Initial Hydrogeological Assessment

Trafalgar Road Environmental Assessment, Town of Halton Hills, Ontario

Prepared For: Halton Region

COMMUNITIES

TRANSPORTATION

BUILDINGS

INFRASTRUCTURE

MMM GROUP

May 2016 Project No. 3214006-000-451

Initial Hydrogeological Assessment
Trafalgar Road Environmental Assessment

Prepared For
Halton Region

MMM Group Limited
Project No. 3214006-000-451

May 2016

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APPENDICES

1.0 INTRODUCTION

Halton Region has retained MMM Group Limited (MMM) to undertake the Environmental Assessment (EA) for the widening of Trafalgar Road between Steeles Avenue and Highway 7 within the Town of Halton Hills, Ontario.

The proposed works include the widening of the existing Trafalgar Road between Steeles Avenue and Highway 7, partial realignments of Trafalgar Road, for the construction of grade separations at the Canadian National Railway (CNR) and Metrolinx railroads, the widening/re-construction of the Black Creek bridge crossing and the repair/re-construction of 18 existing culverts.

For the purposes of this study, a 500 m study area was added to either side of the existing Trafalgar Road (the Study Area), to focus the investigation on areas with high potential groundwater sensitivity to the project.

1.1 Report Objective

The objective of the Hydrogeological Assessment is to broadly characterize the local hydrogeological conditions within the Study Area and provide technical hydrogeological input to the project's EA and Preliminary Design, by completing a desktop study.

This study discusses potential impacts resulting from the proposed Trafalgar Road construction in the context of the following:

- Potential impacts to municipal, commercial and private water wells;
- Existing source water protection areas;
- Likelihood of release of contaminants; and
- Impacts to groundwater and surface water from construction activities.

Scope of Work

The Scope of Work undertaken in this hydrogeological assessment includes the following tasks:

- *Review of Available Physiographic, Geological, Geotechnical, and Hydrogeological Maps and Reports* – to help characterize the general physiography, geology and hydrogeology within and surrounding the Trafalgar Road Study Area, in an effort to understand the general groundwater flow system(s);

- *Review of the Ontario Ministry of Environment and Climate Change (MOECC) Water Well Records* - to provide any relevant information on the construction of wells, well depth, location, static water levels, geologic stratigraphy and pumping rates; and,
- *Review of Permits to Take Water (PTTWs)* - to identify existing heavy water users in the Study Area.

L:\Projects\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_20160303214006_TrafalgarSteelesHwy7_SiteLocations_20160302.mxd 03/02/2016

MAIN STREET
RIVER DRIVE
ARMSTRONG AVENUE
SINCLAIR AVENUE
ARGYLL ROAD
SIDEROAD 10
HIGHWAY 407
CONFEDERATION STREET
MOUNTAINVIEW ROAD NORTH
MOUNTAINVIEW ROAD SOUTH
9TH LINE
GUELPH ST
TILDWOOD ROAD
DELREX BOULEVARD
MAPLE AVENUE
MAIN STREET SOUTH
8TH LINE
HIGHWAY 401
STEELES AVENUE
TRAFALGAR ROAD
HORNBY ROAD
SIDEROAD 17
SIDEROAD 15

Cedarvale Wellfield

Princess Anne Wellfield

Lindsay Court Wellfield

Hydrogeology Study Area Section 4: 15 Side Road to Highway 7

Hydrogeology Study Area Section 3: 10 Side Road to 15 Side Road

Hydrogeology Study Area Section 2: 5 Side Road to 10 Side Road

Hydrogeology Study Area Section 1: Steeles Avenue to 5 Side Road

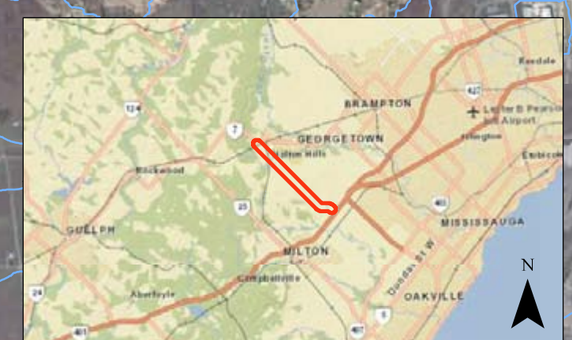
Proposed Metrolinx Grade Separation

Proposed CNR Grade Separation

Black Creek Bridge Crossing

Legend

- Study Area
- Watercourse
- Waterbody



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TRAFALGAR ROAD – STEELES AVENUE TO HIGHWAY 7

Site Location Plan

0 0.5 1 km

1:35,000

N

Date: March 2016

Project No: 3214006

Figure No: 1 – 1

2.0 STUDY AREA DESCRIPTION AND SETTING

2.1 Description of the Study Area

The Study Area includes a 500 m area around the existing Trafalgar Road alignment within the Town of Halton Hills, Ontario. The Study Area boundary is shown on **Figure 1-1**. The Study Area is divided into four northwest - southeast aligned sections for the purpose of the hydrogeology review, namely:

- **Section 1**: Trafalgar Road between Steeles Avenue and 5 Side Road;
- **Section 2**: Trafalgar Road between 5 Side Road and 10 Side Road;
- **Section 3**: Trafalgar Road between 10 Side Road and 15 Side Road; and,
- **Section 4**: Trafalgar Road between 15 Side Road and Highway 7.

Study Area Sections 1, 2 and 3 are located within the jurisdiction of Conservation Halton (CH) while Study Area Section 4 is located within the purview of Credit Valley Conservation (CVC).

2.2 Current Land Use

The southeast end of Section 1, at the intersection of Trafalgar Road and Steeles Avenue is currently a mixture of rural and commercial development. The widening of Trafalgar Road, along with the up-coming construction related to the widening of Steeles Avenue and the installation of a watermain (ongoing by MMM Group, 2016), may promote future commercial and sub-development housing construction within this area.

Between Steeles Avenue and 15 Side Road, the land use is predominantly rural, with few commercial, religious and educational properties located at the 5 Side Road and 10 Side Road intersections.

The land use changes at the northwest, north and east sides of the Trafalgar Road and 15 Side Road intersection, to commercial and residential. This land use type extends further, north and northeast of Highway 7. The landscape changes across the Study Area from primarily rural north of Steeles Avenue, to being dominated by sub-division housing developments, golf courses, the urban centre of Georgetown (Town of Halton Hills) and commercial properties.

2.3 Physiography and Topography

The Niagara Escarpment, a UNESCO World Biosphere Reserve, is located west of the Study Area and is the most significant physiographic feature within the region. It follows a northwest-southeast orientation and is characterized by vertical cliffs and areas of exposed bedrock. The Horseshoe Moraine, which is composed of the Paris Moraine, Galt Moraine and Acton Moraine, overlies the Niagara Escarpment, is hummocky in nature and forms the regional topographic

high. The west side of Trafalgar Road between the existing Metrolinx railroads and Highway 7 is classified as an Escarpment Rural Area, by the Niagara Escarpment Plan.

The ground surface elevation declines east of the Escarpment into the South Slope physiographic region which characterizes project Sections 2, 3 and 4. South of the South Slope is the Peel Plain, which characterizes project Sections 1 and 2.

The Peel Plain represents areas that were once covered by a proglacial lake (Glacial Lake Peel), whereby shallow water deposits (silt and clay) overlie deeper glacial till units, and bedrock. This region consists of flat to undulating terrain, whereby this plain has a very gentle slope to the southeast, towards Lake Ontario. Larger rivers and streams, which cross the Peel Plain, often flow down broad and sometimes deep incised valleys, however smaller tributaries, typically have very low gradients and poorly defined valleys, if any. As per Chapman and Putnam (1984), much of the Peel Plain is underlain by poorly drained clay soils, however select regions have sandy sub soils.

The South Slope differs from the Peel Plain in that the glaciolacustrine deposits are absent and glacial till is typically the surficial geological unit. Again, this area consists of undulating terrain (drumlinized to bevelled till plains), with a very gentle slope towards Lake Ontario, however the plain is characterized by flutings (subtle elongated ridges and valleys) and localized drumlins.

The topography, drainage and location of natural features are shown on **Figures 2-1 to 2-4**.

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8TH LINE
SIDEROAD 5
TRAFALGAR ROAD
HORNBY ROAD
STEELES AVENUE
HIGHWAY 401

Legend

- Study Area
- Watercourse
- Contour (5m)

Thermal Regime

- Cold Water Watercourse
- Cool Water Watercourse
- Warm Water Watercourse
- Wooded Area

Wetland Significance

- Evaluated Wetland

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TRAFALGAR ROAD – STEELES AVENUE TO 5 SIDE ROAD
Topology, Drainage, and Natural Features

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 2-1

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TRAFALGAR ROAD

6TH LINE

SIDEROAD 10

SIDEROAD 5

Legend

- Study Area
- Watercourse
- Contour (5m)

Thermal Regime

- Cold Water Watercourse
- Cool Water Watercourse
- Warm Water Watercourse
- Waterbody
- Wooded Area

Wetland Significance

- Unevaluated Wetland
- Evaluated Wetland

WSP | MMM GROUP

TRAFALGAR ROAD – 5 SIDE ROAD TO 10 SIDE ROAD
Topology, Drainage, and Natural Features

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 2-2

L:\Projects\2014\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_20160303214006_TrafalgarSteelesHwy7_NaturalFeatures_201603.mxd 14/03/2016

LAWLOR STREET
GRIST MILL DRIVE
MCNALLY STREET
BELMONT BOULEVARD
NORTH RIDGE CRESCENT
STONEBROOK CRESCENT
CHANTELAY CRESCENT
TRAFALGAR ROAD
STEWARTTOWN ROAD
HARRISON PLACE
MILL POND DRIVE
SIDEROAD 15
SIDEROAD 10
6TH LINE

Legend

- Study Area
- Railway Track
- Watercourse
- Contour (5m)

Thermal Regime

- Cold Water Watercourse
- Cool Water Watercourse
- Wooded Area

Wetland Significance

- Unevaluated Wetland

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TRAFALGAR ROAD – 10 SIDE ROAD TO 15 SIDE ROAD
Topology, Drainage, and Natural Features

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 2-3

L:\Projects\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_3214006_TrafalgarSteelesHwy7_NaturalFeatures_201603.mxd 14/03/2016

HYLAND AVENUE
JOYCELYN CRESCENT
RUDDELL CRESCENT
ATWOOD AVENUE
MOWAT CRESCENT
BERTON BOULEVARD
MUNRO CIRCLE
MCCULLOUGH CRESCENT
HILLSIDE DRIVE
MARY STREET
GARDINER DRIVE
MAPLE AVENUE
HALTON HILLS DRIVE
PRINCESS ANNE DRIVE
NEWMAN PLACE
LINDSAY COURT
JOHNSON CRESCENT
HIGHWAY 7
SIDEROAD 20
TRAFALGAR ROAD
THOMPSON DRIVE
STEWARTTOWN ROAD
HARRISON PLACE
MILL POND DRIVE
SIDEROAD 15
SIDEROAD 17
AUTUMN CIRCLE
6TH LINE
LAWLOR STREET
GRIST MILL DRIVE
MCNALLY STREET
NORTH RIDGE CRESCENT
BELMONT BOULEVARD
STONEBROOK CRESCENT
GHANTELAY CRESCENT

Legend

- Study Area
- Railway Track
- Watercourse
- Contour (5m)

Thermal Regime

- Cold Water Watercourse
- Wooded Area

Wetland Significance

- Unevaluated Wetland
- Provincially Significant Wetland

Niagara Escarpment Designated Area

- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Rural Area

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TRAFALGAR ROAD – 15 SIDE ROAD TO HIGHWAY 7
Topology, Drainage, and Natural Features

0 100 200 300
Meters
1:10,000

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Date: March 2016
Project No: 3214006
Figure No: 2-4

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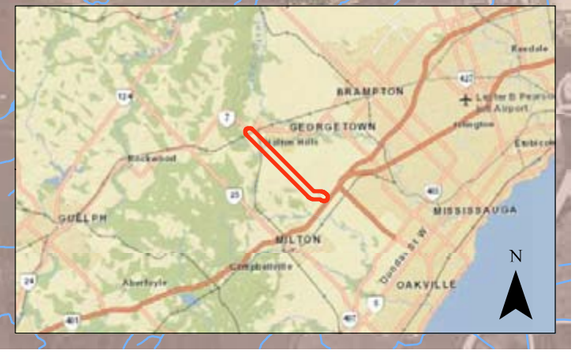
MAIN STREET
CONFEDERATION STREET
RIVER DRIVE
ARMSTRONG AVENUE
SINCLAIR AVENUE
MOUNTAINVIEW ROAD NORTH
GUELPH STREET
MOUNTAINVIEW ROAD SOUTH
ARGYLL ROAD
SIDEROAD 10
9TH LINE
WILDWOOD ROAD
DELREX BOULEVARD
MAPLE AVENUE
MAIN STREET SOUTH
8TH LINE
HIGHWAY 7
TRAFALGAR ROAD
HORNBY ROAD
STEELES AVENUE
HIGHWAY 401
SIDEROAD 17
SIDEROAD 15

Legend

- Study Area
- Watercourse
- Waterbody

Bedrock Geology

- Sandstone, shale, dolostone, siltstone
- Shale, limestone, dolostone, siltstone



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TRAFALGAR ROAD – STEELES AVENUE TO HIGHWAY 7
Bedrock Geology

0 0.5 1 km
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Date: March 2016
Project No: 3214006
Figure No: 3 – 1

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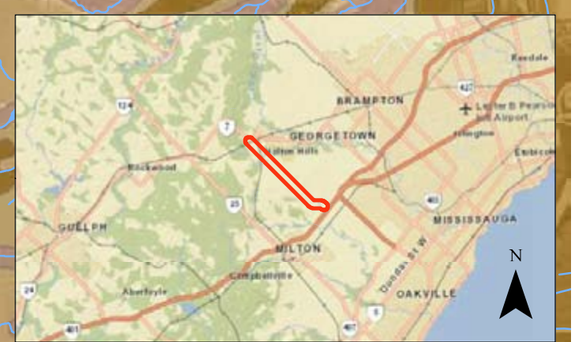
MAIN STREET
CONFEDERATION STREET
RIVER DRIVE
ARMSTRONG AVENUE
SINCLAIR AVENUE
MOUNTAINVIEW ROAD NORTH
GUELPH STREET
MOUNTAINVIEW ROAD SOUTH
ARGYLL ROAD
SIDEROAD 10
9TH LINE
WILDWOOD ROAD
DELREX BOULEVARD
MAPLE AVENUE
MAIN STREET SOUTH
8TH LINE
HIGHWAY 7
TRAFALGAR ROAD
HORNBY ROAD
STEELES AVENUE
HIGHWAY 401
SIDEROAD 17
SIDEROAD 15

Legend

- Study Area
- Watercourse
- Waterbody

Surficial Geology

- Paleozoic Bedrock
- Clay, silt
- Clay, silt, sand, gravel
- Diamicton
- Gravel
- Organic deposits
- Sand
- Sand, gravel



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TRAFALGAR ROAD – STEELES AVENUE TO HIGHWAY 7
Surficial Geology

0 0.5 1 km
1:35,000

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Date: March 2016
Project No: 3214006
Figure No: 4 – 1

2.4 Geology

2.4.1 Bedrock Geology

The Niagara Escarpment, located within the northwest portion of the Study Area, consists of resistant dolomite cap-rock of the Amabel Formation which forms the upper scarp, overlying inter-layered dolostone and shale of the Manitoulin Formation (lower scarp), which in turn overlies the red shales of the Queenston Formation. The Queenston Formation is the uppermost bedrock formation within the Trafalgar Road Study Area.

The Queenston Shale bedrock consists of reddish brown and thinly bedded shale with frequent hard grey limestone layers with occasional siltstone and some clay seams (Holysh, 1995). The limestone beds are typically more competent in comparison to the shale. The upper portion of the Queenston formation is highly weathered, making it difficult to distinguish the top of bedrock from the overlying Halton Till. The Queenston formation is regionally extensive, found as the uppermost bedrock formation in most areas of Halton Region which is below the Niagara Escarpment.

The bedrock geology within the Trafalgar Road Study Area is shown on **Figure 3-1**.

2.4.2 Quaternary Geology

The surficial geology within the Trafalgar Road Study Area is characterized by the South Slope and Peel Plain physiographic regions. The South Slope is overlain by Halton Till; glacial till deposits that were previously laid down by the ice sheet during an earlier episode of glaciation and characterized by its red-brown colour and silty-clay texture.

As per Holysh (1995), the Peel Plain was formed by a glacial lake that ponded between the retreating Laurentide Ice Sheet, during a time when the ice margin formed a northeast-southwest trending end moraine (Trafalgar Moraine) located south of Trafalgar Road (near Highway 407), and uplands to the north and west. Silts and clays were deposited at the bottom of this proglacial lake, on top of the Halton Till. The Peel Plain sediments are fairly shallow and overlie the Halton Till, which grades downward into the Queenston Formation bedrock.

A series of buried bedrock valleys have been identified within Halton Region, carved into the Queenston Shale by flowing rivers prior to and during the last glacial period. Many of these bedrock valleys have been infilled by sands and gravels and serve as major regional groundwater aquifers.

The Acton/Mississauga bedrock valley originates above the Niagara Escarpment near Acton, follows an east-southeast orientation through Limehouse and Georgetown and then follows the alignment of the Credit River, through the cities of Brampton and Mississauga, to Lake Ontario (CVC, 2009). The Inglewood/Milton bedrock valley follows an alignment parallel to the Niagara

Escarpment from Inglewood to Milton, east of Trafalgar Road. The two bedrock valleys join within the vicinity of the Cedarvale Wellfield in Georgetown (CVC, 2009)

The surficial geology of the Study Area is shown on **Figure 4-1. Figure 5-1** shows the bedrock surface elevation within the vicinity of the Lindsay Court Well 9 (AECOM, 2010), with warmer yellow/red colours representing shallow bedrock surfaces and cooler green colours representing deeper bedrock surfaces. The location of the Acton/Mississauga bedrock valley is shown, relative to the location of the Lindsay Court Wellfield.

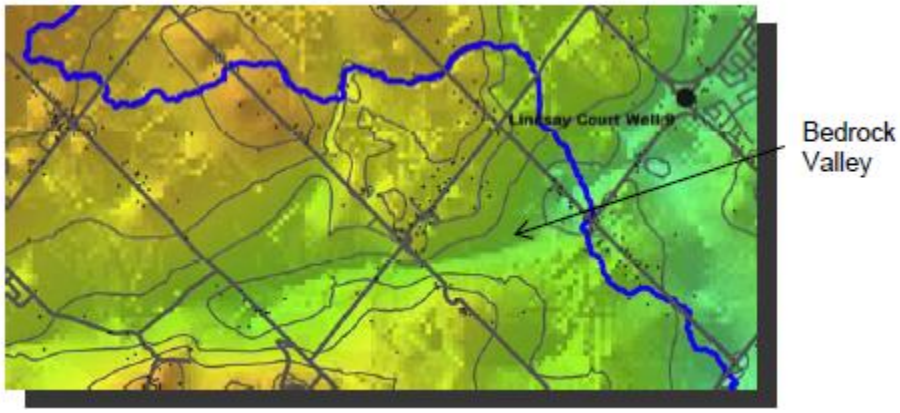

Figure 5 - 1: Bedrock Surface Elevation (AECOM, 2010)

2.4.3 Surface Water

Section 4 of the Study Area lies within the Black Creek Subwatershed and adjacent to the Silver Creek Subwatershed, which both lie within the greater Credit River Watershed. The construction for Trafalgar Road includes the widening of the existing bridge over Black Creek, located south of the CN railroad crossing. Black Creek flows into Silver Creek near Maple Avenue and Main Street South and collectively enters the Credit River at Norval. Tributaries of Black Creek and Silver Creek located near the Lindsay Court Wellfield may not be physically or hydraulically connected to groundwater (AECOM, 2010). Study Area Sections 3, 2 and 1 lie within the headwater tributaries of the Middle East Branch of the Sixteen Mile Creek Watershed, are groundwater fed (cold water), but warm up downstream (Halton Region Source Protection Area Assessment Report (HRSPA), 2015).

The hydraulic connectivity between surface water creeks and aquifers (shallow overburden aquifers and buried bedrock valley aquifers) will have to be determined, to identify the effects of the road cut and construction dewatering on these creeks.

2.5 Hydrogeology

The main regional aquifers within Halton Region include the shallow overburden aquifer, the overburden bedrock valley aquifer and bedrock aquifer.

2.5.1 Shallow Overburden Aquifers

The shallow overburden aquifer consists of thin sand and gravel lenses interbedded within the Halton Till. These lenses have created minor aquifers that support private domestic water supplies.

2.5.2 Bedrock Aquifer

The bedrock underlying the Study Area is the Queenston Shale; that yields some water within the upper weathered zone. The groundwater yield is adequate to supply private domestic supplies, but has marginal aesthetic drinking water quality, due to the mineral content.

2.5.3 Buried Bedrock Valley Aquifer

The Acton/Mississauga and Inglewood/Milton buried bedrock valley aquifers are the major regional supply aquifers. All the municipal wellfields in Georgetown namely, Cedarvale, Princess Anne and Lindsay Court are supplied by groundwater from these aquifers. The Lindsay Court and Princess Anne wellfields are located in the Acton/Mississauga bedrock valley aquifer, while the Cedarvale wellfield is located in the Inglewood/Milton bedrock valley aquifer, near the area where it joins the Acton/Mississauga bedrock valley (CVC, 2009). The aquifers were formed due to glaciofluvial processes that deposited sands and gravels within the bedrock valleys.

Figures 6-1 and **7-1** (Genivar, 2012) show plan views of transects through the Lindsay Court and Princess Anne wellfields. Hydro-stratigraphic cross-sections are presented in **Figures 6-2** and **7-2** for the Lindsay Court Standby Well 9B (Genivar, 2012) and the Princess Anne Standby Well PA 6B (Genivar, 2012). The overlying Halton Till varies in thickness from approximately 2 m to 15 m within the vicinity of the Lindsay Court and Princess Anne Wellfields. Groundwater flow is from west to east along the bedrock valley and is recharged through surface infiltration (AECOM, 2010).

2.5.4 Groundwater Elevations

Figures 6-2 and 7-2 show the groundwater elevations during **active pumping** at the Lindsay Court and Princess Anne wellfields, respectively.

The static groundwater elevations as a result of the pumping at the Lindsay Court Wellfield (**Figure 6-2**) are estimated to be approximately 270 masl, in the area of the proposed Metrolinx grade separation. The sub-drain beneath the base of the proposed Metrolinx grade separation will be at 271.6 masl, which is above the approximate static groundwater level. However, the actual groundwater elevations along the proposed grade separation alignment will have to be identified during the geotechnical investigation, to confirm whether the construction will intercept the draw-down cone of the Lindsay Court Wellfield, located within the buried bedrock valley aquifer, and to provide a determination of non-pumping static levels.

The static groundwater elevations as a result of the pumping at the Princess Anne Wellfield (**Figure 7-2**) are estimated to be approximately 254 masl, in the area of the proposed CNR grade separation. The sub-drain beneath the base of the proposed CNR grade separation will be at 257.6 masl, which is above the inferred static groundwater level. The actual groundwater elevations along the proposed CNR grade separation alignment will have to be identified during the geotechnical investigation, to confirm whether the construction will intercept the groundwater table of the buried bedrock valley aquifer and provide a determination of non-pumping static levels.

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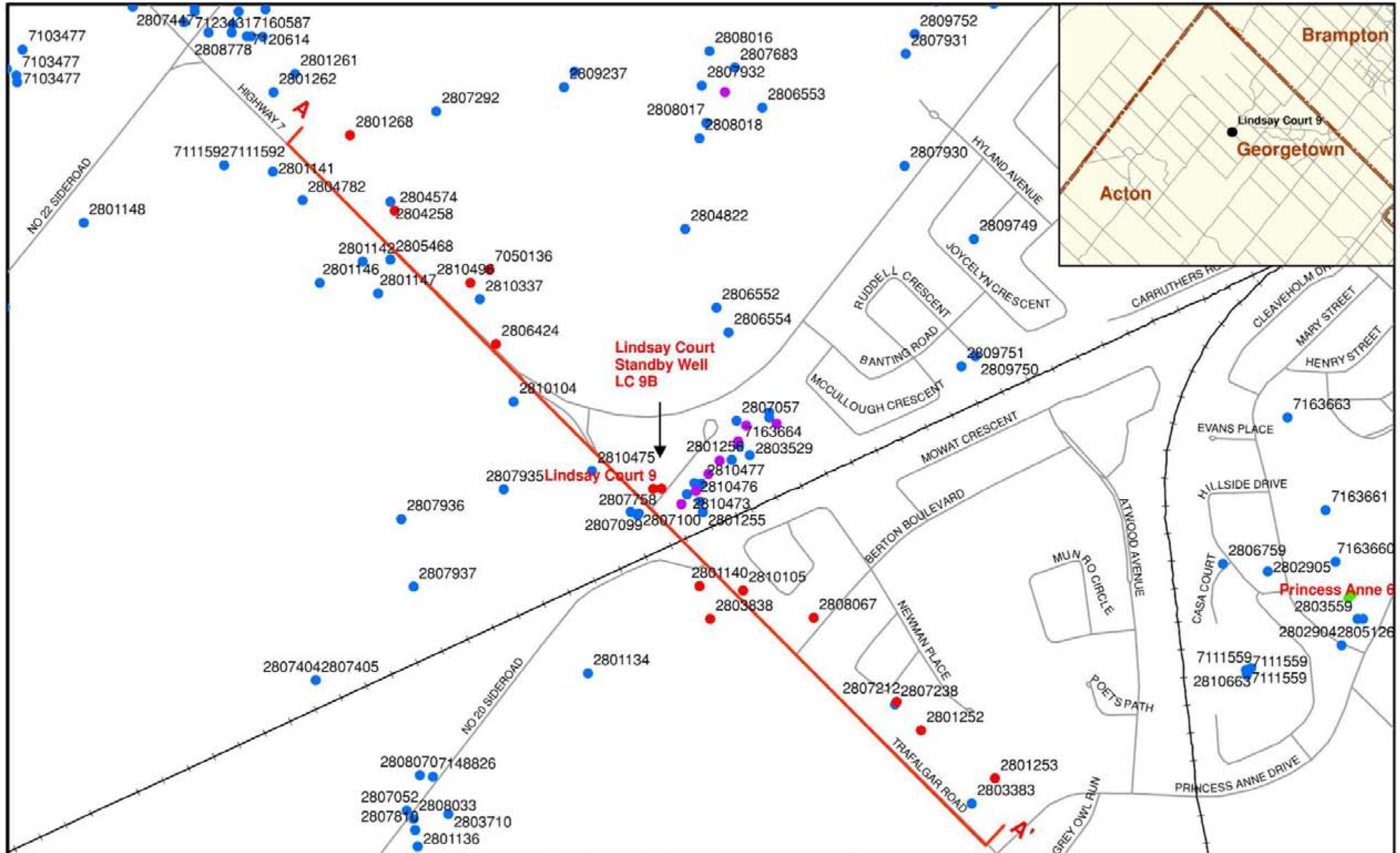


Legend

- Wells From Section
- MOE Wells
- Princess Anne Wells 5 & 6
- Locations Surveyed
- Cross Section (A A')
- Railway
- Roads

N W E S

100 50 0 100 Meters

Data Source: Ministry of Natural Resources, Ontario Base Mapping, July 2010.

SCALE: 1:10,000
FILE. NO.:111-21394-00F3
DATE: APRIL 2012
PROJECT: 111-21394-00

GENIVAR

LOCAL WATER SUPPLIES

CONSTRUCTION, DEVELOPMENT AND TESTING OF THE LINDSAY COURT STANDBY WELL LC 9B
For: The Region of Halton

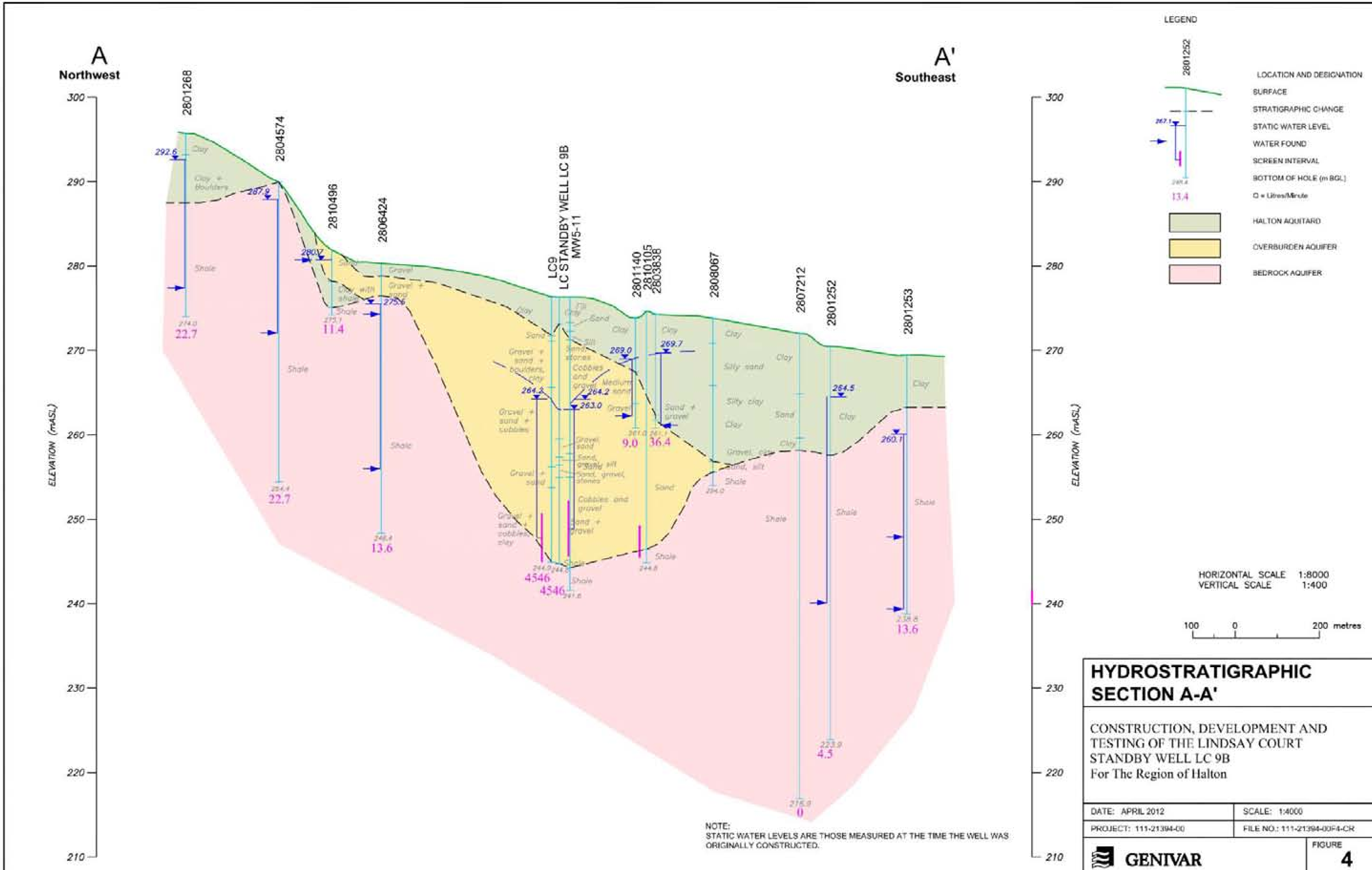
FIGURE 3

WSP | MMM GROUP

TRAFALGAR ROAD
Lindsay Court Well Field Transect (Genivar, 2012)

SCALE
AS SHOWN

Date: March 2016
Project No: 3214006
Figure No: 6-1



A
Northwest
A'
Southeast
ELEVATION (mASL)
2801268
2804574
2810496
2806424
LC9
LC STANDBY WELL LC 9B
MW5-11
2801140
2810105
2803838
2808067
2807212
2801252
2801253
LEGEND
LOCATION AND DESIGNATION
SURFACE
STRATIGRAPHIC CHANGE
STATIC WATER LEVEL
WATER FOUND
SCREEN INTERVAL
BOTTOM OF HOLE (m BGL)
Q = Litres/Minute
HALTON AQUITARD
OVERBURDEN AQUIFER
BEDROCK AQUIFER
HORIZONTAL SCALE 1:8000
VERTICAL SCALE 1:400
100 0 200 metres
NOTE:
STATIC WATER LEVELS ARE THOSE MEASURED AT THE TIME THE WELL WAS ORIGINALLY CONSTRUCTED.
HYDROSTRATIGRAPHIC SECTION A-A'
CONSTRUCTION, DEVELOPMENT AND TESTING OF THE LINDSAY COURT STANDBY WELL LC 9B
For The Region of Halton
DATE: APRIL 2012
SCALE: 1:4000
PROJECT: 111-21394-00
FILE NO.: 111-21394-00F4-CR
GENIVAR
FIGURE 4

07 Mar 2016

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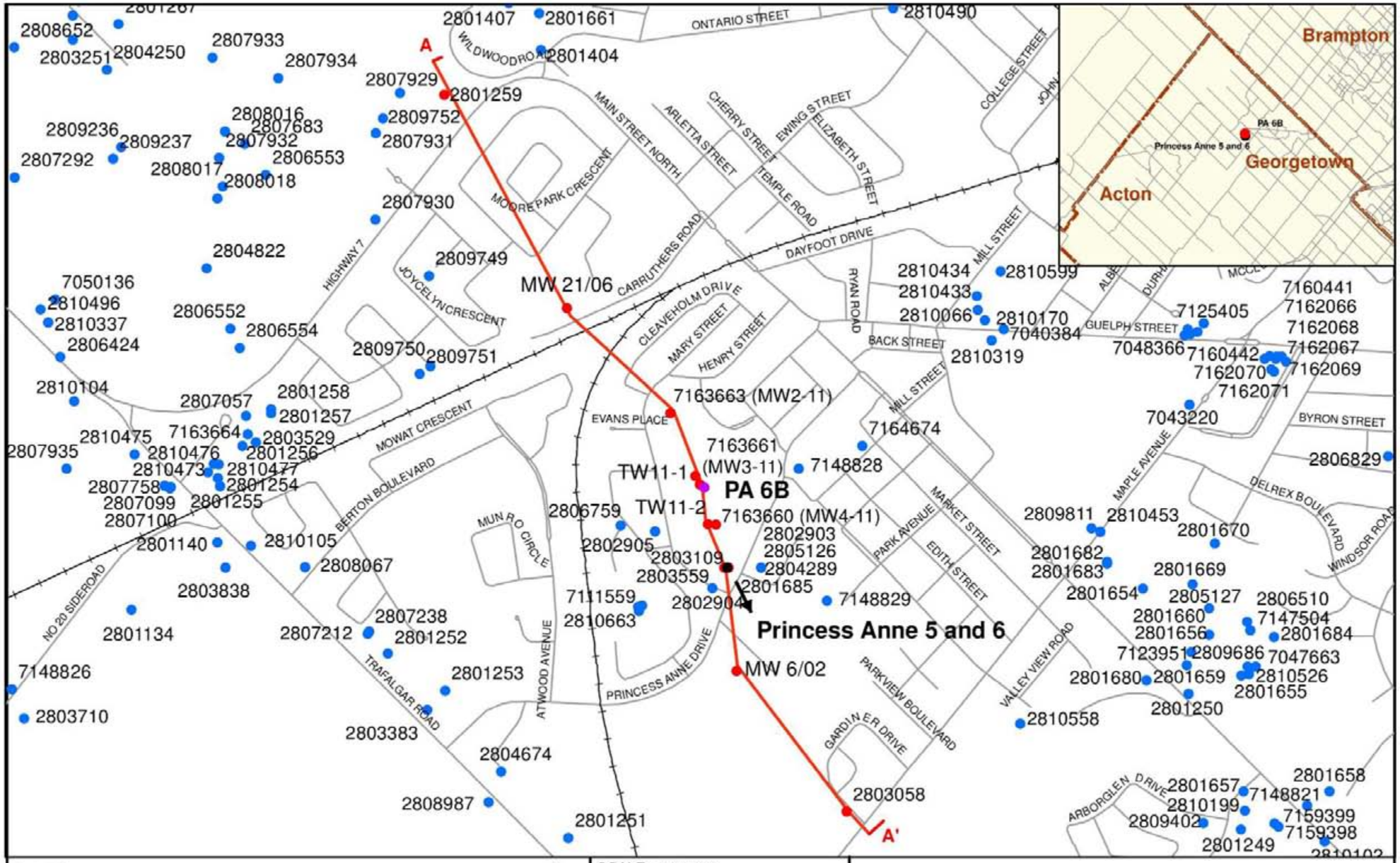
TRAFALGAR ROAD
Hydrogeological Cross-Section – Lindsay Court Well Field (Genivar, 2012)

SCALE
AS SHOWN

Date: March 2016	
Project No: 3214006	
Figure No: 6-2	



SCALE: 1:13,000	**LOCAL WATER SUPPLIES**
FILE. NO.:111-21395-00F3	
DATE: DECEMBER 2012	CONSTRUCTION, DEVELOPMENT AND TESTING OF THE PRINCESS ANNE STANDBY WELL PA 6B For: The Region of Halton
PROJECT: 111-21395-00	FIGURE 3
GENIVAR	

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TRAFALGAR ROAD
Princess Anne Well Field Transect (Genivar, 2012)

SCALE
AS SHOWN

Date: March 2016
Project No: 3214006
Figure No: 7-1

L:\Projects\2014\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_201603\3214006_TrafalgarSteelesHwy7_72HydroGPrincessAnne_201603.mxd 07 Mar 2016

A
North Northwest

A'
South Southeast

LOOKING EAST

WOODLOT

HIGHWAY #7

PRINCESS ANNE DRIVE

MAPLE AVENUE

2801259 MW21/06 MW2-11 (7163663) TW11-1 MW3-11 (7163661) PA6B MW4-11 (7163660) TW11-2 PA5 (2603109) PA6 (2605126) MW5/02 2803658

HALTON AQUITARD

UPPER GRAVEL

UPPER FINE SAND

LOWER TILL

SAND AND GRAVEL AQUIFER

SAND

LOWER SAND

SHALE

FILL

ELEVATION (mASL)

DISTANCE (m)

LEGEND

LOCATION AND DESIGNATION
SURFACE
STRATIGRAPHIC CHANGE
STATIC WATER LEVEL
WATER FOUND
SCREEN INTERVAL
BOTTOM OF HOLE (m BGL)
Q = Litres/Minute

FILL
HALTON AQUITARD
SAND
SAND AND GRAVEL AQUIFER
LOWER TILL
BEDROCK AQUIFER

NOTES:
STATIC WATER LEVELS ARE THOSE MEASURED AT THE TIME THE WELL WAS ORIGINALLY CONSTRUCTED.

THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE WELL LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS.

HYDROSTRATIGRAPHIC SECTION A-A'

CONSTRUCTION, DEVELOPMENT AND TESTING OF THE PRINCESS ANNE STANDBY WELL PA 6B
For The Region of Halton

DATE: SEPTEMBER 2012	SCALE: AS SHOWN
PROJECT: 111-21395-00	FILE NO.: 111-21395-00F4-CR

GENIVAR — FIGURE 4

WSP | MMM GROUP

TRAFALGAR ROAD
Hydrogeological Cross-Section – Princess Anne Well Field (Genivar, 2012)

SCALE
AS SHOWN

Date: March 2016
Project No: 3214006
Figure No: 7-2

3.0 GROUNDWATER RESOURCES

3.1 Municipally Serviced Areas

Recent well surveys performed along Steeles Avenue and Hornby Road have determined that although access to municipal water is available on Steeles Avenue, most households and small commercial properties use private wells as the main source of water, within Section 1 of the Trafalgar Road Study Area.

Figures 8-1 to **8-4** show the location of the watermains within the Study Area. The municipally serviced areas are located on Steeles Avenue, and north and east of the 15 Side Road intersection with Trafalgar Road (Study Area Section 4). Study Area Sections 1, 2 and 3 rely on private water wells for their water supply, as shown on Figure 4.7 of the Halton Region Source Protection Area Assessment Report (2015)

3.2 Water Well Records

The Ministry of the Environment and Climate Change's (MOECC) Water Well Information System (WWIS) is a compilation of records for water wells drilled in the Province of Ontario for the purpose of human, agricultural and industrial consumption. Pursuant to the Ontario Water Resources Act (1990), any well drilled for these purposes must be drilled by a MOECC licensed well drilling contractor and documented on a water well record. The record is then filed with the MOECC. Examples of data recorded on a water well record include: location of well, date drilled, depth to where water is found, static water level and subsurface stratigraphy. Given that well records have been completed by many different drillers during the past 50 years, data accuracy and consistency is variable, and the measurement accuracy for older well records is often approximate. The information in the records cannot always be taken as precise and must be interpreted in the context of the overall regional setting, and geological conditions.

As per information available on the MOECC website (accessed March 2016), there are 219 Water Well Records (WWRs) within 500 m of the existing Trafalgar Road alignment. The records are shown on **Figures 9-1** to **9-4** and are summarized below:

<u>Summary of MOECC Water Well Records</u>

- 118 records are for Domestic Water Supply;
- 8 records are for Municipal Water Supply and larger Public Water Supply (Churches and Temples);
- 29 records are for Commercial Properties, Schools, Churches, and Farm Water Supply
- 19 records are for Monitoring Wells

- 30 records are for Well Abandonment
- 15 records do not specify use.

A door to door well survey will need to be performed within the entire Study Area during the Detailed Design phase, to confirm whether private wells are in active use. Important information that should be documented includes the well depth, well construction details, depth to groundwater level, water quality and any type of treatment system being used.

Documentation of other permitted water takings need to be evaluated and the effects considered as part of this door to door survey.

