



Town of Midland Official Plan Review and Update Project

Natural Heritage System Review

Prepared by
Severn Sound Environmental Association
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Town of Midland Natural Heritage System Review

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Town of Midland Natural Heritage System Review

1.0 Introduction

1.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) sets out the Province's interests in land use planning and development. These policies must be reflected in local planning documents, such as the update to the Town of Midland's Official Plan. The PPS requires the Town to protect significant natural heritage features and areas, known collectively as the Natural Heritage System, by restricting development and site alteration, and by demonstrating that the features and ecological function of the areas will not be harmed if development is permitted. This is normally done through the preparation of an environmental impact study by a qualified individual.

The components that comprise the Natural Heritage System are those as identified in the Provincial Policy Statement (PPS) and include: Significant Habitat for Endangered and Threatened Species; Significant Wetlands; Significant Woodlands; Significant Valleylands; Significant Wildlife Habitat; Areas of Natural and Scientific Interest; Habitat for Fish; and Linkages. This report addresses the requirements of Section 2.1 Natural Heritage of the PPS by identifying those features and providing the criteria and mapping to the Town to identify the Natural Heritage System that should be protected within the update of the Town's Official Plan. The Natural Heritage System is based on the GIS methodology outlined latter in this report.

1.2 Natural Heritage

The Ontario Ministry of Natural Resources describes natural heritage as including geological features and landforms; associated terrestrial and aquatic ecosystems; their plant species, populations and communities; and all native animal species, their habitats and sustaining environment. Natural heritage features may be determined to have ecological significance at a provincial, regional or local level. Significant natural heritage features can be targeted for protection and/or management to ensure the sustainability of that feature and its contribution to the overall biodiversity of the larger landscape.

Some of the general natural heritage features that are of ecological importance are wetlands, forests, unique habitats and aquatic habitats.

Lake Simcoe Environmental Management Strategy

1.3 Purpose

The Severn Sound Environmental Association (SSEA) was contracted to provide a habitat analysis (including mapping and an evaluation of natural heritage features) of Midland, Ontario, to assist the Town with their Official Plan Review and other planning initiatives.

1.4 Project Area

This Town of Midland/SSEA project uses two boundaries to define the area of analysis: the interior boundary delineates the Settlement Area (2,358 ha) which contains mostly residential, commercial, industrial and institutional land uses with some recreational and green space zones; the area outside the Settlement boundary but within the jurisdiction of the Town of Midland will be referred to as the Rural Area (1,333 ha); total size of study area is 3,691 hectares. Municipal and settlement boundary locations were provided by the Town of Midland via shapefile.

1.5 Scope

This project has been undertaken in two parts: primarily, a Habitat Analysis that provides an overview of existing conditions within the Town of Midland; and second, an examination and scoring of the Natural Heritage Features.

1.5.1 Habitat Analysis

The first part of this project completes a Habitat Analysis of the study area. This is based on the **Automated Arcview 3.1 Habitat Analysis Method (Severn Sound Remedial Action Plan, 1999)**.

Three types of habitat are used to model the existing landscape, those being:

- Forested areas (percentage of area covered by forest and interior forest areas)
- Riparian areas (percentage of stream reaches with adjacent forest cover and more than 30m adjacent forest cover)
- Wetlands (percentage of watershed covered by wetland and amount of forest cover adjacent to wetland)

See *Section 4.1* for further information on the background of the Habitat Analysis.

1.5.2 Natural Heritage Evaluation

The second part of the project focuses on the natural heritage features currently found within the Town of Midland. The information presented here provides a baseline of natural heritage information that may be used as part of future development and planning initiatives.

In addition to the features examined in the Habitat Analysis, five additional features were scored as part of the Natural Heritage Evaluation, creating ten layers of information as listed within Table 1.

Table 1 : Natural Heritage Features.

1	Woodland – Patch Sizes
2	Woodland – Significant Forest
3	Woodland – Interior Forest
4	Woodland – Riparian
5	Woodland – Wetland
6	Natural Water courses
7	Wildlife Habitat Areas
8	Slope
9	Low Slope with Water
10	Shorelines

1.6 Scoring and Evaluation

Based upon existing models when possible (see *Section 7.0 References*), a SSEA scoring system was designed to provide an evaluation for each of ten natural heritage features. Each feature was weighted equally and scored out of 10 possible points; a description of the scoring is provided in Section 3.0. Using GIS technology, the feature layers were then overlaid and a cumulative score determined. These results are indicated on maps that illustrate a colour representation of their score (see sections *4.0 Results*, *5.0 Figures* and *6.0 Maps*). Areas of significance are readily identifiable.

Some evaluation criteria differ in scoring weight between the **Settlement Area** and the **Rural Area**. In four of the 10 features scored, greater values were assigned to those features found within the Settlement Area in accordance with other methodologies and reports (e.g. Significant Woodland patch size as defined within County of Simcoe Official Plan). Natural features found within a Settlement Area tend to be smaller or fewer, yet remain critical to maintaining ecological functions within that area.

Table 2: Features that were scored differently between Settlement Area and Rural Area: (see *Section 3.0 Scoring and Evaluation Descriptions* for details)

3.1 Woodland – Patch Sizes
3.2 Woodland – Significant Forest
3.4 Woodland – Riparian
3.5 Woodland – Wetland

2.0 Data Preparation

As part of the Natural Heritage System Review (NHSR) modeling process, several GIS layers were used as inputs to the model. These inputs included slope, surface water courses, woodland cover, wetlands, Areas of Natural and Scientific Interest (ANSI) and other natural heritage features.

The evaluation required additional interpretation and analysis of some of the layers to update the information to the most recent conditions (*see 2.1 Updated Layers*) and to provide additional derived data (*see 2.2 Derived Data Layers*).

All input layers were converted to a 5-metre resolution raster grid. The scored grid layers were added together mathematically using the ArcGIS 9.3 Spatial Analyst software's Raster Calculator tool which produced a single combined score grid layer. The final combined score layer provides a visual delineation of high priority Natural Heritage areas within the Town of Midland.

Note: All layers used in the NHSR were limited to fall within the Town of Midland boundary; however, for some scoring purposes the Habitat Analysis method included woodland features that extended into other municipalities.

Table 3 presents the data sets used to establish and score the ten natural heritage features of this report.

2.1 Updated Layers

The Natural Heritage System Review model required woodland, wetland and riparian data that were updated to the ground conditions found in the most recent, available aerial photos. The latest aerial photos that were available for this project are 10 cm resolution Ortho-photographs that were flown by the County of Simcoe in late April, 2008. The update was crucial in order to provide a representation of the current 2008 conditions.

2.1.1 SOLRIS Woodland Updated to 2008

The existing Southern Ontario Land Resources Information System (SOLRIS) woodland data was produced by the Ontario Ministry of Natural Resources and is based on 2002 Ortho-photographs. To update the 2002 SOLRIS data to 2008 conditions, a method was used similar to the original method applied by OMNR. Woodland patches were interpreted and on-screen digitized using the 2008 Ortho-photographs and criteria from **SOLRIS: Image Interpretation Manual (Natural Resources Management Branch, 2004)**.

In general, a woodland patch was added or altered if it contained: contiguous forest growth with gaps no greater than 20 meters; had greater than 60% tree cover; and was larger than 0.5 hectare. (**SOLRIS Image Interpretation Manual**)

For this study, large hedgerows were also considered a woodland patch if it contained tree cover greater than 60%, gaps between woodland patches were no wider than 20 meters across and trees appeared to be greater than 2 meters in height.

The updated layer was produced as a shapefile and was then used as an input to the Habitat Analysis for the Natural Heritage System Review.

2.1.2 Evaluated Wetlands, Unevaluated Wetlands, Wet Areas and Areas of Natural and Scientific Interest

Existing Natural Resources and Values Information System (NRVIS) data was used for the evaluated wetlands, unevaluated wetlands and areas of natural and scientific interest boundary components of the analysis.

There are four evaluated wetlands that fall within or touch the Town of Midland boundary. The Wye Marsh (evaluation date October 1986), Sucker Creek (evaluation date April 2004), Midland Swamp (evaluation date December 2006) and Midland Little Lake wetlands (evaluation date October 2007) boundaries were used as inputs to the model.

Unevaluated wetlands were also included in the analysis. Their boundaries are based on OMNR aerial photo interpretation but have not been evaluated.

Wet areas were included as part of the NHR and Habitat Analysis models and were interpreted from the 2008 Ortho-photos. A wet area was on-screen digitized if a distinct boundary can be distinguished from the air photo. A wet area is a zone that has standing water and has not been previously identified in the wetland or drainage layers. The wetland and wet areas layers were combined into a single wetland/wet area shapefile for the Habitat Analysis.

The Wye Marsh ANSI boundary overlaps a portion of the Town of Midland boundary. The effective date of the ANSI was listed in the NRVIS database as December 2005. The ANSI boundary layer was appended to the wetland/wet area layer for the NHR process.

Urban stormwater ponds were not included in the analysis as they are specifically managed to control runoff and may be altered or cleaned out periodically.

2.1.3 Water Courses Corrected to 2008

As part of the on-going Severn Sound Source Protection Area Study, detailed water course data had already been interpreted using the 2008 Ortho-photos, including the identification of natural streams, ditches, overland flow and culverts. This water course data was also used for the riparian component of the Habitat Analysis method as well as an input into the natural water course component of the NHR model.

For the NHR study, a natural water course was considered to be a series of connecting drainage line segments that are part of an unaltered drainage system and may include channels with intermittent flow. Sometimes it was necessary to include ditches or culverts in the natural watercourse designation when the water flowing through a ditch originates in, or flows to, a natural system.

2.2 Derived Data Layers

Additional analysis was undertaken to produce derived layers that in turn were used as inputs to the Natural Heritage System Review model. These layers included elevation contour, slope, shoreline data and results from the habitat analysis.

2.2.1 Elevation and Slope Data

A 5-metre resolution Digital Elevation Model (DEM) was used to generate elevation contours and a slope model. The DEM used is a product of the Water Resources Information Project (OMNR) and is based on data captured during the 2002 Ortho-photo project.

The contour data was used to identify the 177.0 MASL line for the NHSR shoreline scoring component.

The slope model was used for the NHSR slope and low slopes with water scoring. Percent gradient of slopes were generated from the DEM and separated into categories of: very low slope (0-5%); low slope (5.1-15%); moderate slope (15.1-25%); and high slope (25.1 or greater) (adapted from the **Eastern Ontario Woodland Valuation System (Rowse, 2003)**).

The low slope associated with water component of the NHSR involved extracting the 0 – 5% slope category, converting the grid to a shapefile and intersecting the shapefile with the Watercourse layer. If a drainage segment flowed through a low slope polygon, then the polygon remained in the shapefile. If a low slope polygon did not have any water courses flowing through it, then the polygon was removed from the layer. The low slope polygons were then scored according to the NHSR low slope categories.

2.2.2 2002 Shoreline

The shoreline information used for the NHSR shoreline component is at an elevation of approximately 176.1 MASL and was compiled from the 2002 Ortho-photo project breakline data, provided by the County of Simcoe and OMNR. A breakline is a line feature that controls surface behavior when modeling elevation data.

The shoreline shapefile was combined with the high water contour line and converted to a polygon layer. Using the 2008 Ortho-photos, an interpretation and scoring of the shoreline area polygon layer was completed using the NHSR shoreline categories (*Table 13*). The polygon layer was then converted to a 5 M grid for input into the NHSR model.

2.3 Habitat Analysis Results Applied to the NHSR Model

Interior forest, amount of woodland to streams and the amount of adjacent woodland to wetlands/wet areas, resulting from the Habitat Analysis component, were used in the scoring of woodland patches in the NHSR model.

2.3.1 Interior Forest

The 2008 SOLRIS woodland layer was combined with the 100 M and 200 M interior forest layers to create a single layer which was joined by a unique identifier to the 2008 SOLRIS layer. Each woodland patch in the 2008 SOLRIS woodland layer was attributed a score dependant on the presence of 100 M or 200 M interior forest. If the woodland patch does not have interior forest, then a proximity selection step was completed. Woodland patches with no interior forest that were within 20 M of a patch that has interior forest, received the appropriate score. All other patches receive a zero score.

2.3.2 Amount of Adjacent Woodland to Streams

Using the riparian output from the Habitat Analysis (*Map 3*), the watercourse layer was clipped to the 2008 SOLRIS Woodland layer. A new layer was created that consists of stream segments with greater than 30.1 M adjacent woodland and stream segments with between 0.1 and 30 M adjacent woodland that fall within the SOLRIS woodland patch boundaries.

Each stream segment was attributed the corresponding unique woodland patch ID. The stream segments were summarized by the unique ID providing a total length of stream with greater than 30.1 M and between 0.1 and 30 M adjacent woodland for each woodland patch. The lengths were converted to percentages that were used to apply the NHSR scoring.

2.3.3 Amount of Adjacent Woodland to Wetlands/ Wet Areas

The widths of adjacent woodland to wetland/wet area boundaries (*Map 4*) were used to provide summary statistics for each woodland patch. The amount of adjacent woodland cover that a woodland patch provides to one or more wetlands can be determined by using this method.

The wetland boundary layer was broken into approximately 10 M segments and attributed the maximum adjacent woodland value for each segment (refer to the Automated AV 3.1 Habitat Analysis Method) clipped to the 2008 SOLRIS woodland layer. The line segments were assigned a unique identification (ID) number for the woodland patch that they fell within. The wetland boundary segments were summarized by the woodland patch ID to provide an average width of adjacent woodland that the patch provides to the wetland.

If a woodland patch was physically reduced in size and the analysis was recalculated, the average value of adjacent woodland provided to the intersecting wetland, for that individual woodland patch, would decrease. The average value for each patch was used in the NHSR scoring process.

Table 3: Data sets used for Natural Heritage Evaluation process

<div>Midland Natural Heritage Evaluation Component</div> <div>Data Set</div>	1	2	3	4	5	6	7	8	9	10
	Woodland - Patch Sizes	Woodland - Significant Forest	Woodland - Interior Forest	Woodland - Riparian	Woodland - Wetland	Natural Water Course	Wildlife Habitat Areas	Slope	Low Slope with Water	Shorelines
SOLRIS Woodland Updated to 2008	X	X	X	X	X					
Evaluated Wetlands					X		X			
NRVIS & Interpreted Wet Areas					X		X			
NRVIS ANSI							X			
Water Courses Corrected to 2008				X		X			X	
5m Digital Elevation Model based on 2002 Ortho-photos								X	X	X
5m Slope Model Based on 5m DEM								X	X	X
177m above sea level High Water Mark Approximation										X
176.1m above sea level, 2002 Shoreline										X
Habitat Analysis Condition Mapping Data Set										
100 and 200m Interior Woodland			X							
Amount of Adjacent Woodland to Streams				X						
Amount of Adjacent Woodland to Wetlands/ Wet Areas					X					

3.0 Scoring Descriptions for Natural Heritage Features

Note: The words “woodland” and “forest” will both appear in this section. Earlier projects and data often use the term ‘forest’ to describe a wooded area, while more recent literature refers to these areas as ‘woodlands’. The terms are treated as interchangeable when looking at older models (e.g. Interior Forest). See 8.0 Appendix – Glossary.

3.1 Woodland – Patch Sizes

For scoring, a woodland patch must contain: contiguous forest growth with gaps no greater than 20 meters; have greater than 60% tree cover; and be larger than 0.5 hectare (**SOLRIS Image Interpretation Manual, 2004**)

Large hedgerows were attached to a woodland patch if: attached and containing tree cover greater than 60%; no gaps were wider than 20 meters; trees appeared to be greater than 2 meters in height.

The largest woodland patch within the Settlement Area and the largest woodland patch in the Rural Area were each measured for spatial size (hectares); these sizes became the 100% benchmark within each of the study areas. The largest woodland patch in the Settlement area was 52.2 hectares, and the largest woodland patch in the Rural area was 191 hectares. Other patch sizes were then compared and scored relative to the largest patch within their respective areas.

Note: if a woodland patch crossed a boundary (e.g. settlement/rural or Midland/Tiny) the entire patch was scored according to the criteria *for the area that contains the largest proportion of the patch*.

Table 4: SSEA scoring for woodland patches.

Relative size of woodland (as % of largest patch)	Rural: (largest patch = 191 ha)	Settlement: (largest patch = 52.2 ha)
100%	10 points	10 points
90 – 99%	9	9
80 – 89 %	8	8
70 – 79 %	7	7
60 – 69 %	6	6
50 – 59 %	5	5
40 – 49 %	4	4
30 – 39 %	3	3
20 – 29 %	2	2
Less than 20 % (but greater than 0.5 ha)	1	1

3.2 Woodlands – Significant Forest

Due to forest fragmentation, there is a need to recognize moderate-sized woodland patches for their value as remaining forest, and for their potential to become larger woodlands if augmented with tree plantings or via natural succession over time.

Using criteria from the **County of Simcoe Official Plan (2008), 5.8 Definitions**, a *significant woodland* in Midland is a minimum of 2 ha for woodland patches within a Settlement Area, and a minimum of 10 ha for woodland patches within the Rural Area.

Note: if a woodland patch crossed a boundary (e.g. settlement/rural or Midland/Tiny) the entire patch was scored according to the criteria *for the area that contains the largest proportion of the patch.*

Table 5: Scoring for Woodlands – Significant Forest.

Settlement Area	Patch size >2ha = 10 points
Rural Area	Patch size >10 ha = 10 points

3.3 Woodlands - Interior Forest

‘Interior forest’ is the portion of a forest patch that is situated 100 metres or more internal from the outer edge of the forest patch. In southern Ontario the criteria of 100 and 200 metres from edge are used as threshold measurements for interior forest and deep interior forest (**A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern, Environment Canada, 2004; Eastern Ontario Woodland Valuation System, Roswell 2003; Ontario Nature, FON 2004**)

Scoring is awarded by determining the proportion of the woodland that remains 100 m or further interior from the patch edge. This replicates the amount of sheltered area available for those species requiring large tracts of undisturbed forest. The highest score attained within a patch is assigned to the entire patch, not just that portion of the buffer zone.

Note: the scoring criteria for interior forest uses the boundaries of the entire woodland patch, and in some instances the patch of contiguous woodland may extend beyond the Town of Midland municipal boundary.

Table 6: SSEA scoring for interior forest.

Feature	Score
Woodland patch contains deep interior forest 200m or greater within the patch boundary	10 points
Woodland patch has interior forest starting 100m from outer patch boundary	8
Woodland patch does not contain interior forest but is within 20m of another patch that does contain interior forest	6

3.4 Woodland – Riparian

Woodland patches provide shade and soil stability to areas immediately adjacent to small water courses. Scoring reflects the Settlement Area having intrinsically smaller woodlands (i.e. a small woodland patch in a Settlement Area has more ‘value’ than the same sized woodland in a Rural Area).

The scoring considers the entire woodland patch so as to determine the full effect of the riparian interface. **How Much Habitat is Enough (2004)** provides the following guideline: “streams should have a minimum 30-metre wide naturally vegetated adjacent lands area on both sides, greater depending on site-specific conditions.”

Note: if a woodland patch crossed a boundary (e.g. settlement/rural or Midland/Tiny) the entire patch was scored by criteria *for the area containing the largest proportion of the patch*.

Table 7: SSEA scoring for Woodland – Riparian.

