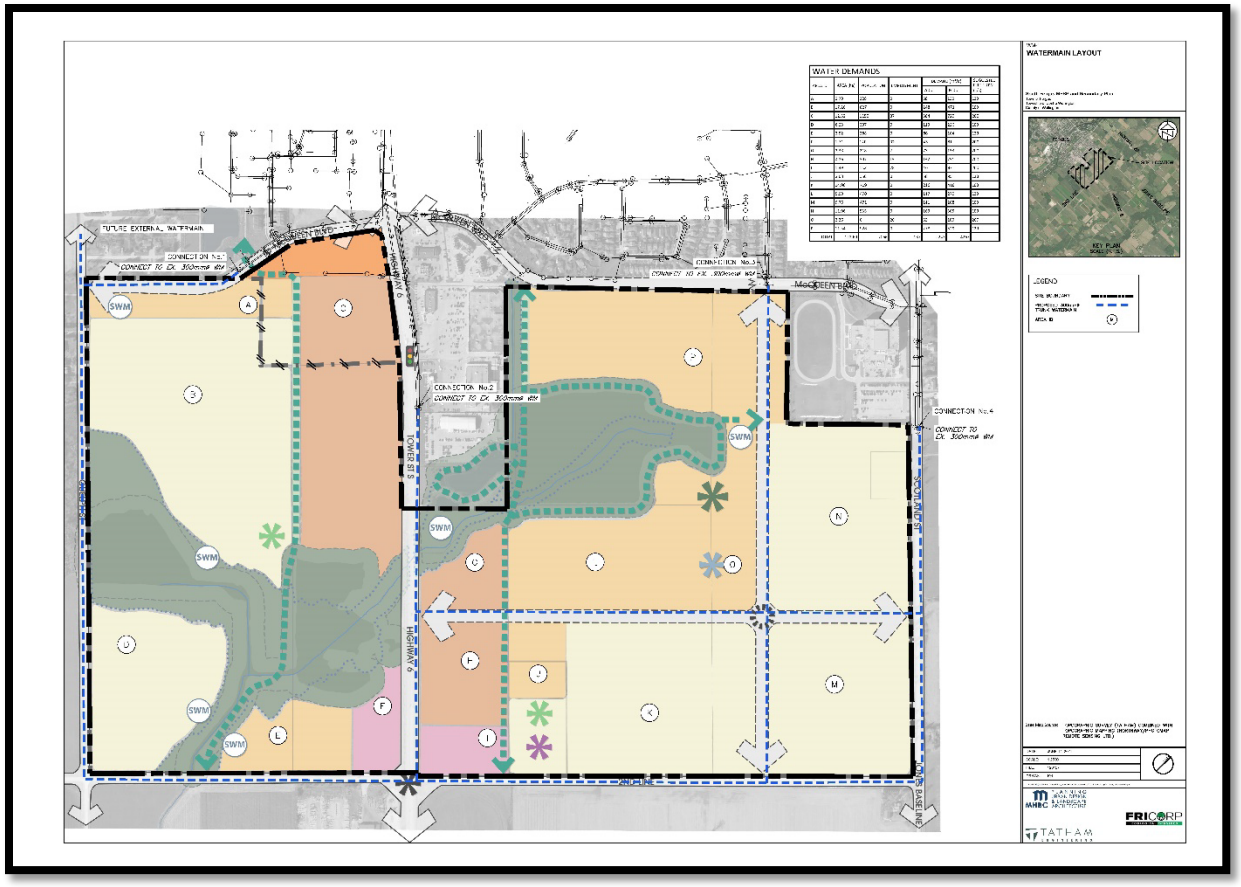


Figure 5. Watermain System

5. Opportunities for Enhancement and Restoration

The proposed Land Use Plan provides a number of opportunities to restore and enhance features and functions associated with the identified natural heritage systems.

5.1. Natural Heritage System Buffers

The establishment of naturally-vegetated 30-metre buffers surrounding the entire natural heritage system will provide a range of enhancement and restoration functions. Currently the three woodland/wetland areas within the core greenlands are narrowly connected by the small watercourses. Agricultural land use is currently carried out virtually from the top of the bank of the watercourse. Watercourses provide valuable linkages and connections that bridge the gaps between natural heritage features. The provision of a 30-metre buffer on either side of this small watercourse will create a much more substantial linkage and the addition of natural vegetation will create better shielding for a more functional linkage.

In general, the addition of a 30-metre to the wetlands and significant woodlands will functionally expand the natural analog of these features and provide a better transition between land uses than currently exists.

5.2. Erosion, Sediment Transport and Nutrient Exchange

The existing agricultural land use on the site promotes accelerated drainage, erosion risks and little opportunity for natural nutrient exchange between terrestrial and aquatic habitats. The naturally-vegetated buffers will provide an enhanced system to address these negative impacts to the associated watercourses. There is evidence of erosion and sediment transport along the banks of the watercourse in several locations due to the agricultural land use. The planting of native riparian shrubs and trees addresses all three issues. The extensive rooting systems of riparian vegetation binds soil particles and reduces the impacts of stormwater and associated sediment transport. Riparian vegetation also provides nutrient uptake from the soil and a more balanced nutrient exchange with the aquatic habitats through the addition of organics to watercourse systems.

5.3. Stormwater Management

The installation of six stormwater management facilities (SWMF) throughout the development can also provide enhancement and restoration benefits. Five of the six SWMF are situated directly adjacent to the existing natural heritage systems providing additional buffering between dissimilar land uses. The existing watercourse has become somewhat ephemeral as a result of the historic man-made alterations that included accelerated drainage of the agricultural fields, straightening of the stream channel and the removal of riparian vegetation. The SWMF will collect stormwater from storm events and slowly discharge flows in a more controlled manner that may improve the habitat of the streams that currently are dry for large portions of the year. The SWMF themselves will likely become refuge habitat for the resident minnow species and will serve as a pool to restock portions of the stream during drier periods. The existing SWMF on the east side of Tower Street/Highway 6 already provide some of these functions and the additional SWMF will likely function in a similar manner.

Beyond the water quantity functions, the SWMF can provide habitat for waterfowl, foraging birds, mammals, amphibians, turtles, fish and a variety of insects. The existing SWMF on the east side of Tower Street/Highway 6 is good evidence of the potential for the new SWMFs to be constructed. Snapping turtles, snapping

turtle nests, beavers, muskrats, three species of amphibians, waterfowl, foraging swallows, fish were all observed in the existing SWMF.

6. Stewardship and Monitoring

The residential development that will occur surrounding these key natural heritage systems will require some stewardship and monitoring to ensure that the features continue to function as intended.

The proposed non-motorized trail presents the best opportunity to encourage stewardship. Interpretive signage placed along the trail corridors highlighting the valuable natural heritage features contained within the protected area will educate those that use the trail networks and provide an appreciation for their inherent values.

Developing a name for the for the protected natural heritage system within the development is a good first step in creating appreciation for the values and creating a common way to refer to the area.

A generic monitoring system of monitoring stations (**Figure 6**) and monitoring activities has been developed but can be further refined as details become available about the specific development activities. **Table 4** suggests some basic and generic monitoring activities to ensure the continued function of the natural heritage systems.

It should be noted that stewardship and monitoring will largely be founded on detail designs and as such, the following measures are a generic framework for reference and future development.

