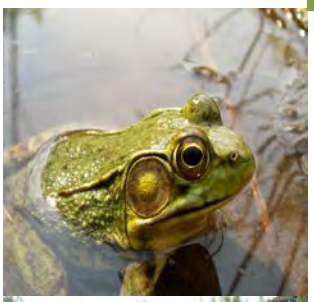
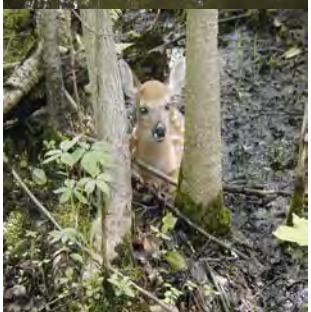
Appendix C

Natural Environment Report (LGL)

LGL LIMITED
environmental research associates

SUMMARY REPORT





HALTON WASTEWATER PUMPING STATION MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT

for:

R.V. ANDERSON ASSOCIATES

by:

LGL Limited
environmental research associates

MAY 2011

LGL FILE TA 4834

HALTON WASTEWATER PUMPING STATION MASTER PLAN CLASS ENVIRONMENTAL ASSESSMENT

SUMMARY REPORT

prepared by:

Digital signature

J. Arnel Fausto
SENIOR ECOLOGIST,
VICE PRESIDENT

Digital signature

Allison Featherstone
PLANNING ECOLOGIST

LGL Limited
environmental research associates
3365 Harvester Road
Burlington, Ontario L7N 3N2
Tel: 905-333-1667 Fax: 905-333-2660
Email: burlington@lgl.com
URL: www.lgl.com

MAY 2011
LGL FILE TA 4834

TABLE OF CONTENTS

1.0 INTRODUCTION

The Regional Municipality of Halton (Region) has retained R.V. Anderson Associates to conduct a Capital Needs Assessment and Master Plan Class Environmental Assessment (EA) for 59 wastewater pumping stations in three wastewater treatment plant (WWTP) drainage areas. A number of these pumping stations are located in residential areas, and are expected to require rehabilitation, reconstruction, decommissioning, and possible expansion in the near future. As many of these pumping stations are expected to be impacted by intensification from the Sustainable Halton initiative, the Region is undertaking an evaluation of all pumping stations in these WWTP drainage areas in a manner that fully addresses the needs of the community and the Region. R. V. Anderson Associates has retained LGL Limited to provide natural heritage services in support of this evaluation. This report provides a summary of the natural heritage review and assumptions for the evaluation matrices for Master Plan Class EA.

1.1 STUDY APPROACH

The Wastewater Pumping Station Capital Needs Assessment and Master Plan Class EA study involves the evaluation of 59 pumping stations distributed in the following 3 WWTP drainage areas:

- Burlington Skyway WWTP Drainage Area (23 Pumping Stations);
- Oakville South West WWTP Drainage Area (21 Pumping Stations); and,
- Oakville South East WWTP Drainage Area (15 Pumping Stations).

For the assessment of natural environment impacts, a number of evaluation criteria were developed. These include the following:

- Impact on the terrestrial environment during construction;
- Long term impact on the terrestrial environment;
- Impact on the aquatic environment during construction;
- Long term impact on the aquatic environment;
- Ability to meet regulatory constraints; and,
- Reduction of system overflows.

These criteria were aimed at prioritizing locations of pumping stations which pose the greatest risk to the natural environment in the event of failure or malfunction due to age and deterioration over time.

2.0 WORK PLAN AND STUDY METHODOLOGY

The study methodology consisted primarily of a desktop evaluation based on 2008 ortho air photography, which includes an overlay of wastewater pumping station locations and wastewater treatment plant drainage areas over natural constraint Geographic Information System (GIS) layers.

Natural heritage information regarding one of the three drainage areas for wastewater treatment plant areas was reviewed and updated to reflect current provincial and federal legislation, regulations and policies. For the purposes of this study, GIS data layers were obtained from a number of sources, including:

- Regional Municipality of Halton GIS database;
- Natural Heritage Information Centre (NHIC);
- Halton Natural Areas Inventory (Conservation Halton, 2006)
- Oakville Natural Heritage Studies;
- Official Plans and Secondary Plans for upper and lower tier municipalities;
- MNR Natural Resource Values Information System (NRVIS) mapping;
- Databases prepared by Conservation Halton;
- Area of Natural and Scientific Interest reports and maps prepared by MNR;
- Wetland Evaluation Data Records and maps prepared by MNR;
- Environmentally Sensitive/Significant Areas studies prepared by Regional Municipality of Halton (2005); and,
- Species-at-Risk Mapping provided by MNR (available as polygons for specific properties and polygons for habitat regulations where available).

Additional areas of local and regional significance including conservation lands and parks, environmentally sensitive/significant areas, local and regional areas of natural and scientific interest, non-provincially significant wetlands, and potential corridors were identified where possible.