Feature	Rural	Settlement
Woodland patch provides >30m adjacent cover to 76 – 100% of an intersecting stream	10 points	10 points
Woodland patch provides >30m adjacent cover to 26 – 75% of an intersecting stream	8	10
Woodland patch provides >30m adjacent cover to 1 – 25% of an intersecting stream	6	8
Woodland patch provides <30m cover adjacent to a stream	4	6
Portion of woodland patch is within 30m of a stream but does not intersect a stream	2	4

3.5 Woodland – Wetland

Woodland cover within or adjacent to a wetland is a critical habitat component. Trees, living and dead, as well as shrubs, provide shade, soil stability and wildlife habitat. Scoring reflects this relationship between wetlands (evaluated and unevaluated) and forest cover by looking at the average distance of adjacent vegetation provided by the forest.

Within the document **A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern: 1st Edition (Environment Canada, 1998)** the guideline for the width of natural vegetation around all wetlands is 240 metres of adjacent habitat that may be herbaceous or woody vegetation. This was broken down into smaller widths for scoring purposes.

Note 1: if a woodland patch crossed a boundary (e.g. settlement/rural or Midland/Tiny) the entire patch was scored by criteria *for the area containing the largest proportion of the patch*.

Note 2: evaluated wetlands occurring within the study area are also scored as 3.7: *Wildlife Habitat Areas*.

Note 3: see *Section 4.2.6* for discussion of 120m study area guideline pertaining to wetlands.

Table 8: SSEA scoring for Woodland – Wetland.

Feature	Rural	Settlement
Woodland patch provides >240m adjacent vegetation	10 points	10 points
Woodland patch provides 101 – 240m adjacent vegetation	8	8
Woodland patch provides 1 – 100m adjacent vegetation	4	6
Woodland patch is within 30m of wetland boundary	2	4

3.6 Natural Water Courses

Three types of water courses were scored by the type of drainage they provided within the Town of Midland.

Natural water courses (usually referred to as streams or creeks) have a permanent channel yet may contain water either year-round or intermittently. A score of ten points was applied to the area 30 metres each side and along the length of a natural water course.

Intermittent overland flow of water (usually seasonal flooding of fields or drainage down shallow hills) received a score of seven points for the area ten metres on each side and along the length of this type of water course.

Should a water course travel through a constructed ditch or culvert, a score of four points was assigned to the area five metres on each side and along the length of the ditch section.

Table 9: SSEA criteria for scoring natural water courses.

Feature	Score
Natural water course	10 points applied to the area 30 metres each side from the centre line of channel
Intermittent overland flow	7 points applied to the area 10 meters each side of the water course centre line
Constructed ditch or culvert	4 points applied to area five meters each side of water course centre line

3.7 Wildlife Habitat Areas

The following wildlife habitats and their identifying programs were looked at although the quality of data on record is quite variable; scoring was done with best information available:

- winter deer yards as identified by the OMNR
- Important Bird Areas (IBA)
- Areas of Natural and Scientific Interest (ANSI)
- Rare, Threatened and Endangered Species
- Evaluated wetlands (This feature's scoring differs from *Section 3.5 Woodland - Wetland* in that the evaluated wetland is now scored unto itself, not just in its relationship to adjacent woodlands.)

A 25 metre 'buffer zone' was created as part to the scoring matrix to assign value to the immediately adjacent lands that may not fall within the boundary of the feature.

Table 10: SSEA scoring for Wildlife Habitat Areas.

Feature	Score
Area is an ANSI or evaluated wetland	10 points
Area is an <i>unevaluated</i> wetland or wet area	7
Area is within 25 metres of ANSI boundary or an evaluated wetland boundary	5
Area within 25 metres an <i>unevaluated</i> wetland	3

3.8 Slope

Percent gradient of slopes were generated from the 5 metre resolution Water Resources Information Project (OMNR) digital elevation model, which was derived from the 2002 ortho photo project data. The data were separated into categories of: very low slope (0-5%); low slope (5.1-15%); moderate slope (15.1-25%); and high slope (25.1 or greater). Adapted from the **Eastern Ontario Woodland Valuation System (Rowse, 2003)**.

Note: areas of Very Low Slope (<5.1%) that *also* indicate presence of intermittent or seasonal surface water are scored in *3.9 Low Slope Associated with Water*.

Table 11: SSEA scoring system for slope.

High slope	25.1% or greater	10 points
Moderate slope	15.1 – 25 %	8
Low slope	5.1 – 15 %	5
Very low slope	0 – 5 % , no surface water	0
Very low slope	0 – 5 % , surface water	See Table 12.

3.9 Low Slope Associated with Water

If an area was determined to be very low slope (0 – 5%) and had indications of containing seasonal or intermittent surface water, a separate scoring layer was employed as this area has potential to be a wetland. The flatter the area is (e.g. 1% slope) the greater the probability that water will collect in this area. (**A Method For Analyzing Historical Wetland Habitat Conditions, SSEA, March 2004**)

Table 12: SSEA scoring for Low Slope Associated with Water.

0 – 1 % slope	10 points
1 – 2 % slope	8
2 – 3 % slope	6
3 – 5 % slope	2
over 5 % slope	0

3.10 Shorelines

Much of the shoreline that marks the coast of the Great Lakes has been subjected to great development pressure and has been degraded to various levels from their natural state. As shown in *Table 13*, the higher scores were awarded to areas with little or no impact to the natural shoreline.

For scoring purposes, a ‘shoreline’ is defined as beginning where the water meets the land and continues upland to a determined contour line. The shoreline used for this analysis has an elevation of 176.1m above sea level (MASL) and was derived from the County of Simcoe’s 2002 Orthophoto break line data; the area that is scored is the terrestrial community extending landwards from the shoreline to the high water contour line which is approximately 177.0 MASL (as generated from 2002 Ortho Digital Elevation Model data).

Table 13: SSEA scoring for shoreline.

Shoreline natural, vegetation buffer present, no structures.	10 points
Shoreline mainly natural (>75%), contains few artificial structures.	7
Shoreline has been somewhat altered (<75%) and contains artificial structures	5
Shoreline greatly altered (>75%) from historic configuration, contains artificial structures.	2
No shoreline present, or vertical steel breakwall installed.	0

4.0 Results and Recommendations.

4.1 Habitat Analysis

The first step of this project was to complete a Habitat Analysis of the study area based on the **Automated Arcview 3.1 Habitat Analysis Method** (Severn Sound Remedial Action Plan, 1999).

The Habitat Analysis includes the following criteria:

Forest Habitat:

- percent forest cover
- size of largest patch
- percent forest >100m from edge
- percent forest >200m from edge

Riparian Habitat:

- percent vegetated stream
- percent streams with >30m buffer

Wetland Habitat:

- percent wetlands in watershed
- amount of vegetation adjacent to wetlands

Using the guidelines from **How Much Habitat is Enough (2004)**, the following minimums (*Table 14*) are presented on a watershed basis. Direct comparisons are difficult between the Town of Midland study area and the larger watershed unit used for these guidelines, however, the values shown provide a ‘benchmark’ for planning purposes.

Table 14. “How Much Habitat is Enough” guidelines.

Forest Habitat	
Percent forest cover	>30% of the area
Size of largest forest patch	At least 200ha and >500m wide
Riparian Habitat	
Percent of stream naturally vegetated	75% of stream length should be naturally vegetated
Wetland Habitat	
Percent wetland in watershed	>10% in watershed; >6% in a subwatershed
Amount of natural vegetation adjacent to the wetland	Marsh: 100m Swamp: 100m

Table 15 provides the results for the **Habitat Analysis** (as outlined in *Scope: Section 1.3.1*).

Table 15. Summary of the 2008 Habitat Analysis of the Town of Midland

Includes a comparison with the 2008 Proposed Developments (PD) areas.

PD changed values are highlighted.

WOODLAND HABITAT

	Whole Area		Settlement Area Only		Rural Area Only	
	2008	2008 with PD	2008	2008 with PD	2008	2008 with PD
% woodland cover of area	36.90%	35.6 (-0.3)%	26.40%	24.3 (-2.1)%	55.4%	
Hectares of woodland cover of area	1360.4 ha		621.9 ha		738.5 ha	
Size of largest patch within area (ha)	191.0 ha	--	52.2 ha	--	63.9 ha	
Size of largest patch intersecting a boundary	316.8 ha	--	160.1 ha	--	316.8 ha	
(amount inside area)	(131.4 ha)	--	(75.1 ha)	--	(98.9 ha)	
% forest >100m from edge	11.0%	10.8 (-0.2)%	3.1%	2.8 (-0.3)%	24.8%	
%forest >200m from edge	3.4%	--	0.4%	--	8.8%	

RIPARIAN HABITAT

	Whole Area		Settlement Area Only		Rural Area Only	
	2008	2008 with PD	2008	2008 with PD	2008	2008 with PD
% natural vegetation along first to third order streams:						
naturally vegetated	71.7%	70.9 (-0.8)%	60.0%	58.1 (-1.9)%	80.4%	
30m wide buffer	51.4%	--	30.5%	--	66.8%	

WETLAND HABITAT

	Whole Area		Settlement Area Only		Rural Area Only	
	2008	2008 with PD	2008	2008 with PD	2008	2008 with PD
% wetlands in Midland	8.2%	--	7.7%	--	9.1%	
Mean width of vegetation adjacent to wetland	170 m	--	91 m	--	230m	
Total area (ha) of wetland/wet areas	302 ha	--	181 ha	--	121 ha	
Total length (km) of wetland/wet areas perimeters	23.9 km	--	9.8 km	--	13.9 km	
Percent of wetland/wet area perimeters by adjacent woodland:						
No adjacent woodland present	28.8%	--	48.7%	--	14.9%	
Between 0.1 and 100m	26.9%	--	27.3%	--	27.1%	
Between 100 and 240m	16.4%	17.2 (+0.8)%	10.9%	12.8 (+1.9)%	20.7%	
Greater than 240m	27.9%	27.1 (-0.8)%	13.1%	11.9 (-1.2)%	37.3%	

4.1.1 Impacts of Proposed Developments (2008)

The Town of Midland provided site information for seven development areas approved prior to 2008 (as indicated on *Map 1*). This report looks at the current woodland, riparian and wetland features and the loss or impact that will occur to these natural heritage features after this approved development.

In gross terms, the total loss of woodland cover would be 48 hectares, spread over the seven development sites (reducing the total forest cover of Midland from 1,362 ha to 1,314 ha). *Table 15* compares the changes for woodland, riparian and wetland habitats within the Town of Midland and, more specifically, the Settlement Area. Each of the three features will be altered due to development pressure, the differing amount highlighted in each column.

The percent of forest cover will be reduced in both Areas, the whole area dropping to 35.6% (from 36.9%) and the Settlement Area with a loss to 24.3% (from 26.4%).

The amount of forest cover with greater than 100m edge decreases from 11.0 to 10.8% in the whole area, and drops from 3.1 to 2.8% in the Settlement Area.

Riparian areas are also affected, with the naturally vegetated sections of the streams dropping from 71.7 to 70.9% in the whole area and decreasing from 60.0 to 58.1% within the Settlement Area.

The proposed developments will also have impact on the wetland areas, with mean width of vegetation adjacent to a wetland dropping from 170m to 165m, and from 91m to 90m in the whole area and Settlement Area respectively.

Woodlands adjacent to wetlands would decrease their greater-than-240m buffer to 27.1% (from 27.9%) in the whole area and drop to 11.9% (from 13.1%) in the Settlement Area. Note that an increase is noted in the smaller 100 to 240m buffers due to this change in woodland configuration (area of large buffer is reduced but remainder of woodland now falls into next size down category, thus adding to the sum of moderate sized values).

4.2 Natural Heritage Evaluation

This project uses two boundaries to define areas of analysis: the interior boundary delineates the Settlement Area (2,358 ha) which contains mostly residential, commercial, industrial and institutional land uses with some recreational and green space zones; the area outside the Settlement boundary but within the jurisdiction of the Town of Midland is referred to as the Rural Area (1,333 ha); **total size of study area is 3,691 hectares**. *Map 1* indicates these boundaries.

The terms “woodland” and “forest” are somewhat interchangeable, however when a reference is being quoted the term found in the original document will be used. “Woodlot” is not used in this report as it is a commercial term more often used in the forestry industry.

The term “significant” indicates that the feature has unique qualities, such as size, function or location, and requires special consideration when found in a planning area. See *Section 8. Appendix - Glossary* for a definition from the Provincial Policy Statement.

4.2.1 Woodland – Percent Cover (Table 15)

Woodland cover within the Town of Midland boundaries is 36.9%. The **How Much Habitat is Enough (2204)** guidelines (*Table 14*) recommend at least 30% of a watershed area should remain forested to ensure ecological functions.

Recommendations:

- Using the above criteria as a guideline, the Settlement Area (with 26.4% woodland coverage) could be enhanced with tree planting where possible.
- Any proposal to remove existing trees should be reviewed with emphasis on retaining forest cover.

4.2.2 Woodland - Patch Sizes (Fig. 5.1A and B)

Woodlands provide a wide range of benefits, including environmental, social and economic returns. A variety of sizes, shapes and species configurations are desirable, with large-sized woodlots being the more productive.

The largest patch within the Settlement Area of the Town of Midland is **52.2 hectares** and includes the Little Lake Wetland and associated forest cover. The largest patch within the Rural Area measured **191 hectares**, located on the west side of the Town’s jurisdiction. (see *Table 15*)

Figure 5.1A indicates woodland patch locations as identified by above criteria. *Figure 5.1B* applies the scores as determined from *3.1 Woodland – Patch Sizes*.

Recommendation:

- Examine possibilities for mitigation of lost habitat or in-filling open areas. For example, tree-planting initiatives for identified areas would enhance the patch size of moderate or marginal sized woodlands on municipal properties. Areas requiring in-filling could be determined using the **Automated Arcview 3.1 Habitat Analysis Method**.

4.2.3 Woodland – Significant Forest (Fig. 5.2)

Due to forest fragmentation, remaining large and moderate sized woodland patches need to be recognized for their values and for their potential to become larger woodlands if augmented with tree plantings or via natural succession over time.

The County of Simcoe Official Plan (2008) states that **any woodland greater than 2 hectares in a Settlement Area, and any woodland greater than 10 hectares in a Simcoe Uplands Rural Area** (which includes the Town of Midland) **will be classified as a significant woodland**. *Figure 5.2* illustrates the locations of significant woodlands within the Town of Midland; note that woodland patches under the 2 ha and 10 ha minimum sizes are shown as outlined areas within their perspective areas.

Recommendations:

- The Town should retain all patches of significant woodland.
- Through tree-planting or natural succession some of the moderate sized patches could become joined, thus creating significant woodland.

4.2.4 Woodland – Interior Forest (Fig. 5.3, Map 6.2)

Large patches of woodland are inherently important areas due to their scarcity within the landscape of southern Ontario. A large woodland usually contains a mix of many botanical and faunal species; some of these species require wide buffers from the forest edge to the quiet and undisturbed interior. The decline in populations of interior species is partially attributed to forest fragmentation and diminished patch size.

To measure the effectiveness of a woodlot as preferred interior habitat, a method was applied to determine the extent of the interior forest. Starting at the outside edge and measuring inwards, 100m and 200m ‘buffers’ were applied to determine the amount of forest cover remaining within the patch; if any area remained beyond the 200m buffer, that area was scored at 10 points. If there was interior forest greater than 100 meters but not reaching 200m, then a scoring of 8 points was applied.

Scoring was applied by mapping the woodlands with a SOLRIS application using the 2008 ortho photos to indicate buffers of 100 and 200 meters.

The guidelines presented in **How Much Habitat is Enough (2004)** recommend that areas with forest cover 100 metres or further from the forest edge should be greater than ten percent. The proportion of the area that is forest cover 200 metres or further from the forest edge should be greater than five percent.

Figure 5.3 illustrates the locations of patches within the Town of Midland containing interior forest values. *Table 15* indicates that 3.4% of all the woodland areas within the Town of Midland contains interior forest greater than the 200m buffer; 11% of the woodlots contains interior forest within the 100 – 200m buffer. Within the Settlement Area

boundary, 0.4% of the woodlots contain interior forest greater than 200m, and 3.1% of them fall within the 100 – 200m buffer zone.

Recommendation:

- Identified patches that contain interior forest should receive special consideration from development pressure to retain their integrity.

4.2.5 Woodland – Riparian (Table 15, Fig. 5.4, Map 6.3, Map 6.6)

The association between healthy streams and woodlots is important, as the trees and shrubs provide soil stability, water retention, and wildlife habitat. **How Much Habitat is Enough?** provides the guideline of at least 30 meters of adjacent vegetation (each side) along 75% of the stream.

First order streams (those emerging as headwater) and second order streams (joined tributaries) are more sensitive to streamside disturbance than the larger and more stable downstream areas (third and fourth orders). Therefore these smaller streams require the bank stability provided by a tree's root system and the shading provided by adjacent forest cover.

Figure 5.4 indicates the scoring for Midland's riparian areas that intersect woodlands. Note that the entire woodland patch is highlighted, since the forest as a whole provides the riparian protection.

Table 15 shows that both Rural and Settlement Areas contain less than the recommended 75% streamside cover (71.7% and 60% respectively). Compounding this deficiency is the lack of 30 metre-wide coverage where the vegetation does exist (51.4% of the Rural Area streamside cover, and 30.5% of the Settlement Area streamside cover).

Recommendations:

- Retain woodlands that are part of the riparian habitat.
- Enhance vegetation cover to 30 metres where possible, thus ensuring healthy streams.

4.2.6 Woodland – Wetland (Fig. 5.5, Map 6.4A, Map 6.7A)

Wetlands are unique habitats unto themselves, but the amount (or lack) of adjacent woodland cover has an effect on both function and diversity of species within a wetland.

Within the document **A Framework for Guiding Habitat Rehabilitation in Great Lakes Areas of Concern: 1st Edition (Environment Canada, 1998)** the guideline for the width of natural vegetation around all wetlands is 240 metres of adjacent habitat that may be herbaceous or woody vegetation.

The Provincial Policy Statement does not outline specific setbacks for provincially significant wetlands. The provincial Wetlands Policy requires a 120 metre study area adjacent to wetlands. This is not a setback, but an area where most impacts could occur. (*Personal communication: K. Woeller, OMNR*)

There are adjacent woodlands to each of the evaluated wetlands that lay within or intersect the boundaries of Midland. *Figure 5.5* illustrates the areas of woodland that interact with the Wye Marsh, Sucker Creek, Midland Swamp and Midland Little Lake wetlands.

Recommendations:

- Any woodlands directly associated with a wetland area should be given special consideration from development pressure.
- No development should be allowed within woodlands located within 120 metres of the wetland boundary without benefit of a study.

4.2.7 Natural Water Courses (Fig. 5.6)

This aspect of the report looked at the type of drainage occurring along a watercourse.

Water courses that include streams with defined beds and banks, as well as any linked ditches, are important elements within a natural heritage system as they provide transfer of water and nutrients throughout the drainage area. Water courses also provide habitat requirements to a great many species of birds, mammals, invertebrates, plants, reptiles, amphibians and fish.

The **Markham Small Streams Study: Principles and Strategies for the Protection and Management of Small Drainage Courses (Schollen And Company, Inc, 2006)** studied the importance and function of small, seasonal and intermittent water courses. Their report indicates that these water courses are a vital aspect of ecological function within a watershed, both as natural flow and as stormwater and flood runoff.

