

Introduction & Background

The following Natural Environment Background Report has been prepared in conjunction with the Keswick Secondary Plan Review. The study area is generally bounded by Woodbine Avenue on the east, Ravenshoe Road on the south, the Lake Simcoe shoreline on the west, and Old Homestead Road on the north (Figure 1). The study area is mainly urban in character with some active agriculture in the southeast and northeast sectors. Natural environment features within the Keswick Secondary Plan area include the following:

- Lake Simcoe and Cook's Bay;
- Maskinonge River;
- Woodlands;
- Wetlands; and,
- Watercourses (tributaries to Lake Simcoe, Maskinonge River and East Holland River) and their associated floodplains and meander belts.

The purpose of this Background Report is to provide an overview level description and analysis of the natural environment features within the study area, and to identify a natural heritage system that will form a "framework" for future urban land use within Keswick. The review and analysis described below is based on a desktop analysis of background information provided by the Town of Georgina and the Lake Simcoe Region Conservation Authority (LSRCA).

Physiography, Topography and Soils

The study area is located within the East Holland River, Maskinonge River, and Georgina Creeks Subwatersheds, as identified by LSRCA. From a physiographic standpoint, the study area is located within the Simcoe Lowlands, which is a till plain comprised of glacio-lacustrine deposits and glacial till (Chapman and Putnam 1984). The glacial till deposits occur mainly in the northern portion of the study area. Glacio-lacustrine deposits are present in the southern portion of the study area. Organic deposits are present in the extreme southwest corner of the study area, in association with the East Holland River subwatershed.

The topography of the study area is quite variable with drumlin features located in the southern portion of the study area, as well as the former shoreline of glacial Lake Algonquin. The western portion of the study area gradually slopes towards the Lake Simcoe shoreline. Hummocky topography occurs in the northeast portion of the study area.

The topography and soil types within the study area are shown on Figure 2. The soil conditions in the southern portion of the study area (i.e. non-urbanized areas) are comprised of clay loam, silt loam and loamy soils with drainage that ranges from poorly drained to well drained. Poorly drained soils are mainly associated with the floodplains of existing watercourses and low-lying areas.

The soil conditions within the northeast section of the study area are mainly comprised of well drained sandy loam soils. Imperfectly to poorly drained soils are associated with low lying areas and drainage courses.

LSRCA Regulated Features

Natural environment features within the study area that are regulated by the LSRCA under O. Reg. 179/06 are mapped on Figure 3. These features include the following:

- Watercourses and their associated floodplain and meander belt;
- Wetlands; and,
- Lake Simcoe shoreline erosion limit.

The regulation limit for the above features is shown on Figure 3, and ranges from 15 m to 120 m.

It should be noted that not all regulated features are shown on Figure 3 and that additional areas may be subject to LSRCA implementation policies under O. Reg. 179/06.

Hydrogeological Sensitive Areas

Hydrogeological sensitive areas within the study area, as defined by LSRCA, are shown on Figure 4. The features include the following:

- Ecologically Significant Groundwater Recharge Areas (ESGRA);
- Highly Vulnerable Aquifers (HVA);
- Significant Groundwater Recharge Areas (SGRA); and,
- Wetlands.

ESGRA's are identified in the northern section of the study area in the vicinity of Morton Avenue, Church Street, and Old Homestead Road. The ESGRA's are associated with LSRCA regulated wetlands.

HVA's occur within the study area in association with areas of well drained soils shown on Figure 3. HVA's are identified by LSRCA south of Old Homestead Road, along the Maskinonge River riparian zone, and in the southwest corner of the study area (East Holland River subwatershed).

SGRA's occupy a large portion of the study area, encompassing both built-up urban areas and agricultural land. The SGRA's are mainly associated with the sub-catchment areas of existing watercourses and wetlands.

In terms of Source Water Protection, Intake Protection Zone 1 and Intake Protection Zone 2 are identified along the Lake Simcoe shoreline in the vicinity of the Municipal Water Intake for Keswick (refer to Figure 4 and Schedule B3 of the Town of Georgina Official Plan).

Vegetation

Vegetation features within the study area are mapped on Figure 5. The vegetation community types shown on the figure are based on information provided by LSRCA and have not been verified on the ground. Vegetation community types within the study area consist of forest (deciduous, mixed, coniferous), wetland (swamp, thicket swamp, marsh, shallow/open aquatic), and cultural (meadow, thicket, woodland, hedgerow, plantation). Remnant natural vegetation features within the study area are mainly located in the southern end of the study area, in association with undeveloped land, as well as south of Morton Avenue and Old Homestead Road, and along the Maskinonge River. Some of these features have been removed as a result of past development approvals but are still identified as present on the LSRCA mapping.

Woodlands

Woodland features within the study area are shown on Figure 6. Remnant woodlands are mainly confined to the southern portion of the study area (undeveloped agricultural land) and to the south of Morton Avenue.

Due to the reduction and fragmentation of forest cover in York Region, the Regional Official Plan policies place a high level of importance on the protection of existing forest cover and increasing the area of forest to meet a minimum target area of 25% habitat cover. Forest cover within Keswick is 97 ha, which represents 5.7% of the total secondary plan study area.

Wetlands

The study area contains numerous wetland features, including the following three provincially significant wetlands (PSW):

- Holland Marsh Wetland Complex;
- Maskinonge River Wetland Complex; and,
- North Keswick Wetland Complex.

The study area contains several “unevaluated” wetlands, mainly associated with closed depressions or drainage features.

All wetlands within the study area, irrespective of their size, are regulated by the LSRCA. The York Region and Town of Georgina Official Plan policies place a high level of importance on protecting, enhancing and restoring wetlands. Wetland cover within Keswick is 3.9%, which is less than the Environment Canada (2013) minimum guideline of 10% for healthy watersheds.

Wetland features within the study area are shown on Figure 7.

Areas of Natural and Scientific Interest

There are no Areas of Natural and Scientific Interest (ANSI) within the study area (Figure 8). The Holland River Marsh Life Science ANSI (Provincial Significance) and a candidate Life Science ANSI however are located adjacent to the southwest corner of the study area. ANSI's represent important elements of the landscape of southern Ontario that are to be protected for future generations.

Wildlife Habitat

From a wildlife perspective, the key habitat features within the study area are associated with remnant woodlands, wetlands, watercourses, Lake Simcoe shoreline, and cultural features (refer to Figure 9). Significant wildlife habitat features within the study area, as defined by MNRF, include the following:

- Deer wintering area (Stratum 2); and,
- Waterfowl staging area.

The deer wintering areas are associated with woodland and wetland features (swamps) located in the southwest portion of the study area and in the extreme north end of the study area.

Waterfowl staging areas are associated with Cook's Bay to the west of the East Holland River (beyond the study area).

Remnant natural environment features (i.e. woodlands, wetlands, valleylands) and cultural habitat within the study area have the potential to support a variety of significant wildlife habitat functions, including habitat for species at risk protected under the *Endangered Species Act*.

Fish Habitat

The study area contains several watercourses that either provide direct or indirect fish habitat functions. Lake Simcoe supports a very diverse fish and aquatic species community, including habitat for species at risk.

The reaches of the Maskinonge River in the study area supports a warmwater fish community (LSRCA 2010). Twenty-five (25) species of fish have been recorded from the Maskinonge River system since 1990 (Source: Maskinonge Subwatershed Plan – LSRCA 2010).

The impacts of urban and agricultural development have greatly impacted water quality and aquatic habitat within Lake Simcoe and its tributaries. As a result, stringent stormwater and groundwater management measures and implementing policies are in place to protect, restore and enhance Lake Simcoe, the Maskinonge River, and other watercourses within the Lake Simcoe watershed (i.e. Lake Simcoe Protection Plan, York Region Official Plan, Town of Georgina Official Plan, LSRCA policies and regulations, Greenbelt Plan, and the Growth Plan for the Greater Golden Horseshoe).

Maskinonge River Subwatershed Plan (LSRCA 2010)

The study area is located within the Maskinonge River subwatershed. LSRCA previously completed a subwatershed plan for this system in 2010. The subwatershed plan provides a management framework to protect, restore and enhance terrestrial/aquatic habitat, and surface and groundwater quality/quantity. The Maskinonge River provides an important corridor function and is directly connected to the Lake Simcoe shoreline.

Species Dispersal Corridors

Corridors and linkages are of critical importance for species dispersal and the maintenance of bio-diversity in a fragmented and habitat deficient landscape. Corridors within the study are shown on Figure 10.