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8TH LINE

SIDEROAD 5

HIGHWAY 401

STEELES AVENUE

TRAFALGAR ROAD

HORNBY ROAD

6TH LINE

Legend

- Halton Region Watermains
- Study Area
- Watercourse

WSP | MMM GROUP

TRAFALGAR ROAD – STEELES AVENUE TO 5 SIDE ROAD
Municipal Water Service - Watermain Locations

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 8 – 1

14/03/2016

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TRAFALGAR ROAD

SIDEROAD 10

SIDEROAD 5

6TH LINE

Legend

- Study Area
- Watercourse
- Waterbody

WSP | MMM GROUP

TRAFALGAR ROAD – 5 SIDE ROAD TO 10 SIDE ROAD
Municipal Water Service - Watermain Locations

0 100 200 300
Meters
1:10,000

N

Date: March 2016

Project No: 3214006

Figure No: 8 – 2

14/03/2016

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LAWLOR STREET

GRIST MILL DRIVE

MCNALLY STREET

NORTHRIDGE CRESCENT

BELMONT BOULEVARD

STONEBROOK CRESCENT

CHANTELAY CRESCENT

TRAFALGAR ROAD

SIDEROAD 10

STEWARTTOWN ROAD

SIDEROAD 15

HARRISON PLACE

MILL POND DRIVE

6TH LINE

Legend

- Halton Region Watermains
- Study Area
- Railway Track
- Watercourse

WSP | MMM GROUP

TRAFALGAR ROAD – 10 SIDE ROAD TO 15 SIDE ROAD
Municipal Water Service - Watermain Locations

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 8 – 3

14/03/2016

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HYLAND AVENUE
JOYCELYN CRESCENT
RUDDELL CRESCENT
ATWOOD AVENUE
MOWAT CRESCENT
BERTON BOULEVARD
MCCULLOUGH CRESCENT
LAUNCH CIRCLE
HILLSIDE DRIVE
MARY STREET
GARDINER DRIVE
MAPLE AVENUE
HALTON HILLS DRIVE
PRINCESS ANNE DRIVE
NEWMAN PLACE
LINDSAY COURT
JOHNSON CRESCENT
HIGHWAY 7
TRAFALGAR ROAD
SIDEROAD 20
GRIST MILL DRIVE
LAWLOR STREET
MCNALLY STREET
BELMONT BOULEVARD
NORTHRIDGE CRESCENT
STONEBROOK CRESCENT
CHANTELAY CRESCENT
THOMPSON DRIVE
STEWARTTOWN ROAD
HARRISON PLACE
MILLPOND DRIVE
SIDEROAD 15
SIDEROAD 17
AUTUMN CIRCLE
6TH LINE

Legend

- Halton Region Watermains
- Study Area
- Railway Track
- Watercourse

WSP | MMM GROUP

TRAFALGAR ROAD – 15 SIDE ROAD TO HIGHWAY 7
Municipal Water Service - Watermain Locations

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 8 – 4

L:\Projects\2014\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_201603\3214006_TrafalgarSteelesHwy7_MWInventory_201603_4.mxd 14/03/2016

Legend

- Study Area
- Watercourse

Monitoring Well Inventory

- Monitoring Well
- Abandoned
- Commercial
- Domestic
- Water Supply
- Unknown Use

8TH LINE
SIDEROAD 5
TRAFALGAR ROAD
HORNBY ROAD
STEELES AVENUE
HIGHWAY 401

7178236 2807503 7164664 7168501 2806793 7178234 7170235 2807504 2807055 2807176632 2806792 2807176 7187632 7178233 2807598 2804499 2804498 2804500 2807799 2808533 7138700 2808522 2808521 2806830 2806830 7136538 2809204 2803188 2803188 2803075 2807648 2804939 2805829 2801196 2801198 2806357 2801197 2801195 2804159 2807166 2803229 2801201 2805675 2805678 2801212 2801202 2805773 2801097 2801206 2801207 2801201 2801096 2801094 2805309 7226063 2805516 2805179 2801095 2807752 2802965

WSP | MMM GROUP

TRAFALGAR ROAD – STEELES AVENUE TO 5 SIDE ROAD
MOECC Water Well Records

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 9 – 1

L:\Projects\2014\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_20160323214006_TrafalgarSteelesHwy7_MWInventory_201603_3.mxd 14/03/2016

2804690
2801221
2807164
2801113
2807169
2801228
2805673
2808451
7160588
2805515
2807166
2801224
2801220
2801222
2801219
2801230
7200063
7160593
2806523
7160598
2801226
2801229
2801111
TRAFALGAR ROAD
2801212
2801097
2805438
2809682
2801114
2801112
2801115
2801110
2805393
7180863
2801206
7226063
2801104
2801103
2801106
2805516
2805179
2805309
2810198
2805018
2807752
2802965
SIDEROAD 5
SIDEROAD 10
6TH LINE
bing

Legend

- Study Area
- Watercourse
- Waterbody

Monitoring Well Inventory

- Monitoring Well
- Commercial
- Domestic
- Water Supply
- Unknown Use

WSP | MMM GROUP

TRAFALGAR ROAD – 5 SIDE ROAD TO 10 SIDE ROAD
MOECC Water Well Records

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 9 – 2

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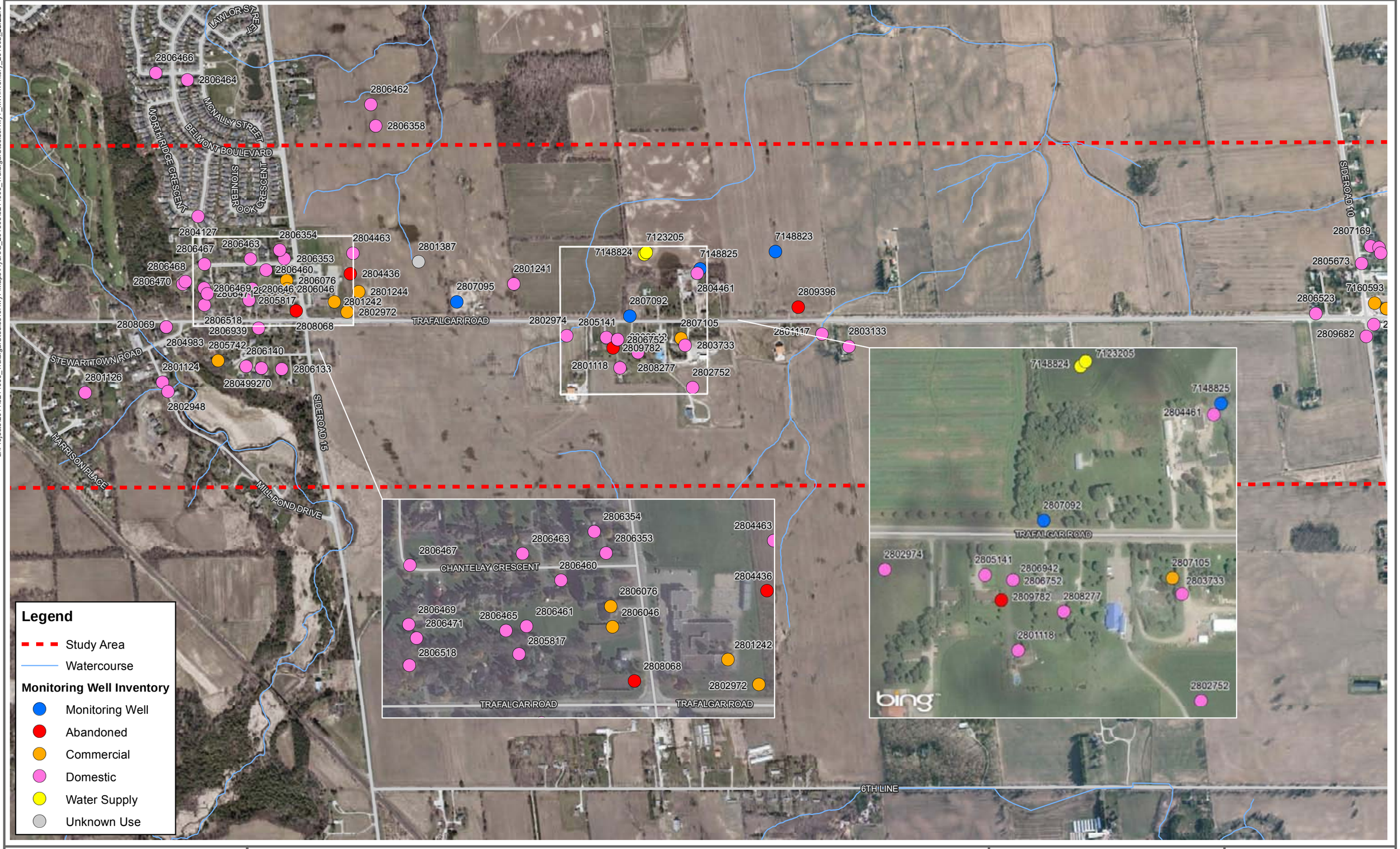


Legend

- Study Area
- Watercourse

Monitoring Well Inventory

- Monitoring Well
- Abandoned
- Commercial
- Domestic
- Water Supply
- Unknown Use

WSP | MMM GROUP

TRAFALGAR ROAD – 10 SIDE ROAD TO 15 SIDE ROAD
MOECC Water Well Records

0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 9 – 3

L:\Projects\3214\3214006_TrafalgarSteelesToHwy7\Maps\HydroG_20160303\3214006_TrafalgarSteelesHwy7_MWInventory_20160304.mxd 3/4/2016

Legend

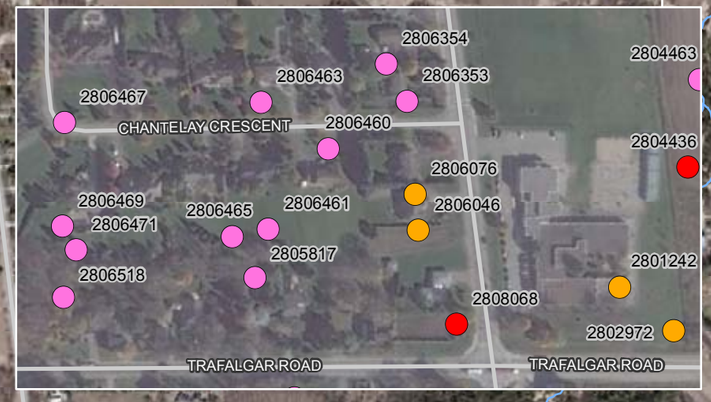
- Study Area
- Watercourse

Monitoring Well Inventory

- Monitoring Well
- Abandoned
- Commercial
- Domestic
- Water Supply
- Unknown Use

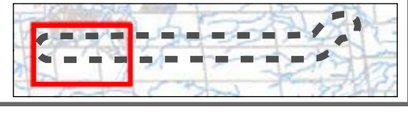
HYLAND AVENUE
JOYCELYN CRESCENT
RUDDELL CRESCENT
HIGHWAY 7
MCCULLOUGH CRESCENT
MOYAT CRESCENT
BERTON BOULEVARD
ATWOOD AVENUE
MUNRO CIRCLE
HILLSIDE DRIVE
MARY STREET
PRINCESSANNE DRIVE
HALTON HILLS DRIVE
MAPLE AVENUE
NEWMAN PLACE
TRAFALGAR ROAD
SIDEROAD 17
AUTUMN CIRCLE
6TH LINE
THOMPSON DRIVE
STEWARTTOWN ROAD
HARRISON PLACE
MILLPOND DRIVE
SIDEROAD 15
LAWLOR STREET
NORTH RIDGE CRESCENT
MCNALLY STREET
BELMONT BOULEVARD
STONEBROOK CRESCENT
CHANTELAY CRESCENT
JOHNSON CRESCENT

99751 2806554 2806552 2801258 2801257 2807057 712803529 7050136 2806424 2810496 2810337 2810476 2807937 2808067 2807238 2807212 2801253 2804674 2801251 2805745 2809574 2809575 2801252 2803383 2810104 2810475 2807758 07100 2801140 2810105 2803838 2807935 2801134 2807936 2810508 2810136 7139565 2808987 2806466 2806464 2804127 2806354 2806467 2806463 2806353 2806468 2806460 2806470 2806076 2806469 2806471 2806046 2805817 2806518 2808069 2804983 2805742 2806140 2806939 2808068 2806133 280499270 2801125 2801126 2801124 2802948 2808813 2807674 2807866 2801128



WSP | MMM GROUP

TRAFALGAR ROAD – 15 SIDE ROAD TO HIGHWAY 7
MOECC Water Well Records



0 100 200 300
Meters
1:10,000

N

Date: March 2016
Project No: 3214006
Figure No: 9 – 4

3.3 Lindsay Court Wellfield Expansion

Halton Region initiated a Class Environmental Assessment Study; 'Schedule B' in November 2007 to address the existing water supply needs at the Lindsay Court Wellfield, to accommodate approved planned development within the servicing area. The Lindsay Court Wellfield is a critical supply component of the long-term water supply strategy in Georgetown and is currently permitted for a sustained water taking of 6,545 m^3/day. Halton Region is proposing to increase the daily water taking in two stages for future planned growth and system redundancy, first to a sustained rate of 7,500 m^3/day, and then to 10,000 m^3/day (Dillon, 2009). The EA for the Lindsay Court Wellfield Expansion from 6,545 m^3/day to 7,500 m^3/day is ongoing (AECOM); however, potential effects of the grade separation should be evaluated assuming the well will be operating at an increased rate in the future. As part of the EA, AECOM is actively undertaking additional field and analytical studies to confirm if the proposed increased water taking is sustainable without interference to domestic wells and/or ecological features, and to support the PTTW application. The results of this work will need to be considered as part of the grade separation aspect of the Trafalgar Road upgrades.

Based on recent communication with Halton Region, there may be a change in the future servicing strategy for the Lindsay Court Well Field.

3.4 Safe Additional Drawdown

As part of Appendix C3 of the Tier 3 Water Budget And Local Risk Assessment – Acton and Georgetown, CVC, July 2015; safe additional drawdowns were calculated for the Georgetown production wells. Safe additional drawdown is defined as the additional depth that the water level within a pumping well could fall and still maintain that well's allocated pumping rate. It is calculated as the additional drawdown that is available above the drawdown created by the existing conditions pumping rate. The Safe Water Level Elevation is the lowermost elevation that an operator can lower the water levels in a municipal pumping well to; this elevation may be related to the well screen elevation, pump intake elevation or similar operational limitations. The safe water level elevation at each municipal water supply well was supplied by Halton Region staff.

Safe additional drawdowns are summarized in **Table 1** below, for the Lindsay Court and Princess Anne production wells. The safe additional drawdown information indicates that the pumping rates at these wells may be increased in the future.

Table 1: Safe Additional Drawdowns - Lindsay Court and Princess Anne Wells

Well	Safe Water Level (masl)	Average Pumping Water Elevation for 2005-2011 (masl)	Safe additional in-well drawdown (m)
Lindsay Court Well 9	251.8	261.9	10.1
Lindsay Court Well 9B	255.9	-	-
Princess Anne Well 5	236.6	251.3	14.7
Princess Anne Well 6	239.6	252.6	13.0

3.5 Permit to Take Water Records

Under Section 34 of the Ontario Water Resources Act, the MOECC requires ground and/or surface water users who require higher volumes of water (>50,000 L/day) to obtain a Permit to Take Water (PTTW). As per information available on the MOECC website (accessed March 2016), there are 12 active PTTWs within 1 km of the Trafalgar Road alignment, as shown on **Figure 10** and summarized below:

- 1 PTTW is listed for a Pumping Test
- 1 PTTW is listed for Recreational purposes
- 3 PTTWs are listed for Golf Courses
- 3 PTTWs are listed for Municipal Water Supply (Princess Anne and Lindsay Court Wellfields)
- 4 PTTWs are listed for the Water Tower Bible and Tract Society of Canada

These ongoing water takings will need to be evaluated and considered as part of any construction period dewatering in support of the Trafalgar Road grade separation work.

3.6 Source Protection Area

Sections 1, 2 and 3 of the Trafalgar Road Study Area (i.e. Steeles Avenue to 15 Side Road) are located within the Halton Region Source Protection Area while the northeast portion of Section 3, and Section 4 of the Trafalgar Road Study Area (i.e. 15 Side Road to Highway 7) are located within the Credit Valley Source Protection Area.

Trafalgar Road Study Area Sections 1, 2 and 3: Steeles Avenue to 15 Side Road

Study Area Sections 1, 2 and 3 are in the Middle East Branch Subwatershed, within the greater Sixteen Mile Creek Watershed.

The Middle East Branch Subwatershed, which contains Sections 1, 2 and 3 of the Study Area, are within areas that have very high surface water monthly stresses, at 266% Percent Water Demand, per Figure 5.8 of the Halton Region Source Protection Area (HRSPA) Assessment Report (July 2015). The surface water stresses are due to rural land use, with substantially higher agricultural and commercial takings. The construction of Trafalgar Road within Sections 1, 2 and 3 are not anticipated to increase the surface water stresses within the Middle East Subwatershed, since no consumptive water takings will be required.

The annual groundwater stresses within the Middle East Branch Subwatershed; however, are very low, at 1% Percent Water Demand. For perspective, the highest groundwater stresses within the Halton Region Source Protection Area are associated with the Upper West Branch (15%) and Willoughby Creek (24%). The Upper West Branch contains the Kelso and Campbellville municipal supply wellfields.

According to Figure 6.9 of the HRSPA Assessment Report (2015), Study Area Sections 1, 2 and 3 are located within an area of Medium Intrinsic Groundwater Susceptibility. A highly vulnerable aquifer near Ashgrove, crosses Trafalgar Road. Vulnerable aquifers, as defined in the HRSPA Assessment Report (2015), are subsurface, geologic formations that are sources of drinking water which could, relatively easily, be impacted by the release of pollutants on the ground surface.

Best Management Practices and a suitable Soil Management Plan (for imported fill used for the road extension) will have to be applied along the entire construction alignment to minimize impacts to groundwater aquifers and surface watercourses.

The alignment of Trafalgar Road within Study Area Sections 1, 2 and 3 is not located within significant groundwater recharge areas (Figures 6.12 and 6.13 of the HRSPA Assessment Report (2015)) and as such, the construction related to the widening of Trafalgar Road is not anticipated to affect groundwater recharge.

A short stretch of Trafalgar Road, within the northeast portion of Study Area Section 3 is within the Georgetown Well Head Protection Area and the Sodium/Chloride Issue Contributing Area. The Approved Source Protection Plan: CTC Source Protection Region (2015) Report and applicable source protection policies will apply to this stretch within Study Area Section 3, and is explained in more detail below.

Trafalgar Road Study Area Section 3 and Section 4: 15 Side Road to Highway 7

The Approved Source Protection Plan: CTC Source Protection Region (2015) Report is presented in **Appendix A.** Maps 1.14, 2.14 and 3.3 from the Source Protection Report show where significant drinking water threat policies will apply in these specific Wellhead Protection Areas (WHPAs) in Georgetown. WHPAs are areas on the land surface around a municipal well

that is determined by how quickly groundwater travels to the well, measured in years. There are six well WHPA categories, namely:

WHPA – A: 100 m radius circle around the municipal well

WHPA – B: 2-year time of travel

WHPA – C: 5-year time of travel

WHPA – D: 25 year time of travel

WHPA – E: Municipal wells that are under the direct influence of surface water.

WHPA-Q: Significant Groundwater Quantity Threat Areas

Maps 1.14, 2.14 and 3.3 are summarized below, with reference to the relevant WHPA categories:

- **Map 1.14**: Georgetown – Significant Groundwater Quality Threat Areas;
    - A short stretch of Trafalgar Road within Study Area Section 3 intercepts the Georgetown Municipal Wellfield **WHPA-D**, and is within the Sodium/Chloride Issue Contributing Area (ICA).
    - Within Study Area Section 4, Trafalgar Road intercepts the Georgetown Municipal Wellfield **WHPA-B** and **WHPA-C**, south of the Black Creek Bridge crossing. The proposed CNR grade separation is outside the municipal wellhead protection areas.
    - The Trafalgar Road alignment between Princess Anne Drive and Highway 7, including the proposed Metrolinx grade separation falls within the **WHPA-B** and **WHPA-A** for the Georgetown Municipal Wellfield, with a Vulnerability score of 10. This stretch of construction will be located within an area that has a high susceptibility to surface contamination.
- **Map 2.14**: Georgetown – Significant DNAPL Threat Areas;
  The handling and storage of dense non-aqueous phase liquid (DNAPL) is prohibited or requires a risk management plan under the Clean Water Act, for all the areas identified in **Map 1.14**

- **Map 3.3**: Georgetown – Future Significant Groundwater Quantity Threat Areas;
  The entire Credit Valley Source Protection Area is classified as WHPA-Q. WHPA-Q1 refers to the area where activities that take water without returning it to the same source, may be a threat. WHPA-Q2 refers to the area where activities that reduce recharge may be a threat. The WHPA-Q1/Q2 shown on Map 3.3 identifies the moderate risk area. The northeast portion of Study Area 3 and all of Study Area 4 are within the WHPA-Q2, and policies related to groundwater recharge could apply.

The areas of aquifer vulnerability follow a westward and southern trajectory that aligns with the orientations of the Acton/Mississauga and Inglewood/Milton bedrock valleys, respectively.

The infiltration reduction potential of the proposed grade separation is considered negligible in comparison to alternative design options which do not include a grade separation.

Several design and construction aspects, such as construction period dewatering, the handling and storage of fuels and chemicals during construction, the application of road salt, the widening design of Trafalgar Road (which can lead to reduced water infiltration), storm water management, and water quality management (use of an oil/grit separator) will need to be considered where Trafalgar Road is within WHPAs and ICAs. Wellhead protection measures need to be considered into the design and construction of the proposed grade separation, as per the policy guidelines defined within the Approved Source Protection Plan: CTC Source Protection Region (2015) report. The CTC SPR (2015) issue category and applicable policy IDs are listed in **Table 2**.

Table 2: Applicable Policies and Policy IDs as defined by the Approved Source Protection Plan: CTC Source Protection Region (SPR), July 2015

CTC SPR (2015) Category	CTC SPR (2015) Policy ID	CTC SPR (2015) Policy Area Map ID (where available)
Sewage (Storm Water Management)	SWG-12	1.14
Road Salt	SAL-2, SAL-3, SAL-4, SAL-5, SAL-6, SAL-7, SAL-8, SAL-9, SAL-10, SAL-11, SAL-12, SAL-13	1.14
Storage of Snow	SNO-1	1.14
Fuel	FUEL-1, FUEL-3, FUEL-4	1.14
DNAPLs and Organic Solvents	DNAP-1, DNAP-2, DNAP-3, OS-1, OS-2, OS-3	2.14
Water Quantity	DEM-1, DEM-2, DEM-3, DEM-4, DEM-8, REC-1	3.3

The Policy IDs listed also have four associated Monitoring Policies that apply, namely MON-1, MON-2, MON-3 and MON-4; which are to be implemented by the Municipality (planning approval authority), Risk Management Official, Source Protection Authority and Provincial

Ministry, respectively. The applicability of the Policy IDs and Monitoring Policies to the project will have to be confirmed with the CTC and the applicable Implementing Body.

A Risk Management Plan (RMP) will need to be negotiated with the Risk Management Official, for construction activities occurring within the WHPAs and ICAs. Additionally, post-construction activities may require RMP(s) as well.

Work performed within the WHPA-Q will require a water balance assessment specific to the WHPA-Q. Recharge post-development needs to match pre-development, or be offset off-site within the same WHPA-Q

4.0 CONTAMINANT INVENTORY

4.1 Ecolog ERIS Database

MMM Group Limited procured a comprehensive environmental database search (Ecolog ERIS) in order to identify possible environmental concerns within a 500 m radius of the construction alignment. The Ecolog Environmental Risk Information Service (ERIS) is a national database service, which provides environmental information for properties across Canada. The database query contains Government of Ontario, Government of Canada and Environment Canada public records, and private sector records, which provide information pertaining to environmental liabilities associated with the property in question and surrounding area. The report includes site diagrams with locations of the database search results.

The Ecolog ERIS report for the Trafalgar Road Study Area, dated March 3, 2016, is provided in **Appendix B** and the Ecolog map is presented as **Figure 10-1**. The search identified five hundred and eighteen (518) records in twenty-two different database categories. A review of the Ecolog ERIS database records is summarized in **Table 3**:

Table 3: Ecolog ERIS Summary Table

Database Acronym	Database Name	Number of Records within 500 m
ANDR	Anderson's Waste Disposal Sites	1
AUWR	Automobile Wrecking & Supplies	1
CA	Certificates of Approval	14
CFOT	Commercial Fuel Oil Tanks	3
EASR	Environmental Activity and Sector Registry	1
EBR	Environmental Registry	1
ECA	Environmental Compliance Approval	3
EXP	List of TSSA Expired Facilities	27
FST	Fuel Storage Tank	13
FSTH	Fuel Storage Tank – Historic	9
GEN	O. Reg. 347 Waste Generators Summary	73
HINC	TSSA Historic Incidents	1
PES	Pesticide Register	3
PINC	TSSA Pipeline Incidents	2
PRT	Private and Retail Fuel Storage Tanks	10

Database Acronym	Database Name	Number of Records within 500 m
PTTW	Permit to Take Water	5
REC	O. Reg. 347 Waste Receivers Summary	0
RSC	Record of Site Condition	2
RST	Retail Fuel Storage Tanks	3
SCT	Scott's Manufacturing Directory	7
SPL	Ontario Spills	21
WDS	Waste Disposal Sites – MOE CA Inventory	0
WDSH	Waste Disposal Sites – MOE 1991 Historical Approval Inventory	1
WWIS	Water Well Information System	304

As shown in the table above, there were records to indicate historic spills, waste generators, fuel storage tanks, a closed waste disposal area and an auto wrecking facility, along the Trafalgar Road Study Area corridor.

Specific environmental risks within 500 m of the construction alignment include:

- Numerous recent spills at various locations along the construction alignment, especially near the urban/commercial areas and major intersections of Trafalgar Road including Steeles Avenue, 5th Side Road, 10th Side Road, 15th Side Road, 17th Side Road and Highway 7. Recent spills are summarized below:
  - 270 L of diesel fuel in July 2014 near Trafalgar Road and 5th Side Road.
  - 15 L of oil to catch basin in July 2014, north of 17th Side Road.
  - 50 L of raw sewage in May 2014, north of 17th Side Road.
  - 20 L of diesel fuel in November 2011 on Steeles Avenue.
  - Many additional spills with no record of spill volumes.
- One historic closed waste disposal site located at the intersection of Trafalgar Road and 17th Side Road.
- One automobile wrecker located at 9811 Trafalgar Road.
- The presence of gas stations, automotive centres along with former and current underground fuel storage tanks at the major intersections of Trafalgar Road and within commercial developments.
- The construction alignment crosses the Canadian National Railway and Metrolinx Railway, locations with potentially higher contamination due to historic reported and non-reported spills.

- The presence of numerous current and former waste generators, and hence the potential to encounter contaminants like PCBs, chlorinated solvents, aromatic and aliphatic solvents, heavy metals, petroleum compounds, pesticides, pharmaceuticals, fertilizers and pathological waste.

The environmental risk associated with property use at the major intersections and at commercial properties, implies that groundwater and soil contamination may be present. The locations of former and current underground storage tanks and the location of the closed waste disposal site will have to be determined. Excavations adjacent/within these properties may encounter contaminated soil and groundwater. Additionally, contamination migration flow paths may be modified during any temporary or permanent dewatering activities

A groundwater management plan may need to be developed for disposal and/or treatment of dewatering discharge during construction dewatering**.** A soil management plan may have to be developed to manage the soil during construction, especially within WHPAs.

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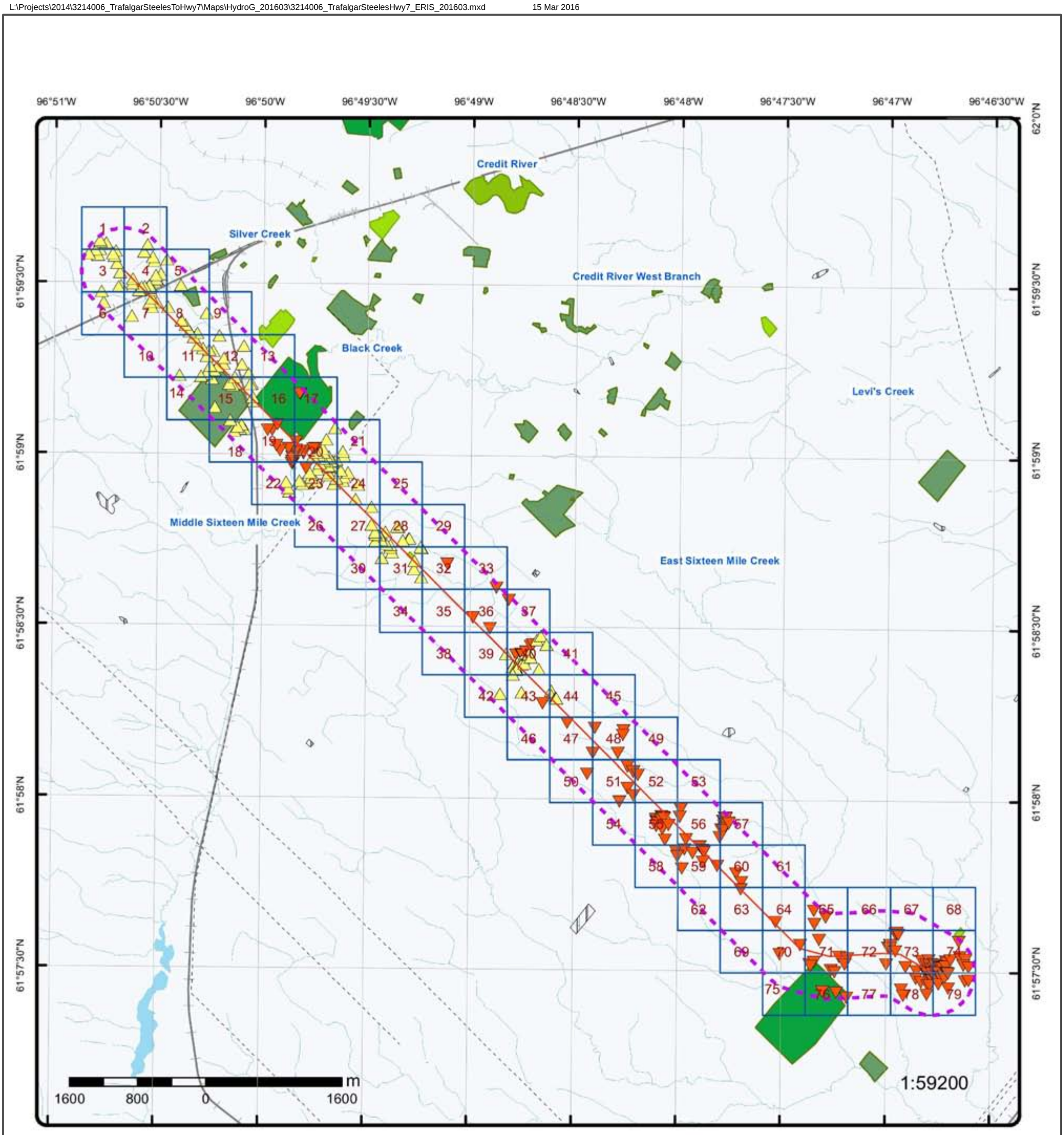

Map

Order No: 20160225127

Address: Trafalgar Rd 7 Hwy, Halton Hills, ON, L0P1E0

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Industrial and Resource - Regions
- Main Line
- Sidetrack
- Transit Line
- Abandoned Line
- National Park
- Provincial or Territorial Park
- Other Park
- Golf Course or Driving Range
- Park or Sports Field
- Other Recreation Area

Source: © 2014 DMTI Spatial Inc.

WSP MMM GROUP

TRAFALGAR ROAD
Ecolog ERIS Study Area

SCALE
AS SHOWN

Date: March 2016
Project No: 3214006
Figure No: 10-1

5.0 GROUNDWATER CONTROL DURING CONSTRUCTION

Information presented in this section is subject to change, until engineering design is finalized. The information presented in this Hydrogeological Assessment should be incorporated in the review of the design stages, and the subsequent Permit to Take Water (PTTW) application.

It is anticipated that groundwater may be encountered during the construction of the two grade separations, the bridge re-construction across Black Creek and for the footings of any structural culverts.

The widening of Trafalgar Road includes raising the grade for most of the alignment and in the proximity of Black Creek crossing, which will minimize any groundwater interactions. The widening/re-construction of the culverts may encounter groundwater that will have to be dewatered, during the construction of the structural culvert footings

Sheet-piled cofferdams can be used as a form of groundwater control for the construction of the footings for the Black Creek Bridge. The depth of sheet-pile penetration required within the Halton Tilll may vary between locations. Pumping inside the cofferdams will be required to maintain a dry excavation for construction.

The proposed CNR and Metrolinx grade separations may require dewatering, especially if the sand and gravel units of the buried bedrock valley aquifer are encountered. The depth to the groundwater table during wellfield pumping and non-pumping conditions will have to be confirmed to determine the need for temporary dewatering, and whether permanent dewatering is required in the distant future, should there be a change in the pumping conditions of the wellfields in the immediate area. Opportunities for minor adjustment at the grade separations should be explored during detailed design where feasible, (e.g. minor profile adjustment or consideration of different structure types) to allow greater separation between the road elevation and the natural groundwater table.

Dewatering may also be required to remove ponded rainwater which may be collected in the isolated work areas following storm events. A Permit to Take Water (PTTW) will likely be required for undertaking these operations.

6.0 ASSESSMENT OF POTENTIAL GROUNDWATER IMPACTS

Based on the background information, MMM Group identified areas of potential concern to existing groundwater conditions that may be associated with the construction activities. Potential impacts resulting from this project are discussed in detail below.

6.1 Metrolinx Grade Separation

Based on the December 2, 2015 Public Information Centre #3 Plans and Profiles, the sub-drain below the base of the proposed Metrolinx grade separation is anticipated to be at an elevation of 271.6 masl. **Figure 6-2** shows the static groundwater elevations under pumping conditions at Lindsay Court Well 9 (LC9). The static groundwater elevation in the area of the proposed grade separation is approximately 270 masl, under current pumping conditions at LC9. Based on this information, the base of the grade separation is above the current groundwater level.

As per **Figure 6-2**, the Halton Till thins out further north of the proposed grade separation. The actual thickness of the Halton Till and the depth to the groundwater table within the vicinity of the proposed grade separation will have to be determined during a geotechnical investigation. The depth to the groundwater table will determine the type of road base and groundwater control system that may be required.

LC9 is currently permitted for a sustained water taking of 6,545 m^3/day. Halton Region is proposing to increase the daily water taking in two stages for future planned growth, first to a rate of 7,500 m^3/day and then to 10,000 m^3/day (Dillon, 2009). The Environmental Assessment is currently being undertaken by AECOM. The proposed increase in the water taking would lower the groundwater table, by providing a 'permanent' local dewatering system. However, higher pumping rates at LC9 may extend the pumping zone of influence, which could have implications for geotechnical settlement. A qualified geotechnical engineer will have to evaluate the risk of settlement of the grade separation infrastructure under higher pumping rates.

Non-pumping conditions at LC9 can arise due to a number of scenarios. For example, temporary interruption caused by mechanical and electrical issues like pump-failures and power losses, or longer term effects such as future changes to Halton Region's long-term growth plans and policies, when LC9 may be shuttered.

The effect of temporary issues like pump failure/power loss to LC9 and permanent issues like discontinued use, and the subsequent rise in groundwater elevations must be considered. There is a requirement that there be a permanent stormwater outlet at the grade separation, to preclude flooding under existing conditions, and if LC9 is turned off. Permanent groundwater gravity underdrain systems will be required as a mitigation measure.

The future desire and/or need for a Lake Ontario based water supply may render the current wellfields redundant. If pumping ceases at the municipal wellfields, groundwater will rise and may reach pre-municipal pumping static groundwater levels. This has implications for geotechnical stability and increases the risk of flooding. Geotechnical settlement/stability monitoring of the grade separation may have to be performed by a qualified geotechnical engineer, on an on-going basis.

The proposed grade separation will encroach into the WHPA-A zone for LC9, which is a zone of high susceptibility to groundwater contamination. The impacts of potential surface spills and road salt application will have to be mitigated through the road design, especially if the grade separation intercepts the sand and gravel aquifer.

Coordination needs to take place with the Halton Region Risk Management Office, to incorporate supplemental wellhead protection measures and wellfield operational protocols into the design and construction of the grade separation.

A suitable **drinking water** monitoring plan will involve the establishment of pre-construction baseline groundwater quantity and quality details at private wells (during a door to door survey), and municipal wells. Monitoring of groundwater levels and water quality will be performed at the municipal and domestic wells during the construction period. The data will be analyzed to determine if any adverse trends regarding groundwater level and quality are observed.

If adverse trends are observed, a suitable **drinking water** mitigation plan will be carried out that involves notification (private well owner, Halton Region Water Services, Halton Region Health Unit, MOECC, etc.), identifying the source/cause of the well issue, providing temporary water supplies to impacted well owners, and providing a solution to the impacted private well owner (e.g. drilling a new well, providing municipal servicing, etc.). Any municipal well specific mitigation measures required by the Halton Region Risk Management Office will be carried out promptly and will be documented.

Field monitoring investigations will need to be performed to confirm the hydraulic connectivity between groundwater and the ephemeral stream that crosses Trafalgar Road, south of the Metrolinx railroad. As mentioned earlier, a permanent outlet is recommended at the grade separation. The impacts on the hydrology and geomorphology of the stream that receives discharge will have to be evaluated by a qualified hydrologist and geomorphologist, respectively.

During the construction of the grade separation, a PTTW from the MOECC for surface water and/or groundwater diversions will be required, based on the information available.

6.2 CNR Grade Separation

Based on the December 2, 2015 Public Information Centre #3 Plans and Profiles, the sub-drain below the base of the proposed CNR grade separation will be at an elevation of 257.6 masl. The Princess Anne Wells are located approximately 900 m north-northeast of the proposed CNR grade separation. **Figure 7-2** is a hydrogeological cross section along a Northwest-Southeast alignment, through the Princess Anne wells (Genivar, 2012). The inferred static groundwater elevation under current pumping conditions (at the Princess Anne Wellfield) is approximately 254 masl. Based on this, the proposed grade separation will not encounter the groundwater table of the bedrock valley aquifer. The grade separation is also not located within the well head protection area of the Princess Anne wellfield, which has a drawdown cone that extends to approximately 100 m.

During the geotechnical investigation, the thickness of the Halton Till and the depth to the water table must be well characterized, to assist with the design of the grade separation. If the groundwater level is near the base of the proposed grade separation, a permanent groundwater gravity underdrain system may be required. A temporary construction period PTTW may be required.

A suitable **drinking water** monitoring plan will involve the establishment of pre-construction baseline groundwater quantity and quality details at private wells (during a door to door survey). Continuous monitoring of groundwater levels and water quality will be performed domestic wells during the construction period. The data will be analyzed to determine if any negative trends regarding groundwater level and quality are observed.

If adverse trends are observed, a suitable **drinking water** mitigation plan will be carried out that involves notification (private well owner, Halton Region Water Services, Halton Region Health Unit, MOECC, etc.), identifying the source/cause of the well issue, providing temporary water supplies to impacted well owners, and providing a solution to the issue (e.g. drilling a new well, providing municipal servicing, etc.).

The construction dewatering for the CNR grade separation is not anticipated to interfere with the Princess Anne Wellfield. However, the groundwater levels and quality will need to be monitored, during the CNR grade separation construction

Field monitoring investigations will have to be performed to confirm the hydraulic connectivity between groundwater and the surface watercourse that crosses Trafalgar Road, south of the CNR railroad. A permanent stormwater outlet is required at the grade separation. The impacts on the hydrology and geomorphology of the stream that receives discharge will have to be evaluated by a qualified hydrologist and geomorphologist, respectively. Erosion and sediment

control best practices will be applied during construction, to prevent sediment-laden runoff from entering the water course.

6.3 Surface Water Crossings at the Proposed Grade Separations

An ephemeral stream crosses Trafalgar Road, via a culvert crossing just south of the existing Metrolinx rail tracks. A stream also crosses Trafalgar Road north of the proposed CNR grade separation, via a culvert crossing. These streams are identified as cold water watercourses (**Figure 2-1**) and are potentially groundwater fed. Field monitoring investigations will have to be performed to confirm the hydraulic connectivity between the surface watercourses and the shallow aquifer (sand/gravel units within Halton Till) and the buried bedrock valley aquifer. The grade separations could intercept groundwater flow, and potentially affect these streams. The maintenance of these streams during construction will have to be considered in the design. A PTTW from the MOECC for surface water and/or groundwater diversions may be required.

Permanent outlets are recommended at the two grade separations. The impacts on the hydrology and geomorphology of the stream that receives discharge will have to be evaluated by a qualified hydrologist and geomorphologist, respectively. Erosion and sediment control best practices will be applied during construction, to prevent sediment-laden runoff from entering the water course.

6.4 Black Creek Bridge and Structural Culverts

The construction of footings for the Black Creek bridge abutments and structural culverts will occur within the shallow depths of Halton Till. These cool and/or cold watercourses may be groundwater fed, so the hydraulic connectivity of the surface water to the shallow aquifer and the buried bedrock valley aquifer will have to be confirmed. The construction of the footings could intercept groundwater flow, and potentially affect these streams. Field monitoring investigations will have to be performed to confirm the hydraulic connectivity between ground water and the surface watercourses. The maintenance of these watercourses during construction will have to be considered in the design. A PTTW from the MOECC for surface water and/or groundwater diversions will likely be required. Erosion and sediment control best practices will be applied during construction, to prevent sediment-laden runoff from entering the water course.

6.5 Wetlands

The hydraulic connectivity of the groundwater, surface watercourses and wetlands located within the Study Area will need to be evaluated. The wetland hydrology and ecosystem health will have to be maintained during the entire construction duration. Field monitoring

investigations will have to be performed to confirm the hydraulic connectivity between ground water, surface watercourses and wetlands. The maintenance of these wetlands during construction will have to be considered in the design. Erosion and sediment control best practices will be applied during construction, to prevent sediment-laden runoff from entering watercourses and wetlands.

6.6 Road Construction Potential Water Well Impacts

Road construction activities have the potential to adversely impact the shallow aquifer through disturbing contaminated soils, or handling and management practices (e.g. spills of fuel, lubricants etc.), thus introducing contaminants that could enter the groundwater system and impact nearby water wells. Construction activities also have the potential to physically impact water wells due to vibration and shock.

Groundwater will have to be pumped out of construction excavations, which may lower the water table temporarily, potentially reducing the water supply to any local well. Wells that are completed within the sand/gravel lenses interbedded within Halton Till could be impacted if the construction excavation intercepts these lenses. Wells that are completed within shallow depths (very close to the water table) of the buried bedrock valley aquifer could be impacted by temporary and/or permanent dewatering, which may be necessary for the grade separations. Deeper wells are not expected to be impacted due to the high transmissivity of the buried bedrock valley aquifer.

A door to door well survey will have to be carried out within the Trafalgar Road Study Area during detailed design, to confirm existing well users and other PTTWs, and to establish a groundwater level monitoring network. Regular groundwater level measurements will have to be recorded at specific well locations, to monitor the effects of construction dewatering on private and municipal wells. Pre-construction groundwater samples will be collected to identify ‘background’ groundwater quality.