Figure 6 Proposed Biological Monitoring Stations

Table 4 Suggested Generic Monitoring Program

Monitoring Phase	Item #	Monitoring Commitment	Biological Monitoring Stations	Monitor Qualifications
Pre-Construction	1	Baseline monitoring of active Barn Swallow nests in the barn to be removed immediately prior to the season for demolition.	1	Environmental Professional
	2	Mark out woodland dripline, wetland boundaries and 30 m buffer in the field	Where required	Environmental Professional/ Landscape Architect
	3	Baseline monitoring of existing streambank stability and riparian vegetation	5 & 7	Environmental Professional
	4	Baseline documentation of natural heritage system buffer area	3, 4 & 6	Environmental Professional
	5	Ensure erosion and sediment controls are installed and functioning prior to construction as per ESC Plan	Where required	Professional Engineer/ Hydrogeologist

Monitoring Phase	Item #	Monitoring Commitment	Biological Monitoring Stations	Monitor Qualifications
During Construction	6	On-going monitoring of the ESC Plan components	Where required on a monthly basis or as per the plan	Professional Engineer/ Hydrogeologist
	7	Disturbed soil shall be revegetated and inspected at 30, 60 and 90 days to ensure adequate revegetation has occurred.	Where required as required	Professional Engineer/ Hydrogeologist
	8	Continue to monitor key boundaries such as dripline, wetland and buffers to ensure compliance	Monthly where required	Environmental Professional
	9	Inspect the Stormwater Management Facility for vegetation establishment, structures, and hydraulic controls	Once per season and after significant storm events	Professional Engineer/ Hydrogeologist & Environmental Professional
	10	All planted material shall be inspected prior to planting to ensure the correct species, health, condition and planting location	Where required as required	Landscape Architect/ Arborist/ Professional Forester
	11	Baseline monitoring of existing streambank stability and riparian vegetation	5 & 7 on a monthly basis or per the ESC Plan	Environmental Professional

Monitoring Phase	Item #	Monitoring Commitment	Biological Monitoring Stations	Monitor Qualifications
Post-Construction	12	Ongoing monitoring of the erosion and sediment controls as per ESC Plan until no longer required	Where required on a monthly basis or as per the plan	Professional Engineer/ Hydrogeologist

	13	Disturbed soil shall be revegetated and inspected at 30, 60 and 90 days to ensure adequate revegetation has occurred.	Where required as required	Professional Engineer/ Hydrogeologist
	14	Inspect the Stormwater Management Facility for vegetation establishment, structures, and hydraulic controls until such time as Municipality assumes the SWMF	Inspect the Stormwater Management Facility for vegetation establishment, structures, and hydraulic controls	Professional Engineer/ Hydrogeologist & Environmental Professional
	15	Final inspection of all planted material and recommend any replacements	Upon completion of warranty period	Landscape Architect/ Arborist/ Professional Forester
	16	Final condition monitoring of existing streambank stability and riparian vegetation	5 & 7	Environmental Professional

7. Conclusions

This EIA provides a comprehensive description of the natural and naturalized features and functions of the study area as well as neighbouring lands. The proposed development includes the retention and enhancement of the natural heritage systems through established buffers and naturalizing these buffer areas from agricultural lands to more natural analogs.

The documented impacts suggested mitigation and monitoring are based on a high-level evaluation and will be fine-tuned at the detailed design stages of the development to ensure consistency with the intent of this EIA.

All future development activities immediately adjacent to the identified natural heritage systems and associated buffers should be carefully planned and monitored to maintain the features and functions.

All activities that may have a direct impact to fish habitat shall be reviewed within the context of the contemporary guidelines through Fisheries and Oceans Canada to maintain compliance with the *Fisheries Act*. Specific activities such as water crossings may require a Request for Review through Fisheries and Oceans Canada.

The removal of the barn identified as Barn Swallow habitat shall be conducted as per the timing restrictions contained in Section 4.1.2. It should be noted that the *Endangered Species Act* is a dynamic piece of legislation and as such, prior to activities, the ESA and associated regulations shall be checked to ensure any changes are complied with.

Based on the contents of this EIA, the proposed development will not create significant negative impacts to the identified natural heritage features and systems and is in compliance with the applicable policies and legislation.

MA6#HB3c

Respectfully Submitted By:

Rod Bilz (Environmental Specialist)

APPENDIX 1

Terms of Reference

South Fergus Master Environmental Servicing Plan & Secondary Plan

(January 2021)

TERMS OF REFERENCE

SOUTH FERGUS MASTER ENVIRONMENTAL SERVICING PLAN AND SECONDARY PLAN

(Updated January 2021)

OVERVIEW

The following Terms of Reference ("TOR") have been prepared to direct preparation of a Master Environmental Servicing Plan ("MESP") and Secondary Plan for the South Fergus Secondary Planning Area.

The Study Area consists of lands outside the Built Boundary of the Fergus Urban Area that are located to the east and west of Highway 6 and north of Second Line. The Study Area has an area of approximately 152 hectares and is known as the South Fergus Secondary Planning Area. **Appendix A** to these TOR illustrates the extent of the Study Area.

The purpose of the MESP and Secondary Plan are to:

a. Identify and categorize natural features and functions;
b. Determine natural areas to be maintained, restored and/or enhanced;
c. Delineate potential development areas and protection areas;
d. Define the limits of natural heritage features;
e. Recommend buffers and mitigation measures necessary to maintain or improve ecological sustainability of the area;
f. Identify stormwater management facility locations and quantity/quality control recommendations;
g. Identify phasing of development based on infrastructure opportunities and constraints and the availability of community services in accordance with a complete community approach;
h. Provide input to the preparation of a Secondary Plan which, including the completion of the following:
    - Stormwater Management Plan
    - Transportation Plan
    - Environmental Impact Assessment
    - Servicing Strategy
    - Urban Design Guidelines
    - Fiscal Impact Study, including Development Charges Study
    - Development Phasing Study
    - Parks Concept Plan
    - Archaeological Assessment
    - Cultural Heritage Resource Evaluation & Assessment
    - Hydrogeological and Groundwater Impact Assessment;
i. Establish a land use plan and implementing policies for the South Fergus area to be implemented through an Official Plan Amendment; and,
j. Provide specific direction to more detailed reports to be prepared in support of future planning and development applications.

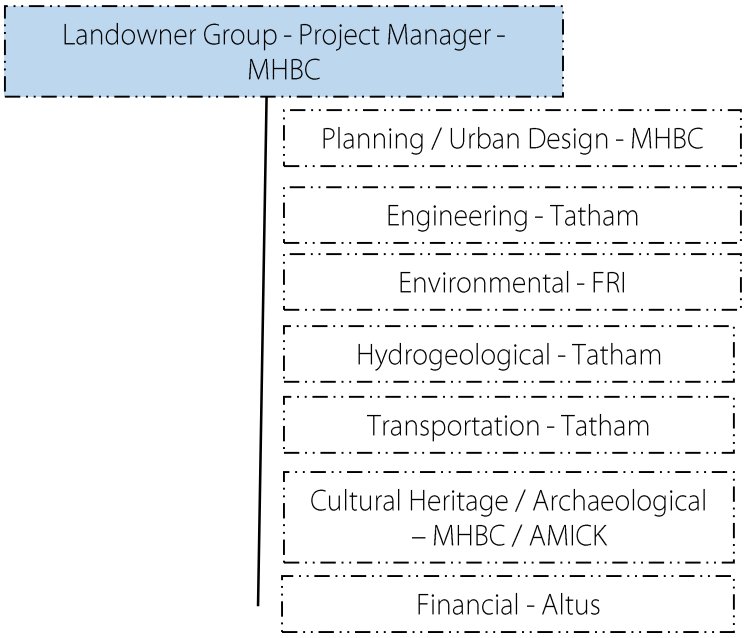
The MESP Study will address issues related to natural heritage, natural hazards, servicing and stormwater management and will be prepared in accordance with Section D.11, E11 and E.1.3 of the Township of Centre

Wellington Official Plan. Consideration will also be given to the County of Wellington Official Plan policies 4.6, 4.9, 9.2.5 as well as GRCA policy documents (i.e. Grand River Fisheries Management Plan, 1998) and complementary Implementation Plan (2001).