2.1 DETERMINATION OF ENVIRONMENTAL IMPACTS

The extent of natural environment impacts differs geographically in terms of the individual environment setting of each drainage area. In areas where pumping stations are located in sensitive locations such as near an important coldwater stream or an Area of Natural and Scientific Interest (ANSI) or an Environmentally Sensitive Area (ESA), the impacts resulting from pumping station failure or spill is potentially more significant than within an urban area where none of these features are present. Within the lakefront areas, natural environmental impacts are generally expected to be more significant in sheltered aquatic environments such as embayments and coastal wetlands, as these zones are general stable areas where there are fish nursery/spawning sites. In contrast, an exposed, dynamic shoreline subject to wind and wave energy provides an unstable environment for fish, and these sites also assimilate the effects of accidental spills more easily (due to dilution/dispersion effects associated with wind and wave transport). Moreover, there are also natural areas such as river valleys within urban environments that have greater sensitivity than other remnant natural areas in the landscape. An example of this type of habitat include well known features such as the Bronte Creek and 16 Mile Creek Valley Corridors that are also designated as Areas of Natural and Scientific Interest (ANSIs) and Environmentally Sensitive Areas (ESAs). These areas serve as important migratory corridors for wildlife and fish movement, provide habitat for species-at-risk, and in many cases, provide spawning habitat for riverine fish.

Based on the above, each of the 3 WWTP drainage areas were examined individually, with the aim of prioritizing which areas are deemed most sensitive within their respective geographical setting. Many of these features can be found by examination of applicable provincial and municipal designations (ESA, ANSI, Provincially Significant Wetland (PSW) etc.) within each corridor, as well as known locations of Species-at-Risk (SAR) records.

2.1.1 Natural Heritage Constraints

Using GIS, preliminary natural heritage mapping for the 3 WWTP drainage areas was produced to determine the locations of the pumping station relative to the constraint areas. Based on this information, the nature of environmental constraints generally fell into aquatic and terrestrial habitat impact categories. Sensitivity analysis was completed based on the level of anticipated impacts that would result in the event of pumping station failure.

The major environmental impacts that are anticipated from pumping station failure includes accidental spills into nearby receiving waters from pumping station failure, and impacts due to construction (such as decommissioning, construction of new retrofits to bring a pumping station up to current standard etc.). All sewage spills resulting from Pumping Station failure primarily affect the receiving waters downgradient of the pumping station location. This includes rivers, creeks, and minor watercourses as well as shoreline habitat. The impact is considered more severe depending on the sensitivity of the receiving water habitat. As mentioned previously, the sensitivity of a given aquatic habitat is variable and is estimated based on factors such as proximity of the pumping station to the waterbody, whether the waterbody supports sensitive fish populations (warm, cold, and species-at-risk fish), proximity to known areas of spawning nursery sites, and magnitude of impact to the downstream fish community. Fish that are trapped in specific locations were there area limited areas of refuge are more susceptible to impacts from accidental sewage spills. The sensitivity of receiving waters can be viewed in a number of ways as follows:

2.1.1.1 Burlington WWTP Drainage Area

The Burlington WWTP drainage area includes pumping stations which extend from the Burlington Skyway to Highway 6 (herein referred to as Burlington West) and from QEW to the vicinity of Burloak Drive (herein referred to as Burlington East). With respect to the drainage area, the inner Hamilton Harbour shoreline in Burlington West contains many aging pumping stations situated in close proximity of the shoreline. The failure of any of these pumping stations would be considered a greater impact to Lake Ontario as this portion of the lake is considered sheltered, relative to the rest of the lake.

Hamilton Harbour provides habitat for many different fish species that use Coote's Paradise, as well as waterfowl. Sewage Spills in this area of Lake Ontario would be of greater impact than elsewhere because of the reduced mixing and dilution of water currents at this location. Hamilton Harbour is considered to be an area of concern with remedial efforts being spent to improve the marsh habitat and the harbour itself.

Although the Burlington East contains relatively fewer pumping stations than in Burlington West, many pumping stations are close to Lakeshore Boulevard. Failure of these pumping stations could have an immediate impact to the nearshore environment.

Major terrestrial sites of importance include Hendrie Valley Life Science Site and Royal Botanical Gardens (RBG) - Henrie Valley-Lambs Hollow Wetland, Sassafras Waterdown Woods Life Science ANSI, Grindstone Valley and Clappison Escarpment Woods Life Science ANSI and ESA. Many of these larger systems contain multiple designations such as Greenlands, ESAs, ANSIs, and PSWs. Since a variety of adverse effects can occur if a sewage spill occurs within the valleys, these are considered to be high risk sites.

2.1.1.2 Oakville Southwest WWTP Drainage Area

The Oakville Southwest WWTP drainage area includes pumping stations which extend just east of Great Lakes Boulevard to the vicinity of Woodhaven Park Drive, south of Rebecca Street in Oakville (herein referred to as Oakville Southwest West) and from Woodhaven Park Drive to Trafalgar Road(herein referred to as Oakville Southwest East). In this drainage area, the major environmental constraints include major creek systems, notably the Bronte and Sixteen Mile Creek, which support anadromous fish populations (rainbow trout, Pacific salmon), Atlantic salmon, and catadromous fish such as American Eel. Many of these areas also have multiple designations as ESAs and Greenlands. The mouth of these large rivers serves as staging areas for many of these fish species. Sewage pumping stations located in close proximity to major river valleys within the Oakville Southwest WWTP drainage area are considered to be high risk sites since sewage spills at these locations will be expected to affect a number of fish species and waterfowl that use these areas. Local marinas also utilize these areas and the sheltered areas within them are utilized by young fish.

As in the Burlington drainage area, there are also many pumping stations that are in close proximity to the Lake Ontario shoreline. In this area a variety of recreational uses such as sailing and charter fishing is common, and the shoreline also supports a variety of nearshore habitats for fish, particularly in the mouths of small tributaries, and within smaller embayments. Since a variety of adverse effects can occur if a sewage spill occurs within the nearshore area, they are considered to be high risk sites. These sites are also generally situated in erosion prone areas, which increase their risk of failure.