Regular monitoring of groundwater levels and water quality will need to be performed at select domestic wells during the construction period. The data will be analyzed to determine if any adverse trends regarding groundwater level and quality are observed. If adverse trends are observed, a suitable mitigation plan will be carried out that involves notification (private well owner, Halton Region Water Services, Halton Region Health Unit, MOECC, etc.), identifying the source/cause of the well issue, providing temporary water supplies to impacted well owners and providing a solution to the issue (e.g. drilling a new well, providing municipal servicing, etc.).

6.7 Release of Contaminants

During any phase of the road construction activities, due care should be exercised to avoid fuel, lubricant and fluid spills. Spill and contamination prevention practices should be implemented to avoid potential environmental hazards and cleanups. Where practical, activities such as refueling should not be undertaken in areas with high susceptibility to surface and groundwater contamination. Some of the construction may intercept properties with soil and/or groundwater contamination..

A groundwater management plan may need to be developed for disposal and/or treatment of dewatering discharge during construction dewatering**.** A soil management plan may have to be developed to manage the soil during construction, especially within WHPAs.

A Risk Management Plan for construction within the WHPAs will require risk management measures to minimize or mitigate the potential for spills within the WHPAs.

7.0 RECOMMENDATIONS

This section discusses measures recommended to be implemented to protect groundwater and surface water resources within the Study Area during construction stage of the project.

- The Ontario Water Resources Act states that the diversion of surface water or the extraction of groundwater in excess of 50,000 L/day requires a Permit to Take Water (PTTW) to be obtained from the MOECC. A Category 3 PTTW is expected to be required for this project for the construction of the grade separations, Black Creek Bridge and structural culverts. The dewatering of excavations shall be conducted to ensure that all discharges meet the Provincial Water Quality Objectives and comply with the Ontario Water Resources Act thresholds for water quality.
- A monitoring and mitigation plan will have to be developed with Halton Region Water Services to mitigate against potential construction period issues and/or operational constraints that relate to the Lindsay Court Wells.
- The works are located within WHPAs for quality and quantity for Georgetown municipal wells. In addition to a monitoring and mitigation plan, risk management plans will have to be developed with the Halton Region Risk Management Office to mitigate or eliminate groundwater threat activities both during construction and possibly post-construction.
- The findings from the ongoing Lindsay Court Wellfield Expansion EA (AECOM) will have to be incorporated with the findings from the Trafalgar Road EA during the design phase.
- The water takings related to active PTTWs will need to be evaluated and considered as part of any construction period dewatering in support of the Trafalgar Road grade separation work.
- A door to door well survey of the Study Area will have to be performed. Groundwater monitoring points will have to be established near the municipal wells fields and near the proposed grade separations, to monitor the effects of construction on the municipal and domestic water wells. Documentation of other permitted water takings will need to be evaluated and the effects considered as part of this door to door survey.
- A suitable drinking water monitoring plan will need to be established, involving pre-construction baseline groundwater quantity and quality details at private wells and municipal wells. Monitoring of groundwater levels and water quality will be performed at the municipal and domestic wells during the construction period. The data will be analyzed to determine if any adverse trends regarding groundwater level and quality are observed.
- Construction related impacts to domestic wells will be mitigated by notification (private well owner, Halton Region Water Services, Halton Region Health Unit, MOECC, etc.), identifying

the source/cause of the well issue, providing temporary water supplies to impacted well owners, and providing a solution to the well issue (e.g. drilling a new well, providing municipal water servicing, etc.)

- The potential for soil and groundwater contamination near major intersections and adjacent to commercial properties should be evaluated. A groundwater management plan may need to be developed for disposal and/or treatment of dewatering discharge during construction dewatering. A soil management plan may have to be developed to manage the soil during construction, especially within WHPAs.
- Contamination migration flow paths may potentially be modified during groundwater pumping in the shallow aquifer. Dewatering discharge may need to be managed and/or treated during construction dewatering**.**
- During construction, the quality of surface water and groundwater in the Study Area needs to be protected from loading of suspended solids into watercourses, potential fuel leaks or falling construction debris caused from construction activities. Protection may be achieved through implementation of best management practices and the development of robust erosion and sediment control plans and monitoring and mitigation programs.
- A Risk Management Plan (RMP) will need to be negotiated with the Risk Management Official, for construction activities occurring within the WHPAs and ICAs. Additionally, post-construction activities may require RMP(s) as well.
- Work performed within the WHPA-Q will require a water balance assessment specific to the WHPA-Q. Recharge post-development needs to match pre-development, or be offset off-site within the same WHPA-Q.
- There is a requirement that there be permanent stormwater outlets at both grade separations (CNR and Metrolinx), to preclude precipitation event flooding. This is especially important at the Metrolinx grade separation, as static groundwater levels reflect LC9 pumping conditions. If LC9 is turned off, the groundwater level may rise to approximately 270 masl, which is just below the proposed grade separation sub-drain.
- The impacts on the hydrology and geomorphology of the surface watercourses that receives discharge from the permanent stormwater outlets at the grade separations will have to be evaluated by a qualified hydrologist and geomorphologist, respectively.
- The hydraulic connectivity between groundwater, surface watercourses and wetlands that are within the Trafalgar Road Study Area will have to be determined during field investigations, to identify the effects of the road construction and dewatering on these sensitive features.

- The depth to the groundwater table during wellfield pumping and non-pumping conditions will have to be confirmed to determine the need for temporary dewatering, and whether permanent dewatering is required in the distant future, should there be a change in the pumping conditions of the wellfields in the immediate area. Opportunities for minor adjustment at the grade separations should be explored during detailed design where feasible (e.g. minor profile adjustment or consideration of different structure types), to allow greater separation between the road elevation and the natural groundwater table.
- WHPA Policy and Monitoring Frameworks as identified in Section 3.5 needs to be considered in the design and construction of the project within WHPAs.
- The construction and/or decommissioning of wells should be carried out by a qualified and licensed well contractor, in accordance with Ontario Regulation 903, under the Ontario Water Resources Act, 1990, which governs well construction, maintenance and decommissioning.

8.0 STANDARD LIMITATIONS

Standard conditions and limitations are presented in **Appendix C** as they apply to this report.

Respectfully submitted

MMM Group Limited

Peter Hayes, P. Geo.

Lionel Sequeira, M. Sc.

9.0 REFERENCES

AECOM, June 2010, Public Information Centre for Lindsay Court Well Field Expansion in the Commmunity of Georgetown – Municipal Class Environmental Assessment Study

Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario. Ontario Geological Survey Special Volume 2, 270p..

CTC Source Protection Region, December 2014; Amended Proposed Source Protection Plan:

CTC, July 2015; Approved Source Protection Plan: CTC Source Protection Region

CVC, September 2001, Silver Creek Subwatershed Study Background Report

CVC, February 2009; Black Creek Subwatershed Study – Subwatershed 10 Background Report

CVC, July 2015, Appendix C3: Tier 3 Water Budget and Local Risk Assessment – Acton and Georgetown

CVSPA, 2015; Approved Updated Assessment Report, Credit Valley Source Protection Area

Dillon Consulting, December 2009; Cedarvale Well Field Expansion Class EA Study, Project File Report.

Ecolog ERIS Database Report, March 3, 2016

Genivar, April 2012; Construction, Development and Testing – Lindsay Court Standby Well LC 9B, Community of Georgetown.

Genivar, September 2012; Construction, Development and Testing of the Princess Anne Standby Well PA 6B.

Halton Region, July 2015; Source Protection Area Assessment Report.

Halton Region, February 2016; The 2015 Annual Drinking Water Quality Report: Georgetown Drinking Water System

Holysh, S., February 1995. Halton Aquifer Management Plan, Phase 1 Report, Background Hydrogeology. Prepared for the Regional Municipality of Halton.

Holysh, S., April 1997. Halton Aquifer Management Plan, Phase 2 Report, Municipal Wellhead Protection Program Technical Study.

Ontario Ministry of Environment and Climate Change, 2015. Maps: Permits to take water. URL: https://www.ontario.ca/environment-and-energy/map-permits-take-water

Ontario Ministry of Environment and Climate Change, 2015. Maps: Well records. URL: https://www.ontario.ca/environment-and-energy/map-well-records

APPENDIX A – Approved Source Protection Plan: CTC Source Protection Region (2015)

DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

CTC Source Protection Region

Credit Valley Source Protection Area

Toronto and Region Source Protection Area

Central Lake Ontario Source Protection Area

Approved Source Protection Plan: CTC Source Protection Region

Prepared by:
CTC Source Protection Region

Ontario

Made possible through funding support from the Government of Ontario

Approved July 28, 2015
Effective Dec. 31, 2015

CTC Source Protection Region

Credit Valley Source Protection Area

Toronto and Region Source Protection Area

Central Lake Ontario Source Protection Area

Approved Source Protection Plan: CTC Source Protection Region

July 28, 2015
Plan comes into effect December 31, 2015

Property of
CTC Source Protection Committee

Prepared by
CTC Source Protection Region

PREFACE

This document was prepared by staff at the CTC (Credit Valley-Toronto and Region-Central Lake Ontario) Source Protection Region. The policies have been developed by the Source Protection Committee (SPC). This Source Protection Plan was submitted jointly by the respective Source Protection Authorities (SPAs) to the Minister of Environment and Climate Change and has received approval.

The objective of this document is to provide the approved policies that the CTC SPC has developed, which when implemented, are to protect existing and future municipal drinking water sources.

The policies contained within this document are approved. If you have any questions about this document or the CTC Source Protection Region, please contact the source protection staff at

(416) 661.6600 ext. 5752, sourcewater@trca.on.ca, or go to www.ctcswp.ca for more information.

Note to readers: In June 2014 the Ministry of the Environment (MOE) was renamed the Ministry of the Environment and Climate Change (MOECC). Where the document references MOE, it indicates activities/ milestones which occurred before the name change.

Approved: July 28, 2015

Effective: December 31, 2015

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1 WHAT IS SOURCE WATER PROTECTION?

In order to understand what a Source (water) Protection Plan is, one must first understand the basic term upon which it is derived. Source water is any untreated water found in rivers, lakes and underground aquifers which is used for the supply of raw water for municipal drinking water systems. Source water protection is the action taken to protect that raw source of municipal drinking water from overuse and contamination.

1.1 WHAT IS A SOURCE PROTECTION PLAN?

A Source Protection Plan (SPP) is a strategy and suite of policies developed by residents, businesses and the municipalities within a watershed or series of watersheds, which outlines how water quality and quantity for municipal drinking water systems will be protected.

A Source Protection Plan sets out policies to:

- safeguard human health;
- ensure adequate safe, clean water is available; and
- protect current and future sources of municipal drinking water from significant threats.

A watershed is the area of land where all of the water that drains off of it goes into the same body of water (i.e., lake, ocean). Its boundaries are defined by ridges of high land.

The SPP is based on a foundation of scientific knowledge.

But there is more than science to the SPP. It is, in large part about land use and the impact of that land use on drinking water quality and quantity.

The chapters that follow provide a more detailed history around source protection planning in Ontario, information about the Credit Valley-Toronto and Region-Central Lake Ontario (CTC) Source Protection Region, and the policy development process. Chapter 10 of this document outlines the proposed policies developed to protect municipal drinking water supplies.

1.2 WALKERTON, THE CATALYST FOR SOURCE WATER PROTECTION IN ONTARIO

In May 2000, heavy rains washed *Escherichia coli* (*E. coli*) bacteria into a well that provided water to the municipal water system in the small town of Walkerton, Ontario. A series of human and mechanical failures allowed the bacteria to get through the treatment system and into the municipal water supply. As a result, seven people died and more than 2,300 became ill. The tragedy received international

attention and instigated a public inquiry, led by Justice Dennis O'Connor of the Supreme Court of Ontario. Justice O'Connor's investigation resulted in two reports, with 121 total recommendations, released in early 2002.

> *The best way to achieve a healthy public water supply is to put in place multiple barriers that keep water contaminants from reaching people.*
>
> *- Justice Dennis O'Connor*

He identified five parts to the multi-barrier system:

1 source water protection
2 adequate treatment
3 a secure distribution system
4 proper monitoring and warning systems
5 strategic responses to adverse conditions

With the exception of source water protection, four of the five barriers relate directly to 'end of pipe' municipal water treatment systems. The government's response to put in place these four barriers was by implementing new legislation: the *Safe Drinking Water Act, 2002* and the *Sustainable Water and Sewage Systems Act*, *2002*.

Justice O'Connor felt that the first barrier in the multi-barrier system, source protection, had to be addressed differently. He saw it as a local planning process to be done "as much as possible at a local (watershed) level by those who will be most directly affected (municipalities and other affected local groups)."

Justice O'Connor felt that the first barrier in the multi-barrier system, source water protection, had to be addressed differently. He saw it as a local planning process to be done, "as much as possible at a local (watershed) level by those who will be most directly affected (municipalities and other affected local groups)." He outlined a broad framework for a Source Protection Plan. Justice O'Connor recommended protecting municipal water supplies on a watershed basis, an area of land where all surface water drains into the same lake or river. Groundwater and surface water systems are linked and activities upstream can affect water downstream, regardless of political boundaries. Thus, developing a SPP on a watershed basis made economic and scientific sense. This recommendation led the Province of Ontario to embark on the development of the *Clean Water Act, 2006.*

1.3 THE CLEAN WATER ACT

The *Clean Water Act, 2006* (*CWA*) introduced a new level of protection for Ontario's drinking water resources that focuses on protecting water before it enters the municipal drinking water treatment system. The *CWA* established a locally driven, science-based, multi-stakeholder process to protect municipal residential drinking water sources and designated private drinking water sources. This process is meant to promote the shared responsibility of all stakeholders to protect local sources of drinking water from threats to both water quantity and water quality.

The *Clean Water Act, 2006* is not designed to protect all of the province's water resources. The *CWA* has a more narrow focus – sources of water that have been designated by a municipality as being a current or future source of residential municipal drinking water for the community. The *Ontario Water Resources Act*, *1990* and the *Environmental Protection Act, 1990* and other provincial and federal laws remain the chief vehicles for protecting the quality and quantity of Ontario's water resources; the *CWA* and the source protection planning process it establishes, provides additional protection to select sources of water.

> The *Clean Water Act*, *2006* has a more narrow focus than other rules governing water resources. This legislation is dedicated to sources of water that have been designated by a municipality as being a current or future source of residential municipal drinking water.

Prior to the Walkerton tragedy, the Province focused on protecting water resources on the basis of the resources' ecological and recreational values, not on the basis of the critical public health goal of maintaining secure water supplies for public consumption. The *CWA* puts the goal of public health protection and preserving present and future sources of drinking water front and centre.

1.4 PRIVATE DRINKING WATER SYSTEMS

Maintaining safe and secure private drinking water systems is the responsibility of homeowners, institutions and businesses that own their water systems and are regulated separately under the *Safe Drinking Water Act, 2002* and the *Health Protection and Promotion Act, 1990*. Private drinking water systems can be included in a SPP if a municipality expressly designates a private system, for example, if there is a known concern with a private drinking water source. The Minister of the Environment and

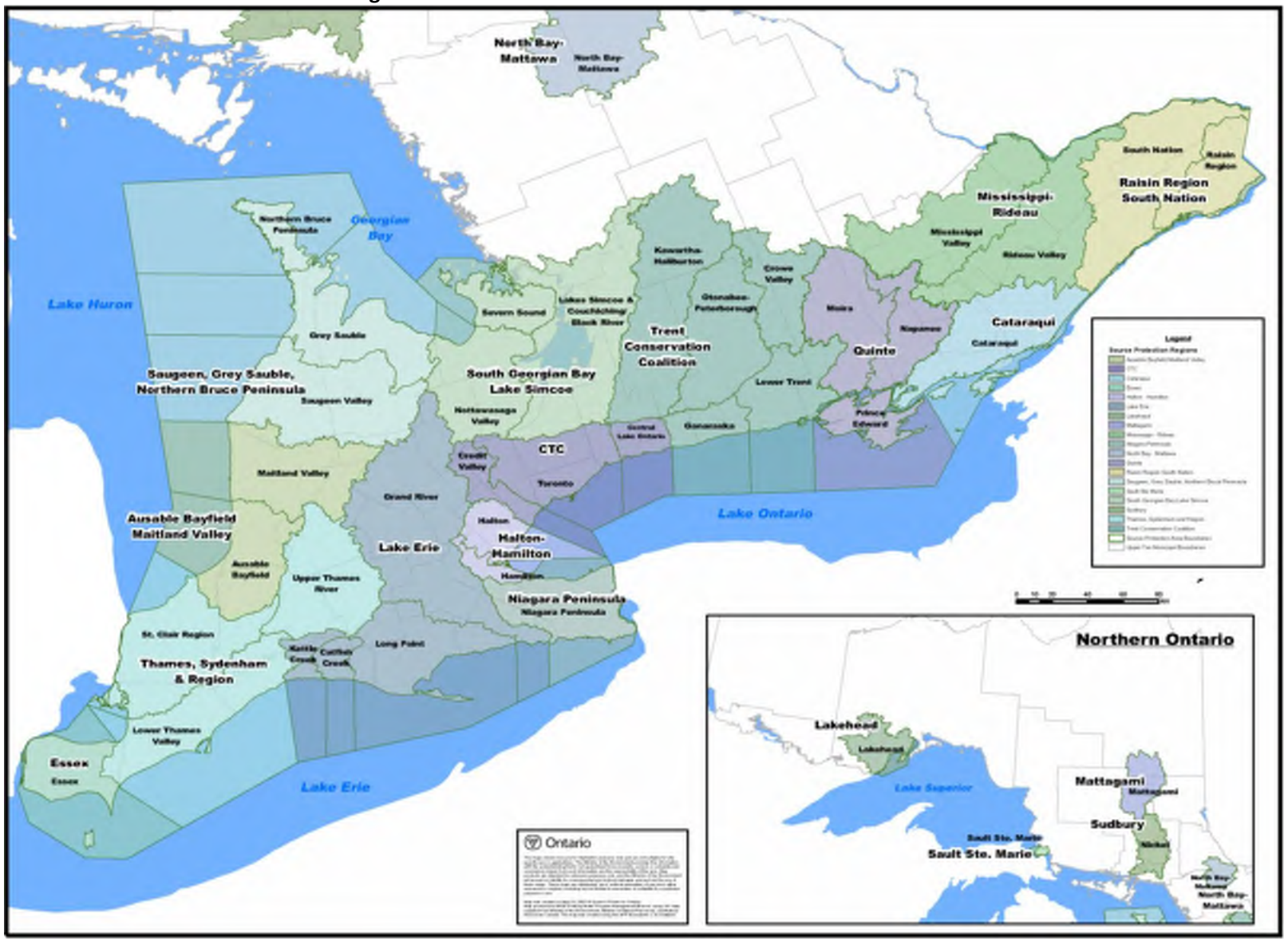
Climate Change also has the authority to designate a private drinking water system for inclusion into a SPP. During this round of source protection planning, the only designated system added in the CTC Source Protection Region is owned and operated by the Region of Durham serving an industrial park in the Township of Uxbridge.

2 SOURCE PROTECTION REGIONS IN ONTARIO

With the *Clean Water Act, 2006* and its first regulations coming into force in 2006, Source Protection Areas, Source Protection Regions (SPR) and the 19 corresponding Source Protection Committees (SPC) were established. Source Protection Regions were initially established using the existing Conservation Authority boundaries as outlined under the *Conservation Authorities Act*, *1990.* Ontario Regulation 284/07 made under the *CWA*, alters the boundaries of each of these Source Protection Areas so that they better encompass watersheds. The *CWA* allows for one SPC for each SPR. It is the members of the SPCs who are ultimately responsible for preparing local SPPs – plans which establish local policies on how significant drinking water threats will be prevented, reduced or eliminated, who is responsible for taking action, when action must be taken and how progress will be measured. **Figure 2-1** shows the 19 SPRs in Ontario.

It is the source protection committees who are ultimately responsible for preparing local source protection plans.

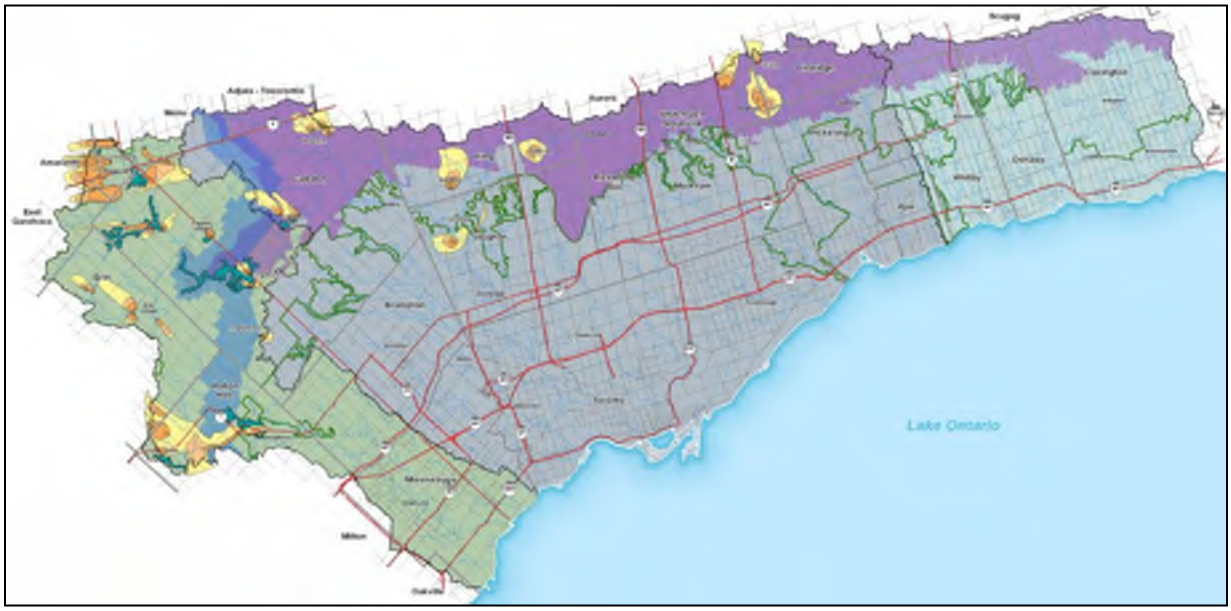
Figure 2-1: Source Protection Areas and Regions in Ontario



2.1 CTC SOURCE PROTECTION REGION

The CTC Source Protection Region **(Figure 2-2)** contains 25 large and small watersheds and spans over 10,000 km^2, from the Oak Ridges Moraine in the north to Lake Ontario in the south. The region contains portions of the Niagara Escarpment, Oak Ridges Moraine, Greenbelt, Lake Ontario and the most densely populated region of Canada.

Figure 2-2: Map of CTC Source Protection Region



The CTC Source Protection Region includes:

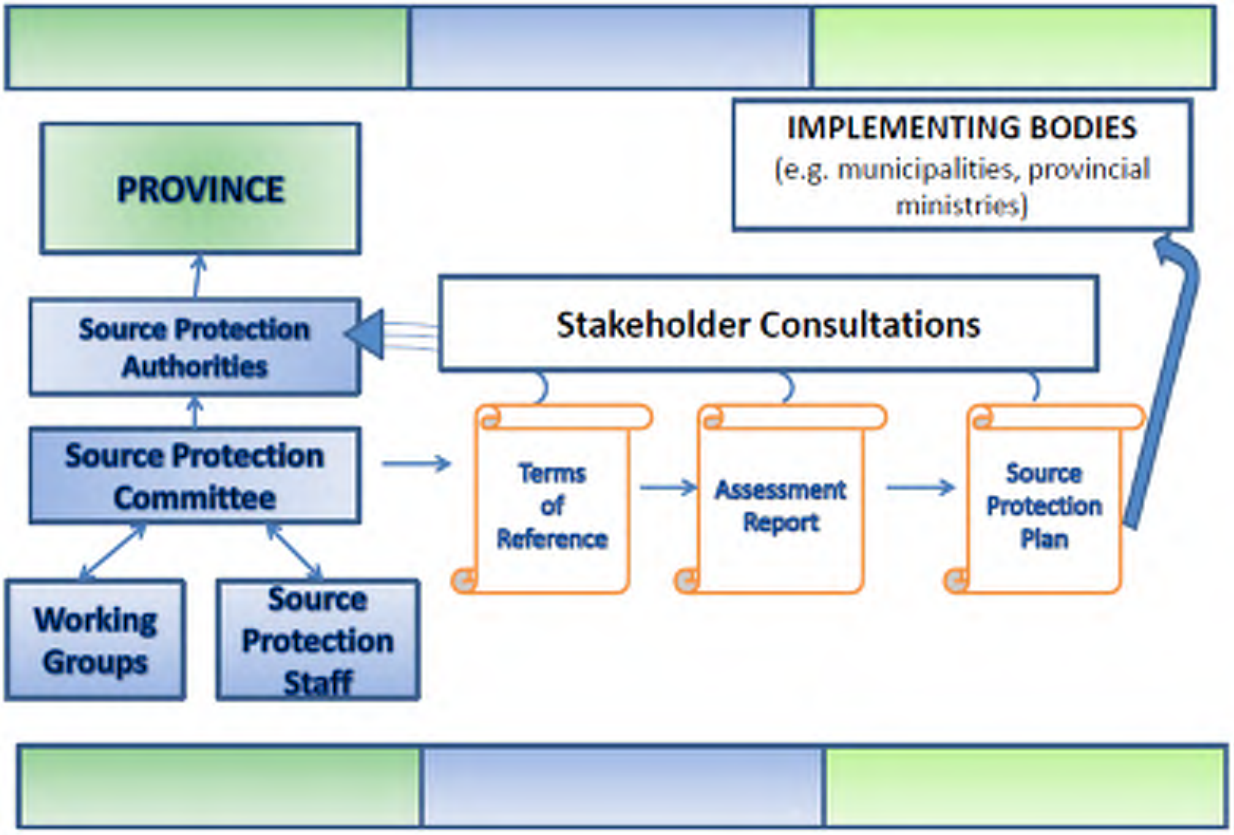
- 25 local municipalities and eight single tier, regional or county municipalities;
- 66 municipal supply wells; and
- 16 municipal surface water intakes on Lake Ontario.

The region is complex and diverse in terms of geology, physiology, population, and development pressures, with many, often conflicting, water uses including drinking water supply, recreation, irrigation, agriculture, commercial and industrial uses, as well as ecosystem needs. This diverse setting represents a significant challenge for the development of the SPP because of the variability of available information upon which to base the technical work, the differing stresses on water resources related to development pressure and population growth, and the differences in the nature, density and locations of threats to the quality and quantity of water resources.

3 ROLES AND RESPONSIBILITIES

Figure 3-1 provides an illustration of the relationship between the various groups in the source protection planning process. Each groups' role and support was critical to developing the SPP.

Figure 3-1: Roles and Responsibilities



3.1 PROVINCE: MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE (MOECC)

The Province sets the rules (largely through the *Clean Water Act, 2006*), provides ongoing guidance, approves the documents produced by the SPC (Terms of Reference, Assessment Reports and Source Protection Plans) and is responsible for implementation of significant threat policies associated with prescribed provincial approvals or permits of provincially regulated facilities and activities.

3.2 SOURCE PROTECTION AUTHORITY (SPA)

The Source Protection Authority is a new body created under the *Clean Water Act, 2006*. The SPAs are made-up of the members of the boards of existing conservation authorities. Initially, it had the

important role of laying the groundwork for the new source protection process in each source protection area. This included creating the SPCs and engaging municipalities in that process.
In the CTC SPR, there are three Source Protection Authorities:

- Credit Valley
- Toronto and Region (lead SPA)
- Central Lake Ontario

The SPAs role has changed over time. Once the SPC was created, the SPAs role focused on supporting the SPC in its duties. Once the SPP is approved, the SPA will continue to have a role in monitoring and reporting on progress in implementing the SPP.

3.3 SOURCE PROTECTION COMMITTEE (SPC)

In addition to the SPA, the *Clean Water Act, 2006* created a second watershed-level body, the Source Protection Committee. The SPC is the primary driver of the process at the watershed level. The *Clean Water Act, 2006* and associated regulation establishes one SPC for each SPR and sets the size of the SPC. The lead SPA appoints the members of the SPC. The chair of the SPC, however, is appointed by the Minister of Environment. The SPC is made up of a mix of local citizens, who live or work in the watershed, and who applied for that role and were selected by the SPA based on a competitive process. Each municipal member of the SPC was selected by the group municipal councils represented by the member and endorsed by council resolutions. The number of committee members varies by region. In the CTC SPR, there are 21 committee members, plus the chair **(Table 3-1)**. Of the 21 members, one third represent the economic sector, one third represent the municipal sector, and one third represent the general public (includes environmental group representation). The SPC is responsible for preparing the Terms of Reference, the Assessment Reports and the Source Protection Plan. The SPC is also responsible for ensuring that stakeholders and the public are consulted throughout the process.

Table 3-1: SPC Membership

Chair: Susan Self		
Economic	**Municipal**	**Public**
Andrea Bourrie Aggregate	**Bob Burnside** Dufferin County	**Julie Abouchar** Public at large
Doug Brown Energy	**Michael D'Andrea** City of Toronto	**Michael Garrett** Public at large
Wendy Burgess Golf Course	**David Kentner** Region of Halton and County of Wellington	**Jessica Ginsburg** Environmental
Louise Foster Development	**Laura McDowell/Don Goodyear** Region of York	**Bob Goodings** Public at large
Heather Laidlaw Agriculture	**John Presta** Region of Durham	**Irv Harrell** Public at large
Peter Miasek Petroleum Products	**Mark Schiller** Region of Peel	**Peter Orphanos (deceased)** Environmental
Lynne Moore Agriculture	**Howard Shapiro** City of Toronto	**Fred Ruf** Public at large

3.4 CONSERVATION AUTHORITY

Through agreement with the SPA, the Conservation Authority provides staff and other expertise. With their experience in watershed-based work and an understanding of local stakeholders, they are able to facilitate cooperation among communities and stakeholders and help prepare the Terms of Reference, Assessment Reports and Source Protection Plan, under the guidance of the SPC.

In the CTC SPR, the Conservation Authority partners are:

- Credit Valley Conservation Authority
- Toronto and Region Conservation Authority (lead)
- Central Lake Ontario Conservation Authority

3.5 MUNICIPALITY

Municipalities are a key partner in the source protection process and work closely with the SPC and SPAs. Municipalities have a primary role of implementing the SPP once it's in place. The municipalities in the CTC Source Protection Region are outlined in **Table 3-2.**

Table 3-2: Municipalities in the CTC Source Protection Region

Dufferin County	**Peel Region**	**York Region**	**Durham Region**
Town of Mono	City of Brampton	Town of Whitchurch-Stouffville	Municipality of Clarington
Township of Amaranth	Town of Caledon	Town of Markham	City of Oshawa
Township of East Garafraxa	City of Mississauga	Town of Richmond Hill	Town of Whitby
Town of Orangeville	**Halton Region**	City of Vaughan	Township of Scugog
Wellington County	Town of Halton Hills	Town of Aurora	City of Pickering
Town of Erin	Town of Oakville	Township of King	Town of Ajax
Simcoe County	Town of Milton	**City of Toronto**	Township of Uxbridge
Township of Adjala-Tosorontio			

*municipalities in **bold** are responsible for providing water services; those shown with shading are the upper or single tier.

4 PURPOSE AND OBJECTIVES OF THE SOURCE PROTECTION PLAN

The policies in this SPP have been written to achieve the objectives identified in the *General Regulation* under the *CWA*. These objectives are as follows:

1. To protect existing and future drinking water sources in the SPA.
2. To ensure that, for every area identified in an Assessment Report as an area where an activity is, or would be, a significant drinking water threat:
    - the activity never becomes a significant drinking water threat,
    - if the activity is occurring when the SPP takes effect, the activity ceases to be a significant drinking water threat.

4.1 RELATIONSHIP TO OTHER SOURCE PROTECTION PLANNING DOCUMENTS

While the SPP is a stand-alone document, there are supplementary documents that have been developed for those who may wish to obtain more information about source water protection. These documents are:

- Terms of Reference
- Assessment Reports
- Explanatory Document

4.1.1 Terms of Reference

There are three Terms of Reference documents; one for each watershed area within the CTC SPR:

- Credit Valley Source Protection Area (CVSPA)
- Toronto and Region Source Protection Area (TRSPA)
- Central Lake Ontario Source Protection Area (CLOSPA)

The Terms of Reference documents were the first documents to be completed. They are the work plans that describe the responsibilities of involved groups and stakeholders, timelines and projected costs. The Terms of Reference were submitted to the Ministry of the Environment in December 2008 and approved in August 2009.

4.1.2 The Assessment Reports

There are three Assessment Reports (see **Appendix A**) – one for each SPA within the CTC SPR:

- Credit Valley Source Protection Area
- Toronto and Region Source Protection Area
- Central Lake Ontario Source Protection Area

The Assessment Reports are technical documents that provide the scientific understanding that is the basis of the SPP. The Assessment Reports describe:

- the local watershed and assess available water supply
- the vulnerable areas and risks to drinking water
- the maps of the vulnerable areas
- the vulnerability of those areas
- the water quality and quantity issues related to water sources
- an assessment of the risk to water systems

The Assessment Reports are 'living documents' that will be continually updated and amended as new information becomes available. The Assessment Reports also identify the work that must be undertaken before the SPP is completed. The Assessment Reports are based on the completion of detailed technical studies. These reports underwent a peer review process that enabled scientists and other experts to evaluate the technical work for technical completeness and whether it met the provincial rules and guidelines.

The CTC proposed Assessment Reports were submitted to the Ministry of the Environment for approval in December 2010. At that time, additional research was being carried out. The new information was then used to update the reports which were submitted to the Ministry of the Environment in July 2011 and were approved in January 2012 **(Appendix A)**. Further updates to portions of the Assessment Reports were submitted in late 2014 and early 2015 and were approved in July 2015. The latest update includes revised Wellhead Protection Areas (WHPAs) and updates the threats assessment and identification around wells owned and operated by the Region of Halton near Georgetown and Acton (Town of Halton Hills). Other updates to the Assessment Reports include the results of the Tier 3 water

budget studies for both Region of Halton wells serving Halton Hills; and all of the Region of York wells and Region of Durham wells in Uxville. The maps for these wells contained in this Approved Source Protection Plan showing where policies apply **(Appendix F)** are based on the new vulnerable areas delineated in the Approved Assessment Reports.

4.1.3 The Explanatory Document

The Explanatory Document explains how the policies in the Source Protection Plan were developed and provides a rationale and guide as to what the SPC intends each policy to do to protect the sources of drinking water. The Explanatory Document is not a legally binding document, but is required by legislation to support the SPP. It includes a record of the rationale that was used to develop the policies in the SPP. In short, it documents the 'thinking' behind the SPP. The Explanatory Document will be of interest to implementing bodies, the Source Protection Authority, stakeholders, the Minister and members of the general public who may wish to understand the intent that the SPC used to prepare the SPP. By disclosing the underlying rationale that was used to develop specific policy approaches, the Explanatory Document supports a transparent decision making process. The Explanatory Document also includes the comments received by stakeholders throughout the development of the Source Protection Plan, and how the Source Protection Committee addressed these comments in the drafting of the SPP. The Explanatory Document and Summary of Consultation Comments can be found at www.ctcswp.ca.

5 CONSULTATION PROCESS: OVERVIEW

Public involvement and consultation has been a strong priority in this program with many legislated requirements. A variety of approaches and different media were used to engage the public, including:

- media releases
- newspaper advertisements
- letters to landowners
- public open houses
- the publication and distribution of newsletters and other informational brochures
- hosting and maintaining a website
- presentations to municipal councils, community and business groups
- attendance at trade shows, environmental fairs and festivals

Public consultation on the Terms of Reference was held in the summer of 2008 and included seven public meetings. The public consultation on the three Assessment Reports was held in the spring of 2010 (CLOSPA) and the fall of 2010 (TRSPA and CVSPA). The three reports were posted on the CTC website and paper copies were made available at Conservation Authority offices. Letters were sent to approximately 15,000 residents identified as owning property in vulnerable areas. All local and regional/county municipalities were also notified. Ten public open houses were held throughout the CTC to consult on the draft Assessment Reports. These open houses were advertised in local newspapers and electronic newsletters were emailed to subscribers. When all three Assessment Reports were updated or amended in the spring of 2011, municipalities and potentially affected landowners were notified and provided an opportunity to comment.

For the 2014 update, consultation began in the fall of 2013 with a mail out to residents affected by the Tier 3 water budget in Halton Hills. Staff also set up a booth at the Georgetown fall fair. In the spring of 2014 a public open house was held in Whitchurch-Stouffville to inform the public about the results of the Tier 3 water budget study for York and Durham Regions.

5.1 SOURCE PROTECTION PLAN CONSULTATION

5.1.1 Notice of Commencement of Source Protection Planning

In April 2011, letters advising of the commencement of source protection planning were distributed to municipal Clerks and 15,000 persons who were identified as potentially engaging in significant threat activities. The letters advised of the commencement of source protection planning, that the plans have the potential to impact them and that there was funding available through the Ontario Drinking Water Stewardship Program (ODWSP), a funding program designed to assist property owners address significant threats.

5.1.2 Pre-Consultation

After draft Source Protection Plan policies were developed, municipalities and provincial ministries that were identified to implement policies were provided the opportunity to comment on the policies in a 'pre-consultation' process. A letter was sent in August 2011 to all municipal contacts to provide them with advance notice of the impending pre-consultation that was set to begin in October 2011. The contents of this letter were coordinated with staff at neighbouring Source Protection Regions so that municipalities straddling more than one SPR received coordinated messaging. Official notice of pre-consultation was distributed to all municipal Clerks in mid-October and was followed by a series of municipal workshops that took place as follows:

- November 15, 2011: Durham Region (with Trent Conservation Coalition (TCC) and South Georgian Bay Lake Simcoe (SGBLS))
- November 23, 2011: York Region (with SGBLS)
- November 30, 2011: Peel Region (with SGBLS)
- December 6, 2011: Dufferin County (with Lake Erie and SGBLS)
- December 9, 2011: Lake Ontario policies (with TCC and Halton-Hamilton)
- December 13, 2011: Halton Region (with Halton-Hamilton)
- December 13, 2011: Wellington County (with Lake Erie)

The purpose of these workshops was to provide municipal staff and councillors the opportunity to meet with source protection staff and SPC members from all the Source Protection Areas within their municipality in an informal workshop to review the draft policies and Explanatory Document. The workshops also provided an opportunity for municipal staff/councillors to ask questions to ensure their

formal comments on the policies were as well informed as possible The joint workshops also helped source protection staff and SPC members to hear feedback on both the CTC policies and those being proposed by adjacent SPCs in an effort to harmonize the policies to the greatest extent possible. A summary of the comments received during pre-consultation and how they were considered in preparing the Draft Proposed Source Protection Plan is found in the Summary of Consultation Comments.

5.1.3 Formal Consultation on the Draft Proposed Source Protection Plan

The first formal consultation on the Draft Proposed Source Protection Plan and Explanatory Document began on March 19, 2012 and ended May 1, 2012. The legislation required a consultation period of a minimum of 35 days, however the SPC provided a 43 day consultation period.

The first formal consultation involved sending notices to all municipal Clerks, implementing bodies and adjacent Source Protection Regions advising of the start of formal consultation. In addition to sending notice to municipalities and other implementing bodies and industries identified as significant threats to municipal drinking water systems in Lake Ontario, approximately 22,000 direct mailings were sent to residents and landowners potentially affected by significant threat policies. These mailings contained:

- notification of Draft Proposed Source Protection Plan public consultation
- map of nearby vulnerable areas
- magazine describing the Assessment Report process and findings
- brochure about the Source Protection Plan process
- a comment form and a postage paid envelope to submit comments

These materials and a copy of the Draft Proposed Source Protection Plan were also posted online. Subscribers to the CTC electronic mailing lists were notified. Advertisements were placed in 17 local and regional newspapers covering the CTC Source Protection Region with information on open houses and where to view copies of the SPP. Printed copies of the Draft Proposed Source Protection Plan were available at four Conservation Authority offices, and at 24 local libraries. A series of seven evening open houses took place as follows (a minimum of three meetings was required, one in each SPA):

- April 3, 2012: Town of Halton Hills
- April 5, 2012: Nobleton
- April 10, 2012: Durham Region

- April 11, 2012: Town of Whitchurch-Stouffville
- April 17, 2012: Town of Mono
- April 19, 2012: City of Brampton
- April 26, 2012: Town of Erin

At the May 1, 2012, CTC SPC meeting, members received six invited deputations from representatives of industry and agriculture, and the municipalities impacted by water quantity policies in Dufferin County. Comments submitted during the first formal consultation period were considered by the SPC in revising policies to prepare the Proposed Source Protection Plan. A summary of the comments received during this first consultation and how they were considered in preparing the Proposed Source Protection Plan can be found in the Summary of Consultation Comments. The Proposed Source Protection Plan was then subject to a second 30 day formal consultation as required by legislation.

This second formal consultation ran between September 7, 2012 to October 8, 2012 under the direction of the respective Source Protection Authorities who were required to send notice to all municipal Clerks, other implementing bodies, adjacent Source Protection Regions, and anyone who submitted written comments during the first formal consultation period. The Proposed Source Protection Plan and Explanatory Document were posted online and written comments were due by the deadline of October 8, 2012.

The Proposed Source Protection Plan was not further revised to address comments submitted during the second formal consultation. However, the comments were submitted to the Minister of Environment for his approval decision along with the Proposed Source Protection Plan and Explanatory Document on October 22, 2012.

5.1.4 Informal Consultation on Amended Proposed Source Protection Plan

In the fall of 2013, consultation was undertaken to engage implementing bodies and inform affected property owners in Halton Region and the County of Wellington who, due to completed technical work, were newly included in a vulnerable area subject to SPP policies. This consultation included notification to Clerks of affected municipalities (Region of Halton, Town of Halton Hills, County of Wellington, and Town of Erin). Approximately 3100 letters were mailed to properties in the Significant Water Quantity Threat Area, where no consultation or communication had previously taken place. A public open house

was held on Saturday October 19, 2013 from 8 AM to 12 noon at the Downtown Georgetown Farmers' Market.

In the spring of 2014, the results of the Tier 3 Water Budget for York and Durham Regions were approved for public consultation. This included public consultation on water quantity policies that would apply in this area. This public consultation was held jointly with the South Georgian Bay Lake Simcoe Source Protection Region (York is in both the CTC and SGBLS SPRs) and took place from April 24 - May 23, 2014 and consisted of newspaper advertising, posting of material online, as well as a public open house held May 7, 2014 in Whitchurch-Stouffville. Notices were also provided to the Clerks of each affected municipality (Region of York, City of Vaughan, Township of King, Town of Aurora, Town of Richmond Hill, Town of Markham, Town of Whitchurch-Stouffville; Region of Durham, Township of Uxbridge).