Recommendations:

- Natural water courses should be retained.
- Any ditching and draining activities should be planned with careful consideration of potential impacts to both upstream and downstream flow patterns.

4.2.8 Wildlife Habitat Areas (Fig. 5.7)

For this report the following wildlife habitats and their identifying programs were looked at (including the available files of the OMNR Natural Heritage Information Centre). The quality of data on record is quite variable, and scoring was done with best information available:

- colonial bird nesting sites
- winter deer yards as identified by the OMNR
- Important Bird Areas (IBA)
- Areas of Natural and Scientific Interest (ANSI)
- Evaluated wetlands

One Life Science ANSI, four evaluated wetlands and a designated Important Bird Area (IBA) were identified in the Midland area from the above listed significant habitats.

Areas of Natural and Scientific Interest (ANSI) have been identified by the Ontario Ministry of Natural Resources, and include Life Science and Earth Science types of sites. ANSIs are classified as being either provincially significant or regionally significant. The municipal boundary of Midland touches upon the Regionally Significant Wye Marsh ANSI. As this ANSI is also a Provincially Significant wetland (see below) only one layer of SSEA scoring has been applied.

Protection of evaluated wetlands has been a priority of municipal and provincial governments for several years. The **Ontario Wetland Evaluation System, OMNR, 1993**, provides a method for evaluating wetlands in southern Ontario, and has been applied to the larger wetland areas within Midland's boundaries.

The Town of Midland either contains all or part of four evaluated wetlands: Midland Little Lake Wetland, Wye Marsh, Midland Swamp and Sucker Creek Wetlands. All of these have been evaluated as Provincially Significant wetlands.

An unevaluated wetland is an area that contains water at or near the surface and supports aquatic plant growth, but has not been scored using the **Ontario Wetland Evaluation System** (often due to minimum-size parameters). These wetlands have been identified using Ontario Basic Mapping (OBM) and air photo interpretations.

Recommendations:

- Maintain protection of evaluated wetland areas and ensure adequate buffer zones exist.
- Investigate for presence of species at risk.
- Consider evaluating any wetland currently unevaluated, including ephemeral wetlands.
- The woodland areas, particularly the large patches located along the westerly side of the study area, should have field work applied prior to development planning decisions.

4.2.9 Slope (Fig. 5.8; Map 6.8)

The gradient (percent) of land slope indicates the dependency for soil stabilization by tree roots and thick herbaceous growth. Generally, the steeper the slope the greater the risk of erosion and subsequent sediment loading into lower areas, as well as loss of stabilization to upper areas. It is therefore important that natural erosion controls are present and maintained to buffer negative effects and that land development (loss of natural controls) does not occur in these areas.

As well as potential erosion sites, slope can be used to assist with identifying Significant Valleylands. For example, the Lake Simcoe Watershed Natural Heritage System uses 8% slope as one of the criteria for identifying a valley wall, whereas the Oak Ridges Moraine model uses a slope of 15%. This indicates that the critical 'cut off' for a significant slope depends upon factors such as local topography and geology.

Figure 5.8 and Map 6.8. Slope and Elevation Contours indicate the slope areas within Midland.

Note: The high slope areas shown within the active gravel pit (southern portion of study area) and the aggregate piles at the harbour shoreline are not natural slopes and should not be included in Natural Heritage Strategy planning decisions.

Recommendations:

- Consider defining and identifying Significant Valleylands in the Town of Midland's Natural Heritage Strategy. The Midland Reservoir area and Wye Valley bear consideration as Significant Valleylands.
- Protect existing cover on high slope areas. For example, the stabilizing influence of the forested slopes along Vindin Street (Midland Reservoir Valleyland) highlights the need to protect cover and minimize disturbance.

4.2.10 Low Slope with Water (Fig. 5.9)

Areas that are very low slope (less than 5% grade) and indicate presence of water (permanent or intermittent) are of interest due to the potential for wetland development. These areas may also be recharge areas for water table replenishment; *Figure 5.9* shows these areas.

Recommendation:

- Investigate the area in the south-west corner of the Town boundary that indicates a large area of low slope with water coverage. This not an evaluated wetland, yet may contain species and features that support a healthy Natural Heritage System within the Town of Midland.

4.2.11 Shorelines (Fig. 5.10A, Fig. 5.10B)

The coastal shoreline of the Great Lakes is being heavily impacted by developments. There has been a great loss of natural shoreline, as vegetation (both on-shore and near-shore) has been replaced by sand beaches, steel breakwalls, dock cribs and other alterations.

Shorelines provide both wildlife habitat (shoreline flora and fauna, littoral zone aquatic life) and human recreational opportunities (e.g. swimming, fishing, photography, canoeing). Midland's municipal boundary contains several kilometres of shoreline including the Wye River, Little Lake and Midland Bay (Severn Sound). Streambanks and wetlands are not included in this layer's analysis.

Shorelines that include undisturbed natural vegetation, and may contain natural stream or river mouth discharge areas, have high suitability for natural habitat. A shoreline currently impacted by artificial structures (e.g. solid crib docks, vertical steel breakwalls, dumped sand or fill) or effluents (drain ditch outflow) is of low quality to the ecosystem. Vertical steel breakwalls scored as "no shoreline" due to their dramatic and negative alteration of shoreline function.

Table 16. Summary of Shoreline Scores by length and percent.

Score	Length (kilometers)	Percent
10	1.9	11 %
7	0.8	5
5	2.1	12
2	8	46
0	4.5	26
Total	17.3 km	

Table 13 (Section 3.10) explains the scoring breakdown for shoreline alterations.

Table 16 shows that only 11% (1.9 km) of Midland's natural shoreline is intact while 89% has undergone alteration to some degree. Approximately 72% of the shoreline length has been altered more than 75% from its natural state. See also *Figures 5.10A and 5.10B*.

Recommendations:

- Along the coast, special consideration should be given to shoreline areas containing a high proportion of natural vegetation (*see Fig. 5.10A and B*).
- Protect the Wye River shoreline from further development. The shorelines north of the Highway 12 bridge are connected to the wetland complex of the Wye Marsh,

4.2.12 Combined Scores and Special Consideration Areas (Fig. 5.11, Fig. 5.12)

The visual display of the combined scores, *Figure 5.11*, gives insight as to how important an area within Midland is in relation to other areas. High scoring areas, presented in yellow, orange and red, may be considered as critical habitat areas.

However, focusing only on the combined score for an area may devalue certain important features. By example, **The Wetland Evaluation System for Southern Ontario** applies methodology and scoring based on unique features: if an identified feature is present and scores high, despite other features scoring low, the area is still considered a high value area.

Accordingly, this study used threshold scores for some parameters (*Table 17*) to identify ‘Special Consideration Areas’. A Special Consideration Area is one that scored a threshold level of points within one or more of the parameters, thereby indicating the presence of notable features, even though the area may have received a low aggregate score.

For example, the streams in the south-west corner of the municipal area appear as a low score area in *Fig 5.11 Features Combined Score*. However, water courses are quite important within a healthy natural heritage system, as indicated in *Fig. 5.6 Natural Watercourse Scoring*. By meeting the threshold score as listed in *Table 17*, this area is included within *Fig. 5.12 Special Consideration Areas*.

Another example is Little Lake, which received a low cumulative score, yet is a very important wildlife habitat feature (*Fig. 5.7*) within the Town.

Recommendation:

- Development within or adjacent to these Special Consideration Areas may need careful consideration, limitations, or mitigation, despite a low cumulative score.

Table 17: Threshold scoring for Special Consideration Areas.

Parameter	Threshold Score to qualify as ‘Special Consideration Area’	Rationale for minimum score
Significant Woodland	10	Corresponds with criteria for <i>Significant Woodlands</i> (County of Simcoe Official Plan 2008)
Interior Forest	8	The landscape within the Town of Midland jurisdiction is slightly below the 100-m interior forest guideline (How Much Habitat is Enough? 2004); any woodland with interior forest may be important
Woodland - Riparian	10	Corresponds with guideline for stream length that should be naturally vegetated (How Much Habitat is Enough? 2004)
Woodland - Wetland	8	Corresponds with guideline for natural vegetation adjacent to swamps and marshes (How Much Habitat is Enough? 2004)
Natural Watercourse	10	Existing permanent/natural water courses (e.g. Wye River) may be important even if they do not have substantial woodland or wetland habitat associated with them
Wildlife Habitat Areas	7	A variety of sizes and types of wetlands should be maintained across a landscape (How Much Habitat is Enough? 2004); wetlands (including evaluated wetlands and unevaluated wetlands larger than 2.0 hectares) and Areas of Natural and Scientific Interest are considered County Greenlands (County of Simcoe Official Plan 2008)
Slope	10	Steep slope areas (see Section 4.9)
Shoreline	7	Fisheries and Oceans Canada advises developing 25 percent or less of a property’s total shoreline frontage (The Shore Primer 2008, Fisheries and Oceans Canada Ontario Operational Statement)

4.2.13 Summary of Recommendations

This report is a 'planning tool' that indicates areas of interest and concern within the Town of Midland; it is a starting point for further detailed studies of natural heritage features. To truly understand a site, and be able to make informed decisions as to development options, a closer inspection should be undertaken. An example would be to conduct an Ecological Land Classification (ELC) level evaluation of sites under development pressure, thus providing more detailed information on site soils, species composition of tree stands, and vegetation communities.

General Recommendations:

1. The Town, as part of its OFFICIAL PLAN REVIEW AND UPDATE PROJECT, should protect and enhance as much as possible of the lands identified as "Special Consideration Areas" as shown on Figure 5.12. These areas represent the natural heritage features of significance and that combined make up the Natural Heritage System for the Town of Midland.
2. The Town should consider a policy requirement for detailed studies where any development would impact the Natural Heritage System including a requirement for an ELC evaluation of the site and features.
3. Where new information is available or detailed studies are completed, the Town should consider amending and refining the natural heritage system to reflect the new and updated information.
4. This report and the Natural Heritage System should be reviewed and updated as part of each five-year review and update to the Town's Official Plan.

Summary of Recommendations (as earlier presented within this report):

4.2.1 Woodland – Percent Cover

- Using the [How Much Habitat is Enough] criteria as a guideline [minimum 30% of area with tree cover], the Settlement Area (with 26.4% woodland coverage) could be enhanced with tree planting where possible.
- Any proposal to remove existing trees should be reviewed very carefully, with emphasis on retaining forest cover.

4.2.2: Patch Sizes (Fig. 5.1B)

- Examine possibilities for mitigation of lost habitat or in-filling open areas. For example, tree-planting initiatives for identified areas would enhance the patch size of moderate or marginal sized woodlands on municipal properties. Areas requiring in-filling could be determined using the **Automated Arcview 3.1 Habitat Analysis Method**.

4.2.3: Woodland – Significant Forest (Fig. 5.2)

- The Town should retain all patches of significant woodland.

- Through tree-planting or natural succession some of the moderate sized patches could become joined, thus creating significant woodland.

4.2.4: Woodland – Interior Forest (Fig. 5.3, Map 6.2)

- Identified patches that contain interior forest should receive special consideration from development pressure to retain their integrity.

4.2.5: Woodland – Riparian (Fig. 5.4, Map 6.3, Map 6.6)

- Retain woodlands that are part of the riparian habitat.
- Enhance vegetation cover to 30 metres where possible, thus ensuring healthy streams.

4.2.6: Woodland – Wetland (Fig. 5.5, Map 6.4A, Map 6.7A)

- Any woodlands directly associated with a wetland area should be given special consideration from development pressure.
- No development should be allowed within woodlands located within 120 metres of the wetland boundary without benefit of a study.

4.2.7 Natural Water Courses (Fig. 5.6)

- Natural water courses should be retained.
- Any ditching and draining activities should be planned with careful consideration of potential impacts to both upstream and downstream flow patterns.

4.2.8 Wildlife Habitat Areas (Fig. 5.7)

- Maintain protection of evaluated wetland areas and ensure adequate buffer zones exist.
- Investigate for presence of species at risk.
- Consider evaluating any wetland currently unevaluated, including ephemeral wetlands.
- The woodland areas, particularly the large patches located along the westerly side of the study area, should have field work applied prior to development planning decisions.

4.2.9: Slope (Fig. 5.8; Map 6.8)

- In their Natural Heritage Strategy, the Town may wish to consider Significant Valleylands for designation, in particular the residential areas, Mountain View ski hills, Tiffin Park and Wye Valley.
- The stabilizing influence of the forested slopes along Vindin Street, for example, highlights the need to protect cover and minimize disturbance.

4.2.10: Low Slope with Water (Fig. 5.9)

- Investigate the area in the south-west corner of the Town boundary that indicates a large area of low slope with water coverage. This not an evaluated wetland, yet may contain species and features that support a healthy Natural Heritage System within the Town of Midland.

4.2.11: Shorelines (Fig. 5.10A, Fig. 5.10B)

- Along the coast, special consideration should be given to shoreline areas containing a high proportion of natural vegetation (*see Fig. 5.10A and B*).
- Protect the Wye River shoreline from further development. The shorelines north of the Highway 12 bridge are connected to the wetland complex of the Wye Marsh,

4.2.12 Combined Scores and Special Consideration Areas (Fig. 5.11, Fig. 5.12)

- Development within or adjacent to these Special Consideration Areas may need careful consideration, limitations, or mitigation, despite a low cumulative score.