The Secondary Plan will address the policies of the Official Plan related to the detailed planning of the South Fergus Secondary Planning Area in order to facilitate its orderly development. The Secondary Plan will address the mix, arrangement, and density of land uses; recommended street pattern; the size and location of neighbourhood parks and school sites and the location of major services. The Secondary Plan will provide a conceptual framework for the area and will provide the basis for the preparation of future *Planning Act* applications. The Secondary Plan will be prepared in accordance with the policies of the Township of Centre Wellington Official Plan.

The MESP and Secondary Plan are to be completed in coordination with the County, Township and GRCA in the context of a Technical Advisory Committee ("TAC") process, including public consultation, agency input and approval. The TAC will be established prior to approval of the Terms of Reference and will include County, Township and GRCA staff, at a minimum. A Study Process Flowchart is included as **Appendix B.**

The following project team has been retained by the property owners to complete the MESP and Secondary Plan:



Key project team information is included in **Appendix C**.

The Project Team has prepared this TOR for review and acceptance to establish and confirm the scope of work associated with the various studies required to complete the MESP and Secondary Plan, including identified field work associated with the TOR.

A Public Consultation Process has been outlined in this TOR to occur in accordance with the requirements of the Township of Centre Wellington Official Plan and the Planning Act. Public consultation is intended for the purposes of obtaining public input and comment to inform the Secondary Plan.

BACKGROUND REVIEW AND EXISTING CONDITIONS

Study Context

The purpose of this section is to define the project objectives and to provide an initial description of the existing conditions (physical, social and regulatory) for the Study Area and surrounding lands. This information provides a context for the MESP and Secondary Plan and background for the anticipated targets and guidelines required for areas that may be suitable for development.

The background document will include a review of: the Wellington County Official Plan, Township of Centre Wellington Official Plan, Nichol Drain No. 2 Subwatershed Study and other environmental reports. This section will highlight key issues to be assessed based on the information collected through pre-consultation discussions with various groups.

Tasks include:

a. Review existing/available background information and documents.
b. Review/summarize existing policies that are applicable to the Study Area
c. Prepare base plans (topographic mapping) and aerial photographs of the Study Area for use throughout the study. Current aerial photography available from the County and GRCA will be reviewed as well as topographic data from Northway-Photomap Inc. Detailed topographical survey information may be used to establish critical key locations such as intersections, existing pipe or culvert inlets, watercourse elevations, etc.

Existing Condition Study

The intent of this Section is to present a detailed summary of the various physical characteristics of the Study Area. To obtain this data, a review of previous reports and documentation, as well as undertaking additional field work to update or obtain necessary information not included within previous studies is proposed.

The topics to be evaluated and tasks to be undertaken include:

1. Natural Environment

The following describes the proposed Natural Environment component of the Study. This study is intended to result in an Environmental Impact Assessment. **Appendix D** to this TOR includes Survey Station Locations.

a. Background Review
    - Review existing biological information from a variety of sources including: wildlife atlases, the Grand River Conservation Authority (GRCA), and Ministry of Natural Resources and Forestry (MNRF) and MECP files.
    - Review previously completed studies for the Study Area and surrounding lands.
    - Review aerial photography for the Study Area.
    - Review relevant policies and regulations, including Wellington County Official Plan, Township of Centre Wellington Official Plan and GRCA Regulations
    - Prepare GIS field maps.

    This information will be used to inform the baseline monitoring program.

b. Wetland Boundary Review
    - There are no Provincially Significant Wetlands (PSWs) present on or within 120m of the Study Area. However, the Speed-Lutteral-Swan Creek Wetland Complex is a large system that bisects the Study Area. The features and functions of this wetland system will be evaluated and assessed.

c. Significant Woodlands Review

- There are no significant woodlands identified within the Study Area.
- Any woodland areas observed will be evaluated and assessed to determine if they qualify as a significant woodland feature.

d. Species at Risk and Habitat Assessment
    - Review of the available background information for endangered and threatened species at risk for the area has been conducted. A copy of this screen is attached as **Appendix E.**
    - The Natural Heritage Information Centre database confirms three observations of threatened species for the one-kilometre squares that overlap the Study Area. Two of the observations are for Eastern Meadowlark and one is an observation of Barn Swallow. A background check with the Ministry of Environment, Conservation and Parks will be completed to confirm any other species at risk observations for the Study Area and initiate consultation.
    - Based on the ecosites present, species at risk will be screened using a habitat-based approach and where required, targeted surveys will be conducted to determine presence or absence of and species at risk.
e. Significant Wildlife Habitat Review
    - Four categories of significant wildlife habitat will be considered during field investigations, including: seasonal concentration areas, rare vegetation communities and specialized habitat for wildlife, habitat of species of conservation concern, animal movement corridors.
    - These investigations will be guided by the Significant Wildlife Habitat Technical Guide, Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E.
    - Those species at risk designated 'special concern' are considered under the significant wildlife habitat framework.
f. Fish Habitat Review
    - A tributary to Swan Creek drains in a southwest direction through the Study Area. Investigations will determine the thermal regime, fish community and sensitivities.
    - Any potential impacts that may require a review by Fisheries and Oceans Canada will be documented in a Request for Review.
g. Field Investigations

The field program includes the following components:

- Leaf-off field investigations including cavity tree surveys (bats, barn swallows, chimney swift, stick nests)
- Identify and map vegetation (Ecological Land Classification)
- Significant wildlife investigations (e.g. amphibian surveys)
- Ecological Land Classification (habitat) determination; species at risk habitat investigations
- Forest bird monitoring
- Fish habitat thermal regime
- Reptile basking surveys – turtles and snakes (SAR and SWH)
- Reptile nesting surveys
- Significant Wildlife Habitat surveys, forest bird monitoring
- Passive acoustic monitoring equipment deployment (bats & birds)
- Fish habitat assessment;
- Map existing features, assignment of direct/indirect habitat classification
- Targeted backpack electro-fisher fish community sampling
- Retrieve passive acoustic monitoring equipment and analyze recordings

h. Analysis
    - Define environmental constraint areas
    - Evaluate impacts and develop mitigation strategies
    - Prepare and submit DFO Request for review (if required)

- Prepare and submit MECP Review (if required)
- Prepare and submit Environmental Impact Study Report to form component of MESP and Secondary Plan
- Prepare recommendations related to the boundaries of the natural heritage system and associated buffer and guidelines for buffer management, biological monitoring and environmental stewardship.