The main species dispersal corridors within the study area are associated with the following features:

- Lake Simcoe shoreline;
- Maskinonge River; and,
- Remnant woodlands and wetlands linked by watercourses.

Greenlands System

The Greenlands system for the study area, shown on Figure 11, is a composite of the current Keswick Secondary Plan and Region of York Greenlands system. It encompasses most but not all of the remnant woodlands and wetlands within the study area, as well as major watercourses and their associated floodplains. The Greenlands system shown on Figure 11 does not include buffers from the various features. The current LSRCA policy framework for the study area requires minimum 30 m buffers from key natural heritage and key hydrologic features such as wetlands, woodlands, watercourses and the Lake Simcoe shoreline.

Refinements to the Greenlands system may be required in some locations to reflect past development approvals and changes in land use.

The Greenbelt Plan Natural Heritage system (NHS) flanks the study area on the east and south, in association with the Maskinonge River and East Holland River, respectively. Greenbelt Plan NHS is also associated with the Georgina Creeks subwatershed abutting the northeast corner of the study area. The Maskinonge River provides a connecting linkage through the study area between Lake Simcoe to the west and the Maskinonge River PSW Complex to the east.

The Greenlands system components within the study area are generally linked by watercourses or the Lake Simcoe shoreline. Isolated woodlands and wetlands, and Town open space/park lands are also identified as part of the Greenlands system.

LSRCA Natural Heritage System

The LSRCA has developed their own NHS, which is depicted on Figure 12. The LSRCA NHS differs from the Town/Region Greenlands system in the following manner:

- Provision of 30 m buffers from all NHS features;
- Protection of all wetlands;
- Protection of all watercourses;
- Floodplain enhancement opportunities;
- Corridor restoration opportunities; and,
- 30 m buffer along the Lake Simcoe shoreline.

NHS enhancement opportunities, shown on Figure 12, coincide mainly with the floodplain of the Maskinonge River and other watercourses.

NHS features located outside of the Town/Region Greenlands system are depicted on Figure 13. These features include woodlands, wetlands and floodplains that are not included in the Town or Region Greenlands system but are recognized by LSRCA as “core features” within their watershed NHS. Further investigation at the development application stage is required to confirm which of the subject features should be included within the Greenlands system for Keswick, and whether ecological off-setting is appropriate for features that have been evaluated and identified for removal or alteration.

Composite Natural Heritage System

A composite NHS is provided in Figure 14. The NHS is a composite of the following components:

- Town of Georgina Greenlands;
- Region of York Greenlands;
- LSRCA Core Natural Heritage Feature;
- Greenbelt Plan Natural Heritage System¹; and,
- Floodplain/Corridor Enhancement Opportunity (LSRCA).

¹ The Greenbelt Plan NHS partially extends into the Keswick Secondary Plan study area in association with the edge of a woodland feature.

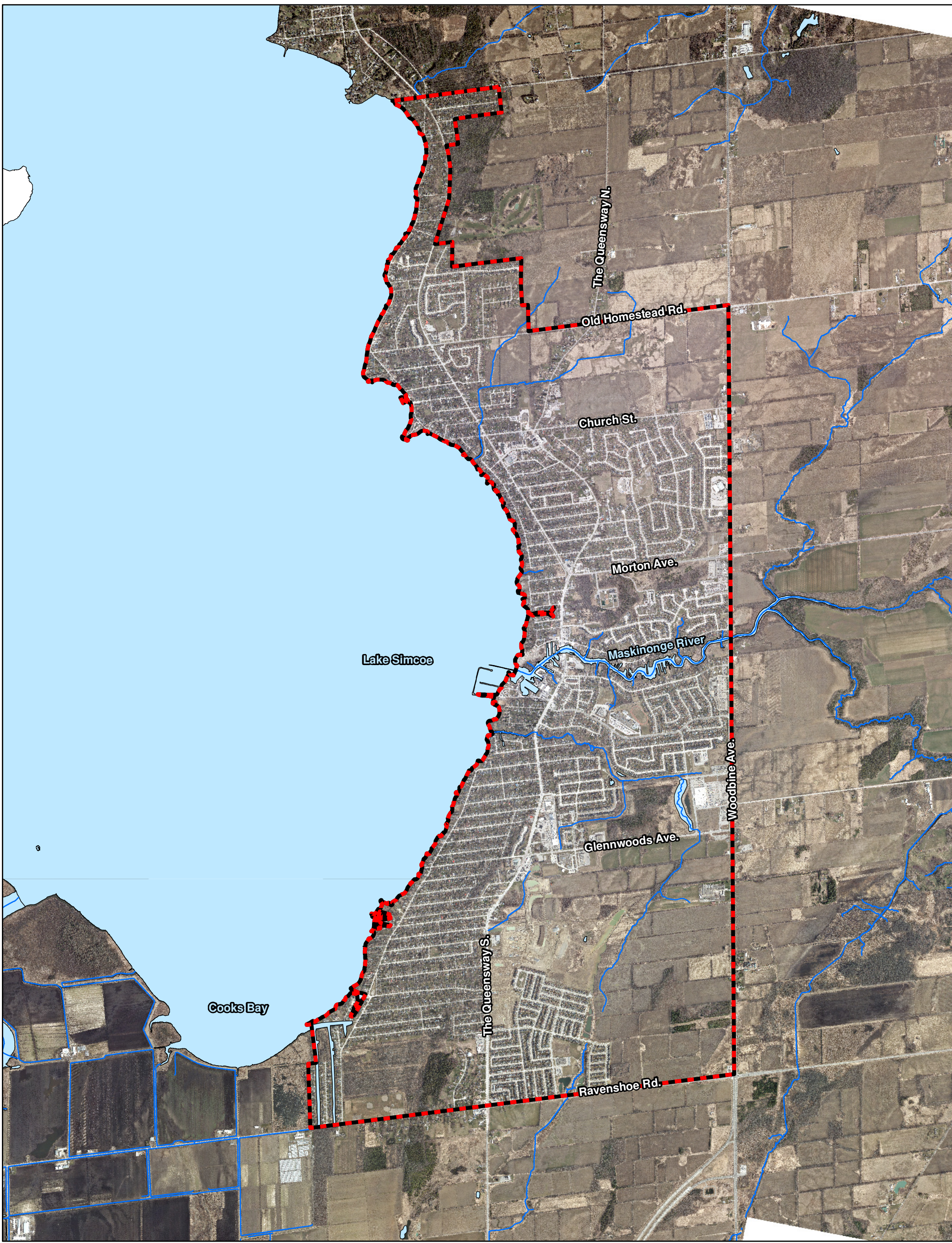
It should be noted that the composite NHS on Figure 14 does not include all of the woodland and wetland features within the study area. Environmental features “outside” of the NHS will need to be evaluated at the development application stage to confirm where development can and cannot occur. Ecological off-setting requirements for environmental features that have been evaluated and have received agency approval for removal/alteration, will also need to be addressed at the development application stage.

For the purpose of preparing land use concepts plans, the NHS depicted in Figure 14 should be considered as the “environmental framework” for the Keswick secondary plan.




Next Steps

The following tasks will be undertaken during the next phase of the Keswick Secondary Plan review:

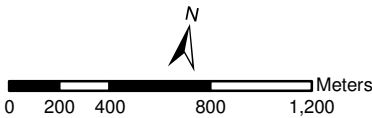
- Confirm and refine the NHS as a “framework” for future land use concept plans, considering existing development approvals;
- Confirm and identify NHS restoration and enhancement opportunities;
- Prepare Key Natural Heritage Features, Key Hydrologic Features, Greenlands System, Source Water Protection, and Hazard Land mapping in support of Secondary Plan schedules;
- Identify ecological off-setting requirements for wetlands, woodlands and buffers, following the LSRCa compensation model;
- Identify general mitigation and environmental management measures;
- Review and provide input to natural heritage policies; and,
- Identify future study requirements for the development application stage.