Figure 5.1A - Woodland Patch locations within
Town of Midland Boundary

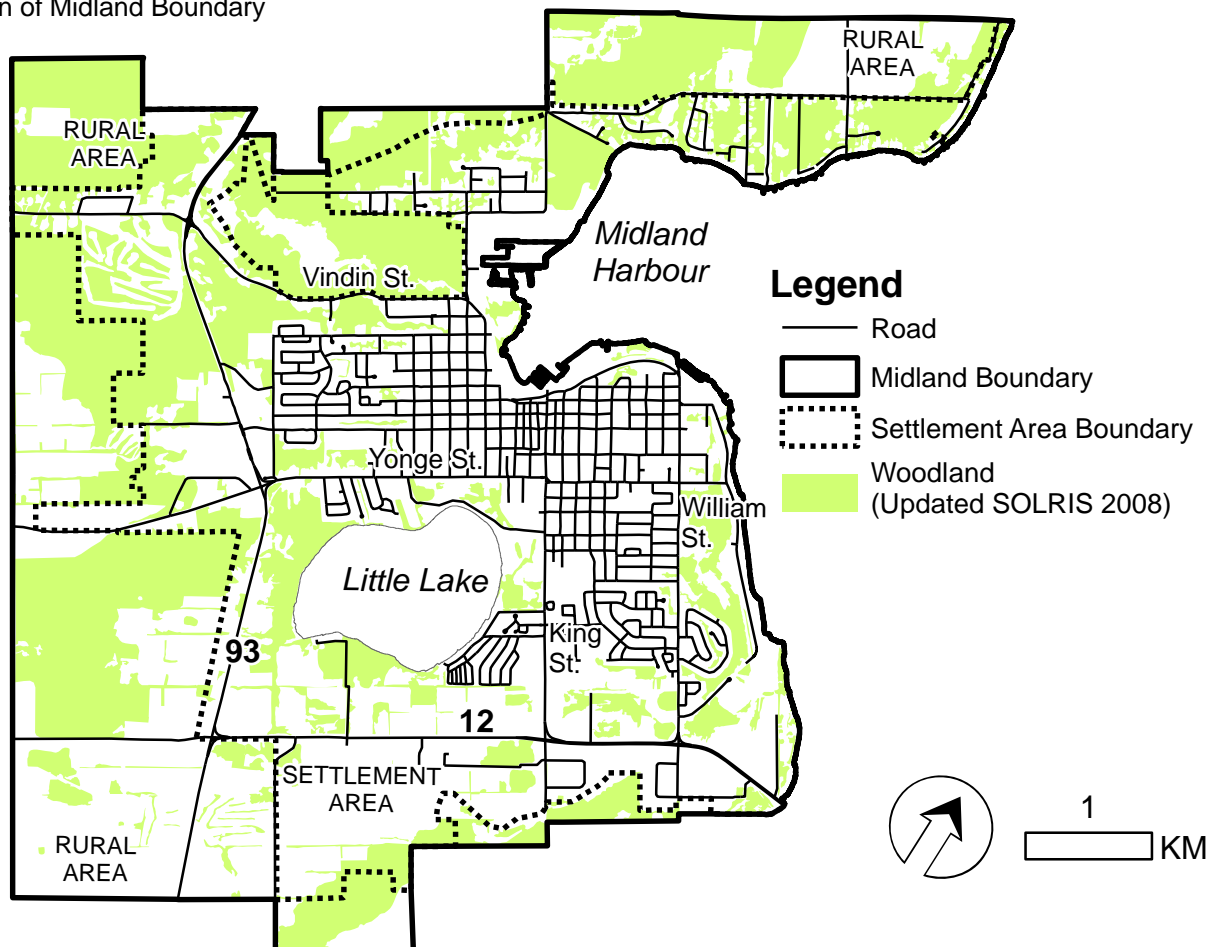


Figure 5.1B - Woodland - Patch Size Scoring

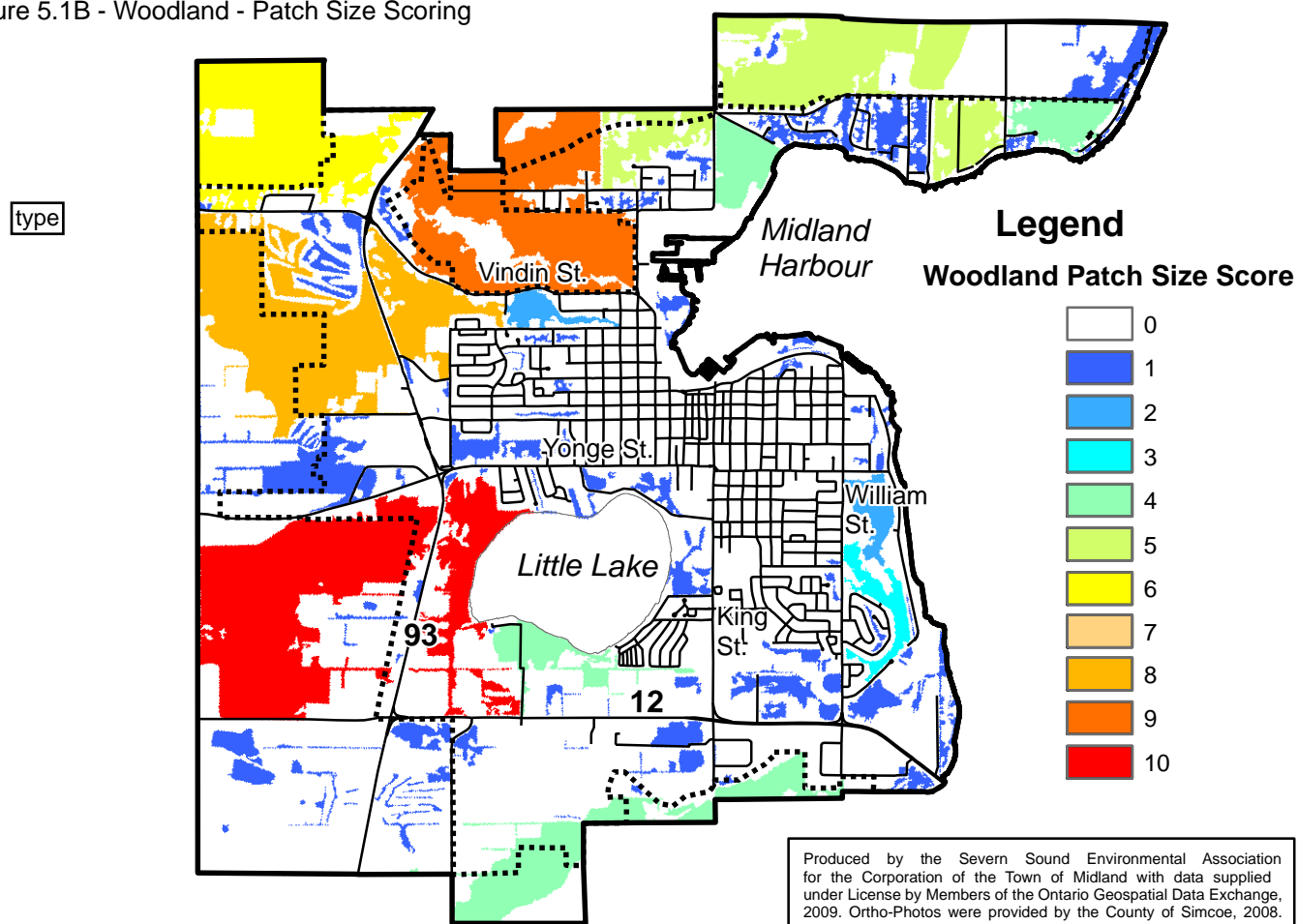


Figure 5.2 - Woodland - Significant Forest Scoring

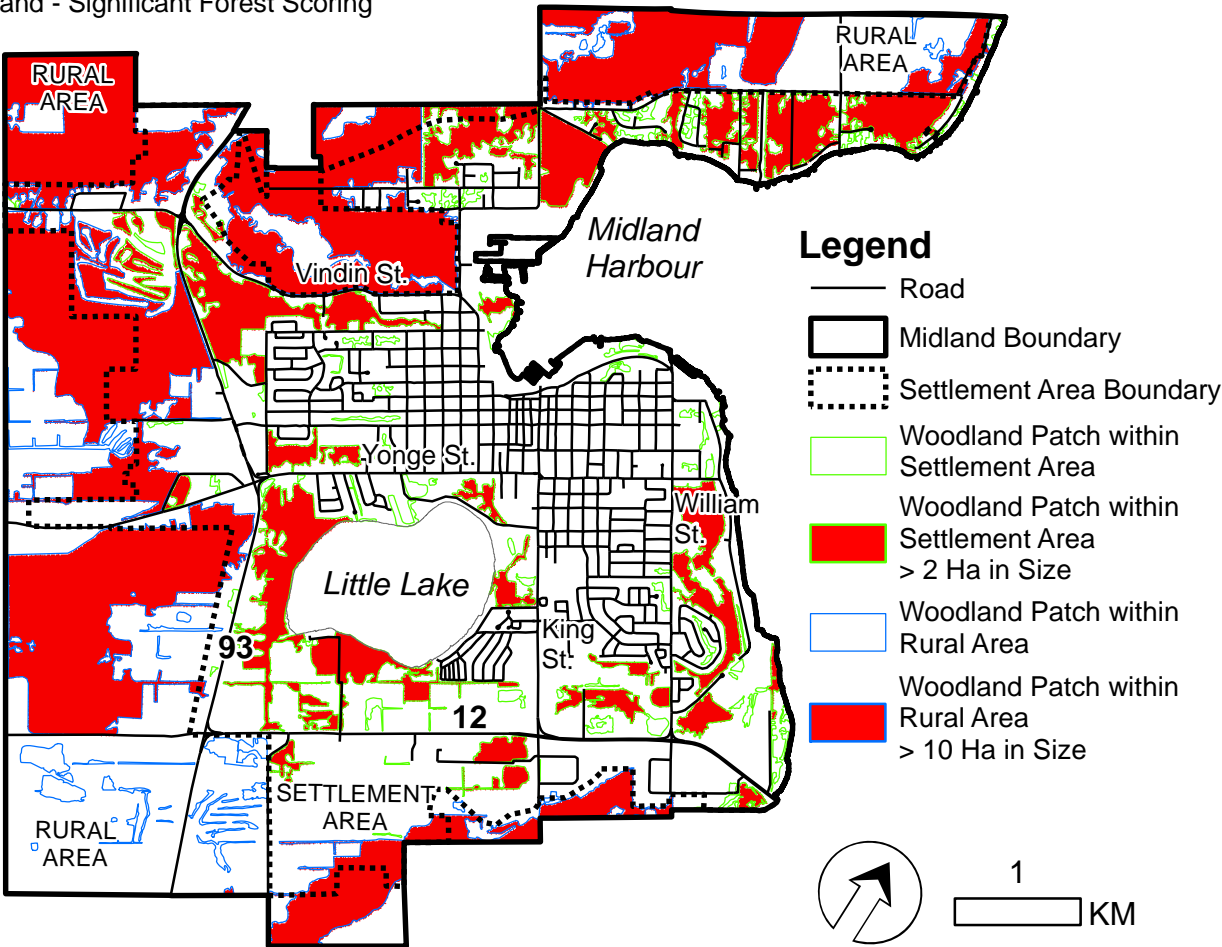


Figure 5.3 - Woodlands -Interior Forest Scoring

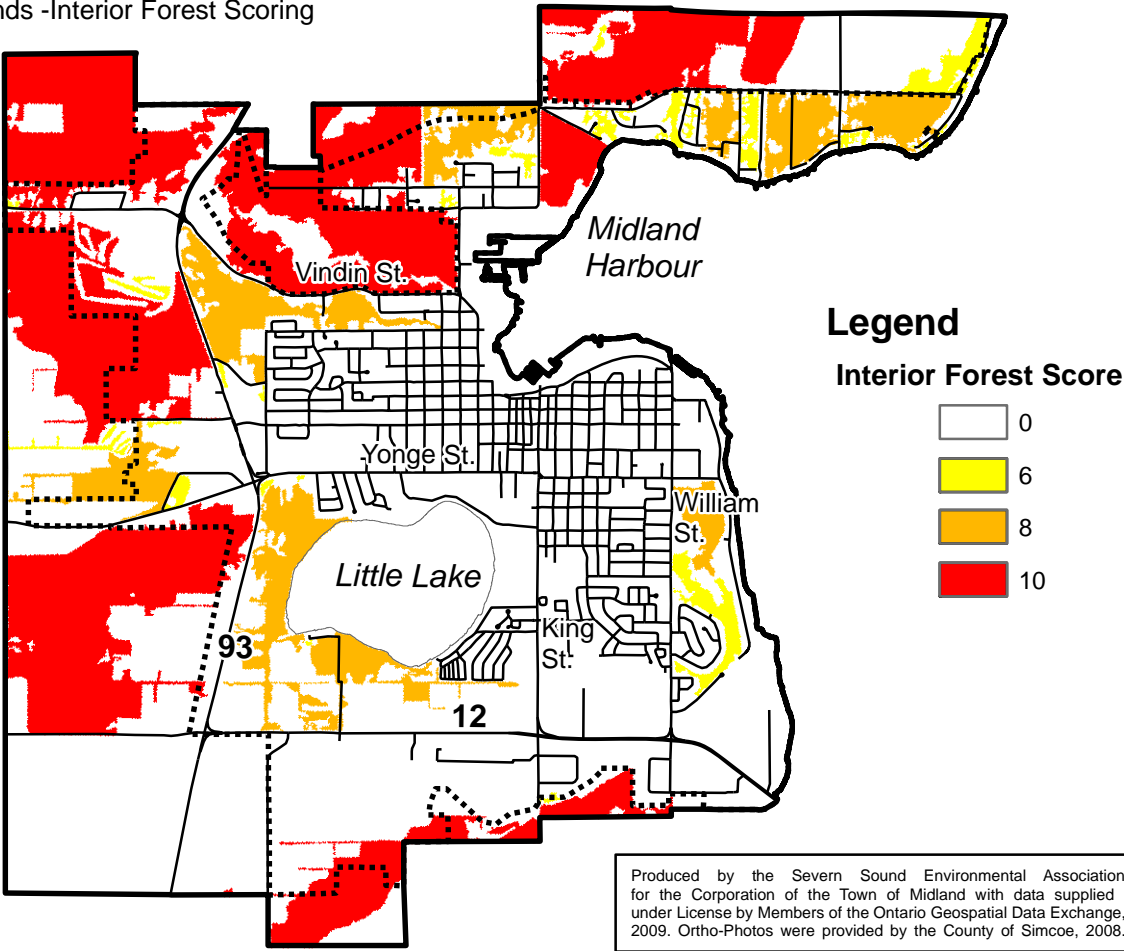


Figure 5.4 - Woodland - Riparian Scoring

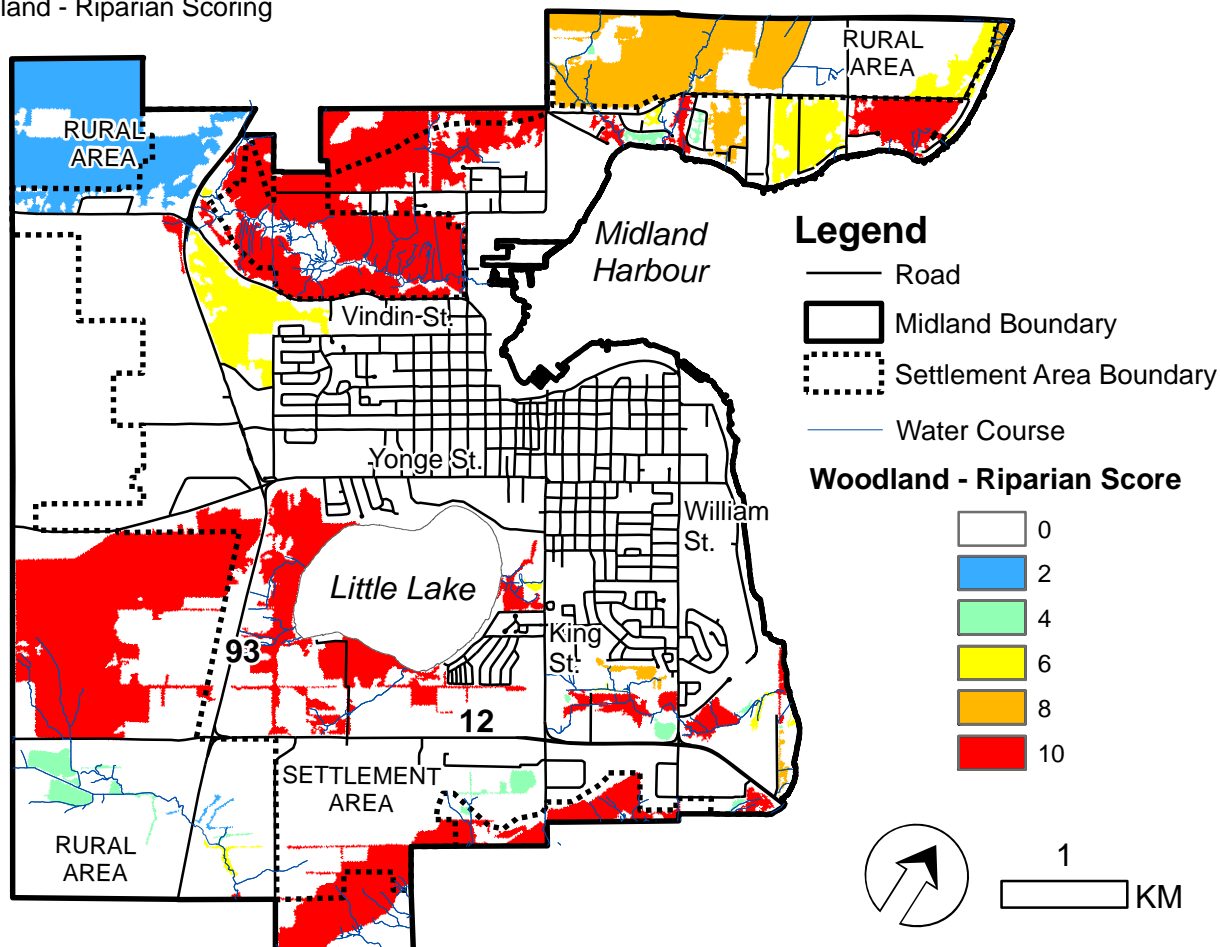
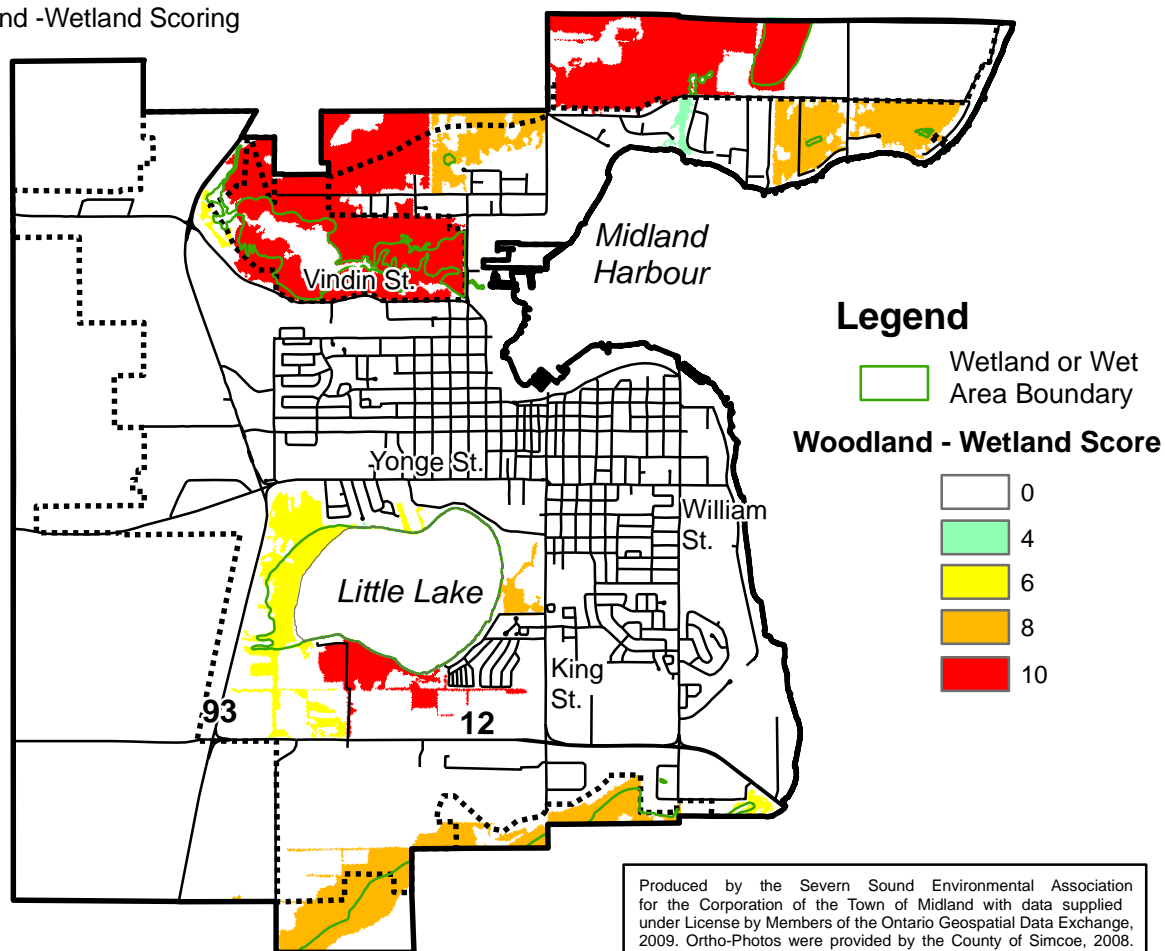


Figure 5.5 - Woodland -Wetland Scoring



Produced by the Severn Sound Environmental Association for the Corporation of the Town of Midland with data supplied under License by Members of the Ontario Geospatial Data Exchange, 2009. Ortho-Photos were provided by the County of Simcoe, 2008.