2. Functional Servicing Report and Servicing Strategy

The Functional Servicing Report will inform the MESP and future Secondary Plan. The following tasks will be completed in the preparation of the FSR:

a. Establish the development build-out time-frames and associated population and employment levels for each, to be used as a basis for evaluating the future infrastructure requirements.
b. Establish the development phasing/triggers for the various external infrastructure improvements.
c. Undertake an initial review for sanitary servicing the entire Study Area including an assessment of major external infrastructure (eg., trunk sewers, sewage pumping stations, forcemains, wastewater treatment plant, etc.) premised on existing information and studies, in anticipation of future growth.
d. Municipal watermains are available along the north limit of the Study Area for future connections. Review water modelling completed by Triton Engineering for the Township of Centre Wellington for the urban boundary of Fergus in order to identify any servicing issues with respect to municipal water supply, storage and distribution.
e. Contact the utility providers (gas, electrical, and communications) to establish what existing facilities are available in the area, and what improvements are required to adequately service the development plan.
f. Prepare conceptual plans demonstrating the serviceability of the subject lands, including their relationship to road grades, grading, wetlands/woodlots and environmental features, including:
    - Cut/fill analysis of the site to determine the quantity of material to be imported or exported from the site, and identification of the locations where significant filling or cutting.
    - Consideration of groundwater depths.
    - Preliminary grading, in consultation with the environmental recommendations, to establish road grades at accesses, boundary grades and buffer considerations.
    - Identification of "major" overland flow routes directed to downstream stormwater management facilities.
    - General road network arrangement for accommodation of transportation, servicing and development needs.
g. Establish projected time of need for infrastructure improvements in consideration of the development horizons.

3. Surface Water Resources & Stormwater Management Strategy

The South Fergus Secondary Plan Study Area is within the Nichol Drain No. 2 Subwatershed. A Subwatershed Study was completed in 1996 to assess impacts to the subwatershed as a result of development at the south end of Fergus. An update to this study will be completed as a component of the MESP and in support of the Secondary Plan.

The preliminary stormwater management strategy will form part of the MESP and include: a review of relevant on site information; a review the recommendations of the earlier subwatershed study; a review of the catchment areas and the locations of the proposed stormwater management facilities; preparation of a

hydrologic model reflecting proposed conditions; completion of preliminary design calculations and drawings; preparation of a water budget analysis; and, preparation of the preliminary stormwater management strategy and associated drawings. Surface Water Monitoring Locations are shown on **Appendix F.**

The following tasks are proposed:

a. Confirm the study limits from a hydraulics and floodplain mapping perspective
b. Undertake erosion assessment
c. Initiate discussions with the MNRF regarding wetlands 2, 3 and 5 and potential PSW, coordinated with the environmental analysis
d. Impact assessment for the downstream watercourse. The extent of this assessment will be established through a review of the flow/structure conditions at road crossings.
e. Determine the need for and extent of modifications to the floodplain in order to improve the system quality and manage the floodplain to a constant corridor width, including consideration of channelization and staging of development works in accordance with GRCA policies.
f. Temperature and flow monitoring

The Stormwater Management Strategy will include:

a. Update watershed and catchment mapping based on current topographic information and land use.
b. Determine watershed modelling parameters, as required.
c. Prepare existing conditions event-based hydrologic model (GAWSER) for the two-year through Regional storm events for the creek system. A continuous simulation model will also be prepared
d. Install and maintain continuous flow gauges to assist in model verification.
e. Install and maintain rain gauge and air temperature monitoring station for local meteorological data collection for non-winter months only. Winter data will be obtained from closest Environment Canada gauge.
f. Validate and/or refine the hydrologic model representation of subwatershed results using the gauged data (local or EC data) and updated hydrologic model.
g. Review potential best management practices with respect to previously established watershed and subwatershed targets in other locations and current regulations and standards.
h. Conduct a technical meeting with GRCA to finalize existing hydrology and initiate stormwater management criteria and concepts.
i. Prepare proposed conditions hydrologic models and preliminary stormwater management facility/infrastructure design.

The stormwater management strategy will provide appropriate levels of quality, quantity and water balance controls, in keeping with the intent of the subwatershed study. The stormwater management strategy will include a combination of management techniques with stormwater management measures implemented at three levels: lot-level, conveyance and end of pipe.

4. Hydrogeological and Groundwater Impact Assessment

The hydrogeological analysis will describe the regional geological setting, onsite geological and hydrogeological conditions, groundwater levels, groundwater flow contours and flow direction. In addition, the hydrogeological investigation will describe how local features in the Study Area are connected to the water table. Monitoring well locations are shown on **Appendix G.**

The hydrogeological investigation will assist in the design of the stormwater management facilities and include the following:

a. Review background studies, the Lake Erie Region Source Water Protection Plan, local Ministry of Environment (MOE) water well records, quaternary geological mapping and the Ontario Geological Survey model in order to confirm understanding of the surficial geologic conditions of the area.
b. Pre-consult with the Wellington County Risk Management Official regarding updates to the Lake Erie Region Source Water Protection Plan currently ongoing.
c. Door to door well survey, as necessary.
d. Install of monitoring wells to complete hydraulic conductivity testing.
e. Measure and monitor of groundwater levels, groundwater temperature and surface water flow for a period of one year.
f. Determine horizontal and vertical gradients across the subject land.
g. Assess groundwater flow direction and hydrogeological conditions of the site.
h. Measure hydraulic conductivity of the unsaturated and saturated zones of the geologic strata to estimate the vertical and horizontal soil permeability, hydraulic conductivity and travel times.
i. Collect groundwater samples (two events) to document pre-development groundwater quality.
j. Assess development of the proposed site on the local Regional groundwater supply aquifer and comment on potential for impacts to existing wells and recommended mitigation measures.
k. Complete preliminary hydrogeological calculation of mounding and impacts of proposed end-of-pipe solutions in the stormwater management plan.
l. Install data loggers for long term monitoring of groundwater levels and temperature to capture seasonal fluctuations, including high and low groundwater elevations.
m. Provide comment regarding potential high groundwater to effect basements and servicing.

5. Floodplain Hydraulics

A floodplain delineation study is to be completed for the extent of the Nichol Drain No. 2 watercourse and will include:

a. Technical meeting(s) with the GRCA to discuss the initial modeling and review the floodplain study limits.
b. Obtain available drain crossing information from the Township and complete a topographic survey of existing drain conditions. The 0.5m contour interval topographic mapping prepared by Northway-Photomap will be used to prepare model cross sections through the Study Area. This topographic information will be supplemented with topographic survey data of low-flow channel sections in order to complete the hydraulic modeling.
c. Determine and confirm of watershed modeling parameters (HEC-RAS).
d. Prepare of ultimate conditions for HEC-RAS model.
e. Map floodplain for Nichol Drain No. 2.

6. Fluvial Geomorphology and Erosion Assessment

The following assessment is to be completed for the extent of a watercourse (e.g. Nichol Drain No. 2 or Nichol Drain No. 13 watercourse):

a. Characterization Report – including summary of background literature, characterization, summary of major issues, concerns and constraints and a summary of opportunities for improvement and/or enhancement
b. Impact Assessment – including assessment of impacts of future land uses on natural environment and development of subwatershed management strategy by:
    - Finalize characterization of the drain using Rosgen Characterization (width/depth ratio, enhancement ratio and cross sectional measurements)
    - Complete cross sectional local long profile slope surveys and substrate sampling for the completion of the Rosgen Assessment and erosive/tractive force assessment
    - Determine the critical shear strength

- Prepare Erosion Potential Analysis to understand processes, identify erosion prone areas, identify structure at risk and determine threshold flows for erosion at strategic points
- Input to flow exceedance analysis using continuous hydrographs to determine impacts to development over a range of scenarios and conditions
- Establish of stormwater management criteria to ensure no increase in downstream erosion potential or flood risk
- Outline the criteria and process framework to evaluate future development proposals
- Preparation of a Stage 2 Report

7. Channel Design Implementation and Monitoring Plan

a. Undertake natural channel designs using principles on previously altered channels, potential development land channels proposed for reconstruction and determine where enhancements are required.
b. Develop an implementation and monitoring plan to ensure compliance with the subwatershed management strategy.
c. Determine timing, future studies, operation and maintenance responsibilities and monitoring plan to ensure compliance with the subwatershed study.