2.1.1.3 Oakville Southeast WWTP Drainage Area

The Oakville Southwest WWTP drainage area includes pumping stations extending from Raymar Place to Winston Churchill Boulevard. This area is more urbanized than the other study areas, with natural heritage constraints consisting of Joshua's Creek, Wedgewood, and Morrison Creek systems. Joshua's Creek is the larger of these systems and is also classified as an ESA in its lower reaches. The rest of the pumping station locations are also within a short distance to the Lake Ontario shoreline, which supports nearshore fish habitat.

2.1.2 Assumptions Associated with Pumping Station Upgrade or Replacement Alternatives

The Halton Wastewater Pumping Station Capital Needs Assessment and Master Plan Class EA is aimed at determining high level priorities for replacement or decommissioning of aging pumping stations. To estimate the level of impacts to natural heritage constraints, there are a number of assumptions with respect to various components used in the overall evaluation. The following subsections outline the assumptions associated with each alternative.

2.1.2.1 Waste Water Pumping Station Upgrades/Replacement

The majority of waste water pumping stations are situated within Region owned properties which are situated near creek valleys and shorelines. As pumping stations age, they are repaired and new components are added. In the event that waste water pumping stations are repaired or upgraded, it is assumed that there will be no change in the pumping station footprint (i.e. repairs and upgrades will be within existing areas occupied by the pumping station) in terms of additional impacts to adjacent natural areas. However, there will be temporary disruption of the site (such as minor tree clearing), new construction of pumping building and new components, and removal of surrounding landscape vegetation and replacement with new landscaping and grading of site.

Over the course of the project, there may be occasional failures, disruption, and maintenance, and possible power failure (which may lead to occasional bypasses and spills) associated with wastewater pumping stations and this risk increases with age. It is assumed that the pumping station and forcemain will be replaced once during its lifetime. This will involve open cut excavation of the pumping station and forcemain alignment. Trees will need to be pruned or removed depending on exact location of the forcemain alignment. The whole pumping station may need to be rebuilt with a larger building and therefore, it is possible that a minor footprint expansion will occur within the property boundary. During the event of a major repair or upgrade, a new forcemain may need to be installed. It is anticipated that all creeks systems situated within the new forcemain route will be traversed by open cut excavation.

2.1.2.2 Waste Water Pumping Station Decommissioning

Decommissioning of the pumping station involves tearing down the existing pumping station and removal/disposal of pumping station components. With respect to the natural environment, this activity involves temporary disruption of the immediate area, and landscaping changes as the building is demolished and disposed, using heavy equipment. It is anticipated that existing trees and vegetation over most of the site will be removed and restored with new replacement plantings after construction. The surrounding disturbed construction footprint will be regraded as part of site landscaping, and planted with new trees. In addition, the existing sewage connection to the old building will be sealed and plugged. Over the course of the long term, it is anticipated that there will be no further spills or equipment malfunctions at the pumping station site location, once decommissioning has taken place.

2.1.2.3 Deep Gravity Interceptor Sewer Option

Installation of a deep gravity sewer is intended to eliminate the need for a pumping station by allowing sewage transport to the WWTP by means of a large diameter gravity sewer. This solution involves the construction and installation of a large diameter sewer deep beneath the ground surface using tunnelling equipment. Since the sewer would be located underground, the anticipated environmental impacts involve loss of vegetation at tunnel shaft locations. For the purposes of this study, it is assumed that there will be direct surface impacts at proposed shaft locations (whereby tunnel shafts would be installed at every 1 km section and at every bend in the gravity sewer). At this stage, no dewatering is anticipated for the deep sewer installation, although some dewatering may be required during the time of shaft excavation. Although there will be an opportunity to move the final shaft locations to avoid certain heritage features, it is assumed that shafts will occupy existing unoccupied open space, boulevards, urban parks, or fallow fields wherever possible. Restoration of the tunnel shafts involves restoring the construction area with new vegetation plantings and trees. It is assumed that a typical shaft will occupy an area of approximately 12mX 12m square (144 sq. Meters).

Local sewers that need to connect to the deep sewer will be connected by means of open cut excavation. All natural heritage features encountered along the local sewer route, such as small creeks or woodland areas will be impacted by open cut excavation, and included as part of the interceptor sewer impacts. Once the gravity sewer is in place, it is assumed that there will be minimal long term impact as the removal of the existing pumping station eliminates the need for accidental spills or overflows. Finally, it is assumed that tunnelling of gravity sewers across major creek valleys and stream corridors is feasible and should not result in major environmental impacts.

3.0 SCORING AND EVALUATION OF IMPACTS

In terms of impacts, scoring of anticipated environmental impacts has been developed to assist in the evaluation of WWTP pumping stations options developed by the project team. These options consist of the following:

- ***Option 1- Maintain all existing pumping stations***

  This option assumes that all aging pumping stations will be maintained and will be repaired or upgraded as they age or in the event of breakdown. Each pumping station will be left in their current capacity and independently assessed. If necessary, each pumping station will be upgraded.

- ***Option 2- Install local and trunk sewers to replace certain existing pumping stations***

  This option assumes the installation of a partial deep sewer by means of a tunnel. Under this option, certain groups of pumping stations within a drainage area will be eliminated and replaced with deep gravity sewers. The remaining pumping stations that are not ideal candidates for replacement will be maintained depending on a number of decision making criteria; and

- ***Option 3- Install gravity trunk sewers to replace existing pumping station***

  This option proposes elimination of all existing pumping stations and replacement with deep sewer, using tunneling methods. In this option, all local flows served by a pumping station will be connected to deep sewers and tunnels through a new local sewer and new maintenance holes.