Legend

-  Keswick Secondary Plan Boundary
-  Watercourse
-  Waterbody

Data Source
- The Town of Georgina
- The Regional Municipality of York
- LSRCA



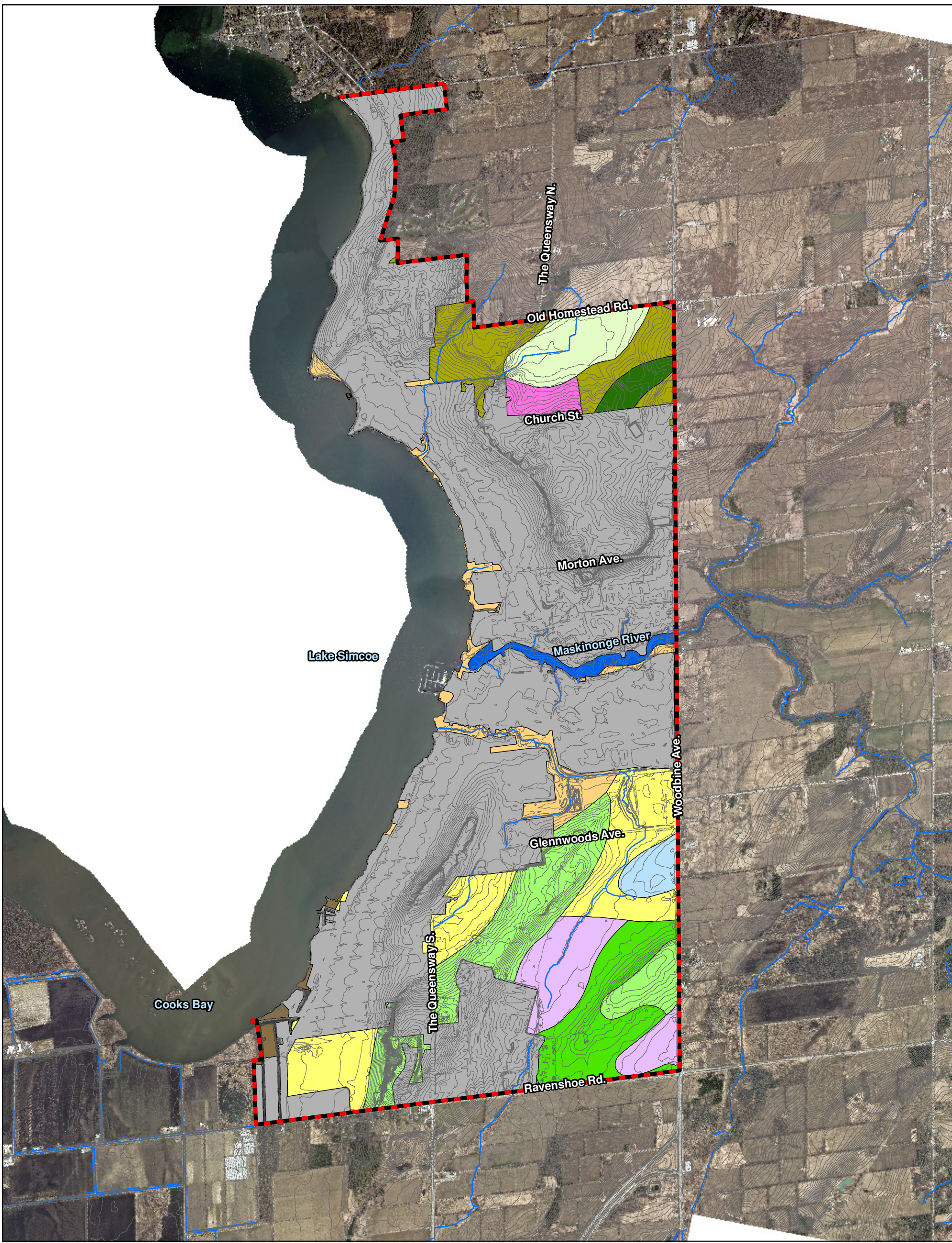
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Landscape Ecology & Natural Heritage Planning

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Keswick Secondary Plan Review
Study Area

Project #	2019-178
Date	November 2019
Scale	30,000
Prepared By: JJJ	Verified By: BDB





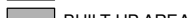










Figure #	1



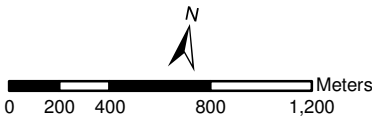
Legend

-  Keswick Secondary Plan Boundary
-  Watercourse
-  Contour Line (1 m intervals)

Soil Type

- | | |
|---|--|
|  BONDHEAD LOAM |  LYONS LOAM |
|  BOTTOM LAND |  MUCK |
|  BUILT UP AREA |  OTONABEE SANDY LOAM |
|  CASHEL CLAY |  SARGENT SANDY LOAM |
|  GRANBY SANDY LOAM |  SIMCOE CLAY LOAM |
|  GUERIN LOAM |  SIMCOE SILT LOAM |
|  GUERIN SANDY LOAM | |
|  JEDDO CLAY LOAM | |
|  KING CLAY LOAM | |

Data Source
- The Town of Georgina
- LSRCA
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Soils and Topography

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Figure #

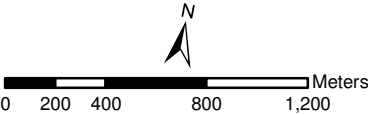
2



Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Meanderbelt
- Regulation Limit
- Waterbody
- Floodplain
- Wetland
- Lake Shoreline Erosion Limit

Data Source
- The Town of Georgina
- The Regional Municipality of York
- LSRCA



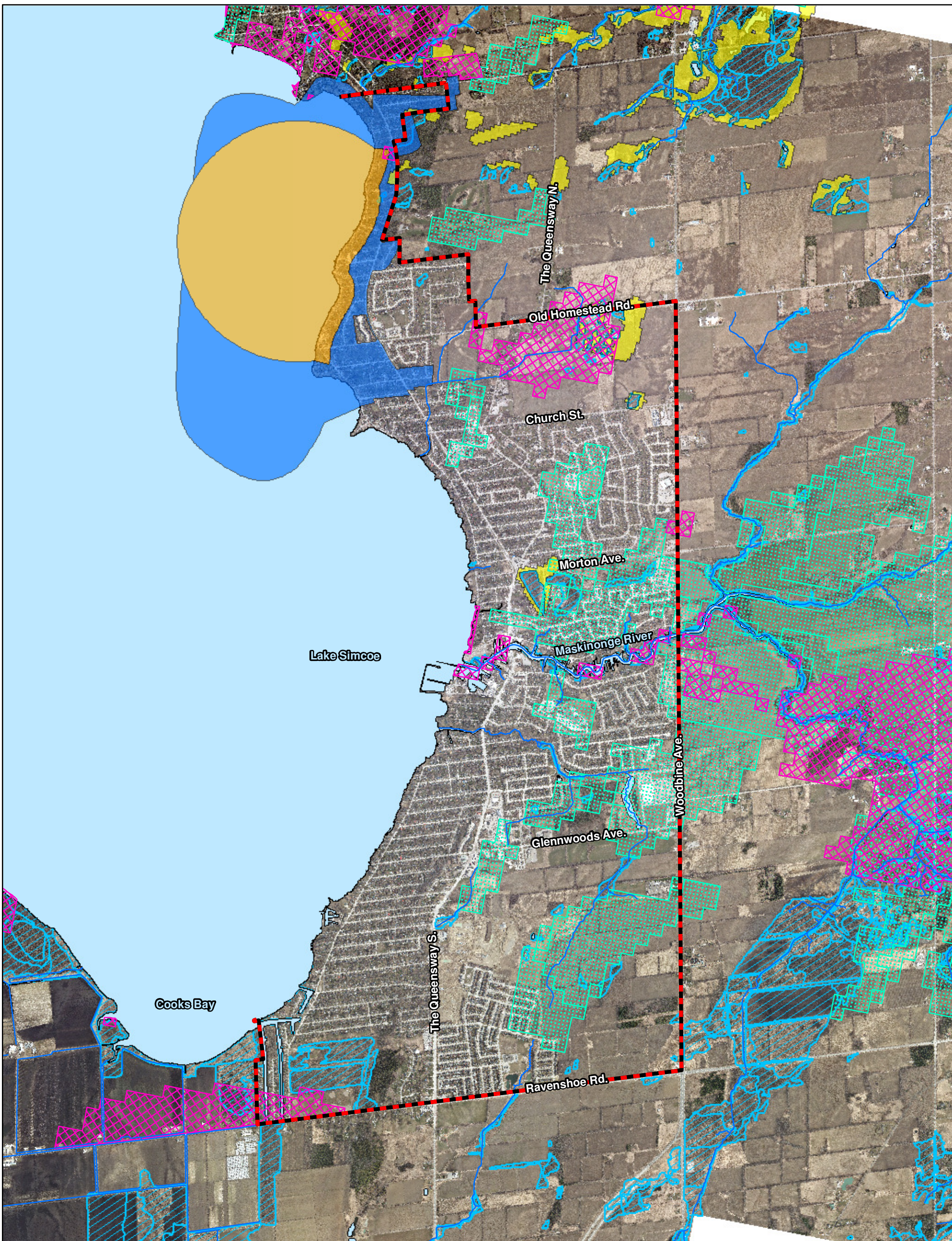
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Keswick Secondary Plan Review
LSRCA Regulated Features