Figure 5.6 - Natural Water Course Scoring

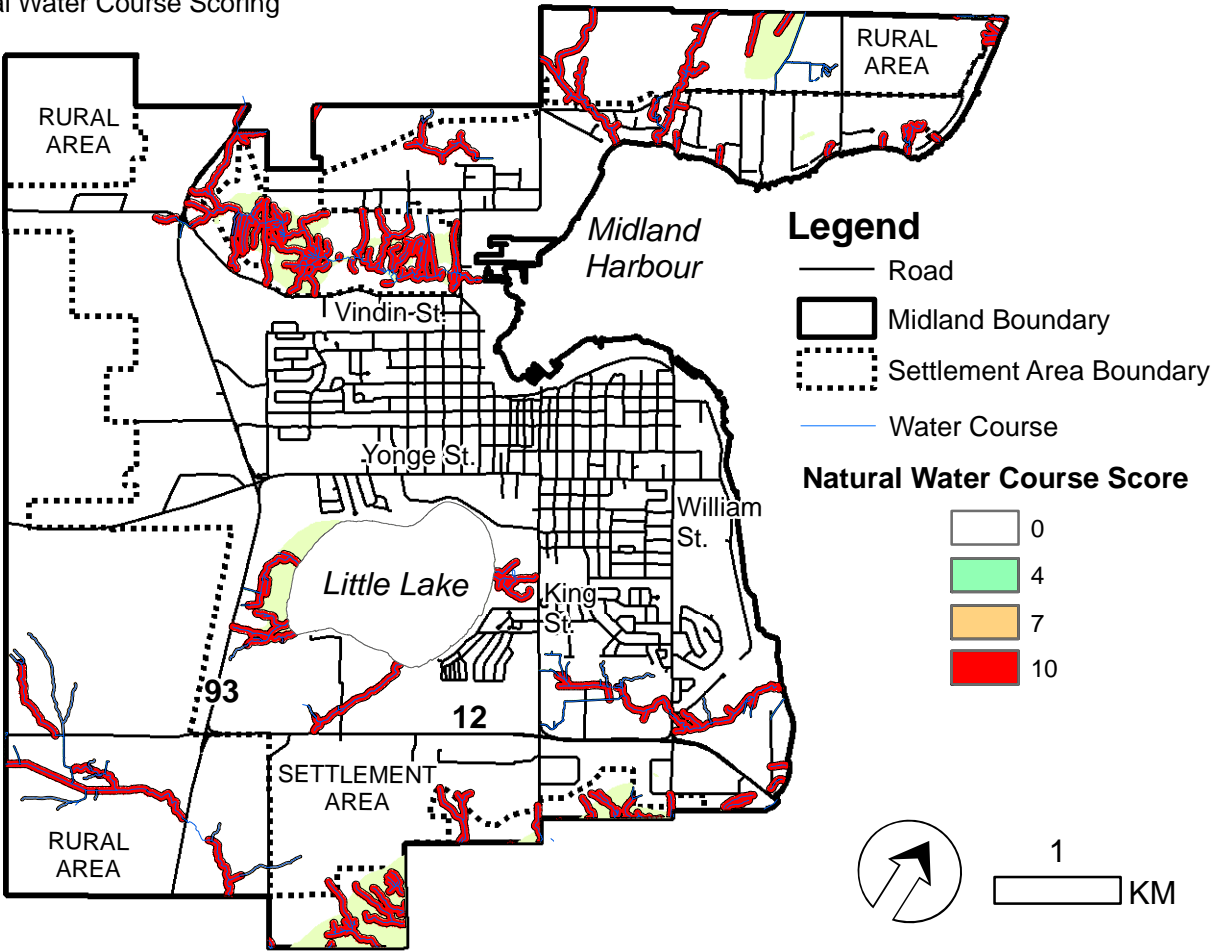
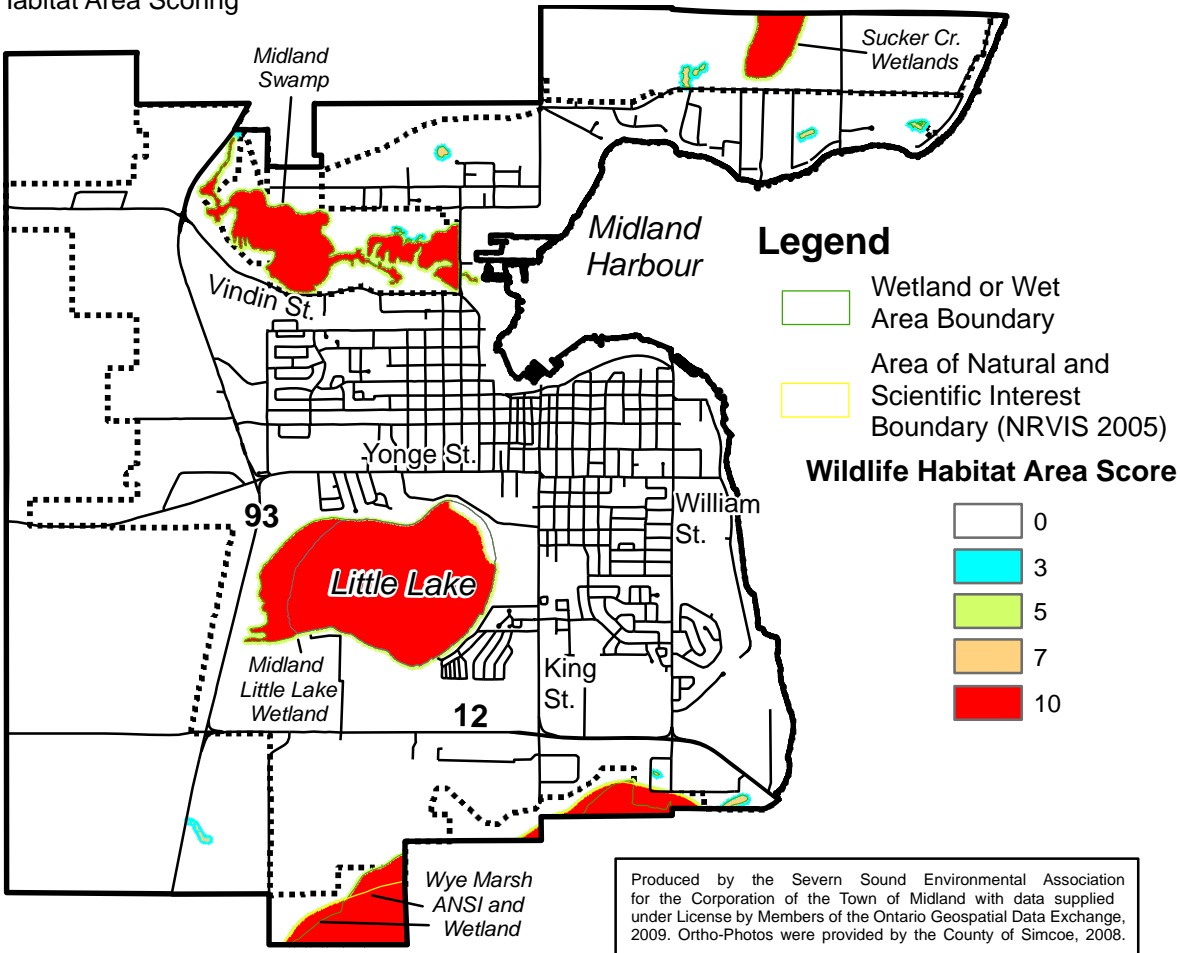


Figure 5.7 - Wildlife Habitat Area Scoring



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Figure 5.8 - Slope Scoring

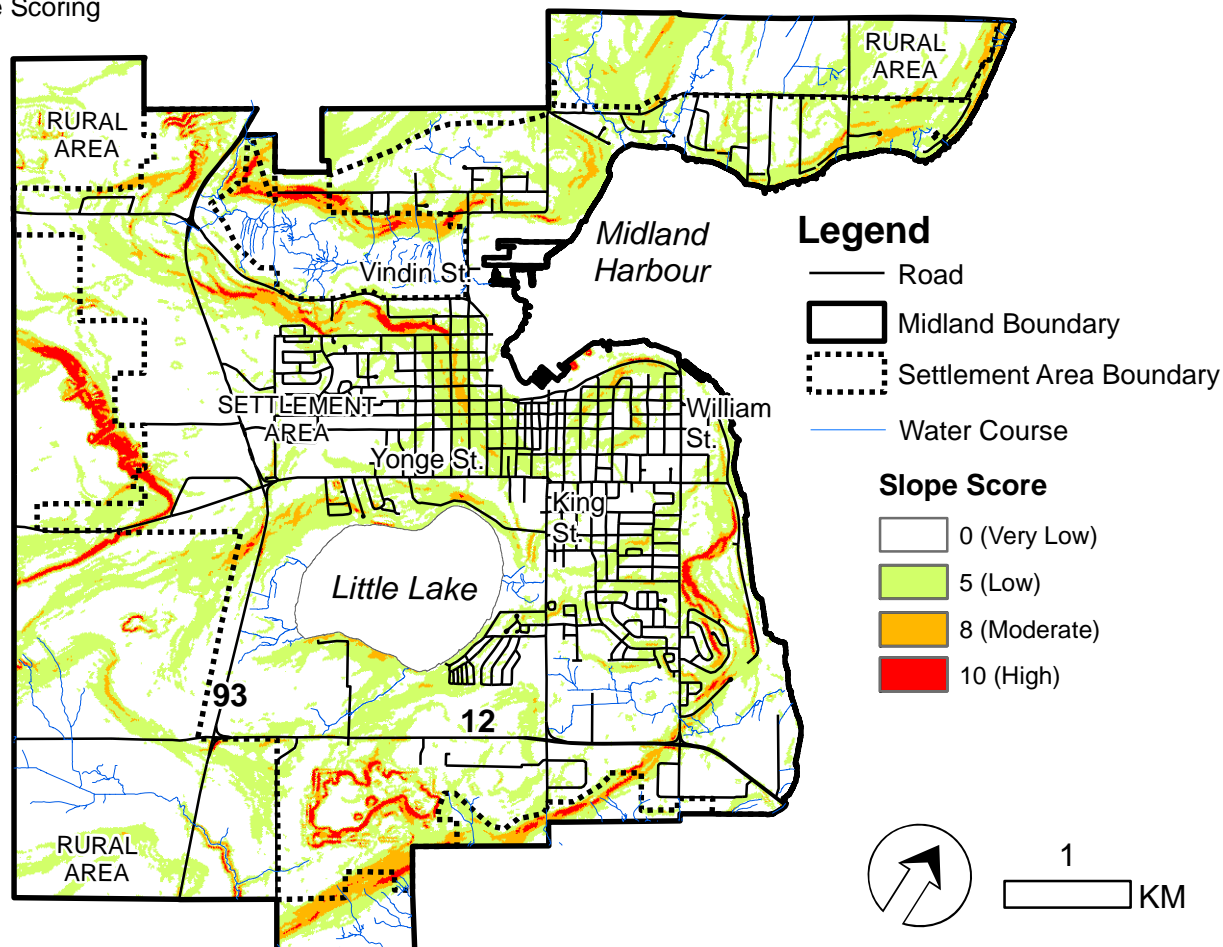
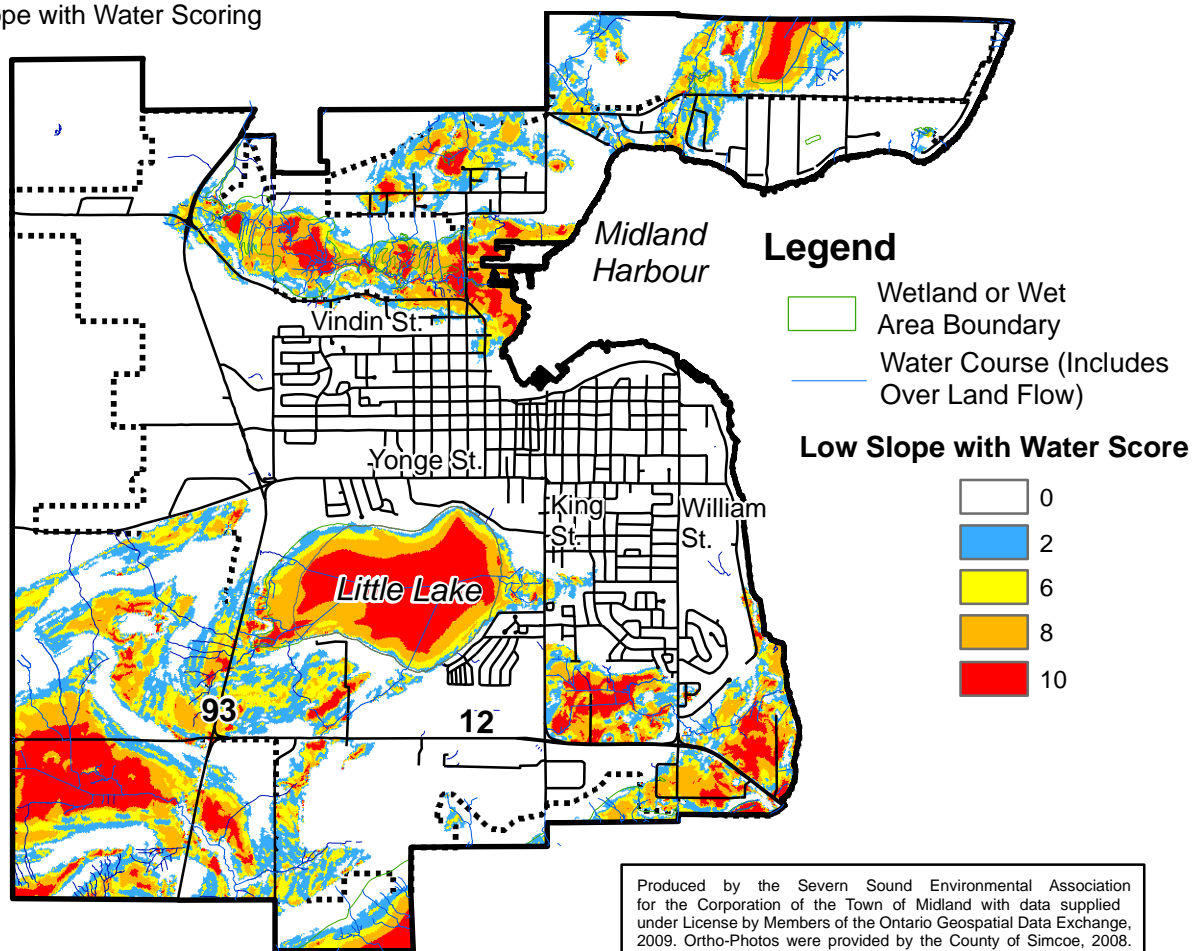
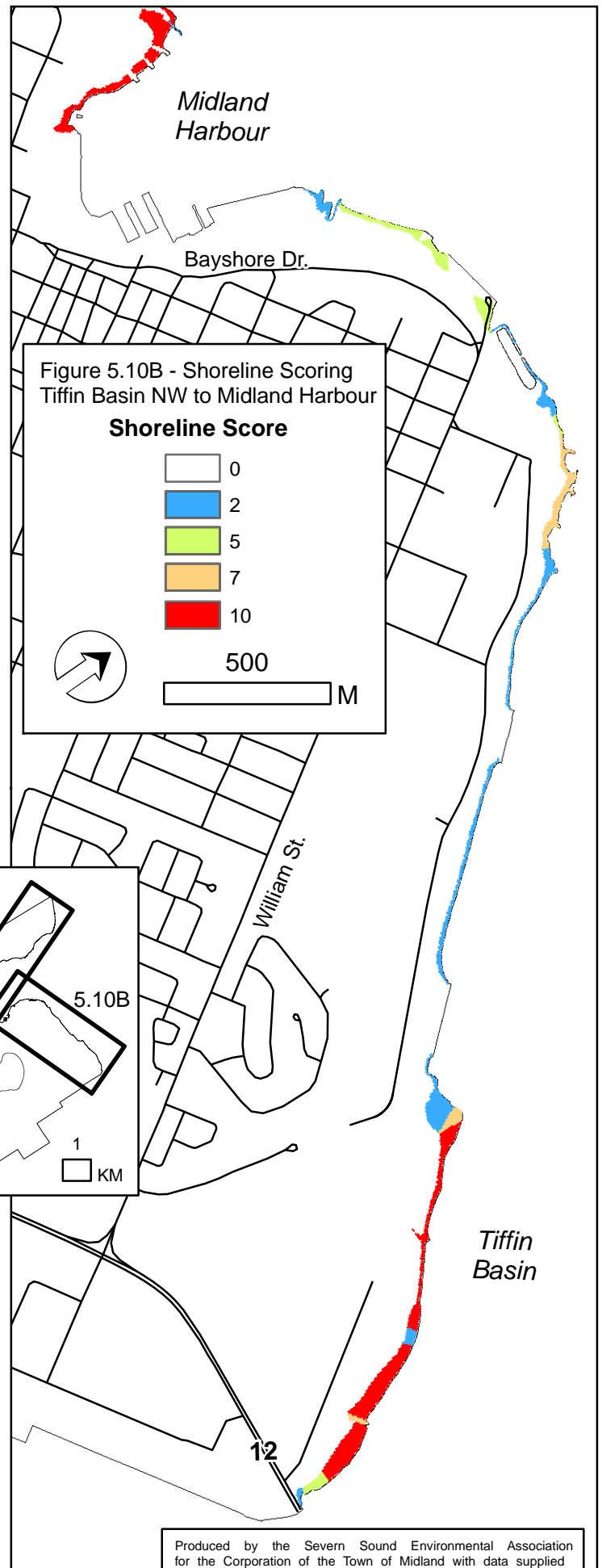
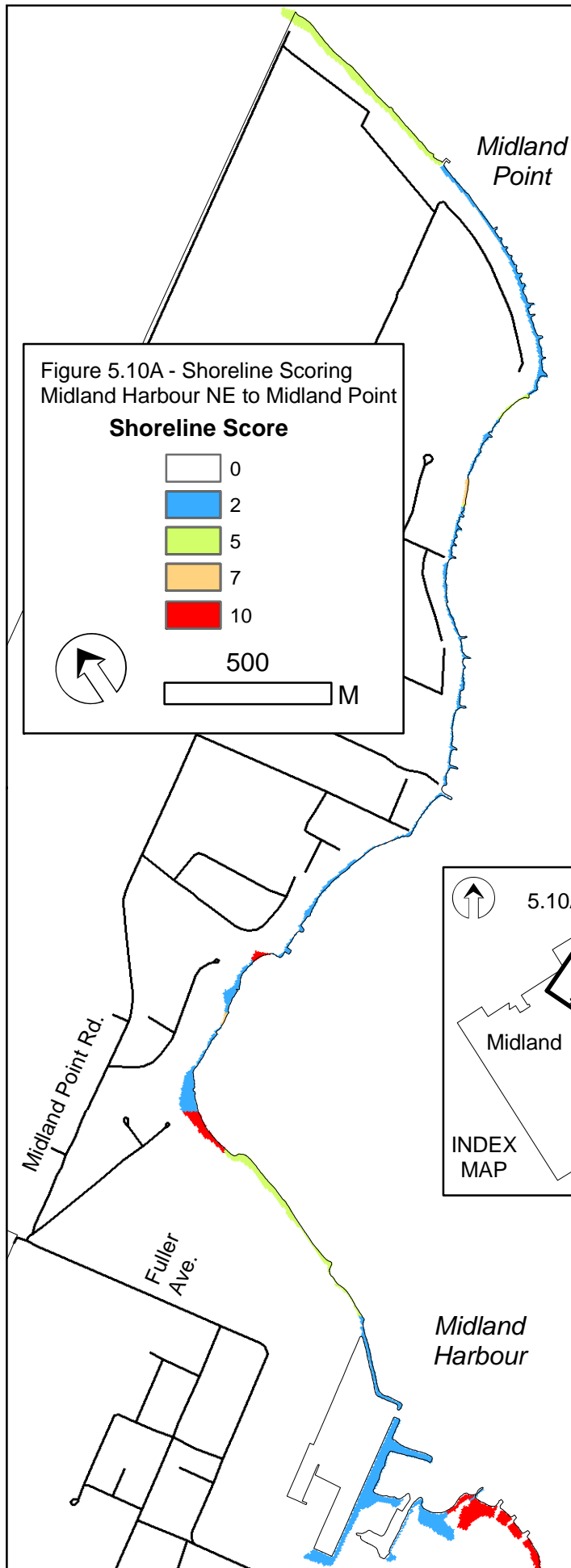
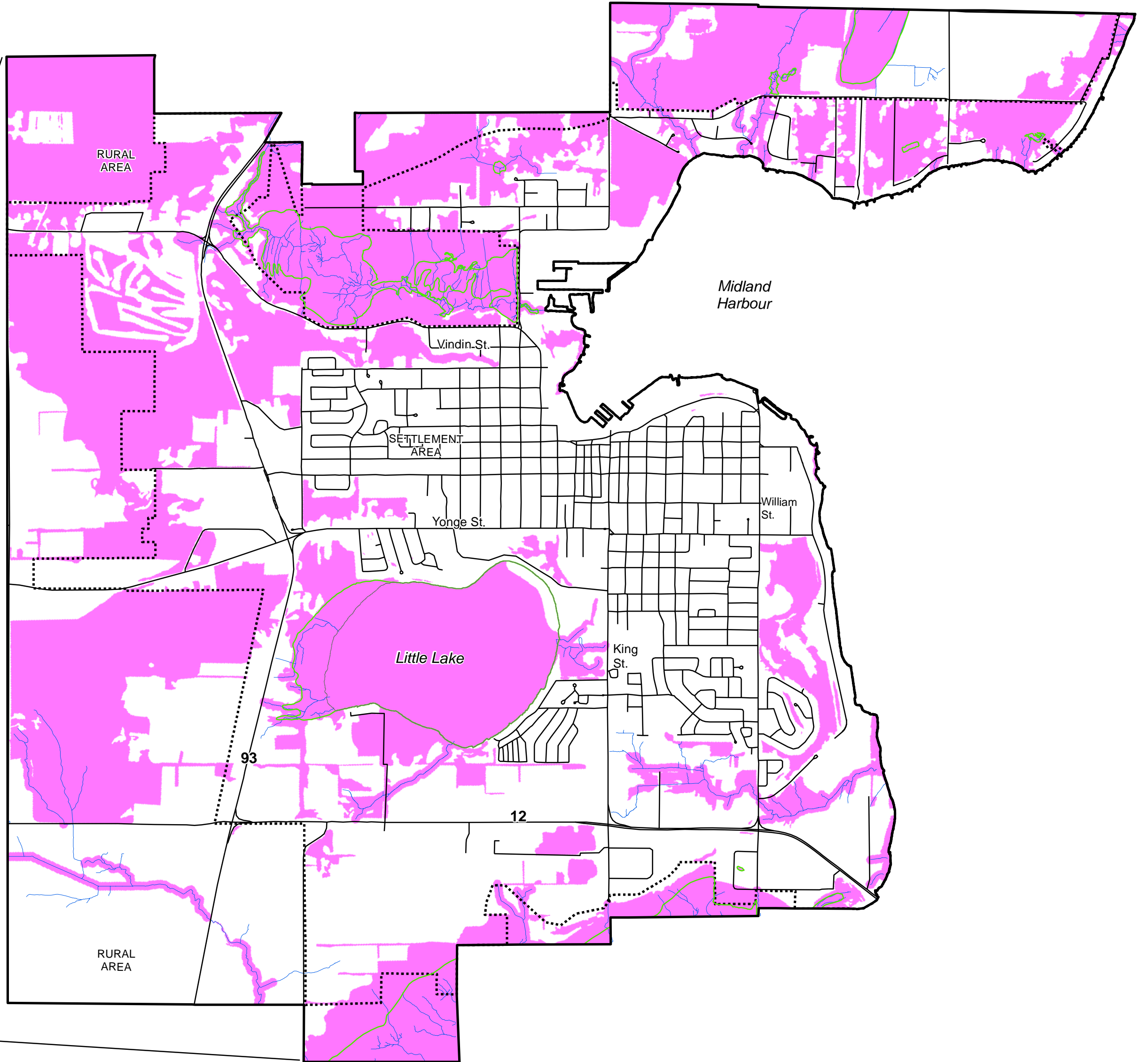
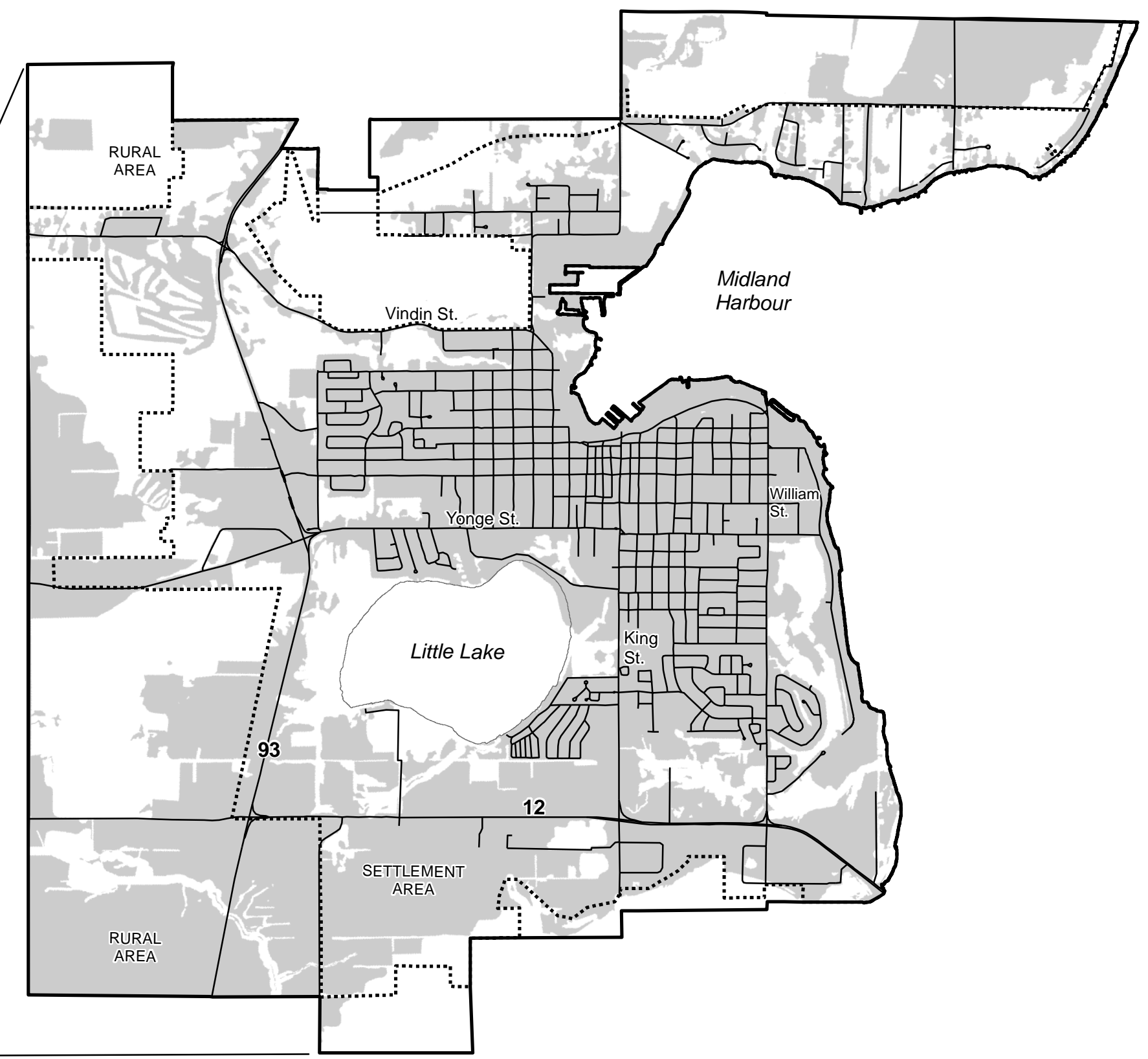
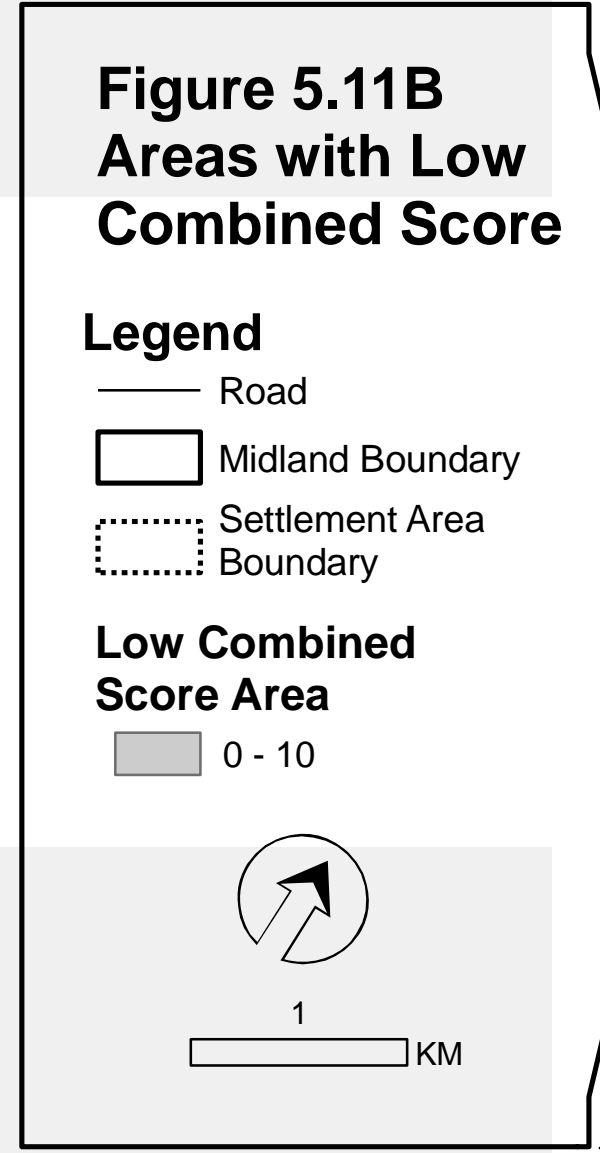
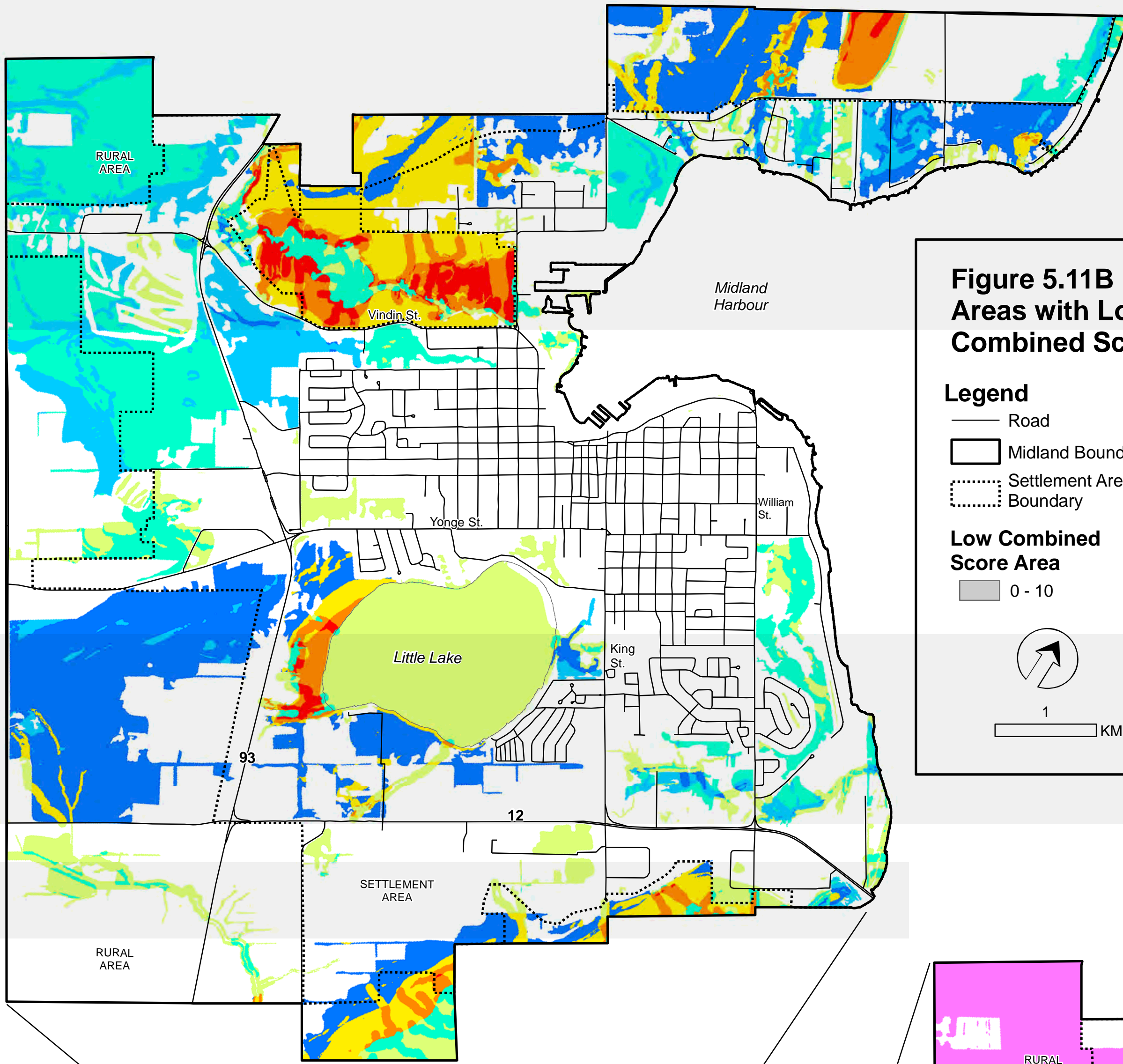