The determination of impacts was provided a scoring, based on locations of pumping stations forcemains, local sewers, and tunnel shafts to in relation to known natural heritage GIS Layers. The GIS layers analyzed include ANSIs, ESAs, Greenlands, regulated SAR habitat areas, areas regulated by the Conservation Authority, woodlands, and wetlands.

The sample output of the GIS layers includes the following attributes:

- MNR Species
- BioD EO Species
- CH Regulation Limit
- OP ESA
- OP ESA 120m Buffer
- MNR ANSI
- MNR ANSI 120m Buffer

- MNR ANSI Candidate
- MNR ANSI Candidate 120m Buffer
- MNR PSW
- MNR PSW 120m Buffer
- MNR Locally Significant Wetlands
- MNR Locally Significant Wetlands 120m Buffer
- MNR Other Identified Wetlands
- MNR Other Identified Wetlands 120m Buffer
- MNR Wooded Area
- MNR Wooded Area 120m Buffer
- OP Woodlands
- OP Woodlands 120m Buffer
- OP Greenlands System
- OP Greenlands System 120m Buffer
- MNR Water 100m Buffer

In determining the sensitivity or nature of impacts, it was important to differentiate whether the proposed undertaking would have an impact on the natural feature itself, or within the "buffer" areas in close proximity to the feature. Although the buffer to natural heritage features is considered an impact (as it could potentially affect the integrity of the feature itself), the nature of impact is generally less severe in a buffer zone, than if any of the locations or structures were located within the physical limits of the natural heritage feature. For other information, site sensitive locations also exist, such as locations of species-at-risk, details of which are typically not disclosed to the general public. In these instances, the location data is provided as a 1 X 1 km square to provide a measure of protection to the species, and is given consideration in the scoring process.

During the GIS mapping of natural features, a 120 m buffer is provided within the search data to determine the location of infrastructure relative to the sensitive features such as PSWs, ESAs and ANSIs, and other natural areas. For shorelines and water features, a 100m buffer was used to determine the proximity of infrastructure relative to the shoreline of a waterbody. The search parameters also noted the number of intersections or potential crossings are found, relative to the location of sewer routes. The results of the GIS search, in relation to the locations of Options 1, 2, and 3 are provided in Appendix A.

During the preliminary scoring of GIS related criteria, an arbitrary score was assigned to both terrestrial and aquatic impacts. The score was used to primarily sort out which alternatives pose the highest relative risk to the natural environment, sites which pose a lower risk. Consideration was made to ensure that the impacts are reflected in the scoring to ensure consistency between all alternative options. The arbitrary scoring was based on the following criteria:

3.1 CRITERIA USED TO ASSESS RISK OF NATURAL HERITAGE IMPACTS

Locations of individual components (pumping stations, sewer connections) were assessed based on the following location criteria:

3.1.1 High Risk Locations

- Mouth of larger creeks and wetlands has a greater potential for impact as these are seasonal migratory corridors for fish. These include areas near Bronte Creek, Sixteen Mile Creek and Fourteen Mile Creek;
- Wetlands in embayment areas are considered to be nursery areas for fish and waterfowl;
- Heavily treed neighbourhoods may experience some loss of tree limbs or one row of trees on one side of the road. Pumping Stations and forcemain routes in heavily treed areas would have a high impact;
- Significant Woodlands;
- Vegetated sites will result in loss of impact to shoreline habitat and adjacent terrestrial habitat which can vary with location;
- Pumping Stations located within 100m of the shoreline and in the mouth of creek systems;
- Pumping Stations and forcemains within Greenlands, and or Niagara Escarpment;
- Pumping Stations, Forcemains, or Shaft locations within ESAs, ANSIs or PSWs;
- Pumping Stations, Forcemains, or Shaft locations with more than 1 creek crossing;
- Forcemains or sewers that involve crossing major valley and creek systems;
- Pumping Stations and forcemains located within buffers of “high risk” locations as described above.

3.1.2 Medium Risk Locations

- Pumping Stations associated with a creek;
- Pumping Stations or forcemain routes in areas with moderate tree cover; and
- Pumping Stations or forcemain routes in urban manicured parklands

3.1.3 Low Risk Locations

- Pumping Stations not associated with a creek or woodland or lake shorelines;
- Pumping Stations or forcemains not associated with designated habitat; and
- Pumping Stations or forcemain routes in open space, away from natural areas or aquatic features

4.0 RESULTS AND FINAL SCORING

Results from preliminary scoring were adjusted by assigning a relative weight to ensure that minor differences among options are reflected in the final score. To accomplish this, the highest relative overall rating of 10 is assigned to the environmental impact with the least amount of risk to the natural environment. In contrast, those options with there is a greatest risk to the environment is provided a low score, which also includes a 0 score. Other scores were derived by adjusting scores between these two extremes to provide a subjective estimate of risk to the natural environment. Every effort was made to ensure that scoring was fair and consistent between individual infrastructure locations and among the various Options under consideration. Discussions of final scores are provided in the following subsections.

4.1 BURLINGTON WEST

The Burlington West drainage area contains many pumping stations within the perimeter of Hamilton Harbour. Of these, 11 pumping stations are considered high risk based on their proximity to waterbodies and ESAs/ANSIs.