5.1.5 Formal Consultation on Amended Source Protection Plan

On June 24, 2014, the CTC Source Protection Committee met and endorsed the Amended Proposed Source Protection Plan policies for a 35-day public consultation period. The consultation took place from July 18 to August 22, 2014. The Amended Proposed Source Protection Plan and new explanatory material was posted on the CTC Source Protection Committee website (www.ctcswp.ca) along with telephone and email contact information to reach staff. Newspaper advertisements were placed in local weekly papers across the CTC Source Protection Region and in publications which target the agricultural community**.** In addition, notices and copies of the SPP and explanatory materials were sent to all implementing bodies (municipal, provincial, source protection authority, federal and industry). Copies of materials were available for viewing at each source protection office.

Following the Source Protection Committee endorsement of the Amended Proposed Source Protection Plan on November 13, 2014, the Chairs of the Source Protection Authority jointly submitted the Amended Proposed Source Protection Plan and Explanatory Document to the Minister of the Environment and Climate Change on December 15, 2014.

6 DRINKING WATER VULNERABILITY ANALYSIS AND THREATS EVALUATION

6.1 TYPES OF VULNERABLE AREAS

This chapter provides an overview of the methodology and definitions developed by the Ministry of the Environment to identify drinking water threats. The ministry developed mandatory *Technical Rules* that must be followed by all Source Protection Committees, as well as extensive guidance and full funding to carry out this technical assessment. These processes are important components in the multi-barrier approach to protecting drinking water sources from contamination and overuse. Source protection technical work is focused on the identification and assessment of drinking water quality and quantity threats and issues affecting four different types of vulnerable areas.

6.1.1 Wellhead Protection Areas (WHPA)

Wellhead Protection Areas are areas on the land around a municipal well, the size of which is determined by how quickly water travels underground to the well, measured in years. For source protection planning, the *Clean Water Act, 2006* required that a standard 100-metre radius circle be provided around each municipal well; this is called WHPA-A. WHPA-B represents the 2-year time of travel; WHPA-C represents the 5-year time of travel; and WHPA-D represents the 25-year time of travel. WHPA-E represents municipal wells that are under the direct influence of surface water. The size and shape of each WHPA (B, C, D or E) is a function of how water travels underground. Time of travel is important because it is an indication of how quickly a contaminant can move from a WHPA into a municipal well. Time of travel can be influenced by a number of factors such as the slope of land, and the type of soil (for example, water travels faster through sand than it does through clay). Wellhead Protection Areas are drawn based on scientific research that took all these factors into consideration. **Table 6-1** provides a list of the number of WHPAs throughout the CTC Source Protection Region. This research was undertaken in the development of the Assessment Reports and details about each specific well can be found in those documents. The maps in **Appendix F** of this document show where significant drinking water threat polices will apply in the specific WHPAs in the CTC Source Protection Region.

Table 6-1: Well Count by Municipality

Source Protection Area	Upper Tier Municipality	Lower Tier Municipality (Water System)	Well Count
Credit Valley	Dufferin County	Mono (Island Lake)	2
		Mono (Coles)	2
		Mono (Cardinal Wood)	3
		Amaranth (Amaranth-Pullen)	1
		Orangeville (Orangeville)	12
	Wellington County	Erin (Bel-Erin)	2
		Erin (Erin)	2
		Erin (Hillsburgh)	2
	Halton Region	Halton Hills (Acton)	5
		Halton Hills (Georgetown)	7
	Peel Region	Caledon (Alton, Caledon Village)	4
		Caledon (Cheltenham)	2
		Caledon (Inglewood)	2
Toronto and Region	Peel Region	Caledon (Caledon East)	3
		Caledon (Palgrave)	3
	York Region	Whitchurch-Stouffville	5
		King (King City)	2
		King (Nobleton)	3
		Vaughan (Kleinburg)	2
	Durham Region	Uxbridge (Uxville Well)	2
Central Lake Ontario	No municipal wells		
TOTAL			**66**

6.1.2 Intake Protection Zones (IPZ)

Intake Protection Zones are the area on the water and land surrounding a municipal surface water intake. The size of each zone is determined by how quickly water flows to the intake, in hours. Because surface water travels much faster than groundwater, the IPZ is drawn primarily for emergency response

purposes. There are three categories of IPZs; the IPZ-1 is a one-kilometre circle around the intake if it is located in one of the Great Lakes; the IPZ-2 is the area where water can reach the intake in a specified time, two hours was used in the CTC. According to the MOE *Technical Rules*, there can be no significant threats in an IPZ-1 or IPZ-2 if it is located in one of the Great Lakes (e.g., Lake Ontario). An IPZ-3 is delineated if modelling demonstrates that spills from a specific activity that is located outside IPZ-1 and IPZ-2 may be transported to an intake and result in a deterioration of the water quality at an intake. Since the vulnerability scores of IPZ-1 and IPZ-2 are not high enough to identify significant threats, the modelling approach can also be used for activities within IPZ-1 and IPZ-2 to determine if spills from a specific activity within these zones may reach the intake and result in deterioration of the water quality at an intake. If modeling in IPZ-1, -2, or -3 demonstrates this deterioration, the modelled threats are deemed significant drinking water threats under the provincial rules. The modelling results are also used to delineate event based areas within IPZs where modelled activities are deemed significant. **Table 6-2** provides a list of the surface water intakes (all are located in Lake Ontario) in the CTC Source Protection Region.

Table 6-2: Intake Protection Zones-3 by Municipality

Source Protection Area	Upper Tier Municipality	Water System	Number of Intakes
CVSPA	Peel Region	Lorne Park	1
		Lakeview	1
TRSPA	City of Toronto	R.C Harris	2
		R.L. Clark	1
		F.J. Horgan	1
		Island	5
	Durham Region	Ajax	1
CLOSPA	Durham Region	Oshawa	2
		Whitby	1
		Bowmanville	1
TOTAL			**16**

6.1.3 Highly Vulnerable Aquifers (HVA)

An aquifer is an area underground that is highly saturated with water – enough water that it can be withdrawn for human use. A Highly Vulnerable Aquifer is one that is particularly susceptible to contamination because of its location near the ground's surface or where the types of materials in the ground around it are highly permeable. For example, clay is more impermeable and typically acts to protect the aquifer below it, compared to sand and fractured bedrock which are both highly permeable and do not have these protective characteristics.

6.1.4 Significant Groundwater Recharge Areas (SGRA)

Significant Groundwater Recharge Areas are areas on the landscape that are characterized by porous soils, such as sand or gravel, which allows water to seep easily into the ground and flow to an aquifer. A recharge area is considered significant when it helps maintain the water level in an aquifer that supplies a community or private residence with drinking water. Numerical thresholds are used to calculate where these significant recharge areas are located.

6.1.5 Wellhead Protection Area-Q (Water Quantity)

Water quantity vulnerable areas are determined differently than other vulnerable areas. Through a tiered process of water budget analyses as set out in the *Technical Rules* under O. Reg. 287/07, SPCs are required to identify any areas with water quantity stress, determine the stress level in the Wellhead Protection Area-Q (WHPA-Q), and where the level is deemed significant or moderate, also identify the type and location of the activities that pose a drinking water quantity threat. At the final stage (Tier 3 Water Budget analysis), any WHPA-Q areas where significant or moderate drinking water stress has been identified is an area where significant drinking water quantity threat activities can occur. Within these areas, future activities which take water without returning it to the same source or which reduce recharge to the aquifer are significant water quantity threats. If the area has a significant risk level assigned then existing activities are also significant water quantity threats. There are two types of WHPA-Q; WHPA-Q1, and WHPA-Q2. WHPA-Q1 refers to the area where activities that take water without returning it to the same source may be a threat. WHPA-Q2 refers to the area where activities that reduce recharge may be a threat. Source Protection Plan policies must be developed to address significant water quantity threats. See **Chapter 10.13** for more details on the Water Quantity policies.

7 PRESCRIBED THREATS

A drinking water threat is defined in the *Clean Water Act, 2006* (Section 2(1)) as:

> *an activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water.*

O. Reg. 287/07 under the *Clean Water Act, 2006* has prescribed 21 threats for which the Source Protection Committee must write policies in areas where these threats could be significant.

Just because an activity is a significant threat does not mean that it is currently harming water sources. It has the potential to cause harm if something should go wrong, such as an accidental spill or leak.

1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*.
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid.
17. The handling and storage of an organic solvent.

18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area, or a farm-animal yard.

In addition to the prescribed threats listed above, a SPC may determine that there are other activities in their area that they think pose a risk to drinking water. Where this is the case, the SPC may ask the Director at the Ministry of the Environment and Climate Change if the activity can be considered as a local threat to drinking water. In 2009, the Lake Ontario Collaborative (LOC) project initiated event based modelling for the purpose of identifying if certain prescribed or local activities posed a significant risk to the LOC municipal partners' Lake Ontario intakes. A list of proposed spill scenario simulations for existing facilities was developed in consultation with municipal partners, SPC Chairs and Project Managers, and MOE. The selected LOC spill scenarios are based on 'real' events that have occurred in the past and are therefore not representative of extreme events. The following spills scenarios resulted in the identification of five different significant drinking water threat activities to Lake Ontario water treatments plants (WTP). Three of these activities fall under the MOECC prescribed drinking water quality threats (*Tables of Drinking Water Threats, Clean Water Act, 2006*):

- Threat # 2. The establishment, operation, or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage (relates to two activities).
- Threat # 15. The handling and storage of fuel.

Two of the activities required MOE approval of additional 'Local' drinking water threats:

- Pipeline transporting petroleum products (containing benzene) crossing tributaries of Lake Ontario; and
- Spill of tritium from nuclear generating station.

Both of these 'local threats' only apply to specific Lake Ontario intakes **(Table 6-2)** identified in the respective Assessment Reports.

7.1 IDENTIFYING AND ENUMERATING POTENTIAL SIGNIFICANT THREATS

Land use activities have been inventoried in vulnerable areas and potential significant threats have been identified using desktop information but have not been confirmed through site visits. All of this information can be found in the Assessment Reports. Just because one of the 21 activities is identified as a significant threat does not mean that it is currently harming the water or that it will in the future. Determining whether or not a threat actually exists is a complex process. The MOE has ranked drinking water threats as being significant, moderate or low. The SPP must, at a minimum, include policies for all areas where significant threats could occur. There are three possible approaches to identifying drinking water threats.

7.1.1 Vulnerability Scoring/Threats-Based Approach

The vulnerability scoring approach relies upon the *Tables of Drinking Water Threats* created by MOE to identify and rank drinking water threats. A variety of specific circumstances are outlined in the *Tables of Drinking Water Threats* for each of the 21 prescribed drinking water threats. These tables were created to provide a consistent approach across all Source Protection Regions in Ontario. The *Tables of Drinking Water Threats* provide the list of circumstances where provincially prescribed activities are low, moderate or significant threats to drinking water. The tables can be accessed through the Ministry of the Environment and Climate Change's website.

To understand how each circumstance applies within the vulnerable areas, it is necessary to understand how the *Tables of Drinking Water Threats* were set up. The tables link the hazard rating of an activity under a specific circumstance and for a specific source of water, with the vulnerability scores needed to make the activity/circumstance a significant, moderate or low drinking water threat. The risk score is determined through the use of the following equation:

R = V x HR

Where:

R is Risk Score

V is Vulnerability of the source water area (scale of 1 – 10)

HR is the Hazard Rating of the threat (scale of 1 – 10)

Risk Score Range	Drinking Water Threat Classification
80 – 100	Significant
60 - < 80	Moderate
> 40 - < 60	Low

The hazard ratings are not provided in the *Tables of Drinking Water Threats*, but the threat level is identified based on the vulnerable area and vulnerability score where the activity is or would be located. The chemical hazard ratings were determined by considering factors such as toxicity, environmental fate, quantity and method of release. The vulnerability scores for different parts of the vulnerable areas described in Chapter 6 are calculated based on provincially mandated factors applied to site specific information about the area, for example how permeable the soil is above the aquifer. The Assessment Reports describe the information and approach used to calculate the vulnerability scores for around each well or intake. The maps **(Appendix F)** included in this SPP show the vulnerability scores for areas around wells or intakes where significant drinking water threats may occur.

The *Tables of Drinking Water Threats* separate circumstances into chemical and pathogen based contaminants. It should be noted that the presence of a DNAPL (dense non-aqueous phase liquid) is considered a significant threat if it occurs anywhere within the five year time of travel (WHPA-A to WHPA-C), regardless of the vulnerability score.

7.1.2 Issues Approach

A drinking water Issue is a documented, existing problem with the quality of the source water. An Issue exists if a contaminant is present at a concentration that may result in the deterioration of the quality of water used as a source of drinking water, or if there is a trend of increasing concentrations of the contaminant. Every elevated contaminant in the raw water is not necessarily considered an Issue.

Elevated parameters are not considered an Issue when they are known to be naturally occurring and do not present a problem for the water treatment plant operator. For Issues caused by human activities, the Assessment Report must delineate the area contributing to an Issue or include a plan to delineate the Issue Contributing Area. Once a drinking water Issue is identified, then any activities or conditions

that may be causing that Issue need to be identified. This is called the Issue approach to identifying drinking water threats.

The first step is to identify an Issue Contributing Area (ICA) in the vicinity of the location at which the Issue has been observed. The ICA may be different than the vulnerable area (WHPA or IPZ). In the second step, specific drinking water threats that could reasonably be expected to contribute to the Issue are identified. All such threats are automatically classified as significant.

7.1.3 Event-Based Approach

The event-based modelling approach was included in the *Technical Rules* to identify threats to drinking water in systems drawing water from larger surface water bodies where the vulnerability scores are generally low. In the CTC Source Protection Region, this approach was used to delineate an event based area (EBA) where a spill from a specific activity within this EBA would cause a significant risk to the drinking water source and hence the modelled activity would be identified as a significant threat; this modeling approach also informed the delineation of IPZ-3s where the EBA extends beyond IPZ-1 and IPZ-2 for the drinking water systems in Lake Ontario.

7.1.4 Enumerating Drinking Water Threats

The minimum requirement for the preparation of the Assessment Reports involved counting the potential significant drinking water threats within WHPAs or IPZs where the risk could be 'significant' based on the vulnerability score of the area. Policies must be developed to mitigate existing significant drinking water threats and ensure activities do not become a significant drinking water threat. The threats identified in the Assessment Reports are *potential* threats only. If an identified property does not have a specific threat activity being carried out on it then the 'existing' threat policies in the SPP for that threat would not apply. Conversely, even though a threat activity is not identified on a property, the relevant SPP policies apply if the threat activity is being carried out now or in the future.

A "condition" is defined as a past land use activity which may pose a problem to water quality.
An "issue" is defined as a documented water quality problem.

7.2 TRANSPORT PATHWAYS

The vulnerability of an aquifer may be increased by any land use activity or feature that disturbs the surface above the aquifer, or which artificially enhances flow to that aquifer. Man-made transport pathways include pits, quarries, mines, road cuts, ditches, storm water, pipelines, sewers, and poorly constructed wells. These pathways can bypass the natural system, resulting in faster pathways for contamination to reach the well or intake. For groundwater drinking water wells, if any of these constructed pathways exist in a water source, the vulnerability score increases by one or two steps (i.e., from low to medium, from medium to high, or from low to high). The decision by the SPC to increase the vulnerability score for an area should be supported by data, and use professional judgment. When determining whether the vulnerability of an area has increased, the following factors shall be considered, as per *Technical Rule 41*.

Hydrogeological conditions:

- The type and design of any transport pathways;
- The cumulative impact of any transport pathways; and
- The extent of any assumptions used in the assessment of the vulnerability of the groundwater.

Examples of features that may provide a transport pathway that could result in an increase in vulnerability of a water supply source include:

- Existing wells or boreholes
- Unused or abandoned wells
- Pits and quarries
- Mines

The *Technical Rules* indicate that a Source Protection Committee may conclude that the data available may be insufficient or of too poor quality to justify an increase in vulnerability.
Several datasets for pathway features were reviewed in an attempt to assess transport pathways within the CTC Source Protection Region. Only the data for pits and quarries were deemed sufficient to adjust the vulnerability score within WHPAs and HVAs.

8 POLICY DEVELOPMENT

8.1 DRAFT PROPOSED SOURCE PROTECTION PLAN

Before the Source Protection Committee could begin the task of researching and creating policies to protect water, a full understanding of the vulnerable areas within the CTC Source Protection Region and what threats existed in those vulnerable areas needed to take place. All the research was compiled into the Assessment Reports which were completed and submitted to the Province in 2010, with updated versions submitted in July 2011 and approval by the Province in January 2012. Further updates to portions of the Assessment Reports were submitted in late 2014 and early 2015 and were approved in July 2015 **(see Chapter 4.1.2.)**. The maps for these wells contained in this Approved Source Protection Plan showing where policies apply **(Appendix F)** are based on the Approved Assessment Reports.

With the vulnerable areas identified and the threats enumerated, the next step for the SPC was to develop policies. In order to do this, a Source Protection Planning Working Group (comprised of SPC members) and a Source Protection Planning Steering Committee (comprised of municipal staff) were established to begin the detailed research and consultation needed to inform the work on policy development. The Working Group and Steering Committee worked with planning consultants to develop a series of background reports which summarized each of the threats, where they are significant and what tools were available to address them. These reports were presented and discussed at six workshops held between January and April 2011. These workshops were attended by SPC members, municipal staff and subject-area experts (i.e., Ontario Farm Environment Coalition, TSSA) where small groups discussed appropriate policies to address the threats to drinking water sources, and to determine how these policies would be implemented. Under the SPC's authority, there are a number of different pieces of legislation, and planning tools available that were selected, as the most suitable approach to achieving its objectives. These workshops resulted in a set of draft policy options that were presented to the SPC at a two-day workshop in June 2011. The SPC members reviewed each threat and selected (by consensus or vote if consensus not achieved) what they believed was the most appropriate policy option to stop an activity from being a significant threat and to prevent an activity from becoming a significant threat in the future. Additional workshops for groundwater quantity threats and Lake Ontario threats were held in August and September, 2011, respectively and followed a similar process.

The CTC Source Protection Committee approved the draft policies for pre-consultation with implementing bodies in September 2011.

Chapter 5.1 of this document describes the process followed by the SPC to assess and revise the policies during the pre-consultation and first public consultation stages taking into account the comments made and reviewing what other SPCs were proposing for similar threats.

8.2 AMENDED PROPOSED SOURCE PROTECTION PLAN

Throughout 2012-2013, between submission of the Proposed Source Protection Plan and receipt of comments from the Ministry of the Environment, the CTC Source Protection Region continued to engage implementing bodies in preparations for implementation of the Source Protection Plan. This included workshops on using the maps and determining if policies apply for municipal and conservation authority staff; launching an online map tool with searching functions to identify if a property was located in a vulnerable area and linked to the policies that could apply, as well as the verification of significant threats in parts of the Credit Valley Source Protection Area in the CTC Source Protection Region. New policies were drafted to address new water quantity threats in vulnerable areas around wells serving Georgetown and Acton in Halton Region and around wells in York Region and parts of western Durham Region.

Although the formal review comments on the Proposed Source Protection Plan which was submitted in October 2012 were not received until June 18, 2014, Ministry of the Environment and Climate Change staff provided an iterative series of draft comments to the CTC beginning in October 2013 with initial comments during the public consultation in Halton Region on draft water quantity policies. The initial groundwater quality comments were received in February 2014 and initial Lake Ontario policy comments in April 2014. This allowed the CTC Source Protection Committee to begin revisions of the Source Protection Plan.

8.2.1 Water Quantity Policies

Draft comments on the water quantity policies were received from MOE in October 2013 and a revised version in January 2014. The CTC Source Protection Committee considered revisions to these policies to respond to the comments on February 4, 2014. Planning staff initiated revisions to the Water Quantity

policies based on SPC direction and delegations received. On March 20, 2014 CTC staff hosted a consultation working session on Water Quantity policy to review any outstanding concerns with affected implementing bodies. Following this session and taking the discussion into consideration staff made further revisions to the Water Quantity policies in preparation for further public consultation.

Pre-consultation with the MOE, the CTC and neighbouring Source Protection Committees, affected municipalities and any other implementing body on the proposed revisions to Water Quantity policies was held prior to a joint public consultation with South Georgian Bay Lake Simcoe Source Protection Region (see **Chapter 5** for full details).

8.2.2 Water Quality Policies

On February 7, 2014 CTC staff received initial comments from the MOE on the water quality policies. On April 23, 2014, the CTC Source Protection Committee reviewed and provided direction to staff on the MOE comments received on the Water Quality policies. While the Source Protection Committee made decisions on many of the comments at that meeting, a number of policies required further information prior to a formal Source Protection Committee decisions.

On May 7, 2014, Water Quality policies were discussed with Halton Region, Towns of Halton Hills and Erin, and County of Wellington staff. Staff attended another meeting with Halton Region and MOE staff on May 22, 2014 to discuss prohibition policies in portions of Issue Contributing Areas.

Following these discussions, the Amended Proposed Water Quality policies were approved by the CTC Source Protection Committee for public consultation at the June 24, 2014 meeting.

8.2.3 Lake Ontario Policies

On April 11, 2014 CTC staff received initial comments from MOE on the Lake Ontario policies which were submitted in the Proposed Source Protection Plan on October 22, 2012 to the Minister of the Environment. Staff and members of the Lake Ontario Working Group met to review the comments on April 24, 2014. At this meeting, Working Group members discussed the comments and provided direction to staff to move forward with policy revisions in preparation for the May 27, 2014 Source Protection Committee meeting.

Following these discussions, the Amended Proposed Lake Ontario Policies were approved by the CTC Source Protection Committee for public consultation at the June 24, 2014 meeting. However it was recognized that due to the late receipt of the formal comments from the Ministry on June 18, 2014, that the SPC had not had sufficient time to fully explore and discuss with ministry staff resolutions to their concerns with the Lake Ontario policies. Therefore the SPC undertook to revisit the comments on these policies in the fall of 2014 along with any additional comments received during the public consultation.

In September 2014, the SPC directed the formation of a Lake Ontario Working Group to revisit MOECC concerns on the Lake Ontario Policies. Prior to the Lake Ontario Working Group meeting, the SPC member for Toronto, and CTC staff met with MOECC to discuss options to address outstanding issues. Policy revisions were provided to the Lake Ontario Working Group which, along with staff and MOECC met several times over the following two weeks to discuss the new policy suggestions along with the other referred policies. Staff were directed to make revisions to all the deferred policies based on Working Group direction. On October 29, 2014 the Working Group met by teleconference, and after discussion of the revisions, approved the Lake Ontario policies and explanatory notes as their recommendations to the CTC SPC for formal approval.

8.2.4 Receipt of Formal Comments and Resubmission

On June 18, 2014, the three Source Protection Authority Chairs received the formal comments on the CTC Proposed Source Protection Plan from the Director, Source Protection Programs Branch. These comments built on the earlier draft comments. As detailed above, the Source Protection Committee had begun to, or had addressed many comments the Director outlined in her letter. On June 24, 2014, the CTC Source Protection Committee met and endorsed the Amended Proposed Source Protection Plan policies for a 35-day public consultation period and also posted the Director's letter as part of the consultation material.

Chapter 5.1 of this document describes the process followed by the SPC to assess and revise the policies during the pre-consultation and formal consultation on Amended Source Protection Plan policies.

Following the consultation period, comments were considered and taken to the SPC in September 2014. SPC directed staff to make changes, resolve any outstanding Lake Ontario policy concerns (as detailed,

above), and bring the Amended Source Protection Plan to the SPC for final endorsement and approval in November 2014.

Following the Source Protection Committee endorsement of the Amended Proposed Source Protection Plan on November 13, 2014, the Chairs of the Source Protection Authority jointly submitted the Amended Proposed Source Protection Plan and Explanatory Document to the Minister of the Environment and Climate Change on December 15, 2014.

9 RANGE OF POLICY TOOLS AVAILABLE

The Source Protection Committee had a variety of policy tools available to use to develop Source Protection Plan policies, including specific prescribed instruments and land use planning powers under specific provincial legislation (described below). The *Clean Water Act, 2006* also introduces new powers that can be used in a SPP which would be implemented by the municipalities responsible for supplying drinking water. These are known as 'Part IV Powers' and these authorities allow specific activities to be regulated (prohibited or managed) in areas where these activities are, or could be, a significant drinking water threat. The SPC can also choose 'softer' tools such as education and outreach programs alone or in combination with other tools. Where existing legislation is available to address a threat, the SPC chose to use tools based on the existing legislation to avoid duplication or conflict. The SPC also chose in many cases to develop new policies/programs to complement the existing controls.

9.1 PRESCRIBED INSTRUMENTS

Prescribed instruments are existing, regulatory tools under specific pieces of provincial legislation. These prescribed instruments allow the regulatory authority to impose conditions on existing and/or future activities that can be used to protect drinking water. Using existing regulatory tools such as Environmental Compliance Approvals under the *Environmental Protection Act*, *1990*, avoids regulatory duplication. This means that, rather than creating a new tool, a policy in a SPP would point to an already-existing tool that fulfills the objective of the policy. The *Clean Water Act, 2006* recognizes certain existing instruments that can be used to meet SPP objectives. The instruments that have been prescribed are:

***The Aggregate Resources Act*, 1990**

- Section 8 with respect to site plans included in applications for licenses
- Section 11 and 13 with respect to licenses to remove aggregate from pits or quarries
- Section 25 with respect to site plans accompanying applications for wayside permits
- Section 30 with respect to wayside permits to operate pits or quarries
- Section 36 with respect to site plans included in applications for aggregate permits
- Section 37 with respect to aggregate permits to excavate aggregate or topsoil

***The Environmental Protection Act*, 1990**

- Section 29 with respect to certificate of approval or provisional certificates of approval issued by the Director for the use, operation, establishment, alteration, enlargement or extension of waste disposal sites or waste management systems
- Section 47.5 with respect to renewable energy approvals issued or renewed by the Director

***The Nutrient Management Act*, 2002**

- Section 10 with respect to nutrient management strategies
- Section 14 with respect to nutrient management plans
- Section 28 with respect to approvals of nutrient management strategies or nutrient management plans
- Section 15.2 with respect to NASM plans

***The Ontario Water Resources Act*, 1990**

- Section 34 with respect to permits to take water
- Section 53 with respect to approvals to establish, alter, extend or replace new or existing sewage works

***The Pesticides Act*, 1990**

- Sections 7 and 11 with respect to permits for land exterminations, structural exterminations and water exterminations issued by the Director

***The Safe Drinking Water Act*, 2002**

- Section 40 with respect to drinking water works permits issued by the Director
- Section 44 with respect to municipal drinking water licenses issued by the Director

9.2 RISK MANAGEMENT PLANS (PART IV TOOL, SECTION 58)

A Risk Management Plan (RMP) is a new tool introduced in the *Clean Water Act*, *2006* which sets out a plan to manage a threat activity in an area where it is, or could be, a significant drinking water threat, which may include responsibilities and protocols of the person engaged in the threat activity. Risk Management Plans are intended to be negotiated between a Risk Management Official (RMO) and a person engaging in the threat activity. If agreement cannot be achieved, a RMP may be ordered, so that

the user complies. The Risk Management Official must be satisfied that a RMP will reduce the potential for adverse effects to a drinking water source, so that the activity ceases to be, or does not become, a significant threat.

9.3 PROHIBITION (PART IV TOOL, SECTION 57)

The Source Protection Committee may choose to prohibit certain activities, including existing activities which pose a particularly significant threat to drinking water sources, using another new tool introduced in the *Clean Water Act, 2006.* Prohibition of existing activities is meant to be a 'tool of last resort', meaning that the SPC may only do so if they are convinced no other method will reduce the risk, or the degree/level of risk that the activity poses is unacceptably high or severe that it may not be permitted to continue. The companion Explanatory Document to this SPP provides the rationale for the SPC's decisions to use these tools to address some existing significant drinking water threats.

9.4 RESTRICTED LAND USES (PART IV TOOL, SECTION 59)

Restricted Land Uses policies are complementary tools under the *Clean Water Act, 2006* which are used with either s.58 Risk Management Plans or s.57 Prohibition of activities. They do not eliminate a land use (and do not have the same meaning as in the *Planning Act, 1990*), but ensure that activities in the designated area are assessed by the RMO to ensure compliance with s.58 Risk Management Plan or s.57 Prohibition policies before the municipality issues a building permit or planning approvals. This tool acts as a screening tool for municipalities when reviewing applications, to prevent the unintentional approval of activities that are a significant threat to municipal drinking water.

9.5 LAND USE PLANNING

These are policies that affect land use planning decisions. Land use planning policies could fall under the *Planning Act, 1990* or the *Condominium Act, 1998*. These policies may manage or eliminate (through prohibiting it from being established) a future threat activity through a land use policy that is implemented through land use planning decisions (such as Official Plans, Zoning By-laws and Site Plan Controls).

9.6 EDUCATION AND OUTREACH

Considered a non-regulatory or 'soft' tool, the SPC may use education and outreach policies in conjunction with other types of policies. If the SPC decides to use only a soft tool to address a significant

drinking water threat as a stand-alone tool, it must be explained why the policy is sufficient to ensure that the threat does not become, or ceases to be significant. The companion Explanatory Document to this SPP provides the rationale for the SPCs decisions to use these tools as the only tool to address some significant drinking water threats.

9.7 SPECIFY ACTION

These policies specify an action to be taken to achieve the SPP objectives. These policies may be mandatory depending on the body responsible for implementation. 'Other' approaches include policies that:

- specify certain actions be taken by a particular person or body to implement the Source Protection Plan or achieve the SPP's objectives;
- establish stewardship programs;
- specify and promote best management practices;
- establish pilot programs; and/or
- govern research.

Additional research may be required to determine new, innovative methods or technologies for addressing certain threats, or to better understand where targeted actions to address threats would have the most benefit to source water (e.g., Issues Contributing Area).

9.8 STRATEGIC ACTIONS

Strategic Action policies are a non-legally binding commitment. They assign a discretionary obligation on the implementing body to achieve the objectives of the SPP. Any policy set out in the SPP that is NOT one of the following policies is a Strategic Action policy:

- a significant threat policy;
- a designated Great Lakes policy;
- a policy to which section 45 of the Act applies (Monitoring);
- a policy to which clause 39 (1) (b) of the Act applies (Land Use Planning – Have Regard For); and/or
- a policy to which clause 39 (7) (b) of the Act applies (Prescribed Instruments – Have Regard For).

Strategic Action policies can apply to moderate and low threats ONLY, not significant threats.

9.9 MONITORING POLICIES

Generally speaking, monitoring policies **(Chapter 10.14)** are provided to track the implementation of a threat policy to determine, over time, the effectiveness of the policy. These policies generally require annual reporting to the Source Protection Authority on the actions taken to implement the policy. Every significant threat policy must have an associated monitoring policy.

9.10 LEGAL EFFECT

The Approved Source Protection Plan policies have a variety of legal effect in the Province. The requirements of the implementing bodies named in each policy vary according to the degree of threat the policy is addressing. It should be noted that the decisions of the Ontario Municipal Board (OMB) and the Environmental Review Tribunal are also required to conform to relevant significant threat policies and have regard for moderate and low threat policies. There are 11 lists that organize all proposed policies according to the legal effect for implementing bodies **(Table 9-1 and Appendix B)**. Implementing bodies include municipalities, planning authorities, provincial ministries, Conservation Authorities, and the Source Protection Authority. The policies are located in tables in **Chapter 10** of this document and include a column that corresponds to the legal effect table below.

Table 9-1: Legal Effect of Source Protection Plan Policies

List	Legal Effect
List A: Significant threat policies that affect decisions under the *Planning Act* and *Condominium Act, 1998*	Legally binding - must conform with
List B: Moderate and low threat policies that affect decisions under the *Planning Act* and *Condominium Act, 1998*	Legally binding - have regard to
List C: Significant threat policies that affect prescribed instrument decisions	Legally binding - must conform with
List D: Moderate and low threat policies that affect prescribed instrument decisions	Legally binding - have regard to
List E: Significant threat policies that impose obligations on municipalities, source protection authorities and local boards	Legally binding - must comply with
List F: Monitoring policies referred to in subsection 22(2) of the *Clean Water Act, 2006*	Legally binding - must comply with
List G: Policies related to section 57 of the *Clean Water Act, 2006* (Prohibition)	Legally binding - must comply with
List H: Policies related to section 58 of the *Clean Water Act, 2006* (Risk Management Plans)	Legally binding - must comply with
List I: Policies related to section 59 of the *Clean Water Act, 2006* (Restricted Land Use)	Legally binding - must comply with
List J: Strategic Action policies	Non legally binding
List K: Significant threat policies that identify a body other than a municipality, source protection authority or local board as responsible for implementing the policy	Non legally binding

10 THE POLICIES

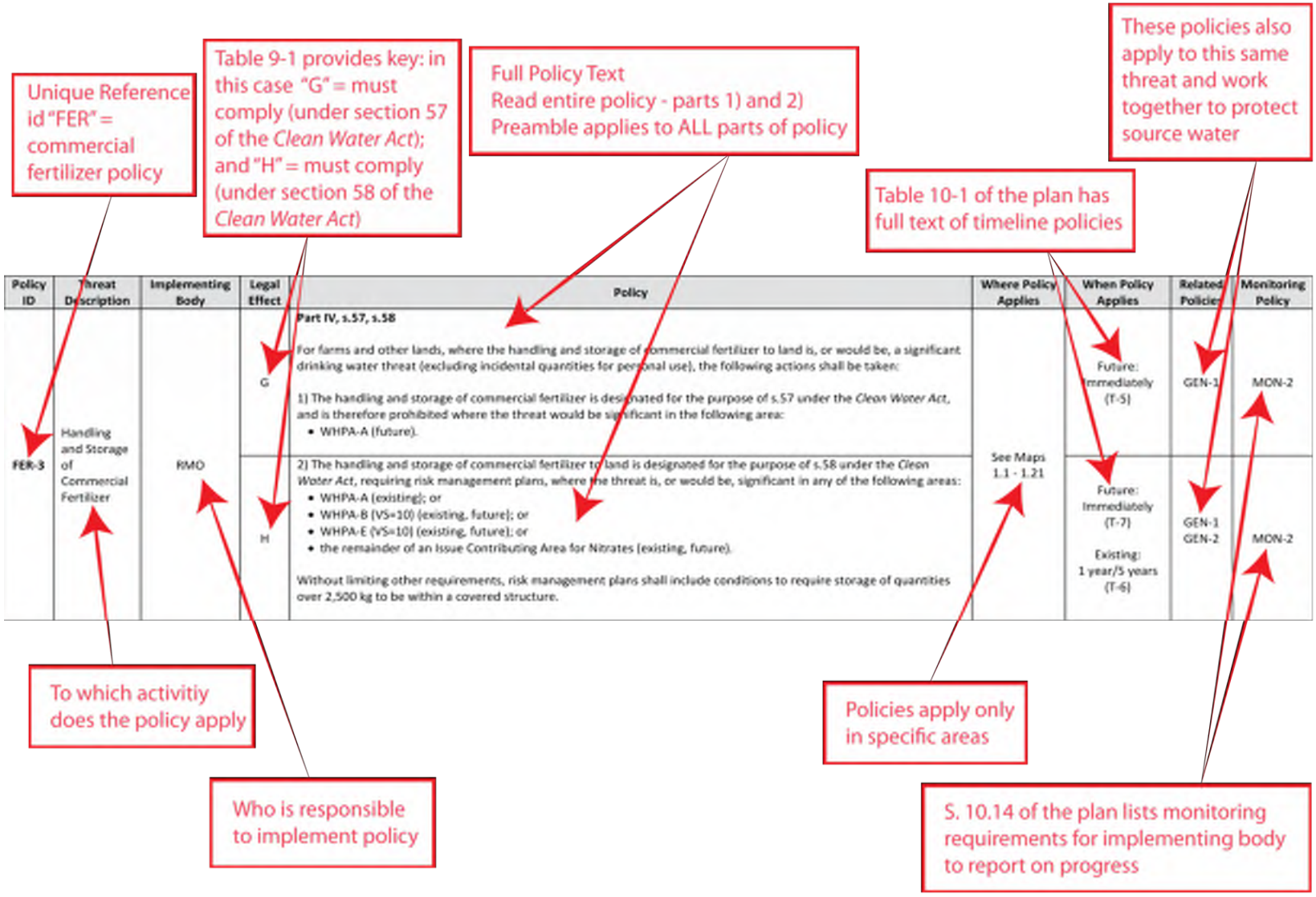
10.1 ORGANIZATION OF POLICIES

The policies are organized by threat activity. Each threat activity begins with a brief description of the threat, and a summary of where the threat is significant based on the vulnerable area and vulnerability score. Included in the description of the threat are specific circumstance numbers which will help when determining the threat classification of a specific threat activity. In order to determine whether a specific threat activity is subject to a policy, you must refer to the Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* available on the CTC website at www.ctcswp.ca to determine if the activity meets the specific circumstances to be a significant drinking water threat. If the activity is taking place in an Issue Contributing Area, and is releasing one of the chemicals identified as an issue in the *Tables of Drinking Water Threats*, the activity is a significant drinking water threat, regardless of vulnerability score. Following the description is a table listing the threat policies applicable to the threat. All policies are for significant threats, unless noted directly in the policy.

10.1.1 How to Read the Policies

Each threat activity is organized into a table (see **Figure 10-1** for example). Policies that have multiple parts must be read in their entirety. For questions on how to read the policies, contact CTC SPR staff for information (www.ctcswp.ca).

Figure 10-1: How to Read the Plan



10.1.2 Definitions

Existing Threat Activity

An existing threat activity shall mean the following, unless expressly stated in a policy:

a) an existing use, activity, building or structure at a location in a vulnerable area that is in compliance with all applicable requirements, and that was being used or had been established for the purposes of undertaking the threat activity, at any time within ten years prior to the date of approval of the Source Protection Plan, or
b) an expansion of an existing use or activity that reduces the risk of contaminating drinking water nor depletes drinking water sources, or
c) an expansion, alteration or replacement of an existing building or structure that does not increase the risk of contaminating drinking water nor depletes drinking water sources.

For clarity, the definition of an existing threat activity includes a change in land ownership and the rotation of agricultural lands among crops or fallow conditions, and allows for alternating between sources of nitrates (agricultural source material, commercial fertilizer, and Category 1 non-agricultural source material).

Future threat activities are anything not covered under existing.

Transition

"Existing Threat" policies apply to prescribed drinking water threat activities under the following circumstances:

1) A drinking water threat activity that is part of a development proposal where a Complete Application (as determined by the municipality or Niagara Escarpment Commission) was made under the *Planning Act*, *Condominium Act* or *Niagara Escarpment Planning and Development Act* (NEPDA) prior to the day the Source Protection Plan comes into effect. The policy for "existing" drinking water threats also applies to any further applications required under the *Planning Act*, *Condominium Act*, Prescribed Instruments, or a development permit under the NEPDA, to implement the development proposal.

2) A drinking water threat activity that is part of an application accepted for a Building Permit, which has been submitted in compliance with Division C 1.3.1.3 (5) of the *Ontario Building Code* prior to the day the Source Protection Plan comes into effect.

3) A drinking water threat activity that is part of an application accepted for the issuance or amendment of a prescribed instrument prior to the day the source protection plan comes into effect.

10.1.3 Timelines for Implementation

The following table **(Table 10-1)** outlines the implementation timelines for the policies in the Source Protection Plan. In the policy tables organized by threat, the third column from the right called "When Policy Applies" contains a brief description of the timeline associated with the existing or future policy and the timeline code (i.e., T-1, T-2), that corresponds to the timelines outlined in the following table. These timeline policies **(Table 10-1)** provide greater detail on when the policy applies than the short reference contained within the threat specific policy.

Table 10-1: Timelines for Policy Implementation

Policy ID	Timelines for Policy Implementation
Prescribed Instruments	
T-1	Prescribed Instruments (existing) shall be reviewed (and amended, as necessary) within 3 years of the date the Source Protection Plan takes effect, or such other date as the Director determines.
T-2	Prescribed Instruments (existing), where prohibited, shall not be renewed when the current Prescribed Instrument expires, and the significant threat activity to which the Prescribed Instrument pertains, shall cease no later than 5 years from the date the Source Protection Plan takes effect.
T-3	The relevant Ministry shall comply with the Prescribed Instrument policy (future) immediately upon the date the Source Protection Plan takes effect.
Part IV Tools	
T-4	Activities (existing) designated for the purpose of s.57 under the Clean Water Act as prohibited, shall be prohibited by the Risk Management Official within 180 days from the date the Source Protection Plan takes effect as per s. 57(2) under the Clean Water Act, unless otherwise specified within the policy.
T-5	Activities (future) designated for the purpose of s.57 under the Clean Water Act are prohibited immediately upon the date the Source Protection Plan takes effect.
T-6	Activities (existing) designated for the purpose of s.58 under the Clean Water Act, requiring risk management plans shall be identified and confirmed within 1 year by the Risk Management Official. Risk management plans shall be established within 5 years from the date the Source Protection Plan takes effect.
T-7	Activities (future) designated for the purpose of s.58 under the Clean Water Act, requiring risk management plans, are prohibited until such time as a risk management plan is approved by the Risk Management Official, immediately upon the date the Source Protection Plan takes effect.
Land Use Planning	
T-8	Official plans shall be amended for conformity with the Source Protection Plan within 5 years from the date the Source Protection Plan takes effect, or at the time of the next review in accordance with s.26 of the Planning Act, whichever occurs first. Zoning by-laws shall be amended within 3 years after the approval of the official plan.
T-9	Decisions on planning matters shall conform with the policy immediately upon the date the Source Protection Plan takes effect.
Education and Outreach, Incentives, Research	
T-10	Education and outreach (materials, programs, etc.) shall be developed and implemented within 2 years from the date the Source Protection Plan takes effect.
T-11	Incentives shall be considered within 2 years from the date the Source Protection Plan takes effect.
T-12	Research shall be initiated within 2 years from the date the Source Protection Plan takes effect, contingent on funding.
Specify Action	
T-13	A prioritized maintenance inspection program shall be in effect no later than January 2017.
T-14	The policy shall be complied with within 180 days from the date the Source Protection Plan takes effect.
T-15	The policy shall be considered within 2 years from the date the Source Protection Plan takes effect.
T-16	The policy shall be initiated within 2 years from the date the Source Protection Plan takes effect.
T-17	The policy shall be implemented within 2 years from the date the Source Protection Plan takes effect.
T-18	The policy shall be implemented immediately upon the date the Source Protection Plan takes effect.

10.1.4 General and Other Policies

General policies apply to more than one group of threat activities, while Other policies only apply to specific threats or locations. Policies are shown below.