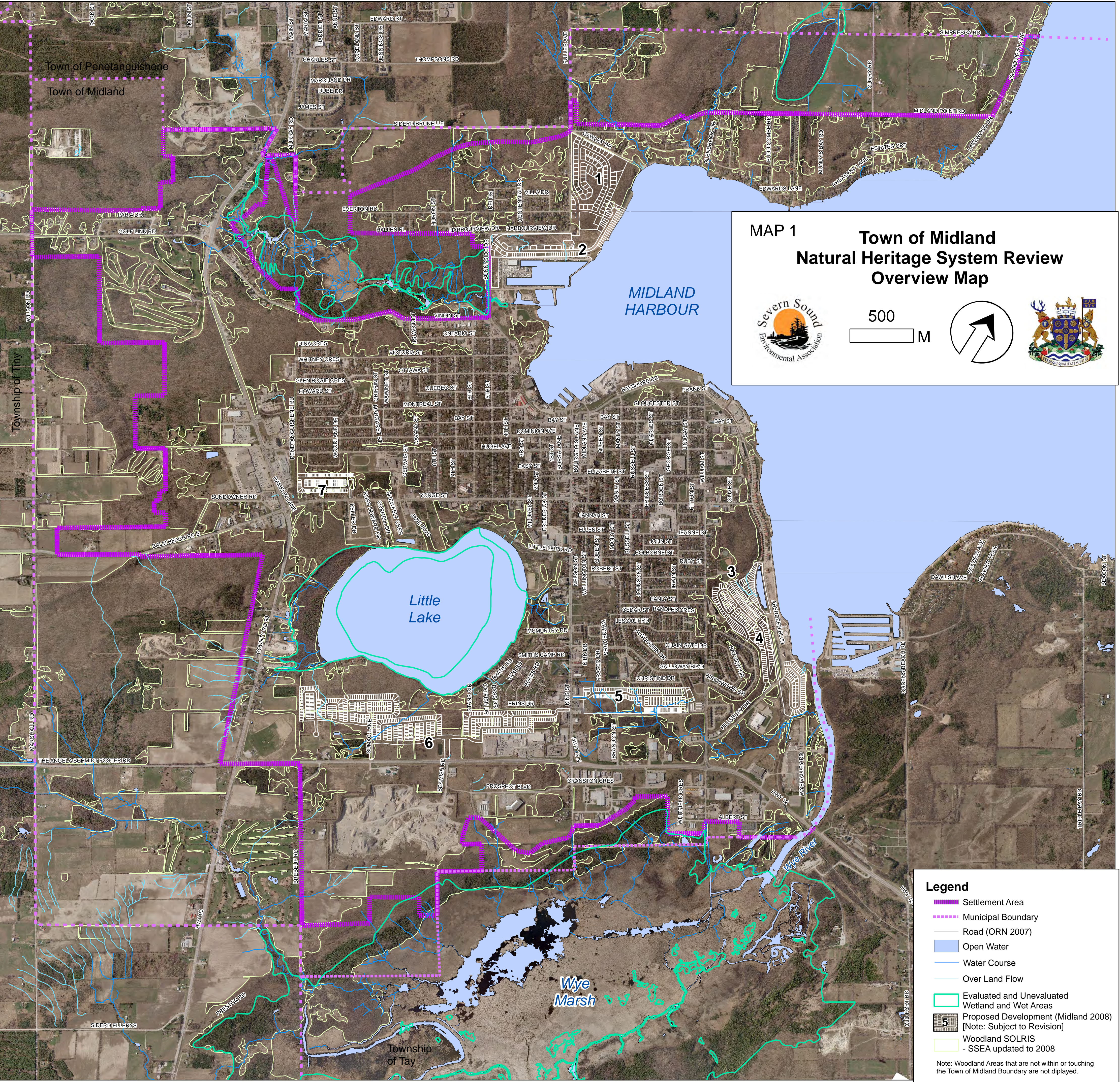
Figure 5.9 - Low Slope with Water Scoring





Produced by the Severn Sound Environmental Association for the Corporation of the Town of Midland with data supplied under License by Members of the Ontario Geospatial Data Exchange, 2009. Ortho-Photos were provided by the County of Simcoe, 2008.






MAP 1

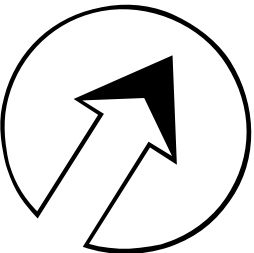
Town of Midland


Natural Heritage System Review

Overview Map





500 M








Legend


 Settlement Area


 Municipal Boundary


 Road (ORN 2007)