Project #	2019-178
Date	November 2019
Scale	30,000
Prepared By: JJJ	Verified By: BDB

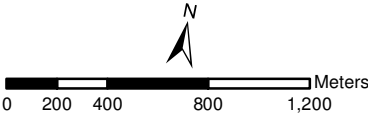
Figure #
3



Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Waterbody
- Wetland
- Highly Vulnerable Aquifers
- Significant Groundwater Recharge Areas
- Intake Protection Zone 1
- Intake Protection Zone 2
- Ecologically Significant Groundwater Recharge Areas

Data Source
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- The Regional Municipality of York
- LSRCA
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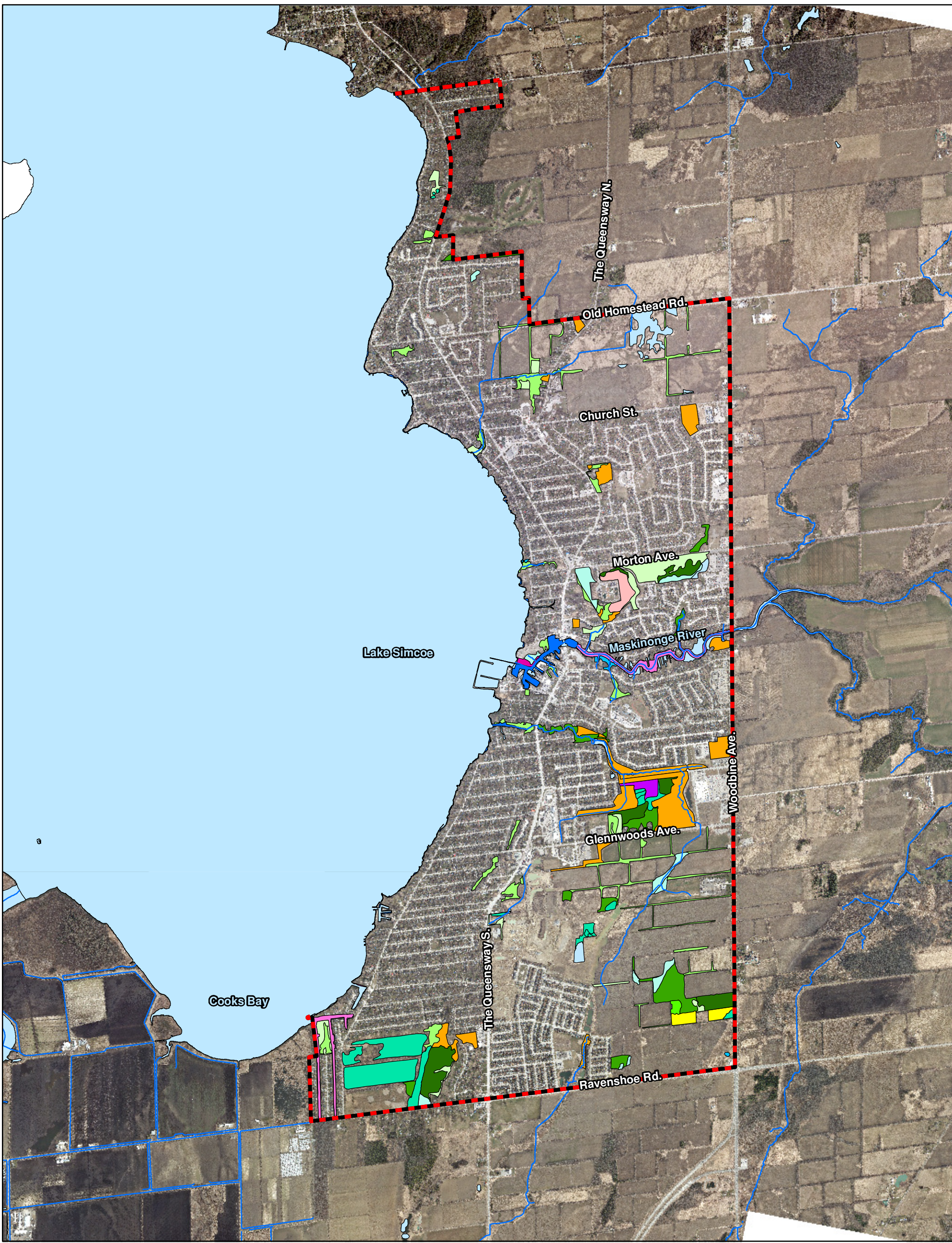
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Keswick Secondary Plan Review
Hydrogeological Sensitive Areas

Project #	2019-178
Date	November 2019
Scale	30,000
Prepared By: JJJ	Verified By: BDB

Figure #

4



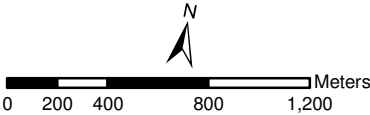
Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Waterbody

Vegetation Communities

- | | |
|---------------------------|---------------------------------|
| Cultural Meadow (CUM) | Open Aquatic (OAO) |
| Cultural Plantation (CUP) | Mixed Shallow Aquatic (SAM) |
| Cultural Thicket (CUT) | Submerged Shallow Aquatic (SAS) |
| Cultural Woodland (CUW) | Coniferous Swamp (SWC) |
| Coniferous Forest (FOC) | Deciduous Swamp (SWD) |
| Deciduous Forest (FOD) | Mixed Swamp (SWM) |
| Mixed Forest (FOM) | Thicket Swamp (SWT) |
| Meadow Marsh (MAM) | |
| Shallow Marsh (MAS) | |

Data Source
- The Town of Georgina
- The Regional Municipality of York
- LSRCA



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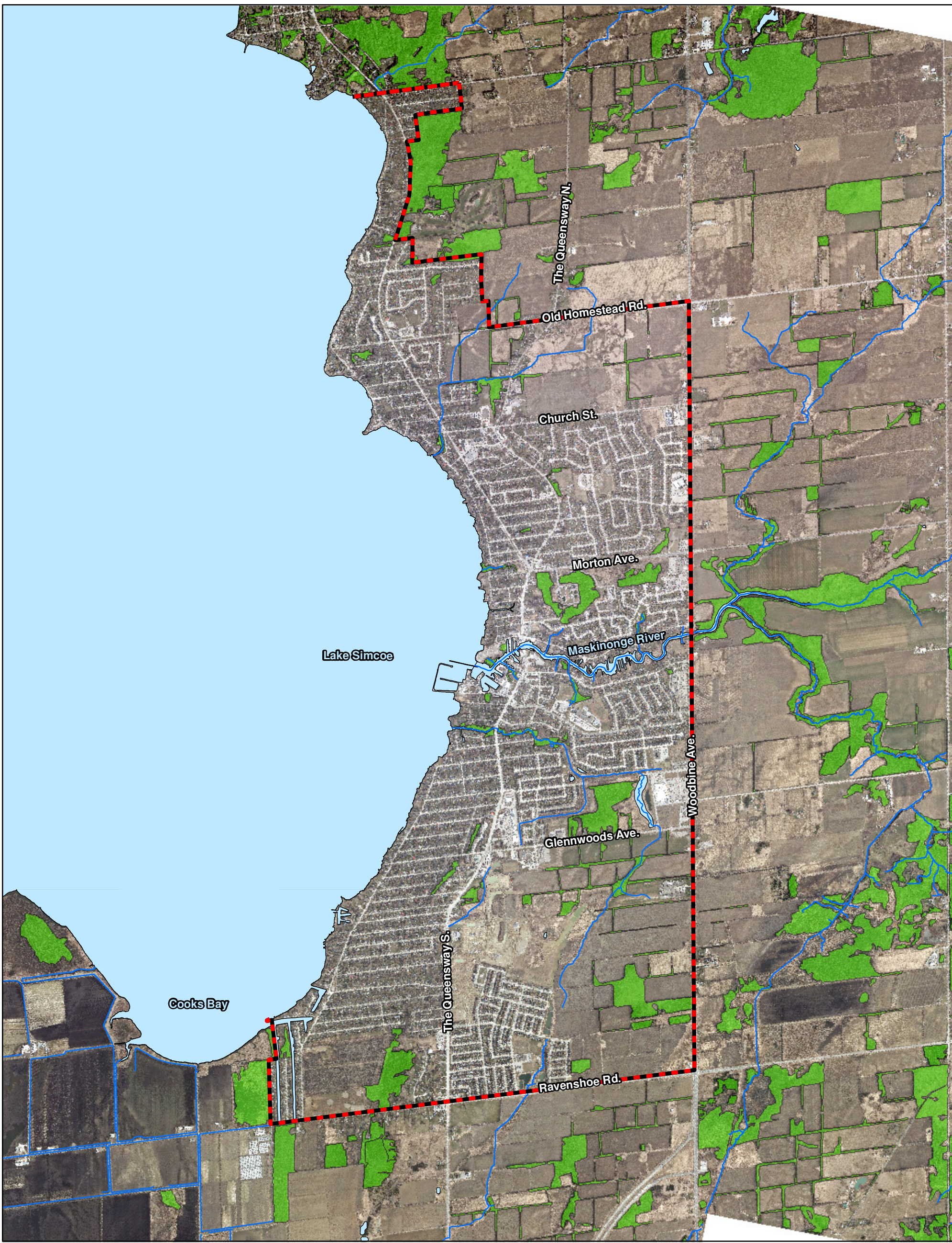
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Keswick Secondary Plan Review
Vegetation Communities