Policy ID	Implementing Body	Legal Effect	Policy	When Policy Applies	Related Policies	Monitoring Policy
GEN-1	Municipality RMO	A I	**s.59 Restricted Land Uses** Land uses are designated for the purpose of Section 59 Restricted Land Uses under the *Clean Water Act, 2006* in all areas where the following activities are, or would be, a significant drinking water threat: • The establishment, operation or maintenance of a waste disposal site (within the meaning of Part V of the *Environmental Protection Act)* that does not require approval under the *Environmental Protection Act* or the *Ontario Water Resources Act* (excluding wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid industrial waste) • The application or storage of agricultural source material • The application or storage of non-agricultural source material (Category 1) • The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard • The application, handling or storage of commercial fertilizer • The application of pesticide to land • The handling and storage of pesticide at a manufacturing, processing or wholesaling facility, retail outlet or custom applicator's storage yard • The application, handling and storage of road salt • The storage of snow (snow dumps) • The handling and storage of fuel that requires s.57 Prohibition or s.58 Risk Management Plan • The handling and storage of DNAPLs and organic solvents • The management of runoff that contains chemicals used in the de-icing of aircraft • An activity that reduces recharge of an aquifer	Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	WST-1 WST-6 ASM-2 ASM-4 NASM-1 NASM-2 LIV-1 LIV-3 FER-2 FER-3 PES-1 PES-2 SAL-1 SAL-2 SAL-7 SNO-1 FUEL-3 DNAP-1 OS-1 DI-1 REC-2	MON-1 MON-2

Policy ID	Implementing Body	Legal Effect	Policy	When Policy Applies	Related Policies	Monitoring Policy
GEN-2	Municipality	E	**Specify Action** Where an activity requires a Risk Management Plan, the municipality shall ensure through their authority that the RMO and RMI responsible for enforcement will establish a priority for how inspections will be conducted to ensure that the activity ceases to be, or does not become, a significant drinking water threat. Ongoing inspections should be conducted at least once every five 5 years or on a basis deemed appropriate by the RMO and RMI.	See Policy	WST-1 PES-2 WST-6 SAL-1 ASM-2 SAL-2 ASM-4 SAL-7 NASM-1 SNO-1 NASM-2 FUEL-3 LIV-1 DNAP-1 LIV-3 OS-1 FER-2 DI-1 FER-3 REC-2 PES-1	MON-1
GEN-3	Provincial Ministry	K	**Specify Action** Where an activity requires approval using a Prescribed Instrument, the regulatory authority shall undertake compliance/verification inspections to confirm that any new or amended conditions of approval are, or have been, implemented by the facility owner within 3 years of the date of the new or amended approval to ensure that the activity ceases to be, or does not become, a significant drinking water threat. Ongoing inspections should be conducted at least once every 5 years or on a basis deemed appropriate by the Issuing Director.	See Policy	WST-4 ASM-3 WST-7 LIV-2 SWG-8 FER-1 SWG-11 FUEL-1 SWG-13 FUEL-2 SWG-15 LO-SEW-1 SWG-17 LO-SEW-2 ASM-1 DEM-1	MON-4

Policy ID	Implementing Body	Legal Effect	Policy	When Policy Applies	Related Policies	Monitoring Policy
GEN-4	MOECC	K	**Incentive** The Ministry of the Environment and Climate Change should maintain and expand the Ontario Drinking Water Stewardship Program and/or fund other relevant programs to enable local delivery to implement risk management measures for the following activities where they are a significant drinking water threats: a) Septic systems governed under the *Building Code Act*; b) Application and storage of ASM; c) Application, handling and storage of NASM; d) Use of land as livestock grazing or pasturing land, an outdoor confinement area or farm-animal yard; e) Application, handling and storage of fertilizer; and f) Application, handling and storage of pesticide.	Existing: Consider within 2 years (T-15)	SWG ASM NASM LIV FER PES	MON-4
GEN-5	Municipality	E	**Incentive** Where an activity is a significant drinking water threat, the municipality shall consider providing incentive programs to encourage actions to reduce the risks to source water.	Existing: Consider within 2 years (T-15)	All Threats	MON-1
GEN-6	MOECC	K	**Specify Action** The Ministry of the Environment and Climate Change is requested to continue its funding to municipalities and Source Protection Authorities under source protection programs to continue local research into Issues (nitrogen, pathogen, sodium, chloride) to determine where the following activities are a contributing source of the contaminant in Issue Contributing Areas: a) Application of untreated septage to land; b) The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage; c) Application and storage of ASM; d) Application, handling and storage of NASM; e) Use of land as livestock grazing or pasturing land, an outdoor confinement area or farm-animal yard; f) Application, handling and storage of fertilizer; g) Application, handling and storage of road salt; and h) Storage of snow.	Existing: Consider within 2 years (T-15)	WST SWG ASM NASM LIV FER SAL SNO	MON-4

Policy ID	Implementing Body	Legal Effect	Policy	When Policy Applies	Related Policies	Monitoring Policy
GEN-7	Municipality	E	**Specify Action** Where municipal groundwater monitoring shows increasing or decreasing trends and/or exceeds Ontario Drinking Water Standards, the municipality shall investigate and share the information with the RMO, the Ministry of the Environment and Climate Change, the Ministry of Agriculture, Food and Rural Affairs (for nitrates or pathogens) and the Source Protection Authority.	Existing & Future: Initiate within 2 years (T-12)	All ICA Threats (Nitrogen, Pathogen, Sodium or Chloride) WST SWG ASM NASM LIV FER SAL SNO	MON-1
GEN-8	Municipality	J	**Specify Action** Where education and outreach materials are prepared and delivered to significant drinking water threat areas, the municipality is encouraged to deliver those materials to affected properties and businesses in moderate and low threat areas.	Existing & Future: Consider within 2 years (T-15)	WST-2 SWG-2 SWG-7 SWG-10 NASM-5 FER-4 PES-3 SAL-8 FUEL-4 DNAP-2 OS-2 DEM-5 REC-3	MON-1
OTHER-1	Niagara Escarpment Commission	K	**Specify Action** The Niagara Escarpment Commission is requested to initiate amendments to the Niagara Escarpment Plan (NEP), no later than in their next scheduled plan review cycle, to incorporate from the Source Protection Plans the relevant policies, restrictions and conditions into appropriate sections of the NEP, in order to protect existing and future drinking water sources in Source Protection Areas by ensuring activities cease to be or do not become significant drinking water threats.	Existing & Future: Initiate within 2 years (T-16)	N/A	MON-4

10.2 WASTE

Definition

Waste means the establishment or operation of a waste disposal site. Waste includes domestic, industrial or municipal waste or refuse, ashes, garbage, refuse and other materials designated under the *Environmental Protection Act*, *1990* (*EPA*).

A "waste disposal site" means:

- Any land upon, into, in or through which, or building or structure in which, waste is deposited, disposed of, handled, stored, transferred, treated or processed;
- Any operation carried out or machinery or equipment used in connection with the depositing, disposal, handling, storage, transfer, treatment or processing of waste.

Ontario Regulation 347 under the *EPA* deals with waste handling, storage and disposal.

Why is Waste a Threat to Drinking Water Sources?

A number of chemicals and pathogens from the application, handling and storage of waste, could make their way into drinking water sources. There are ten potential sub-categories of this threat, three of which have been identified as existing significant threats in the CVSPA and TRSPA:

- Storage of hazardous or liquid industrial waste at disposal sites (see circumstances #1884-1913)
- Storage of waste described in clauses (p), (q), (r), (s), (t), or (u) of the definition of hazardous waste in O. Reg. 347 of *EPA* (small quantity wastes)[1] (see circumstances #1914-1943)
- Application of untreated septage to land (see circumstances #96-101, 1969)

[1] These refer to small quantities of hazardous waste, empty hazardous waste containers, and cleanup materials from small spills. The small quantity thresholds have been established by the Ministry of the Environment and Climate Change in the waste regulation and procedures.

The other seven sub-categories of waste threats are:

- Storage, treatment and discharge of tailings from mines (see circumstances #1533-1584)
- Landfarming of petroleum refining waste (see circumstances #1585-1602)
- Landfilling (hazardous waste) (see circumstances #1603-1638)
- Landfilling (municipal waste) (see circumstances #1639-1674)
- Landfilling (solid non-hazardous industrial or commercial) (see circumstances #1675-1710)
- Liquid industrial waste injection into a well (see circumstances #1711-1878)
- PCB waste storage (see circumstances #1879-1883)

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identify a number of chemicals that could make their way from waste disposal sites into the groundwater and/or surface water under certain conditions. Pathogens may also be a concern, for example from untreated septage. Contaminants of concern for drinking water sources that may occur in waste include:

- Arsenic
- Barium
- Cadmium
- Chromium VI
- Copper
- Dichlorophenoxy acetic-acid
- Lead
- Mercury
- Nitrogen
- Phosphorus
- Selenium
- Silver
- Trichlophenoxyacetic acid-2,4,5
- Vinyl Chloride
- Pathogens

See **Table 10-2** for when and where waste may be a significant drinking water threat.
Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. In the case of the application of untreated septage to land, this activity may also be a significant drinking water threat anywhere in an Issue Contributing Area (ICA) for nitrates or pathogens. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-2: When/where waste may be a significant drinking water threat

Prescribed Drinking Water Threat	Waste Threat Sub-category	Area and Vulnerability Score (VS)
The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*	Storage of hazardous or liquid industrial wastes (excluding those described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste)	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9)
	Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10)
	Application of untreated septage to land	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens
	Storage, treatment and discharge of tailings from mines	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9)
	Landfarming of petroleum refining waste	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9)
	Landfilling of hazardous waste	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9)
	Landfilling of municipal waste or solid non-hazardous industrial or commercial waste	• WHPA-A • WHPA-B (VS ≥ 8) • WHPA-C (VS = 8) • WHPA-E (VS ≥ 9)
	Liquid industrial waste injection into a well	• WHPA-A • WHPA-B (VS ≥ 8) • WHPA-C (VS = 8)
	PCB waste storage	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10)

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
WST-1	Storage of Hazardous or Liquid Industrial Wastes (not included in the small quantity exemptions)	RMO	H	**Part IV, s.58** The establishment, operation, or maintenance of a site used by the generator to store hazardous or liquid industrial waste which is not included in the small quantity exemption in Ontario Regulation 347 under the *Environmental Protection Act*, is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future).	See Maps 1.1 – 1.21	Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2
WST-2	Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid or industrial waste	Municipality MOECC	E K	**Education and Outreach** The municipality shall deliver education and outreach materials and programs where the storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid or industrial waste is, or would be, a significant drinking water threat targeted towards ensuring that facilities that generate small quantities of waste manage the storage of these wastes so that they cease to be, or do not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future). Where appropriate education and outreach materials prepared by the Ministry of the Environment and Climate Change are available, the municipality shall deliver those materials.	See Maps 1.1 – 1.21	Existing & Future: 2 years (T-10)	GEN-8	MON-1 MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
WST-3	Application of Untreated Septage to Land	MOECC	C	**Prescribed Instrument** 1) The application of untreated septage to land shall be prohibited where the activity would be a significant drinking water threat in the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 8) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: Upon expiry or within 5 years (T-2)	N/A	MON-4
				2) The application of untreated septage to land may continue only until the expiry of the current approval, after which time it shall be considered a future activity in any of the following areas: • WHPA-B (VS = 10) (existing); or • WHPA-E (VS ≥ 8) (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing).		Existing: Upon expiry or within 5 years (T-2)	N/A	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
WST-4	• Storage, Treatment, and Discharge of Tailings from Mines • Landfarming of Petroleum Refining Waste • Landfilling (Hazardous Waste) • Landfilling (Municipal Waste) • Landfilling (Solid Non-Hazardous Industrial or Commercial Waste) • Liquid Industrial Waste Injection into a Well • Storage of Hazardous or Liquid Industrial Waste (at large facilities such as landfills and transfer stations) • Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid industrial waste (at large facilities such as landfills and transfer stations)	MOECC	C	**Prescribed Instrument** 1) Waste disposal sites (future) shall be prohibited where the storage, generation or management of waste would be a significant drinking water threat, where these activities include: a) Storage, treatment, and discharge of tailings from mines; b) Landfarming of petroleum refining waste; c) Landfilling (hazardous waste); d) Landfilling (municipal waste); e) Landfilling (solid non-hazardous industrial or commercial waste); f) Liquid industrial waste injection into a well; g) Storage of hazardous or liquid industrial waste (large facilities such as landfills and transfer stations); and h) Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid industrial waste (large facilities such as landfills and transfer stations).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	WST-5	MON-4
				2) Where a waste disposal site (existing) is in an area where the storage, generation or management of waste is a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed to ensure appropriate terms and conditions are included so that the activity ceases to be a significant drinking water threat, where waste disposal sites include: a) Storage, treatment, and discharge of tailings from mines; b) Landfarming of petroleum refining waste; c) Landfilling (hazardous waste); d) Landfilling (municipal waste); e) Landfilling (solid non-hazardous industrial or commercial waste); f) Liquid industrial waste injection into a well; g) Storage of hazardous liquid industrial waste (at large facilities such as landfills and transfer stations); and h) Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid industrial waste (at large facilities such as landfills and transfer stations).		Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
WST-5	•Storage, Treatment, and Discharge of Tailings from Mines •Landfarming of Petroleum Refining Waste •Landfilling (Hazardous Waste) •Landfilling (Municipal Waste) •Landfilling (Solid Non-Hazardous Industrial or Commercial Waste) •Liquid Industrial Waste Injection into a Well •Storage of Hazardous or Liquid Industrial Waste (at large facilities such as landfills and transfer stations) Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid industrial waste (at large facilities such as landfills and transfer stations)	Planning Approval Authority	A	**Land Use Planning** The use of land for waste disposal (future) shall be prohibited where the storage or generation of waste would be a significant drinking water threat at the following types of waste disposal sites: a) Storage, treatment, and discharge of tailings from mines; b) Landfarming of petroleum refining waste; c) Landfilling (hazardous waste); d) Landfilling (municipal waste); e) Landfilling (solid non-hazardous industrial or commercial waste); f) Liquid industrial waste injection into a well; g) Storage of hazardous or liquid industrial waste (at large facilities such as landfills and transfer stations); h) Storage of wastes described in clauses (p), (q), (r), (s), (t) or (u) of the definition of hazardous waste, or in clause (d) of the definition of liquid industrial waste (at large facilities such as landfills and transfer stations).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	WST-4	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
WST-6	PCB Waste Storage	RMO	G	**Part IV, s.57, s.58** Where an approval under the *Environmental Protection Act* is not required, the establishment, operation or maintenance of a waste disposal site, including for the storage of PCB waste where it is, or would be, a significant drinking water threat, will require the following actions to be taken: 1) The storage of PCB waste is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The storage of PCB waste is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS = 10) (existing).		Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2
WST-7	PCB Waste Storage (temporary waste destruction units)	MOECC	C	**Prescribed Instrument** Where a temporary waste destruction unit for PCBs is required in an area where the storage of PCB waste is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future).	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3	MON-4

10.3 SEWAGE

Definition

Sewage is the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage. Sewage includes drainage, storm water, commercial and industrial wastes, and other matters or substances defined in the *Ontario Water Resources Act, 1990*. Sewage systems include stormwater retention pond discharges, sewage treatment plant bypasses, septic systems that service individual properties and others as identified below.

Why is Sewage a Threat to Drinking Water Sources?

A number of chemicals and pathogens from sewage could make their way into drinking water sources. There are nine potential sub-categories of this threat, five of which have been identified as existing significant threats in the CTC:

- Septic system (see circumstances #695-706, 1956)
- Septic system holding tank (see circumstances #707-718, 1957)
- A storm water management facility designed to discharge storm water to land or surface water (see circumstances #277-504, 1949)
- Sanitary sewers and related pipes (see circumstances #631-694, 1958)
- Storage of sewage (e.g., sewage treatment plant storage tanks) (see circumstances #904-1097, 1960)

The remaining four sub-categories are:

- Combined sewer discharge from a stormwater outlet to surface water (see circumstances #212-276, 1947)
- Industrial effluent discharges (see circumstances #505-630, 1950-1954)
- Sewage treatment plant bypass discharge to surface water (see circumstances #719-783, 1948)
- Sewage treatment plant effluent discharges (includes lagoons) (see circumstances #784-903, 1959)

Small septic systems (for single family homes) are regulated under the *Ontario Building Code Act, 1992.* Multi-residential septic systems and large systems (greater than 10,000 litres per day (L/day)) are

regulated under the *Ontario Water Resources Act, 1990*. From the sub-threat activities mentioned above, the specific chemicals and pathogens that threaten drinking water sources include:

- Acetone
- Aluminum
- BTEX
- Cadmium
- Chloride
- Chromium
- Dichlorobenzene-1,4(para)
- Haxachlorobenzene
- Lead
- Mecoprop
- Mercury
- NDMA
- Nitrate
- Petroleum hydrocarbons
- Total phosphorus
- PAHs
- PCBs
- Sodium
- Trichloroethylene
- Vinyl chloride
- Pathogen

**Note: Total phosphorus is not considered to be a threat for groundwater. It is a threat for surface water because excessive amounts of total phosphorus in surface water can result in eutrophication and toxic algae blooms.

See **Table 10-3** for when and where sewage may be a significant drinking water threat.

Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. A number of these activities may also be <u>significant</u> drinking water threats anywhere within an Issue Contributing Area (ICA). If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score. The exception to this is for septic systems subject to the *Ontario Building Code Act, 1992* in an Issue Contributing Area for Sodium or Chloride.

Table 10-3: When/where sewage may be a significant drinking water threat

Prescribed Drinking Water Threat	Sewage Threat Sub-category	Area and Vulnerability Score (VS)
The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Septic system	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10) • Anywhere in an ICA for Nitrates, Pathogens, Sodium* or Chloride* *subject to the *Ontario Water Resources Act*
	Septic system holding tank	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10) • Anywhere in an ICA for Nitrates, Pathogens, Sodium* or Chloride* *subject to the *Ontario Water Resources Act*
	Combined sewer discharge from a stormwater outlet to surface water	• WHPA-E (VS ≥ 8) • Anywhere in a WHPA-E in an ICA for Nitrates or Pathogens
	A storm water management facility designed to discharge storm water to land or surface water	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates, Pathogens or Chloride
	Industrial effluent discharges	• WHPA-E (VS ≥ 8) • Anywhere in a WHPA-E in an ICA for Nitrates, Pathogens or Chloride
	Sanitary sewers and related pipes	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10) • Anywhere in an ICA for Nitrates or Pathogens
	Sewage treatment plant bypass discharge to surface water	• WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens
	Sewage treatment plant effluent discharges (Includes lagoons)	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens
	Storage of sewage (e.g., treatment plant tanks)	• WHPA-A • WHPA-B (VS ≥ 8) • WHPA-C (VS = 8) • WHPA-E (VS ≥ 9) • Anywhere in an ICA for Nitrates or Pathogens

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-1	Septic Systems Governed under the *Building Code Act*	Municipality	E	**Specify Action** A prioritized maintenance inspection program for septic systems, including holding tanks, governed under the *Building Code Act* in locations where the threat is, or would be, significant, shall be implemented by the municipality or Principal Authority under the Ontario Building Code no later than January 2017. Inspection efforts should be prioritized based on systems that pose the greatest risk to sources of drinking water, such as the oldest systems or those in any of the areas of highest vulnerability: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).	See Maps 1.1 - 1.21	January 2017 (T-13)	N/A	MON-1
SWG-2	Septic Systems Governed under the *Building Code Act*	MOECC Municipality	K E	**Education and Outreach** The Ministry of the Environment and Climate Change should develop and produce education and outreach materials which shall be delivered by local municipalities to landowners with septic systems, including holding tanks, governed under the *Building Code Act* within significant threat areas that explains the rationale for the maintenance inspection program and the benefits of regular maintenance and properly functioning septic systems where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).	See Map 1.1 - 1.21	Existing & Future: Implement within 2 years (T-10)	GEN-8	MON-4 MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-3	Septic Systems Governed under the *Building Code Act*	Planning Approval Authority	A	**Land Use Planning** Where septic systems, including holding tanks, governed under the *Building Code Act* (vacant existing lot of record) would be a significant drinking water threat, vacant lots of record shall be subject to site plan control so that the location of the individual on-site sewage systems and replacement beds only be permitted if they are sited to ensure they do not become a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	N/A	MON-1
SWG-4	Septic Systems Governed under the *Building Code Act*	Planning Approval Authority	A	**Land Use Planning** 1) No new lots requiring septic systems, including holding tanks, governed under the *Building Code Act* shall be created where the activity would be a significant drinking water threat in the following area: • WHPA-A (future). 2) New lots requiring septic systems, including holding tanks, governed under the *Building Code Act* in an area where the activity would be a significant drinking water threat shall only be permitted if the municipality is satisfied that the activity will not become a significant drinking water threat. The hydrogeological assessment to determine appropriate development density shall be conducted by a professional licensed to carry out that work in any of the following areas: • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	N/A	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-5	Septic Systems Governed under the *Building Code Act*	MMAH	K	**Specify Action** The Ministry of Municipal Affairs and Housing is requested to amend the *Building Code Act* to permit municipalities to require higher standards for septic systems governed under the *Building Code Act* to deal with nitrate and pathogen threats where they would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-18)	N/A	MON-4
SWG-6	Septic Systems Governed under the *Building Code Act* and *Ontario Water Resources Act*	Municipality	E	**Specify Action** Where municipal sanitary sewers and capacity are available, the municipality is encouraged to pass by-laws under the *Municipal Act* to require mandatory connections to the municipal sewer system for new development and existing septic systems, including holding tanks, governed under the *Building Code Act* and the *Ontario Water Resources Act*, and the decommissioning of existing systems, where they are a significant drinking water threat located in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates, Pathogens, Sodium* or Chloride* (existing, future) (*not applicable to systems subject to *BCA*).	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	N/A	MON-1
SWG-7	Septic Systems Governed under the *Ontario Water Resources Act*	Municipality SPA	E	**Specify Action** The municipality in cooperation with local health units and Source Protection Authorities shall provide education and outreach materials for septic systems governed under the *Ontario Water Resources Act* (existing) to landowners in the entire Issue Contributing Area for Sodium or Chloride regarding: a) the use of more efficient water softeners to reduce the discharge of salt to the septic system; and b) promoting best management practices to ensure outdoor taps are not connected to the softened water line.	See Maps 1.2 1.3 1.14	Existing: Implement within 2 years (T-10)	GEN-8	MON-1 MON-3

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-8	Septic Systems Regulated under the *Ontario Water Resources Act*	MOECC	C	**Prescribed Instrument** 1) Septic systems with subsurface disposal of effluent, as regulated by the *Ontario Water Resources Act*, shall be prohibited where the activity would be a significant drinking water threat in the following area: • WHPA-A (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	SWG-9	MON-4
				2) Where septic systems with subsurface disposal of effluent, as regulated by the *Ontario Water Resources Act*, are in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates, Pathogens, Sodium or Chloride (existing, future).		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3 SWG-9	MON-4
SWG-9	Septic Systems Regulated under the *Ontario Water Resources Act*	Planning Approval Authority	A	**Land Use Planning** 1) New development dependent on septic systems with subsurface disposal of effluent, as regulated by the *Ontario Water Resources Act*, shall be prohibited where the activity would be a significant drinking water threat in the following area: • WHPA-A (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	SWG-8	MON-1
				2) New development dependent on septic systems with subsurface disposal of effluent, as regulated by the *Ontario Water Resources Act*, in an area where the activity would be a significant drinking water threat, shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location for the septic system is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas: • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or • the remainder of an Issue Contributing Area for Nitrates, Pathogens, Sodium or Chloride (future).				

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-10	Septic Systems Regulated under the *Ontario Water Resources Act*	MOECC	K	**Specify Action** The Ministry of the Environment and Climate Change is requested to develop guidelines for managing significant drinking water threats from septic systems with subsurface disposal of effluent, as regulated by the *Ontario Water Resources Act*, for distribution to developers, municipalities and other interested or affected parties in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates, Pathogens, Sodium or Chloride (existing, future).	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	GEN-8	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-11	A Storm Water Management Facility Designed to Discharge Storm Water to Land or Surface Water	MOECC	C	**Prescribed Instrument** 1) Discharge, including infiltration, from a stormwater management facility shall be prohibited into an area where the discharge would be a significant drinking water threat in the following area: • WHPA-A (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	SWG-12	MON-4
				2) Where the discharge from a stormwater management facility is in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates, Pathogens or Chloride (existing, future). Not limiting any other conditions to be included in the Environmental Compliance Approval, the Issuing Director should include the following conditions, where possible: • no stormwater is discharged from the pond into a WHPA-E where it would be classified as a significant drinking water threat; • existing infiltration ponds are lined to prevent infiltration of contaminants; and • in an Issue Contributing Area for Chloride, require actions to reduce salt loading into the pond from upstream lands where the application of road salt occurs.		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3 SWG-12	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-12	A Storm Water Management Facility Designed to Discharge Storm Water to Land or Surface Water	Planning Approval Authority	A	**Land Use Planning** 1) The use of land for the establishment of a new stormwater management facility shall be prohibited where the discharge (including infiltration) of stormwater would be into a significant threat area in: • WHPA-A (future). 2) The use of land for the discharge from a stormwater management facility in an area where the activity would be a significant drinking water threat shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location of discharge from a stormwater retention pond is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas: • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 8) (future); or • the remainder of an Issue Contributing Area for Nitrates, Pathogens or Chloride (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	SWG-11	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SWG-13	Sanitary Sewers and Related Pipes	MOECC	C	**Prescribed Instrument** Where sanitary sewers and related pipes are in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future). Not limiting any other conditions to be included in the Environmental Compliance Approval, the Issuing Director should include the following conditions, where possible: • requiring higher construction standards; and • inspections by the owner for leaks.	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3 SWG-14	MON-4
SWG-14	Sanitary Sewers and Related Pipes	Planning Approval Authority	A	**Land Use Planning** New development dependent on sanitary sewers and related pipes, in an area where the activity would be a significant drinking water threat, shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location for the sanitary sewer and related pipes is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	SWG-13	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
SWG-15	Storage of Sewage	MOECC	C	**Prescribed Instrument** 1) The storage of sewage shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-E (VS ≥ 9) (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	SWG-16	MON-4
				2) Where facilities for the storage of sewage are in an area where the activity is, or would be, a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS ≥ 8) (existing, future); or • WHPA-C (VS = 8) (existing, future); or • WHPA-E (VS ≥ 9) (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3 SWG-16	MON-4
SWG-16	Storage of Sewage	Planning Approval Authority	A	**Land Use Planning** 1) The use of land for the establishment of facilities for the storage of sewage shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-E (VS ≥ 9) (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	SWG-15	MON-1
				2) The use of land for the establishment of facilities for the storage of sewage, in an area where the activity would be a significant drinking water threat, shall only be permitted where it has been demonstrated by the proponent through an approved Environmental Assessment or similar planning process that the location for the storage of sewage is the preferred alternative and the safety of the drinking water system has been assured in any of the following areas: • WHPA-B (VS ≥ 8) (future); or • WHPA-C (VS = 8) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).				

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
SWG-17	Combined Sewer Discharge from a Storm-water Outlet to Surface Water Sewage Treatment Plant Bypass Discharge to Surface Water Industrial Effluent Discharges Sewage Treatment Plant Effluent Discharges (Includes Lagoons)	MOECC	C	**Prescribed Instrument** 1) Future sewage works shall be prohibited where the establishment, operation and maintenance of sewage works would be a significant drinking water threat, where the sewage works discharge is to surface water from: a) Combined sewer discharge from a stormwater outlet to surface water; and b) Sewage treatment plant bypass discharge to surface water, in any of the following areas: • WHPA-E (VS ≥ 8) (future); or • In any WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future). c) Industrial effluent discharges, in any of the following areas: • WHPA-E (VS ≥ 8) (future); or • In any WHPA-E in an Issue Contributing Area for Nitrates, Pathogens or Chloride (future). d) Sewage treatment plant effluent discharges (includes lagoons), in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 8) (future); or • In any WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	SWG-18	MON-4
				2) Where sewage works are in an area where the activity is a significant drinking water threat, the Environmental Compliance Approval that governs the activity shall be reviewed to ensure appropriate terms and conditions are included so that the activity ceases to be a significant drinking water threat, where the sewage works discharge is to surface water from: a) Combined sewer discharge from a stormwater outlet to surface water; and b) Sewage treatment plant bypass discharge to surface water, in any of the following areas: • WHPA-E (VS ≥ 8) (existing); or • In any WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing). c) Industrial effluent discharges, in any of the following areas: • WHPA-E (VS ≥ 8) (existing); or • In any WHPA-E in an Issue Contributing Area for Nitrates, Pathogens or Chloride (existing). d) Sewage treatment plant effluent discharges (includes lagoons), in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS ≥ 8) (existing); or • In any WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing).		Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
SWG-18	Combined Sewer Discharge from a Stormwater Outlet to Surface Water Sewage Treatment Plant Bypass Discharge to Surface Water Industrial Effluent Discharges Sewage Treatment Plant Effluent Discharges (Includes Lagoons)	Planning Approval Authority	A	**Land Use Planning** Development dependent on the establishment of sewage works shall be prohibited where sewage works would be a significant drinking water threat where the sewage works discharge is to surface water from: a) Combined sewer discharge from a stormwater outlet to surface water; and b) Sewage treatment plant bypass discharge to surface water, in any of the following areas: • WHPA-E (VS ≥ 8) (future); or • In any WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future). c) Industrial effluent discharges, in any of the following areas: • WHPA-E (VS ≥ 8) (future); or • In any WHPA-E in an Issue Contributing Area for Nitrates, Pathogens or Chloride (future). d) Sewage treatment plant effluent discharges (includes lagoons), in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 8) (future); or • In any WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	SWG-17	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Polices	Monitoring Policy
SWG-19	Combined Sewer Discharge from a Stormwater Outlet to Surface Water Sewage Treatment Plant Bypass Discharge to Surface Water Sewage Treatment Plant Effluent Discharges (Includes Lagoons)	Town of Orangeville CVSPA	E	**Research** The Town of Orangeville shall undertake research to determine the extent to which the sodium and chloride loading from the Town's Water Pollution Control Plant (WPCP) outfall into WHPA-E for Well 10 influences the rising sodium and chloride levels measured at this well and report back to the Credit Valley Source Protection Authority (CVSPA) within 2 years from the date the Source Protection Plan takes effect. The CVSPA in partnership with the Town of Orangeville shall provide the report along with recommendations to the CTC Source Protection Committee to determine whether to make a formal request to the Director pursuant to section 119 of the Technical Rules: Assessment Report under the *Clean Water Act, 2006* dated November 2009 to add this WPCP outfall as a Local Threat. If the WPCP outfall is added as a Local Threat then policies SWG-17 and SWG-18 shall apply.	See Map 1.3	See Policy	SWG-17 SWG-18	MON-1 MON-3

10.4 AGRICULTURAL THREATS

10.4.1 Application, Storage and Management of ASM

Definition

Agricultural Source Material (ASM) is a class of nutrients that can be applied to land for the purpose of improving the growth of agricultural crops and soil conditioning. Ontario Regulation 267/03 under the *Nutrient Management Act, 2002*, lists the following sources of ASM that may be produced, applied, stored, handled, or used on a farm:

- manure produced by farm animals (includes bedding materials);
- runoff from farm-animal yards and manure storages;
- wash water that has not been mixed with human body waste (e.g., from the milking centre);
- organic materials produced by intermediate operations that process the above materials (e.g., mushroom compost);
- anaerobic digestion output that does not include sewage biosolids or human body waste; and
- regulated compost (which contains dead farm animals).

Storing ASM can be at or above grade in a permanent nutrient storage facility or on a temporary field nutrient storage site (solid ASM only).

Why is ASM a Threat to Drinking Water Sources?

A number of chemicals and pathogens from ASM could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- The application of ASM to land (see circumstances #1-18, and 1944)
- The storage of ASM (see circumstances #1201-1224, 1962-1964)
- The management of ASM – aquaculture (see circumstance #1955) (Note: there are no existing or future significant threats possible for management of ASM)

ASM threats can occur on large or small farms – those regulated by the *Nutrient Management Act, 2002* (producing more than 300 nutrient units or phased-in) and those not regulated by the *Act* (producing less than 5 nutrient units or not yet phased-in). ASM is produced on farms with livestock, and under certain conditions, there are specific chemicals and pathogens that are able to make their way from

ASM application and storage sites into groundwater drinking sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following chemicals and pathogens as potential concerns:

- Nitrogen
- Total phosphorus
- Pathogens

Nitrogen is a concern for surface and groundwater, while phosphorus is only a concern for surface water, for example, in WHPAs where the wells are assessed as GUDI (groundwater under the influence of surface water). Permanent nutrient storage facilities are generally (but not always) located near barns and outdoor confinement areas. Temporary field nutrient storage facilities can be located near barns and outdoor confinement areas, as well as on fields where the ASM will be applied. The storage and application of ASM as potential threats to drinking water sources, is dependent on the vulnerability score of the specific area, and the combination of the percentage of managed land[2] and density[3] of livestock in the vulnerable area.

See **Table 10-4** for when and where application and storage of ASM may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for Nitrates or Pathogens. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

[2] "Managed land": includes cropland, fallow land, improved pasture, golf course, sports fields and lawns to which ASM, NASM or commercial fertilizer could be applied.

[3] "Livestock density" is the number of farm animals in a given area. It is standardized to **nutrient units per acre** to account for the fact that different types of animals produce different amounts of manure with different nutrient values. One (1) nutrient unit is the equivalent of 43 kilograms of nitrogen or 55 kilograms of phosphorus fertilizer. Please consult the local source protection authority to obtain information on the above calculations for a specific property.

Table 10-4: When/where application and storage of ASM may be a significant drinking water threat

Prescribed Drinking Water Threat	Application and Storage of ASM Threat Sub-category	Area and Vulnerability Score (VS)
The application of agricultural source material to land	The application of agricultural source material to land	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens
The storage of agricultural source material	The storage of agricultural source material	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
ASM-1	Application of Agricultural Source Material (ASM) to Land	OMAFRA	C	**Prescribed Instrument** 1) The application of ASM to land shall be prohibited where the activity is, or would be, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Pathogens (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: Upon expiry or within 5 years (T-2)	N/A	MON-4
				2) Where the application of ASM to land is in an area where the activity is, or would be, a significant drinking water threat, the Nutrient Management Plan or Strategy that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat. In addition to any other risk management measures required through the Prescribed Instrument, the Prescribed Instrument shall as a minimum ensure: a) the application of ASM is not applied during restricted periods, or any other time when the soil is snow covered or frozen consistent with the limitations of subsection 52.2 – 52.4 of Ontario Regulation 267/03 under the *Nutrient Management Act, 2002* to avoid runoff; and b) soil testing is required for plant available nitrogen each year prior to application of ASM to determine appropriate application rates, in any of the following areas: • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Pathogens (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
ASM-2	Application of Agricultural Source Material (ASM) to Land	RMO	G	**Part IV, s.57, s.58** For farms that do not require a Nutrient Management Plan or Strategy, where the application of ASM is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The application of ASM is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Pathogens (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5) Existing: 180 days (T-4)	GEN-1	MON-2
			H	2) The application of ASM is designated for the purpose of s.58 under the Clean Water Act, requiring risk management plans where the threat is, or would be significant. In addition to any other risk management measures required through the risk management plan, the risk management plan shall as a minimum ensure: a) the application of ASM is not applied during restricted periods, or any other time when the soil is snow covered or frozen consistent with the limitations of subsection 52.2 – 52.4 of Ontario Regulation 267/03 under the Nutrient Management Act, 2002 to avoid runoff; and b) soil testing is required for plant available nitrogen each year prior to application of ASM to determine appropriate application rates, in any of the following areas: • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Pathogens (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
ASM-3	Storage of Agricultural Source Material (ASM)	OMAFRA	C	**Prescribed Instrument** 1) The storage of ASM shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	N/A	MON-4
				2) Where the storage of ASM is in an area where the activity is, or would be, a significant drinking water threat, the Nutrient Management Plan or Strategy that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
ASM-4	Storage of Agricultural Source Material (ASM)	RMO	G	**Part IV, s.57, s.58** For farms that do not require a Nutrient Management Plan or Strategy, where the storage of ASM would be a significant drinking water threat, the following actions shall be taken: 1) The storage of ASM is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The storage of ASM is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2
ASM-5	Management of Agricultural Source Material (ASM) (Aquaculture)	MOECC	C	**Prescribed Instrument** The management of ASM (aquaculture) shall be prohibited where the activity is, or would be, a significant drinking water threat in the following areas: • An Issue Contributing Area for Pathogens (existing, future).	See Map 1.9	Future: Immediately (T-3) Existing: Upon expiry or within 5 years (T-2)	N/A	MON-4

10.4.2 Application, Handling and Storage of NASM

Definition

The application to land, handling and storage of non-agricultural source material (NASM) are prescribed drinking water threats listed in Regulation 287/07 under the *Clean Water Act, 2006*. NASM is one class of nutrients that are not produced on a farm, and can be applied to land for the purpose of improving the growth of agricultural crops and for soil conditioning. NASM includes the following materials that are intended to be applied to land as nutrients:

- pulp and paper biosolids;
- sewage biosolids;
- anaerobic digestion output, where less than 50% of the total material is on-farm anaerobic digestion materials (anaerobic digestion is a process used to decompose organic matter by bacteria in an oxygen-limited environment); and
- any other material that is not from an agricultural source and that is capable of being applied to land as a nutrient (such as materials from dairy product or animal food manufacturing).

Furthermore, the Categories of NASM are broken into 3 groups:

- Category 1 – unprocessed plant based materials such as fruit and vegetable peels;
- Category 2 – processed plant based materials such as bakery washwater;
- Category 3 – animal based materials such as meat and dairy washwater, sewage biosolids, and any material that is not listed in the other categories.

NASM can be applied to both agricultural and non-agricultural lands for nutrient enhancement and soil conditioning purposes. NASM that will be applied to fields on a farm can be stored in a permanent nutrient storage facility (usually a steel or concrete tank), or on a temporary field nutrient storage site (only for solid NASM stored for more than 24 hours). There are restrictions about what types of NASM can be stored on a farm and for how long.

Why is NASM a Threat to Drinking Water Sources?

Chemicals and pathogens from NASM could make their way into drinking water sources. The Ministry of the Environment's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- The application of NASM to land (including treated septage) (see circumstances #37-54, 1970-1971)
- The handling and storage of NASM (see circumstances #1409-1432, 1965-1968)

Under certain conditions, specific chemicals and pathogens can make their way from NASM application, handling or storage sites into groundwater drinking sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following chemicals and pathogens as potential concerns:

- Nitrogen
- Total phosphorus
- Pathogens

Nitrogen is a concern for both surface and groundwater, but phosphorus is mainly a concern for surface water. Nitrogen and phosphorus, are typically associated with human waste, household and personal care products (such as soap and detergents), and animal by-products.

Pathogens are associated with the following sources of NASM:

- seafood processing operations
- dairy producers
- dairy product manufacturing operations
- pulp and paper mills
- animal food manufacturing operations (from animal sources)
- meat plants
- sewage works

The assessment of chemical threats for the application of NASM to land considered the geographic location, percentage of managed land and livestock density. The assessment of pathogen threats for the application of NASM to land considered the geographic location and the source of the material. The

assessment of NASM storage sites, considered the geographic location, whether the storage facility is temporary or permanent, the source of the material, and whether the material is stored above or below grade.

See **Note:** to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for nitrates or pathogens. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-5 for when and where application and storage of NASM may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for nitrates or pathogens. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-5: When/where application and storage of NASM may be a significant drinking water threat

Prescribed Drinking Water Threat	Application, Handling and Storage of NASM Threat Sub-category	Area and Vulnerability Score (VS)
The application of non-agricultural source material to land	The application of non-agricultural source material to land (including treated septage)	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens
The handling and storage of non-agricultural source material	The storage of non-agricultural source material	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
NASM-1	Application of Non-Agricultural Source Material (NASM) to Land (Category 1)	RMO	G	**Part IV, s.57, s.58** Where the application of NASM (Category 1) to land is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The application of NASM (Category 1) to land is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future).	See Maps 1.1 - 1.21	Future: Immediately (T-5) Existing: 180 days (T-4)	GEN-1	MON-2
			H	2) The application of NASM (Category 1) to land is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates (existing, future); or • the remainder of an Issue Contributing Area for Nitrates (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2 NASM-5	MON-2
NASM-2	Handling and Storage of Non-Agricultural Source Material (NASM) (Category 1)	RMO	G	**Part IV, s.57, s.58** Where the handling and storage of NASM (Category 1) is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The handling and storage of NASM (Category 1) is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in the following area: • WHPA-A (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of NASM (Category 1) is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2 NASM-5	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
NASM-3	Application of Non-Agricultural Source Material (NASM) to Land (Category 2 and 3)	OMAFRA MOECC	C	**Prescribed Instrument** 1) The application of NASM (Category 2 and 3) to land shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 8) (future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	N/A	MON-4
				2) The application of NASM to land (existing) may continue only until the expiry of the current approval, after which time it would be considered as a future activity.		Existing: Upon expiry or within 5 years (T-2)	NASM-5	MON-4
NASM-4	Handling and Storage of Non-Agricultural Source Material (NASM) (Category 2 and 3)	OMAFRA MOECC	C	**Prescribed Instrument** The handling and storage of NASM (Category 2 and 3) shall be prohibited where the activity is, or would be, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: Upon expiry or within 5 years (T-2)	N/A	MON-4
NASM-5	Application of NASM to Land Handling and Storage of NASM	OMAFRA MOECC	K	**Education and Outreach** The Ministry of the Environment and Climate Change and the Ministry of Agriculture, Food and Rural Affairs are requested to provide to landowners and haulers that have a Prescribed Instrument or Risk Management Plan to haul, store or apply NASM, information on the importance of protecting source water and the location of the nearby municipal wells where the application, handling and storage of NASM is, or would be, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	GEN-8 NASM-1 NASM-2 NASM-3	MON-4

10.4.3 Livestock

Definition

The use of land for livestock grazing or pasturing, an outdoor confinement area or a farm-animal yard is prescribed drinking water threat #21 listed in Regulation 287/07 under the *Clean Water Act, 2006*.

- **Livestock** includes dairy, beef, swine, poultry, horses, goats, sheep, ratites (flightless birds), fur-bearing animals, deer, elk, game animals and birds, and other animals identified in the Minimum Distance Separation Guidelines (http://www.omafra.gov.on.ca/english/landuse/guide_toc.htm).
- **Grazing and pasturing land** is considered to be the land on which livestock eats growing herbaceous plants.
- An **outdoor confinement area** is an enclosure for livestock, deer, elk or game animals, and is further defined in O. Reg. 267/03 under the *Nutrient Management Act, 2002* as follows:
    1. It has no roof, except as described below in #3;
    2. It is composed of fences, pens, corrals or similar structures;
    3. It may contain a shelter to protect the animals from the wind or another shelter with a roof of an area of less than 20 square metres;
    4. It has permanent or portable feeding or watering equipment;
    5. The animals are fed or watered at the enclosure;
    6. The animals may or may not have access to other buildings or structures for shelter, feeding or watering; and
    7. Grazing and foraging provides less than 50 percent of dry matter intake.
- **Farm-animal yards** are outdoor livestock areas lined with concrete other than those meeting the definition of an outdoor confinement area. Food and water are not provided in farm-animal yards. They are generally used as outdoor exercise areas or as holding areas when barns are being cleaned.