Based on further evaluation, scoring indicated that Option 3 had the highest environmental score and Option 1 was the lowest score, as indicated in Table 1. The long term benefit of the decommissioning of aging pumping stations provides the greatest overall benefit primarily from reducing the risk of overflows and spills to the Hamilton Harbour, considered to be an Area of Concern in Lake Ontario.

The partial solution provided by Option 2 did not score as high, in relation to Option 3. This was largely because of this option does not address the potential risk of other pumping station locations (PS 57, 37, 70, 68) at the east end of this drainage area. These locations are close to the shoreline of Hamilton Harbour and continue to pose a risk to the sheltered harbour aquatic environment.

Table 1 Final Adjusted Score for the Burlington West Drainage Area

Sub-Criteria		Score		
Description	Sub-Weighting	Option 1	Option 2	Option 3
Terrestrial environment impact during construction	5%	10	8	6
Terrestrial environment long term impact	20%	5	8	10
Aquatic environment impact during construction	15%	4	6	4
Aquatic environment long term impact	40%	3	6	10
Ability to meet regulatory constraints	20%	3	8	10
TOTAL	**100%**	**3.90**	**6.90**	**8.90**

4.2 BURLINGTON EAST

The Burlington East drainage area contains relatively fewer pumping stations, of which many are located in close proximity to the Lake Ontario shoreline and near the mouth of smaller creeks. As in Burlington West, the most beneficial long term solution is Option 3, which aims to reduce the risk of accidental spills or malfunction to the nearshore lake environment and creek systems through elimination of all pumping stations and replacement with a new gravity sewer. The partial solution provided in Option 2 scores relatively high but does not address all the risks associated with other pumping stations in terms of potential failure within the nearshore aquatic environment. Pumping stations 33, 34, and 35 remain under this scenario. The long term benefit of the decommission of aging pumping stations provides the greatest overall benefit primarily from reducing the risk of overflows and spills to the nearshore Lake Ontario and tributary creek systems within this dominantly urbanized drainage area.

Table 2 Final Adjusted Score for the Burlington East Drainage Area

Sub-Criteria		Score		
Description	Sub-Weighting	Option 1	Option 2	Option 3
Terrestrial environment impact during construction	5%	10	9	8
Terrestrial environment long term impact	20%	5	8	10
Aquatic environment impact during construction	15%	6	7	10
Aquatic environment long term impact	40%	3	6	10
Ability to meet regulatory constraints	20%	7	8	10
TOTAL	**100%**	**5.00**	**7.10**	**9.90**

4.3 OAKVILLE SOUTHWEST WEST

The Oakville Southwest drainage area contains the mouth of Bronte Creek system, as well as the marina and associated wetlands. The pumping stations and sewers situated at this location are considered high risk sites. In contrast, the remaining pumping stations are situated some distance away from the Lake Ontario shoreline, and (with one exception) nearly all are directly connected to the existing gravity trunk sewer.

A partial solution, provided in Option 2 provides a marginal improvement compared to the existing Option 1. In both Option 1 and Option 2, the risk to the Bronte Harbour from pumping stations 28 and 29 remain. Option 3 scores the highest as it eliminates the long and short term risk to Bronte Harbour by conveying all sewage flows beneath the harbour environment.

Table 3 Final Adjusted Score for the Oakville Southwest West Drainage Area

		Score		
Sub-Criteria		**Option 1**	**Option 2**	**Option 3**
Description	**Sub-Weighting**			
Terrestrial environment impact during construction	5%	10	8	8
Terrestrial environment long term impact	20%	7	7	10
Aquatic environment impact during construction	15%	7	8	10
Aquatic environment long term impact	40%	7	8	10
Ability to meet regulatory constraints	20%	7	8	10
TOTAL	**100%**	**7.15**	**7.80**	**9.90**

4.4 OAKVILLE SOUTHWEST EAST

The Oakville Southwest East drainage area contains a number of pumping stations in close proximity to the Lake Ontario shoreline and along creek systems, which are designated as Greenlands. The major creeks within this drainage area include the Fourteen and Sixteen Mile Creek systems. Wooded areas also occur in close proximity to the pumping stations. The pumping stations and sewer mains situated at these locations are considered high risk sites.

Option 3 appears to be the most favourable environmental option as it involved elimination of all pumping stations near the lakefront and creek valleys. Some impact will occur during construction, as there will be a need to cross these major creek valleys. In contrast Option 2 is not expected to incur a greater impact during construction, but some existing pumping stations such as PS 7, 25, and 23 will remain, which could potentially increase the risk of future long term impacts as these pumping stations age.

Table 4 Final Adjusted Score for the Oakville Southwest East Drainage Area

Sub-Criteria		Score		
Description	Sub-Weighting	Option 1	Option 2	Option 3
Terrestrial environment impact during construction	5%	10	7	5
Terrestrial environment long term impact	20%	5	8	10
Aquatic environment impact during construction	15%	10	5	5
Aquatic environment long term impact	40%	3	8	10
Ability to meet regulatory constraints	20%	7	7	8
TOTAL	**100%**	**5.60**	**7.30**	**8.60**

4.5 OAKVILLE SOUTHEAST

The Oakville Southeast Drainage Area contains a number of pumping stations in close proximity to the Lake Ontario shoreline and along creek systems, which are designated as Greenlands. These creeks include Morrison, Wedgewood, and Joshua's Creek, the latter containing ESA 15. The pumping stations and sewer mains situated at these locations are considered high risk sites. In terms of scoring, both Options 2 and 3 ranks favourably in terms of overall benefit. The difference in scoring between Options 2 and Option 3 is slight, as both options are similar. In terms of Option 2, the remaining risk is associated with Pumping Station 12 and 9.