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Figure #

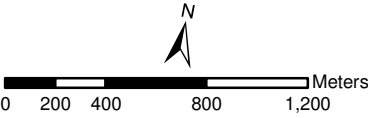
5



Legend

-  Keswick Secondary Plan Boundary
-  Watercourse
-  Waterbody
-  Woodland

Data Source
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- The Regional Municipality of York
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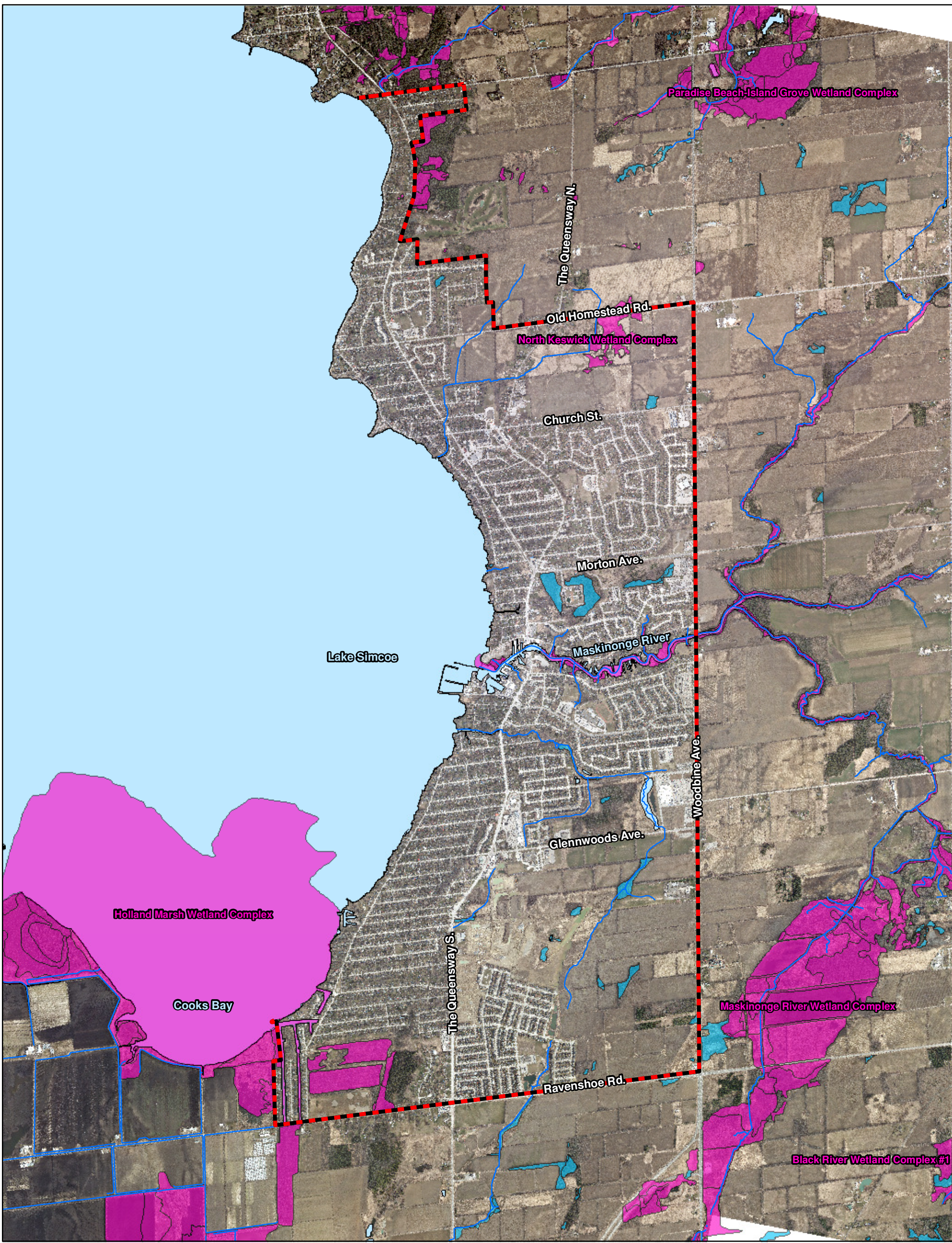
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Keswick Secondary Plan Review
Woodlands

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Date	November 2019
Scale	30,000
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Figure #

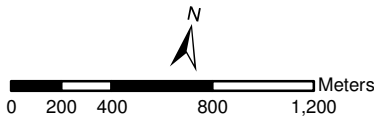
6



Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Waterbody
- Wetland - Evaluated as Provincially Significant
- Wetland - Not Evaluated per the Ontario Wetland Evaluation System

Data Source
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- The Regional Municipality of York
- LSRCA



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Keswick Secondary Plan Review
Wetlands

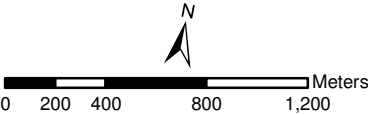
Project #	2019-178	Figure # 7
Date	November 2019	
Scale	30,000	
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Legend

-  Keswick Secondary Plan Boundary
-  Watercourse
-  Waterbody
-  Area of Natural and Scientific Interest (Life Science) - Provincial
-  Candidate Area of Natural and Scientific Interest (Life Science) - Provincial