Why is Livestock Grazing, Pasturing and Outdoor Confinement a Threat to Drinking Water Sources?

Livestock threats can be on large or small farms – those regulated by the *Nutrient Management Act, 2002* (with more than 5[4] nutrient units) and those not regulated by the *NMA* (less than 5 nutrient units). Chemicals and pathogens from the use of land as livestock grazing, pasturing, outdoor confinement, or farm-animal yard, could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities and the contaminants that could make their way into drinking water sources:

- Use of land as livestock grazing or pasturing, an outdoor confinement area or farm-animal yard
    - livestock/grazing (see circumstances #200-205, 1945)
    - outdoor confinement (see circumstances #206-211, 1946)
- Contaminants of potential concern - nitrogen, total phosphorus and pathogens

Nitrogen is a concern for both surface and groundwater, while phosphorus is a concern primarily for surface water. Generally speaking, the greater the number of livestock kept in a space, the greater the accumulation of manure, and the greater the risk of contaminating water sources with these nutrients and pathogens. Accordingly, the assessment of the potential threat to drinking water sources from use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard is dependent on the concentration of manure in a given area.

[4] The requirements of the *Nutrient Management Act, 2002* are being phased in by the province. Initially all farms with more than 300 nutrient units were required to comply. Remaining farms with more than 5 nutrient units become subject when they undertake a change which requires a municipal approval such as a building permit for a new structure or expansion.

See **Table 10-6** for when and where livestock may be a significant drinking water threat.

Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for Nitrates or Pathogens. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-6: When/where may be livestock a significant drinking water threat

Prescribed Drinking Water Threat	Livestock Threat Sub-category	Area and Vulnerability Score (VS)
The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard	The use of land as livestock grazing or pasturing land	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens
	The use of land as an outdoor confinement area or a farm-animal yard	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 8) • Anywhere in an ICA for Nitrates or Pathogens

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LIV-1	The Use of Land as Livestock Grazing or Pasturing Land (O. Reg. 385/08, s.3)	RMO	G	**Part IV, s. 57, s.58** Where the use of land as livestock grazing or pasturing land is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The use of land as livestock grazing or pasturing land (with an animal density >1 Nutrient Unit per acre) is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat is, or would be, significant in any of the following areas: • WHPA-A in an Issue Contributing Area for Nitrates or Pathogens (existing, future).	See Maps 1.1 - 1.21	Future: Immediately (T-5) Existing: 180 days (T-4)	GEN-1	MON-2
			H	2) The use of land as livestock grazing or pasturing land is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-A in an Issue Contributing Area for Nitrates or Pathogens with an animal density <1 Nutrient Unit per acre (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LIV-2	The Use of Land as an Outdoor Confinement Area or a Farm-Animal Yard (O. Reg. 385/08, s.3)	OMAFRA	C	**Prescribed Instrument** 1) The use of land as an outdoor confinement area or farm-animal yard shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	N/A	MON-4
				2) Where the use of land as an outdoor confinement area or farm-animal yard is in an area where the activity is, or would be, a significant drinking water threat, the Nutrient Management Plan or Strategy that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LIV-3	The Use of Land as an Outdoor Confinement Area or a Farm-Animal Yard (O. Reg. 385/08, s.3)	RMO	G	**Part IV, s.57, s.58** For lands that do not require a Nutrient Management Plan or Strategy, where the use of land as an outdoor confinement area or farm-animal yard is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The use of land for an outdoor confinement area or farm-animal yard is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where it would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (future); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The use of land as an outdoor confinement area or farm-animal yard is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-E (VS ≥ 8) which is not in an Issue Contributing Area for Nitrates or Pathogens (existing, future); or • WHPA-B (VS = 10) in an Issue Contributing Area for Nitrates or Pathogens (existing); or • WHPA-E in an Issue Contributing Area for Nitrates or Pathogens (existing); or • the remainder of an Issue Contributing Area for Nitrates or Pathogens (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

10.5 COMMERCIAL FERTILIZER

Definition

Commercial fertilizer is one of the prescribed drinking water threats listed in Regulation 287/07 under the *Clean Water Act, 2006*. Commercial fertilizer is a manufactured compound containing nitrogen, phosphorus, potassium or other minerals intended for use as a plant nutrient. In the drinking water source protection process, commercial fertilizer is distinguished from other nutrient sources – agricultural source material (ASM) and non-agricultural source material (NASM).

Why is Fertilizer a Threat to Drinking Water Sources?

Chemicals from the application, handling and storage of fertilizer, could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- The application of commercial fertilizer to land (see circumstances #19-36)
- The handling and storage of commercial fertilizer (see circumstances #1273-1288)

The nitrogen and phosphorus in commercial fertilizer can enter drinking water sources due to the improper use and storage of the fertilizer. The improper use of fertilizer includes the application of fertilizer without consideration for nutrients already available in the soil and plant requirements, or the inappropriate timing of application for plant growth cycles and weather conditions. Potential impacts of storing fertilizer relate to leaks and spills from aging infrastructure or improper storage techniques. Phosphorus is often associated with runoff and soil erosion from both the storage and application of commercial fertilizer.

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following chemicals as potential concerns:

- Nitrogen
- Total phosphorus

Nitrogen is a concern for both surface and groundwater, but phosphorus is primarily a concern for surface water. The assessment of potential threats to drinking water sources from commercial fertilizer application is dependent on the location and the combination of the percentage of managed land, and

livestock density in the vulnerable area and where the fertilizer is applied. The potential threat to drinking water from the storage of fertilizer depends on the location, type of facility where it is stored, and the quantity stored.

See **Table 10-7** for when and where application and storage of commercial fertilizer may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for Nitrates. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-7: When/where application and storage of commercial fertilizer may be a significant drinking water threat

Prescribed Drinking Water Threat	Commercial Fertilizer Threat Sub-category	Area and Vulnerability Score (VS)
The application of commercial fertilizer to land	The application of commercial fertilizer to land	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9) • Anywhere in an ICA for Nitrates
The handling and storage of commercial fertilizer	The storage of commercial fertilizer	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10) • Anywhere in an ICA for Nitrates

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FER-1	Application of Commercial Fertilizer to Land	OMAFRA	C	**Prescribed Instrument** 1) The application of commercial fertilizer (containing nitrogen) to land shall be prohibited where the activity is, or would be, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-E in an Issue Contributing Area for Nitrates (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: Upon expiry or within 5 years (T-2)	N/A	MON-4
				2) Where the application of commercial fertilizer (containing nitrogen or phosphorus) to land is in an area where the activity is, or would be, a significant drinking water threat, the Nutrient Management Plan or Strategy that governs the activity shall be reviewed or established to ensure appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) which is not in an Issue Contributing Area for Nitrates (existing, future); or • WHPA-E in an Issue Contributing Area for Nitrates (existing); or • the remainder of an Issue Contributing Area for Nitrates (existing, future).		Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FER-2	Application of Commercial Fertilizer to Land	RMO	G	**Part IV, s.57, s.58** For lands that do not require a Nutrient Management Plan or Strategy, where the application of commercial fertilizer to land is, or would be, a significant drinking water threat (excluding incidental quantities for personal use), the following actions shall be taken: 1) The application of commercial fertilizer (containing nitrogen) is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-E in an Issue Contributing Area for Nitrates (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5) Existing: 180 days (T-4)	GEN-1	MON-2
			H	2) The application of commercial fertilizer (containing nitrogen or phosphorus) to land is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) which is not in an Issue Contributing Area for Nitrates (existing, future); or • WHPA-E in an Issue Contributing Area for Nitrates (existing); or • the remainder of an Issue Contributing Area for Nitrates (existing, future).		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FER-3	Handling and Storage of Commercial Fertilizer	RMO	G	**Part IV, s.57, s.58** For farms and other lands, where the handling and storage of commercial fertilizer to land is, or would be, a significant drinking water threat (excluding incidental quantities for personal use), the following actions shall be taken: 1) The handling and storage of commercial fertilizer is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in the following area: • WHPA-A (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of commercial fertilizer to land is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates (existing, future). Without limiting other requirements, risk management plans shall include conditions to require storage of quantities over 2,500 kg to be within a covered structure.		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FER-4	Application of Commercial Fertilizer to Land Handling and Storage of Commercial Fertilizer	Municipality MOECC	E K	**Education and Outreach** The municipality shall deliver education and outreach materials and programs where the application, handling and storage of commercial fertilizer is, or would be, a significant drinking water threat, targeted towards: a) an individual for personal use to promote timely fertilizer application and best management practices in urban settings; and b) owners/tenants of non-agriculturally zoned lands to promote best management practices to safeguard water supplies from drinking water threats; in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9 for application; VS = 10 for handling and storage) (existing, future); or • the remainder of an Issue Contributing Area for Nitrates (existing, future). Where education and outreach materials prepared by the Ministry of the Environment and Climate Change are available, the municipality shall deliver those materials.	See Maps 1.1 - 1.21	Existing & Future: Implement within 2 years (T-10)	GEN-8	MON-1 MON-4

10.6 PESTICIDES

Definition

The application of pesticide to land and the handling and storage of pesticide are prescribed drinking water threats listed in Regulation 287/07 under the *Clean Water Act, 2006*. Pesticide is defined in the Ontario *Pesticides Act, 1990* as "any organism, substance or thing that is manufactured, represented, sold or used as a means of directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest or of altering the growth, development or characteristics of any plant life that is not a pest and includes any organism, substance or thing registered under the federal *Pest Control Products Act, 2002*." Pesticides are typically chemicals, but could be organisms, that are used to control undesirable pests such as weeds, insects, and fungi. Eleven pesticides are considered drinking water threats under the *Clean Water Act, 2006* (see below).

Why is Pesticide a Threat to Drinking Water Sources?

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identify the following sub-threats as potential concerns:

- The application of pesticide to land (circumstances #55-87)
- The handling and storage of pesticide (circumstances #1113-1200)

The 11 chemicals that could make their way, under certain conditions, from the application, storage or handling of pesticide into drinking water sources, are:

- Atrazine
- Dicamba
- Dichlorophenoxy Acetic Acid (2,4-D)
- Dichloropropene-1,3
- Glyphosate
- MCPA (2-methyl-4-chlorophenoxyacetic acid)
- MCPB (4-(4-chloro-2-methylphenoxy) butanoic acid)
- Mecoprop
- Metalaxyl
- Metolachlor or s-Metolachlor
- Pendimethalin

These substances are herbicides except for dichloropropene-1, 3, which is a nematicide (used to control nematodes) and Metalaxyl, which is a fungicide. Other pesticides are not considered to be drinking water threats.

Pesticide has historically been applied to agricultural, recreational, institutional, industrial, commercial and residential land uses. Since 2009, there has been a ban on the cosmetic use of pesticide in Ontario on lawns, vegetable and ornamental gardens, patios, driveways, cemeteries, parks and school yards. The major uses for pesticide will continue to be in agriculture and on golf courses.

The assessment of potential threats to drinking water sources from the application of commercial pesticide to land is dependent on the area of land to which the pesticide is applied: less than 1 hectare; between 1 and 10 hectares; or greater than 10 hectares. In general, the greater the application area, the greater the risk to drinking water. The assessment of potential threats to drinking water sources from the handling and storage of pesticide is dependent on the location, the type of storage (whether at a facility where it is manufactured or processed, or at a facility for retail sale or extermination), and the amount of pesticide stored.

See **Table 10-8** for when and where application, handling and storage of pesticides may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat.

Table 10-8: When/where application, handling and storage of pesticide may be a significant drinking water threat

Prescribed Drinking Water Threat	Pesticides Threat Sub-category	Area and Vulnerability Score (VS)
The application of pesticide to land	The application of pesticide to land	WHPA-A WHPA-B (VS = 10) WHPA-E (VS ≥ 8.1)
The handling and storage of pesticide	The handling and storage of pesticide	WHPA-A WHPA-B (VS = 10) WHPA-E (VS ≥ 9)

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
PES-1	Application of Pesticide to Land	RMO	H	**Part IV, s.58** The application of pesticide to land is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8.1) (existing, future). Without limiting other requirements, risk management plans shall incorporate appropriate agri-environmental best management practices and standards to ensure the activity ceases to be, or does not become, a significant drinking water threat.	See Maps 1.1 - 1.21	Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2
PES-2	Handling and Storage of Pesticide	RMO	G	**Part IV, s.57, s.58** Where the handling and storage of pesticide is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The handling and storage of pesticide is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in the following area: • WHPA-A (future); or	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of pesticide is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future). Without limiting other requirements, risk management plans shall incorporate appropriate agri-environmental best management practices and standards to ensure the activity ceases to be a significant drinking water threat.		Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
PES-3	Application of Pesticide to Land Handling and Storage of Pesticide	MOECC	K	**Education and Outreach** Where the application, handling and storage of pesticide is, or would be, a significant drinking water threat, the Ministry of the Environment and Climate Change should develop education, training and outreach programs promoting integrated pest management and alternative pest control best management practices, particularly for farms, golf courses and sports fields where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 8.1 for application; VS ≥ 9 for handling and storage) (existing, future).	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	GEN-8	MON-4
PES-4	Application of Pesticide to Land Handling and Storage of Pesticide	Municipality	E	**Incentive** Where the application, handling and storage of pesticide is a significant drinking water threat, the municipality shall consider providing incentive programs to encourage best management practices for agricultural/rural landowners to reduce the risks to groundwater where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS ≥ 8.1 for application; VS ≥ 9 for handling and storage) (existing).	See Maps 1.1 - 1.21	Existing: Consider within 2 years (T-11)	N/A	MON-1

10.7 ROAD SALT

Definition

The application, handling and storage of road salt is a prescribed drinking water threat listed in O. Reg. 287/07 under the *Clean Water Act, 2006.* Road salt is any product containing sodium and/or chloride that is used to maintain roads, parking lots and pedestrian areas. Most road salt is used as a de-icer or an ice prevention agent, but can also be used for dust suppression. The most commonly used products for de-icing and preventing ice formation on roads are sodium chloride and calcium chloride because they are effective and inexpensive. Road salt application works by breaking the bond formed between the pavement and the ice/compacted snow. Salt prevents this bond from forming because it reacts with moisture to create a layer of salty water (brine) which has a freezing point below zero degrees Celsius.

Why is Road Salt a Threat to Drinking Water Sources?

Chemicals from the application, handling and storage of road salt, could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- The application of road salt (see circumstances #88-95)
- The handling and storage of road salt (see circumstances #1433-1444)

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identify the chemicals that could make their way from the application or storage and handling of road salt under certain conditions into drinking water sources. Sodium and chloride can threaten drinking water sources in certain situations by making it unpalatable or unsafe. The aesthetic Ontario Drinking Water Objective (ODWO) for sodium is 200 milligrams per litre (mg/L). However, since sodium intake can present a health issue for some people, the local Medical Officer of Health must be notified by the municipality when concentrations are greater than 20 mg/L. At concentrations above 250 mg/L, chloride imparts a salty taste to drinking water.

See **Table 10-9** for when and where the application, handling and storage of road salt may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for Sodium or Chloride. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-9: Where/when the application, handling and storage of road salt may be a significant drinking water threat

Prescribed Drinking Water Threat	Road Salt Sub-category	Area and Vulnerability Score (VS)
The application of road salt	The application of road salt	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9) • Anywhere in an ICA for Sodium or Chloride
The handling and storage of road salt	The storage of road salt	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9) • Anywhere in an ICA for Sodium or Chloride

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-1	Application of Road Salt (Unassumed Roads and Private Parking Lots)	RMO	H	**Part IV, s.58** For unassumed roads and private parking lots with greater than 200 square metres, the application of road salt is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing, future). Without limiting other requirements, risk management plans shall include a goal to minimize salt usage through alternative measures, while maintaining roadway safety for users.	See Maps 1.1 - 1.21	Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2 SAL-3 SAL-9	MON-2
SAL-2	Application of Road Salt (Public Roads)	RMO	H	**Part IV, s.58** For public roads, the application of road salt is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would, be significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing, future). Without limiting other requirements, risk management plans shall include provisions for: a) the reduction of salt usage through best management practices such as alternative de-icer materials (with lower sodium and chloride) and/or contemporary technology; and b) the use of trained individuals in the application of road salt (could include technicians and technologists and others responsible for salt management plans, winter maintenance supervisors, patrollers, equipment operators, mechanics, and contract employees).	See Maps 1.1 - 1.21	Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2 SAL-3 SAL-9	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-3	Application of Road Salt	Planning Approval Authority	A	**Land Use Planning** Where the application of road salt to roads and parking lots would be a significant drinking water threat, the planning approval authority shall: 1) Prohibit the establishment of new parking lots with greater than 2000 square metres in: • WHPA-A not in an Issue Contributing Area for Sodium or Chloride (future); 2) Prohibit the establishment of new parking lots with greater than 200 square metres in: • WHPA-A in an Issue Contributing Area for Sodium or Chloride (future); and 3) Require a salt management plan, which includes a reduction in the future use of salt, as part of a complete application for development which includes new roads and parking lots where the application of road salt is significant in any of the following areas: • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 9) (future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (future). Such plans should include but not be limited to mitigation measures regarding design of parking lots, roadways and sidewalks to minimize the need for repeat application of road salt such as reducing ponding in parking areas; and directing stormwater discharge outside of vulnerable areas where possible.	See Maps 1.1 - 1.21	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	SAL-1 SAL-2 SAL-9	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-4	Application of Road Salt	MOECC	K	**Specify Action** Where the application of road salt is, or would be, a significant drinking water threat, the Ministry of the Environment and Climate Change in consultation with other provincial ministries and municipal associations should promote best management practices for the application of road salt, to protect sources of municipal drinking water in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing, future).	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	SAL-5 SAL-9	MON-4
SAL-5	Application of Road Salt	MOECC	K	**Specify Action** Where the application of road salt is, or would be, a significant drinking water threat, the Ministry of the Environment and Climate Change in consultation with other provincial ministries and municipal associations should develop a licensing and accreditation program for Snow and Ice Contractors for the application of road salt, to protect sources of municipal drinking water in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing, future).	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	SAL-4 SAL-9	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-6	Application of Road Salt (Provincial Highways)	Ministry of Transportation	K	**Specify Action** For provincial highways where the application of road salt is, or would be, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing, future); the Ministry of Transportation should: a) continue the proactive implementation of their salt management plans with their supporting de-icing contactors and the use of best management practices within wellhead protection areas; b) update their salt management plan, as required, to ensure consistency with the most current versions of Environment Canada's Code of Practice for the Environmental Management of Road Salts and Transportation Association of Canada's Synthesis of Best Practices; c) investigate and implement where practical, alternative products and mitigation practices and technologies for road salt application and the management of highway runoff and infiltration; d) in consultation with the Source Protection Authority, consider the information contained in the CTC Source Protection Assessment Reports for the siting and prioritization of future assessments related to road salt application and the management of highway runoff and infiltration. In particular, an assessment of application rates and options for reducing the application of salt should be undertaken at those wells in Orangeville immediately adjacent to Highways 9 and 10; and e) forward upon request to the Source Protection Authority the results of monitoring data on specific pilot projects.	See Maps 1.1 - 1.21	Existing & Future: Consider within 2 years (T-15)	SAL-9	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-7	Handling and Storage of Road Salt	RMO	G	**Part IV, s.57, s.58** Where the handling and storage of road salt is, or would be, a significant drinking water threat (excluding incidental quantities for personal use), the following actions shall be taken: 1) The handling and storage of road salt is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 9) (future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of road salt is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS ≥ 9) (existing); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing).		Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2 SAL-9	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-8	Application of Road Salt Handling and Storage of Road Salt	Municipality MOECC	E K	**Education and Outreach** The municipality shall deliver education and outreach materials and programs where the application, handling and storage of road salt is, or would be, a significant drinking water threat, targeted towards: a) owners/tenants of residences and small businesses where the application, handling and storage of road salt (existing, future) is, or would be, a significant drinking water threat about the impact of salt on municipal drinking water and what they can do to reduce their use of salt to ensure that the activity ceases to be or does not become a significant drinking water threat; and b) commercial and industrial sectors to address the importance of source protection planning and the impacts of road salt on drinking water sources, with the key message being responsible salt storage and application, and the use of contemporary technology; in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (existing, future). Where appropriate education and outreach materials prepared by the Ministry of the Environment and Climate Change are available, the municipality shall deliver those materials.	See Maps 1.1 - 1.21	Existing & Future: Implement within 2 years (T-10)	GEN-8 SAL-9	MON-1 MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-9	Application of Road Salt Handling and Storage of Road Salt	SPA Municipality	F	**Monitoring** Where the application, handling and storage of road salt (existing, future) is, or would be, a significant drinking water threat in an Issue Contributing Area for Sodium or Chloride: a) the responsible Source Protection Authority, in partnership with affected municipalities, shall conduct an investigation on the source and nature of sodium or chloride threats, contingent on funding; b) the municipality shall undertake monthly sampling of sodium and chloride levels in raw water at affected wells and report the results to the Source Protection Authority; and c) the Source Protection Authority in partnership with affected municipalities shall assess the information for any increasing trends and advise the Source Protection Committee on the need for new source protection plan policies to be developed to prevent future drinking water Issues.	See Maps 1.2 1.3 1.14	Existing & Future: Initiate within 2 years (T-16)	SAL-1 SAL-2 SAL-3 SAL-4 SAL-5 SAL-6 SAL-7 SAL-8	MON-3 MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-10	**Moderate/ Low Threats** Application of Road Salt	Planning Approval Authority	B	**Land Use Planning** Where the application of road salt would be a moderate or low drinking water threat, the planning approval authority is encouraged to require a salt management plan, which includes a reduction in the future use of salt, as part of a complete application for development which includes new roads and parking lots in any of the following areas: • WHPA-B (VS < 10) (future); or • WHPA-C (future); or • WHPA-D (future); or • WHPA-E (VS ≥ 4.5 and <9) (future); or • HVA (future); or • SGRA (VS ≥ 6) (future). Such plans should include, but not be limited to, mitigation measures regarding design of parking lots, roadways and sidewalks to minimize the need for repeat application of road salt such as reducing ponding in parking areas, directing stormwater discharge outside of vulnerable areas where possible, and provisions to hire certified contractors.	See Chapter 5 of the respective Assessment Reports	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	N/A	N/A
SAL-11	**Moderate/ Low Threats** Application of Road Salt	MOECC	J	**Specify Action** Where the application of road salt is or would be a moderate or low drinking water threat, the Ministry of the Environment and Climate Change in consultation with other provincial ministries and municipal associations should promote best management practices for the application of road salt, to protect sources of municipal drinking water in any of the following areas: • WHPA-B (VS < 10) (existing, future); or • WHPA-C (existing, future); or • WHPA-D (existing, future); or • WHPA-E (VS ≥ 4.5 and <9) (existing, future); or • HVA (existing, future); or • SGRA (VS ≥ 6) (existing, future).	See Chapter 5 of the respective Assessment Reports	Existing & Future: Consider within 2 years (T-15)	N/A	N/A

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SAL-12	**Moderate/ Low Threats** Application of Road Salt	Municipality	J	**Specify Action** Where the application of road salt on unassumed roads and private parking lots with greater than 200 square metres is or would be a moderate or low drinking water threat in any of the following areas: • WHPA-B (VS < 10) (existing, future); or • WHPA-C (existing, future); or • WHPA-D (existing, future); or • WHPA-E (VS ≥ 4.5 and <9) (existing, future); or • HVA (existing, future); or • SGRA (VS ≥ 6) (existing, future). The municipality is encouraged to: a) require implementation of a salt management plan which includes the goal to minimize salt usage through alternative measures, while maintaining public safety; and b) require the use of trained individuals in the application of road salt (could include technicians and technologists and others responsible for salt management plans, winter maintenance supervisors, patrollers, equipment operators, mechanics, and contract employees).	See Chapter 5 of the respective Assessment Reports	Existing & Future: Consider within 2 years (T-15)	N/A	N/A
SAL-13	**Moderate/ Low Threats** Application of Road Salt Handling and Storage of Road Salt	SPA Municipality	J	**Specify Action** Where the application, handling and storage of road salt is, or would be, a moderate or low drinking water threat, the municipality is requested to report the results of its sodium and chloride monitoring conducted under the *Safe Drinking Water Act* and any other monitoring programs annually to the Source Protection Authority. The Source Protection Authority shall assess the information for any increasing trends and advise the Source Protection Committee on the need for new source protection plan policies to be developed to prevent future drinking water Issues, in any of the following areas: • WHPA-B (VS < 10) (existing, future); or • WHPA-C (existing, future); or • WHPA-D (existing, future); or • WHPA-E (VS ≥ 4.5 and <9) (existing, future); or • HVA (existing, future); or • SGRA (VS ≥ 6) (existing, future).	See Chapter 5 of the respective Assessment Reports	Existing & Future: Consider within 2 years (T-15)	N/A	N/A

10.8 STORAGE OF SNOW

Definition

The storage of snow is a prescribed drinking water threat under O. Reg. 287/07 under the *Clean Water Act, 2006*. Under heavy winter weather conditions, the accumulation of snow inhibits traffic flow on the roads. Snow is able to pick up and hold any contaminants that are on roadways as it is being transferred to another location for storage.

Why is Snow Storage a Threat to Drinking Water Sources?

Snow removed from roads and parking lots can be contaminated with salt, oil, grease and heavy metals from vehicles, litter and airborne pollutants. The activities around snow storage and handling include:

- Snow that is pushed into large piles on a property (e.g., stored in parking lots);
- Snow transported to a central site from other locations (e.g., snow disposal sites); and
- Large snow banks along roads that are close to municipal wellheads or surface water intakes (if accumulation meets area circumstances identified below).

To determine if a road side snow bank meets the area circumstances it will be necessary to multiply the length of the roadway and average width of the snow bank to calculate the size of the area. Snow banks on roads and parking areas either melt on site or are transported elsewhere to be melted or stockpiled. Snow that stays on site must be handled and stored in ways that protect water sources. A number of chemicals from the storage of snow could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- The storage of snow (see circumstances #1445-1532)

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following chemicals as potential concerns:

- Chloride
- Copper
- Cyanide
- Lead
- Nitrogen
- Petroleum hydrocarbons F1 to F4
- Sodium
- Zinc

This threat is closely linked to the application, handling and storage of road salt, because snow is able to pick up the salt that has been applied to roads. A reduction in the amount of salt applied to roads and parking areas could reduce the amount of road salt that contaminates snow. The main source of sodium, chloride and cyanide in snow is road salt; the other contaminants are generally from vehicle fluids, exhaust, brake linings, and tire and engine wear. The assessment of the threat from a snow storage area is dependent on its specific location (vulnerability score) to drinking water sources, whether the snow is stored above or below grade, and the size of the storage area. In general, the greater the snow storage area (and therefore the volume of snow stored), the greater the risk to drinking water.

See **Table 10-10** for when and where the storage of snow may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat. These activities may also be significant drinking water threats anywhere within an Issue Contributing Area (ICA) for Sodium or Chloride. If the activity meets the description in Column 2 of the *Tables of Drinking Water Threats* it is a significant drinking water threat irrespective of vulnerability score.

Table 10-10: Where/when the storage of snow may be a significant drinking water threat

Prescribed Drinking Water Threat	Storage of Snow Sub-category	Area and Vulnerability Score (VS)
The storage of snow	The storage of snow	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9) • Anywhere in an ICA for Sodium or Chloride

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
SNO-1	Storage of Snow	RMO	G	**Part IV, s.57, s.58** Where the storage of snow is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The storage of snow is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 9) (future); or • the remainder of an Issue Contributing Area for Sodium or Chloride (future). Notwithstanding the above, emergency snow storage may be permitted outside of WHPA-A as determined by the risk management official and the municipality responsible for snow storage.	See Maps 1.1 - 1.21	Future: Immediately (T-5) Existing: 180 days (T-4)	GEN-1	MON-2
			H	2) The storage of snow is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-B (VS = 10) (existing); or • WHPA-E (VS ≥ 9) (existing); or • The remainder of an Issue Contributing Area for Sodium or Chloride (existing). Without limiting other requirements, risk management plans shall include appropriate terms and conditions to ensure the storage of snow, and associated runoff, ceases to be a significant drinking water threat.		Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

10.9 FUEL

Definition

The handling and storage of fuels is a prescribed drinking water threat under O. Reg. 287/07 under the *Clean Water Act, 2006*. Fuels include diesel, kerosene and hydrocarbon fuel (e.g., gasoline). The main activities that pose a threat to drinking water sources includes the handling of liquid fuel in relation to its storage and the storage of fuel. The types of fuel storage facilities include:

- bulk plants or facilities where fuels are manufactured or refined;
- permanent or mobile retail outlets;
- marinas;
- cardlocks/keylocks;
- private outlets (e.g., public works yard, contractor yard);
- farms; and
- furnace oil tanks for home and business heating purposes.

Most of these storage facilities are defined in O. Reg. 213/01 (Fuel Oil) or O. Reg. 217/01 (Liquid Fuels) which are made under the *Technical Standards and Safety Act, 2000* as regulated by the Technical Standards and Safety Authority (TSSA). Facilities where fuel is manufactured or refined are not included in the TSSA Regulations because they are regulated under the *Environmental Protection Act, 1990* and *Ontario Water Resources Act, 1990*.

Why is Fuel a Threat to Drinking Water Sources?

A number of chemicals from the handling and storage of fuel could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- the handling of fuel (see circumstances #112-191)
- the storage of fuel (see circumstances #1289-1408)

and the following chemicals as potential concerns:

- Benzene, Toluene, Ethylbenzene and Xylene (referred to as BTEX)
- Petroleum hydrocarbons F1 to F4 (referred to as PHC)

BTEX compounds have strong odours and tastes, which generally discourages any accidental consumption of drinking water. However, benzene is a known carcinogen, and some research has suggested that ethylbenzene may be carcinogenic and produce birth defects. BTEX is a non-aqueous phase liquid that does not easily dissolve into water and persists in the environment. It can lead to contamination of groundwater over a long period of time and the BTEX contaminated water can travel over long distances. Petroleum hydrocarbons can cause an array of negative health effects to the reproductive, respiratory, immune and nervous systems and can also harm the kidneys, liver, skin, eyes, and blood. PHCs may also affect the odour, taste, and appearance of water. The assessment of potential threats to drinking water sources from handling and storage of fuel is dependent on the location; the chemicals of concern in the fuel; whether it is stored above, below or partially below grade; the type of facility where it is stored; and the quantity stored.

See **Table 10-11** for when and where the handling and/or storage of fuel may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat.

Table 10-11: Where/when the handling and/or storage of fuel may be a significant drinking water threat

Prescribed Drinking Water Threat	Fuel Sub-category	Area and Vulnerability Score (VS)
The handling and storage of fuel	The handling of fuel	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10)
	The storage of fuel	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10)

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FUEL-1	Handling and Storage of Fuel (Municipal Wellheads)	MOECC	C	**Prescribed Instrument** Where the handling and storage of fuel at a municipal wellhead is in an area where the activity is, or would be, a significant drinking water threat, drinking water licences under the *Safe Drinking Water Act* shall be reviewed to ensure that appropriate terms and conditions are included so that the activity ceases to be, or does not become, a significant drinking water threat in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future).	See Maps 1.1 - 1.21	Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3	MON-4
FUEL-2	Handling and Storage of Fuel (Aggregate Extraction Sites)	MNRF	C	**Prescribed Instrument** 1) The handling and storage of fuel at an aggregate extraction site shall be prohibited where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future).	See Maps 1.1 - 1.21	Future: Immediately (T-3)	N/A	MON-4
				2) Where the handling and storage of fuel at an aggregate extraction site is in an area where the activity is a significant drinking water threat, the license, site plan or permit that governs the activity shall be reviewed to ensure appropriate terms and conditions are included so that the activity ceases to be a significant drinking water threat in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS = 10) (existing).		Existing: 3 years (T-1)	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FUEL-3	Handling and Storage of Fuel (Liquid Fuel and Fuel Oil in Non-Residential (includes ICI, Farm), Multi-unit Residential and Small Business in quantities ≥2500 litres above or below grade)	RMO	G	**Part IV, s.57, s.58** Where the handling and storage of liquid fuel and fuel oil at non-residential properties, multi-unit residential properties or small businesses (in quantities ≥ 2500 litres above or below grade) is in an area where the activity is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The handling and storage of fuel is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of fuel is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS = 10) (existing). Without limiting other requirements, risk management plans shall incorporate appropriate provisions of Ontario Regulations 213/01 and 217/01 and their codes, best management practices and standards as amended from time to time to ensure the activity ceases to be a significant drinking water threat.		Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2
		SPA	E	3) The Source Protection Authority shall: a) request inspection reports from the Technical Standards and Safety Authority (TSSA) on Private Fuel Outlets (PFOs) in areas where the handling and storage of fuel is a significant threat as requested by the SPA; and b) provide this information to the Risk Management Official to aid in prioritizing the development of the risk management plans for those that pose the greatest risk first; and c) provide to TSSA any data about leaks and other concerns observed, as they relate to TSSA's mandate to enforce O. Reg. 213/217 (as amended) and their corresponding codes, at PFOs from RMOs or through SPA staff work that would support TSSA's enforcement of regulatory requirements for PFOs.		Existing: 180 days (T-14)	N/A	MON-3

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
FUEL-4	Handling and Storage of Fuel (Liquid Fuel and Fuel Oil in Non-Residential (includes ICI, Farm), Multi-unit Residential, Residential, and Small Business)	Municipality	E	**Education and Outreach** The municipality shall prepare and deliver education and outreach materials and programs to residences and small businesses where the handling and storage of liquid fuel and fuel oil is, or would be, a significant drinking water threat to advise the owner/tenant about the actions to take to ensure that the activity ceases to be, or does not become, a significant drinking water threat. Where appropriate education and outreach materials prepared by the Ministry of the Environment and Climate Change, the Technical Standards and Safety Authority or other parties are available, the municipality shall deliver those materials in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future).	See Maps 1.1 - 1.21	Existing & Future: Implement within 2 years (T-10)	GEN-8	MON-1
		MOECC TSSA MGCS	K	The Ministry of the Environment and Climate Change shall collaborate with the Technical Standards and Safety Authority (TSSA) and the Ministry of Government and Consumer Services to: a) provide education and outreach materials for delivery by local municipalities to residences and small businesses about how to prevent spills or leaks from contaminating water and what to do if a spill happens or is suspected; b) include source water safety information into current public education vehicles, such as TSSA's website and seasonal brochures; c) work with fuel industry associations to facilitate distribution of educational materials to fuel suppliers; and d) provide colleges with source water awareness information that can be integrated into fuel technician training programs.				MON-4

10.10 DNAPLS AND ORGANIC SOLVENTS

Definition of DNAPLs

The handling and storage of a dense non-aqueous phase liquid (DNAPL) is a prescribed drinking water threat under O. Reg. 287/07 under the *Clean Water Act, 2006*.

A DNAPL is an organic liquid that is denser than water and tends to be insoluble in water, meaning that it does not mix with water. When released into the environment, DNAPLs sink through to the bottom of groundwater aquifers (until they hit bedrock, for example) as well as through surface water bodies. However, after 'sinking', a DNAPL will continue to flow through the ground, at which time it will only then start to mix with water. Water that is contaminated with DNAPLs can spread over a number of kilometres and persist over a long period of time, as DNAPLs can be present in the aquifer for decades or centuries before they have been completely depleted. This accounts for their 'special' status in Source Water Protection evaluation (i.e., the fact that they are considered to be a significant threat in the 5-year time of travel zone or WHPA-C).

DNAPLs have been readily used in vast quantities for decades in industrial and commercial applications such as dry cleaning, cleaning/degreasing solvents, electronics, aerosols, plastics, pesticides, pharmaceuticals, wood preservation, asphalt operations, varnishes and the repair of motor vehicles and equipment. These chemicals can also be found in small quantities in common household products such as adhesives and cleaners. 'Handling' of DNAPLs is not specifically defined in regulations.

Why are DNAPLs a Threat to Drinking Water Sources?

A number of chemicals from the handling and storage of DNAPLs could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activities:

- The handling of a DNAPL (see circumstances #102-111)
- The storage of a DNAPL (see circumstances #1098-1112)

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identify the specific chemicals that could make their way from DNAPL handling and storage into drinking water sources, which include:

- Dioxane-1,4 (a stabilizer)
- Polycyclic aromatic hydrocarbons (PAHs)
- Tetrachloroethylene (also known as Perchloroethylene or PCE) (dry cleaning solvent, de-grease metals, paint strippers)
- Trichloroethylene (TCE) (industrial applications)
- Vinyl chloride (VC) (polymer production)

There is no minimum quantity for a DNAPL – any amount of a DNAPL is considered a significant drinking water threat in specific vulnerable areas.

See **Table 10-12** for when and where the handling and/or storage of a DNAPL may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat.

Table 10-12: Where/when the handling and/or storage a DNAPL may be a significant drinking water threat

Prescribed Drinking Water Threat	DNAPLs Sub-category	Area and Vulnerability Score (VS)
The handling and storage of a dense non-aqueous phase liquid	The handling of a dense non-aqueous phase liquid	• WHPA-A • WHPA-B • WHPA-C • WHPA-E (VS = 10)
	The storage of a dense non-aqueous phase liquid	• WHPA-A • WHPA-B • WHPA-C • WHPA-E (VS = 10)

Definition of Organic Solvents

The handling and storage of an organic solvent is a prescribed drinking water threat under O. Reg. 287/07 under the *Clean Water Act, 2006*. Organic solvents are liquid organic compounds (i.e., containing carbon) with the power to dissolve solids, gases, or liquids. Most organic solvents have a lower density than water, which means they are lighter and will sit as a separate layer on top of water. Organic solvents have been readily used in vast quantities for decades in industrial and commercial applications such as paints, cleaning/degreasing, dry cleaning, electronics, aerosols, plastics, pesticides, pharmaceuticals, wood preservation, asphalt operations, varnishes and the repair of motor vehicles and equipment. Organic solvents can also be found in small quantities in common household products such as cleaners.

Why are Organic Solvents a Threat to Drinking Water Sources?

Chemicals from organic solvents could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activity:

- The handling and storage of an organic solvent (see circumstances #1225-1272)

The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identify the following four chemicals that could make their way from the handling and storage of organic solvents into water sources, which include:

- Carbon tetrachloride
- Chloroform
- Dichloromethane
- Pentachlorophenol

The assessment of potential threats to drinking water sources from the handling and storage of organic solvents is dependent on the location; the chemicals of concern in the solvent; where it is stored above, below, or partially below grade; and the quantity stored.

See **Table 10-13** for when and where the handling and/or storage of an organic solvent may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat.

Table 10-13: Where/when the handling and/or storage of an organic solvent may be a significant drinking water threat

Prescribed Drinking Water Threat	Organic Solvents Sub-category	Area and Vulnerability Score (VS)
The handling and storage of an organic solvent	The handling and storage of an organic solvent	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS = 10)

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DNAP-1	Handling and Storage of a Dense Non-Aqueous Phase Liquid	RMO	G	**Part IV, s.57, s.58** Where the handling and storage of a DNAPL is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The handling and storage of a DNAPL in any quantity (excluding incidental quantities for personal use) is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (future); or • WHPA-C (future); or • WHPA-E (VS = 10) (future).	See Maps 2.1 - 2.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of a DNAPL in any quantity (excluding incidental quantities for personal use) is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (existing); or • WHPA-C (existing); or • WHPA-E (VS = 10) (existing).		Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DNAP-2	Handling and Storage of a Dense Non-Aqueous Phase Liquid	Municipality MOECC	E K	**Education and Outreach** The municipality shall deliver education and outreach materials and programs where the handling and storage of a DNAPL is, or would be, a significant drinking water threat, targeted towards: a) an individual for personal use to promote the use of non-toxic products and additional opportunities for participation in household hazardous waste disposal and to advise the owner/tenant about the actions to take to ensure that the activity ceases to be, or does not become, a significant drinking water threat; and b) industrial and commercial users to promote the use of alternatives to DNAPLs (including non-toxic products), pollution prevention approaches, best management practices, and safe disposal; in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (existing, future); or • WHPA-C (existing, future); or • WHPA-E (VS = 10) (existing, future). Where education and outreach materials prepared by the Ministry of the Environment and Climate Change are available, the municipality shall deliver those materials	See Maps 2.1 - 2.21	Existing & Future: Implement within 2 years (T-10)	GEN-8	MON-1 MON-4
DNAP-3	**Moderate/ Low Threats** Handling and Storage of a Dense Non-Aqueous Phase Liquid	Municipality	J	**Specify Action** Where the handling and storage of a DNAPL is, or would be, a moderate or low drinking water threat, the municipality is encouraged to specify and promote best management practices for the handling and storage of DNAPL for ICI land uses in any of the following areas: • WHPA-D (existing, future); or • WHPA-E (VS ≥ 4.8 and <10) (existing, future); or • HVA (existing, future); or • SGRA (VS = 6) (existing, future).	See Chapter 5 of the respective Assessment Reports	Existing & Future: Consider within 2 years (T-15)	N/A	N/A

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
OS-1	Handling and Storage of an Organic Solvent	RMO	G	**Part IV, s.57, s.58** Where the handling and storage of an organic solvent is, or would be, a significant drinking water threat, the following actions shall be taken: 1) The handling and storage of an organic solvent is designated for the purpose of s.57 under the *Clean Water Act*, and is therefore prohibited where the threat would be significant in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS = 10) (future).	See Maps 1.1 - 1.21	Future: Immediately (T-5)	GEN-1	MON-2
			H	2) The handling and storage of an organic solvent is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is significant in any of the following areas: • WHPA-A (existing); or • WHPA-B (VS = 10) (existing); or • WHPA-E (VS = 10) (existing).		Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
OS-2	Handling and Storage of an Organic Solvent	Municipality MOECC	E K	**Education and Outreach** The municipality shall deliver education and outreach materials and programs where the handling and storage of an organic solvent is, or would be, a significant drinking water threat, targeted towards: a) an individual for personal use to promote the use of non-toxic products and additional opportunities for participation in household hazardous waste disposal and to advise the owner/tenant about the actions to take to ensure that the activity ceases to be, or does not become, a significant drinking water threat; and b) industrial and commercial users to promote the use of alternatives to these chemicals (including non-toxic products), pollution prevention approaches, best management practices, and safe disposal; in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS = 10) (existing, future). Where education and outreach materials prepared by the Ministry of the Environment and Climate Change are available, the municipality shall deliver those materials.	See Maps 1.1 - 1.21	Existing & Future: Implement within 2 years (T-10)	GEN-8	MON-1 MON-4
OS-3	**Moderate/ Low Threats** Handling and Storage of an Organic Solvent	Municipality	J	**Specify Action** Where the handling and storage of an organic solvent is, or would be, a moderate or low drinking water threat, the municipality is encouraged to specify and promote best management practices for the handling and storage of organic solvent for ICI land uses in any of the following areas: • WHPA-B (VS < 10) (existing, future); or • WHPA-C (existing, future); or • WHPA-D (existing, future); or • WHPA-E (VS ≥ 4.8 and <10) (existing, future); or • HVA (existing, future); or • SGRA (VS ≥ 6) (existing, future).	See Chapter 5 of the respective Assessment Reports	Existing & Future: Consider within 2 years (T-15)	N/A	N/A

10.11 AIRCRAFT DE-ICING

Definition

An aircraft that has frost, ice or snow on any of its critical structures (e.g., wings) is not permitted to attempt take-off under the Canadian Aviation Regulations. During weather conditions that would result in frost, ice or snow, the aircraft may be sprayed with de-icing and/or anti-icing fluids prior to take-off to remove or prevent ice or snow accumulation.