Supplementary Reports/Analysis

In support of the Secondary Plan, the following additional reports, studies and guidelines are proposed in order to inform the policies of the Secondary Plan.

1. Transportation Plan

The purpose of this study is to assess the existing road network, determine the location and suitability of new roads and assess the overall impact of the Secondary Plan on the existing and proposed road network. The plan includes:

a. Establish the development build-out time-frames and associated population and employment levels for each, to be used as a basis for evaluating the future infrastructure requirements.
b. Identify and inventory the surrounding external road system (which is to consist primarily of Highway 6, McQueen Boulevard, Millburn Boulevard, Scotland Street, Guelph Street and 2nd Line) and their respective intersections. The inventory will address jurisdiction, number of lanes, cross-sections, speed limits, intersection configurations, vertical and horizontal alignment constraints, etc
c. Compile traffic data from the appropriate road jurisdictions for the subject road sections and intersections.
d. Conduct additional traffic counts as may be required to address data gaps and ensure traffic data represents current conditions. It is noted that due to the COVID-19 pandemic, travel demands have changed significantly and thus any new counts completed at this time may not be representative of typical conditions. This will be further reviewed and resolved with the road authorities and an appropriate course of action resolved (eg. use historic growth, apply factors, etc.). For purposes of this proposal, we have allowed for 7 new intersection traffic counts (to be completed at the major boundary road intersections).
e. Complete an assessment of the existing road system traffic operations and establish any system needs based on existing conditions. Reference will be made to the Township's Transportation Master Plan relating to identified existing needs external to the Secondary Plan area.
f. Establish traffic projections for the future horizon years (to correspond to full build-out, 10 years beyond build-out and 2 interim horizon years to consider a phased development approach). In addition to historic growth, consideration will be given to other development in the immediate and surrounding areas that could have a bearing on future traffic volumes.

g. Identify the future road system, considering any planned road improvements or developments that would otherwise occur independent of the Secondary Plan. Reference will be made to the Township's Transportation Master Plan and any identified external needs.
h. Complete an assessment of the future road system traffic operations (prior to consideration for the Secondary Plan development) and establish any system needs based on future background conditions. This could include road widenings, provision of turn lanes, traffic signal and/or roundabout control, etc.
i. Establish and review potential road system connection points to the existing system and related receiving system capacities, including consideration for any growth-related upgrades planned or underway.
j. Advance the initial transportation concepts for the study area in conjunction with the proposed conceptual plans, providing input to road layout, classification (local or collector), cross-sections, provision of active transportation facilities, provision of public transit, intersection locations and configurations, etc. Identify any major constraints to the provision of a contiguous transportation system (eg. topography, environmental features, etc.). Reference will be made to the Township's Transportation Master Plan, including consideration for traffic calming and a complete streets approach to road design, and the Township's Development Manual (2018, as revised) to ensure conformity.
k. Based on the development concepts, estimate the volume of traffic that will be generated by each. This will be based on the ITE *Trip Generation Manual 10th Edition* with consideration for the proposed land uses and development sizes.
l. Confirm the number and location of external road connections to ensure the Secondary Plan area can be appropriately serviced. Consult with MTO regarding any new proposed municipal road connections to Highway 6 and the form of intersection control (with consideration for stop, signal and roundabout control).
m. Determine the anticipated distribution of traffic in context of the Secondary Plan and surrounding areas, and assign such to the road system considering the proposed road system, major intersections and connections to Highway 6.
n. Evaluate the serviceability of the conceptual plans from a road system and traffic operations perspective.
o. Identify potential improvements to the external road system required to service the development concepts. Give due consideration for the implementation of roundabouts as an alternative intersection control, particularly on the major boundary roads, recognizing their benefits relating to traffic operations, safety and opportunity for a gateway feature.
p. Identify development triggers relating to transportation system improvements.

2. Urban Design Guidelines and Parks Concept

The intent of the Urban Design Guidelines is to promote an appropriate built form within the Secondary Plan area. The Urban Design Guidelines will result in a set of principles for new development which encourages a high standard of urban design and the incorporation of common design elements within the Secondary Plan Area. These guidelines will ultimately inform the urban design policies of the Secondary Plan. The proposed Urban Design Guidelines include:

a. Review of Community Design policies contained in the Township of Centre Wellington Official Plan
b. Design context and vision for the Secondary Plan area, including key design features and design consideration for specific locations (views, vistas, gateways);
c. Design guidelines for the public realm including roads, streetscape, parks, trails, stormwater management facilities and the natural system

d. Design guidelines for the private realm as direction for the development of future plans of subdivision
e. Recommendation on park location and design criteria
f. Recommendations for community safety principles
g. Recommendations for landscaping as direction for future landscape plans

3. Fiscal Impact Study

The purpose of this study is to assess the fiscal impact of the proposed development of the Secondary Plan on the Town's finances. The proposed report includes:

a. Estimate the ongoing revenues that will be generated by the development of the Secondary Plan Area, including property taxes, non-tax revenues and water/waste water fee revenues
b. Estimate the additional annual operating and maintenance costs the community may incur as a result of the development of the Secondary Plan, such as net operating costs, water, wastewater, and road operating and lifecycle maintenance costs;
c. Estimate the development charges that the build-out of the Secondary Plan would generate, at current DC rates;
d. Identify the potential capital costs arising from the development, including those eligible to be funded by development charge revenues.

4. Archaeological Assessment

The Archaeological Assessment will be conducted for the entire Study Area. The assessment will be undertaken in accordance with provincial requirements for archaeological investigations (Standards and Guidelines for Archaeological Consultants, Ministry of Tourism and Culture, 2011).

5. Cultural Heritage Evaluation & Assessment

This assessment will consist of an overview of the Township's cultural heritage resources within the Secondary Plan area, if any. Any identified heritage resources will be mapped for identification in the Secondary Plan. Recommendations for future Heritage Impact Assessments within the Secondary Plan Area will be provided, in the event that cultural heritage resources in the Study Area are identified.

IMPACT ASSESSMENT, IMPLEMENTATION AND MANAGEMENT PLAN AND RECOMMENDATIONS

An assessment of potential impacts to the Study Area and surrounding areas will be provided in this section. Impacts of the proposed land use, infrastructure and trails will be discussed in terms of groundwater recharge and quality, surface water quality and quantity, and the integrity of the surrounding environmental features, including ecological connectivity and recommendations for restoration.