Data Source
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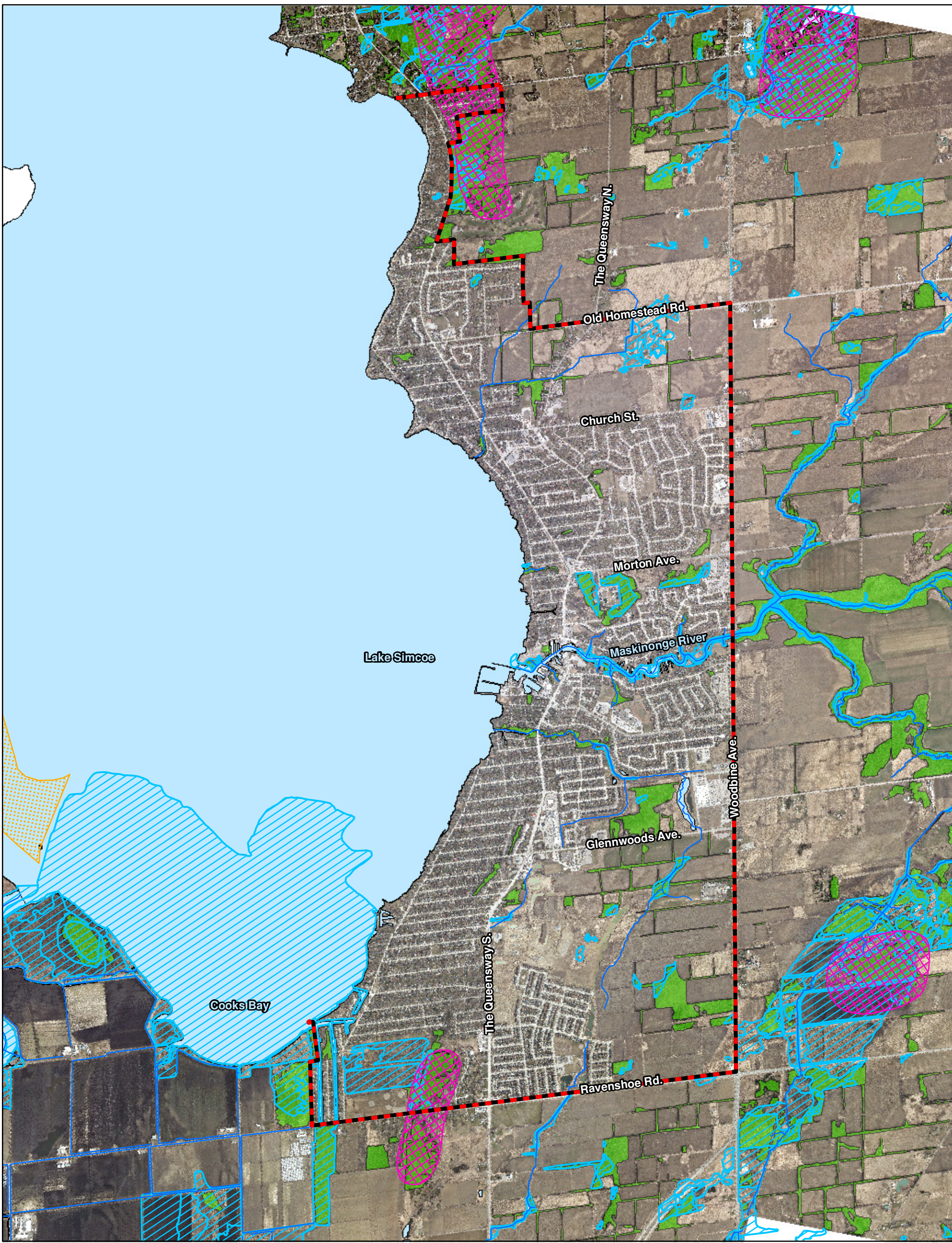
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Keswick Secondary Plan Review
Areas of Natural and Scientific Interest

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Figure #
8

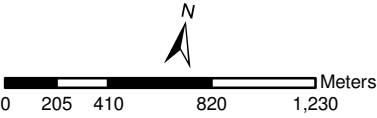


Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Waterbody
- Wetland
- Woodland
- Deer Wintering Area (Stratum 2)
- Waterfowl Staging Area

Data Source

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Keswick Secondary Plan Review
Significant Wildlife Habitat Features

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Figure #
9



Legend

Keswick Secondary Plan Boundary

Watercourse

Waterbody

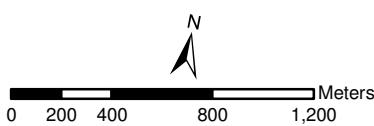
Wetland

Woodland

Species Dispersal Corridors

Data Source

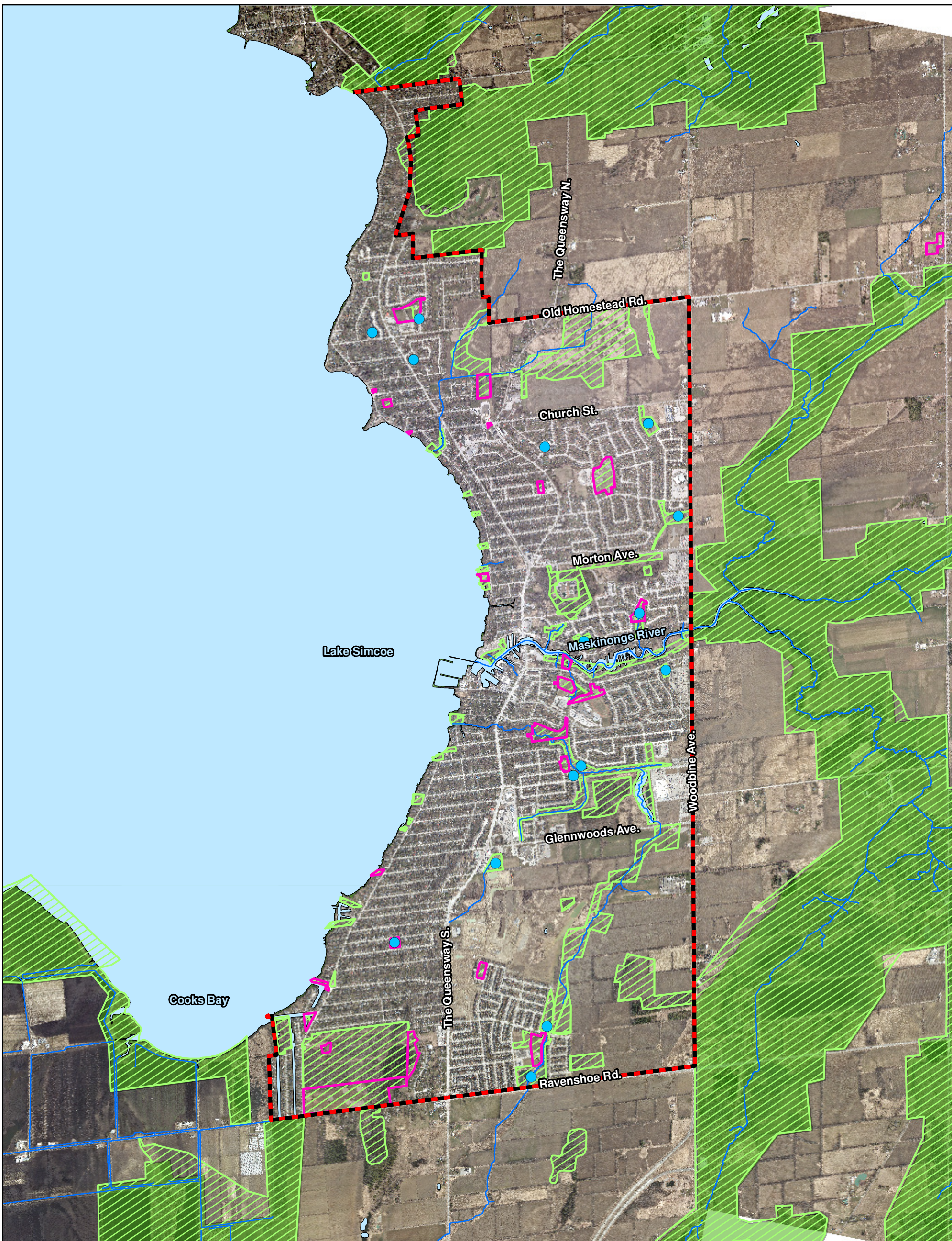
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Keswick Secondary Plan Review
Species Dispersal Corridors and Connections

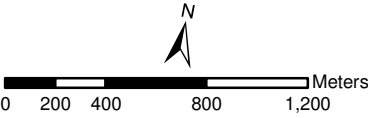
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Date	November 2019	
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Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Town Park
- Storm Water Management Pond
- Waterbody
- Greenbelt Plan NHS
- Greenlands System (Region of York/Town of Georgina)

Data Source
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- The Regional Municipality of York
- LSRCA
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Landscape Ecology & Natural Heritage Planning