Why are Chemicals that De-ice Aircraft a Threat to Drinking Water Sources?

A number of chemicals used in the de-icing aircraft, could make their way into drinking water sources. The Ministry of the Environment and Climate Change's *Tables of Drinking Water Threats* identifies the following sub-threat activity:

- The management of runoff that contains chemicals used in the de-icing of aircraft (see circumstances #192-199); and

the following chemicals as potential concerns:

- Dioxane-1,4
- Ethylene Glycol

Ethylene glycol is the active ingredient in de-icing fluids, and dioxane-1, 4 may be used as an additive for its wetting or dispersing properties. These chemicals could threaten the safety of drinking water sources in certain situations. The classification of this activity as a significant, moderate or low drinking water threat is dependent on the classification of the airport as remote, small, regional or national airport. The activity is classified as a significant threat only for airports that:

i) have passenger traffic as part of the definition of 'regional' or 'national' airport and;
ii) lie within an Intake Protection Zone or Wellhead Protection Area.

There are currently none of these threat activities in the CTC Source Protection Region.

See **Table 10-14** for when and where the management of runoff that contains chemicals used in the de-icing of aircraft may be a significant drinking water threat. Note: to determine if a specific activity is a significant drinking water threat consult the *Tables of Drinking Water Threats* for the specific circumstances that must be met for the activity to be a threat.

Table 10-14: Where/when the management of runoff that contains chemicals used in the de-icing of aircraft may be a significant drinking water threat

Prescribed Drinking Water Threat	Aircraft De-icing Sub-category	Area and Vulnerability Score (VS)
The management of runoff containing chemicals used in the de-icing of aircrafts	The management of runoff containing chemicals used in the de-icing of aircrafts	• WHPA-A • WHPA-B (VS = 10) • WHPA-E (VS ≥ 9)

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DI-1	Management of runoff that contains chemicals used in the de-icing of aircraft	RMO	H	**Part IV, s.58** The management of runoff that contains chemicals used in the de-icing of aircraft is designated for the purpose of s.58 under the *Clean Water Act*, requiring risk management plans where the threat is, or would be, significant in any of the following areas: • WHPA-A (existing, future); or • WHPA-B (VS = 10) (existing, future); or • WHPA-E (VS ≥ 9) (existing, future).	See Maps 1.1 - 1.21	Future: Immediately (T-7) Existing: 1 year/ 5 years (T-6)	GEN-1 GEN-2	MON-2
DI-2	Management of runoff that contains chemicals used in the de-icing of aircraft	Municipality	E	**Specify Action** When developing new airports, the municipality shall encourage the federal and other government agencies to locate facilities for the de-icing of aircraft and the management of de-icing fluid runoff outside of areas where the activity would be a significant drinking water threat in any of the following areas: • WHPA-A (future); or • WHPA-B (VS = 10) (future); or • WHPA-E (VS ≥ 9) (future).	See Maps 1.1 - 1.21	Future: Immediately (T-18)	N/A	MON-1

10.12 LAKE ONTARIO THREATS

The Ministry of the Environment under the Director's *Technical Rules* for the preparation of assessment reports provided for the use of an event based modelling approach as a tool to identify activities that could be significant threats to drinking water sources in the Great Lakes. Any modelled activity which exceeds the threshold established by the local Source Protection Committee is deemed to be a significant threat. There is also a requirement to delineate an area known as an event based area (EBA) where the modelling approach supports the identification of the modelled activity as a significant threat within the entire EBA. Each modelled threat activity deemed significant has its own relevant EBA on land and is associated with one or more drinking water intakes. EBAs can exist in IPZ-1, -2 or -3 or a combination of these. Where the EBA extends beyond IPZ-1 and IPZ-2, an IPZ-3 must be created to capture this extent as EBAs must be within an IPZ. Source Protection Committees must develop policies to address these significant drinking water threats from existing or future threat activities within the delineated EBAs.

Where the activity was located near a tributary upstream from Lake Ontario, a separate assessment was done to estimate the travel of the contaminant to the lake. The three-dimensional model was used to simulate the contaminant pathway within Lake Ontario to assess potential concentrations at the intakes. In carrying out the events-based modelling, no consideration was made to determine whether there are existing risk management measures in place to manage the threat or to assess the adequacy of any such measures. The SPC did consider the current regulatory controls in place in developing policies to address the threat. Using the events based modelling approach, the storage and handling of fuel and sewage systems have been identified as significant threat activities to Lake Ontario drinking water sources in specific EBAs within the CTC. The CTC SPC received approval from the MOE Director to add two additional local threats relating to Lake Ontario intakes. These activities were also assessed using the events based modelling approach:

- Pipeline transporting petroleum products (containing benzene) crossing tributaries of Lake Ontario; and
- Spill of tritium from a nuclear generating station.

10.12.1 All Threats

These are general policies that apply to all significant threat activities identified for Lake Ontario intakes in the CTC.

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-G-1	All Lake Ontario Threats	MOECC	K	**Specify Action** (Spill Prevention/Contingency and Emergency Response) To protect drinking water sources from potential spills along highways, shipping lanes and railways, the Ministry of the Environment and Climate Change shall: a) in consultation with the Spills Action Centre and other appropriate bodies, update notification protocols for spills to ensure direct notification of all potentially affected water treatment plant operators and appropriate communication to the public and media; b) in consultation with the Spills Action Centre and the affected municipalities, review the notification protocol for significant threat activities and adjust the protocols as required to ensure that water plant operators are notified appropriately for a given magnitude of spill; c) ensure that information is communicated to all responsible parties (e.g., the originators of the spill, emergency response/clean-up personnel, medical officer of health, municipal water system owner and water system operating authority) who are responding to the spill; d) in consultation with the owners and operators of municipal drinking water systems, require that a Contingency Plan is developed, reviewed and/or updated under the Drinking Water Quality Management Standard to ensure that significant drinking water threats identified in the Assessment Report are included and amend the municipal drinking water license, as required; e) in consultation with the Office of the Fire Marshal and Emergency Management and other appropriate bodies, ensure that testing of the Contingency Plan is carried out within 3 years from the date the Source Protection Plan takes effect, followed by regular (frequency and priority to be determined in consultation) emergency response preparedness exercises to address the significant threats identified; and f) in consultation with appropriate bodies, promote spill prevention and share information about source protection with the public.	EBA See Map 4.1	Existing & Future: Consider within 2 years (T-15) unless otherwise specified	N/A	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-G-2	**Significant/ Moderate/ Low Threats** All Lake Ontario Threats	MOECC	J K	**Specify Action** (Lake Ontario Collaborative Group) The Ministry of the Environment and Climate Change will work in partnership with Environment Canada and municipalities responsible for providing water from systems with intakes in the western basin of Lake Ontario to establish and chair a Lake Ontario Collaborative Group (LOCG) focused on the western basin to undertake actions to support the implementation of policies to protect this source of drinking water. Within one year of this plan coming into effect the LOCG should develop and approve Terms of Reference. The Terms of Reference should include but not be limited to defining roles, tasks, and responsibilities of the LOCG partners with respect to: 1) Sharing information about Lake Ontario circulation and water quality monitoring, and where technically feasible: a) install permanent instrumentation (e.g., continuous recording current meters, with wireless telephone link to MOECC Environment Monitoring and Reporting Branch and the LOCG members) to provide real-time monitoring of current speed, direction and temperature throughout the water column for use with a 3-D Hydrodynamic Circulation Model for future forecasting of spills impact assessments and assessing spill prevention strategies; b) ensure that the real-time data are available to municipalities and conservation authorities; and c) undertake annual Lake Ontario nearshore water quality monitoring, and make the data available to municipalities and conservation authorities; 2) Maintaining and further developing a 3-D Hydrodynamic Circulation Model or more advanced models as appropriate, with particular focus to the nearshore of Lake Ontario to assess activities to determine their potential to be significant drinking water threats, including: a) maintaining specialized modelling expertise to undertake spills scenario modelling; and b) leading the development of typical lake circulation spill base cases to provide tools for quick assessments of spills, in real time, to provide early warning for emergency response and remedial action, including determining the parties to be notified in the event of a spill; (LO-G-2 continued on next page)	EBA See Map 4.1 IPZ-1, 2 See Map 4.2	See Policy	N/A	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-G-2 Cont'd	**Significant/ Moderate/ Low Threats** All Lake Ontario Threats	MOECC	J K	3) Using the model as a consistent approach to assess potential drinking water threats from: a) other existing activities which might be a drinking water threat to one or more municipal drinking water system; b) assessing newly proposed activities which may pose a threat to one or more municipal drinking water systems at the proposal stage; and c) assessing impacts of climate change; 4) In the event of a spill use the model to assess and respond to potential water quality impacts at municipal water treatment plant intakes; 5) Sharing environmental monitoring data and using modelling to inform research on topics such as, but not limited to: a) the effectiveness of risk management measures and spill contingency measures; b) cumulative impacts of point and non-point sources of contaminants on near shore water quality; and c) the effectiveness of source protection plan policies in reducing the risk related to pathogens (not limited to E. coli), including identifying the pathogens and the respective densities at different times; assessing the associated risk at intakes due to pathogens in non-disinfected wastewater and other known specific sources of these pathogens; and undertaking quantitative microbial risk assessments, using a structured research and development design (such as based on the protocols established by the US EPA) to assess the threat and adequacy of existing treatment on a plant-by-plant basis.	EBA See Map 4.1 IPZ-1, 2 See Map 4.2	See Policy	N/A	MON-4
LO-G-3	**Significant/ Moderate/ Low Threats** All Lake Ontario Threats	Municipality (Peel, Toronto, Durham)	E	**Specify Action** (Lake Ontario Collaborative Group) The municipalities of Peel, Toronto and Durham shall participate as members of the Lake Ontario Collaborative Group (LOCG) and shall undertake tasks (including funding portions) as agreed to in the Terms of Reference established by the LOCG.	EBA See Map 4.1 IPZ-1, 2 See Map 4.2	See Policy	N/A	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-G-4	**Significant/ Moderate/ Low Threats** All Lake Ontario Threats	MOECC	J K	**Education and Outreach** The Ministry of the Environment and Climate Change is requested to establish an outreach program to discuss the findings and policies arising from the source water protection program with the National Energy Board, Ontario Energy Board, Environment Canada, Health Canada, New York State and US government agencies in order to: a) encourage collaboration on protecting our shared drinking water sources; and b) raise profile of the importance of Lake Ontario as a source of drinking water for Ontario.	See Map 4.1 and 4.2	Existing & Future: Consider within 2 years (T-15)	N/A	MON-4

10.12.2 Nuclear Generating Station (Local Threat)

Model scenarios were undertaken to determine if a spill of tritium in water from the Pickering or Darlington nuclear power plants would cause deterioration of the quality of raw water for the intakes located in Lake Ontario. The modelled parameter of concern was tritium and the threshold selected by the SPC to identify a significant drinking water threat was the Ontario Drinking Water Standard (ODWS) for tritium (7000 Bacquerels per litre (Bq/L)). The scenario was based on the volume and duration of a 1992 spill event which was a release of 2900 kg of wastewater with a tritium level of 7.9×10^{11} Bq/L and using a series of wind and lake current conditions normally found in the vicinity of these two facilities. These were not extreme weather conditions. The model was used to simulate the contaminant pathway within Lake Ontario and the concentrations at the nearby municipal drinking water intakes to determine if the tritium levels could exceed the current ODWS. More details on this work can be found in each of Assessment Reports for the CTC Source Protection Areas.

Why is a Tritium Spill a Threat to Drinking Water Sources?

Tritium is not removed in the treatment process in municipal drinking water plants. In order to meet the ODWS in the finished water municipal operators may need to shut off pumps at the intake during a spill event to avoid bringing raw water containing elevated tritium levels into the treatment plant.

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-NGS-1	Spill of Tritium From NGS	MOECC	K	**Specify Action** (Risk Mitigation/Reduction Plans) Where event based modelling has shown that a spill from a nuclear generating station would cause the storage and/or use of tritium contaminated heavy water to be a significant drinking water threat, the Ministry of the Environment and Climate Change should, in consultation with the appropriate authorities: a) update spill notification protocols jointly with Spills Action Centre to ensure direct notification to all potentially affected water treatment plant operators and appropriate communication to the public and media; b) review the reporting thresholds jointly with affected municipalities, including consideration to lowering of the spill notification threshold to municipalities for significant threat activities and adjust the reporting threshold as required; c) ensure that information is communicated to all responsible parties (e.g., the originators of the spill, emergency response/clean-up personnel, medical officer of health, municipal water owner and water operating authority) who are responding to the spill; d) investigate and evaluate existing Risk Mitigation Plan/Risk Reduction Plan/Risk Contingency Plans make modifications where necessary with priority on reducing the likelihood of spills (such as potential additional design and operational best management practices and operational procedures), which would impair drinking water sources; and e) work with the Office of the Fire Marshal and Emergency Management to ensure that testing of the Risk Mitigation/Risk Reduction/Risk Contingency Plan is carried out within 3 years of the Source Protection Plan coming into effect, followed by regular (frequency and priority to be determined in consultation) emergency response preparedness exercises to address the significant threats identified.	EBA See Map 4.1	Existing & Future: Consider within 2 years (T-15) unless otherwise specified	N/A	MON-4

10.12.3 Pathogen Threat Activities -Wastewater Treatment Plant and Sanitary Sewer (Sewage)

Waste Water Treatment Plant (WWTP) Disinfection Failure

Modelling scenarios were undertaken to determine if disinfection failures at Waste Water Treatment Plants (WWTP) would cause deterioration of the quality of raw water above the normal range observed at the nearby municipal drinking water intakes. The modelled parameter of concern for these scenarios was *E. coli* and the recreational standard for *E. coli* (100 colony forming units per 100 millilitres (CFU/100 ml)) was selected by the SPC as the threshold to identify a significant drinking water threat. The scenarios were modelled for each waste water treatment plant using a series of wind and lake current conditions normally found in the vicinity of the facilities. These were not extreme weather conditions. The model was used to simulate the contaminant pathway within Lake Ontario and to determine the concentrations of the contaminant at the intakes. More details on this work can be found in each of Assessment Reports for the CTC Source Protection Areas.

Sanitary Trunk Sewer Breaks

A series of scenarios were modelled to determine if a large trunk sewer break along the shoreline of Lake Ontario could result in *E. coli* levels above the normal range observed at the nearby municipal drinking water intakes. Four trunk sewer break locations were modelled within the Toronto and Region Source Protection Area. The modelled parameter of concern for these scenarios was *E. coli* and the recreational standard for *E. coli* (100 colony forming units per 100 millilitres (CFU/100ml)) was selected by the SPC as the threshold to identify a significant drinking water threat. The scenarios were modelled for each wastewater treatment plant using a series of wind and lake current conditions normally found in the vicinity of the facilities. These were not extreme weather conditions. The model was used to simulate the contaminant pathway within Lake Ontario and to determine the concentrations of the contaminant at the intakes. More details on this work can be found in each of Assessment Reports for the CTC Source Protection Areas.

Why are Elevated *E. coli* Levels a Threat to Drinking Water Sources?

Water treatment plant operators are required to regularly measure the *E. coli* level in raw water in order to make adjustments to their disinfection process to ensure that all pathogens are killed. The *E. coli*

levels normally found in the vicinity of the Lake Ontario intakes in the CTC are below 10 CFU/100 ml. The Ontario Drinking Water Standard for *E. coli* in drinking water is zero CFU/100 ml. Since *E. coli* are living organisms and the test requires growing a culture for a period of time, monitoring results require approximately 24 hours. It is not an immediate result. When *E. coli* levels increase quickly due to a spill, it can make the proper disinfection treatment process more difficult.

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-SEW-1	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	MOECC	C	**Prescribed Instrument** (Review and Enhancement of Spill Prevention and Contingency Plans) Where event based modelling has shown that a disinfection interruption at a Waste Water Treatment Plant (WWTP Diffuser) would cause a sewage treatment plant by-pass discharge to surface water or sewage treatment plant effluent to be a significant drinking water threat, the Ministry of the Environment and Climate Change should: a) review and amend Environmental Compliance Approvals to ensure they contain terms and conditions that ensure that the threats cease to be significant. Terms and conditions shall include a spill prevention and contingency plan. Consideration should also be given to the need for a year-round disinfection system and sufficient redundancy in the disinfection system to minimize the length of time that the disinfection system would not be working; b) update spill notification protocols jointly with Spills Action Centre to ensure direct notification to all potentially affected water treatment plant operators and appropriate communication to the public and media; c) review the notification protocols for significant threat activities and adjust the reporting protocols as required to ensure the water plant operators are notified appropriately for a given magnitude of spill; d) ensure that information is communicated to all responsible parties (e.g., the originators of the spill, emergency response/clean-up personnel, medical officer of health, municipal water owner and water operating authority) who are responding to the spill; and e) work with the Office of the Fire Marshal and Emergency Management to ensure that testing of the Contingency Plan is carried out within 3 years of the Source Protection Plan coming into effect, followed by regular (frequency and priority to be determined in consultation) emergency response preparedness exercises to address the significant threats identified.	EBA See Map 4.1	Existing: 3 years (T-1) Future: Immediately (T-3) unless otherwise specified	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-SEW-2	Spill from a Sanitary Trunk Sewer Break	MOECC	C	**Prescribed Instrument** (Spill Prevention and Contingency Plan) Where event based modelling has shown that a spill from a sanitary trunk sewer break would be a significant drinking water threat, the Ministry of the Environment and Climate Change shall: a) review and amend Environmental Compliance Approvals to ensure that the threat ceases to be significant. Terms and conditions should include a spill prevention and contingency plan incorporating a requirement for assessment of erosion and flooding risks in tributaries which could jeopardize the integrity of the sanitary sewer systems identified as a significant threat. Re-inspections shall also be required with the frequency commensurate with the level of risk identified during the initial inspection; b) update spill notification protocols jointly with Spills Action Centre to ensure direct notification to all potentially affected water treatment plant operators and appropriate communication to the public and media; c) review the notification protocols for significant threat activities and adjust the reporting protocol as required to ensure that water plant operators are notified appropriately for a given magnitude of spill; d) ensure that information is communicated to all responsible parties (e.g., the originators of the spill, emergency response/clean-up personnel, medical officer of health, municipal water owner and water operating authority) who are responding to the spill; e) work with the Office of the Fire Marshal Emergency Management to ensure that testing of the Contingency Plan is carried out within 3 years of the Source Protection Plan coming into effect, followed by regular (frequency and priority to be determined in consultation) emergency response preparedness exercises to address the significant threats identified; and f) direct the responsible municipality to undertake a review and report on the depth of ground cover over the pipeline at each crossing including an assessment of erosion, flood risk and the integrity of their infrastructure. MOECC shall consider this information in determining the risk mitigation measures required to ensure that the drinking water threat ceases to be or does not become significant. The inspection report should be shared with the Source Protection Authority.	EBA See Map 4.1	Existing: 3 years (T-1) Future: Immediately (T-3) unless otherwise specified	GEN-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-SEW-3	**Significant/ Moderate/ Low Threats** All Threats that are Linked to Storm Sewers	MOECC	J K	**Specify Action** (Storm Sewers) Where a spill from a facility could reach an off-site storm sewer such that it would be a significant drinking water threat, or moderate or low drinking water threat as identified in the *Tables of Drinking Water Threats*, the Ministry of the Environment and Climate Change should enact the necessary regulation and/or instrument to require such facility owners to be subject to provincial approvals for spill prevention/ mitigation plans.	EBA See Map 4.1 IPZ-1, 2 See Map 4.2	Future: Consider within 2 years (T-15)	N/A	MON-4

10.12.4 Petroleum Product Spills Containing Benzene

Oil/Gas Pipelines (Local Threat)

Modelling scenarios were undertaken to determine if petroleum products spilled from a pipeline rupture as it crosses various rivers (tributaries) would reach any of the drinking water intakes and cause deterioration of the quality of raw water. The contaminant of concern in the petroleum product for these scenarios was benzene and the threshold selected by the SPC to identify a significant threat from benzene was the Ontario Drinking Water Standard (ODWS) of 0.005 milligrams per litre (mg/L). The spill parameters used in the scenario was based on the pipeline spill that occurred near Kalamazoo, Michigan in the summer of 2010, adjusted for the size and product volumes carried in the specific portions of the Ontario pipelines. More details on this work can be found in each of Assessment Reports for the CTC Source Protection Areas.

Petroleum Tank Farm (Fuel)

Two modelling scenarios were undertaken to determine if the release of gasoline containing benzene from bulk petroleum storage and handling facilities in Oakville or North York would reach water treatment plant intakes and cause deterioration of the quality of raw water. One scenario involved was based on a complete loss of product from a tank and the second estimated losses of smaller volumes during loading/unloading from shore to ship at the Oakville location. The modelled contaminant of concern for these scenarios was benzene and the threshold selected by the SPC to identify a significant the threat from benzene was the ODWS (0.005 mg/L). More details on this work can be found in each of Assessment Reports for the CTC Source Protection Areas.

Why is a Spill Containing Benzene a Threat to Drinking Water Sources?

Benzene is a hazard to human health and is not removed in the conventional treatment process in municipal drinking water plants. In order to meet the ODWS in the finished water, municipal operators may need to shut off pumps at the intake during a spill event to avoid bringing raw water containing elevated benzene levels into the treatment plant.

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-PIPE-1	Pipelines Transporting Petroleum Product (Containing Benzene) Crossing Tributaries of Lake Ontario	MOECC	K	**Specify Action** (Spill Prevention/Contingency and Emergency Response) Where event based modelling has shown that a spill from a petroleum pipeline system reaching a tributary would be a significant drinking water threat, the Ministry of the Environment and Climate Change should work with facility owners and provincial and federal regulators to develop, review and recommend necessary improvements to existing spill prevention, spill management, risk reduction, and contingency plans to ensure the following: a) plans are based on the depth of ground cover at surface water crossings; b) spill response time frames are established; c) responsibilities of first responders are established to ensure a prompt unified regulatory command structure to manage the spill response; d) notification protocols are established jointly with the Spills Action Centre to ensure direct notification to all potentially affected water treatment plant operators and appropriate communication to the public and media; e) notification protocols are established for significant threat activities to ensure the water plant operators are notified appropriately for a given magnitude of spill; f) that information is communicated to all responsible parties (e.g., the originators of the spill, emergency response/clean-up personnel, medical officer of health, municipal water owner and water operating authority) who are responding to the spill; g) that there are appropriate spills response plans for each crossing; h) that appropriate pipeline system failure and shut down measures and policies are included; i) a review is undertaken on the depth of ground cover over the pipeline at each crossing, including an assessment of erosion and flood risk; j) that the facility owner provides assurance concerning the integrity of their infrastructure to prevent spills where these could be a significant drinking water threat; k) that a report on the inspection of the pipeline crossings at each tributary is provided to the Source Protection Authority; l) that the pipeline design and operational best management practices are in place (including potential additional design and operational best management practices); m) that any new or expansions or pipeline replacements are constructed to meet current best design criteria; and n) a provision is included in the contingency plan that the facility owner work with the Office of the Fire Marshal and Emergency Management to ensure that testing of the contingency plan is carried out within 3 years of the Source Protection Plan coming into effect, followed by regular (frequency and priority to be determined in consultation) emergency response preparedness exercises to address the significant threats identified.	EBA See Map 4.1	Existing & Future: Consider within 2 years (T-15) unless otherwise specified	N/A	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
LO-FUEL-1	Handling and Storage of Fuel (Petroleum Tank Farm Spill)	MOECC	K	**Specify Action** (Spill Prevention/Contingency Plan) Where event based modelling of a spill from a petroleum tank farm has shown that it would be a significant drinking water threat, the Ministry of the Environment and Climate Change will work with applicable regulating authorities (e.g., Ministry of Government and Consumer Services and Technical Standards and Safety Authority) to ensure consideration is given to the following actions related to spill prevention contingency measures: a) investigate and evaluate existing Spills Prevention Plans/Spill Contingency Plans; b) recommend additional measures to reduce the likelihood that a spill from a storage facility would impair drinking water source quality; c) incorporate all applicable provisions of Ontario Regulations 213/01 and 217/01 and their codes as well as other measures to ensure the protection of drinking water sources into a Risk Management Plan for the facility, which may include but not be limited to: i. best management practices ii. site characterization as necessary iii. proof of ability to pay for clean-up of potential contamination iv. the appropriate frequency of inspections d) review existing Environmental Compliance Approvals for discharges to surface water at the identified sites to determine if there are adequate safeguards to protect drinking water sources; e) determine if additional works or procedures are required to reduce the likelihood of contaminants discharging to Lake Ontario in the event of a spill or equipment failure/malfunction; f) ensure provisions for spill notification protocols are established jointly with Spills Action Centre to ensure direct notification to all potentially affected water treatment plant operators and appropriate communication to the public and media; g) establish notification protocols for significant threat activities to ensure that water plant operators are notified appropriately for a given magnitude of spill; (LO-FUEL-1 continued on next page)	EBA See Map 4.1	Existing & Future: Consider within 2 years (T-15) unless otherwise specified	N/A	MON-4

				h) ensure that information is communicated to all (e.g., the originators of the spill, emergency response/clean-up personnel, medical officer of health, municipal water owner and water operating authority) responsible parties who are responding to the spill; and i) include a provision that the facility owner work with the Office of the Fire Marshal and Emergency Management to ensure that testing of the Contingency Plan is carried out within 3 years of the Source Protection Plan coming into effect, followed by regular (frequency and priority to be determined in consultation) emergency response preparedness exercises to address the significant threats identified.				
LO-FUEL-2	**Significant/ Moderate/ Low Threats** Handling and Storage of Fuel (Spill from Petroleum Storage Tanks)	MOECC	J K	**Education and Outreach** (Fuel Tank Farms) Where event based modelling has identified activities that are significant drinking water threats or where the *Tables of Drinking Water Threats* (Ontario Regulation 287/07 under the *Clean Water Act, 2006*) identifies moderate or low drinking water threats, the Ministry of the Environment and Climate Change shall, in consultation with appropriate authorities, work with the facility owner to: a) support the investigation and evaluation of existing Spills Prevention Plans/ Spill Contingency Plans; and b) identify the need for potential additional design and operational best management practices which would reduce the likelihood that a spill from a storage facility would impair drinking water source quality for tanks located on federal lands.	EBA See Map 4.1 IPZ-1, 2 See Map 4.2	Existing & Future: Consider within 2 years (T-15)	N/A	MON-4

10.13 WATER QUANTITY

All of the drinking water quantity threats identified in the CTC Source Protection Region are threats to groundwater-sourced municipal drinking water supplies. Through a tiered process of water budget analyses as set out in the *Technical Rules* under section 107 of the *Clean Water Act, 2006*, SPCs are required to identify the vulnerable areas, enumerate the activities that pose a drinking water threat, and determine the threat level of the activity. At the final stage (Tier 3 water budget analysis), specific vulnerable areas (Wellhead Protection Areas for Quantity called WHPA-Q) are delineated and significant drinking water threat activities are identified. WHPA-Q1 refers to the area where activities that take water without returning it to the same source may be a threat. WHPA-Q2 refers to the area where activities that reduce recharge may be a threat.

The Tier 3 water budget for the areas around municipal wells in Orangeville, Mono and Amaranth was completed in early 2011. One WHPA-Q1, -Q2 was assigned a significant risk level which means that existing and future threat activities (see below) in this area can be significant quantity threats. In late 2013 the Tier 3 Water Budget was completed for the Region of Halton's wells serving Acton and Georgetown in the Town of Halton Hills. Two WHPA-Q1, -Q2 vulnerable areas where identified where activities can be significant quantity threats. The WHPA-Q1, -Q2 around the wells serving Acton was assigned a significant risk level. The WHPA-Q1, -Q2 vulnerable area around wells serving Georgetown was assigned a moderate risk level which means that only future activities can be significant quantity threats. In 2013, the Tier 3 Water Budget was completed for the Regions of York and Region of Durham wells in the Toronto and Region Source Protection Area. This WHPA-Q1, -Q2 was assigned a moderate risk level.

Some of the policies outlined below apply only to specific municipalities while the majority apply to the WHPA-Q1, -Q2 vulnerable areas throughout the CTC Source Protection Region.

10.13.1 Taking Water Without Returning It to the Same Aquifer

Definition

Any activity that takes water from an aquifer, without returning the water to that aquifer is a threat if it results in a depletion of available supply which could impair the long-term viability of a water system. Municipal and private wells are typical examples of such water taking activities, along with industrial uses such as agriculture irrigation and aggregate extraction below the water table which requires pumping operations. When a Permit to Take Water (PTTW) is required, the province assesses the request to determine if the water taking is sustainable and issues a PTTW with appropriate conditions, to protect the ecosystem and other users. A PTTW is not generally required for private domestic wells as the amount of water taken is generally less than 50,000 litres per day which is the minimum threshold requiring approval.

Why is this Activity a Threat to Drinking Water Sources?

Taking water without returning it to the same aquifer can lead to the depletion of water in the aquifer, which reduces the amount of water available for municipal water supplies. If the available water in the aquifer drops below the safe threshold levels, municipal wells cannot produce enough to supply water demands which can lead to a water shortage.

10.13.2 Recharge Reduction

Definition

When recharge to an aquifer is reduced, the available water supply becomes depleted and can impair the long-term viability of a water system. Typical examples which reduce recharge include existing and planned land use developments, such as residential subdivisions, employment areas and undifferentiated suburban lands. Any conversions of land to an impervious surface, such as paved parking lots, do not let water travel through the ground to recharge the aquifer.

Why is this Activity a Threat to Drinking Water Sources?

Activities that reduce the recharge of an aquifer, reduces the water available for municipal water supplies. Impervious surfaces impede the ability for the aquifer to recharge and continue to provide water over the long term.

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-1	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	MOECC	C	**Prescribed Instrument** (Permit To Take Water Policies in WHPA-Q1 with Significant Water Quantity Threats) Within the Tier 3 Water Budget WHPA-Q1 where a water taking is or would be a significant water quantity threat the Ministry of the Environment and Climate Change shall ensure each water taking threat ceases to be, or does not become significant, through actions the Director considers appropriate on a case by case basis, such as: 1) Reviewing all existing Permits To Take Water, located within WHPA-Q1 with a significant risk level, in consultation with the other Ministries (as required), the affected municipality, relevant conservation authorities, and permit holders, and amend the permits where necessary to ensure: a) that municipal water supply requirements for the allocated and planned quantity (per the current approved population and employment projections of the most recent Growth Plan for the Greater Golden Horseshoe) will be met on a sustainable basis; and b) that the hydrological integrity of municipal wells in the vulnerable areas will be maintained. 2) Issuing Permits To Take Water for new or increased takings, located within WHPA-Q1 with moderate or significant risk levels, only if it can be satisfactorily demonstrated, using the findings of the most recently approved Tier 3 Water Budget Model and other available data, where appropriate, that the taking: a) can be maintained on a sustainable basis; b) will not affect the ability of the aquifer to meet the municipal water supply requirements for the current and planned service capacity; and c) will ensure the hydrological integrity of municipal wells will be maintained.	Existing & Future: WHPA-Q1 with a significant risk level See Maps 3.1 3.2 Future: WHPA-Q1 with a moderate risk level See Maps 3.3 3.4	Future: Immediately (T-3) Existing: 3 years (T-1)	GEN-3 DEM-2 DEM-8	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-2	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Planning Approval Authority	A	**Land Use Planning** (Planning Policies in WHPA-Q1 with Significant Water Quantity Threats) Within the Tier 3 Water Budget WHPA-Q1 where a water taking is or would be a significant water quantity threat the relevant Planning Approval Authority shall ensure water taking does not become a significant drinking water threat by: 1) Only permitting new development if the new development does not require a new or amended Permits To Take Water; 2) Only providing final approval for new development that requires a new or amended Permit To Take Water once the Ministry of the Environment and Climate Change has determined that the proposed taking will not become a significant water quantity threat; 3) Only approving settlement area expansions within WHPA-Q1 as part of a municipal comprehensive review where the applicable provincial planning criteria have been met and the following has been demonstrated: a) the aquifer has sufficient capacity to sustainably provide municipal water services to the expanded settlement area; b) the expansion will not adversely impact the aquifers ability to meet the municipal water supply requirements for current and planned service capacity, for other permitted takings, or for wastewater receiving bodies; and c) the hydrological integrity of municipal wells will be maintained.	Existing & Future: WHPA-Q1 with a significant risk level See Maps 3.1 3.2 Future: WHPA-Q1 with a moderate risk level See Maps 3.3 3.4	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	DEM-1 DEM-9	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-3	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	MMAH MOECC	K	**Specify Action** (Growth Management/Planning Ministries to Review Growth in WHPA-Q1 with Significant Water Quantity Threats) Within a Tier 3 Water Budget vulnerable areas identified as having significant water quantity threats the Provincial Ministries specified below should undertake the following to ensure the provision and distribution of water supply for municipal population and employment growth forecasts does not create a new or increase an existing significant water quantity threat: 1) The Ministry of Municipal Affairs and Housing in consultation with the Ministry of the Environment and Climate Change and any affected municipalities should use the Tier 3 Water Budget information and other data available, to ensure that municipal Official Plan growth forecasts and distributions will not result in creating or worsening a significant water quantity threat, given water quantity constraints identified in Tier 3 Water Budget model areas; and 2) The Ministry of Municipal Affairs and Housing should take into consideration water quantity constraints identified through Tier 3 water budgets, and other data available, during its review of the population forecasts contained in the Growth Plan for the Greater Golden Horseshoe, in consultation with relevant municipalities.	Existing & Future: WHPA-Q1 with a significant risk level See Maps 3.1 3.2 Future: WHPA-Q1 with a moderate risk level See Maps 3.3 3.4	Existing & Future: Consider within 2 years (T-15)	DEM-8	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-4	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Municipality	E	**Specify Action** (Municipal Water Conservation Plans) Municipalities responsible for the production, treatment, and storage of water, who have a municipal well and/or whose residents are served by a municipal water supply within the Tier 3 Water Budget WHPA-Q1 shall develop and/or update Water Conservation Plans to ensure they are an effective tool to support sustainable water quantity by reducing consumption and therefore the demand for water.	Existing & Future: WHPA-Q1 with a significant risk level See Maps 3.1 3.2 Future: WHPA-Q1 with a moderate risk level See Maps 3.3 3.4	Existing & Future: Initiate within 2 years (T-16)	N/A	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-5	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Municipality	E	**Education and Outreach** Municipalities responsible for the production, treatment and storage of water and/or jurisdictional lands within a Tier 3 Water Budget WHPA-Q1 identified as having significant water quantity threats shall undertake the following education and outreach initiatives to help ensure water supplies are protected and increase the effectiveness of water conservation efforts in their jurisdictions to reduce consumption and demand by: 1) Implementing education and outreach programs to ensure that property owners and businesses are aware of: a) their role in protecting water supplies and conserving water; b) actions that can be taken to protect water supplies and use less water; and c) financial incentive programs and projects that may be eligible for funding under future funding of the Ontario Drinking Water Stewardship Program; or 2) Reviewing any similar programs that may already exist and update them where necessary to ensure their effectiveness.	Existing & Future: WHPA-Q1 with a significant risk level See Maps 3.1 3.2	Existing & Future: Implement within 2 years (T-10)	GEN-8	MON-1
		MOECC	K	3) The Ministry of the Environment and Climate Change should provide municipalities with a list of appropriate education and outreach materials that provide information and guide actions that can be taken to reduce the usage of drinking water for delivery by the municipality.				MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-6	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Municipality	E	**Specify Action** (Joint Municipal Water Management) The Dufferin County municipalities that share a water source within a Tier 3 Water Budget WHPA-Q1 identified as having significant water quantity threats shall develop a Joint Municipal Water Supply Management model, and implement within 3 years of approval of the Source Protection Plan. This management model shall facilitate the planning and management of water supply sources to ensure sustainability of a long term water supply in each municipality and ensure that water quality and quantity is maintained or improved such that activities cease to be, or do not become, significant drinking water threats in the WHPA-Q1. The municipalities shall report to the Ministry of the Environment and Climate Change and the Ministry of Municipal Affairs and Housing, on the options and proposed management model within 1 year of the approval of the Source Protection Plan.	WHPA-Q1 with a significant risk level (Orangeville, Amaranth, East Garafraxa and Mono) See Map 3.1	See Policy	DEM-7	MON-1
DEM-7	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	MOECC MMAH	K	**Specify Action** (Province to Support Joint Municipal Water Management System or Authority) The Ministry of the Environment and Climate Change, in collaboration with the Ministry of Municipal Affairs and Housing and other affected provincial ministries and agencies, as required, should initiate meetings with the Dufferin County municipalities that share a water source within a Tier 3 WHPA-Q1 identified as having significant water quality and quantity threats, to support the municipalities in developing mutually beneficial solutions to address water quantity and quality constraints within 1 year of approval of the Source Protection Plan. And further, the Ministry of the Environment and Climate Change should provide technical support to the municipalities.	WHPA-Q1 with a significant risk level (Orangeville, Amaranth, East Garafraxa and Mono) See Map 3.1	See Policy	DEM-6	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-8	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	MOECC	K	**Specify Action** (MOECC to Adopt and Fund Maintenance of the Tier 3 Water Budget Model) The Ministry of the Environment and Climate Change should adopt and fund a Tier 3 Water Budget Model in a WHPA-Q1 identified as having a moderate or significant risk level and undertake the following to ensure it is maintained as the primary model to review existing and future Permits To Take Water, to allow municipalities and other Provincial Ministries (i.e., Ministry of Municipal Affairs and Housing and Ministry of Infrastructure) to evaluate growth projections and distributions, and to facilitate the review of planning applications by municipalities where necessary to ensure that these activities cease to be, or do not become significant drinking water threats: 1) Through the Permit To Take Water program, require municipal takers in WHPA-Q1 to monitor water quantity and supply data on a regular basis to assist in the upkeep of the model to determine any increase or reduction in significant water quantity threats; 2) Use the model with the most up to date data as an analysis and decision making tool; and 3) When necessary, contribute to funding for new continuous flow gauging stations in key surface water features and enhance conservation authorities existing Hydrometric Network in WHPA-Q1 to monitor long term trends in surface water quantity, study impacts of urbanization and climate change on aquifer recharge, and facilitate calibration of the model.	Existing & Future: WHPA-Q1 with a significant risk level See Maps 3.1 3.2 Future: WHPA-Q1 with a moderate risk level See Maps 3.3 3.4	Existing & Future: Consider within 2 years (T-15)	DEM-1 DEM-3	MON-4

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
DEM-9	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Municipality	E	**Specify Action** (Identifying Additional Water Supplies) Municipalities located within a Tier 3 Water Budget WHPA-Q1 with a significant risk level are encouraged to identify additional water sources outside of the WHPA-Q1 to reduce demand from well systems which have been identified with significant water quantity stress and to report to the Source Protection Authority within 3 years on their progress.	WHPA-Q1 with a significant risk level See Maps 3.1 3.2	See Policy	DEM-2	MON-1
DEM-10	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Municipality	E	**Specify Action** York Region shall develop and implement a drought management plan using the Tier 3 water quantity risk assessment findings and modelling tool to prevent consumptive demand from becoming significant.	Future: WHPA-Q1 with a moderate risk level See Map 3.4	Existing & Future: Immediately (T-18)	N/A	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
REC-1	An activity that reduces recharge to an aquifer	Planning Approval Authority	A	**Land Use Planning** (Planning Policies for Protecting Groundwater Recharge) For applications under the Planning Act within the Tier 3 Water Budget WHPA-Q2 identified as having significant water quantity threats, the relevant Planning Approval Authority shall ensure recharge reduction does not become a significant drinking water threat by: 1) Requiring new development for lands zoned Low Density Residential (excluding subdivisions) or zoned Agricultural to implement best management practices such as Low Impact Development (LID) with the goal to maintain predevelopment recharge. 2) Requiring that that all site plan (excluding an application for one single family dwelling) and subdivision applications for new residential, commercial, industrial and institutional uses provide a water balance assessment for the proposed development to the satisfaction of the Planning Approval Authority which addressed each of the following requirements: a) maintain pre-development recharge to the greatest extent feasible through best management practices such as LID, minimizing impervious surfaces, and lot level infiltration; and b) where pre-development recharge cannot be maintained on site, implement and maximize off-site recharge enhancement (within the same WHPA-Q2) to compensate for any predicted loss of recharge from the development, c) for new development (excluding a minor variance) within the WHPA-Q2 and within an ICA (for sodium, chloride or nitrates), the water balance assessment shall consider water quality when recommending best management practices and address how recharge will be maintained and water quality will be protected. 3) Only approving settlement area expansions as part of a municipal comprehensive review where it has been demonstrated that recharge functions will be maintained on lands designated significant groundwater recharge areas within WHPA-Q2. 4) Amending municipal planning documents to reference most current Assessment Reports in regards to the significant groundwater recharge areas within WHPA-Q2.	Future: WHPA-Q2 with a significant risk level See Maps 3.1 3.2 Future: WHPA-Q2 with a moderate risk level See Maps 3.3 3.4	Future: Immediately (T-9) Amend OPs for conformity within 5 years and ZBLs within 3 years of OP approval (T-8)	N/A	MON-1

Policy ID	Threat Description	Implementing Body	Legal Effect	Policy	Where Policy Applies	When Policy Applies	Related Policies	Monitoring Policy
REC-2	An activity that reduces recharge to an aquifer	RMO	H	**Part IV, s.58** When a Building Permit that is not subject to a site specific Planning Application (excluding lands zoned Low Density Residential) located within a Tier 3 Water Budget WHPA-Q2, identified as having a significant risk level, an activity that reduces the recharge to an aquifer is designated for the purpose of s.58 under the *Clean Water Act* as, requiring a risk management plan where the threat would be significant. Without limiting other requirements, risk management plans shall require implementation of downspout disconnections and other best management practices to increase infiltration of clean water whenever modifications, additions or renovations are undertaken at existing properties or in new development with the goal of restoring or maintaining pre-development recharge.	Future: WHPA-Q2 with a significant risk level See Maps 3.1 3.2	Future: Immediately (T-7)	GEN-1 GEN-2	MON-2
REC-3	An activity that reduces recharge to an aquifer	Municipality	E	**Specify Action** Within a Tier 3 Water Budget WHPA-Q2 with a significant risk level, the municipality shall develop and implement actions to be taken and an implementation schedule, to ensure that an activity which reduces aquifer recharge ceases to be a significant water quantity threat. Such actions may include: a) reviewing options to maximize aquifer recharge; b) delivering an education and outreach program to inform property owners about actions that can be taken to protect aquifer recharge (e.g., site grading, rain gardens). The program may include incentives (such as rebates) to encourage best management practices; c) requiring the use of Low Impact Development in new development or retrofits; and d) passing a by-law to require downspout disconnection.	Existing: WHPA-Q2 with a significant risk level See Maps 3.1 3.2	Existing: Implement within 2 years (T-17)	GEN-8	MON-1
		MOECC	K	The Ministry of the Environment and Climate Change should provide municipalities with a list of appropriate education and outreach materials that provide information and guide to actions that can be taken to protect aquifer recharge for delivery by the municipality.				MON-4

10.14 MONITORING OF POLICY IMPLEMENTATION

Policy ID	Implementing Body	Legal Effect	Monitoring Policy
MON-1	Municipality	F	The municipality or planning approval authority shall, by February 1 of each year, prepare and submit a report equivalent to Section 65 of O. Reg. 287/07 under the *Clean Water Act, 2006* to the Source Protection Authority on the actions taken in the previous calendar year to achieve the outcomes of the source protection policy. Where applicable, municipal planning authorities shall provide a copy of the notice of adoption of amendments to official plans and/or zoning by laws. Reporting shall include information related to the effectiveness of the policies in ensuring a threat ceases to be, or does not become significant, and any actions required to respond to a drinking water threat during the reporting period.
MON-2	RMO	F	The risk management official shall, by February 1 of each year, undertake the reporting requirements specified in Section 65 of O. Reg. 287/07 under the *Clean Water Act*, 2006 on the actions taken in the previous calendar year to achieve the outcomes of the source protection policy. Reporting shall include information related to the effectiveness of the policies in ensuring a threat ceases to be, or does not become significant, and any actions required to respond to a drinking water threat during the reporting period.
MON-3	SPA	F	The source protection authority shall include in the annual report pursuant to s.46 under the *Clean Water Act, 2006*, documentation on the risk reduction efforts they administered throughout the year. Reporting shall include information related to the effectiveness of the policies in ensuring a threat ceases to be, or does not become significant, and any actions required to respond to a drinking water threat during the reporting period.
MON-4	Provincial Ministry	F	The provincial ministry shall, by February 1 of each year, prepare and submit a report to the Source Protection Authority on the actions taken in the previous calendar year to achieve the outcomes of the source protection policy. Reporting shall include information related to the effectiveness of the policies in ensuring a threat ceases to be, or does not become significant, and any actions required to respond to a drinking water threat during the reporting period.