Table 5 Final Adjusted Score for the Oakville Southeast Drainage Area

Sub-Criteria		Score		
Description	Sub-Weighting	Option 1	Option 2	Option 3
Terrestrial environment impact during construction	5%	10	7	6
Terrestrial environment long term impact	20%	6	9	10
Aquatic environment impact during construction	15%	10	8	8
Aquatic environment long term impact	40%	5	9	10
Ability to meet regulatory constraints	20%	6	8	10
TOTAL	**100%**	**6.40**	**8.55**	**9.50**

5.0 CONCLUSIONS

The scoring provided above provides a summary of scores based on foreseen risks to the environment. The scores are based primarily on proximity of pumping stations and sewer forcemains with respect natural heritage features. The scoring is intended to be at a very broad or high level. There are a number of assumptions which are made in terms of determination of potential impacts that are used to derive the scores. The intent of the scoring is to provide a means of reducing the potential risks to the environment wherever possible during the long term. Costs and engineering feasibility are not factored into this scoring.

APPENDIX A
GIS ANALYSIS SUMMARY OUTPUT

LEGEND

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Species *(Biodiversity Explorer, April 16, 2010)*

COSEWIC Status

- Endangered
- Threatened
- Special Concern
- Not at Risk
- Not Ranked

- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*

Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions
(Burlington West)

LGL LIMITED
environmental research associates

Project	TA4834	Figure	1
Date	April, 2011	Prepared By	KC
Scale	1:10,000	Verified By	JAF

LEGEND

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Species *(Biodiversity Explorer, April 16, 2010)*

COSEWIC Status

- Endangered
- Threatened
- Special Concern
- Not at Risk
- Not Ranked

- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*

Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions
(Burlington East)

LGL LIMITED
environmental research associates

Project	TA4834	Figure	2
Date	April, 2011	Prepared By	KC
Scale	1:13,000	Verified By	JAF

LEGEND

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Species *(Biodiversity Explorer, April 16, 2010)*

COSEWIC Status

- Endangered
- Threatened
- Special Concern
- Not at Risk
- Not Ranked

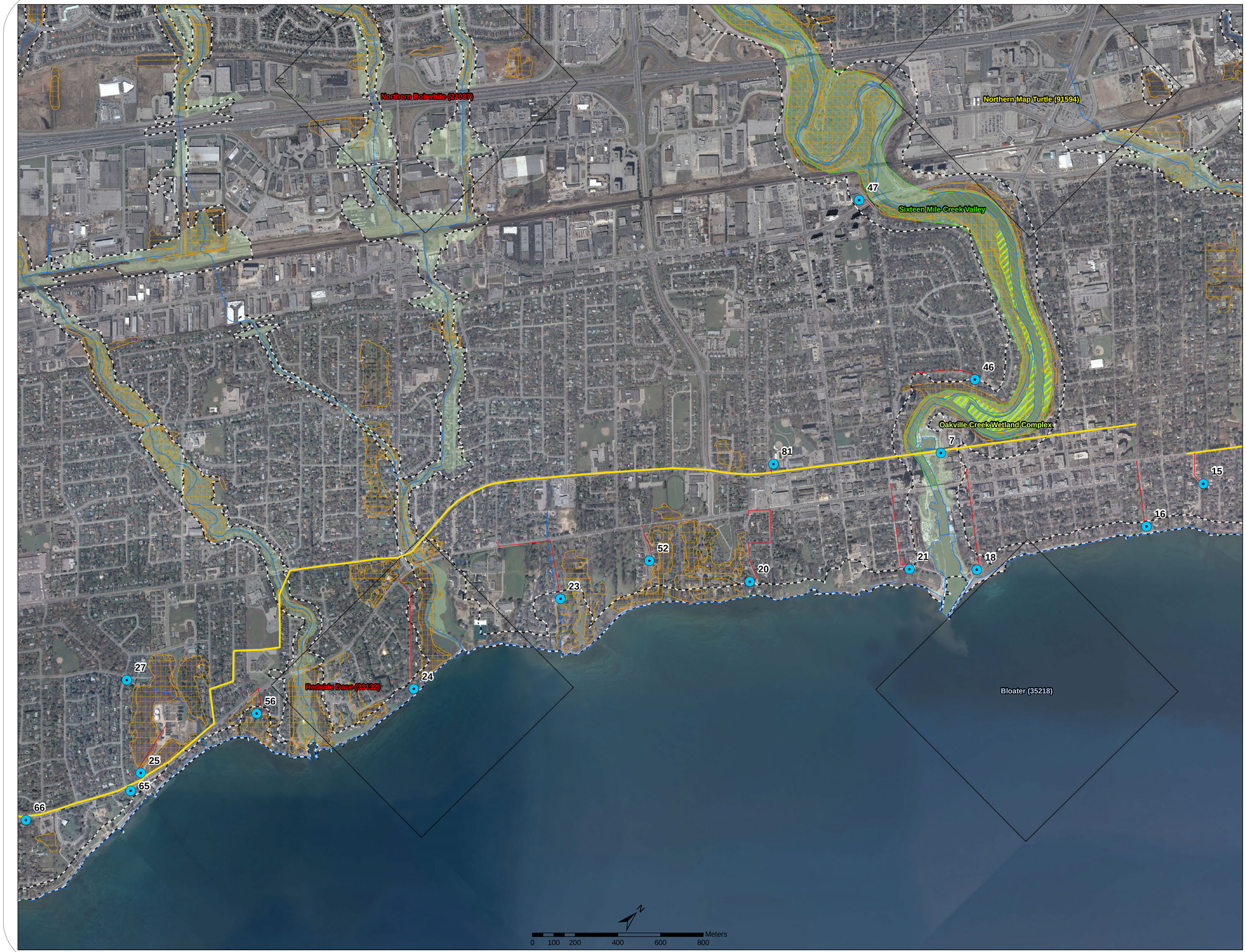
- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*

Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions
(Oakville Southwest West)

LGL LIMITED
environmental research associates

Project	TA4834	Figure	3
Date	April, 2011	Prepared By	KC
Scale	1:6,000	Verified By	JAF



LEGEND

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Species *(Biodiversity Explorer, April 16, 2010)*

COSEWIC Status

- Endangered
- Threatened
- Special Concern
- Not at Risk
- Not Ranked

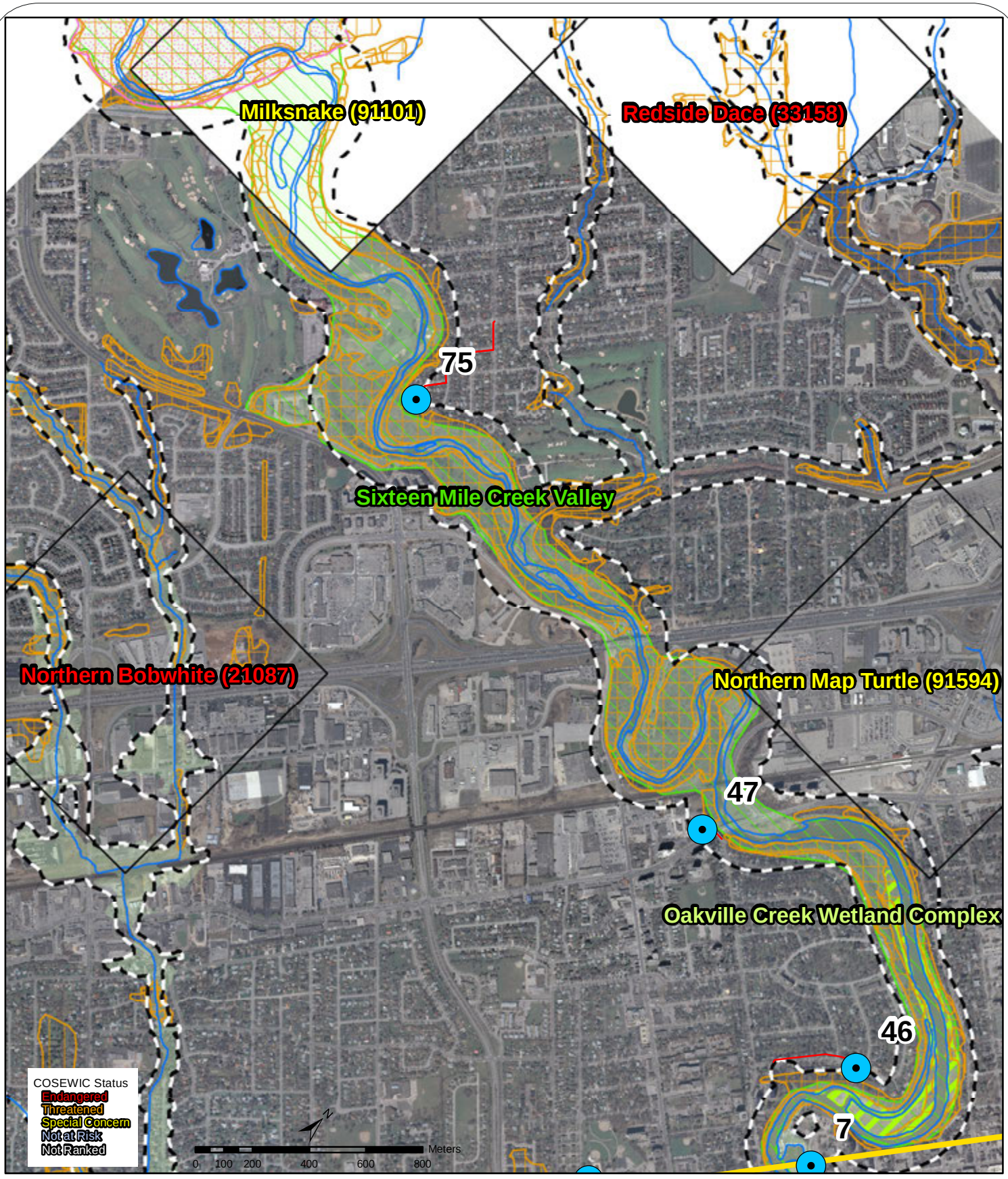
- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*

Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions
(Oakville Southwest East)

LGL LIMITED
environmental research associates

Project	TA4834	Figure	4
Date	April, 2011	Prepared By	KC
Scale	1:8,000	Verified By	JAF



Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions ***(Oakville Southwest East - PS75)***

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*
- Species *(Biodiversity Explorer, April 16, 2010)*
- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*

LGL LIMITED
environmental research associates

Project	TA4834	Figure	4a
Date	April, 2011	Prepared By	KC
Scale	1:18,000	Verified By	JAF

LEGEND

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Species *(Biodiversity Explorer, April 16, 2010)*