The results of the data and analysis will provide for the completion of the MESP and recommendations for the Secondary Plan, including:

a. Final natural feature limits and constraint areas
b. Prepare hydrologic model for proposed conditions
c. Review stormwater management practices and identify which are applicable within the Study Area
d. Evaluate the effectiveness of alternate stormwater management strategies
e. Recommend stormwater management criteria including consideration of LID principles and practices to mitigate proposed condition impacts for the Study Area relating to:
    - Water quality control (TSS, DO, phosphorous)

- Water quantity control
- Erosion assessment (channel and from development areas)
- Surface water balance and ground water balance
- Chloride assessment
- Drainage constraints such as external drainage areas, outlet/discharge locations and changes in drainage conditions

f. Update floodplain model for future development conditions
g. Identify enhancement and restoration opportunities
h. Review potential direct and indirect impacts to natural environment features/systems according to:
   - Potential impact
   - Proposed mitigation measures
   - Residual effects
i. Identify natural heritage feature enhancement and restoration opportunities to mitigate impacts of development

This will include coordination meeting with the project team and landowners and meetings with the Township and/or Technical Advisory Committee (The "TAC"). The meetings are anticipated to occur following the Background Review and Existing Conditions Analysis, following identification of Development Constraints and Opportunities and identification of options to determine the preferred land use plan; and prior to Council approval of the Secondary Plan.

Management Plan

This section summarizes the management plan for the Study Area, based on the information provided in the previous sections of these Terms of Reference. Specifically, the management plan will be separated into components that apply to the Natural Heritage System, stormwater management measures and monitoring.

Tasks include:

1. Natural Heritage System

a. Delineate the Natural Heritage System and associated buffers
b. Recommend guidelines for developing a buffer management and stewardship strategy
c. Identify opportunities for enhancement and/or restoration, including strengthening/restoring of existing linkages, where appropriate, or mitigate impacts of development
d. Identify areas where site specific EIS studies may be required for the review of development applications.
e. Develop a biological monitoring strategy including locations for monitoring activities.

2. Stormwater Management

a. Identify stormwater management facility locations
b. Identify stormwater management measures required throughout the Study Area. These measures are required to maintain or enhance the quality, quantity and distribution of stormwater including infiltration measures, and minimize stormwater runoff volumes ad contaminate loads.
c. Consider use of LID practices wherever feasible

3. Monitoring Plan

a. Prepare a Monitoring Plan for the Study Area that follows established municipal standards/requirements and includes biological, groundwater and surface water components
b. Monitoring locations will be shown in the MESP

c. Monitoring Plan will confirm performance standard and measures, including the duration or monitoring activities, timing of monitoring events and protocols.

4. Implementation Plan

a. Provide guidelines for the implementation of recommendations (requirements) through the development process.
b. Establish preliminary phasing plan for development based on recommendations associated with stormwater management facilities. and the availability and capacity of infrastructure (water, wastewater, roads).

SECONDARY PLAN

The Secondary Plan will provide the land use vision and policy framework for the Study Area by establishing specific direction of the development of South Fergus. The Secondary Plan will be based on the findings of the background review and input received through the public consultation process. The Study will form the basis of an Official Plan Amendment to implement the Secondary Plan. This amendment will direct the preparation and approval of future Planning Act applications to facilitate the development of the Study Area.

The contents of the Secondary Plan will include the following:

a. The physical context, opportunities and constraints for the Study Area
b. The overall context for the Study Area, including relevant policies
c. The vision and objectives for the development of the Study Area
d. Land use designations and implementing policies for the various designations within the Secondary Plan
e. Urban design policies for the Secondary Plan Area
f. Transportation plan which includes a network of streets and active transportation facilities and policies to implement the transportation plan
g. Servicing and stormwater management strategy for the Secondary Plan area which includes consideration of existing and planned capacity and phasing of development
h. Natural heritage network identifying features within the Study Area, recommended buffers and policies related to the preservation and enhancement of the natural heritage network.
i. Policies related to implementation of the Secondary Plan for future site-specific applications

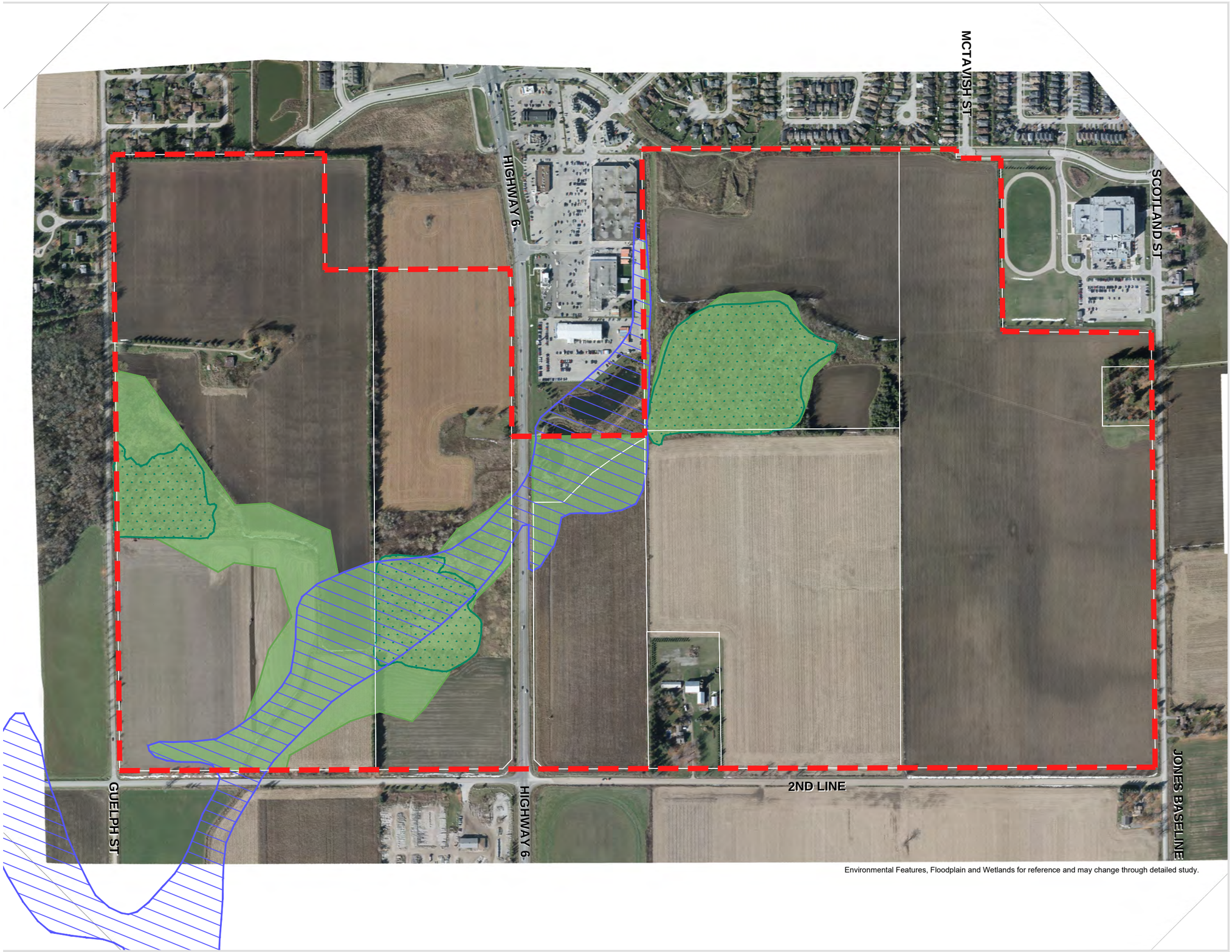
PUBLIC CONSULTATION

The MESP and Secondary Plan processes require public consultation to ensure that subwatershed, resident and stakeholder issues are incorporated into the Study. The public will have opportunity to review and provide comment to the subwatershed plan at various stages of the process. It is anticipated Public Open Houses will be held following approval of the Terms of Reference, following preparation of the preliminary development constraints and opportunities plan and prior to Council approval of the Secondary Plan. The timing, format and venue for the Public Open Houses will be determined in consultation with Township staff and the Technical Advisory Committee and will be coordinated with secondary plan process.