11 LIST OF ACRONYMS

ASM	Agricultural Source Material
AVI	Aquifer Vulnerability Index
BCA	*Building Code Act, 1992*
BMPs	Best Management Practices
Bq	Bacquerel
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CA	Conservation Authority
C of A	Certificate of Approval (now called an Environmental Compliance Approval)
CFU	Colony Forming Units
CLOSPA	Central Lake Ontario Source Protection Area
CTC	Credit Valley-Toronto and Region-Central Lake Ontario
CVSPA	Credit Valley Source Protection Area
CWA	*Clean Water Act, 2006*
DNAPL	Dense Non-Aqueous Phase Liquid
EBA	Event Based Area
ECA	Environmental Compliance Approval (formerly called Certificate of Approval)
EPA	*Environmental Protection Act, 1990*
GUDI	Groundwater Under the Direct Influence of Surface Water
HVA	Highly Vulnerable Aquifer
ICA	Issue Contributing Area
IPZ	Intake Protection Zone
LID	Low Impact Development
LOC	Lake Ontario Collaborative
LOCG	Lake Ontario Collaborative Group
LUP	Land Use Planning
MGCS	Ministry of Government and Consumer Services
MMAH	Ministry of Municipal Affairs and Housing
MNRF	Ministry of Natural Resources and Forestry

MOECC	Ministry of the Environment and Climate Change
MOI	Ministry of Infrastructure
MTO	Ministry of Transportation
NASM	Non-Agricultural Source Material
NEC	Niagara Escarpment Commission
NEP	Niagara Escarpment Plan
NEPDA	*Niagara Escarpment Planning and Development Act*
NGS	Nuclear Generating Station
NMA	*Nutrient Management Act*
NMP	Nutrient Management Plan
NMS	Nutrient Management Strategy
ODWO	Ontario Drinking Water Objective
ODWS	Ontario Drinking Water Standard
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
OMB	Ontario Municipal Board
OP	Official Plan
OWRA	*Ontario Water Resources Act, 1990*
PCB	Polychlorinated Biphenyl
PFO	Private Fuel Outlet
PHC	Petroleum Hydrocarbons
PTTW	Permit To Take Water
RMI	Risk Management Inspector
RMO	Risk Management Official
RMP	Risk Management Plan
SGBLS	South Georgian Bay Lake Simcoe
SGRA	Significant Groundwater Recharge Area
SPA	Source Protection Authority
SPC	Source Protection Committee
SPR	Source Protection Region

STP	Sewage Treatment Plant
SWM	Stormwater Management
SWP	Source Water Protection
TCC	Trent Conservation Coalition
TOT	Time of Travel
TRSPA	Toronto and Region Source Protection Area
TSSA	Technical Standards and Safety Authority
VS	Vulnerability Score
WHPA	Wellhead Protection Area
WPCP	Water Pollution Control Plan
WTP	Water Treatment Plant
WWTP	Waste Water Treatment Plant
ZBL	Zoning By-Law

12 GLOSSARY OF TERMS

Abandoned Well

A well that is deserted because it is dry, contains unpotable water, discontinued before completion, not being properly maintained, constructed poorly, or determined that natural gas may pose a hazard.

Activity

One or a series of related processes, natural or anthropogenic that occurs within a geographical area and may be related to a particular land use.

Aquifer

An underground saturated permeable geological formation that is capable of transmitting water in sufficient quantities under ordinary hydraulic gradients to serve as a source of groundwater supply.

Aquifer Vulnerability Index (AVI)

A numerical indicator of an aquifer's intrinsic or inherent vulnerability susceptibility, to contamination expressed as a function of the thickness and permeability of overlying layers.

Chemical

A substance used in conjunction with, or associated with, a land use activity or a particular entity, and with the potential to adversely affect water quality.

Condition

A drinking water condition refers to contamination that exists already and is associated with past activities.

Confined Aquifers

An aquifer that is bounded above and perhaps below by layers of geological material that do not transmit water readily.

Consumptive Water Demand

The net amount of water that is taken from a source and not returned locally to the same source in a reasonable time.

Contaminant of Concern

A chemical or pathogen that is or may be discharged from a drinking water threat activity that could contaminate a drinking water source.

Designated System

A drinking water system that is included in a Terms of Reference for developing source protection plans, pursuant to resolution passed by a municipal council under subsection 8(3) of the *Clean Water Act, 2006* or added by the Minister.

Development

Development means the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*, but does not include:

a) activities that create or maintain *infrastructure* authorized under an environmental assessment process;

b) works subject to the *Drainage Act*; or

c) for the purposes of policy 2.1.4(a), underground or surface mining of *minerals* or advanced exploration on mining lands in *significant areas of mineral potential* in Ecoregion 5E, where advanced exploration has the same meaning as under the *Mining Act*. Instead, those matters shall be subject to policy 2.1.5(a).

Drinking Water Issue

A substantiated (through scientific means) condition relating to the quality of water that interferes or is anticipated to soon interfere with the use of a drinking water source by a municipal residential system or designated system.

Drinking Water Threat

An existing activity, possible future activity or existing condition that results from a past activity, (a) that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water.

Event

Occurrence of an incident (isolated or frequent) with the potential to promote the introduction of a threat into the environment. An event can be intentional as in the case of licensed discharge or accidental as in the case of a spill.

Existing Drinking Water Source

The aquifer or surface water body from which municipal residential systems or other designated systems currently obtain their drinking water. This includes the aquifer or surface water body from which back-up wells or intakes for municipal residential systems or other designated systems obtain their drinking water when their current source is unavailable or in the event of an emergency.

Groundwater

Subsurface water that occurs beneath the water table in soils and geological formations that are fully saturated.

Groundwater Recharge Area

The area where an aquifer is replenished from (a) natural processes, such as the infiltration of rainfall and snowmelt and the seepage of surface water from lakes, streams and wetlands, (b) from human interventions, such as the use of storm water management systems, and (c) whose recharge rate exceeds a threshold specified in the regulations. The Director's rules will specify the acceptable methodologies to determine groundwater recharge rates i.e. what qualifies as significant.

Hazard

In the context of this guidance, a hazard is equivalent to a contaminant and pathogen threat.

Hazard Rating

The numeric value which represents the relative potential for a contaminant of concern to impact drinking water sources at concentrations significant enough to cause human illness. This numeric value is determined for each contaminant of concern in the Threats Inventory and Issues Evaluation of the Assessment Report.

Highly Vulnerable Aquifer (HVA)

An aquifer that can be easily changed or affected by contamination from both human activities and natural processes as a result of (a) its intrinsic susceptibility, as a function of the thickness and permeability of overlaying layers, or (b) by preferential pathways to the aquifer. The Director's rules will permit the use of various methods, such as the Intrinsic Susceptibility Index (ISI), to determine those aquifers that are highly vulnerable. Ontario's ISI defines a highly vulnerable aquifer as having a value of less than 30. An ISI is a numerical indicator that helps to indicate where contamination of groundwater is more or less likely to occur as a result of surface contamination due to natural hydrogeological features. The ISI is the most commonly used method of index mapping and was the prescribed method set out in the provincial 2001/2002 Groundwater Studies.

Hydrogeology

Hydrogeology is the study of the movement and interactions of groundwater in geological materials.

Hydrologic Integrity

The condition of ecosystems in which hydrological features and hydrological functions are unimpaired by stresses from human activity.

Hydrological Features

a)permanent and intermittent streams, b)wetlands, c)lakes and their surface catchment areas, d)seepage areas and springs, and e)aquifers and recharge areas.

Hydrologic Functions

The functions of the hydrological cycle that include the occurrence, circulation, distribution, and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things.

Imminent Threat to Health

A contaminant of concern that can affect human health in a short period of time.

Incidental Quantities for Personal Use

Means standard size containers that are used for personal or domestic activities. This will exclude larger quantities used in activities, such as hobbies, businesses/home businesses.

Intake Protection Zone (IPZ)

The contiguous area of land and water immediately surrounding a surface water intake, which includes:

- the distance from the intake;
- a minimum travel time of the water associated with the intake of a municipal residential system or other designated system, based on the minimum response time for the water treatment plant operator to respond to adverse conditions or an emergency;
- the remaining watershed area upstream of the minimum travel time area (also referred to as the Total Water Contributing Area) – applicable to inland water courses and inland lakes only.

Intrinsic Vulnerability

The potential for the movement of a contaminant(s) through the subsurface based on the properties of natural geological materials.

Issues Contributing Area (ICA)

The area of land where drinking water threats may contribute to a known drinking water issue. For example, if Trichloroethylene (TCE) is determined to be an Issue, the area from which the source of TCE is determined is called the Issues Contributing Area.

Land Use

A particular use of space at or near the earth's surface with associated activities, substances and events related to a particular land use designation.

Local Area

Specific area around a wellhead or surface water intake as determined through analysis. This area must encompass a drinking water system and surrounding potential quantity threats.

Model

An assembly of concepts in the form of mathematical equations or statistical terms that portrays a behaviour of an object, process or natural phenomenon

Municipality

Refers to the appropriate municipality responsible for the actions described in the policies. Pursuant to the *Municipal Act 2001*, in a two tier municipal structure different municipalities are assigned responsibilities for a number of municipal services. Likewise the *Planning Act,* and *Building Code Act* assign responsibilities to the upper- and lower-tier municipality which will provide guidance as to which municipality is responsible for the actions. In some cases both tiers will take complementary actions, for example the upper-tier may amend the Official Plan to include vulnerable areas and policies and the lower tier will pass zoning by-laws to implement the Official Plan policies. While the municipality responsible for water treatment will typically be the lead implementing body, it is expected that upper- and lower-tier regional municipalities will work together to develop their implementation roles and expectations. Note that under the *Clean Water Act*, only the municipality responsible for passing by-laws respecting water production, treatment and storage under the *Municipal Act, 2001* is responsible for establishing the Risk Management Office and the powers under Part IV as well as enforcement. It is possible to enter into agreement with another municipality to jointly enforce or to transfer enforcement responsibilities.

Municipal Residential System

All municipal drinking-water systems that serve or are planned to serve a major residential development (i.e. six or more private residencies).

Parcel Level

A parcel is a conveyable property, in accordance with the provisions of the Land Titles Act. The parcel is the smallest geographic scale at which risk assessment and risk management are conducted.

Pathogen

A disease causing organism.

Raw Water

Water that is in a drinking-water system or in plumbing that has not been treated in accordance with, (a) the prescribed standards and requirements that apply to the system, or (b) such additional treatment requirements that are imposed by the license or approval for the system.

Recharge

Recharge is the process by which water moves from the ground surface, through the unsaturated zone, to arrive at the water table.

Regulated Areas

Those areas for which Conservation Authorities delineate and restrict land uses by making regulations under subsection 28(1) of the Conservation Authority Act. This subsection applies to water courses, streams, lakes, valleys, flood plains, and wetlands in Ontario.

Reserve Amounts

Minimum flows in streams that are required for the maintenance of the ecology of the ecosystem.

Response Factor

Typical factors affecting the response include dilution, rate of discharge, absorption, and degradation of the contaminant or pathogen in question. Because of the nature of the water resource, certain contaminants and pathogens may not have an impact great enough to warrant concern or responsive action. The level of impact may not effectively degrade the water resource and therefore would not require a mitigative action.

Risk

The likelihood of a drinking water threat (a) rendering an existing or planned drinking water source impaired, unusable or unsustainable, or (b) compromising the effectiveness of a drinking water treatment process, resulting in the potential for adverse human health effects.

Sensitivity Area

That portion of a defined vulnerable area that has been assigned a vulnerability score.

Severity

The degree to which an impact is measured compared to an idealized value of some parameter of concern. In the case of water quality, the severity may relate to degree of measurable exceedance of some contaminant or pathogen. In the case of water quantity deviation from some measurable parameter (e.g. minimum annual flow, piezometric head or lake level) must also be established.

Site-level

The most refined scale at which technical assessment of hydrological and hydrogeological conditions can be conducted. These assessments may contribute to water budgets, vulnerability assessments, and issues evaluation.

Sub-Watershed

An area that is drained by an individual tributary into the main watercourse of a watershed.

Surface Water

Water that is present on the earth's surface and may occur as rivers, lakes, wetlands, ponds, etc.

Tier 1, 2, and 3 Water Budgets

Numerical analysis at the watershed/subwatershed (Tier1 and 2) or local area (Tier 3) level considering existing and anticipated amounts or water use within the watershed, as well as quantitative flow between the groundwater and surface water systems.

Time of Travel (TOT)

An estimate of the time required for a particle of water to move in the saturated zone from a specific point in an aquifer into the well intake.

Tolerance of a Water Supply System

A measure of the ability to sustain required pumping levels even during exposure events.

Transport Pathway

Transport pathways are features or activities occurring at the surface that disturb the surface above the aquifer, or which artificially enhances flow to an aquifer. The presence of a transport pathway can increase the vulnerability rate of an area.

Unconfined Aquifer

An aquifer whose upper boundary is the water table.

Unassumed

Publicly accessible road allowances owned by the municipality which usually do not meet the minimum standards that the municipality considers acceptable for assumption, thus the municipality absolves itself of liability in connection to these roads.

Valuation of the Supply

An evaluation of the importance of a particular municipal well or intake to the whole municipal drinking water supply. For example, where there are multiple supplies, value may be smaller, versus a single supply where value may be greater.

Vulnerable Area

An area referring to a groundwater recharge area, a highly vulnerable aquifer, and a surface water intake protection zone or wellhead protection area.

Water Intake Reliability

The probability that a wellhead or surface water intake can meet demand.

Water Reserve

A proportion of surface water flow that must be sustained to support anthropogenic or ecological requirements.

Water Source

An aquifer or surface water body being used to supply drinking water.

Water Source Supply

The total amount of water flowing through a surface water or groundwater system.

Water Supply System

The group of surface water intakes and/or groundwater wells that pump water to supply a municipal water distribution system.

Watershed

A watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. Its boundaries are defined by ridges of high land.

Wellhead Protection Area (WHPA)

The surface and subsurface area surrounding a water well or well field that supplies a municipal residential system or other designated system through which contaminants are reasonably likely to move so as to eventually reach the water well or well.

APPENDIX A: ASSESSMENT REPORT

As per Section 22 (2) of the *Clean Water Act*, the Approved Assessment Report is available for review online at www.ctcswp.ca or at the offices of Credit Valley Conservation Authority, Toronto and Region Conservation Authority and Central Lake Ontario Conservation Authority.

APPENDIX B: APPLICABLE LEGAL PROVISIONS OF POLICIES

<table>
<tr><th colspan="5">LIST A</th></tr>
<tr><td>Title:</td><td colspan="4">Significant threat policies that affect decisions under the Planning Act and Condominium Act, 1998</td></tr>
<tr><td>Preamble:</td><td colspan="4">• By including a significant threat policy in this list, decisions under the Planning Act and Condominium Act, 1998 will be required to conform with the listed policy (Clause 39 (1) (a) of the CWA).
• Official plans and zoning by-laws will be required to be amended and brought into conformity with the listed significant threat policy by the dates specified in the source protection plan (Section 40 and 42 of the CWA).
• In cases of conflict between a listed significant threat policy and an official plan or zoning by-law, the significant threat policy prevails (subsection 39 (2) of the CWA).
• By including a significant threat policy in List A, if there is a conflict between this significant threat policy and a policy in another provincial plan (e.g. the Green belt Plan), the policy that provides the greatest protection to drinking water prevails (subsection 39 (4) of the CWA).
• A municipality or municipal planning authority must not undertake any public work, improvement of a structural nature or other undertaking or pass a by-law for any purpose that conflicts with a significant threat policy in List A (subsection 39 (6) of the CWA).</td></tr>
<tr><td>Opening Statement:</td><td colspan="4">“Clause 39 (1)(a), subsections 39 (2), (4) and (6), and sections 40 and 42 of the Clean Water Act, 2006 apply to the following policies:”</td></tr>
<tr><td rowspan="5">Policy ID #:</td><td>Transition Provision</td><td>T-8</td><td>T-9</td><td>GEN-1</td></tr>
<tr><td>WST-5</td><td>SWG-3</td><td>SWG-4</td><td>SWG-9</td></tr>
<tr><td>SWG-12</td><td>SWG-14</td><td>SWG-16</td><td>SWG-18</td></tr>
<tr><td>SAL-3</td><td>DEM-2</td><td>REC-1</td><td></td></tr>
</table>

<table>
<tr><th colspan="5">LIST B</th></tr>
<tr><td>Title:</td><td colspan="4">Moderate and low threat policies that affect decisions under the Planning Act and Condominium Act, 1998</td></tr>
<tr><td>Preamble:</td><td colspan="4">• By including a moderate or low threat policy in this list, decisions under the Planning Act and Condominium Act, 1998 will be required have regard to the policy (Clause 39 (1) (b) of the CWA).</td></tr>
<tr><td>Opening Statement:</td><td colspan="4">“Subsection 39 (1)(b) of the Clean Water Act, 2006 applies to the following policies:”</td></tr>
<tr><td>Policy ID #:</td><td>SAL-10</td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><th colspan="5">LIST C</th></tr>
<tr><td>Title:</td><td colspan="4">Significant threat policies that affect prescribed instrument decisions</td></tr>
<tr><td>Preamble:</td><td colspan="4">• By including a significant threat policy in this list, a decision to issue, otherwise create or amend a prescribed instrument must conform to the listed policy (clause 39 (7) (a) of the CWA).
• A person or body that has issued or otherwise created a prescribed instrument before the source protection plan took effect will be required to amend the instrument to conform with the listed significant threat policies before the date specified in the source protection plan (section 43 of the CWA).
• A municipality or municipal planning authority must not undertake any public work, improvement of a structural nature or other undertaking or pass a by-law for any purpose that conflicts with a significant threat policy in List C (subsection 39 (6) of the CWA).</td></tr>
<tr><td>Opening Statement:</td><td colspan="4">“Subsection 39 (6), clause 39 (7) (a), section 43 and subsection 44 (1) of the Clean Water Act, 2006 apply to the following policies:”</td></tr>
<tr><td rowspan="7">Policy ID #:</td><td>Transition Provision</td><td>T-1</td><td>T-2</td><td>T-3</td></tr>
<tr><td>WST-3</td><td>WST-4</td><td>WST-7</td><td>SWG-8</td></tr>
<tr><td>SWG-11</td><td>SWG-13</td><td>SWG-15</td><td>SWG-17</td></tr>
<tr><td>ASM-1</td><td>ASM-3</td><td>ASM-5</td><td>NASM-3</td></tr>
<tr><td>NASM-4</td><td>LIV-2</td><td>FER-1</td><td>FUEL-1</td></tr>
<tr><td>FUEL-2</td><td>LO-SEW-1</td><td>LO-SEW-2</td><td>DEM-1</td></tr>
</table>

LIST D	
Title:	Moderate and low threat policies that affect prescribed instrument decisions
Preamble:	• By including a moderate or low threat policy in List D, a decision to issue, otherwise create or amend a prescribed instrument must have regard to the listed policy (clause 39 (7) (b) of the CWA).
Opening Statement:	“Clause 39 (7)(b) of the Clean Water Act, 2006 applies to the following policies:”
Policy ID #:	No applicable policies.

<table>
<tr><th colspan="5">LIST E</th></tr>
<tr><td>Title:</td><td colspan="4">Significant threat policies that impose obligations on municipalities, source protection authorities and local boards[5]</td></tr>
<tr><td>Preamble:</td><td colspan="4">• Requires a municipality, a source protection authority or a local board to comply with any obligation that is imposed on it by significant threat policy (section 38 of the CWA).
• If the policy relates to education, outreach and incentive programs, stewardship programs, the promotion of best management practices, pilot programs, research, and other specified actions to be taken to implement the source protection plan or achieve the plan's objectives, section 30 of the regulation requires that the policy designate (identify) the person or body responsible for implementing the policy.
• By including a significant threat policy in List E, the person or body identified for implementing the policy will be required to comply with the obligations specified in the policy.
• A municipality or municipal planning authority must not undertake any public work, improvement of a structural nature or other undertaking or pass a by-law for any purpose that conflicts with a significant threat policy in List E (subsection 39 (6) of the CWA).</td></tr>
<tr><td>Opening Statement:</td><td colspan="4">"Section 38 and subsection 39 (6) of the Clean Water Act, 2006 applies to the following policies:"</td></tr>
<tr><td rowspan="11">Policy ID #:</td><td>Transition Provision</td><td>T-10</td><td>T-11</td><td>T-12</td></tr>
<tr><td>T-13</td><td>T-14</td><td>T-15</td><td>T-16</td></tr>
<tr><td>T-17</td><td>T-18</td><td>GEN-2</td><td>GEN-5</td></tr>
<tr><td>GEN-7</td><td>WST-2</td><td>SWG-1</td><td>SWG-2</td></tr>
<tr><td>SWG-6</td><td>SWG-7</td><td>SWG-19</td><td>FER-4</td></tr>
<tr><td>PES-4</td><td>SAL-8</td><td>FUEL-3 (3)</td><td>FUEL-4</td></tr>
<tr><td>DNAP-2</td><td>OS-2</td><td>DI-2</td><td>LO-G-3</td></tr>
<tr><td>DEM-4</td><td>DEM-5</td><td>DEM-6</td><td>DEM-9</td></tr>
<tr><td>DEM-10</td><td>REC-3</td><td></td><td></td></tr>
</table>

[5] Under the *CWA*, "Local board" has the same meaning as in the Municipal Affairs Act. Local board means a school board, municipal service board, transportation commission, public library board, board of health, police services board, planning board, or any other board, commission, committee, body or local authority established or exercising any power or authority under any general or special Act with respect to any of the affairs or purposes, including school purposes, of a municipality or of two or more municipalities or parts thereof.

LIST F				
Title:	Monitoring policies referred to in subsection 22 (2) of the Clean Water Act, 2006			
Preamble:	• By including monitoring policies in List F, the public body[6] that is designated in the monitoring policy will be required to implement a monitoring program in accordance with the policy.			
Opening Statement:	"Subsection 45 of the Clean Water Act, 2006 applies to the following policies:"			
Policy ID #:	T-16	SAL-9	MON-1	MON-2
	MON-3	MON-4		

LIST G				
Title:	Policies related to section 57 of the Clean Water Act, 2006			
Preamble:	• By including a policy in List G, no one is permitted to engage in any of the specified activities within the vulnerable areas set out in the policy after the date by which existing activities must be phased out or new activities prohibited in accordance with the policy. • The reader should refer to the actual policy text for information pertaining to the designated prohibited activity(ies), their respective designated areas, and other details related to the sec section 57 prohibition – for instance the date by which existing activities must be phased out in accordance with subsection 57(2) of the CWA.			
Opening Statement:	"The following policies relate to section 57 (prohibition) of the Clean Water Act."			
Policy ID #:	T-4	T-5	WST-6 (1)	ASM-2 (1)
	ASM-4 (1)	NASM-1 (1)	NASM-2 (1)	LIV-1 (1)
	LIV-3 (1)	FER-2 (1)	FER-3 (1)	PES-2 (1)
	SAL-7 (1)	SNO-1 (1)	FUEL-3 (1)	DNAP-1 (1)
	OS-1 (1)			

[6] Under the CWA, "public body" means, (a) a municipality, local board or conservation authority, (b) a ministry, board, commission, agency or official of the Government of Ontario, or (c) a body prescribed by the regulations or an official of a body prescribed by the regulations.

LIST H				
Title:	Policies related to section 58 of the Clean Water Act, 2006			
Preamble:	• By including a policy in List H, no one is permitted to engage in any of the specified activities within the vulnerable areas set out in the policy after the date specified without conforming to the Risk Management Plan developed in accordance with the policy, the Act and regulations and approved by the Risk Management Official. • The reader should refer to the actual policy text for information pertaining to the designated regulated activity(ies), their respective designated areas, and any other details related to the regulation of the activity under section 58 – for instance – the policies governing the content of risk management plans.			
Opening Statement:	"The following policies relate to section 58 (risk management plans) of the Clean Water Act."			
Policy ID #:	T-6	T-7	WST-1	WST-6 (2)
	ASM-2 (2)	ASM-4 (2)	NASM-1 (2)	NASM-2 (2)
	LIV-1 (2)	LIV-3 (2)	FER-2 (2)	FER-3 (2)
	PES-1	PES-2 (2)	SAL-1	SAL-2
	SAL-7 (2)	SNO-1 (2)	FUEL-3 (2)	DNAP-1 (2)
	OS-1 (2)	DI-1	REC-2	

LIST I				
Title:	Policies related to section 59 of the Clean Water Act, 2006			
Preamble:	• Purpose of which is to ensure that a development proposal complies with section 57 or 58 of the CWA before it is given other municipal approvals. • The reader should refer to the actual policy text for details related to each policy, including the designated land uses and their respective designated areas.			
Opening Statement:	"The following policies relate to section 59 (restricted land use) of the Clean Water Act."			
Policy ID #:	GEN-1			

LIST J				
Title:	Strategic Action policies			
Opening Statement:	For the purposes of section 33 of Ontario regulation 287/07, the following policies are identified as strategic action policies:			
Policy ID #:	T-15	GEN-8	SAL-11	SAL-12
	SAL-13	DNAP-3	OS-3	LO-G-1
	LO-G-4	LO-SEW-3	LO-FUEL-2	

LIST K				
Title:	Significant threat policies that identify a body other than a municipality, source protection authority or local board as responsible for implementing the policy, and which represent a non-legally binding commitment			
Policy ID #:	T-10	T-15	T-16	T-17
	T-18	GEN-3	GEN-4	GEN-6
	OTHER-1	WST-2	SWG-2	SWG-5
	SWG-10	NASM-5	FER-4	PES-3
	SAL-4	SAL-5	SAL-6	SAL-8
	FUEL-4	DNAP-2	OS-2	LO-G-2
	LO-NGS-1	LO-SEW-3	LO-PIPE-1	LO-FUEL-1
	LO-FUEL-2	DEM-3	DEM-5	DEM-7
	DEM-8	REC-3		

APPENDIX C: PRESCRIBED INSTRUMENTS WHICH APPLY TO SOURCE PROTECTION PLAN POLICIES IN LISTS C AND D (SS. 34(4) OF O. REG. 287/07)

Policy ID	Legal Effect	Aggregate Resources Act: Licenses, Wayside Pit Permits, Aggregate Permits, and Site Plans	Environmental Protection Act: Waste Sites and Systems	Nutrient Management Act: Nutrient Management Plans/Strategies	Nutrient Management Act: NASM Plans	Ontario Water Resources Act: Permits to Take Water	Ontario Water Resources Act: Sewage Works	Safe Drinking Water Act: Permits, Licenses
WST-3	Must conform		X					
WST-4	Must conform		X					
WST-7	Must conform		X					
SWG-8	Must conform						X	
SWG-11	Must conform						X	
SWG-13	Must conform						X	
SWG-15	Must conform						X	
SWG-17	Must conform						X	
ASM-1	Must conform			X				
ASM-3	Must conform			X				
ASM-5	Must conform						X	
NASM-3	Must conform				X			
NASM-4	Must conform				X			
LIV-2	Must conform			X				
FER-1	Must conform			X				
FUEL-1	Must conform							X
FUEL-2	Must conform	X						
LO-SEW-1	Must conform		X					
LO-SEW-2	Must conform		X					
DEM-1	Must conform					X		

APPENDIX D: POLICY SUMMARY MATRIX

Policy ID	Legal Effect	Policy affects decisions under the *Planning Act and Condominium Act, 1998* **(Lists A & B)**	Policy affects Prescribed Instruments decisions **(Lists C & D)**	Significant threat policies that impose obligations on municipalities, SPA's and local boards **(List E)**	Monitoring Policies referred to in s.22(2) of the *CWA* **(List F)**	Part IV Policies - Significant threat policies that are designated in the plan as requiring a RMP, are prohibited under s.57, or to which s.59 of the *CWA* applies **(Lists G, H & I)**	Strategic Action Policies **(Lists J)**	**(List K)**
Transition	Must Comply	X	X	X				
T-1	Must Comply		X					
T-2	Must Comply		X					
T-3	Must Comply		X					
T-4	Must Comply					X		
T-5	Must Comply					X		
T-6	Must Comply					X		
T-7	Must Comply					X		
T-8	Must Comply	X						
T-9	Must Comply	X						
T-10	Must Comply			X				
	Strategic							X
T-11	Must Comply			X				
T-12	Must Comply			X				
T-13	Must Comply			X				
T-14	Must Comply			X				
T-15	Must Comply			X				
	Strategic						X	X
T-16	Must Comply			X	X			
	Strategic							X
T-17	Must Comply			X				
	Strategic							X
T-18	Must Comply			X				
	Strategic							X

Policy ID	Legal Effect	Policy affects decisions under the *Planning Act and Condominium Act, 1998* **(Lists A & B)**	Policy affects Prescribed Instruments decisions **(Lists C & D)**	Significant threat policies that impose obligations on municipalities, SPA's and local boards **(List E)**	Monitoring Policies referred to in s.22(2) of the *CWA* **(List F)**	Part IV Policies - Significant threat policies that are designated in the plan as requiring a RMP, are prohibited under s.57, or to which s.59 of the *CWA* applies **(Lists G, H & I)**	Strategic Action Policies **(Lists J)**	**(List K)**
GEN-1	Must Comply	X				X		
GEN-2	Must Comply			X				
GEN-3	Strategic							X
GEN-4	Strategic							X
GEN-5	Must Comply			X				
GEN-6	Strategic							X
GEN-7	Must Comply			X				
GEN-8	Strategic						X	
OTHER-1	Strategic							X
WST-1	Must Comply					X		
WST-2	Must Comply			X				
	Strategic							X
WST-3	Must Comply		X					
WST-4	Must Comply		X					
WST-5	Must Comply	X						
WST-6	Must Comply					X		
WST-7	Must Comply		X					
SWG-1	Must Comply			X				
SWG-2	Must Comply			X				
	Strategic							X
SWG-3	Must Comply	X						
SWG-4	Must Comply	X						
SWG-5	Strategic							X
SWG-6	Must Comply			X				
SWG-7	Must Comply			X				
SWG-8	Must Comply		X					

Policy ID	Legal Effect	Policy affects decisions under the *Planning Act and Condominium Act, 1998* **(Lists A & B)**	Policy affects Prescribed Instruments decisions **(Lists C & D)**	Significant threat policies that impose obligations on municipalities, SPA's and local boards **(List E)**	Monitoring Policies referred to in s.22(2) of the *CWA* **(List F)**	Part IV Policies - Significant threat policies that are designated in the plan as requiring a RMP, are prohibited under s.57, or to which s.59 of the *CWA* applies **(Lists G, H & I)**	Strategic Action Policies **(Lists J)**	**(List K)**
SWG-9	Must Comply	X						
SWG-10	Strategic							X
SWG-11	Must Comply		X					
SWG-12	Must Comply	X						
SWG-13	Must Comply		X					
SWG-14	Must Comply	X						
SWG-15	Must Comply		X					
SWG-16	Must Comply	X						
SWG-17	Must Comply		X					
SWG-18	Must Comply	X						
SWG-19	Must Comply			X				
ASM-1	Must Comply		X					
ASM-2	Must Comply					X		
ASM-3	Must Comply		X					
ASM-4	Must Comply					X		
ASM-5	Must Comply		X					
NASM-1	Must Comply					X		
NASM-2	Must Comply					X		
NASM-3	Must Comply		X					
NASM-4	Must Comply		X					
NASM-5	Strategic							X
LIV-1	Must Comply					X		
LIV-2	Must Comply		X					
LIV-3	Must Comply					X		
FER-1	Must Comply		X					

Policy ID	Legal Effect	Policy affects decisions under the *Planning Act and Condominium Act, 1998* **(Lists A & B)**	Policy affects Prescribed Instruments decisions **(Lists C & D)**	Significant threat policies that impose obligations on municipalities, SPA's and local boards **(List E)**	Monitoring Policies referred to in s.22(2) of the *CWA* **(List F)**	Part IV Policies - Significant threat policies that are designated in the plan as requiring a RMP, are prohibited under s.57, or to which s.59 of the *CWA* applies **(Lists G, H & I)**	Strategic Action Policies **(Lists J)**	**(List K)**
FER-2	Must Comply					X		
FER-3	Must Comply					X		
FER-4	Must Comply			X				
	Strategic							X
PES-1	Must Comply					X		
PES-2	Must Comply					X		
PES-3	Strategic							X
PES-4	Must Comply			X				
SAL-1	Must Comply					X		
SAL-2	Must Comply					X		
SAL-3	Must Comply	X						
SAL-4	Strategic							X
SAL-5	Strategic							X
SAL-6	Strategic							X
SAL-7	Must Comply					X		
SAL-8	Must Comply			X				
	Strategic							X
SAL-9	Must Comply				X			
SAL-10	Strategic	X						
SAL-11	Strategic						X	
SAL-12	Strategic						X	
SAL-13	Strategic						X	
SNO-1	Must Comply					X		
FUEL-1	Must Comply		X					
FUEL-2	Must Comply		X					

Policy ID	Legal Effect	Policy affects decisions under the *Planning Act and Condominium Act, 1998* **(Lists A & B)**	Policy affects Prescribed Instruments decisions **(Lists C & D)**	Significant threat policies that impose obligations on municipalities, SPA's and local boards **(List E)**	Monitoring Policies referred to in s.22(2) of the *CWA* **(List F)**	Part IV Policies - Significant threat policies that are designated in the plan as requiring a RMP, are prohibited under s.57, or to which s.59 of the *CWA* applies **(Lists G, H & I)**	Strategic Action Policies **(Lists J)**	**(List K)**
FUEL-3	Must Comply			X		X		
FUEL-4	Must Comply			X				
	Strategic							X
DNAP-1	Must Comply					X		
DNAP-2	Must Comply			X				
	Strategic							X
DNAP-3	Strategic						X	
OS-1	Must Comply					X		
OS-2	Must Comply			X				
	Strategic							X
OS-3	Strategic						X	
DI-1	Must Comply					X		
DI-2	Must Comply			X				
LO-G-1	Strategic							X
LO-G-2	Strategic						X	X
LO-G-3	Must Comply			X				
LO-G-4	Strategic						X	X
LO-NGS-1	Strategic							X
LO-SEW-1	Must Comply		X					
LO-SEW-2	Must Comply		X					
LO-SEW-3	Strategic						X	X
LO-PIPE-1	Strategic							X
LO-FUEL-1	Strategic							X
LO-FUEL-2	Strategic						X	X
DEM-1	Must Comply		X					

Policy ID	Legal Effect	Policy affects decisions under the *Planning Act and Condominium Act, 1998* **(Lists A & B)**	Policy affects Prescribed Instruments decisions **(Lists C & D)**	Significant threat policies that impose obligations on municipalities, SPA's and local boards **(List E)**	Monitoring Policies referred to in s.22(2) of the *CWA* **(List F)**	Part IV Policies - Significant threat policies that are designated in the plan as requiring a RMP, are prohibited under s.57, or to which s.59 of the *CWA* applies **(Lists G, H & I)**	Strategic Action Policies **(Lists J)**	**(List K)**
DEM-2	Must Comply	X						
DEM-3	Strategic							X
DEM-4	Must Comply			X				
DEM-5	Must Comply			X				
	Strategic							X
DEM-6	Must Comply			X				
DEM-7	Strategic							X
DEM-8	Strategic							X
DEM-9	Must Comply			X				
DEM-10	Must Comply			X				
REC-1	Must Comply	X						
REC-2	Must Comply					X		
REC-3	Must Comply			X				
	Strategic							X
MON-1	Must Comply				X			
MON-2	Must Comply				X			
MON-3	Must Comply				X			
MON-4	Must Comply				X			

APPENDIX E: POLICIES BY IMPLEMENTER

The following table lists the policies in the CTC Source Protection Plan by implementing body.

Implementer	Policies	
MGCS	Fuel	FUEL-4
MMAH	Sewage Systems	SWG-5
	Quantity - Demand	DEM-3; DEM-7
MNRF	General	GEN-3
	Fuel	FUEL-2
MOECC	General	GEN-3; GEN-4; GEN-6
	Waste	WST-2; WST-3; WST-4; WST-7
	Sewage Systems	SWG-2; SWG-8; SWG-10; SWG-11; SWG-13; SWG-15; SWG-17
	Agricultural Source Material	ASM-5
	Non-Agricultural Source Material	NASM-3; NASM-4; NASM-5
	Fertilizer	FER-4
	Pesticide	PES-3
	Road Salt	SAL-4; SAL-5; SAL-8; SAL-11
	Fuel	FUEL-1; FUEL-4
	Dense Non-Aqueous Phase Liquids	DNAP-2
	Organic Solvents	OS-2
	Lake Ontario - All Threats	LO-G-1; LO-G-2; LO-G-4
	Lake Ontario - NGS	LO-NGS-1
	Lake Ontario - Sewage	LO-SEW-1; LO-SEW-2; LO-SEW-3
	Lake Ontario - Pipe	LO-PIPE-1
	Lake Ontario - Fuel	LO-FUEL-1; LO-FUEL-2
	Quantity - Demand	DEM-1; DEM-3; DEM-5; DEM-7; DEM-8
	Quantity - Recharge	REC-3
MTO	Road Salt	SAL-6

Implementer	Policies	
Municipality	General	GEN-1; GEN-2; GEN-5; GEN-7; GEN-8
	Waste	WST-2
	Sewage Systems	SWG-1; SWG-2; SWG-6 SWG-7 (only applicable to municipalities with Sodium or Chloride ICAs) SWG-19 (only applicable to Town of Orangeville)
	Fertilizer	FER-4
	Pesticide	PES-4
	Road Salt	SAL-8 SAL-9 (only applicable to municipalities with Sodium or Chloride ICAs) SAL-12; SAL-13
	Fuel	FUEL-4
	Dense Non-Aqueous Phase Liquids	DNAP-2; DNAP-3
	Organic Solvents	OS-2; OS-3
	Aircraft De-icing	DI-2
	Lake Ontario - All Threats	LO-G-3 (only applicable to the Regions of Peel and Durham, and the City of Toronto)
	Quantity - Demand	DEM-4; DEM-5; DEM-6; DEM-9 DEM-10 (only applicable to York Region)
	Quantity - Recharge	REC-3
Niagara Escarpment Commission	Other	OTHER-1
OMAFRA	General	GEN-3
	Agricultural Source Material	ASM-1; ASM-3
	Non-Agricultural Source Material	NASM-3; NASM-4; NASM-5
	Livestock	LIV-2
	Fertilizer	FER-1
Planning Approval Authority	Waste	WST-5
	Sewage Systems	SWG-3; SWG-4; SWG-9; SWG-12; SWG-14; SWG-16; SWG-18
	Road Salt	SAL-3; SAL-10
	Quantity - Demand	DEM-2
	Quantity - Recharge	REC-1

Implementer	Policies	
Risk Management Official	General	GEN-1 GEN-2 (through municipality)
	Waste	WST-1; WST-6
	Agricultural Source Material	ASM-2; ASM-4
	Non-Agricultural Source Material	NASM-1; NASM-2
	Livestock	LIV-1; LIV-3
	Fertilizer	FER-2; FER-3
	Pesticide	PES-1; PES-2
	Road Salt	SAL-1; SAL-2; SAL-7
	Snow	SNO-1
	Fuel	FUEL-3
	Dense Non-Aqueous Phase Liquids	DNAP-1
	Organic Solvents	OS-1
	Aircraft De-icing	DI-1
	Quantity - Recharge	REC-2
Source Protection Authority	Sewage Systems	SWG-7 (only applicable to CVSPA) SWG-19 (only applicable to CVSPA)
	Road Salt	SAL-9 (only applicable to CVSPA) SAL-13
	Fuel	FUEL-3
TSSA	Fuel	FUEL-4