 Open Water

 Water Course

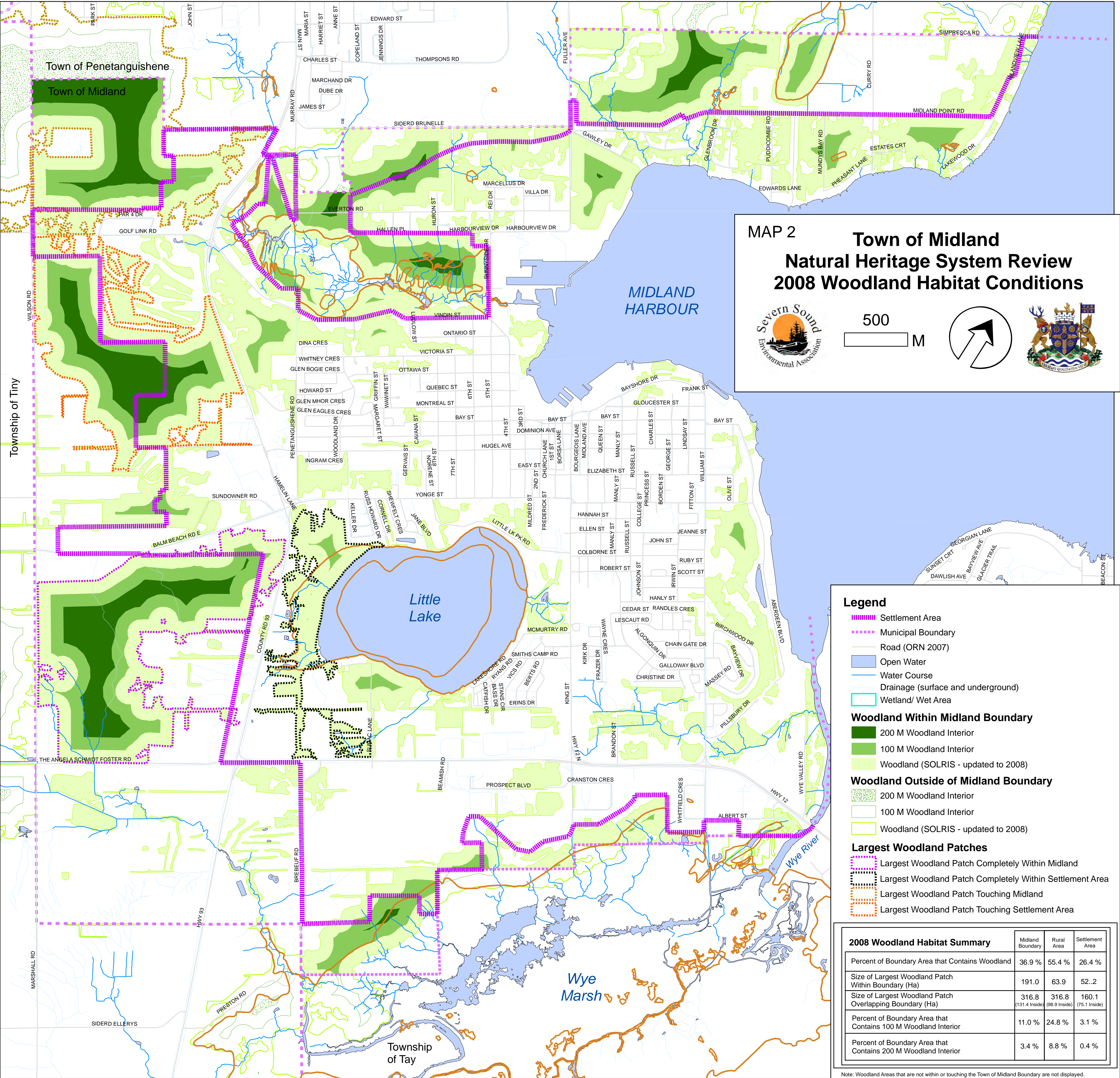
 Over Land Flow

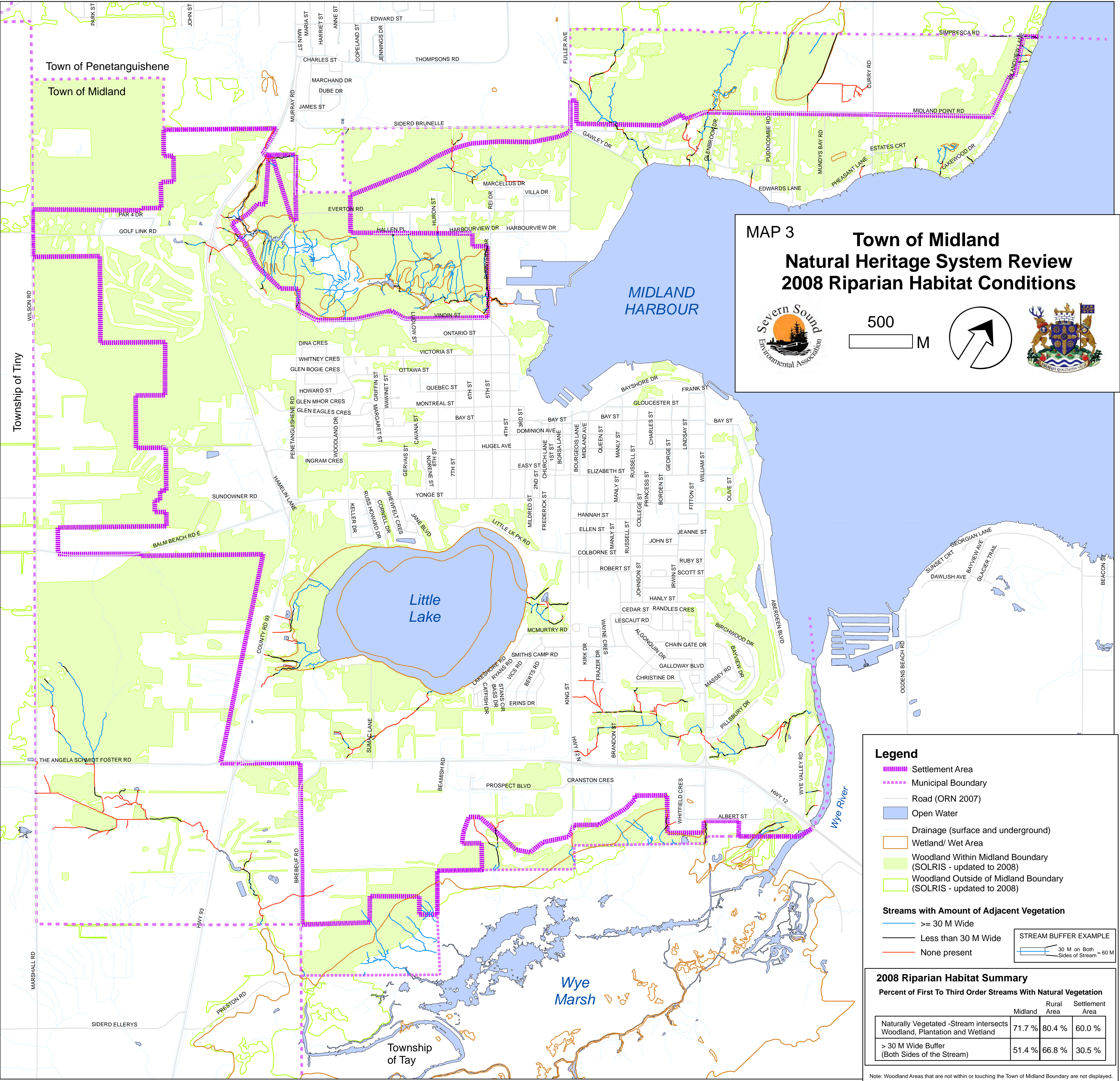
 Evaluated and Unevaluated Wetland and Wet Areas

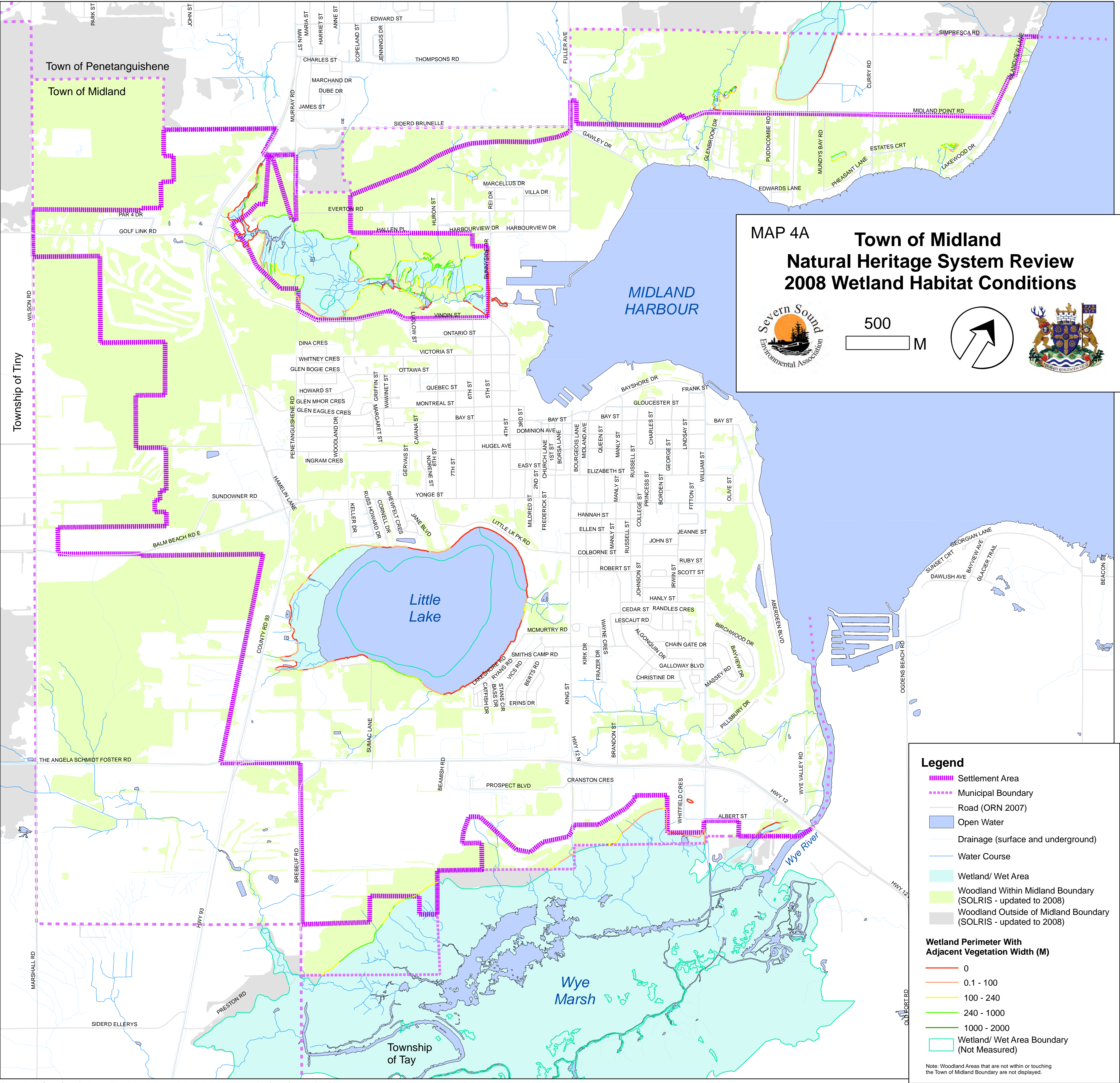
 Proposed Development (Midland 2008)
[Note: Subject to Revision]

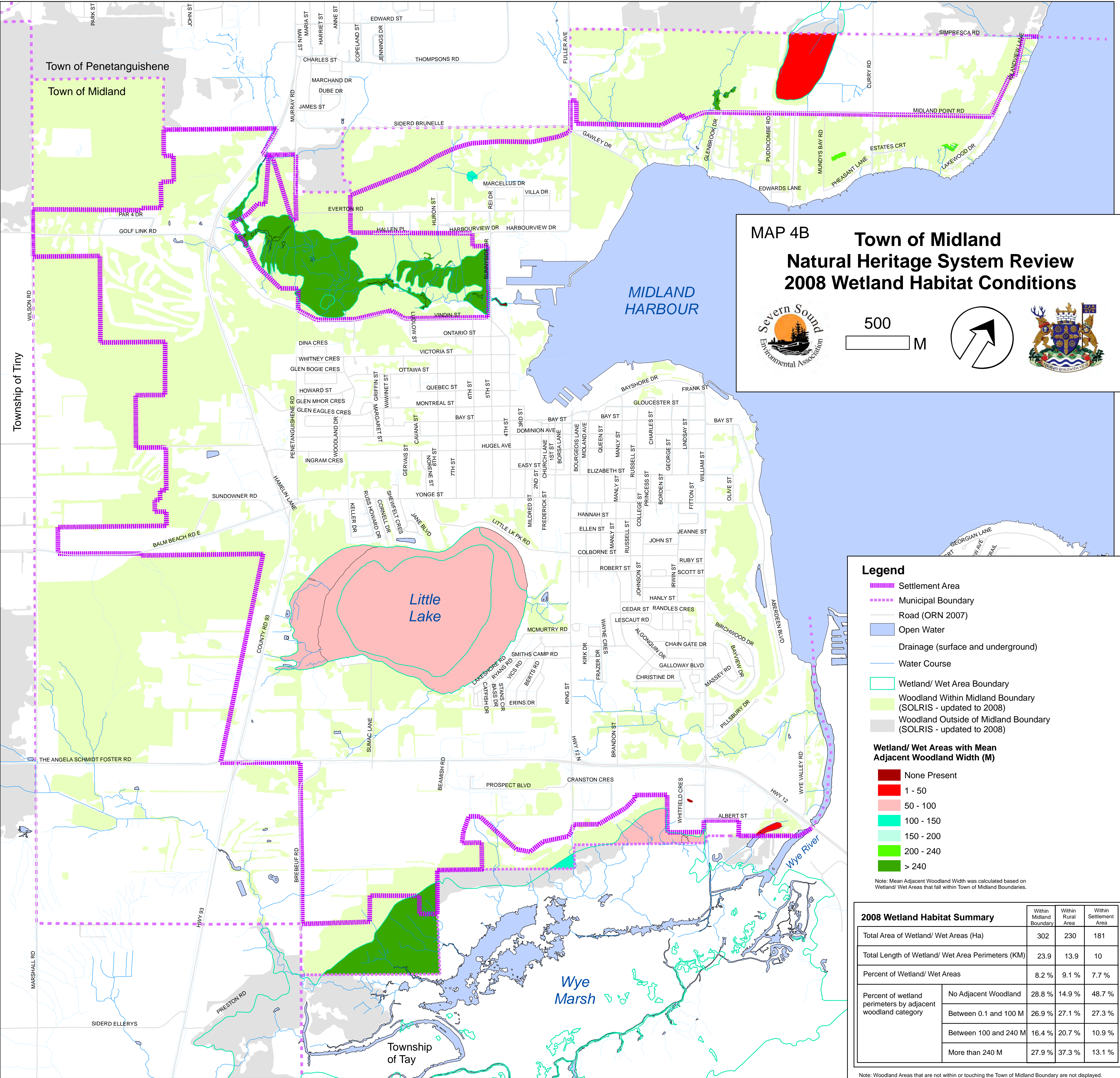
 Woodland SOLRIS - SSEA updated to 2008

Note: Woodland Areas that are not within or touching the Town of Midland Boundary are not displayed.









Legend

- Settlement Area
- Municipal Boundary
- Road (ORN 2007)
- Open Water
- Drainage (surface and underground)
- Water Course
- Wetland/ Wet Area Boundary
- Woodland Within Midland Boundary (SOLRIS - updated to 2008)
- Woodland Outside of Midland Boundary (SOLRIS - updated to 2008)

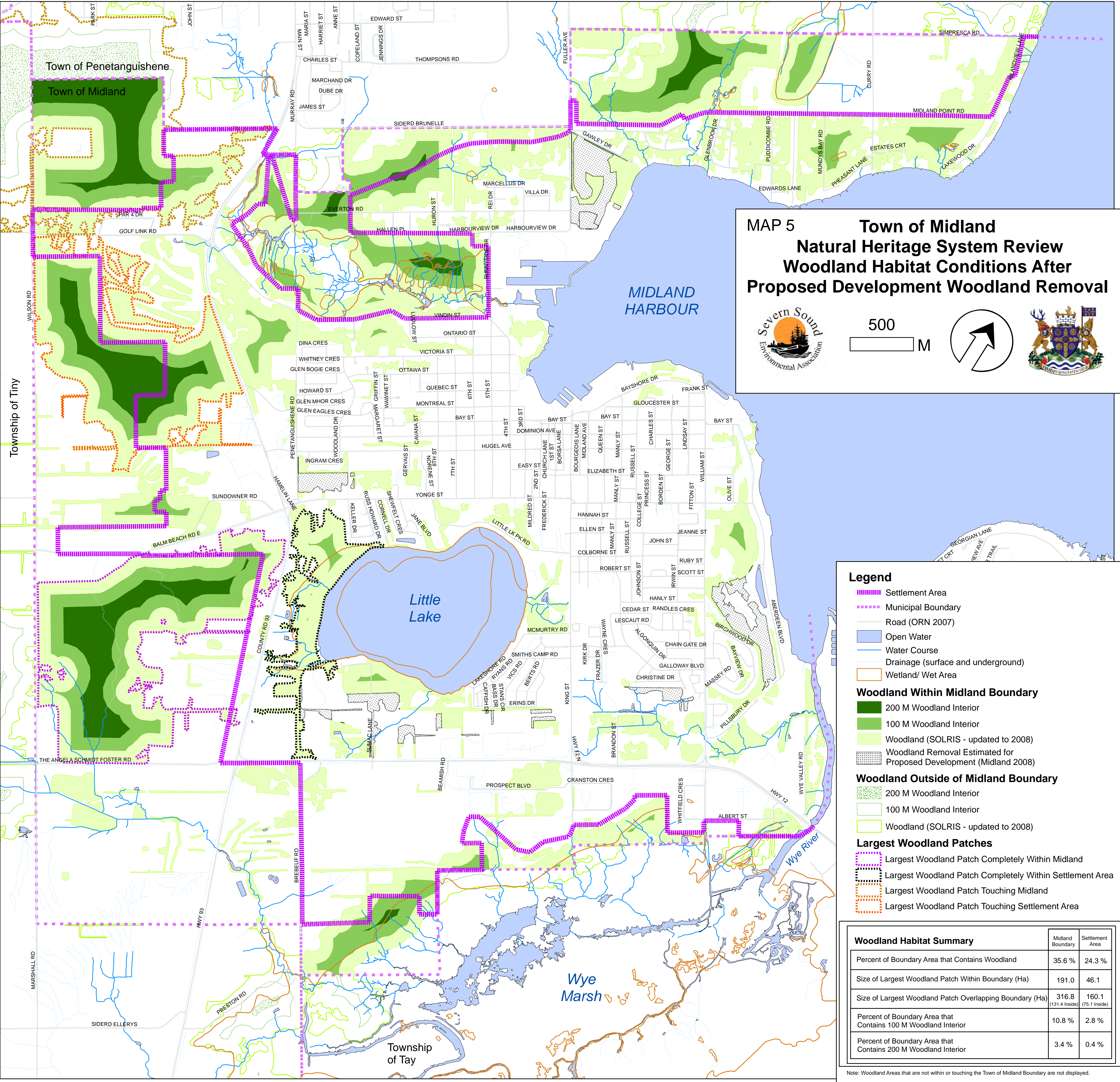
Wetland/ Wet Areas with Mean Adjacent Woodland Width (M)

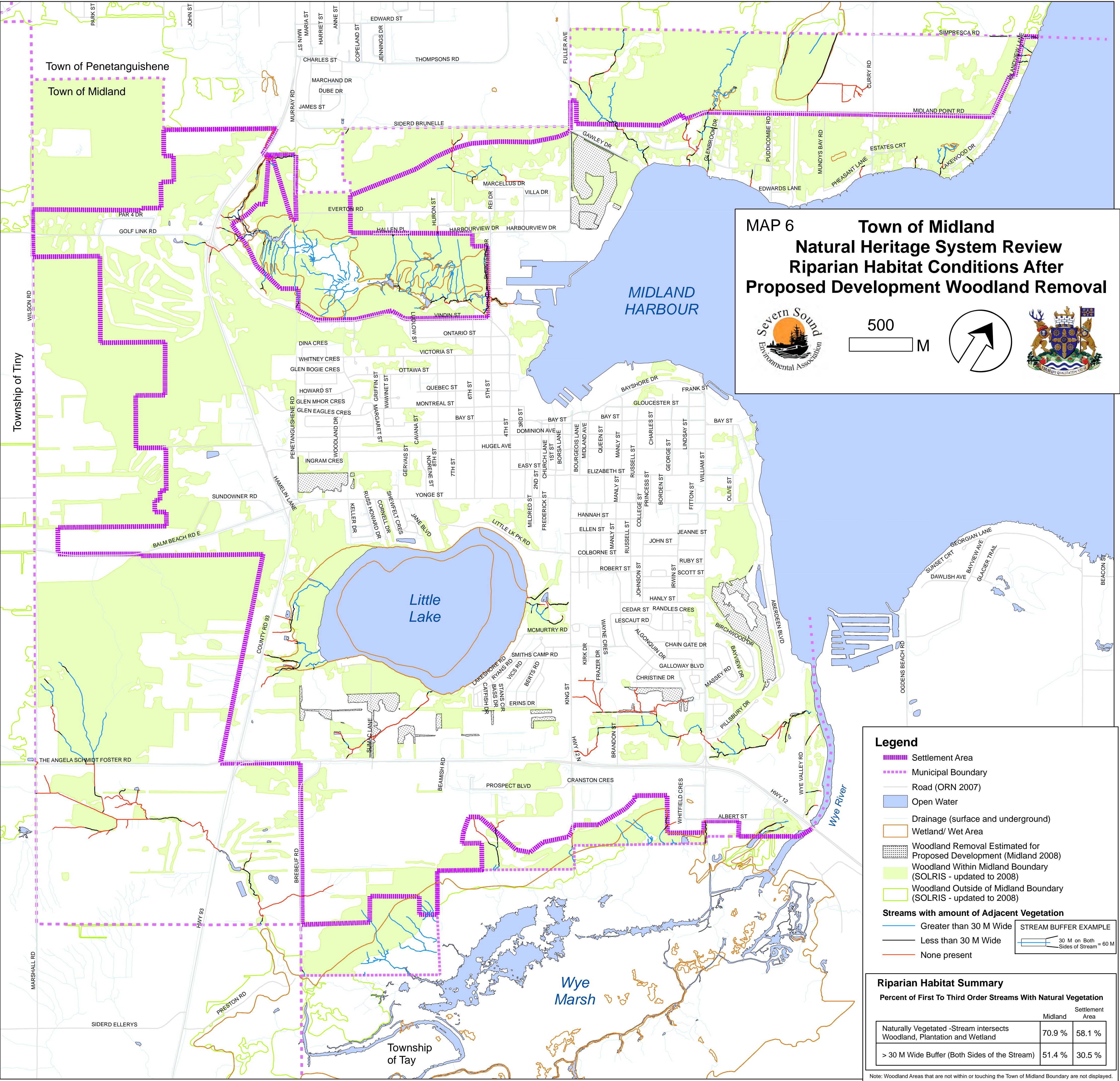
None Present
1 - 50
50 - 100
100 - 150
150 - 200
200 - 240
> 240