APPENDIX A

Location Plan
South Fergus Secondary Planning Area

Town of Fergus
Township of Centre Wellington



LEGEND

- South Fergus Secondary Planning Area
- Parcel Fabric*
- Environmental Features (Core Greenlands, Wetlands, & Floodplain)
- Floodplain (GRCA)
- Wetlands (GRCA)

Sources
- Imagery: Northway\Photomap\Remote Sensing Ltd, 2020
- Floodplain and Wetland data: GRCA Open Data 2018
- Core Greenlands digitized from Township of Centre Wellington Official Plan Schedule A-1 *Land Use Plan - Fergus, Elora 2016*

**Parcel fabric digitized from GRCA web mapping and is approximate in size and location*

Date: December 21, 2020

Scale: 1:6,000

File: 19144A

Drawn: JB

north

K:\19144A - SOUTH FERGUS MESP AND SECONDARY PLAN\CP\LOCATION PLAN_21DEC2020.DWG

Environmental Features, Floodplain and Wetlands for reference and may change through detailed study.

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

APPENDIX B

SOUTH FERGUS MESP & SECONDARY PLAN **STUDY PROCESS FLOWCHART**

TASK	2020		2021						2022			
	Sept/Oct	Nov/Dec	Jan/Feb	Mar/Apr	May/June	July/Aug	Sept/Oct	Nov/Dec	Jan/Feb	Mar/Apr	May/June	July/Aug
TERMS OF REFERENCE APPROVAL												
MESP & SECONDARY PLAN INITIATED												
NOTICE OF STUDY COMMENCEMENT												
BACKGROUND REVIEW & EXISTING CONDITIONS												
COMPLETION OF EXISTING CONDITION STUDIES												
UNDERTAKE EXISTING CONDITION STUDIES / FIELD INVESTIGATIONS												
NATURAL ENVIRONMENT (work initiated & partially completed in 2020)												
HYDROGEOLOGY												
HYDROLOGY												
FLOODPLAIN HYDRAULICS												
EROSION ASSESSMENT												
NATURAL SYSTEM LINKAGES & FUNCTIONS												
IDENTIFY MANAGEMENT OBJECTIVES AND TARGETS												
TRAFFIC ANALYSIS												
CULTURAL HERITAGE EVALUTION												
ARCHAOLOGICAL ASSESSMENT												
COMPLETE BACKGROUND & EXISTING CONDITIONS REPORT												
IMPACT ASSESSMENT & SCREENING OF MANAGEMENT PRACTICES												
IDENTIFY STORMWATER MANAGEMENT AND SERVICING APPROACH												
PREPARE PRELIMINARY LAND USE PLAN AND SECONDARY PLAN POLICIES												
IDENTIFY LAND USE OPTIONS AND SERVICING												
DETERMINE PREFERRED LAND USE PLAN AND SERVICING												
URBAN DESIGN GUIDELINES												
FISCAL IMPACT ANALYSIS												
PHASING PLAN												
SUBMIT DRAFT MESP & SECONDARY PLAN												
AGENCY CIRCULATION OF DRAFT MESP & SECONDARY PLAN												
FINALIZE AND SUBMIT MESP & SECONDARY PLAN												
MESP & SECONDARY PLAN CONSIDERED BY TOWNSHIP COMMITTEE												
TOWNSHIP COUNCIL CONSIDERATION OF MESP & SECONDARY PLAN												
NOTICE OF STUDY COMPLETION												
PROJECT MANAGEMENT MEETINGS WITH TOWNSHIP STAFF	*		*		*		*		*	*		
TECHNICAL ADVISORY COMMITTEE (TAC) MEETINGS					*		*					
PUBLIC CONSULTATION				*		*		*		*		

Attachment to Agreement with Township March 2021

APPENDIX C

APPENDIX 2

Applicable Schedules from the

Official Plan of the

Township of Centre Wellington

Appendix 3

County of Wellington

MINTO

WELLINGTON NORTH

MAPLETON

CENTRE WELLINGTON

ERIN

GUELPH ESSAMOSA

City of Guelph

PUSLINCH

Legend

Provincially Significant Wetlands

N

Sources:

County of Wellington Planning and Development Department 2017.

Produced using natural resource information by the Ministry of Natural Resources (Copyright Queen's Printer 1997).

Updated: May 3, 2017.

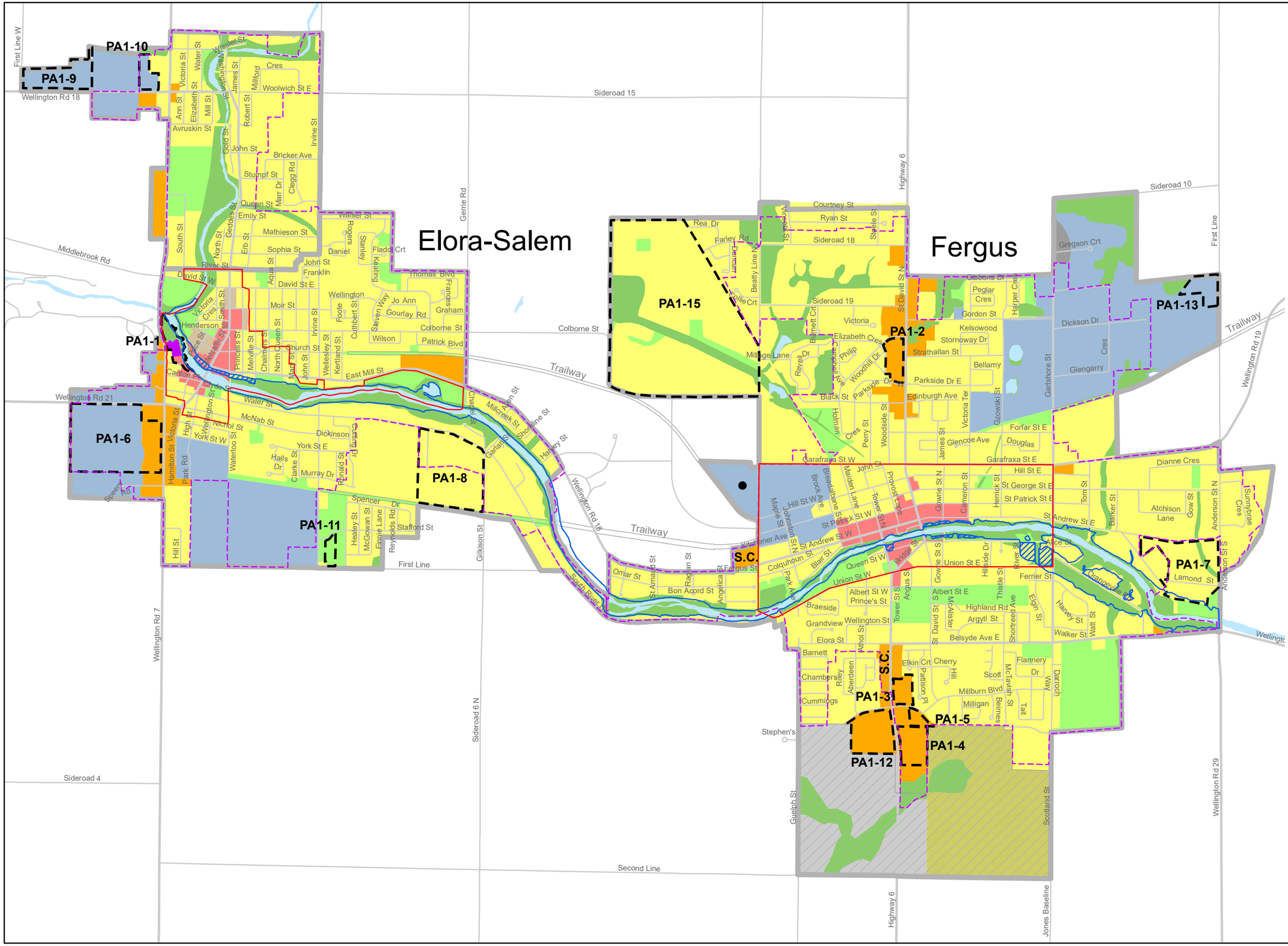
Date Printed: May 3, 2017.