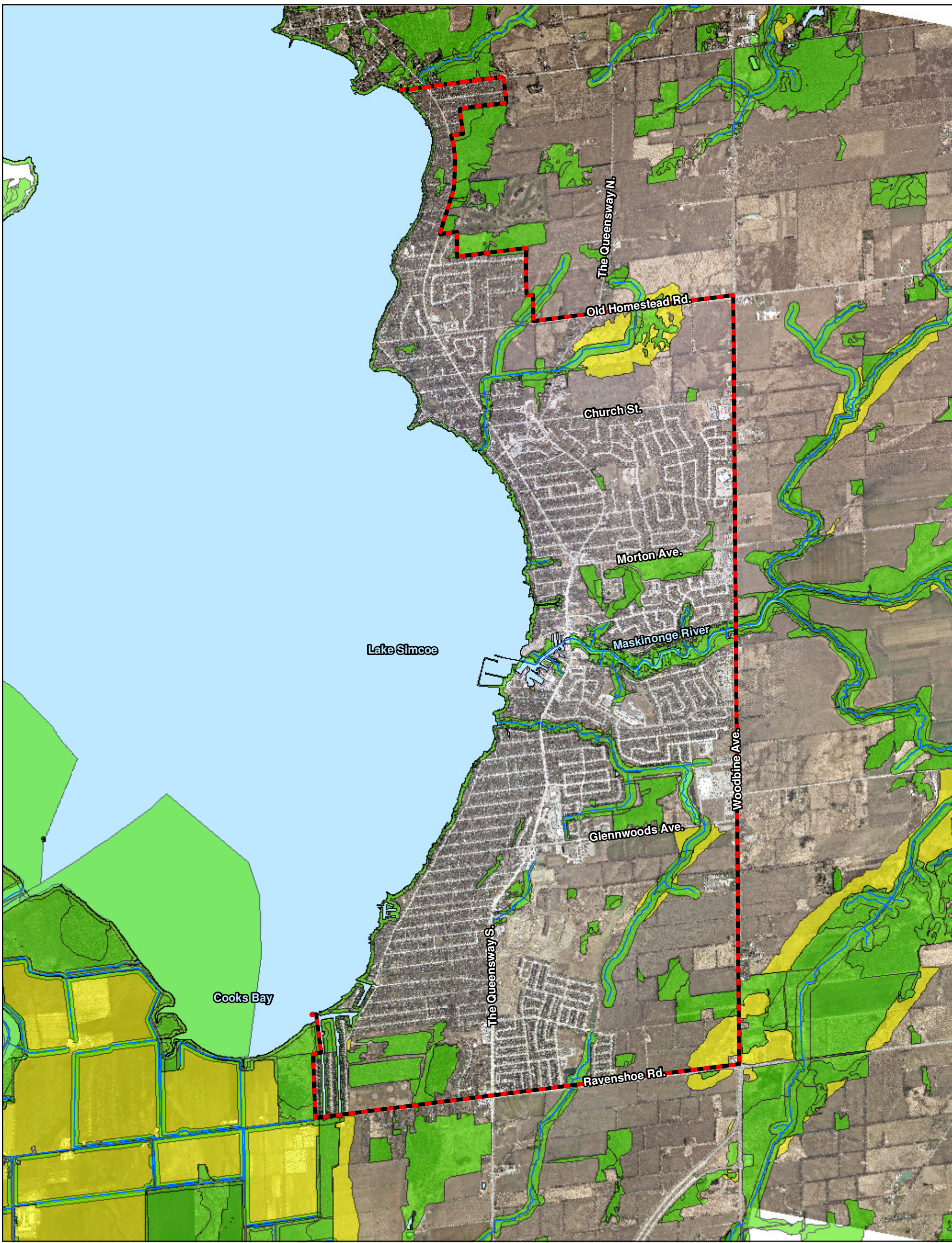
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Keswick Secondary Plan Review
Preliminary NHS






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Figure #

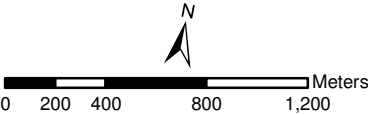
11



Legend

-  Keswick Secondary Plan Boundary
-  Watercourse
-  Waterbody
-  Core Natural Heritage Feature
-  Corridor/Floodplain Enhancement Opportunity

Data Source
- The Town of Georgina
- The Regional Municipality of York
- LSRCA



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Landscape Ecology & Natural Heritage Planning

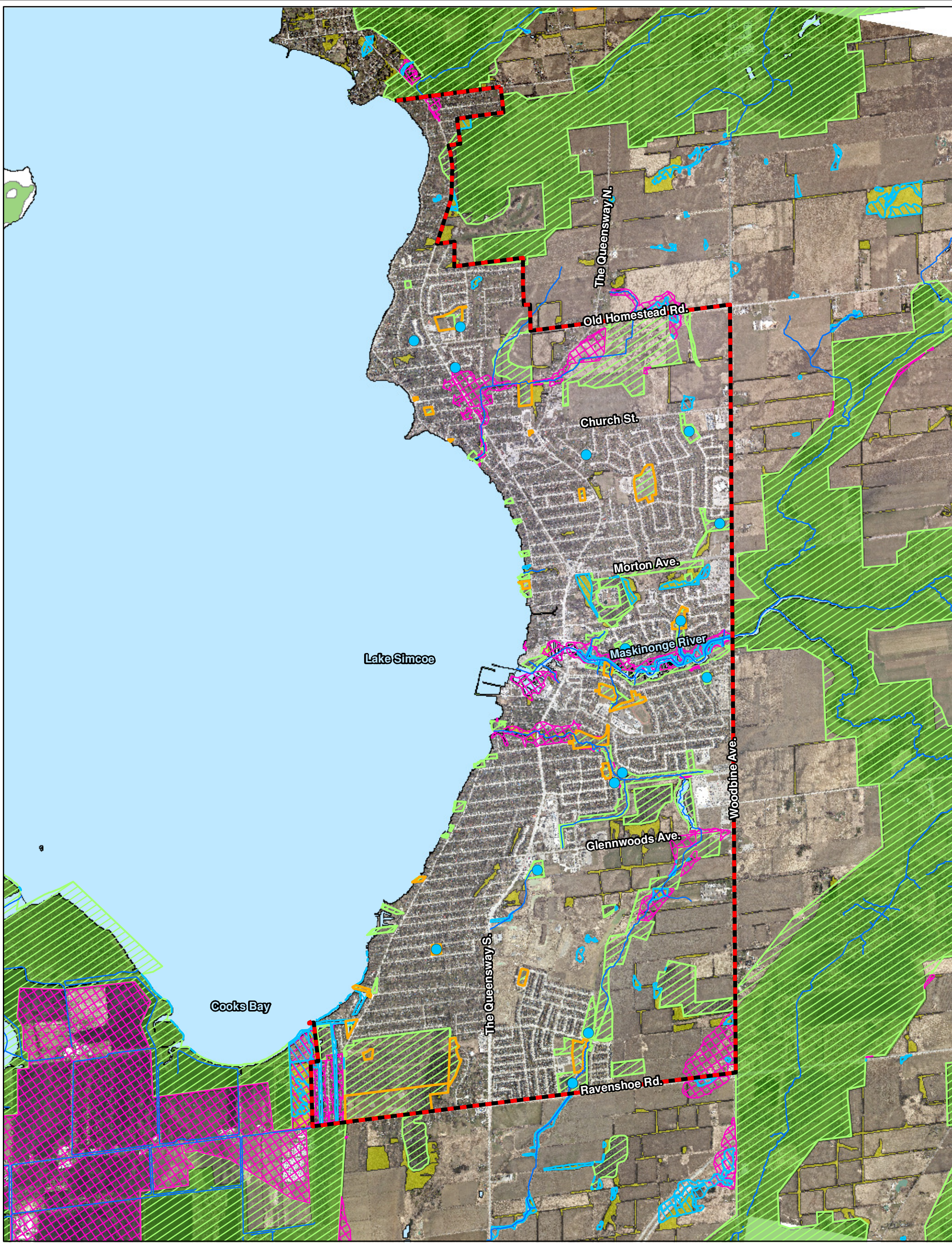
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Keswick Secondary Plan Review
Core Natural Areas and Floodplain/Corridor
Enhancements (LSRCA)

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Figure #

12

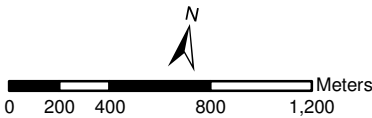


Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Town Park
- Storm Water Management Pond
- Waterbody
- Wetland
- Woodland
- Floodplain

- Greenbelt Plan NHS
- Greenlands System (Region of York/Town of Georgina)

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- The Regional Municipality of York
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Landscape Ecology & Natural Heritage Planning