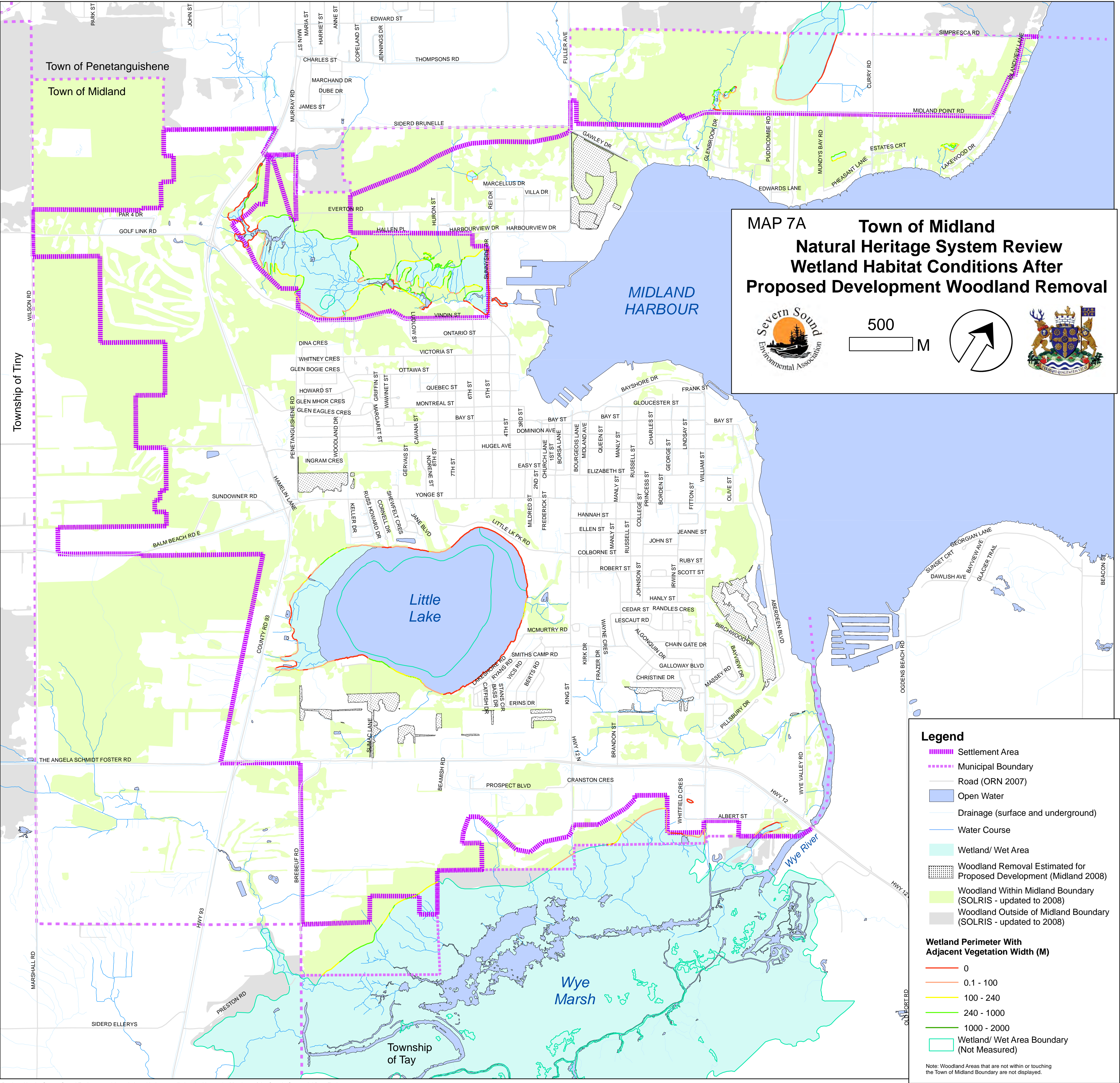
Note: Mean Adjacent Woodland Width was calculated based on Wetland/ Wet Areas that fall within Town of Midland Boundaries.

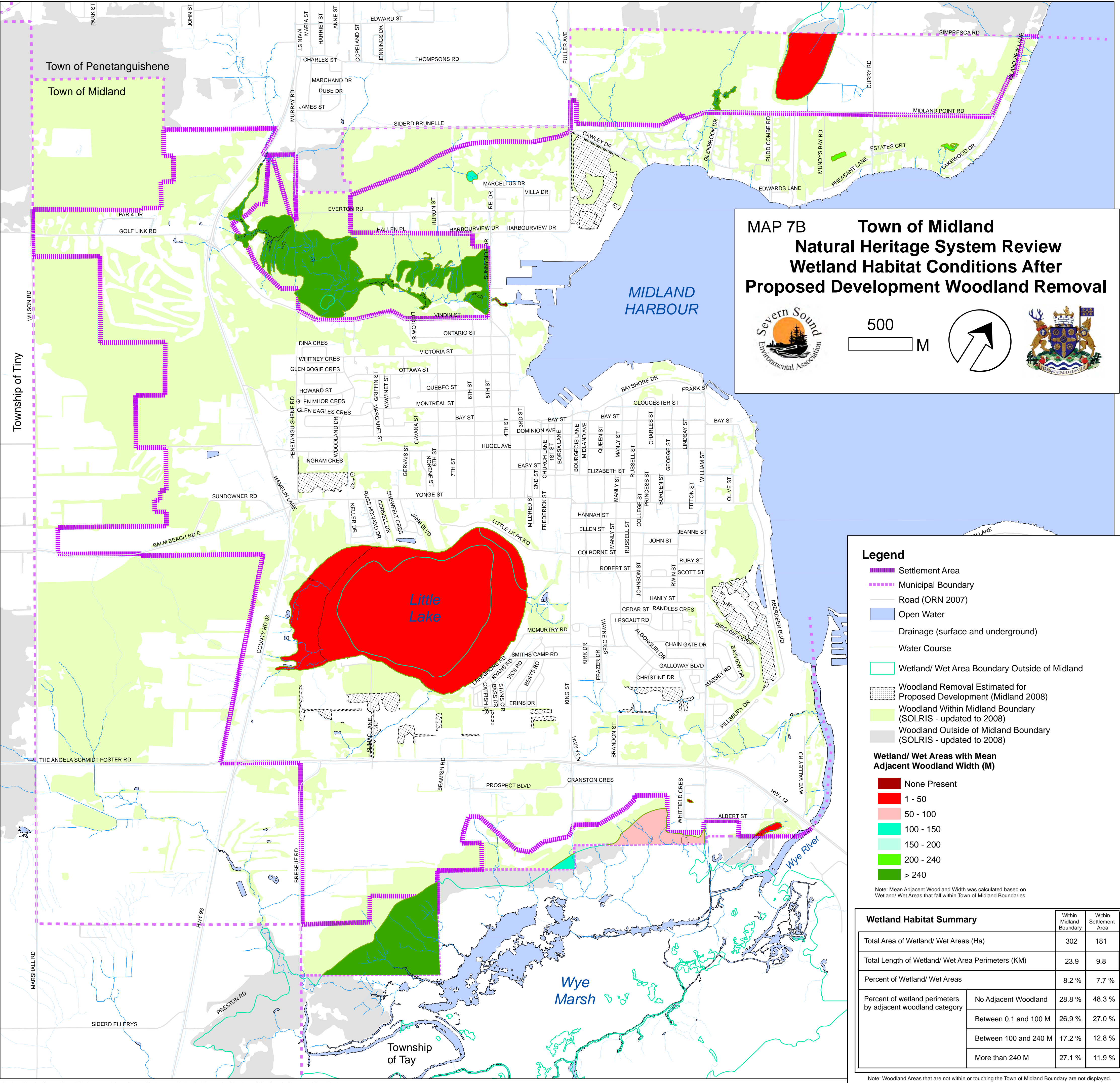
2008 Wetland Habitat Summary		Within Midland Boundary	Within Rural Area	Within Settlement Area
Total Area of Wetland/ Wet Areas (Ha)		302	230	181
Total Length of Wetland/ Wet Area Perimeters (KM)		23.9	13.9	10
Percent of Wetland/ Wet Areas		8.2 %	9.1 %	7.7 %
Percent of wetland perimeters by adjacent woodland category	No Adjacent Woodland	28.8 %	14.9 %	48.7 %
	Between 0.1 and 100 M	26.9 %	27.1 %	27.3 %
	Between 100 and 240 M	16.4 %	20.7 %	10.9 %
	More than 240 M	27.9 %	37.3 %	13.1 %

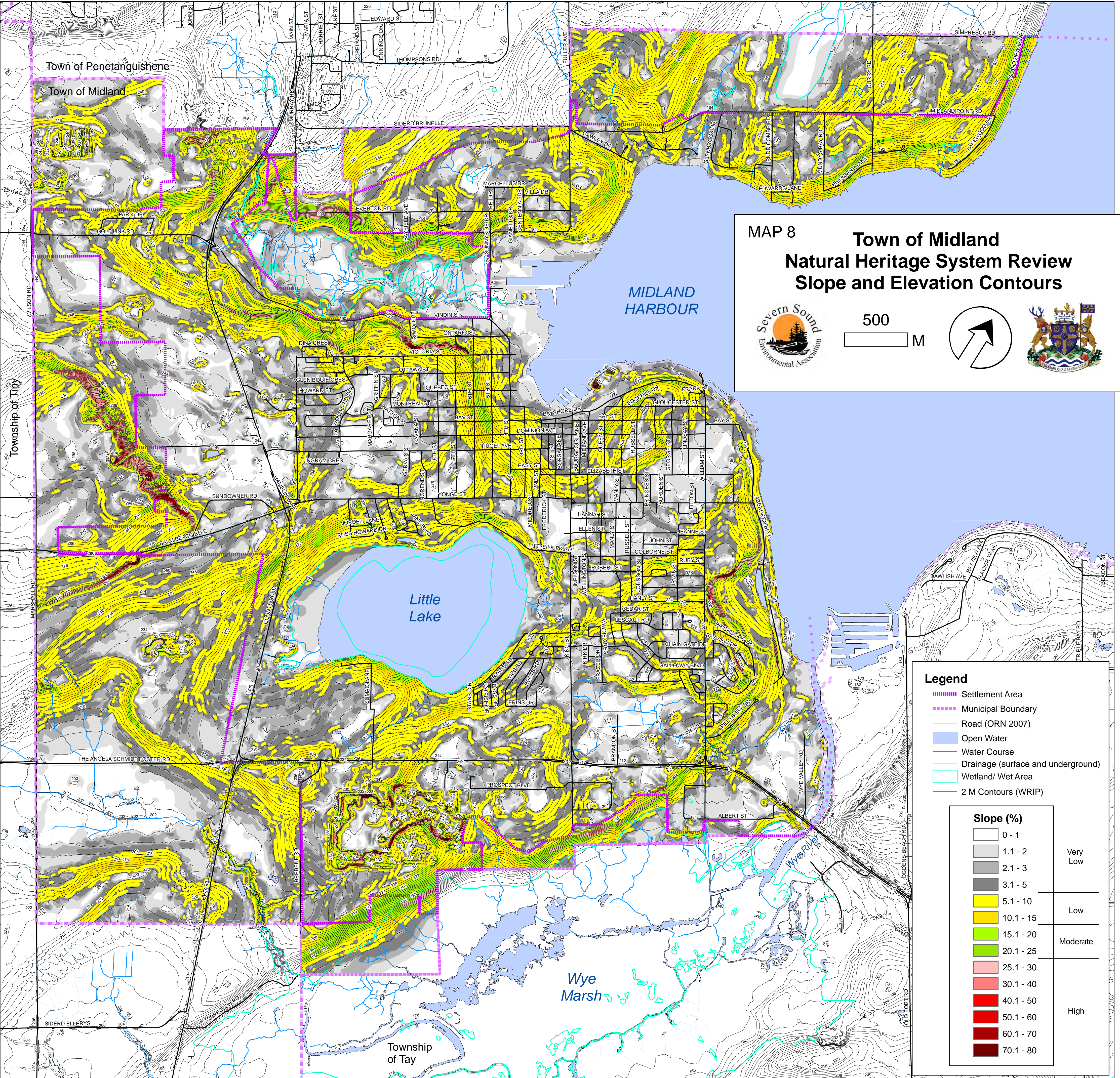
Note: Woodland Areas that are not within or touching the Town of Midland Boundary are not displayed.











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9.0 Appendix

Glossary and List of Acronyms

ANSI **Areas of Natural and Scientific Interest.** Represent lands and waters containing important landscapes or features that are important for the natural heritage, protection, appreciation, scientific study or education. Designated as either Life Science or Earth Science, classified as either Provincially or Regionally Significant.

ArcMap or ArcView
An image editing system used within GIS applications

DEM **Digital Elevation Model.**

ELC **Ecological Land Classification.** A method of determining and classifying land types based on vegetation cover, soil type and hydrology. Designed by the Ontario Ministry of Natural Resources.

Forest An area containing tree species, most of which are mature.

GIS **Geographic Information Systems.** Computer-based systems that are used to store and manipulate geographic information.

Habitat Analysis
A methodology designed by SSEA to provide a natural features profile of an area, created using GIS technology to determine characteristics of Forest Habitat, Riparian Habitat and Wetland habitat.

IBA **Important Bird Area.** International designation by Nature Canada, Bird Studies Canada and Bird Life International of areas that contain unique habitat for nesting, feeding or resting of populations of birds.

MASL **Metres Above Sea Level.** Used in shoreline scoring.

Natural Heritage
The ecological functioning of naturally occurring features and areas such as water, woodlands, wetlands, meadows and the wildlife species found within that depend on such features for their survival, that are a legacy of the natural landscapes of an area.

NRVIS The **Natural Resources and Values Information System** is a Geographic information System (GIS) based system for managing the storage of Ontario Ministry of Natural Resources' (OMNR) digital land related information in a standardized manner. It allows the user to work with spatial data along with the corresponding attribute information.

OBM **Ontario Basic Mapping.** Past standard for land form and land use mapping; produced by the Ontario Ministry of Natural Resources. Now utilized within GIS technology.

OMNR **Ontario Ministry of Natural Resources.** Also referred to as “MNR”.

Ontario Wetland Evaluation System

A document produced by the Ontario Ministry of Natural Resources that provides methodology for scoring wetlands in southern Ontario. Widely accepted as the governing document in classifying wet areas.

OP **Official Plan.** Guiding planning document for a municipality e.g. County of Simcoe Official Plan; Town of Midland Official Plan.

Orthophotography

The ortho process corrects for distortions caused by the terrain, the orientation of the airplane and the camera lens, resulting in an image that allows users to accurately measure distances and areas. Orthophotography is a product which has the geometric accuracy of a map but contains the immense detail of a photograph.

PPS **Provincial Policy Statement.** Document produced by Ontario Ministry of Municipal Affairs and Housing to guide and assist planners in land use decisions.

Riparian To be associated with streams, waterways.

Rural Area (from Provincial Policy Statement)
means lands in the rural area which are located outside settlement areas and which are outside prime agricultural areas.

Settlement Area (from Provincial Policy statement)

means urban areas and rural settlement areas within municipalities (such as cities, towns, villages and hamlets) that are:

- a. built up areas where development is concentrated and which have a mix of land uses; and
- b. lands which have been designated in an official plan for development over the long term planning horizon provided for in policy 1.1.2. In cases where land in designated growth areas is not available, the settlement area may be no larger than the area where development is concentrated.

Significant The term is generally used in reference to habitat that is ecologically important, functionally important and/or economically important to the prolonged well-being of species that are found in or utilize that aspect of the habitat.

Significant: (from Provincial Policy Statement)

- a. in regard to wetlands, coastal wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time;
- b. in regard to the habitat of endangered species and threatened species, means the habitat, as approved by the Ontario Ministry of Natural Resources, that is necessary for the maintenance, survival, and/or the recovery of naturally occurring or reintroduced populations of endangered species or threatened species, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of its life cycle;
- c. in regard to woodlands, an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history;
- d. in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system;
- e. in regard to mineral potential, means an area identified as provincially significant through comprehensive studies prepared using evaluation procedures established by the Province, as amended from time to time, such as the Provincially Significant Mineral Potential Index;
- f. in regard to potential for petroleum resources, means an area identified as provincially significant through comprehensive studies prepared using evaluation procedures established by the Province, as amended from time to time; and
- g. in regard to cultural heritage and archaeology, resources that are valued for the important contribution they make to our understanding of the history of a place, an event, or a people.

Criteria for determining significance for the resources identified in sections (c)-(g) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used.

While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation.

Slope percent

A way to determine how steeply the land rises. The rise is divided by the run to determine slope: e.g. the land rises 2 metres over a 10 metre distance, resulting in a 20% slope; the land rises 0.5 metre over a 25 metre run, resulting in a 2% slope. GIS applications determine this information from ortho photographs.

SOLRIS

Southern Ontario Land Resource Information System is a regional, ecologically based, land cover / land use inventory. It provides a comprehensive, landscape-level inventory of natural, rural and urban areas in Southern Ontario. The land cover / land use classification follows the standardized Ecological Land Classification for southern Ontario to describe, inventory and interpret land cover for ecoregions in southern Ontario. The inventory represents the landscape current to 2000 to 2002 including: exposed bedrock, shoreline, forest, agriculture (annual, mixed and perennial crop), vegetation, transportation, built-up areas and water.

SSEA

Severn Sound Environmental Association. A group formed in 1997 to continue monitoring environmental factors within Severn Sound watershed; supported by nine municipalities.

SSRAP

Severn Sound Remedial Action Plan. A federal/provincial plan in place from 1987 to 1996 to investigate and mitigate pollution factors within the Severn Sound watershed.

Wetlands: Evaluated and Unevaluated

An evaluated wetland is 2 hectares or larger that has been scored using the Ontario Wetland Evaluation System, and as a result is classified as being either Provincially Significant or Non-provincially Significant.

An unevaluated wetland has not been scored using the Ontario Wetland Evaluation System, sometimes due to its small size (less than 2 hectares).

Woodland

An area that is 0.5 hectare or larger containing over 60% contiguous tree cover with trees that are approximately two metres or greater in height with an identifiable canopy. May contain both tree and shrub species.

Woodland patch

A cluster of contiguous woody vegetation that contains over 60% trees and does not have any openings or gaps larger than 20m in width. The boundary of the woodland patch creates a closed polygon which may then be used in GIS applications.

Woodlot

A forestry term used to describe a woodland that may be designated for commercial uses and is actively managed (e.g. utilized for firewood or lumber; maple syrup production).