May 6, 1999

0 2.5 5 10

Kilometres

Document Path: F:\Land Information System\Nad83OP\Appendix 3.mxd


Elora-Salem
Fergus
PA1-1
PA1-2
PA1-3
PA1-4
PA1-5
PA1-6
PA1-7
PA1-8
PA1-9
PA1-10
PA1-11
PA1-12
PA1-13
PA1-15
S.C.
Sideroad 15
Sideroad 10
Sideroad 18
Sideroad 19
Sideroad 4
Sideroad 6 N
Wellington Rd 18
Wellington Rd 21
Wellington Rd 7
Wellington Rd 19
Wellington Rd 29
Gerrie Rd
Highway 6
Colborne St
Trailway
First Line
First Line W
Second Line
Middlebrook Rd
Gilkison St
Speers Rd
Stephen's
Residential
Highway Commercial
Central Business District
Residential Transition
Industrial
Core Greenlands
Recreational
Future Development
Mixed Use
Secondary Planning Area
Future Residential
Future Employment Lands
Note: The identification of Future Residential and Future Employment Lands is for public notice only and is subject to future considerations through Secondary Plan requirements.
Urban Boundary
Built Boundary
Heritage Area
Policy Area
Regulatory Flood Line
Regulatory Flood Fringe
S.C. Shopping Centre
Former Waste Disposal Site
Schedule A-1
Land Use Plan
Fergus, Elora-Salem
Township of Centre Wellington
Built Boundary: Wellington County, 2008
Projection: UTM, NAD 83, Zone 17
Note: This product is not survey data.
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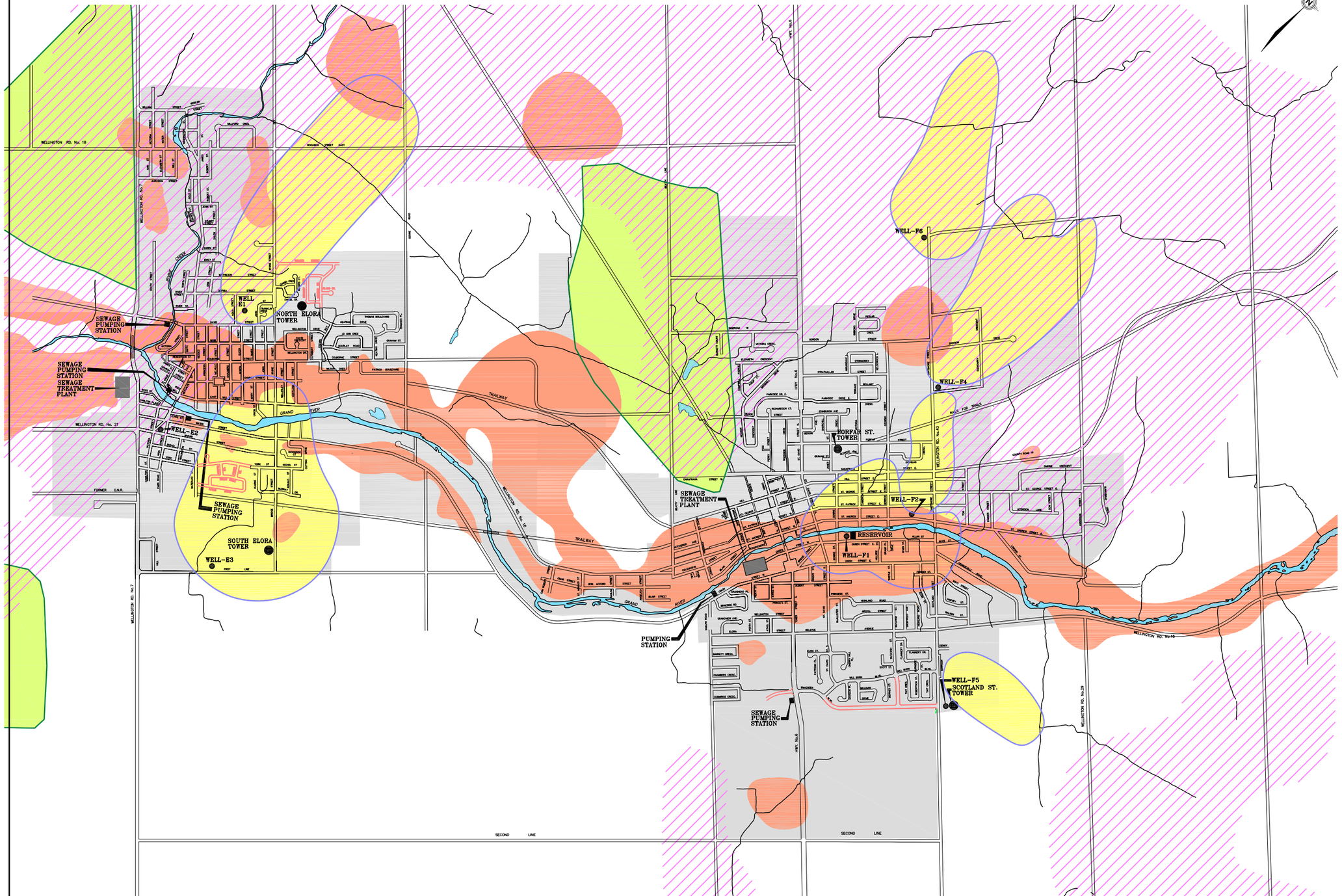
Updated: November, 2016
0 200 400 800m
1:25,000

GROUNDWATER MANAGEMENT PLAN
FERGUS - ELORA - SALEM
TOWNSHIP OF CENTRE WELLINGTON
SCHEDULE C



LEGEND:

- POTENTIAL AREAS FOR FUTURE WATER SUPPLY TAKING
- 2 YEAR CAPTURE ZONE
- HIGH AQUIFER VULNERABLITY
- POTENTIAL RECHARGE AREAS
- URBAN CENTRE LIMITS

APRIL 2003

SCALE: 0 100 250 500

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

SOURCE DATA:
TOWNSHIP OF CENTRE WELLINGTON
GROUNDWATER MANAGEMENT STUDY