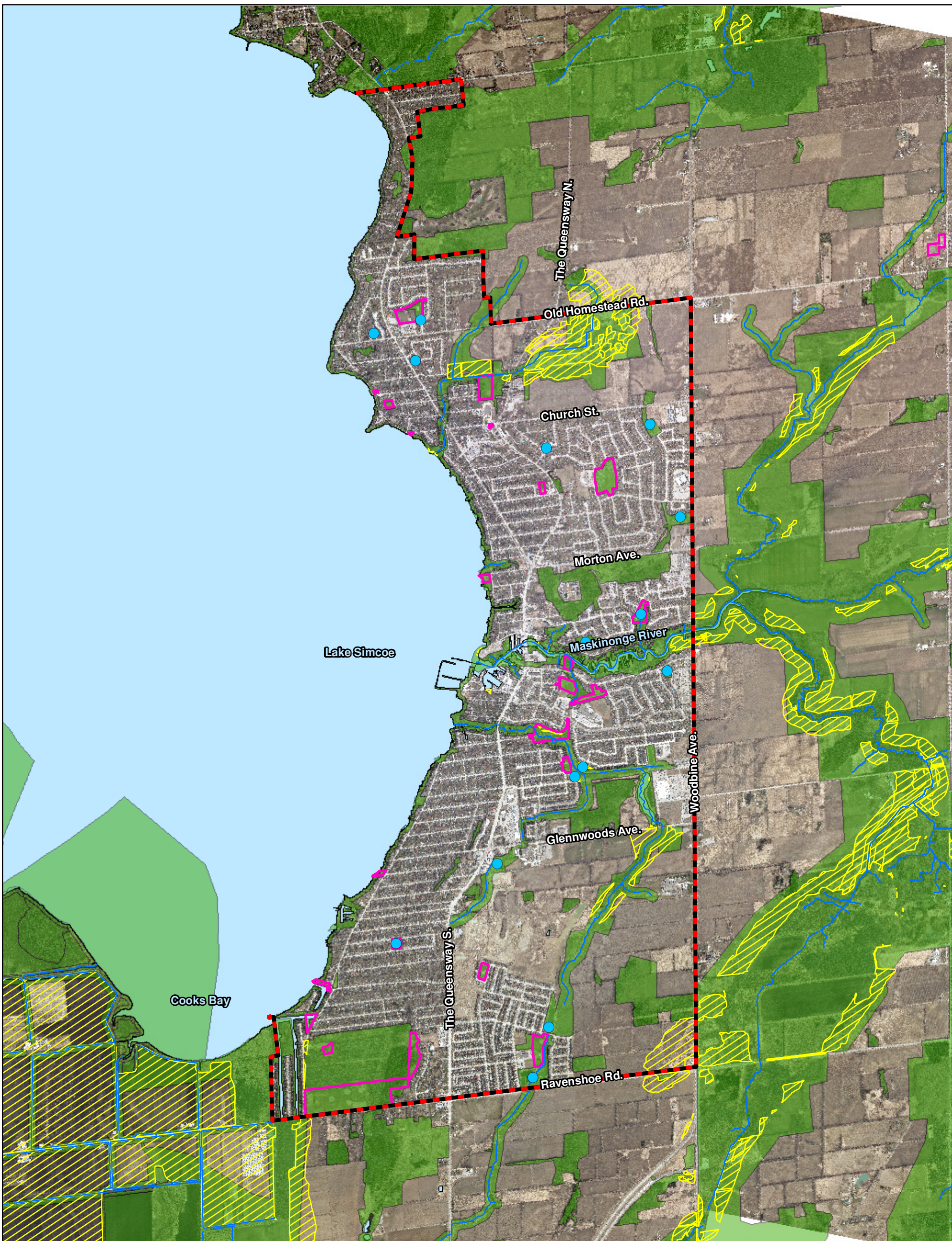
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Keswick Secondary Plan Review
*NHS Features Outside of the Town/Region
Greenlands System*

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Date	November 2019
Scale	30,000
Prepared By: JJJ	Verified By: BDB

Figure #

13



Legend

- Keswick Secondary Plan Boundary
- Watercourse
- Town Park
- Storm Water Management Pond
- Waterbody
- Natural Heritage System
- Enhancement Opportunities

Data Source
- The Town of Georgina
- The Regional Municipality of York
- LSRCA
- © Queen's Printer for Ontario, 2019



0 200 400 800 1,200 Meters

PLAN B Natural Heritage
Landscape Ecology & Natural Heritage Planning

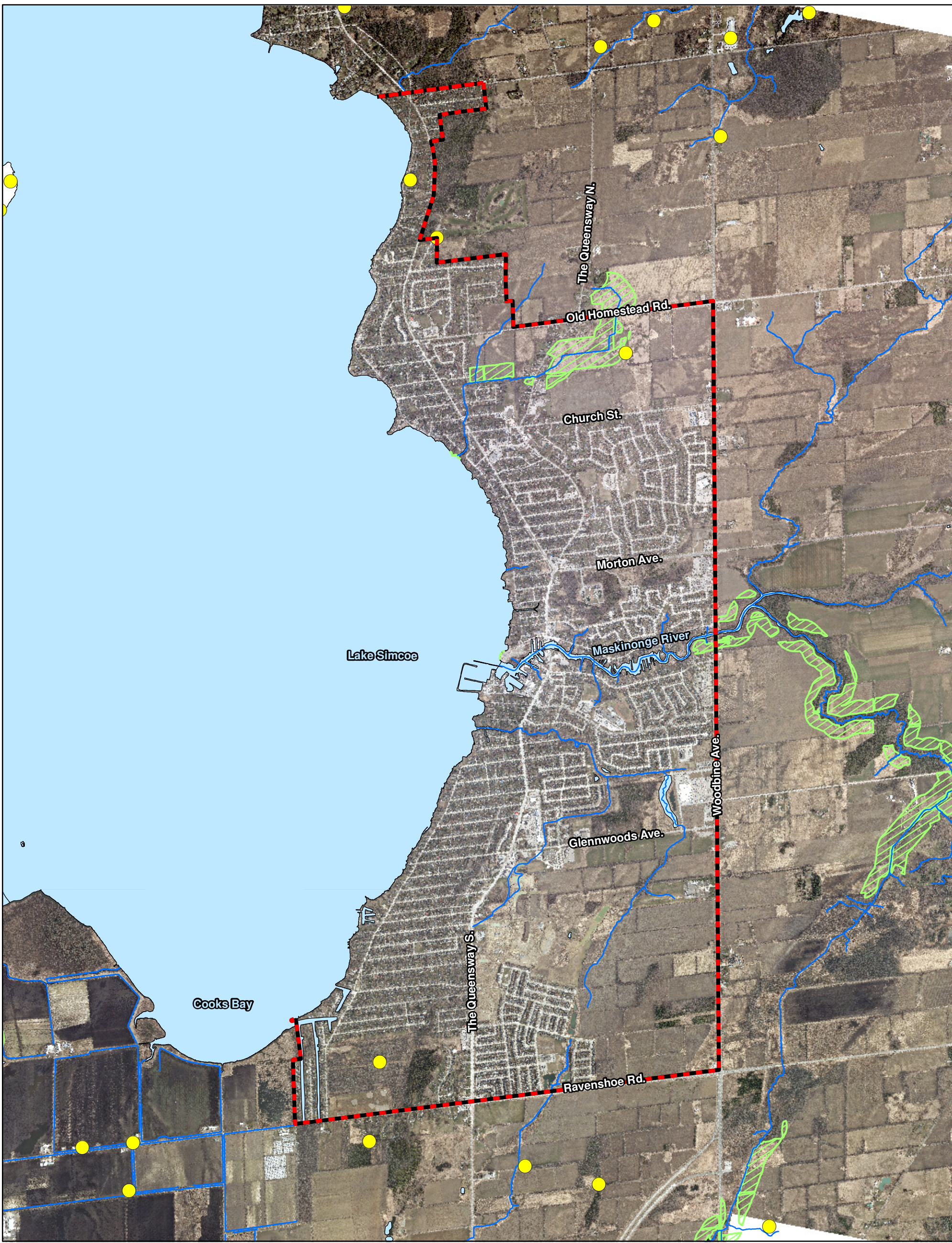
176 Fellows Crescent
Waterdown, ON
L0R 2H3

Keswick Secondary Plan Review
*Composite Natural Heritage System
(Town/Region/LSRCA)*






Project #	2019-178
Date	November 2019
Scale	30,000
Prepared By: JJJ	Verified By: BDB

Figure #

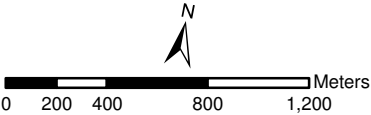
14



Legend

-  Keswick Secondary Plan Boundary
-  Watercourse
-  Local Linkage
-  Waterbody
-  Corridor Restoration Opportunity

Data Source
- The Town of Georgina
- The Regional Municipality of York
- LSRCA



PLAN B Natural Heritage

Landscape Ecology & Natural Heritage Planning

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Keswick Secondary Plan Review

Linkages & Corridor Restoration (LSRCA)

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Figure #

A