COSEWIC Status

- Endangered
- Threatened
- Special Concern
- Not at Risk
- Not Ranked

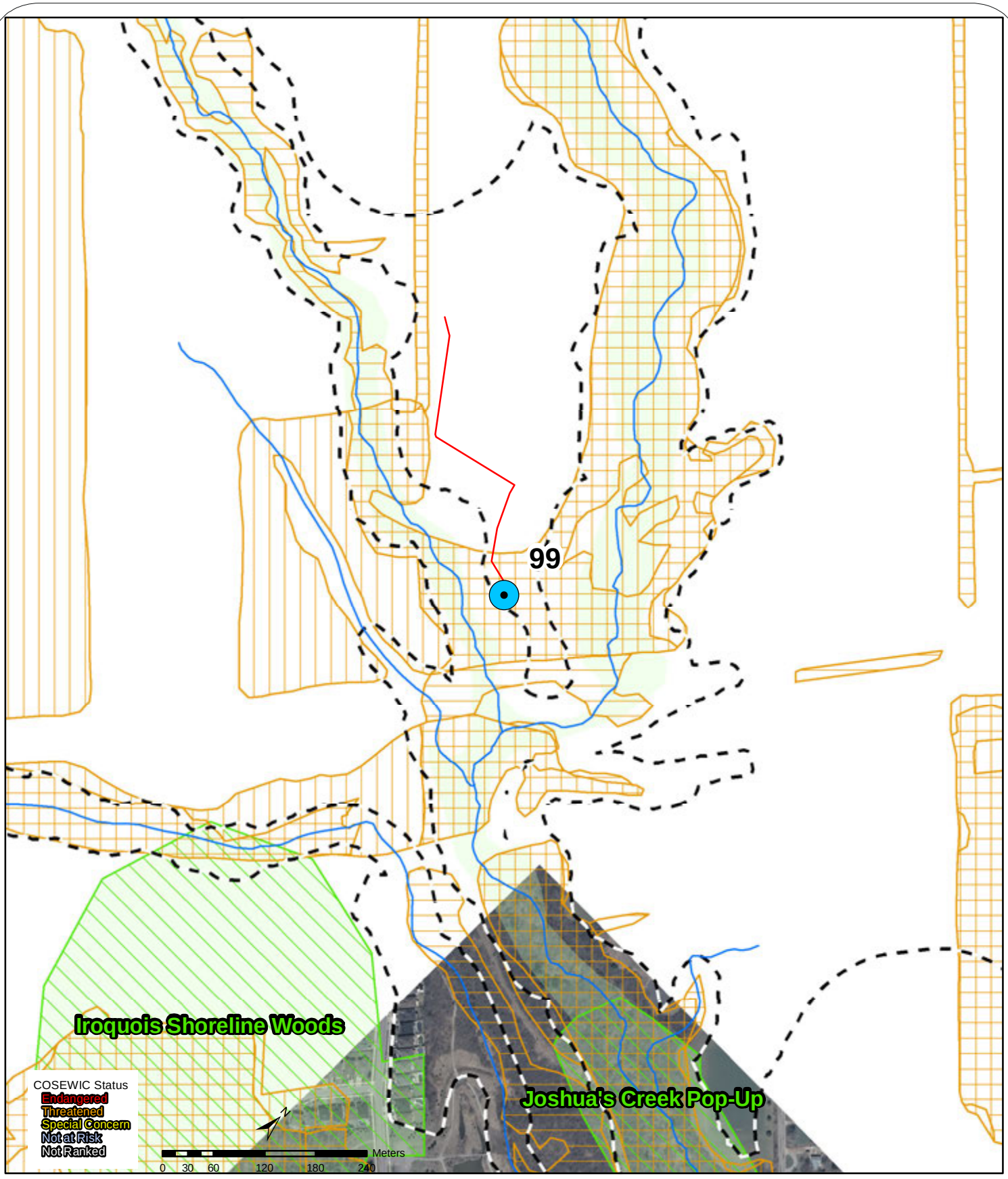
- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*

Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions
(Oakville Southeast)

LGL LIMITED
environmental research associates

Project	TA4834	Figure	5
Date	April, 2011	Prepared By	KC
Scale	1:7,000	Verified By	JAF



Halton Wastewater Pumping Station Capital Needs and Master Plan

Existing Conditions ***(Oakville Southeast - PS99)***

- Existing Pumping Stations *(as of April 20, 2011)*
- Existing Gravity Trunk Sewer *(as of April 20, 2011)*
- Existing Forcemains *(as of April 20, 2011)*
- Watercourses *(MNR, April 16, 2010)*
- Threatened, Endangered Species *(MNR)*
- Other Wetlands *(MNR, April 16, 2010)*
- ESA *(OP, April 16, 2010)*
- Wooded Area *(MNR, April 16, 2010)*
- Woodlands *(OP, April 16, 2010)*
- Greenlands System *(OP, April 16, 2010)*
- Species *(Biodiversity Explorer, April 16, 2010)*
- Regulation Limit *(Conservation Halton, April 16, 2010)*
- ANSI *(MNR, April 16, 2010)*
- ANSI Candidates *(MNR, April 16, 2010)*
- Provincially Significant Wetlands *(MNR, April 16, 2010)*
- Locally Significant Wetlands *(MNR, April 16, 2010)*

LGL LIMITED environmental research associates

Project	TA4834	Figure	5a
Date	April, 2011	Prepared By	KC
Scale	1:6,000	Verified By	JAF